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"Ali Baba and the 40 Metaverses": Ethical Paradigms Related to the Metaverse in Business Contexts

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ABSTRACT

The metaverse is rapidly emerging as a key area of interest in business circles, promising an immersive experience for all users through virtual worlds. Within these computer-generated realms, users can create avatars to represent themselves and engage with other avatars and virtual environments. The title "Ali Baba and the 40 Metaverses" underscores the transformative potential of this innovation, which is often perceived as a magical technology. "Open sesame" was the magical phrase spoken to enter the cave in "Ali Baba and the 40 Thieves", so too is the gateway into the enchanted realm of the metaverse—where the imagination reigns supreme—technologies such as virtual or augmented reality. However, the alluring prospect of the metaverse is associated with ethical issues that must be considered carefully, as they could significantly influence its acceptance and integration into societies and business settings. Using the 6-3-5 method | brainwriting and stepladder technique, this study develops a process-oriented analysis system to help companies identify and address ethical challenges related to metaverse technology. The results are based on two sessions with an expert panel, which not only shed light on the ethical paradigms associated with the metaverse but also provide actionable insights for businesses navigating this emerging landscape. To ensure the integrity and reliability of the findings, a consolidation session was conducted with an independent expert to validate the identified paradigms and pinpoint areas needing improvement.

1 | Introduction

Technology is one of the most pertinent topics today, particularly emerging technological innovations. In the modern world, companies often find it nearly impossible to ensure their survival without embracing new technologies, as these innovations offer new ways to optimize processes, enhance operations, acquire knowledge and accelerate essential activities (Santos et al. 2024; Ramos et al. 2025). Thus, businesses must invest in technological innovation to keep up with or surpass the competition. In particular, firms have to guarantee their position in the online world given that *"the lack of an adequate online presence is a major competitive disadvantage that has the potential to diminish a company's success"* (Goldberg and Schär 2023, 1).

Summary

- This study explores the ethical paradigms that emerge from the integration of metaverse technologies in business contexts, offering a validated framework for identifying and addressing ethical concerns in immersive digital environments.
- The 6-3-5 method | brainwriting and stepladder technique are applied to uncover key ethical issues and challenges associated with metaverse adoption in business settings.
- A process-oriented analysis system is developed to support companies in navigating the ethical implications of virtual and augmented reality technologies.
- The study provides actionable insights for decision-makers aiming to balance innovation with ethical responsibility in metaverse applications.
- Validation by an independent expert ensures the robustness and practical relevance of the ethical paradigms identified, highlighting areas for refinement and future consideration.
- The findings serve as a foundation for more responsible and sustainable integration of metaverse solutions in organizational environments.

The metaverse is one of the most recent technological innovations. This concept has numerous definitions (Dwivedi et al. 2022; Richter and Richter 2023) and already has great potential even as it continues to evolve. This positive assessment is based on its ability to enable global connections and revolutionize the way people interact (Richter and Richter 2023). The metaverse can open doors to varied business opportunities by facilitating real-time interactions between teams located in different parts of the world and by simulating reality in virtual environments for employee training. This innovation also creates personalized experiences and advertisements for users, reaches a wider audience for sales and for announcements of new products, establishes virtual marketplaces to encourage commercial transactions and opens new points of sale, among other opportunities.

Significant investments have been made in developing the metaverse given its intrinsic opportunities. However, insufficient knowledge is available about the progress made so far in this area, its implications and the magnitude of its impact on business contexts and society at large (Richter and Richter 2023; Zhang et al. 2023). Thus, further analysis is needed for a fuller understanding of the metaverse.

The present study comprehensively explores the different concepts and technologies comprising the metaverse, identifying its main cross-cutting limitations. The results of this overview highlight the need to examine the ethical paradigms associated with using the metaverse in business contexts. Therefore, the current investigation focused on two research questions:

- How can companies effectively identify and categorize the various ethical paradigms associated with integrating the metaverse into business contexts?
- How can structured ethical frameworks derived from these paradigms be applied to decision-making processes and corporate strategies when metaverse technologies are adopted?

To address these issues, this study sought to create an analysis system that relied on the 6-3-5 method | brainwriting and stepladder technique to identify, analyze and stratify the diverse ethical paradigms related to using the metaverse in business settings. Considering the complexity of this subject, the methodologies had to provide a comprehensive understanding of the metaverse to ensure that company managers are aware of all aspects of this technology when making decisions. The 6-3-5 method | brainwriting and stepladder technique were thus selected as the most appropriate group decision making (GDM) and problem structuring methods (PSMs).

The 6-3-5 method | brainwriting was applied first to identify the various ethical paradigms associated with the metaverse. Next, the stepladder method was used to prioritize the identified paradigms according to their negative impact on the implementation of this technology. In other words, the ethical paradigms that were ranked as more important are those that companies should focus on first to ensure that metaverse tools are applied appropriately and that they function well.

The results of the present study are based on the knowledge and professional experience of the six specialists recruited for a decision-maker panel. The members were selected with meticulous care to ensure their familiarity with the metaverse and direct involvement and professional experience in contexts using this technology. The findings include a novel, well-structured framework for identifying, analyzing and prioritizing ethical considerations associated with the metaverse. This investigation fills a research gap by addressing the ethical implications of metaverse adoption, providing practical insights for businesses navigating across this emerging technological landscape. The study thus systematically explores relevant ethical paradigms and their impacts on decision-making processes and corporate strategies, thereby contributing to a more informed and ethically sound implementation of metaverse technologies in the business world.

The remainder of this paper is organized as follows: Section 2 contains the literature review, which highlights key concepts that contextualize the topic and provides a clearer understanding of the emergence of the metaverse. Section 3 presents the two methods (i.e., GDM and PSMs) and specifically discusses the two techniques (i.e., 6-3-5 method | brainwriting and the stepladder) used to develop the analysis model, including how these were applied to analyze ethical paradigms. Section 4 describes the ways the methodologies were employed in two group sessions by the panel of decision makers. Finally, Section 5 provides the main results of the model's application, along with practical recommendations for companies and suggestions for future research.

2 | Literature Review

Companies' progress is currently based on technological innovations (Berghoff 2001; Zhang et al. 2023; Silva et al. 2025).

Some trends among these innovations have intensified with increased globalization (i.e., greater openness around the world to new technologies) and strengthened the connections and interrelationships between countries and people. This tendency can be described as global interconnectedness (Zhang et al. 2023; Macedo et al. 2024).

According to Aloqaily et al. (2023), virtual reality (VR) is a technology that allows users to enter a three-dimensional (3D) world in which they can interact while completely disconnected from the physical world. Access to this 3D world is gained via electronic devices (e.g., VR headsets or helmets). This technology offers immersive encounters as users experience the virtual world in a vivid way (Aloqaily et al. 2023). In contrast, augmented reality (AR) lets users remain aware of changes in their surrounding physical environment (Li et al. 2022). This dual awareness is possible because, as Huynh-The et al. (2023) explain, AR consists of superimposing 3D content on the real world. Digital twin technology duplicates the real world by recreating a digital representation and produces the virtual worlds that make up the metaverse (Tang et al. 2023). AR tools *"replicate everything in the physical world in the digital space and provide …* [users] *with feedback from the virtual world"* (Attaran and Celik 2023, 1), combining digital twin technology with 3D modeling that creates 3D digital representations of objects and environments. The scenarios created thus become more realistic (Shi et al. 2023).

In security technologies, blockchain has emerged as a valuable tool (Huang et al. 2023). According to Hawlitschek et al. (2018) and Huang et al. (2023), decentralized distributed databases offer a reliable, valid trading platform in which data integrity, content authenticity and user transparency can be guaranteed. Technologies linked to security in the digital world have become increasingly important given the growing number of interconnected devices. Attaran and Celik (2023) named this giant network of interconnected things (i.e., things–things, people–things and people–people links) the "Internet of Things" (IoT).

When everything is interlinked, constant communication and sharing of information occur. Increased interconnection means data are generated at a faster rate, expanding the amount and variability of information present in big data. In addition to collecting large quantities of information, big data analytics processes it to generate insights that companies can use for decision-making (Agarwal et al. 2023; Silva et al. 2025).

In conjunction with data storage, cloud computing technology has been created that offers infrastructure, platform and software services (Sharma et al. 2023). This innovation is popular because it allows people to obtain useful information whenever and wherever it is needed—via the Web (Hassan et al. 2022). The speed with which these data are generated and transmitted has grown, so experts predict that *"data traffic* [will] *… increase at an explosive rate"* (Tang et al. 2023, 78). This trend indicates that moving from 5 gigabytes (G) to 6G will soon become necessary to facilitate *"higher levels of computing, sensing, localisation, and communication resources that* [will] *… enable faster transmission speeds"* (Huynh-The et al. 2023, 405).

A final major trend is artificial intelligence (AI), which Yigitcanlar et al. (2020) reports has the ability to replicate human beings' cognitive functions, such as the ability to learn and to resolve problems. In addition, AI *"is capable of learning from past experiences,* [and] *researches, hence,* [it] *is* [able] *to understand intelligence by building computer programmes that* [are capable] *of making reasoned decisions, and of responding rapidly"* (Yigitcanlar et al. 2020, 3).

The development of the metaverse has been made possible by these trends as it is *"the convergence of several cutting-edge technologies"* (Yaqoob et al. 2023, 1). First, VR and AR allow users to access—and interact within—the metaverse, which is a world created by digital twinning and 3D modeling. The metaverse only functions properly if big data can be obtained, stored and processed continuously. Cloud computing, in turn, is responsible for providing data computing tools and cloud data storage, as well as making information available to digital twin technology when and where data are needed (Attaran and Celik 2023). Second, everything is interconnected, so data can be supplied to the metaverse in real time, allowing it to reflect changes in the real world. The time factor makes 6G wireless systems *"essential for the metaverse"* (Huynh-The et al. 2023, 405) as users require increased speed in digital worlds. Avatars in the metaverse are divided into representations of real people and non-player characters (i.e., virtual beings created and controlled by AI). At last, blockchain technology guarantees the security of users' virtual resources, such as digital currencies and items.

Goldberg and Schär (2023) explain that the word "metaverse" comes from joining the prefix "meta" (i.e., transcendent or beyond) to the abbreviation of "universe" (i.e., "verse"). This technology is, therefore, a universe that transcends the physical world (Dionísio et al. 2013) or a mirror of reality that encompasses numerous virtual worlds (Weking et al. 2023). In the metaverse, people use their avatars to interact with other digital representations of real individuals or virtual characters (cf. Apala et al. 2022; Goldberg and Schär 2023; Zhao et al. 2022), as well as interacting with the surrounding ecosystem (Huynh-The et al. 2023). These interactions offer each user an immersive experience.

The concept of the metaverse was first introduced in 1992, in Neal Stephenson's science fiction novel *Snow Crash*. At the time, this idea was only considered fantasy rather than achievable (Ye and Wang 2023). By 2021, this concept had attracted enough attention to earn a place among the Top 10 Words of 2021 (Golf-Papez et al. 2022), especially when Mark Zuckerberg decided to change the name of his group's holding company to Meta and started a project with the same name (i.e., a new joint platform) (Anderson and Rainie 2022; Felice et al. 2023). This abrupt growth in popularity made the metaverse a buzzword, especially in business contexts (Jafar et al. 2023). As a result, the metaverse is seen as the next generation of the Internet (Christensen and Robinson 2022), and one of the most promising technologies, especially as a new way of connecting people (Hwang and Chien 2022).

However, the metaverse concept remains *"vaguely defined, but seemingly imminent"* (Ball in Zalan and Barbesino 2023), without a clear conceptualization due to its embryonic stage

of development (Christensen and Robinson 2022). Thus, *"it is more of an evolving vision than an examinable phenomenon"* (Weinberger 2022, 1). As a result, *"it is too early to know exactly what a 'day in the life' will be like when the metaverse arrives"* (Ball in Weinberger 2022, 1). Table 1 presents a few studies of this revolutionary technology, including their results, contributions and limitations.

According to Table 1, a consensus appears to exist on the limitations since this technology is in an embryonic phase. Because the metaverse is in its start-up and development stage, the literature shows a lack of agreement with regard to the core concept, a paucity of concrete answers on its implications and controversy about the future of this technology. These issues, in turn, prevent the researchers involved in developing this technology from moving toward a common goal and slow down the evolution of the metaverse. Given these limitations, practical applications of this technology must wait until unity is reached on a theoretical level (Shi et al. 2023).

In addition to the shortcomings identified in Table 1, two other research gaps were found. The first is a lack of clarity about the ethical paradigms associated with using the metaverse in business and the ways this technology could impact society. The second gap is the absence of a ranking of the paradigms according to their negative effect, which would facilitate the prioritization of these ethical paradigms (cf. Schöbel and Tingelhoff 2023). The present study sought to fill these research gaps by applying the 6-3-5 method | brainwriting and stepladder technique.

3 | Methodologies and Sources

The metaverse is a complex subject because of its large scope and the ethical issues associated with it. This section focuses on the theoretical framework underpinning GDM and PSMs, specifically the 6-3-5 method | brainwriting and stepladder technique, which were used to develop an analysis model for exploring the multifaceted paradigms related to the metaverse in business contexts.

3.1 | GDM and PSMs

The GDM approach has recently been attracting more attention (Morente-Molinera et al. 2023). It was developed to address the increasingly complex issues that group debates must deal with to reach a consensus (Pasi and Yager 2006). As its name suggests, GDM is a process that mixes individuals' different ideas and perspectives by discussing and evaluating them and then ranking them by order of preference (Morente-Molinera et al. 2021). This process proves especially valuable in situations that are complex and require rapid decision-making (e.g., emergency situations) (Tu et al. 2023). As a result, companies have come to favor GDM (Strang et al. 2023) as a way to make the most of individuals' diverse knowledge and opinions (Brodbeck et al. 2021).

One of the challenges currently facing GDM is the Internet, which makes so much information available that the number of alternatives has substantially increased, thereby making decision making more difficult (Morente-Molinera et al. 2023). In addition, *"creativity is not only an individual matter but* [...] *also the product of social processes involved in group functioning"* (Hénaff et al. 2018, 351). In other words, collective decision making tends to be more effective (Hsieh et al. 2020).

PSMs emerged in the mid-1960s as an approach to structuring and overcoming complex and ambiguous decision-making problems, but these methods only became more prominent in the late 1980s (Thaviphoke 2020). An important feature of PSMs is that they emphasize a holistic approach to structuring the decision problems in question and understanding their source as opposed to looking exclusively for mathematically optimal solutions (Thaviphoke 2020). Thus, PSMs focus more closely *"on context-oriented aspects* [... of] *the problematic situation rather than on how to solve the problem objectively"* (Thaviphoke 2020, 14). These methods also facilitate finding answers to problems when multiple stakeholders with different points of view are involved (Thaviphoke 2020; Gonçalves et al. 2024). As a result, PSMs allow decision makers to gain a more in-depth understanding of the problems under analysis.

GDM concentrates on the process of collective decision making, while PSMs help structure and analyze complex problems. When combined, these methods improve the overall quality and efficiency of decision-making processes. The 6-3-5 method—also known as brainwriting—and the stepladder technique can additionally play an important role in GDM and in formatting and resolving complicated decision-making problems.

3.2 | 6-3-5 Method | Brainwriting

Companies have had to concentrate part of their resources and efforts on the innovation process because of increasing competition in the business world. According to Fleury et al. (2020), this process can best be realized through idea creation techniques.

The 6-3-5 method | brainwriting was developed by Rohrbach in 1969 to overcome the disadvantages of brainstorming (cf. Litcanu et al. 2015). This alternative method of idea generation focuses not only on the number of ideas generated but also on their quality (Heslin 2009). In addition, participants write down their ideas instead of sharing them verbally (Schmitt et al. 2012). Thus, brainwriting can also be categorized as a *"silent creativity technique"* (Voß et al. 2022, 2).

Litcanu et al. (2015) argue that writing down ideas stimulates collective thinking and mutual reflection about everyone's ideas. This approach further allows all participants the same amount of time to express their ideas and prevents any participant from monopolizing the entire process. This technique also eliminates the pressure to conform to the group, encourages everyone to focus on the task at hand and ensures decision makers work systematically since each round lasts for a stipulated time. The 6-3-5 method thus facilitates the resolution of controversial topics and the creation of a greater number of ideas in less time. Brainwriting is considered an essential method for managing debates about controversial topics (Fleury et al. 2020).

TABLE 1 | Contributions and limitations of metaverse technology research.

Authors	Purpose and methodological approach	Results and contributions	Limitations
Alvarez-Risco et al. (2022)	• Construct a research model to explore the effect and relevance of variables related to social cognitive theory, which explain intention to participate in Facebook's metaverse. • Questionnaires filled out by 410 participants at least 18 years old.	• Definition of the most significant variables that explain interest in participating in Facebook's metaverse: (1) institutional support; (2) technological literacy; and (3) self-efficacy in interacting with this new digital world.	• The study population was confined to one country with limited access to the Internet. • The sample covers only citizens 18 or older.
Zallio and Clarkson (2022)	• Capture the big picture of the metaverse's ethical and social impacts on society. • Qualitative study based on 12 interviews with experts in the technology industry.	• Identification of the 10 principles for designing a good metaverse: (1) being open and accessible; (2) being honest and understandable; (3) being safe and secure; (4) leading to social equity and inclusion; (5) being sustainable; (6) valuing privacy, ethics and integrity; (7) guaranteeing data and property protection; (8) stimulating diversity through self-expression; (9) ensuring responsible innovation; and (10) complementing the physical world.	• The study sample seems biased. • This pioneering research lacks specific answers regarding how to develop a secure, accessible and inclusive metaverse.
Oleksy et al. (2023)	• Develop a model to assess people's motivation and aversion to adopting the metaverse, including the participants' connection with existing virtual worlds and the threats associated with this technology. • Two different samples: (1) users of open-world games (number [N] = 366); and (2) the adult Polish population (N = 995).	• Willingness to migrate to the metaverse associated with a greater affinity for virtual worlds and less fear of possible threats.	• The study was limited to only the most popular concept of the metaverse. • The sample was limited to one country, so additional research is needed in other countries and cultural contexts (e.g., with greater virtualization of everyday life).
Schöbel and Tingelhoff (2023)	• Analyze the challenges, opportunities and value creation associated with the implementation of the metaverse. • Qualitative analysis based on interviews with 34 experts.	• Clarification of social, technological, organizational and user-related challenges; opportunities associated with organizations, users and sources of value creation; and value classified in terms of functional, social and emotional benefits.	• Metaverse technology is still in its infancy. • The study was restricted to experts with a positive outlook on the implementation of the metaverse. • Uncertainty still exists in terms of value creation.

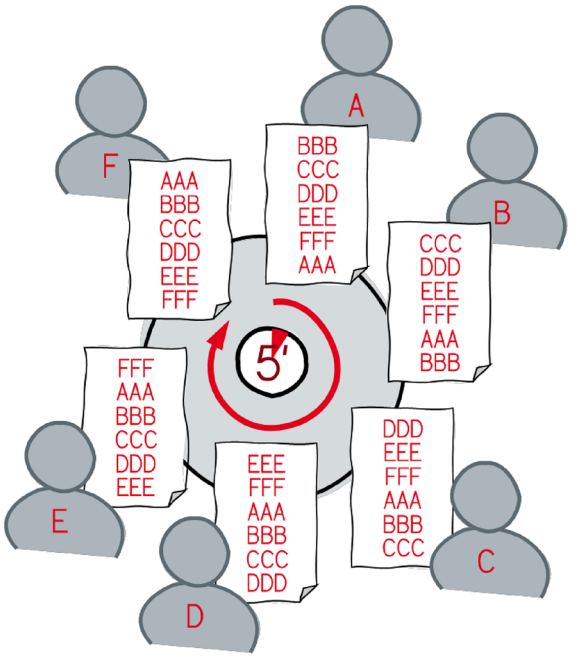

FIGURE 1 | Brainwriting process. *Source:* Voß et al. (2022, 2). [Color figure can be viewed at wileyonlinelibrary.com]

Voß et al. (2022) clarify that the 6-3-5 designation explains how the brainwriting process should be conducted (see Figure 1). First, each of the six participants receives a sheet of paper with six rows and three columns (see Figure 2). Next, each individual has 5 min to write or draw three ideas on the first line of their sheet. After 5 min, the decision makers pass their sheet on to the next person, in a clockwise direction, and so on, until all six sheets have been passed on by all six individuals. Each time a new round begins, the participants can choose to improve, develop or modify the ideas already on the sheet, or they can simply decide to formulate new suggestions that do not have to be linked to the ideas from previous rounds.

After 30 min, the 6 rounds are complete and the participants' 108 ideas (i.e., 3 columns × 6 rows × 6 sheets) can be analyzed (Litcanu et al. 2015). This method (i.e., the 6-3-5 method) was used to identify ethical paradigms. The stepladder method was then applied to stratify the paradigms.

3.3 | Stepladder Technique

The 6-3-5 method served an important purpose, but the stepladder technique was added as a complementary tool for identifying good ideas. The latter method was created by Rogelberg et al. (1992) to meet the same main objective of ensuring all the decision makers' participation in the process of generating and debating ideas is homogeneous (Rogelberg et al. 1992; Sovatzidi and Iakovidis 2022). In contrast to the 6-3-5 technique, each participant has the opportunity to present their ideas for resolving the decision problem before being influenced by the others (Sovatzidi and Iakovidis 2022).

Rogelberg et al. (1992) stipulate that the number of steps required to apply the stepladder method depends on the number of individuals involved in the process of sharing and debating ideas. In other words, if more decision makers participate, a greater number of steps is needed. In addition, the time given to debate ideas in each step is equal to the time each individual has to reflect on how to resolve the decision problem. For example, if 4 decision makers and 1 facilitator determine that thinking time $t = 7$ min and the final debate $t \leq 35$ min, the steps are as described in the following subsections (see Figure 3).

3.3.1 | Step One: Duration 7 min

The decision problem in question is presented to Participants 1 and 2. Both are then given a predefined time of 7 min to think silently about possible solutions to the problem.

3.3.2 | Step Two: Duration 7 min

After the 7 min are up, the problem is presented to Participant 3, who also has 7 min to think in silence about what needs to be done and formulate his or her opinions. During these 7 min, Participants 1 and 2 meet to present their ideas to each other and then work together to solve the problem.

3.3.3 | Step Three: Duration 7 min

After these seven additional minutes, Participant 3 enters the room where Participants 1 and 2 are. Before the debate between these three individuals begins, Participant 3 has the opportunity to present his or her ideas for solving the problem first. At the same time, Participant 4 reflects on the problem alone.

3.3.4 | Step Four: Duration Less Than or Equal to 35 min

Participant 4 joins the group after the 7 min are up. Once Participant 4 has presented his or her ideas, the group has up to 35 min to discuss collectively the best possible solution. If more decision makers are involved, all the steps are repeated until the discussion group is complete.

The stepladder technique has various interconnected advantages when it is correctly implemented. First, this method can improve decision-maker groups' performance while debating ideas by increasing individual participants' confidence and determination. Second, their self-assurance and resolve help eliminate social loafing (i.e., some group members hiding behind others who are more comfortable debating). When this behavior is reduced, each individual's involvement increases, which promotes not only knowledge sharing but also more effective communication. Last, the number and variety of solutions created and debated increase, resulting in more effective, informed decision making. The stepladder technique thus ensures a collaborative, productive environment in which everyone's ideas are considered and valued as a source of knowledge (Rogelberg et al. 1992; Sovatzidi and Iakovidis 2022).

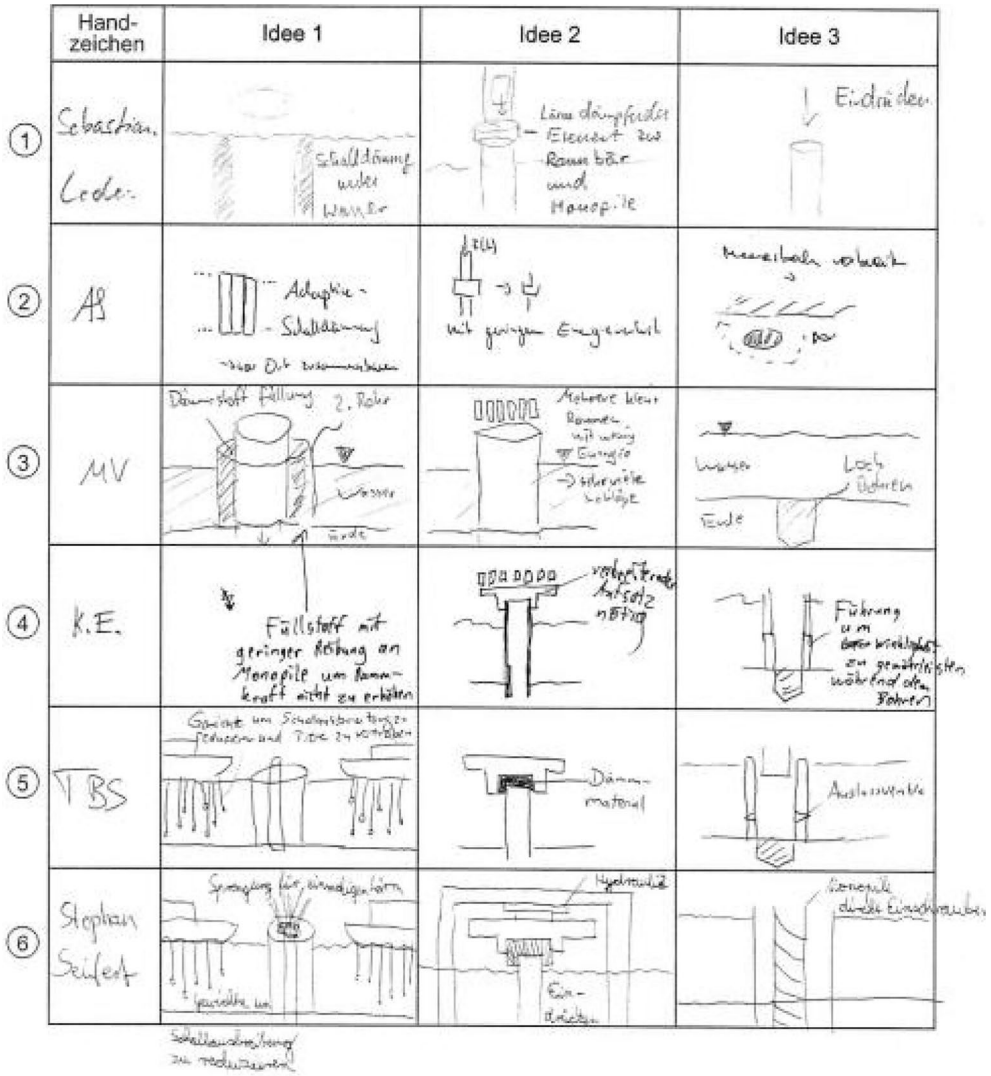

FIGURE 2 | Example of sheet filled in during brainwriting. *Source:* Voß et al. (2022, 2).

Overall, the 6-3-5 method | brainwriting was selected because it is particularly effective in generating a large volume of diverse ideas while mitigating groupthink and dominance effects, which are especially relevant when discussing sensitive ethical issues such as those associated with the metaverse. The stepladder technique, in turn, was chosen because it ensures equal participation, prevents conformity bias and facilitates systematic prioritization of alternatives, thereby complementing the exploratory nature of the brainwriting phase. Together, these methods provide a robust balance between creativity and structured decision-making, making them especially appropriate for uncovering and prioritizing ethical paradigms in a novel and underexplored domain. The next section presents the practical application of these methods.

4 | Empirical Analysis and Discussion of Results

The methodologies were applied in two phases during two group work sessions with a panel of decision makers. The 6-3-5 method | brainwriting was used in the first session to identify, from the participants' different perspectives, various ethical paradigms related to metaverse technology. In the second session, the stepladder technique was applied to develop a deeper understanding of—and to stratify—all the paradigms identified by analyzing the impact each one has on the decision problem.

4.1 | Application of 6-3-5 Method | Brainwriting and Paradigm-Based Analysis

The methods require the joint participation of a group of experts in relevant fields, who form a decision-maker panel. Putting together this panel was thus the first task to complete. The basic principles of the 6-3-5 method | brainwriting require six participants. The greatest challenge in recruiting this panel was that the metaverse is still an emerging topic, which means few experts currently focus on it. In addition, the two techniques are usually applied in face-to-face sessions, but they can be used in an online format thanks to technological innovations. The methods were, therefore, applied using the *Teams* platform (see https://teams.microsoft.com/). Finally, many difficulties arose due to the decision makers' conflicting schedules. The six experts were otherwise completely willing to take part in this research and to join the panel. The *Teams* platform allowed the meetings to take place as it facilitated a consensus about when to meet.

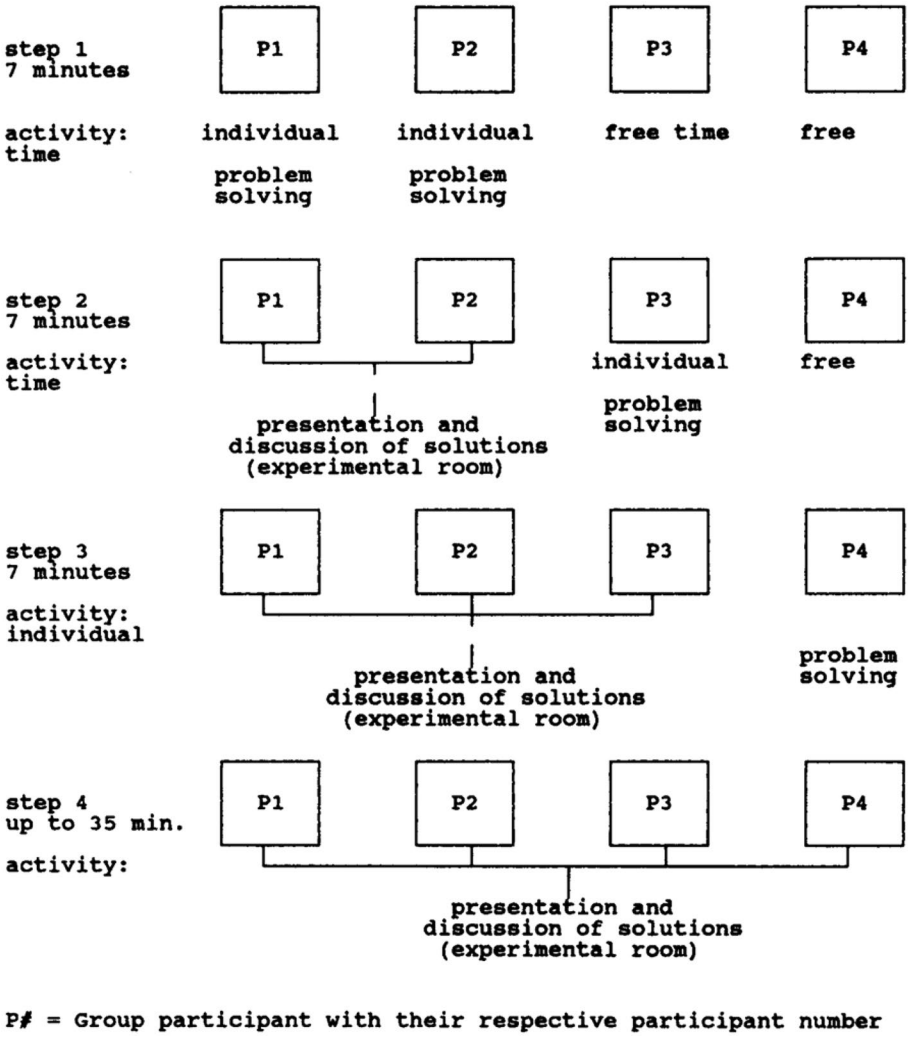

FIGURE 3 | Stepladder technique procedure. *Source:* Rogelberg et al. (1992, 733). P# = group participant with their respective participant number.

The first session lasted 2 h and had the goal of identifying ethical paradigms associated with the metaverse. The meeting began with a brief presentation of each participant's professional background, and then the 6-3-5 method | brainwriting was explained. Instructions were given to help the decision makers (i.e., D_i, with $i = 1, 2, 3... 6$) pass Excel sheets with their ideas to each other and ensure the six rounds would flow smoothly. The 6-3-5 application began with the following trigger question: *"Based on your values and professional experience, what are the ethical paradigms associated with the use of metaverse technology in business contexts?"* ....This prompt encouraged the decision makers to draw on their know-how and professional experience while formulating their ideas.

The first group work session ended when the experts had created a list of paradigms, after which the six completed sheets could be analyzed in detail (see Table 2). The results include 15 ethical paradigms.

The first paradigm was *user data privacy*. Due to growing concerns about unauthorized leaks of information, companies must inform users about the data they collect and why they are collected. The second ethical issue is *illiteracy* because, for metaverse technology to be used responsibly and for users to be aware of the associated risks, access to education about technologies has to be guaranteed. The third is *diversity and inclusion*, which addresses concerns about creating elites (i.e., few people and/or companies with the means to access the metaverse) and excluding other groups. The fourth is *online security and/or money laundering* given that, due to the magnificent scope of virtual worlds and all that they encompass, security gaps exist that can lead to fraud and jeopardize users' experience and assets. To this end, these issues need to be controlled by regulating financial markets more closely and checking that the services created focus on preventing fraud. The fifth paradigm is *veracity of information* because metaverse tools should concentrate on guaranteeing that the information shared is accurate in order to combat, for instance, fake news and deepfakes. The sixth is *interoperability* given that the metaverse is made up of multiple virtual worlds, which entails technological and cross-platform alignment so that assets acquired by users from a specific ecosystem can be used in the same way in all the other environments. The seventh is *digital asset saturation bubbles* (i.e., digital trash)

TABLE 2 | Six sheets generated by application of brainwriting method.

		Idea 1	Idea 2	Idea 3
Round 1	D1	Privacy—Companies are obliged to inform their customers about what kind of data is collected in Metaverse experiences and how that data will be used, something that can cause problems due to most people's lack of knowledge about Metaverse issues.	Inclusion—Companies must also guarantee inclusion and diversity in the Metaverse, respecting all ethnicities and orientations, among others.	Ethics.
Round 2	D2	I maintain privacy. D1 explained it better.	I stand by money laundering. With the caveat that the fact that there is no "central" entity can mean more diversity.	I would also add technological and cross-platform alignment.
Round 3	D3	Authenticity and transparency.	Inclusion of social classes at the risk of creating elites in the Metaverse.	What is truth, what is disinformation.
Round 4	D4	There is a lack of civic education, technical skills and general education for the responsible use of technologies and for valuing personal data as an inalienable part of an individual's identity.	Frameworks that are accepted across the board should be created, along with maintenance/enforcement services for these rules that are present on these platforms.	The word ethics is widely used, but it is necessary to concretize what is being addressed in this context.
Round 5	D5	The challenge is to define—The New Rules of Trust, in a world where privacy can no longer be seen in the light of "yesterday".	The main barrier is, initially, to mitigate the effect of inequality in technological access.	The very notion of ethics is not consensual. I agree with D4, we need to concretize what we're talking about.
Round 6	D6	Legislation to guarantee the right to anonymity. When the user authorizes it, they must know very well what their data is going to be used for and where. Gamification in the process of obtaining more data.	It seems more relevant to me the issue of money laundering and web 3 scams to be scrutinized by greater regulation of the financial market.	It seems to me that the topic of ethics relating to the veracity of information is more relevant, namely combating fake news, deep fake and so forth.
		Idea 1	**Idea 2**	**Idea 3**
Round 1	D2	User data.	Online security/money laundering with Web 3.0.	Digital asset bubble.
Round 2	D3	Utilizing blockchain for transparency and privacy.	Once again, blockchain can play a crucial role.	Saturation bubble of digital assets and digital waste resulting in uncontrolled energy use.
Round 3	D4	Awareness of the diversity of types of data that are collected and inferred.	Creating decentralized checking services alongside centralized ones.	Creation of standards for marketplaces that can guarantee the trust of the markets.
Round 4	D5	D4: Through education about the types of data and how they are used, clear communication about what data is being collected and why, user control by allowing those who view, modify or even delete their data, always ensuring properly communicated and transparent updates about any changes to policies.	D2: Money laundering is a huge risk, accentuated by a certain amount of anonymity, so it's important to rethink the structure of the Metaverse economy, to challenge it so that it's not a copy of the "as is" world, which is potentially more vulnerable.	D2: It's a big challenge, this happens even in ecosystems with economies that have no direct parallel to legal tender (e.g., World of Warcraft coins).

(Continues)

TABLE 2 | (Continued)

		Idea 1	Idea 2	Idea 3
Round 5	D6	People are used to signing commitments without even reading the T&Cs. The trend will continue with Metaverse, with the particularity of adding biometric data to the equation, which can be as reliable or more reliable than the usual, but we will have to involve the adserving/DSP/CCP industry and so forth to find the best solutions.	Digital assets and services must be taxed, just as they are in the physical world. Robust security measures must be taken to protect users from scams and fraud, in an ecosystem that is in definition and still functioning.	It will continue to exist as long as there are no more stable coins with regulation and the possibility of credit insurance. But tokenization is here to stay, but always linked to the development and maturity of the blockchain.
Round 6	D1	Data privacy is an issue that involves several fronts and requires another discussion.	Security and financial literacy will be key for users to avoid fraud.	Tokenization is independent of the digital asset bubble and it is indisputable that it is a technology that is here to stay.
		Idea 1	**Idea 2**	**Idea 3**
Round 1	D3	Privacy. How will companies guarantee users' privacy?	Diversity and inclusion—Are we creating an elite and inflo-excluded? Or Metaverse excluded?	In the future, could AI have enough computing power to make an alternative simulation of reality?
Round 2	D4	Much of the business model of Big Tech and massively disseminated services depends on massive data collection and this is increasing in the Metaverse, with biometric information and spatial information being collected by the second. I believe that companies will emerge with business models based on maintaining privacy, but in general I think that governments will be the ones to provide this guarantee.	Just as there is digital illiteracy today, I believe we will have a myriad of illiteracies equal to the number of technologies and their natural conjugations. There is a tremendous need for education in the responsible use of technology that has not yet begun to be addressed socially.	Yes, I have no doubt, although another aspect that is equally interesting to explore is the opportunity that technologies such as augmented reality, for example, offer us to edit physical reality. That is, to filter perception so that we only see people of one gender or ethnicity. And this doesn't require a great deal of computing power.
Round 3	D5	Transparency in the Transfer of Property—Establish transparent processes for the transfer of digital property, ensuring that all parties are properly informed.	How can we guarantee the democratization of access to Metaverse for any type of business structure, regardless of its financial capacity or type of institution?	Transparency in the Transfer of Property—Establish transparent processes for the transfer of digital property, ensuring that all parties are properly informed.
Round 4	D6	I defend the right to anonymity by default, but if the person wants to they can unlock their privacy in return for the platform. The Meta model remains in advertising, so there will always be obscure algorithms to circumvent privacy. How can this be avoided?	A good literacy program is fundamental, as in all areas. A good knowledge retention rate will require the use of new technologies, such as immersive ones, for example.	Metaverse will enable all of this even without such a huge evolution in AI. I agree that it is a laboratory for the convergence of various technologies, from immersive to decentralized.

(Continues)

TABLE 2 | (Continued)

		Idea 1	Idea 2	Idea 3
Round 5	D1	Accessibility—How can we guarantee that Metaverse will be accessible to people with disabilities?	I don't know what kind of institutions would be responsible for stimulating literacy in these kinds of subjects, I think that this search for knowledge will have to come from each individual.	D3: Do we want AI to go so far as to make an alternative simulation of reality? Should we put the brakes on developments in the Metaverse, so as not to create a dangerous virtual parallel world, where children of the future will be focused on the Metaverse, disregarding the real?
Round 6	D2	I think that for legal and even international security and terrorism control reasons, anonymity on Metaverse will become untenable.	If there is no centralizing, regulatory body, there may be an exclusion of some individuals, but on the other hand, a world is being created that is more diverse by nature, without elites or "big companies or entities" dictating the rules. In any case, adaptation is necessary and will probably be done by schools and individuals (as happened with PCs).	In my view, the use of AI will be more widespread. Even so, it could have applicability in Web 3.0 and the Metaverse. The biggest danger I see is that, given how little control over identity there is in the Metaverse, there will be AI posing as humans and vice versa.

		Idea 1	Idea 2	Idea 3
Round 1	D4	The digital identity of users in the Metaverse is an essential aspect for the existence of digital ownership across platforms, as well as for the creation of a growing environment of trust in the Metaverse, and an essential part of this identity is avatars. On the platforms, avatars are the property of the platforms themselves, which can deactivate them whenever they want.	How can blockchain be reconciled with the right to be forgotten on the Web?	What data should be limited to collection for marketing purposes on Metaverse? Is the user's consent enough?
Round 2	D5	How can the intellectual property of content creators on the various platforms be protected?	Education and awareness—Promote user education about best practices and the potential risks associated with Metaverse.	The transversality/universality of ownership and the coexistence of different Metaverses is an unresolved issue. How can we guarantee that by acquiring an asset from a particular ecosystem, it can be used in all the others?
Round 3	D6	I'm also concerned about what is linked to the issue of avatars, which is fake news, deep fake, which will have to be subject to new legislation.	As blockchain is a tracing and transparency technology, if we continue to use smart contracts, I hardly see the possibility of the right to be forgotten, as the information will be recorded in perpetuity. Literacy programs in schools, companies and other institutions.	The right to anonymity should be universal and fundamental as a condition of the Metaverse. Any user should have the flexibility to choose their digital representation, be it a username or an avatar.

(Continues)

TABLE 2 | (Continued)

		Idea 1	Idea 2	Idea 3
Round 4	D1	Dependency—What is the risk of children living in a "virtual world" constantly attached to hardware, forgetting about the real world?	Companies have a responsibility to educate users about how to best use Metaverse.	I agree with D6 in the sense that a Metaverse user has no "need" to represent their real identity in the Metaverse, even though all the responsibilities are theirs.
Round 5	D2	As I see it, the question is how to build the right bridges between the real and virtual worlds, so that we can make the most of the virtual world without (children and adults) becoming detached from the real world.	There's a terms and conditions angle (which companies have to spell out clearly) and an awareness angle, which will inevitably fall to the state and associations for this. My question is: Given the right to be forgotten, what should be recorded on blockchain and what shouldn't?	I find anonymity on Metaverse unsustainable. I think that interoperability between the various Metaverses or between the various platforms that currently exist is important. How can this be achieved?
Round 6	D3	Identity, or choosing an anonymous avatar.	Education and literacy without a doubt.	Biometric data bio hacking and brain hacking. An article came out today which, just by the way we write and interact with Chat GPT, already manages to draw up a psychometric profile.

		Idea 1	Idea 2	Idea 3
Round 1	D5	Sustainability—Assessing the environmental impact of Metaverse, ensuring full transparency and awareness of its impact and exploring ways to minimize it.	Corporate responsibility—Accepting responsibility for the actions and content promoted within Metaverse, ensuring that it complies with ethical and legal laws and regulations, as well as transparency within it toward its users.	Inclusion and accessibility—Ensuring that Metaverse is accessible and inclusive for everyone, regardless of their physical and technological capabilities.
Round 2	D6	One of the possible solutions is the Digital Protocol for Sustainability, which aims, through blockchain and tokenization, to erase organizations' digital footprint.	Transparency, being a fundamental element for the success of Metaverse, can be guaranteed by a greater level of maturity of blockchain technology.	Metaverse by nature can be very socially inclusive, but it has major challenges in terms of hardware and interoperability.

(Continues)

TABLE 2 | (Continued)

		Idea 1	Idea 2	Idea 3
Round 3	D1	I didn't know about the Protocol, but I think it's easy to offset the footprint spent on Metaverse through carbon offsetting.	If smart contracts are further developed, they can guarantee a high degree of transparency.	I disagree that the Metaverse can be very inclusive, I think there may be some problems related to this, for example a player may feel discriminated against because they don't see their real-life style as a possibility to personalize their avatar.
Round 4	D2	The energy needed for servers and the cloud for Metaverse to fulfill its promises doesn't make carbon neutrality that simple. Even so, I think there are many use cases for web 3.0 and immersive realities to promote sustainability.	I agree 100% with the above. It must be complemented by interoperability and appropriate regulation.	As with any technology, exclusion can eventually exist and will be corrected over time with education efforts, carried out by the players themselves in this space, by the state or by associations for this purpose.
Round 5	D3	Digital ecology.	Regulators are always chasing technology. At the current speed, we run the risk of regulating issues that technology itself has already surpassed (e.g., PL118).	Social argument.
Round 6	D4	There are projects to create the world's Digital Twin that can not only allow access to increasingly consolidated data, but even test simulations.	Corporate self-regulation and acceptance of standards that translate desires for ethical behavior into effective rules; Smart contracts.	Unfortunately, without an assertive effort to identify appropriate mechanisms, the degree of accessibility and inclusion of users with less financial means or in developing economies will be increasingly lower, contributing to development at different speeds.
		Idea 1	**Idea 2**	**Idea 3**
Round 1	D6	Digital identity and privacy—What should the rights to anonymity and data protection look like?	Digital property rights—How will we address copyright with the emergence of GenAI? How will we regulate and compensate?	Monopoly and market manipulation—How do we ensure that power remains in the centralized hands of all-powerful private platforms?

(Continues)

TABLE 2 | (Continued)

		Idea 1	Idea 2	Idea 3
Round 2	D1	Sustainability—Is the Metaverse sustainable? Does it contribute to a healthier planet and society?	An excellent question that should be debated by experts, a very complex issue that involves several fronts.	Marketing—How do we ensure that adverts and publicity are transparent?
Round 3	D2	The right to data protection remains a challenge in a world as loosely controlled as the Metaverse. As far as sustainability is concerned, I think the use cases are enormous and it won't be here that the green objectives aren't met.	Very interesting. I would add that this depends on the value in terms of intellectual property that we are going to give to the prompt made for GenAI to generate something.	The issue of the possible centralization of the Metaverse, together with interoperability, are, in my opinion, some of the biggest challenges.
Round 4	D3	Big data vs. trash data.	It would take years to format copyright and related and moral rights in digital, a subject to be debated.	Oligarchy already taken for granted.
Round 5	D4	On the one hand, there's a volume of journeys that aren't made and equipment that isn't produced. However, the volume of data processing required for the concept of a single, interoperable Metaverse is, for the time being, absolutely unsustainable.	Yes, a subject with many nuances. In any case, with regard to the issue of recognition, I believe it will depend much more on recognizing the human author than the AI author. I believe that the authors of works will digitally sign their documents.	I don't understand the concept of transparent marketing/advertising. As far as monopolies are concerned, they will continue as long as there is value in the services obtained immediately in exchange for the collection of personal data.
Round 6	D5	D4: Nothing to add to this answer, which summarizes my opinion.	The issue is broader, creation is creation, AI is a tool, the rights holder is the “prompter”. I don't want to be consensual.	Aren't Metaverses small monopolies in themselves conceptually? What is THE Metaverse? Or rather, ONE Metaverse.

Abbreviations: AI, artificial intelligence; D, decision maker.

within which the diversity of assets and types of coins means that more stable coins complying with regulations become crucial as these currencies can reduce the appearance of trash data. The eighth ethical paradigm *is simulation of reality*, namely the fear of creating a virtual world that could become an alternative to the real world. The nineth is *users' digital identity* (i.e., avatars) since people do not need to maintain their real identity in the metaverse. The tenth is *dependence* because, in virtual worlds, people's imagination seems to be the only limit. As a result, the right bridges need to be built between real and virtual worlds to prevent the former from becoming despised because of the latter. The eleventh paradigm is the *right to be forgotten*, which determines what should and should not be recorded on blockchains. The twelfth is *sustainability* given concerns about how much energy must be spent on servers and the cloud so that the metaverse can fulfill its promises, especially while processing the immense amount of data generated per second. The thirteenth ethical paradigm is *corporate responsibility* as users and/or companies need to be held responsible for both their actions and the content promoted within the metaverse in order to ensure that everything complies with ethical standards, laws and regulations. The fourteenth is *digital property rights*, which reflect concerns about how to define the author of assets created by AI. The last paradigm is *monopolies and market manipulation* because, for the metaverse to be a free world, no single company should control activities in that environment. In addition, all users have to have equal access—and power to add information—to the metaverse.

4.2 | Applying the Stepladder Technique to Stratify Paradigms

The 6-3-5 method | brainwriting helped the expert panel identify the 15 ethical paradigms listed above. The next step was to create a hierarchical structure of these paradigms based on the priority each should be given, which was done by applying the stepladder technique. The decision makers prioritized the ethical paradigms according to how important they are in terms of avoiding delays in the implementation of the metaverse. The paradigms were ranked on a scale of 1–15, with "1" representing the paradigm that companies must focus on 100% and "15" the paradigm that—although also significant—has the least impact on the usage of metaverse technology. In other words, the paradigm listed fifteenth does not depend on companies for its implementation but rather on the cultures and societies in question.

To complete this task, the second group work session was split into two different parts due to the complexity of coordinating each decision maker's entry during the rounds. Both meetings in which the stepladder technique was applied were held via the Teams platform (i.e., online). The first part of the second session was attended by decision makers D4, D5 and D6, and it lasted one and a half hours. The meeting began with a brief overview of the stepladder method to ensure the panel members understood how the debate would unfold across the rounds.

After this explanation, D4 left the meeting, whereas D5 and D6 remained online to start round one. Both experts had sent their prioritization ideas before the session began, and these were combined to form the pre-debate prioritization ranking (see Table 3), which allowed the two decision makers to start exchanging ideas immediately. After D5 and D6 discussed their opinions, they reached a consensus ranking (see Table 3).

Once round one was over, D4 rejoined the meeting and presented his prioritization of the positive ethical paradigms for implementing metaverse technology in companies. D4's prioritization ideas included significant differences from the prioritization produced in round one, so the three decision makers focused on these points, especially online security and/or money laundering and dependence. After this discussion, the three experts reached the result shown in Table 4.

The stepladder technique ensured that the subsequent discussions allowed each participant to contribute to the final ranking. The second part of the second session was shorter because, after analyzing the ranking individually, the decision makers all agreed with the previous round's prioritization list. The final ranking of the 15 ethical paradigms is shown in Table 5.

4.3 | Discussion and Consolidation of Results

To assess the internal consistency and applicability of the results, a consolidation session was conducted with a professional who had not participated in the research, ensuring an impartial perspective. This specialist was a member of the Cross-Functional Digital Innovation Team within the Bank of Portugal's Information Systems and Technologies Department. While relying on a single external expert may limit the robustness of validation, such triangulation—that is, obtaining feedback from an independent external expert—is a widely recognized procedure in the literature (cf. Caboz et al. 2025), particularly in process-oriented studies like ours. Broader validation involving multiple experts from diverse sectors could provide additional perspectives. However, this study's process-oriented nature allows for adaptation in future applications to address these limitations (cf. Bell and Morse 2013; Ormerod 2020; Vaz-Patto et al. 2024). Due to the expert's schedule, the session was split into two parts: the first held in person in a Bank of Portugal conference room, and the second conducted online via the Teams platform, totaling 1 h.

This session was organized as follows. First, a brief summary was given of the background of the topic under discussion and the main purpose of the research. Next, the methodologies applied in the study were presented and discussed, after which the results were shared and examined. Finally, the interviewee's opinions were elicited on the ethical paradigms identified and ranked, as well as his suggestions for how to improve the proposed analysis model.

After listening to the theoretical and practical explanation of the methods used, the specialist expressed interest in receiving more information so that he could apply these techniques in Bank of Portugal contexts. However, he also pointed out shortcomings in the application of the methods that could diminish the quality of the results. Regarding the brainwriting technique,

TABLE 3 | Hierarchization completed in round one.

Ethical paradigms	D5 (1–15)	D6 (1–15)	D5 + D6	Pre-debate ranking	Post-debate ranking (Round 1)
User data privacy	10	1	11	Veracity of information (5)	Veracity of information
Illiteracy	6	8	14	Interoperability (5)	Sustainability
Diversity and inclusion	5	7	12	Sustainability (10)	Interoperability
Online security/money laundering	11	10	21	Monopolies and market manipulation	Monopolies and market manipulation
Veracity of information	1	4	5	User data Privacy (11)	User data Privacy
Interoperability	2	3	5	Diversity and inclusion (12)	Digital property rights
Digital asset saturation bubble	13	14	27	Digital property rights (12)	Diversity and inclusion
Simulation of reality	15	15	30	Illiteracy (14)	Illiteracy
Users' digital identity	12	5	17	Users' digital identity (17)	Users' digital identity
Dependence	14	13	27	Corporate responsibility (19)	Corporate responsibility
Right to be forgotten	9	11	20	Right to be forgotten (20)	Right to be forgotten
Sustainability	8	2	10	Online security/money laundering (21)	Online security/ money laundering
Corporate responsibility	7	12	19	Digital asset saturation bubble (27)	Digital asset saturation bubble
Digital property rights	3	9	12	Dependence (27)	Dependence
Monopolies and market manipulation	4	6	10	Simulation of reality (30)	Simulation of reality

Abbreviation: D, decision maker.

he said that the main reason to apply this method is to ensure homogeneity in idea sharing, so the process should ensure the sheets are redistributed randomly. If they are passed in a clockwise circular direction, the next participant in the process ends up knowing who wrote the initial ideas. This realization alone could inhibit the next decision maker's willingness to express his or her ideas for improvements or possible changes to the previous person's ideas if the latter is, for example, a superior within the organization.

The interviewee concurred that the stepladder method complements the brainwriting method. However, its application would offer fewer benefits for a larger number of decision makers, as was the case in this research. In rounds one and two, the entire process of applying the technique was powerful, but as the panel progressed through the rounds, the advantages dissipated due to intragroup pressures. For example, in round five, the five people who had previously engaged in debates had already reached a consensus when the last decision maker entered the debate. That individual thus had greater difficulty changing the group's opinions and modifying the ranking already proposed.

The expert suggested that one solution would be to apply the technique in stages. In Group 1, D1 and D2 discuss and reach an agreement. In Group 2, D3 and D4 debate and reach a consensus. Concurrently, in Group 3, D5 and D6 discuss and reach an agreement. Once this first phase has been completed, Groups 1 and 2 meet, but Group 3 only enters the debate after the first two groups have reached a consensus, after which the final decision can be reached. The interviewee was informed that, although the stepladder method has recognized limitations, it is well established in the academic community and all the steps followed in the study were taken directly from the literature.

Regarding the results, the specialist said that he still had a large number of unanswered questions and many doubts about the validity of the findings. He scrutinized the various ethical paradigms identified by the decision-maker panel in the first group session, and he agreed that the list comprised *"no-goers in terms of moving toward a metaverse environment"* (in the specialist's words). However, he asserted that more than half of these paradigms are already real problems in existing social networks. In his opinion, the metaverse is a social network that only differs from current ones in that it is immersive. Thus, this new reality called the metaverse already exists—as do all the concepts linked with it—to which is added the possibility of immersive experiences that allow people to use their five senses.

Based on this expert's observations, the conceptualization of the metaverse could be simplified to *"things are new because of what they bring"* (also in his words). In other words, the metaverse itself is not something new but rather a further development of what already exists. A supporting example of this is Second Life's metaverse, which was created in 1999 (i.e., a virtual 3D

TABLE 4 | Hierarchization completed in round two.

Post-debate ranking (Round 1)	D4	Post-debate ranking (Round 2)
Veracity of information	Veracity of information	Veracity of information
Sustainability	Sustainability	Sustainability
Interoperability	Interoperability	Interoperability
Monopolies and market manipulation	User data privacy	User data privacy
User data privacy	Monopolies and market manipulation	Monopolies and market manipulation
Digital property rights	Online security/money laundering	Digital property rights
Diversity and inclusion	Diversity and inclusion	Diversity and inclusion
Illiteracy	Digital property rights	Illiteracy
Users' digital identity	Illiteracy	Users' digital identity
Corporate responsibility	Dependence	Corporate responsibility
Right to be forgotten	Right to be forgotten	Dependence
Online security/money laundering	Users' digital identity	Right to be forgotten
Digital asset saturation bubble	Corporate responsibility	Online security/money laundering
Dependence	Simulation of reality	Simulation of reality
Simulation of reality	Digital asset saturation bubble	Digital asset saturation bubble

Abbreviation: D, decision maker.

environment that simulates humans' real social life using interactions between avatars). Therefore, current metaverses are different from other social networks mainly because of innovations in headsets, AR or VR glasses and haptic gloves, among other gadgets that offer users a much more immersive experience than what previously existed.

At the end of the consolidation session, the specialist gave positive feedback on the results and suggested ways to improve them. His first idea was to start the first meeting with the decision-maker panel by asking them to compile a list of possible definitions of the metaverse in order to identify their different perspectives and form a consensual definition of the topic under study. The second recommendation he made was to deepen the results by listing relevant advantages, disadvantages, capabilities and ethical conflicts, especially since some paradigms identified in the group's analysis are merely features, needs or aspects inherent to the metaverse. The consolidation session ended with sincere thanks to the expert for his willingness to participate and for his input, which enriched this research.

The results are in alignment with those reported by Dwivedi et al. (2022), Golf-Papez et al. (2022) and Oleksy et al. (2023), who also explored ethical paradigms associated with the metaverse. The ethical dilemmas identified by these studies include issues such as data privacy and security, digital inclusion, virtual identity and representation, economic disparity and the potential for addiction or dependency. These investigations provided valuable insights into the ethical considerations surrounding the metaverse and other digital innovations, but the present research stands out with regard to its methodological approach and focus on practical applications.

TABLE 5 | Final hierarchization using stepladder technique.

Final prioritization (consensus of six decision makers)
Veracity of information
Sustainability
Interoperability
User data privacy
Monopolies and market manipulation
Digital property rights
Diversity and inclusion
Illiteracy
Users' digital identity
Corporate responsibility
Dependence
Right to be forgotten
Online security/money laundering
Simulation of reality
Digital asset saturation bubble

By using the 6-3-5 method | brainwriting and stepladder technique, this study actively engaged decision makers in the identification, analysis and prioritization of ethical paradigms. This approach ensured a more comprehensive understanding of the challenges and opportunities presented by metaverse technologies. The emphasis put on providing actionable solutions and

tools for organizations also distinguishes this research from prior work, as the current findings offer a roadmap for ethical decision making and responsible implementation in the rapidly evolving landscape of digital technologies.

Due to the process-oriented methodology applied, the results have significant theoretical, practical and societal implications. On a theoretical level, this study contributes to the nascent field of metaverse research by providing a structured approach to identifying and prioritizing ethical considerations. The methodologies used were innovative, namely the 6-3-5 method | brainwriting and stepladder technique, and their successful application demonstrates the usefulness of operational research techniques (i.e., GDM and PSMs) in complex ethical landscapes.

On a practical level, the findings offer valuable insights to companies seeking to adopt metaverse technologies, which can guide decision-making processes and shape corporate strategies. The prioritized list of ethical paradigms and proposed solutions outlined should serve as practical tools for addressing ethical dilemmas proactively, thereby ensuring sustainable, responsible implementations of metaverse technologies.

On a societal level, this study contributes to a broader discourse on the ethical implications of emerging technologies and highlights the need for interdisciplinary collaboration and international perspectives. By engaging decision makers and stakeholders in constructive dialogue, the methods applied foster a greater awareness and deeper understanding of the ethical challenges inherent in the metaverse's development and deployment. Ultimately, the results should promote more accountability and inclusivity. The findings not only advance academic knowledge but also offer tangible benefits for businesses and society at large, paving the way for ethical innovation in the evolving landscape of digital technologies.

Clearly, we recognize that ethical paradigms are dynamic, shaped by ongoing technological, legal and societal developments. Consequently, ethical issues in the metaverse—such as digital identity—are likely to grow more complex as avatars incorporate biometric or AI-driven features, raising questions of ownership, accountability and authenticity. Similarly, market dynamics may shift: risks of manipulation and monopolistic control could increase if a few dominant platforms consolidate power or decrease if regulatory frameworks mature and promote fair competition. Interoperability, currently a technical and organizational challenge, may become less critical if industry-wide standards emerge, yet could reappear in new forms as technologies continue to diversify. This reflection underscores the importance of continuously revisiting and adapting ethical frameworks as the metaverse ecosystem evolves, thereby future-proofing analytical approaches and encouraging longitudinal research.

5 | Conclusion

Metaverse technologies have a strong potential in business contexts as these innovations provide new ways to operationalize processes, additional knowledge and speedier procedures that ensure companies' core business runs smoothly. These technologies have, in the past, been unsuccessful, but, due to consecutive technological advances, they have more recently attracted the attention of numerous specialists and developed an increasingly high profile. The wide scope of virtual world tools has made research on the possible consequences of their implementation increasingly urgent.

The lack of a consensual definition of the metaverse has contributed to forming the many gaps present in this field. The main goal of this study was to overcome the limitations identified in previous investigations and to help companies evaluate this technology. To this end, an analysis system was created using the 6-3-5 method | brainwriting and stepladder technique, which allowed an expert panel to identify, analyze and stratify different ethical paradigms related to using the metaverse in business contexts.

This technology is extremely wide-ranging both in terms of the tools it requires and the impact it could have on societies, with possible direct repercussions for the daily lives of people and companies, so the issues related to the metaverse are quite complex. The methodologies applied were chosen for their ability to help six decision makers prioritize the ethical paradigms involved and to facilitate these experts' homogeneous participation. This decision problem was especially challenging because the metaverse is a highly controversial topic that could inhibit the sharing of diverse perspectives.

The 6-3-5 method | brainwriting and stepladder technique were used to ensure an efficient and effective decision-making process. Both methods allowed the expert panel to offer ideas that complement each other. The first technique was used to share ideas silently, while the second method encouraged a healthy debate between the decision makers. These techniques thus enriched the research and generated justifications for varied rankings of the ethical paradigms and a consensus about the final hierarchy. Based on the experts' collective know-how, a prioritized list was created of the main ethical paradigms that companies need to address when implementing metaverse technology.

The results answer the initial research questions, of which the first was how companies can effectively identify and prioritize the varied ethical paradigms associated with integrating the metaverse into business contexts. The second asked how structured ethical frameworks can be derived from these paradigms to inform decision-making processes and shape corporate strategies related to the adoption of metaverse technologies. In addition, the findings simplify firms' decision-making processes by identifying which ethical paradigms require more urgent, intense and prompt attention to be resolved. Possible solutions to each dilemma were also outlined to ensure greater sustainability for and acceptance of this revolutionary technology.

The consolidation session supported the conclusion that positive results were produced by applying the two techniques, which made it possible to synthesize issues related to the metaverse and to clarify its conceptualization. Thus, companies and the business community in general need to pay close attention to this research's findings, as they can prevent significant problems.

Despite the valuable results, this study had various limitations. The first was the difficulty of recruiting a panel of decision makers specializing in the metaverse given that no one is currently a metaverse expert. The participants were thus professionals who were eager to understand and explore this new world. The second limitation was the problem of reconciling the decision makers' different schedules while setting up the sessions. In addition, a methodological limitation concerns the circulation order in the 6-3-5 method | brainwriting stage. Following the canonical protocol reported in the literature, sheets were passed sequentially to preserve flow, equal exposure and time discipline. Although anonymity and silent writing help mitigate dominance and conformity pressures, this approach may still reduce idea independence by creating serial dependence. Alternative procedures—such as randomizing circulation or using digital platforms that shuffle ideas while preserving anonymity—could help determine whether additional gains in independence outweigh the benefits of the standard procedure.

This research and its results show the potential applications of the operational research techniques (i.e., GDM and PSMs) used in the two sessions with the expert panel. The methods facilitated the identification and prioritization of ethical paradigms related to the metaverse in business contexts. The findings could help organizations learn more about ethical paradigms and decide in which order to deal with them. Additional limitations also appeared during the group and consolidation sessions.

The above shortcomings have the potential for becoming lines of future research. First, appropriate decision makers could be found among specialists in related subjects but with diverse complementary competencies or from different sectors of activity. Second, the present study needs to be repeated with a different decision-maker panel to check for significant changes in the results. Last, this research should be carried out at an international level to tap into the broad technological knowledge available outside national contexts. As a process-oriented study, our framework is designed to be adaptable, meaning that applying the same methods in different countries or sectors would naturally produce context-specific results. While this may lead to variations in the ethical paradigm hierarchy, tailored outcomes are advantageous, as they provide insights that are highly relevant to the specific institutional, cultural and sectoral context under study.

In conclusion, the present study can be said to have produced encouraging results. However, much room exists for further research given the magnitude of the metaverse and the gaps in knowledge associated with this topic. Thus, any contributions that can be made to understanding this emerging technology will be beneficial.

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Ethics Statement

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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