



Metaverse: A real change or just another research area?

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Abstract

The Metaverse, an evolving concept that fuses physical reality with digital virtuality, offers a dynamic environment for exploration. This paper reports the panel discussion on the Metaverse and its potential implications for individuals and research. This discussion was held at the Digitization of the Individual (DOTI) workshop at the International Conference on Information Systems in December 2022. Four scientists who have researched virtual reality, immersiveness, and corresponding user behavior were invited to the panel discussion. The panelists offered their perspectives on the unique characteristics of the Metaverse, how it differs from earlier digital worlds, and the implications that the Metaverse will bring for individuals. This paper provides an introduction to the emerging phenomenon of “Metaverse” and summarizes the discussion and expert perspectives on the topic. Furthermore, this paper links the discussion to the ongoing discourse in the literature, setting the stage for further investigations by providing explicit research avenues and questions.

Keywords Metaverse · Virtual reality · Digitization of the Individual (DOTI) · Research agenda · Panel

JEL Classification M000 · M150 · O320 · O330

Introduction

Emerging as a pivotal driver of future digital interactions, the Metaverse represents a distinct convergence of virtual and augmented realities that is redefining the boundaries of individual experience and societal dynamics.

While the concept of the Metaverse remains dynamic, the prevailing understanding suggests its characterization as a post-reality world—a continuous and interconnected multi-user environment that blends the physical reality with the digital virtuality (Mystakidis, 2022). The Metaverse represents an extended reality (XR) that integrates the physical with the digital to different degrees, including virtual reality (VR), mixed reality (MR), and augmented reality (AR) (Lee et al., 2021). This integration is facilitated by technologies and devices that enable users to engage in multisensory interactions, thus allowing them to interface

with objects and entities through personalized avatars. Moreover, the Metaverse consists of interconnected social networks of immersive environments linked by multi-user platforms. Consequently, the Metaverse presents many challenges and opportunities for practitioners aiming to harness its potential (Elnaj, 2022) as well as researchers delving into its nuances (Dwivedi et al., 2022).

While the Metaverse as such is still evolving, it is used as a buzz phrase to attract users, companies, and investors (Dolata & Schwabe, 2023). Nonetheless, not all characteristics of the Metaverse are new. For years, research has been looking at related phenomena in virtual spaces to explain avatar-self relationships (e.g., Zhang et al., 2020), collaboration practices (e.g., Pinkwart & Olivier, 2009), cooperation and competition in virtual worlds (e.g., Weiss & Schiele, 2013), and user innovation (e.g., Chandra & Leenders, 2012). Initial research that directly investigates the Metaverse studies entry-level challenges (Xi et al., 2022), the influence of emotions on user interactions (Mandolfo et al., 2022), and affordance actualization in Metaverse gaming (Shin, 2022). The topic is also picked up in research perspectives which focus on emerging challenges, opportunities, and agendas for research, practice, and policy in marketing (Kim,

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2021), information systems (Peukert et al., 2022), and multidisciplinary perspectives (Dwivedi et al., 2022). However, research is still in its infancy, terminology is disagreed upon, and understanding of the technology is controversial.

To explore and address these important contemporary issues, we convened a panel of four experts. Our goal was to discuss whether the Metaverse has the potential to significantly change the lives of individuals and what the information systems (IS) discipline and community can contribute. This discussion was part of the Digitization of the Individual (DOTI) workshop held in conjunction with the International Conference on Information Systems in December 2022 in Copenhagen. The Metaverse theme of this DOTI workshop was triggered by controversial discussions at previous workshops such as the panel discussion on Artificial Intelligence and Robots (Liang et al., 2021) as well as on the Dark Side of IS (Turel et al., 2019). The paper presentations during the workshop centered around a broad set of Metaverse issues including technological challenges, privacy, and user behavior and set the stage for a discussion among the experts on the panel facilitated by impulses from the experts in the audience.

The four panelists, in alphabetical order, were Christian Peukert, Karlsruhe Institute of Technology; Hamed Qahri-Saremi, Colorado State University; Ulrike Schultze, University of Groningen; and Jason B. Thatcher, Temple University. The panel was moderated by Adeline Frenzel-Piasentin, University of Augsburg.

During the workshop, the four panelists shared how their research experiences relate to the Metaverse, virtual reality, and user behavior and explained their motivations for focusing on these topics. They discussed the uniqueness, and implications of the Metaverse, before delving into the potential for IS research to contribute to the theoretical understanding and practical application of the Metaverse. Finally, the panelists outlined potential areas for future research, which we see as essential for stimulating the current discussions and providing guidance for researchers who wish to study the Metaverse.

Understanding the Metaverse

The status quo of research on the Metaverse

While the Metaverse is most prominently driven by practitioners and organizations such as Facebook, the buzz phrase finds increasing attention in research among various disciplines. Focusing on the IS discipline reveals that the Metaverse builds upon long-standing research interests in virtual worlds, laying a substantial foundation for new scholarly inquiry into this domain. For instance, platforms like Second Life, popular in the early 2000s, were the subject of extensive research (Chandra & Leenders, 2012; Schultze, 2014; Schultze & Orlikowski, 2010). Although technical

advancements have significantly transformed contemporary virtual worlds (Peukert et al., 2022), certain research themes persist, such as exploring user identity through avatars (Schultze, 2010; Zhang et al., 2020), investigating user experience and design (Kohler et al., 2011; Nickerson et al., 2022; Seidel et al., 2022), and analyzing the digital ecosystem and platform dynamics (Mueller et al., 2011; Pohsner & Hanelt, 2023; Schöbel & Leimeister, 2023).

Recent literature reviews, commentaries, and conceptual papers on the Metaverse (e.g., Chen et al., 2023; Dwivedi et al., 2022; Lee et al., 2021; Peukert et al., 2022) provide comprehensive overviews of current and potential research directions and highlight the field's nascent stage. For example, Dincelli and Yayla (2022) review the literature on immersive VR, as they claim that the main change is the degree of immersion, compared to previous research on digital virtual worlds. They identify two main research streams: (a) studies that focused on industry-specific applications and (b) the effect of immersive VR on individuals and groups. These papers further indicate the lack of consensus in its definition. This issue is exemplified by the works of Park and Kim (2022), who compare more than 54 different Metaverse definitions used in scholarly articles, and Zhou et al. (2023), who trace the evolution of its definition from a simple virtual world concept, via a specification of dimension involving AR, VR, life logging, and mirror worlds, to today's current state with a remaining need for a common definition of the metaverse.

Overall, extant literature underscores the evolution of virtual worlds and the ongoing challenges in defining and understanding their scope. This evolving academic discourse sets the stage for further exploration through the lens of expert insights. To delve deeper into these themes and gain a contemporary perspective, the panel discussion was convened, featuring experts whose research intersects various facets of the Metaverse. The discussion began by inviting panelists to share how their research connects to the Metaverse concept. In this context, Jason and Hamed mentioned that they feel that the term "Metaverse," even after reviewing its definitions in recent publications, is very fuzzy and poorly defined. This admission aligns with the previously discussed definitional ambiguity evident in the existing literature, highlighting the ongoing challenge of establishing a clear understanding of the Metaverse in academic circles.

Christian investigates foundational phenomena of the Metaverse by focusing on its "building blocks" by, for example, studying human behavior in VR. He explores how different degrees of immersion impact user behavior and the integration of various devices and modalities (e.g., Gnewuch et al., 2022). He investigates this in different domains, including the shopping context (e.g., Peukert et al., 2019), platform economy, or most recently also in the learning context.

In contrast, Hamed's research centers on user behavior on digital platforms (e.g., Qahri-Saremi & Turel, 2020), social media platforms (e.g., Turel & Qahri-Saremi, 2016), and review

platforms (e.g., Qahri-Saremi & Montazemi, 2023). Therefore, he sees the Metaverse as a new platform where he is still interested in researching how features and affordances impact user behavior. Like Christian, he particularly emphasizes that the concept of immersion and XR features differentiate the Metaverse from other platforms. Hamed aims to understand how the features that are unique to the Metaverse context influence user behavior.

Ulrike sets her focus on the role of technology within the context of the Metaverse. She draws comparisons between her previous studies of platforms like Second Life (Schultze, 2014) and the current landscape of the Metaverse. Her interest lies in understanding how technology shapes the Metaverse and its implications for user experiences, particularly in contrast to earlier platforms.

Lastly, Jason is interested in the concept of immediate feedback within the Metaverse. He discusses how the immersive nature of the Metaverse can change the way feedback is received. He emphasizes the need to redefine metrics and performance evaluation due to the real-time nature of interaction and feedback in the Metaverse.

The discussion of the panelists indicated that achieving a common and widely accepted definition of the Metaverse is challenged by its multidisciplinary nature, rapid technological advancements, and diverse applications, which contribute to conceptual ambiguity and evolution. The subjective nature of user experience, along with the broad economic and social implications, adds complexity. Moreover, global and cultural differences affect its interpretation, further complicating efforts to define it succinctly. The term “Metaverse” remains fuzzy due to these factors, reflecting the difficulty of crafting a definition that is both inclusive of its current and potential dimensions and specific enough to guide research and development effectively. This situation calls for a dynamic, collaborative approach to continuously refine and adapt the definition as the Metaverse evolves.

In summary, there is a consensus that the Metaverse, as Jason put it, “provides new ways of studying phenomena that we already study, but in a different context,” which is shaped by the immersive experience and the immediate feedback for users. This notion is also depicted in the academic discourse. For example, Dolata and Schwabe (2023) outline emerging research questions on the metaverse in the context of established IS research areas. Adding to this, the experts collectively underscore the significance of user behavior research, technological influence, and foundational features in shaping the emerging landscape of the Metaverse.

The uniqueness of the Metaverse

The consensus that the Metaverse represents a significant evolution from prior virtual environments, that emerges as

a profoundly immersive and interconnected digital frontier, the experts discussed insights to delineate the unique characteristics that distinguish the Metaverse from its predecessors (e.g., other platforms or virtual worlds such as Second Life).

Unlike earlier isolated platforms, the Metaverse is envisioned as a network of virtual worlds that are deeply intertwined. As Christian highlighted, this new realm promises the ability for “seamless movement from one virtual world to another,” where users can transfer their experiences and assets with unprecedented fluidity due to interoperability. Moreover, this interconnected space heralds a new era of fusion between virtual and physical realities. In the Metaverse, digital presence blends with tangible existence, resulting in a richer, more immersive experience. Ulrike drew attention to the pivotal relationship between users and their avatars in this context, noting the need to explore “How can I relate to the avatar? Who am I as an avatar in this virtual setting?” This suggests a deeper psychological and existential engagement with virtual spaces, challenging the traditional concept of technology as a separate tool and making it a more integral part of an individual’s identity and experience.

The Metaverse is not only a revolution in terms of user experience but also stands to transform economic interactions. As Hamed pointed out, it introduces a novel economic dimension, characterized by transactions through cryptocurrencies and Non-Fungible Tokens (NFTs), giving rise to what could be considered a “shadow economy.” This new form of economy within the Metaverse, powered by decentralized digital assets, represents a significant departure from previous virtual platforms and has the potential to influence global economic structures. However, the arrival of the Metaverse also comes with significant challenges, most notably regarding accessibility and societal impact. As Jason articulated, the Metaverse prompts urgent questions about inclusivity and equity—whether this burgeoning digital universe will be a space “for the privileged or for everyone” due to its high entry costs. The Metaverse thus challenges societies to address the digital divide and consider how this new space might either exacerbate existing inequalities or offer new pathways for more equitable global participation.

The discussion of the panelists on the uniqueness of the Metaverse indicated their diverse perspectives on the phenomenon. Christian holds a technical perspective, focusing on interoperability and the seamless transition between virtual environments within the Metaverse. In contrast, Ulrike and Jason offer social perspectives. Ulrike explores the integration of identity and the psychological relationship between users and their avatars, indicating a social and existential inquiry into how individuals relate to themselves and others in virtual spaces. Jason discusses inclusivity and the societal impact of the Metaverse, addressing concerns about equity and accessibility, which are inherently social issues.

Further, Hamed's perspective, while focusing on the economic aspects of the Metaverse, bridges both technical and social domains, highlighting the transformation of economic interactions through digital assets. However, his emphasis on cryptocurrencies and NFTs leans more toward the technical implications of these changes on societal structures.

In summary, the Metaverse uniquely allows for seamless, interconnected experiences across various virtual worlds, enabling users to maintain their assets and identities as they move between environments. The Metaverse may also introduce a new economic system potentially driven by cryptocurrencies and NFTs, blur the line between digital and physical reality, and challenge traditional concepts of self-perception and the human relationship with technology. However, high entry costs limit accessibility and raise the issue of inclusion. Table 1 summarizes the mentioned characteristics that have changed from "predecessor" virtual worlds to today's Metaverse.

The impact of the Metaverse on the individual

While the discussion on the uniqueness of the Metaverse already slightly touched upon the impact on the individual, this is further discussed by the experts regarding its impact on individuals' personal and professional lives. As an opener for this aspect, Jason noted that there is a significant gap between public perception and the actual concept of the Metaverse. He emphasized that the starting point is to "understand what people think the Metaverse is and how that meaning is being constructed." He believed that the meaning of the Metaverse will shape the path dependencies of what we see as implications and opportunities for study. Contrasting this perspective, Ulrike argued that the focus should not be on defining the Metaverse but rather on its practical applications, suggesting that we need to "decompose the Metaverse into its applications and see how people enact it." She called for a socio-material perspective (e.g., Orlikowski & Scott, 2008) depicting the Metaverse as a moving concept that consists of a confluence of experiential computing practices. Therefore, in her opinion, it will probably never have a stable meaning on which people will agree. Their arguments tangle back to the discourse in the literature on the misalignment in definition and understanding, which trigger various approaches to research the topic, such as multi-perspectives approach (Dwivedi et al., 2022), expert interviews (Lacity et al., 2023), and patent analysis (Pohsner & Hanelt, 2023) through various theoretical lenses (e.g., affordances (Dincelli & Yayla, 2022) or the sociotechnical perspective (Zhou et al., 2023)).

The Metaverse holds transformative potential for individuals, as outlined by Hamed. He highlighted its capacity to significantly change work environments, create a new large-scale economy, and offer deeper social interactions.

However, he also pointed to the darker sides of this technological frontier. One significant issue is the problem of misinformation in a world where reality can be constructed and reconstructed at will. Hamed raised the critical question, "What is the true information and what is the misinformation?" alongside expressing deep concerns over potential security and privacy issues, especially with the vast biometric data collection that the Metaverse could involve.

Once more, the issue of interoperability was highlighted by Christian. It is the capability of moving data, identity, and other aspects seamlessly from one platform to another, which Christian pointed out as a "key difference between what we have now and what the Metaverse will be." Ulrike also returned to her previous point on the relationship between the user and the avatar. She added that identity is another intricate component in this new landscape. She delved into questions of identity within the Metaverse, pondering how individuals might choose to represent themselves in this expansive virtual space. She questioned, "How closely do people want to link their virtual identities to their real identities?" and boldly challenged the clear separation between virtual and real, positing that "the real is what you are doing right now, whether on- or offline. That is what is real."

Jason introduced the concept of a "social portmanteau"—the baggage of social connections and relationships that a user develops on one platform. He raised the question regarding the implications of this social portmanteau as users move between different platforms in the Metaverse: "What happens to my social portmanteau and how does that portmanteau make it stickier not to move?"

This conversation underscored the multifaceted impacts that the Metaverse may have on individuals, intertwining technology with our sense of self, our work, our connections with others, and our very understanding of reality itself, which will manifest itself in a spectrum of physical and virtual artifacts. As these consequences for the individual are based on the characteristics of the Metaverse, Table 1 indicates how the characteristics result in consequences for the individual.

Future research directions for IS scholars in the context of the Metaverse

Future directions for IS research on the Metaverse

The panelists discussed whether and how traditional IS theories may apply to the Metaverse as a new, socially constructed, technology-enabled environment. The assumption of the rational actor maximizing utility, which is the underlying logic of many research studies, may not be applicable in this environment because there are many non-economic user motivations. The experts

Table 1 Metaverse characteristics and its consequences

Characteristics	Virtual worlds	Metaverse	Consequences for the individual
Inter-connectedness	Isolated platforms with limited interconnectivity	Network of deeply intertwined virtual worlds	Enhanced ability to maintain social connections and digital assets across platforms, potentially altering social interaction patterns
Reality fusion	Clear distinction between virtual and real worlds	Blends digital presence with tangible existence	Challenges in differentiating between virtual and real-life experiences, potentially impacting real-world interactions and perceptions
User-avatar relationship	Avatars are simple online representations	Deeper psychological and existential engagement	Decision-making about virtual identity representation, impacting self-identity and social interactions
Economic model	Traditional virtual economy (if any), often isolated to a specific platform	Introduction of cryptocurrencies and NFTs, creating a novel, decentralized economic system	Exposure to new forms of digital economy and potential financial opportunities, coupled with risks associated with digital transactions
Accessibility and societal impact	Basic digital access, limited economic barriers	High entry costs raise issues of inclusivity, potentially widening the digital divide	Reduced access to emerging digital opportunities and experiences for economically disadvantaged individuals, potentially intensifying feelings of exclusion and inequality

suggested that native IS theories need to be created to theorize this technology-infused environment. This can be done by combining social theories such as the structuration theory (Giddens, 1984), the practice theory (Bourdieu & Bourdieu, 1977), and Goffman’s interaction theories (Goffman, 1956). According to Ulrike, the holy grail of IS research is to develop mid-range theories that apply specifically to IT contexts. She emphasized the urgency for IS research to develop native theories that are more suited to the digital and experiential nature of the Metaverse. “Combining existing social theories with theories related to Metaverse-specific phenomena might be a fruitful way forward,” she advised. This would allow the IS discipline to make more insightful and context-relevant statements about technology-infused environments like the Metaverse.

The panelists also mentioned that social presence theory (Short et al., 1976) and the trust literature (Gefen et al., 2003; Luhmann, 1997) may need to be re-evaluated to see if the current research discourse provides enough understanding of highly immersive environments. Christian introduced the importance of reimagining how immersion and trust function in these new digital spaces by stating: “The ability to port avatars, digital inventory, etc. from A to B implies that we need people, companies, or operators to trust that what is ported from one platform to the other will really work well.”

Furthermore, Hamed and Ulrike delved into the philosophical implications of the Metaverse, particularly concerning the concepts of truth and reality. Hamed posed the question, “What is the truth in the Metaverse?” and highlighted the complexity of defining truth in such an expansive and mutable space. The coherence approach in the philosophy of truth may become dominant in the Metaverse, which could lead to polarization and different versions of truth. Ulrike proposed that “data creates reality,” rather than merely representing it, which suggests a performative view of reality that challenges existing philosophical constructs and that the Metaverse changes our assumptions about correspondence and representation of reality.

The panel also engaged in discussions about governance within the Metaverse, with Hamed raising questions about the responsibility and role of Metaverse platform owners, asking, “How are they able to govern and control the Metaverse given the plethora of behaviors that can emerge?” This conversation naturally put an emphasis on the importance of proactive design, as Jason urged the IS community to engage with the Metaverse in its formative stages, asking “Do we want to engage with the technology after it has been created, or do we want to help create the technology?” He encouraged a focus on the normative implications of design decisions.

The panel's insights collectively call for a deeply philosophical reevaluation of how IS research approaches the complex, immersive, and socially constructed worlds of the Metaverse.

Emergent approaches to IS research in the Metaverse

While the previous discussion focuses on the Metaverse as the phenomenon of research, the panelists further discussed the opportunities and threats of conducting experimental studies within the Metaverse.

Christian opened the discourse by highlighting the unique opportunity "to use the Metaverse as an environment for experimental studies which may solve the trade-off conflict between ecological validity and experimental control," assuming future technology's ability to induce a highly convincing telepresence experience. He envisioned that the Metaverse could act as a "virtual lab," offering an unprecedented combination of realistic, immersive environments, and precise experimental conditions. This could facilitate more scalable and globally accessible experiments, with results potentially aligning with the "ground truth" observed in the real world. However, the transferability of results from the Metaverse to the physical world is a contentious point. Ulrike pushed back on this optimistic view, arguing, "The leap to say that what we study in the virtual is reflective of and the results are transferable to the real, goes too far; it will always be questioned." She suggested that even though the Metaverse offers a rich environment to study phenomena, it is fundamentally different from physical reality due to its distinct material and social configurations. The Metaverse, in her view, should be studied for its own sake, especially if it becomes a significant part of our daily lives.

The convergence of online and offline identities and experiences, and the increasingly blurred line between these realms, is another significant aspect. Jason articulated this perspective, arguing, "Our offline and online is an artificial distinction today... The Metaverse, as a social vision, is a place, where this convergence becomes even closer." He contended that the Metaverse raises a new set of intricate and context-specific research questions, including issues around cyberbullying in highly immersive environments and the mental and emotional effects of long-term exposure to these spaces. Adding to the discussion, Hamed raised the issue of the rapid technological development of the Metaverse and the risks this poses for research. He warned, "If you use the current Metaverse technology and run an experiment in that environment, once the technology develops in a year or two, you will have to do the experiment all over again because you may get different results." This draws attention to the inherently transient and evolving nature of the technologies, which challenges the stable conditions typically sought in experimental design.

Lastly, Jason introduced a broader concern regarding the tension between fast-to-market and slow-to-market research. As technology evolves at a swift pace, he suggests the need for agility in research outputs: "We need to accelerate our publishing cycle times if we want to be relevant and have an impact on practice." At the same time, Jason called for deeper, reflective, and philosophically informed research to address fundamental issues tied to the Metaverse and argued for a scholarly culture that values both approaches equally.

The panelists uncovered a spectrum of perspectives and challenges surrounding experimental research in the Metaverse. While acknowledging the significant opportunities presented, they are united in their call for careful, thoughtful, and adaptable approaches to studying this fast-evolving digital frontier.

Challenges to address

This section revisits the panel discussion on the metaverse and highly immersive environments to connect the experts' insights to the existing academic discourse on the metaverse. The focus is on the extent to which the current literature adequately captures the uniqueness of the metaverse and what future research can do beyond this. The panelists shed light on their own areas of focus in the discussion of the Metaverse and highly immersive environments. They provided their viewpoints on avenues for future research in this area and highlighted opportunities and challenges regarding research topics, methodologies, and philosophy. Building on the viewpoints of the experts, we distinguish six distinct research perspectives to explore the challenges around the Metaverse: the impact of the metaverse, technological considerations, theory-focused questions, philosophical perspectives, emerging concepts and constructs of interest, and methodological opportunities. The expert's viewpoints, interwoven with the analysis of existing literature and the discussion around the panel, guided the formulation of research questions that aim to advance the scholarly discourse on the Metaverse.

The impact of the metaverse

The economic implications of the Metaverse, as discussed by Hamed, foreground the role of cryptocurrencies and NFTs, which are also concerns and observations in existing literature (Dowling, 2022; Urquhart, 2016). The shadow economy within the Metaverse, alongside the mainstream adoption of digital currencies, presents new challenges and opportunities for economic models. Hamed's insights prompt an investigation into how these economic activities influence traditional financial systems and the broader socio-economic landscape. Complementing this, Jason's focus on social implications, including the transformative potential of the Metaverse on communication, interaction, and societal norms, aligns with

Schultze's (2010) exploration of virtual worlds' impact on social behaviors. Research questions emerging from this perspective address the balance between technological advancements and their social ramifications, probing the dual potential of the Metaverse to innovate and disrupt.

Technological considerations

Christian's emphasis on interoperability and the seamless integration of virtual experiences with real-world applications highlights a critical area of technological inquiry within the Metaverse. This perspective resonates with Chen et al.'s (2023) discussion on the technical challenges of creating a unified Metaverse, including standardization and security challenges. The exploration of augmented and virtual reality technologies, as foundational elements of the Metaverse, necessitates a deeper understanding of their implications for user experience, privacy, and digital sovereignty.

Theory-focused questions

Ulrike's advocacy for the development of mid-range, native IS theories that reflect the socio-material complexities of virtual identities and environments is crucial. Her viewpoint aligns with the theoretical exploration of how sociality is constructed in the Metaverse, the adaptation of theories from social psychology, and the reevaluation of traditional IS theories in light of immersive experiences. The questions around governance structures and the dynamic conception of identity within the Metaverse highlight the pressing need for theoretical frameworks that can navigate the nuanced realities of technology-infused environments. Also the fuzziness around the definition of the concept "Metaverse" is among the potential challenges that need to be addressed by research.

Philosophical perspectives

The Metaverse, as Hamed points out, challenges conventional notions of truth and reality, invoking a philosophical inquiry into how these concepts are constructed and perceived in digital contexts. This discussion intersects with the exploration of digital twins and their implications for our understanding of authenticity and replication in virtual spaces. The philosophical dimension of Metaverse research probes the ethical, existential, and epistemological questions raised by the creation and inhabitation of these comprehensive digital worlds.

Emerging concepts and constructs of interest

The emergence of new concepts and constructs, particularly those related to identity, community, and immersion,

is central to understanding the Metaverse's societal impact. Christian and Jason's discussions highlight the importance of these constructs in shaping user experiences and expectations within virtual environments. This perspective encourages an examination of how digital identities are formed, managed, and perceived, drawing on (Schultze, 2010, 2014) virtual identity and community.

Methodological opportunities

Finally, the Metaverse offers unique methodological opportunities for research, as noted by Christian and Jason. The potential to utilize the Metaverse as a "virtual lab" for experimental research opens new avenues for studying behavior, interaction, and technology adoption in controlled yet complex virtual settings. This approach aligns with the exploration of virtual environments for empirical research, suggesting the Metaverse can significantly contribute to our methodological repertoire, especially in fields that intersect with human-computer interaction, sociology, and economics.

Table 2 synthesizes these research perspectives and outlines specific future research questions that were identified during the discussions in and surrounding the workshop. They are not intended to be exhaustive but rather serve as inspiration for future research.

Concluding remarks

In conclusion, the evolving Metaverse landscape converges digital and physical realities, generating novel prospects and complexities for individuals, societies, and researchers. The insights shared by our expert panel underscore that the Metaverse transcends a mere technological concept, fundamentally altering how we perceive, engage with, and interpret the world. The panel's discourse has thoroughly traversed the Metaverse's facets, unveiling its distinct attributes, potential individual impacts, and burgeoning research avenues within the IS discipline.

Clearly, the panelists agree that the Metaverse holds significant importance, which beckons IS researchers to comprehend the synergy between humans and technology, potentially fostering substantial disruptions across personal, organizational, and societal spheres. Amidst this socio-technical evolution, the toolkit and methodologies of IS scholars bear the potential to both understand and shape the Metaverse's course. Simultaneously, the discussions shed light on the need to critically discern between novel aspects and recurring themes in the Metaverse research.

The ideas shared by the panelists also point to different approaches to understanding the challenges and possibilities of the Metaverse. In particular, the panelists advocate for the inclusion of diverse philosophical underpinnings, multifaceted

Table 2 Discussed topics for future research

Research perspectives	Potential research questions
The impact of the Metaverse	<ul style="list-style-type: none"> • Economic impact <ul style="list-style-type: none"> ◦ Which impact have <i>cryptocurrencies and non-fungible tokens</i> on economic transactions in the Metaverse? ◦ What role do cryptocurrencies and NFTs play in the development of new economic models within the Metaverse for sectors such as real estate, education, and healthcare? ◦ How do unregulated <i>transactions</i> contribute to the development of a shadow economy in the Metaverse? ◦ Which new dimensions of <i>value creation</i> evolve in highly immersive environments? How can value creation in the Metaverse be characterized? ◦ Which impact do highly immersive environments have on <i>value creation</i>? • Social impact <ul style="list-style-type: none"> ◦ Which <i>social implications</i> does the Metaverse have for users? ◦ How do <i>negative consequences</i> (e.g., fake news and misinformation, privacy, and security) differ in the Metaverse? ◦ How do highly immersive environments <i>change social interactions</i> (e.g., enhancing communication and collaboration and facilitating bullying and harassment)?
Technological considerations	<ul style="list-style-type: none"> • Which role has <i>technology</i> in highly immersive environments? • How do the <i>building blocks</i> of the Metaverse (AR, VR, XR) contribute to its distribution across user groups and sectors? • How do <i>immersive virtual and augmented reality features</i> affect user behavior? • How do individuals respond to specific <i>applications</i> of the Metaverse? • Which <i>levels of interoperability</i> exist in the Metaverse? How do different levels of interoperability enable new business models? • How do <i>interoperability and portability</i> influence user experiences? • How does <i>portability</i> enable user co-creation?
Theory-focused questions	<ul style="list-style-type: none"> • Theory building and adaptation of native IS theories <ul style="list-style-type: none"> ◦ How is <i>sociality</i> created in the Metaverse? ◦ How can we adapt <i>social psychology theories</i> to inform new native IS theories? ◦ How do highly immersive environments <i>challenge our assumptions within traditional IS theories</i> (e.g., TAM)? ◦ How do we define the <i>governance structure</i> in the Metaverse? • Conception of identity and user perceptions of the Metaverse <ul style="list-style-type: none"> ◦ Under what conditions would users want their <i>virtual identity</i> to stay the same and under what conditions would user want to have flexibility? ◦ How do individuals <i>perceive</i> the Metaverse? • Conception of the definition and characteristics of the Metaverse <ul style="list-style-type: none"> ◦ How to categorize the diverse components, functionalities, and user interactions within the Metaverse? ◦ How do the characteristics of the Metaverse evolve over time?
Philosophical perspectives	<ul style="list-style-type: none"> • How to conceptualize the Metaverse for a <i>common understanding</i>? • How does the <i>correspondence theory of truth</i> apply to the Metaverse? • If <i>data creates reality</i>, how does this perspective change our understand of truth? • How is <i>reality represented</i> in the Metaverse? • How is reality perceived in the emergence of digital twins? • If traditional ideas of correspondence and representation do not apply to the Metaverse, how can we understand <i>reality</i> in the Metaverse?
Emerging concepts and constructs of interest	<ul style="list-style-type: none"> • How do individuals construct their <i>social portmanteau</i> in highly immersive environments? • How <i>interoperability and portability</i> impact individuals' <i>social portmanteaus</i>? • How can interoperability between different Metaverse platforms be improved to support a wider range of economic activities, including commerce, education, and professional services? • Which challenges arise for individuals' <i>social portmanteaus</i> in highly immersive environments? • How does the <i>concept of immersion</i> change in the Metaverse? • How does <i>immersion</i> influence individuals' <i>usage experiences</i> in the highly immersive environments? • How does the <i>concept of trust</i> change in the Metaverse? • Which dimensions of <i>portability</i> increase <i>trust</i> of organizations and individuals?
Methodological opportunities	<ul style="list-style-type: none"> • How <i>transferable</i> are experimental results obtained within the Metaverse when applied to real-world contexts? • What are the advantages and limitations of using the Metaverse as a "<i>virtual lab</i>" for experimental studies compared to traditional laboratory settings? • How can researchers harness the <i>immersive and realistic qualities</i> of the Metaverse to conduct experiments that would be challenging or impossible in physical settings? • How can researchers account for the <i>rapid technological evolution</i> of the Metaverse when designing and conducting experiments? • What are the implications of the <i>fast pace of technological change</i> in the Metaverse on the speed and depth of research output?

approaches to theory construction and validation, and a broad spectrum of methodological avenues in the study of immersive environments like the Metaverse. In conclusion, this synthesis of expert insights acts as a guide, directing researchers toward the multifaceted exploration of the ever-evolving Metaverse.

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References

- Bourdieu, P., & Bourdieu, P. (1977). *Outline of a theory of practice (Nachdr.)*. Cambridge Univ. Press.
- Chandra, Y., & Leenders, M. A. A. M. (2012). User innovation and entrepreneurship in the virtual world: A study of Second Life residents. *Technovation*, 32(7–8), 464–476. <https://doi.org/10.1016/j.technovation.2012.02.002>
- Chen, H., Duan, H., Abdallah, M., Zhu, Y., Wen, Y., Saddik, A. E., & Cai, W. (2023). Web3 metaverse: State-of-the-art and vision. *ACM Transactions on Multimedia Computing, Communications, and Applications*. <https://doi.org/10.1145/3630258>
- Dincelli, E., & Yayla, A. (2022). Immersive virtual reality in the age of the metaverse: A hybrid-narrative review based on the technology affordance perspective. *The Journal of Strategic Information Systems*, 31(2), 101717. <https://doi.org/10.1016/j.jsis.2022.101717>
- 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(3), 239–266. <https://doi.org/10.1177/02683962231159927>
- Dowling, M. (2022). Fertile LAND: Pricing non-fungible tokens. *Finance Research Letters*, 44, 102096. <https://doi.org/10.1016/j.frl.2021.102096>
- 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., Janssen, M., Kim, Y.-G., Kim, J., Koos, S., Kreps, D., Kshetri, N., Kumar, V., Ooi, K.-B., Papagiannidis, S., Pappas, I. O., Polyviou, A., Park, S.-M., Pandey, N., Queiroz, M. M., Raman, R., Rauschnabel, P. A., Shirish, A., Sigala, M., Spanaki, K., Tan, G. W.-H., Tiwari, M. K., Viglia, G., & 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>
- Elnaj, S. (2022). *The challenges and opportunities with the metaverse*. Forbes. <https://www.forbes.com/sites/forbestechcouncil/2022/05/17/the-challenges-and-opportunities-with-the-metaverse/>. Accessed 5 Sept 2024.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51–90. <https://doi.org/10.2307/30036519>
- Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration (First paperback edition)*. University of California Press.
- Gnewuch, U., Ruoff, M., Peukert, C., & Maedche, A. (2022). Multi-experience. *Business & Information Systems Engineering*, 64(6), 813–823. <https://doi.org/10.1007/s12599-022-00766-8>
- Goffman, E. (1956). *The presentation of self in everyday life* (1. Anchor Books ed., rev. ed.). Anchor Books.
- Kim, J. (2021). Advertising in the metaverse: Research agenda. *Journal of Interactive Advertising*, 21(3), 141–144. <https://doi.org/10.1080/15252019.2021.2001273>
- Kohler, T., Fueller, J., Matzler, K., Stieger, D., & Füller, J. (2011). Co-creation in virtual worlds: The design of the user experience. *MIS Quarterly*, 35(3), 773–788. <https://doi.org/10.2307/23042808>
- Lacity, M., Mullins, J. K., & Kuai, L. (2023). Evolution of the metaverse. *MIS Quarterly Executive*, 22(2), 165–173. <https://doi.org/10.17705/2msqe.00079>
- Lee, L.-H., Braud, T., Zhou, P., Wang, L., Xu, D., Lin, Z., Kumar, A., Bermejo, C., & Hui, P. (2021). All one needs to know about metaverse: A complete survey on technological singularity, virtual ecosystem, and research agenda. *arXiv*. <http://arxiv.org/abs/2110.05352>. Accessed 5 Sept 2024.
- Liang, T.-P., Robert, L., Sarker, S., Cheung, C. M. K., Matt, C., Trenz, M., & Turel, O. (2021). Artificial intelligence and robots in individuals' lives: How to align technological possibilities and ethical issues. *Internet Research*, 31(1), 1–10. <https://doi.org/10.1108/INTR-11-2020-0668>
- Luhmann, N. (1997). *Trust and power* (C. Morgner & M. King, Eds.; H. Davies, J. Raffan, & K. Rooney, Trans.). Polity.
- Mandolfo, M., Baisi, F., & Lamberti, L. (2022). How did you feel during the navigation? Influence of emotions on browsing time and interaction frequency in immersive virtual environments. *Behaviour & Information Technology*, 0(0), 1–14. <https://doi.org/10.1080/0144929X.2022.2066570>
- Mueller, J., Hutter, K., Fueller, J., & Matzler, K. (2011). Virtual worlds as knowledge management platform – A practice-perspective. *Information Systems Journal*, 21(6), 479–501. <https://doi.org/10.1111/j.1365-2575.2010.00366.x>
- Mystakidis, S. (2022). Metaverse. *Encyclopedia*, 2(1), 486–497. <https://doi.org/10.3390/encyclopedia2010031>
- Nickerson, J. V., Seidel, S., Yepes, G., & Berente, N. (2022). Design principles for coordination in the metaverse. *Academy of Management Annual Meeting*.
- Orlikowski, W. J., & Scott, S. V. (2008). Sociomateriality: Challenging the separation of technology, work and organization. *Academy of Management Annals*, 2(1), 433–474. <https://doi.org/10.5465/19416520802211644>
- Park, S.-M., & Kim, Y.-G. (2022). A metaverse: Taxonomy, components, applications, and open challenges. *IEEE Access*, 10, 4209–4251. <https://doi.org/10.1109/ACCESS.2021.3140175>
- Peukert, C., Pfeiffer, J., Meißner, M., Pfeiffer, T., & Weinhardt, C. (2019). Shopping in virtual reality stores: The influence of immersion on system adoption. *Journal of Management Information Systems*, 36(3), 755–788. <https://doi.org/10.1080/07421222.2019.1628889>
- Peukert, C., Weinhardt, C., Hinz, O., & van der Aalst, W. M. P. (2022). Metaverse: How to approach its challenges from a BISE perspective. *Business & Information Systems Engineering*. <https://doi.org/10.1007/s12599-022-00765-9>
- Pinkwart, N., & Olivier, H. (2009). Cooperative virtual worlds—A viable eCollaboration pathway or merely a gaming trend? *Electronic Markets*, 19(4), 233–236. <https://doi.org/10.1007/s12525-009-0022-2>
- Pohsner, H., & Hanelt, A. (2023). Mapping the metaverse – Knowledge generation structures in a nascent ecosystem. *International Conference on Information Systems*.

- Qahri-Saremi, H., & Montazemi, A. R. (2023). Negativity bias in the diagnosticity of online review content: The effects of consumers' prior experience and need for cognition. *European Journal of Information Systems*, 32(4), 717–734. <https://doi.org/10.1080/0960085X.2022.2041372>
- Qahri-Saremi, H., & Turel, O. (2020). Ambivalence and coping responses in post-adoptive information systems use. *Journal of Management Information Systems*, 37(3), 820–848. <https://doi.org/10.1080/07421222.2020.1790193>
- Schöbel, S. M., & Leimeister, J. M. (2023). Metaverse platform ecosystems. *Electronic Markets*, 33, 12. <https://doi.org/10.1007/s12525-023-00623-w>
- Schultze, U. (2010). Embodiment and presence in virtual worlds: A review. *Journal of Information Technology*, 25(4), 434–449. <https://doi.org/10.1057/jit.2010.25>
- Schultze, U. (2014). Performing embodied identity in virtual worlds. *European Journal of Information Systems*, 23(1), 84–95. <https://doi.org/10.1057/ejis.2012.52>
- Schultze, U., & Orlikowski, W. J. (2010). Research commentary: Virtual worlds: A performative perspective on globally distributed, immersive work. *Information Systems Research*, 21(4), 810–821. <https://doi.org/10.1287/isre.1100.0321>
- Seidel, S., Berente, N., Nickerson, J., & Yepes, G. (2022). Designing the metaverse. *Hawaii International Conference on System Sciences*. <https://doi.org/10.24251/HICSS.2022.811>
- Shin, D. (2022). The actualization of meta affordances: Conceptualizing affordance actualization in the metaverse games. *Computers in Human Behavior*, 133, 107292. <https://doi.org/10.1016/j.chb.2022.107292>
- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London: Wiley.
- Turel, O., & Qahri-Saremi, H. (2016). Problematic use of social networking sites: Antecedents and consequence from a dual-system theory perspective. *Journal of Management Information Systems*, 33(4), 1087–1116. <https://doi.org/10.1080/07421222.2016.1267529>
- Turel, O., Matt, C., Trenz, M., Cheung, C. M. K., D'Arcy, J., Qahri-Saremi, H., & Tarafdar, M. (2019). Panel report: The dark side of the digitization of the individual. *Internet Research*, 29(2), 274–288. <https://doi.org/10.1108/INTR-04-2019-541>
- Urquhart, A. (2016). The inefficiency of Bitcoin. *Economics Letters*, 148, 80–82. <https://doi.org/10.1016/j.econlet.2016.09.019>
- Weiss, T., & Schiele, S. (2013). Virtual worlds in competitive contexts: Analyzing eSports consumer needs. *Electronic Markets*, 23(4), 307–316. <https://doi.org/10.1007/s12525-013-0127-5>
- Xi, N., Chen, J., Gama, F., Riar, M., & Hamari, J. (2022). The challenges of entering the metaverse: An experiment on the effect of extended reality on workload. *Information Systems Frontiers*. <https://doi.org/10.1007/s10796-022-10244-x>
- Zhang, Y. G., Dang, M. Y., & Chen, H. (2020). An explorative study on the virtual world: Investigating the avatar gender and avatar age differences in their social interactions for help-seeking. *Information Systems Frontiers*, 22(4), 911–925. <https://doi.org/10.1007/s10796-019-09904-2>
- Zhou, Z., Chen, Z., & Jin, X.-L. (2023). A review of the literature on the metaverse: Definition, technologies, and user behaviors. *Internet Research, ahead-of-print*(ahead-of-print). <https://doi.org/10.1108/INTR-08-2022-0687>

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