12-12-2022

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8th Annual Meeting of SIG BD,
International Research Workshop on Big Data for Business Ecosystems

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Abstract

The metaverse is envisioned as a virtual shared space facilitated by emerging technologies such as virtual reality (VR), augmented reality (AR), the Internet of Things (IoT), 5G, artificial intelligence (AI), big data, spatial computing, and digital twins (Allam et al., 2022; Dwivedi et al., 2022; Ravenscraft, 2022; Wiles, 2022). While still a nascent concept, the metaverse has the potential to "transform the physical world, as well as transport or extend physical activities to a virtual world" (Wiles, 2022). Big data technologies will also be essential in managing the enormous amounts of data created in the metaverse (Sun et al., 2022).

Metaverse technologies can offer the public sector a host of benefits, such as simplified information exchange, stronger communication with citizens, better access to public services, or benefiting from a new virtual economy. Implementations are underway in several cities around the world (Geraghty et al., 2022).

In this paper, we analyze metaverse opportunities for the public sector and explore their application in the context of Germany's Federal Employment Agency. Based on an analysis of academic literature and

practical examples, we create a capability map for potential metaverse business capabilities for different areas of the public sector (broadly defined). These include education (virtual training and simulation, digital campuses that offer not just online instruction but a holistic university campus experience, etc.), tourism (virtual travel to remote locations and museums, virtual festival participation, etc.), health (employee training – as for emergency situations, virtual simulations for patient treatment – for example, for depression or anxiety, etc.), military (virtual training to experience operational scenarios without being exposed to a real-world threats, practice strategic decision-making, or gain technical knowledge for operating and repairing equipment, etc.), administrative services (document processing, virtual consultations for citizens, etc.), judiciary (AI decision-making aids, virtual proceedings, etc.), public safety (virtual training for procedural issues, special operations, or unusual situations, etc.), emergency management (training for natural disasters, etc.), and city planning (visualization of future development projects and interactive feedback, traffic management, attraction gamification, etc.), among others. We further identify several metaverse application areas for Germany's Federal Employment Agency. These applications can help it realize the goals of the German government for digital transformation that enables faster, more effective, and innovative government services. They include training of employees, training of customers, and career coaching for customers. These applications can be implemented using interactive learning games with AI agents, virtual representations of the organizational spaces, and avatars interacting with each other in these spaces.

Metaverse applications will both use big data (to design the virtual environments) and generate big data (from virtual interactions). Issues related to data availability, quality, storage, processing (and related computing power requirements), interoperability, sharing, privacy and security will need to be addressed in these emerging metaverse applications (Sun et al., 2022). Special attention is needed to understand the potential for power inequities (wealth inequity, algorithmic bias, digital exclusion) due to technologies such as VR (Egliston & Carter, 2021), harmful surveillance practices (Bibri & Allam, 2022), and undesirable user behavior or negative psychological impacts (Dwivedi et al., 2022).

The results of this exploratory study can inform public sector organizations of emerging metaverse opportunities and enable them to develop plans for action as more of the metaverse technologies become a reality. While the metaverse body of research is still small and research agendas are only now starting to emerge (Dwivedi et al., 2022), this study offers a building block for future development and analysis of metaverse applications.

References

Allam, Z., Sharifi, A., Bibri, S. E., Jones, D. S., & Krogstie, J. (2022). The metaverse as a virtual form of smart cities: Opportunities and challenges for environmental, economic, and social sustainability in urban futures. *Smart Cities, 5*(3), 771-801.

Bibri, S. E., & Allam, Z. (2022). The metaverse as a virtual form of data-driven smart urbanism: On post-pandemic governance through the prism of the logic of surveillance capitalism. *Smart Cities, 5*(2), 715-727.

Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., ... & 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.

Egliston, B., & Carter, M. (2021). Critical questions for Facebook's virtual reality: Data, power and the metaverse. *Internet Policy Review, 10*(4).

Geraghty, L., Lee, T., Glickman, J., & Rainwater, B. (2022). Cities and the metaverse. *National League of Cities*.

Ravenscraft, E. (2022, April 25). *What is the metaverse, exactly?*. Wired. https://www.wired.com/story/what-is-the-metaverse/.

Sun, J., Gan, W., Chen, Z., Li, J., & Yu, P. S. (2022). *Big data meets metaverse: A survey*. arXiv preprint arXiv:2210.16282.

Wiles, J. (2022, October 21). *What is a metaverse? And should you be buying in?*. Gartner. https://www.gartner.com/en/articles/what-is-a-metaverse.