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The metaverse, online communities, and (real) urban space

With the COVID-19 pandemic, technological advancements and investments accelerated to create an alternative to the real world that makes it possible for various activities and experiences to be handled online. Among these developments, the metaverse comes to the fore because it makes possible real and virtual experiences simultaneously, regardless of the time and space the user exists in, and it acts as a mediator and medium to bring these two environments together. This article discusses the possible impacts of advancements in the metaverse on (real) urban space considering the socio-spatial dialectic through theory synthesis and adaptation. An overall evaluation of the socio-spatial impacts of this is also included and opened up for discussion. Based on a literature review, it is expected that technological developments like the metaverse will introduce a new organization to physical and virtual socio-spatial relations, and new socio-technological groups will be created in them and by using them.

Keywords: metaverse, online communities, urban space, phygital, COVID-19 pandemic

1 Introduction

With the COVID-19 pandemic, technological advancements and investments accelerated to create an alternative to the real world that makes it possible for various activities and experiences to be handled online. The main reason behind this increase in technological advancements and investments can be inferred as the need to overcome the problem of interrupted processes due to restrictions during the COVID-19 pandemic that prevented people from using the physical environment: the (real) urban space (i.e. working spaces, public spaces, commercial areas, green areas, areas for entertainment, etc.; Lim et al., 2022). On the other hand, there already existed several platforms and applications that allow users to virtually experience places either via virtual reality or augmented reality glasses and headsets (as though they were there), or via PC monitors (only for viewing, watching, etc.). Online platforms (e.g., Facebook and similar social network sites, or SNSs), applications (e.g., Zoom, WhatsApp, Messenger, etc.), and tools (PCs, mobile phones, etc.) are used for communication among people and to ease the operations and activities that need to occur in daily life – although the "interaction" is limited to messaging, talking, and video conferencing.

However, the technical and physical limitations of these standard means of communication and interaction resulted in certain problems for users (see also Wiederhold, 2020). Different from these standard means of communication and interaction, the metaverse comes to the fore because it makes possible real and virtual experiences simultaneously, regardless of the time and space the user exists in, and because it acts as both a mediator and a medium to bring these two environments (physical and virtual) together. Compared to standard means of communication and interaction, a limitation that it overcomes is the loss of concentration and motivation while handling these activities and/or operations due to the loss of spatial reference (for an overview of the importance of spatial reference, see Moser et al., 2015). As Riva and Wiederhold (2022) state, via the metaverse, users "experience the sense of 'presence', that is, the feeling of 'being there', of actually being inside a place". Users can also create a virtual world that allows them and others to be part of the experience or to produce the experience together. Moreover, because this experience will be actualized in real time, the technical limitations faced by standard means of communication and interaction will be overcome. Via the metaverse, users are expected to interact with each other through physical and virtual means within virtually created environments and without the problems they face while using standard means of communication and interaction.

Although the term *metaverse* was introduced by Meta Platforms in 2021, the origin of the word goes back to Neal Stephenson's 1992 science-fiction novel *Snow Crash*. In *Snow Crash*, the protagonist moves between a dystopian version of Los Angeles and a virtual world called the metaverse (Kirtley, 2021), and the internet evolves into a virtual reality–based form, where people use their digital avatars to explore this virtual world to "escape" from the dystopian reality of their lives (Arapkirli, 2021). This is why the metaverse is also referred to as the next-generation internet, or NextG internet (Cheng et al., 2022). Actually, when examined, the earliest broadly accepted prototype of the metaverse was already introduced in the late 1970s as a text-based interactive game called MUD (multi-user dungeon; Cheng et al., 2022). Then, with the advancements in technology and the internet, development of commercial virtual worlds (e.g., Second Life, a 3D virtual world where users can interact with each other in real time and generate content themselves; Second Life, 2022a) and open-source server platforms, such as OpenSimulator to host these 3D virtual worlds (OpenSimulator, 2022), followed. What makes the current metaverse different from its earlier versions is that it is easily accessible anywhere and anytime through any mobile or digital means (S.-M. Park & Kim, 2022), and it can be developed by anyone that has the basic equipment, an internet connection, and knowledge. All in all, the current metaverse is simply defined as "an offline/online interface of a virtual set of worlds" (van der Merwe, 2021).

Recently, discussions have moved toward the metaverse being "a medium for exchanging interests and social interaction centred on content" (S.-M. Park & Kim, 2022: 4211), which is to be supported by 5G and mobile immersive computing (Cheng et al., 2022). With 5G, it is expected to connect "things everywhere – reliably, without lag" so that "people can measure, understand and manage things in real time" (Ericson, 2022). Therefore, billions of connected devices (the internet of things) will collect and share information in real time to solve problems of daily life activities and operations (Ericson, 2022). Likewise, with 5G, the metaverse is expected to come to life because 5G is dedicated to ensuring the infrastructure needed by mobile immersive computing to operate the flows of information that it acquires. It is even expected that various metaverses will be created, as in the case of the initiation of the internet (Haber Global, 2022). Cheng et al. (2022) define this process as "an open development phase of the Metaverse".

This open development phase of the metaverse is on the march. "Already, several companies including Microsoft, Roblox, and Epic are investing in their versions of the metaverse, supported by advancements in technology enablers such as 5G, artificial intelligence (AI), edge, and cloud computing" (Clement, 2022). Meanwhile, (real) urban space is being reproduced in

digital form (referred to as *digital twins*) on it (for an overview of *MetaCities*, which are virtual copies of existing (real) urban space, see Wang et al., 2022) so that the emerging virtual societies can live in, act, move and engage through it. To give an example from one of the earliest metaverses, which is Second Life, the total number of registered "residents" increased from 64,687,961 to 66,614,470 in only one and a half years (between 2020 and 2022; Second Life, 2022b; Voyager, 2021). These "residents" – or the online communities – are creating content or experiencing the created content in various topics; that is, shopping, adventure, fantasy and gaming, arts and music, recreational areas and facilities, business, historical assets, education and universities, non-profits and social awareness, hobbies, sports, and so on (Second Life, 2022a). They also come together and build (online) societies. These societies can also create social events and participate in them. Moreover, it is possible to earn money from these events because the content served can be bought and sold as non-fungible tokens with cryptocurrencies through a decentralized blockchain (Cheng et al., 2022). Nevertheless, these experiences served by the metaverse are not expected to critically replace current digital interactions, but are "likely to displace many of them while opening up new types of interactions and business models to optimise on these new use cases" (Nguyen, 2021). According to predictions by Gartner (Rimol, 2022), "by 2026, 25% of people will spend at least one hour a day in the metaverse for work, shopping, education, social and/or entertainment reasons" without any need for physical space at all.

Given the statistics and facts in several sources (Statista Research Department, 2021; Johnson, 2022; Wise, 2022), it is obvious that the metaverse is rapidly becoming an alternative medium for one-to-one, one-to-many, and many-to-many interactions for various activities. As also put forward by Hemmati (2022), depending on "the forthcoming developments . . . this technology would grow and have a deeper impact on human life in the coming decades". Thus, it can be presumed that the metaverse will be the new umbrella term for virtual spaces that physically and virtually bind today's newly emerging metasocieties along with the commercial, political, and social systems that are currently being rooted and developed in those virtual spaces. It can even be claimed that, if these applications, devices, and infrastructure keep on being developed and, as far as they are backed up with the network of interconnected experiences, the metaverse will replace certain activity spaces in the (real) urban space. In his 1995 book *City of Bits: Space, Place and the Infobahn*, Mitchell already determined some activity spaces transitioning under the impact of developing technologies as follows: bookstores to bitstores, stacks to servers, galleries to virtual museums, theatres to entertainment infrastructure, schoolhouses to virtual campuses, and hospitals to telemedicine. By 2025, with the advancements in technologies that support the metaverse, and in information and communication technologies (ICTs), it will be no surprise to observe a critical change in these activity spaces in cities because the way of interacting – or, as defined by John (2017), "the way of doing things" – is changing and diverging. In this sense, the advancements in these technologies will change the way one-to-one, one-to-many, and many-to-many interactions are created, and they will change the medium for these interactions to occur (Ulubaş Hamurcu & Terzi, 2022).

Nevertheless, "these interactions are becoming more and more digital . . . and less in need of being place contingent" (Ulubaş Hamurcu & Terzi, 2022). Proceeding from this point of view, a few critical questions can be raised: Which of the urban uses will be replaced by new ones that will make possible the physical and digital experiences that are (or will be) provided by the metaverse? Will some of them be removed from the real urban areas because there will no longer be a need or a demand for them? How will they be adapted to this change and be reshaped to allow the use of the infrastructure, systems, and tools needed? The concepts of online communities and (real) urban space are delivered in reference to the related developing literature on the metaverse. Because the main aim is to discuss the possible impacts of advancements in the metaverse on (real) urban space, the sections are dedicated to identifying the changing meanings of these concepts considering the socio-spatial dialectic through theory synthesis and adaptation (for an overview of theory synthesis and adaptation, see Jaakkola, 2020). An overall evaluation of the possible socio-spatial impacts of this is also included and opened up for discussion. Conclusions are presented by leaving certain reservations.

2 The socio-spatial dialectic revisited: Changing meanings of online communities and (real) urban space

As the socio-spatial dialectic asserts, the production of space is a recurrent series of actions where one can be the subject or the object of the action based on the affirmation that social-based spatiality is both space-forming and space-contingent (Soja, 1989). This is a two-way interaction between human beings and the physical environment. With the advancements in ICTs, similarly, "the virtual world is becoming a wider expression of our personal and collective space, an interactive spatial dimension where at the very same moment we shape it, it shapes us" (Moneta, 2020: 48). Nevertheless, these actions occur in both the physical and virtual spaces, and they reveal a "fuzzy ground in-between the physical existence of a human being and his/her actions in the physical environment and his/her virtual identity (and actions) in digital networks" (Ulubaş Hamurcu & Terzi, 2022; see Figure 1).

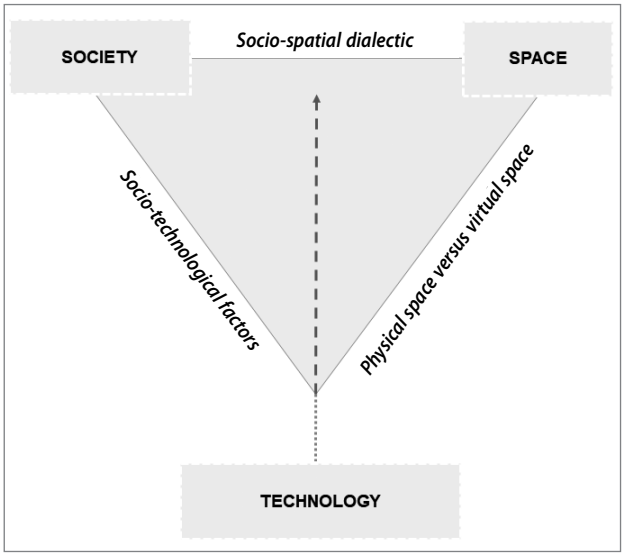

Figure 1: Society, space, and technology threefold (adapted from: Ulubaş Hamurcu, 2021).

The metaverse as a medium and a mediator for bringing both physicality and virtuality together stands on this fuzzy ground. Gaggioli (2017: 744) defines space that "originates from the increasing convergence of the physical environment and the virtual dimension" as *phygital* (a combination of physical and digital) and explains this concept as a transformation of "our living spaces – houses, offices, public places, and so on – in digitally enriched environments that blur the distinction between the 'real' and the 'simulated'". Unsurprisingly, ever-growing technologies such as augmented reality, the internet of things, robotics, and artificial intelligence are the mediators of this transformation. In this sense, the metaverse is also classified as a phygital space because it offers a new virtual reality by utilising an application, tool, or product (van der Merwe, 2021). In addition, as Gaggioli (2017: 744) states, "the integration of computers in everyday objects and the increasing bidirectional information flow between the digital and the physical realm is transforming our surrounding environment (including even our bodies) into a seamlessly programmable interface, where virtually every object can be creatively reconfigured to provide new kinds of phygital experiences".

In the case of the metaverse, these phygital experiences as part of social-based spatiality are produced both physically and virtually in real time regardless of the locations of the users. On the one hand, users are space boundless (or place independent) to become connected to it and to interact in it. However, they are still physically and digitally connected to the tools and infrastructure that enable them to (have) access to the immersive environment on the metaverse, where they are gradually becoming attached. Therefore, first, the changing nature of place-independent interactions of users along with advancements in the metaverse are described in Section 2.1. Following this, the status of (real) urban space is examined in Section 2.2.

2.1 From online communities to metasocieties

Online communities are defined as a "collective group of entities, individuals, or organisations that come together either temporarily or permanently through an electronic medium to interact in a common problem or interest space" (Plant, 2004: 54). Users conceive online communities as "a tool", "a way of being", and "a place" (Markham, 1998). They use online platforms and SNSs to represent themselves by creating digital avatars, which replace their real selves, and to act in a virtual space in the way they desire through infinite possible actions (Liboriussen, 2012). Therefore, these online platforms and SNSs are not only basic tools for entering the virtual environment but are also the "space" themselves where these online communities gather. Along with developments in ICTs, today the metaverse is unavoidably becoming both the mediator and the medium for those offline interactions so that they can cultivate various metasocieties, come together, and spread. As Berg (2012: 176) summarizes, standard SNSs only help their users "establish social relationships and perform a self-presentation, observe each other and exhibit social relations through the graphical user interface". However, they are still a mediator, not a medium. With the metaverse, the aim is to assign such online platforms a new task, which is to house the online communities; that is, to turn them into a medium for these online communities to participate in by experience. As mentioned by Wang et al. (2022: 5), metasocieties will run in parallel to real societies, and "any human, enterprise and city in the real societies will have corresponding virtual human, virtual enterprise, and virtual city, respectively". Hence, metasocieties will enable virtual-real interactions at the same time. These virtual–real interactions will also produce their relative spatial representations. Berg (2012) defines this differentiation between the physical and the digital as having both ontological and practical conditions of social interaction. However, with advances in ICTs, the boundaries between physical and digital interactions are blurring and thus between the physical and digital spaces because the interactions are being bound to and shaped by them (as affirmed by the socio-spatial dialectic). All these advancements in technologies instrumentalize the production of phygital spaces mediating phygital experiences.

The concept of Society 5.0 is proposed as making possible "a high degree of convergence between cyberspace (virtual space) and physical space (real space)" (Cabinet Office, 2022). It is a "human-centred society that balances economic advancement with the resolution of social problems by a system that high-

ly integrates cyberspace and physical space" (Cabinet Office, 2022). Society 5.0 is the initial stage to which existing standard online communities are targeted to evolve as a part of the advancements in the metaverse and related technologies. Certain objectives are put forward to be achieved by Society 5.0: 1) to enable it for the benefit of everyone regardless of age and sex; 2) to liberate people from cumbersome work and enable them to use their time effectively; 3) to provide time for spare-time activities; and 4) to provide more convenient, safe and secure living environments (Cabinet Office, 2022). The metaverse, as a service, aims to share sustainable content and social meaning (S.-M. Park & Kim, 2022). Thus, Society 5.0 is to be implemented via the metaverse, which will be used as both the mediator and the medium.

If Society 5.0 is actualized, then this might end in a new socio-spatial turn. It should not be forgotten that the development of the social web and SNSs ended in a social turn in the way the internet is perceived (Berg, 2012). For Berg (2012: 175), in contrast to digital space being conceived as a separate social realm, "current conceptualisations increasingly situate digital space as deeply embedded in everyday life and as a challenge to the contemporary modes of societal organisation in physical space". Likewise, with the emergence of locative technologies, a spatial turn has also occurred (Castells, 2004; Jansson & Falkheimer, 2006; Wilken, 2008; Berg, 2012). As discussed by Graham (2004), these technologies are anticipated to cause the dissolution of cities and trigger spatial homogenization and transmission of place as a part of the change that will occur in social systems. He explains the reasons behind this as passing from physicality to virtuality and casting away material bodies to extend the individual being of humans. However, as the socio-spatial dialectic suggests, the social entity and the physical entity cannot be examined as two separate variables of the production of space. They are intertwined and none is the dominating factor over the other. Thus, with the metaverse, the discussions on the social turn and spatial turn should widen to cover socio-spatiality (as also suggested by Berg, 2012) as a means of intertwining virtual and physical social relations and interactions (or phygital experiences) exerted on the blurring boundaries and spatialities of real urban space and virtual space (or phygital space) under the impact of socio-technological factors (see also Ulubaş Hamurcu, 2021 and Ulubaş Hamurcu & Terzi, 2022). An overview of the possible outcomes of these factors on (real) urban space related to the metaverse is further discussed in Section 3.

2.2 From (Real) Urban Space to MetaCities

Kemec (2022) states that "with Metaverse applications, a new experience has been experienced in business, shopping, education, sports, social, cultural, and artistic activities in cities". These multiple functionalities of the metaverse are realized through the means of digital twins. Digital twins are "large-scale and high-fidelity digital models and entities duplicated in virtual environments" and "reflect the properties of their physical counterparts" in the real urban space (Lee et al., 2021: 1–2). They make possible "heterogenous activities in real-time characterised by unlimited numbers of concurrent users" (Lee et al., 2021: 2). Therefore, it is not possible to fully cover all these phygital spaces and experiences (also considering that it is still the open development phase of the metaverse), but it is possible to list some of them to imagine the future they offer.

Mac Ghlionn and Hamilton (2022) exemplify a phygital experience on the metaverse as follows: "Decked out with full-spectrum [virtual reality] headsets, smart clothing and tactile-responsive haptic gloves, the at-home traveller can touch the Parthenon in Athens or taste the rich foam of a Korean dalgona coffee". There are also examples in economic, educational, governmental, and even religious systems. The transition to remote working spaces on the metaverse during the COVID-19 restrictions can be given as one of the remarkable and concrete examples of the socio-spatial impacts of it on (real) urban space. Meta built Horizon Workrooms to hold online meetings, and Microsoft is planning to integrate its virtual reality and augmented reality platform Mesh with Teams (Lawrence, 2021). Platforms like Gather, Teamflow, and Virbela seek to make possible online gatherings and ease the problems that are faced on standard means of communication and interaction that only permit viewing each other from a computer screen. Similarly, the research by Choi (2022) suggests a significant difference between the use of standard means of communication and interaction and the metaverse in the preference of employees regarding remote work conditions. With regard to educational systems, there are examples that seek to bring together different participants from different organizations and geographies to collaborate on mutual projects (Suzuki et al., 2020) and consider the metaverse a medium for sustainable education, which is free from certain pre-defined constraints like time and space (S. Park & Kim, 2022). Seoul is the first major city to announce preparations for establishing a metaverse platform to fulfil economic, educational, cultural and tourism, communication, urban development, administrative, and infrastructure tasks considering the trends and demands of public and private sectors (Seoul Metropolitan Government, 2022). By 2023, it is aimed to provide convenient consultations and civil service on the metaverse, which is currently being provided by public officials in Seoul City Hall. Even a church exists on the metaverse to allow worship and offer prayer services (Dsouza, 2022). Nevertheless, how many of these virtual environments and related online communities

will be adapted and used, and for how long, remains unclear because it is still the open development phase of the metaverse.

3 Discussion: An overview of possible socio-spatial impacts of the metaverse

The COVID-19 pandemic demonstrated that, in certain situations, we are constrained by technological means in various ways (Ulubaş Hamurcu, 2021). With the COVID-19 pandemic, we observed ICTs become a mandatory part of our daily lives. Especially due to lockdown, all products and services began to be sold or provided on the internet, just a click away. This unexpected mandatory use of ICTs changed the presumptions made regarding the impact of newly emerging technologies and products in the technology market (Panetta, 2021). It also changed the discussions on their adaptability and usability by users and their socio-spatial impacts on cities (Ulubaş Hamurcu, 2021; Ulubaş Hamurcu & Terzi, 2022).

Existing (real) urban space is under the influence of changing ways of doing things based on advancements in technologies (John, 2017). On the one hand, it is expected that certain socio-technological groups will try to improve their conditions to acquire such technologies and use them more effectively and efficiently to overcome their daily life activities and tasks (Allam & Jones, 2021; Ulubaş Hamurcu, 2021). In such a case, certain land uses in real urban space might be – or aimed to be – replaced by digital twins. Such services or uses might be served virtually. They include business, education, entertainment, and public/governmental services and facilities. Examples have already been discussed in Section 2.2. On the other hand, the unexpected mandatory use of ICTs during the COVID-19 pandemic is also expected to evoke the importance of (real) urban space, and users will expect higher-quality urban areas, infrastructure, and services to be provided by local administrators (Allam & Jones, 2021; Ulubaş Hamurcu, 2021). However, in such a case, the metaverse will still be on the agenda of urban planning and design practices. Virtual simulations on it can be used to generate parallel versions of cities to test the policies and visions developed by (local) governments (Devisch, 2016; Martynova, 2020), to search for better solutions to the problems in cities, or to ease existing systems. One can benefit from digital twins, which provide several significant opportunities for early-stage collaboration and rapid optioning (Nazir, 2020) for decision-making processes. Bizjak (2012) suggests that tools that can be applied to e-participation in spatial planning and design should be improved.

Nevertheless, there is still another option. For Roy (2020), "historically, pandemics have forced humans to break with the past and imagine their world anew. This one is no different. It is a portal, a gateway between one world and the next". In this sense, designing and planning mixed-use areas, which make it possible for multiple physical and virtual actions and interactions to occur simultaneously, will appear on the agenda of cities (Ulubaş Hamurcu & Terzi, 2022). Along with the actualization of the metaverse, the services and the physical environment served to the users will adapt to facilitate its necessities. Related professions, developers, and local administrations will have to catch up with the upcoming technological developments and adapt them to the physical environment. In addition, new urban areas and spaces might emerge to mediate these necessities. Because entering the metaverse only requires certain equipment, such as virtual reality glasses, mobile phones or PCs, and an internet connection, then the space required for handling certain activities (e.g., shopping, recreation, education, and work) might decrease, or, based on the type of activity, it might even increase to allow the movement of the user while using virtual reality and augmented reality glasses and headsets. Therefore, the socio-spatial impacts of the metaverse will diversify based on certain premises.

It is also crucial to list some of the current limitations of the metaverse. Among these are 1) lack of commonality, continuity, and global standards; 2) problems of accessibility, inclusivity, and global connectedness; 3) low levels of social acceptability; and 4) the gap between the latest technologies and the requirements of the metaverse. Every platform on the metaverse is operated by separate entities, and there is no unified system (Lim et al., 2022). Therefore, the continuity of such platforms will depend on the service they provide or on the commonality they create. In certain cases, owning a smartphone and having access to the internet is sufficient for immediate access to these platforms. However, some may have specialized requirements for access, such as a signup process, paid subscription, unique identifier, and digital wallet (van der Merwe, 2021). Therefore, it should also be discussed whether the metaverse can achieve its aim of providing sustainable content and social meaning as part of Society 5.0 considering the discussions on the digital divide and literacy. Moreover, to create, provide, and develop sustainable content and social meaning, eventually the metaverse should be socially acceptable. For Lee et al. (2021), privacy threats, user diversity, fairness, and user addiction will define the sustainability of the metaverse, and therefore there will be a high need for complementary rules and norms to ensure security and provide privacy. Moreover, it is becoming crucial to include generations other than Generation Z, which is the primary adopter of the metaverse, by explaining the possible advantages of the metaverse compared to the standard means of communication and interaction (Kovach, 2021). Lee et al. (2021: 3) claim that "the advent of [augmented reality]

and [virtual reality], high-speed networks and edge computing, artificial intelligence, and hyperledgers (or blockchain), serves as the building blocks of the metaverse". However, they also emphasize the gap between the latest technologies and the requirements of the metaverse that will integrate the virtual world into the everyday lives of people. Moreover, 5G infrastructure is still unavailable in most places. Therefore, whether the metaverse will survive or not depends on the advancements, investments, and borders of technological and technical infrastructure and services, and on their economic and geographical accessibility by the majority. Thus, owning the specified equipment is not the only prerequisite to being able to enter the metaverse and use it efficiently.

4 Conclusion

Because of the diversification of the phygital experiences and spaces that online platforms allow users to participate in and experience, the needs of the metaverse will differ from today's and they will diverge in parallel with its cultural, economic, social, technical, and political content. The possibility of the emergence of infinite and various hetero(chrono)topias leaves certain reservations regarding global policies and economies. Because there is no commonality in developing the metaverse, its future is fuzzy. Nevertheless, developments like the metaverse will introduce a new organization to physical and virtual socio-spatial relations. As Allam and Jones (2021: 3) state, "the more the innovation, the less the human engagement, and the more that the digital illiterate or 'luddites' are struggling with in comprehending and navigating this new realm". Therefore, such socio-technological groups will try to adapt themselves to these devastating changes, and the digital literacy and divide discussions will eventually move toward overcoming this problem and finding solutions for supporting social sustainability.

In addition, advancements in technologies will affect the notions of place attachment and place dependency (Ulubaş Hamurcu, 2021). As mentioned before, place dependency is merely shaped by the infrastructure and services provided to users. However, place attachment is a different notion. Place attachment may be both toward a physical or a social entity and even at the same time (Ulubaş Hamurcu, 2021). The metaverse is targeting the way attachment is exerted by users and the entity this attachment is exerted on. Thus, the level of adaption to the relationships and services provided by metasocieties and the virtual space they provide will have a critical socio-technological impact on the future of (real) urban space. Even these will end up in the formation of new socio-technological groups within real societies. On and by using the metaverse, these socio-technological groups are being created asynchronously and unbounded by physicality. Thus, it is crucial to analyse these groups to understand their expectations from both the metaverse and real urban space to determine the socio-spatial impacts of this phygital experience as a part of further research.

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