METAVERSE OR URBAN DIGITAL TWIN: THAT IS THE QUESTION

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METAVERSE
URBAN DIGITAL TWIN
AUGMENTED CITY

The growing interest in the Metaverse from the business world is a testament to its increasing importance and the potential impact it could have on our society. Large companies and investors have recognized the enormous economic potential that the Metaverse can offer, prompting them to invest significant amounts of money in its growth and the development of platforms and applications. The acquisition of land and properties in the Metaverse by prominent figures in various sectors, such as finance, entertainment, and sports, reflects the rise of the Metaverse as a new form of expression, entertainment, and social interaction.

Bringing these reflections into the field of urban planning, we can say that the technological innovation behind the development of the Metaverse has dematerialised the urban object by transfiguring it into an immaterial digital content. Can new technologies merely replicate or simulate the city? Starting from this question, this paper seeks to overcome a naive fascination with the Metaverse, proposing instead a reflection on the Urban Digital Twin and the Augmented City, in the firm belief that new technological tools can redefine and develop new dimensions of humanised space rather than reproduce a *simulacrum* of the city inhabited by cyber-citizens.

TALKING (BAD) ABOUT THE METAVERSE

It often happens that innovative words become iconic in society and spread with an appeal largely attributable to the not understanding of their true meaning.

There is no doubt that the term 'Metaverse' possesses a semantic value that has contributed to its diffusion, thanks in large part to the rapid spread in the use and dependence on new technologies, and, in general, the fascination of the possibility of transferring oneself to virtual worlds where a significant portion of one's biological existence can be spent 'digitally', with much more satisfaction than what is normally obtained in real life.

Recently, the Metaverse has also attracted the interest of the business world, represented by major international companies and investors who, as reported by McKinsey's report for the first half of 2022, have invested approximately 120 billion dollars. At a lower level, there have been reports of acquisitions of land and properties in the Metaverse by well-known figures from the world of finance, entertainment, and sports, such as the footballer Verratti, who purchased one of the 25 digital islands available for sale on *The Sandbox*, one of the Metaverse platforms available online, and on which he will establish his residential settlement, complete with access infrastructure, specific commodities, sports and training spaces, etc.

What makes the Metaverse so fascinating is the ability to experience new identities, explore virtual worlds, and interact with other people in a digital context. It offers an escape from everyday reality and the opportunity to live experiences that may otherwise be inaccessible or unrealizable. This has generated strong interest among people seeking new forms of entertainment, socialization, and personal fulfillment. However, despite the growing interest and enthusiasm for the Metaverse, there are still many aspects to think about. For instance, how will we users, with our physical and corporeal nature, be able to interface with a space without a place?

And again, will we be able to strike a balance between digital and real life, so that the Metaverse can be a tool for enrichment and social connection rather than an escape from reality or a form of alienation?

DIGITAL TWIN AND METAVERSE WHAT RELATIONSHIP

Within the most recent contributions found in literature comparing Digital Twin (DT) and Metaverse, the hypothesis that they can be considered similar and sometimes coincident is often put forward. Analyzing the main characteristics of the two 'environments', it is possible to observe structurally dissimilar components. The DT, or more precisely the Urban Digital Twin (UDT), replicates a model of a specific city by building a twin based on specific data and variables derived from the real counterpart. In the Metaverse, the 'urban metaphor' is used to allow for a more familiar user experience, where users configure themselves as cyber-citizens through the transfiguration into avatars. In other words, the UDT can be seen as a digital model of a single city built using algorithms that simulate its behavior and is fed, in real-time, by packets of big data generated by sensors, control systems, traffic loops, IoT environments, etc. The Metaverse, or rather Metaverses, as it would be more accurate to say, are a semantic reconstruction of socially situated spatial organizations, namely cities. It is evident, therefore, that from an urbanistic perspective, it is not possible to claim that Digital Twin and Metaverse are closely linked.

The difference between the two becomes even more marked if we reflect on the fact that the Metaverse, at least in its current configuration, denies any mediation between the digital world and the real world, with respect to which it is completely autonomous. The UDT, on the other hand, by its very definition, could not exist without its physical twin, the variation of which automatically modifies its information content.

From a different perspective, it appears more interesting to explore the contribution that Extended Reality (XR) can provide in transforming UDTs into collaborative intelligence environments. Empowering digital twins with XR collaborations can open up new possibilities for enhancing the collaborative capabilities of UDTs. Overall, while DT and Metaverse share some similarities, they also have distinct characteristics and serve different purposes. Exploring the potential of combining Extended Reality and Digital Twins can provide valuable insights and opportunities for collaborative intelligence in urban contexts.

BEYOND THE METAVERSE: THE AUGMENTED CITY

As with the Metaverse, the UDT can also be visualised and interrogated by the XR tools. The result of the interaction between the individual instances of the UDT and the XR tools is the Augmented City (AC), a city within which it is possible to interact with "augmented urban objects" usable through XR technologies.

What substantially differentiates the AC from the Metaverse is the possibility of relating, in the same time, to both real and digital instances, in what becomes a new spatial experience that recovers the mediation between the real and digital worlds denied by the Metaverse.

Putting aside sophisticated and dedicated devices for the enjoyment of the Metaverse, through common devices such as smartphones and tablets, it is possible to visualize, live and on demand, the urban digital instances with which the citizen can dialogue in the same way as what happens with the physical instances.

In addition to being a tool at the service of citizens, the UDT, if visualised and queried by planners and decision-makers, can contribute to the governance of territorial transformations and to the redefinition of urban assets as an innovative tool for the prefiguration of planning choices.

Fig. 1 Prefiguration by LCIM app of the architectural project of the new building of the University of Sannio in Benevento.

These are the thoughts that have guided the development of the app *Live City Information Modeling* - LCIM and the app *City Augmented Reality for the Environment* - CARE, developed by the AURUS research group for urban prefiguration with the aim of simulating new design choices and testing them in terms of economic, environmental and social sustainability.

Specifically, the LCIM app allowed citizens and planners to visualise, through their smartphones, the full-scale model of the new building of the University of Sannio at Via dei Mulini in Benevento, making it possible to preview the new project within the urban context (Figure 1). Similarly, the CARE app simulates the possible tree essences that could be planted on Via Posillipo in Naples, allowing citizens to visualise the possible morphological configurations of the street to choose from, guiding the final choices of decision-makers (Figure 2).

Fig. 2 Prefiguration by CARE app of the trees that will be planted in via Posillipo in Naples.

Fig. 3 The Obama's speech in *Second Life*.

In both cases, what is generated is not a virtual urban context, but rather an augmented space born of the interaction between physical and digital entities.

CONCLUSIONS

The Metaverse or Metaverses are seeking their affirmation within individuals' existential spaces, attracting the attention of major corporations, famous brands, and innovative entrepreneurs who hope to generate new business by being among the first to enter the virtual world. There is no doubt that the digital dimension exerts a considerable charm, as was the case with *Second Life,* where even Barack Obama opened a campaign office for the 2008 presidential elections (Figure 3).

In the case of *Second Life,* its early success was also attributed to the innovation it offered by leveraging the allure of new 3D multiplayer games. However, it should be emphasized that *Second Life* was not a game with a specific goal, where players interacted to form teams dedicated to achieving an objective. Instead, it allowed the definition of a 'digital sociality' among avatars, in a way, a precursor to a significant social and economic revolution (Castronova, 2007). One of the basic challenges with *Second Life* was widespread access and effective utilization of the Virtual World's potential: knowing the technology and, to some extent, English.

Today, the Metaverse can benefit from the latest hardware and software innovations that bridge the technological gap and enable all users and their avatars to adopt 'natural' behaviors, gestures, and interactions, much like those in the real world.

The fundamental question remains: will the virtual world modify the real one? Will the digital city affect the socio-spatial structures of the physical city? Can the UDT serve as a bridge between these two dimensions, allowing new possibilities for sustainable governance of urban and territorial transformations?

The reflections proposed in this text may indicate a path for future investigations, particularly by urban planners of the 'cities of the future', but it must be explored with the full awareness that it is not the only possible way.

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