E-participation in the digital future: an exploration of e-participation in the Metaverse

Master of Science Business Administration Thesis

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25 June 2024, Epse
In collaboration with the municipality of Enschede, The Netherlands

ENSCHEDE

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Abstract

Over the years, local e-participation—engaging citizens via ICT—has gained prominence. The potential impact of the Metaverse on local e-participation, including opportunities and challenges, remains unexplored. This study delves into these aspects, drawing from academic literature on both the Metaverse and e-participation. The academic literature on both Metaverse and e-participation were studied to determine what to observe and discuss during the VR experience and focus groups with municipal employees and citizens students. The study identifies several opportunities in citizen engagement, creativity, and address societal challenges. Conversely, challenges such as physical awareness and comfort, privacy, and data misuse, real-world disconnect, digital skills, technical limitations, and engagement motivation are identified. This study contributes to the academic field by providing a basis for future research on this intersection of Metaverse and e-participation. Lastly, this study contributes to practice by providing empirical evidence to the European Union's Digital Europe work programme 2023-2024 on opportunities and challenges on a possible CitiVerse. Municipalities can leverage this evidence to craft proactive e-participation strategies harnessing the Metaverse's potential. Moreover, it presents an opportunity for businesses to develop applications facilitating digital twin city visualization within the Metaverse for local governments.

Keywords
Metaverse, Participation, E-participation, Opportunities, Challenges, Virtual Reality, Municipality, Technology Adoption, Municipalities

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1 Introduction

The Metaverse is a phenomenon that can impact various aspects of society. While the term has recently become more mainstream, it was first used in a novel by Neal Stephenson in 1992 (Dwivedi et al., 2022). Stephenson described the Metaverse as a virtual reality (VR) world where the internet and augmented reality (AR) are accessed through avatars and software (Joshua, 2017). According to Lee et al. (2021), the term 'Metaverse' refers to "a hypothetical synthetic environment linked to the physical world". It is the new iteration of the internet that integrates the physical and virtual worlds (Dwivedi et al., 2022). It consists of virtual spaces where people can meet, explore, and create with one another while being physically apart (Bosworth & Clegg, 2021). In 2021, Meta Platforms (formerly Facebook) launched Horizon World (Dwivedi et al., 2022), aiming to make online time more meaningful through the Metaverse (Bosworth & Clegg, 2021). Mark Zuckerberg and Meta envision people connecting, learning, shopping, working, and playing in the Metaverse (Meta, 2023b), essentially living a full life within it. Their view on working and socializing within the Metaverse and the consequences for society have caused a surge in the debate in the academic world and society (Dwivedi et al., 2022).

The Metaverse offers exciting opportunities such as new income streams, solutions for urban planning challenges (Allam et al., 2022), and fostering new social interactions (Zallio & Clarkson, 2022). However, it also raises various challenges. Concerns include data privacy (Falchuk et al., 2018), psychological risks from data misuse (Tromp et al., 2018), regulation and governance (Fernandez & Hui, 2022), the presence of democracy (Bibri & Allam, 2022), and potential digital exclusion of certain subpopulations (Goedhart et al., 2022). However, these challenges and opportunities are quite general and have not been specifically applied to another academic field where they could potentially be beneficial.

Furthermore, a new technology, such as the Metaverse, is not easily accepted and used by the users according to Venkatesh et al. (2003). Factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions drive technology acceptance and usage and must be considered before implementing and promoting new technologies. Gender, age, experience, and voluntariness of use can also moderate the effect of these factors on intention to use the technology (Venkatesh et al., 2003). Thus, implementing new technology in a different field or process requires careful consideration.

Another academic field that presents numerous opportunities and challenges for society and is becoming more digitalized is participation, specifically e-participation. Participation is vital for a healthy democracy, bringing legitimacy, empowerment, and community building (Arnstein, 1969; Boyte, 2005; Pateman, 1970; Putnam, 2000). In a legitimate democracy, power lies with the people, and their participation ensures decisions align with the collective will. Empowerment involves not just having a say, but also contributing meaningfully to decisions affecting citizens' lives. Participation builds trust and a sense of community, which are essential for societal well-being. It is crucial for informed decision-making by both citizens and governments, shaping a robust, inclusive, and legitimate democratic society. As Meta wants users to life a full life in the Metaverse, e-participation could become an important part of it. E-participation, the use of ICT to facilitate citizens' involvement in democratic decision-making (Medaglia, 2012; Tavares et al., 2020), can enhance democracy by overcoming constraints associated with traditional public participation, thus increasing inclusivity (Pflughoeft & Schneider, 2020). According to Adnan et al. (2022), participatory processes should be regularly refined and innovated due to fast technological advances, where the Metaverse may offer potential opportunities.

Local e-participation is particularly important as local policy decisions significantly impact citizens' lives (Lourenço & Costa, 2007). Assessments of municipality websites show that that ICT applications often focus more on service management and delivery than on participation(Medaglia, 2012). However, the internet and ICTs provide opportunities for local governments to increase citizen participation (Tejedo-Romero et al., 2022). In the Netherlands, platforms like De Stem van Groningen facilitate various participation processes (VNG, 2021). Other e-participation tools used by local governments include complaint offices, discussion forums, chats, blogs, and social networks (Tejedo-Romero et al., 2022). Municipality Enschede is another municipality that is working with e-participation, as they have the Stem van Enschede online platform where citizens can participate in various projects. However, they are also interested in what the Metaverse could do for e-participation for their municipality. Therefore, they are chosen as the case for this research, and they will provide municipal employees for the data collection.

Given that e-participation in the Metaverse is a novel concept but holds potential for future development, it is crucial to understand the associated opportunities and challenges. Therefore, the research question for this master thesis is:

What are the opportunities and challenges of e-participation in the Metaverse?

This study will address the research question by utilizing a classification scheme based on the theoretical framework. This scheme will guide observations of citizens and municipal employees during a VR experience. Following these observations, focus groups will be conducted to delve into participants' experiences. Any aspects that emerge during data collection but are not included in the classification scheme will also be included in the results.

This study has theoretical relevance. Most studies focus on the creation of the Metaverse and general ethical issues, with no attempts to apply it to e-participation. This study explores the intersection of e-participation and the Metaverse, uncovering potential challenges and opportunities for local government. It addresses concerns about disconnection from reality and highlights the positive impact of VR technology on citizen engagement. By identifying opportunities and challenges for e-participation in the Metaverse, this study lays the groundwork for future research.

This study also has practical relevance. It contributes to the public sector by highlighting the opportunities and challenges of using the Metaverse for e-participation, particularly the engagement potential of its immersive visualizations. While further development is needed, examples include VR policy simulations and virtual city replicas for urban planning feedback. Businesses can develop tailored Metaverse applications for municipalities and other sectors. Furthermore, the study aligns with the European Union's Digital Europe work programme 2023-2024, emphasizing its practical relevance. The envisioned CitiVerse highlights potential applications in spatial planning, management, and navigation (EuropeanCommission, 2023). These insights could aid the EU's efforts to create an immersive digital environment for citizens, governments, and businesses.

Next, the theoretical framework explores the Metaverse, e-participation and its combination. The methodology chapter details the data collection and analysis process. Results from the VR experience and focus groups are presented, followed by an analysis comparing these findings with the theoretical framework. Finally, the conclusion and discussion of this study are given.

2 Theoretical framework

In this chapter the concepts of this research are explained in greater detail. It is important to clearly establish what the Metaverse entails. Furthermore, participation and e-participation are discussed to determine the main theory for this study. Lastly, the theory is summarized in a classification scheme.

2.1 The Metaverse

The Metaverse is a concept that has been discussed in many papers, but it does not have one definition. Therefore, it is important to discuss what the Metaverse is and its many definitions by various authors to be able to define the Metaverse for this study. Furthermore, challenges in the Metaverse are described. The recreation of municipalities in the Metaverse with the use of digital twin cities is also discussed. Moreover, the current state of governance in the Metaverse is described. Lastly, this section will be concluded based on the gathered information.

2.1.1 What is the Metaverse?

The term Metaverse has been used in the novel Snow Crash by Neal Stephenson (1992) for the first time (Dwivedi et al., 2022). He saw it as the successor to the internet and it was his vision on a virtual reality-based internet. Stephenson described the Metaverse as a virtual reality (VR) world where internet and augmented reality (AR) are used via avatars and software (Joshua, 2017). In his book, the users of the Metaverse gain access through personal terminals and goggles and experience it from a first-person perspective (Stephenson, 1992). Various virtual environments and games are seen as antecedents of the Metaverse. A few examples are Second Life, Roblox, and Fortnite (Dwivedi et al., 2022; Fernandez & Hui, 2022; Gent, 2022). Multimedia platform Second Life was the first attempt at a useable Metaverse in 2003 (Gent, 2022; Ritterbusch & Teichmann, 2023). It is an online world where users could explore, trade, and create through avatars (Gent, 2022). There were technical limitations because of the IT infrastructural problems and the immature VR glasses (Ritterbusch & Teichmann, 2023). Therefore, Second Life has not gotten the audience creators Linden Lab would have wanted and is not the breakthrough Metaverse. Roblox is also an interactive platform seen as a antecedent due to the use of avatars and the ability to interact with other gamers in the virtual world (Damar, 2021). Roblox want people to come together, connect and have experiences in the virtual world as if they are in the real world (Roblox Corporation, 2023). However, various authors think that it cannot be seen as the Metaverse since it does not capture the essence of the Metaverse. It is not a fully immersive three-dimensional environment that can be accessed through VR and AR (Dionisio et al., 2013; Dwivedi et al., 2022). Fortnite was created in 2017 and has the same elements as Roblox. It has already hosted a concert which shows the opportunities for an interactive digital world (Dwivedi et al., 2022), but lacks the immersive three-dimensional environment as well. In 2021 Meta Platforms launched Horizon Worlds as the new Metaverse concept. It is a set of virtual spaces where people can create and explore with one another while being physically apart and being able to do activities as if you are in the real world (Bosworth & Clegg, 2021). It is the new iteration of the internet that integrates the physical and virtual worlds (Dwivedi et al., 2022) and can be seen as the Metaverse if it succeeds. Bosworth and Clegg (2021) from Meta also state that the Metaverse should be built by a variety of people and that it will take some time to be fully realized. It is unlikely that the Metaverse will be built by one company. There is even the possibility of multiple Metaverses (Zallio & Clarkson, 2022). Thus, the Metaverse has been developing for the past decades and will continue in the future.

The academics even have different definitions for the Metaverse. Lee et al. (2021) state that the term 'Metaverse' means "a hypothetical synthetic environment linked to the physical world". Allam et al. (2022) use the definition: "a futurist digital world that, as depicted by its creators and advocates, is immersive and feels tangible connected to the everyday objects and to the real lives and bodies of humans". Ritterbusch and Teichmann (2023) have conducted a literature review to determine the definition. They found 28 definitions which they comprised into two definitions. The more general definition is: "Metaverse … describes a three-dimensional online environment in which users represented by avatars interact with each other in virtual spaces decoupled from the real physical world". The specified definition is: "Metaverse … describes a (decentralized) three-dimensional online environment that is persistent and immersive, in which users represented by avatars can participate socially and economically with each other in a creative and collaborative manner in virtual spaces decoupled from the real physical world." Meta describes the Metaverse as: "a set of virtual spaces where you can create and explore with other people who are not in the same physical space as you" (Bosworth & Clegg, 2021).

Even though the definitions are not the same, they show the same main elements of the Metaverse. The definition used in this study is:

The Metaverse is an immersive 3D virtual reality universe that enriches the physical world which users can access through digital avatars and allows users to interact with one another.

Now that the Metaverse is explained and defined, the opportunities and challenges of the Metaverse can be discussed. Opportunities may present themselves on a societal, business, or personal level. The challenges may affect a single person or society.

2.1.2 Opportunities of the Metaverse

From a social perspective, the Metaverse revolutionizes interaction by enabling people to connect globally without economic or travel constraints (De Felice et al., 2023). The Metaverse also facilitates participation in events like concerts, parties, art exhibitions, sports, and sightseeing, expanding the range of experiences available to users (Dwivedi et al., 2022). Beyond this, it promotes user fitness through virtual group exercise programs, fostering social interactions, play, and health (Allam et al., 2022). The Metaverse extends its impact to the realm of work, offering versatile platforms that allow remote work with enhanced tools for efficiency. This transition not only saves time spent commuting but also provides workers with unprecedented control over their work environment, addressing issues of disconnection and isolation (Allam et al., 2022; De Felice et al., 2023). Moreover, the Metaverse present new opportunities for the gaming aspect of the technology. It presents new opportunities for game developers, creators, and gamers, offering innovative environments with interactive possibilities previously unimaginable (Allam et al., 2022). Its unique features, such as high realism, freedom, and user-friendly sharing, set it apart from traditional gaming platforms (De Felice et al., 2023).

Economically, the Metaverse holds promise both in the physical and digital world. Physically, sales of hardware and software are anticipated, while digitally, customization of users' virtual spaces and entertainment within the Metaverse are emerging trends (Allam et al., 2022). The Metaverse also blurs the lines between offline and online shopping, creating seamless experiences (De Felice et al., 2023). As more individuals engage in the Metaverse for various purposes, economic opportunities are expected to grow for users, businesses, developers, and creators (Allam et al., 2022; Dwivedi et al., 2022). Allam et al. (2022) even suggest that these new income streams may positively impact societal challenges, such as employment.

Furthermore, the Metaverse is expected to stimulate innovation and transformation in various industries, including fashion, marketing, and production, contributing to the overall economic landscape (Dwivedi et al., 2022; Lee et al., 2022).

The societal impact of the Metaverse goes beyond individual and economic gains. Urban planners, developers, and administrators can leverage the Metaverse to address urban issues, from predicting flooding to planning infrastructure and emergency responses. Cities such as Orlando, Las Vegas, and Boston in the Unites States of America already use it for these challenges affecting urban physical assets. The Metaverse could also play a critical role in the reduction of emissions from sectors such as transportation, manufacturing, and energy generation (Allam et al., 2022; De Felice et al., 2023; Dwivedi et al., 2022). Governments stand to benefit through improved healthcare delivery, enhanced urban planning, job creation, and innovative educational experiences (Allam et al., 2022). For example, the Metaverse cancels the distance between doctors and patients, facilitating and reducing the time for diagnosis and access to treatment. The Metaverse can also enable hybrid, formal and informal learning experiences with can provide customized curricula for students (De Felice et al., 2023). For local governments the Metaverse will provide opportunities to improve interaction with citizens, offer fast, efficient, and real-time services, and better manage urban spaces (Allam et al., 2022). In the broader societal context, the Metaverse has the potential to cultivate diverse communities, foster new social interactions, enhance digital literacy, and amplify different voices (Zallio & Clarkson, 2022).

Lastly, digital twin technology could play a pivotal role in the Metaverse, offering exciting possibilities for various applications. By creating digital replicas of physical objects, processes, or services, digital twin technology bridges the gap between the physical and digital worlds (Allam et al., 2022; Liu et al., 2021). For instance, digital twin cities replicate real-world urban environments in a virtual space like the Metaverse, providing detailed, dynamic, and interactive models. These virtual cities are valuable for urban planning and can also enhance economic activities and business improvements (Bibri & Allam, 2022; Dwivedi et al., 2023). Despite its potential, the integration of digital and physical worlds remains underutilized (Liu et al., 2021). Although initial connectivity between these worlds may be limited, they are expected to eventually merge seamlessly (Lee et al., 2021). Thus, this technology could be useful for the opportunities mentioned before.

2.1.3 Challenges of the Metaverse
Every new disruptive technology will have certain challenges to consider. Especially a technology that is not fully realized yet. While this study will focus on e-participation in the Metaverse, it is important to know what the challenges are of participating in the Metaverse in general.

One of the main challenges for the users of the Metaverse is the control of their privacy. A lot of data will be generated by usage of the Metaverse, but it is unknown what the big tech companies behind the Metaverse will use the data for and at what risks (Allam et al., 2022; Bibri & Allam, 2022). The data will have several layers of complexity through the technology used which means it will offer more detailed information than current technology. It will include behavioral and biometric data (Dwivedi et al., 2022; Zallio & Clarkson, 2022), which can show important aspects of users' psyche (Fernandez & Hui, 2022). More detailed information about each user can be aggregated and available than ever before (Tromp et al., 2018). It could be used for surveillance capitalism: the commodification of personal data for profit-making and power-grabbing (Zuboff, 2019). The data will be transformed into money-

makers for big tech companies and not be used for what it was originally generated for (Bibri & Allam, 2022). The big tech companies collecting data will not be the only privacy risk. Criminals can target personal and financial data, and crypto-assets (Dwivedi et al., 2022). So, users should not only be wary of protecting their data from big tech companies, but also from fellow users. Metaverse users can also eavesdrop on other users (Fernandez & Hui, 2022). Users should be aware that currently their privacy is not protected in the Metaverse.

The Metaverse also brings challenges regarding deviant behavior to fellow users. There are reported cases of harassment, sexual abuse, bullying, hate speech, racism, and other forms of deviant behavior. Because of the enhanced immersive and sensory experience within the Metaverse and the level of social interaction using avatars, the deviant behavior in the Metaverse could feel real to the victim (De Felice et al., 2023; Dwivedi et al., 2022). Moreover, terrorism entrapment and indoctrination are also possibilities that raise the question how to shape the Metaverse (Allam et al., 2022). The internet and social media can have a strong effect on a user's self-perception and self-esteem. The long-term physiological effects are unknown for the "standard" internet and social media. If the immersive nature of the Metaverse is included into this equation, it can be expected to have even bigger consequences. Even if the consequences are still unknown, the expected risks are addiction, manipulation of agency, unnoticed psychological change, and privacy (Tromp et al., 2018).

Another challenge is physical safety of users and bystanders. Participating in the Metaverse with the current technology means that users will not be as aware of the physical world and any nearby objects or other people. This means that users could fall or could accidently hurt bystanders (Fernandez & Hui, 2022; Zallio & Clarkson, 2022). Moreover, the technologies must be designed for accessibility and inclusion, but most VR headsets are currently designed for middle-aged adults. People not in this age group may have a negative experience. People with physical or sensory disabilities may also experience setback with accessing and participating in the Metaverse (Zallio & Clarkson, 2022).

Moreover, digital exclusion is a challenge which is important to mitigate as much as possible since ICT is a fundamental resource for everyone due to the immense use in everyday life (Brants & Frissen, 2017). Digital exclusion is "the lack of access and to ICTs and the lack of skills needed to use them" according to Punie et al. (2009). People will not only by digitally excluded, but also socially, economically, and culturally if they cannot participate in the digital world (van Dijk, 2020). While the Metaverse is not as mainstream as for example digital government services and social media networks Facebook and X (formerly known as Twitter), there is a possibility it could be the next big technological thing. If people are digitally excluded, it could also impact them in the physical world. Digital exclusion is usually linked with a low level of digital literacy which will also hinder someone in participating in the Metaverse (Zallio & Clarkson, 2022) and their usage of the internet for political purposes (Ranchordás, 2022). Digital literacy is "having the knowledge and skills to use a wide range of technological tool across different platforms. One possesses critical thinking skills and can use technology in a strategic way to search, locate, filter and evaluate information; to connect and collaborate with others in online communities and social networks" (Dimitrakopoulou, 2018). Moreover, there can also be a lack of awareness and trust to use a new online service or technology (Zallio & Clarkson, 2022). Someone will not sign up for the Metaverse if one does not know of its existence or does not trust the technology.

The cost for hardware, for example VR headsets, and other products that will allow people to enter the virtual world is another challenge for participating in the Metaverse (Allam et al., 2022; Keegan et al., 2023; Zallio & Clarkson, 2022). The price of the cheapest VR headset is €349.99 for the Quest 2 from Meta. The newer Quest 3 is on the market for €549.99 (Meta, 2023a). The prices for the headsets could be too high for people to be able or want to participate in the Metaverse. Thus, there are various challenges to using this technology. However, users do not readily adopt new technologies. The following paragraph dives deeper into this.

2.1.4 Technology adoption

Users need to accept a new technology before organizations can apply it to their processes. (Venkatesh et al., 2003) has developed the Unified Theory of Acceptance and Use of Technology (UTAUT) which combines elements from several theories to offer a comprehensive model (figure 1) for explaining technology adoption and usage. The constructs in figure 1 highlight four key determinants of user acceptance and usage behavior:
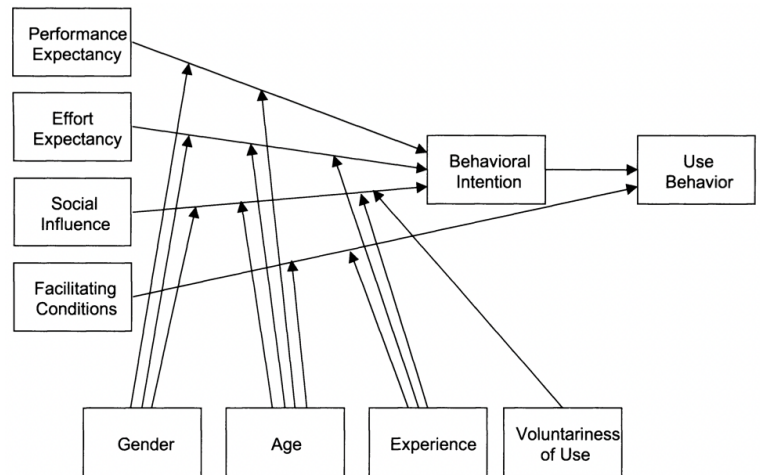

Figure 1UTAUT model (Venkatesh et al., 2003)

1. Performance expectancy is the degree to which an individual believes that using the technology will help them attains gains in performance.
2. Effort expectancy is the degree of ease associated with the use of the system.
3. Social influence is the degree to which an individual perceives that important others believe they could use the new technology.
4. Facilitating conditions is the degree to which an individual believes that an organization and technical infrastructure exists to support use of the system.

There are also moderating influences of gender, age, experience, and voluntariness. For example, the effect of performance expectancy is stronger for men and younger workers and the effect of effort expectancy is stronger for women, older workers, and those with limited experience (Venkatesh et al., 2003). Concluding, understanding the constructs and its moderators that drive technology acceptance and usage could help organizations develop effective strategies to promote adoption and integration of new technologies.

2.1.5 Conclusion

In conclusion, the Metaverse has evolved from a concept explored in science fiction to tangible virtual spaces like Meta Platforms' Horizon Worlds. Even though the Metaverse has various academic definitions, the consensus is that the Metaverse is an immersive 3D virtual reality universe that enriches the psychical world. Table 1 outlines the opportunities and challenges of the Metaverse as discussed in the literature, along with the respective authors who have written about them.

Table 1 Opportunities and challenges of the Metaverse from the literature

Opportunities/challenges	Articles										
	(Allam et al., 2022)	(De Felice et al., 2023)	(Bibri & Allam, 2022)	(Dwivedi et al., 2022)	(Lee et al., 2022)	(Zallio & Clarkson, 2022)	(Fernandez & Hui, 2022)	(Zuboff, 2019)	(Tromp et al., 2018)	(van Dijk, 2020)	(Keegan et al., 2023)
Enables global interaction		X									
Facilitates participation				X							
Improving remote work	X	X									
Offers new income streams	X										
Fosters innovation and transformation	X	X		X	X						
Blurs the lines between offline and online commerce		X									
Provides solutions for urban planning	X	X		X							
Improves healthcare delivery	X										
Enhances educational experiences		X									
Contributing to overall well-being and connectivity	X					X					
Unknown what the data is used for	X		X								
Behavioral and biometric data can show aspects of users' psyche				X		X	X				
Surveillance capitalism									X		
Data will be money-makers			X								
Criminals are after crypto assets				X							
Reported cases of harassment, sexual abuse, bullying, hate speech, and racism		X		X							
Deviant behavior could feel real to the victim		X		X							
Terrorism entrapment and indoctrination	X										

Effect on user's self-perception and self-esteem								X		
Long-term physiological effects unknown								X		
Users could fall or injure themselves						X	X			
Sensory discomfort						X				
Digital exclusion could lead to exclusion in the physical world									X	
Low digital skills could exclude people						X				
Lack of awareness and trust in new technology						X				
Hardware may be too expensive	X					X				X

2.2 E-participation

E-participation is a part of participation in the academic world and is studied more thoroughly the last years. Firstly, the predecessor participation is discussed. Secondly, e-participation is explained, and tools used by local government. It is important to know where the theory stands nowadays. Lastly, the information will be summarized in the conclusion.

2.2.1 What is participation?

Arnstein (1969) states that "participation of citizens in their government is the cornerstone of democracy". The interest in citizen participation has risen due to the dissatisfaction with traditional mechanisms of political representation (Ianniello et al., 2019). With the use of citizen participation, the ways in which ordinary citizens can participate and influence policies which affect their lives is intensified (Fung & Wright, 2001). The overall purpose of citizen participation is to enhance the quality and legitimacy of policy decisions. Other goals are incorporating public values and preferences into decision-making, increasing the quality of decisions, informing the public, fostering trust in institutions, and reducing conflict (Beierle, 1999; Ianniello et al., 2019). Thus, citizen participation refers to the active involvement and engagement of individuals in the decision-making processes and activities that affect their communities, society, or government.

However, participation will not only influence the decision-making processes of governments, but also affect a democracy. It is essential for the legitimacy of political systems (Pateman, 1970), for a healthy and strong democracy (Boyte, 2005; Putnam, 2000), and is a means for empowerment (Arnstein, 1969). It will contribute to not only democracy, but social cohesion within communities and overall well-being of society and thus citizens.

Participation theories
There are various theories by researchers who contribute to the knowledge field op participation. These theories are chosen for their different outlooks on participation.

Rational Choice Theory by Downs (1957).
Downs (1957) developed Rational Choice Theory to explain human decision-making through the rational pursuit of self-interest. He suggests that political participation is based on a cost-

benefit analysis, where individuals weigh the benefits of engagement against the costs. Participation costs, like time and effort, are balanced against the benefits of having one's policies enacted. Factors such as perceived efficacy, political competitiveness, and policy impact also influence participation. Therefore, Downs (1957) argues that political participation is a rational decision-making process.

Social Capital Theory by Putnam (1994)
Putnam (2000) argues that social capital has significantly declined since the mid-20th century, reflecting a societal shift towards individualism and a weakened sense of community. Social capital includes connections, trust, reciprocity norms, and networks that enable collective action for the common good. Participation in social and civic activities is a key indicator of social capital's health. This decline is attributed to different factors: technological advancements leading to isolated lifestyles, longer work hours and job mobility reducing community involvement, suburbanization causing physical dispersion, and a shift in societal values prioritizing individual pursuits over collective well-being. Putnam (1994) stresses that social capital is vital for a thriving democracy, as active participation fosters civic duty and responsibility, contributing to the health of a community and country.

Civic Voluntarism by Verba et, al (1995)
Verba et al. (1995) argue that political inactivity is due to a lack of resources, engagement, or recruitment. Civic voluntarism highlights the importance of individual resources like time, money, and civic skills. Time is equally distributed, unlike money, which is tied to education, occupation, and other factors, making monetary-based participation more unequal. Engagement includes psychological factors like political interest and efficacy, which drive the desire to participate. However, without time, money, and skills, engagement is ineffective. Recruitment typically occurs through personal networks and previous participation, favoring those with higher education and occupational levels. Thus, Verba et al. (1995) suggest that resources, engagement, and recruitment crucially impact participation.

Participation ladder by Arnstein (1969)
Arnstein (1969) views citizen participation as a means to redistribute power to include previously voiceless citizens. Arnstein (2019) argues that participation without power redistribution is ineffective. Arnstein's typology of participation outlines a ladder of citizen power. The first two rungs represent non-participation, where citizens are excluded by powerholders. Rungs 3-5 are "tokenism," allowing citizens to voice opinions without real influence. Higher rungs indicate increasing levels of citizen power and decision-making. Figure 2 shows the typology of participation with the extent of citizens' power according to Arnstein (2019).
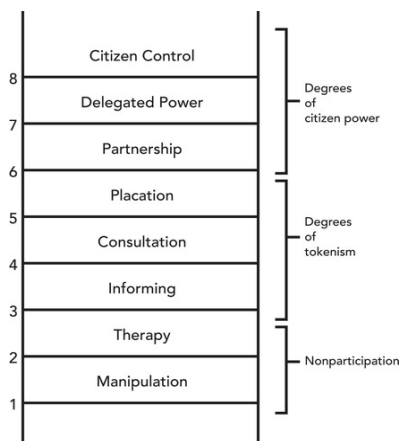

Figure 2 Participation Ladder (Arnstein, 2019)

A limitation of Arnstein's ladder is that it doesn't address barriers to achieving true participation. Obstacles from powerholders include racism, paternalism, and resistance to power shifts. Barriers for citizens include political and socioeconomic challenges and organizational difficulties due to feelings of futility and distrust (Arnstein, 2019). Thus, the participation ladder of Arnstein (1969) can help in characterizing the level of participation but does not offer advice how to overcome barriers of participation. Some other participation challenges are mentioned hereafter.

Participation challenges
Citizen participation faces challenges due to information deficits. Governments may lack knowledge of citizens' preferences, while citizens may not understand government processes. This gap is worsened for complex issues requiring technical knowledge, like environmental concerns, which rely heavily on scientific expertise (Ianniello et al., 2019; Sun et al., 2009). As a result, citizens may have poor focus and unrealistic expectations. Ianniello et al. (2019) suggest sustainable interactions for mutual learning and shared research efforts to mitigate these knowledge gaps. However, trust in expert findings is essential (Edelenbos, 1999). Another challenge is that public officials often view citizen participation as an external imposition and distrust citizens' abilities (Campbell, 2010; Stout, 2010). Institutionalizing participatory processes can improve officials' attitudes over time. Enhanced citizen understanding of language, culture, and politics fosters better engagement. Additionally, having skilled facilitators can help manage participation and build trust (Ianniello et al., 2019). Thus, various challenges to participation arise from the theories and points mentioned above.

However, there are also organizational arrangements that can contribute to successful engagement. Ianniello et al. (2019) emphasize that successful engagement relies on community representation criteria and process design. Deciding who participates is crucial, as the number and selection of participants significantly influence outcomes. The quantity of participants significantly influences both the process and the results. While the idea of granting everybody the right to participate is admirable, it might not be the best solution due to differences in knowledge, skills, and interests of the participants. For example, if a citizen does not have the motivation to participate, they will also add no value to the discussion (Ianniello et al., 2019; Sun et al., 2009). Furthermore, process design is critical for successful citizen participation, especially for the choice and implementation of tools (Yang & Pandey, 2011). Multiple involvement mechanisms, like public hearings and online surveys, can improve results (Ianniello et al., 2019; Yang & Pandey, 2011). McGuire (2006) advises that the chosen mechanisms should fit the specific community and context, requiring continuous refinement by administrators. Lastly, it's not just the tools that matter; the process itself also requires fine-tuning. Ryfe (2005) outlines four key requirements for successful participatory processes: (1) establishing rules of equality, civility, and inclusivity, (2) using stories to frame discussions, (3) clarifying personal stakes, and (4) allowing for learning and improvisation. Participation requires tweaking and refinement while the administrators learn how to engage their citizens.

2.2.2 What is e-participation?
"ICT-supported participation in processes involved in government and governance" is an early description of e-participation (OECD, 2003). According to Sæbø et al. (2008), e-participation includes all parts of technology-mediated interaction between society and formal political and administrative circles. Thus, e-participation is the use of ICT to facilitate citizens' involvement in democratic decision making (Hovik et al., 2022; Medaglia, 2012; Pflughoeft & Schneider, 2020; Tavares et al., 2020; Tejedo-Romero et al., 2022). Effectively implemented e-participation can enhance democratic decision making since it can overcome issues associated with traditional public participation and thus increase inclusivity (Pflughoeft & Schneider, 2020).

Participation is made possible by modern communication technologies and citizens can thus actively participate in public decision-making processes. Due to fast technological advances, the participatory processes should be refined and innovated regularly (Adnan et al., 2022).

The presence of a functioning and accessible infrastructure is a necessary condition for adoption of e-participation tools. Moreover, e-participation initiatives are usually based on available technologies, rather than technology that is specifically developed for e-participation purposes (Medaglia, 2012). Usable and well-structured websites are found to encourage citizen engagement (Coleman et al., 2008). The citizens should have adequate digital skills in order to participate (Medaglia, 2012), but it should still be made as easy as possible for them to participate. Furthermore, e-participation can put the privacy of citizens at risk, and it requires consumption of their own resources, such as battery and computing power. Therefore, applications aiming to enhance e-participation need to handle data security and privacy (Bastos et al., 2022).

Even though the technological advances should make it easier for citizens to participate, it is not fully incorporated everywhere. The Netherlands have a high e-participation index (EPI) of 0.9643 and total utilization of 96,51%. In comparison, the United States of America, Republic of Korea, and Estonia have the perfect score of 1 (EPI) and 100% utilization which means the Netherlands could perform better (NATIONS, 2020). The size of e-participation audience keeps increasing, but there are still challenges in turning this audience into active users (Bicking et al., 2011; Medaglia, 2012). Moreover, various studies show that e-participation is not effective in engaging citizens to participate if they have not before (Afzalan & Muller, 2014), if they are newly targeted demographics (Lindner & Riehm, 2011), and if they have a low level of digital skills (He et al., 2016; Pflughoeft & Schneider, 2020).

2.2.3 Local government e-participation
A lot of studies are based on the e-participation of the national government, but local policy decisions play a crucial role in shaping the lives of citizens (Lourenço & Costa, 2007). Local policy problems are complex, "because of the dynamic character of the problems, the many phenomena included, the many actors involved and the impact these problems have on society" (DeTombe, 2001). It is especially important that "ordinary" citizens participate because of their representation in the decision-making process, they may prove to be experts in some fields due to their experience or knowledge, and they are aware of the problems of the communities where they live (Bastos et al., 2022; Lourenço & Costa, 2007). Their potential contributions will otherwise be completely wasted and there is a higher chance of acceptance if citizens are involved (Lourenço & Costa, 2007). Moreover, engaging in e-participation requires less time and effort compared to attending in-person meeting (Effing et al., 2011), and demands less network resources and less self-confidence of participating citizens (Hovik et al., 2022). There is a trend to improve the interaction between the municipalities and citizens which leads to the establishment of direct communication channels between them with the use of ICT, thus e-participation (Tejedo-Romero et al., 2022). It is important that citizens trust their local government, otherwise citizens have no reasons to engage with the municipality through digital or non-digitals participation channels (Hovik et al., 2022; Reichborn-Kjennerud et al., 2021).

At the local level of government, the assessments of municipality websites shows that the focus of ICT application is often on management and delivery of services instead of participation (Medaglia, 2012), while the internet and ICTs have provided opportunities for local governments to increase citizen participation. There are municipalities that show less development in the use of online initiatives by only offering information, while other municipalities implement more advanced initiatives such as complaints offices, discussion processes as forums, chats, blogs, and social networks (Tejedo-Romero et al., 2022). An example in the Netherlands is De Stem van Groningen which is an online platform for various

participation processes. The open source tool Consul is used which means other municipalities can also apply it (VNG, 2021). Such participatory websites are also implemented for local governments in other countries as Austria, Croatia, and Italy. Italy also has a regional website where the portal allows citizens to get involved in the process of collaborative design by engaging in "virtual room" discussions (Roblek et al., 2020).

Municipalities have differing e-participation strategies because they implement e-participatory tools for different reasons and in different ways. Some municipalities want to introduce e-participation to expand participation opportunities while others want to digitalize participations opportunities. Most cities choose to implement one comprehensive and multifunctional digital platform (Hovik et al., 2022), such as De Stem van … websites in the Netherlands (VNG, 2021). Nearly every modernization program in western democracies incorporates local e-government initiatives (Bonsón et al., 2012).

In order for e-participation tools to be effective for e-participation and the government decision-making process the platforms should not only consider advanced technical parameters as user interface design and interactivity, and a high level of public involvement, but also public interest in the topics discussed (Revyakin, 2018). If local governments choose to want participation on topics the citizens are not interested in or what is not most important to citizens, they will not get the participation they hope for. Therefore, Porwol et al. (2012) proposes open discussions where citizens are free to post their own ideas and are not limited to discussion topics provided by the municipality.

2.2.4 Conclusion
Traditional participation, as outlined by various theories, emphasizes the critical role of citizen involvement in democracy, the decision-making process, and societal well-being. These theories provide diverse perspectives on why and how citizens participate, highlighting the importance of resources, engagement, and power redistribution. E-participation, defined as ICT-supported interaction between citizens and government, offers a solution to some of the challenges of traditional participation. It provides platforms for broader and more inclusive engagement, although it also presents its own set of challenges, such as ensuring digital literacy (Medaglia, 2012), maintaining privacy (Bastos et al., 2022), and fostering trust in digital platforms (Hovik et al., 2022; Reichborn-Kjennerud et al., 2021).
Local e-participation gains prominence, recognizing that local policy decisions significantly impact citizens' lives. E-participation, requiring less time and effort than physical meetings, aligns with the trend of improving interaction between municipalities and citizens (Hovik et al., 2022). Municipalities exhibit varying e-participation strategies, with some focusing on expansion and others on digitalization. Successful e-participation platforms must not only prioritize technical parameters but also align with public interest to effectively engage citizens. Open discussions, allowing citizens to contribute ideas freely, can enhance the effectiveness of e-participation tools (Porwol et al., 2012). E-participation, when carefully implemented, stands as a powerful tool to augment democracy, fostering inclusivity and informed decision-making in the local governance arena.

2.3 E-participation in the Metaverse
While research into e-participation in the Metaverse is still emerging, some considerations have been identified in the literature. E-participation in the Metaverse could quickly become gamified, which may deter some groups of citizens from participating. Deterding et al. (2011) define gamification as "the use of game design elements in non-game contexts". Thiel et al. (2016) found that older citizens tend to oppose gamification in participation, while it might

attract younger individuals. This demographic difference should be considered when using the Metaverse for e-participation.

Furthermore, Kreijveld (2023) has three recommendations to maximize e-participation, citizen engagement and platforms in the Metaverse: (1) reuse and enhance a platform for residents to see the results of their efforts, (2) integrate virtual and physical meetings with governments officials in the lead, and (3) prioritize high-quality decision-making. The software developer should not create what they want but what benefits the municipality and residents the most. The municipality must ensure this to have effective e-participation with engaged citizens. Moreover, there have already been benefits defined by Şahin (2023). Those benefits are among others a more realistic and effective understanding of real-life issues, increased empathy for the problems of others, exploring possibilities for gathering where differences in language, culture, and understanding can be minimized (Şahin, 2023). Lastly, there is still a lot unknown about the Metaverse. For instance, will the Metaverse be a monarchy, a democracy with multiple layers of authority, or a decentralized system (Zallio & Clarkson, 2022)? It is also unclear whether democracy is even applicable in the Metaverse, who is accountable, and whether current laws can be applied to the Metaverse (De Zwart & Lindsay, 2020). Thus, there is not set structure for governance in the Metaverse. This can be a problem once the Metaverse will grow in users and its purposes as e-participation.

In conclusion, a classification scheme (figure 3) is created based on the literature to summarize the information and to use it for gathering data for this study.

0 E-PARTICIPATION IN THE METAVERSE

100 E-participation

110 Challenges traditional participation
    111 Information deficit
    112 Public officials' skepticism
120 E-participation implementation
    121 Technical parameters
    122 Accessible infrastructure
130 Opportunities
    131 Encourage citizen engagement
140 Challenges e-participation
    141 Engaging newcomers

200 Metaverse

210 Characteristics
    211 Immersive VR
    212 Digital avatars
220 Opportunities
    221 Foster innovation
    222 Provide solutions for societal challenges
230 Challenges
    231 Deviant behaviour
    232 Physical awareness and comfort

300 Metaverse and e-participation

310 Opportunities
    311 Facilitatie interaction and increase inclusivity
320 Challenges
    321 Privacy and security
    322 Digital skills
    323 Consumption of citizens' resources

Figure 3 Classification scheme E-participation in the Metaverse

3 Methodology

In this chapter, the methodology of this research is described. Firstly, the research design will be discussed. Furthermore, the participants, the construction of the measurement instruments, and how the data was collected will be explained. Lastly, how the data was analyzed is described.

3.1 Research design

To answer this exploratory research question, a qualitative research method is needed. Qualitative research seeks to describe the meaning of an occurring phenomenon in the social world. It can be used with data from various sources: people, organizations, texts, setting, and events (Cooper & Schindler, 2013). As this study wants to explore the opportunities and challenges of e-participation in the Metaverse, the main data source will be people. This approach is suitable for investigating and understanding the new phenomenon of e-participation in the Metaverse.

Participation can transpire in various forms, yet for data collection purposes, a specific format needed to be selected. Participation needed to occur with a Meta application as creating a participation application was outside the scope of this research. Consequently, participation meetings were selected as the preferred mode, leveraging the Meta Horizon Workrooms application for their execution.

A consideration for this study is that the concepts of e-participation and the Metaverse may be entirely new to some participants, especially citizens. Participants needed to experience the Metaverse and understand what participation entails within it. Without this experience, it would be difficult to address the research question. Data gathering involved observational techniques where participants engaged in a Metaverse participation meeting using Meta Quest 2 VR glasses, the First Steps for Quest 2 application, and the Meta Horizon Workrooms application. Afterwards, each group participated in a focus group to share their experiences and thoughts. The municipality of Enschede served as the case study. The municipality of Enschede is exploring the potential integration of this technology into their participation process to keep pace with the rapid technological advancements in society. Therefore, they aim to understand what is needed and what could occur if they implemented this technology. Consequently, they wanted to collaborate on this study. They facilitated connections with various municipal employees to participate in the study and provided feedback.

3.2 Participants

Due to its exploratory nature, this study doesn't aim for a comprehensive representation of the entire population but seeks insights into challenges and opportunities of using the Metaverse for e-participation. Challenges and experiences encountered are viewed as informative rather than conclusive. Given the uncertainties surrounding e-participation in the Metaverse, generalizing findings to the entire population is challenging. Any further limitations regarding the selection of participation are mentioned in paragraph 6.4.

Participants were selected in advance due to equipment limitations; the University of Twente had six Meta Quest 2 VR glasses, allowing six participants per session. To ensure uniformity, all participants used the same type of VR glasses. Data collection occurred in both morning and afternoon sessions to ensure data availability, aiming for a total of twelve participants.

Ideally, participants for the VR experience and focus groups were drawn from both municipal employees and citizens, reflecting the diverse stakeholders involved in participation meetings. The morning session aimed for three municipal employees and three young citizens, but due to last-minute cancellations, it comprised two municipal employees and two young citizens from Enschede. Conversely, the afternoon session successfully accommodated three municipal employees and three young citizens. A collaborator from Enschede municipality invited colleagues with diverse job functions via email. The researcher was not involved in the selection; it was first-come, first-served. The citizens were invited through the researcher's extended network, but they did not have a close connection to the researcher. Municipal employees included those engaged in participatory activities or interested in the technology, from the participation, IT, and management teams, totaling five employees with no prior VR experience. Citizen participants were young residents of Enschede, mostly University of Twente students from various fields. One was an HBO student interning with the participation team. Three had lived in Enschede for over three years, two since 2023. Two had limited VR experience, while the rest had none.

3.3 Measurement

As this study is exploratory and delves into uncharted territory, there are currently no established measurements. A classification scheme is created based on the literature and aimed at the challenges and opportunities (figure 2). While the classification scheme offers guidance, the aim of an exploratory study lies in the discovery of unforeseen aspects not captured before. Therefore, there could be results from the experiment that do not correlate to the classification scheme in this section but will still be included in the results of this study.

Note on the classification scheme: Some opportunities and challenges overlapped between e-participation and the Metaverse. To avoid measuring these twice, they have been consolidated into a separate category. Consequently, certain challenges and opportunities may appear absent compared to the theoretical framework, but they are indeed included in this consolidated category.

3.4 Data collection

In this study, data were collected during an observation of a participation meeting in the Metaverse involving municipal employees and citizens, followed by a focus group. The data collection process is outlined below.

The sessions, held at the Vrijhof library on the University of Twente campus in Enschede (the Netherlands), included a morning and an afternoon session on April 4th, 2024. Six adjacent rooms were used for the Metaverse experience, with a larger room for briefing and the focus group. This setup minimized auditory interference and allowed researchers to assist participants. The VR glasses, guardian zone, desk zone for Meta Horizon Workrooms, and the online meeting for the experience were set up beforehand to try to ensure the VR experience would run as smoothly as possible for the participants. Furthermore, a reliable internet connection was essential, but Wi-Fi connectivity issues in both sessions hindered the Meta Horizon Workrooms application. Despite these issues, participants experienced the First Steps for Quest 2 tutorial and tested the Meta Horizon Workrooms application functions, though a full participation meeting couldn't take place.

The empirical part of the research lasted an hour (table 4), beginning with an introduction to the study and the Metaverse, along with instructions on using VR glasses. Participants then engaged with the Metaverse tutorial to familiarize themselves with the technology. Although

the participation meeting was disrupted by connectivity issues, participants had enough exposure to form opinions. The session concluded with a focus group to discuss experiences and the future of Metaverse e-participation. The question asked during the focus groups can be found in appendix 1 Focus group questions.

Table 2 Overview of the VR experience

Steps during the experience	Time duration
1. Welcome, introduction of the study	3 minutes
2. Short explanation of the Metaverse and introduction of the VR glasses and Horizon Workroom	7 minutes
3. Time for participants setting up in the Metaverse and Metaverse tutorial	15 minutes
4. VR participation meeting	Approximately 15 minutes
5. Focus group	20 minutes
Total duration	*60 minutes*

Data was gathered using researcher notes and voice recordings. The researcher documented noteworthy observations during the experiment, following the classification scheme outlined in section 3.3 Measurement and noting any other interesting observations. The objective was to capture and audio-record the experiences of all participants using the VR glasses. However, the audio-recording with the VR glasses in the Metaverse did not work. Additionally, during the focus group discussions, recording was conducted via both a laptop and a phone to guarantee thorough data capture.

3.5 Data analysis

The data analysis for the experiment relied on notes taken during the morning and afternoon sessions and audio-recordings of focus group discussions. To facilitate analysis, recorded data was transcribed using automatic transcription from Word Online and corrected by hand using the audio file. The classification scheme provided in section 3.3 Measurement served as a framework for analyzing both observations and transcriptions. For example, if a participant's lack of spatial awareness was observed through their movements rather than verbal communication, it was categorized accordingly. Since the researcher and another person were there together, they verified with one another whether they both observed the same thing. Similarly, the classification schemes guided the analysis of focus group transcriptions. Participants' comments on their experiences and additional thoughts were compared with the classification scheme to identify correlations. Moreover, a measurement will only be counted if it was observed more than twice or expanded on in the focus groups by other participants. However, if there would only be one participant with e.g. a hearing aid, their comments would be included immediately since another participant could not corroborate. For example, if one participant would touch the wall outside of the guardian zone, it would not immediately be significant, but if multiple participants were to touch the wall, it could be significant.

Any new observations or quotes not addressed by the classification scheme were also documented. Given the study's focus on a novel phenomenon and its exploratory nature, it was possible that certain aspects would emerge that were not initially accounted for in the classification scheme but were nevertheless outcomes of the experiment.

4 Results

The chapter shows the findings obtained through the data collection at the University of Twente. Firstly, the participants were observed during a VR experience using the classification scheme. Secondly, the data collected from the two focus groups are summarized into themes using participants' quotes. Finally, the results are summarized in a concluding table with overarching themes.

The municipality of Enschede in the Netherlands served as the case study for data collection on e-participation. Employees from various municipal departments participated in a VR experience and subsequent focus groups. Citizens were represented by local students. The objective was to simulate an e-participation meeting in the Metaverse using the Meta Horizon Workrooms application (figure 6), accessed through Meta Quest 2 VR glasses (figure 4). However, the participants first explored the Metaverse in the First Steps for Quest 2 application (figure 5). After the VR experience, the participants gathered to discuss their experience in a focus groups. This setup aimed to explore the potential of Metaverse technology to enhance participatory processes.

Figure 4 Meta Quest 2 VR glasses

Figure 6 Meta Horizon Workrooms application

Figure 5 First Steps for Quest 2 application

4.1 Observation results

During the VR experience, participants were closely monitored for any relation with the classification scheme outlined in section 3.3 Measurement. These observations are detailed in the final column of the classification schemes. Any observations that diverged from the classification scheme are also noted. These extensive results can be found in Appendix 3 Classification scheme observations. The results are summarized in this section per topic.

Citizen engagement

During the VR experience, observations revealed that multiple participants displayed enthusiasm and excitement towards the technology, evident through their laughter and smiles. Their eagerness to continue exploring the Metaverse instead of participating in the focus groups also showed their interest. This applied to both municipal employees and citizens. This could indicate the potential for well-designed applications to foster citizen engagement which could be a great opportunity for citizen participation.

Technical limitations

Wi-Fi connectivity issues during the VR experience could suggest that technological limitations may pose a challenge to participation in the Metaverse. Although the participants could partake in the tutorial application without difficulty, their experience in the Meta Horizon Workrooms application was significantly hindered by internet connectivity issues. The participants could explore various features of the application, but the internet connection was not stable enough to hold a conversation.

Digital skills

While some participants confidently navigated outside the provided guide, troubleshooting issues such as Wi-Fi connectivity on their own, others remained reliant on immediate assistance when faced with tasks beyond the guide's scope or entering in the first place. For instance, two citizen participants successfully located the Wi-Fi settings but required the hotspot password to proceed. Despite the Meta Horizon Workrooms application desks being calibrated for all users, one participant had to reset theirs independently, which they managed to do successfully. Another participant customized their avatar to better resemble themselves. In instances where Wi-Fi troubles persisted or application locations proved difficult to find, the researcher had to intervene by taking over the VR glasses. Nonetheless, most participants adeptly handled the VR equipment and the Metaverse environment. This suggests that certain participants may require more guidance than others, which could be associated with their digital skills, problem-solving capabilities, or the accessibility features of the Metaverse.

Physical awareness and comfort

Some participants exhibited a lack of awareness of their physical surroundings, despite the presence of a guardian zone in the Metaverse. This resulted in instances where individuals approached the walls closely, nearly punching the wall during the tutorial. Potentially this could lead to injuries of participants. Additionally, there was a risk of sensory discomfort associated with the technology. Some participants attempted to wear their regular glasses with the VR glasses, using glasses spacers, but found little improvement in their experience. While one participant successfully used the glasses spacer throughout the VR session, others opted to remove their regular glasses altogether. This indicates that wearing glasses could potentially impede participants' comfort and participation in the Metaverse. Furthermore, one participant who wore hearing aids showed no signs of discomfort or unease during the VR experience. This suggests that wearing hearing aids does not necessarily present a challenge to participating in the Metaverse and is thus not immediately excluding anyone. It's worth mentioning that the hearing aids were relatively small, and the experience may be different with different hearing aids.

4.2 Focus groups results

Data was also collected during focus group sessions after the VR experience. Not all relevant data could be collected solely through observation, as opinions and thoughts on the experience necessitated verbal expression. Therefore, the classification scheme outlined in section 3.3 Measurement were supplemented with quotes from the focus groups to determine if specific aspects were mentioned. Any quotes that do not directly align with the classification scheme were also noted. The data transcripts are available in Appendix 2. For detailed results, please refer to Appendix 4, which contains the classification scheme for the focus groups. A summary of these results is provided in this section divided into opportunities and challenges.

Added value of the Metaverse
While the focus of the study was on opportunities and challenges, the participants were also in search of added value of participation meetings in the Metaverse. One participant thought "the meeting room looked nice and all, but it stills feels a bit like a kind of Teams 2.0". Another agreed that "sitting in a room that seems a bit like Teams" is not really added value. "What is the advantage over Teams" is a question that was asked multiple times. Participants even thought that "it would be better to keep a Teams meeting like that, with Teams". Even saying that Teams is preferred since "with Teams you still have the video". The participants were curious about the added value: "picking up blocks and all that is fun and meeting in the Caribbean is also a lot of fun, but what else is going on? What is really the added value that I am curious about". It must be mentioned that these comments about Microsoft Teams were mostly said regarding the application Meta Horizon Workrooms. Nonetheless, it is interesting that the participants were genuinely seeking added value from this technology to consider its integration into the participatory process.

Opportunities

Citizen engagement
An opportunity to overcome traditional issues of participation is that citizens can participate from home: "Everyone can participate even from home. You do not have to go somewhere" and "as people have it at home and it is all very easy and accessible. Then you could have people at their own location and still hold a meeting". This could mean that citizens who are homebound, and unwilling or unable to attend in person can still participate. Municipal employees also expect that "it will attract a certain type of people and they have a bit of fun and perhaps a lot of young people". It could potentially also serve as an incentive for newcomers to join in, thereby fostering citizen engagement. Furthermore, a usable and well-structured application could also encourage citizen engagement. As a citizen participant said, "it is much more fun and interesting" and a municipal employee thought "it could be a nice crowd-pleaser". Participants believed it could attract a crowd to participation meetings who otherwise might not participate.

Address societal challenges
Another opportunity is that the technology excels in visualization, which could significantly aid in addressing societal challenges. Especially since it felt real to the participants because one participant "went to get one of those ping pong bats, it did feel like I had it". A participant said, "If you want to visualize something, well you can do that very easily with these glasses." An example given was "we are going to completely change 'Stationsplein', and we want to show what that could look like". Another example was "you can ask residents to lay out the playground and see what works and what does not". With this application "you could really walk through it" and "they can really do it themselves and see what works and what does not". This could be added value for the citizens in a participation event. The municipal employees agreed that "it will be very nice to present such a plan in this way" and "it would be a nice icing on the cake at such a meeting". However, it still needs some further development, according to one participant "It was a bit of a drawn picture now. If you really want to talk about, say, windmills, then you really do have to have a realistic environment where you then place your windmills in." Another participant could also see the possibilities but "as realistic a depiction of the environment as possible is needed" to have the most effect. The question also arose "who is going to develop it digitally". While there are some considerations to visualizing in the Metaverse, they do agree that the Metaverse has potential

for it since "if it is really developed through and you have it visually in front of you then it is one of the best possibilities out there".

Creativity
Another opportunity is that it could improve creativity according to the municipal employees, since they think "it is also kind of a nice outcome in those barren spaces that we are also familiar with at our city offices, that in case of brainstorming, we put on VR glasses, and we get I do not know what kind of ideas". Especially since they miss that kind of space, they are looking for "a space that fuels that creativity". Though it may not have a direct correlation with e-participation in the Metaverse, it does indicate that the Metaverse could foster creativity, which could subsequently benefit participation in the Metaverse.

Challenges

Technical limitations
There are also certain prerequisites that might pose challenging for citizens to participate. First, "if you want to participate with people you have to have enough glasses and those things are not cheap". Thus, it would require monetary expenses from participants or perhaps from the municipality depending on how they are going to apply the Metaverse in the participatory process. One participant thinks "it represents an expensive option for a visualization" which would be the main opportunity according to the participants. However, one participant mentioned "a game computer PlayStation are also that expensive". Furthermore, future participation meetings require participants to be in separate rooms. Otherwise "you are going to hear each other twice".
Moreover, the Wi-Fi needs to work perfectly, "especially if you throw a lot of people on a particular Wi-Fi network". Poor Wi-Fi was one of the most irritating factors for the participants and "it has to work a lot better in a sense, because then there are indeed snags". Before implementing it into the participatory process, "it has to do it all".

Digital skills
Furthermore, people may not be able to participate if they do not have the digital skills needed. According to the study's participants, understanding how to use the technology requires training, as highlighted by the comment, "you must have taken such a course to understand how such a thing works". The participants think that "if you have to do that with 40 people, I think ultimately you will need a lot of supervisors". Especially for elderly people "it can be a hurdle how they find their way in the Metaverse". There is the issue of unintentionally excluding certain demographic groups from participation. "Especially if you hold participation meetings, there are often a lot of older people attending, so 70, 80 plus. It can also be a hurdle, how they find their way in". Not only potentially elderly people can be excluded, but also "if you do not like gaming, you might experience a barrier to using it". People who do not feel comfortable or do not like to use these technological tools might see it as a barrier. Especially since 'instead of grabbing something, you have to do something with another tool, point or top or draw something". One participant even compared it to "as if you are eating with chopsticks". However, municipal employees "have to make sure that we serve the people who cannot do it". This unintentional exclusion could deprive decision-makers of valuable insights and feedback.

Physical awareness and comfort
Moreover, participants "found it scary that indeed I could not see anything anymore" and were worried about potentially "having her suddenly crash into the wall". They felt "that you

do get very disconnected from the physical world" and lost their "sense of security and privacy". One participant would even lock their own room so that they would not have "someone suddenly standing next to me". Thus, the participants felt a lack of awareness of the real world which got them worried about their safety and sense of security.

Participants also experienced some sensory discomfort such as nausea. They "would not want to sit in VR glasses like that for very long". One participant even said, "it does a lot on your brain" and that the nausea got worse when the "connection diminished and those black clouds came". Additionally, one participant "cannot imagine that this would include a meeting for an hour or so, because at one point you do notice it on your head a little bit. It does put a lot of weight on your head". Moreover, participants who wore glasses used the glasses spacer but "glasses fogged up all the time, but that could also be due to the weather". Whether or not it was due to the weather, it could be an issue for glasses wearers to participate. According to the participants the technology might not be suitable for usage over a longer period due to sensory and physical discomfort.

Engagement motivation
While it is an opportunity that newcomers may come to the participation meetings to use the technology, a municipal employee expresses concern that "there is the temporary effect that people do it because they think it is so cool". This suggests that citizens might be motivated by factors unrelated to genuine interest in the meeting or its topics, potentially affecting the meeting's outcomes.

Privacy and security
Furthermore, participants raised concerns about their privacy and data, particularly regarding Meta (Facebook), the company behind the technology used in the study. "Facebook of course does not really stand up very well in that regard with influencing elections and all kinds of weird algorithms that pushed people into conspiracy theories". They were concerned regarding "unconscious that they impart through certain pictures". For example, "suddenly there is a bottle of Coca-Cola" and thus there is "product placement" in the Metaverse. The question was even asked "do I want this? What will be left on the internet?". A participant even stated that "to surrender yourself completely because they possibly already know everything is another thing". Thus, their privacy and data are something the participants worry about. While they were not conclusive whether these concerns could be a reason not to use the Metaverse, they certainly found it a concern worth discussing and voicing.

Real-world disconnect
Another challenge highlighted by participants is losing sense of the real world. While they thought it was beautiful, they also "found it quite frankly a bit scary too" and one participant even thought "this is just the matrix". They thought "it is really a new reality, a different reality" and that "a parallel world is really emerging". Participants were wondering "what is still true and that becomes even more unclear" and "at some point you may not remember what you saw through such glasses". Some even said, "I can image you would almost rather be there at any given time" and saw "it can also really be an escape". This could be an issue according to the participants since "you can show people things and they are going to assume it is reality". Even the question "was it a dream or was it in that Metaverse?" was raised. This could be an issue since people could lose sense of the real world and what is real and what is not, with potentially significant consequences.

There was also a concern that people could lose connection with one another which is important since "at a local level, you actually want to look people in the eye". Various participants mentioned that they found it "annoying that you cannot see people's faces" and found it difficult "especially when you are going to meet new people". It may be an issue that "everyone starts using it for everything, even though it is not necessarily necessary". Thus, there is a possibility of diminished social interaction in real life.

4.3 Conclusion

The results are displayed in figure 7. The opportunities and challenges outlined earlier have been categorized to enhance generalizability as much as possible given this exploratory study and facilitate comparison with the theoretical framework.
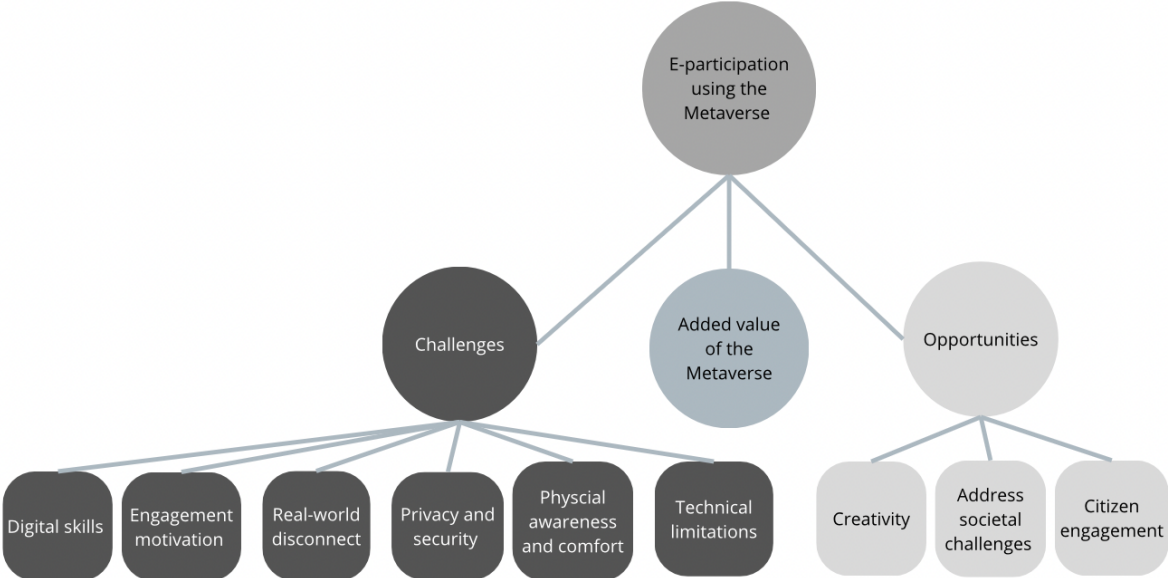

Figure 7 Challenges and opportunities from observations and focus groups

The model identifies opportunities and challenges based on observations and focus groups of this study. For instance, privacy and security pose challenging for utilizing the Metaverse in e-participation, whereas citizen engagement could be an opportunity. Thus, there are six challenges for using the Metaverse for e-participation and three opportunities that came forward during the data collection. Moreover, the Metaverse should add value to the participatory process, otherwise its usage may be deemed unnecessary and will not be adopted by local governments.

5 Analysis

In this chapter, the results of the VR experience and focus groups are compared to the existing literature. The analysis examines whether certain items from the literature were not mentioned by participants and whether new items emerged during data collection that were not covered in the literature. Furthermore, the opportunities and challenges are laid next to the UTAUT of Venkatesh et al. (2003).

Firstly, the classification scheme used for measurement will be adapted to highlight any gaps from the data collection and incorporate new items discovered during the study (figure 8). Items with an asterisk did not emerge during data collection, while items that are cursive represent new findings that emerged.

0 E-PARTICIPATION IN THE METAVERSE

100 E-participation

110 Challenges traditional participation
  111 Information deficit*
  112 Public officials' skepticism
120 E-participation implementation
  121 Technical parameters
  122 Accessible infrastructure
130 Opportunities
  131 Encourage citizen engagement
140 Challenges e-participation
  141 Engaging newcomers

200 Metaverse

210 Characteristics
  211 Immersive VR
  212 Digital avatars
220 Opportunities
  221 Foster innovation*
  222 Provide solutions for societal challenges
230 Challenges
  231 Deviant behaviour*
  232 Physical awareness and comfort

300 Metaverse and e-participation

310 Opportunities
  311 Facilitatie interaction and increase inclusivity
  312 Creativity
320 Challenges
  321 Privacy and security
  322 Digital skills
  323 Consumption of citizens' resources
  324 Engagement motivation
  325 Real-world disconnect
330 Added value of the Metaverse

Figure 8 Adapted classification scheme after results

Missing items

As shown in Figure 7, the item information deficit did not emerge during data collection. Information deficit refers to the gap where governments lack knowledge of citizens' preferences, and citizens do not fully understand government processes, particularly in complex issues (Ianniello et al., 2019; Sun et al., 2009) Although participants noted that visualization could aid citizens in imagining solutions for urban planning, these comments primarily highlighted the benefits of visualization rather than addressing whether municipal employees perceived citizens as having an information deficit. Additionally, there were no mentions of citizens lacking understanding of government processes. Consequently, this item was not observed in the data.

Another item that did not emerge was fostering innovation. While (Dwivedi et al., 2022) view the Metaverse as an opportunity for innovation and transformation across various industries, participants acknowledged its potential for participatory processes but noted that it is not yet sufficiently developed. They cited various technical limitations that currently hinder municipalities from integrating the Metaverse into their participatory processes. Thus, they could not yet say it fosters innovation.

Lastly, deviant behavior is mentioned extensively in the literature referring to harassment, sexual abuse, bullying and other forms (De Felice et al., 2023; Dwivedi et al., 2022) and its possibility to have long-term physiological effects on users (Tromp et al., 2018). However, this part did not surface during the data collection. Perhaps it is because the participants did not encounter users outside of their group. Nevertheless, it is important to note that this item could not be corroborated in this research. However, the absence of evidence does not negate

the possibility of such occurrences. In a different setting of e-participation in the Metaverse, such behavior could surface as it cannot be said with certainty why it did not manifest.

New items

Four items emerged during the data collection that were not addressed in the literature of the Metaverse and e-participation.

Arguably, the most significant item that emerged during the data collection is the added value of the Metaverse. All participants concurred that the Metaverse must offer something unique that other technologies cannot provide for the participatory process. If it fails to do so, or if it is incapable of adding value in the future, the participants deemed further development for municipalities unnecessary. While the literature discusses technology tools for e-participation, it does not emphasize the necessity for the Metaverse to distinctly differentiate itself from other technological tools for e-participation. This item appeared to be paramount for the participants, who expressed its importance multiple times.

Another notable item, albeit not directly linked to e-participation in the Metaverse as acknowledged by participants, is creativity. Municipal employees perceived the Metaverse environment as more inspiring than their real-world meeting rooms, sparking creativity. Interestingly, citizens did not provide any commentary on this item. While it was not specified how this could benefit e-participation in the Metaverse, the notion that the Metaverse could nurture creativity is intriguing.

Engagement motivation is another new item, contrary to encouraging citizen participation. One participant raised the point that while technology could indeed boost engagement, there was a concern about whether participants were engaging for the right reasons. This issue was not discussed in the literature, leaving it uncertain whether motivations other than genuine interest in the participation topic might be detrimental to the participatory process.

Fourthly, real-world disconnect was a prominent topic in both focus groups. One group emphasized the risk of losing personal connections, while the other was concerned about people losing their sense of the real world. Although the literature describes the Metaverse as a means of digitally connecting with others, participants primarily feared that it could diminish real-world connections, potentially impacting both participation and real-world communities. Putnam (1994) already stated that there was a decline in social capital due to technological advancements. The concern about losing a sense of the real world relates to the blurring of digital and physical realities, leading to uncertainty about what is true. This could have significant consequences such as challenges in distinguishing between virtual and real experiences, potentially affecting societal trust.

Thus, some items of the classification scheme did not emerge during data collection, while new items surfaced that were not previously identified. All other items were consistent with both the literature and the data collected.

UTAUT

Furthermore, it is crucial that citizens accept and use the technology. For instance, participants emphasized that the Metaverse must enhance the participatory process; otherwise, investing time and money in this endeavor would be useless. This aligns with the performance expectancy aspect of UTAUT, which suggests that user acceptance and usage depend on the belief that the technology will improve performance. However, it is also important that the effort expectancy, the ease of the use of the technology, is at an acceptable level, especially

for women, older people, and those with limited experience (Venkatesh et al., 2003). Participants expressed concerns about excluding the elderly or individuals with low digital skills from participating. Therefore, the technology must be easy to use for people from all demographics and with lower digital skills to be accepted and used. Moreover, the facilitating conditions must ensure that participants feel supported in their use of the technology. For example, users should have access to necessary resources and assistance with any technological difficulties (Venkatesh et al., 2003). Participants noted some technical limitations that could hinder the adoption of the Metaverse in the participatory process and suggested these issues should be resolved beforehand. They also mentioned that citizens would need guidance in using the technology. Thus, before the technology can be accepted and used, these technical limitations must be addressed to meet the facilitating conditions. Lastly, the construct social influence from UTAUT (Venkatesh et al., 2003) did not emerge during the observations or focus groups.

Furthermore, in figure 7, more challenges than opportunities are presented for using the Metaverse for e-participation. However, some of these challenges are not unique to the Metaverse but are common to the adoption of any new technology. Other technologies may also face technical limitations, as UTAUT highlights the importance of facilitating conditions for the acceptance and use of new technologies (Venkatesh et al., 2003). While certain limitations might be specific to the Metaverse, other technologies could have different limitations that also need to be addressed. Choosing not to adopt new technology due to technical limitations could result in a perpetual cycle where no new technologies are embraced, leading to a lack of innovation. This stagnation is far from a favorable outcome. Furthermore, digital skills as a challenge are not exclusive to the Metaverse. The ease of use is a crucial consideration for the adoption of any new technology, particularly for the elderly and individuals with low digital skills (Venkatesh et al., 2003). Thus, while digital skills present a challenge for the acceptance and use of the Metaverse, this issue is relevant to other technologies as well. Additionally, the challenge of engagement motivation may not be as problematic as it appears. While it is ideal for citizens to participate for the "right" reasons, getting them involved in the participatory process is valuable in itself. Initial participation can encourage further engagement in the future. In conclusion, while there are certainly challenges in using the Metaverse for e-participation, they are not insurmountable. The balance between opportunities and challenges may not be as skewed as it seems, and with the right strategies, these challenges can be effectively addressed.

6 Discussion

This chapter presents the conclusion. Furthermore, it delves into the theoretical implications, practical applications, and limitations of the study. Lastly, future research is suggested.

6.1 Conclusion

In this section, drawing upon the theoretical framework and the results, the main research question is answered: "*What are the opportunities and challenges of e-participation in the Metaverse?*" Before summarizing the opportunities and challenges, it is essential to highlight a crucial point about the added value of the Metaverse for the participatory process.

Firstly, utilizing the Metaverse for e-participation should genuinely enhance the participatory process according to the participants. Without demonstrable value-addition, its adoption by local governments may falter. The technology must add to the participatory process but must also be inherently different from other technologies used before in the process. A new participatory process in the Metaverse should not only make sense for the local governments who want to adopt it, it should also make sense for the citizens who they want to participate since Downs (1957) suggests that citizens make rational decisions to participate or not based on a cost-benefit analysis. Therefore, the satisfaction of participating should outperform the costs such as time, effort, money, and information gathering. The citizens should see the true impact of their e-participation in the Metaverse.

The potential opportunities of e-participation in the Metaverse, based on the observations of the VR experiences and focus groups, are citizen engagement, creativity, and address societal challenges. While creativity is somewhat of an outlier—mentioned more for the inspirational environment the Metaverse provides rather than its direct impact on e-participation—the other opportunities are closely tied to e-participation within the Metaverse. However, the inspirational environment of the Metaverse can work as a catalyst for innovative thinking and problem-solving beyond the conventional boundaries. Furthermore, the Metaverse's capacity to break down barriers and provide an inclusive platform for participation holds immense promise, particularly in enabling individuals with disabilities to engage fully and facilitating remote participation, thereby fostering a more diverse and representative discourse and potentially increase engagement due to its accessibility. Additionally, participants' enthusiasm for the technology suggests that citizen engagement could flourish, potentially attracting newcomers and serving as a crowd-pleaser. Furthermore, the Metaverse's visualization capabilities and immersive VR experiences felt real to participants. Municipal employees noted that these features could help citizens better envision municipal plans and contribute their own solutions. However, the visualizations and immersive VR should be as realistic as possible, akin to a digital twin, so that people feel like they are walking through the real Enschede instead of an animated version. However, the achieving this level of realism requires effort to bridge the gap between virtual and physical realities, demanding attention to further technological development. The immersive visualization aspect was frequently highlighted as a significant advantage by participants, second only to the added value the Metaverse brings to e-participation.

Using the Metaverse for e-participation also presents several implementation challenges. These include issues related to physical awareness and comfort, privacy and data misuse, real-world disconnect, technical limitations, digital skills, and engagement motivation. However, some of these challenges are not unique to the Metaverse but are common to adoption of any new technology. According to Venkatesh et al. (2003) new technology often face technological limitations which can be conquered by facilitating conditions and digital skills

are also always a consideration for the ease of use of a new technology. While certain challenges are well-documented in the academic fields—such as physical awareness and comfort, digital skills, technical limitations, and privacy and data misuse—others, like real-world disconnect and engagement motivation, are less discussed. Real-world disconnect is particularly concerning, as it could undermine the municipal employees' responsibility to ensure that all citizens can participate, have access to accurate information, engage meaningfully in the real world, and maintain their sense of security. Additionally, the underlying motivation for citizen engagement in the Metaverse must be considered carefully. Engagement driven by novelty rather than genuine interest may not lead to substantive contributions to participatory processes but could also inspire citizens to participate again. Finally, according to the participants, the Metaverse is not yet developed enough to be used ideally. For instance, the technology currently cannot accurately visualize a realistic enough Enschede in which municipal employees and citizens can interact effectively.

Thus, there are various opportunities and challenges for e-participation in the Metaverse. Several challenges should be addressed to fully benefit from the opportunities, some more difficult than others. For instance, an application must be developed that allows participants to navigate a digital twin of the municipality within the Metaverse. Additionally, technological limitations need to be resolved, and experts should be available during e-participation sessions to assist citizens with limited digital skills. These challenges are common to most new technologies but the challenges of privacy and data misuse, and real-world disconnection require more thorough consideration and study to determine effective solutions. In conclusion, there are important considerations before implementing the Metaverse in the e-participation process, but if these are adequately addressed, the Metaverse could be beneficial for e-participation.

6.2 Theoretical implications

The exploration of the Metaverse predominately resides in the social sciences and business domain. Most studies on the Metaverse are still focused on the creation of the Metaverse and general ethical issues. However, there has been no attempt to apply the Metaverse to an entirely distinct research area such as e-participation. By delving into the intersection of e-participation and the Metaverse, this study seeks to unearth potential challenges and opportunities for local government.

Furthermore, this study also contributes to the Metaverse and e-participation academic literature. For instance, it sheds light on concerns regarding the disconnection from reality and its implications for individuals and society, enriching the literature on the Metaverse. Similarly, it highlights the potential positive impact of VR technology on citizen engagement when utilized effectively, thus advancing discussions within e-participation research.

Apart from identifying opportunities and challenges for e-participation within the Metaverse, this study lays the groundwork for subsequent research suggestions, given its explorative nature. These potential research suggestions are given in section 6.4. Thus, this study will contribute to both the Metaverse and e-participation existing literature and potentially carve a new research avenue for its combination.

6.3 Practical implications

This research also offers practical valuable insights for local governments and other organizations. By understanding the identified opportunities and challenges, local governments can take proactive steps towards formulating an e-participation strategy to

harness the potential of the Metaverse. According to this research the engagement potential with visualization of the Metaverse is the most promising feature for effective participation in the Metaverse. The question whether the municipality should develop these applications themselves or outsource it to businesses remains unanswered, but further development is needed.

The following are examples of exploiting the Metaverse technology for e-participation but have not been realized yet. Firstly, citizens engage in VR policy simulations within the Metaverse, exploring the impacts of various policy decisions in immersive environments. They make choices and receive real-time feedback, which deepens their understanding of policy complexities. The simulations are regularly updated with new information and feedback to stay relevant and effective. Another example is a municipality using the Metaverse to create a virtual replica of the city in which citizens can explore proposed changes to urban planning, such as new parks, road layouts, placement of windmills, and provide feedback. They can see 3D models of proposed developments, walk through them, and suggest modifications, enhancing participatory urban planning. Another example is before implementing environmental policies, the government creates VR simulations showing the potential impacts of different policies, like reducing emissions or deforestation. Citizens can experience these impacts first-hand in a virtual setting, fostering a deeper understanding of the consequences and encouraging informed public discourse. Thus, aligning with participants' feedback on enhancing value through visualization and immersion, Metaverse technology can provide citizens with a better understanding of different choices by allowing them to experience them directly.

This also presents an opportunity for businesses and developers, as there is currently no existing application tailored for this specific use within the Metaverse. If they could develop an application that allows municipalities to select and visualize elements within their jurisdiction, they could stand to gain a significant clientele base. Furthermore, this potential application could be used for other sectors and organization such as construction companies.

Lastly, the study's implications align with broader initiatives, such as the European Union's Digital Europe work programme 2023-2024, which shows its relevance to the academic world and for practical application. As the EU focuses on developing VR/AR worlds, the study's outcomes become particularly relevant. The envisioned creation of a CitiVerse, a seamless and immersive environment for citizens and businesses, underscores the potential applications in virtual/real spatial planning, management, and navigation (EuropeanCommission, 2023). The study's insights could offer valuable inputs in this starting phase, contributing to the EU's ambitions and aiding in the realization of a harmonious and immersive digital environment for citizens, governments, and businesses.

6.4 Limitations
Despite the careful conduct and analysis of this research, the results should be interpreted with caution given the limitations of this research. Due to the sample size and composition of citizen participants, it is difficult to generalize the results of this study to the population. The study involved ten participants in total, comprising five citizens and five municipal employees. While twelve participants were initially intended, unforeseen cancellations occurred. Furthermore, the citizens who participated were all university or university of applied sciences students of similar age from the Netherlands. This excludes the perspectives of non-students and non-Dutch-speaking individuals. Therefore, this study is unable to generalize to the population.

Another limitation regarding participant selection is whether the appropriate municipal employees from Enschede were included. Participants belonged to IT, participation, or management teams. While participation team members understand the typical flow of participation meetings and IT employees may offer valuable insights into technology applications, the contribution of management employees might be less clear due to their expertise. However, the impact of this on the research results remains uncertain.

Furthermore, the data collection process was hindered by Wi-Fi connectivity, impacting the intended participation meeting in the Meta Horizon Workrooms application. Even though the participants still experienced the application and tested various features in the application, a participation meeting was infeasible. Participants were able to form opinions on the application and the potential for participation meetings in the Metaverse, but it might have skewed their opinions.

Moreover, there is a question about whether the appropriate Metaverse application was used during the data collection. Meta Horizon Workrooms application, still a beta application, was utilized, but participants indicated that an upgraded version of Teams is not what they needed. While users can draw on a whiteboard and use post-it notes, it is not yet possible to visualize complex elements, such as a neighborhood playground, in this application. If such visualization tools had been available during the focus groups, the outcomes might have differed, as many participants expressed a desire for more advanced visualization. Thus, a different application could have influenced participants' perceptions of the technology and its potential use in participatory processes.

Building on the previous limitation, it remains uncertain whether Meta will develop the primary Metaverse platform used in the future. While this research utilized Meta's Metaverse, another company might develop the dominant platform. Consequently, the opportunities and challenges identified in this research could vary if a different company's Metaverse technology is used.

6.5 Future research agenda

Since this study is explorative and its aim was not to generalize, there are various future research possibilities. These research suggestions are also partially based on the limitations.

Firstly, this study was not conducted to generalize to the whole population, given its small sample size comprising municipal employees and students. Expanding the sample size could reveal potential findings missed in this study. Additionally, as the citizen participants were exclusively Dutch students, exploring perspectives of non-student citizens, citizens from diverse backgrounds or older demographics could provide valuable insights on the matter. For example, it is a possibility that older demographics will have some kind of adversity towards e-participation in the Metaverse due to the gamification aspect (Thiel et al., 2016) or may experience more barriers to participate. Hence, further research along these lines could be beneficial.

Secondly, as indicated in the limitations, the application of the Metaverse for participation was solely examined within the context of local government. However, its implications for provincial or national government remain unknown. Considering potential variations in the utilization of the Metaverse across these government levels, conducting research to explore its

implications for them could yield valuable insights. Thus, another research avenue could be exploring participation in the Metaverse on provincial or national government levels.

Thirdly, the literature identifies e-participation technologies as a motivator for engagement, a view supported by participants in this research. However, one participant expressed concern that newcomers might be drawn to participate solely due to the novelty of the technology, rather than genuine interest. Further research should investigate whether participation driven by the appeal of novel technology affects the outcomes of participatory events.

As highlighted in the analysis, the notion of creativity was predominantly emphasized by municipal employees, suggesting that the Metaverse may indeed ignite creativity for them. Surprisingly, citizens did not mention this aspect at all. Further research could explore whether creativity also pertains to citizens and examine its potential role in e-participation in the Metaverse.

Lastly, one particularly intriguing outcome is the potential of visualization in the Metaverse to enhance participation. For example, envisioning the placement of windmills within the municipality or determining the location of playgrounds in neighborhoods. Although the concept of digital twin cities is not novel and certain aspects are already adopted by municipalities, this specific utilization remains unused. Particularly noteworthy is the ability for municipal employees to visualize potential outcomes for citizens. Therefore, further research is warranted to explore how municipal employees can generate precise and compelling visualizations in the Metaverse for citizens, thereby adding value.

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Appendices

Appendix 1 Focus group questions

The questions are based on the classification scheme in section 3.3 Measurement. The aim is to not steer the participants in any direction. Therefore, general questions are asked before and more specific questions after if there is little to no input as a back-up.

Since the data collection was in Dutch, the focus group questions are also in Dutch.

General questions
- Kan je je ervaring omschrijven / Wat vonden jullie ervan?
- Sprong er iets voor jullie uit tijdens de ervaring?
- Wat is jullie mening over de Metaverse?
- Wat vinden jullie van participatie in de Metaverse?

More in-depth questions
- Kunnen jullie de informatie van elkaar krijgen die jullie wilden? (Information deficit and public officials' skepticism)
- Zien jullie mogelijkheden voor participatie in de Metaverse (en welke)? (opportunities)
- Hebben jullie belemmeringen ervaart tijdens de Metaverse ervaring?
- Kunnen jullie belemmeringen voorzien voor participatie in de Metaverse in de toekomst?
  - o Belemmeringen met betrekking tot toegankelijkheid, financiële beperkingen, technologische beperkingen, digitale geletterdheid, nieuwe deelnemers; als er niks wordt genoemd hiernaar vragen (barriers)
- Zijn er volgens jullie risico's voor participatie in de Metaverse?
  - o Risico;s met betrekking tot privacy, gedrag, fysiek, fysiologisch (zelfvertrouwen etc.), digitale uitsluiting; als er geen risico's genoemd worden hiernaar vragen
- Wat vinden jullie van de technische kenmerken/toegankelijkheid? (technical parameters/access/digital skills)
- Wat vinden jullie van de effectiviteit van participatie in de Metaverse? (open discussions)

Appendix 2 Transcripts focus groups

The focus group was held in Dutch since all participants were Dutch. Therefore, the transcript is in Dutch.

Morning session

Onderzoeker
Oke, dan neemt die vanaf nu op. Eerste vraag: hoe was het?
Deelnemer 1
Oh, ik vond het best leuk.
Deelnemer 2
Heel leuk.
Deelnemer 3
Dit zou wel een uitkomst later zijn hoor. Dat je zo soort van in een ruimte zit, lijkt wel een beetje teams denk ik.
Deelnemer 4
Ik vind het zo vervelend dat je de gezichten van mensen niet ziet. Dus je weet echt niet wie het is. Bij teams heb je nog gewoon die video.
Deelnemer 3
Ja.
Deelnemer 1
Zeker als je nieuwe mensen gaat ontmoeten, dan ga ik denk ik heel moeilijk om. Als je dan vanuit de gemeente praat om te zeggen van goh, ik ben van de gemeente, moet je net dat poppetje maar onthouden, dat lijkt me wel lastig.
Deelnemer 2
Is dat niet aan te passen?
Deelnemer 3
Ik denk het wel.
Deelnemer 1
Zal altijd aan te passen zijn.
Deelnemer 4
Dus dat vond ik vervelend, dat je mensen niet kan aankijken.
Onderzoeker
En voor de rest de ervaring?
Deelnemer 3
Leuk
Deelnemer 2
Leuk, maar je moet er wel van houden inderdaad. Als je niet van gaming houdt, ervaar je misschien wel een drempel om het te gebruiken.
Onderzoeker
Ja, sprong er iets voor jullie uit waarvan je denkt nou, dat los van dat je elkaars gezichten niet kan zien dan, dat je denkt, nou, dit viel me heel erg op? Moeilijk te zeggen van die twee minuten gesprek.
Deelnemer 1
Nee, qua gesprek kun je dan niet veel zeggen. Maar ik denk als je zoals, ik weet niet meer wie dat zei, maar die ruimte zag er zo mooi uit. Als je bijvoorbeeld iets wil visualiseren. Nou, dat kan heel makkelijk met zo'n bril. En als je er dan ook doorheen kan lopen, doen volgens mij bijvoorbeeld een makelaar doet dat volgens mij. Dat zal je ook met dit soort beelden zou je dat ook gewoon toe kunnen passen op participatiebeleid. Dus ik denk dat dat heel mooi kan.
Deelnemer 2

Maar je moet het dan wel echt, want het blijft, het was nu een beetje een getekend beeld. Als het echt over bijvoorbeeld windmolens wil hebben, dan moet je echt wel een realistische omgeving waar je je windmolens dan in plaats dat mensen het wel kunnen herkennen. Ik weet niet of dat kan, maar dat vind ik toch wel interessant.

Onderzoeker

Daar zijn ze volgens mij onder andere wel mee bezig hoor om te ontwikkelen. Omdat je daar echt erin stapt en mensen kunnen visualiseren hoe een wijk er dan uit gaat zien, et cetera. Is ook, denk ik, een van de mooiere toepassingen kunnen zijn persoonlijk, want als je zo'n gesprek over ja, dat kan overal wel, zeg maar dat kan ook gewoon via teams maar.

Deelnemer 3

Ja, dat is de toevoeging ervan

Deelnemer 4

Ja dat zoek ik inderdaad ook wel heel erg. Wat is dan de toevoeging? Ook inderdaad van die rare dingen voor mij niet natuurlijk

Onderzoeker

Ja, ik moet zeggen, ik kan het zeg maar ook wel met je vinger doen, dan moest ik zeg maar instellen, maar al tegen jullie te zeggen dat je met je vinger kan wijzen en knijpen en dan selecteert het. Ik denk daar, ja begin ik allemaal niet aan, maar.

Deelnemer 4

Je bent heel indirect bezig. Alsof je een instrument hebt, alsof je het stokjes aan het eten bent. Er zit iets tussen. In plaats van dat je iets pakt, moet je met een andere tool iets doen, iets aanwijzen of aantikken of tekenen.

Deelnemer 2

Ik had wel. Ik ging zo'n ping pong bat pakken, had ik wel het idee dat ik die had. Zo'n balletje opgooien

Onderzoeker

Sorry, die heb jij dus niet gedaan helaas. Dat niet lukt, bij Deelnemer 4 ging het helemaal niet goed bij de tutorial.

Deelnemer 4

Nee, ik vond het wel leuk dat dat je wel de stemmen hoorde van iedereen. Daaraan herkende ik wel de rest.

Deelnemer 1

Heel goed, heel scherp ook.

Deelnemer 3

Alsof ze echt in de ruimte waren ook.

Deelnemer 2

Ik weet niet of je dit ook bij gemeenteraadsvergaderingen met al die gemeenteraadsleden ook zo'n VR bril als je het over windmolens hebt. Of je dan ook aan inwoners weer erbij kan laten komen. Moet je natuurlijk weer zo'n opstelling hebben.

Deelnemer 3

Dat wel ook met tijd van mensen en als mensen ver weg wonen.

Deelnemer 4

Ja dat iedereen mee kan doen, ook vanuit huis. Maar er niet naartoe hoef te gaan.

Deelnemer 3

Dan is inderdaad de vraag, wat is het voordeel ten opzichte van teams? Alleen de inkijk in dingen, denk ik ja.

Deelnemer 2

Visualisatie.

Deelnemer 3

Precies.

Deelnemer 1
Plaatje ja.
Onderzoeker
Dus jullie zien wel mogelijkheden erin?
Deelnemer 3
Denk het wel. Ik denk dat dit later wel steeds meer gaat gebeuren.
Deelnemer 1
Ligt eraan in wat moet je de mogelijkheden zien? In het vergadergedeelte of?
Onderzoeker
Ja gewoon in het algemeen in participatie en dan in zo een metaverse wereld. En dan kijk we hebben nu de app dan gebruikt omdat ik die ter beschikking had dat je dan vergadert. Maar stel, ze gaan verder ontwikkelen en je kan de windmolens zien of waar dan een speeltuin wordt geplaatst. Bijvoorbeeld om even zelf een voorbeeld noemen om verder te denken, hoor.
Deelnemer 1
Dan wel. Als het echt doorontwikkeld wordt en dat je het visueel voor je hebt dan is het een van de beste mogelijkheden die er is. Dan kun je gelijk zien wat er gebeurt, wat er met jouw wijk gebeurt. Maar zo'n teams meeting zoals net, kan je beter bij teams houden denk ik dan.
Deelnemer 3
Ja, vooral omdat je de mensen dan kan zien.
Onderzoeker
En dien jullie ook nog dat je denkt, nou, dat zou een belemmering zijn om te participeren zo via deze manier?
Deelnemer 4
Slechte wifi. Je moet wel eerst zo'n tool, hoe de tool werkt, met zo'n bril. Dat het allemaal werkt. Het moet het allemaal doen.
Deelnemer 3
Ik weet niet hoe het met jullie was met een bril?
Deelnemer 2
Niet, het besloeg de hele tijd, maar dat kwam ook door het weer denk ik net. Dus dat is belemmerende factor.
Deelnemer 4
Ja, dat klemt allemaal inderdaad.
Onderzoeker
En jij zei toegang?
Deelnemer 1
Nou gewoon. Als je met mensen wil participeren moet je wel genoeg brillen hebben en die dingen zijn niet goedkoop denk ik. Dus het is wel een dure optie voor een visualisatie zoals ik het merk.
Deelnemer 2
Wel ja, maar als je een zo'n ruimte in zou richten in de wijkgebouwen ofzo en je nodigt mensen uit van he, we gaan jullie speeltuin bouwen en kijk met ons mee, geef je mening.
Deelnemer 1
Ja maar dan ook niet per se, want de microfoons. Je gaat dan elkaar door elkaar heen horen. Het moet wel in die aparte ruimtes zitten. Dan ga je elkaar dubbel horen.
Deelnemer 4
Elkaar muten enzo?
Onderzoeker
Ja je kan wel muten en zo hoor, maar ja, als je dan toch praat, dan hoor je het toch dubbel. Stel Deelnemer 1 zegt wat en we zitten allemaal in die ruimte. Daarom heb ik jullie ook allemaal apart gezet wat je anders elkaar dubbel gaat horen als het ware. Hetzelfde als je met

elkaar gewoon in een teamvergadering zit, want het geluid wel gewoon uit die headsets door blijft komen.

Deelnemer 3

Ja, het is dan misschien beter om dan inderdaad dingen te laten zien aan mensen. Dus de bril opzetten en zeggen, zo komt het eruit te zien, maar dan de vergadering wel real life.

Deelnemer 4

Ja, zolang dat nog het geval is met het geluid.

Deelnemer 1

Dat je eigenlijk gewoon, net zoals dat wij net hadden, zo'n introductie gedeelte en dan de vergader gedeelte, wat dan net misging, dat je dat dan gewoon zo doet? Zo kan het wel. Voor de visualisatie, dan zit je er wel echt in.

Deelnemer 2

Dan loop je erdoor.

Deelnemer 4

Wij konden nu niet bewegen of kon je opstaan?

Onderzoeker

Ja je kon ook opstaan. Nou ja, kijk jij zat precies in de app waar je niet, waarbij je aan een bureau zat, hoor, maar zij hebben ook echt moeten staan en weet ik veel allemaal.

Deelnemer 3

Jij zat ook lager voor mijn gevoel.

Onderzoeker

Ja jij zat wel heel laag. Dat klopt.

Deelnemer 4

Nou als je er doorheen kan wandelen.

Onderzoeker

Ja dus dan zouden ze echt dus nog verder moeten ontwikkelen op bepaalde gebieden wil je daar iets aan hebben?

Deelnemer 4

Ja, voor de voordelen opwegen tegen de nadelen.

Onderzoeker

Ja precies, want wat vinden jullie voor de rest een nadeel?

Deelnemer 3

Ja bijvoorbeeld je kan er dus wel misselijk door worden. Ik denk, ik zou niet heel lang achter, in zo'n VR bril willen zitten, dus dit was prima. Maar als je bijvoorbeeld de hele dag door vergaderingen hebt, ik zou niet de hele dag door in een VR bril kunnen zitten.

Onderzoeker

Ik ook niet hoor, maar je went eraan.

Deelnemer 3

Ja, misschien dat wel.

Deelnemer 4

Als die verbinding minder werd, kwamen er van die zwarte wolken en werd je echt misselijk inderdaad. Ja, dan doet die heel veel op je hersenen.

Onderzoeker

Ja omdat je er zo in zit als het ware. Omdat het voor de rest stopt zeg maar.

Deelnemer 4

Ja hij beweegt dan ofzo anders. Dan was het echt even naar.

Onderzoeker

En voor de rest kunnen jullie nog nadelen bedenken voor in het algemeen? Stel je zou zelf mee willen doen als burger, maar of vanuit de gemeente? Dat maakt het lastig of dat kan eigenlijk niet.

Deelnemer 3
Nee, je moet wel zo'n cursus hebben om even te begrijpen hoe zo'n ding werkt.
Deelnemer 1
Als je dat met 40 man moet doen, dan heb je wel veel begeleiders voor nodig, denk ik uiteindelijk. Zeker als je participatiebijeenkomsten gaat houden, komen er ook vaak heel veel oudere mensen op af, dus 70, 80 plus. Het kan ook nog een drempeltje zijn, zeg maar hoe hun daar de weg in vinden.
Deelnemer 4
Wordt het altijd opgenomen dan?
Onderzoeker
Nee, je kan het dus zelf opnemen. Je kan hem dus zelf, zeg maar casten naar je scherm en dan kan je bijvoorbeeld hier opzetten of dan kan je een schermopname maken, maar het wordt niet automatisch opgenomen.
Deelnemer 4
Bij de raadsvergaderingen worden ook altijd opgenomen en transcriptie en zo.
Onderzoeker
Maar je kan dan ook wel weer in bepaalde apps wel een bepaalde apps niet. Bijvoorbeeld toen ik probeerde in te bellen, wat dus ook niet lukte, wat wel de bedoeling was, dan kan je niet tegelijkertijd casten naar een scherm. Dat doet hij dus niets, dus dan moet je bijvoorbeeld in een bepaalde applicatie tot ze in workrooms dan kan je wel het casten nou ja, scherm. Maar als je bijvoorbeeld ondertussen belt, dan gaat dat dus weer niets.
Deelnemer 3
Ja, maar ik denk dat hij met die jaren nog gaat verbeteren. Al die kleine puntjes.
Onderzoeker
Die was ook nog de beta versie van die app namelijk ja. Al sinds 2020 is de beta versie, maar ze zijn er nog mee bezig.
Deelnemer 3
Dat moest ook wel.
Onderzoeker
Dus jullie wel bepaalde effectiviteit alleen wel echt met randvoorwaarden dat het eerst soepel moet lopen?
Deelnemer 2
Ja, voor mij zo'n realistisch mogelijke verbeelding van de omgeving. Ik denk dat dat het meeste effect heeft. Dat dat zijn dan 3d opnames van een hele stad, dus dat ik echt de steden ziet. Maar dat is best wel heftig denk ik als je dat wil realiseren.
Onderzoeker
Dat je echt een digital twin als het ware aan het maken bent van een wijk of van de stad of iets dergelijks.
Deelnemer 2
Ja, of van een speeltuin en de woningen eromheen. Het zou kunnen, we gebruiken het al voor de bodem. Dus als je iets in de grond wil doen.
Deelnemer 3
Ik denk ook wel nog een voordeel kan zijn is ja. Het is wel tegenstrijdig ook weer, maar je hebt natuurlijk als je dus een hele dag thuiswerkt met zo'n bril je kan wel veel staan. Veel bewegen door het park wandelen en dan werken, want je hebt die bril op en dan kan je gewoon aan het werk.
Onderzoeker
Je hebt wel die rand he. Je kan wel een stukje lopen, maar op een gegeven moment loop je tegen die muur op.
Deelnemer 3

Ohja dat werkt niet nee.

Onderzoeker

Ik snap wel wat je bedoel, want je hebt het idee dat je ergens anders loopt, maar je kan twee stappen zetten. Je hebt in de ruimte naar voren en naar achteren enzo, maar ja, als jij echt fysiek gaat wandelen. Daarom heb je die rand. Daarom zie je opeens zo'n zwart en allemaal van die lijnen van misschien moet je nu stoppen want anders knap je tegen iets aan.

Deelnemer 1

Je hebt wel, dat heb ik wel eens op een filmpje gezien van die loopband en. Die zijn nog machtig duurder. Ja je staat op zo'n loopband en dan kun je gewoon alle kanten op lopen en je blijft op een plek staan, maar voor jezelf bewegen.

Deelnemer 4

Ja, ik vond het wel eng dat ik inderdaad niks meer kon zien. Dus elke keer als je wat nodig had of je wilde even weten wat in het fysieke wereld gaande is.

Deelnemer 3

Dan niet dat ze ineens tegen de muur aan knalt.

Deelnemer 4

Dat je wel heel afgesloten bent van de fysieke wereld.

Onderzoeker

Ja, onder andere daarvoor heb je die rand, maar ik moet ook zeggen, Ik vind het ook een beetje een gek gevoel hoor eerlijk gezegd.

Deelnemer 4

Probeer ook de hele tijd onder die bril door te kijken. Dat is natuurlijk niet de bedoeling.

Deelnemer 3

Vooral als jullie wat zeiden, dacht ik ook wacht waar ben je.

Onderzoeker

Oh ja sorry, als ik natuurlijk even wat kwam zeggen zien jullie mij natuurlijk niet.

Deelnemer 3

Nee ik vond het niet erg hoor.

Deelnemer 4

Ja dat soort dingen. Ik vind het wel qua veiligheid, het gevoel van veiligheid.

Deelnemer 1

Het is ook even wennen. Je doet het allemaal voor het eerst.

Deelnemer 4

Jij vond het wel fijn?

Deelnemer 2

Ja, ik had het wel naar mijn zin. Ik was naar die knop aan het zoeken, maar die zat dan helemaal ergens anders.

Onderzoeker

Ja, je kan zeg maar wel als je een knopje indrukt en dan weer indrukt, dan komt hij wel weer voor je neus hoor. Maar ja, dat zijn ook allemaal dingen waarbij je op gegeven moment word je daar handiger in en dan vind je het ook minder erg als je een bril. Want ik werd eerste keer na 5 minuten al misselijk. Op een gegeven moment, als je dan half uur inzit na een paar keer, dan is allemaal niet zo heel erg meer. Maar ja, dat moet je dan ook maar net zo doen. En je moet inderdaad ook wel überhaupt prettig vinden om afgesloten te zijn.

Deelnemer 3

Ik zou ook wel een eigen kamer willen op slot. Niet dat iemand opeens hoi en naast me staat.

Deelnemer 4

Je hebt nu ook die augmented reality waarbij je beide ziet dus Ik weet niet of dat.

Onderzoeker

Dat heb je nu met die Apple vision pro. Ik weet niet of je dat hebt gezien, maar dan zet je ook zo'n bril op, maar dan kijk je er nog doorheen. Zeg maar, dan heb je gewoon van die browser schermen wat je neer kan zetten, maar dan zie je wel nog wat er gebeurt en je hebt ook die functie wel hierop hoor dat je passthrough hebt is maar dan zie je dus grijs, dus die we alles om je heen. Alleen kan je intussen dus niet echt een applicatie in.Dat klik je dan alleen even aan om even snel je omgeving te zien, maar voor de rest kan je dan niet tegelijkertijd.

Deelnemer 1

Even checken sta ik nog in mijn eigen huis?

Onderzoeker

Ja, dus het kan wel. We zitten trouwens ook op de tijd. Heel erg bedankt voor alle input.

Afternoon session

Onderzoeker

Ik heb eigenlijk mijn paar open vragen, want het gaat er voornamelijk om wat jullie vinden en dan kijken ik later wel of de theorie dat ook zo beschrijft of is het iets heel anders. Eerste vraag: wat vonden jullie ervan?

Deelnemer 5

Ja jammer van de internetverbinding, want het zag er wel heel gaaf uit zeg maar.

Deelnemer 6

Ja de tijd die ik had in connectie dat ik echt wow. Ja, ik vond het wel heel gaaf. Het was simpel wat we deden, maar wel heel erg leuk. Vliegtuigje gooien enzo. Of die raket waar je dan aan moest trekken en die moest ik dan wel loslaten want straks knalt die nog.

Onderzoeker

Hij kan niet je gezicht eraf knallen he, want zo realistisch is het ook niet.

Deelnemer 6

Nee, gelukkig maar

Onderzoeker

En de rest?

Deelnemer 7

Nou, Ik ben vooral benieuwd wat het wat de mogelijkheden zijn, dus ik zit vooral vanuit mijn werk ook te kijken van ja en hoe dan, wat kan het nog meer? Want ja, blokje oppakken en zo is hartstikke leuk en vergadering in de Cariben is ook heel erg leuk, maar wat gaat er nog meer, hè? Wat is echt die toegevoegde waarde ben ik wel benieuwd naar.

Onderzoeker

Daar was ik met de andere ook naar op zoek kijken van denken jullie dat het toegepast kan worden wat de mogelijkheden zijn, want kijk, die tutorial doen we voornamelijk omdat we maar even vanuit gaan dat niemand echt ja, Deelnemer had er een beetje ervaring mee, maar niemand had echt ervaring had met een VR bril en dat je niet weet hoe het werkt en dat je even iets kan voorstellen van dat je gewoon alles om je heen zo kan aanpassen. En dan hebben we dus die workrooms gaan om even te kijken van Dat is echt heel erg de basis en dan ligt dat jullie zelf kunnen nadenken van jullie werk van nou helemaal vanuit de fantasie. Wat kan je er nog meer mee? En dan even kijken of het ook werkt, etcetera, want Wij hebben vanmorgen een bijvoorbeeld daarover gehad, maar.

Deelnemer 8

Nou ja, voor mij de zeg maar, de meeting room zag er heel mooi uit enzo, maar het voelt nog wel een beetje als een soort van Team 2.0. Ik kan me wel voorstellen dat je daarin meetings of zo organiseert en ook wel dat het extra dimensie geeft ten opzichte van gewone alleen dat platte beeld en je kan denk ik zag ik zo ook opstaan en naar het bord lopen en dat dingen optekenen. Dus je hebt wel een soort van fysieke bijeenkomst, hè? Terwijl je wel allemaal op

één plek kan zitten. Dus ik denk ook vooral van multinationals en zo ja, die allemaal weer hoofdkantoren over de hele wereld hebben dat dit echt ideaal is dat je elkaar eigenlijk bij een soort van echt kan zien zonder dat je echt in dezelfde ruimte zit. Op lokaal niveau wil je mensen eigenlijk wel in de ogen aankijken? En dat heb je natuurlijk toch niet hè? Met zo een avatar en ik vond het heel eerlijk gezegd ook wel een beetje eng. Ik dacht serieus, hé, dit is gewoon de matrix nee maar echt serieus. Ik bedoel, als die graphics nog even iets realistischer zijn, dan weet je gewoon niet meer. Ik dacht ik wil zo'n woonkamer met die bergen. Ja, Ik wil dit als werkkamer. Ik bedoel ik heb best een aardige werkkamer, maar ik dacht, ja, Ik wil ook hier zo zitten. Als de graphics nog mooier zijn, dan kan ik me voorstellen dat je daar bijna liever op gegeven moment zou willen zijn. Ik vond het wel een beetje eng.

Deelnemer 9

Dat is niet de matrix he, dat is ready player one. Ik weet niet of je die kent.

Deelnemer 8

Nee.

Deelnemer 9

Dat is een supergoed boek en film waarbij de mens liever in deze wereld zit dan in de werkelijke wereld. En dat merk je wel, je gaat er wel in geloven vind ik.

Deelnemer 8

Een soort escape ofzo.

Deelnemer 9

Ja, het wordt gewoon de werkelijkheid.

Deelnemer 8

Ja, get is echt een nieuwe werkelijkheid, een andere werkelijkheid.

Onderzoeker

Maar vind je dat positief of negatief?

Deelnemer 8

Nou, ik vond het dus vond het mooi maar ik vond het ook eng dus.

Onderzoeker

En de rest?

Deelnemer 9

Ja ik vond het wel vooral mooi. Ik kan me er wel voor bij voorstellen dat je inderdaad ook toepassing hebt dat je bijvoorbeeld zegt van nou we gaan met het Stationsplein helemaal veranderen en we willen laten zien hoe dat uit kan zien. Nou, we gaan eerst de variant een eens met zijn allen rond wee lopen even rond en variant twee. Dat doen we nu al met filmpjes, dan kun je dat allemaal laten zien met maquette en zo, maar dat zou je kunnen zeggen je loopt er echt doorheen.

Deelnemer 8

Je hebt een veel beter gevoel van waar je ja tegen zegt of niet.

Deelnemer 9

Je gelooft er wel echt in, dus ja ik vind het wel gaaf.

Deelnemer 6

Ik vind het wel een goede toepassing. Ik had er nog helemaal niet zo over nagedacht maar was vooral inderdaad dan zit je met die raketten enzo en dan ja, het leek echt even ook alsof ik in een droom zat, want Ik heb altijd hele vreemde dromen, dus dat heeft daar wel wat van weg. Nee ik ben natuurlijk gewoon nog op de universiteit.

Onderzoeker

Maar zou je dat dan ook, want ook onder andere in de theorie en zo van dat eventueel mensen het wel of niet een reden vinden om mee te doen, zou je het een plus vinden als je dan zal de gemeente dacht ik even dat je meedenkt over waar we de windmolens plaatsen dat je er even

doorheen kan lopen of dat bij je in de wijk komt? Vind je dat dan leuker dan dat je naar een presentatie kijkt en dat je op zo'n plattegrond ziet daar komt het.

Deelnemer 6

Ja echt wel, veel leuker en interessanter.

Deelnemer 7

Voor je visualisatie natuurlijk fantastisch. Dat hebben ze ook al wel in die woning programmas, hè dat je met een VR bril het nieuwe huis kijken. Eigenlijk kun je dit anders zoeken als soort. Dan kan ik me voorstellen dat je het in een grotere toepassingen doet.

Onderzoeker

Dus dat zijn dan wel voordelen eraan. Zien jullie ook iets waarvan je denkt dat vind ik helemaal niks? Ja, jij vindt het een beetje eng.

Deelnemer 8

Ja nou ja, het kan ook echt wel een vlucht zijn.

Deelnemer 9

Noem eens wat je eng vindt.

Deelnemer 8

 Ja, er ontstaat zeg maar echt een parallelle wereld. Dat is natuurlijk al wel hè met online is er al een soort van parallelle wereld aan het ontstaan. En wat is nog waar en dat wordt nog onduidelijker, dus ja, ja, en dan ja weet ik niet. Ja, gaat iedereen dan zo'n bril opzetten of gaan er ook altijd mensen zijn die niet zo'n bril opzetten? Ja, ik weet niet, ik vind het ook wel beangstigend of zo.

Onderzoeker

Heb jij nog iets deelnemer, jij hebt er al iets meer verstand van.

Deelnemer 10

Iets van niet nice is of?

Onderzoeker

Ja, het mag beiden.

Deelnemer 10

Het voelt sowieso chill gewoon in die kamer. Ik deed niet echt veel, maar gewoon de omgeving was mooi. Toen ik het afzette dacht van oh shit.

Onderzoeker

Niet een hele inspirerende kamer moet ik zeggen waar ik jullie in heb gezet, sorry

Deelnemer 10

Met die bril op leek het wel gewoon alsof ik aan het strand zat. Dus dat was nice. Wat een nadeel misschien was is dat iedereen dat maar voor alles gaat gebruiken en dan terwijl het niet per se nodig is zo. Niet dat je iets wil laten zien dat je iets in je tuin hebt gedaan dan zeggen, oh ja, zeg maar die bril op en dan het zo ziet.

Onderzoeker

En dan een beetje het menselijk contact of zo wat dan mist of?

Deelnemer 10

Ja zoiets of gewoon dat het onnodig is om alles maar via zo'n bril te doen waardoor het doorslaat.

Deelnemer 9

Wat jij noemt he dat mensen nu al de gekste dingen geloven, hè? Je kunt mensen dingen laten zien en ze gaan aannemen dat het de werkelijkheid is. Dat is wel "ik heb het zelf gezien?"

Deelnemer 7

Op een gegeven moment weet je misschien niet meer wat je hebt gezien via zo'n bril.

Deelnemer 8

Ja, wat heb je op een gegeven moment nog echt van gezien, was het een droom of was het in die metaverse?

Deelnemer 8
Ja, dat zal wel goed heel kunnen
Deelnemer 8
Ja en dit is natuurlijk ook, dit is Facebook, Metaverse?
Onderzoeker
Ja Meta, dus Facebook
Deelnemer 8
Ja kijk, Facebook staat natuurlijk niet echt heel goed te boeken hè wat dat betreft met beïnvloeding van verkiezingen en allerlei rare algoritmen die mensen in fuiken drukte enzo.
Deelnemer 7
Nou, dat onbewuste dat ze dat meegeven via bepaalde plaatjes of zo, hè?
Deelnemer 8
Ik vind het heel tof maar ook altijd heel spannend.
Deelnemer 9
Staat er opeens een flesje Coca-Cola.
Deelnemer 8
Product placement inderdaad
Onderzoeker
Deelnemer, wat vond jij?
Deelnemer 5
Ik vond het wel gaaf om daarin te zitten, maar ik kan me niet voorstellen dat hier een meeting van een uur of zoiets in zou houden, want ik op een gegeven moment merk je het ook wel aan je hoofd een beetje. Het is wel een gewicht op je hoofd. En ik vond zelf ook misschien iets beter gekalibreerd worden met je bureau, want op een gegeven moment ging ik zo met mijn hand door het bureau heen. Toen dacht ik oh, eigenlijk moet ik meer naar voren om op het bureau te zitten en zo. Het matcht nog niet helemaal lekker met je omgeving eigenlijk. Je zou ook alles eigenlijk digitaal moeten hebben als je bijvoorbeeld een papier of zo dit kan bijvoorbeeld niet lezen terwijl ik in die ruimte zat.
Onderzoeker
Ja, dat heb ik dus niet gedaan, want het is heel lastig, maar je kan zeg maar ook je eigen laptop erin plaatsen en dat je dan documenten ziet. Maar ik denk dat wordt wel heel technisch lastig nu, maar dat is een mogelijkheid. Maar ben met je eens als je gewoon iets op papier schrijft dat wordt lastig.
Deelnemer 8
Nou ik zag wel op mijn bureaublad was een vak en daar kon ik op gegeven moment op een knopje drukken met een oogje en toen werd het doorzichtig en toen zag ik in zeg maar, mijn virtuele hand en mijn gewone hand. Toen zag ik echt mijn gewone hand weer weliswaar in zwart wit en een beetje pixelig, dat zag ik wel van oh, hier dus kan ik ook op dit stukje weer iets echt is doen en dan kan ik daar weer door virtuele wereld.
Deelnemer 9
Ja, dan kan je in allebei tegelijkertijd.
Deelnemer 7
Ik denk dat dat ook wel een mooie uitkomst is in die kale ruimtes die wij ook zo kennen bij ons stadskantoor en stadhuis, dat we in het geval van brainstormsessie zo'n bril op zetten. Ik denk dat we weet ik veel wat van ideeën krijgen.
Deelnemer 8
Ik denk wel inderdaad creativiteit misschien wel aanwakkert.
Deelnemer 7
Want dat mis ik nu ook echt. Dat ik zoekende ben naar een ruimte wat die creativiteit aanwakkert nou ja dat vindt je haast niet.

Deelnemer 10
Dan kun je in de Alpen gaan zitten
Deelnemer 7
Ja bij wijze van.
Onderzoeker
Hebben jullie ook nog de achtergronden aangepast? Ik weet niet of jullie dat hadden gezien, maar je kon nog allemaal andere achtergronden kiezen.
Deelnemer 8
Je hebt wel mijn avatar nieuwe kleding gegeven.
Onderzoeker
Oh ja, dat is helemaal goed. Ja, Ik had standaard avatars gedaan, want ja ik weet niet wie er komt en wie dan ook welke bril opzet. Zijn die ook dingen waarvan je denkt, nou dat belemmert eigenlijk niet per se een nadeel dan denk ik dat belemmert eigenlijk om het in te zetten voor participatie. Dat je denkt, nou, dat maakt het lastig kan zijn als je de bril ophebt maar ook daarbuiten, hoor.
Deelnemer 9
Ik zie het eigenlijk toch nog wel als iets van de toekomst. Ik zie hem eigenlijk nog niet echt toepasbaar. Als ik zeg dat ik enthousiast ben, dan is het meer dat ik denk van over zoveel jaar als dat ding niet meer zo zwaar is, als iedereen zo'n ding in huis heeft. Wat natuurlijk nog lang niet zo nog niet zo ver is hè. Dus als ik praktisch zie hoe je het nou kan toepassen, zou er inderdaad zijn dat je mensen in een kamer zoals deze bij elkaar roept dus dat is bijna niet praktisch voor te stellen. Je zou er dan echt al naartoe moeten dat dat iedereen zo'n ding in huis heeft.
Deelnemer 7
Zoals een iPhone zeg maar.
Deelnemer 9
Ja dat het echt ingeburgerd raakt. Ja, en dat het ook nog een stuk beter werk in zekere zin, want dan zijn er inderdaad nog wel haken en ogen.
Deelnemer 7
Ja zeker als je veel mensen op een bepaald wifi netwerk gooit. Als die randvoorwaarden allemaal goed zijn en iedereen kan ook zo'n bril op van jong tot oud, want dat dat vraag je eigenlijk ja, want participatie is van jong tot oud met alle gebreken die een mens kan hebben.
Deelnemer 8
Ja, het is op zich wel gebruiksvriendelijk. Ja, nogmaals je kan mensen zo'n bril opzetten in een gecontroleerde setting om bijvoorbeeld een na een verbouwing of iets te tonen. Maar je kan als mensen dus het inderdaad echt thuis hebben en het is allemaal heel makkelijk en toegankelijk. Ja, dan zou je ook mensen op hun eigen locatie en dan toch een meeting kunnen houden.
Deelnemer 9
Ja precies, dus als je praktisch kijkt naar hoe je het participatief in zou kunnen zetten, dan denk ik dat het nog wel eventjes verder is
Deelnemer 8
Ja, misschien dat je nog zo'n windmolen of zo'n verbouwing dat je dat nog zou kunnen doen nu, maar voorlopig heeft nog niet iedereen zo'n ding in huis.
Deelnemer 7
Misschien wel bij de organiseren van bepaalde omgevingsplannen enzo. Mensen moeten dan wel naar locatie komen om informatie te delen.
Deelnemer 8
Ja, daar kan je het wel toepassen.
Deelnemer 7

Dat zal toch heel erg leuk dat je zo'n plan kunnen presenteren op deze manier.

Deelnemer 9

Dan is er nog natuurlijk het tijdelijke effect dat mensen het doen omdat ze het zo cool vinden, hè dus? Dan krijg je wel een bepaald type mensen denk die dit inderdaad cool vinden, dat zijn wij blijkbaar ook. Maar er zijn ook veel mensen ook denk ik die dit inderdaad maar eng vinden. Die denken oh dit is niks voor mij.

Deelnemer 7

Wil ik dit? Wat blijft er achter op het internet?

Deelnemer 8

Ja om je helemaal over te leveren omdat ze eventueel alles al weten is ook weer zo wat.

Deelnemer 7

Dus Ik denk dat daar inderdaad wel een knelpunt zit. De angst om hiermee aan de slag te gaan.

Deelnemer 8

Toch ook dat het van Facebook is wel, want die hebben nou niet echt een goede naam?

Deelnemer 9

We zijn als gemeente juist ook heel erg alert op digitaal leuk en aardig, maar we moeten ook altijd zorgen dat we de mensen die het niet kunnen dat we die net zo goed bedienen, dus dat moet je hier ook wel bij doen.

Deelnemer 7

Het zou een mooie kers op de taart zijn bij zo'n bijeenkomst. Dat je zegt van nou, we gaan presenteren zo en nu gaan we wandelen voor degene die het willen.

Onderzoeker

Dat je echt visueel kan zien voor de mensen.

Deelnemer 9

Het zou een leuke publiektrekker kunnen zijn.

Deelnemer 7

Oh, dat lijkt me hartstikke gaaf.

Onderzoeker

Dan komen er misschien ook wel jonge mensen er naartoe bent. Ik weet niet of jullie dat nu vaak hebben, maar als je ziet hoeveel plezier Deelnemer had.

Deelnemer 7

Heb je enig idee, want je moet het ook natuurlijk allemaal digitaal ontwikkelen voordat je iets kunt laten zien. Wat dat meebrengt, want wie gaat dat doen?

Deelnemer 9

Ja daar heb je developers voor.

Onderzoeker

Ze zijn nu ook nog heel erg aan het ontwikkelen hoor, want ze zitten echt miljarden in te stoppen. Niet Alleen Meta, maar ze hebben ook andere bedrijven. En ze zeggen echt dat het next big thing is, maar omdat ze dus al zoveel erin aan het stoppen zijn, willen ze echt dat het lukt. Alleen zoals je ziet en nu hebben ook nog eens een keer 1 bèta applicatie gedaan, want Workrooms is nog niet helemaal volledig klaar, maar je hebt wel een paar dingen die dat wel zijn. Je hebt ook dat Horizons World en dan kan je nog gewoon er doorheen wandelen als een soort van sims en dan kan je concerten zien en dan kan je gamen met elkaar over de hele wereld etcetera. Stel je wilt een digital twin maken van bijvoorbeeld Enschede voor een wijk voor een speeltuin bouwen. Dan moet dat wel eerst ontwikkeld worden. Ze zijn nog niet zo ver, ze zijn nog in de fase van je kan er leuk mee gamen etcetera, maar voor de publieke sector moeten ze nog verder ontwikkelen.

Deelnemer 7

Dan praat je dus echt wel over jaren.

Deelnemer 6

Het klinkt wel interessant wat je zegt. Het is ook nog echt wel game purpose. Het is wel echt super leuk dat je zelfs in de sims zit.

Onderzoeker

Ja, maar je hebt ook echt heel erg veel Mensen die van gamification houden hoor en daardoor kan het wel heel erg werken. Dat het dan leuker maakt.

Deelnemer 8

Daarom dacht ik ook wel, Ik wil eigenlijk wel een gewoon alleen voor het gamen.

Deelnemer 6

Ja echt. Dan zou ik er wel een beetje verslaafd aan raken denk ik.

Onderzoeker

Gegeven moment kan je ook misselijk worden hoor, dus op gegeven moment is het ook wel genoeg.

Deelnemer 7

Hoe duur is zo'n bril eigenlijk?

Onderzoeker

Die Meta Quest 2 brillen zijn rond de €300. Dit is zo'n pro, maar die wordt voornamelijk door developers gebruikt. Die zijn €1200. Dus ja, ik koop dit niet voor mezelf thuis. Ik weet niet wat jullie daarvan vinden?

Deelnemer 8

Jawel, maar op zich hè? Een gamecomputer PlayStation dat zijn ook ook wel dat soort bedragen.

Deelnemer 6

Ja en hij doet het wel gewoon goed.

Onderzoeker

Ik moet zeggen, hij werkt er thuis echt beter. Als je een beetje stabiel internet hebt.

Deelnemer 6

Ja dat geloof ik graag, maar ook gewoon hoe het eruit zag inderdaad, hoe die kamer een beetje afgebakend was enzo.

Deelnemer 8

En dan heb je een facebook account nodig?

Onderzoeker

Ja ik heb dit allemaal apart op gmail accounts, want ik wilde niet allemaal op mijn privé mail hebben en ik heb die van mezelf om mijn studenten mail gedaan. Dat vind ik prima, maar je moet dus wel of je maakt een Facebook account, maar daar wilde ik het niet aan gekoppeld hebben, of Je moet even een aparte e mail daarvoor aanmaken. Ook om het te connecten met je telefoon en dat je erin kan. Dus het is niet dat je zo'n ding koopt en kan opzetten en je kan meteen kan gaan.

Deelnemer 8

Nee, het is niet plug and play. Je moet wel even wat verbinden en zo ja.

Onderzoeker

Ja en ook en dat kost natuurlijk allemaal geld als je apps wil kopen in de store. Sommige zijn gratis, maar je ontkomt er niet aan.

Deelnemer 9

Ja, ik ken wel een bedrijf en dat lijkt hier een beetje op, maar dat gaat dan gewoon op een laptop of computer. Die zetten, zeg maar een pleintje zetten ze dan 3D in de ruimte en een beetje Minecraft-achting denk ik. En dan mag jij zelf daar bijvoorbeeld een speeltuintje neerzetten en hier zet ik schommel neer. Op die manier kan je dan aan inwoners vragen om dat pleintje in te richten zeg maar en te zien wat wel en niet werkt.

Deelnemer 8

Ja, dan kunnen ze het echt zelf doen en zien wat werkt en wat niet.

Deelnemer 9

Het is eigenlijk de uitgeklede versie van dit, dat je het gewoon op een scherm doen maar het werkt wel. Maar ook daarvan denk ik van het is bepaald een bepaald type mensen die het aan zal trekken en die moeten moet dan wel een beetje lol hebben en misschien wel veel jongeren. Dat weet ik niet zeker.

Deelnemer 6

Ja, die zijn er misschien iemand wat meer bij betrokken op het moment dat het überhaupt een ding is.

Onderzoeker

Of qua vaardigheid, want jullie vlogen er wel doorheen.

Deelnemer 6

Ja, ik vond het niet heel erg lastig. Ik weet niet hoe jullie dat hebben ervaren, maar ik wil had het snel door. Ik kon alleen voor geen meter dan ping pong balletje slaan, maar dat kan ik in het echt ook niet.

Deelnemer 5

Dat lukt me wel een keer, maar wel na wat oefening.

Deelnemer 8

Oh nee ik heb die bal van de tafel af laten rollen.

Onderzoeker

Nee, maar ik snap wel wat je bedoelt, want stel je wil iemand van 70 jaar erbij iemand die ook even wat wil zeggen over dit soort speeltuin in zo'n sessie dan is het misschien lastig, dat vul ik even voor mezelf in. Je hebt ook vast wel digitaal vaardige 70-jarige hoor.

Deelnemer 9

Ja maar dat denk ik dus ook. Er zit wel een lijn in. Ik denk inderdaad dat jullie (jongeren) dit twee keer zo snel doen als wij. Ook al denk ik wel dat de mensen van nu wat makkelijker meegroeien met de technologie ook al ontwikkelt die zich zo snel.

Onderzoeker

Hebben jullie voor de rest nog iets waarvan je denkt dat wil ik graag kwijt, want we zitten er al overheen qua tijd, van dat wil ik nog even melden. Zo te zien niet. Dan stop ik het namelijk. Heel erg bedankt.

Appendix 3 Classification scheme observations

During the VR experience, participants were closely monitored for any correlation with the classification scheme (figure 3). In instances where a classification remains empty, no corresponding observation was noted for the given phenomenon. Additionally, any observations that diverged from the classification schemes are noted.

0 E-PARTICIPATION IN THE METAVERSE

100 E-participation

110 Challenges traditional participation
    111 Information deficit
    112 Public officials' skepticism
120 E-participation implementation
    121 Technical parameters
    122 Accessible infrastructure
130 Opportunities
    131 Encourage citizen engagement
140 Challenges e-participation
    141 Engaging newcomers

200 Metaverse

210 Characteristics
    211 Immersive VR
    212 Digital avatars
220 Opportunities
    221 Foster innovation
    222 Provide solutions for societal challenges
230 Challenges
    231 Deviant behaviour
    232 Physical awareness and comfort

300 Metaverse and e-participation

310 Opportunities
    311 Facilitatie interaction and increase inclusivity
320 Challenges
    321 Privacy and security
    322 Digital skills
    323 Consumption of citizens' resources

121 Technical parameters
There were Wi-Fi connectivity issues which hindered the VR experience.

122 Accessible infrastructure
Some participants needed guidance starting in the Metaverse but overall, they all could navigate it eventually. Most participants did not need any help with the VR glasses and controllers and could find the application themselves.

131 Encourage citizen engagement
Multiple participants showed excitement over the technology by laughing and smiling.

232 Physical awareness and comfort
Some participants got very close to the walls compared to the guardian zone and nearly punched the wall.
Participants who wore glasses experimented with the glasses spacer provided with the VR glasses. One participant successfully used the glasses spacer throughout the entire VR experience. Other participants decided to remove their regular glasses as the spacer did not seem to improve their experience.
One participant with hearing aids encountered no difficulties with either hearing the VR glasses or wearing them in general, so no discomfort.

322 Digital skills
Some participants needed help when they needed to do something that was not mentioned in the guide. Some did not venture out of what was written down. Most participants did not need any guidance in the Metaverse apart from the Wi-Fi connectivity issues. Some participants got into more advanced parts of the Metaverse and applications than others (e.g. changing their avatar).

Appendix 4 Classification scheme focus groups

Data was also collected during focus group sessions after the VR experience. Not all relevant data could be collected solely through observation, as opinions and thoughts on the experience necessitated verbal expression. Therefore, the classification scheme (figure 3) is supplemented with quotes from the focus groups to determine if specific aspects were mentioned. In instances where a classification remains empty, no corresponding quotes were said for the given phenomenon. Additionally, any quotes that do not directly align with the classification scheme are also noted and divided into themes.

0 E-PARTICIPATION IN THE METAVERSE

100 E-participation

110 Challenges traditional participation
    111 Information deficit
    112 Public officials' skepticism
120 E-participation implementation
    121 Technical parameters
    122 Accessible infrastructure
130 Opportunities
    131 Encourage citizen engagement
140 Challenges e-participation
    141 Engaging newcomers

200 Metaverse

210 Characteristics
    211 Immersive VR
    212 Digital avatars
220 Opportunities
    221 Foster innovation
    222 Provide solutions for societal challenges
230 Challenges
    231 Deviant behaviour
    232 Physical awareness and comfort

300 Metaverse and e-participation

310 Opportunities
    311 Facilitatie interaction and increase inclusivity
320 Challenges
    321 Privacy and security
    322 Digital skills
    323 Consumption of citizens' resources

112 Public officials' skepticism

"If you really want to talk about windmills, for example, then you really need a realistic environment where you can place the windmills so people are able to recognize them." (Participant 2)

121 Technical parameters

"It was a bit of a drawn picture now. If you really want to talk about, say, windmills, then you really do have to have a realistic environment where you then place your windmills in." (Participant 2)

"Yes (digital twin), or from a playground and the homes around it. It could be, we already use it for soil. So if you want to do something in the soil." (Participant 2)

"You are working very indirectly. As if you have an instrument, as if you are eating with chopsticks. There's something in between. Instead of grabbing something, you have to do something with another tool, point or tap or draw something." (Participant 4)

"I liked that you could hear everyone's voices. I could recognize the rest from that." (Participant 4)

"You are then going to hear each other through each other. It must be in those separate rooms. Then you're going to hear each other twice." (Participant 1)

"It doesn't quite match your environment yet actually. You should also have everything actually digital if you have, for example, a paper or so this can't read for example while I was in that room." (Participant 5)

"Poor wifi. You do have to get such a tool, how the tool works, with such glasses first. That it all works. It has to do it all." (Participant 4)

"That it also has to work a lot better in a sense, because then there are indeed snags." (Participant 9)

"Especially if you throw a lot of people on a particular Wi-Fi network." (Participant 7)

"It's not plug and play. You have to do some connecting" (Participant 8)

122 Accessible infrastructure

"We as a municipality are just also very attentive to digital fun, but we also always have to make sure that we serve the people who can't do it that we serve them just as well, so you have to do that with this as well." (Participant 9)

"If you don't like gaming, well you might experience a barrier to using it." (Participant 2)

131 Encourage citizen engagement
"Much more fun and interesting." (Participant 6)

"This would be a blessing later though" (Participant 3)

"It could be a nice crowd-pleaser." (Participant 9)

"Then, of course, there is the temporary effect that people do it because they think it's so cool, right?" (Participant 9)

141 Engaging newcomers
"But I also think that it will attract a certain type of people and they have to have a bit of fun and perhaps a lot of young people." (Participant 9)

211 Immersive VR
"I went to get one of those ping pong bat, did I feel like I had." (Participant 2)

"I did find it scary that indeed I couldn't see anything anymore. That you do get very disconnected from the physical world." (Participant 4)

"I seriously thought, hey, this is just the matrix no but really seriously. I mean, if those graphics are just a little bit more realistic, you just don't know." (Participant 8)

212 Digital avatars
"I find it so annoying that you can't see people's faces. So you really don't know who it is." (Participant 4)

"Especially when you're going to meet new people, I think it's very difficult. If you talk from the municipality to say, gee, I'm from the municipality, you just have to remember that little figure, that seems difficult to me." (Participant 1)

"So I found it annoying that you can't look at people." (Participant 1)

"At a local level, do you actually want to look people in the eye. And of course you don't have that, do you?" (Participant 8)

222 Provide solutions for societal challenges
"For your visualization, of course, fantastic. They do have that already in those housing programs, huh that you look at the new house with VR glasses. Then I can imagine you doing it in larger applications" (Participant 7)

"I can well imagine that you indeed also have application that you say for example of well we are going to change the Stationsplein completely and we want to show how that can look like. Well, first we are going to walk around variant one and variant two. We already do that with videos, you can show all that with models and so on, but you could say you really walk through it." (Participant 9)

"Surely that will be very nice that you can present such a plan in this way." (Participant 7)

"It would be a nice icing on the cake at such a meeting. That you say of well, we are going to present like this and now we are going to walk for those who want it." (Participant 7)

"Do you have any idea, because also, of course, you have to develop it all digitally before you can show anything. What that entails, because who's going to do that?" (Participant 7)

"And then you can put a playground there and I'll put a swing here. In this way you can ask residents to lay out the playground and see what works and what does not." (Participant 9)

"Then they can really do it themselves and see what works and what doesn't." (Participant 8)

"For example, if you want to visualize something. Well, you can do that very easily with such glasses. And if you can then also walk through them, I think for example a real estate agent does that I think. You will also with this kind of images you could also just apply that to participation policy" (Participant 1)

"If it really wants to talk about, say, windmills, you really do need a realistic environment where you put your windmills then in place that people can recognize it. I don't know if that's possible, but I still think that's interesting." (Participant 2)

232 Physical awareness and comfort
"I did find it scary that indeed I couldn't see anything anymore. So every time you needed something or you just wanted to know what was going on in the physical world." (Participant 4)

"Then not having her suddenly crash into the wall." (Participant 3)

"That you do get very disconnected from the physical world. I do find it in terms of safety, the sense of security." (Participant 4)

"I would also like my own room locked. Not having someone suddenly hi and standing next to me." (Participant 3)

"Glasses fogged up all the time, but that was also due to the weather I think just now. So that's hindering factor." (Participant 2)

"So it can make you nauseous. I think, I wouldn't want to sit behind, in VR glasses like that for very long." (Participant 3)

"When that connection diminished, those black clouds came and you got really nauseous indeed. Yes, then it does a lot on your brain." (Participant 4)

"I can't imagine that this would include a meeting for an hour or so, because I at some point you do notice it on your head a little bit. It does put a weight on your head." (Participant 5)

311 Facilitate interaction and increase inclusivity
"This also applies to people's time and when people live far away." (Participant 3)

"Yes, everyone can participate, even from home. But you don't have to go somewhere" (Participant 4)

"But as people indeed have it at home and it is all very easy and accessible. Yes, then you could also have people at their own location and still hold a meeting." (Participant 8).

"If you were to set up a space like that in the community centers or something and you invite people from hey, we're going to build your playground and watch with us, give your opinion." (Participant 2)

321 Privacy and security
"Facebook of course doesn't really stand up very well in that regard with influencing elections and all kinds of weird algorithms that pushed people into conspiracy theories" (Participant 8)

"Well, that unconscious that they impart that through certain pictures or something, right?" (Participant 7)

"Product placement indeed" (Participant 8)

"Do I want this? What will be left on the Internet?" (Participant 7)

"Yes, to surrender yourself completely because they possibly already know everything is another thing." (Participant 8)

"Still also that it's from Facebook though, because they don't really have a good name?" (Participant 8)

"Suddenly there is a bottle of Coca-Cola." (Participant 9)

"Product placement indeed" (Participant 8)

"Well, that unconscious that they impart that through certain pictures or something, right?" (Participant 7)
"Facebook of course doesn't really stand up very well in that regard with influencing elections and all kinds of weird algorithms that pushed people into conspiracy theories" (Participant 8)
"Yes, to surrender yourself completely because they possibly already know everything is another thing." (Participant 8)
"Still also that it's from Facebook though, because they don't really have a good name?" (Participant 8)

322 Digital skills
"You must have taken such a course to understand how such a thing works" (Participant 3)
"If you have to do that with 40 people, I think ultimately you will need a lot of supervisors. Especially if you are going to hold participation meetings, a lot of older people often attend, so 70, 80 plus. It can also be a hurdle, just say how they find their way in the Metaverse" (Participant 1).
"We as a municipality are just also very attentive to digital fun, but we also always have to make sure that we serve the people who can't do it that we serve them just as well, so you have to do that with this as well." (Participant 9)
"Yes, I didn't find it very difficult. I don't know how you experienced it, but I went through it quickly." (Participant 6)
"Especially if you hold participation meetings, there are often a lot of older people attending, so 70, 80 plus. It can also be a hurdle, say how they find their way in." (Participant 1)
"I think you (young people) are doing this twice as fast as we are. Even though I do think that today's people grow a little easier with technology even though it is developing so fast." (Participant 1)

323 Consumption of citizens' resources
"You do need such a tool first, how the tool works, with such glasses." (participant 4)
"If you want to participate with people you have to have enough glasses and those things are not cheap I think. So it does represent an expensive option for a visualization as I notice." (Participant 1)
"A game computer PlayStation that are also those kinds of amounts." (Participant 8)
"If you want to participate with people you have to have enough glasses and those things are not cheap I think" (Participant 1)

Quotes that did not align to the classification scheme or that are also closely related to another theme due to their context are divided into other themes:

In search of added value
"I think the fact that you're sitting in a room like that seems a bit like Teams". (Participant 3)
"With Teams you still have the video". (Participants 4)
"Then the question is indeed, what is the advantage over Teams? Just the visualization of things, I think". (Participant 3)
"But I think it would be better to keep a Teams meeting like that, with Teams". (Participant 1)
"The meeting room looked very nice and all, but it still feels a bit like a kind of Team 2.0". (Participant 8)
"Picking up block and all that is fun and meeting in the Caribbean is also a lot of fun, but what else is going on, huh? What is really that added value I am curious about." (Participant 7)

Lack of connecting with people
"I find it so annoying that you can't see people's faces. So you really don't know who it is." (Participant 4)
"Especially when you're going to meet new people, I think it's very difficult. If you talk from the municipality to say, gee, I'm from the municipality, you just have to remember that little figure, that seems difficult to me." (Participant 1)
"So I found it annoying that you can't look at people." (Participant 1)
"At a local level, do you actually want to look people in the eye. And of course you don't have that, do you?" (Participant 8)
"What may have been a disadvantage is that everyone starts using it for everything, even though it is not necessarily necessary. Not that you want to show that you have done something in your garden other than saying, oh yes, put on those glasses and see it like this." (Participant 10)

Improving creativity
"I think that's also kind of a nice outcome in those barren spaces that we are also so familiar with at our city office and city hall, that in the case of brainstorming, we put on glasses like that. I think we get I don't know what kind of ideas." (Participant 7)
"I do think indeed creativity might be fueled" (Participant 8)
"Because I really miss that. That I am looking for a space what fuels that creativity well you can hardly find it." (Participant 7)

(Fear of) Losing sense of the real world
"I found it quite frankly a bit scary too. I seriously thought, hey, this is just the matrix no but really seriously. I mean, if those graphics are just a little bit more realistic, you just don't know. If the graphics are even more beautiful, I can imagine you would almost rather be there at any given time. I did find it a little scary." (Participant 8)
"It is really a new reality, a different reality." (Participant 8)
"It can also really be an escape." (Participant 8)
"a parallel world is really emerging. Of course that is already with online there is already a kind of parallel world emerging. And what is still true and that becomes even more unclear" (Participant 8)
"People already believe the craziest things, right? You can show people things and they're going to assume it's reality. That's like "I saw it myself?" (Participant 9)
"At some point, you may not remember what you saw through such glasses." (Participant 7)
"Yes, what did you really see of it at one point, was it a dream or was it in that Metaverse?" (Participant 8)