Dec 11th, 12:00 AM

Are Organizations Ready for Metaverse? Identifying Influencing Factors for Initiating Metaverse in the Organizational Context

Philippe Herve Jacquemin
Technical University of Darmstadt, jacquemin@is.tu-darmstadt.de

Merve Turan Akdag
TU Darmstadt, merve.turan_akdag@tu-darmstadt.de

Maren Mehler
Technical University of Darmstadt, maren.mehler@tu-darmstadt.de

Nihal Wahl
Information Systems, wahl@is.tu-darmstadt.de

Peter Buxmann
Technische Universität Darmstadt, buxmann@is.tu-darmstadt.de

Are Organizations Ready for Metaverse? Identifying Influencing Factors for Initiating Metaverse in the Organizational Context

Completed Research Paper

Philippe H. Jacquemin, Merve Turan Akdag, Maren F. Mehler, Nihal Wahl and Peter Buxmann
Technical University of Darmstadt
Hochschulstraße 1, 64289 Darmstadt
philippe.jacquemin@tu-darmstadt.de, merve.turan_akdag@tu-darmstadt.de, maren.mehler@tu-darmstadt.de, nihal.wahl-islam@tu-darmstadt.de, peter.buxmann@tu-darmstadt.de

Abstract

The metaverse is intended to reflect almost all activities of everyday and professional life in creating a new experience of social interaction by merging the virtual and real world in an interactive environment. It has the potential to disrupt the way we interact, socialize and work and thus organizations pursue possible application areas. However, there is a lack of research on the organizational readiness factors to ensure a successful initiation. To address this, we conducted 17 expert interviews from different industries. Drawing on the TOE framework, we identified 14 factors and respective propositions for the organizational context. Thereby well-known factors such as top management support were adapted to the requirements of the metaverse, but also new metaverse-specific factors emerged such as standards and interoperability.

Keywords: Metaverse, TOE framework, organizational readiness, virtual worlds

Introduction

In recent years, digitalization has led to significant advances in organizations striving to seize the opportunities of digital transformation. One of the latest developments to emerge is the metaverse as a network of virtual (3D) environments, which is intended to reflect almost all activities of everyday as well as professional life and creates a new experience of social interaction by merging the virtual world with the real world (Dwivedi et al., 2022). It is currently among the top 10 strategic technology trends in 2023 (Groombridge, 2022) that organizations can leverage to enter new business areas and evolve in innovative ways. Even though the term and vision of the metaverse dates back three decades, it first gained widespread awareness in 2021 when Mark Zuckerberg, founder of Meta Platforms, announced an offensive metaverse strategy by rebranding Facebook to Meta (Dolata & Schwabe, 2023; Kelly, 2021). Consequently, the concept of metaverse has become increasingly popular and is attracting users, investors, and organizations (Dolata & Schwabe, 2023). With the metaverse, virtual worlds are created that combine today's internet and elements of the real world in an interactive environment (Bao et al., 2022; Dwivedi et al., 2022). *Metaverse* can be understood as a general abstract concept or as a specific instance. We use the term *the metaverse* to refer to the general sociotechnical concept of a new digital ecosystem that is emerging from the interaction of a variety of technologies and not to a single specific instance or prototype of the overarching concept (Dolata & Schwabe, 2023; Marabelli & Newell, 2023). We will give examples, but do not refer to a specific prototype such as Horizon Workrooms of Meta by the term *the metaverse*.

Technical advancements in immersive technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) have led to a new surge in virtual worlds, making the concept of the metaverse closer to becoming possible than ever before. Despite this early stage of metaverse with a variety of perspectives, it has the potential to disruptively change business as an emerging technology. In the future, the metaverse is expected to be able to generate use cases in almost all industries, such as retail, entertainment, healthcare, education, financial services, and e-commerce (Dwivedi et al., 2022). Given this promising and disruptive potential of the metaverse, many of the world's largest technology organizations such as Meta, Microsoft, NVIDIA, and Apple are investing large amounts of money in metaverse-related technologies such as blockchain, non-fungible token (NFT), AR/VR, 3D representations, and even cloud and edge computing (Dolata & Schwabe, 2023). Gartner, a provider of market research results and analyses on developments in IT, predicts that by 2026, 25% of the population will spend at least one hour a day in metaverse for various activities such as working, shopping, learning, or even socializing (Gartner, 2022). Depending on the scope of the definition, the market for the metaverse is expected to be between $1-5 trillion in 2030 (Bloomberg, 2023; McKinsey, 2022).

The vision of virtual worlds is not a new phenomenon as virtuality and virtual worlds in particular have existed in various forms for decades. Over these past years, various stages of development have contributed to advancing technology and shaping today's vision of the metaverse. Also in the IS literature, work can be found – in particular Second Life, a virtual world where users can interact with items and other users as avatars, is often referred to as one of the main predecessors of the idea behind the current metaverse, respectively described as the (first mass-scale) metaverse itself (Gent, 2022; Matsubara & Oguchi, 2010). Thus, many of the features of the metaverse discussed today were already present (in rudimentary form) in Second Life. The constant advancements in both technology and concepts have led to the metaverse being continually reimagined or rethought, and use cases for both organizations and individuals are being reexamined and developed (Kim, 2021; Lee & Kim, 2022), even though it is not yet clear what exactly the metaverse will look like (Dolata & Schwabe, 2023). Some visions are already feasible today, others will be in the coming years and decades (Peukert et al., 2022). Although metaverse related research has been existing for several years, there is hardly any guidance to initiate metaverse in organizations. In research so far there is on the one hand one research stream attempting to conceptualize properties and key elements of the metaverse (e.g., Bao et al., 2022; Dionisio et al., 2013; Dolata & Schwabe, 2023; Dwivedi et al., 2022; Peukert et al., 2022), on the other hand a second stream describing specific use cases, how the metaverse changes experiences, and how it can be used especially in daily (e.g., Choi & Kim, 2017; Niu & Feng, 2022) but also in business life (e.g., Bian et al., 2022; Bourlakis et al., 2009; Hassouneh & Brengman, 2015; Marabelli & Newell, 2023). Most publications describe impacts on organizations when they are already in the metaverse. However, there has been no research so far that examines the influencing factors during the initial phase of metaverse initiation within organizations. Identifying these influencing factors can be crucial for success. Understanding the dynamics that come into play when introducing the metaverse concept within organizational contexts is essential. This includes exploring the technological, organizational, and environmental dimensions that can either enable or inhibit the adoption of metaverse technologies and practices. Therefore, our research investigates the readiness of organizations to pursue the metaverse in order to implement use cases and business models. Against this background, we define the following research question (RQ): W*hat factors influence an organization's readiness to embrace the metaverse?* To answer this research question, we conducted a qualitative study based on semi-structured expert interviews. The experts are organizational users and providers of current metaverse applications and related technologies but are also dealing with the overall future concept of the sociotechnical ecosystem of the expected metaverse and whose current position is directly related to the metaverse. The results are sorted according to the theoretical fundamentals of the innovation process by Rogers (2003) and the technology-organization-environment framework (TOE) from DePietro et al. (1990). In this way, we are able to provide an extended framework in an organizational context to assess specific factors of the initiation – the first step of the innovation process, explained in the conceptual framework section – of metaverse applications and associated technologies. This paper follows this structure: In the next chapter, we delve into the theoretical background and provide an overview of related works. We then describe our qualitative study's methodology and present the 14 factors and their respective propositions influencing metaverse adoption in organizations, considering technological, organizational, and environmental perspectives. The paper concludes with a discussion covering contributions, limitations, and future research. Our work contributes to a unified understanding of the metaverse concept and offers practical guidance for organizations.

Theoretical Background

Characteristics and Definition of Metaverse

The fundamental ideas and visions of the metaverse are not a new phenomenon. It was first mentioned in Neal Stephenson's (1992) book *Snow Crash* (Bourlakis et al., 2009; Dolata & Schwabe, 2023) and the rise of the term metaverse is closely intertwined with the ideas of science fiction (Faraboschi et al., 2022). For decades, virtual worlds – "internet-based three-dimensional (3D) computer-generated environments where users interact through avatars" (Boughzala et al., 2012, p. 714) – have been around in a variety of forms like Second Life in the 2000s and Roblox, Minecraft, or Decentraland nowadays. Various stages of this developments have contributed to the advancement of technology and have also shaped today's vision of the metaverse (Dionisio et al., 2013). Each stage was innovative at the time and contributed to the current understanding, thus has an impact on future developments (Downey, 2014). Although the term metaverse is discussed widely, numerous technologies are developed and possible use cases are explored, literature and practice lack a precise and general definition (Barrera & Shah, 2023; Dolata & Schwabe, 2023; Dwivedi et al., 2022; Lee & Kim, 2022; Peukert et al., 2022). In some literature there are distinctive characteristics of metaverse: Park and Kim (2022) retrieved 54 definitions – one of the most comprehensive reviews of the metaverse (Dolata & Schwabe, 2023) – where they focus on the metaverse as a place or world with its interconnection to the physical world, whereby their review is extended by Lee and Kim (2022), who identified the basic elements of the metaverse to be avatar, world, synchronicity, interactivity, immersion and realism, social collaboration, and persistence. Others consider in particular the properties of metaverse to be ubiquity, immersive realism, interoperability, and scalability (Dionisio et al., 2013), but also interaction, immersion, and personalization (Park et al., 2022). This degree of inconsistency and different views is not surprising at the current stage of the development, as confusion is a necessary feature of disruption (Ball, 2022; Peukert et al., 2022).

The metaverse in a broad sense is a new digital ecosystem that is emerging from the interaction of a variety of technologies which are currently discussed but might be outdated for the concept in the future, like Blockchain, AR/VR, cryptocurrencies, 3D experiences, NFTs, or cloud and edge computing. In particular, the metaverse can be described as the "*societal transition from the current information ecosystem based on flat media viewed in the third person to a new ecosystem rooted in immersive media experienced in the first person*" (Rosenberg, 2022, p. 264). It is a persistent and immersive simulated world, or a massively scaled interoperable network of 3D worlds (Ball, 2022), rendered in real time and experienced synchronously by a large number of users. The users thereby "*share a strong sense of mutual presence*" (Rosenberg, 2022, p. 264). As a basis, immersive technologies such as VR/AR enable the perception of a completely virtual metaverse, where users are represented by fully controllable graphical avatars or a metaverse that extends the real world, where virtual contents are incorporated into the real world (Ball, 2022; Rosenberg, 2022). With AR, real objects are augmented by virtual attributes or virtual objects are integrated into reality with the help of, for example, smart glasses. VR describes the concept of virtual environments with exclusively virtual objects in which people are represented with the help of avatars (Dwivedi et al., 2022). Beyond that MR (Mixed Reality) combines the two technologies AR and VR, while XR (eXtended Reality) is mostly used as an umbrella term for both (Dwivedi et al., 2022; Park & Kim, 2022). Especially, due to these immersive ways of communication, the metaverse offers enormous potential in new ways of interaction. It goes beyond simple conversations and non-player characters (NPCs) and enables new opportunities in persona dialog, collaboration, and social networking. For organizations in particular, collaboration within a team and interaction with customers will intensify and a unique customer experience can be build that will go far beyond a virtual service counter in the future (Dwivedi et al., 2022).

Current Research on Metaverse

In order to gain an overview of the current state of research, we reviewed literature up to mid 2023 and in particular A+ to C (based on VHB-JOURQUAL3) ranked papers in IS and further publications (through backward search). In doing so, two streams of research – in accordance with other research works, such as Lee and Kim (2022) – can be identified on metaverse. To gain insights of relevant publications and to identify these predominant streams, we employed a visualized topic modeling technique called VOS analysis, which is based on bibliographic coupling (van Eck & Waltman, 2010). The first stream addresses research areas of what the metaverse is in *terms of a definition, which technologies and technical*

implementations can be envisioned, and opportunities, risks, and challenges from a holistic perspective. To this end, technical studies exist, such as the use of blockchain technology in metaverse (Augustin et al., 2023), ways to defend metaverse against new threats (Han et al., 2023), or even a framework that captures how graphics, interaction, and visualization techniques support the visual construction of metaverse and user-centered exploration (Zhao et al., 2022). Holistic views of similarities and differences between various concepts and highlighting the motives and conflicts of interest of different stakeholders (Dolata & Schwabe, 2023) as well as essential techniques for realizing the metaverse with applications and open challenges (Park & Kim, 2022) are discussed, where multi-perspective approaches exist across research directions and industries (Dwivedi et al., 2022) as well as on specific disciplines and fields (Peukert et al., 2022). Viewing the metaverse as a new digital ecosystem with different layers and platforms and their interplay provides an overall macro-perspective approach (Duan et al., 2021; Schöbel & Leimeister, 2023). Such publications view the metaverse from a general point of view, but mainly offer no guidance for initiation and implementation of metaverse on an organizational level. The second research stream describes *specific use cases* and *how metaverse changes* political, social, cultural and business activities (Dolata & Schwabe, 2023; Lee & Kim, 2022). For business life, the immersive nature in a virtual environment of metaverse can create richer, more engaging collaboration within a team (Davis et al., 2009) and a new business environment to expand entrepreneurial activities (Bian et al., 2022). There are opportunities for new concepts, revenue streams and business models: Immersive and interactive designing and selling of products in the virtual environment (Kshetri, 2023) will create a new customer experience (Hassouneh & Brengman, 2015) for organizations as users as well as data tracking for better targeted advertising or "renting" metaverse land to businesses for providers (Marabelli & Newell, 2023). As literature shows, the potential of metaverse is not limited to a specific industry, but rather offers huge potential across almost all industries and business activities (Dwivedi et al., 2022; Marabelli & Newell, 2022, 2023) including but not limited to tourism (e.g., Choi & Kim, 2017), education (e.g., Kye et al., 2021), manufacturing (e.g., Kshetri, 2023), retail (e.g., Bourlakis et al., 2009) and operations and supply chain management (Queiroz et al., 2023). The interplay of different technologies within the metaverse ecosystem brings forth applications and use cases which every company has to assess individually for new business models and revenue streams (Marabelli & Newell, 2023). As shown, literature analyses the use of the metaverse in the business environment when the organization *is already* in the metaverse (either for current metaverse prototypes or conceptually for the expected metaverse). There are hardly any insights for the initiation of metaverse in the organizational context, which could lead to some factors being neglected or not considered sufficiently when initiating and implementing metaverse projects in organizations and therefore causing them to fail.

Conceptual Framework

The metaverse is a new concept that has only developed in recent years and therefore organizations need to build new knowledge and skills in order to successfully implement and use the technology. Against this background, the implementation of metaverse applications in organizations and the strategic positioning is associated with an innovation process. According to Rogers (2003), the innovation process in an organization is divided into the (I) initiation phase and the (II) implementation phase by a clear decision regarding the innovation. The initiation phase – which is the focus of this paper – is first triggered by an organizational problem, for which a need for an innovation may occur, but also through the knowledge of an innovation with the chance of new possibilities for an organization and second, potentials and specific use cases of an innovation are evaluated. If the evaluation is positive, the process shifts to the implementation phase (Rogers, 2003). As a framework on the organizational level for the adoption of technological innovations – even though their future development is not yet foreseeable – the majority of papers on the initiation and adoption of new technologies use the TOE framework for research on the organizational level (Rogers, 2003; Zhu & Kraemer, 2005; Zielonka et al., 2022). Its characteristic of comprehensively identifying and including both internal and external influencing factors (Oliveira & Martins, 2011) offers a solid theoretical grounding for investigating the factors that influence the decision-making process in the initiation phase (Bremser, 2018). It was developed in 1990 by DePietro et al. (1990) (but often cited as Tornatzky & Fleischer) and seeks to identify and understand the factors in the process of adoption, implementation, and acceptance of technological innovations. The framework has a solid theoretical basis and consistent empirical support (Oliveira & Martins, 2011; Zhu & Kraemer, 2005), as it has been widely applied to various contexts such as cloud computing (Lian et al., 2014), big data (Bremser, 2018), AR in e-commerce (Chandra & Kumar, 2018), artificial intelligence (Pumplun et al., 2019), or blockchain (Zielonka et al., 2022). It is based on three components that have an impact on the initiation

and implementation of technological innovations within a company (DePietro et al., 1990; Zhu & Kraemer, 2005): (1) The technological context describes the available internal and external technologies relevant to the firm, (2) the organizational context consists of descriptive measures about the organization's characteristics such as company size or resources, and (3) the environmental context describes the surrounding of the organization, such as industry, competitors, or governments. Therefore, as one of the most commonly used models in the adoption of new technologies in organizations, it is adopted as a scientific methodological framework, as it provides a generic theory for the diffusion and successful adoption of various types of technologies at the organizational level (Pumplun et al., 2019; Zhu & Kraemer, 2005) and allows us to include internal and external characteristics relevant for an organization in the emerging ecosystem of metaverse. Thus, the innovation process in organizations according to Rogers (2003) and the TOE framework of DePietro et al. (1990) constitute the conceptual setting for our research on organizational readiness factors with respect to the initiation of metaverse and related technologies. In this context, organizational readiness for digital innovations such as the metaverse "refers to the ability of an organization to initiate innovation with digital technologies" and to evaluate their potential (Lokuge et al., 2019, p. 36). This involves assessing existing tangible and intangible capabilities and resources, building new ones, and thus reducing the risk of failure (Bharadwaj, 2000; Lokuge et al., 2019; Molla et al., 2009; Yen et al., 2012). For the classification of the readiness factors, the TOE framework provides a suitable structure on the organizational level (Pumplun et al., 2019). We will use this approach as an initial framework and extend it with requirements of metaverse. Our research focus in Figure 1 illustrates how the TOE framework is embedded in the innovation process and provides existing research areas as an overview.

Qualitative Research Methodology

The topic metaverse has not yet been fully explored with all aspects around the (technical) development and implementation, especially regarding organizational perspectives. The objective of this paper is to identify factors influencing the readiness of organizations to pursue application areas of the metaverse. Therefore, an explorative approach using a qualitative study in the form of interviews seems appropriate, as this provides a suitable approach for new research areas which have not yet been extensively explored (Corbin & Strauss, 2015; Flick et al., 2004; Myers & Newman, 2007). In addition, expert interviews provide insights into exclusive knowledge based on a wide variety of experiences and opinions in the respective subject and topic area. Thus, findings can be gained that are not available in the literature (Bogner et al., 2009). We chose semi-structured interviews with experts in order to get a comparable structure into the interview process and to give the experts enough space to share their own experiences, so that further relevant aspects for the underlying research can be identified (Myers & Newman, 2007). Interviewees were invited if they had experience in the field of AR, VR, virtual worlds or metaverse, if their role was directly related to metaverse (e.g., metaverse strategist), or if their role was directly related to the evaluation and assessment of new technologies (e.g., innovation manager). To ensure an appropriate level of knowledge among the experts about the general concept of the metaverse, we selected only experts who are dealing with the metaverse due to their job and related tasks after an initial call. This ensures the quality of answers to adequately dive in the concept of the metaverse and not only a specific instance. As the experts work in different industries and companies, they work independently on or with different specific instances and available prototypes. To obtain an overall perspective, experts from Germany with both a technical and a business focus were interviewed in order to cover influencing factors related to technological considerations as well as factors related to the business context and use cases. To obtain these insights and consistent merger through different perspectives within the data sample, the experts were chosen from companies of different sizes (from start-ups to established companies), with different levels of knowledge (young professionals to experienced experts), and from different industries, including experts with a broad knowledge of client companies such as consultants. In preparation for the interviews, we used guidelines from literature to avoid typical pitfalls (Myers & Newman, 2007). The final interview guide consists of three sections. The first section contains general questions about the interviewee's job profile, experience, and current responsibilities, in particular experience regarding the metaverse. In addition, this section is intended to ask for a definition, and subsequently expand on this definition to achieve a consensus across all participants for a common understanding. In the second section, the metaverse and related initiated projects were discussed in more detail, with a particular focus on the advantages and prerequisites as well as the risks and challenges. Focus was also placed on the future (strategic) potential. The last section dealt with concrete projects and how they are implemented, both from a strategic and operational perspective.

Conducting the interviews by using a semi-structured interview guide allowed us to adapt the questions according to the experience and job profile of the interviewee, so that we could set an appropriate focus depending on the interview partner. With regard to the role of a person or a company, we can divide them into two different roles: Persons or companies who actively shape the metaverse, virtual worlds and spaces and are assumed to have the technical capabilities to contribute to the creation of the metaverse or whose core competence is to enable others to use or engage with the metaverse (Provider – P). The second group represents the user group who participate in or will use the metaverse and related technologies in organizations (Users – U). In order to collect a variety of impressions, a variety of experts were interviewed according to the principle of triangulation (Flick, 2004; Myers & Newman, 2007; Rubin & Rubin, 2005).

Data Sample and Analysis

The interviews were conducted during February and March 2023 mainly via online conferencing tools. Only one interview was conducted by telephone and one interview was conducted in person. All interviews were moderated by one author. Table 1 provides an overview of the experts with the information about their role (provider or user), position, their total years of job experience and the specified time of experience regarding the metaverse, the industry and size of their company. The interviews were all recorded and fully transcribed with the agreement of all participants. The average duration was 54 minutes. Data collection was concluded after the 17th interview, as it was considered unlikely that the information value could be increased by including more interviews, consistent with theoretical saturation (Flick, 2004).

We performed a qualitative content analysis to analyze the interviews systematically and categorize the content, as this enables the identification of factors during a deep exploration (Corbin & Strauss, 2015; Mayring, 2014). As we identified the TOE framework as the most suitable theory for our research, we follow the procedure of the single-context theory contextualization as suggested by Hong et al. (2014). It starts with the identification of a well-established general theory, which fits to the research context and is of interest in the specific research area. General theories like the TOE framework have the advantage of being applied frequently and having a strong scientific basis, but because of the wide-ranging nature of information technology, they are not always generalizable to different IS contexts and must therefore be adapted to the individual context by adding, refining, or removing constructs (Hong et al., 2014). To ensure high-quality analysis, we coded sentences or sections of the interviews using the software f4analyse with a parallel deductive-inductive approach according to Mayring (2000, 2014) and applied investigator triangulation with all authors to analyze the content from different perspectives and to enhance the rigor and reliability of the analytic process. A factor was included into the framework if it was identified as relevant by all authors and if it was mentioned to both expert groups (providers and users). This ensures the minimization of individual researcher influence and the objectivity of the research (Hsieh & Shannon, 2005; Whittemore et al., 2001). In doing so, we applied the known TOE factors to our interview content as the deductive coding procedure and adapted them to our research context, i.e., aligned with metaverse-specific characteristics, described as Level 1 (Hong et al., 2014). To identify specific factors and requirements for initiating metaverse in the organizational context, we followed Hong et al. (2014)'s third option (Level 2c), which involves decomposing core factors into contextual subfactors. To obtain these new insights, we coded the interviews according to the inductive approach (Mayring, 2000, 2014) for identifying further aspects that go beyond the previously determined aspects and therefore enrich the framework.

ID	Position	Job Experience (with metaverse)	Industry	Size
P-01	Senior Consultant for AR/VR/XR/Metaverse	25 (10) years	IT Services	Large
P-02	Founder and Chief Metaverse Officer (CMO)	22 (3) years	Tech Start-Up	Small
P-03	Founder and CEO Metaverse Consulting, Investor, Book author on "Metaverse"	16 (4) years	Research	Small
P-04	Founder and CEO Innovation Consulting	12 (4) years	IT Consulting	Small
P-05	Consultant for AR/VR/Metaverse Strategy	11 (7) years	IT Consulting	Medium
P-06	Senior Metaverse Sales Strategist	10 (3) years	Tech Startup	Small
P-07	Founder and CEO Metaverse Consulting	6 (4) years	IT Consulting	Small
P-08	Chief Marketing Officer / Head of Metaverse	5 (4) years	Tech Startup	Small
P-09	Digital Consultant	2 (2) years	IT Consulting	Very large

ID	Position	Job Experience (with metaverse)	Industry	Size
U-01	Senior Manager Digitalization & Innovation	31 (4) years	Finance	Large
U-02	Innovation Manager	14 (2) years	ICT	Large
U-03	Senior Solution Manager	17 (3) years	IT Services	Very large
U-04	Chief of Metaverse Strategy (company-wide)	7 (4) years	Consulting	Medium
U-05	Innovation Manager	6 (2) years	Telecommunication	Very large
U-06	Head of Metaverse Strategy, UX/UI Designer	5 (2) years	Finance	Very large
U-07	Innovation Manager	3 (1) years	Finance	Large
U-08	Manager Business Strategy	2 (1) years	Finance	Large

P: Provider, U: User; Company size: small: < 50, medium: < 250, large: < 10,000, very large: ≥ 10,000 employees

Table 1. Overview of Experts Interviewed (sorted by Job Experience)

Results

In the following, the 14 factors and respective derived propositions that influence the initiation of the metaverse in the organizational context are described in detail, enriched by exemplary quotes from the expert interviews. Figure 1 shows an overview of the identified factors according to the three elements of the TOE framework in addition to the relevant research areas based on the findings from the literature.

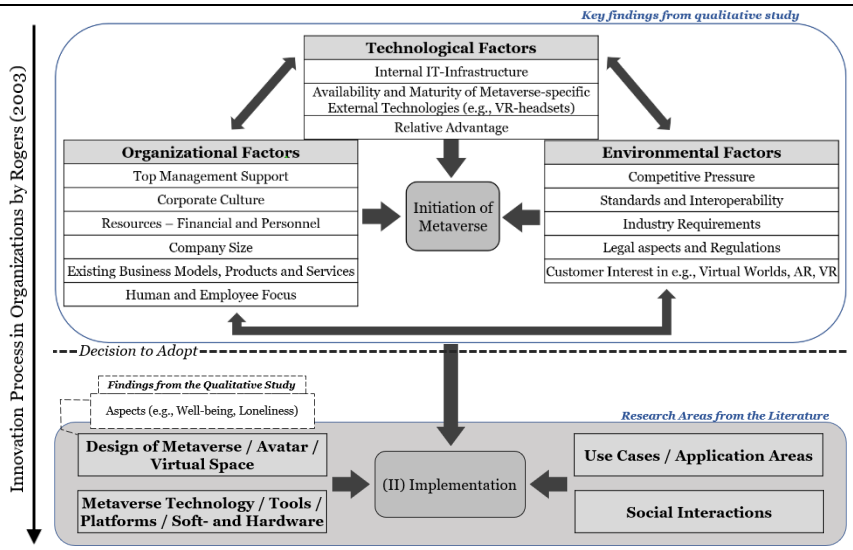

Figure 1. Organizational Readiness Factors According to the Innovation Process by Rogers (2003) and the TOE Framework by DePietro et al. (1990)

Technological Context

The required **internal IT-infrastructure** within the organization highly depends on the use case in metaverse. An expert sees, in the simplest case, low requirements for internal hardware: "*We use Unreal Engine and pixel streaming for our customer projects, where rendered content of the 3D engine is streamed via a cloud base infrastructure, similar to streaming Netflix, so I don't need a lot of computing power on the local PC and still have the full immersive 3D experience*" (P-06). In the case of existing platforms, there is the option of either going to large, well-known platforms or drawing on the products and expertise of start-ups operating in the metaverse environment, where it is often possible both to use existing virtual spaces and to design one's own space. However, in the latter case, the experts rather see internal purposes, as hardly any users are attracted to unknown worlds or spaces. The metaverse, especially in its visionary definition, will require substantial computing capacity, but experts assume that cloud solutions or rather edge computing will prevail, but that investments in internal IT infrastructure (cf. Resources) will

still be necessary in the further development of the metaverse: "*It's more a question of which cloud service provider it is in the future? Is that one or is there a linkage of all? Actually, there will be a bit of linking of all existing service providers to provide the computing power for it. So, from an architectural point of view, I don't think you have to prepare for that much*" (U-01), because it will be an "*interconnection of different internal and external systems which we cannot foresee yet*" (P-06). In addition, there will be a need to adapt to the requirements: "*Research says the most creative area is the forest. But a forest, leaves are very processing intensive. Second: the sea. And that's why we took the sea, to have a trade-off between computational power and psychology*" (P-02). Thus, the factor of the required infrastructure and the associated costs play a role for the respondents, also against the background of make-or-buy decisions, where buy means either investing in an existing world or having a completely custom world created (U-01; U-04; U-05; U-06). Currently, the first step for many organizations is to test use cases with VR glasses on existing platforms. The purchase of devices such as VR glasses is currently expensive if an entire company wants to be equipped, whereby it is more likely that a few devices will be purchased for certain user groups (P-06). In addition, it is important for companies to know how much energy the metaverse concept consumes with the required software and hardware, where the power comes from, and how companies can reconcile this with their sustainability requirements and goals, but also to what extent the metaverse can help to save energy in other areas (e.g., virtual trade fairs instead of traveling). With regard to sustainability, there were differing opinions among the experts: While some are convinced that the metaverse will create sustainable business models and that remote work will reduce the carbon footprint, others consider these assumptions to be a naive fallacy (P-01; P-02; P-03; P-05; P-06; P-07; P-09; U-02; U-04; U-05; U-06; U-07; U-08). ***Proposition 1: The needed internal IT-infrastructure and their costs have a negative influence on the initiation of the metaverse.***

The **availability and maturity of external technologies, especially metaverse-specific immersive technology devices like VR-headsets or VR-gloves,** have an impact when considering the initiation of the metaverse or related technologies in an organizational context. The experts see a need for improvement both in wearing comfort and price (P-01; P-03; P-05; P-06; P-07; P-08; U-01; U-02; U-03; U-05; U-06; U-08), because "*you can wear them for an hour and then it starts to pinch. It's just not good enough yet*" (U-01), which is why "*especially the development of devices still has to make significant progress to spread it to the broad mass, also on a price level*" (U-05). An 'iPhone-moment' of devices could currently make the metaverse experiences fundamentally accessible, as the iPhone did with mobile devices (P-06; U-02; U-05). Since the metaverse is expected to be a real-time, large-scale multimedia system, its operation requires a huge amount of computing power and a high level of communication in order to build a (virtual) environment based on sensor and other communication data (P-06; P-08; Duan et al., 2021; Marabelli & Newell, 2023). Therefore, computing and communication technologies with the expansion of cloud and edge computing, high-speed broadband connections, 5G and the development of 6G are essential components to enable high bandwidths and low latencies for synchronous communication. Within this category, the technological developments – referred to the infrastructure of metaverse (Duan et al., 2021) – are considered as key technologies or metaverse-enabling technologies such as soft- and hardware, blockchain, NFT, AR/VR, 3D representations and rendering, game engines or even cloud and edge computing (Dolata & Schwabe, 2023). ***Proposition 2: The availability and maturity of external technologies, especially metaverse-specific immersive technology devices like VR-headsets or VR-gloves, have a positive influence on the initiation of the metaverse.***

The **relative advantage** of a technology is defined as the extent to which an innovation is perceived as an advantage over existing systems, services, or practices (Ifinedo, 2011). Chandra and Kumar (2018) extend the relative advantage further by considering information technology for gaining a sustainable competitive advantage. In the context of metaverse, it is essential to identify the opportunities for internal purposes, but also to cater user experience of customers. The experts particularly emphasize the live, 3D interactive and collaborative capabilities as a clear advantage over current technologies or services, as the metaverse enables an experience of *being* in the respective environment. The flat representation in online conference tools does not convey a sense of shared presence because "*I see you, I see myself, but we're not there. That might work [for two], but when we're ten, 15 people, that doesn't make sense anymore*" (P-01). Especially the new immersive possibility of training, collaboration and social interaction can offer potentials to save time and money (P-07), as interaction is brought to a new level, close to communication in the real world. The experts see the advantage especially in completely new possibilities to engage with customers and in new business models. For example, one is no longer dependent on a trade fair for personal contact but can

present the company and products entirety at any time virtual. Above all, companies can also gain efficiency and cost improvements as a result (P-06; Kshetri, 2023). In particular, the experts see the opportunity to gain a competitive advantage in the future by dealing with the metaverse and related technologies, because companies "*now have the chance to shine with small things, to inspire, to collect feedback and simply to gain experience, which gives a competitive advantage in the future, because I was a pioneer*" (P-06). It is about standing out from the competition and serving customers who will become relevant in the next few years and thus have the metaverse as a strategic asset in the future (P-02; P-06; P-07; P-08; U-01; U-04; U-06). ***Proposition 3: The organization's perceived and expected relative (and competitive) advantage of the metaverse has a positive influence on the initiation of the metaverse.***

Organizational Context

(Top) management support has been considered an important requirement for the adoption of (innovative) technologies for a long time (Kim et al., 2011; Lederer & Mendelow, 1988). The experts also consider it to be fundamental, especially in the current phase of the metaverse, where companies are confronted with pioneering due to a wide variety of definitions, opinions, and technological developments (P-05; P-06; P-07; P-09; U-03; U-05; U-08). In this phase, the support is particularly important since many metaverse projects are associated with a certain willingness to take a risk through exploration (U-02; U-05; U-06; U-07). Management support involves not only understanding the importance and potential of an innovation for an organization, but ensuring sufficient allocation of human, financial and time resources. A lack of sufficient management support is a severe obstacle for an effective implementation and utilization (Igbaria et al., 1997). A challenge in the initiation of a metaverse project is that "*at management level, one rather has to impress with numbers*" (U-07). This also requires the calculation of a positive business case, which is currently a challenge to calculate costs, demonstrate a ROI, and also in terms of standardization and regulations. Therefore, many considerations regarding the metaverse are rather "*to make it clear to the management what the benefits are*" (U-07). The experts emphasized the importance of a certain foresight and curiosity on the part of management, i.e., that although the metaverse does not yet have a concrete status in business and society, it will play an important role in the future – whatever form it will take in concrete terms. According to the experts, a special aspect of the metaverse is that there are less hurdles for trying out small use cases compared to other technologies. By presenting a small use case in a current metaverse prototype like Roblox or Decentraland with the help of VR glasses, the management gets tangible impressions, because "*managers with this vision, who say, I don't even know what can happen yet, but there is something new behind it and behind everything new there is actually also the potential for a new business, i.e., a blue ocean strategy, then it can be very interesting and successful*" (P-01). ***Proposition 4: The top management support has a positive influence on the initiation of the metaverse.***

Corporate culture refers to values and beliefs within an organization that shape the decisions, actions, and behaviors of its employees (Dasgupta & Gupta, 2010; O'Reilly, 1989). The experts pointed out that an innovative culture is a key factor for the metaverse, especially because of the metaverse-specific character of immersion since employees most likely had no or few touchpoints to virtual worlds and immersive technologies, which is a new (physical) experience (P-06). Only if there are interested employees and managers who push the topic of metaverse and use relevant technologies such as AR/VR, it can be successful in the long term (P-07; U-01; U-05; U-06; U-07; U-08). Metaverse culture refers in particular to the understanding of the organization as a hybrid actor in the metaverse ecosystem, operating in both the physical world and the virtual world and their intersection, including for example new business models, a new form of remote work or engaging with customers in the virtual space (P-03; P-07; U-04). While some experts consider that the immersive nature itself with inspirational technologies (e.g., AR, VR) can contribute to a completely new, digital corporate culture (P-02; U-02; U-04; U-06), others believe that there is a risk of personal detachment due to a lack of in-person contact (P-04; U-01; U-05). Especially by enabling an immersive experience of the work-life, the metaverse has the potential to change the future of remote work (P-02; U-06). Overall, a positive attitude of decision-makers toward innovation and change is essential for creating an environment conducive to metaverse. Innovative companies have the intention and willingness to use new technologies; conservative companies tend to be reserved (Oh et al., 2009). An innovation-friendly corporate culture and metaverse strategy is therefore important: "*If we now have a really open strategy and it goes wrong, if we created a flop, […] it's a million-dollar loss. Our culture is too cautious and conservative for the metaverse*" (U-07). ***Proposition 5: An innovative and open-minded corporate culture has a positive influence on the initiation of the metaverse.***

Resource availability also plays an important role in the organizational context for the evaluation, planning and implementation of innovations. If the assessment or adoption of a technology cannot be achieved due to a lack of resources, the potential benefits for the company are irrelevant (Kuan & Chau, 2001). Organizational resources for innovations include sufficient financial and human resources with technical skills. Financial resources are likely to be one of the key factors when it comes to developing, evaluating and launching innovations (Chandra & Kumar, 2018). A high budget allows to commit capacities to the project, to be financially independent and also to build up know-how, e.g., by acquiring external know-how (Kim et al., 2011; Pumplun et al., 2019). The experts also agree on the need for a certain budget when initiating a metaverse project. A dedicated budget allows to allocate resources, to try different approaches and to create knowledge about the metaverse. The budget depends on the use case and ranges from the purchase of VR-headsets for collaborative work on existing platforms for a few thousands up to the purchase of land in e.g., Decentraland for a virtual presence for possibly several million. The range of costs is currently very large (P-01; P-02; P-04; P-05; P-06; P-07; P-08; P-09; U-03; U-04; U-06; U-08). Slack resources like insufficient budgets, time or personnel are the main reasons for metaverse project failure: "*Then rather to say I define a team and give them six months a clear focus and let them work, a lot of companies make the mistake of saying, hey, metaverse is your task number four and you have two months to do that. This is almost doomed to fail as they can't manage to initiate that at all and try things out, because it's a complex topic after all*" (P-02). A dedicated metaverse department that is firmly anchored in the organization does not need to be established immediately; rather, it is sufficient to find a small group of employees with different expertise who are willing to experiment and work out possible use cases for the organization (P-07). At the current stage of the metaverse, experts do not see any particular skills that employees need to assess the metaverse for enterprise usage as an initial step except the interest and a certain affinity for technology to deal with existing topics. But especially in the future, experts see a need for very highly skilled employees in job profiles such as 3D designers, blockchain experts, AI experts and data scientists, or professionals with technical knowledge to implement and deploy (P-01; P-02; P-05; P-06; P-07; P-08; P-09; U-01; U-02; U-04; U-08). A third resource is that of software and hardware (cf. internal IT infrastructure/availability and maturity of external technologies). ***Proposition 6: The resources available have a positive influence on the initiation of the metaverse.***

Company size was not clearly confirmed by the experts as a key factor in the initiation of the metaverse. They identified an advantage for large companies in terms of financial and human resources, as they often have a dedicated innovation budget (P-01; P-03; P-06; P-07; P-09; U-01; U-04; U-06; U-08). This allows companies to experiment with internal use cases or pilot projects, whereas smaller companies often have to select one metaverse use case. However, smaller companies benefit from their flexibility and less hierarchical and rigid structures. The downside of being limited can also be an advantage, as smaller companies prioritize and focus on one or a few use cases: "*If you are smaller, you simply have more flexibility to deal with the topic more intensive. If you are in a company with 10,000 employees, depending on how hierarchical, everyone wants to have a say. If you do it in a big company, you need a structure like a small company*" (U-04). To compensate the company size, experts see partnerships and cooperation between small and large companies as promising, allowing strong synergies to emerge (P-02; P-06; U-01; U-04; U-06). ***Proposition 7: Company size has an indirect positive influence in terms of higher financial and human resources on the initiation of the metaverse.***

Existing business models, products and services have an impact on the decision to initiate the metaverse (P-01; P-04; P-05; P-06; U-01; U-03; U-06; U-07). The experts see three possibilities for business models: First, existing products and services are transferred to the metaverse as a business model. Second, new business models are derived from the metaverse, and new products and services emerge. Third, new products and services from the metaverse are connected with existing ones, i.e., a hybrid model results. Predominantly large and therefore financially strong companies are adopting new or hybrid business models, but the experts see a trend in that "*companies are trying to transfer existing business models to the metaverse. But are also the ones that fail the most, so the greatest potential for success is usually when you rethink products and services and develop new business models around it*" (P-07). In general, it is easier for organizations to deal with the concept of the metaverse if they already see their products and services in the metaverse instead of building something new, although the metaverse can also help to increase efficiency or save costs. But organizations should use the potentials of the metaverse to think in new ways and to established new business models, e.g., direct-to-avatar (D2A) (P-01; P-07). ***Proposition 8: Existing business models, products and services have both a positive (when***

organizations already see and transfer their business models/products/services in the metaverse) and negative (when it is difficult) influence on the initiation of the metaverse.

A central factor is the **focus on employees**, as the metaverse provides new ways of interaction in the context of collaboration, customer interaction, training, prototyping, and social networking. Especially due to the metaverse-specific attribute of immersion with inspirational technologies like AR/VR, which makes the metaverse different from other technologies, it is important to focus on the employee and to explain the underlying concepts and technologies, to organize workshops and to provide space for trying out, because "*the average corporate employee is not necessarily able to deal with the topics around the metaverse if he doesn't get an explanation*" (P-06), as "*many people – except maybe gamer – do not have any touchpoints until it becomes a topic in the company*" (P-06). The key is to create awareness and understanding of the potential and importance for the organization among both management and employees (P-02; P-06; P-07; U-01; U-02; U-03; U-06; U-07; U-08). With such potentially disruptive technologies as the metaverse, knowledge transfer needs to be encouraged and employees need to be educated (P-07; U-06; U-07), because they need to be comfortable with using it in the context of their work, e.g., as an avatar in a digital space representing the company or working within a metaverse space (P-02; P-07; U-01; U-02). In terms of personal requirements for usage, respondents see a general affinity for technology (P-05; P-06; U-01; U-05). However, it is important to use interested employees as multipliers to spread the concept and possible use cases throughout the company and remove inhibitions (P-06; P-09; U-01; U-04; U-06). In particular, employees are also one of the key factors in identifying use cases, pain points and optimization potential (P-05). ***Proposition 9: Focusing on the employee with his work-related tasks and the (social) interaction with the technology has a positive influence on the initiation of the metaverse.***

Environmental Context

Competitive pressure as the number of companies using a current technology and the degree of competition influence the engagement and implementation of the metaverse. If more direct and indirect competitors are already using a technology, companies are forced to adopt to remain competitive (Chandra & Kumar, 2018; Oh et al., 2009). If a direct competitor would anchor the topic of metaverse in its strategy media effective, this would also have an effect on the company itself (U-02; U-04; U-06). Especially due to the powerful media presence of the metaverse topic, a "*certain FOMO effect [has] emerged*" (P-07), i.e., **f**ear **o**f **m**issing **o**ut on something (P-07; U-03; U-06). Rather, every company should feel an internal pressure that originates from concerns about being no longer competitive in the future, because companies run the risk of "*simply being left behind as a non-metaverse company*" (P-03), that the company is recognized by "*existing and new customers, especially in younger generations such as Gen Z, Gen Alpha, who spend their time in virtual worlds anyway*" (P-06). The metaverse can provide competitive advantages, particularly through new, immersive forms of collaboration, enhanced customer user experience, and product design and simulation (P-01; P-07; U-04). ***Proposition 10: Competitive pressure has a positive influence on the initiation of the metaverse.***

Currently, one barrier for many organizations is the lack of **standards and interoperability** (P-02; P-04; P-05; P-06; P-07; P-08; U-01; U-04; U-06; U-07), where "*interoperability in particular [is] indispensable*" (P-05). With the concept of the metaverse as an ecosystem (Schöbel & Leimeister, 2023) where interconnected worlds offers different services and the possibility to buy or create artifacts or skins for avatars, the (still) missing interoperability restricts users' access and limits them to one virtual world instead of allowing them to freely navigate multiple virtual worlds, although it was already discussed in literature 15 years ago (e.g., Kaplan & Haenlein, 2009). Many companies are currently interested in building a virtual presence like BCG in The Sandbox or Samsung in Decentraland to reach their customers or gaining experience in virtual worlds. However, the experts feel limited by proprietary platforms without the possibility to cross boundaries specific to each provider (P-07; U-01; U-05; U-06). Despite impressive user numbers of virtual worlds and Massively Multiplayer Online Games, there is still the empty world problem, in which companies have only few users who visit the virtual presence (U-04), thus some metaverse prototypes have been viewed critically and declared to have failed (Tassi, 2022). The platforms are currently stand-alone solutions. The experts named open standardization issues with the platforms themselves (common rules, compatible infrastructures, laws, etc.), identity portability (self-sovereign identities (SSI)), standardized instead of proprietary hardware (e.g., VR/AR devices, similar to current standard developments such as USB-C), digital assets management (virtual objects/artifacts and accessories of avatars like skins), underlying infrastructure and technologies (e.g., game engines such as Unreal Engine)

and associated safety standards (P-01; P-02; P-04; P-05; P-06, P-07; P-08; U-01; U-02; U-03; U-04; U-06; U-07; U-08). In order to implement such projects, the experts see the need for less individual solutions and more standardization of artifacts, services, and systems. To what extent completely open worlds will develop, remains to be seen as there is more profit potential for providers of closed or half-open ecosystems in particular (Seidel et al., 2022), but the first coordination is in progress: The Metaverse Standards Forum – hosted by Khronos Group – with many leading technology firms offering cooperation between standards organizations and companies to foster interoperability with open standards (Khronos Group Inc., 2023), which is considered to be fundamental for the experts, because it would be fatal to build up a metaverse like current social networks with a few large central players who track "*everything you do that is data and that is sold to the highest bidder. That would be the worst metaverse*" (P-04). ***Proposition 11: Existing standards and interoperability have a positive influence on the initiation of the metaverse.***

Industries have their own specific requirements, such as own laws, external circumstances, or within industry relationships (Pumplun et al., 2019). Similar to other technologies like AI (e.g., Kruse et al., 2019; Pumplun et al., 2019), especially the financial industry, which was represented by several experts, faces regulatory requirements, including documentation and reporting (U-01; U-06; U-07; U-08). Thus, the introduction of a new technology can take longer because of regulatory authorities (e.g., the Federal Financial Supervisory Authority (BaFin) in Germany). One participant compared it with the blockchain technology: "*No transaction will be carried out until the EU has decided to deal with it and set laws in motion*" (U-07). Furthermore, the challenge of legacy systems – IT systems that have been merged and expanded over the years without renewal – in the banking industry can hinder initiating the metaverse (U-07). However, factors such as the importance of values or the trustworthy relationship between financial service providers and customers, plays a role and it is therefore still unclear how virtual banks in the metaverse conduct their sensitive financial transactions and how – especially older – customers react (U-01; U-06; U-08). ***Proposition 12: The industry with its specific characteristics has both a positive and negative influence on the initiation of the metaverse, dependent on enabling or inhibiting factors such as special regulations.***

Legal aspects and regulations for the providers of metaverse platforms, but also for the users – organizations and their employees as well as private users – were often addressed. Rosenberg (2022) sees new challenges similar to the emergence of social media in ensuring data protection. The experts also feel a great need for a legal framework and community standards regarding the metaverse. One central aspect is data protection as there are "*significantly more sensitive and much more data [that can be tracked]*" (P-06). Assuming that wearables are used for the metaverse experience, it will be possible to collect facial expressions, gestures, or even vital signs (U-08). The use of such devices by employees within the company poses challenges, as the data of employees is collected all day and "*the employees' council has a word in this respect. Are we allowed to collect such data from employees in the context of their work at all?*" (U-01). Such devices are important regarding the collection of data because "*most of the technology devices are not from companies from Europe*" and thus might not meet the requirements for the strict data protection in the EU (U-03). The issue of data protection also depends on the future structure of the metaverse: centralized (large providers offer metaverse platforms and have data sovereignty) vs. decentralized (data control returns to the users) (P-07; P-08; P-09; U-02; U-04). Another important legal aspect is in the handling of intellectual property (IP), copyright and trademark protection. Kalyvaki (2023) anticipates difficulties in enforcing such rights, particularly in the case of a decentralized structure, in determining who is the owner and authorized user of virtual goods in the metaverse. Especially for companies, where virtual goods are part of the business model but also for user-created content, such legal aspects are essential. The experts raise the question of "*what happens if you take your items somewhere and they are transformed? Is there a solid legal framework there?*" (U-04). Furthermore, they see uncertainties regarding anonymity and accountability of virtual identities associated with cybercrimes, such as deep fakes or avatar theft (P-01; P-05; U-01; U-03; U-08), or regarding taxation of economic activities (P-06; U-01; U-02). Similar to what literature already calls for (e.g., Rosenberg (2022)), the experts perceive a need for a framework created by all stakeholders. They have a clear opinion on the role of states: They must provide legal guidelines at a certain stage, but if it is set too early, it will prevent innovation (U-04). On the other hand, there is a risk of establishing clear guidelines too late that "*the legislator [will] be always far behind*" (U-03). ***Proposition 13: Legal aspects and regulations have both a positive (e.g., clear standards and reliable legal frameworks) and negative (e.g., uncertainties about cybercrimes, data privacy or accountability) influence on the initiation of the metaverse.***

Customer interest and knowledge must be considered when evaluating and initiating the metaverse. It can be leveraged to assess the potential market volume and the opportunity to generate new business models and revenue streams. This can encourage organizations to adopt an emerging technology (Zhu et al., 2003). In the current stage, the first step into the metaverse is often achieved through virtual realities which are equated to the metaverse. However, an interaction with a customer in a (dedicated) virtual space or an existing virtual world often fails because "*most customers simply do not have a headset at home*" (P-06), which is why, despite the enormous range of interaction possibilities, "*it [makes] no sense to say now that we absolutely want a virtual reality use case*" (P-06). Thus, one of the reasons why metaverse is not prioritized is that customers do not expect or demand it (U-01; U-06; U-07). Although Decentraland has gained some popularity, "*it is now rather a stagnant topic, and you have to be where your customers are, and our customers are simply not there*" (U-01). Nevertheless, it is recommended to explore smaller use cases even if customers are not yet demanding them, because without customers being aware of the possibilities, it is also difficult to generate demand (P-01; P-06; U-01; U-04; U-05; U-06). ***Proposition 14: Customer interest to virtual worlds/AR/VR/XR has a positive influence on the initiation of the metaverse in organizations.***

Discussion and Conclusion

The metaverse has the potential to disruptively change not only social life, but also the business world, thus, making it a topic of great interest from an organizational perspective. Using a qualitative approach based on 17 expert interviews, we were able to identify 14 readiness factors and corresponding propositions on the initiation of the metaverse, which we categorized using the TOE framework. In summary, we provide three technological, six organizational and five environmental specific readiness factors. Our research work extends the identified research streams by providing the first step – the consideration for organizations to enter the metaverse – through a concise framework of influencing factors, while existing literature mostly examines the organizational context when companies are already in the metaverse. On the one hand, some of these factors have already been demonstrated for other technologies but have a specific character in terms of the metaverse. For example, the importance of *top management support* to ensure a sufficient allocation of financial and human resources has already been shown for AI (Pumplun et al., 2019) and AR in e-commerce (Chandra & Kumar, 2018). This strategic importance has also been demonstrated for the success of organizations in virtual worlds (Yang et al., 2012). However, we identified for the metaverse that a certain curiosity and also a willingness to take risks for exploration on the part of the management is required, since it is difficult to calculate a business case at this early stage of development, but also that it is easier to demonstrate concrete use cases with VR-headsets on current metaverse prototypes like Decentraland compared to other technologies. On the other hand, *sustainability* could not be derived as a decisive factor for organizations in this study and *company size* could also not be demonstrated as a direct influence either, only the associated assumption that larger organizations have more financial and human resources. In addition, the three factors *existing business models, products and services*, *standards and interoperability*, and the *employee focus* were identified as new, metaverse-specific factors. The first mentioned describes, that it is easier for organizations to pursue metaverse if they see their business model, existing products and services already there instead of building something new. Furthermore, the lack of standards and interoperability impedes the initiation of metaverse in the organizational context as one is bound to a proprietary system. Due to the disruptive potential in collaboration, social interaction and communication, a special focus has to be on employees when applying the metaverse in the context of their work, as they have to feel comfortable with it. While the 14 derived factors are all critical for initiating metaverse in the organizational context, the experts emphasized the factors of *(top) management support*, *availability and maturity of external technologies*, *financial and human resources, corporate culture*, *standards and interoperability* and the special *employee focus*. For the latter factor, we were able to identify aspects that should be considered in the design of metaverse. These include like improved well-being by e.g., including familiar elements to create a connection and provide a sense of security and reduce loneliness by e.g., introducing dynamic and lively elements to mitigate such feelings and promote a sense of social connectedness among users. In this context, it is important to address the employees' needs by creating an environment that fits to the tasks. Overall, this can improve work performance and leads to less distraction. In general, the expert statements by providers and users about the requirements are largely consistent, but it became apparent that providers see fewer barriers than users. Users still see, e.g., the empty-world-problem of some proprietary systems as a constraint, where they do not want to invest,

whereby some current metaverse prototypes are considered to have failed (Tassi, 2022). Our identified factors using the TOE framework are partially overlapping with recent research works examining especially the architecture of the ecosystem metaverse: In particular, our identified factors in the technology domain *internal IT infrastructure* and *availability and maturity of external technologies* coincide with aspects of physical world infrastructure from Duan et al. (2021). Also, our findings of *existing business models, products and services* and the aspects about the handling of intellectual property (IP), copyright and trademark protection of the factor *legal aspects and regulations* address and deepen the economics and user generated content from the ecosystem layer in the virtual world of Duan (2021). Beyond that, our findings go further by identified factors in the organizational context and environment, which provide an inter-organizational insight for the prerequisite of metaverse initiations in organizations that have not been addressed in this extent in literature for the metaverse so far. Finally, the further technical developments of the next few years will determine whether and how the metaverse is applied in organizations. Although the metaverse does not yet exist in its entirety, the experts agree that organizations should not miss the transition and instead try and evaluate the technology in order to be prepared for a successful future in the metaverse. While large organizations invest massively in metaverse, many organizations are in the early stages of exploring metaverse or are not even aware of its potential.

Overall, with this paper we provide several **theoretical contributions**. First, by pointing out the characteristics and our detailed definition of the metaverse, we contribute to a more unified view towards a general definition. Second, we show the different factors in the still quite sparse IS metaverse research in highly ranked publications that have an influence on the initiation and thus the adoption of the metaverse in organizations. We provide a foundation for future organizational studies and research on readiness factors for the metaverse and related technologies. We were also able to identify factors that have been addressed in the context of other technologies, but which we adapted to the specific requirements of the initiation of the metaverse in the organizational context. In addition, we identified metaverse-specific factors which have never previously influenced the initiation of any emerging technology projects to this extend, namely *standards and interoperability*, *existing business models, products and services*, and the special *employee focus*. Third, by linking the two frameworks (innovation process in organizations by Rogers (2003) and the TOE framework by DePietro et al. (1990)), we can provide a context for the factors in the early initiation phase of the innovation process, as the metaverse is still in its infancy. We also make **practical contributions**. First, for organizations, the TOE factors offer a guide which technological, organizational, and environmental factors have an influence on the initiation. A focus is on the organizational factors such as *top management support*, *corporate culture*, *financial and personnel resources*, and the *employee focus*. Managers as well as other employees are offered a broad overview of metaverse-related conditions in organizations by this study. Second, according to the experts, regulations need to be developed further in order to build on such projects in a legally secure environment in the future. Here, companies are also required to contribute to the development of regulations, making it an effort of all stakeholders. Our study is also subject to **limitations**. The experts interviewed are limited to Germany. Although internationally operating organizations were questioned, especially environmental aspects such as regulations require an international view. In addition, we focus on the organizational perspective of managers and employees who drive metaverse in their organizations or in the organizations of their customers, but individual perspective is also interesting. Furthermore, the TOE framework might not capture the full complexity of a technology and the factors in detail as it enables to take a macro perspective from an organizational level. This leads to **future research**. It would be beneficial to examine the individual perspective of employees, especially regarding the aspects already mentioned above concerning the design of metaverse and virtual spaces. For this purpose, a Design Science Research approach would be useful to explore attributes such as well-being or loneliness, but also which requirements employees place on the technology so that it fits their tasks in the organizational context. In addition, our research offers a solid ground to delve deeper into single factors and to investigate them with respect to specific concepts about the structure of the ecosystem metaverse (e.g., Duan et al., 2021; Schöbel & Leimeister, 2023). In addition, it is necessary to investigate this research field in a couple of years again, when the metaverse is adopted more widely. Moreover, future research should consider exploring factors for the metaverse from an industry-specific perspective especially in the context of a case study, similar to the perspectives taken for other technologies (e.g., Hoffman & Mehler, 2023).

References

Augustin, N., Durani, K., Kollmer, T., & Eckhardt, A. (2023). Examining the Use of Blockchain Technology in Virtual Worlds: A Socio- Technical Systems Perspective. *HICSS 2023*, 6035–6044.

Ball, M. (2022). *The Metaverse - And How It Will Revolutionize Everything*. Liveright Publishing.

Bao, X., Shou, M., & Yu, J. (Joseph). (2022). Exploring Metaverse: Affordances and Risks for Potential Users. *ICIS 2022 Proceedings*, 1–9.

Barrera, K. G., & Shah, D. (2023). Marketing in the Metaverse: Conceptual understanding, framework, and research agenda. *Journal of Business Research*, *155*, 1–19.

Bharadwaj, A. S. (2000). A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *MIS Quarterly*, *24*(1), 169–196.

Bian, Y., Leng, J., & Zhao, J. L. (2022). Demystifying Metaverse as a New Paradigm of Enterprise Digitization. *BigData 2021. LNCS*, 109–119.

Bloomberg. (2023). *Metaverse Market to Hit $936.6 Billion by 2030 at CAGR of 41.6%: Grand View Research, Inc.* https://www.bloomberg.com/press-releases/2023-03-06/metaverse-market-to-hit-936-6-billion-by-2030-at-cagr-of-41-6-grand-view-research-inc

Bogner, A., Littig, B., & Menz, W. (2009). *Interviewing Experts*. Palgrave Macmillan.

Boughzala, I., de Vreede, G.-J., & Limayem, M. (2012). Team Collaboration in Virtual Worlds: Editorial to the Special Issue. *Journal of the Association for Information Systems*, *13*(10), 714–734.

Bourlakis, M., Papagiannidis, S., & Li, F. (2009). Retail Spatial Evolution: Paving the Way From Traditional to Metaverse Retailing. *Electronic Commerce Research*, *9*, 135–148.

Bremser, C. (2018). Starting Points for Big Data Adoption. *ECIS 2018 Proceedings*.

Chandra, S., & Kumar, K. N. (2018). Exploring Factors Influencing Organizational Adoption of Augmented Reality in E-commerce: Empirical Analysis Using Technology-Organization-Environment Model. *Journal of Electronic Commerce Research*, *19*(3), 237–265.

Choi, H., & Kim, S. (2017). A Content Service Deployment Plan For Metaverse Museum Exhibitions—Centering on the Combination of Beacons and HMDs. *International Journal of Information Management*, *37*(1), 1519–1527.

Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th ed.). Sage Publications.

Dasgupta, S., & Gupta, B. (2010). Organizational Culture and Technology Use in a Developing Country: An Empirical Study. *GLOBDEV 2010*.

Davis, A., Murphy, J., Owens, D., Khazanchi, D., & Zigurs, I. (2009). Avatars, People, and Virtual Worlds: Foundations for Research in Metaverses. *Journal of the Association for Information Systems*, *10*(2).

DePietro, R., Wiarda, E., & Fleischer, M. (1990). The Context for Change: Organization, Technology and Environment. In L. G. Tornatzky & M. Fleischer (Eds.), *The Processes of Technological Innovation* (4th ed.). Lexington Books.

Dionisio, J. D. N., Burns III, W. G., & Gilbert, R. (2013). 3D Virtual Worlds and the Metaverse: Current Status and. *ACM Computing Surveys*, *45*(3), 1–38.

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*, *0*(0), 1–28.

Downey, S. (2014). History of the (Virtual) Worlds. *The Journal of Technology Studies*, *40*(1/2), 54–66.

Duan, H., Li, J., Fan, S., Lin, Z., Wu, X., & Cai, W. (2021). Metaverse for Social Good : A University Campus Prototype. *Proceedings of the 29th ACM International Conference on Multimedia*, 153–161.

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., … 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*, 1–55.

Faraboschi, P., Frachtenberg, E., Laplante, P., Milojicic, D., & Saracco, R. (2022). Virtual Worlds (Metaverse): From Skepticism, to Fear, to Immersive Opportunities. *Computer*, *55*(10), 100–106.

Flick, U. (2004). Triangulation in Qualitative Research. In U. Flick, E. von Kardorff, & I. Steinke (Eds.), *A Companion to Qualitative Research*. Sage Publications.

Flick, U., von Kardorff, E., & Steinke, I. (2004). What is Qualitative Research? An Introduction to the Field. In U. Flick, E. von Kardorff, & I. Steinke (Eds.), *A Companion to Qualitative Research* (pp. 3–11). Sage Publications.

Gartner. (2022). *Gartner Predicts 25% of People Will Spend At Least One Hour Per Day in the Metaverse by 2026*. https://www.gartner.com/en/newsroom/press-releases/2022-02-07-gartner-predicts-25-percent-of-people-will-spend-at-least-one-hour-per-day-in-the-metaverse-by-2026

Gent, E. (2022). Lessons From a Second Life. *IEEE Spectrum*, *59*(1), 19.

Groombridge, D. (2022). *Gartner Top 10 Strategic Technology Trends for 2023*. https://www.gartner.com/en/articles/gartner-top-10-strategic-technology-trends-for-2023

Han, J., Yang, M., Chen, X., Liu, H., Wang, Y., Li, J., Su, Z., Li, Z., & Ma, X. (2023). ParaDefender: A Scenario-Driven Parallel System for Defending Metaverses. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, *53*(4), 2118–2127.

Hassouneh, D., & Brengman, M. (2015). Retailing in Social Virtual Worlds: Developing a Typology of Virtual Store Atmospherics. *Journal of Electronic Commerce Research*, *16*(3), 218–241.

Hoffman, M., & Mehler, M. F. (2023). An Industry-Specific Investigation on Artificial Intelligence Adoption: The Cases of Financial Services and Manufacturing. *PACIS 2023 Proceedings*.

Hong, W., Chan, F. K. Y., Thong, J. Y. L., Chasalow, Lewis, C., & Dhillon, G. (2014). Theorizing in Information Systems Research. *Information Systems Research*, *25*(1), 111–136.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288.

Ifinedo, P. (2011). An Empirical Analysis of Factors Influencing Internet/E-Business Technologies Adoption by SMES in Canada. *International Journal of Information Technology and Decision Making*, *10*(4), 731–766.

Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. L. M. (1997). Personal Computing Acceptance Factors in Small Firms: A Structural Model. *MIS Quarterly*, *21*(3), 279–305.

Kalyvaki, M. (2023). Navigating the Metaverse Business and Legal Challenges: Intellectual Property, Privacy, and Jurisdiction. *Journal of Metaverse*, *3*(1), 87–92.

Kaplan, A. M., & Haenlein, M. (2009). The Fairyland of Second Life: Virtual Social Worlds and How to Use Them. *Business Horizons*, *52*(6), 563–572.

Kelly, S. M. (2021). *Facebook Changes Its Company Name to Meta*. CNN Business. https://edition.cnn.com/2021/10/28/tech/facebook-mark-zuckerberg-keynote-announcements/index.html

Khronos Group Inc. (2023). *The Metaverse Standards Forum*. https://metaverse-standards.org/

Kim, D. Y., Jang, S., & Morrison, A. M. (2011). Factors Affecting Organizational Information Technology Acceptance: A Comparison of Convention and Visitor Bureaus and Meeting Planners in the United States. *Journal of Convention and Event Tourism*, *12*(1), 1–24.

Kim, J. (2021). Advertising in the Metaverse: Research Agenda. *Journal of Interactive Advertising*, *21*(3), 141–144.

Kruse, L., Wunderlich, N., & Beck, R. (2019). Artificial Intelligence for the Financial Services Industry: What Challenges Organizations to Succeed. *HICSS 2019 Proceedings*, 6408–6417.

Kshetri, N. (2023). The Economics of the Industrial Metaverse. *IT Professional*, *25*(1), 84–88.

Kuan, K., & Chau, P. (2001). A Perception-Based Model for EDI Adoption in Small Businesses Using a Technology-Organization-Environment Framework. *Information and Management*, *38*(8), 507–521.

Kye, B., Han, N., Kim, E., Park, Y., & Jo, S. (2021). *Educational Applications of Metaverse: Possibilities and Limitations*. 1–13.

Lederer, A. L., & Mendelow, A. L. (1988). Convincing Top Management of the Strategic Potential of Information Systems. *MIS Quarterly*, *12*(4), 525–534.

Lee, U. K., & Kim, H. (2022). UTAUT in Metaverse: An "Ifland" Case. *Journal of Theoretical and Applied Electronic Commerce Research*, *17*(2), 613–635.

Lian, J. W., Yen, D. C., & Wang, Y. T. (2014). An Exploratory Study to Understand the Critical Factors Affecting the Decision to Adopt Cloud Computing in Taiwan Hospital. *International Journal of Information Management*, *34*(1), 28–36.

Lokuge, S., Sedera, D., Grover, V., & Dongming, X. (2019). Organizational Readiness for Digital Innovation: Development and Empirical Calibration of a Construct. *Information and Management*, *56*(3).

Marabelli, M., & Newell, S. (2022). Everything You Always Wanted to Know about the Metaverse* (*But Were Afraid to Ask). *Academy of Management Annual Meeting*.

Marabelli, M., & Newell, S. (2023). Responsibly Strategizing with the Metaverse: Business Implications and DEI Opportunities and Challenges. *Journal of Strategic Information Systems*, *32*(2), 1–28.

Matsubara, M., & Oguchi, M. (2010). Evaluation of Metaverse Server in a Widely-Distributed Environment. *OTM 2010 Workshops*. *LNCS*, 307–316.

Mayring, P. (2000). Qualitative Content Analysis. *Forum: Qualitative Social Research*, *1*(2).
Mayring, P. (2014). *Qualitative Content Analysis: Theoretical Foundation, Basic Procedures and Software Solution*.
McKinsey. (2022). *Value creation in the metaverse*. https://www.mckinsey.com/~/media/mckinsey/business functions/marketing and sales/our insights/value creation in the metaverse/Value-creation-in-the-metaverse.pdf
Molla, A., Cooper, V. A., & Pittayachawan, S. (2009). IT and Eco-Sustainability: Developing and Validating a Green IT Readiness Model. *ICIS 2009 Proceedings*, 1–17.
Myers, M. D., & Newman, M. (2007). The Qualitative Interview in IS Research: Examining the Craft. *Information and Organization*, *17*(1), 2–26.
Niu, X., & Feng, W. (2022). Immersive Entertainment Environments - From Theme Parks to Metaverse. *DAPI 2022*. *LNCS*, 392–403.
O'Reilly, C. (1989). Corporations, Culture, and Commitment: Motivation and Social Control in Organizations. *California Management Review*, *31*(4), 9–25.
Oh, K. Y., Cruickshank, D., & Anderson, A. R. (2009). The Adoption of E-Trade Innovations by Korean Small and Medium Sized Firms. *Technovation*, *29*(2), 110–121.
Oliveira, T., & Martins, M. F. (2011). Literature Review of Information Technology Adoption Models at Firm Level. *The Electronic Journal Information Systems Evaluation*, *14*(1), 110–121.
Park, D., Kim, J. M., Jung, J., & Choi, S. (2022). Method to Create a Metaverse Using Smartphone Data. *VAMR 2022 Held as Part of the HCII 2022*., 45–57.
Park, S.-M., & Kim, Y.-G. (2022). A Metaverse: Taxonomy, Components, Applications, and Open Challenges. *IEEE Access*, *10*, 4209–4251.
Peukert, C., Weinhardt, C., Hinz, O., & van der Aalst, W. (2022). Metaverse: How to Approach Its Challenges from a BISE Perspective. *Business & Information Systems Engineering*, *64*(4), 401–406.
Pumplun, L., Tauchert, C., & Heidt, M. (2019). A New Organizational Chassis for Artificial Intelligence - Exploring Organizational Readiness Factors. *ECIS 2019 Proceedings*, 1–15.
Queiroz, M. M., Wamba, S. F., Pereira, S. C. F., & Jabbour, C. J. C. (2023). The Metaverse as a Breakthrough for Operations and Supply Chain Management: Implications and Call for Action. *International Journal of Operations & Production Management*, *ahead-of-print*.
Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). Free Press.
Rosenberg, L. B. (2022). Regulating the Metaverse, a Blueprint for the Future. *XR Salento 2022 Proceedings*. *LNCS*, 263–272.
Rubin, H. J., & Rubin, I. S. (2005). *Qualitative Interviewing - The Art of Hearing Data* (2nd ed.). SAGE.
Schöbel, S., & Leimeister, J. (2023). Metaverse platform ecosystems. *Electronic Markets*, *33*(12), 1–10.
Seidel, S., Berente, N., Nickerson, J., & Yepes, G. (2022). Designing the Metaverse. *HICSS 2022 Proceedings*, 6699–6708.
Stephenson, N. (1992). *Snow Crash*. Bantam Books.
Tassi, P. (2022). *There's No Fixing Meta's Metaverse, Scrap It, Start Over*. Forbes. www.forbes.com/sites/paultassi/2022/11/23/theres-no-fixing-metas-metaverse-scrap-it-start-over/
van Eck, N. J., & Waltman, L. (2010). Software Survey: VOSviewer, a Computer Program for Bibliometric Mapping. *Scientometrics*, *84*, 523–538.
Whittemore, R., Chase, S. K., & Mandle, C. L. (2001). Validity in qualitative research. *Qualitative Health Research*, *11*(4), 522–537.
Yang, S. B., Lim, J. H., Oh, W., Animesh, A., & Pinsonneault, A. (2012). Using Real Options to Investigate the Market Value of Virtual World Businesses. *Information Systems Research*, *23*(3), 1011–1029.
Yen, H. R., Wang, W., Wei, C. P., Hsu, S. H. Y., & Chiu, H. C. (2012). Service Innovation Readiness: Dimensions and Performance Outcome. *Decision Support Systems*, *53*(4), 813–824.
Zhao, Y., Jiang, J., Chen, Y., Liu, R., Yang, Y., Xue, X., & Chen, S. (2022). Metaverse: Perspectives from graphics, interactions and visualization. *Visual Informatics*, *6*(1), 56–67.
Zhu, K., & Kraemer, K. (2005). Post-adoption Variations in Usage and Value of E-business by Organizations: Cross-Country Evidence From the Retail Industry. *Information Systems Research*, *16*(1), 61–84.
Zhu, K., Kraemer, K., & Xu, S. (2003). Electronic Business Adoption by European Firms: A Cross-Country Assessment of the Facilitators and Inhibitors. *European Journal of Information Systems*, *12*(4), 251–268.
Zielonka, J. T., Heigl, R. M., & Rothlauf, F. (2022). From Block to TOE: Analyzing Opportunities of Blockchain Technologies in the Automotive Industry. *ICIS 2022 Proceedings*, 1–17.