Real Participation in Virtual Environments: Navigating Public Participation in the Metaverse

Jonas Fegert

The Evolution of the Metaverse: Opportunities Beyond the Hype?

In 2021, Meta Platforms unveiled its ambitious vision for the metaverse, sparking a polarized debate about the future of digital environments (Dolata & Schwabe, 2023). Alongside this vision, the company announced its rebranding from Facebook to Meta, a move that underscored its commitment to virtual environments. This rebranding signaled to stakeholders that Meta's founder was serious about reshaping the digital landscape.

The timing of this shift was notable. At the time, Facebook was grappling with criticism surrounding its platforms, particularly Instagram, impact on mental health and societal polarization. During these challenges, Meta's rebranding seemed to serve as a strategic move to redirect public and industry attention. The announcement ignited a wave of excitement, with journalists and technology enthusiasts engaging in extensive debates about the potential of immersive systems.

Four years later, the reality appears more complex. Meta has already let go of some of the developers originally hired to bring this vision of the metaverse to life (Heath, 2024). While this might cast some doubt on the company's long-term commitment, it's undeniable that immersive environments are here to stay. In particular, the commercial sector has embraced the metaverse as a new frontier for advertising and selling products.

Yet, beyond its commercial potential, the metaverse offers intriguing possibilities for non-commercial applications. How might this digital sphere be harnessed for societal benefit? Could virtual environments facilitate meaningful public participation, allowing users to contribute as citizens and shape their physical surroundings through virtual engagement?

This article explores the current state of public participation in the metaverse and envisions how these virtual spaces could serve as platforms for civic engagement and societal contributions.

Meta did not coin the term "metaverse," nor did it invent immersive environments. The term was first introduced by author Neal Stephenson

in his 1992 science fiction novel *Snow Crash* (Stephenson, 1992), where the vision of an enhanced virtual world gradually becomes reality. The metaverse, as conceived today, represents a hypothetical, immersive, and interactive virtual space, envisioned as the next generation of the Internet (Dwivedi et al., 2022; Xi et al., 2023). Multiple virtual worlds exist today, operated by various platforms under the collective label of the metaverse. These environments consist of virtual spaces, objects, and entities, accessible through a wide range of devices. Thereby, the metaverse is more than a single technology; it represents a vision of a seamless, interconnected digital world where the boundaries between reality and virtuality blur, enabling new forms of social interaction, commerce, and entertainment (Dwivedi et al., 2022). The term "XR" (extended reality) encompasses all immersive technologies that aim to expand human perception of reality, including augmented reality (AR) and virtual reality (VR), and everything in between (Xi et al., 2023). As Dwivedi et al. (2022) note, immersion in the metaverse can be achieved through either AR or VR, though simultaneous use of both remains a challenge. However, rapid advancements in AR and VR hardware suggest that mixed-reality formats may become more prevalent.

Innovations like Apple's Vision Pro, which seamlessly blends the physical and digital worlds, exemplify how hardware is advancing. Although Meta succeeded in bringing the term "metaverse" into mainstream discourse, the development of XR technologies and platform infrastructure has been more challenging than anticipated. The initial wave of hype has diminished (Robinson, 2023), but the long-term potential of the metaverse remains. Nevertheless, the road to widespread adoption will be more complex than many expected.

This period of hardware and software development presents an opportunity to rethink how the metaverse can and should be used. The debates surrounding the metaverse today are reminiscent of discussions about early online social networks like Facebook and Twitter, now X, in the 2010s. Social media initially sparked great expectations, particularly regarding its potential for deliberative discourse, as seen during the Arab Spring (Wolfsfeld et al., 2013). Over time, however, online social networks have also revealed significant challenges, including the spread of hate speech, misinformation and disinformation. In the platform economy, mechanisms like network effects and microtargeting put advertisers – not users – as the primary customers at the center (Weinhardt et al., 2024). Data-driven

platforms offer advertisers new opportunities for personalized sales, and this has, to a large extent, also driven expectations around the metaverse.

Much of the research into immersive systems has focused on commercial applications. However, to avoid repeating the mistakes made with online social networks, it is essential to consider how the metaverse could be designed for civil society and political use. Early discussions should explore how democratic entities – governments, cities, and local communities – might engage in these new virtual spaces. One promising application is the use of immersive systems for public participation, such as urban planning. The demand for digital participation has grown in recent years, partly due to the COVID-19 pandemic (United Nations, 2020). Therefore, the potential for combining these participation tools with immersive systems in a metaverse context will be explored in the following discussion.

The Current State of Immersive Participation

Back in the 1990s, Lombard and Ditton (1997) found that telepresence and immersion could significantly enhance users' engagement and sense of involvement. This finding has profound implications for using XR technologies in public participation. A technology capable of generating excitement and captivating users in video game contexts seems highly relevant to public participation.

(Digital) Participation

In *Reconstructing Democracy* (2020), Taylor, Nanz, and Taylor emphasize the importance of local participation, giving citizens the opportunity to voice their concerns, even in representative democracies. Particularly in times of major transformation, such as in the energy or mobility sectors, the authors underscore the necessity of including citizens in decision-making processes. The village of Langenegg in Austria provides a positive example of this. Faced with population decline, the local authority engaged citizens in envisioning the region's future. This long-term consultation process not only made the village more attractive to residents but also had a positive impact on population growth, contrary to initial forecasts (Statistik Austria, 2021; Taylor et al., 2020).

In contrast, public participation is often discussed in the context of problematic cases, where participation is initiated to resolve conflicts stemming

from democratic deficits. A prime example is the controversy surrounding the Stuttgart 21 infrastructure project, which involved rebuilding Stuttgart's main railway station. After the partial demolition of the station began in 2010, protests emerged, and the conflict was only resolved through a public participation process and referendum. This case highlights the importance of early public involvement in construction planning, as the lack of transparency had led to widespread confusion and frustration (Brettschneider, 2013), failure to communicate the project's details, such as construction plans, to local citizens damaged trust in politicians and local authorities (Thaa, 2013).

Despite the lessons learned from Stuttgart 21, public participation processes are still frequently criticized for being costly, time-consuming, and complex. However, the knowledge gap between project initiators and affected citizens necessitates more accessible approaches. Since the 2010s, platforms like Consul, Liquid Democracy, LiquidFeedback, CitizenLab (Go Vocal), and Zebralog have emerged to facilitate digital citizen participation (Fegert, 2022), also known as e-participation (Macintosh, 2004). These platforms offer modular systems – some open-source – to streamline participation and voting procedures through digital platforms. Their relatively low cost and simplicity in implementation make them attractive compared to traditional outreach methods (Spirakis et al., 2010).

These digital tools remain niche, but the Pirate Party's use of LiquidFeedback for internal organization and the COVID-19 pandemic, which forced political parties in Germany and other countries to adopt digital platforms for party member participation, helped bring e-participation into the mainstream. However, studies by Rottinghaus and Escher (2020) and Novo Vázquez and Vicente (2019) show that prior political interest and personal relevance remain the key motivators for digital public participation. Additionally, gender-specific differences in e-participation have been observed, with male citizens being more likely to engage (Kim & Lee, 2019). Usability issues are cited as barriers to broader adoption, with e-participation platforms lacking user-friendliness (Fegert et al., 2021).

Given these challenges, there is a need to explore new approaches to digital participation that motivate users and make participation more accessible. The think tank Democracy Technologies predicts that the digital public participation market will grow from €100 million in 2022 to €300 million by 2027 (Democracy Technologies, 2023). As cities and local authorities begin to embrace online participation processes, the challenge lies in designing technologies that align with user preferences.

Digital Participation with Immersive Systems

To effectively enable public participation in local decision-making, it is essential to create intuitive visualizations and user-friendly feedback mechanisms. Immersive systems have the potential to greatly enhance participation platforms. Although no current e-participation platforms fully integrate immersive systems, their potential has been explored extensively, especially in industrial and commercial contexts. Research from these fields offers valuable insights that can be applied to public participation. For instance, Suh and Lee (2005) demonstrated that VR enhances users' knowledge about products, a finding that can be adapted to public participation contexts.

Funded by the Federal Ministry of Research, Technology and Space (BMFTR), the FZI Research Center for Information Technology has been developing and testing immersive participation applications through two projects: *Take Part* (2018–2021) and *VIRTUS* (2021–2024). These projects aim to design and evaluate the potential of immersive systems in public participation while engaging citizens and urban planners in the development process. Early prototypes were refined through various studies, with the goal of providing e-participation platform operators, cities, and local authorities with insights into immersive participation's potential.

In a qualitative interview study conducted in 2018 (n=27), we found significant interest among stakeholders in using immersive systems for public participation (Fegert et al., 2020). The majority of participants saw digital technologies as a valuable complement to traditional public participation, with two-thirds expressing a preference for 3D visualizations over traditional architectural plans. Our research demonstrated that immersive technologies, such as VR and AR, could help reduce the knowledge gap between citizens and experts in public construction projects.

A field study (n=339) from 2019 further supported these findings, showing that immersive systems, particularly VR, significantly enhanced participants' spatial understanding of building sites and urban planning. While both AR and VR improved engagement, VR outperformed AR in helping users visualize and comprehend spatial relationships (Fegert, 2022).

The studies also identified design principles for immersive participation platforms, which include: (1) **Accessibility**: ensuring the platform is easy to navigate and compatible with various devices; (2) **Information Quality**: leveraging appropriate visualization formats tailored to the strengths of different technologies; (3) **Motivation**: engaging users through incentives like badges or gameful design elements; (4) **Transparency**: communicating the

participation process clearly, also in immersive environments; and (5) **Data Protection and Sovereignty**: ensuring user anonymity and safeguarding sensitive data, such as eye-tracking data.

Figure 1: *Public participation with immersive systems at an urban planning project in the city of Karlsruhe; 2021 within the research project Take Part*

Following Meta Platforms' 2021 announcement, public interest in immersive systems surged, prompting a reassessment of their relevance to public participation within the VIRTUS research project. In early 2022, a qualitative interview study (n=14) explored stakeholders' knowledge and concerns regarding the metaverse. The study revealed that most participants had limited awareness of the metaverse, with those familiar mostly learning about it through media reports on Facebook's rebranding. While respondents saw potential in its use for e-commerce and gaming, they were skeptical about its application for civic participation, expressing concerns about alienation from reality and trust in platform operators. There were also fears of manipulation, a digital divide, and exclusion of individuals with visual impairments. However, some saw opportunities for engaging younger generations and modeling cities through digital twins. Overall, respondents reacted cautiously to the idea of the metaverse as a participation platform, with concerns primarily focused on the trustworthiness of the platform operator.

In contrast to these positive findings, a 2023 study found that the design elements of virtual participation platforms significantly influence the literacies users acquire during their engagement. The study argues that a

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more nuanced evaluation of XR tools is necessary to ensure meaningful participation in urban planning processes (Stein, 2024).

In addition to government-funded research projects, student initiatives have creatively explored simpler implementations of immersive participation tools. For example, in 2020, Paulina Porten developed *Augmented Participation*, a tool that combines voice messages with immersive presentations, demonstrating innovative possibilities for enhancing citizen engagement.

Figure 2: Augmented Participation application (Paulina Porten, 2020)

Looking ahead, research on the use of immersive systems in the metaverse for public participation offers exciting possibilities for the future of digital engagement, particularly in urban planning. However, the current state seems far from being market-ready and thus not easily integrable into metaverse environments. As a result, the implementation of immersive participation in the metaverse remains a concept that is still far from widespread realization – lagging even further behind the mainstream adoption of the metaverse itself.

Conclusion: Opportunities and Challenges of Public Participation in the Metaverse

The current state of research indicates that while immersive technologies hold promise for digital public participation, they have yet to be integrated into existing software systems. Their use can greatly motivate public en-

gagement and enhance spatial visualization during participation processes. However, since such processes are typically initiated at the municipal or city level – where the digitization of administrative units, particularly in Germany, is lagging – it is unlikely that the metaverse will play a significant role in public participation within the next five years. While immersive technologies may be utilized in certain areas, e-participation platforms are unlikely to be early immersive systems due to their limited financial and staffing resources, particularly in development.

In contrast, small yet wealthy countries like Saudi Arabia are already focusing on digital twins, and it is more likely that these nations will explore digital twins in the metaverse as prestige projects, experimenting with participation initiatives. However, local contexts suggest that these participation efforts would not occur in democratic environments. It remains to be seen whether real citizen participation will be desired in such projects, or if simulated behavior, powered by generative AI – such as generative agents and memory streams (Park et al., 2023) – will increasingly be used as a substitute. This possibility should be closely monitored to ensure that democratic participation remains a priority if these generative agents become integrated into digital twins or the metaverse.

A more pertinent question is: What are the actual valuable applications for citizen participation in the metaverse? The most feasible applications may be for smaller, non-representative processes. For example, involving diaspora communities in the planning of memorial sites, regardless of their current location, could be a meaningful use case. Another promising scenario is participative meetings within citizens' councils, which have grown in importance in recent years, including at the federal level. The personal interactions central to these councils could translate well to the metaverse, where real-time interactions occur through avatars.

Despite this potential, several challenges remain in enabling citizen participation in the metaverse. These include high hardware costs, hardware performance limitations (such as short battery life and sensitivity to light), and the need for interconnectivity and interoperability of platforms and hardware standards. These practical issues present obstacles to designing inclusive participation processes in the metaverse. As noted earlier, skepticism toward platform operators also hinders adoption. Furthermore, the tension between the desire for personal interaction through avatars and the need for anonymity in participation processes remains unresolved.

Nonetheless, it is crucial to explore how the metaverse could complement existing democratic procedures and analogue participation formats.

The potential to clearly visualize complex subjects and facilitate gatherings across various locations offers a unique opportunity. This presents a challenge for e-participation platform operators, metaverse developers, and researchers: they must consider how to design metaverse spaces that enable democratic participation. The mistakes made with online social networks – where content moderation and the prevalence of hate speech depend largely on the platforms' willingness to act – could be reimagined for the metaverse, provided there is sufficient interest from public entities in creating alternative participatory virtual environments. Ideally, the metaverse will become a space for democratic experimentation and inclusion, rather than a fertile ground for exclusion and hate.

References

Brettschneider, F. (2013). Großprojekte zwischen Protest und Akzeptanz: Legitimation durch Kommunikation. In F. Brettschneider & W. Schuster (Eds.), *Stuttgart 21: Ein Großprojekt zwischen Protest und Akzeptanz* (pp. 319–328). Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978 -3–658–01380–6_12

Democracy Technologies. (2023). *Report on democracy technologies in Europe.* https://democracy-technologies.org/report-2023/

Dolata, M., & Schwabe, G. (2023). What is the metaverse and who seeks to define it? Mapping the site of social construction. *Journal of Information Technology*, 38(5), 978–996. https://doi.org/10.1177/02683962231159927

Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C. M. K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D. P., Gustafsson, A., Hinsch, C., Jebabli, I., ... Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management,* 66, 102542. https://doi .org/10.1016/j.ijinfomgt.2022.102542

Fegert, J. (2022). *Digital Citizen Participation: Involving Citizens Through Immersive Systems in Urban Planning.* https://doi.org/10.5445/IR/1000147640

Fegert, J., Pfeiffer, J., Peukert, C., Golubyeva, A., & Weinhardt, C. (2020, December 14). *Combining e-participation with augmented and virtual reality: Insights from a design science research project.* Proceedings of the International Conference on Information Systems (ICIS). https://aisel.aisnet.org/icis2020/digitization_in_cities/digitization_i n_cities/4

Fegert, J., Stein, C., Peukert, C., & Weinhardt, C. (2021). Using e-participation for mission statement development: Promises and challenges. In P. Kommers (Ed.), *Proceedings of the 19th International Conference "e-Society"* (p. 233). https://publikati onen.bibliothek.kit.edu/1000130538

Heath, A. (2024, June 18). *Meta forms new wearables group and lays off some employees.* The Verge. https://www.theverge.com/2024/6/18/24181420/meta-wearables-reality-labs-layoffs

Kim, S., & Lee, J. (2019). Gender and e-participation in local governance: Citizen e-participation values and social ties. *International Journal of Public Administration,* 42(13), 1073–1083. https://doi.org/10.1080/01900692.2019.1575669

Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication,* 3(JCMC321). https://doi.org/10.1111/j.1083-6101.1997.tb00072.x

Macintosh, A. (2004). *Characterizing E-Participation in Policy-Making.* Proceedings of the Proceedings of the 37th Annual Hawaii International Conference on System Sciences (HICSS'04) – Track 5 – Volume 5, 50117.1-. http://dl.acm.org/citation.cfm?id=962753.962993

Novo Vázquez, A., & Vicente, M. R. (2019). Exploring the determinants of e-participation in smart cities. In M. P. Rodríguez Bolívar & L. Alcaide Muñoz (Eds.), *E-participation in smart cities: Technologies and models of governance for citizen engagement* (pp. 157–178). Springer International Publishing. https://doi.org/10.1007/978-3-319-89474-4_8

Park, J. S., O'Brien, J. C., Cai, C. J., Morris, M. R., Liang, P., & Bernstein, M. S. (2023). *Generative agents: Interactive simulacra of human behavior.* arXiv Preprint. https://arxiv.org/abs/2304.03442

Porten, P. (2020, March). *Paulina Porten—Augmented participation.* https://paulinaporten.com/augmented-participation-1

Rauschnabel, P. A., Felix, R., Hinsch, C., Shahab, H., & Alt, F. (2022). What is XR? Towards a framework for augmented and virtual reality. *Computers in Human Behavior,* 133, 107289. https://doi.org/10.1016/j.chb.2022.107289

Robinson, K. (2023, November 7). *Meta exec: "Metaverse hype is dead."* Fortune. https://fortune.com/2023/07/11/meta-vp-vishal-shah-happy-metaverse-hype-is-dead/

Rottinghaus, B., & Escher, T. (2020). Mechanisms for inclusion and exclusion through digital political participation: Evidence from a comparative study of online consultations in three German cities. *Zeitschrift für Politikwissenschaft,* 30(2), 261–298. https://doi.org/10.1007/s41358-020-00222-7

Spirakis, G., Spiraki, C., & Nikolopoulos, K. (2010). The impact of electronic government on democracy: E-democracy through e-participation. *Electronic Government*, 7(1), 75–88. https://doi.org/10.1504/EG.2010.029892

Statistik Austria. (2021). *Ein Blick auf die Gemeinde Langenegg.* https://www.statistik.at/blickgem/G0201/g80223.pdf

Stephenson, N. (1992). *Snow crash.* Bantam Books.

Stein, C., & Fegert, J. (2024). *Bridging realities: Exploring enablement factors for XR participatory urban planning.* Proceedings of the European Conference on Information Systems (ECIS).

Suh, K.-S., & Lee, Y. E. (2005). The effects of virtual reality on consumer learning: An empirical investigation. *MIS Quarterly,* 29(4), 673–697. https://doi.org/10.2307/25148705

Taylor, C., Nanz, P., & Taylor, M. B. (2020). *Reconstructing democracy: How citizens are building from the ground up.* Harvard University Press.

Thaa, W. (2013). „Stuttgart 21" – Krise oder Repolitisierung der repräsentativen Demokratie? *Politische Vierteljahresschrift*, 54(1), 1–20. JSTOR.

United Nations. (2020, April 15). *Embracing digital government during the pandemic and beyond*. Economic Analysis & Policy Division. https://www.un.org/developmen t/desa/dpad/publication/un-desa-policy-brief-61-covid-19-embracing-digital-govern ment-during-the-pandemic-and-beyond/

Weinhardt, C., Fegert, J., Hinz, O., & van der Aalst, W. M. P. (2024). Digital democracy: A wake-up call. *Business & Information Systems Engineering*, 66(2), 127–134. https:// doi.org/10.1007/s12599-024-00862-x

Wolfsfeld, G., Segev, E., & Sheafer, T. (2013). Social media and the Arab Spring: Politics comes first. *The International Journal of Press/Politics,* 18(2), 115–137. https://doi.org/ 10.1177/1940161212471716

Xi, N., Chen, J., Gama, F., Riar, M., & Hamari, J. (2023). The challenges of entering the metaverse: An experiment on the effect of extended reality on workload. *Information Systems Frontiers*, 25(2), 659–680. https://doi.org/10.1007/s10796-022-10244-x