

# Decision-making in participatory urban development

An exploration of transparent decision-making about values and conflicts



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# Colophon

## Decision-making in participatory urban development

How can the weighing process of citizens' values be made more transparent to better safeguard these values in a VR model?

*Picture generated by AI.*

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# Preface

Dear reader,

This master's thesis marks the end of my graduation project for the MSc Management in the Built Environment. At the same time, it marks the end of my time at the beautiful faculty of Architecture and the Built Environment in Delft, and with that, the end of an era as a student.

After working on this project for the past six months, it feels strange to finally finish it. When you invest that much time and energy into something, handing it in feels both rewarding and difficult. At the same time, it is time for the next phase of my career.

I would like to thank my supervisors, Jelle Koolwijk and Clarine van Oel, for their guidance and support throughout this process. There were moments where I was still figuring out which direction I wanted to take, but you helped me find out the roadmap that allowed me to shape my own path. Our meetings were always insightful and gave me the confidence to keep moving forward.

I would also like to thank the XR zone at the TU Delft for providing the VR model. Your knowledge and expertise helped me better understand how cool VR is and what it could contribute to participatory planning processes.

Lastly, I want to thank my family for their continuous support during this journey and for always helping me keep my head up. Especially mom and dad, thank you for listening, thinking along with me, and supporting me whether I was full of energy or completely exhausted.

With that, I proudly present my final thesis.

Enjoy reading!

## Executive summary

Citizen participation has become an important part of urban development projects, as spatial interventions have an effect on the daily lives of residents and it often involves competing interests. Although participation aims to include citizens' values, concerns, and preferences in decision-making, many citizens perceive that their input has limited influence on final decisions and designs. As a result, tensions and frustrations may arise when decisions are perceived as disconnected from participatory processes. The literature describes this gap between citizen participation and formal decision-making as a "Black box": an invisible process in which citizen input interpreted, filtered, and translated into planning decisions by experts and politicians.

At the same time, Virtual Reality (VR) is increasingly used in participatory planning. Existing research highlights its potential to improve communication and understanding of spatial plans, but little is known about how VR is linked to the decision-making process itself. Specifically, there is limited knowledge about how citizens' values are weighed, negotiated, and incorporated into VR models. This study addresses that gap by examining how values move through participatory processes and how transparency can be improved during the transition from participation to decision-making.

The research question is: *"How can the weighing process of citizens' values be made more transparent in order to better safeguard these values in a VR model?"*

The research adopted a qualitative case study approach focused on a road infrastructure and housing development project in a Dutch municipality. This provided a suitable setting because the project was situated in the transition between the vision-forming and the plan-forming phase, which made it possible to investigate how citizen input moves through the less visible stages of planning and what the role and limitations of VR are.

The research followed a hybrid approach that combined deductive and inductive reasoning. Existing theories on participation, public values, decision-making, and virtual reality were first used to develop a conceptual framework. Building on the Triple Diamond model of Staffans et al. (2020), the black box described by Eriksson (2022) and the 3A<sup>3</sup> framework of Hofer and Kaufmann (2023), the study examined how values are articulated and filtered through institutional and project related decision-making criteria. At the same time, the analysis remained open to new themes emerging from the empirical data, particularly regarding the local dynamic between politicians and formal decision-making in the case-study.

Data collection consisted of several methods, first a literature review was conducted to identify theoretical concepts related to public values, value conflicts, participation, decision-making, and the use of VR in spatial planning. Second, semi-structured interviews were conducted with

involved experts and residents who were directly affected by the proposed development. The different points of view show the citizen perception of participation and decision-making, while also explaining expert considerations in these processes. Third, VR sessions were organised using a virtual representation of a proposed roundabout. During these sessions, experts experienced the design from different perspectives and reflected on the potential role of VR in communication, participation, and decision-making.

### **Main findings**

The findings show that citizens primarily express values that relate directly to their everyday living environment. Concerns focused mainly on liveability, traffic safety, accessibility, and the impact of the proposed road on neighbourhood quality. These concerns often conflicted with broader planning objectives such as housing development and regional accessibility.

However, substantive conflicts were not the only source of tension. The study identified a second category: procedural value conflicts. These conflicts emerged around values such as transparency, influence, fairness, trust, and justice. Many residents felt that important decisions had already been made before participation took place, limiting their ability to influence outcomes. As a result, dissatisfaction was often directed at the process itself rather than solely at the design proposal.

A key finding is that procedural tensions reinforce substantive conflicts. Concerns about traffic safety or liveability become more intense when citizens perceive decision-making as unfair or insufficiently transparent. In other words, opposition is not only driven by what is decided, but also by how decisions are made.

### **Strategies**

The research identified three broad strategies through which experts cope with value conflicts. The first is a deliberative approach, which focuses on inclusivity, legitimacy, and dialogue. This strategy is most visible in the early phases of planning, where citizens are invited to explore problems and values before concrete solutions are developed. However, empirical findings suggest that this approach plays only a limited role in later project phases.

The second is strategic participation. Here, participation is used partly to manage risks, maintain control, ensure feasibility, and prevent conflict escalation. Experts employ tailor-made approaches, informal conversations, and selective engagement to keep participation manageable and avoid delays. While these strategies may reduce tensions in some situations, they can also create perceptions of arbitrariness and unequal treatment.

The third is technocratic handling, in which decisions are largely made internally by experts based on technical expertise, feasibility, regulations, and policy objectives. This approach becomes more dominant when projects face time pressure, financial constraints, or legal

obligations. Under such circumstances, citizen participation plays a smaller role in shaping final decisions.

### **Synthesis: opening the black box**

The most important contribution of the study lies in explaining what happens inside the black box between participation and decision-making. The synthesis demonstrates that decision-making is not a neutral process in which citizen input is simply translated into planning outcomes. Instead, values pass through multiple arenas where they are interpreted, prioritised, negotiated, and sometimes transformed.

The findings reveal a reciprocal relationship between value conflicts and expert strategies. Experts develop strategies in response to existing conflicts, but these strategies can simultaneously generate new procedural tensions. Strategic participation intended to reduce opposition may unintentionally create perceptions of exclusion or unfairness, thereby producing additional procedural conflicts.

This relationship can be understood as a feedback loop. Environmental value conflicts lead experts to adopt strategic or technocratic approaches. These approaches often reduce opportunities for influence and transparency, creating procedural value conflicts. Citizens subsequently seek alternative ways to influence decision-making, for example through media attention, political mobilisation, public debate, or legal procedures. These actions place additional pressure on the institutional and political arenas, which in turn affects how experts manage participation and decision-making. Rather than being passive recipients of decisions, citizens actively attempt to influence the black box itself.

The study therefore demonstrates that the black box is not merely an administrative process. It is a dynamic arena shaped by interactions between citizens, experts, institutions, and political actors. The weighing of values is influenced by planning considerations, as well as by factors such as feasibility, control, efficiency, political priorities, and risk management.

### **The role of VR**

The findings suggest that VR can contribute to transparency in ways that go beyond its commonly recognised communication function. Rather than merely visualising design proposals, VR can help make the consequences of decisions, trade-offs, and alternative scenarios visible to both citizens and experts.

For citizens, VR improves understanding of spatial interventions by making future situations more tangible. For experts, VR encourages empathy and awareness of citizens' lived experiences by allowing them to view projects from different perspectives. This can improve understanding of how design decisions affect everyday life and help identify potential sources of conflict earlier in the process.

Most importantly, VR can support transparency by visualising the criteria, constraints, and trade-offs that shape decisions. By explicitly showing why certain choices are made and what alternatives were considered, VR can help citizens understand how their values are weighed against competing objectives. In this way, VR has the potential to partially open the black box of decision-making.

### **Conclusion and discussion**

The study concludes that transparency about decision-making requires clear communication about how values are interpreted, weighed, and balanced against institutional, political, and project-related considerations. The weighing process is shaped by interactions between participation arenas, project arenas, and institutional arenas, each of which influences which values are prioritised and which are constrained.

A key theoretical contribution is the finding that existing participation models insufficiently explain what occurs during transitions between planning phases. The Triple Diamond model captures processes of divergence and convergence, but does not adequately account for the strategic and political mechanisms that shape decisions in later project stages. The study therefore argues that a political arena should be added to the model to better explain how trade-offs are made and why participation often shifts from deliberative dialogue towards strategic steering and technocratic decision-making.

The research also highlights the importance of understanding participation and decision-making as interconnected processes. Procedural conflicts, trust, transparency, and perceptions of influence are not secondary issues but central factors shaping how citizens evaluate planning outcomes. Future research should therefore examine how these dynamics evolve over time and how citizen values move through different planning phases. Longitudinal research could provide further insight into when conflicts emerge, how trust develops or declines, and how participation outcomes are translated into spatial interventions.

Overall, the study demonstrates that the black box between participation and decision-making is shaped by ongoing interactions between citizens, experts, institutions, and political actors. By making trade-offs more visible and understandable, VR offers promising opportunities to improve transparency, strengthen legitimacy, and better safeguard citizens' values within participatory urban development processes.

**KEYWORDS** – Virtual Reality, Participation, Value conflicts, Decision-making

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# 1. Introduction

Area development projects in the Netherlands involve many stakeholders with different and often conflicting interests. For this reason, citizen participation has become a standard part of spatial planning processes. Participation enables residents to express their values, preferences, and concerns, which can be considered in decision-making,

## 1.1. Research problem

However, studies show that participation is often limited to informing citizens and does not support interaction between citizens and experts. Many participants feel that their input has little impact on actual decision-making, leading to design outcomes that do not fully meet their wishes and societal needs (Eilola et al., 2023; Luo et al., 2025). Participation may be applied as a legitimate instrument, but when citizens do not perceive either the outcomes or the process as effective, tensions and dissatisfaction may arise.

One explanation for this lies in the limited transparency of decision-making processes. While a substantial body of research focuses on participation and communication, less is known about what occurs between these stages. For participants, this internal decision-making process is often invisible and hard to follow. Healey (2020) describes this as an “impenetrable black box”, in which stakeholders have little insight into how citizen input is sorted, evaluated and transformed before reaching formal decision-making. Experts such as planners and municipal officials tend to hold more power in this phase and often struggle to store and share citizen input across planning teams, making it difficult to interpret and translate this input (Rossi et al., 2025). Values or concerns that do not align with predefined constraints may therefore be (partly) excluded from further decision-making.

## 1.2. Knowledge gap and research questions

The literature describes Virtual Reality (VR) as a promising additional tool for participatory urban design. They help citizens better understand spatial plans by allowing them to move through the virtual design, including sensory experiences such as sound and light (Loyola et al., 2019). Design interventions and their consequences can be experienced directly and interactively in VR and AR, which increases engagement (Van Leeuwen et al., 2018), motivation, and improves communication between experts and residents with different backgrounds (Chowdhury & Schnabel, 2020; Postert et al., 2022; Sanchez-Sepulveda et al., 2019; Wolf et al., 2020).

Eriksson et al. (2022) emphasise that the role of digital technologies within this black box remains a knowledge gap. On the one hand, such technologies may generate richer citizen input (Nyseth et al., 2019), while on the other hand it also gives experts control over which concerns and values citizens are able to express and which remain unaddressed. It remains unclear how citizens' values are actually processed and safeguarded during this converging phase, particularly in contexts with multiple conflicting interests (Eilola et al., 2023). After all, competing interests require the weighing of values and the making of necessary design choices.

Moreover, because participation is shaped by context-dependent conditions, tensions emerge between these constraints and the citizen input generated through participatory processes.

Decisions about which scenarios are visualized and how internal constraints such as budget and technical feasibility of the VR tool are handled are primarily determined by planners and other experts (Chowdhury & Schnabel, 2020; Rossi et al., 2025). Participants therefore often do not know how their input and values have shaped the VR model they engage with, while they expect to have more influence on design outcomes due to the interactive nature of VR and AR (Slingerland & Köse, 2022).

This study therefore focuses on how the weighing of citizens' values is made visible in the transition between planning phases, and how this process is reflected in VR models. It examines what citizens consider important or concerning in urban planning and how those values, preferences and concerns move through the participation process as well as how they are translated and reflected into design choices by experts. To make the decision-making process more transparent, it is necessary to understand how VR is used and which factors shape the process of weighing, negotiating and translating input towards VR. This means for what purpose it is used, to clarify how citizen input is translated into a VR model. Based on this, the following research question is formulated:

*How can the weighing process of citizens' values be made more transparent to better safeguard these values in a VR model?*

The following sub-questions are derived from this main question:

- *Which values and interests do citizens have in participatory urban design?*
- *How do experts weigh citizens' input against other decision-making criteria?*
- *How does VR support communication and understanding of citizens' perspectives in participation and decision-making processes?*

### 1.3. Research purpose

The research gap concerns the limited knowledge of how and when citizen input is processed and incorporated into a VR model during participatory urban development. The main and sub-questions are addressed through qualitative research. First, the decision-making process is examined based on findings confirmed by academic literature. It is necessary to have a clear understanding of the concept of decision-making in the general participatory urban design process, without a specific focus on using VR. By comparing findings from the literature, an analytical framework is developed to examine how citizens' feedback, wishes, and concerns are considered by experts after gathering those.

The first and second sub-questions are examined through semi-structured interviews. These interviews are conducted with both citizens and experts specialising in different fields of urban planning and area development, based on a case study in a small municipality. A case study focuses on a specific case as the object of interest and seeks to understand it in depth (Bryman, 2016). This case is described in more detail in the methodology. Theoretical insights and interview findings are combined to answer the main research question, which can be found in the results section.

### 1.4. Societal relevance

The findings of this study can support public authorities in developing policies focused on how to deal with citizens' input, and on the use of digital tools in citizens' participation. More specifically, the municipality and the stakeholders involved in the project can use the results to support next steps in citizens' participation, as the outcomes are grounded in the context of this case. This is also relevant for IT companies, who develop VR models, sometimes in collaboration with education institutes. Key choices within such a model can be discussed more fairly and transparently with citizens, which helps align future models more closely with stakeholder values and concerns.

Citizens also have a direct interest in this research. Minority perspectives and conflicting interests are more likely to be acknowledged, weighed, and safeguarded because of better understanding and communication with experts. This will make participation more meaningful and reduce the risk of so-called tokenistic participation, meaning that participation will not allow citizens to have substantial influence (Amnå, 2006). VR techniques help clarify what influence participants actually have and ensure that less dominant voices are not overlooked (Slingerland & Köse, 2022).

### 1.5. Scientific relevance

Existing literature shows a knowledge gap on how citizen input is safeguarded and processed into VR models as well as after usage of those models (Eriksson et al., 2022). Although VR helps citizens understand spatial plans more clearly and reduces the high level of abstraction of maps and drawings — compared to traditional means (Loyola et al., 2019; Wolf et al., 2020) — choices for certain scenarios and design solutions are often not made transparently. Theoretical

models, described in the next chapter, are rigid and suggest exploring ideas and solutions together with citizens, while experts must deal with internal considerations and trade-offs, before and after interaction with citizens. Citizens do not have a real influence in choices between the formal participation moments. Research on what happens in this 'in-between space' is still limited, because findings are highly context-dependent and often tied to specific case studies (Rowe & Frewer, 2004). Furthermore, as the VR test provides insights into how certain values are made visible in an immersive environment, this study could support future research on VR in other contexts with a different project context and different (internal) considerations.

## 2. Theoretical background

This chapter examines, based on academic literature, the process through which societal and individual values are articulated, interpreted, and eventually translated into spatial plans. The theoretical model developed by Staffans et al. (2020) serves as the basis for outlining this process, in combination with elements emerging in participation processes from the 3A<sup>3</sup> framework of Hofer and Kaufmann (2023). To better align the model with the practical realities of citizen participation and decision-making in spatial planning, several conceptual adjustments are proposed. This discussion ultimately contributes to answering the first and second sub-questions:

- *Which values and interests do citizens have in participatory urban design?*
- *How do experts weigh citizens' input against other decision-making criteria?*

Staffans et al. (2020) present a process model that addresses the different communicative actions and ways of engagement that occur during citizen participation. They distinguish between two dimensions: broad participation and small group collaboration, and the movement from diverging to converging knowledge. Diverging knowledge means diversifying and exploring ideas and alternatives whereas choosing the best possibility is called converging knowledge. This results in four participation modes, each producing and integrating different types of knowledge. These types of knowledge can be positioned across three phases within participatory urban design: goal, vision and plan. In the goal phase, a wide range of perspectives are captured from participants, in order to formulate shared ambitions and goals. The vision phase supports the development and comparison of alternative futures, often through more intensive interaction among selected stakeholders. In the plan phase, the previous vision and proposals are elaborated and consolidated toward a plan and formal decision-making. Figure 1 shows the process-oriented structure of the 3 main phases as 'diamonds' in which knowledge diverges and converges, while giving a voice to citizens.

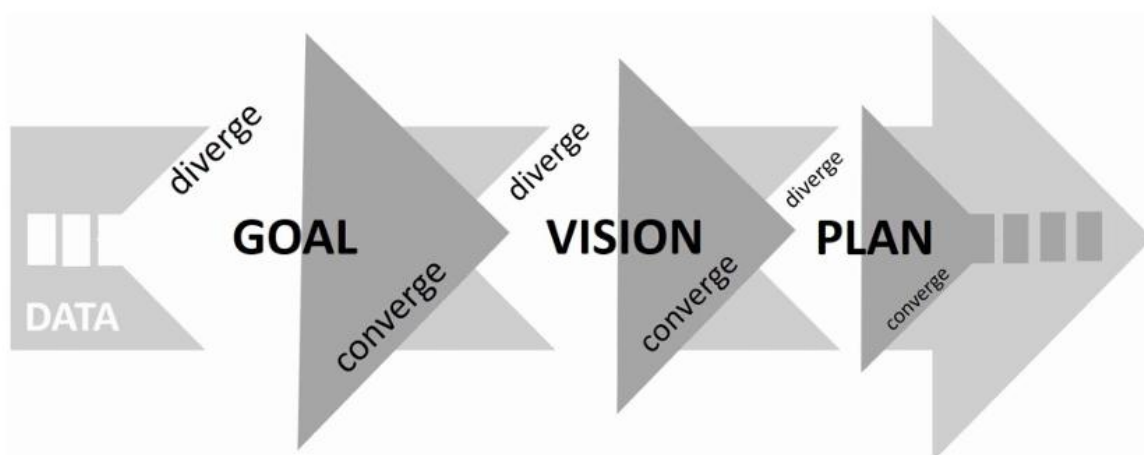


Figure 1, the triple diamond model consisting of 3 key phases and the flow of civic engagement and knowledge needs (Source: Staffans et al. (2020))

The model also has several limitations. These are numbered for reference to the sections in which specific adjustments to the model are discussed.

1. Identifying values (2.3)
2. Participation arena (2.4)
3. Institutional arena (2.5)

### **Identifying values:**

First, the three phases (goal, vision, plan) are presented in a rather rigid way, creating the impression that citizens' participation is a linear process in which input is collected and knowledge is gradually formed through three consecutive stages. In practice, however, values are dynamic and new input or data often emerges throughout the process and between phases, outside organised participatory settings (Chilvers et al., 2018). Elements shaping participation itself are dynamic as well (Hofer & Kaufmann, 2023); changes in involved actors (Schlossberg & Shuford, 2005), aims (why participation takes place) and the interaction process can shift how values are expressed and interpreted. Participation is better understood as an ongoing and adaptive process rather than a linear progression of knowledge, requiring multiple rounds of interaction (Keeney, 1996; *Value-Focused Thinking*, n.d.). The model therefore needs to account for the cyclical nature of participation and decision-making.

### **Participation arena**

Second, the model implicitly suggests that citizen participation takes place primarily within formal frameworks and instruments. This is reflected in the three diamond shapes that represent the settings in which communication between citizens and experts occurs. In recent decades, however, citizens have become increasingly engaged and outspoken in planning processes (Yvonne de Kluizenaar et al., 2023). Such a representation with diamonds leaves limited room for citizen initiatives, self-organized groups, or forms of engagement such as protests and demonstrations. In practice, experts often move beyond formal participation moments and approach active citizens in ways that allow their values to be considered and potential conflicts to be addressed early. Instead of relying only on surveys or public meetings, other settings can be created to facilitate dialogue.

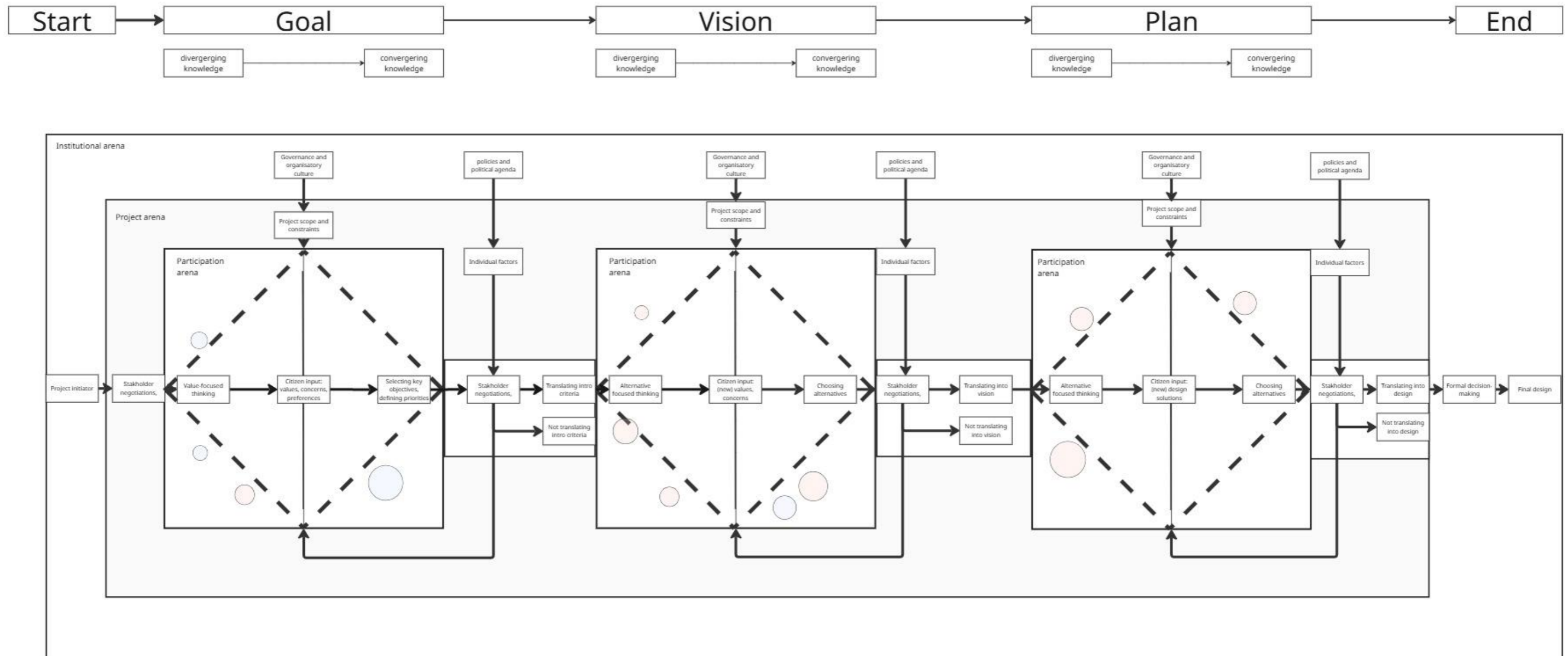
### **Institutional arena**

Third, and most importantly, a key limitation concerns the transition moments between phases. In the original model, these transitions are not conceptualized as arenas in which trade-offs are made. Processes such as claim testing and the closing of the converging phase are largely carried out by experts. In this research, the term "experts" refers to experts involved in the planning, design, and decision-making processes surrounding the project, including municipal officials, traffic specialists, urban designers, project managers, and external consultants. From this point onward, these actors are referred to as "experts."

The role of the institutional context including the organisational culture, political decision-making, and project scope with its boundary conditions, shape the individual considerations of experts during these transitions, which remains underdeveloped (Eriksson et al., 2022; Staffans et al., 2020; Wallin, 2019). Between the formal participation moments lie the — as expressed by citizens — “black boxes,” where important interpretative and decision-making processes take place. In Dutch planning processes, where formal procedures and council decisions structure participation, the intermediate balancing of citizen input remains difficult to trace, making it essential to better understand how input is transformed into spatial outcomes (Bakunowitsch et al., 2024).

These three intended additions were integrated, leading to an adaption of the model developed by Staffans et al. (2020). Figure 2 below shows the conceptual model as an adaption to the triple diamond model.

2.1. Theoretical framework



*Figure 2, Theoretical framework (Made by author)*

Within the model, the articulation, translation, and weighing of public values is the central analytical thread. The chapter therefore begins by discussing the concept of public values as the foundation of spatial planning, including the distinction between fundamental and instrumental values and the emergence of value conflicts. It then examines the participation arena as the process in which these values are elicited, contrasting value-focused and alternative-focused approaches and clarifying how different deliberative settings influence whether values are openly explored or reactively expressed. Finally, the influence of the institutional context and planning culture on how interests are weighed within the project arena is discussed. In this regard, understanding stakeholder dynamics is essential. By embedding these elements within the three-diamond structure and explicitly acknowledging the “black box” moments between phases, the theoretical framework clarifies how citizen values move from initial articulation in early phases to institutional weighing and formal decision-making.

## 2.2. Values

In the conceptual model, the first diamond represents the goal formation phase, in which ideas, concerns and preferences are articulated and translated into objectives. A useful way to describe this is to treat citizen contributions as expressions of underlying public values, as participatory input reflects what people consider important in relation to urban spaces (Herzog et al., 2024). According to the literature, values contain both cognitive and emotional elements. This means values relate to what people find important in a place, but also to the feelings and personal attachments they associate with it (Bozeman, 2007). Values are therefore personal and closely tied to place and context. They include both non-material values, such as beliefs and experiences about what is considered important, as well as values related to material objects (Bakunowitsch et al., 2024). This makes values difficult to compare directly.

To gain an overview of commonly occurring values in area development, mapping public value spheres can provide useful insights, especially because public values do not hold the same meaning or priority for all actors at the same time. As Herzog et al. (2024) mentioned, values are co-existing and relative, meaning that what one actor considers important, another may see as secondary or even problematic. Conflicts often arise from different interpretations of what counts as “public value”. Public values refer to values people want to see realised in the public domain and are rooted in private values. Value conflicts emerge when the realisation of one value limits or prevents the realisation of another, for example between economic development and ecological quality.

Research on public values by Keeney (1996) distinguishes between different types of values that play different roles in participatory urban development. Values representing desired outcomes are called fundamental values. Fundamental values typically reflect broader normative commitments, including for example procedural fairness or transparency during the process. More specific preferences or design proposals, such as a request for more green, are labelled as instrumental values and can be understood as concrete translations of those broader aims

(Jørgensen & Bozeman, 2007). These serve as conditions to achieve fundamental values and shared public values. The distinction between fundamental and instrumental values is context dependent; some values can be both fundamental and instrumental, since they are established as desired outcomes, but also represent as means for achieving such outcomes. Democratic participation itself, for instance, can be understood as a public value rather than merely a mechanism to reach other fundamental goals (Bryson et al., 2017).

To assess values to design options in a fair and inclusive way, distinguishing between fundamental and instrumental values is essential, because these values do not operate at the same analytical level. Underlying values are made explicit when citizens are asked to explain their positions, revealing both their preferences and the reasons and moral considerations behind them (Isacs et al., 2023). Such reflection reveals tensions between values that are considered equally important yet difficult to compare because they lack a shared scale to be meaningfully weighed against one another, such as safety versus economic returns. Isacs et al. (2023) demonstrate that compelling citizens to choose in such scenarios often results in significant emotional distress, as they face a profound internal struggle between their core beliefs and the unavoidable need to make concessions.

### 2.3 Perception

In line with the principles of direct democracy, citizens should have the opportunity to influence the definition of the problem, the direction of the process, and the content of plans. After all, spatial interventions directly affect citizens' immediate living environment. While such participation strengthens social legitimacy, experts — specifically political representatives — ultimately make decisions on behalf of society, thereby providing political legitimacy (Thomassen et al., 2014). In this approach, experts strive for both legitimate participation and politically legitimate decision-making. Fair decision-making can only be made when people are able to participate in the process and when their participation has a meaningful influence on decision-making.

Citizens and experts have different perceptions of spatial interventions, while perceptions may also vary between citizens themselves due to differences in daily routines, experiences, and values. Because participatory input is shaped by these perceptions, fair decision-making requires experts to understand how citizens experience their living environment and interpret the potential impacts of a project. To understand what people value, it is therefore essential to examine how individuals experience their living environment.

The values articulated by citizens in participatory processes are closely tied to how they experience their living environment. This experience emerges through the everyday use of a place, such as the routes people take and the locations where they spend time. In this way, residents develop a form of experiential knowledge (Bąkowska-Waldmann, 2023), which differs from the more abstract perspective of planners and designers. What is perceived as a quality or a problem depends on how an intervention affects existing routines.

In addition, less visible aspects play an important role in the daily life of citizens, for instance feelings of safety or familiarity. These are not always explicitly articulated, yet they strongly influence how people respond to spatial change. Perceived safety may diverge from objective safety (Amiour et al., 2022), meaning that a well-intended measure can be evaluated negatively depending on how it is experienced in everyday use (Qin et al., 2025). Participatory input therefore reflects how people interpret their environment at a given moment and should be understood within that experiential context.

The way plans are presented shapes which values become visible. Visualisations and maps help to make future situations imaginable and render spatial effects more concrete. VR allows individuals to experience a design at eye level. As a result, values that are directly linked to the physical and sensory experience of a place tend to come to the fore, such as spatial quality, greenery, density, legibility, and traffic safety. Aspects like scale, sightlines, and the sense of space also become more tangible. At the same time, other values remain more difficult to capture. Issues such as social equity, the distribution of costs and benefits, affordability, or long-term effects are harder to represent in a VR environment and therefore receive less attention in participants' initial responses.

#### 2.4 participation arena

The participation arena refers to the stage in which interactions between planners, stakeholders, and citizens are organised to gather input and values. This arena includes the different formats, spaces and rhythms (Hofer & Kaufmann, 2023) that structure how participation is designed and shape how participants express their views. The way participation is organised therefore affects how manageable and interpretable that input is within the planning process. It also influences the types of values that emerge, such as fundamental values or more instrumental ones. Keeney (1996) argues that participatory input often has limited impact, which he explains through the distinction between (traditional) alternative-focused thinking and value-focused thinking. In common participation practices, citizens' values may only become explicit when concrete spatial plans or alternatives have already been developed. Citizens are therefore placed in a reactive position. Their values emerge only when there is something to respond to. As a result, participation mainly consists of reactions to proposed solutions, meaning that underlying values are not fully expressed. This approach is aimed at addressing predefined decision problems.

Value-focused thinking, however, starts by articulating and clarifying objectives, and tracing those objectives to fundamental rather than means values by asking why a particular objective matters in the decision-making context. The key question shifts from "which design is better?" to "what do we consider important?". The focus moves from evaluating solutions to defining decision objectives and criteria that guide the next phase of analysis and design.

In practice, value-focused thinking is difficult to apply when considering the different objectives during phases of spatial planning projects. The 5D model designed by Nisha and Nelson (2012), illustrates how decision-making moves from *diagnosing* the problem and defining goals toward collecting data, designing solutions and deciding which option is the best. The phase of diagnosing problems and defining goals offers space for articulating and clarifying fundamental values. Due to uncertainties, values are still open, flexible and interpretative (Talstra & Peek, 2003). After that, values are subsequently translated into measurable objectives and design criteria, like a housing programme or architectural ambitions. The Design and Decide stages compare scenarios based on previously defined criteria, resulting in what is presented as the “probable” scenario. These are formalised in the urban plan and are largely the result of earlier translations of values. As such, they fall within an alternative-focused approach when new responses are not linked back to the underlying values that are supported or constrained.

If input is fixed too early, later changes in values may no longer be incorporated. The long duration of spatial planning projects is crucial in this respect, as both the context and the objectives may shift over time, while citizens’ values can also evolve, given their dynamic nature. Literature describes two main reasons for this; Firstly, deliberation allows people to reflect on what matters to them, which can lead to changed or more nuanced positions. Perspectives may shift from individual interests to broader collective considerations (Mavrommati et al., 2021). Secondly, values only become clearly articulated when people understand the consequences of spatial interventions. This creates a practical dilemma, since experts often start dialogue with residents by presenting an idea or visualisation to elicit responses. Values tend to become visible when proposed changes conflict with everyday routines and expectations (Legacy et al., 2019). This suggests that values are not fixed, but evolve during the process, which challenges the assumption of stable input in planning models.

#### 2.4.1 Participation settings

To understand how experts deal with this tension, it is necessary to consider the conditions under which citizens are engaged and encouraged to articulate their values. What experts can expect from citizens, and how collaboration leads to alternatives, depends on citizens’ motivations and interests. Fung (2003) distinguishes between “hot” and “cold” deliberative settings based on the level of commitment and conflict participants bring into participation.

In hot settings, positions are already fixed and participants are less likely to reconsider their views. Conflicts become more visible and underlying values surface more clearly. Because positions differ strongly, some level of consensus-building is required, although too much emphasis on consensus can suppress disagreement and obscure value differences (Legacy et al., 2019).

In cold settings, no final plan exists yet and discussion is exploratory, with less emotional pressure and fewer fixed interests. Participants can reflect more openly on what they find important in their environment, exchange information, and shape values. In this context, actors

are more willing to revise their views, allowing experts and citizens to explore fundamental values before translating them into concrete alternatives.

The level of tension within a setting is shaped by several factors. The presence of a concrete design proposal, the perceived impact on daily life, and the extent to which participants feel they can influence outcomes all play a role. When opportunities for influence are experienced as limited, participants may seek other ways to make their concerns visible, for instance through media attention, political pressure, or legal procedures. In this sense, more confrontational forms of engagement can emerge when formal participation processes are perceived as insufficient. citizens can take the initiative themselves in popular spaces (Cornwall, 2017). Through this bottom-up approach, citizens are able to influence policy outside the formal planning system (Wallin, 2019).

In contrast to popular spaces, experts can deliberately create invited spaces by approaching different groups of citizens separately and in ways that fit the situation. In situations with higher levels of tension, smaller-scale interactions such as one-on-one conversations or discussions in small groups can help to create space for dialogue and reduce escalation. Instead of relying only on formal public meetings, they may organize personal one-on-one conversations or small group discussions, often referred to as mini-publics, to talk about a specific issue. These more informal, invited spaces allow values and concerns to emerge that might not surface in larger group meetings with strong tensions or emotions (Nyseth et al., 2019).

As indicated in the theoretical framework, these settings are positioned outside the diamonds as blue or red circles, indicating such invited spaces as cold and hot settings respectively. Home visits, kitchen-table conversations, or discussions within existing social networks allow for more exploratory dialogue. This helps reach groups that are less visible in formal participation procedures, such as quiet residents or residents with limited language skills. It can also provide space to engage highly motivated citizens with strong opinions and reduce tensions (Planbureau voor de Leefomgeving, 2023). If this latter group, often referred to as the usual suspects, is only involved later, participation may be experienced as unexpected or as confirmation of decisions already made.

## 2.5. Institutional context

Participatory processes function as arenas in which stakeholders articulate, exchange and negotiate public values through consultation, deliberation and interaction (Wang & Li, 2025). The outcomes of these participation processes are subsequently translated into institutional arrangements and formal decisions within governance structures. As participatory urban design processes take place within a broader societal, cultural and economic context (Chilvers et al., 2018), the conceptual framework introduces the institutional arena and the project arena around the three diamonds of the participation arena as factors influencing this process. The moments between the diamonds are shown as black boxes, representing the institutional moments in which the sorting process of input takes place. This will be discussed in section

2.5.4. The following arenas and their dimensions, derived from the 3A<sup>3</sup> framework of Hofer and Kaufmann (2023) shape this process.

### 2.5.1. Institutional arena

The outer arena in the conceptual model is the governance arena, including legislation and policy frameworks that apply to the project. It is important that participatory input does not conflict with existing legal or policy requirements. Legislation and policy frameworks influence the direction of a project and determine which aspects receive priority and which do not, structuring the balancing process by defining which concerns must be considered and how they are weighed (Bakunowitsch et al., 2024). Existing policies at the national, provincial, and municipal levels shape how experts assess and interpret input. Policies and legal frameworks are often politically influenced and guide public goals, such as liveability and traffic safety. This affects how input is interpreted and prioritised in relation to these broader objectives.

Governance arrangements also shape how the municipal administrative apparatus operates. An important institutional factor is planning culture, which influences how the participation process is organised and how input is interpreted and weighed. Whether input can be implemented also depends on organisational capacity. Municipalities define the scope of a project in advance, which already sets certain possibilities and limits. Practical constraints such as limited time, financial resources, and staff capacity often restrict participation to the legally required minimum. This can conflict with citizen or neighbourhood initiatives (Blijleven & van Hulst, 2022). As a result, the processing and analysis of participatory input may receive limited attention or capacity (Rossi et al., 2025).

In processes involving clearly assigned responsibilities and roles across municipal departments, what Eriksson et al. (2022) refers to as formal processes, citizen input is frequently interpreted and evaluated within sector-specific perspectives rather than through an integrated view. This is also reflected in how budgets and resources are distributed across departments (Aschhoff & Vogel, 2018). In more informal settings with fewer involved experts, the sorting and interpretation of input rely more strongly on individual expert judgement (Eriksson et al., 2022). The absence of fixed roles and procedures can allow for more flexibility in how values and concerns are taken into account, but also introduces variability in how consistently input is assessed and translated into design decisions.

Specifically, aldermen as municipal administrators have political attitudes and responsibilities towards the political party they represent. This means that assessing input is shaped by political priorities, institutional responsibilities, and accountability to their constituents. Politicians have the power to demand a redo of participation in projects and intervention (Kantola & Tuulentie, 2020). They can also downplay or withhold outcomes that are not in their favour or in favour of the party they represent, resulting in exclusion or less attention for conflicting or deviating perspectives compared to ideas that align with perceived public interest or political visions. In addition, critical or protesting residents may be labelled as self-interested or irrational, which

affects how seriously their values are taken in formal deliberation (Inch, 2015). This can limit fairness and justice in inclusive participation.

2.5.2. Project arena

The project arena refers to the black box in which key actors involved in a specific development project interact, negotiate and make decisions about its scope, direction and feasibility. Positioned between the institutional arena and the participation arena, this arena translates broader policy framework into concrete project choices, considering the planning culture and political agendas. This shapes how the process of participation is designed and how input will be collected as decisions will be made about who is involved and which tools will be used. In line with the 3A framework (Hofer & Kaufmann, 2023), the project arena can be understood as the point where **aims** and **actors** dimensions come together. First, the aim of participation includes the *issue* of the planning problem, the individual perspective as underlying *rationales*, and the *outcome* of participation. And second, the **actor** dimension includes their *roles* and *subjects*, influencing the *recruitment* of participants. First, the aims dimension is discussed, after which the actors dimension is addressed.

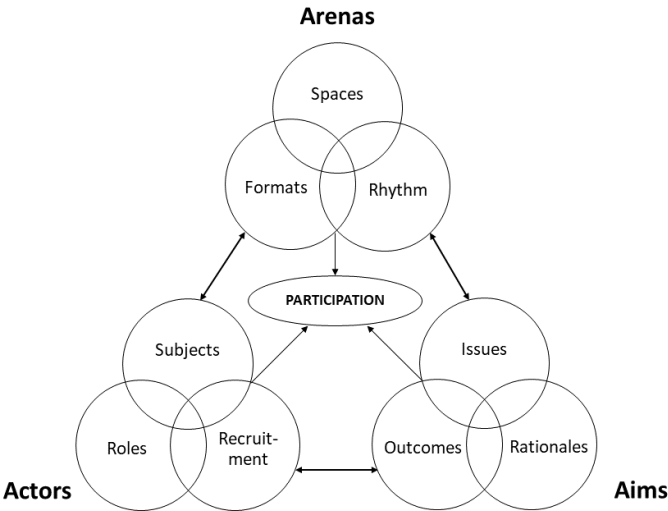


Figure 3, 3A³ Framework, source: Hofer and Kaufmann (2023)

Aims

In addition to the actor-dimension, the aims of participation are important to understand as well. Two underlying rationales can be distinguished: participation as a means, where it is used as a tool to develop solutions, and participation as an end, where it functions as a democratic instrument to empower communities and give them a voice in a project. A specific planning problem serves as the trigger for participation and shapes how the process is designed. (Lane, 2005). The objective for which participation is used shapes which type of input is collected, how this is evaluated, and how the process is designed. When participation is embedded in earlier, more strategic phases, such as the revision of an Environmental Vision. Participation is typically

open-ended, focusing on gathering broad input on what citizens consider important or concerning in their environment, while taking place in a relatively 'cold' setting where no immediate decision is at stake and where the focus lies on articulating fundamental values. By contrast, when participation is linked to a specific decision-making moment, such as an application for an environmental permit in case of a *buitenplanse omgevingsplanactiviteit*<sup>1</sup> (BOPA), it is oriented towards assessing a concrete proposal within existing frameworks, leaving less room to reconsider underlying principles and shifting the focus towards weighing interests, concerns, and conditions in a more solution-oriented manner.

## Actors

To understand who is involved and how trade-offs are made after values and alternatives have been formulated, stakeholder analysis reveals how influence is distributed across the arenas. Figure 4 emphasises the multi-actor perspective in which no single actor controls the creation or safeguarding of public values. Instead, values emerge and are negotiated across multiple arenas, objectives and institutional logics, each actor with different capacities to define, legitimise, and operationalise what counts as public value (Bryson et al., 2017).

Building on the actors dimension of participation, different types of subjects can be distinguished, including representatives of the state, civil society, and the private sector. Different actors play different roles in how values are processed. Citizens and NGOs have a high interest as locals and contribute experiential knowledge and value perspectives. In line with Arnstein's (1969) ladder of participation, their role often remains consultative or informative, reflecting relatively low levels of decision-making power. This is further reinforced by recruitment dynamics, as participation processes rarely include all affected actors equally, and tend to privilege those with greater resources, knowledge, or institutional access

Urban designers, civil officials or developers interpret, assess and negotiate about the input. They all bring different interests, knowledge forms, and resources into the process (Hofer & Kaufmann, 2023). The way trade-offs are made based on input differs across actors; urban designers tend to prioritise spatial quality and a diverse mix of functions, whereas developers must ensure the viability of the business case and therefore assess input differently.

The subsequent step involves the translation of values into spatial proposals. Urban designers and planners operationalise values into programmes of requirements, spatial structures, and design alternatives. In doing so, professional expertise and disciplinary knowledge determine which values can be concretely embedded in plans. This translation process is not neutral. Underlying ideologies and institutional logics shape how input is categorised, evaluated, and prioritised (Eriksson et al., 2022). Input must be considered legitimate or relevant by planners, who may also hold personal preferences or biases that influence their level of objectivity (Rossi

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<sup>1</sup> Buitenplanse Omgevingsactiviteit, translated to an activity outside the environmental plan, refers to a development or activity that does not comply with the municipal environmental plan, but can still be allowed if the municipality grants a special environmental permit.

et al., 2025). Differences in knowledge, skills, and age affect how local knowledge is interpreted and how easily it can be exchanged between actors. Previous experience also shapes how planners balance competing values, often relying on professional judgement and intuition (Campbell, 2002).

Furthermore, public officials often give more weight to technically substantiated input, and therefore to instrumental values, because these fit more easily within their technical evaluation frameworks (Dudley et al., 2018) and align with the type of expertise they possess (Hasse van der Veen et al., 2025). Emotional expressions and personal experiences, by contrast, are often more difficult to translate into spatial terms or into formal planning categories (Eriksson et al., 2022).

The previous sections may give the impression that municipalities mainly facilitate participation processes and steer the interpretation of input. In practice, however, municipalities may outsource participation processes to private actors who organise the process and handle the processing of input. Examples include project developers, urban design firms, or consultancy agencies. Nevertheless, formal decision-making authority in area development remains with public institutions. Municipal councils ultimately vote on planning decisions, such as amendments to the environmental plan or the adoption of a master plan. The stakeholder table (Figure 4) distinguishes the main actors by their role in the process, moment of influence, and level of decision-making power, thereby making explicit the stakeholder dynamics.

Arena	Stakeholder	Role	Decision-making power	Interest
Institutional arena	National Government	Defining public goals, policy frameworks and procedural conditions.	Medium	Low
	Local government	Formally approve decisions, defining policy frameworks and organizational culture	high	Medium
Project arena	Local Government	Determining project scope based on public goals and (financial) resources	high	Medium
	Developer	Determining project scope based on program and feasibility	High	Medium
	Land owner	Control over land influences feasibility and development conditions	High	high
	Urban designer	Translating values and policy goals into spatial quality and design proposals	Medium	low
	External advisor	Providing advice on specific subject	low	low
Participation arena	Local Government	Facilitator of format, rhythm and spaces to gather input and collaborate with citizens	High	Medium
	Residents	Provide experiential knowledge, concerns and preferences about their living environment	Low	High
	NGOs	Represent collective interests and advocate for specific societal or functional concerns	Low	High
	Companies	Represent economic activity or business interest	Low	Medium

Figure 4, stakeholder analysis (Source: made by author)

Table 4 shows that actors with the highest decision-making power are not citizens who articulate values, but those who interpret and translate them. This creates a structural imbalance between input and influence.

## 2.6 Conclusion

In summary, the following factors explain why not all articulated values move from the participation diamonds into the final plan.

Arena	Dimensions from 3A <sup>3</sup> framework	Impact on weighing values
Institutional arena	Context and planning process	Legal framework, policies and planning culture steer organisations and experts in defining which input is legal and desirable. Formal decision-making
Project arena	Actors: Roles, subjects, recruitment Aims: Issues, rationales, outcomes	Stakeholder negotiations and individual factors define project scope, how participation is organised and how input will be categorised and balanced.
Participation arena	Arena: aim, format, spaces	Producing input and values based on cold or hot settings and different ways of thinking

Figure 5, summary of factors influencing the way citizen input is gathered and weighed (Source: Made by author)

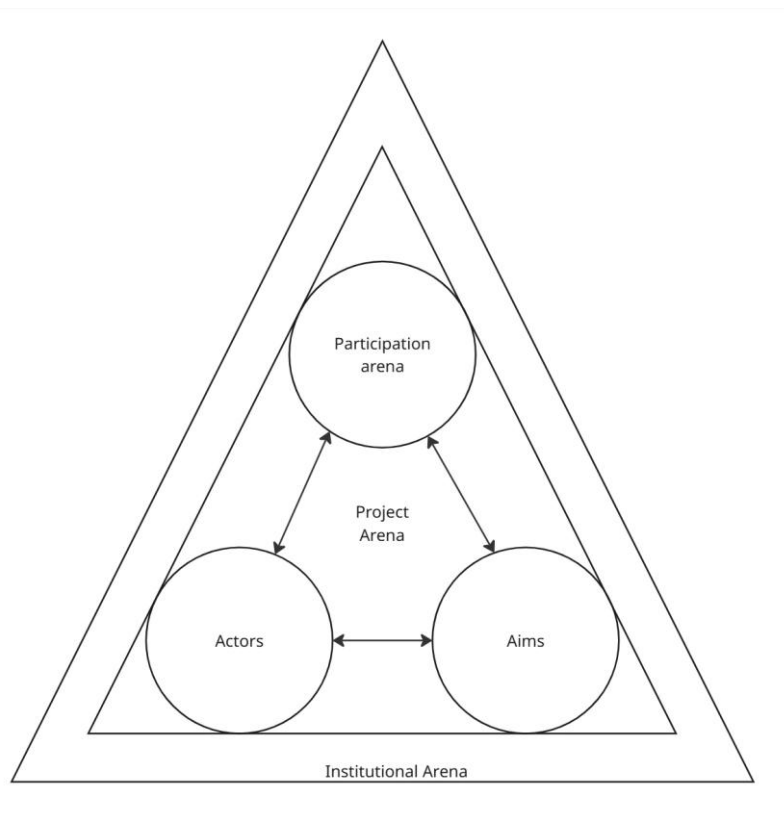


Figure 6, Conceptual relational framework (Source: based on Hofer and Kaufmann (2023))

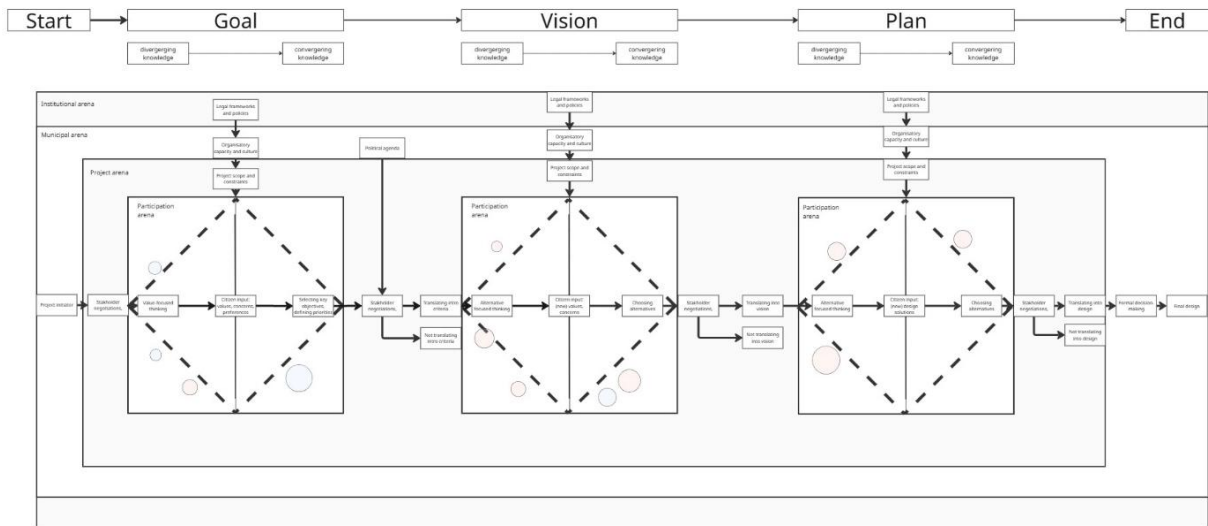


Figure 7, theoretical process model as recap of chapter (Source: made by author).

## 3. Methodology

This chapter elaborates on the research design and how data will be collected and analysed. To answer the main research question and sub-questions, multiple research methods are used. First, the type of research approach is described, followed by an explanation of how the literature review was conducted. After that, the case study approach will be explained, including the process of identifying and approaching interview respondents as well as the approach to conduct interviews. Finally, a brief outline of the data management and ethical considerations are discussed.

### 3.1. Research design

This study follows a hybrid research approach in which concepts derived from the literature provide the initial analytical structure for the analysis. The theoretical framework defines key concepts that guide how the empirical data will be examined and coded. These concepts help structure the analysis of how citizen values move through participatory planning processes. At the same time, the analysis remains open to additional themes that may emerge from the interviews. In particular, new insights may arise regarding how considerations and trade-offs are made in practice, an aspect that is only limitedly addressed in the existing literature.

This research approach is combined with a practice-based research perspective, in which knowledge is understood as something that emerges through action and participation (Gherardi & Nicolini, 2002). The theoretical framework provides deductive codes for analysing how values move through planning processes, but the practice-based perspective focuses on how these processes are implemented in everyday interactions between citizens and experts. A case study design supports this by facilitating an in-depth exploration of a specific project in its real life context (Huby et al., 2011), making it possible to observe how values and concerns are articulated and negotiated in practice.

The central research question focuses on how the weighing of citizens' values can be made more transparent, and how this process is reflected in VR models used in participatory urban design. Since the study aims to understand what citizens consider important and how this input is interpreted and taken into account by experts, a qualitative approach is appropriate.

The three sub-questions introduced in the introduction elaborate on different aspects of the central research question and are examined and addressed using different research methods. Figure 8 shows an overview of the research design.

The first and second sub-questions are addressed through a literature review. The first question focuses on the values, concerns, and priorities mentioned by citizens. This provides the theoretical background for understanding how citizens can contribute to thinking and decision-making about their living environment, and which values they articulate based on the applied tools and formats. Sub-research question two provides insights into how experts deal with this

input to direct it towards the decision-making process. By combining different frameworks and concepts, a new theoretical framework has been established which provides insights into the opaque process of generating knowledge and choosing alternatives. Besides usage of scientific sources, policy documents from the municipality were used to identify the fundamental values expressed by citizens during the participatory process for the development of the environmental vision in 2022 (Brécheteau, 2021). The way in which environmental interests are weighed against the prevailing policy framework is set out in the Strategic Impact Assessment<sup>2</sup>. Outcomes from the participatory processes are explicitly compared, making tensions visible and allowing alternative choices to be tested and evaluated. Both the (fundamental) values that emerge and the tensions, understood as value conflicts, form the basis for the first sub-question.

After this, the sub-research question is explored through interviews with residents from the municipality who are involved in the project. They hold diverse views, ideas, and concerns regarding specific parts of the design, which are valuable to understand. The second sub-research question addresses the perspective of experts and is examined through interviews with experts involved in the project. These interviews explore how citizen input is interpreted and weighed against other considerations, such as technical, policy, and financial constraints.

The final sub-research question addresses the application of VR. An exploratory VR test was conducted using a VR model of the proposed roundabout within the project area. The VR environment was developed in collaboration with the XR Lab of TU Delft and based on the sketches and CAD models previously presented during public participation meetings. The test focuses on how spatial interventions, traffic impacts, and citizen concerns can be translated into an immersive environment. Particular attention is given to the expected increase in traffic intensity and its impact on nearby residents along the northern side of the proposed ring road including the effect of vehicle headlights during dark periods (the so-called “lighthouse effect”) and perceived traffic safety for cyclists and pedestrians. Participants were able to experience the design from multiple perspectives, including those of residents, cyclists, and motorists. It builds on the second sub-question by examining — in a more technical and concrete way — which qualitative input from participatory processes can be translated into visualised design options.

Finally, residents’ perspectives will be compared with expert responses, by combining the findings of both interviews

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<sup>2</sup>The strategic Impact Assessment is a tool that supports the development of the Environmental vision, in which citizens input will be compared and assessed.

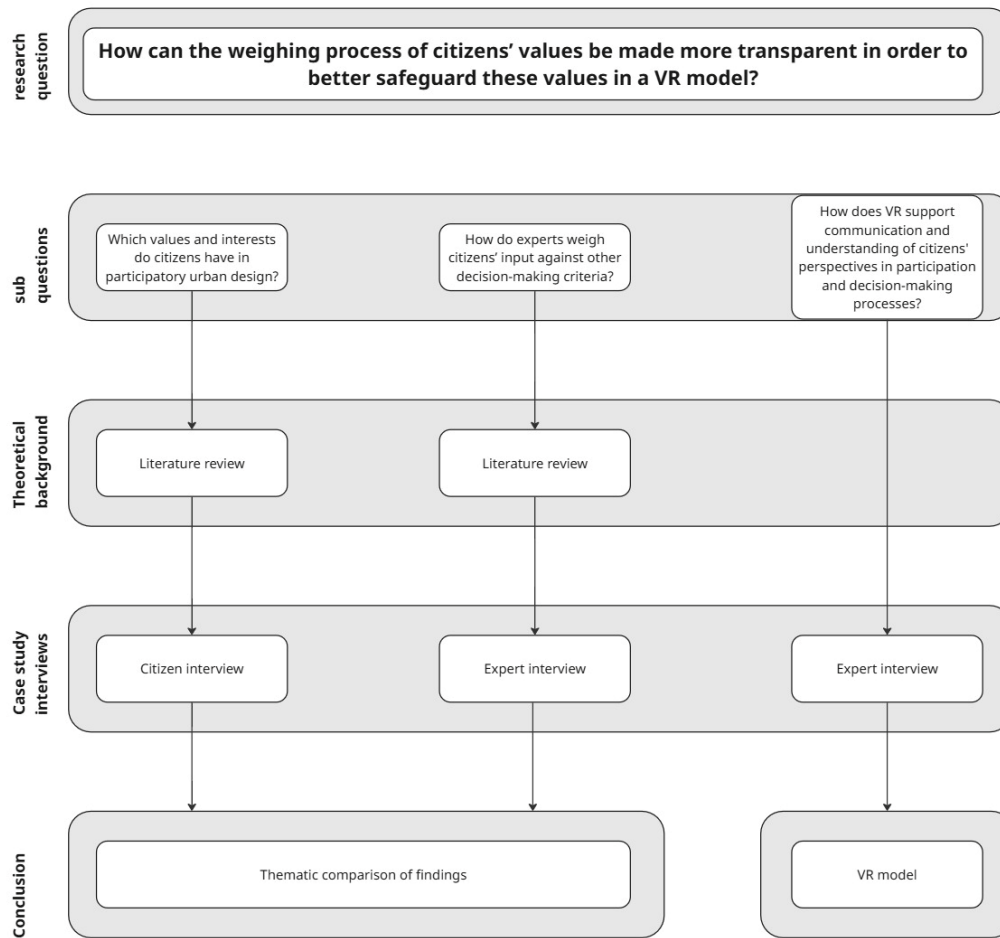


Figure 8, scheme research design (Source: made by author)

### 3.2. Literature review

Data collection starts with a literature review to identify key concepts and insights. The literature review identifies different concepts that explain how citizens' values are articulated, interpreted and translated into spatial planning decisions. Attention was also given to research on public values in participatory urban design processes and the institutional conditions under which citizen input is weighed and incorporated into spatial proposals.

Both English and Dutch academic literature are included by using Scopus and Google Scholar. The following key words, including synonyms, have been used as a starting point to identify appropriate scientific literature:

Key words	synonyms
Virtual Reality	VR, Immersive Environment, Augmented Reality, AR, digital
Urban planning	City planning, spatial planning, urban design, urban development
Participation	Co-design, codesign, co creation, participatory design, collaborative design, deliberative planning
Values	Public values, Interest, conflict, dispute, disagreement
Decision-making	Institutional context, participatory governance,

*Figure 9, used key words and their synonyms for literature research (Source: made by author)*

Figure 10 shows an overview of the literature research. The literature review of Loyola et al. (2019) and the research of Staffans et al. (2020) were considered as starting point for searching relevant papers and knowledge gaps. The 3A<sup>3</sup> – framework developed by Hofer and Kaufmann (2023) is used to develop a clearer understanding of what participation entails, the interrelated elements it consists of, and the context in which it is embedded.

Boolean operators (AND, OR) and synonyms and abbreviations have been used to enhance the outcomes of the research. To filter and exclude appropriate literature from questionable research, papers with relatively less citations were not considered most of the time. While the search prioritised recent literature published between 2020 and 2025 — as VR environments rapidly change for instance — several foundational works on public values and participatory planning were also included.

To find gaps related to VR in participatory planning, I read the abstract and conclusion. Based on this, I screened the rest of paper while keeping in mind the key words. Different AI-assisted tools were used to identify relations between papers and new, related papers. Examples of tools are Chat GPT, Notebook LM, and Research Rabbit.

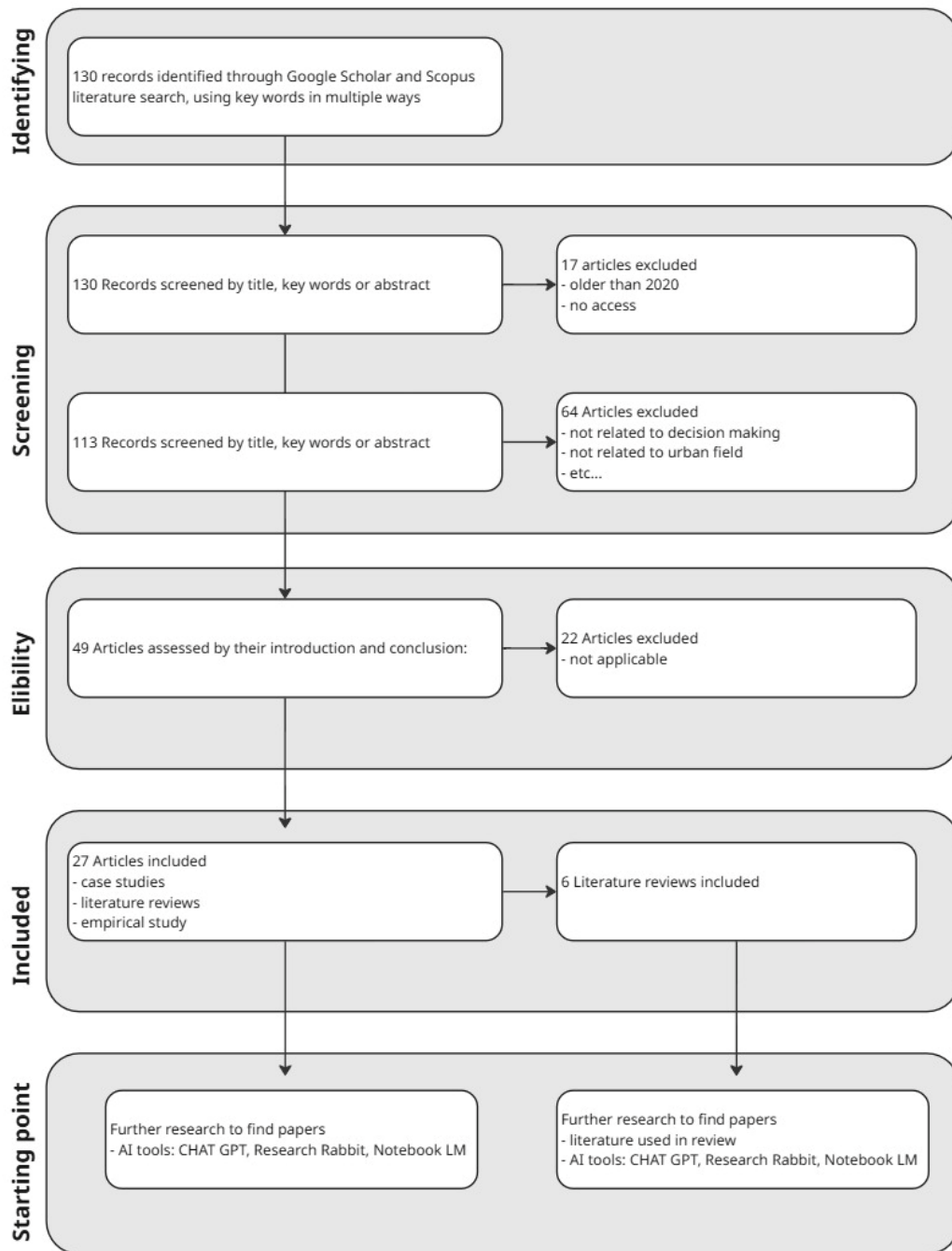


Figure 10, literature review scheme (Source Made by author)

### 3.3. Case description



Figure 11, location of trace on the northern edge of the city (Source: made by author)

The case study is embedded within the VR Retrofit 4U research project, carried out by the TU Delft. The aim of the project is to develop an XR (Extended Reality) model that prioritizes residents' experiences and participation. This collaboration provides access to both the case study and involved stakeholders, including experts and residents, which simplifies the selection of relevant interviewees and improves the practical feasibility of the research.

#### 3.3.1 Scope

The area development project is selected based on the current phase of the project as well as its project characteristics. It aligns with the phase in which citizens' input needs to be weighed and, eventually, translated into a VR model. The master plan has already been defined as part of the vision-forming phase, most likely resulting in a wide range of citizen input and values that needs to be considered. However, the concrete elaboration of the plan (plan forming phase)

has not yet been defined, leaving opportunities for residents to influence how the plan is further developed towards the final plan phase.

Regarding project characteristics, the project is suitable as a case study due to its mixed-use development, combining a road infrastructure project with residential development and additional changes in public space. The project is located on the northern edge of the city, with approximately 27,700 inhabitants (*Statistieken gemeente*, 2025). The development includes approximately 700 to 1000 new dwellings with a varied housing programme aimed at different target groups. Together with the trace, designed to accommodate increased traffic volumes in the future, this creates a context in which different and potentially conflicting values related to mobility, liveability and spatial quality are likely to emerge. Figure 12 shows the master plan of the trace.

The history of the proposed development dates back to 2009, when the expressed its ambition in its structural vision to extend the trace and connect it to the neighbouring roads. Following traffic studies and a citizen participation process, the municipal council approved this preferred scenario in 2009 (Gemeente, 2009). More recently, €2.6 million in national funding became available through the Woningbouwimpuls (Housing Construction Boost) programme, which has brought the project back onto the agenda. This came as a surprise to local residents and led to unrest, as many feel that the traffic situation has changed since then, with a noticeable increase in traffic volumes (Leanne de Munnik, 2025).

As the case-study runs alongside residential neighbourhoods, companies and greenery, multiple citizens can be expected to have an interest. The gardening association also holds a lease for the land on which the planned route is situated. The proposed developments are expected to have a spatial and social impact for the surrounding area, resulting in possible conflicting values and interests that must be addressed in the decision-making process. Together with the nature of spatial planning projects, in which multiple experts are involved with their own area of expertise, the current phase in the transition from vision forming to plan forming and the open attitude of the municipality towards citizens' participation (Gemeente, 2023), this case study is relevant for researching how values are weighed and negotiated, combined with the potential of using VR.



Figure 12, Master plan (Source: Frans Beune, *Landschap en Stedenbouw*)

### 3.3.2. Selection of interviewees

For the first set of interviews, conducted on 11 and 12 November, participants were selected using purposive sampling. This method allows the researcher to deliberately select participants who are directly involved in the case study and therefore able to provide relevant insights (Blaikie & Priest, 2019). Rather than relying on random selection, the researcher uses judgement to identify respondents who are closely engaged with the case, allowing for in-depth insights into the key themes.

Participants were selected based on their expertise and involvement in the project, ensuring representation of different roles within the process. The sample includes two project managers, a spatial planning advisor, an urban design advisor, and a traffic and transport advisor. In addition, two aldermen were interviewed, each holding a portfolio relevant to spatial development projects. Finally, an asset manager from a housing corporation involved in the project was included.

Taken together, the nine interviews provide a well-rounded representation of different perspectives on the area development process. Figure 13 presents an overview of the interviewed participants.

Time	Role
<b>11-november</b>	
10:00-11:00	Project manager
11:00-12:00	Advisor spatial planning
13:00-14:00	Senior project manager area development
14:00-15:00	Advisor urban planning
15:00-16:00	Advisor traffic and transport

16:00-17:00	Alderman with portfolio's: Economic affairs, Real Estate and Municipal Land Development, Spatial Planning and Spatial Development, Housing
<b>12-november</b>	
10:00-11:00	Alderman with portfolios: Traffic and Transport, Public Space management, Green policy, Water Management, Energy Transition
11:00-12:00	Asset manager housing association

*Figure 13: Overview expert interviews (Source: Made by author)*

For the second set of interviews, participants were selected in three ways. First, citizens were approached through purposive sampling, based on an assessment of the extent to which they have an interest in the ring road project. Local residents were defined as households living along neighbouring roads. These residents are expected to experience the most direct consequences of the new road, such as increased traffic and noise, reduced views, and concerns about traffic safety. They constitute an interest group of four households and have previously expressed their concerns through written submissions in collaboration with the local political party. (SP, 2025). Furthermore, members of the association were also considered stakeholders, as the complex will be relocated because the design of the ring road runs through its current location.

Finally, respondents were recruited through snowball sampling. In this approach, interviewees can suggest other candidates, helping identify additional participants who are relevant to the research topic but present during the public meeting (Blaikie & Priest, 2019). For example, the board of the allotment association and the SP faction leader have provided contact details of members who could be approached as involved residents. The Figure below (Figure 14) provides an overview of the interviewed participants.

Time	Role
<b>1 April</b>	
11:00-12:00	Municipal council member
13:00-14:00	Local resident and member gardening association
14:00-15:00	Local resident and member gardening association

*Figure 14: Overview citizen interviews (Source: made by author)*

The sample consists of one interview per stakeholder, except for the fifth interview in November (advisor traffic and transport) and the first interview (municipal council members) in April, where two participants were interviewed simultaneously. This provides insights into their perspectives and experiences. As a result of sampling strategy, the aim is not statistical representativeness but to gain an in-depth understanding of the phenomenon under study.

Regarding the VR sessions, they were conducted with experts involved in the project and combined interaction with the VR model with reflective discussion between participants and researcher. In total, four VR sessions were organised with two participants per session, resulting in a total of seven participants.

Time	Role
7 may	
13:00-14:00	Project manager and Asset manager housing association
14:00-15:00	Project manager and advisor traffic and transport
15:00-16:00	Alderman x and Alderman x
16:00-17:00	Advisor spatial planning

Figure 15, overview VR sessions (Source: made by author)

3.3.3. Data collection

By examining the perspective of both residents and experts, it becomes possible to compare how values and concerns move through the project and which arenas shape this journey. Semi-structured interviews were chosen because they allow respondents to explain their experiences and perspectives in their own words while still ensuring that similar themes are addressed across interviews.

The first round of interviews was conducted in November 2025, followed by a second round in April 2026. Each interview lasted between approximately 45 and 60 minutes. The first round focuses on the current stage of the project. Depending on their role, participants were asked to reflect on key decisions, challenges, and considerations within the process. Particular attention was also given to how participation with residents most directly affected by the project — citizens living near the planned route — has been organised. These insights clarify the approach adopted by the municipality to communicate the impact of the design to affected stakeholders. In this way, the role of different participation settings could be explored. The interview with the aldermen, in particular, focused on political steering and the institutional context, explaining how different arenas affect negotiations and (value) trade-offs. Particularly, tensions between the political agenda and considerations within the project arena became apparent.

The second round of interviews provides insights into what local residents value in their living environment and whether the proposed design aligns with their concerns and preferences. These personal accounts reveal the extent to which residents were able to understand the potential impact of the project. In addition, they offer a clearer picture of how the design has been developed and the extent to which, and with which groups of citizens, collaboration has taken place. The municipal council members further contribute an additional perspective on power relations within local governance and the role of the involved aldermen.

Finally, attention is also given to the timing and purpose of VR use within the participation process. The study examines how VR contributes to understanding spatial impacts, discussing design choices, and identifying which values and concerns can be visualised within participatory planning processes, while also considering the limitations and constraints of the technology.

#### 3.3.4. Data analysis

First, the interviews were transcribed and pseudonymised using Amberscript. The transcripts were subsequently analysed in the programme of ATLAS.ti, a qualitative data analysis software that supports accurate coding and thematic analysis (Schulz, 2012).

The coding process started with a preliminary set of deductive codes derived from the literature and theoretical framework. Deductive codes are used to test and validate the concepts from the literature and municipal policy documents (BréchetEAU, 2021), as well as to be able to categorize the interviews based on the literature. The deductive codes are based on three predefined categories: values-conflicts, participation, and institutional factors.

During the analysis of the interview transcripts, additional inductive codes were developed to capture themes emerging from the data. Within the category of value conflicts, a clearer distinction was made between conflicts related to environmental and spatial values, such as liveability and accessibility, and procedural values related to power, justice, and communication. Furthermore, inductive codes were added to capture the underlying rationales that shaped the actions and decision-making of experts. This makes the trade-offs made by experts — especially aldermen — between the project arena and political arena more visible, identifying governance dynamics that were not as clearly addressed within the theoretical framework. The coding process therefore developed iteratively throughout the analysis, following recurring themes and tensions from the interviews to refine and complement the theoretical insights.

As the interviews were conducted in Dutch, the codes are presented (simplified) in Dutch (left) and English (right).

## **Waarde-conflict**

- Omgevingswaarden hot setting:
  - o Leefbaarheid
  - o Groen
  - o Bereikbaarheid
  - o Veiligheid
  - o Voorzieningen
  - o Economische weerbaarheid
  - o Duurzaamheid
  - o Ruimtelijke identiteit
  
- Procedurele waarden conflict:
  - o Macht
  - o Transparantie
  - o Rechtvaardigheid
  - o Vertrouwen

## **Participation:**

- 1-op-1 gesprek
- Perceptie

## **Expert motief:**

- Inclusiviteit
- Kwaliteit
- Legitimiteit
- Controle
- Efficiëntie
- Risicomanagement
- Expertise
- Technisch
- Haalbaarheid

## **externe factoren:**

- Institutionele arena
- Politieke arena
- Project arena
- Politieke factor
- Individuele factor

## **Value-conflict**

- Environmental value, hot setting:
  - Liveability of residential areas
  - Green space, nature and spatial quality
  - Accessibility and mobility
  - Safety and health
  - Amenities and urban vitality
  - Economic vitality and strong town centre
  - Sustainability and climate resilience
  - Historical identity and spatial character
  
- Procedural value-conflict
  - Power
  - Transparency
  - Justice
  - Trust

1-to-1 conversation

Perception

## **Expert rationale:**

- Inclusivity
- Quality
- Legitimacy
- Control
- Efficiency
- Risk-management
- Expertise
- Technical
- Feasibility

## **External factors:**

- Institutional arena
- Political arena
- Project arena
- Political factor
- Individual factor

Because much of the interview data is closely tied to the local context, it is useful to map certain information spatially. During the interviews with nearby residents in particular, making notes, crosses, and arrows on an A3 map of the city helped respondents explain their answers in a clearer and more accessible way. For this reason, the map material will be linked to the transcripts and the codes mentioned above. The physical annotations on the maps will help clarify responses and make certain ideas or locations more explicit.

### 3.4. Validity and reliability

This section will discuss the reliability and validity of the study. This study follows a qualitative and interpretative approach that aims to provide insight into participants' experiences and interpretations, rather than producing statistically generalisable results. Based on four criteria for trustworthy qualitative research, described by Guba (1981), several measures are discussed to strengthen the reliability and validity of this study.

#### **Credibility**

The validity of a study can generally be divided into internal and external validity. Internal validity refers to the extent to which the research design accurately captures the relationship or phenomenon that is being studied, without the results being distorted by other factors. This is strengthened by selecting research methods that make it possible to examine how residents' values are expressed and interpreted in the case study. Clarification and follow-up questions during interviews helped reduce the risk of misunderstanding participants' statements and interpretations. Furthermore, by combining different data sources, such as the perspective of residents compared to the experts and observations from the VR test, the study aims to capture this process as accurately as possible within the context of the case study. This form of triangulation enhances the credibility of the research findings by identifying recurring patterns, such as opinions and values, across different sources of information (Stahl & King, 2020).

#### **Transferability**

External validity concerns the extent to which the findings of the study can be applied to other contexts, populations or situations (Shenton, 2004). Because this research is based on a single case study, the aim is not to produce statistically generalisable results. Instead, the study provides an in-depth view of how citizens' values are articulated and translated within a specific participatory planning process. According to Shenton (2004), researchers differ in their views on the extent to which contextual information about the research setting and methods should be described. This thesis therefore provides extensive contextual information about the case-study context and the institutional setting in which the case takes place. Although the findings remain context-specific, the case of a relatively small Dutch municipality reflects broader challenges within spatial planning, including tensions between citizens' participation and project feasibility. Based on these contextual similarities, readers and researchers can assess the extent to which the findings may be applicable to other planning contexts.

## **Dependability**

Dependability concerns the degree to which similar results would emerge if the same study were conducted using the same methods, participants, and research context (Shenton, 2004). Within this case study, the research setting is highly dynamic and context-dependent due to several factors. The political and institutional arenas illustrate the changing nature of spatial planning processes, where previous decisions, administrative considerations and political sensitivities shaped participation and decision-making. To strengthen dependability, these contextual and procedural factors are described in detail, to ensure that future researchers are aware of them and can take them into account. Reflection on methodological limitations and on the interpretations of the findings, also see chapter 6.1, is essential for assessing the effectiveness and reliability of the research process and its outcomes.

## **Confirmability**

Confirmability concerns the extent to which findings emerge from the experiences and perspectives of participants rather than from the assumptions or preferences of the researcher. (Patton, 1990). To support this, the research process has been described as transparently as possible by explaining how data were collected, coded, analysed and interpreted. A structured coding procedure using Alasia was applied throughout the analysis process. Interpretations presented in the results section are supported by direct quotations from the interviews. Including such quotations allows readers to see how the interpretations are what respondents actually said during the interviews and helps demonstrate that findings emerge from participants' perspectives rather than from the researcher's assumptions.

At the same time, qualitative research inevitably involves — often subconscious — the perspectives and assumptions of the researcher. In this study, this includes the normative assumption that participation processes should ideally be organised according to the democratic principle. Personal interest in VR as an innovative gamification tool may also have influenced the evaluation of VR applications, while the political perspective of the researcher may have affected the analysis of governance tensions between the SP faction and the aldermen. Although the analysis aimed to describe both perspectives empirically and as evenly as possible, certain arguments or concerns may unconsciously have been interpreted as more legitimate, participatory or socially desirable than others.

## **3.5. Ethical considerations**

Research involving human participants involves potential risks, making it essential to protect participants from harm (Blaikie & Priest, 2019). All participants, so both citizens as well as experts, were informed in advance about the purpose of the study. The informed consent can be found in appendix IV. Participation was voluntary, and respondents could withdraw at any time. Interviews were pseudonymised, and personal data such as name, age, gender, role and political party are not traceable since this data is linked to a random key that is not accessible. This prevents identification of individuals. Especially in a smaller sample such as the municipality

of the case study — a relative small organisation with a few stakeholders — this is necessary to avoid the information being traced back to individuals. Finally, the findings of this study will be stored using SURFdrive, provided by the TU Delft. This ensures the privacy and confidentiality of all participants.

### 3.6. Data management plan

Careful data management is essential throughout the research process. A data management plan is included in Appendix IV. Identified risks are categorized according to their relevance to this research design. Interview recordings, transcripts, and analysis materials are stored securely and used exclusively for this study. After completion of the research, the report will be uploaded to TU Delft's repository, which will be findable with the used key words. Processed data is stored in the protected space of SURFdrive. Raw material such as physical notes and A3 maps including marks will be securely destroyed after the completion of this research.

## 4. Results

The results are structured around two types of values that emerge in the case study: environmental values and procedural values. The chapter first discusses how these values lead to tensions and value conflicts. It then examines the strategies used by experts, the underlying motives that guide their actions, and how external factors influence the trade-offs they make. Finally, the potentials of VR regarding participation and decision-making will be discussed.

Following this structure, sub-question (1) is addressed first, after which the perspective of experts is discussed to answer sub-question (2). Sub-question (3) is addressed in the final section.

*(1) Which values and interests do citizens have in participatory urban design?*

*(2) How do experts weigh citizens' input against other decision-making criteria?*

*(3) How does VR support communication and understanding of citizens' perspectives in participation and decision-making processes?*

The data show that two types of values emerge, which can broadly be divided into values related to outcomes and values related to the process. The first category concerns the outcomes themselves: environmental values that describe what citizens consider important in their physical living environment. These include environmental qualities such as greenery, traffic safety, and a liveable neighbourhood. Certain values are experienced as problematic and thereby provide the reason for a spatial intervention. The intended outcome of such an intervention is to improve the environmental qualities associated with these values. The second category consists of procedural values, in which citizens' judgement of fairness and justice is shaped by how they experience the procedure (Van Velthoven, 2011). These values relate to power, communication, and equal treatment. Figure 16 provides an overview of the distribution of the values mentioned.

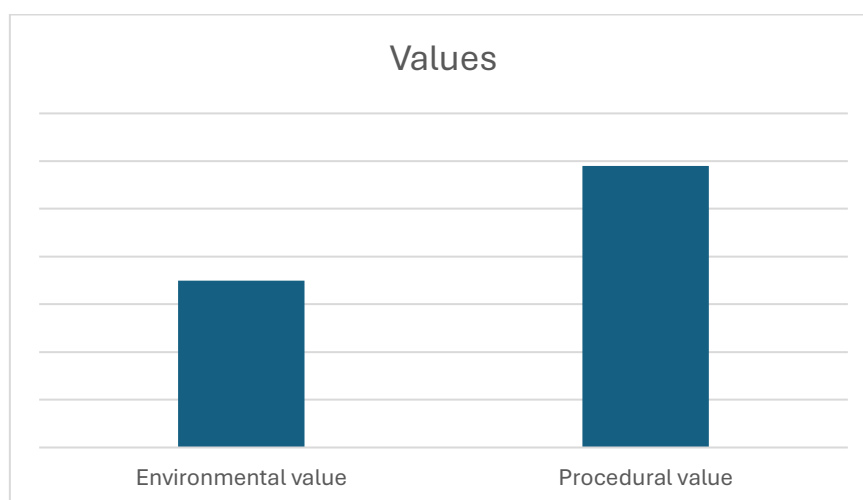


Figure 16, Overview of two types of values mentioned in interviews (Source: made by author)

#### 4.1 Environmental value conflicts

Environmental values represent aspects of the physical environment that citizens consider important and wish to protect or realise (Herzog et al., 2024). These are the basis of what citizens prefer, expect or where concerns will raise when these values are negatively affected. An overview of fundamental values is first presented, specified for the local context of the case study, providing a basis for assessing how the proposal relates to these environmental values. Citizen data collected through the Wijkprikker (W.J. Daggenvoorde & BréchetEAU, 2022) — an online participatory tool as part of the revision of the municipal environmental vision. This allowed residents to indicate what they considered important in their living environment, what they were proud of, and where they saw opportunities for improvement. With more than 500 responses, the tool provides a broad overview of the underlying fundamental values and instrumental values related to the quality of the living environment. Figure 17 shows an overview of the key environmental values and associated measures to achieve those values.

Fundamental values	Instrumental values / measures
Liveability of residential areas	Maintenance of public space, addressing neighbourhood deterioration, keeping public areas clean, limited environmental noise and nuisance
Accessibility and mobility	Improving cycling infrastructure, expanding public transport
Safety and health	Traffic calming measures, car-free or low-traffic areas, safe playgrounds
Green space, nature and spatial quality	Adding more greenery in neighbourhoods, greening squares and public spaces, stimulating biodiversity
Recreation and outdoor space	Investing in Borgerswold, creating walking and cycling routes, sports and playground facilities
Amenities and urban vitality	More restaurants and cafés, events and terraces, social and cultural activities
Social cohesion and community	Meeting places, neighbourhood activities, facilities for youth
Housing and housing quality	New housing development, diversifying the housing stock, housing for seniors and starters
Historical identity and spatial character	Preservation of canal structures and historical buildings, adaptive reuse of heritage buildings
Economic vitality and a strong town centre	Tackling vacancy, creating a more compact retail centre, stimulating entrepreneurship
Sustainability and climate resilience	Energy-efficient housing, solar panels on rooftops, water management and climate adaptation

*Figure 17, Overview of environmental values gathered through the online 'Wijkprikker' Tool. (Source: BréchetEAU (2021))*

The analysis of the interview data reveals both similarities and differences between the values outlined above and the values related to the design of the trace. The data show that the values

and concerns regarding the proposal mainly relate to liveability, including views and environmental noise. These concerns are closely related to values such as accessibility, traffic safety, and health. Greenery and spatial quality, and outdoor space are identified as important, as shown in Figure 18.

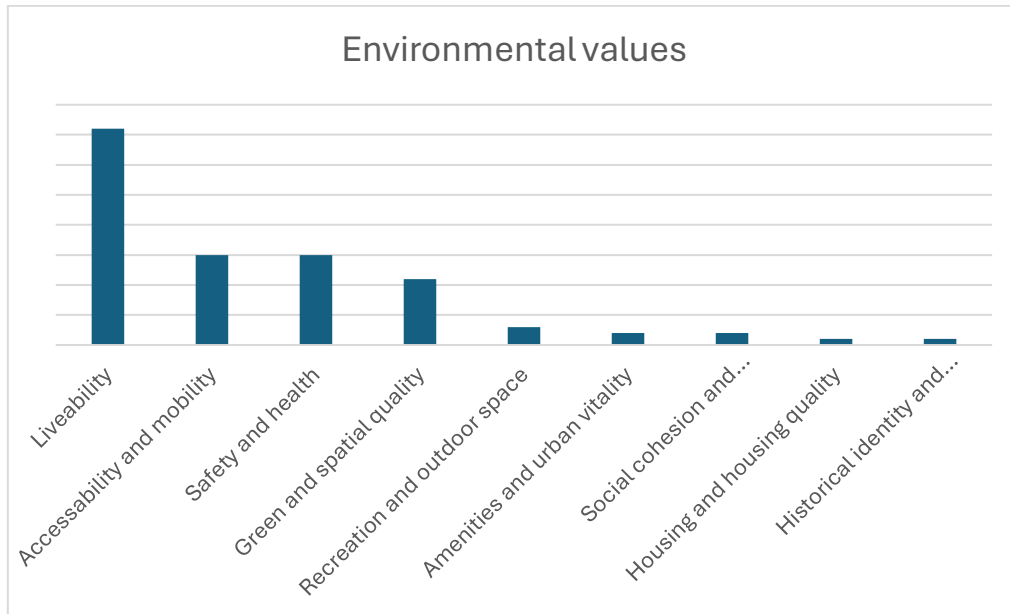


Figure 18, overview environmental values mentioned during interviews (Source: Made by author)

The Sankey diagram (Figure 19) shows that citizen's values frequently co-occur with hot settings, suggesting that issues and values citizens consider important are often linked to strong stakes, heightened emotions and strong concerns (Fung, 2003). On the one hand, this reflects concerns about aspects of the living environment, such as liveability and traffic safety. Experts acknowledge these concerns, which shapes the planning problem for which spatial design seeks a solution through the realisation of public values (Candel & Paulsson, 2023). On the other hand, the proposal itself also generates controversy since it makes value conflicts explicit. In such situations, tensions may already exist in a latent form before they surface in participation processes, since differences in interests or perspectives have not yet been openly discussed or translated into concrete design proposals. According to Herzog et al. (2024), values become concrete and may come into conflict once they are materialised in space. In this case, the proposal activates existing tensions about increased traffic intensity.

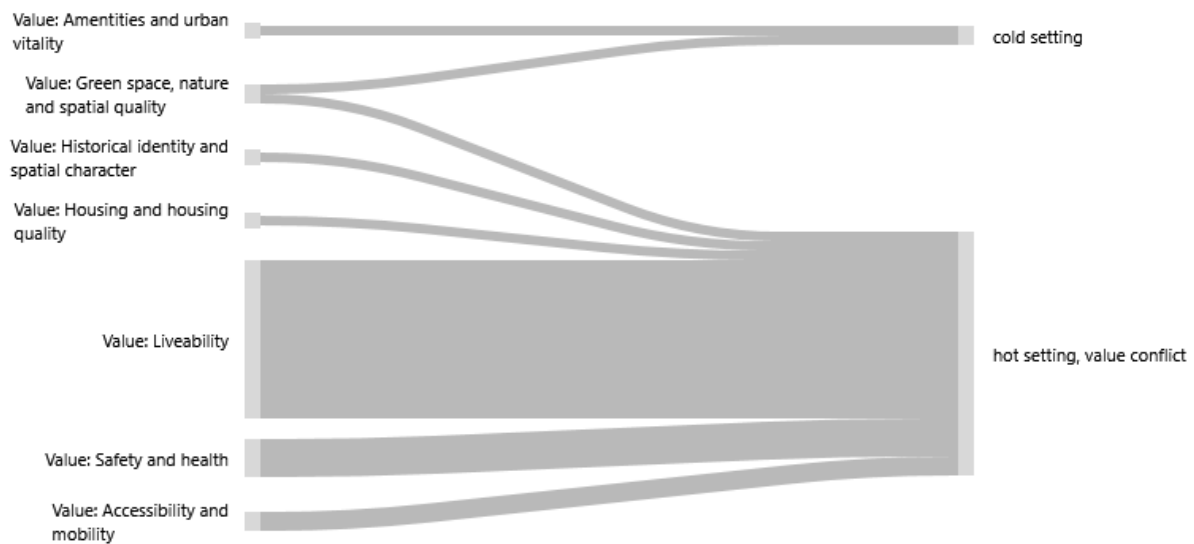


Figure 19, Sankey diagram showing the relationships between expressed values and high stakes (Source: made by author using Atlas.Ti)

The interview data reflects both lines of reasoning through concerns about conflicting values related to, on the one hand, liveability and, on the other hand, safety and accessibility. Although the speed limit is 50 km/h, residents experience that many motorists exceed this limit. Concerns are particularly strong at a road connected to the ring road, where current traffic conditions are perceived as unsafe because of high driving speeds. An involved project manager explained: *“People here have also indicated that cars drive very fast here.”* At the same time, concerns about accessibility form the direct reason for extending the ring road. According to residents, traffic flow is already insufficient, especially during rush hour: *“But the result is that, especially during rush hour, traffic becomes a gigantic mess in [the city].”* Several roads are already unable to accommodate current traffic volume, while future housing developments in the nearby neighbourhood are expected to increase pressure on the road network further. *“Adding 600 houses here means it will become extremely busy here.”*

The second line of reasoning suggests that the extension of the ring road also triggers value conflicts because it makes value explicit. Residents expect the proposal to increase traffic on nearby roads and express concerns about rising traffic intensity directly in front of their homes. These concerns mainly relate to traffic noise: *“And if you ask further, then the problem is not the number of cars, but the noise caused by speeding traffic.”* The proposal also raises concerns about preserving existing views, which aligns with what Herzog et al. (2024) describe as conservatism as a value: the preference to maintain the current situation. Residents who currently overlook open land feel entitled to retain this view. As a project manager explained: *“People who are used to having an unobstructed view over a vacant plot and a sparse pond [...] they do have opinions about that.”* In addition, several residents expressed concerns about headlights from vehicles. Traffic circulating around roundabouts may create a “lighthouse

effect”, where headlights shine into nearby homes: *“There are still some people here, I think, who believe that [...] the headlights shine too much into their windows.”*

The proposal primarily affects the value of liveability due to the expected increase in traffic on certain roads. Within the public debate, directly experienced and situated values become more dominant than collective or abstract values (Bakunowitsch et al., 2024). Other values are affected not as much. As one urban designer explained, citizens mainly become involved once impacts become tangible in their daily living environment: *“And as soon as you become concrete with these kinds of matters, people do start to engage [...] But when it happens in their front yard, then they are involved, because they look out over it. That is when it becomes tangible.”* At that stage, the participation process shifts into a hot setting.

Values related to greenery and facilities are also discussed in relatively cold settings. A plausible explanation is that these values are not central to the proposal itself, meaning that the planned intervention does not strongly conflict with these values. The project concerns an access road with relatively limited effects on surrounding nature. In addition, although citizens consider greenery and facilities important (Figure 18), these aspects are not currently perceived as problematic, generating less discussion and fewer tensions.

## 4.2 Procedural values conflicts

Second, “heat” can also emerge from concerns and value conflicts concerning procedural values. In these situations, public resistance, emotions, and strong convictions result from the way decisions are made, particularly when this conflicts with values such as fairness, being heard, and trust in institutions. Figure 20 provides an overview of procedural value conflicts identified in the interview data.

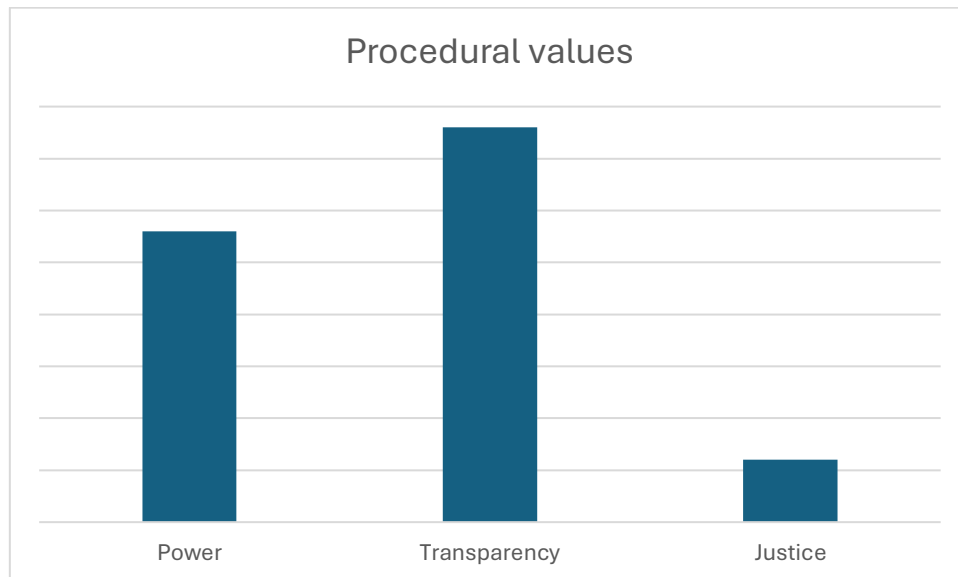


Figure 20, overview of procedural values mentioned by participants (Source: made by author using Atlas.Ti)

The first value concerns the extent to which participation feel that they can influence outcomes. This includes both opportunities for participation and the extent to which input affects the final design. There was limited opportunity for citizens to influence fundamental aspects of the proposal, as the interviews suggests that the overall design had already largely been determined. As one spatial advisor explained: *“The road is essentially cast in concrete [...] there is still some room for adjustment, but in principle there is very little room within the alignment itself.”* Given that the project is in the third diamond, this aligns with alternative-focused thinking (Keeney, 1996), where citizens respond to predefined solutions rather than shaping the design of the road or the location of the road. Although proposed solutions focus primarily on the spatial integration of the road, not all outcomes of participation could be used in decision-making, causing discussions to be perceived as symbolic rather than consequential. This illustrates how limited opportunities for meaningful influence can generate procedural tensions related to exclusion and loss of control.

A second procedural value that generates tension concerns the lack of transparency in communication throughout the participation process and the limited feedback provided to citizens afterwards. Several key decisions had already been made, as earlier council decisions regarding the location of the road dated back to 2009. Reintroducing the proposal created

uncertainty about what would happen and how decisions would unfold, particularly because communication about the proposal remained unclear. One resident explained: *“the only feedback we received came from the project about those garden plots and from that television broadcast [...] and we got that information from the TV programme, not from the alderman, that the allotment gardens had been given another destination.”* Reintroducing the proposal without transparency created heat among residents because the proposal directly affected their living environment and conflicted with expectations they had existed since 2008. During the intermediate period between 2009 and now on, the neighbourhood itself had changed considerably. New residents had moved into the area without being familiar with the earlier discussions or agreements, while traffic conditions also had evolved through increased number of cars and changing mobility patterns. According to project manager x: *“Yes, maybe he said that we were not going to build there again for the time being.”* Circumstances had changed, causing experts and policymakers to return to earlier statements that the trace would not be extended.

Justice forms a third procedural value contributing to the emergence of a hot setting among citizens. This concerns procedural justice, referring to equal opportunities to participate in decision-making, as well as distributive justice, which involves the impartial balancing of conflicting interests and the recognition of different forms of knowledge and values (Weghorst & Singelenberg, 2024). The interviews reveal a perceived sense of arbitrariness in how participation was organised, as experts distinguish between different groups of citizens. Not all citizens are invited to participate at the same stage of the process, and some may not be invited at all, resulting in unequal opportunities to influence decision-making. Concerns raised by citizens were only acknowledged to a limited extent or even dismissed, as mentioned by a resident: *“At that point, we told them that all the measures they were proposing were short-term solutions [...] The alderman would often dismiss our concerns and simply say: ‘Well, this is going to happen anyway. This is how we are going to do it.’”* Local party politics and the way decision-making processes unfold also play an important role in perceptions of fairness. These aspects are discussed further in section 5.1, as part of the synthesis between strategies and conflict.

The procedural value conflicts described above contribute to a decline in trust in local government and public officials. According to an expert who had been involved in the proposal for a longer period, concerns expressed in earlier stages had never been properly addressed, while these same concerns resurfaced: *“You do not know the entire history, and the feelings that the directly affected residents have expressed are of course also difficult for those people. [...] then trust in the municipality disappears as well.”* Earlier negative experiences with participation processes can further deepen distrust, even in situations where the design itself does not (yet) produce clear instrumental value conflicts, such as trade-offs between green space and traffic. This can lead citizens to redirect their feelings of powerlessness into collective action and public mobilisation.

Fundamental value	Instrumental values / measures
Lack of influence	Decision-making without citizen input
Lack of transparent communication	Not being kept informed about progress
Fair decision-making	Equal access to decision-making and governance

Figure 21, overview of procedural values (Source: made by author)

### Popular spaces

When opportunities for influence are experienced as limited, participants may seek alternative ways to make their concerns visible, for example through media attention, political pressure, or legal procedures (Fung, 2003). Drawing on Cornwall's (2017) distinction between invited and popular spaces, the case also shows that when formal participatory spaces offer insufficient access, recognition, or influence, the public arena — settings outside the formal participation arena — itself can become a means through which citizens seek to force political responsiveness.

A relevant example concerns the public resistance expressed by a local garden association following the expiration of its rental contract as a result of the proposed road alignment., despite being directly affected by the proposal, the association had not been consulted beforehand. In response, its members sought public attention through local media, after which a new location was proposed by the municipality. According to alderman x: *"Then they started mobilising the municipal council, saying how antisocial the municipality was [...] and then they came with a television programme: Ook dat nog<sup>3</sup>. And all kinds of protest signs and some kind of horse-drawn tram and so on."*

This quote illustrates how citizens may seek alternative arenas to voice their concerns when opportunities for participation are perceived as insufficient. It also shows how a relatively "cold" setting can evolve into a "hot" one. While interests were already present back in 2009, they only became emotionally charged when the municipality failed to communicate transparently about the implications of the proposal for the garden association. The absence of open communication shifted the issue from a substantive matter to a procedural one, centred around distrust and perceived unfairness. This shows that "heat" in the participation process emerged through the organisation and conduct of the process, rather than from the debate of value conflicts itself. The lack of influence made the material loss more emotionally charged and exposed how political power was unevenly distributed in the process. This reinforces the idea that procedural shortcomings can activate tensions, even when initial design impacts appear limited.

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<sup>3</sup> "Ook dat nog!" is a Dutch satirical consumer affairs television programme, broadcast by KRO-NCRV in which a regular panel humorously addressed consumer complaints and everyday problems.



### 4.3 Strategies for coping with value conflicts

To understand how experts handle citizen input and deal with the previously identified value conflicts, this section identifies the strategies they apply. The interviews reveal several underlying rationales, also see figure 22. To provide a more comprehensive picture, these rationales were informed by empirical findings as well as by definitions and concepts outlined in the theoretical framework.

- **Feasibility:** Ensuring that different stakeholders and viewpoints are represented in decision-making.
- **Risk management:** Identifying and addressing concerns early to prevent conflicts and resistance.
- **Control:** Maintaining influence over the direction, scope, and generated input of citizens (Dudley et al., 2018)
- **Efficiency:** Reducing delays and enabling timely project implementation.
- **Expertise:** Drawing on professional knowledge and experience
- **Inclusivity:** Representing diverse stakeholders and perspectives (Fung, 2003)
- **Technical:** Trust and compliance with technical models and data
- **Quality:** improving decisions and outcomes through integration of local and experiential knowledge
- **Legitimacy:** increasing perceived fairness and acceptance of decisions (Thomassen et al., 2014)

What stands out in Figure 22 is that experts primarily act on the basis of project-related considerations, particularly feasibility. Risk management, control, efficiency and expertise are also mentioned regularly, although to a lesser extent. Democratic rationales are mentioned considerably less often by both experts and citizens. These rationales encourage experts to participate with citizens according to inclusivity and legitimate decision-making.

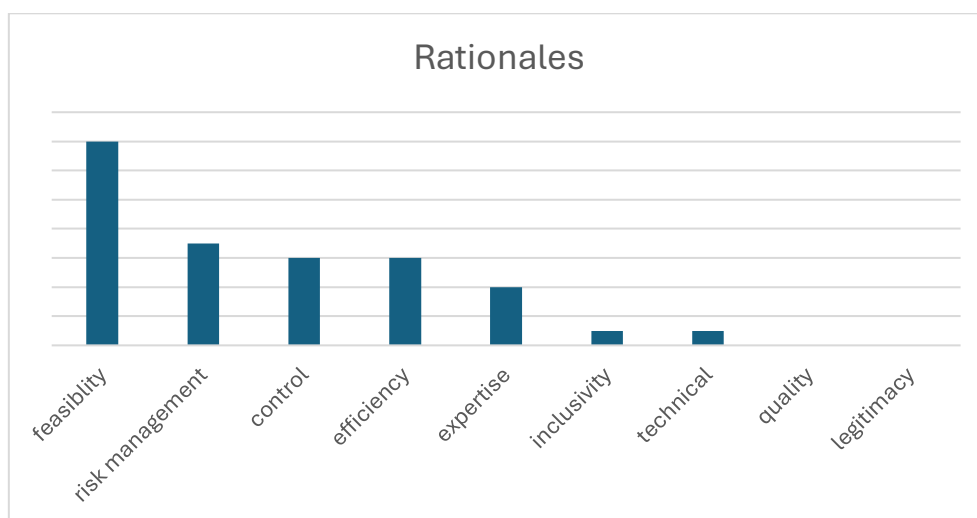


Figure 22, overview of expert rationales (Source: Made by author using Atlas.Ti)

The identified rationales can be linked to strategies that experts apply throughout the planning process, before, during and after participation with citizens. These rationales shape how experts define the direction of the project, through which spatial issues are interpreted, boundaries are defined and problems are made manageable before participation takes place. Within this process of problem definition, experts assess what exactly constitutes the problem, why it is considered problematic, and from which perspectives or social groups the problem gains meaning (Wassink & Honingh, 2024). Therefore, these rationales guide the problem framing, how experts organise participation and how citizen input and conflicting values are incorporated into decision-making. Figure 23 illustrates the relationship between the identified rationales and the strategies employed by experts. The following sections further elaborate on these three strategies, linking them to the rationales and discussing their implications for participation and decision-making.

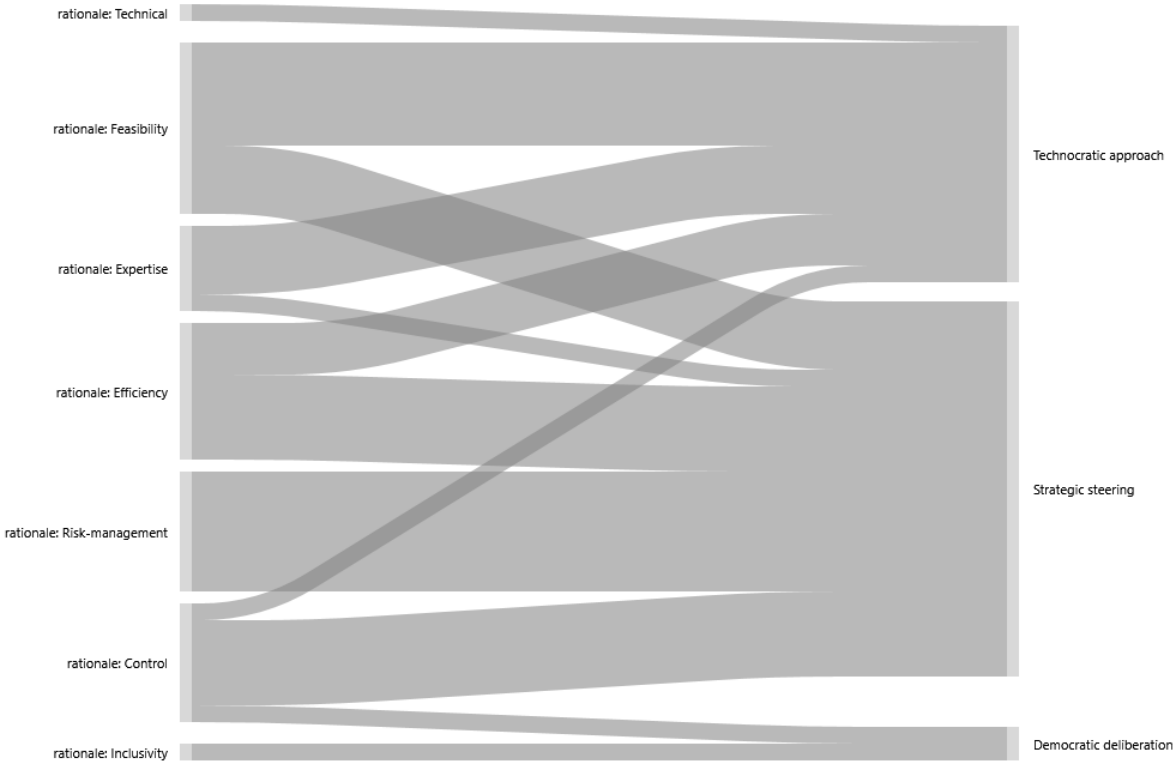


Figure 23, relationships between rationales and strategy

### 4.3.1 Deliberative approach

The deliberative approach — aimed at recognising and respecting public values — is only marginally reflected in the findings. Inclusivity is mentioned only once, while legitimacy is never mentioned. This suggest that experts primarily approach practical and project-related considerations. However, the deliberative approach emerges during the early stages of the project, particularly within the first and second diamond, where problem exploration, vision development, and the formulation of initial solution directions are central. According to two

aldermen, the broader decision regarding the road intervention has already been made through an extensive process of public participation back in 2009. During these phases, major decisions are still relatively open, creating more room to incorporate different perspectives, local knowledge, and lived experiences before choices become fixed.

#### 4.3.2 Strategic participation

In this approach, project interests and expert knowledge carry more weight than in deliberative sessions. Especially in the current phase where the existing decision regarding the trace is considered leading, the room for fundamental project changes is more limited. Opening up the process completely would introduce — for experts — undesirable, new uncertainties. Experts mainly focus on several small bottlenecks within the project that require additional consideration. Experts acknowledge concerns only to a limited extent, while they emphasize that collective goals, such as improving traffic circulation and accessibility, ultimately outweigh individual objections. This is illustrated by statements such as: *“the general interest is slightly more important here than the individual interest. We make sure the individual interest is handled properly, but in the end the project still has to move forward.”*

This illustrates how priorities gradually shift from democratic ambitions such as openness and co-decision-making towards project-oriented concerns related to *efficiency, risk management, and maintaining control* over the implementation process. Possibilities of participation are still regarded by experts as legitimate, but its role shifts from co-defining the project and broad participation towards resolving individual concerns and negotiating project-specific solutions with directly affected residents. The more open the process is — with as many stakeholders, perspectives, and values as possible — the bigger the likelihood of conflicts, delays, and uncertainty about the direction of the project (Aschhoff & Vogel, 2018). While conflict — understood as a disagreement between stakeholders — is legitimate from a democratic perspective, it may generate tensions with efficiency and control.

First, experts aim to retain control over the participation process, in the first place over the type of input that is generated by citizens. This may involve framing the problem for citizens in a way that makes participants more inclined to provide technical and solution-oriented input that fits the defined planning problem (Dudley et al., 2018). Experts also limit the range of alternatives that can be discussed. As one spatial planning advisor described it, this was a tactical decision not to present all information at once: *“But we are not going to mention the numbers, at least not for now, because it depends on how people perceive things. One person sees a hundred small walls, while another immediately imagines a hundred apartments appearing everywhere at once.”* Experts deliberately consider where flexibility should remain within the design. The preference for a roundabout rather than an intersection is subsequently incorporated into the design and presented as a ‘fixed’ element, whereas certain aspects of the urban design are intentionally left open to stimulate discussion. For example, by using shaded areas instead of

fixed elements, residents are encouraged to express initial concerns and ideas: *“They deliberately left it somewhat open to gather reactions when it is presented.”*

Secondly, experts retain control by offering tailor-made solutions, often with the underlying aim of preventing project delays and managing value conflicts. Municipal officers engage with citizens in personal settings, such as conversations at their homes, exploring what is needed to address their concerns and manage their expectation. According to one project manager: *“You really have to go there, sit down with them at the kitchen table, have a coffee, and explain things calmly.”* Within this pragmatic and people-oriented approach, experts rely on their experience with similar cases and on their “gut feeling” to assess which citizens are most likely to be affected by the proposal, and where the main concerns are likely to arise. As one project manager explains: *“[...] What kind of nuisance might arise? How can we anticipate that in advance?”* The short lines of communication and personal connections between experts and citizens within the municipality play a role as well. Aschhoff and Vogel (2018) describe this coping strategy as “casuistry”: making situational and case-specific judgements in which the room for certain values, such as inclusiveness or control, is determined per individual or situation. Rather than following a standardised approach, experts assess case by case whether citizens’ concerns fit within the existing framework, what information to share and whether there is room to deviate from it.

The maintenance of control also enables experts to prevent or reduce hot settings caused by value conflicts. In this regard, the distinction between invited and popular spaces is relevant for understanding the strategies that are employed. In popular spaces — when citizens seek attention through the media for example — their position is often already more fixed. In invited spaces, opinions may develop and intensify through public debate or a small number of vocal actors. This can spill over into top-down participation formats and increase the risk that heat spreads among a wider group of participants, escalating the hot setting. Experts therefore seek to identify and address potential bottlenecks early, often through informal and small-scale interactions.

The reasons for retaining control are closely related to path dependency. Earlier choices continue to shape the rest of the process, as agreements and selected design directions determine which options remain available, excluding alternatives. This dependency arises from limitations in the scope of the project, which lead experts to make strategic choices. These choices are linked to internal considerations within the project arena, including negotiations between experts and agreements from the past that still need to be honoured. But they also relate to the institutional arena, including existing legislation and policy frameworks at both municipal and national level. Agreements made within the housing deal<sup>4</sup> set targets for the

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<sup>4</sup> The Housing deal, in Dutch Woondeal

number of new dwellings. In addition, the Woningbouw impuls<sup>5</sup> has played a key role in restarting the project through national subsidies aimed at projects that would otherwise not be realised due to financial shortcomings.

Such strategies allow experts to address concerns while safeguarding the rationales below:

- Feasibility: safeguarding technical, financial, and regulatory constraints
- Control: maintaining the ability to steer outcomes and deliver the project
- Efficiency: avoiding delays and keeping the process manageable
- Risk management: limiting opposition, conflict escalation, or political controversy

### 4.3.3 Technocratic handling

Within the strategic steering approach, a more technocratic form can be distinguished in which experts solve the planning problem internally, without citizen participation. In such cases, the problem is treated primarily as an expert issue, rather than as a democratic arena in which citizens can exercise influence (WRR, 2004). This is especially the case for structured problems that are limited to one policy field or sector, where expert knowledge tends to play a dominant role (Rittel & Webber, 1973). An example includes the choice of a roundabout from the perspective of traffic safety and traffic flow models. The first motive is therefore that experts rely mainly on their own knowledge and experts competence. Traffic engineers, for example, draw on their technical expertise when choosing an access road with a specific road layout. In doing so, they make internal trade-offs in which one value (e.g. traffic flow) outweighs another (e.g. safety): *“The same applies to a deliberate decision to implement a roundabout here. This is quite a busy road, and it is expected to become even busier, so maintaining traffic flow is important [...] Here, the rationale is more from a safety perspective, whereas in this case it is more about traffic flow.”*

This corresponds with the coping strategy of “bias”, described by Aschhoff and Vogel (2018), in which one value is made dominant within the design. In this case, that value aligns with internal project considerations. Although the design aims to serve the public interest as well as possible — which is part of the role of spatial planners — experts also have internal reasons for prioritising certain solutions over other interests when values conflict: *“We are also going to build a road where people can drive fifty kilometres per hour towards the N33. People may find that unpleasant because it may create noise, views of cars, or, yes, danger. Traffic danger.”* A related motive is technical rationality, where experts rely on models, data, and research. The debate shifts from moral questions about what people consider important towards technical solutions, often shaped by underlying institutional or project-related reasons. For example, mandatory traffic analyses and ecological studies, which are intended to safeguard public values

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<sup>5</sup> The Woningbouwimpuls (WBI) stands for Housing construction boost, a financial incentive to accelerate the housing construction.

such as traffic safety and biodiversity, steer spatial projects towards what is considered rational and legally correct.

In the case study, however, the reliance on data and models is inconsistent. The preliminary design of the route is still being continued on the basis of traffic studies from approximately fifteen years ago, without carrying out a new traffic analysis. As a result, the underlying rationale shifts from a purely technical one towards an organisational and political one, fitting the approach mentioned before. Realising the project within existing agreements and available resources becomes more important than updating the knowledge base.

This points to an important nuance within technocratic handling. Although decisions are legitimised by referring to expertise and models, other motives such as efficiency, progress, and administrative consistency play at least as important a role. If technical rationality had remained the leading principle, updating the traffic model would have been a logical step. The absence of such an update shows that continuing with the existing plan is both a technical and a strategic decision. Nisha and Nelson (2012) show that design decisions in practice are often strongly shaped by experts routines, assumptions, and the interpretations of experts themselves. In the context of a relatively small municipality, experts may have more influence, allowing individual judgements to shape major decisions. As one project manager explained when discussing how they approach concerned residents: *“That is a feeling. An estimate.”*

Trade-offs within this approach are mainly based on the following rationales:

- Expertise: relying on specialised knowledge and professional judgement
- Technical rationality: selecting solutions based on models, standards, and evidence
- Feasibility: respecting technical, financial, and regulatory constraints
- Control: maintaining the ability to steer outcomes and deliver the project
- Efficiency: avoiding delays and keeping the process manageable

#### 4.4 Virtual Reality as a communicative and participatory tool

As mentioned in section 4.1 design proposals can make value conflicts more visible by visualising them. However, citizens often struggle to imagine how proposal of the trace will affect their immediate living environment. The apparent absence of conflict therefore does not necessarily imply consensus between experts and citizens, nor a lack of concern about the environment. It may also result from limited awareness of the potential consequences of design choices. This section discusses the potential opportunities and limitations of Virtual Reality (VR) as a communication and decision-making tool.

##### Between expert and citizen

The VR sessions — see figure 24 for an impression the model showing the effect of car lights — show that experts primarily view VR as an instrument for supporting more effective communication between citizens and experts. According to the interviews, VR contributes to the early identification of potential value conflicts because it creates spatial awareness, enabling citizens to critically interpret their environment (Hilmer, 2024). As mentioned by an urban designer: *“We subsequently modelled everything in 3D, people put on the VR headset, and it gave them a feeling for the space. That simply helps, because then, as I say, it becomes tangible.”* In contrast to traditional visualisation methods, such as maps, drawings or technical documents, which often remain abstract and consequently certain spatial interventions remain difficult to interpret for citizens and experts: *“I find it hard to imagine that this [green dot as a tree] would result in such a rhythm of trees, or that the area would be fully filled with dense vegetation [...] That is something you could, and perhaps should, make more explicit.”* (advisor traffic and transport)



Figure 24, VR test model roundabout on ring road (Source: screenshot of screen recording)

VR functions as a shared language between experts and citizens that helps bridge knowledge gaps. VR also clarifies why certain design choices have been made and why alternative solutions may be considered less suitable. As one project manager explained: *“I think it helps a lot [...] because you can also show why. So I think you can communicate much better on the same level through these kinds of instruments.”* Wolf et al. (2020) describe this as a more transparent selection and evaluation of design alternatives by making underlying interests and the necessity

of certain measures more visible. During the VR sessions, participants developed — because of an improved spatial understanding — new design ideas and suggestions for the model. Several respondents indicated that the added value of VR could be even greater if the model were interactive and design adjustment could be made in real time. As one advisor traffic and transport noted: *“Yes, it would indeed be easy if you could simply say: hey, let’s place a one-metre hedge there!”*

In such situations, citizens and experts gain influence over detailed design solutions, increasing awareness that every design choice also produces secondary effects and trade-offs. For example, the implications of choosing a roundabout rather than a conventional intersection could be visualised for residents, including both the positive and negative consequences for the surrounding environment. As one project manager explained: *“then this is the impact it will have on your environment [...] But then you can also show why.”*

### **Between experts**

the interviews suggests that VR also increase awareness among experts. Compared to traditional two-dimensional techniques, the enhances visualisation capabilities of VR make design choices and underlying assumptions more visible, particularly when viewed from the perspective of residents. The VR model prompted questions and critical reflections with participations commenting on issues relating lighting and traffic safety.

The technology encouraged experts to reason beyond the boundaries of their own professional expertise and background, fostering greater empathy towards residents. For example, one project manager reflected on the added value of experiencing the environment from the perspective of a cyclist, stating: *“But is very useful to get an impression [...] for different users [...] That is why it might be interesting to experience it in VR while actually being on a bicycle.”* Similarly, an advisor traffic and transport began reasoning from a social rather than a purely technical perspective, asking: *“If you lived upstairs, would the light also cause a lot of disturbance?”* participants therefore became aware that the absence of vehicle headlights on that particular façade could positively affect residential liveability. As one project manager explained: *“They are split-level apartment buildings [...] that is indeed a good point, because those residents would not be affected if they live upstairs.”*

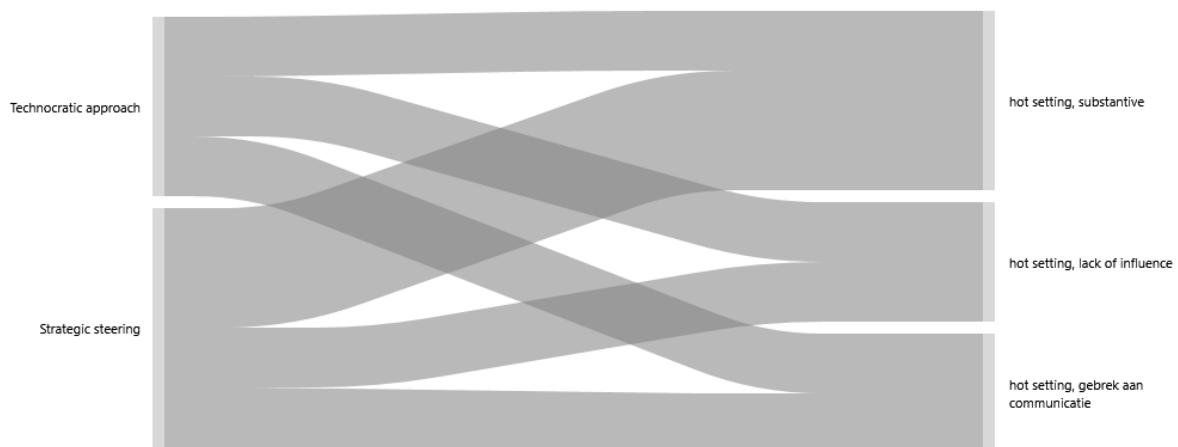
## 5. Synthesis

### 5.1 Interaction between strategies and conflicts

In this chapter, the findings presented in chapter 4 are analysed and compared to identify relationships and draw conclusions, for example between different types of conflicts and their underlying motivations. The results also indicate that the strategies employed and the motivations behind them are influenced by external factors from the institutional arena and, in particular, the political arena. The interaction between these arenas provides new insights into the mechanisms underlying the ‘black box’ identified by Healy (1997)

#### Project arena

First, the overview of the different strategies described in Section 4.3 can have different effects depending on the setting in which it is used. The interview analysis shows, for example, that tailor-made solutions in cold settings are mainly linked to the rationale of efficiency — when stakes are low and opinions are less fixed — whereas in hot settings, tailor-made solutions may fuel distrust among citizens because they can create a sense of arbitrariness. This shows that hot settings caused by procedural value conflicts can be difficult to resolve through a tailor-made approach, even when such an approach is intended to reduce tensions.



*Figure 25, relationships between strategies and hot settings: Made by author using Atlas.Ti)*

Second, the findings reveal a mutual relationship between experts’ strategies and value conflicts. The Sankey diagram (figure 25) shows that a strategic approach aimed at risk management, efficiency, and maintaining administrative control frequently co-occurs with substantive value conflicts, particularly those related to liveability and traffic safety, as well as procedural tensions concerning a lack of influence and communication. Strategic behaviour can be understood as both a response (meaning: strategy) to existing tensions and value conflicts and a factor that may further intensify these tensions or generate new procedural conflicts. For example, some residents perceive the municipality’s approach as arbitrary, particularly in how

decisions are made regarding which residents receive personal attention and which concerns are priorities within the process. This can also reinforce substantive value conflicts by reducing public support and contributing to distrust towards local decision-makers. While this effect is not observed in all value conflicts, it appears to be particularly relevant for environmental values that are closely connected to residents' daily lives, sense of place, health, and perceived quality of life. Concerns regarding the proposed roundabout, for instance, are often amplified by emotions and public controversy. In contrast, procedural justice tends to play a less prominent role in conflicts concerning more technical or abstract policy issues.

Unlike strategic behaviour, technocratic behaviour does not appear to generate substantive value conflicts. A likely explanation is that citizens are not involved in the participation process, which means that opportunities for substantive value conflicts remain limited. However, technocratic approaches do give rise to similar procedural tensions, particularly regarding insufficient communication and a lack of influence. The technocratic strategy appears to be a source of conflict rather than a response to existing conflicts.

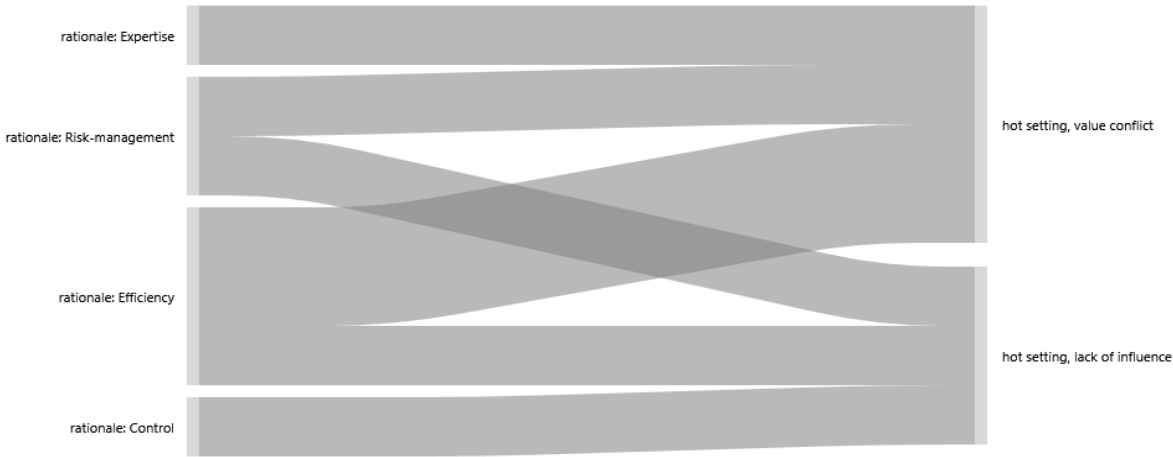


Figure 26, overview of expert rationales (Source: Made by author using Atlas.Ti)

The mutual relationship between experts' strategies and value conflicts evolves throughout the planning process. A gradual shifts can be observed from a democratic approach towards a more technocratic and eventually strategic approach. This development is illustrated in Figure 27 which visualises the underlying cause-and-effects chain. The process initially followed a (1) democratic deliberative approach, in which the route alignment was selected after a participatory process that considered multiple alternatives and was subsequently approved by a majority in the municipal council. Over time, however, the approach shifted towards a more (2) technocratic mode of decision-making and ultimately towards (3) strategic steering. This translation is therefore related to the emergence of conflicts itself, as well as to factors originating from the institutional and political arenas.



Figure 27, relationships between rationales and hot settings (Source: Made by author using Atlas.Tis)

### Institutional arena

Several constraints within the institutional arena help explain why experts increasingly adopted a technocratic approach. These constraints influenced the motivations underlying their actions. The Sankey diagram illustrates the co-occurrence between specific motivations and the arenas in which they emerge. For example, the motivation of ensuring feasibility is closely linked to limited financial resources. As a result, the project was postponed despite the municipal decision that had already been taken in 2009. According to a project manager: *“... at the time there were insufficient financial resources, as far as I understood, to carry out the project.”*

In addition, the project has become linked to the national Housing Construction Impulse (Woningbouwimpuls, WBI) subsidy programme in recent years. This has increased the urgency of completing the project within the timeframe of the subsidy. Under these conditions, experts increasingly make decisions internally and place greater emphasis on efficiency and maintaining control, as also illustrated in Figure 28. Although the resulting designs may still draw on input gathered during earlier participation processes — and municipal policy formally encourages citizen participation — the motivation of efficiency becomes particularly important for ensuring project delivery. Consequently, expert judgement and practical considerations become more influential than participatory ambitions and democratic motivations in affecting decision-making.

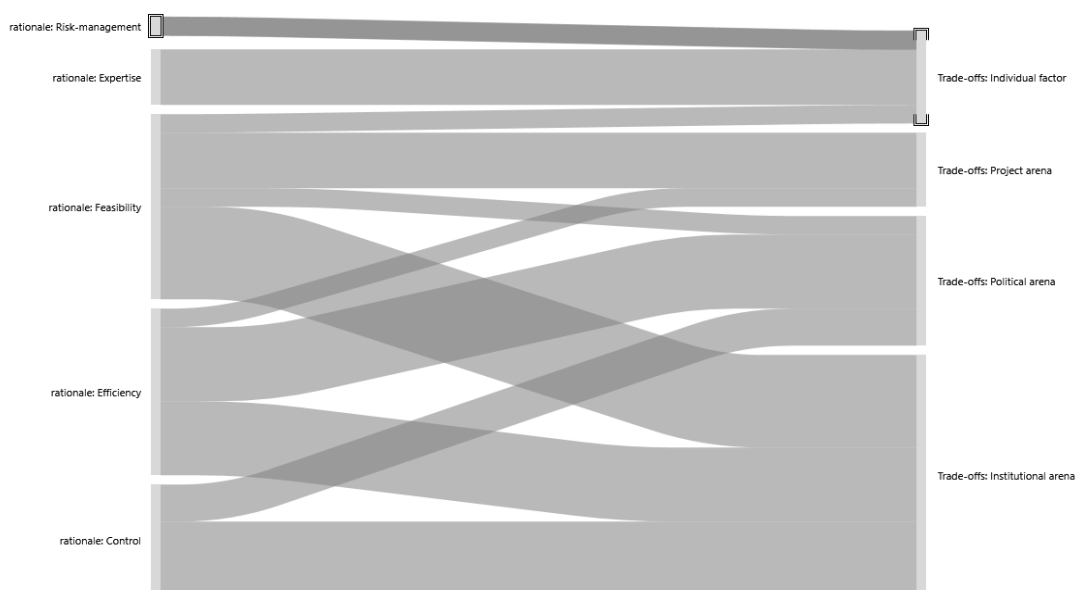


Figure 28, relationships between rationales and hot settings: Made by author using Atlas.Tis)

## Political arena

In addition to the motives and project constraints discussed above, local political dynamics also shaped the course of action. A local political party had presented the proposal of the trace on its website since 2009, although in a relatively hidden way. This allowed the alderman to justify the 2022 route decision by arguing that his party had publicly presented the proposal. However, the local opposition party, together with an interest group, challenged this decision because no participation had taken place, while the traffic situation had changed in the meantime. The concerns raised by residents within the interest group are often brought forward by an opposition party during council meetings. However, these concerns are often dismissed by the alderman of the dominant local party. Residents are often portrayed as being opposed to any form of development, while their concerns may simply reflect different political priorities or policy preferences. Disagreement itself is not problematic; conflicting viewpoints should be openly discussed within a democratic dialogue. Instead, substantive and procedural conflicts that initially emerge within the project arena increasingly become politicised and shift into the political arena.

The motivations of control and feasibility can partly be explained by the dual position of municipal administrators. Aldermen are responsible for their portfolios — such as spatial development or traffic — while they also represent the political interests of their respective parties. Politicians have the power to demand a redo of participation in projects and intervention (Kantola & Tuulentie, 2020). They can also downplay or withhold outcomes that are not in their favour or in favour of the party they represent, resulting in exclusion or less attention for conflicting or deviating perspectives compared to ideas that align with perceived public interest or political visions. After all, as decisions ultimately require political support within the municipal council and among the party's electoral base. Therefore, maintaining control over both project outcomes and implementation becomes important.

This also helps explain the rationale of efficiency. Within the municipal organisation, the separation between the executive branch (aldermen and mayor) and the municipal council is not always as strict as formally intended under the Dutch dual governance system. As a result, aldermen may exert considerable influence over both project development and political decision-making. This increases their capacity to steer project in a preferred direction and creates opportunities for political priorities to become intertwined with project objectives.

These dynamics are further reinforced by the relatively small scale of the municipal organisation. Due to short communication lines and a limited number of administrators responsible for multiple portfolios, coordination tends to be more direct and less fragmented than in larger municipalities. As one respondent explained: *“I think that makes it more manageable; you have fewer directorates, fewer people interfering in everything.”*

A final source of power within the political arena is the strategic use of public attention. Heat can also be used to support a decision that gains visibility through media attention and is then perceived as fair by the political supporters of the party involved. Press freedom and media attention can exert considerable pressure on political parties and municipal administrators more broadly. The force of a headline or the appeal of a television programme can strongly influence the political process. This helps explain why experts may use public attention to advance their own interests. In such cases, the fundamental problem itself may remain insufficiently recognised.

## 5.2 interaction between virtual reality and strategies

Building on the motives and strategies described in Section 4.3, VR can be positioned according to the extent to which the technology aligns with different planning objectives and motives for action. VR can be integrated across multiple strategies as it aligns with the underlying rationales within these strategies. The tool can have different applications and can be used both as a legitimate participatory instrument and as a strategic means to safeguard project interests, serving both public goals and project management objectives. It brings together two functions: it supports citizens in developing spatial understanding at an early stage, while also helping experts pursue project management objectives.

The findings suggest that VR can contribute to the **legitimacy** of participatory planning processes by making the spatial consequences of interventions visible at an earlier stage. This allows citizens to better understand how proposed plans may affect their living environment and enables experts and policymakers to identify concerns, value conflicts, and design preferences before plans become more technically and financially constrained. This may increase the chance of conflict — in the most productive sense of the word — and can therefore make participation more legitimate. VR also aligns with the rationales of **inclusiveness** and **design quality**, as citizens and stakeholders with limited technical or spatial planning knowledge are able to understand the proposed interventions and participate more meaningfully in discussions about design solutions. This makes it easier for citizens to articulate experiential knowledge. Also, VR allows designers and planners to test and evaluate spatial proposals from a 3D user perspective before implementation, improving design quality.

At the same time, technical barriers affect the degree of **inclusiveness**, especially among older participants with limited digital literacy (Hilmer, 2024). Furthermore, studies show that VR is used more often as a tool for diverging perspectives, ideas, and design solutions than for convergence (Eilola et al., 2023) or consensus-building among citizens (Ng et al., 2024). However, broad participation — often combined with divergence of knowledge — does not easily align with co-design and collaboration in small group settings (Staffans et al., 2020). Interview data shows VR appears particularly suitable for settings with smaller groups of participants, also due to the limited number of VR headsets available during the participation process generally.

This aligns closely with project management objectives and the associated rationales of **risk management** and **efficiency**. VR can be used before participation processes take place to help experts identify which residents may have concerns and where value tensions are likely to emerge. As one project manager explained: *“That way you have already thought of solutions beforehand [...] and you simply prevent a lot of inconveniences.”* Rather than relying primarily on experience or intuition, experts can use VR to assess a design from both a three-dimensional perspective and the perspective of residents. This enables potential concerns and conflicts to be identified more systematically — VR can help prevent project delays when it is used early in

the process, as spatial plans become tangible and understandable for lay people at an earlier stage. Instead of value conflicts only becoming operationalised during the plan elaboration phase — when plans become more technically and financially limited (Wolf et al., 2020) — they can surface earlier in the process. This also allows experts to get more control over the input, resulting in input that may become more closely aligned with the objectives of the project. The increased **control** that experts gain through this improved communication can, however, also be used strategically, depending on the institutional and political context in which the project is embedded.

At the same time, differences in perception can be observed between actors, particularly between aldermen and civil servants. These differences can largely be explained by their underlying rationales. Aldermen appear to place greater emphasis on control, risk management, and efficiency. Because VR makes both the design and the underlying trade-offs more visible, value conflicts that previously remained implicit may become more explicit. Given the stage of the process and its history — the case is currently situated within the third diamond of the framework proposed by Staffans et al. (2020) — VR may reveal new tensions and concerns at a stage where there is limited room to fundamentally reconsider previous decisions. This helps explain why some aldermen regard proposed mitigation measures, such as additional hedges, as unnecessary, while civil servants are generally more inclined to explore solutions that respond to residents' concerns. For these actors, considerations of legitimacy and inclusiveness appear to carry greater weight.

When examining how VR relates to the rationales of **expertise** and **feasibility**, it is important to recognise that the technology requires time, financial resources, and technical knowledge. Whether the benefits outweigh the costs depends on the scope and complexity of the project. Nevertheless, several respondents emphasised that relatively small interventions can already generate valuable insights for both experts and residents. As one project manager noted: *“They are relatively small interventions compared to the project as a whole [...] but they can help avoid unnecessary inconvenience and disturbance for residents.”* Despite these potential benefits, not all experts and civil servants are equally convinced of the added value of VR within participation and decision-making processes

### **Framing**

A critical nuance is that VR is not a fully objective representation of an environment. Citizens therefore need to be informed about which elements are represented in the model and which are excluded. On the one hand, VR can have a democratising effect because it enables citizens to participate more effectively. On the other hand, it can also reinforce technocratic decision-making. Digital simulations and visualisations can be highly persuasive, which may lead citizens to accept experts designed scenarios more readily instead of questioning fundamental alternatives (Wolf et al., 2020). In this way, VR supports a form of alternative-focused thinking

(Keeney, 1996), in which the exploration of underlying concerns and values may be overshadowed by debate about specific design details.

Also, the findings demonstrate that VR is not a neutral instrument. Experts consciously determine which scenarios, perspectives, and design elements become visible within the simulation, based on their own assessment of where the road will have the greatest impact and where concerns are likely to emerge. It is possible that some local residents expressed specific concerns that could be addressed in this manner. However, this does not provide a complete understanding of the broader concerns and underlying value conflicts present among all citizens. So framing occurs more implicitly because experts themselves have limited insight into the everyday experiences of citizens. They inevitably make assumptions about where concerns are most significant. As one expert reflected: *"I can imagine that people there might think... like, yes, what is that going to look like? How am I supposed to get in and out of here?"*

furthermore, this selectivity is also shaped by the pilot character of the case-study. Rather than a fully comprehensive and neutral representation of the entire road design, it is a test case for the municipality to assess whether VR could function as a participatory tool in practice. Within this context, choices had to be made regarding which parts of the design could realistically be visualised within the available time, technical capacity, and budget. For example, the roundabout was deliberately selected as a focal area because it was expected to concentrate interactions between cyclists, cars, and nearby residents living in houses owned by a housing association. Although this selection partly reflected practical and financial considerations, it also introduced a degree of bias by prioritising a location where concerns and spatial impacts were anticipated to become most visible.

## 6. Conclusion

This study examines the values and concerns of citizens and how these are incorporated into decision-making through participatory processes. Previous research identified a so-called “black box” between participation and decision-making, as it remains unclear how citizen input is weighed in practice (Eriksson et al., 2022) and what role political actors play in this process (Staffans et al., 2020). By drawing on interviews with both residents and experts, this research provides insight into the trade-offs, motivations, and external factors that shape decision-making. In doing so, it contributes to a better understanding of the mechanisms within this black box and clarifies the potential role of VR within these processes.

### ***Which values and interests do citizens have in participatory urban design?***

The findings indicate that citizens are primarily concerned with values that directly affect their everyday living environment. Residents in the case study expressed concerns about the liveability of their neighbourhood. At the same time, tensions emerged around broader mobility objectives, such as improving traffic flow and maintaining accessibility to the town centre. These findings suggest that citizens primarily evaluate spatial interventions through their expected impact on their immediate surroundings and daily quality of life.

Apart from all these substantive concerns, the findings reveal the presence of procedural value conflicts. These conflicts result from differing perceptions of legitimacy of the decision-making process. Experts generally consider the project to be democratically and administratively legitimate, as the route alignment has been officially accepted by a political majority in 2009 following an extensive participation process. However, a number of residents, supported by a local opposition party, do not share this view. They perceive the process as lacking transparency and feel that they have had limited opportunities in the past 15 years, to influence decisions that directly affect their living environment.

The findings suggest that these procedural tensions reinforce existing substantive conflicts. Concerns regarding liveability and traffic safety become more pronounced when residents perceive the decision-making process as unfair or feel excluded from it. In contrast, procedural justice appears to play a less prominent role in discussions concerning more technical or abstract policy objectives. Similarly, design proposals aimed at improving sustainability or spatial quality are less affected by concerns regarding influence and participation. A likely explanation is that these issues generate fewer direct value conflicts and are therefore less closely connected to residents’ everyday experiences.

### ***How do experts weigh citizens’ input against other decision-making criteria?***

the findings show that citizen input is weighed against a broader set of considerations than is often visible to participants themselves. Concerns about traffic safety, liveability, and spatial

quality are taken into account, yet they are considered alongside factors relating to the institutional and political arena. Existing political decisions, financial constraints, policy commitments, and requirements related to project feasibility. This helps explain why residents and experts evaluate the legitimacy of the process differently. While experts (aldermen) view the project as the continuation of a democratically legitimised decision, many residents focus on their limited opportunities to influence the project under changed circumstances.

The findings further show that experts frequently act on rationales related to efficiency, risk management, and the preservation of administrative control. For political decision-makers — specifically aldermen — these strategic considerations are closely linked to a dual responsibility: ensuring the successful delivery of the project while maintaining public and political support. As a result, experts often favour approaches that address residents' concerns through targeted dialogue and personal engagement, on the one hand to prevent delays while on the other hand to prevent debates about decisions that are considered politically settled.

These rationales partly emerge in response to procedural value conflicts resulting from the technocratic nature of earlier decision-making stages, where key decisions were made internally. At the same time, considerations of feasibility remain important, as experts continue to rely on professional expertise, previous experience, and practical constraints when evaluating citizens' input.

### ***How does VR support communication and understanding of citizens' perspectives in participation and decision-making processes?***

The results suggest that VR can play a role in visualizing project interests and the trade-offs between these interests and citizens' values. Previous literature has mainly considered VR to be useful for communication purposes, engagement, and designing alternative solutions. This thesis reveals that VR could also assist in transparency when transferring from participation into the process of decision-making. This could be achieved through the use of VR to visualize various design decisions, trade-offs, and consequences. In this manner, it would become easier for the participants to comprehend the balancing of citizens' values. Thus, it can be suggested that VR will allow opening up the “black box” identified by earlier researchers.

VR has significant potential as a visualisation tool, provided that it offers sufficient flexibility for participation to adopt a value-focused thinking approach, while remaining within institutional constraints and predefined boundary conditions. The literature emphasises that immersive technologies such as VR can easily turn into engaging co-design activities without ensuring that the collected input can actually be incorporated into the final design (Sanchez-Sepulveda et al., 2019). By providing citizens with clear frameworks and constraints from the outset, trade-offs and design choices can be made more explicit.

An important risk of VR — and immersive techniques in general — is framing and visualisation of specific aspects of the design, because simulating the entire design remains unrealistic due to technical feasibility and financial costs. The model therefore reflects expert assumptions about where the greatest impacts and concerns are experienced. By selectively visualising parts of the design and using a fixed, predetermined navigation path (Loyola et al., 2019), VR shapes both the identification of problems and the types of interests, experiences, and knowledge that guide the debate. From the perspective of procedural fairness, citizens should be given the opportunity to contribute before the VR model is developed. Early involvement can help ensure that the representation of concerns, values, and local perspectives is more inclusive and accurate. This may reduce the risk of framing, since the content of the model is informed by citizens daily life experiences and priorities, rather than by expert assumptions.

### **How can the weighing process of citizens' values be made more transparent in order to better safeguard these values in a VR model?**

The findings contribute to the Triple Diamond model of Staffans et al. (2020) by providing insight into the decision-making processes that occur between the phases of participation. While the original model explains how knowledge diverges and converges throughout the goal, vision, and plan phases, this study demonstrates how VR can support the identification, communication and weighing of values.

The findings further show that experts operate within a project arena shaped by institutional and political constraints, where objectives such as efficiency, control, feasibility, and risk management play an important role. Within this context, VR can contribute to a more legitimate technocratic and strategic steering approach. By enabling experts to better understand and visualise the lived experiences of citizens, VR supports a more accurate and balanced assessment of where potential issues may arise. This might reduce procedural value conflicts — when experts are transparent about whose perspectives are represented and with which intention — and reduce bias by fostering empathy and greater awareness of which citizens are likely to experience negative impacts

Although framing effects remain a concern, VR offers opportunities to make the consequences and side effects of design alternatives explicit and visually accessible. This enables citizens to better understand both the advantages and disadvantages of proposed interventions, which supports diverging and converging of conflicting ideas and values, while also building trust and improving transparency and justice.

After participation, it becomes important to make the trade-offs between different values more transparent. This can be achieved by explicitly visualising the criteria, constraints, and boundary conditions that influence decision-making, thereby clarifying how citizens' input is weighed against competing project considerations and where tensions emerge. In this way, VR can

support transparency in the weighing process and be applied for different purposes and at different stages of the planning process, depending on the rationales and objectives of experts.

## 7. Discussion

### 7.1 Limitations

#### **Generalisability**

The generalisability of the findings is limited and requires a context-sensitive interpretation. This research was conducted within the Dutch institutional context. As emphasised in the methodology section on qualitative research, the aim is to provide a coherent and insightful account of a specific situation. As a result, it remains unclear to what extent these findings can be generalised to other contexts, to which contexts they may apply to, and under what conditions such generalisation would be possible. Assessing transferability therefore requires a comparison between contexts, in which both similarities and differences between research sites are taken into account when assessing the relevance of this study (Blaikie & Priest, 2019; Schofield, 2000).

For example, the legally oriented governance structure in the Netherlands and its institutional conditions are likely to influence which values become central. These conditions also affect how values come into conflict and which solutions are available and considered acceptable. The local and regional context of the municipality also matters. Its administrative culture, as well as distrust among citizens towards the government linked to decades of gas extraction by NAM (Rijksuniversiteit Groningen, 2023), may have influenced the strategies used by experts and municipal officers.

The findings therefore suggest that the insights from this study are mainly analytically generalisable. They offer conceptual points of reference for comparable situations, but require careful translation to other institutional and societal contexts. The case has been described in sufficient detail to enable future researchers to assess whether the findings are transferable to their own research context and situation.

#### **Methodological and results limitations**

A key methodological limitation concerns possible bias in the selection of participants. The experts were selected because they played an important role in the case-study. For the second set of interviews, two candidates from the local political party participated, as well as two members of the garden association. These participants may have had a stronger than average stake in the outcome of the project and in the way the process unfolded. They do not represent the wider group of residents living around the proposed ring road. The environmental and procedural values identified in this study may present a more conflict-oriented image of the case than would have emerged from a broader sample of residents. This is particularly relevant because the political party in question was critically towards the alderman as they are part of the opposition in the municipal council.

VR also has technical limitations. While it provided valuable insights into citizens' perspectives, the test model did not incorporate multi-sensory elements, such as effects of noise or smell. By incorporating these additions, the potential impacts on citizens can be assessed more effectively, which contributes to greater citizen engagement (Meenar & Kitson, 2020).

Moreover, the model focused on only a limited section of the proposed intervention. Consequently, many of the concerns and values expressed by citizens fell outside the scope of the roundabout presented in the model. Finally, evaluations of traffic safety and liveability were based on estimated daily traffic volumes, meaning that variations in traffic conditions, such as peak-hour periods, were not represented in the model.

## 7.2. Implications and recommendations

This study developed through a combination of deductive and inductive reasoning. At the start of the research, I intended to use existing theories and models to interpret the empirical findings. During the research process, however, I gained new insights into environmental participation, principles of justice, and public administration that I had not fully anticipated when I began writing the thesis. These insights changed how I understood the central concepts. As a result, the study moved beyond the application of existing theory and also contributed to the development of new conceptual insights through an inductive process (Blaikie & Priest, 2019).

A concrete example concerns the theoretical background of the thesis. In hindsight, the triple diamond model by Staffans et al. (2022) may need to be revised to better reflect the insights gained from the participation process in the case-study. In the theoretical chapter, I aimed to make the phasing less rigid by adding bottom-up initiatives and feedback moments, thereby emphasising the cyclical character of participation. However, these adjustments do not fully explain the type of interaction that takes place in the final diamond of the model. As discussed in the conclusion, experts in the plan elaboration phase — the final diamond — act more strategically than in earlier phases in order to prevent or reduce heat in hot settings. In addition to institutional factors, political factors explain the shift from democratic participation towards technocratic decision-making and ultimately, strategic steering.

Consequently, a possible revision of the triple diamond model would involve incorporating a political arena alongside the institutional and project arena. Such an extension would make visible how political considerations shape participation and decision-making before formal decisions are taken. Eriksson et al. (2022) already described how politicians influence the sorting process both directly and indirectly. The findings of this study suggest that the role of politicians — in combination with external institutional constraints — is considerably greater, which explain how trade-offs between values are made and why experts engage in strategic behaviour. Participation and decision-making can therefore not be considered separately from the political arena.

The identified strategies also have implications for the proposed phasing of planning processes. These strategies operate between planning phases — part of the black-box — and are shaped by the overarching institutional and political arena. The final diamond may require revision, as the focus shifts from diverging and converging knowledge and solutions towards the realisation of an implementable plan in which maintaining public support becomes a priority. Diverging and converging thinking are primarily directed towards solutions within relatively fixed conditions and take place through invited spaces. Representing this stage as a single large ‘diamond’ may provide a misleading impression of the participatory process. Instead, smaller sub-diamonds are proposed, without rigid boundaries between the arena’s.

At the same time, theoretical insights may also differ from the empirical findings. For example, participation as a democratic instrument received little attention in the empirical data, despite its prominent role in the theoretical framework. Instead, experts largely steered the project strategically, with project interests in mind. Other codes could be defined more precisely and divided into sub-codes after new insights had emerged during the research process. Examples include value conflicts, which were after conducting interviews defined as procedural value conflicts and environmental value conflicts.

## **Recommendations**

Future research could focus on a longitudinal study in which a case is followed throughout the different diamonds described by Staffans et al. (2022). Such research could examine how citizen input changes over time, which arguments are retained or discarded during transitions between phases, and how experts justify these decisions internally. This longitudinal research would provide more insight into the ‘black box’ between formal participation moments and into the institutional mechanisms through which participation outcomes are translated into spatial intervention. It may also shed a light on when value-conflicts arise and how distrust evolves through different cycles of participation.

Related to this is the knowledge gap concerning the role of the political arena in the application of VR. The findings highlight a strategically guided approach to participation, in which political interests are intertwined with project interests. It would therefore be interesting to investigate how politicians use VR in relation to these interests. The findings already indicate a potential risk of framing, for example by highlighting only selected parts of a design or by presenting certain effects, such as vehicle headlights, in a less realistic way. Politicians may take advantage of the accessible visualisation capabilities of VR to present citizens with a framed representation of reality in order to maintain sufficient support for a project. This also raises questions regarding which actors are most influencing the modelling, design and execution of VR.

Furthermore, due to the scope of this case study, only limited attention was paid to the potential of VR during the early stages of planning. At these stages, major decisions have not yet been taken, procedural conflicts have not yet escalated into hot settings, and project ambitions and

objectives remain open for discussion. Under such conditions, experts are likely to have different priorities (meaning: rationales). Future research could therefore examine how the use of VR relates to the strategies employed by experts, as well as to different forms of participation. Broad participation aimed at diverging knowledge and generating ideas may not align well with co-design settings involving only a small number of participants and a limited number of available VR headsets.

## 8. Reflection

### 8.1. Process, results, and personal development

Conducting the literature review and writing the theoretical background turned out to be both challenging and instructive. During the literature review, I tried to work as systematically as possible by keeping track of the keywords, Boolean operators, and year filters I used. This helped me develop a relatively broad overview of relevant papers, literature reviews, and case studies related to the sub-questions. At the same time, this breadth also had a downside. I was influenced by a wide range of theories and perspectives within environmental participation, VR, and the broader institutional context. As a result, maintaining a clear line of argument throughout the thesis proved to be challenging. Given the broad scope of the topic, I sometimes devoted too much attention to side issues, assuming they would add value. This showed me the importance of clearly defining what each sub-question aims to address, to avoid drifting into overly broad literature exploration.

Another factor was the duration of the literature review itself. Over time, my understanding of environmental participation and its contextual factors developed significantly. This was partly because my prior knowledge of topics such as citizen engagement, institutional settings, and VR tools during my Bachelor's and Master's programmes had been relatively limited. As my understanding evolved, I also had to revise my earlier assumptions and interpretations.

Conducting the interviews was a valuable learning experience as well. It was the first time since the start of my Bachelor's programme in 2021 that I conducted interviews myself. While this was somewhat challenging to at first — as it was difficult to anticipate how respondents would interpret and respond to questions — it was also valuable to gain practical knowledge. This highlighted the importance of thorough preparation. I learned that it is essential to allow enough space for respondents to formulate more elaborate and reflective answers. Questions need to be open, non-leading, and accessible, enabling each respondent to provide their own perspective. It also helped that the first round of interviews was conducted together with my supervisors.

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# Appendices

## Appendix I: Use of generative AI

For this thesis, I made use of several AI tools to support the thinking process, the visual design, and as a check for grammatical and spelling errors.

For brainstorming, I mainly used ChatGPT. In doing so, I made my prompts as concrete as possible and provided as much data and as many sources as possible. This meant that I would, for example, ask the model to formulate different viewpoints on a particular statement while thinking from different backgrounds. An example prompt would be: Act as a traffic expert and provide me with 10 different viewpoints on...

I also used NotebookLM as a research tool to analyse and compare (academic) literature. This offered several advantages, including comparing concepts and finding similar sources or sources that reveal contradictions or nuances. Research Rabbit is a similar tool that I used during the first weeks of the literature review. It visualises relationships between literature, allowing me to make a quick pre-selection of sources based on shared themes and publication years.

I am aware of the limitations of AI. Because it is a Large Language Model (LLM), it is essentially a word prediction machine that presents the most statistically plausible combination of words. Combined with suggested sources, this may create the impression that the information follows directly from those sources and is therefore correct. However, outputs may contain factual errors, also referred to as hallucinations, and there is no understanding of empirical truth or morality. LLMs are trained on data from lots of sources, ranging from scientific articles to low-quality content on social media. Mollick (2024) also points out that the training of LLMs involves human feedback. While this sounds positive, these low-paid workers from Africa and India are unlikely to be completely neutral. As a result, biases and incorrect assumptions may be embedded in the output when one probes further into certain topics. My research topic is based on the Dutch context, which means that the output may be even less accurate if such biases are still present.

For these reasons, I always draw my own conclusions after using AI. Analyses may appear highly convincing, but as an academic student I want to make my own interpretations and be able to substantiate them myself. If we simply start believing that AI is smarter than people, we will begin outsourcing cognitive tasks to AI and effectively place humans below machines. I would simply consider that a loss for education. For this reason, I checked all literature suggested by AI before using direct quotations. This was also not the most time-consuming task, as it could often be done efficiently by using CTRL+F.

For grammar and spelling corrections, however, I am convinced of the added value of AI. ChatGPT quickly identifies mistakes and indicates whether my writing style is appropriate according to formal English writing conventions suitable for a master's thesis. Hallucinations are less of a concern in this context. After all, it concerns a review and then limited adjustments based on my own written text. One side note is that my writing style has probably changed, perhaps unconsciously. It may be an improvement compared to how I used to write — with a richer vocabulary and more nuance through subordinate clauses — but it is also possible that some degree of personality has been lost as a result.

Appendix II: Data management plan

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## Plan Overview

*A Data Management Plan created using DMPonline*

**Title:** SimCityScope, Virtuele participatie in stedelijke ontwikkeling

**Creator:** Jelle Koolwijk

**Principal Investigator:** Jelle Koolwijk, Clarine van Oel

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**Template:** TU Delft Data Management Plan template (2025)

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### Project abstract:

Urban development projects often lead to frustration, resistance, and delays because residents and other stakeholders are informed or involved too late—or inadequately. Uncertainty about what will change, when, and with what impact, breeds mistrust and misunderstandings. SimCityScope aims to address this issue by making spatial plans virtually, clearly, and interactively understandable from an early stage. This creates shared understanding, lowers the barrier for participation, and enables better-supported decision-making.

SimCityScope focuses on making spatial interventions—such as road construction projects or area redevelopments—tangible and understandable for residents, entrepreneurs, and other stakeholders. Through VR, AR, or on-screen simulations, users can experience the expected disruptions, phases, and changes even before implementation begins.

This project builds on previous research projects *VR Renovate* and *uVital*, in which we developed virtual communication tools for the housing renovation sector. These projects demonstrated the potential of immersive and interactive technologies to improve communication, reduce uncertainty, and increase engagement among residents. With SimCityScope, we aim to transfer and expand this approach to the broader context of urban (re)development.

In this project, we collaborate closely with the Municipality of Veendam, who acts as the problem owner, and with Recreate B.V., a company specialized in developing XR technologies for the construction sector. Their practical expertise and local knowledge play an important role in aligning the SimCityScope concept with real-world needs and applications.

As part of our research, we would like to conduct open interviews with experts—such as urban planners, project managers, and communication specialists— and local stakeholders who are involved in such urban development projects. In these conversations, we aim to discuss concrete examples from various projects, as well as dive deeper into one rich and diverse case that is currently underway – the *Buitenwoel trace* in Veendam. This will help us gather practical, nuanced insights into how spatial development processes unfold in practice, and where SimCityScope could add the most value.

In addition, we would like to observe and audio record a number of public information evenings. The goal is to better understand the types of questions residents and stakeholders raise, and to assess what kinds of information are effectively communicated (or not) using traditional communication tools. In addition, we might hold short open interviews with some participants at the public information evenings. Before we start observing, we ask all participants if they want to consent and sign an informed consent form. A separate form for this information events is included in this application.

Lastly, we plan to develop a proof-of-concept (a small VR test model), which we would like to validate with the experts involved using short evaluative interviews.

The project is funded by RVO - Innovation Impact Challenge (IIC): IX in Stedelijke ontwikkeling, phase 1. More information can be found here: <https://www.rvo.nl/subsidies-financiering/innovation-impact-challenge/ix-stedelijke-ontwikkeling>

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**Grant number / URL:** SB1SO25033

# SimCityScope, Virtuele participatie in stedelijke ontwikkeling

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## 0. Administrative questions

**1. Provide the name of the data management support staff consulted during the preparation of this plan and the date of consultation. Please also mention if you consulted any other support staff.**

A data steward has not been consulted for this project.

**2. Is TU Delft the lead institution for this project?**

- No – please provide details of the lead institution below and TU Delft's role in the project

Recreate B.V. is the lead partner in this RVO-funded project. The TU Delft conducts research into the potential added value of virtual reality (VR) for this type of study, focusing on how VR can help different stakeholders better understand urban development plans and spatial interventions. Our role is to identify the main functionalities of the VR application and evaluate a first prototype VR communication tools.

## I. Data/code description and collection or re-use

**3. Provide a general description of the types of data/code you will be working with, including any re-used data/code.**

Type of data/code	File format(s)	How will data/code be collected/generated? For re-used data/code: what are the sources and terms of use?	Purpose of processing	Storage location	Who will have access to the data/code?
Audio-recordings of interviews with practitioners and stakeholders	.mp3	Interviews conducted on-site or online (Teams). Audio recordings made on external device, then moved to project storage. Recordings deleted after transcription.	Capturing experiences and opinions of practitioners, stakeholders, and residents regarding urban development projects	External recording device (temporary) + project storage (primary)	Master student + supervisors Clarine van Oel, Jelle Koolwijk
Audio-recordings of information evenings (e.g., Buitenwoel, Veendam) and short interviews with participants	.mp3	Audio recorded during information evenings; short interviews optionally conducted. Recordings are securely transferred to project storage.	Capturing questions, concerns, and priorities of participants after presentations on urban development plans	External recording device (temporary) + project storage (primary)	Master student + supervisors Clarine van Oel, Jelle Koolwijk
Transcriptions of interview and information evening data, pseudonymised	.txt	Manual transcription of audio recordings, with pseudonyming of participant identities	Privacy-preserving qualitative analysis of stakeholder input, questions, and feedback	Project storage drive	Master student + supervisors Clarine van Oel, Jelle Koolwijk
Atlas.ti project file	.qdpX	Data obtained from coding pseudonymised transcriptions using Atlas.ti software. TU Delft has a campus license	Systematic analysis of qualitative data to identify themes, patterns, and insights relevant to urban planning and VR communication	Project storage drive	Master student + supervisors Clarine van Oel, Jelle Koolwijk
Informed consent forms	.pdf	Collected from all participants to document voluntary participation and consent for interviews, recordings, and observations	To ensure legal and ethical compliance, and to document consent for use of data	Project storage drive, encrypted	Master student + supervisors Clarine van Oel, Jelle Koolwijk

## II. Storage and backup during the research process

### 4. How much data/code storage will you require during the project lifetime?

- < 250 GB

### 5. Where will the data/code be stored and backed-up during the project lifetime? (Select all that apply.)

- Another storage system – please explain below, including provided security measures

All project data will be stored within the TU Delft Teams environment, which is part of the university's secure Microsoft 365 infrastructure. This environment is accessible only to members of the TU Delft research team involved in the SimCityScope project. To ensure participant privacy, pseudonymised interview and meeting transcripts will be stored separately from the key files containing personal information (such as names and contact details). The key files will be given an additional layer of security and will only be accessible to the principal investigators.

### III. Data/code documentation

#### 6. What documentation will accompany data/code? (Select all that apply.)

- Data - README file or other documentation explaining how data are organised
- Metadata - I will adhere to the metadata standards used by the data repository where the data will be shared (see section V)
- Data - Codebook describing the contents, structure, layout, and variable definitions of the data
- Data - Methodology of data collection

code books for open en closed coding will be provided to complement the qdpx file and a readme file will be provided to explain how data is organised.

### IV. Legal and ethical requirements, code of conducts

#### 7. Does your research involve human subjects or third-party datasets collected from human participants?

***If you are working with a human subject(s), you will need to obtain the HREC approval for your research project.***

- Yes - please provide details in the additional information box below

In this project, we will conduct interviews and make audio recordings of stakeholder information meetings related to an urban development project. In addition, we will conduct short interviews with users of a prototype model as part of the evaluation process.

This Data Management Plan (DMP) is submitted as part of a Human Research Ethics Committee (HREC) application.

#### 8. Will you work with personal data? (This is information about an identified or identifiable natural person, either for research or project administration purposes.)

- Yes

As part of the informed consent process, we will collect personal data (name). During interviews, we will collect information about the role and professional experience of individuals, particularly when they are experts involved in urban development projects.

All data will be stored within the secure TU Delft Teams environment, accessible only to members of the TU Delft research team. Audio recordings will be transcribed and pseudonymised, meaning that names and any other identifying details will be removed or replaced with codes. The key linking these codes to personal identities will be stored separately, with an additional layer of security, and will only be accessible to the principal investigators. This ensures that the pseudonymised data used for analysis cannot be traced back to individual participants.

#### 9. Will you work with any other types of confidential or classified data or code as listed below? (Select all that apply and provide additional details below.)

***If you are not sure which option to select, ask your Faculty Data Steward for advice.***

- No, I will not work with any other types of confidential or classified data/code

**10. How will ownership of the data and intellectual property rights to the data be managed?**

***For projects involving commercially-sensitive research or research involving third parties, seek advice of your [Faculty Contract Manager](#) when answering this question.***

The datasets underlying the published papers will be released upon request and only if the participant has consented with this. During the active phase of research, the project leader from TU Delft will oversee the access rights to data (and other outputs), as well as any requests for access from external parties. Access will be made available upon request no later than at the time of publication of corresponding research papers.

**11. Which personal data or data from human participants do you work with? (Select all that apply.)**

- Other types of personal data or other data from human participants - please provide details below
- Proof of consent (such as signed consent materials which contain name and signature)
- Date of birth and/or age
- Gender

Personally identifiable information: interviewee name.

Personally Identifiable Research Data: gender, age or age group, education, function, occupation, audio-recordings

**12. Please list the categories of data subjects and their geographical location.**

Categories of data subjects:

- Stakeholders/residents attending information meetings related to the Buitenwoel project (non-expert participants).
- Professionals and experts involved in urban development projects (e.g., urban planners, project managers, communication advisors).
- Users of the prototype model during evaluation sessions (may include both stakeholders and professionals).

Geographical location:

- Veendam, the Netherlands (for residents and stakeholders attending the information evening).
- Professionals primarily based in the Netherlands; mainly Veendam and surroundings.

**13. Will you be receiving personal data from or transferring personal data to third parties (groups of individuals or organisations)?**

- No

**16. What are the legal grounds for personal data processing?**

- Informed consent

The HREC informed consent guide and template will be used to create the informed consent forms for the interviewees, participants of the information events, and participants in the VR prototype validation session.

**17. Please describe the informed consent procedure you will follow below.**

All participants will receive a written Informed Consent Form prior to data collection. This document explains the purpose of the project, the type of data collected (including audio recordings), how the data will be stored and used, and the rights of participants under GDPR.

Participants will be informed that:

- Audio recordings will be made of interviews, stakeholder information meetings, and, where relevant, short evaluation interviews with prototype users.
- Data will be pseudonymised before analysis, and personal identifiers (e.g., name) will be stored separately from research data with additional security measures.
- Participation is voluntary, and they can withdraw at any time without giving a reason and request deletion of their data.
- Only the TU Delft research team will have access to the original data.
- Pseudonymised data may be used in scientific publications or for future research, but never in an identifiable form.

Consent will be obtained by asking participants to sign the informed consent form (digitally or physically) prior to the interview or meeting recording. For online sessions, a scanned signed form or a secure digital signature will be accepted. The signed forms will be stored securely (encrypted) within the TU Delft Teams environment, separate from the research data.

**18. Where will you store the physical/digital signed consent forms or other types of proof of consent (such as recording of verbal consent)?**

Informed consent forms and contact information are stored in the Project Storage on Teams and encrypted separately from research data to minimise risk of re-identification.

Hard copies of informed consents will be destroyed after scanning.

**19. Does the processing of the personal data result in a high risk to the data subjects? (Select all that apply.)**

*If the processing of the personal data results in a high risk to the data subjects, it is required to perform a Data Protection Impact Assessment (DPIA). In order to determine if there is a high risk for the data subjects, please check if any of the options below that are applicable to the processing of the personal data in your research project.*

*If any category applies, please provide additional information in the box below. Likewise, if you collect other type of potentially sensitive data, or if you have any additional comments, include these in the box below.*

*If one or more options listed below apply, your project might need a DPIA. Please get in touch with the Privacy team ([privacy-tud@tudelft.nl](mailto:privacy-tud@tudelft.nl)) to get advice as to whether DPIA is necessary.*

- None of the above apply

**23. What will happen with the personal data used in the research after the end of the research project?**

- Other – please explain below
- Pseudonymised or aggregated data will be shared with others

if interviews agree with sharing data then their pseudonymised data will be separately stored. The transcripts will be pseudonymised using no referral to the location, just replacing names by 'city' and not including the reference to the project, making that there are more than 100 cities that might apply. We also will classify age, and education into broad categories and use these in the transcripts. There are always more persons that share the same role, and we think sharing perceptions on what is of importance in an urban development project not bearing a high risk. The audio-recordings will be deleted upon transcription as mentioned.

**24. For how long will personal research data (including pseudonymised data) be stored?**

- Personal data will be deleted at the end of the research project
- 10 years, in accordance with the TU Delft Research Data Framework Policy

## **25. How will your study participants be asked for their consent for data sharing?**

- In the informed consent form: participants are asked to give their explicit consent for sharing their (pseudonymised) personal data with restricted access with specific recipients for specific purpose(s)

We will make data available upon request, and we will evaluate the request whether the research aims are meeting the aim of our research project to meet the conditions as stated in the informed consent.

## **V. Data sharing and long term preservation**

### **27. Apart from personal data mentioned in question 23, will any other data be publicly shared?**

*Please provide a list of data/code you are going to share under 'Additional Information'.*

- No other data/code can be publicly shared – please explain below why data/code cannot be publicly shared

## **VI. Data management responsibilities and resources**

### **33. If you leave TU Delft (or are unavailable), who is going to be responsible for the data/code resulting from this project?**

My co-researcher in this project is Clarine van Oel: [c.j.vanoel@tudelft.nl](mailto:c.j.vanoel@tudelft.nl). When she is not available, the Head of the Department of MBE [mbe-bk@tudelft.nl](mailto:mbe-bk@tudelft.nl). Currently that is Ellen van Bueren [E.M.vanBueren@tudelft.nl](mailto:E.M.vanBueren@tudelft.nl)

### **34. What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?**

4TU.ResearchData is able to archive 1TB of data per researcher per year free of charge for all TU Delft researchers. We do not expect to exceed this and therefore there are no additional costs of long term preservation.

### **35. Which faculty do you belong to?**

- Faculty of Architecture and the Built Environment (ABE)

Department of Management in the Built Environment.

Appendix III: Interview protocols

# semi-structured Interview protocol

TU Delft

Management in the Built environment

February, 2026

## Inhoud

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## Vorbereiding voor interview

- A3 kaart, 1 per interview, meenemen Masterplan Buitenwoeltracé
- Oplader en powerbank meenemen voor telefoon
- Notitieblok en pen meenemen voor aantekeningen
- Informed consent meenemen

## Introduction to the interview

Bedankt dat u tijd wilde maken voor dit interview.

Ik ben student aan de Tu Delft en doe een afstudeeronderzoek namens mijn opleiding Management in the Built environment. Ik onderzoek naar wat betrokkenen, zoals omwonenden en professionals, belangrijk vinden in het Buitenwoeltracé project.

De reden dat wij u benaderd hebben is doordat wij inschatten dat u erg betrokken bent bij het project.

Het doel van dit onderzoek is om inzicht te krijgen hoe deze belangen, door middel van burger participatie, worden meegenomen in de besluitvorming en uiteindelijk het ontwerp van de Buitenwoellaan.

Het interview gaat ongeveer 60 minuten duren

Als u toestemming verleent, dan nemen we dit gesprek op zodat we de data vertrouwelijk en anoniem kunnen gebruiken voor dit onderzoek

- Heeft u het toestemmingsformulier gelezen en heeft u nog vragen hierover?
- Gaat u akkoord met deelname aan dit interview?
- Gaat u akkoord met het opnemen van dit gesprek?
- Gaat u akkoord dat we uw antwoorden anoniem gebruiken voor onderzoeksdoeleinden?

*(Na opname gestart te hebben opnieuw toestemming vragen zodat dit op de opname staat)*

Ik start nu de opname

# Interview vragen betrokken burgers

## Achtergrond participant 5 minuten

- Waar woont u ongeveer in Veendam, zou u dat op de kaart willen aanwijzen?
- Hoelang woont u daar al?

## Mening over voorstel 15 minuten

- Wat vind u van het huidige voorstel voor de weg?
- Wat vind u goed in het plan?
- Is dit ontwerp uw voorkeur of ziet u verbeterpunten, zo ja welke?
- Is dit voorstel zoals u had verwacht of had gehoopt?

## Participatie ervaring 15 minuten

Dan ben ik nu benieuwd hoe u betrokken bent bij het Buitenwoellaan project

- Heeft u contact gehad met de gemeente over dit project, zo ja hoe ging dat?
- Heeft u mogelijkheden gehad om uw mening te geven over het plan, en hoe?
- Kon u alleen reageren op plannen, of ook zelf ideeën aandragen?

## Setting 10 minuten

Er zijn verschillende manieren om de meningen van omwonenden op te halen, een voorbeeld is bijvoorbeeld 1-op-1 keukentafelgesprekken waarin een wethouder persoonlijk langskomt

- In hoeverre helpt een persoonlijk gesprek met de gemeente volgens u om uw zorgen of ideeën te bespreken?
- Wat zouden mensen volgens u kunnen doen als ze het niet eens zijn met het plan?

## Na participatie 15 minuten

U heeft uw belangen en waarden gedeeld.

- In hoeverre verwacht u dat de gemeente iets met uw aanbevelingen gaat doen?
- Voelt u zich gehoord door de gemeente? Waarom wel of niet?
- Is het voor u duidelijk hoe de gemeente uiteindelijk beslissingen neemt over het plan?

## Aanvullende vragen

- Zou je een voorbeeld kunnen geven wat u precies bedoeld?
- Je noemde .... kan je daar verder op in gaan?

## Afsluiting 5 minuten

- Is er nog iets wat u wilt toevoegen wat we niet besproken hebben?
- Bedanken voor deelname en uitleggen hoe informatie verder wordt gebruikt.

# VR sessie protocol

TU Delft

Management in the Built environment

Mei 2026

## Inhoud

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Introductie 5 minuten .....	4
Sessie 2x 10-15 minuten .....	4
Gesprek 10 minuten .....	5
Afsluiting.....	5

# Introductie tot de sessie

Bedankt dat jullie tijd wilden vrijmaken voor deze Virtual Reality sessie

Ik ben student aan de TU Delft en doe een afstudeeronderzoek namens mijn opleiding Management in the Built environment. Ik onderzoek wat betrokkenen, zoals omwonenden en professionals, belangrijk vinden in het Buitenwoeltracé project en wat de rol van VR kan zijn in participatie en besluitvorming.

Samen met het XR-lab van de TU Delft is er een VR-testmodel ontwikkeld voor de nieuwe rotonde ten hoogte van de Somerlustweg-Middenweg. Het VR model is gemaakt op basis van de schetsen/CAD modellen die tijdens de inloopavond zijn gebruikt.

Met deze test willen we evalueren of een VR-model helpt om meer begrip te krijgen van een ontwerp en of dit het gesprek hierover vergemakkelijkt. In het model staat met name de toename van verkeer over het tracé centraal en het effect daarvan op de woningen aan de noordzijde van de Vredelustlaan. Specifiek kijken we naar de invloed van autoverlichting in de donkere maanden (het zogeheten “vuurtoren-effect”) en de invloed daarvan op de leefkwaliteit. Daarnaast kan men de positie aannemen van een fietser die van het noorden naar het zuiden wil fietsen over de rotonde.

De sessie gaat ongeveer 40-45 minuten duren en vinden plaats per 2 personen. 1 persoon zet de VR-bril op, de andere persoon kijkt mee. Na ongeveer 10-15 minuten wordt er gewisseld en zet de andere persoon de VR-bril op. Het gesprek levert waardevolle inzichten op hoe VR kan bijdragen aan participatie en besluitvorming

Als u toestemming verleent, dan nemen we dit gesprek op zodat we de data vertrouwelijk en anoniem kunnen gebruiken voor dit onderzoek

- Heeft u het toestemmingsformulier gelezen en heeft u nog vragen hierover?
- Gaat u akkoord met deelname aan deze sessie?
- Gaat u akkoord met het opnemen van dit gesprek?
- Gaat u akkoord dat we uw antwoorden anoniem gebruiken voor onderzoeksdoeleinden?

*(Na opname gestart te hebben opnieuw toestemming vragen zodat dit op de opname staat)*

Ik start nu de opname

## Introductie 5 minuten

Introduceren onderzoek

Uitleggen procedure

Uitleggen bewegen door model adhv joystick

## Sessie 2x 10-15 minuten

### **Woonkamer**

Een minuut tijd nemen voor vertrouwd raken met de VR-bril en wennen aan omgeving

Woonkamer van woning aan Vredenburglaan

Effect testen van lage heg en hoge heg naast de tuin op autolampen in woning

Effect aanpassing lichtbundel auto's naar groot lichteffect testen van aanpassing verkeersintensiteit

- Wanneer zijn de autolampen hinderlijk?
- Welke maatregel is het meest effectief?
- Veranderd uw oordeel wanneer u dit vanuit de woning ervaart?

### **Voortuin**

Terug naar voortuin

Effect testen van lage heg en hoge heg naast de tuin op autolampen

Effect testen van lage heg direct aangrenzend aan rotonde op autolampen

Effect aanpassing lichtbundel auto's naar groot licht

- Welke effecten zijn hier volgens u het meest merkbaar voor bewoners?"
- Zou u dit op basis van tekeningen even sterk hebben ingeschat?

### **Rotonde**

Verplaatsen naar rotonde en perspectief van fietser bij rotonde demonstreren

Effect testen van aanpassing verkeersintensiteit

- Hoe veilig voelt deze situatie vanuit het fietsersperspectief?
- Denkt u dat bewoners of fietsers dit anders ervaren dan verkeerskundigen?

Wisselen en opnieuw procedure doorlopen

## Gesprek 10 minuten

- Welke inzichten levert het testmodel op?
- Helpt de VR-omgeving om u in te leven in het perspectief van de bewoners aan de Vredenburglaan?
- Geeft de VR-omgeving een beter begrip van de zorgen en waarden van bewoners dan reguliere visualisatiemethoden zoals schetsen 'van bovenaf'?
- Hoe heeft deze VR-ervaring invloed op ontwerpkeuzen en afweging van belangen?
- Zijn er aandachtspunten voor het testmodel?
- Welke, vanuit uw mening, belangrijke effecten blijven ondanks VR nog onvoldoende zichtbaar?
- Wanneer zou u VR niet inzetten?

## Afsluiting

Zijn er verder nog vragen over het model of over hoe het proces verder verloopt?

Bedanken voor deelname en uitleggen hoe informatie verder wordt gebruikt?

Appendix IV: Informed consent form

## Geïnfomeerd toestemmingsformulier

U wordt uitgenodigd om deel te nemen aan een onderzoek genaamd Besluitvorming in participatieve gebiedsontwikkeling. Dit onderzoek wordt uitgevoerd door student x van de TU Delft als afstudeeronderwerp van de master Management in the Built Environment.

Het doel van dit onderzoek is om beter inzicht te krijgen in welke waarden, belangen en zorgen burgers hebben in het Buitenwoellaan project, hoe deze informatie kan gedeeld in omgevingsparticipatie en hoe ze worden meegenomen en vertaald in de besluitvorming en in het ontwerp.

Het interview zal ongeveer 60 minuten in beslag nemen. De data zal gebruikt worden voor publicatie van de masterscriptie. U wordt gevraagd om vragen te beantwoorden over:

- wat u belangrijk vindt in het project
- waar u zich zorgen om maakt
- Op welke manier u betrokken bent
- hoe en in welke situatie u uw belangen duidelijk kan maken richting professionals
- in hoeverre uw waarden worden meegenomen in het proces

Zoals bij elke online activiteit is het risico van een databreuk aanwezig. Wij doen ons best om uw antwoorden vertrouwelijk te houden. We minimaliseren de risico's door uw gegevens te pseudonimiseren en op te slaan onder een unieke code. Uw gegevens worden veilig opgeslagen op een versleutelde Europese server, met aparte beveiliging voor het document waarin de codes aan identiteiten gekoppeld zijn. Dat sleuteldocument wordt 5 jaar na de laatste publicatie over dit project vernietigd. In rapportages gebruiken we gefingeerde namen en zorgen we dat uw uitspraken niet naar u herleidbaar zijn. Alleen de onderzoeker krijgt toegang tot de originele data.

Uw deelname aan dit onderzoek is volledig vrijwillig, en **u kunt zich elk moment terugtrekken zonder reden op te geven**. U bent vrij om vragen niet te beantwoorden.

Voor eventuele vragen over het onderzoek of als u toch wilt afzien van deelname aan het onderzoek vindt u hieronder de contactgegevens van de uitvoerende en verantwoordelijke onderzoeker.

Door een handtekening te zetten gaat u ermee akkoord dat we uw antwoorden zullen verwerken voor het hierboven genoemde onderzoek en dat we over de resultaten van het onderzoek zullen publiceren. Alvast hartelijk dank voor uw deelname!

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
<b>A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICIPANT TASKS AND VOLUNTARY PARTICIPATION</b>		
1. Ik heb de informatie over het onderzoek gedateerd gelezen en begrepen, of deze is aan mij voorgelezen. Ik heb de mogelijkheid gehad om vragen te stellen over het onderzoek en mijn vragen zijn naar tevredenheid beantwoord.	<input type="checkbox"/>	<input type="checkbox"/>
2. Ik doe vrijwillig mee aan dit onderzoek, en ik begrijp dat ik kan weigeren vragen te beantwoorden en mij op elk moment kan terugtrekken uit de studie, zonder een reden op te hoeven geven.	<input type="checkbox"/>	<input type="checkbox"/>
3. Ik begrijp dat mijn deelname aan het onderzoek de volgende punten betekent: <ul style="list-style-type: none"> <li>- Er zal een audio opname van dit interview worden gemaakt</li> <li>- De onderzoeker kan aantekeningen maken tijdens het interview</li> <li>- Van deze audio opname en aantekeningen zal een tekstueel transcript gemaakt worden welke op een beveiligde omgeving wordt opgeslagen</li> <li>- De audio opname van dit interview zal na het opstellen van het transcript verwijderd worden.</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ik begrijp dat, wanneer dit onderzoek volgens planning verloopt, het eind juni eindigt.	<input type="checkbox"/>	<input type="checkbox"/>
<b>B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)</b>		
5. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoek data worden verzameld, met het risico dat ik hieruit geïdentificeerd kan worden. Dit betekent dat ik herkend zou kunnen worden door een lezer van de thesis, waaruit mijn mening over het onderwerp kan worden gehaald.	<input type="checkbox"/>	<input type="checkbox"/>
6. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoeksdata worden verzameld, met het risico dat ik hieruit geïdentificeerd kan worden	<input type="checkbox"/>	<input type="checkbox"/>
7. Ik begrijp dat de volgende stappen worden ondernomen om het risico van een databreuk te minimaliseren, en dat mijn identiteit op de volgende manieren wordt beschermd in het geval van een databreuk <ul style="list-style-type: none"> <li>- Interviews worden omgezet in gepseudonimiseerde audio transcripten. Hierdoor zijn uw gegevens niet navolgbaar en onmogelijk te identificeren</li> <li>- De audio opnamen van het onderzoek zal na het opstellen van de transcripten worden verwijderd</li> <li>- Het geïnformeerd toestemmingsformulier zal op een beveiligde omgeving worden opgeslagen, welke alleen toegankelijk is voor het onderzoeksteam. De eventuele hard copy van dit formulier zal worden vernietigd.</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
8. Ik begrijp dat de persoonlijke informatie die over mij verzameld wordt en mij kan identificeren, zoals naam, adres en e-mail niet gedeeld worden buiten het studieteam.	<input type="checkbox"/>	<input type="checkbox"/>



## Geïnfomeerd toestemmingsformulier

U wordt uitgenodigd om deel te nemen aan een onderzoek genaamd Besluitvorming in participatieve gebiedsontwikkeling. Dit onderzoek wordt uitgevoerd door student x van de TU Delft, samen met mijn begeleiders Jelle Koolwijk en Clarine van Oel, als afstudeeronderzoek van de master Management in the Built Environment.

Het doel van dit onderzoek is om beter inzicht te krijgen in wat de rol van Virtual Reality is binnen projecten zoals het Buitenwoellaan project. Specifiek gaat het over welke aspecten van een ontwerp meer zichtbaar worden voor burgers én professionals en welke toepassingen VR heeft op participatie en besluitvorming.

De sessie zal ongeveer 40-45 minuten in beslag nemen. De data zal gebruikt worden voor publicatie van de masterscriptie. Naast het doorlopen van het testmodel, verwachten wij dat er een gesprek op gang komt over de volgende zaken:

- Welke inzichten het testmodel oplevert
- Wat de invloed van VR kan zijn op het maken van ontwerpkeuzen
- Waarin VR verschilt ten opzichte van traditionele visualisatietechnieken
- Welke aspecten wel en welke niet zichtbaar worden in VR

Zoals bij elke online activiteit is het risico van een databreuk aanwezig. Wij doen ons best om uw antwoorden vertrouwelijk te houden. We minimaliseren de risico's door uw gegevens te pseudonimiseren en op te slaan onder een unieke code. Uw gegevens worden veilig opgeslagen op een versleutelde Europese server, met aparte beveiliging voor het document waarin de codes aan identiteiten gekoppeld zijn. Dat sleuteldocument wordt 5 jaar na de laatste publicatie over dit project vernietigd. In rapportages gebruiken we gefingeerde namen en zorgen we dat uw uitspraken niet naar u herleidbaar zijn. Alleen de onderzoeker krijgt toegang tot de originele data.

Uw deelname aan dit onderzoek is volledig vrijwillig, en **u kunt zich elk moment terugtrekken zonder reden op te geven**. U bent vrij om vragen niet te beantwoorden.

Voor eventuele vragen over het onderzoek of als u toch wilt afzien van deelname aan het onderzoek vindt u hieronder de contactgegevens van de uitvoerende en verantwoordelijke onderzoeker.

Door een handtekening te zetten gaat u ermee akkoord dat we uw antwoorden zullen verwerken voor het hierboven genoemde onderzoek en dat we over de resultaten van het onderzoek zullen publiceren. Alvast hartelijk dank voor uw deelname!

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
<b>A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICIPANT TASKS AND VOLUNTARY PARTICIPATION</b>		
1. Ik heb de informatie over het onderzoek gedateerd gelezen en begrepen, of deze is aan mij voorgelezen. Ik heb de mogelijkheid gehad om vragen te stellen over het onderzoek en mijn vragen zijn naar tevredenheid beantwoord.	<input type="checkbox"/>	<input type="checkbox"/>
2. Ik doe vrijwillig mee aan dit onderzoek, en ik begrijp dat ik kan weigeren vragen te beantwoorden en mij op elk moment kan terugtrekken uit de studie, zonder een reden op te hoeven geven.	<input type="checkbox"/>	<input type="checkbox"/>
<p>3. Ik begrijp dat mijn deelname aan het onderzoek de volgende punten betekent:</p> <ul style="list-style-type: none"> <li>- Er zal een audio opname van het gesprek worden gemaakt</li> <li>- Er zal een schermopname worden gemaakt tijdens het navigeren door het testmodel</li> <li>- De onderzoeker kan aantekeningen maken tijdens het interview</li> <li>- Van de audio opname en aantekeningen zal een tekstueel transcript gemaakt worden welke op een beveiligde omgeving wordt opgeslagen</li> <li>- De schermopname wordt gesynchroniseerd met de audio opname voor analyse van gesprek</li> <li>- De audio en schermopname zal na het opstellen van het transcript verwijderd worden.</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ik begrijp dat, wanneer dit onderzoek volgens planning verloopt, het eind juni eindigt.	<input type="checkbox"/>	<input type="checkbox"/>
<b>B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)</b>		
5. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoek data worden verzameld, met het risico dat ik hieruit geïdentificeerd kan worden. Dit betekent dat ik herkend zou kunnen worden door een lezer van de thesis, waaruit mijn mening over het onderwerp kan worden gehaald.	<input type="checkbox"/>	<input type="checkbox"/>
6. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoeksdata worden verzameld, met het risico dat ik hieruit geïdentificeerd kan worden.	<input type="checkbox"/>	<input type="checkbox"/>
<p>7. Ik begrijp dat de volgende stappen worden ondernomen om het risico van een databreuk te minimaliseren, en dat mijn identiteit op de volgende manieren wordt beschermd in het geval van een databreuk</p> <ul style="list-style-type: none"> <li>- Audio opnames worden omgezet in gepseudonimiseerde audio transcripten. Hierdoor zijn uw gegevens niet navolgbaar en onmogelijk te identificeren.</li> <li>- Scherm opnames worden omgezet in</li> <li>- Audio en schermopnamen van het onderzoek zal na het opstellen van de transcripten worden verwijderd</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>



