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IL RUOLO DELL' ACCADEMIA NELLE SFIDE DELLA SOCIETÀ, DELL'ECONOMIA E DELLE ISTITUZIONI.

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Beyond the physical world... Digital entrepreneurship opportunities in the metaverse

Paolo Biancone¹, Silvana Secinaro², Davide Calandra³, Michele Oppioli⁴

Abstract:

Purpose: Considering the pervasiveness of technology, this article offers an understanding of how the metaverse can impact digital entrepreneurship. The objective will be to gather professional evidence on how the revival of this new technology can bring entrepreneurial development.

Methodology: Through a qualitative study approach based on applying the metaverse in digital business contexts and analysing 533 practitioner sources from the NexisUni database, it will be possible to identify this emerging technology's concepts and application techniques. The research adopts a qualitative methodology based on a mixed thematic and content review using tools such as ATLAS.ti and Leximancer.

Findings:

Our study finds three relevant macro-topics for metaverse and digital entrepreneurship (Technology, Immersive and Design) and eight concepts (Private Solutions, Digital Twins, Gamification, Public Solutions, New Business Worlds, Co-design, Collaborative Spaces and Stakeholders' participation).

Originality:

The uncovered elements demonstrate professionals' interest in a new mode of digital entrepreneurship using the metaverse. This highlights the commitment of companies and entrepreneurs toward discovering new services delivered in virtual and parallel worlds that find the creation of digital twins as their essence.

Keywords: Metaverse, digital entrepreneurship, co-design- digital twins, qualitative study

1. Introduction

In recent years, we have witnessed the spread of new digital technologies acting as drivers for more and more new business ideas (Kraus et al., 2019a). A large part of the world's entrepreneurship progress depends on technological changes. Numerous studies certify the role of technology as an entrepreneurial enabler. For instance, according to Schiuma et al. (2021), entrepreneurs are increasingly used to looking for new technological ways to promote their competitiveness. Moreover, according to Troise et al. (2022), new technical environments enable entrepreneurs to navigate turbulent and uncertain environments. Therefore, numerous colleagues indicate that the cutting-edge use of new technologies can promote winning entrepreneurial opportunities (Dong, 2019; Nambisan, 2017; Upadhyay et al., 2021). While one side of the literature invokes positivist and constructivist ideas, other authors question the business issues that such changes might promote. For instance, according to Oyemomi et al. (2016), adopting emerging technologies only sometimes represents light and successful choices from a business perspective.

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Nonetheless, as most often recalled, it is first necessary to study and evaluate the theoretical significance of technology adoption and, subsequently, provide practical implications for entrepreneurs (Garousi Mokhtarzadeh et al., 2020). The need to rely on external knowledge and evaluate application capabilities is emerging, especially regarding dynamic platforms (Biancone, Secinaro, Iannaci, et al., 2021). These include, for example, the metaverse. Despite considerable interest in professionals from leading international consulting firms (Accenture, 2022; KPMG, 2022; Ward, 2022) and other sectors such as marketing, supply chain, gaming, and health (Cross, 2022; Marr, 2022), science is currently questioning technology's impacts. The metaverse refers to a virtual reality shared through the Internet, where each human being is represented in three dimensions through an avatar (Neal Stephenson, 1992; Sparkes, 2021). What seemed futuristic a short time ago opens the door to new forms of digital entrepreneurship today (Gursoy et al., 2022). For instance, first (Kraus et al., 2022) provide an entrepreneurial and rebranding perspective through the metaverse, denoting a radical change in the Facebook business model. Other research experiences are ongoing in conferences and book chapters (Inder, 2023; Sarkar and Kedas, 2022). Therefore, we need to glimpse a contribution that offers state-of-the-art attempts by companies and entrepreneurs to foster their businesses through the metaverse.

Our research contribution will have two primary objectives. First, to provide the concepts, theoretical tools, and advanced techniques related to the metaverse. Second, to link theory to empirical practice by showing how the metaverse can be an enabling technology for entrepreneurship. Therefore, our paper will address the following research question:

RQ1: How can the metaverse enable digital entrepreneurship tools and techniques?

Through a qualitative study approach based on the metaverse application in digital business contexts and analysing 533 practitioners' sources, it will be possible to identify the application-oriented concepts and techniques of this emerging technology. Furthermore, the data will demonstrate how it can increase management efficiency and extend the entrepreneurial business model using frontier technologies. Therefore, this research will also provide a theoretical framework for all digital entrepreneurs looking at new and emerging technologies.

The study will present several theoretical and practical implications. On a theoretical level, benefiting from the study of Kraus et al. (2022), our research will shed light on an empirical case concerning the conceptual difference between innovation or increased transformation of business models through the metaverse. This work will directly contribute to the global discussion by identifying a model for applying emerging technology to digital entrepreneurs. The study will provide new insights for digital entrepreneurs on a practical level. Starting from the selected best practices, the objective will be to extract and contribute knowledge applicable to countless contexts and share practical entrepreneurial ideas.

Our paper is organized as follows. The next section identified the theoretical background focusing on digital entrepreneurship theories and experiences and analysed metaverse opportunities in theory. Then, section three will fix the methodological flow followed to address RQ1. Section four presents our results, discussing them and considering the literature flow. Finally, the last section concludes the paper by addressing theoretical and practical implications, limitations, and future research avenues.

2. Literature review

2.1 Digital entrepreneurship

The pervasiveness of digitization has paved the way for countless entrepreneurial opportunities and a timely research line (Mir et al., 2022). As indicated in the literature review of (Kraus et al., 2019b), studying digital entrepreneurship means identifying new digital business

models, understanding new processes, implementing new platform strategies, creating, and facilitating new digital ecosystems, providing entrepreneurship education, and facilitating digital social entrepreneurship. Creating new digital businesses means designing, launching, and managing new companies as much as possible in the digital world (Hsieh and Wu, 2019a). These characteristics then clash with the reality of businesses and entrepreneurs. While digital pervasiveness is highest in large companies, this is more limited for small-to-medium-sized companies or single-entrepreneurship entities. For example, (Jiao et al., 2022) show how digital entrepreneurship is more difficult in single-entrepreneurship cases and is positively influenced by exposure to digital networks and innovative culture, even according to the gender of the entrepreneur himself. Other studies point out that being a digital entrepreneur depends on variables such as business innovativeness, intentionality, convenience, culture, flexible design, entrepreneurship orientation, generality, openness, network, and technology orientation (Dutot and van Horne, 2015; Upadhyay et al., 2022). Therefore, while exposure to the digital environment can play an essential role for entrepreneurs, the presence of digital skills enables the start of new initiatives to understand new technologies (Mir et al., 2022).

As suggested by (Biancone, Secinaro, Iannaci, et al., 2021) and (Jafari-Sadeghi et al., 2021), digital transformation and the use of new technologies can create value in the company through new expenditures in research and development as well as the registration of brands or patents. This is happening for technologies that were previously little considered and are now revealing their potential such as Or, less long since is the case with the metaverse and the massive investments of large entrepreneurs such as Mark Zuckerberg for Meta (Kraus et al., 2022).

2.1 Entrepreneurship through the metaverse

A metaverse is a virtual world where users participate in the first person (Hirsch, 2022). Advances in new computing powers, hardware-software blending, and efficient Internet speeds enable the creation of dedicated applications in virtual worlds (Arpaci et al., 2022). Advancements are progressively leading people to use virtual, interactive, collaborative, and immersive environments (Dwivedi et al., 2022). Therefore, the metaverse now turns out to be a parallel virtual world where people can perform, play, socialize, discover new realities, and act themselves (Duan et al., 2021).

Movement (albeit virtual) into new digital worlds creates unique individual needs, progressively stimulating entrepreneurs to provide new products and services that match real needs. In other cases, the metaverse is seen as an opportunity for entrepreneurs to offer new activities to individuals and manually bring them into a virtual and digital world. This is the case for vehicle manufacturers creating sales spaces for new electric vehicles (Glenday, 2022; Stellantis, 2022), for social media creating a range of dedicated services for consumers to test and try products digitally (Kraus et al., 2022; Meta, 2023) or for transforming the concept of telemedicine and raising the level of doctor-patient interaction (Biancone, Secinaro, Marseglia, et al., 2021; Walcott, 2022). Although being explored, the metaverse represents both a risk and an excellent opportunity for entrepreneurs (Kang, 2021) who will be able to use digital services as a lever for development. Making our own the inherent riskiness of a constantly updating research topic, the continuation of the article will aim to shed light on best practices and case studies of digital entrepreneurs and companies that see the metaverse as a future source of development.

3. Methodology

The research adopts a qualitative methodology based on a hybrid thematic and content survey. Numerous authors confirm this research approach through countless scientific

publications. For example, in their theoretical contribution, Massaro et al. (2019) state that this approach allows researchers to discover new variables and complex processes within a social and corporate context. In addition, for Gummesson (2006), qualitative research in managerial fields allows researchers to capture countless intangible factors that create value for the literature. Furthermore, the opportunity to bring in practical evidence and success stories allows, in retrospect, to make cross-comparisons between different realities, answering research questions that question the "How" and "Why" of a phenomenon (Yin, 2017). Therefore, considering that the metaverse is progressively introducing new ways of doing business and entrepreneurial opportunities potentially changing social contexts, the qualitative methodology is suitable for investigating application modes and challenges (Dal Mas et al., 2020).

In addition, as stated by (Scott et al., 2013), the qualitative methodology may include the analysis of multiple sources and the comprehensive development of "leading case studies, i.e., best practices that can advance scarce practical knowledge in each field. Again, the practical explanation of the meta-verse as an enabler of digital entrepreneurship leads us to assert that the multiple case study methodology will be able to provide more knowledge in this ongoing field.

The present research is grounded in the theory of digital entrepreneurship and aims to discover how the metaverse can be a positive enabler of entrepreneurship experiences. Therefore, from these premises, the first step taken by the researchers was to research and subsequently select all the current and available sources.

As suggested by (Massaro et al., 2019), rhetoric and insufficient transparency in qualitative sources and case studies are two of the most evident problems in the literature. Additionally, recent research topics may require more work to find relevant academic sources. As indicated by (Romme et al., 2015) and explored by (Secinaro et al., 2021), practitioners' sources can help find results where one is in growing research topics with nascent debate. It could be even more interesting in entrepreneurship (Jack and Anderson, 1999). Therefore, researchers use the NexisUni database to select and map entrepreneurship experiences in the metaverse. This database is widely used to conduct literature reviews and extract practical sources such as business opportunities, web articles, blogs, news releases, and case studies (Biancone et al., 2022; Boudlaie et al., 2022; Calandra et al., 2022). Considering the research question, the filter "Business Opportunities" seems adequate for looking forward to new entrepreneurial opportunities using the metaverse (Nandi et al., 2022; Weiss and Nemecek, 2021).

Finally, we limit the searches to the last two years (i.e., the period of greatest momentum to select sources that adopt the metaverse as a possible development for their business) and to English sources.

After an initial selection of reports and news items, we validate the sample by triangulating the information available through web pages, press interviews, and audio/video interviews where possible to verify the existence of sources (Secinaro et al., 2020; Yin, 2017). Furthermore, to refine the technique of company selection, the researchers used the technique of snowball sampling, which, as indicated by (Noy, 2008), allows access to information through direct contacts and field interviews. Therefore, the technique was used to gather new entrepreneurship experiences through the metaverse.

Using the search criteria, 533 articles for business opportunity sources were selected. Data analysis thus began by sorting through all sources and downloading the PDF of each article. Then, all data were analyzed by researchers using two software programs, ATLAS.ti and Leximancer.

The first is a data analysis tool that can classify and create nodes between topics covered in documents (Hwang, 2008). The software allowed researchers to develop a holistic analysis environment by including codes for sectors and countries first investing in entrepreneurial opportunities in the metaverse.

The second, adopting different algorithms can extract co-occurrence, semantic, and relational information from qualitative sources (Smith and Humphreys, 2006). Mainly,

Leximancer extracts Thesaurus-based concepts from text data using automated content analysis. As confirmed by (Massaro et al., 2021), it can enhance data analysis avoiding biases by manual procedures.

4. Results

As shown in Figure 1, the subject of metaverse feeds practitioners' debates creating connections with different concepts such as "technology", "digital", "platform", "business", "immersive", "developers", "design", and "solutions". The first research topic considers practical elements of emerging technologies used by companies. Then, the content analysis directly links new businesses and spin-offs. Finally, design and solutions conclude by providing a new matter of expert collaboration.

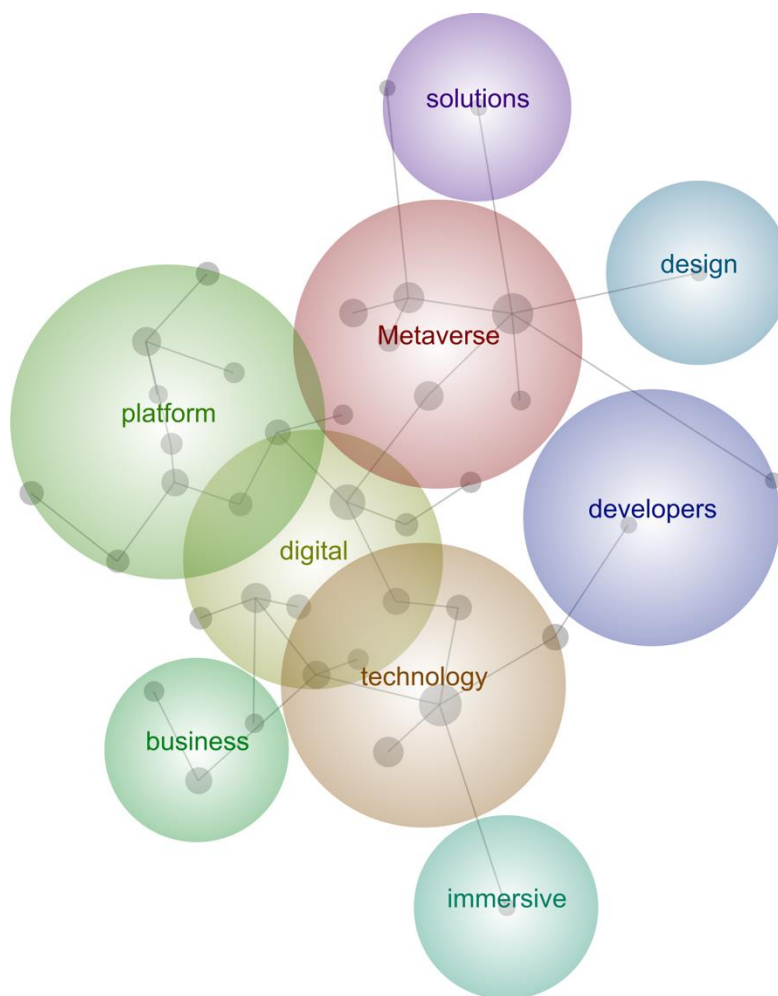


Figure 1. The metaverse and entrepreneurial opportunities, Source (Authors' elaboration)

The first topic practitioners address concerns the opportunities that the metaverse as an emerging technology offers traditional businesses and entrepreneurs (Table 4). For example, through a virtual world, it is possible to increase the number of services and solutions offered to consumers in countless areas. This can increase the number of customers, positively impacting margins and revenue (LG, 2022a). This is the case with companies offering control services for

e-mobility and virtual health care. Another application by LG denotes how: “The Metaverse will bring greater capabilities that will change how we engage across the digital space in the future. LG is looking to broaden its role and explore new services and applications for enterprises that leverage the capabilities of the Metaverse. iQ3 Connect provides immersive 3D workspace technology enabling distributed teams to work cost-effectively, collaborate and train from anywhere, on any Augmented Reality, Virtual Reality, or 2D device” (LG, 2022b). In addition, the same is happening for Siemens with the launch of the industrial metaverse that can democratize the use of virtual worlds for manufacturing and production service employing the digital twins' concept (Dubai Future Foundation, 2022; Siemens, 2022). Also along the same lines is DP World, which has launched simulations of warehouse and terminal operations for the logistics sector, following the logic of the digital twin, i.e., 3D virtual versions of physical assets and inspections of containers and ships (Dubai Future Foundation, 2022). Therefore, such applications make it possible to extend corporate businesses, bring more and more consumers closer and diversify the activities of entrepreneurs.

In addition, as demonstrated by Metascale (i.e., a startup active in corporate communications), the metaverse enables new forms of financial and non-financial communication. At the same time, thanks to interactivity, it is possible to convey messages of various kinds according to business needs and induces dynamic behavior on the part of customers (e.g., using avatars) (Metascale, 2022).

The technology also opens up questions about the role of governments. For example, findings show that public companies consider the metaverse significantly. Such is the case with the United Arab Emirates, which clarifies through Minister of Health Al Olama: "Metaverse technology addresses customers' needs in the three-dimensional digital spaces easily while enjoying a digital and interactive sensory experience. He explained that the ministry intends to expand the range of services it provides through the virtual environment offered by this innovative technology to continue its pioneering journey towards improving the community's quality of life” (Khaleej Times, 2022). Or again, France considers investment in the sector so strategic that it adopted and launched a dedicated tax credit on the European continent. Finally, still in the context of public utility contexts, the role of multi-service companies also emerges (France 2030, 2022). The Dubai Electricity and Water Authority (DEWA) sees the metaverse as a source of advanced innovation by launching an entirely dedicated hackathon (Dubai Electricity & Water Authority, 2022).

Practitioners' consideration of the potential of the metaverse continues beyond there. Digital reality enables the creation of virtual worlds and enables the creation of immersive businesses. The challenge is well understood by Intel, which has begun production of next-generation hardware capable of expanding the boundaries of current data connections (e.g., 5G) by enabling companies and entrepreneurs to create new services and business models (Koduri, 2021). These include the opportunity to create online art exhibitions. For example, (Forkast, 2022) has launched a new business that allows people to arrange a viewing of up to 52 works of art by offering a sense of scale and immersion. In addition, exhibitions can also be enjoyed offline (e.g., this is the case in areas lacking data connections). Finally, (Walmart, 2022), the world's leading large retail retailer, has unveiled one of the largest metaverse platforms to offer its customers immersive experiences that include games and additional services compared to physical stores.

The third and final macro-theme that emerges from the thematic analysis is designed. Launching immersive experiences requires personalized, immersive features with high-profile interactive 3D content. For (Adobe, 2022), a leader in software for creative marketing and document management solutions, the metaverse will require co-design and design of even more sophisticated marketing and e-commerce products and resources. This will also require new collaborative spaces that will enable designers, engineers, entrepreneurs, and business figures to work together to scale new businesses and accelerate research and development of solutions in the metaverse (Microsoft, 2022; NVIDIA, 2022).

5. Discussion

Starting with the RQ: How can the metaverse enable digital entrepreneurship tools and techniques? the analysis of 533 results allowed researchers to highlight some new implications for theory and practice.

The results of this study bring out three relevant macro-topics (Technology, Immersive and Design) and eight concepts (Private Solutions, Digital Twins, Gamification, Public Solutions, New Business Worlds, Co-design, Collaborative Spaces and Stakeholders' participation). The uncovered elements demonstrate professionals' interest in a new mode of digital entrepreneurship using the metaverse. This highlights the commitment of companies and entrepreneurs toward the discovery of new services delivered in virtual and parallel worlds that find as their essence the creation of digital twins. Therefore, the study explores ongoing relationships for developing increasingly technically complex metaverse platforms and customer service offerings.

In this study, the authors argue that the metaverse represents an opportunity for numerous business and entrepreneurial stakeholders and the entire supply chain, including the need to upgrade Internet networks and data infrastructure. Furthermore, we denote how adopting a new technology to explore new virtual worlds capable of increasing customers requires several vital elements. First, as indicated by (Jafari-Sadeghi et al., 2021), value creation through technology needs favourable conditions such as investment and knowledge translation regarding brands and patents. This was observed in our results in the case of Adobe or NVIDIA through the market launch of new enabling platforms towards entrepreneurs. Second, for the metaverse to be explored by more and more entrepreneurs, it is necessary to create collaborative, flexible environments aimed at the market launch of new services (Upadhyay et al., 2022). Third, although the difficulty for individual entrepreneurs to implement significant investments (Jiao et al., 2022), we discover how even in the case of the metaverse, support from public companies (e.g., central governments) can be vital. For example, through tax credits (France 2030, 2022) and finalized participation in hackathons (Dubai Electricity & Water Authority, 2022; Koduri, 2021).

Moreover, any decision to act at the level of digital entrepreneurship can be explored through the framework of (Kraus et al., 2019b). Table 5 and the following subsections connect the results with some theoretical implications, allowing a better understanding of the topic and opening opportunities for future research.

5.1 *Digital business model*

According to (Kraus et al., 2019b; Toniolo et al., 2020), a digital business model concerns shifting business activities to fully digital environments. This coincides with the emergence of new companies resulting from digitization and offering products and services for the digital world. This aligns with the metaverse, even more so than other technologies, which aim to shift the real environment to the virtual (Dwivedi et al., 2022). We discover how LG is increasingly increasing its digital strategy through source observation. Or, again, Ifland Gallery is gradually diversifying its business by offering virtual art exhibitions using the metaverse. Finally, unlike physical stores, Walmart offers new virtual worlds for customers to experience different games and services. Therefore, the analysis of practical results confirms what is present in theory, although we are at an early stage of exploration by entrepreneurs.

5.2 *Digital entrepreneurship model*

Digital entrepreneurship models differ from traditional ones in the greater need for networking (Dutot and van Horne, 2015). The revival of the metaverse as a tool for entrepreneurship demonstrates this claim. This has been observed primarily from the Metascale case, which allows for different communication tools based on technology and focuses on the participation of potential customers through gamification (Rodrigues et al., 2019). Moreover, such elements are also present in the Walmart case. Improving entrepreneurship models use the metaverse to center the customer through avatars, enabling virtual games and simulating virtual shopping experiences that are then matched in the real world (Figures 2).



Figure 2. Walmart Land and Walmart's Universe of Play, Source (Walmart, 2022)

5.3 Platform strategies

Early entrepreneurial ventures in the metaverse use digital platforms and, through avatars, allow users immersive experiences in virtual worlds. Our results, in line with (Hsieh and Wu, 2019b; Kraus et al., 2019b), show that digital platforms can be used in three ways. First, through pure innovation initiatives that aspire to share new digital tools and develop entrepreneurial ventures, such as for Adobe, Intel Corporation, NVIDIA, and Microsoft. Second, through transaction platforms for business promotion by leveraging third-party technology to create additional lines of business and services (e.g., Ifland, Walmart, Metascale and DP World). Finally, integration platforms where entrepreneurs can develop new consumer projects (e.g., Siemens).

5.4 Digital ecosystem

As recalled, digital entrepreneurship is based on an ecosystem, i.e., a complex mechanism of interactions between different entities and with multiple utilities (Kraus et al., 2019b; Mir et al., 2022). Our results are in line with this view by extending its validity. The selected sources demonstrate elements of governance innovativeness by companies and public institutions. For example, the digital ecosystem is promoted by the Dubai Electricity and Water Authority (DEWA) through forms of collaboration with schools and universities. Or, considering that immersive experiences require solid digital skills and investments, tools such as tax credits can

facilitate the ecosystem of stakeholders interested in developing business in the metaverse (e.g., Minister of Economy, Finance, and Industrial and Digital Sovereignty - France).

5.5 Entrepreneurship education

Being a digital entrepreneur also means having the tools and notions that can make people create innovative business ideas. The theoretical evidence of (Kraus et al., 2019b) has been both a light and a confirmation for us. The observation also confirms and extends the concepts for the case of the metaverse as a living laboratory for digital applications (le Dinh et al., 2018). Education initiatives are put in place by Adobe and Walmart towards developers and their customers to co-create novel business solutions. However, this assumption is also confirmed through hackathons that inherently have prominent educational connotations.

5.6 Social digital entrepreneurship

Being digital also invokes social elements. As defined by (Smith et al., 2017), new digital business models require studies, among others, on the benefits of using digital profiles on social capital. In addition, (Sussan and Acs, 2017) further extend the vision by specifying how some digital activities could be equally traditional, creating an inevitable intertwining with routines (Sussan and Acs, 2017). In the metaverse, the "social" need of entrepreneurs and then customers mean using avatars to simulate digital worlds while maintaining the characteristics that best suit the individual. Being social, therefore, is innate in entrepreneurs and is reflected in the theoretical concept of digital twins repeatedly referred to by Siemens and DP World

6. Conclusions

To conclude our study, it is necessary to start from the premises that inspired it. Our research aimed to explore the concepts, theoretical tools, and advanced techniques that digital entrepreneurs can apply to the metaverse. Since this is a burgeoning area of research, we adopted a qualitative research methodology using only professional sources. Therefore, our research focused on available sources by identifying real case studies that can serve academics and entrepreneurs to strengthen business ideas using the metaverse. Analyzing 533 sources, we discovered three relevant macro-topics (Technology, Immersive and Design) and eight concepts (Private Solutions, Digital Twins, Gamification, Public Solutions, New Business Worlds, Co-design, Collaborative Spaces and Stakeholders' participation). In addition, we confirmed and extended the theoretical implications of digital entrepreneurship by applying it to real metaverse cases. Finally, our study reiterates how digitization can distribute value and diversify business activities.

As reported in the discussion, the research allowed us to outline some implications of both a theoretical and practical nature. At the theoretical level, we extend the debate on digital entrepreneurship using the lens of (Kraus et al., 2019b). In particular, the metaverse fosters new entrepreneurial ventures based on theoretical concepts such as gamification, co-design and digital twins.

On a practical level, we have demonstrated with established cases the opportunities that the metaverse can provide digital entrepreneurs by reaffirming the value of technology as a lever for creating new business models. In addition, the cases recounted here can inspire CEOs, managers,

and future entrepreneurs to use the metaverse to expand their businesses by diversifying their services into numerous sectors. Finally, to the best of our knowledge, this study represents one of the first attempts to study the metaverse by framing it from theoretical and practical perspectives.

As is the case with all research, the study has some limitations. First, using a single database and selecting some of the most globally cited cases may have limited our research. This will prompt new frontier studies by integrating more databases as time and knowledge of the topic progress. Second, not using scholarly sources from traditional databases such as Scopus or Web of Science stems from the timeliness of our study and a constantly evolving stream of knowledge. This can be a stimulus to future researchers to conduct holistic literature reviews that can encapsulate the thinking of academics on the topic of the metaverse and its implications for entrepreneurship. Third, the desire to explore the metaverse generically may have caused researchers to miss some typical case study elements and concepts. Therefore, in the future, colleagues may adopt multiple methodologies to explore one or more case studies in this area.

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