Metaverse: How to Approach Its Challenges from a BISE Perspective

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1 The Rise of the Metaverse

"*Some innovations, whose long history of success faded into the background in the course of time, come back in a refreshed form decades later initiated by marketing activities of some companies.*" (Buhl and Winter 2009, p. 133)

In 2009, the former BISE Editor-in-Chief Ulrich Buhl and his colleague Robert Winter described what happened with the development of the concept of "virtualization" from their point of view. Currently, a similar development can be outlined for the *metaverse* concept. Although various companies and researchers had continuously been working on different aspects related to the so-called metaverse, it was the voice of some big technology companies that ultimately fueled the prominence of the metaverse idea (Kim 2021). Among others, they released major investment and ambitious development plans for the metaverse (Di Pietro and Cresci 2021). Most prominently,

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Mark Zuckerberg's announcement (Zuckerberg 2021) that his empire Facebook would rename itself Meta as part of Facebook's transformation into a metaverse company led to a massive hype. Zuckerberg's (2021) metaverse vision is to craft a highly immersive, embodied form of the Internet in which the users experience a feeling of presence in a place and/or with another person or many other persons instead of being a spectator only [i.e., what we refer to as *social* and *tele*-presence in literature (Biocca et al. 2003)]. In his vision, the metaverse should facilitate activities such as socializing, sports, work, education, shopping, and other technology-based experiences beyond what we can imagine today (Zuckerberg 2021). At the moment, from what we can see in literature and from industry (announcements) everyone is painting his or her own picture of the metaverse, which is why the opinions, as well as the envisaged areas of application, are quite diverse. Almost every major digital player is currently discussing the metaverse concept and setting out to explore how it may affect their business. Moreover, some companies even start advertising their products and platforms under the umbrella of the metaverse (e.g., The Sandbox). Thus, it has taken almost three decades from the time the term *metaverse* was initially coined and described by Neal Stephenson in his 1992 released novel "Snow Crash" to the widespread attention across industry.

During that time, fostered by technological advances in, e.g., network infrastructure, cloud and edge computing, immersive systems and associated sensor technology, computer graphics, computing power, and blockchain technology, the metaverse has transitioned from a *completely* fictitious idea as outlined by Neal Stephenson to a more tangible phenomenon from which – at least some – parts are already technologically viable or will be in the near future. Originally, Neal Stephenson described the

metaverse in his novel as a massively scaled, multi-user 3D computer-generated parallel universe controlled by a central institution that is inhabited by people represented by their self-created or bought, partly photo-realistic avatars with authentic facial expressions and by software agents (Stephenson 1992). Nowadays, it is quite common that *avatars* represent human individuals in digital encounters (Suh et al. 2011), e.g., in online multi-user games such as Fortnite, World of Warcraft, Minecraft, and others.[1] Furthermore, avatar representation is increasingly enabled by platform providers for serious applications such as business meetings, e.g., in Horizon Workrooms, or other virtual conference formats. For instance, parts of the WI2021 conference were hosted on the Gather.town platform where conference attendees used avatars to socially interact. Similarly, for many years, different *multi-user 3D computer-generated virtual worlds* have already existed where people spend a considerable amount of their leisure time. Well-known representatives are, for instance, the 2003 released social platform Second Life or the 2004 released multiplayer online game World of Warcraft. Over time, some of these platforms have even developed to non-negligible virtual economies, enabling the trade of virtual goods and services (Animesh et al. 2011; Guo et al. 2019). Particularly, due to the temporary popularity of Second Life, some – also established and primarily non-IT oriented (e.g., Nike or BMW) – businesses in those days tried to position themselves on the platform, e.g., by virtual stores (Yang et al. 2012). However, many of these projects failed to meet the high expectations, which is why most of them were discontinued (Yang et al. 2012).

The metaverse as outlined by Stephenson (1992) shares similar characteristics to the above-described platforms: Companies and individuals can buy land, trade virtual goods such as avatar skins (i.e., the avatar's look), and continuously extend the metaverse through writing software extensions (Stephenson 1992). A few of the platforms that are currently attracting extensive public attention offer similar functionalities, e.g., Decentraland and The Sandbox offer virtual real estate and provide the opportunity to sell objects as NFTs, i.e., individuals are granted a commonly accepted, vested right to ownership of these items. Fortnite and Roblox allow users to create and share their own content, e.g., self-developed games or designed worlds, or to trade virtual items. While the former two strive to be as decentralized as possible, meaning that the users should have agency, ownership, and be in charge of everything, the latter two are controlled by a central institution, similar to the Snow Crash metaverse (Kim 2021; Lee and Kim

2022). Further, Stephenson's protagonist named "Hiro" enters the metaverse by wearing goggles and headphones that are capable of creating realistic 3D vision and stereo sound leading to a telepresence experience (Stephenson 1992). The system description thereby resembles that of today's available consumer-grade VR technology. While former virtual worlds were mostly explored via desktop computers (e.g., Second Life), a couple of platforms now support virtual reality experiences as well, e.g., AltspaceVR or Horizon Worlds. These were only a few exemplary analogies of today's platform and technology developments to the initially described metaverse, and more could certainly be identified.

Overall, the metaverse vision largely benefits from the steady progress in the gaming industry, which – as outlined – has already incorporated many of the different facets in their games for a considerable amount of time. Interestingly, however, already with the advent of virtual worlds around the development of Second Life, "virtual worlds have gained legitimacy in business and educational settings for their application in globally distributed work, project management, online learning, and real-time simulation" (Schultze and Orlikowski 2010, p. 810) widening the application area to include fields far beyond gaming and entertainment. Similarly, virtual and augmented reality technology owes its rise mainly to the gaming and entertainment industry but is now also adopted by other domains such as manufacturing or retail (Kohn and Harborth 2018; Peukert et al. 2019; Wohlgenannt et al. 2020).

As the above enumeration demonstrates, several facets of the initial metaverse concept have already found their way into real-world and non-gaming applications. Therefore, some start referring to the current state or some of the existing platforms as *proto*-metaverses (Xu et al. 2022). However, as it seems that everything pre-existed before, the question now arises as to what the metaverse hype is all about. In this regard, people have very different – even rather critical – attitudes towards the metaverse. While some see and proclaim the metaverse as "*quasi*"-successor state to (Ball 2021) or next chapter of (Zuckerberg 2021) the Internet as we experience it today, others argue that the metaverse is just a *buzzword* misused for marketing purposes without any substantial raison d'être (Smith 2022). To trace these opposing viewpoints, we should have a closer look at what development we expect for the metaverse in the future.

2 On the Need to Demystify the Metaverse

When observing the public discourse around the metaverse, the question of whether the metaverse is only a cleverly set marketing campaign to sell pre-existing things under this

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[1] Please note: The here and in the following referenced platforms serve as examples only. The enumerations are by far not exhaustive and other platforms with similar characteristics exist.

new guise is absolutely legitimate. Therefore, it is important to carve out *what* is – if anything – the novelty factor that distinguishes the metaverse from everything else that exists.

Within the above introductory section, we have mainly built on Stephenson's (1992) initial description of the metaverse and showcased some real-world examples that have implemented parts of it. Over time, however, scholars, practitioners, and companies have refined the initial metaverse idea in different directions or developed completely new ones. Thus, even though the metaverse is widely discussed, it lacks a commonly accepted and consistent definition (Lee and Kim 2022; Park and Kim 2022; Xu et al. 2022). Yet, the lack of a definition is not surprising at this stage, as only the future will show us what shape it will ultimately take. Nevertheless, given that circumstance, debating about the metaverse can sometimes be very confusing because everyone thinks of it in a different way. Accordingly, we argue that there is a need to demystify the term in the future.

As a result of a literature review, Park and Kim (2022) provide a list of metaverse definitions originating from 54 different sources that take reference to the metaverse. Lee and Kim (2022) have further refined and updated the list and retrieved common characteristics within the definitions, namely, *avatars* as user representation, technology used for *world representation* (i.e., AR, VR, MR), *synchronicity* reflecting the real-time component, *interactivity* with objects, *immersion* and *realism* describing the closeness to reality and the ability to experience telepresence, support of *social collaboration* (i.e., interaction between users), and *permanence* outlining the continuance and persistence of the metaverse. In Information Systems (IS), the term metaverse has also been around for several years, mostly to capture phenomena around virtual worlds such as Second Life. However, some argue that today's metaverse concept substantially differs from that of the first peak period of virtual worlds due to technological advancements in various areas (Park and Kim 2022). Within IS research, already more than 10 years ago Davis et al. (2009, p. 90) outlined that "Metaverses are immersive three-dimensional virtual worlds in which people interact as avatars with each other and with software agents, using the metaphor of the real world but without its physical limitations." At that time, however, they did explicitly not link the metaverse to peripherals such as AR or VR glasses and referred to experiences in desktop environments. In contrast, Xi et al. (2022) directly relates to the metaverse simply as extended reality (XR) – an umbrella term for immersive systems technologies such as AR and VR.

However, Dionisio et al. (2013) note that "[a]lthough the Metaverse always references an immersive three-dimensional digital space, conceptions about its specific nature and organization have changed over time" (p. 7) and more strongly emphasize the evolution from considering the metaverse as an extended version of a *single* virtual world to a wide *network* of an infinite number of interconnected worlds. In that sense, they argue that Stephenson's pictured metaverse only fitted the former characteristics, i.e., being "in both form and operation, essentially an extremely large and heavily populated virtual world" (Dionisio et al. 2013, p. 7). In their article, they set out to describe the status of this transition and name perceived immersive *realism*, *ubiquity* of access, i.e., device-agnostic, and identity across the whole metaverse, *interoperability*, i.e., the ability to seamlessly switch between environments while maintaining experience and assets, e.g., taking the avatar with you, and *scalability* as important aspects of a viable future metaverse (Dionisio et al. 2013). In the BISE journal, the first (and so far only) reference to the metaverse appeared within a footnote by Pannicke and Zarnekow (2009) linking to the "Metaverse Project[2]" which, at that time, already emphasized the need for an *open*, non-commercial, customizable metaverse as a countermovement to the *closed*, commercially controlled, and only in a limited way customizable virtual worlds such as Second Life.

Thus, even at that time, the idea of having an open, interoperable metaverse was around. However, the desired capabilities are accompanied not only by numerous technological as well as privacy and security-related challenges (Di Pietro and Cresci 2021), but also by the need to agree on common standards enabling the implementation of an open and interoperable ecosystem. Although it is often said that the metaverse will not be built by one single company, e.g., Zuckerberg (2021), it will be interesting to see as to what extent the established companies that have positioned themselves as so-called "walled gardens" in the platform economy will participate in this prospective movement. Furthermore, in the context of the metaverse, reference is made not only to the fusion of different virtual worlds, but also to the full blending of the physical and virtual reality which blur the lines between the two realities (Lee et al. 2021) and make computer-generated artifacts indistinguishable from real-world content and vice versa. Sometimes this indistinguishability is referred to as *pure mixed reality* (Flavián et al. 2019) or *superrealism* (Slater et al. 2020). In this vein, Slater et al. (2020) discuss a set of potential negative consequences of superrealism in XR applications, e.g., including the question of what will happen if people tend to prefer to "live" in the virtual rather than in the real world – potential ethical dilemmas in light of the metaverse development. Tech investor and expert Shaan Puri posted a similar notion via Twitter in

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[2] http://metaverse.sourceforge.net, last accessed 06/23/22, 11:40 am.

which he referred to the metaverse not as a virtual place but as a point in time from which people value their virtual life higher than their physical life (Puri 2021), thus introducing another perspective on the metaverse.[3]

In sum, no consensus prevails as to *what* exactly the metaverse is and how it could in turn be conceptualized in research (Xu et al. 2022). Some even argue that up to now it is difficult to provide a complete definition and thus it is easier to only state what is *not* the metaverse (Ball 2021). It is for instance not a single technology such as VR, it is not a single virtual world such as Second Life, it is not a simple telepresence experience as known from VR applications, it is not a multiplayer video game, just to name a few. However, it may be a mix of all of these and aspects beyond. Especially from a research point of view, it is essential to distinguish between truly new questions, which are worth pursuing to generate *new* knowledge, and already addressed questions (e.g., within the *not* categories), which may simply be posed again under the premise of the metaverse. Therefore, it is of utmost importance to justify why it is necessary to study certain research questions now in the realm of the metaverse. Analogously to Kim (2021) for the advertising context, we argue that first steps need to clarify the fundamental definition of what is and more importantly what is not the metaverse in the view of IS research in order to demystify the term and to make the area easier to research for our community.

3 Relevance for BISE and Concluding Thoughts

When browsing the IS literature, one quickly recognizes that many of the characteristics that are associated with the metaverse have already been touched on. For instance, roughly around 100 articles published in journals originating from the Senior Scholars Basket-of-Eight take reference to the virtual world Second Life and studied related phenomena. Chaturvedi et al. (2011, p. 674) even described virtual worlds as a "new class of information system with several unique requirements." Similarly, already 20 years ago, Walsh and Pawlowski (2002) outlined that virtual reality technology is in need of IS research. Thus, we

observe that different facets that are said to constitute the metaverse have attracted attention among IS scholars and related fields. Far from being exhaustive, the following list provides an illustrative overview of some research directions followed in the past:

- Virtual worlds, its economy, and commerce (Animesh et al. 2011; Chaturvedi et al. 2011).
- Avatars as user representation (Suh et al. 2011).
- Immersive systems (AR,VR,MR) (Peukert et al. 2019; Wohlgenannt et al. 2020).
- Presence perceptions in digital encounters and factors contributing to it (i.e., social and tele-presence) (Cummings and Bailenson 2016; Gefen and Straub 2004; Nah et al. 2011).
- Interoperability, e.g., in terms of cross-platform trust signaling (Teubner et al. 2020).
- Virtual worlds with their richness of digital footprints as opportunity to learn more about economic and social behavior (Hinz et al. 2015; Hinz and Spann 2008).
- Technology-agnostic, e.g., in terms of multi-device information systems (Brudy et al. 2019; Gnewuch et al. 2022).
- Blockchain, NFTs, cryptocurrencies, decentralization (Beck et al. 2018; Jørgensen and Beck 2022; Sunyaev et al. 2021).

Overall, based on the prior work on different aspects around the metaverse, the IS discipline, in general, seems to be well prepared to contribute to prospective metaverse research. Similarly, the BISE community, with its ambition to research the efficient design and utilization of socio-technical systems and associated issues that involve individuals, groups, and organizations, may be well suited to tackle research questions popping up in that area. While first research areas for some of our BISE departments are already obvious (e.g., *Human Computer Interaction & Social Computing* may study design and usability/ user experience related questions of the metaverse, *Economics of IS* may set out to investigate the economic consequences of the metaverse development on business and society, or *Digital Business Management and Digital Leadership* may research the role of the metaverse in companies' digital transformation processes), for other departments they can probably only be specified in the next few years, once a clearer picture of the metaverse becomes apparent. Particularly given the large number of studies that have been conducted in the IS field on the topic of virtual worlds, we anticipate that many IS scholars will adopt the closely related topic of the metaverse in future. First articles can already be found within the latest IS conference proceedings and some calls for papers on the metaverse have recently been released [e.g., at the *HICSS conference* (Cheng et al. 2022a) or the *Internet Research* journal

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[3] A further comprehensive and particularly among practitioners popular source of information are the metaverse essays by Ball (2020, 2021). Therein, he outlines various metaverse attributes, which are largely congruent – even if sometimes named slightly differently – with the characteristics derived from literature in the previous sections. Nevertheless, we want to revisit two of his attributes in more detail here: (1) the attribute of supporting an *unlimited number of users* that can synchronously and persistently experience the metaverse, as well as (2) the fact that there will be a *multitude of different contributors*, from private individuals to commercial corporations, who will create and/ or operate all kinds of content and experiences within the metaverse (Ball 2020, 2021).

(Cheng et al. 2022b)]. Considering the groundwork that IS scholars have already carried out for virtual worlds and other related topics, the IS discipline is in a prime position to expand the already captured knowledge to the concept of the metaverse.

However, as shown before, multiple partly contradicting definitions of the metaverse have been formulated. We argue that based on today's rather vague picture of how the metaverse will finally take shape, it is currently not possible and/or reasonable to establish the *one* strict definition. Further, we believe that having several slightly different definitions is not a serious concern, as long as a clear foundation is laid within each article to avoid any misconceptions. Therefore, we encourage scholars to clearly mention the characteristics of their referenced metaverse concept to be able to interpret the results also against the background of the assumptions on which they are based. This will become especially important once the first empirical papers approach *the* metaverse to estimate to what extent the results are generalizable.

In essence, with this editorial we want to promote that any relation to the metaverse should be well substantiated. This means we should not just sell already existing phenomena under the umbrella of the metaverse anew. Therefore, we encourage all authors to (1) provide a sound description of what they refer to when linking their research to the metaverse, and to (2) not position research that clearly falls under the category *not* metaverse under its realm, and to (3) precisely justify the novelty of the pursued research question to avoid selling research outcomes twice.

Yet, some patience might be required in order to avoid writing too hastily about the metaverse. Even the big trailblazers say it is unrealistic that the metaverse will suddenly appear. It will take 10 to 15 years until the full potential of the metaverse will become visible (Bosworth and Clegg 2021). Until then, many incremental fragments will be sculpted on the way to form the big whole. Nevertheless, it is our responsibility today to prepare for that future and continuously accompany the development from a research perspective. If the metaverse follows a similar trajectory as the Internet, it could even not take several years but decades before the initial idea turns into a solution suitable for everyday use – but, like the Internet, it could then radically transform our lives. In a recently launched BISE special issue, Spiekermann-Hoff et al. (2021) invited contributions around the topic "Technology for Humanity." Particularly in light of the partially assumed transformative power of the metaverse, we as researchers need to take care that the metaverse will be developed *for* and not *against* humanity!

"*For some companies, the initial question of why a VW [Virtual World] presence might be needed for their organization has been answered by market pressures. Some organizations have a VW presence simply because their competitors are doing it, a phenomenon that mimics the early days of the Internet.*" (Davis et al. 2009, pp. 110–111).

Whether the same reasoning holds true for companies' metaverse endeavors, the future will show!

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