Master Thesis Report

Co-creation of wind energy projects:
insights about the process from two German case studies.

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Abstract

Research on co-creation in the wind energy sector gains traction. Essentially, co-creation is about the negotiation of interests and knowledge between experts and laypeople. Co-creation is often endorsed due to its potential to raise public acceptance towards wind energy projects, which appears critical to ensure the energy transition. However, literature on wind energy co-creation provides scant insights into how expert and lay knowledge influence relevant process-related co-creation outputs of wind energy projects. To address this gap, two wind energy case studies situated in Germany have been examined qualitatively by conducting interviews with involved expert stakeholders. There was a starkly perceived dichotomy between expert and lay knowledge, resulting in knowledge being transferred from experts to laypeople rather than being collaboratively produced amongst involved stakeholders. The findings are largely in congruence with the literature highlighting the typically hierarchical character of wind energy projects. A notable representation of co-creation constituted the round table in case study 1 in which laypeople exerted influence on the content and outputs of the participatory meetings. However, considering the findings in both case studies, the limitations of co-creation as a means to achieve widespread public acceptance has been critically discussed. Based on the findings, recommendations for policymakers and co-creation researchers are presented that may be valuable to enhance the conceptual and practical understanding of co-creation of wind energy projects.

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1. Introduction

1.1 Problem description

Wind energy plays an increasingly important role in achieving the European Union's (EU) goals associated with the energy transition. The revised Renewable Energy Directive elevated the EU renewable energy target to 42.5 % with a top-up of 2.5% (European Commission [EC], n.d.). This share needs to almost double in almost 10 years compared to 2022 (ibid.), at a time when wind energy on average provided 16% of electricity consumed in the EU (EC, 2023). To meet these ambitious policy goals, the expansion of wind farms constitutes a critical component.

However, the expansion of wind farms faces opposition from local actors, mainly due to environmental, visual, and socioeconomic reasons (Enevoldsen & Sovacool, 2016). When asked about the importance of expanding onshore wind energy to reach the energy transition, the majority (79%) find it (very) important (Fachagentur Windenergie an Land, 2020). Nonetheless, low local acceptance towards approved wind turbines is not rare. In Germany, lawsuits filed against wind turbines concern two-fifths of approved wind energy capacity, resulting in increased permit and realization durations (Fischer and Kube, 2020). Thus, despite the overall acceptance towards wind energy, local opposition can negatively impact the rapid expansion of wind turbines.

Co-creation is endorsed as a democratic and effective way of raising acceptance amongst citizens by including them in wind power projects (Langer et al., 2017; Liebe et al., 2017; Reitz et al., 2022). Co-creation can be defined as a participatory approach that enables multiple ways of public engagement in wind energy which go beyond merely informing the public about decisions (Elkjær et al., 2021; Solman et al., 2021; Brandsen & Honingh, 2018). Reitz et al. (2022) observed that early public engagement that gives power and agency to citizens at a local level can increase the acceptance of wind parks. Similarly, Liebe et al. (2017) found that citizens generally accept new wind turbines if they are involved in the participatory process, have a certain level of ownership, and if energy is consumed regionally. Moreover, the authors found procedural justice to be the most influential factor in local acceptance Liebe et al. (2017). Conversely, in an online study (n~1400) situated in Germany, Langer et al. (2017) found that participation in which citizens express a willingness to engage but can only engage in limited ways with confined effectiveness shows a significant negative influence on the acceptance of wind energy projects. In sum, literature on wind energy co-creation indicates that early public engagement that provides citizens with agency and a certain degree of influence can increase citizens' acceptance towards wind turbines.

Since co-creation is about involving the public in the planning process, integrating different knowledge in a project represents an integral part of co-creation. Incorporating differing beliefs and

belief systems could improve a project's process and outputs by enabling different actors to deliberate and negotiate their interests and knowledge (Chambers et al., 2021; Elkjær et al., 2021). Specifically, benefits that relate to co-creation processes and outputs include not only increased social acceptance but also, for example, that project participants may gain skills, the government increase their trust and avoid litigation costs, and society can profit from more democratically decided policies (Stober et al., 2021). Thus, the promises of co-creation in wind energy projects to enhance the process as well as the outputs are manifold.

Despite the various potentials of co-creation, negotiating expert and lay knowledge can also cause friction (Lidskog, 2008). A potential "clash" (ibid., p.78) between expert and lay knowledge corresponds to the perceived difference in the legitimacy of both forms of knowledge. Expert knowledge is often viewed as more legitimate than lay knowledge which is why experts tend to educate laypeople (ibid.) In wind power planning, 'expert' knowledge appears to be prioritized over lay knowledge (Geraint & Gianluca, 2016). Expert knowledge takes on a prevalent and unquestioned role in technical decision-making in wind power planning, which is perpetuated by project developers (Aitken, 2009). The friction between expert and lay knowledge is occasionally addressed by external supporters, such as civic forums. Civic forums can represent relevant stakeholders in public engagement processes as they assist municipalities by providing expertise, involving the citizens in a more accessible way, and adopting a neutral role (NeulandQuartier & Pollytix, 2018). As such, civic forums can be understood as a liaison between municipalities and the public and, thus, could address the 'friction' between expert and lay knowledge.

While co-creation is increasingly applied in many sectors, for example, education, development, etc. (Chambers et al., 2021), there is comparatively scarce literature on co-creation in relation to wind energy development (Elkjær et al., 2021). Furthermore, little is known about how expert and lay knowledge influence the outputs of co-creation processes. To bridge this gap, this research serves three main purposes.

Firstly, the outputs of two wind energy projects will be assessed. In a systematic literature review of over 120 articles and books between 1987 and 2013 on co-creation and co-production, Voorberg et al. (2014) conclude that studies focusing on the outcomes of co-creation and co-production processes are scarce. One notable exception to that is the work of Chambers et al. (2021) who systematically assess a set of 'outcome' indicators to evaluate case studies' sustainability. Since the indicators deployed by Chambers et al. (2021) represent a useful operationalization of co-creation or co-production, six indicators were selected and used in this research as 'output' indicators that relate to the co-creation process.

Another focus of this research is examining how stakeholders involved in co-creation processes perceive the role of civic forums in facilitating public engagement in wind energy projects. Across

German states, co-creation processes are often accompanied by civic forums to facilitate communication and moderation between involved actors (Federal Environment Agency [UBA], n.d.). Chambers et al. (2021) found that facilitation significantly contributed to a higher attainment of outcomes. Despite the relevance of facilitating co-creation processes, there is limited knowledge of how the role of civic forums in facilitating public engagement processes is perceived by involved stakeholders.

Thirdly, this research attends to how expert and lay knowledge are negotiated in wind energy projects. Co-creation primarily concerns the engagement of the public, often described as laypeople, and the negotiation of their interests with other involved actors, or experts. Thus, the negotiation of knowledge between experts and laypeople is an essential component of co-creation. This part of this research aims to add insights to the literature on wind power concerning the negotiation between expert and lay knowledge.

To investigate co-creation outputs, the perceived role of civic forums in facilitating public engagement, and expert-lay-knowledge negotiations, two wind energy case studies situated in Germany were examined. Germany needs to drastically increase the share of renewable energy in total energy consumption to meet its Energy transition policy goals. Until 2030, installed wind power needs to double in Germany (UBA, 2022). In terms of co-creation, Germany appears ambivalent. A quantitative study on participatory opportunities and experiences, amongst 124 municipalities showed that in only 13% of cases, citizens are merely informed (NeulandQuartier & Pollytix, 2018, p. 6), a participation level that co-creation objects. However, information events are by far the most common form of public engagement (ibid.). The next most conventional formats are workshops, working groups, groups, round tables, and future labs (ibid.), which may constitute co-creation formats. Moreover, the German word for co-creation 'Koproduktion' is, in comparison to the English use of the term, still mostly unknown or rarely used in public administration (Löffler et al., 2015), which may point to a scarcity of co-creation applications. Thus, Germany is confronted with the need to rapidly expand wind energy production as well as the opportunity to implement more co-creation in wind energy projects.

A notable and impactful example of public inclusion in Germany occurred in the aftermath of the Fukushima incident in 2011. The citizens' dialogue on future technologies (CDFT) was established to discuss the future of Germany's energy technologies across multiple governance levels and with various stakeholders. Several participatory formats were deployed, such as citizen workshops and citizen conferences, and facilitated by a professional service provider (Fraune & Knodt, 2017). This series of events ended in November 2011 at a citizens' summit, in which a citizens' report was handed to the former Federal Minister of Education and Research (Decker & Fleischer, 2012). Compared to other deliberative events, the design of the CDFT stands out concerning its magnitude. Each of the dialogue's topics was discussed by roughly 1000 citizens (ibid). Since Germany contains some record of co-

creation it can provide experiences in co-creation in wind power development, which may also be relevant for other co-creation projects within the EU and potentially across the globe.

1.2 Research aims and questions

Policymakers and scholars could benefit from an enhanced understanding of addressing co-creation outputs and the negotiations between expert and lay knowledge. Firstly, given the broad landscape of co-creation conceptualizations, scholars could profit from a framework that enables them to orient themselves towards essential aspects and mechanisms of co-creation processes, that go beyond wind energy projects. The framework has been purposefully formulated in more general terms to provide constructive guidance for co-creation scholars. Secondly, policymakers at a municipal level could derive value from empirical evidence of how knowledge of experts and laypeople is negotiated and with which consequences since an awareness of insights into community engagement could contribute to more inclusive and effective public involvement. Moreover, municipalities could be informed by what has 'worked' and what has not in terms of public engagement and, hence, may adopt and adapt strategies that are appropriate for their context. Thus, this research intends to provide improved conceptual guidance on co-creation and insights into how different knowledge influences the outputs of co-creation wind energy projects by considering two case studies in Germany. This research focuses on the following question, which is approached by three sub-questions:

How do expert and lay knowledge influence the co-creation outputs of wind energy projects, based on two case studies in Germany?

Sub-questions:

- What are the co-creation outputs in both case studies?
- How do stakeholders perceive the role of civic forums in facilitating public engagement in both wind energy projects?
- How is knowledge negotiated between experts and laypeople?

1.3 Outline of the following chapters

Following this introduction, the second chapter will discuss relevant co-creation literature and introduce the co-creation framework for this research. Subsequently, the third chapter will elucidate the methods deployed, the methodological approach to analyzing the two case studies, and the 'expert' understanding of this research. Moreover, the third chapter will present the criteria for selecting the case studies and interviewees. Afterwards, the fourth chapter will present the results of the two case

studies with respect to the research questions. Before addressing the three sub-questions of this research, this chapter will describe the level, forms, and approach to participation that were present in these case studies. The systematic outline of the results will help to answer the main research question that will be addressed at the end of the fourth chapter. In the subsequent chapter, the results will be discussed by embedding the findings in wind energy co-creation literature. Furthermore, the limitations and implications of this research and of the concept of co-creation itself will be elucidated. The last chapter will succinctly refer to the research questions and summarize its key findings. Eventually, recommendations for co-creation researchers and policymakers on co-creation in the wind energy sector will be presented.

2. Conceptualisation of co-creation

In the following chapter, it will be outlined how co-creation is defined in the literature and in this research, which is further illustrated by a co-creation framework. Co-creation can be described as a participatory process that exceeds informing citizens and offers various forms to engage with other stakeholders. In addition, the operationalisation of the wind energy project outputs will be presented, which is relevant to answer the first sub-question regarding the co-creation outputs of the case studies. Altogether, six indicators have been utilized to assess the co-creation outputs.

2.1 Co-creation defined

While the emergent body of literature has produced many useful concepts and distinctions for the term co-creation, it has also created a plethora of slightly different uses of the term. In a systematic literature review on co-creation in wind energy transitions, Elkjær et al. (2021) identify three different perspectives on co-creation. This research focuses on the perspective of co-creation as "[a]n approach to organizing social relations in concrete project development" (ibid., p. 6). As a response to 'invited stakeholder participation', co-creation represents a critical view on the exclusion of the public from the technical design, implementation, and operation of a wind farm (Solman et al., 2021). In a systematic literature review on co-creation and co-production, Voorberg et al. (2014) found that co-creation and co-production are often defined similarly. According to Brandsen and Honingh (2018), co-creation includes citizen input in the early stages of a service cycle, for example, initiating the planning of a service, whereras co-production refers to later stages of citizen involvement (Brandsen & Honingh, 2018). Solman et al. (2021) define co-production more openly as a participatory approach that goes further than merely informing citizens in that co-production allows for "multiple ways through which different publics choose to engage with wind energy" (Solman et al., 2021, p. 2). Thus, there is a variety of co-creation perspectives as well as a conceptual overlap with 'co-production' with varying emphases of both terms.

In this research, 'co-creation' has been used instead of co-production since co-creation is more typically employed in the context of public engagement in wind energy (Elkjær et al., 2021). Given these descriptions outlined above (Elkjær et al., 2021; Solman et al., 2021; Brandsen & Honingh, 2018), co-creation in this research is described as *a participatory approach that enables ways of public engagement which goes beyond merely informing and consulting the public about decisions.*

Proponents of co-creation demand that politics, administration, and citizens collaborate "on par with another" (Löffler, 2014, in Löffler et al., 2015, p. 17, my translation). In co-creation processes, according to Abt (2022), stakeholders are equally involved in the production of a common good, a description that corresponds to the 'partnership' level, stated in Arnstein's (1969) concept of the

participation ladder. The partnership level goes beyond a perfunctory form of public engagement, like informing or consulting citizens, by allowing participants to "negotiate and engage in trade-offs with traditional powerholders" (p. 217). Moreover, co-creation means that residents with local knowledge can become "important allies" (Kitzing et al., 2024, p. 5) to contribute to innovative solutions. In sum, co-creation refers to the equitable involvement of citizens and their ability to negotiate 'on par' with other, more powerful stakeholders.

Co-creation, essentially, represents what Wolsink and Breukers (2010) refer to as an 'egalitarian' policy style. Wolsink and Breukers (2010) propose four different policy and decision-making styles, of which two are relevant to consider for this research, namely *hierarchism* and *egalitarianism*. *Hierarchism* constitutes a style that is top-down and technocratic with a planned rationality. (ibid.). This perspective considers motives of opposition as illegitimate since they would be 'emotional' rather than 'factual' (ibid.). *Egalitarianism*, on the other hand, emphasises cooperation, early stakeholder involvement, and communicative rationality (Wolsink & Breukers, 2010). The results of the authors' research indicate that the egalitarian policy style is more likely to promote legitimacy and reduce local opposition to wind energy projects than the technocratic, hierarchical perspective (ibid.). In geographical comparison, the egalitarian approach was among the most prevalent approaches in North-Rhine Westphalia, Germany, and has been more successful in terms of wind power implementation than in England and the Netherlands (ibid.). To conclude, egalitarianism essentially means co-creation, whereas hierarchism describes a top-down and technocratic approach.

2.2 Approaches to co-creation

Despite the widespread academic approval of co-creation to ensure legitimacy and improve outputs, co-creation in this research is understood as a concept constrained by trade-offs. The co-production typology from Chambers et al. (2021) reflects the idea that no approach to co-production, or co-creation, is ideal. For example, if the purpose of co-production is to reframe problems, the time-intensive deliberation may prohibit finding solutions (Chambers et al., 2021) and entail unintended consequences with counterproductive outcomes (Lemos et al., 2018). Also, given the scarcity of studies that focus on outputs and outcomes of co-creation and co-production processes, Voorberg et al. (2014) state that they cannot assess how and if co-creation or co-production is "beneficial" (p. 1346). Thus, there is a tension between an orientation towards the process and the outputs of a project.

The distinction between process and outputs can also be understood as two forms of approaches to co-creation. According to Chambers et al. (2021), the rationales for co-creation can be framed in terms of 'solving' problems and 'reframing' problems. 'Solving' problems constitutes a pragmatic approach focussed on the outputs that utilizes co-creation, whereas 'reframing' problems concerns rethinking solutions to problems (Chambers et al., 2021). According to Baker and Chapin (2018),

a pragmatic approach can contribute to a better implementation, whereas a process-oriented approach would "deepen democracy" (p. 2). A third approach, described as 'substantive' (Stirling, 2008), features pragmatic and process-oriented components. While the focus lies on outcomes or outputs, most details are deliberatively reasoned (Stirling, 2008). While in practice, it can be argued that projects always exhibit a mix of both approaches, it is helpful for this research to distinguish between approaches that emphasise the process or the outputs.

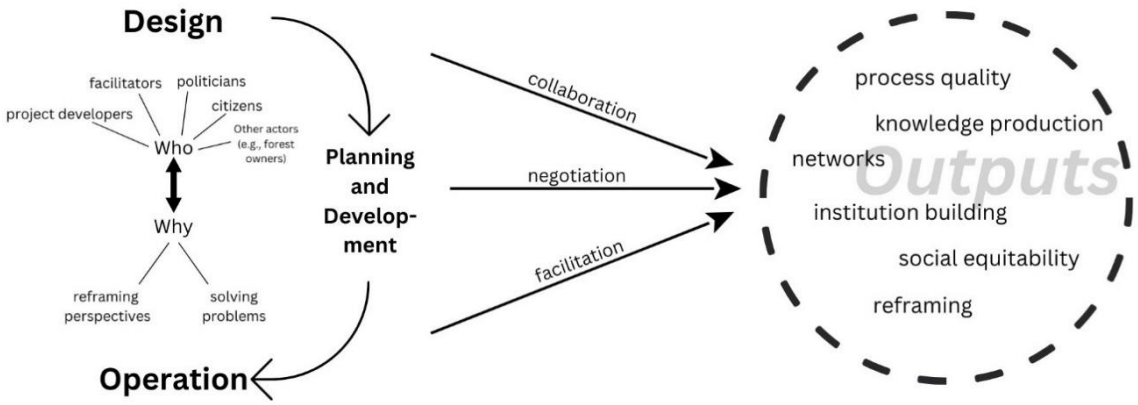
2.3 Co-creation framework

A growing body of researchers conceptualizes co-creation in the context of wind energy development (Elkjær et al., 2021; Solman et al., 2021; Kirkegaard et al., 2021) and in other fields, such as education, industrial production, and health (Chambers et al., 2021; Steiner, 2022). To guide this research, a framework was created that builds on existing co-creation frameworks and concepts (see Figure 1). The framework contains contextual information as it describes relevant co-creation variables, for example, knowledge production as a potential output or 'project developers' as part of 'Who' is involved in the case studies. Also, the framework serves a heuristic reason as it indicates the direction of causality and a general approach to the topic (Lund, 2014). For example, it explicitly contains components, such as 'Who', 'Why', and 'Output', that represent general aspects that may be worth considering in other contexts as well. In sum, the framework indicates various actors with potentially different rationales to co-create as well as several processes, such as deliberation, that contribute to a variety of outputs.

The framework shows two interconnected dimensions, 'Who' and 'Why'. The component 'Who' indicates 'who' was involved in both case study projects, whereas the component 'Why' refers to two general rationales to co-create. The purpose of 'solving problems' represents a pragmatic approach, whereas 'reframing' describes a process-oriented perspective. 'Who' and 'Why' are linked with a double-sided arrow, indicating the intertwinement of both aspects which is highlighted by Chambers et al. (2021) who examined the relationship between the purpose of co-production and the empowerment of underrepresented actors. The authors identified a negative relationship between bottom-up approaches and the rationale of co-production to solve problems, but a positive relationship between bottom-up approaches and the rationale of reframing problems. This suggests that an approach that focuses on empowering marginalized actors is more apt to reframe problems than solving them (Chambers et al., 2021). A connection between the rationale to co-create and who is involved seems intuitive. For example, if a project is aimed primarily at achieving its intended goals, those people who seem best suited to solve the problem are likely to be involved. Conversely, actors with differing interests would be considered unnecessary to solve predefined problems. Thus, the rationale to co-produce influences the inclusion of actors in a project.

Figure 1:

Framework on co-creation in a wind energy project



To answer the first sub-question concerning the outputs of the wind energy projects, a set of six co-creation output indicators have been adopted from the work of Chambers et al. (2021): 'process quality', 'knowledge production', 'networks', 'institution building', 'social equitability', and 'reframing' (see Table 1). According to Steinebach (2023), environmental policy 'outputs' directly result from the decision-making process, whereas environmental policy 'outcomes' describe the consequences of the outputs and primarily how the policy addressee's behaviour changes in response to outputs. Following Steinebach's (2023) distinction, most of the indicators adopted by Chambers et al. (2021) would be considered 'outputs' because they are the direct result of a project. Nonetheless, it could be argued that, for example, the indicator 'networks' represents an outcome since that indicator describes a behavioural change. For reasons of consistency and simplicity, the selected indicators are understood as 'output' indicators.

Table 1:

Definitions of output indicators

Output indicators	*Description of indicators*
Knowledge production	"Extent the case generates new knowledge"
Networks	"Extent the case changes the social network of connections among actors"

Process quality	"Extent the case produces a process that creates a meaningful/valuable experience for participants"
Reframing	"Extent the case changes pre-existing beliefs/values/ priorities of people"
Social equitability	"Extent the case creates [outputs] that shift[s] power and resources away from more powerful actors and towards more marginalized actors"
Institution building	"Extent the case strengthens or creates institutions"

Note: Adapted from Chambers et al., (2021) in 'Supplementary Table 4' (p. 11-12).

The selected array of indicators stems from a list of 14 'outcomes' considered by Chambers et al. (2021). There are three reasons why the remaining eight indicators were not chosen. First, two of the complete set of indicators by the authors refer to ecological and social outcomes that are intrinsically difficult to measure since they are "often spatially and temporally dispersed" (Chambers et al., 2021, p. 992). Second, indicators that were not expected to be pronounced in this research were also not considered. For example, it was not assumed that a 'policy uptake' would take place, which would imply the creation of new policies in response to the projects. This was considered unrealistic in the context of public engagement processes in wind energy projects. Finally, some indicators were not chosen when they were more accurately captured by other selected indicators. For instance, the indicator 'management practices' describing the adoption of new practices and strategies was essentially already covered by the indicators 'institution building' and 'social equitability'. In sum, indicators were not chosen either because they were difficult to measure, not expected, or already largely represented by other selected indicators.

3. Methodology and methods

The following chapter introduces the wind energy projects and how they meet the selection criteria. In addition, the data collection and analysis methods as well as the sampling methodology of this research will be outlined. The case studies have primarily been approached by conducting 13 semi-structured, online expert interviews whose transcripts as well as further project documents were analysed using qualitative thematic text analysis.

3.1 Case study criteria

Analysing case studies provides the opportunity to gain a more "nuanced view of reality" by closing the "distance to the object of study" (Flyvberg, 2006, p. 223). To zoom in in this way is critical to answer the main research question of how expert and lay knowledge influence the co-creation outputs of wind energy projects. In this research, two case studies have been analysed that were selected in an "[i]nformation-oriented" (Flyvberg, 2006, p. 230) way which means that case studies needed to exhibit co-creation features with the characteristics outlined below (for example, 'Diversity of actors'). Compared to other wind energy projects in Germany, the case studies chosen for this research could be viewed as "deviant" (Flyvberg, 2006, p. 230) since both entailed co-creation features, i.e., certain participatory formats, that appear to be atypical in other German case studies. Thus, the selected case studies do not likely represent the typical wind energy project in Germany in terms of public engagement. However, given that specific co-creation characteristics were perceived as highly positive by various stakeholders and interviewees, these case studies could provide valuable lessons to future wind projects that aim to implement similar co-creation measures.

The following list explains the criteria for selecting the cases and their relevance to this research. Based on the co-creation literature (as discussed in Chapter two), the following criteria are presumed to reflect the core of co-creation as defined in this research.

Diversity of actors

Fundamental to co-creation is the inclusion of a diversity of experts and laypeople. A group of 'various' actors is the necessary condition of co-creation that allows an assimilation of power imbalances and the negotiation of various forms of knowledge.

Adjusted power relations

The case studies needed to indicate adjusted power relations. Co-creation tries to subvert traditional power relationships through collaboration and negotiations of various actors as "equal partners" (Steen et al., 2018, p. 287). A direct or indirect expression of this 'equity' amongst participants of co-creation processes in a project description has been used as a measure for assessing the presence of

'adjusted power relations'. Critical to the notion of power, as defined in this research, is the scope of influence of actors to shape the processes or the outputs of the wind energy projects. An 'adjustment of power relations', thus, could be understood as reducing the gap in the scope of influence between more powerful (for example, project developer) and less powerful (for example, citizen) actors.

Negotiation

Essential to co-creation projects is the negotiation of expert and lay knowledge. Negotiation, in this research, is understood as discussing conflicting interests of experts and laypeople. The 'negotiation' of knowledge and interests has been measured by considering the amount and format of discussions and meetings that include citizens.

Facilitation

Another relevant evaluation factor is the facilitation of the participatory process. Facilitation is understood, in this research, as the guidance of negotiations, meetings, hearings etc. by external experts. Chambers et al. (2021) found that expert facilitation in co-creation is generally associated with higher attainment of goals. Thus, exploring case studies with such facilitation could provide the opportunity to gain insights into how the facilitating experts are perceived by other actors involved, which relates to the second sub-question of this research.

Planning Stage

Considering the life cycle of wind turbines as a process of four stages (Kirkegaard et al., 2021), the selected case studies needed have reached the planning and development stage to be able to assess outputs and identify possible changes in response to participatory processes.

3.2 Presentation of Case Studies

As explained in the introduction, an appropriate geographical context for this research is Germany because of its need for as well as experience in wind energy expansion and, thus, likely, public engagement. The next chapter presents the case studies of this research. In a practical guide for municipalities, the UBA refers to civic forums across Germany that aim at facilitating conversations and discussions between actors in wind energy projects. After scanning through the websites of these civic forums and UBA's suggestions, two case studies are considered apt for this research as they align with the criteria mentioned above (see also Table 2 below for how the case studies meet the criteria).

To guarantee confidentiality, certain details are left out[1]. Specifically, this refers to the location or town of the two case studies, the name of organisations or institutions, as well as other geographical details, including the German states in which both are located. The civic forum in case study 1 or 2 will occasionally be named 'civic forum 1' respectively 'civic forum 2'. Furthermore, certain temporal details of the wind energy projects were omitted or kept vague to avoid drawing conclusions that would reveal the locations, institutions, and interviewees.

Case study 1

The wind energy project in case study 1 has been highlighted by civic forum 1 for its public engagement in the early stages of the decision-making process and the transparency of the wind energy project (Civic forum 1, d.w.a[2]). A round table was created to discuss the future of wind energy in the area of case study 1 (Municipality of case study 1, d.w.a). The round table was a group of 16 randomly selected citizens between mid-twenty and 80 years old, with an equal number of men and women (ibid.). The participative meetings were followed by a unanimous endorsement by the municipality council for the construction of the wind park (Muncipality of case study 1, d.w.b). As of the current writing, the wind energy project is in the phase of contract closing (Muncipality of case study 1, d.w.c). This participatory process consisting of four meetings was facilitated by a civic forum that provides support with moderating events, resolving conflicts, and more communicative offers (Municipality of case study 1, d.w.a).

Case study 2

The wind energy project of case study 2 was mentioned in an article by an agency for wind energy that showcased case studies that 'successfully' realised wind energy projects across several German states (Agency for wind energy, d.w.). Among those case studies, case study 2 was conspicuous for several reasons. First, it included a diversity of actors that were coordinated during the realisation phase, such as project developers, property owners, forest owners, and nature conservation organisations (ibid.). Furthermore, the wind energy project provided an info-market and opportunities for debate during which the moderator of that info-market asserted that this setting enabled participation in an "an exchange on an equal footing between experts and citizens" (ibid, my translation). This participatory event phase was accompanied by civic forum 2 that assisted the communication between actors, including citizens, in the realisation phase of the wind energy project (ibid.). The citizen forum 2 aims to contribute to the energy transition by, among other measures, including citizens early in the process,

[1] For that matter, the literature, documents, or websites that would reveal the case studies are referenced confidentially as well.

[2] d.w. = date withheld (to maintain confidentiality)

solving conflicts through neutral moderation, communicating transparently as well as consultancy on the ecological outcomes of wind parks (State Energy Commission, d.w.).

Table 2:

Congruence between selection criteria and case studies

Criteria	*Case 1*	*Case 2*
Diversity of actors	Randomly selected citizens; equal number of men and women	Inclusion of citizens, nature conservation organisations, property owners etc.
Adjusted power relations	The format of a round table suggested the presence of adjusted power relations	"an exchange on an equal footing between experts and citizens" (Agency for wind energy, d.w., my translation)"
Negotiation	Four different deliberative meetings	Info-market; coordination between actors during realisation phase
Planning Stage	In the phase of contract closing (as of current writing (Municipality of case study 1, d.w.c)	Completed
Facilitation	By civic forum 1	By civic forum 2

Note: This table presents how case studies meet the criteria explicated in '3.1'. Importantly, the table is based on information from the outset of this research, thus, before the beginning of the data collection and analysis.

Differences between case studies

The two case studies diverge from each other in terms of the stage of their wind energy project, the population, and the location. As of current writing, case study 1 was situated during the planning and development process. The round table that represented the main participatory instrument was created less than five years ago, as of current writing. In contrast, the commissioning of the wind park in case study 2 occurred more than five years ago. The project in case study 1 offered the benefit of improved quality and accuracy of interview responses since the planning phase of the project was still ongoing. Conversely, case study 2 provided the advantage that possibly a greater number or depth of changes may had been observable due to the time that has passed since the commissioning of the wind farm. Another notable difference concerns the population of both case studies. The population

of case study 1 is four times larger than of case study 2. Considering this population difference has been relevant for the implications for the communication presented in chapter four. Case study 2 is a town with an incorporated district that is located several kilometres away from the town. For reasons of simplicity, from now on, both are referred to as the 'town' and the 'district'. Separating both in this research is relevant because both possess their own, separately managed forest areas on which the wind park falls. This means that the stakeholders from both 'the town' and 'the district' have been involved since the planning of the wind energy project. Finally, the case studies are situated in different German states. Considering two states allowed the possibility to explore differences in the governance and facilitation, for example, regarding the role of the civic forum, of both co-creation projects. Altogether, both case studies were compared to gain insights from exploring possible impacts of contextual differences on the co-creation process and outputs.

3.3 Interviews and documents as data sources

The principal data collection method was conducting semi-structured interviews. The more structural element of that method allowed some degree of making comparisons and improved congruence with the research questions, whereas the partial openness enabled posing follow-up questions to unanticipated answers (Rubin & Rubin, 2012). The interview questionnaires were adjusted appropriately to the role of the interviewee in the case studies (see Appendix A). All interviews were conducted virtually, except for one telephone interview. The duration of the majority of interviews was between 30 and 45 minutes. In sum, 13 interviews have been conducted, which, except for one interview, were all held in German (see Appendix B). Moreover, documents that pertained to both case studies were also considered. Analysing documents in addition to interviews established a degree of data triangulation and, thus, enabled more precise conclusions (Yin, 2014), reduced potential biases from one data collection source (Bowen, 2009), and increased saturation (Lund, 2014). Documents that were considered for case study 1 provided details about the participatory meetings, whereas in case study 2 documents encompassed decisions of political bodies, invitations to public events as well as press reports.

3.4 Sampling methodology

The interview sample has been selected after two criteria. Of greatest relevance was the direct involvement in the participatory processes of the planning phase of the wind energy projects. Expertise in public engagement was considered as another criterion to be able to obtain general insights about co-creation processes from the perspective of 'experts'. Many interviewees meet both criteria and thus fulfil a double function as directly involved experts to varying degrees. To maintain confidentiality, interviewees were abbreviated with the letter 'I' (for 'interviewee') and a number (for example, 3) that reflect the order in which the interviews were conducted. For example, 'I5' refers to the fifth

interviewee of this research. Due to confidentiality, the interviewee's position in an organisation and the institution itself were kept vague as well.

Most interviews took the form of guideline-supported expert interviews (Gläser & Laudel, 2010). This research defines experts in a narrower sense as people with "knowledge of organizational procedures and processes" (Littig & Pöchhacker, 2014). Experts, according to Bogner et al. (2018), can shape institutions, practices, and the way people understand and interpret the world with their 'expert knowledge'. Thus, experts "personify a complex interdependence of knowledge and power" (p. 6). Giddens (1994) describes the difference between experts and laypeople as an "imbalance between skills and information" (p. 84). Thus, an imbalance in terms of skills and information categorizes a person as an 'authority' or 'layperson' (ibid.).

The entanglement of knowledge and power may lead to an association of citizens, as less powerful actors, with lay knowledge, the less authoritative knowledge. Conversely, everyone who is not acting as a citizen would be an expert and possess expert knowledge. Social scientists tend to view the expert-lay-knowledge distinction as problematic. Criticism concerns the epistemological foundation and the arbitrariness of this distinction as well as the injustice that this dichotomy does to the diversity of actors and knowledge within each knowledge 'category' (Aitken, 2009; Elkjær et al., 2021). Moreover, there appears to be an asymmetry in terms of how expert and lay knowledge are defined. While 'expertise' is defined variously, the concept of lay knowledge is less straightforward (Aitken, 2009). Also, there is a practical difficulty in identifying expert knowledge and lay knowledge. This difficulty applies to this research's interviewees as well. Thus, this research explored the accounts of stakeholders how expert and lay knowledge manifests itself in the co-creation interaction and how 'both' knowledge forms are negotiated.

Interviewees were contacted directly or indirectly via networks from established interview contacts (the snowball approach). At the end of the interviews, the respondents were asked if they were in contact with someone who was involved in the participatory meetings or in the project more broadly. However, the snowball effect only unfolded in some instances. The main obstacle appeared to be the lack of "some kind of social network or group" (Waters, 2015, p. 378) that would enable a snowball effect. Moreover, as interviews would later indicate, the consideration of privacy of involved citizens in participatory meetings may have been a contributing factor why relevant names and contacts, who could be contacted for interviews, were not publicly available. However, except for one person, all who were contacted agreed to an interview.

3.5 Qualitative thematic analysis

Characteristic of qualitative research, the analysis underwent an iterative and self-corrective process to refine findings by reference to continued data analysis (American Psychological Association, 2020,

p. 5). The data analysis was based on the thematic qualitative text analysis process after Kuckartz (2014) which aims at identifying, systematizing, and analysing themes, subthemes, and the connectedness of the content (ibid.). Guided by the research focus, initially codes and subcodes were created deductively. For example, the output indicators (social equitability, networks etc.) represented subcodes that were used as codes before data collection and that constituted a critical part of the interview questionnaires. Also, codes were coded inductively and reflect topics identified from the transcripts themselves. The hierarchy of code largely corresponds to the structure of chapter '4' (see Appendix C).

4. Results

The following chapter will discuss the empirical findings of this research. Before addressing the research questions directly, initially, the participatory processes of both case studies will be delineated. The subsequent subsections (4.2, 4.3, and 4.4) are structured around the three research sub-questions to answer the main research question that will be addressed at the end of this chapter.

4.1 Public engagement in case studies

This subchapter discusses the case studies in terms of the level, formats, and reasons for participation. In case study 1 citizens were involved more actively and collaboratively than in case study 2. Also, it was found that participatory formats appear to influence the inclusion of societal groups. Moreover, in both case studies public engagement was largely viewed pragmatically.

4.1.1 Level of participation in case studies

The degree to which citizens participated in the wind energy project and influenced the participatory process was a critical marker for co-creation. The following addresses how citizens were informed and engaged in discussions. Overall, informing citizens constituted a common form of participation, particularly in case study 2.

4.1.1.1 Informing citizens

Informing citizens as a way of public engagement was particularly pronounced in case study 2. Citizens have been invited to public information events several times (I5). Information events aimed to reflect the project's status, allow citizens to ask questions, and inform about possibilities of financial participation (I5; I12). According to information provided by I5, public information events were held each year for seven years, except for one year. Public invitations in case study 2 have been sent out for at least four consecutive years (Invitation d.w.a;b;c;d;e;f). Citizens were encouraged to join public events to gain more information on the status quo and financial participation (invitation d.w.c.;e;f). The entire citizenry was invited to a town hall meeting in which the mayor provided an overview of the project (Press release, d.w.a). I2 estimated that around 100 people were present, including the mayor, the project developer, and the energy provider who informed citizens about the status quo of the project as well as opportunities for financial participation (Press release, d.w.b). In the same year, all interested individuals could partake in a two-hour forest walk to the prospective wind farm site (Press release, d.w.c). This was organised by the mayor to "include all participants in advance, to avoid conflicts" (ibid., my translation). Towards the end of the project planning, an inauguration event took place as an info-market in which the civic forum, the project developer, forest owners, the mayor, and other

representatives informed citizens about the status of the project (Agency for wind energy, d.w.). According to I5, after the commissioning of the wind park, information events continued to take place to discuss which form of financial participation would be suitable. To conclude, a considerable number of public events took place in case study 2 that centred primarily around informing citizens about the wind energy project, its current status, and financial possibilities.

Communication difficulties

The municipality in case study 1 expressed public outreach difficulties. At various times, interviewees considered citizens as badly informed or unaware of various aspects. For example, citizens, according to I3, seemed to have forgotten that German states are legally *required* to implement measures that contribute to the energy transition. Moreover, I11 perceived an "information deficit" that would be reflected by the citizen initiative. Based on feedback that I11 received, citizens would be unaware of information provided by the community newsletter or the wind energy website. Also, I11 recognized that older citizens are likely to be less inclined to use this format. I11 stated that half of the citizens would receive the municipal newsletter that included a municipal council invitation as well as a report on the council. I8 also highlighted the limitations of invitations: "I mean, you cannot force anyone to join an information event" (my translation). Another problem, I8 noted, is the decreasing number of subscribers to newspapers and community newsletters. While case study 1 was able to involve randomly selected citizens, the municipality also expressed difficulties in reaching reach people, an issue that was not explicitly expressed in case study 2. This may have contributed to the "information deficit" (I11) that characterised the citizen initiative in case study 1. On the other hand, the absence of an information deficit in case study 2 could partly be explained by the social network and size of the population. The town population in case study 2 is roughly three times smaller than in case study 1. Also, I13 highlights that in the district, with only a few hundred inhabitants, information transfers quickly. To conclude, case study 1 exhibited an information deficit and difficulty with public outreach that in part could in part be explained by the size and social interconnectedness of the population.

Bureaucracy as obstacle to comprehensibility

The general complexity of wind energy projects may also limit the comprehensibility and thus the quality and level of public engagement. I9 reported that even volunteers from the nature organisation that I9 is part of in case study 2 would experience difficulties in fully comprehending the regulations surrounding wind energy projects. This concern could be aggravated for the "ordinary citizen" (I9). I9 also stressed the need for transparency since a lack of it could limit the comprehensibility of information (I9). The interview responses from both case studies emphasised a high level of transparency. I13 stated that in the district of case study 2 "there were no secrets" (my translation). In case study 1,

respondent 7 expressed surprise concerning the protest's accusation of intransparency: "Honestly, we were really surprised by the referendum because we as a project developer, never experienced a process as transparent as this one before" (I7). On the other hand, I11 also highlighted the potential pitfalls of transparency in early public engagement, when information may be scarce (I11). While transparency would be important, according to I11, not being able to share information due to a lack of it, may lead to scepticism amongst citizens. Thus, bureaucracy could affect public engagement negatively as it may decrease comprehensibility for laypeople and therefore the ability to meaningfully participate.

4.1.1.2 Enabling discussions

In case study 1, public engagement entailed formats to inform citizens as well as to enable discussions with them. Compared to other projects in the same state, I11 found that there has been extensive communication and information dissemination to the residents regarding the wind energy project. I11 listed five openly held discussions in the municipal council, a public information event, the instrument of randomly selected citizens, and a website created to inform about the wind energy project. The round table established for the wind energy project constituted the main form of citizen engagement in case study 1. The round table consisted of randomly selected citizens who exhibited work-related differences, i.e., merchants, pensioners, and homemakers. However, I1 noted that the round table's random selection is not a means to gain representativeness of case study 1's population. Rather, the round table aims to accompany and assist the municipal council in making decisions (I1).

Throughout four meetings, citizens were tasked by the municipality to develop recommendations which were formulated in a public document during the last meeting. Divided into working groups and guided by the civic forum, the citizens initially were asked to voice what they considered important to address over the coming meetings. Concerns, topics, and questions were written on cards which were then placed onto a presentation board. Topics that were found relevant pertained to individual and communal profitability, ecological efficiency, and acoustic and environmental impacts (Municipality of case study 1, d.w.a). Most relevant to the round table were the topics of financial profitability, ecological effectiveness, and species protection (Document, d.w.a). After relevant topics had been gathered, people with expertise on these topics were selected and invited by the civic forum to join the subsequent meetings (I8).

The topics that were collected at the beginning of the round table meetings were eventually formulated as a public document with recommendations by the round table to the municipality. For example, regarding the point 'Nature and species protection' the recommendation stated that "it should be strived for, that the municipality determines, which compensation measures are implemented" (Document, d.w.b., my translation). Further, the municipality should consider and present all the document recommendations in a public council meeting (Document, d.w.b). The round table

meetings were accompanied by one representative from each political party of the municipality. I1 stated that recommendations were collaboratively created within the round table. Unclear remains the extent to which the municipal politicians were actively involved in the meetings. However, as I8 stated, during the last meeting of the round table, everyone except for the citizens appeared to have been excluded in order to minimise the influence of the formulation of the recommendations (I8).

The round table could co-determine the content of the meetings, whereas the agenda and overall structure of the meetings were suggested by civic forum 1 (I1). The citizens wished to discuss two topics that were discussed in the following meetings: landscape and sound (Document, d.w.a). At the second meeting, politicians and a representative of a municipal development agency were invited to the round table to report on financial profitability and potential sites for wind turbines. Maps and visualisation showed potential sites (Document, d.w.c). and how the wind turbines would appear, i.e., from a point on a highway (Document, d.w.d). Subsequently, twenty participants formed three groups, each focussing on a distinct topic – financial profitability, ecological effectiveness, and financial participation - to formulate opinions and recommendations. Afterwards, during an excursion, that was guided by the civic forum and accompanied by an acoustician and three other experts (Document, d.w.e), citizens could visit an operating wind farm site. Overall, the round table meetings included various forms of engaging with experts and co-determining the content of the events.

4.1.2 Effects of participatory formats on public inclusion

Participatory formats differed not only in terms of *how* citizens were involved but also in *who* was likely to be involved. Certain formats appeared to discourage or encourage different audiences. Information-markets, or short 'info-markets', were commonly employed in the case study projects. At info-markets, citizens could obtain specific information from stakeholders and engage in dialogue with them (I12). Because of the dialogical nature of info-markets, I12 argued that especially older and more reserved people may be more inclined to join an info-market than a lecture-like event. Moreover, information events may be dominated by groups that express their opinion loudly, whereby intimidating quieter participants. Another unsuitable form for participation would be panel discussions as they tend to attract critical voices and people who are male and between 40 and 70 years old, creating homogeneity amongst the audience (I11). Groups that are discouraged are particularly young people, who do not speak German fluently and/or are female (I11). Likewise, I3 stated that lecture-like events would encourage debates between groups that act like "fan teams" (my translation) which may facilitate unserious debates in which participants may only want to voice populist statements (I3). In conclusion, participatory formats, more generally speaking, appear to attract or discourage certain societal groups causing homogeneity or heterogeneity amongst the involved public.

4.1.3 Public engagement as a tool

The interviews indicated a pragmatic rationale for participation. I1 viewed the involvement of citizens as a tool to support democratic decision-making and establish peace (I1). I10 noted that early public engagement in case study 1 was regarded as a way to preventively counteract critical voices by being able to state that citizens were exceptionally involved in the project. Similarly, I8 viewed the round table as a means to be able to defend against critics by demonstrating that attempts to involve citizens have been made. However, the round table went beyond a pragmatic approach to participation since it enabled citizens to engage in discussion of topics of their interest and to shape the public outputs of the recommendations. Overall, a pragmatic approach to public engagement was explicit and prevalent to be able to prove exceptional public engagement.

This pragmatic approach to participation may also be related to the repeatedly expressed need to act in light of the urgency of climate change. Three interviewees (I4; I6; I8) highlighted the need to move away from fossil fuels and contribute to the energy transition: "We are driving the world against the wall. What we are doing is only a drop on the hot stone. But without us, it is getting even worse" (I8, my translation). The recommendation paper by the round table highlighted the importance of wind energy in energy provision that is not based on fossil fuels and nuclear energy (Document, d.w.b).

Some comments highlighted that participation is also subject to decisions to include or exclude actors. In case study 1, the civic forum decided not to involve "typical stakeholders" (I1, my translation) since they did not seem to be "very relevant" (ibid., my translation). There were two farmers who would not want to oppose the vote (I1), and regional nature conservation organisation stated that its organisation would not be highly represented in the area of case study 1 (I1). In addition, I8 said that concerns from nature conservation organisations during the approval process were taken seriously, for example, concerning the amount and location of wind turbines.

Furthermore, I1 argued that early public engagement in wind energy projects may have undesired consequences since involving citizens too early in the project could open the opportunity for the formation of public resistance. Public resistance at an early stage could be gratuitous because of the construction law that applies to wind priority zones (I6)[3]. Thus, resistance could only delay but not stop a wind project (I6). Moreover, information meetings at an early stage could be "counterproductive" (I6, my translation) when crucial information about the project is still missing (I6). Contrary to that, I9 found that 'the earlier, the better' in terms of which stage the citizens should be involved because, at an early stage, their positions are likely not entrenched and opposed towards the projects. Thus,

[3] Regional associations are obligated to determine wind prsiority zones of around two percent of the region's area, outside of which wind energy projects will not be permissible (Regional association, d.w.).

citizens would be more likely to participate. Overall, there has been a dissensus amongst the interviewees that early public engagement would always be optimal.

Interviewees also highlighted the need for continuity in public engagement. While the round table was an important format to mobilize the town-wide political interest in the energy transition, I4 recognizes that causing lasting public engagement would cross generations. Similarly, I1 highlights the need to view wind energy projects as a process that necessitates repeated discussion. Having engaged in discussions with citizens that several years ago would not be sufficient to maintain public acceptance (I1).

4.2 Outputs of wind energy projects

This subchapter aims to answer the first sub-question of this research, namely assessing the outputs of the wind energy projects. The co-creation outputs of the case studies were assessed using six 'output' indicators. Importantly, further outputs were also observed that may have the potential to have long-term consequences compared to the outputs observed with the intended output indicators.

4.2.1 Institution building

The round table of case study 1 represents a brief yet noteworthy establishment of an institution for the wind energy project. However, another implementation of a round table for other projects was not stated to be planned. Nonetheless, I8 and I11 view this participatory format, including randomly selected citizens, as a viable instrument for large-scale projects. I1 noted that a permanent round table, at which participants are invited, i.e., every half a year to discuss the progress of the wind project, could have been an option in case study 1. However, due to the general work overload of municipalities, as I1 states, such an institutionalisation would not always feasible. More broadly, I1 did not yet experience any considerable establishment or change of long-term governance structures in other wind energy projects in response to the co-creation arrangements. Saliently, I1 expressed doubts about the promises of co-creation: "So the idea that a new world is created, that new forms of governance are created, about that I am sceptical" (I1, my translation). In case study 2, there also does not seem to be any lasting change in institutionalising forms of public engagement. Interviewee 2 could not recall any substantial creation of an institution for case study 2 except for a temporary working group that became inactive over time. Thus, while the round table in case study 1 constitutes a notable example of an institution that was purposefully established to foster the co-creation of the wind energy project, the results in case studies did not indicate a long-term establishment or strengthening of institutions in both cases studies.

4.2.2 Social equitability

Most interview responses indicated difficulties in assessing the indicator 'social equitability', the extent to which the case creates outputs that shift power and resources away from more powerful actors and towards less powerful actors. As in the previous indicator 'institution building', the round table in case study 1 constituted the closest attempt to shift power since the citizens could influence the content of the meetings. However, I1 stated that a round table with a few selected citizens of the town will not cause large impacts. No co-management arrangement was created in other projects that would indicate a middle-to-long-term adjustment of power imbalances. One aspect that, according to I7, indicated some degree of change in power, pertains to the tender agreement which demonstrates that municipalities can be in a powerful position if the area belongs to the community. Interestingly, interviewees reiterated the low conflict level and the project fairness when asked about social equitability. Nevertheless, no changes in the decision-making power nor an increase in public engagement seem to have taken place.

4.2.3 Process quality

The interviewees largely found the project to have been valuable and legitimate. I4 appreciated that the municipality did confront the citizenry with a fait accompli, which would frequently happen in other projects. Concerning the project legitimacy, I7 states that case study 1 would represent the power that municipalities in Germany would have in deciding about the handling of their land. What also supports the legitimacy, according to I11, is the fact that citizens who typically were not active now participated in the project.

The local initiative in case study 1 is relevant to consider since it accused the municipality of intransparency (Local newspaper, d.w.a), and transparency, as it contributes to a project legitimacy, is associated with co-creation. A representative of the protests wondered why the names of the round table participants were not made public (Local newspaper, d.w.b), which would raise concerns about transparency. I1 emphasised the privacy and the participants' protection of the participants because of the potential agitation usually surrounding wind energy discussions. The allegation of intransparency also contradicted all interview responses. I10 emphasised the availability of public protocols as well as numerous opportunities for public events that allowed citizens to inform themselves. Because of the amount of public information and transparency, many interviewees in case study 1 were surprised by the protest. I7 even described the wind energy project of case study 1 as a "prime example" of how a municipality should inform and engage citizens. Also, ironically, the initiative appeared to have begun in response to the opening of the website dedicated to disclosing information on the wind energy project.

However, compared to a typical wind energy protest, I10 highlighted that the protest in case study 1 would not oppose the wind turbine construction per se but the location of it, specifically whether the wind farm site would be placed in a forest area or not. This may help explain the copious support that the initiative was able to garner (I10). Moreover, the initiative according to I11 appeared to comprise various motives. I11, who stated to have talked to citizens about the dispute, responded that a few citizens wanted to vote in favour of the project through this initiative. Another share of the initiative appeared to want to gain more information (I11). The majority would be in a "confused state" (I11, my translation). In response to the protest and the apparent "information need" (I11), the municipality organised another public discussion event in the form of an info-market as well as a "bus information excursion" to a wind energy park to provided more information (I11). Since the deadline for submitting the votes has been exceeded, the referendum, consequently, was likely unlawful (I10). Despite the surprise expressed by the interviewees, the legitimacy of this initiative is also acknowledged: "… there's always some kind of people that are not ok with … the project and they try to use every legal way to block it, which is fine. So, it's their legal right. They can hold on to that" (I7). I11 also expressed an understanding of citizens' concerns about a large-scale project like a wind energy project. Moreover, the initiative would need to be more accurately understood as a sign of political interest (I11). Similarly, I3 also expressed support and views the formation of citizen initiatives as part of the democratic process. Thus, while the interviewees disagreed with the accusation made by the initiative, the formation of such a group was positively as a sign of political interest.

A recurrent theme in case study 2 was that involved actors interacted 'on par with another'. I2 experienced the process to be overall positive. When asked about the project legitimacy, I2 expressed the feeling of being 'on par with another' among the involved actors. Similarly, the info-market was described by the facilitator in the following: "an exchange on an equal footing between experts and citizens" (Agency for wind energy, d.w., my translation)". I5 named two components that may explain this framing. First, one conspicuous factor that was reported to have contributed positively to the project's acceptance has been the lease contract arrangement between the town and its district. There has been an overwhelming acceptance by seemingly almost all actors, including residents. I2 said that the wind project in case study 2 was not at all comparable to other projects in terms of acceptance. I5 reported no resistance at all on the communal and political levels. The town and its district that manage their forests differently, concluded an agreement on the lease income before it was known how many wind turbines would be placed on either side. The agreement stated that independent of which side wind turbines would be placed, the lease income was going to be halved (Press release, d.w.d). In this way, envy was to be avoided (I5). Second, the interviewee highlights the regionality of the project developer and the fact that its contact persons are known to the town and district. Conversely, an offer by a Dutch project developer was rejected due to the lack of regionality (City

Council of case study 2, d.w.a). Therefore, the repeated expression of 'being on par with another' in case study 2 referred to the tender agreement that generated a sense of fairness and to the regionality of the project developer causing a sense of familiarity.

4.2.4 Knowledge production

The responses to indicator knowledge production suggested a transfer of knowledge rather than the co-creation of new knowledge. In case study 1, the location of the wind turbines was reconsidered throughout the round table meetings (I1). Whereas the wind park was initially planned to be constructed on the field, the round table participants recommended locating the turbines in the forest due to species protection benefits, i.e., for the red kite[4], and for the residents because of the greater distance from the town (I1). I8 answered the question on knowledge production in a similar vein by reference to the potentially improved ecological outcomes, for example, for endangered raptorial birds as a result of the round table meetings. In I1's opinion, however, new knowledge has not been created in case study 1. According to the interviewees from the civic forums, the knowledge production would only occasionally occur in other projects, where surprising insights are gained through, for example, visibility analyses (I1; I3). Representative for the elicitation of unexpected learning moments was the statement by the citizen in case study 1 (I4), for whom the round table meetings were "a wonderful experience, discovering the range of topics one can discuss and the things to consider" (I3). However, I3 found it difficult to give an exact answer which would require conducting surveys. Altogether, what tended to take place is a form of 'education', particularly in case study 2.

4.2.5 Reframing

'Reframing', for the most part, occurred when citizens became more informed. I1 argued that in the context of round tables, citizens tend to become more reflective and determined but do not necessarily change their attitude. In addition, the understanding of the side that is disagreed with would grow while the polarization would decrease. Similarly, I3 asserted that citizens tend to become more differentiated about a project. In line with I1's response, the beliefs of the interviewed citizen (I4) appear not to have changed. Rather, I4's felt sense of urgency of the energy transition has been strengthened, indicating a heightened level of determinacy. Moreover, I8 did not observe any encounter with a person who was strictly against wind turbines. I13 also remembered that the I5 has also been enthusiastic about the project from the beginning. As for I4 and I5, their supportive position may have been connected to their professional backgrounds that indicated knowledge about energy provision. In addition, I8 noted that information provided does not necessarily dominate private discussion: "It is,

[4] A red kite is a raptorial bird.

however, very difficult to reach everyone. That is one thing. And the second is, you are far from having interpretational sovereignty over bars" (I8, my translation). To conclude, whereas a change of beliefs and priorities did and generally does not appear to occur in round table meetings for wind energy projects, perspectives became and generally becomes more nuanced and participants more determined.

4.2.6 Networks

No middle-to-long term social networks have been established as a result of the public engagement in both case studies. A small number of citizens appeared to have engaged in subsequent interactions with one another (I1). Nevertheless, according to I2, no contacts persisted after the round table meetings. Moreover, I1 emphasised that social networks are typically created when protests are formed. Similarly, I3 observed that occasionally citizen initiatives form to partake in the democratic process and participate in discussion events. I5 concluded that a close dialogue exchange as a result of the public engagement did not unfold. Overall, respondents showed difficulties answering the questions. The lack of an expansion of the networks could be explained by the trust in municipalities and acceptance towards the project that may have resulted in a sense of superfluity to join or form a network beyond one's needs for engagement that were fulfilled. Thus, the interviews indicated that no social networks were established in both case studies and that, generally, social networks tend to form and last temporarily when citizens are opposing (parts of) a project as was the case in case study 1.

4.2.7 Additional outputs

In addition to the insights about the outputs gained from employing the six output indicators, there were further noteworthy output observations that went beyond the scope of the output indicators (see Table 3 for how case studies reflect outputs). In case study 2, I5 noted that the project elicited a change in the identity between the town and the district in response to the lease agreement, which fostered a sense of community and enabled I5 to state that "the city is all of us, it's us together" (my translation). This agreement also seemed to have reduced potential envy between both sides that might have arisen as a result of a feeling of unjust distribution of the wind turbines (I5). The increased sense of a shared identity is reflected in the early unanimity in attitude between the town and the district towards the wind energy project. This consensus was decisive since the entire project would have been at risk if only one forest owner of the district had objected (City Council of case study 2, d.w.b). Furthermore, in response to the experiences made in both projects, according to I5, there would be plans to adopt participatory formats for future events in other projects. Case study 2 aims to create a "multi-generational playground" that offers various activities for multiple demographic groups. The planning of this project aims to involve residents who are encouraged to contribute their

ideas. In case study 1, I11 stated the plan to adopt an info-market format for the next information meeting of the wind energy project. Moreover, in case study 1, this is reflected by the fact that a few citizens of the round table continued to participate in the municipal council meetings. The participants, according to I1, wanted to "see their effectiveness ensured" (I1, my translation). Lastly, the recommendations paper that was collaboratively formulated represented an additional output. Importantly, the additional outputs listed here may have the potential to have long-term consequences. In sum, further outputs and observations include the adoption of participatory formats, the strengthening of a more common identity in case study 2 as well as a short-term interest of citizens in subsequent city council meetings and the formulation of the recommendations document in case study 1.

Table 3:

Alignment between output indicators and case studies

'Output' indicators	*Case study 1*	*Case study 2*
Institution building	• Short term establishment of round table	• No changes observed
Social Equitability	• Temporary and slight changes during round table	• No changes observed
Process Quality	• High level of legitimacy • Initiative accused municipality of intransparency • Initiative viewed as legitimate in the face of a wind energy project's large scale (but not lawful)	• High level of legitimacy • Being 'on par with another'
Knowledge production	• Understood as knowledge transfer • Reconsideration of wind farm site during round table meeting	• Understood as knowledge transfer
Reframing	• No considerable changes in attitudes/values/opinions • Citizens tend to become more reflected and determined (I1)	• No considerable changes in attitudes/values/opinions • Citizens tend to become more differentiated (I3)
Networks	• Initiative against wind farm site	• No changes observed
Additional outputs	• Adoption of participatory formats • Short-term continuation of participating in council meetings by a few round table citizens • Recommendation document by the round table	• Adoption of participatory formats • Strengthening of a more common identity between the town and district

4.3 The role civic forums in public engagement

The goal of this subchapter is to address the second sub-question, specifically how the role of civic forums in facilitating public engagement is perceived by the interviewees, including their own perceptions. Civic forums were perceived to provide neutral moderation and mediation, factual provision of information, inclusion of various stakeholders, with the overall aim to assist municipalities. The civic forums were perceived positively because of their expertise in public engagement and neutral stance, which likely contributed to more trust and factual information. Salient was the pragmatism that characterized their approach to public engagement.

4.3.1 Civic forums' self-description

The civic forums of both case studies mostly exhibited similar goals and approaches to public engagement. Both civic forums do not primarily intend to raise the acceptance of citizens towards wind energy projects but help municipalities solve problems and create peace amongst the public. Thus, they typically assist municipalities that are conflicted in discussions around wind energy as well as lacking capacities to evaluate the complexities of a wind energy project (I1). The main goals of civic forum 1 are to reduce conflict escalation, strengthen the municipalities' operational capacity, and help inform citizens about the chances and risks of the energy transition (civic forum 1, d.w.b). I1 claimed that civic forum 1 is "independent" and thus provides "multipartial" information to allow citizens to form their own opinions. Civic forum 2 considers various interests from politics, economy, and society in the context of energy transition projects, involves them in the early project stage, and to co-develop sustainable concepts through neutral moderation (Civic forum 2, d.w.). Over recent years, their scope of work has also evolved including consultancy for municipalities, especially regarding the mayors (I3). Both civic forums work together with external agencies to support their work (I1; I3). Emotionalised meetings are intended to be countered with transparency and the provision of factual information in the form of publications (Civic forum 2, d.w.). However, the dissemination of detailed information also carries the risk of providing information that could be exploited as "ammunition" (ibid., my translation) against the opposite argument in a debate. Counterintuitively, the interviewee from the civic forum 2 (I3) viewed its own role critically: "…[I]n principle, it could be said, that the civic forum is not necessarily needed to realise wind energy project". I1 expressed a comparable opinion by acknowledging a potential bias since the civic forum 1 would only address projects with a 'problem'. Interestingly, both interviewees from the civic forum view their role critically. I1 recognized its own bias since there are municipalities without 'problems', and thus, where the civic forum is not needed. I3 also saliently said that the civic forum is not necessary for the implementation of a wind energy project. However, I3 from civic forum 2 reported overall highly positive responses from political actors. The general overload of municipalities likely contributes to the overall appreciation of the forum's work (I1). Altogether, both

civic forums emphasise neutral moderation and mediation, factual provision of information, inclusion of various stakeholders, and the aim to assist municipalities.

4.3.2 Interviewees' perceptions of the civic forums

The interviewees positively view the self-expressed 'unaffiliated position' of the civic forums in wind energy projects. I9 described civic forum 1 as a "neutral mediator" with "no opinion on their own" (my translations) on expanding renewables in discussions that include various stakeholders. According to I1, civic forums would be critical for the supply of factual data which would enable municipalities to make decisions free of "fake news". Providing 'objective' data would also be relevant for information or discussion events that are not rarely emotional (I8). Interviews appreciated the neutral stance of the civic forums. Given the neutral position of the forum, the municipality could avoid potential accusations of top-down steering of the project. Both civic forums contributed to more factual discussions through moderation. I11 underscored the extensive knowledge and experience of the civic forum in case study 1. Also, the civic forum has consulted the municipality in case study 1 on how to design public engagement, for example, the round tabled. Certain participatory formats, such as info-markets, were unfamiliar to the municipality beforehand (I11). In case study 2, I5 and I12 evaluated the role of the civic forum positively. Like I11 in case study 1, I5 also asserted that including the civic forum as an unaffiliated, not-for-profit-oriented party in a project could increase trust among citizens. While both civic forums explicitly present themselves as 'neutral' in projects, I3 from case study 2 expressed a self-understanding of a counterweight to well-resourced project developers. However, the project developer in case-study 2 did not articulate opposition to civic forum 2. On the contrary, the forum's effort to proffer factual discussions was viewed positively (I12). Hence, the civic forums were perceived positively because they provided expertise on public participation to municipalities, and constituted a neutral role, which presumably increased trust amongst participants and the factuality of information. To sum up, civic forums can serve a critical function in wind energy projects mainly because of their neutral stance, their ability to strengthen the municipalities' capacity to effectively carry out projects and the ability to prove efforts to public engagement.

4.4 Negotiation of expert and lay knowledge

This subchapter addresses the third sub-question, namely how knowledge is negotiated between experts and lay people. The manifestation of an expert and lay knowledge understanding was starkly observable in the statements of both project developers. I1 addressed the possibility that citizens can be invited by project developers to co-develop the wind farm layout. This stands in contrast to the statement of I12 who found that an exchange with residents would neither be common nor conducive due to the complexity of finding a suitable wind farm location: "… in all fairness, it must be said that

the facility location does not just fall from the sky" (I12, my translation). Thus, it would not be constructive to include a group of people with "no corresponding expertise" (I12, my translation). Similarly, the project developer for case study 1 expressed a clear expert self-understanding: "we are and should be the experts of […] project planning because that's our job" (I7). Unsurprisingly, the project developer (I7) stated that while the municipality has likely acquired various insights, they as the project developer have not: "I think on our side, it didn't really create new knowledge in that kind of case…" (I7). Thus, both project developers expressed a clear self-understanding as experts, and one questioned the benefits of including citizens in the decision-making.

The scope of influence differed considerably in both case studies. I3 reported that it is often the case that in wind energy projects the citizens are not involved in discussions around financial participation. I4 expressed disappointment at the inability as a citizen to attend non-public council meetings surrounding the wind energy project in case study 1. However, I10 highlighted the unusual and extensive degree to which citizens have been engaged in the project. Over the round table meetings, according to I10, "laypeople were turned into experts" (my translation). Altogether, the participatory processes in case study 1 exhibited greater influence over the participation process than case study 1.

4.5 Impact of expert and lay knowledge on projects' outputs

This section addresses the main research question, how the knowledge of experts and laypeople shaped the outputs of the wind energy projects. Prominently, this is evident in how the indicator 'knowledge production' was perceived by the interviewees, namely as a transfer of knowledge passing from experts to laypeople, instead of indicating the emergence of insights and knowledge or compromises between actors through collaboration. The perception of knowledge transfer succinctly symbolizes the overall weight of experts and expert knowledge, particularly in case study 2. While this does not seem surprising, it stands in contrast to the idea of co-creation that highlights the collaborative efforts that aim to integrate interests and knowledge and possibly generate novel insights. The observed expert-laypeople dichotomy directly related to the distinction between people who primarily provide and those who predominantly receive information. These distinctions fit the overall emphasis by the municipality to inform citizens about wind energy projects, mainly apparent in case study 2. The asymmetrical knowledge flow reflects the stark perceived dichotomy between experts and laypeople and the associated power-related differences.

From the results of case study 1 can be derived that the civic forum played an important role as experts in arranging and structuring participatory meetings. Since they consult municipalities on selecting appropriate participatory formats, it could be argued that civic forums co-steer who is included or likely to be engaged in wind energy projects. While they directed their efforts towards the needs of the municipalities, they were still considered experts in terms of public engagement. Thus,

given their somewhat considerable scope of influence, they can be influential for the outputs of co-creation. Since they influence the decision-making of how the public will be involved. The round table as purported and organised by the civic forum enabled a meaningful exchange between citizens and experts which culminated in a public document proffering recommendations to the municipality. Moreover, the design of the round table temporarily enabled a more equal exchange between the citizens and politicians. The civic forum's expertise in case study 1 also appeared to have inspired the municipality to adopt participatory formats.

Altogether, most of the project outputs that were investigated by employing the output indicators can be understood against the backdrop of the dichotomy between expert and lay knowledge. The perception of knowledge transfer rather than production illustrates the dominance of expert knowledge and the role of experts. The expertise of the civic forum in case study 1 influenced the project outputs mainly by organising and designing the round table that enabled a brief, yet meaningful and more equal exchange between the actors involved.

5. Discussion

The following chapter aims to confront the results of this research with the literature on wind energy co-creation that has been referred to thus far as well as evaluate the limitations and implications of this research and of the concept of co-creation itself. While the co-creation outputs can be viewed positively, they also point to the need to be aware of the limitations and necessity of co-creation. Thus, in view of the results, the common, implicit notion that the employment of more co-creation leads to improved outputs is viewed cautiously. Moreover, the co-creation framework has been edited to highlight that communication, participatory formats, and bureaucracy can impact the inclusion and involvement of societal groups in wind energy projects. Finally, the findings of this study could contribute to the conceptual and practical understanding of co-creation in research, not restricted to the wind energy sector.

5.1 Confrontation with literature

The case studies differed in their incorporation of egalitarian elements for public engagement. The participatory process and formats of case study 1 reflect both a hierarchical and egalitarian (Wolsink & Breukers, 2010) orientation. The overall pragmatic approach and the relatively clear distinction between expert and lay knowledge, particularly expressed by both project developers, reflect a hierarchical perspective. Case study 1 also contained egalitarian elements, indicated by the presence of early stakeholder involvement and that opposition, the citizen initiative, was viewed as a legitimate expression of political interest. Also, the municipality underscored the efforts to address citizen concerns by the municipality. Moreover, the round table citizens were able to shape the meetings' content and formulate recommendations on their first meeting, this participatory arrangement represents a small-scale version of the series of events that took place in Germany in 2011. In both cases the deliberative meetings were assisted by external agencies, they included various forms of public engagement, and it mounted in the creation of a public document. As a mix of egalitarian and hierarchical elements, the round table could be understood as a 'substantive' form of participation (Stirling, 2008), containing both a pragmatic and process-oriented character. The evident rationale towards public engagement in both case studies was pragmatic, and public engagement was viewed as a tool. While the focus of the round table concerned an output, namely a public document with recommendations for the municipality, the content of the output itself was subject to the public interest and discussed by the citizens, and thus, "socially deliberated [and] publicly reasoned" (Stirling, 2008, p. 271). The deliberation of these meetings can be viewed ambivalently. The round table constituted the most noteworthy attempt at which stakeholders were given "equal weight to incumbent and alternative values/perspective" (Elkjær et al., 2021). While participants were "turned into experts" (I10), the expert/non-experts divide still dominated. Also, the results are largely aligned with the study by Pollytix and

Neulandquartier (2017) in that the civic forums provided expertise, made engagement with the public more accessible, and their neutral position.

In comparison, case study 2 almost exclusively represented a hierarchical perspective and thus a lack of co-creation because of its approach to public engagement that did not go beyond informing citizens. The prevalence of expert knowledge, particularly in case study 2, aligns with Aitken's (2009) finding that expert knowledge dominates wind power planning. However, the lease agreement between the town and its district was perceived to have contributed considerably to the project's fairness and acceptance. This consequence is in line with the findings from Liebe et al. (2017) that procedural justice is a critical contributor the acceptance. Nonetheless, in case study 2 in particular, citizens did not become "important allies" that would be involved in finding "creative solutions" (Kitzing et al., 2024, p. 5). Altogether, case study 1 can be located closer to 'partnership' level (Arnstein, 1969) of participation than case study 2. Given the predominant 'hierarchical' nature of wind energy projects (Wolsink & Breukers, 2010), it seems more appropriate to highlight the egalitarian features of the round table in case study 1 as well as the high level of transparency as an instance of uncommon public engagement.

5.2 The more co-creation, the better?

This research sheds a critical light on the prevalent approval of co-creation observed in the literature. In other words, the analysis questioned the notion that more co-creation is also always 'better'. In case study 2 there has been almost no co-creation, thus, almost no public engagement that went beyond informing citizens about the wind energy project. However, the acceptance amongst citizens appeared to be extraordinarily high. On the other hand, case study 1 exhibited co-creation in the form of the round table and overall transparency, yet it could not preclude the formation of an initiative accusing the project of intransparency. Thus, it seems worth questioning the relevance of co-creation compared to other aspects that also contributed to a high acceptance. For example, the land pooling and the lease contract in case study 2 created not only a sense of fairness but also strengthened the identity between the town and the incorporated district. Moreover, there are wind energy projects without a 'problem' (I1) that do not need facilitation, deliberation, and collaboration as extensively way as in case study 1. In addition, not every participatory format may be adequate for each area and public. The effectiveness of a format, such as a round table with randomly selected citizens, may be negatively influenced by a small population and a tight social network that could inhibit unbiased discussions (I1). In short, the case studies present a paradoxical situation: the case study that did entail co-creation could not preclude local opposition, whereas the case study that lacked co-creation indicated essentially no opposition.

The implication should not be to renounce co-creation as a participatory endeavour. The overall response to the participatory processes in both case studies showed that valuable lessons can be learned from the case studies. The co-creation arrangement deployed in case study 1 represented an unusual degree of public engagement in a wind energy project that entailed collaboration, diverse participatory formats, and a temporary institution that empowered citizens. Moreover, case study 2, exhibited factors that do not strictly relate to co-creation, but that nonetheless contributed positively to public acceptance. Thus, while the results of this research show the positive consequences of co-creation, they also point to the need to be aware of the limitations and necessity of co-creation.

5.3 Reflection

In the following, the limitations of this research will be presented as well as an evaluation of conceptualisation and operationalisation of co-creation. The asymmetry of the interviewees between both case studies hampered the comparability between both projects. The co-creation framework was expanded by one general component to co-creation that features three aspects that were found to be relevant in this research as they influence public involvement. Together with a critical evaluation of the output indicators, these insights can provide points of attention that may be considered for future co-creation research.

5.3.1 Limitations

There were a few mentionable aspects that may impact the interpretation of the results. Firstly, this research exhibited an imbalance of interviewees in each case study. While eight interviews were conducted for case study 1, there were five interviews in the second case study. This discrepancy affected the comparability between both case studies The intended snowball effect to reach interviewees in case study 2 did not unfold as ‚successfully' as in case study 1. The majority of responses during and after the interview indicated that new contacts with minor exceptions were not established. This observation aligns with the finding of the 'networks' indicator that did not show a formation or expansion of new social connections between citizens as a result of the projects. Moreover, the absence of the snowball effect, especially in case study 2, could partially be explained by the temporal distance (several years) between when the participatory meetings were held and when the interviews were conducted. This temporal difference also helps explain the occasional difficulties of interviewees in remembering project details. Since the temporal difference could have impacted the accuracy of the interviewees' statements, this should be considered when reflecting upon the results.

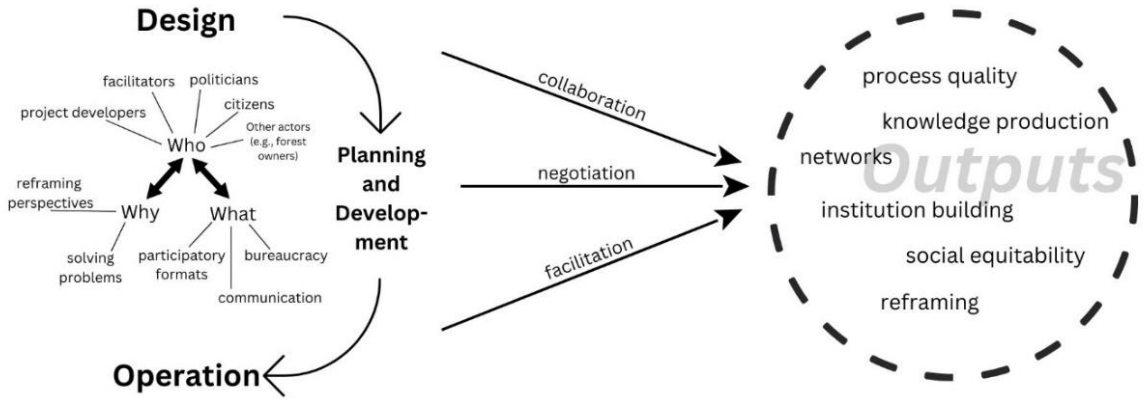
5.3.2 Adjustment of co-creation framework

The co-creation framework was edited in light of new insights gained from the research. Next to answering the research question and its sub-questions, three aspects were identified that can indirectly

influence the inclusion and engagement of the public in wind energy projects and that may be worth considering when conceptualising co-creation: Participatory formats, communication, and bureaucracy are factors that can influence the inclusion and opinion formation of certain 'publics'. Participatory formats can affect the involvement of societal groups, bureaucracy can obstruct the comprehension of wind energy regulations particularly for laypeople, and communication and outreach can influence how well the public is informed. Given these insights, the framework now includes another heuristic component which is connected to 'who' is involved (see Figure 2).

Figure 2:

Adjusted co-creation framework



5.3.3 Assessment of output indicators

The output indicators that were conducted in both wind energy projects enabled the comparability between the case studies with respect to their outputs. Nonetheless, there are also conceptual and practical limitations to them. Respondents faced little to no difficulties responding to the 'process quality' indicator, thus, assessing the projects' legitimacy. Other indicators, on the other hand, seemed to present challenges. For example, concerning the 'networks' indicator, respondents were not able to provide answers to which extent the social network of actors is changed. Citizens may have been in a more suitable position to respond to this indicator. Moreover, the indicators may need to be formulated more in less academic terms when confronting them with respondents. For example, the formulation of the indicator 'social equitability', which asked about the "extent [to which] the case creates [outputs] that shift[s] power and resources away from more powerful actors and towards more marginalized actors", may bear little resemblance to the everyday conception of what this indicator

attempts to describe. Thus, employing more common terms may improve the understanding of and answers to the indicators for respondents. Furthermore, it is debatable whether the indicators differ thematically too starkly from one another with respect to what they intend to represent or whether the breadth of indicators can be considered a strength to gain a better overview of project outputs. The broadness of the indicators as adopted by Chambers et al. (2021) may relate to the framing as 'sustainability' indicators, a term (sustainability) that is notoriously vague and all-encompassing. While this broadness would point to a need to limit the focus to a smaller number of indicators, case study 2 exhibited outputs that were not captured by the indicators. Thus, it is crucial to be aware that projects may entail outputs that go beyond one's initial conceptualisation of output indicators.

5.3.4 Contribution to literature

The research led to numerous insights that can enrich the conceptual and practical understanding of co-creation for scholars and policymakers. Conceptually, the employment and adjustment of the co-creation framework and the evaluation of the output indicators provide points of attention that may need to be considered for future co-creation research. These insights are not limited to the wind energy sector, since the output indicators are generalized enough to be applied in other contexts and the framework mainly represents a possible guidance that illustrates core features of co-creation and may help understand the dynamics of co-creation. Another focal point as part of the second sub-question constituted the civic forums in both energy projects that have hitherto received little attention in co-creation literature despite their explicit goal to foster collaboration and public involvement. Finally, this research could be added to the wind energy co-creation literature as an instance that diverges from the generally strong approval of co-creation, although co-creation in this research is not renounced.

6. Conclusion

6.1 Summary

Co-creation is widely endorsed by academics as a participatory process to promote public acceptance towards wind farms that is needed to ensure the energy transition. Germany exhibits the need to rapidly increase installed wind energy in the coming years and indicates experience with employing co-creation processes, thus providing a useful context to explore co-creation processes. Given the need to raise acceptance and the promise of co-creation to achieve that, the co-creation processes of two German wind energy projects have been investigated, specifically addressing how expert and lay knowledge influenced the co-creation outputs. To obtain detailed insights into the co-creation processes, expert-interviews with involved stakeholders have been conducted that provided both insights into the participatory processes as well as experience drawn from their expertise. The main objective to study the impact of expert and lay knowledge on co-creation outputs has been approached by answering three sub-questions.

An essential part of this research constituted studying the co-creation outputs of both wind energy projects that were assessed using six output indicators. The case studies differed considerably in the extent to which they displayed co-creation outputs. Similarly, the case studies diverged in how strongly pronounced the expert-lay-knowledge divide was that corresponded to the degree to which the public was merely informed. In addition to the anticipated outputs using the output indicators, further outputs have also been observed in both case studies. The civic forums that facilitated the participatory processes were perceived positively by the interviewees partly due to the forums' neutral stance and their contribution to factual discussions. Notable has been the pragmatic approach expressed both by the municipality in leveraging the civic forums to avoid possible accusations and also by the civic forums who viewed public engagement as a 'tool'. Finally, the divide between expert and lay knowledge was evident in both case studies, particularly evident in the strong self-understanding among project developers as experts.

Overall, a general asymmetry of the weight of expert and lay knowledge in the participatory processes was observed that aligns with the literature highlighting the hierarchical nature of wind energy projects. The influence of experts and expert knowledge meant that knowledge was not perceived to be produced but transferred from experts to laypeople. Expert knowledge of civic forum, especially observable in case study 1, can influence the co-creation outputs in various ways. Civic forums can indirectly impact the co-creation outputs by exerting influence over participatory formats that affect the diversity of actors present in participatory events during the planning phase of the wind energy projects as well as influencing the adoption of future participation formats. The influence of lay knowledge is best expressed by the round table that exhibited some considerable scope of influence

in shaping the content of participatory meetings and creating a public document that included recommendations that were collaboratively formulated.

There are various insights and implications for co-creation researchers and practitioners. In light of the results, the co-creation framework has been adjusted to include factors influence the inclusion of societal groups, which is critical to co-creation. The insights of this study could be valuable not only to the co-creation literature on the wind energy sector but potentially other sectors since the co-creation outputs and framework that guided this research are not restricted specifically to wind energy co-creation. Finally, the implicit notion that 'the more co-creation, the better' was critically evaluated by indicating the limitations of co-creation. While the positive implications of co-creation were highlighted in this study, the research sheds an overall critical light on co-creation.

6.2 Recommendations

Based on the findings of both case studies, the following recommendations are proposed to future co-creation researchers and policymakers, mainly but not exclusively to those involved in wind energy projects. The recommendations are multifaceted and include general considerations as well as practical steps for conceptualising co-creation and concerning public engagement.

Co-creation Research

- To accurately capture micro-changes that occur during and in response to participatory processes, research may benefit from employing appropriate qualitative methods. Accompanying or engaging in co-creation processes, for example, in round tables, in-person as researchers could provide more detailed insights into expert-lay-knowledge negotiations and improve the accuracy of the results.

- Simultaneously, research would benefit from deploying methods that allow the observation of unexpected outputs and potentially outcomes. Semi-structured interviews have enabled the observation of unexpected outputs in this research. Thus, further qualitative research of case studies could elicit further outputs or outcomes that could enrich the understanding of the potential and perhaps limitations of co-creation.

- Co-creation research should be open to study further interventions or approaches that can also foster public acceptance. Case study 2 demonstrated a high level of public acceptance that was largely attributable to the regionality of the project developer and the lease agreement of the wind farm, both of which are not directly related. In order to broaden the view of what also promotes the sense of 'being on par with another', more qualitative in-depth case study research should be conducted.

- Moreover, further research could explore ways to systematically examine outcomes in addition to outputs to explore the consequences of the outputs. With respect to this research, it would be worth considering, for example, the impact of the recommendations paper formulated by the round table and the actual consideration of this document by the municipal council. Analysing not only outputs but also outcomes could form the basis for a more complete evaluation of co-creation.

Policymaking:

- Establishing a middle-to-long-term participatory format, for example, a round table, would ensure a continuous effort to promote legitimacy and public acceptance. Iterative and regular meetings, for example, every half a year, as suggested by I1, with, for example, members of a round table throughout the planning and development phase and possibly after the commissioning of the would ensure that the legitimacy sustains that could promote long-term political trust in the municipality.

- Being aware of the limitations of co-creation and of other possible aspects that promote social acceptance could improve the ability to deploy 'tools' that are appropriate to the individual context respectively project. Other aspects that promoted public acceptance included a fair lease agreement or opting for regional project developers. It should not be assumed that *only* and simply 'more' co-creation could lead to better outputs or outcomes. Depending on the context or project, it would be useful to consider such or other aspects as well as co-creation if the public acceptance is intended to be elevated.

- Furthermore, it should be kept in mind that early public engagement may have undesired consequences since involving citizens too early in a project could cause gratuitous resistance that could unnecessarily obstruct the wind energy project. Similarly, communicating transparently could in certain cases raise suspicions when even the availability of information for policymakers is limited. Thus, while transparency and early public engagement can promote legitimacy, both should be planned thoughtfully to avoid adverse consequences.

- Finally, to promote inclusion, it could help to address aspects which, potentially negatively, influence inclusion. In this study, it was found that bureaucracy, participatory formats, and communication in terms of outreach can impact the degree to which citizens are included and how they are involved. Thus, being aware of potentially unwanted consequences can contribute to a more informed choice of how to promote inclusivity and diversity.

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Appendices

Appendix A

List of frequently asked interview questions

Questions that were present in most interviews:

- Personal questions:
  - Could you elaborate on the work of your organization?
  - Were you personally involved in the planning process?
  - Have you been in contact with citizens?
- Regarding the project design and setting:
  - Which actors were present during the planning process of the wind energy project?
  - How many people during the planning process /this [specific] meeting?
  - When did the meeting take place?
  - What actors were involved during the participatory meetings
  - How many citizens participated during the meetings?
- Concerning participation:
  - Could the meetings better be described as informing citizens or enabling a discussion between them?
  - How considerable was the say of involved actors?
  - How do you assess the protest? (for case study 1)
  - Have there been any conflicts in the case studies? (for case study 2)
  - Have there been any post-meeting discussions?
- Regarding the 'Output indicators':
  - To which extent did the case study generate new knowledge?
  - To which extent did the case change the social network of connections among actors?
  - To which extent did the case produce a process that creates a meaningful/valuable experience for participants?
  - To which extent did the case change pre-existing beliefs/values/priorities of people?
  - To which extent did the case shift power and resources away from more powerful actors and towards less powerful actors?
  - To which extent did the case strengthen or create institutions?
- Is there anything else that you would like to add?

Moderately frequent questions:

- Why have citizens been included in the planning process?
- What made the case studies unique?
- Are there any legal or regulatory differences between German states that affect public participation or the work of your organization?

Appendix B

Overview of interviewees from both case studies

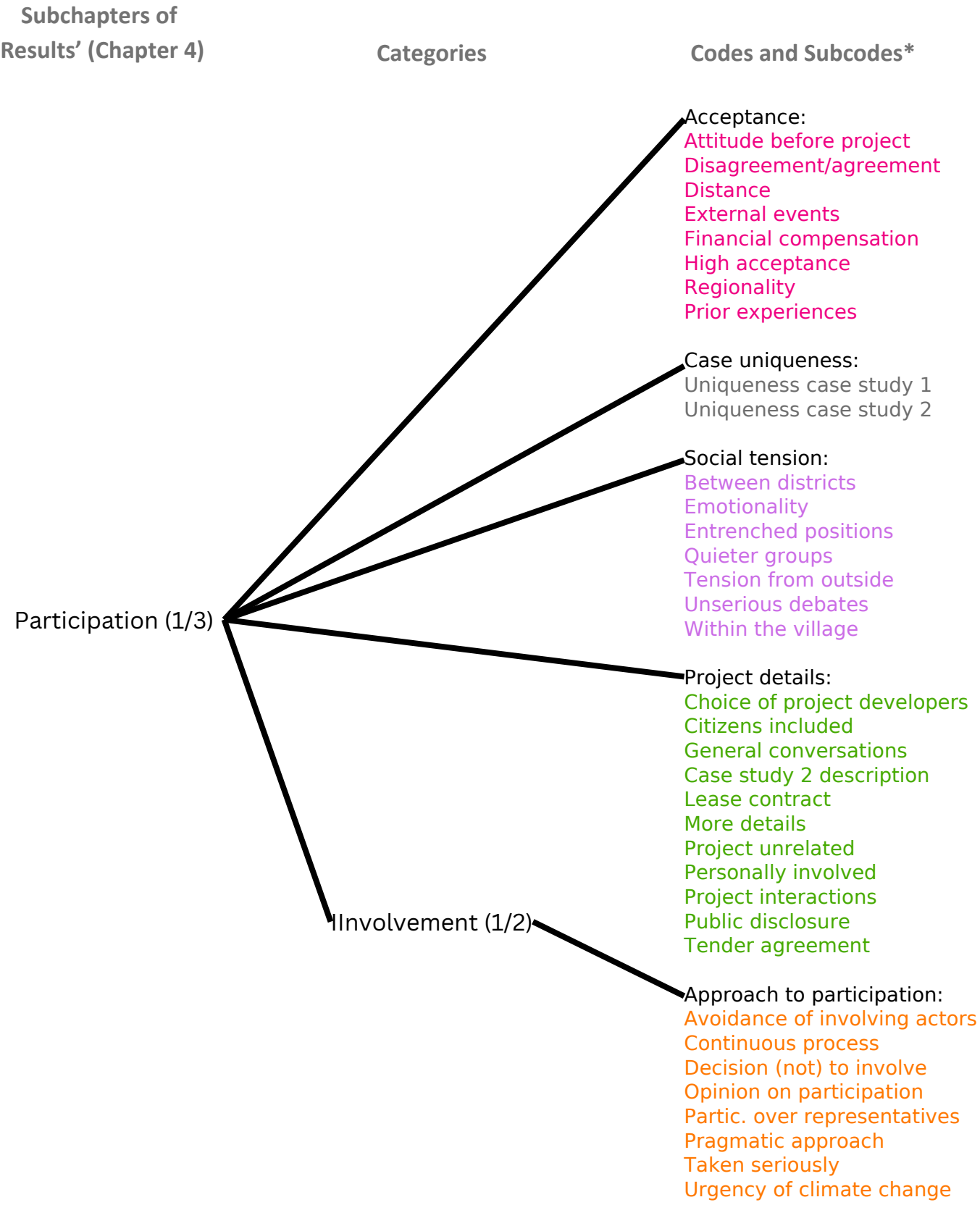
Actor	*Case study 1*	*Case study 2*
Higher municipal politician	I11	I5
Municipal politician	I8	x
District office	I10	x
Citizen	I4	x
NGO (environmental/ nature conservation)	I9[5]	I2
Project developer	I7	I12
Civic forum	I1	I3
Municipal project advisor	I6	x
Forester	x	I13

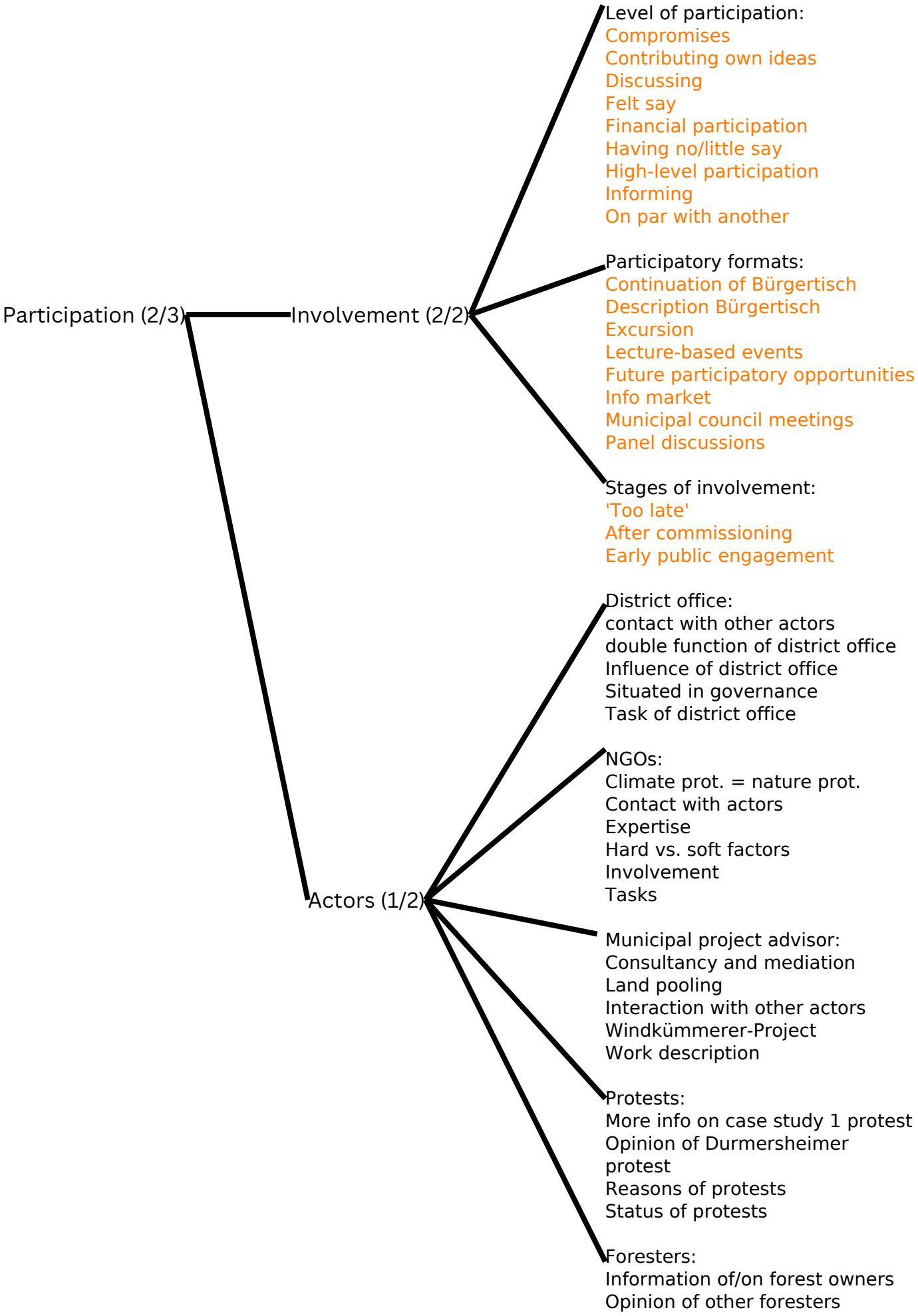
Note: Explanation of colours: The colour 'green' means that interviewees have been personally involved in case studies, either directly in the participatory process or indirectly in the project. 'Orange' means that interviewees have not been personally involved, but their institution or organisation has been. 'Red' means that neither the interviewee nor their organisation has directly engaged in the participatory process. The cross 'x' implies that the indicated interview has not been conducted.

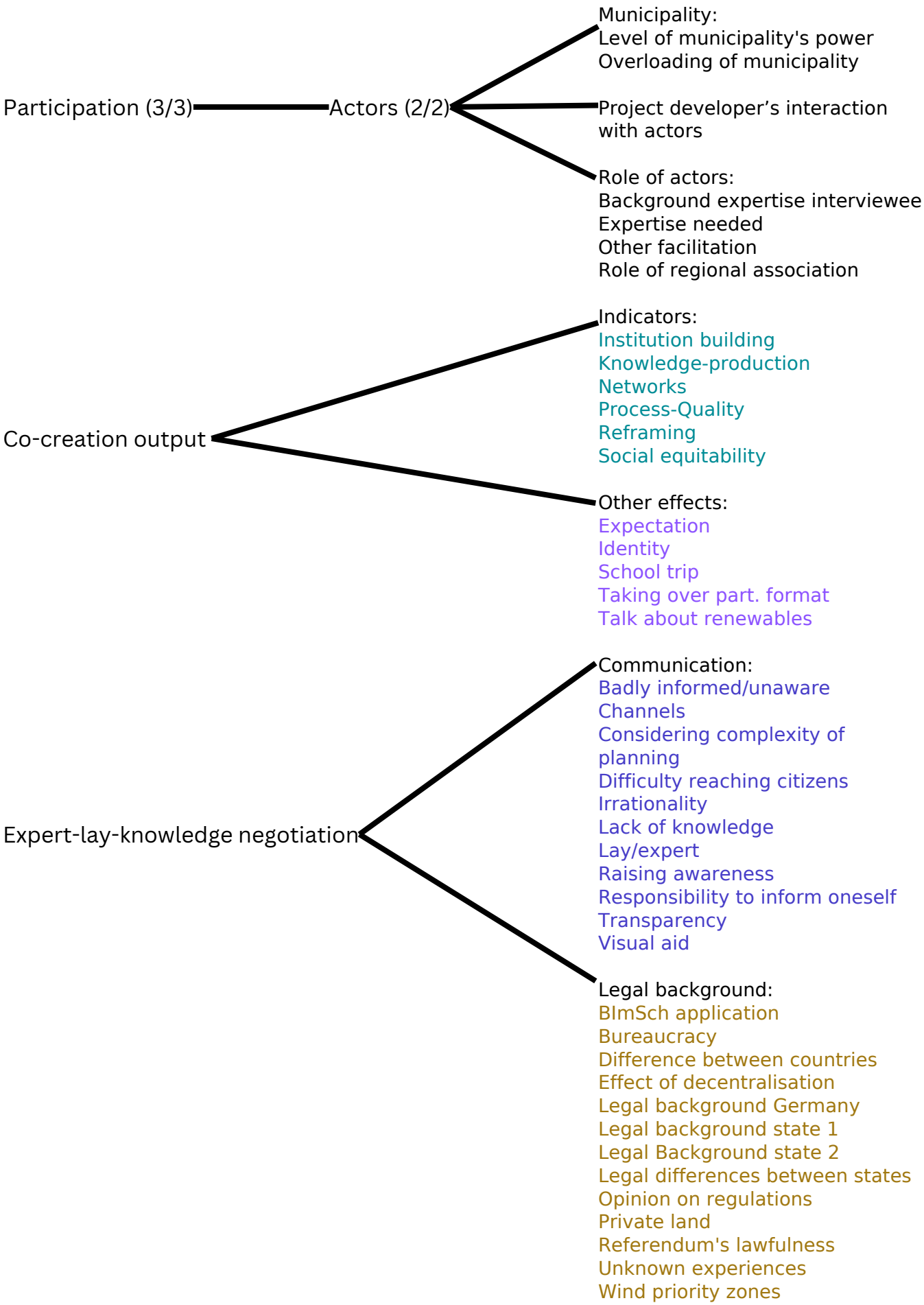
[5] It is noteworthy that I2 is active on a local level as part of the organisation, while I9 works on a regional level. While the research aimed to contact the local contact of I9's organisation, it found that a local representation was neither present nor actively involved in case study 1. The lack of a local representation of nature conservation organisations also became evident by interviewee 1.

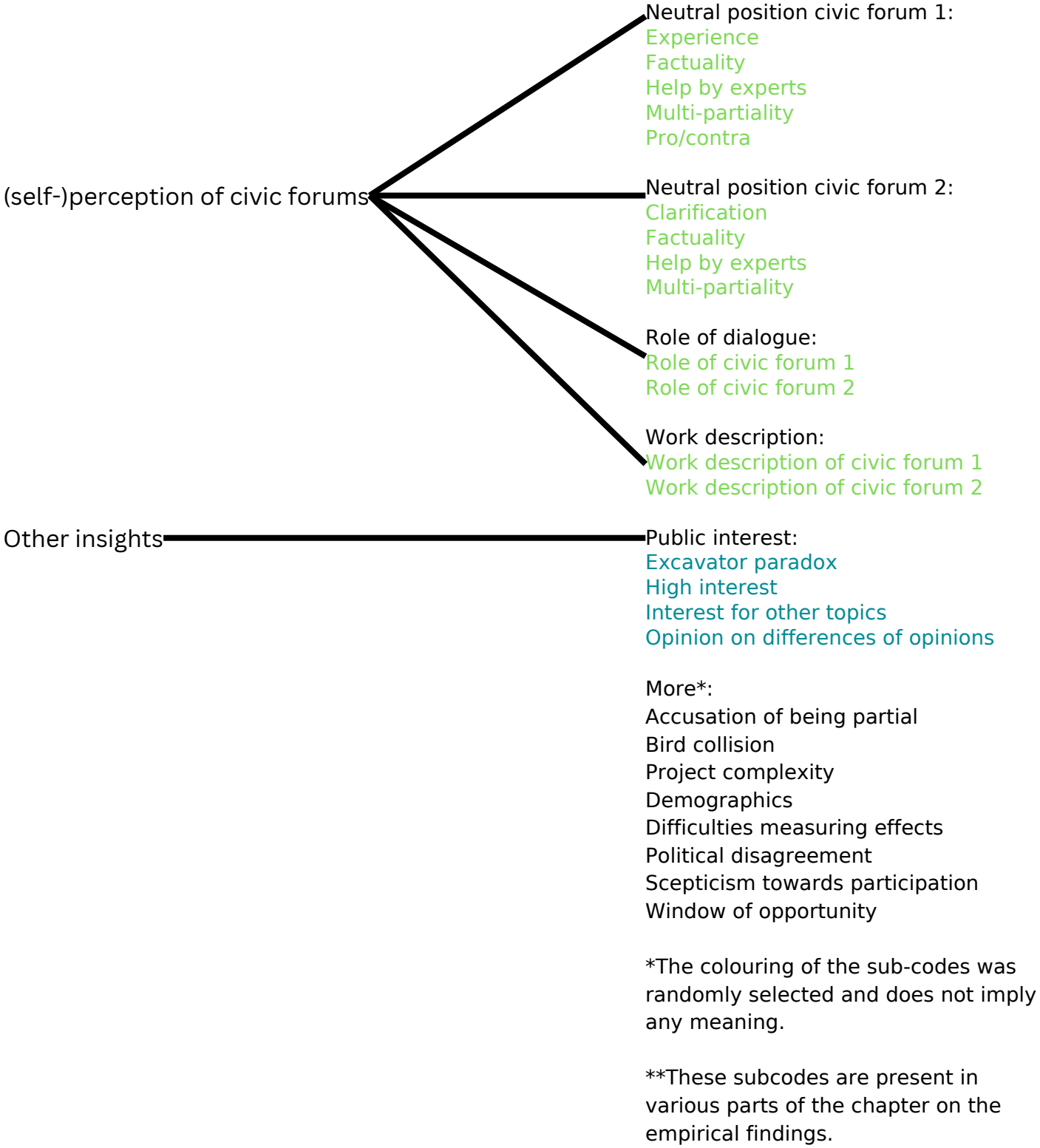
Appendix C:

Connections between the structure of the subsections of the empirical findings chapter and the coding system




Participation (2/3)
Involvement (2/2)
Level of participation:
Compromises
Contributing own ideas
Discussing
Felt say
Financial participation
Having no/little say
High-level participation
Informing
On par with another
Participatory formats:
Continuation of Bürgertisch
Description Bürgertisch
Excursion
Lecture-based events
Future participatory opportunities
Info market
Municipal council meetings
Panel discussions
Stages of involvement:
'Too late'
After commissioning
Early public engagement
Actors (1/2)
District office:
contact with other actors
double function of district office
Influence of district office
Situated in governance
Task of district office
NGOs:
Climate prot. = nature prot.
Contact with actors
Expertise
Hard vs. soft factors
Involvement
Tasks
Municipal project advisor:
Consultancy and mediation
Land pooling
Interaction with other actors
Windkümmerer-Project
Work description
Protests:
More info on case study 1 protest
Opinion of Durmersheimer protest
Reasons of protests
Status of protests
Foresters:
Information of/on forest owners
Opinion of other foresters


Participation (3/3)
Actors (2/2)
Municipality:
Level of municipality's power
Overloading of municipality
Project developer’s interaction with actors
Role of actors:
Background expertise interviewee
Expertise needed
Other facilitation
Role of regional association
Co-creation output
Indicators:
Institution building
Knowledge-production
Networks
Process-Quality
Reframing
Social equitability
Other effects:
Expectation
Identity
School trip
Taking over part. format
Talk about renewables
Expert-lay-knowledge negotiation
Communication:
Badly informed/unaware
Channels
Considering complexity of planning
Difficulty reaching citizens
Irrationality
Lack of knowledge
Lay/expert
Raising awareness
Responsibility to inform oneself
Transparency
Visual aid
Legal background:
BImSch application
Bureaucracy
Difference between countries
Effect of decentralisation
Legal background Germany
Legal background state 1
Legal Background state 2
Legal differences between states
Opinion on regulations
Private land
Referendum's lawfulness
Unknown experiences
Wind priority zones


(self-)perception of civic forums
Neutral position civic forum 1:
Experience
Factuality
Help by experts
Multi-partiality
Pro/contra
Neutral position civic forum 2:
Clarification
Factuality
Help by experts
Multi-partiality
Role of dialogue:
Role of civic forum 1
Role of civic forum 2
Work description:
Work description of civic forum 1
Work description of civic forum 2
Other insights
Public interest:
Excavator paradox
High interest
Interest for other topics
Opinion on differences of opinions
More*:
Accusation of being partial
Bird collision
Project complexity
Demographics
Difficulties measuring effects
Political disagreement
Scepticism towards participation
Window of opportunity
*The colouring of the sub-codes was randomly selected and does not imply any meaning.
**These subcodes are present in various parts of the chapter on the empirical findings.