

Co-creation: The New Spirit of *What?*
**Tracing Co-creation as an Emerging Mode of Public Participation
in Science, Technology, and Innovation**

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Thesis Summary

Over the past decade, *co-creation*, that is practices bringing together diverse actors to achieve mutually beneficial outcomes, has emerged as a novel, broadly desired approach to innovation governance, both at a discursive level and in practice. Co-creation is multifaceted and its promises are manifold, ranging from more successful innovations that would satisfy the demand of a broader customer base to more inclusive forms of innovating that would embrace public perspectives in and throughout innovation processes. The latter in particular could be interpreted as a reaction to the long-standing call of the Science and Technology Studies (STS) community for the early engagement of members of the public in innovation processes before important design choices are locked in. What remains to be explored, however, is the question of whether this is truly the predominant version of co-creation that emerges in contemporary policy environments, or, which other visions, practices, purposes, and outcomes might circulate. Adding to the rich tradition of public engagement research in STS, the central objective of my dissertation project is to explore co-creative innovation practices with a particular focus on how they shape techno-scientific governance processes. Concretely, in the first article of this dissertation, I provide a discourse analysis of European policy documents and scrutinize the underlying value inscriptions that pervade co-creation. With the second article of this dissertation, I trace these value propositions at an empirical co-creation site, focusing on the social dynamics of *doing* co-creation between the confines of pre-defined desirable outcomes and the desire to involve publics openly. In doing so, I show how co-creation evokes many aspects of earlier forms of public engagement, however, in an economic guise that foregrounds economic over social benefit and alleged opportunities to participate over equitable and socially just inclusion. Through my dissertation project, I would like to contribute to enhancing the current understanding of integrating society in techno-scientific governance and innovation processes through co-creation. I would also like to add to the academic discourse on public engagement the perspective of co-creative innovation practices and vice versa. Finally, I hope to sensitize policymakers for more socially robust and responsible forms of innovation.

Zusammenfassung

Im Verlauf des letzten Jahrzehnts hat sich *Co-creation*, d. h. Praktiken, bei denen verschiedene Akteure zusammengebracht werden, um wechselseitig vorteilhafte Ergebnisse zu erarbeiten, sowohl auf diskursiver Ebene als auch in der Praxis als neuartiger, weithin wünschenswerter Ansatz für die Entwicklung und Steuerung von Innovationen herausgebildet. Co-creation ist facettenreich und ihre Versprechen sind vielfältig, von erfolgreicheren Innovationen, die die Nachfrage eines breiteren Kundenspektrums bedienen würden, bis hin zu inklusiveren Formen von Innovation, die öffentliche Perspektiven in und entlang von Innovationsprozessen einbeziehen würden. Insbesondere Letzteres könnte als Reaktion auf die seit langem bestehende Forderung der Science and Technology Studies (STS)-Gemeinschaft nach einer frühzeitigen Einbindung der Bevölkerung in Innovationsprozesse interpretiert werden, bevor wichtige Designentscheidungen getroffen werden. Zu ergründen bleibt jedoch die Frage, ob dies wirklich die vorherrschende Version von Co-Creation ist, die in der heutigen politischen Landschaft zum Tragen kommt, oder welche anderen Visionen, Praktiken, Ziele und Ergebnisse im Umlauf sein könnten. In Anknüpfung an die umfangreiche Tradition der Public-Engagement-Forschung in den STS besteht das zentrale Vorhaben meines Dissertationsprojekts in der Erforschung ko-kreativer Innovationspraktiken mit besonderem Augenmerk darauf, wie diese technowissenschaftliche Governance-Prozesse gestalten. Im ersten Artikel dieser Dissertation führe ich eine Diskursanalyse europäischer Policy-Dokumente durch und untersuche die zugrundeliegenden Werteinschreibungen, die Co-creation durchdringen. Im zweiten Artikel dieser Dissertation beleuchte ich diese Werteinschreibungen an einem empirischen Co-creation-Standort und konzentriere mich dabei auf die sozialen Dynamiken von Co-creation zwischen den Grenzen vordefinierter wünschenswerter Ergebnisse und dem Wunsch, Öffentlichkeiten offen zu beteiligen. Dabei zeige ich, wie Co-creation viele Aspekte früherer Formen von Public Engagement aufgreift, allerdings in einer ökonomischen Gestalt, die wirtschaftlichen gegenüber sozialem Nutzen und vermeintliche Partizipationsmöglichkeiten gegenüber einer gleichberechtigten und sozial gerechten Beteiligung in den Vordergrund stellt. Mit meinem Dissertationsprojekt möchte ich dazu beitragen, das derzeitige Verständnis der Integration von Gesellschaft in technowissenschaftliche Governance- und Innovationsprozesse durch Co-creation zu vertiefen. Außerdem möchte ich den akademischen Diskurs über Public Engagement um die Perspektive ko-kreativer Innovationspraktiken ergänzen und vice versa. Schließlich hoffe ich, politische Verantwortungstragende für sozial robustere und verantwortliche Formen von Innovation zu sensibilisieren.

To my grandparents, Ludwig (1922–2015) and Anneliese Deibler (1925–2018).

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Acknowledgements

It was the Polish and Israeli microbiologist and science theorist Ludwik Fleck who described cognition as a social activity taking place within what he called *thought collectives*. With this, he locates the genesis of scientific knowledge not in the individual researcher, but within the wider knowledge environment that surrounds her (Fleck 1979). At least to an STS researcher, this once revolutionary postulate might no longer have much news value. Nevertheless, it is special in its own right to experience such meaning of community in practice – particularly in the context of a dissertation, which after all continues to be framed predominantly as an individual achievement. The following lines are to pay tribute to *my* thought collective.

The arguments I propose in this dissertation have been developed within the good five years I spent at the STS Department of the TUM School of Social Sciences and Technology, formerly Munich Center for Technology in Society. Being part of this vibrant research community has become part of my identity and I thank all the staff of the department for their collegiality and warm-heartedness. I am particularly indebted to my supervisor Ruth Müller, who has been my steady compass in both good and (occasionally) stormy weather. Her encouragement and advice have been indispensable – I could not have imagined having a better supervisor. I would like to extend my thanks to Carlos Cuevas-Garcia, my mentor and office mate of three years. I cannot count the times I lamented to him about the challenges I have encountered throughout the entirety of this project. And how my research world would look brighter again after these conversations that would usually take place over a cup of coffee, or two, or five... To no lesser extent, I would like to thank my examiners Alan Irwin and Brice Laurent for the time they invested in reviewing my work. I am honored to have two scholars whose work has so profoundly influenced the ideas I develop in my dissertation review it.

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that my contemplation of co-creation in discourse and practice has grown considerably as a result of our exchanges. With my work, I hope to be able to make a modest contribution to some of the questions we have so often racked our brains over: What is co-creation? And what should responsible co-creation look like?

Throughout my dissertation project, it has been vital for me to be embedded in the Science and Technology Policy Research Group at the TUM STS Department. Throughout the entire research process, it was the critical perspectives of my colleagues that challenged and inspired me, especially at times, when I could no longer see the forest for the trees. I am grateful for the time they invested in reading many earlier drafts of this work, for their feedback, and for the peer support we provide for each other. To me, being embedded means interacting: As we enrich our work with constructive feedback in seminars and workshops. As we support each other in critical moments (holding hands while submitting manuscripts is and should continue to be a thing). As we jointly confront administrative challenges of all kinds. Or, as we cultivate the beloved Bavarian tradition of *Feierabendbier* that simply tastes best in good company. I am grateful to have found an academic home in my current and former teammates.

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Many of the skills that benefited me in completing this dissertation have their roots in my school days. In particular, I would like to thank two of my teachers, Susanne Walz-Bihler and Gino Mühlen-Di Jullo, who have shaped my path more than they might realize. I am certain that much of my passion for teaching stems from their stellar example. Therefore, it goes without saying that I also wish to express my gratitude to my own students. More than once in my seminars have I used examples from my research work to illustrate topics. This has resulted in

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I dedicate this thesis to my grandparents, Ludwig and Anneliese, both of whom did not live to see me complete my graduate studies. My grandparents grew up in modest circumstances and were not allowed to study beyond what was deemed necessary for them to support their families. Not seldom have I wondered how their lives would have turned out had they had the same privileges that I enjoy. Their memory has carried me through many of the nights I spent writing out this project. I hope they would be proud.

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1. Introduction

Böhmen liegt am Meer

*Sind hierorts Häuser grün, tret ich noch in ein Haus.
Sind hier die Brücken heil, geh ich auf gutem Grund.
Ist Liebesmüh in alle Zeit verloren, verlier ich sie hier gern.*

Bin ich 's nicht, ist es einer, der ist so gut wie ich.

*Grenzt hier ein Wort an mich, so laß ich 's grenzen.
Liegt Böhmen noch am Meer, glaub ich den Meeren wieder.
Und glaub ich noch ans Meer, so hoffe ich auf Land.*

*Bin ich 's, so ist 's ein jeder, der ist soviel wie ich.
Ich will nichts mehr für mich. Ich will zugrunde gehen.*

*Zugrund - das heißt zum Meer, dort find ich Böhmen wieder.
Zugrund gerichtet, wach ich ruhig auf.
Von Grund auf weiß ich jetzt, und ich bin unverloren.*

*Kommt her, ihr Böhmen alle, Seefahrer, Hafenhuren und Schiffe
unverankert. Wollt ihr nicht böhmisch sein, Illyrer, Veroneser,
und Venezianer alle. Spielt die Komödien, die lachen machen.*

*Und die zum Weinen sind. Und irrt euch hundertmal,
wie ich mich irrte und Proben nie bestand,
doch hab ich sie bestanden, ein um das andre Mal.*

*Wie Böhmen sie bestand und eines schönen Tags
Zum Meer begnadigt wurde und jetzt am Wasser liegt.*

*Ich grenz noch an ein Wort und an ein andres Land,
ich grenz, wie wenig auch, an alles immer mehr,*

*ein Böhme, ein Vagant, der nichts hat, den nichts hält,
begabt nur noch, vom Meer, das strittig ist, Land meiner Wahl zu sehen.*

[Ingeborg Bachmann]

Bohemia Lies by the Sea

*If houses here are green, I'll step inside a house.
If bridges here are sound, I'll walk on solid ground.
If love's labour's lost in every age, I'll gladly lose it here.*

If it's not me, it's one who is as good as me.

*If a word here borders on me, I'll let it border.
If Bohemia still lies by the sea, I'll believe in the sea again.
And believing in the sea, thus I can hope for land.*

*If it's me, then it's anyone, for he's as worthy as me.
I want nothing more for myself. I want to go under.*

*Under – that means the sea, there I'll find Bohemia again.
From my grave, I wake in peace.
From deep down I know now, and I'm not lost.*

*Come here, all you Bohemians, seafarers, dock whores, and ships
unanchored. Don't you want to be Bohemians, all you Illyrians,
Veronese and Venetians. Play the comedies that make us laugh*

*until we cry. And err a hundred times,
as I erred and never withstood the trials,
though I did withstand them time after time.*

*As Bohemia withstood them and one fine day
was released to the sea and now lies by water.*

*I still border on a word and on another land,
I border, like little else, on everything more and more,*

*a Bohemian, a wandering minstrel, who has nothing, who
is held by nothing, gifted only at seeing, by a doubtful sea,
the land of my choice.*

[Ingeborg Bachmann, translated by Peter Filkins]

Arguably as old as humanity are the utopias of good coexistence for all. They have been theorized as emancipatory responses to wars, crises, social inequalities, or more generally to negative images of humanity as such. Among these manifold visions of the common good term, different intellectual histories have offered different, sometimes strongly opposing models of how social order for the benefit of all might be realized: If one were to consult the Swiss philosopher Jean-Jacques Rousseau, the answer would probably be the *volonté générale*, the general will, in whose legislative expression all *citoyens* participate equally (Rousseau 1986). If one considers some of the indigenous traditions of South America, in particular the Aymara, Quechua and Kichwa Andean cultures, which have contributed significantly to the concept of *Buen Vivir*, or good living, as now incorporated in the constitutions of Ecuador and Bolivia, good living is based on coexistence in diversity and conviviality with nature. This notion also implies a consensual orientation of social order, as well as the rejection of growth as a means of development, recognizing that there can be no progress if some remain excluded from that progress (Gudynas 2011). If, however, one were to believe the Austrian Formula One driver Niki Lauda, who featured prominently in a 2011 commercial for the Austrian Economic Chambers (alongside a Formula car speeding through idyllic Austrian mountainscapes), then “if the economy is doing well, we are all doing well” (Österreichische Wirtschaftskammern 2011, own translation).

Not least, it is the poets who have clothed their utopia of a good coexistence for all in melodious, albeit more contemplative words – a utopia in which, as the Austrian poet Ingeborg Bachmann, whose words I have chosen to precede my dissertation, formulated, the seeking, the ‘ships unanchored’, ‘seafarers’ and ‘dock whores’, might find a home. Anyone who could enter this utopia would ‘walk on solid ground’, ‘sound bridges’, and ‘wake in peace’. For Bachmann, this utopia culminates in the image of Bohemia, implicitly evoking a political landscape which, at the time the poem was written, still reverberated with the hopes of political reform around a democratic socialism in the context of the Prague Spring. That Bachmann locates Bohemia, which lies to the west of Moravia and has no coastline, ‘by the sea’ is thus not evidence of poor geographical knowledge. Rather, with an indicative of certainty she ‘release[s]’ Bohemia to the sea, thereby creating a counter-truth that, in my humble reading of her work, nevertheless remains utopia, and the sea, Bachmann’s powerful symbolism for the hope of a social order that would also and especially consider those previously excluded, doubtful.

So if, even for the poets, visions of a good and equitable coexistence for all ultimately remain a distant utopia floating within the tension between ‘going under’ and ‘not being lost’, what are

the consequences for the practical enactments of these visions? If one turns to the specific social sphere of techno-scientific and innovation governance, the answer that emerges from some of the more recent developments may come as a surprise. While technologies themselves have long been framed not only as utopia, but an element worth striving for in the present in order to make a good future attainable, prominent failures, adverse effects, and societal rejection of certain technologies have increasingly shifted the focus to societies' roles and involvements in the development of emerging technologies as a means to rectify democratic deficits in innovation. Within this discourse, at least as concerns the processes, results and governance of innovation, the utopia of an inclusive, fair, and universally beneficial mode of doing innovation suddenly seems imminent:

"The co-creation methodology", so explicates the open-source knowledge platform for participatory and democratic governance Participedia "enables active participation by citizens as designers and implementors through the self-organizing process of democratic decision-making, ideally including those who have been traditionally excluded" (Participedia n.d.).

"Collective intelligence" and "cocréation par le bas" (co-creation from the bottom), as the French newspaper Le Monde argued in 2013 in response to the question of a good future in the face of complicated and gloomy realities, "offers the opportunity to balance society more effectively", and continues: "In this new participative and contributive context, we need to co-reflect on the relationship between citizens and the State, [...] and engage in a sincere dialogue between politicians and citizens. We are at the dawn of a real counter-power" (de Rosnay 2013, own translation).

Or as the entrepreneur, EU Youth Ambassador and keynote speaker Ali Mahlodji recently stated in a Facebook post: *"Anyone focusing on the climate crisis, corporate transformation and other changes must learn to understand co-creation as a basis and this begins with embracing life as unknown territory in which only joint experimentation can boost the learning curve. And so we find ourselves in a world where everyone involved is part of the solution" (Mahlodji 2023, own translation).*

'Co-creation', it seems, is the salvific answer to the long-cherished visions of a form of doing innovation oriented towards the common good, which has been increasingly proliferating in the realm of science-society-policy relations for just over a decade now. In its widest sense, the concept refers to the participation "of diverse actors, such as companies, universities, policymakers, and members of the public, in innovation processes" (Müller et al. 2021a: 2).

Within this broad definition, co-creation is linked to a whole range of promises. These range from providing a means to unlock new sources of innovation (Prahalad & Ramaswamy 2004a; von Hippel 2006) to enabling more democratic and socially just practices of doing innovation (Bentzen 2021; Robinson et al. 2021) that, as the above quotes suggest, would constitute a ‘counter-power’ to established forms of top-down techno-scientific governance, while also providing a method to address all sorts of even the biggest and most pressing problems, like the ‘climate crisis’. In light of such abundance and diversity of promissory elements being invoked for co-creation, scholars have heralded the arrival of the “co-creation paradigm” (Ramaswamy & Ozcan 2014: 280), called it a “magic concept” (Voorberg et al. 2015: 1334) or “panacea” (Lystbæk et al. 2019: 4) applicable to all sorts of challenges, placed it at the “highest rungs” (Pappers et al. 2020: 12) of what is deemed desirable citizen participation within a “new spirit of participation” (Palmer et al. 2019: 247).

Equally diverse as these higher-level promises of co-creation appear the formats and forms of science-society-policy relations subsumable within the umbrella of this broad definition¹. More concretely, co-creation has been used to described different interactions with different rationales ranging from, e.g., the purposeful engagement of disadvantaged communities in the planning of inclusive urban infrastructures to the community-based design of a public sauna (Leino & Puumala 2021), or from the involvement of people with disabilities into the development of care robots (de Saille et al. 2022) to Nike’s customer co-creation service for buyers “to have fun customizing a shoe that feels more like you” (Nike 2023). Importantly, over the last decade, co-creation has also increasingly surfaced in policy circles, such as the European Union’s (EU) innovation policy discourse, where co-creation is explicitly understood as a “‘new wave’ of public engagement” (European Commission 2016a: 29) and thus as a mode of participation² of publics in science, technology, and innovation. All of these different interpretations of co-creation revolve around the fundamental belief and hope that diverse perspectives brought into conversation with each other would allow for a generative space for solutions to emerge that benefit all involved.

It is no coincidence that the notion of co-creation as being able to achieve mutually beneficial outcomes that shines through so strongly in all of these formats is reminiscent of a win-win

¹ Even the esoteric scene has recently adopted the term co-creation to describe the interconnection of disparate systems “for the good of all” and to “make miracles possible” (Lindau 2023: 10).

² While I recognize that the terms ‘public engagement’ with and ‘public participation’ in science and technology are used differently depending on the national context (Joly & Kaufmann 2008), I consider both interchangeable in how they refer to understandings and enactments within a broader trajectory of science-society-policy interactions.

logic, as it has been conceptualized in game theory and is frequently mobilized in business contexts in particular (Rieck 1993; Porter & Kramer 2011). For co-creation is not an entirely new term or concept that would only have assumed meaning through its use in recent innovation policy discourses or participatory initiatives in techno-scientific governance, but has its roots in marketing and business contexts. Here, co-creation is primarily understood as the joint development of products by consumers and producers, whereby consumers are involved as “co-creators of value” (Prahalad & Ramaswamy 2000: 80; 2002; 2004a; 2004b). From this perspective, the primary objective and value proposition of co-creation is the development of new sources of innovation and, ultimately, the creation of economic value in the private sector (Vargo & Lusch 2004; Grönroos 2011). At the heart of this, so to speak, original notion of co-creation (in innovation contexts) is the assumption that the inclusion of a broader customer base in innovation processes would help to align commodity and service features with the preferences of future buyers and thus increase both consumer satisfaction and producers’ revenues (Alves et al. 2016; Vargo & Lusch 2008). As policy circles have begun to take up the term co-creation, they have, to a certain extent, reframed the concept, placing the interaction of different actors, which co-creation suggests through its most abstract possible definitional component, explicitly within the context of the participation of publics in science, technology, and innovation. Accompanying this reframing is a series of new alleged promises ascribed to co-creation. These include, for instance, broader democratic legitimization of techno-scientific developments, earlier engagement of publics throughout innovation processes, and improved alignment of research and innovation with societal challenges (European Commission 2016a; European Economic and Social Committee 2022; European Commission 2020).

It is against this backdrop that co-creation appears closely related to public engagement with science and technology, which policymakers and social scientists alike have framed as a governance mode in modern democracies that invites members of the public to consult about technology-grounded matters since the 1960s. Over the decades, the growing relevance of public engagement in science and technology policymaking in Western democracies has led to a proliferation of a range of participatory activities across countries and contexts, which scholars have referred to as the “participatory turn” (Jasanoff 2003a: 235) in science and technology governance. Within this participatory turn, policymakers have depicted public engagement as a promising solution in the context of complex, often heated techno-political controversies, such as nuclear risk and waste governance or genetically-modified organisms. In doing so, they have attributed to public engagement the ability to mediate between polarized attitudes, but also, and often primarily, to provide more factual (in the sense of scientific)

information to publics constructed as irrational, in order to mitigate controversies by (re-)establishing trust in scientific and political institutions (Grove-White et al. 1997; Pidgeon 2008). Particularly in light of this instrumental deployment of public engagement, scholars from Science and Technology Studies (STS) have empirically examined the promissory elements of public engagement and critically reflected on its effects. Their critique has emphasized, among other things, how policymakers tend to understand public engagement not as genuine dialogue, but as a means to reduce public opposition towards innovation (Irwin 2006; Wynne 2006a) or to justify and solidify their pre-existing notions of and decisions about what constitutes desirable technological or innovation outcomes (Stirling 2006; 2008). This raises questions about the extent to which the members of the public involved can actually influence the technologies or decisions they are invited to discuss. Based on these empirical observations and critique of public engagement, the STS community has consistently argued for a shift “from deficit to democracy” (Irwin 2014: 72; 2006; Stilgoe et al. 2014), as well as, increasingly, for engaging publics earlier in and throughout innovation processes (Nowotny 2003; Wilsdon & Willis 2004).

From this perspective, the recent proliferation of co-creation in policy circles (European Commission 2016a) could be interpreted as a response to STS’s persistent calls for a form of public participation that goes beyond merely including publics in the decision-making about novel technologies, i.e., once important design choices have been stabilized already, but instead enables members of the public to have true agency in and throughout the shaping of emerging technologies and innovation. Needless to say, this reading puts co-creation in a rather favorable, perhaps overly optimistic light. What remains to be explored is, whether this interpretation indeed manifests in the predominant understanding of co-creation and co-creation practice circulating in contemporary innovation policy landscapes and, if not, which other versions surface.

So how does co-creation unfold in its recast role as part of the allegedly “new spirit of participation” (Palmer et al. 2019: 247) of publics in science, technology, and innovation? Addressing this question is essential to advance our understanding of co-creation as a continuation of public engagement with science and technology, to critically scrutinize its alleged promises, and to integrate into broader discourses on what it means to innovate responsibly the perspective of co-creation. Therefore, it is this overarching question that constitutes the starting point for my dissertation project. In doing so, I consider co-creation as

a phenomenon from two arguably closely related perspectives, namely by focusing on its discursive landscape on the one hand and on its translations into practice on the other:

Firstly, on a discursive level, I further operationalize my overarching research question by examining how the discursive uptake of co-creation unfolds in innovation policy. In doing so, I focus in particular on the implicit value propositions that co-creation entails, the discursive formations that emerge around co-creation, as well as the resulting discursive effects. I center this analysis on the EU innovation policy discourse as one of the central political arenas in which co-creation has gained particular momentum, not least through the EU's 8th Framework Programme for Research and Innovation *Horizon 2020*. To this end, I draw on a sample of EU innovation policy-related documents (2010-2020), which I examine by means of qualitative discourse analysis. The results of this analysis I present in the first article of my dissertation.

Secondly, following on from my discourse analytical approach, I explore co-creation by examining one specific practice case: In particular, I scrutinize co-creation as it was enacted by the German mid-size municipality of Ulm in the context of a smart city initiative, which I have studied as an embedded participant observer for three years, aided by qualitative interviewing and document analysis. This initiative (*Urban Future Ulm*³) pursued the explicit goal of employing co-creation as a bottom-up approach to the digitalization of one prototypical neighborhood and thereby conceptualized its co-creative approach as both wide participation and a tool for orienting the solutions developed as part of the project towards citizens' quotidian challenges. Within my analysis of this specific enactment of co-creation, I focus specifically on emerging agencies for citizens throughout the co-creation process. In doing so, I trace how these agencies came into being, how they were enacted and negotiated over the course of the project, where frictions arose, and to what extent the participating citizens were ultimately able to influence both the outcomes of co-creation and the co-creation process itself. The findings of this analysis I present in the second article of this dissertation.

I begin my dissertation by conducting a literature review, which I draw on to situate my own perspective on co-creation within the broader trajectory of participatory science-society-policy relations. To this end, I trace participation as an emancipatory concept in the context of increasingly porous boundaries between science, society, and policy back to the radical science movement of the 1960s and 1970s. By proposing what I call an 'incomplete chronology of participation', I examine the particularly significant moments where this notion of participation

³ As stated in my methodology chapter, *Urban Future Ulm* is a pseudonym for my case study that I use consistently throughout my dissertation in order to protect the privacy of my interlocutors.

as an emancipatory concept has re-emerged in the participatory enactments advanced in policy circles and in the STS literature that has critically examined these enactments. In its last decade, this chronology leads me to the advent of co-creation, which represents the juncture for my dissertation at which I delve deeper into the concept. Because co-creation has its roots in the marketing and business literature, I digress briefly into this original source context and conceptualization, and discuss how critical marketing and business scholars have problematized co-creation in this context. On this basis, I consider the to date limited, but growing number of STS accounts of co-creation as discourse and practice in order to link my own questions to the existing state of research, and as a fundament to be able to contextualize my subsequent analysis.

I continue by outlining my methodological approach and the data that I base my analysis on. This also includes how my dissertation is interrelated with the research consortium *Scaling up co-creation: Avenues and Limits for Integrating Society in Science and Innovation*, or *SCALINGS* for short, which examined co-creation using a range of case studies across different European countries and technological domains over a period of three years (2018-2021). In particular, I focus on the mutual shapings that I see between *SCALINGS* and my dissertation. Moreover, my methodology chapter includes a reflection on what being embedded means for me in the specific constellation of my case study, as well as a brief consideration of how my ethnographic work has been affected by the global Covid-19 pandemic.

Following the methodology chapter is the first article of my dissertation, co-authored by Ruth Müller and Sebastian Pfothenhauer, which examines the discursive uptake of co-creation at EU level by drawing on a range of EU innovation policy-related documents. A subsequent transitional section links the discursive level with co-creation practice and offers a detailed introduction to the local specificities of my case study *Urban Future Ulm*. For this purpose, I also draw on material that elucidates the local innovation context of my case study through highly specific local narratives – i.e., material that, despite gathered as part of my participant observation, is not the focus of the second article of this dissertation, but will be presented in a manuscript in preparation as a synergetic consideration of the translation processes between universal innovation ideals and local innovation narratives in its own right. This detailed introduction into my case study is followed by the second article of my dissertation, co-authored with Ruth Müller, in which I explore the emergent social dynamics that shape agencies for citizens as co-creators in the specific context of my case study.

Through my discussion and conclusion I interrogate how the versions of co-creation that I have seen emerging discursively and in practice in my work relate to the earlier observations of STS scholars in the context of public engagement with science and technology. In doing so, I draw attention to the novel aspects that co-creation, based on my analysis, seems to introduce into prevalent understandings of the participation of publics in science, technology, and innovation. To this end, I connect my work to an extended body of literature, particularly selected contemporary perspectives around the critique of capitalism that I see my findings resonating with. Furthermore, in light of the pattern of mutual shaping of participation formats and STS critique thereof that seems to shine through my literature review, I raise broader questions around the role of STS in the shaping of co-creation as one of the prevalent notions of public participation in innovation today and provide an overview of some of the new, potentially fruitful avenues for future scholarly inquiry into co-creation that I see emerging from my work. I conclude my discussion by attempting to approach co-creation from a normative stance in that, based on my observations, I discuss which specific aspects need consideration in a rewriting of co-creation if the concept is to serve meaningful, responsible, socially inclusive, and equity-oriented participation. To do so, I draw on the SCALINGS Policy Roadmap (Annex), of which I am co-author, wherein we crystallized a set of assessment questions for different co-creation actors to design, implement, and evaluate co-creation practices based on insights from all SCALINGS case studies in a collaborative and iterative process. Reflecting on the findings from and experiences made during my work, I reconsider the roadmap, highlighting in particular how my findings speak to specific aspects, to make concrete suggestions for a continuation and update of the roadmap in consideration of my findings.

With my epilogue, I open up my consideration of co-creation once again to a broader, more contemplative and personal than analytical level, and return to the questions that initially inspired my work: What can and should co-creation mean in the context of a utopia of a good life for all? To what extent can co-creation, at least in the specific context of science, technology, innovation, genuinely contribute to ensuring that everyone can participate equitably in innovation? Everyone, that is, including those disadvantaged and previously excluded from the discourses about desirable futures – in Bachmann’s words the ‘ships unanchored’, the ‘seafarers’, and ‘dock whores’? Or do the visions of equity-oriented participation of publics in science, technology, and innovation, within the context of co-creation, too, ultimately remain at best a hopeful yet doubtful reverie, a ‘Bohemia by the sea’?

2. Literature Review

The aim of this chapter is to systematize the current state of research on co-creation and thus to present the conceptual framings I use in my dissertation. In doing so, I loosely pursue a chronological approach⁴, where I focus on tracing the moments and different ways in which the idea of ‘science for the people’ has become particularly visible, thereby considering public engagement as an important precursor to co-creation. Viewing co-creation as part of the larger engagement discourse allows me to interrogate the promissory elements associated with co-creation based on the tensions that STS scholars have widely discussed for public engagement. At the same time, it allows me to situate co-creation within a wider genealogy and academic context.

I start (2.1) by providing a brief introductory overview of the semantic concepts and meanings associated with public engagement. To map the academic discourse on public engagement and be able to revisit key findings in light of emergent co-creation discourses and practices at a later stage, I proceed by tracing the evolution of the STS literature on and critique of public engagement⁵, focusing on pivotal moments within this evolution that I consider particularly relevant and instructive to my analysis of co-creation: First (2.1.1), I examine the social activism of the late 1960s and 1970s, particularly the radical science movement in the United States, in which many scholars locate the origins of our current notion of public engagement. Second (2.1.2), I consider the relationships and negotiations between scientific and public perspectives that dominated the 1980s discourse on the public understanding of science. Third (2.1.3), I attend to the participatory turn of the 1990s and 2000s, in the wake of which scholars have increasingly begun to call for deliberative public participation in techno-scientific decision-making. Fourth (2.1.4), I consider how policymakers’ notions of participation have increasingly moved upstream since the 2010s, i.e., away from participation in decision-making about the implementation and/or regulation of technologies and instead towards co-shaping the design of innovations throughout the innovation process. Next (2.2) and building on this brief history of co-creation, I turn to the concept of co-creation, starting from the marketing literature,

⁴ I am aware that the various foci of the engagement discourse can only to a limited extent be clustered chronologically, and that many of the issues and tensions that STS scholarship has problematized have by no means evolved linearly, but transcend the phases of the discourse as suggested here. Nevertheless, I have opted for an arguably loose chronological approach in order to map out the developmental trends from early conceptions of the relationships between publics, science, and technology to more recent notions of co-creative participation by focusing on the most important moments in which these notions surfaced. The fact that similar issues continue to reappear across the evolution of the engagement discourse all the more illustrates the relevance of existing critical scholarly engagement with public engagement to my analysis of co-creation.

⁵ I roughly build upon a chronology of public engagement as proposed by Maja Horst and Alan Irwin at a doctoral workshop on ‘Public Engagement – reflections, remakings, and re-imaginings’ (Horst & Irwin 2022).

where co-creation first features prominently as a term in the academic literature. In doing so, I focus both on the promissory elements that are often invoked in connection with co-creation and on the pitfalls that critical marketing and business scholars have highlighted for co-creation. I then (2.3) review the existing STS literature that to date has explicitly addressed co-creation. This includes STS accounts of co-creation discourses as well as empirical explorations of specific case studies of co-creation practices. I end (2.4) by summarizing the salient themes of this chapter and explicate how the articles in my dissertation connect and contribute to the state of the art in research.

2.1 An Incomplete Chronology of Participation

Before being able to trace the academic discourse on public engagement along crucial moments and shifts in its chronology, we must first attend to the “substance of participatory politics” (Jasanoff 2003a: 238) and question what public engagement with science and technology means and which divergent understandings of the concept subsist in parallel. In its widest sense, public engagement with science and technology denotes the “involvement of nonscientists, laypeople, or citizens in science and technology” (Lengwiler 2008: 187). This arguably vague definition leaves ample room for interpretation. It is thus no surprise that the term public engagement encompasses a whole landscape of different practices, processes, and rationales, all of which invoke ideals of participation and offer tools to translate these ideals into practice, or at least claim to do so. This tapestry of engagement practices including the multiple, often conflicting understandings, ambitions, and normative valuations it entails creates semantic problems that make it difficult to define and understand what public engagement signifies.

To navigate the landscape of participation and to be able to differentiate participatory practices, scholars have pursued a variety of approaches. For example, public engagement can be described along its different modes and formats, such as consensus conferences, citizens’ juries, deliberative opinion polls, or town meetings (Rowe & Frewer 2005; Joss & Durant 1995). Furthermore, public engagement can be examined along a continuum of degrees of participation. The focus here is on the question of how much agency publics have in the process, ranging from an often instrumental pretense of participation whereby policymakers or scientists merely acknowledge the social component of a problem to members of the public being in (shared or full) control of research practices or policymaking (Arnstein 1969; Kleinman 2000). This ties in closely with the question of how strongly public engagement is linked to political decisions, that is what impact and transformative potential the engagement process can achieve (Joly & Kaufmann 2008). Lastly, as Quet (2014) suggests, one can approach the question of

the “substance of participatory politics” (Jasanoff 2003a: 238) by attending to the socio-historical construction of the engagement discourse.

In my dissertation, I follow Quet (2014)’s approach and adopt a chronologically driven analysis of the engagement discourse to be able to understand the scholarly critiques of public engagement in their respective situational and socio-cultural contexts and look at participation through the lens of its dynamics, diverse meanings, and dominance of particular meanings over others that have evolved over time. This includes, not least, recent drifts from deliberatively oriented engagement practices to notions of co-creation, which draw heavily on marketing and business ideals. Hence, taking a chronological stance on the engagement discourse also allows me to approach the substance of co-creation that I base my dissertation on. Importantly, I curate this chronology of participation from an STS vantage point. While I recognize and value the rich body of influential work that the political science literature has contributed to the analysis of participation in the broader context of participatory democracy (e.g., Pateman 1970; 2012; Fischer 2003; Rosenberg 2007; Biegelbauer & Hansen 2011), I center my own perspective on public engagement around its explicit articulations in science, technology, and innovation as well as around related STS accounts thereof. Moreover, it is important to note that this development is not a universal story and – even within Western democracies – there are substantial differences in how deeply and early participatory ideas were embedded in national cultures of governing science, technology, and innovation. Therefore, my ‘incomplete chronology of participation’ represents my situated perspective of participation, which is based on a selection of moments and narratives of participation in specific national contexts that I have chosen because I consider them particularly relevant both for the emergence of currently circulating understandings of participation in Europe and for my subsequent discussion of co-creation.

2.1.1. Agitated Publics and Radical Science

“The emergence of participatory claims in science and technology”, as Lengwiler (2008: 189) emphasized in his analysis of the historical origins of participatory approaches in science and technology policy, “is the result of a specific historic constellation”. And of course, ideas and first attempts to move issues of science and technology into the public sphere in the 1960s and 1970s did not occur in a vacuum, but were a product of historical developments in the relationship between science, politics, and publics, which have constantly rearranged

themselves vis-à-vis each other in varying degrees of mutual permeability⁶. Nonetheless, most scholars situate the cradle of public engagement with science, technology, and innovation within the 1960s and 1970s (Agar 2008; Lengwiler 2008; Quet 2014). But what exactly happened in that period? And what is it that motivated scholars to frame this particular moment in time as “period of social relevance” (Elzinga & Jamison 1995: 591) and a reverberating incision in science-politics-society relations?

Among several circulating explanatory approaches⁷, all of which highlight different yet interrelated dynamics that shaped the specific socio-political constellation of the 1960s and 1970s, two seem particularly relevant with respect to the rise of participatory dynamics in science, technology, and their governance. The first concerns the role of scientific expertise: After the end of the Second World War, both the military demands of the Cold War period and the numerous peacefully framed technological development projects (e.g., nuclear energy) of the time created a high demand for scientific experts. To meet this demand, existing universities were expanded and new ones founded, which resulted in increasing access to university education for larger parts of society. This institutional dynamic shifted scientific knowledge production from behind closed doors to public arenas, thus making visible how different experts made different claims on truth (Agar 2008; Balogh 1991). Such moments of public articulation of expert disagreement in turn altered and opened up the public image of scientific knowledge, moving away from the notion of incontestable truth towards something negotiable and disputable. In this context, Agar (2008: 591) speaks of a “melting of Merton’s norms”, i.e. of the imperatives that Robert Merton (Merton 1972) described in his 1942 essay on the normative structure of science as characterizing the ethos of modern science. On closer inspection, this seems to apply in particular to the norms of communism, universalism, and disinterestedness, while the fourth norm of organized skepticism seems to have grown into the mantra of the time, with a simultaneous shift of its locus from predominantly academic contexts into a highly politicized public sphere. One example that prominently demonstrates this dynamic is the evolution of the United States Atomic Energy Commission, whose mission was to manage the legacy of the Manhattan Project and recast the meaning of nuclear technology, formerly associated predominantly with its military application and the horrors of the atomic bomb, through the commercial, or in Eisenhower’s words, “peaceful” (Eisenhower 2023: 1), use of nuclear energy. This mandate required scientists to build institutional networks and

⁶ For a detailed account of the history of science-society relations before the 1960s, see Shapin (1990) and Lengwiler (2008).

⁷ For a more comprehensive overview, see Agar (2008).

relationships outside of academia and to engage in agenda-setting and policymaking. At the same time, this new role of experts altered the face of expert knowledge to become highly politicized, characterized by disagreement and therefore also a venue for public criticism (Balogh 1991).

This criticism gave rise to the second, probably most crucial dynamic of the era that constituted fertile ground for participatory thinking: From the late 1960 onwards, the relationship between science, politics, and publics was increasingly shaped by the political activism of agitated publics commonly summarized as the 68 revolution. This includes, but is of course not limited to, the anti-nuclear movement, the civil rights movement, the feminist movement, the anti-Vietnam movement, and the ecological movement (Agar 2008; Mendelsohn 1994). Most of the critique at the heart of these and other movements of the era was initially directed against capitalist, militarist, and imperialist ideologies, either generally or in relation to specific manifestations. Over time, technological progress increasingly became the focus of criticism in its role as a component of these ideologies (Feenberg 1999; Leslie 1993). Based on this critique of technology, the social movements of the late 1960s began to question the boundaries between science and society, and the interdependence of science and policymaking in different ways: On the one hand, scientists were the object of criticism of many social movements insofar as they were often perceived as instrumentalized by established political elites. On the other hand, universities emerged as both important intellectual breeding grounds for social movements and spaces where political dissent was articulated, with many scientists themselves engaged as activists within social movements (Agar 2008).

As Kelly Moore (2008) carefully analyzed, two major perspectives of scientists on their social responsibility and, as a result, on modes of techno-scientific governance competed with each other during this period: The liberal mode, which is arguably still dominant today, envisioned scientific knowledge as politically neutral and assumed that both scientific quality and neutrality would be ensured through mechanisms such as peer review processes and funding applications. Within this liberal mode of techno-scientific governance, science is perceived as innocent, while any kind of misuse of technology or scientific knowledge is attributed to governments or allegedly uninformed publics. Accordingly, the social responsibility of science in this framework is the moral duty to act as a “conduit for factual information” (Moore 2008: 17) that keeps both governments and publics well-informed while simultaneously building trust in science and the scientific method. In contrast, the radical perspective aligned with many of the values of the social movements of the era and started from the premise that, within the

context of larger power imbalances and inequities, scientific advances would always lead to forms of science and technology that profited a small privileged group at the expense of the oppressed majority. Against this background, radical scientists understood their social responsibility alongside other radical thinkers and activists to call for a “fundamental reorganization of power relations” (Moore 2008: 17). This included a critique of scientific activity in a broader sense and more concrete self-criticism of their own scientific practice (Rose 1979).

At the time, a number of organized associations of scientists in the United States (US) and the United Kingdom (UK), but also across Europe, and in India, emerged that advocated such a radical perspective on science and the social responsibility of scientists. Together, these organized associations are referred to as the radical science movement (Ienna & Freyberg 2023). Among the largest of these organizations was the Science for the People (SftP) movement, which was founded in the United States in 1969 and evolved into a decentralized network of multiple US campuses over the 1970s. Its mission included “to explain how social relations shaped ideology, and how ideology in turn shaped the production of scientific knowledge”, “pierce the façade of pure or disinterested inquiry”, and “dismantle the notion that science could operate outside of the sway of dominant power structures” (Schmalzer et al. 2018: 14). This broader mission outlined many of the aspects that would later grow into the central axes of the critique of public engagement with science and technology, such as challenging expertise and looking at scientific knowledge production as an inherently political endeavor. It also incorporated more concrete ideas about the relationship between science and the public, calling not only for a general orientation of scientific research towards society in the sense of a science done *for* the people, but also for a participatory approach to science *by* the people (Moore 2008).

This orientation towards the role of the public in science is particularly evident in SftP’s response to the controversy over the regulation of recombinant DNA (rDNA) research from the mid-1970s onwards, particularly with respect to the 1975 Asilomar conference⁸. As Botelho

⁸ Recombinant DNA technology refers to a development in molecular biology that allows DNA molecules to be artificially modified using genetic engineering methods. This type of modification can be used, for example, to make animal and plant breeding more efficient and resistant to environmental influences. When new technologies to modify DNA emerged in the 1970s, several scientists urged a memorandum for these technologies out of concern over potential biohazards. To evaluate associated risks and to establish guidelines for research on and with rDNA following a precautionary principle and to preempt public regulation of rDNA, a group of influential biologists gathered at Asilomar State Beach, California, in February 1975. Rather than publics or governments, with the Asilomar conference “the scientific community assumed the authority to define science’s responsibilities in the present and to declare what promises can be made, what risks warrant worry, and what technological futures are possible, desirable, and good” (Hurlbut 2005: 11). Thus, Asilomar can be seen as

(2021) traced in detail, the SftP movement played an important role in critiquing Asilomar's liberal approach to scientific governance from different angles, one being the lack of attempts to involve public perspectives into their regulatory efforts. In an open letter to Asilomar, SftP insisted that "decisions at this crossroad of biological research must not be made without public participation" (Science for the People 1981: 49). While this criticism was met with deaf ears at Asilomar, SftP successfully shifted the controversy surrounding rDNA into the public sphere in the context of the 1976 Cambridge debate – a dispute over the establishment of a high-containment facility at Harvard University. After the initial planning steps had taken place behind closed doors, SftP became so vehement in its criticism of this secretive approach that the university first convened a meeting for the campus public to ask questions and voice their concerns. This meeting, or rather the considerable public attention it generated, served as a catalyst for SftP to setting an early precedent for public engagement with science and technology. Only a few weeks later, "Harvard biologists on both sides of the rDNA issue found themselves testifying for hours in front of city officials and a jam-packed audience in Cambridge City Hall" (Botelho 2021: 14).

The example of radical science perspectives and reactions to Asilomar, however, signifies more than an early attempt to move debates about controversial future-oriented scientific decisions from behind closed doors into the public sphere and thus establish a form of accountability of scientists towards society. It also shows how the understanding of participation has evolved from a diagnosis of a mere lack of accountability and transparency towards society into a fundamentally "emancipatory concept" (Renn & Schweizer 2009: 179), where participation is understood as a catalyst for a fundamental change of incumbent power structures. During the Cambridge City Council Hearing of June 23, 1976, Jonathan King, one of the leading biologists at the Massachusetts Institute of Technology and at the time one of the strongest critics of expert-based scientific self-regulation, argued: "Whether you use this pipette or that pipette that is a scientific issue. Whether you go ahead with the research, that is not a scientific issue. Okay. That is a social policy issue. The people here pay the taxes and they bear the risk and they're supposed to reap the benefits. Well, let them decide; let them decide" (Cambridge City Council 1976: 96). With this, King expressed one of the central ideas of radical science thought by emphasizing that there is more at stake in science than testing hypotheses about the laws of nature for their falsifiability, but that science both reveals and is part of inherently social dynamics and power structures. Likewise, he captured the essence of an emancipatory notion

an expression of scientific responsibility towards society, but also as a demonstration of scientific authority and control that prioritized insular expert self-regulation over public regulatory oversight.

of public engagement with science and technology, which in the decades that followed – and in many respects still today – would serve as the basis for advocating for the involvement of publics in decisions about science, technology, and innovation: that publics who are affected by science and technology must also be able to play a role in shaping and governing them.

Of course, the debate around the use of rDNA technology was not the only controversy over science and technology that this time period witnessed, nor was it the only one in the context of which the involvement of members of the public in decisions about the direction of research became an issue. One particularly prominent example that represented a fundamental shift in power relations in science and science policy in the context of controversy was the political activism of the AIDS movement of the 1980s, in particular the political group ACT UP (AIDS Coalition to Unleash Power). ACT UP was founded in New York in 1987 as a grass roots movement with the aim of ending the AIDS pandemic and responding to the institutional failures and the then dominant homophobic practices of national governments in dealing with HIV/AIDS. As Epstein (Epstein 1995; 1996) detailed, ACT UP evolved into an international coalition that advocated for affordable medication and the dignity of those affected by AIDS. Through public protests and media-savvy campaigns, ACT UP pressured policymakers as well as institutions like the US Food and Drug Administration to adopt more flexible regulatory approaches. In particular, ACT UP's emphasized the inclusion of patient experiences and knowledge in decision-making processes, which led to a range of reforms that accelerated clinical trial processes and fundamentally improved the responsiveness of public health institutions to the needs of those affected by AIDS. ACT UP is thus considered an early example of how the participation of non-expert activists in scientific knowledge making can induce profound policy shifts and the alignment of research agendas with socio-political goals.

Like the HIV/AIDS epidemic of the 1980s, other controversies (e.g., questions about the use of nuclear energy or the role of animal experiments in scientific research) too created venues in which science, society and politics – not least as a result of the politicization of these issues through the social movements of the era – collided in a novel kind of confrontation (Nelkin 1971; Jasper & Nelkin 1991). Concurrently, an entire strand of research emerged within the social sciences that explicitly dedicated itself to the study of these controversies: Controversy studies provided a new “unexpectedly informative window” (Jasanoff 2019: 1) for critical social scientists to move beyond scrutinizing the inner scientific negotiation processes involved in establishing what becomes scientific fact, as was the focus of the sociology of scientific knowledge (Bloor 1976; Collins 1981) and instead shift their focus to the broader social and

political struggles over these facts as well as the broader directions and goals of scientific research. The latter focus on the contestations surrounding scientific controversies within societies allowed social scientists to trace scientific knowledge production and its governance as contingent and inherently political processes. This perspective also entailed for social scientists to approach questions of societies' stakes and, related, questions of their involvement in science and technology from an analytical angle (Nelkin 1972). At the same time, the controversy studies of the 1970s and onwards also represent one of the cornerstones for the establishment of science and technology studies as a field.

However, one would be wrong to conclude that these social scientific perspectives on the relationship between society and science would have considered the participation of publics in science and technology purely as a new ontology. Scientific research on science also continued to reflect aspects of an emancipatory understanding of participation, be it through the interconnections between communities of social scientists and activists or through specific normative value judgments through which STS scientists have described the involvement of publics in technoscientific governance as a desirable endeavor. In light of the controversies over science and technology in the 1970s, Latour and Callon⁹ were the first to mobilize the term 'technical democracy' to express their notion of a desirable way of governing science and innovation (Quet 2014). In doing so, they adopted a terminology that makes active reference to democratic values and norms drawn from deliberative democratic theory (Habermas 1995; Bohman & Rehg 1997; Fishkin 2011), thus sketching the ideal of ultimately steering and controlling science and technology through a process of civic deliberation that allows for genuine collaboration between scientists and laypersons. This idea also links closely to pragmatic conceptions of democracy, which situate democracy not as an external condition, but in the situational enactments of everyday life and thus in the collaborative interaction of publics (Dewey 1927). In a 1982 issue of the French bulletin *Pandore*, which was published by the *Centre de Sociologie de l'Innovation* and constituted one of the most important media channels of the early French STS community, Latour concretized STS's normative mission in relation to this ideal: "STS is expected to give the resources to build a technical democracy" (Latour 1982 as cited in Quet 2014: 636).

Within this normative mission, it is precisely the question of the *how* of participation that has driven STS scholars ever since the emergence of radical science thinking and demands for involving publics in science and technology. That said, this question has not been confined to

⁹ Callon et al. (2009) later developed this concept further with reference to their previous exchanges with Latour.

the realms of activists and critical social science, but has likewise – in different and shifting interpretations – taken root in science and technology policymaking through practical enactments of public engagement, which again became the subject of social science inquiry. Accordingly, the aim of the following sub-chapters (2.1.2–2.1.4) is to trace selectively important moments in which participatory thinking and enactments of participation emerged empirically in science and technology policymaking and how emancipatory understandings of participation that question incumbent power structures have (re)surfaced within the STS critique in relation to these empirical manifestations. Doing so will allow me to better understand co-creation as part of this genealogy and simultaneously open up a space for my subsequent exploration of co-creation in relation to the existing STS critique of public engagement.

2.1.2 Public Understanding of Science or Science’s Understanding of the Public?

In the wake of the controversies over science and technology of the 1960s and 1970s, a growing number of scientists from different disciplines outside the radical science movement began to recognize that their own scientific work could not be considered completely detached from the public sphere. Many of them believed that negative public attitudes towards or general disinterest in science had contributed to weakening their influence on policy and curtailing their access to government funding (Gregory & Lock 2008; Yearley 2000). This confronted scientists with a range of unfamiliar challenges in relation to how the public perceived and responded to their work. One predominant response to these challenges has been the attempt to actively manage the relationship between science and society. At the heart of these efforts was a 1985 report published by the British Royal Society¹⁰ entitled ‘The Public Understanding of Science’, which was also the first prominent source to introduce and establish the term public understanding of science. The report rested on the underlying premise that adverse public perceptions of or indifference to scientific advances were due to an “apparent lack of public understanding of scientific principles and knowledge of scientific facts” (Royal Society 1985: 16). On this basis, the report concluded that every citizen should have some form of basic understanding of both science and scientific work. In order to establish this knowledge within the population, the report outlined a series of measures thereby calling various institutions and sectors of public life to account: This included the education system to provide science education that both teaches scientific facts and fosters scientific thinking; the media to cover more scientific content and adopt “a much more positive attitude to the role of science” (Royal

¹⁰ The United Kingdom’s national academy of sciences

Society 1985: 33); the industry to actively contribute to science education; but also the scientific community to cultivate science communication skills and actively engage with society, e.g., through museums or public lectures (Royal Society 1985).

The Royal Society's report met with widespread interest and resonance among policymakers, leading to the institutionalization of a series of measures to advance the public understanding of science, such as a prize for popular science literature, media training programs for scientists, and funding schemes to incentivize social scientists to concentrate their activities on social science research into the public understanding of science (Gregory & Lock 2008; Gregory & Miller 1998). Within these funding schemes, a range of social scientists began to map society's attitudes towards science and its knowledge of scientific issues, e.g., by means of social surveys. Most notably, Durant et al. (1989) published a commentary on two national surveys on the public understanding of science in the United Kingdom and the United States in the multidisciplinary¹¹ science journal *Nature*. The commentary not only addressed that, despite their interest in science, both UK and US publics would lack knowledge about scientific issues, but also that the survey data would suggest "a tendency for better-informed respondents to have a more positive general attitude towards science and scientists" (Durant et al. 1989: 14). These and similar studies were interpreted by the Royal Society and its proponents as support for their claims and as empirical evidence of how the key to easing conflicts between society and science would lie in better public understanding of science and thus improved ways of communicating science to the public (Gregory & Lock 2008; Lewenstein 1992). Hilgartner (1990: 519) characterized this then "culturally-dominant view of the popularization of science" as a two-step model in which scientists would first produce, in idealized terms, 'pure' knowledge, which would then be fed into the public sphere through the work of journalists. He concluded that the dominant view of science communication relied on a highly simplified model that assumed a vertical and fundamentally hierarchical social structure in which all epistemic authority would rest with scientists, journalists would act as uncritical heralds of science, and the public, despite readily absorbing information, would remain passive.

Other social scientists and scholars from STS in particular approached the concept of public understanding of science from a different perspective. Instead of investigating an alleged lack of scientific understanding among the public, they have focused their scientific inquiry on how the relationship between science and society was negotiated, thereby exposing and problematizing dominant assumptions about the social relations between science and society,

¹¹ Albeit an unusual medium for social scientists at the time (Gregory & Lock 2008)

as well as the practices surrounding these assumptions (e.g., Wynne 1992; Michael 1992; Irwin et al. 1996; Lambert & Rose 1996). In particular, these studies have shown how the notion of the public understanding of science that was both propagated by scientists and echoed in politics at the time was based on a deficit construction that assumed an ignorant – in the sense of scientifically illiterate – public. This deficit model of the public understanding of science also implied that scientific knowledge was inherently coherent and would only become prone to conflict, once it was misunderstood and contaminated by ignorant publics (Ziman 1991; Wynne 1991). As a consequence, many social scientists began to distance themselves from such deficit constructions and equally from the – mostly quantitative – social science studies that were employed as alleged empirical grounds for the deficit model (Irwin & Wynne 1996; Wynne 1995). What may have looked like a methodological schism within the social sciences turned out, on closer inspection, to be the result of deeply conflicting normative conceptions of society, science, and their relationality. Accordingly, the public understanding of science emerged as a “contested space in the social studies of science” (Gregory & Lock 2008: 1255).

Within this contested space, researchers from STS contributed to recasting notions around the public understanding of science by reorienting the discourse away from the oversimplifying epistemic models of the original public understanding of science campaign towards exploring the complex social relations between science and society¹². One result of these efforts has been a number of studies that have shown, among other things, how notions of ignorance are actively socially constructed (Stocking & Holstein 1993), and how different forms of knowledge and ignorance can coexist with differentiated perspectives on the role of science and technology in society (Lambert & Rose 1996; Michie et al. 1995). Michael (1992), for example, illustrated how the relationship between science and society tends to unfold through two distinct discourses: Drawing on an interview study on different sources of radioactivity, he demonstrated that individuals may possess nuanced knowledge and opinions about a specific scientific field. At the same time, they may claim to know little about science in general, suggesting that knowing something about science would require knowledge about everything (which is unattainable for anyone, whether scientist or not) (Wynne 1995). As Michael (1992) argues, inquiries into the public understanding of science depend on the cultural meaning attached to the term ‘science’ and thus on how these inquiries conceptualize science, i.e., as an abstract notion (‘science-in-general’) or in concrete contexts and implementations (‘science-in-

¹² This was paralleled by further research and subsequent concessions by quantitative researchers, including the original survey team of the 1989 *Nature* commentary (Durant et al. 1989), that no general conclusions could be drawn about potential correlations between knowledge levels and attitudes towards science (Evans & Durant 1995).

particular’). Mobilizing one or the other not only enables fundamentally different ways of how publics relate to science, thereby provoking different societal responses, but can also contribute to (de)legitimizing specific projects. With such kind of empirical research into the social relationships between science and society, STS scholars have studied the multifaceted and complex ways in which these relations unfold and, in doing so, shown that increasing the public’s knowledge about scientific developments does not necessarily increase public acceptance of these developments. At the same time, they exposed the performativities emerging from the enactments of these relationships and argued that the question of how publics and science interact with each other constitutes an inherently political one.

These insights into the politics and performativities of the then dominant conceptualizations of science-society relations paved the way for STS scholars’ increasingly vigorous critique of the deficit model, in particular of its underlying assumption that public resistance to science could be attributed to a knowledge deficit on the part of the public and could thus be rectified by (more and better) science education. This critique developed on three major levels: Firstly, a number of researchers emphasized how deficit constructions failed to provide meaningful epistemic approaches to the complex relationships between science and society that unfolded within their empirical studies. Instead, the deficit model represented a professional logic that negated the existence of competing knowledge claims through a generic diagnosis of anti-scientific publics without interrogating their often multi-layered perspectives and reasoning (Lock 1999; Wynne 1992).

Secondly and importantly, STS scholars in the face of persistent deficit constructions increasingly foregrounded normative questions about alternative roles for citizens in science and scientific governance. By identifying the need to both rethink the relationships between science and society and to enable ways of enacting these relationships, a new wave of participatory ideals ran through the STS critique of scientific perceptions of the public (Wynne 1991; 1992; Irwin & Wynne 1996; Fischer 1999). These ideals may well be interpreted as a renewal of the emancipatory conceptualizations of active publics within science and scientific governance in the sense of a ‘science for the people’. One of the then early calls for spaces for negotiation between scientists and the public came from Brian Wynne (1991). Based on his empirical work on the interactions between Cumbrian sheep farmers and radiation experts in the aftermath of the Chernobyl nuclear disaster of 1986¹³, Wynne (1992; 2013) argued that

¹³ Wynne’s empirical case study focused on the British county of Cumbria in the late 1980s, whose economic viability at the time was largely shaped by two economic factors: traditional sheep farming and the Sellafield Nuclear Complex, formerly Windscale, which had experienced the worst nuclear accident in pre-Chernobyl

competing knowledge claims, including scientific or expert knowledge, were always socially grounded and relational to evolving social identities. Disagreement was therefore less a matter of public ignorance than of the public's rational considerations of their experiences in relation to scientists and their resulting assessment of the "credibility and trustworthiness of the institutions, which claim to be in charge" (Wynne 2013: 283). Wynne's subsequent call for opportunities for publics to engage with scientists was based on a fundamentally different image of the public, which is no longer conceptualized as an empty vessel that must be filled with allegedly superior scientific knowledge in a top-down process, but rather as legitimate participants with stakes in a discourse on the role and direction of science in democratic societies. This in turn implied a form of interaction between scientists and citizens that allows for mutual attentiveness and reciprocal learning – a form of interaction that would enable both citizens and scientists to enact a "collective exercise of citizenship in a participatory democracy" (Gregory & Lock 2008: 1257).

Thirdly and based on this normative argument for a participatory reorganization of science-society relations to extend democratic activity, many STS scholars have questioned established conceptualizations of expertise as an attribute reserved exclusively for scientists (Wynne 1992; Epstein 1995; Agrawal 1995; Turnbull 1997). Drawing again on Wynne's (1992) analysis of the interactions between Cumbrian sheep farms and radiation experts in the aftermath of the 1986 Chernobyl disaster, it becomes apparent that the experts were not the only ones to possess knowledge. Rather, what emerges from Wynne's account is a form of knowing as experience-based deep understanding of the local context and sheep farming practices that was equally relevant for evaluating radiation risk, yet exclusive to the farmers. Such alternative perspectives on expertise shift away from the specific and institutionally standardized qualifications of individuals but ask instead how expertise is actively constructed, becomes visible in new places and gains recognition. At the same time, they highlight how socially constructed hierarchies between different forms of knowing are not universally valid and that the boundaries between what is considered scientific expertise and what is deemed lay knowledge can in practice turn out fluid.

times in 1957. Wynne examined in particular the period after the 1986 Chernobyl disaster, which prompted a series of interactions between radiation experts and sheep farmers. These interactions were characterized by inconsistent and changing assessments of the situation, ranging from an initial dismissal of the radiation risk by experts and government, to bans on sheep movement and slaughter, to a gradual disclosure of the links between measured radiation levels and both radioactive fallout from Chernobyl *and* the Windscale accident of nearly 30 years earlier (Wynne 1992).

At this point, it is important to emphasize that related critiques of scientific expertise emerged from feminist STS. As Wajcman (2010) pointed out, feminist scholars had long argued that claims to expertise in Western societies are linked to hegemonic notions of masculinity and inherently patriarchal logics (see also Wajcman 1991; Corea et al. 1985; Spallone & Steinberg 1987; Faulkner & Lohan 2004). This monopoly of masculinity over defining what knowledge could mean also entailed the denial of artifacts and ways of knowing that were traditionally associated with women, such as technologies and practices of care, to be considered technology or knowledge at all (Wajcman 2010). Donna Haraway (1988) prominently countered this patriarchal understanding of expertise as hierarchy by offering a different conceptualization that could accommodate provisional, experience-based, non-exclusive, and situational forms of knowing. By mobilizing the concept of situated knowledges, Haraway staged an understanding of expertise that assumes all forms of knowledge, scientific or not, to be based on individual partial perspectives and bound to specific contexts and social processes. Thus, the actual distinction between scientific expertise and lay knowledges lies not in the ability to access truth, but in the socially rehearsed practices of safeguarding the claim to supremacy over truth.

Attending to questions of expertise and knowledge as a socially distributed, highly contextualized phenomenon not only provided an epistemological approach to better understand divergent and competing ways of knowing, as exemplified by many empirical studies of cases in which lay knowledges have challenged the claims of scientific experts (Wynne 1992; Epstein 1995; Agrawal 1995; Turnbull 1997). It also has equipped STS scholars of the time with the argumentative foundation to challenge established notions of reliable expertise, in particular with regard to their role in policymaking. What they called for instead was the appreciation of an empirically grounded notion of expertise, accompanied by participatory ideals as part of STS's vision of how science-society relations could and should be reconfigured. Jasanoff (2003b: 162) has argued that expertise itself has become the "foundation stone on which the functioning of modern democracies has come to rest". Building on this active link between expertise and democracy, scholars have argued that the rights and duties of citizens of democratic states should not be limited to challenging political decisions, but also include challenging the scientific grounds of these decisions. Likewise, for democratic governments, this entailed the explicit mandate to create space for active participation of publics in science and technology governance (Jasanoff 2003b; Nowotny 2003). Stemming from the desire to increase the democratic accountability of science and technology decision-making, this line of reasoning can be interpreted as complementary to previous arguments that have

linked the imperative of participation to citizens' rights to participate in democratic systems as well as their explicit stakes in questions of science and technology governance.

To articulate their demands, STS scholars increasingly engaged in providing normative recommendations, often in the form of policy reports, to governments and policymakers (e.g., Felt et al. 2013; Renn et al. 2019; Rip et al. 2012; Stirling 2015; Stilgoe et al. 2011). In doing so, they not only fed radical science imaginaries of a 'science for the people' from the STS discourse into policymaking, but also foreshadowed one of the central promises of co-creation, namely to enable more legitimate innovation outcomes. At the same time, these demands found growing resonance in policymaking, albeit in many cases – and much in contrast to the STS community's motives for promoting participation – connected to the policy goal of safeguarding the legitimacy of government institutions (Weingart et al. 2021). These developments laid the foundation for a "participatory turn" (Jasanoff 2003a: 235), both in relation to the burgeoning of public engagement formats in practice and STS scholars' ongoing critical reflection on these formats. This first heyday of public engagement with science and technology, along with its social science critique, constitutes the focus of the next section.

2.1.3 From Deficit to Dialogue?

While the increasing calls by STS scholars for involving publics in science, technology, and their governance that had been building up since the 1960s were undoubtedly major drivers of the actual shift towards public engagement that occurred in the US and Europe from the mid-1990s onwards, it would be wrong to assume that scientists and policymakers had 'simply' – i.e., on the basis of STS's empirically well-grounded normative demands – converted into disciples of a radical participatory ideology. It is therefore no surprise that, in many national contexts, the great "participatory turn" (Jasanoff 2003a: 235) was preceded by incidents or outright crises that had less to do with participation than with any such failure of the deficit model of science communication that the question of alternative enactments of science-society relations could no longer be ignored.

Perhaps the most prominently criticized example of such a crisis of science-society relations is the events surrounding the UK's Bovine Spongiform Encephalopathy (BSE, commonly known as 'mad cow disease') outbreak¹⁴: While BSE has been detected in British cattle since the mid-1980s, the UK government announced in 1996 that a new variant of Creutzfeldt-Jakob disease¹⁵

¹⁴ For a more complete discussion of the events, see Jasanoff (1997).

¹⁵ Variant Creutzfeldt-Jakob disease refers to a fatal neurological disease characterized by psychiatric and pain symptoms that may occur over a decade after infection that typically happens through the consumption of contaminated beef (Ironsides 2012).

had been diagnosed and could be linked to its animal equivalent BSE, thus concluding that a transmission of BSE from cattle to humans through the consumption of beef was possible. However, prior to this statement, the British government had repeatedly assured the public that beef was safe to consume, thus implying that animal-to-human transmission was impossible. This reassessment of both scientific evaluation and several years of political action in addressing BSE led to an “unprecedented breakdown in communication” (Jasanoff 1997: 223) between the British public and the government including its scientific expert advisors. According to both a number of STS analyses, which provided detailed empirical analysis of the events surrounding BSE, and policy reports, this breakdown was the result of a series of poor decisions in terms of governmental and scientific handling of risk in the context of uncertainty and contested authority (Jasanoff 1997; Irwin 2001; Hagendijk et al. 2006; Grove-White et al. 1997). What remained of the BSE crisis was a fundamental alienation between the British public, its government, and scientific experts. What also remained, however, was the irrepressible realization that profoundly new ways for citizens, science, and governments to negotiate the values and aspirations entrenched in science and technology and, in doing so, increase the accountability in the negotiations and policies around risk in democratic societies were indeed overdue.

Although the BSE crisis primarily affected the UK, trends towards greater accountability, transparency, and social inclusion, paralleled by governments that were no longer willing to ground their regulatory actions blankly on scientific expertise, spread across large parts of Europe and the USA from the 1990s onwards (Jasanoff 1997). This resulted in a diverse range of experimental deployments of public engagement formats in the context of techno-political controversies like the fiercely debated questions over the role of bioscientific developments such as genetically modified organisms (GMOs) that emerged at the time. Concrete methodological approaches included, for instance, public meetings, deliberative opinion polls, citizens’ juries, consensus conferences, or focus groups¹⁶. A prominent practical case that combined several elements of these methodological approaches is again to be found in the British context, which is interesting not least because it illustrates how the BSE shock reverberated in British science-society relations beyond the controversy itself. Branded as *GM Nation?*¹⁷, the British government conducted a series of exercises between 2002–2003 to facilitate a debate between the public and scientific advisors on the possible commercialization

¹⁶ For a typology and further methodological details, see (Rowe & Frewer 2005).

¹⁷ For a more detailed examination and evaluation of the initiative, see, e.g., Horlick-Jones et al. (2006), Hansen (2010), and Mayer (2003).

of GMOs (The House of Commons 2003). The use of technologies to modify the genome of organisms, for example to increase resistance to harmful environmental influences in crops, had been controversial in the UK on two important levels: On the one hand, the national debate reflected the broader international skepticism about the safety and desirability of GMOs in terms of environmental protection and food safety. On the other hand, a *de facto* moratorium on the commercial cultivation of GM crops, agreed between the UK government and the biotechnology industry, was due to expire in 2004, thus necessitating regulatory action.

With the aftershock of the BSE crisis still lingering, the New Labour administration, also in light of its ‘modernising government programme’ (Blair & Cunningham 1999), sought a fundamentally different approach to science-society relations around the GMO controversy, which would take into account the values and norms of lay publics as much as scientific evidence (The House of Lords 2000; Horlick-Jones et al. 2006; Hansen 2010). In the context of the GMO debate, the UK government translated this novel approach to “draw(ing) the public [...] into the policy making process” (Blair & Cunningham 1999: 19) into a series of participatory exercises¹⁸, including *GM Nation?*, which comprised engagement methods like focus groups, public meetings, and qualitative and quantitative feedback forms. Although STS scholars have described *GM Nation?* as an innovative and for the UK “unprecedented experiment in government-sponsored public engagement” (Horlick-Jones et al. 2006: 266), their evaluations of the initiative identified fundamental shortcomings in terms of representative recruitment of participants from the wider public and transparency in relation to the incorporation of results into policymaking, as well as a general lack of expertise in participatory engagement practices among those in charge of designing and implementing *GM Nation?* (Horlick-Jones et al. 2006; Hansen 2010; Stilgoe et al. 2011).

Importantly, *GM Nation?* represents only one of numerous participatory exercises in one national context that policymakers undertook from the late 1990s onwards in an attempt to open up expert decision-making processes in science and technology to the public. While discussions around techno-scientific controversies drew attention to questions about the role of publics in techno-scientific governance in other (largely European) countries, too, the timescales of institutional transformations varied. For instance, participatory practices were increasingly subject to bureaucratization trends in some of the countries with longer histories of seeking consensus, such as Denmark or The Netherlands (Hagendijk & Irwin 2006; Irwin 2006). Other

¹⁸ *GM Nation?* was preceded by a series of smaller-scale public and stakeholder engagement exercises in the context of GMOs. For a more comprehensive overview and discussion, see, e.g., Stilgoe et al. (2011), and Irwin (2001).

countries like Germany or Italy had long been dominated by technocratic decision-making structures and only began experimenting with state-initiated participatory formats at the time (Gottweis & Braun 2007; Jasanoff 1995). Nevertheless, most European countries experienced an increased emphasis on public participation in techno-scientific decision-making¹⁹ during this period. Therefore, despite being closely intertwined with the specific histories and situated contexts of science-society relations in the UK, the case of *GM Nation?* exemplifies larger shifts in how science-society relations could be conceptualized and enacted. Or, as Sheila Jasanoff (2003a: 238) reflected: “The issue, in other words, is no longer *whether* the public should have a say in technical decisions, but *how* to promote more meaningful interaction among policy-makers, scientific experts, corporate producers, and the public”.

Attending to this question of the politics and performativities of engagement practices, i.e., the *how* of participation, the STS community began to study emergent engagement exercises in different national contexts. In this context, STS research has highlighted, among other things, how the outcomes of participatory exercises are dependent on the ways in which different elements of the engagement process are framed. This concerns, for instance, “(f)orming relationships with sponsors, constituting oversight, structuring process design, choosing focus, partitioning perspectives, engaging stakeholders, recruiting participants, phrasing questions, bounding remits, characterizing alternatives, providing information, selecting the medium of discourse, conducting facilitation, reading the demeanor of practitioners, considering the personalities of protagonists, understanding the dynamics of deliberation, managing dissensus, documenting findings, and articulating with policy” (Stirling 2008: 275). Indeed, these STS engagements provide such an abundance of empirical insights that it would hardly be possible to cover all strands of STS research within the scope of the incomplete chronology of participation I aim to provide herein, let alone do them justice. I therefore concentrate on five specific aspects of the STS problematizations of the time that I consider particularly instructive in light of my subsequent consideration of co-creation. These include: (1) the performativities of engagement exercises, (2) consensus as an ideal, (3) enactments of epistemic authority, and (4) agency over engagement outcomes.

¹⁹ This also reflects in the emergence of a series of international political declarations on the rights and roles of the public, such as the 1998 Aarhus Convention (United Nations Economic Commission for Europe’s Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters) in the field of environmental planning (Soneryd 2016).

(1) Performativities of Engagement Exercises

One central focus of STS research on public engagement lies in the way in which the pre-existing visions and understandings that policymakers have of democracy and the public influence the design of engagement exercises, thereby defining upfront the outcomes that may emerge from these specific designs. Various authors have discussed how public engagement exercises themselves evolve as performative, especially when the results of the exercises feed back into democratic policy- and decision-making processes, or become arguments within these processes (Lezaun & Soneryd 2007; Laurent 2011; Ezrahi 2012; Chilvers & Kearnes 2016; Voß & Amelung 2016; Breuer & Penkler 2024). Laurent (2011: 650) explored this performativity by describing public engagement as technologies of democracy, which organize and structure how democratic life may be enacted publicly, but also embody normative ideals and thus perform specific versions of democracy. Public engagement exercises hence emerge as both “part and parcel of the political choices that define legitimate public problems and acceptable ways to deal with them” (Laurent 2011: 664).

This lens on public engagement also differs substantially from previous approaches that attempted to classify – more or less standardized – concrete types of engagement methods (Rowe & Frewer 2005) or evaluate their respective democratizing capacities (Rowe & Frewer 2000; 2004). Rather, it approaches public engagement exercises as highly situated practices that are simultaneously reflective of, responsive to, and transformative of the context they are embedded in. Voß and Amelung (2016) provide a concrete example of how this mutual shaping of public engagement exercises and the political decision-making processes in which they are embedded unfolds by tracing the evolution of citizen panels²⁰ over four decades. In doing so, the authors demonstrate how the engagement formats themselves generated a kind of “leverage effect” (Voß & Amelung 2016: 763; see also Voß 2016), whereby epistemic authority over the design of participatory methods not only established specific versions of democracy, but also enabled specific versions of political authority.

However, it is not only the pre-established ideas of policymakers about democracy that contribute to the performativity of public engagement exercises. STS scholars have observed similar phenomena with respect to how policymakers pre-conceive ‘the public’, how these imaginaries become translated into those samples of publics that participate in public engagement formats, and how the configurations of these “mini-publics” (Goodin & Dryzek

²⁰ Here: genre of participation formats designed for randomly selected members of the public to stand in as a proxy for society at large and jointly discuss a techno-scientific issue and define further options for action

2006: 220) in turn affect policymaking processes (Goodin & Dryzek 2006; Lezaun & Soneryd 2007; Michael 2009; Braun & Schultz 2010; Felt & Fochler 2010). The premise that society as a whole could be reproduced through smaller collectives presupposes a classification system of society by which a translation between society as a whole and the participatory mini-public becomes possible. These classification systems, which policymakers use in the configuration of mini-publics, can significantly influence the outcomes of engagement processes and, for instance, lead to unintended bias or intended pre-formulations of engagement outcomes. Felt and Fochler (2010: 219) have thus proposed to analyze public engagement exercises as “machineries for making publics”.

One example of bias lies in the demographic categories that policymakers often draw on to achieve representativeness (as a basis for the legitimacy of engagement outcomes) of their mini-publics towards society at large. This abstract notion of representativeness is most commonly translated into practice by drawing on the demographic characteristics of the participating members of the public, such as age, sex, or income, and how these are proportionate to the composition of the wider public (Irwin et al. 2012; Mohr & Raman 2012). Here, STS research has discussed the epistemologies that undergird the categories of demographic data collection and the subsequent application of these categories. For example, Muigai (in Mukharji et al. 2020) has examined how the racist demographic practices of the early 20th century would later reflect within anti-racist policies: In particular, the author traced the lingering policy effects of the census collection of the US state of Virginia in the early 20th century, which introduced a standardization of birth forms and thus changed the practices of recording births. One of the purposes of this standardization was to “make racial identity hypervisible to the state” (Mukharji et al. 2020: 320) by replacing the previously diverse and, from the registrars’ perspective, elicit ways in which (mostly black) midwives described the skin color of newborns (e.g., ‘blond’, ‘light-skinned’, ‘dark’) with binary categories of either ‘white’ or ‘colored’. While these categorizations initially enabled racial policing and thus intentional discriminatory practices, they later became the basis of Virginia’s 1924 Act to Preserve Racial Integrity, using the same categories to restrict what constituted a “valid racial identity [...] by defining blacks as having one-sixteenth or more ‘negro blood’” (Mukharji et al. 2020: 320). As this example illustrates, demographic attributes are not innocent categories, but are highly interpretative, context-dependent, and often themselves a product of existing inequalities, which they tend to stabilize rather than alleviate (Reardon 2007; Sovacool et al. 2020). For public engagement exercises that often rely on these categories in an attempt to increase the representativeness of

mini-publics, this raises questions of who gets to speak for society at large within public engagement formats and, respectively, whose perspectives become excluded.

However, it is not only policymakers' preconceived notions of society at large that shape engagement processes and their outcomes, but also the roles participating members of the public choose to assume and the perspectives from which they choose to speak (Hacking 1986; Felt & Fochler 2010). Based on their analysis of a range of public engagement events on gene technology in Austria, Felt and Fochler (2010) have demonstrated that it is not only the policymakers who construct mini-publics in relation to society at large, but also the participants in engagement formats who position their roles and identities vis-à-vis their notions of the wider public. Hence, because of these entanglements between policy-makers' and participants' preconceived notions of society at large, analyzing public engagement exercises along both the publics they create and their performative effects on policymaking, emerges as more complex than a mere assessment of fixed and distinct categories of social roles and identities. For both cases, however, and much in contrast to the promise of greater societal representation through public engagement, the shrinking of the wider public into a small proxy society may contribute not only to a *de facto* de-valuation of society's role in policymaking (Goven 2006), but may also serve to foreground and stabilize certain perspectives over others. This is particularly the case if substantial reflection about the performativity of engagement practices is lacking.

In addition to unintended biases, the classification systems that policymakers use to construct mini-publics can also serve to deliberately pre-shape the discourses that take place within the engagement exercise and, therefore, the outcomes that may emerge. Here, STS scholars have shown how public engagement is by design often deployed by policymakers in instrumental ways to (re)establish public trust in scientific authority or in the alleged superiority of a predetermined technology in order to circumvent public resistance (Wynne 2006a; Thorpe & Gregory 2010), as a convenient way to elicit public perspectives (Lezaun & Soneryd 2007), or as a means of "decision justification" (Stirling 2006: 102). The latter can refer both to the justification of specific outcomes that policymakers have endorsed *a priori*, or to a means of externalizing responsibility to the public if a decision proves awry in retrospect. Stirling (2008; 2006) in particular has emphasized how public engagement exercises, rather than creating spaces for dialogue, might contribute to closing down policy- or decision-making processes, as they tend to admit only a small subset of predetermined courses of action into the discussion, while other perspectives are prevented from surfacing. In other words, participation exercises are frequently designed to reinforce and solidify policymakers' existing beliefs about preferred

technological outcomes, prompting the question of whether rejecting these technologies is possible at all.

(2) Consensus as an Ideal

A second focus of STS research, which is arguably closely linked to the performativities of engagement processes, has been the extent to which opposing perspectives can be articulated and negotiated in engagement processes. In this respect, two levels of analysis seem particularly relevant. Firstly, STS scholars have emphasized that engagement exercises are predominantly interpreted by policymakers as tightly orchestrated processes with (often carefully assembled) mini publics invited to specific formats. As a result, spontaneous or uninvited forms of participation remain largely unacknowledged and are often not deemed a legitimate or desirable form of public engagement – if at all they are deemed a form of public engagement (Wynne 2007; Cuppen 2018). Such a focus on invitation as the only legitimate route to public engagement denies citizens the ability to act as independent public actors who are able to evaluate themselves the issues that matter to them and in the context of these issues can mobilize to collectively enact knowledge, meaning, and political action (Wynne 2007; Arendt 2003). From this perspective, orchestrated versions of public engagement appear to impose a hierarchical structure on public issues that might otherwise have emerged as bottom-up processes, and as a potentially useful device for policymakers to either avoid such bottom-up effects from the outset, or at least to take the wind out of their sails (Horst 2003). Public engagement may thus not only serve to limit the agency of citizens as public actors to a narrow, predetermined, and intricately orchestrated structure of possible ways of engagement, but also to systematically exclude undesirable, potentially critical perspectives through the process of invitation (Wynne 2007).

Secondly, with the prioritization of invited over spontaneous forms of participation also comes the tendency for many of the circulating versions of public engagement with science and technology to foreground consensus as the implicit normative ideal at their heart, while neglecting the potentially constructive role of dissent (Irwin 2006; Wynne 2007; Horst & Irwin 2010; Cuppen 2018). Drawing on the participatory exercises conducted as part of the British *GM Nation?* initiative of 2002-2003, Irwin (2006) has emphasized how an implicit pursuit of building collective agreement dominates many contemporary forms of scientific governance. Idealizing consensus as a desirable and seemingly achievable objective of public engagement not only assumes a homogenous model of society, where competing perspectives could either be easily reconciled or marginalized. It also relies on certain perspectives constructed by

policymakers as desirable input as well as certain citizens constructed as legitimate participants. Nurtured by the concern that activists, i.e. those with existing views or high stakes in the topic at issue, could subvert the debate, policymakers tend to construct the ideal participant in public engagement as “innocent” (Irwin 2006: 315), and thus an elusive figure who ought free of opinions and interests to be able to participate in the debate without bias.

Drawing on the animal rights controversy of the 1980s and 1990s, Micheal and Birke (1994) provide a particularly detailed example of such a construction of legitimate participants: Based on a series of interviews with scientists who use animal experiments in their research, the authors have demonstrated how these scientists use certain characteristics of individuals to construct a member of the public that they consider ideal for joining them in a discourse on animal experimentation. These characteristics include non-violence, the willingness and ability to rationally assess the role of biomedical research, as well as “authentic emotionality” (Michael & Birke 1994: 91), i.e., emotions grounded in prior experience with animals and taking into account the cultural-historical status of animals. The authors show how these membership criteria create active exclusion mechanisms to disconnect those perceived by the scientists as most vocal in the debate, in particular animal rights activists, from a deliberation of the controversy. Concurrently, this example illustrates how the exclusion of certain publics can become part of an attempt to avoid conflict and thus an orientation towards consensus as an ideal closely linked to notions of deliberation.

On a more general level, especially if one consults wide parts of political philosophy, articulating and negotiating different potentially conflicting perspectives is considered one of the central elements of the political itself and thus also the core of democratic life (Mouffe 1999; Arendt 2003). Hence, if public engagement exercises are designed in such a way that they avoid conflict from the outset, they by design entail the risk of depriving public negotiations of the relationships between science, technology, and society of what is actually political. While it would go beyond the scope of this dissertation to examine in detail the philosophical-theoretical dimension of the invited-uninvited difference²¹, looking at the empirically oriented STS accounts in this regard opens up critical normative questions as to how a prioritization of consensus, enacted through the selection of participants, limits the possible range of participation outcomes and “why consensus should be a better input for policy

²¹ Or to contrast them with theorists such as Habermas (1995), who orient themselves towards ideals of consensus

making than identifying the central areas where authentic disagreement, or even dislocation remain” (Felt & Wynne 2007: 61; Irwin & Michael 2003).

(3) Enactments of Epistemic Authority

A third concern of the STS critique centers on the question of how epistemic authority is enacted in the context of public engagement and thus explicitly builds on earlier critiques of expertise around the deficit model of science communication and the public understanding of science. Although policymakers have explicitly distanced public engagement from the top-down structure of the public understanding of science of the 1980s, which assumes the communication of knowledge by scientific experts to an allegedly ignorant public (Wynne 1991; Hilgartner 1990), various STS authors have observed empirically how participatory formats often continue to reflect an underlying lay-expert divide (Irwin 2006; Lezaun & Soneryd 2007; Parthasarathy 2010). Irwin (2006) in particular has illustrated poignantly how many of the public engagement exercises of the late 1990s and early 2000s exhibit a rhetorical *mélange* that simultaneously feed on the premises of both ‘old’ and ‘new’ scientific governance. This manifested, for example, in policymakers assuring openness to citizens’ input, but at the same time assigning science a privileged role in engagement processes, with the purpose of instilling trust in science rather than truly opening spaces for dialogue. Accordingly, Irwin argues that even within allegedly ‘new’ approaches to scientific governance, policymakers continue to rearticulate a deficit logic, albeit more subtly than in the 1980s, while the “conventional model of ‘best expertise’ remains unchallenged” (Irwin 2006: 306).

In practice, citizens who participate in public engagement exercises often face what Parthasarathy (2010: 355) has termed an “expertise barrier”, meaning that both formal and non-formalized logics within participatory science and technology governance impede participation at eye level for those who do not have technical or scientific expertise in the subject of decision-making. Various authors have pointed to how possible modes of engagement tend to be predefined by stringent boundaries between expert and lay knowledges, the latter of which often becomes de-valued as mere opinion (Levidow 2008). While experts can often maintain their positions, it is the participating members of the public that shift their perspectives (and are expected to do so) in order to reach agreement (Lezaun & Soneryd 2007). This reflects especially in the ways in which public engagement exercises achieve closure, i.e., stabilize certain outcomes in the political process: Arguments that may retain authority within these outcomes are predominantly those that invoke narrow technical evidence, to the detriment of broader social and ethical considerations that tend to be submerged (Irwin 2006; Stirling 2008).

For instance, as Jasanoff (2005: 286) has demonstrated by comparing deliberative practices in the context of GMOs across Germany, Britain, and the United States, deliberation formats tend to be pre-structured around narrow questions that are considered “amendable to expert resolution”, such as regarding potential health risks of GM food. At the same time, questions aimed more generally at the desirability of biotechnologies frequently remain absent from the design of these formats, so that arguments in this direction would fall out of the scope of the formats. As Horst and Irwin (2010) have noted in reference to Jasanoff (2005)’s work, scientific evidence can serve as the boundary between legitimate and illegitimate claims, thus leaving publics the option of either converging towards expert claims or being effectively excluded from deliberation. From this perspective, public engagement emerges not only as geared towards an “innocent” (Irwin 2006: 315) public, but also towards an adaptable one, whereby strong opinions are at risk of being excluded, especially if they are incongruent with the viewpoints of experts. Meanwhile, the epistemological status of the significance of public knowledges remains unresolved (Jasanoff 2003c).

Although most STS scholars identify for public engagement that scientific expertise continues to enjoy a privileged position in terms of both epistemological claims and agency over the outcomes of engagement processes, there are also counterexamples. Most notably, Horst and Irwin (Horst & Irwin 2010) have discussed the Danish notion of *folkelig* (= ‘common’, ‘popular’) democracy and its implications for conceptualizations and enactments of public engagement exercises in Denmark. According to the authors, Denmark’s political culture was historically characterized by an anti-elitist attitude and the deeply entrenched belief that decisions should be reached through broad societal consensus²². Rather than granting scientific expertise unquestioned epistemological authority, scientific hierarchies were considered detached from the realities of the public, along with the belief that the ability to represent society as a whole was vested solely in the lay members of the public (see also Lund & Horst 1999). For public engagement with science and technology in Denmark, this entailed a strong “willingness to question scientific expertise and an explicit tendency to disregard expert advice²³” (Horst & Irwin 2010: 11). From this perspective, the Danish approach adds yet another level of complexity to the issue of expertise in public engagement: Not only is there a

²² It is important to note that many of the then dominant arguments about including diverse forms of knowing may read sourly in the current political context: While the STS perspectives of the time primarily emphasized the legitimation of different knowledges as politically relevant, the focus of contemporary post-truth contexts has shifted to other issues of science-society relations than challenging the hegemony of scientific experts.

²³ It is also against this backdrop that the authors warn against unreflected attempts to transfer the much-praised Danish model of consensus-oriented participation to other contexts (Horst & Irwin 2010).

vacuum with regard to the role that the situated knowledges of members of the public should play in public engagement, but potentially also with regard to the role of traditional scientific or technical expertise.

In the face of the complex and multifaceted questions of who counts as an expert, what counts as expertise, and how expertise should be valued and evaluated, scholars have called for a normative theory of expertise that explicates how different forms of knowing can and should interact in the context of science and technology governance (Collins & Evans 2002). One more concrete approach that could be interpreted as an answer to this call is what Nowotny et al. (2001: 167; Nowotny 2003) have termed “socially robust knowledge”. This notion entails that participatory governance models take into account the relationality of different ways of knowing in their respective contexts and in doing so, actively embrace the perspectives of an extended group of knowers, yet without abandoning the merit of reliable scientific knowledge as part of these assemblages.

With such normative demands for a conversation among different forms of knowing, i.e., one that explicitly includes the local, practice-based knowledges held by citizens, STS scholarship not only draws explicitly on feminist understandings of knowledge as a historically and culturally situated phenomenon (Haraway 1988). They also entail the hope that a broadening of the notion of expertise and conversations between different forms of knowledge might produce synergies and thus be constructive and desirable for society as a whole, including for scientists themselves (Collins & Evans 2007; Nowotny 2003; Neves-Graca 2004). Such substantive reasons for including more diverse bodies of knowledge approach participation less as a resource for more equitable policymaking, but rather as a means to improve the quality of policies through a more robust evidence base, social learning, and the explicit consideration of different values (Coenen et al. 1998; Harremoës et al. 2001; Stirling 2003). More than implicit in this is an argument that again draws on the normative underpinnings of deliberative democratic theory (e.g., Habermas 1995; Fishkin 2011; Cobb 2011): namely, the promise of achieving better outcomes for all through the inclusion of many, thus foreshadowing one key component of the value propositions that co-creation claims to deliver.

(4) Agency over Engagement Outcomes

Closely related to – and to a certain extent drawing on – all previously discussed aspects is a fourth strand of STS research that has investigated questions of power and, respectively, the agencies of participants over the outcomes of public engagement activities. Analytical perspectives on power, as Stirling (Stirling 2006: 97) has pointedly summarized, are “diverse,

ambiguous, complex, and hotly contested”. It would therefore exceed the scope of this incomplete chronology of participation to delineate the numerous strands of theoretical discussion²⁴ on how power operates in different social constellations, relations, and contexts. Within this broad spectrum, STS scholars have explored concrete forms of exercising power and agency in public engagement with science and technology. This analytical focus on power relations in participatory governance did not emerge for the first time alongside the participatory turn, but was already debated at the end of the 1960s, particularly in the context of urban planning. Most notably, Arnstein’s (1969) famous ladder of citizen participation provides a typology of participation based on the degree of influence citizens’ can exert on the participation process and its outcomes. What the STS accounts have in common with these early studies is that they do not consider the mere installation of participatory processes as a successful redistribution of power, but rather question them at the level of their *de facto* enactments. An important difference, or perhaps more an important continuation, lies in the departure from typologies of participation on a scale from good to bad, but rather in the situated reflection on how different agencies are negotiated in public engagement processes, and how they thus reinforce and/or contest incumbent power structures²⁵ (Wynne 2006a; Stirling 2006; Stirling 2008; Chilvers 2010; Thorpe & Gregory 2010; Oudheusden 2011; Stilgoe et al. 2014).

One central aspect of these inquiries has been the temporal choreographies of engagement exercises and how they shape agency over engagement outcomes. Here, the STS community has repeatedly emphasized how policymakers tend to enact participation at specific moments of engagement, where publics are included in the deliberation about emerging technologies; outside of these moments, however, research and policymaking are again conceptualized as acting alone (and in a sense undisturbed), often following a logic of efficiency and plannability

²⁴ For a starting point, I suggest Foucault (1977) and Lukes (1974).

²⁵ Importantly, this research has been supported by a related major strand in STS research, the contemplation of which would go beyond the scope of this incomplete chronology of participation: Since around the 1980s, work on the social construction of technology and, later, material politics has questioned the alleged neutrality of technologies and provided empirical studies to illustrate how the dominance of certain technologies over others is not the result of intrinsically better properties, but one of stakeholder struggles over problem definitions and potential solutions (Winner 1980; Pinch & Bijker 1984; Winner 1993; Marres 2012; M. B. Brown 2015). Technologies thus invariably embody certain values while excluding others. As these values materialize in the form of technologies or infrastructures, they become stabilized “similar to legislative acts or political foundings that establish a framework for public order that will endure over many generations” (Winner 1980: 128). This implies that technologies are highly political in themselves and can entail disadvantageous effects for certain groups, which may be intended (e.g., defensive architecture of public space that limits sleeping spots for the homeless by making them as uncomfortable as possible), but need not necessarily be intended, conscious, or foreseeable. Based on this research, STS scholars have not only argued for “extensive opportunities for citizens to participate in important decisions that affect them” (Sclove 1995: 26), but also advocated the need for value-sensitive design and a design ethics that would align innovation with moral practices (Verbeek 2006; van den Hoven 2013; Jasanoff 2016).

(Felt 2016; Pestre 2008; Macnaghten et al. 2005; Wilsdon & Willis 2004). Such narrow choreographies, on the one hand, significantly limit the possibilities for continuous and iterative learning (Stilgoe et al. 2013). On the other hand, and importantly, several authors have criticized that these moments of engagement tend to become part of techno-scientific governance processes only after important design choices about the technologies at stake have been made. This leads to a *de facto* exclusion of societal perspectives, such that genuine deliberation about and public influence on the direction of research and innovation is effectively impossible already by the time the engagement process has only commenced (Gaskell 2004; Wynne 2006a; Stirling 2006; 2008). In other words, the ability to influence the agendas of engagement processes and to shape their problem definitions emerges as a central determinant of power and agency over the outcomes of these processes.

In light of the broad STS critique of policymakers' attempts to create novel dialogue-oriented venues for society, science, and policymaking to interact that I have reviewed in this chapter, STS scholars have not only drawn the sobering conclusion that public engagement exercises often fail to live up to their promises in terms of both their normative claims to enable more legitimate decision-making and their substantive claims to better, i.e., socially robust policy outcomes. Anew, STS scholars have linked their critique to normative arguments about how genuine and meaningful forms of public involvement in the governance of science, technology, and innovation might evolve. To this end, the STS community has increasingly called for facilitating earlier public engagement and thus opening up research and innovation processes to public input (Nowotny 2003; Wilsdon & Willis 2004).

To describe such types of participation, Wilsdon and Willis (2004: 18) first prominently coined the term "upstream engagement". Critical innovation scholars have later criticized the term 'upstream' for reinforcing conceptions of a linear model of innovation that envisions innovation to flow through a pipeline from basic research to applied research, development, and diffusion, thus neglecting the complexities, iterations, multi-actor contributions, and contingencies inherent in innovation processes (Joly & Kaufmann 2008; Thorpe & Gregory 2010; see also Pfotenhauer & Juhl 2017). The fundamental idea of involving publics earlier and throughout research and innovation processes in order to avoid both a pre-emptive narrowing of innovation and policy outcomes as well as inequities 'by design' had, however, gained firm ground in normative STS imaginations of how a 'science for the people' could be realized in meaningful ways. At the same time, while many of the issues that public engagement raises (e.g., as regards the performativities of engagement exercises, the role of consensus, or the enactments of

epistemic authority) are still open, it is the shift in the moment of engagement that has gained particular momentum in the policy sphere. As I will highlight in the following subsection, this has led to an increasing proliferation of new approaches (or at least terminologies) of participation in the context of science, technology, and innovation from the 2010s onwards, as a part of which I also situate my perspective on co-creation.

2.1.4 Engaging Publics ‘Upstream’: Co-creation and the ‘New Wave’ of Participation

It has been striking to see the rapid official uptake in UK and EU science policy communities of the idea of upstream public engagement, informed by analytical approaches showing how technologies cannot be black-boxed and separated from sets of constitutive social relations (Wynne 2006b: 72).

With these words, Brian Wynne reflected already in 2006, i.e., only two years after Wilsdon and Willis (2004) had introduced the term upstream engagement into the social science discourse on participatory science-society relations, upon how much resonance the idea of embedding public engagement earlier and throughout scientific research and innovation processes had encountered in policy circles. What Wynne referred to concretely here is the *NanoDialogues*²⁶, a series of attempted upstream public engagement activities in nanotechnology in the UK, which were among the earliest efforts to involve members of the public before technological features were locked in or, borrowing Wynne’s words, vanished inside a black box. Despite nanotechnology presumably being the earliest breeding ground for ‘upstream engagement’ (Thorpe & Gregory 2010), the idea subsequently spilled over²⁷ into other fields of emerging science and technology as well as other national contexts (Corner & Pidgeon 2010; Felt & Fochler 2011; Escobar 2014).

With the rapid expansion of upstream engagement came a range of new concepts and terminologies through which policymakers sought to translate the general idea of engaging publics ‘upstream’ into more concrete, tangible, and actionable approaches. One of these

²⁶ The *NanoDialogues* initiative was funded under the UK government’s ScienceWise programme and involved, among other actors, STS scholars in the design of its public engagement activities (Kearnes et al. 2006).

²⁷ In addition to STS scholars’ long-standing advocacy for earlier public engagement, calls for upstream engagement have been echoed by a number of policy and economic scholars who have urged a better alignment of research and innovation with societal needs, thus strengthening the relevance of efforts to engage publics earlier in innovation processes (Mazzucato 2013). Particularly in economic policy circles, these calls for upstream engagement to actively influence the direction of research and innovation represent a revolutionary demand in some sense, as they stand in direct contradiction to market-liberal imperatives for less state intervention (e.g., Hayek 2005). In light of this fundamental change in the envisioned roles of both state actors and publics in innovation, Pfotenhauer and Juhl (2017: 68) have diagnosed a “new *Zeitgeist* in innovation policy”.

concepts²⁸ is co-creation, which has gained particular relevance over the last decade and in the European Union as part of its 8th Framework Programme for Research and Innovation *Horizon 2020* – a terminology that partly runs parallel to existing notions of public engagement, but partly also subsumes them. In the widest sense, co-creation denotes the participation “of diverse actors, such as companies, universities, policymakers, and members of the public, in innovation processes” (Müller et al. 2021a: 2) to achieve mutually beneficial outcomes. Within this broad definition, policymakers have framed various implementation formats as co-creative, including, for instance, living labs, i.e. the in-situ implementation of possible future socio-technological arrangements on a trial basis and in a locally delimited space (Engels et al. 2017; SCALINGS 2018). By drawing on the term ‘co-creation’, policymakers express notions of participation by explicitly employing a terminology originally rooted in the marketing and business literature (Prahalad & Ramaswamy 2000; 2002; 2004a; 2004b). It could therefore be assumed that co-creation was primarily intended to serve economic interests and enable products to become more successful in market terms by incorporating the preferences of future buyers into development and design. However, the use of the term ‘co-creation’ in the European policy context appears distinctly more complex: As policymakers speak of a “‘new wave’ of public engagement where ‘co-creation’ is a key notion” (European Commission 2016a: 29), they extend the envisioned scope of co-creation beyond innovation processes into the governance of science and technology, thus invoking an entire chronology of ideals previously associated with public engagement.

In a sense, co-creation seems to consolidate many of the hopes associated with public engagement by including publics earlier in and throughout innovation processes: This includes genuine agency for these publics, the recognition of society’s stakes in science, technology, and innovation, broader democratic legitimization of innovation, the potential for substantively better policy outcomes, as well as, more generally, better alignment of research and innovation

²⁸ Other concepts include citizen science (Irwin 1995) and Responsible Research and Innovation (RRI) (von Schomberg 2011; 2013; Owen et al. 2012; Stilgoe et al. 2013). What these approaches and co-creation have in common is that they all envision in more concrete terms how an earlier involvement of members of the public throughout research and innovation processes, could be realized: Citizen science, as defined by Irwin (2015: 29-30; 1995) aims at “expanding the possibilities for constructive science society relations”, e.g., in so-called science shops that enable research support for civil society. RRI, in its broadest sense, aims to align research and innovation with societal challenges, which requires, among other dimensions, a broader involvement of societal stakeholders across research and innovation (Owen et al. 2012; von Schomberg 2013; RRI Tools 2024). In practical terms, RRI relies on previous conceptualizations of public engagement such as consensus conferences, whereby RRI explicitly refers to central aspects of the STS critique of public engagement as “factors affecting implementation” (Stilgoe et al. 2013: 1573). Lastly, co-creation serves to describe the participation “of diverse actors, such as companies, universities, policymakers, and members of the public, in innovation processes” (Müller et al. 2021a: 2) and to translate such participation into practical approaches.

with societal challenges (European Commission 2016a; European Economic and Social Committee 2022; European Commission 2020). As a result, co-creation emerges as an alleged response to decades' worth of STS critique of science-society relations and in particular to STS's repeated calls for upstream engagement, while at the same time maintaining its emphasis on economic ideals. The question that remains to be asked is to what extent co-creation can redeem its claim to reconcile economic rationales with a science (and innovation) 'for the people', or, to borrow Alan Irwin's (2006: 316) words, whether these economic and technological objectives, that emerge as even more pronounced for co-creation, continue to sit as "awkwardly with calls for greater engagement", as they did for earlier versions of public engagement.

It is at this point that I depart from my incomplete chronology of participation in favor of a focus on co-creation. 'Departing' may not be the right word, though. Rather, I take advantage of the moment here reached to delve deeper while I ultimately hope to continue this chronology of participation with my work on co-creation by expanding it to include another angle of STS critique. Before I present my analysis, two further aspects warrant consideration, not least to enable a better contextualization of my perspective on co-creation. Firstly, I embark on a brief excursion into the marketing and business literature to explore the origins of co-creation, the ideas and ideals associated with co-creation before the term entered the policymaking sphere, and, following on from this, how critical marketing and business scholars have engaged with co-creation. I do so in subchapter 2.2. Secondly, with subchapter 2.3, I address the as yet limited but growing state of STS research on co-creation.

2.2 Co-create more – win more? Customer Co-option, Marketing Research and the Origins of Co-creation

Co-creation, despite emerging as a novel descriptor for notions of the participation of publics in science, technology, and innovation within the European policy discourse, is not a new term. Rather, with co-creation, policymakers draw on a concept which had been established previously, namely in the marketing and business literature, and accordingly had been associated with specific ideas, concepts, and value propositions. These original notions of co-creation are not automatically erased by switching discursive contexts, but potentially continue to reverberate in the use of the term as an expression for participatory activities at the interface of science, society, policy, and the private sector and may therefore interact discursively with previously existing notions of participation. In order to analyze the discursive uptake of co-creation within the EU as well as its practical translations into local co-creation initiatives that

feed on this interpretation of co-creation, it is essential to first address the ways in which co-creation was originally and largely continues to be understood in marketing and business contexts.

2.2.1 Marketing and Business Perspectives on (Value) Co-creation

The term ‘co-creation’ was first prominently coined by marketing scholars Prahalad and Ramaswamy (2000; 2002; 2004a; 2004b), who proposed through a series of essays a redefinition of value that does not conceptualize value as produced by firms alone, but instead shifts its source to interactions between firms and consumers. Within this shift of the locus of economic value production, the term co-creation denotes that the joint (‘co-’) engagement of firms and consumers in the design and manufacturing of products (‘creation’) generates a form of value that stems from these very interactions. At the center of these interactions lies the exchange and joint provision of resources, such as technological infrastructure, capital, skills, and knowledge, whereby consumers explicitly assume active roles through the development and design of goods and services (Grönroos 2011; Vargo & Lusch 2004). Co-creation in this sense can be summarized as “customer-made”, meaning “the phenomenon of corporations creating goods, services and experiences in close cooperation with experienced and creative consumers, tapping into their intellectual capital, and in exchange giving them a direct say (and rewarding them for) what actually gets produced, manufactured, developed, designed, serviced, or processed” (Trendwatching.com n. d. as cited in Foster 2007: 715).

With this new understanding of the sources of economic value creation, Prahalad and Ramaswamy (2000; 2002; 2004a; 2004b) laid the foundation for a strand of marketing research that has gained vast momentum in the subsequent years and is referred to as value co-creation (Grönroos 2011; Grönroos & Voima 2013; Gummerus 2013; Lusch & Webster 2011; Vargo & Lusch 2008). Various authors adhering to this theoretical tradition have emphasized that value co-creation neither merely relocates the locus of value production nor creates roles for consumers as mere add-ons in development, design, and manufacturing processes. Instead, they argue that co-creation implies a fundamental shift towards a notion of value that is “always uniquely and phenomenologically determined by the beneficiary” (Vargo & Lusch 2008: 9). Accordingly, goods and services may only emerge as valuable through the presence of and utilization by consumers (Vargo & Lusch 2008; Grönroos 2011; Gummerus 2013).

For companies, this means that they cannot create value by themselves, but rather “offer value propositions, that is, configurations of resources, which customers may draw on to co-create value-in-use” (Laamanen & Skålén 2015: 382-383). The theory implies that both producers and

consumers benefit from co-creative interactions. This claim hinges on two major interrelated assumptions: Firstly, involving consumers in development and design processes would enable co-created goods and services to better match consumers' actual needs and preferences, thereby increasing customer satisfaction. Secondly, companies would be able to anticipate more accurately the success (in market terms) of design features and tap into new consumer groups through early cooperation with potential future users. For producers, the resulting broader and more satisfied customer base would improve sales forecasts, potentially increase revenue, and create competitive advantages (Alves et al. 2016; Grönroos 2011; Vargo & Lusch 2008). Hence, co-creation in marketing and business contexts is predominantly understood as an endeavor resulting in mutually beneficial outcomes, the “mantra” of which, as Ramaswamy and Ozkan (2014: 190) put it, is “win more – win more”.

In practical terms, co-creation in business contexts may refer to a range of ways that allow for different degrees of customer involvement in production processes. For example, this can refer to the partial customization of products purchased by individual consumers such as custom printable T-shirts or shoes (Gabriel et al.: 2015). At the same time, co-creation in business contexts may also refer to companies harnessing the collective creativity of multiple consumers to develop a product that cannot be further customized once it has reached market maturity. A prominent example is the development of the new Fiat 500 (Bauer & Gegenhuber 2015; Kleemann et al. 2008), as part of which the public was invited to submit design proposals via a digital concept laboratory. These proposals were subsequently evaluated by a jury and awarded cash prizes, all under the banner of developing a “car for the people, made by the people” (Pattuglia 2011: 37).

The emergence of value co-creation as a new mode of product and service development and correspondingly as a new strand in marketing and business theory did not simply appear out of nowhere, but rather fell into a wider context of increasingly blurred boundaries between production and consumption. Characteristic of this development, and much like value co-creation suggests, was that consumers were no longer conceptualized at the end of the production chain, but could contribute directly through a range of activities, such as the customization of products and services, to production and service delivery processes (Korczynski 2002; Firat & Dholakia 2006; Willmott 2010; Cova et al., 2011). While some authors trace the roots of this development of consumers increasingly involved in production processes back to the Industrial Revolution (Büscher & Igoe 2013), there is broad agreement that it has been the technological and social changes of the last two decades, in particular the

rise of the Web 2.0 and more recently social media, that have significantly accelerated the conflation of production and consumption, providing ample opportunities for consumers to customize products or provide feedback through product rating (Ritzer & Jurgenson 2010; Ritzer et al. 2012; Ritzer 2014; Büscher & Igoe 2013; Fontenelle 2015).

Within the academic debate, this conflation manifested most notably in the emergence of the neologism of the ‘prosumer’ (Toffler 1980) as the first embodiment of consumers’ active engagement in development and production processes, as well as subsequently in other incarnations such as the ‘digital prosumer’ (Ritzer & Jurgenson 2010), the ‘working consumer/customer’ (Cova & Dall’I 2009; Rieder & Voß 2013), or, most recently, the ‘co-creator’ (Ramaswamy & Ozcan 2014). From this perspective, co-creation emerges less as a paradigm shift, as for instance proclaimed by Ramaswamy and Ozkan (2014), but rather ties in with existing analyses of consumer-producer encounters by offering a more concrete terminology and, to a certain extent, a more concrete way of capitalizing on these encounters framed as explicitly desired ‘co-creative’ interactions.

Based on these notions of co-creation in marketing and business contexts, authors from the open innovation literature have adopted the concept and, with a slightly different focus, examined the potential of co-creation in the context of interorganizational knowledge flows and user-driven innovation. This strand of literature has primarily emphasized co-creation’s ability as a means for companies to access external knowledge pools through collaboration in innovation processes (von Hippel 2006; Chesbrough & Schwartz 2007). Collaborations of this kind include, for instance, university-industry collaborations (Hughes 2014), business incubators (Eriksson et al. 2014), or makerspaces (Lensing et al. 2018). From this, so the theory goes, arises the potential to reduce knowledge asymmetries between producers and consumers, thereby unlocking both new sources of innovation and new markets (Chesbrough & Schwartz 2007). In light of the increasingly central role of users in innovation processes, Eric von Hippel (2006: 121) has diagnosed a “democratization of innovation”, which he both perceives as already manifesting and considers to be a desirable trajectory. Democratization in this context refers primarily to the participation of diverse user groups in innovation processes from the perspective of economic value creation and less in relation to normative arguments for the participation of publics in science, technology, and innovation as advanced by STS scholarship with demands for public engagement. As von Hippel (2006; see also Henkel & von Hippel

2005) argues, forms of user-centered innovation²⁹ would enhance social welfare, for example by avoiding biases and through resource-saving effects of products that meet consumer needs in the first place, and should therefore be promoted by governments.

In view of the many recent innovation initiatives that frame themselves as co-creative, one could speak of a heyday that co-creation is currently experiencing both conceptually and in marketing and business practice. What follows from this proliferation of co-creation initiatives is an equally manifold proliferation of promises attributed to co-creation, ranging from unlocking new sources of knowledge and innovation, to empowering consumers, enabling mutually beneficial outcomes for firms and their customers, to a democratization of innovation processes and outcomes. Reflecting the resounding success of the concept, some authors have declared the arrival of a “co-creation paradigm” (Ramaswamy & Ozcan 2014: 280). Likewise and in a similarly positive fashion, others have dubbed co-creation a “magic concept” (Pappers et al. 2020: 12; Voorberg et al. 2015: 1334) or a “panacea” (Lystbæk et al. 2019: 4) that would be applicable to all sorts of problems and contexts.

2.2.2 Critical Marketing and Business Perspectives on Co-creation

While these promissory elements continue to resonate widely across marketing and business contexts, critical marketing and business scholars have analyzed both the discursive value propositions of co-creation and its practical implications for the relationships between the private sector and publics through empirical case studies. Two aspects of their critique appear particularly instructive for now: Firstly, several authors have questioned the all too positive framing of co-creation as an allegedly mutually and equally beneficial activity for both producers and consumers (Cova et al. 2015; Laamanen & Skålén 2015). While the marketing literature promotes co-creation as a form of consumer empowerment (Sassatelli 2007), there is widespread agreement among critics that co-creation is in fact based on an asymmetrical relationship between producers and consumers, which both rests on and actively reinforces extreme power imbalances in favor of producers (Tesfaye & Fougère 2022; Bauer & Gegenhuber 2015; Zwick et al. 2008). From this perspective, co-creation emerges as a form of “free labor” that is “simultaneously voluntarily given and unwaged, enjoyed and, perhaps, exploited” (Terranova 2004: 74; Cova et al. 2011; Cova et al. 2015). This potential for exploitation in the name of economic value co-creation is based on consumers generally not being paid for the time, skills, knowledges, and efforts they invest in development and design

²⁹ Von Hippel (2006) does not explicitly use the term ‘co-creation’, but writes about collaborative and user-centered innovation in a way that allows parallels to be drawn with conceptualizations of co-creation that emerged in the open innovation literature around the same time.

processes and thus *de facto* in the revenue of companies. At the same time, consumers themselves usually pay a higher price for co-created products (i.e., the fruits of their own labor) compared to standardized commodities (Humphreys & Grayson 2008; Bonsu & Darmody 2008; Gabriel et al. 2015). As consumers increasingly devote their personal resources to private sector activity, several authors argue how co-creation is not only a symptom of already porous boundaries between production and consumption, but contributes actively to a further blurring of these boundaries and an erosion of private life (Fontenelle 2015; Cova et al. 2011; Rieder & Voß 2010; Zwick et al. 2008).

Secondly, and closely related, some scholars describe co-creation as a capitalist ordering principle that regulates consumer behavior in such a way that it corresponds to market-liberal rationality (Zwick et al. 2008; Zwick & Cayla 2011; Bookman & Martens 2013). Zwick et al. (2008) explicitly reference co-creation as an emerging version of governmentality in a Foucauldian (Foucault 1991) sense, whereby consumers are rendered governable subjects by framing them as market agents. Rather than through the use of coercion and overt control, co-creation operates through imperatives of empowerment to innovate and tinker freely, while ideally never gaining the impression of performing work (Shankar et al. 2006). Rather, the form of control that producers exert on consumers through co-creation is based on “ambiences that program consumer freedom to evolve in ways that permit the harnessing of consumers’ newly liberated, productive capabilities” (Zwick et al. 2008: 165).

With the notion of freedom and empowerment that emerges for co-creation from this perspective, the conventional meanings of the terms ‘freedom’ and ‘empowerment’ take on a paradoxical twist: While freedom remains the intended emotion experienced by consumers and empowerment becomes co-creation’s discursive figurehead, consumers ultimately evolve into self-disciplined participants “in the capitalist project [...] through their own exploitation” (Cova et al. 2011: 236). As Tesfaye and Fougère (2022) discuss for the example of frugal innovation, these effects of co-creation as a capitalist ordering principle may also contribute to reinforcing the inequalities experienced by already disadvantaged communities. Frugal innovations refer to forms of innovation that are developed in and for contexts of scarce resources and are therefore oriented towards simple, affordable, good-enough products (Zeschky et al. 2014). In this context, co-creation as a mode of doing innovation *with* the poor has enabled frugal innovation to be located at the heart of poor communities. The authors (Tefaye & Fougère 2022) argue that co-creation functions as a hegemonic logic whose exploitative effects become amplified in disadvantaged communities, for example when companies use co-creative projects to distract

from social or environmental scandals and thus to restore corporate legitimacy. Concurrently, any monetary returns tend to benefit companies alone, while the majority of local publics remain, at best, passive extras in the staging of a corporate success story. To illustrate their argument, Tesfaye and Fougère (2022; see also Nari Kahle et al. 2013) draw on the example of *ColaLife*, a social business aimed at combating child mortality in poor communities. To this end, the business introduced a co-created frugal innovation, an *AidPod*, which contained important nutritional supplements (e.g., vitamins, minerals, water purification tablets) and was designed to fit exactly into beverage crates between Coke bottles, thus enabling delivery to remote communities via *Coca Cola's* distribution channels. The authors criticize that the *Coca-Cola Company*, which is ostracized especially in many of these poor communities for the negative health effects of its production facilities on local populations, has deliberately seized on the scaling-up of *ColaLife* to improve its reputation while at the same time underpinning its market supremacy. Such exploitative effects are frequently exacerbated, as governments seize the presence of co-creative frugal innovation projects as an opportunity to cut welfare benefits. As a result and contrary to its promise of mutually beneficial outcomes, co-creation may contribute to a *de facto* deterioration of living conditions for poor communities (Tesfaye & Fougère 2022; Varman et al. 2012).

On a more abstract level, these critiques indicate that many of the effects of co-creation in marketing and business contexts appear to be in strong tension with the normative aspects of public engagement that STS scholars have argued for over the decades. This pertains in particular to the ubiquitous dominance of market rationales as the benchmark for measuring success as well as the effects of power imbalances that ultimately place members of the public (here in their specific role as consumers) in the service of creating economic value in that they may only choose from a limited set of predetermined specifications (here less about policies than about goods and services) all under the guise of empowerment. So if co-creation is now to include broader notions of participation, the question arises as to what extent the problematizations that critical marketing scholars have highlighted for co-creation continue to apply in the context of co-creation's new incarnations in discourse and practice. To this end, the few STS accounts of co-creation that exist to date afford valuable insights and starting points, which I will review in the following sub-chapter.

2.3 On the Highest Rungs of Arnstein's Ladder? STS Engagements with Co-creation

The novelty of co-creation has allowed it to become a 'magical concept' (Pollitt & Hupe 2011) that has a broad range of meanings and carries a positive normative charge. [...] Rather than being a new method or approach, we suggest that co-creation can be defined as a form of public participation in which creative methods are used, innovation is emphasised, and which is situated on the highest rungs of Arnstein's (Arnstein 1969) ladder of participation (Pappers et al. 2020: 12).

From this conclusion, which Pappers et al. (2020) have drawn about the significance of co-creation for transport and mobility, emerges one essential observation: namely, that co-creation in its recasting as a notion of participatory engagement no longer seems to be limited to its economic value propositions, but instead pledges to fulfill the long-cherished desire for meaningful participation of publics in science, technology, and innovation. This becomes particularly evident in the authors' reference to Arnstein's famous ladder of citizen participation, which proposed a classification system for engagement exercises in urban planning according to power relations between citizens and planners as early as the 1960s (Arnstein 1969). Placing co-creation at the highest rungs, i.e., assuming that citizens may exert control over the planning process and its outcomes, not only rewrites co-creation as any form of participation. Rather, placing it at the top rungs implies that co-creation would represent a normatively desirable version of participation and, potentially, a response to the decades of STS critique of public engagement, which has long argued for meaningful forms of participation that allow for members of the public to assume actual agency within these formats (Wynne 2006a; Stirling 2006; 2008; Stilgoe et al. 2014). Such overly optimistic readings of co-creation as part of an allegedly "new spirit of participation" (Palmer et al. 2019: 247) contrast strongly with observations that have emphasized how co-creation in public sector contexts lacks a shared definition, thus allowing for a variety of objectives, practices, and outcomes to be framed as co-creative³⁰ (Voorberg et al. 2015). Hence, questions arise as to which extent co-creation might actually be able to contribute to a reorientation of innovation practices towards broader societal needs, or whether it is in fact other values that co-creation seeks to establish.

³⁰ In some disciplinary contexts, for example in public management or urban studies, co-creation is frequently understood as related to or even synonymous with co-production (Voorberg et al. 2015; Lee et al. 2024). It is important to note that this notion of co-production is quite distinct from the dominant STS understanding of co-production, where co-production refers to the ways in which "scientific knowledge both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments, and institutions – in short all the building blocks of what we term the social" (Jasanoff 2004: 3).

To address these questions, STS scholars have increasingly turned to the concept and begun to examine the social and political aspects related to co-creation. Two broad types of analysis can be distinguished, which also constitute an important framework and starting point for my analysis: The first looks at the conceptual dimensions of co-creation, i.e., the discursive uptake of the concept in science and technology policymaking, and so questions the nature of co-creation as a form of participation, including how co-creation relates to previous notions of public engagement. The second is dedicated to practical implementations of co-creation and draws on a diverse range of case studies to elucidate how local actors design and implement co-creation practices, as well as the resulting effects. In what follows, I first turn to STS accounts of the co-creation discourse (2.3.1) and subsequently summarize a selection of empirical STS accounts of co-creation in practice that I consider particularly instructive for my analysis (2.3.2).

2.3.1 Between Socially Robust Innovation and Economic Production: Conceptual Dimensions of Co-creation

The growing importance of co-creation as a participatory concept in the development and governance of science, technology, and innovation, as it has been actively promoted by the European Union³¹ (European Commission 2016a), is consistent with recent observations from STS that have addressed the uptake of co-creation and its associated underpinnings. This becomes particularly evident from a study by Elkjær et al. (2021), who investigated circulating understandings of co-creation in the international scientific literature on wind energy development through an explorative systematic review. The authors identify three essential readings of co-creation: The first understands co-creation as a way of thinking about the complex entanglements of knowledge, values, and artefacts in socio-technological environments, with co-creation taking place continuously and unintentionally. Secondly, co-creation can also be understood as a mode of innovating in socio-technological systems, or as an analytical tool for understanding such processes retrospectively. Here, co-creation takes place through the collaboration of various actors involved in concrete projects, as is the case with local renewable energy communities. The third and by far most widespread notion frames co-creation as a participatory governance device, whereby co-creation is understood as an organizational mechanism for social relations in the implementation of concrete innovation projects. From this perspective, co-creation is often linked to promissory elements such as enabling substantively better socio-technological outcomes, enhancing the legitimacy of these

³¹ As well as taken up by many national governments (e.g., Bundesministerium für Bildung und Forschung 2021; Mergel 2020; Creative Ireland 2024; Open Government Partnership 2022)

outcomes, and, more generally, providing a more socially just way of approaching innovation and innovation governance. Furthermore, the authors observe that the literature suggests new roles for citizens in innovation governance, pertaining in particular to the involvement of citizens in design processes “from the bottom up” (Elkjær et al. 2021: 8), rather than limiting their input to the agenda setting phase. Looking beyond the wind energy context, several authors share this largely optimistic attitude towards co-creation as an emerging mode of participation that Elkjær et al. (2021) have diagnosed for their analytical sample. In particular, these authors have emphasized the potential of co-creation to shape science, technology, and innovation agendas based on socially shared explorations of desirable futures (Gudowsky & Peissl 2016), to promote social cohesion through collaboration (Torfing et al. 2019), to empower citizens through “participative leadership” (Ryszawska et al. 2021: 8) roles in their local communities, or more generally to enable “fair and equitable” (Robinson et al. 2021: 5) forms of innovating.

Other authors advocate a more cautious outlook on co-creation. Herberg (Herberg 2021), for example, has discussed co-creation as an open concept that could both respond to pragmatic conceptions of democracy and drift into post-democratic tendencies that contribute to an erosion of democracy in the name of participation. With both readings, Herberg establishes an explicit link between co-creation and democracy. In the first optimistic reading, co-creation emerges as a tangible enactment of democratic participation by citizens at the interface between society on the one hand and science, technology, and innovation on the other. Co-creation, so the line of reasoning, may contribute to shaping governance processes towards greater inclusivity and could therefore be regarded as a means to democratize science, technology, and innovation governance. This is countered by Herberg’s second, less optimistic reading of co-creation as a mechanism that may contribute to the creeping erosion of democracy by putting a dark twist on co-creation’s promise of inclusivity. From this perspective, co-creation may entail that the representation of publics does not reflect social diversity or affected publics overall, that decision-making power is appropriated by those entrusted with facilitating co-creation, or that co-creation serves primarily to create legitimacy while mechanisms of accountability and transparency are lacking. In view of this tension of co-creation as potentially enhancing or eroding democratic life, Herberg concludes that “the jury is still undecided on the political value of co-creation” (Herberg 2021: 33). This question of the alleged democratization potential of co-creation has also been addressed by Maja Horst (2021) in a recent essay: Co-creation, according to Horst, presupposes the coming together of actors with different, potentially conflicting interests and that these interests can be expressed freely in the co-creation process. With this form of welcoming and valuing diverse interests, co-creation differs significantly

from public engagement, for which several authors have criticized that participants are expected to abandon their perspectives in the interest of consensus (Irwin 2006; Horst & Irwin 2010). At the same time, she notes that co-creation tends to reinforce the perspectives of particularly active and assertive participants, while those unwilling or unable to participate remain excluded from the innovation process in which co-creation is applied. Co-creation alone therefore neither contributes to more equitable forms of participation nor does it enhance participation *per se*. Horst offers a pragmatic answer to questions surrounding the relationship between co-creation and participatory democracy: “the process of co-creation is [...] only as democratic as the participants are able to make it” (Horst 2021: 1).

In light of the EU innovation policy discourse taking up co-creative terminology so eagerly, thus making the EU an important discursive site for studying co-creation, a small but growing number of authors have focused explicitly on co-creation at supranational, i.e. the EU policy level. Macq et al. (2020) have analyzed the development of articulations of public participation in the European Commission’s research and innovation policies (1998–2019). In their study, they demonstrate how these perceptions have changed over time and categorize these temporal shifts by distinguishing three phases: The first phase (2000–2010) was characterized by policymakers conceiving participation primarily as a deliberative activity. The second phase (2010–2014), which the authors describe as a transitional phase, placed participation increasingly in the context of Responsible Research and Innovation. This shift, which would become more pronounced in the subsequent third phase, entailed a growing importance of rhetorical formations around user-led innovation, which, so the authors, opened the door for a reframing of notions of participation towards an innovation activity rather than a contribution to research and technology policy. Accordingly, since 2014, the authors observe for the EU that notions of participation have increasingly developed towards production logics, whereby participation is constructed as an enabler of creating marketable products within the European knowledge and innovation economy. At the center of this third phase stands co-creation as an emerging key mechanism for involving members of the public in innovation processes. This focus on co-creation also entails, so the authors note, that members of the public become primarily constructed through their role as “consumers and potential co-creators of science, technology, and innovation, rather than potential contributors to debates about how to govern them” (Macq et al. 2020: 509). With their analysis, Macq et al. (2020) provide important accounts of the broader context in which co-creation is embedded as part of EU research and innovation policies. From their observation that co-creation appears as an integral part of a discursive trajectory that understands participation primarily as production, follows the need

for in-depth exploration into the emergence of co-creation, including its value propositions and discursive effects.

Few studies to date seem to have addressed this gap and, if so, only partially and with a slightly different focus. Most notably and for the context of social innovation³², Broekema et al. (2021) have studied co-creation as an emerging category in the EU's social innovation discourse over roughly the same investigation period as Macq et al. (2020). Based on an analysis of European policy-related documents by means of a combination of quantitative and contextual analysis, the authors have interrogated both the interrelations between the two concepts and their underlying assumptions. On the one hand, the study emphasizes that both concepts have different contextual roots: While social innovation emerged as a multidimensional concept that initially denoted the transformation of social relations and only later became linked with themes of austerity and economic growth (see also Moulaert & MacCallum 2019), co-creation was initially understood as a mode of involving end-users in innovation processes and, in turn, only later became associated with questions of value and impact. On the other hand, and in spite of these different backgrounds, both concepts are increasingly used in relation to each other, with co-creation primarily portrayed as an indicator for successful social innovation processes – a development that has gained momentum, especially in the wake of Horizon 2020. This leads Broekema et al. (2021) to conclude that co-creation and social innovation can be considered part of the same policy paradigm, resulting in the *raison d'être* of both concepts being subject to ever less scrutiny. Particularly the increasing “self-eviden[ce]” (Broekema et al. 2021: 2) of co-creation and social innovation in EU research and innovation policy rationales, so their call, warrants both a deeper analysis of the concepts with respect to their significance in policymaking and a critical examination of their practical manifestations.

Notwithstanding these few but all the more important reviews, there is to date a comparatively scarce number of STS analyses that address the discursive formations around and discursive effects of co-creation, both in general and specifically in the context of EU and national research and innovation policies. While the studies I have reviewed up until this point reveal valuable avenues for addressing these questions, what remains to be explored is how the discursive landscape around co-creation unfolds, the value propositions that become attached to co-creation, its discursive effects, and how emerging notions of co-creation relate to previous STS

³² In its broadest sense, social innovation means “significant changes in the way society evolves, how its structures are modified [and] its ethical norms revisited” (Moulaert et al. 2013: 13) and is often associated with promises to strengthen social relations, reduce inequalities and improve well-being. Several authors have noted that the meanings attached to the concept are of a similarly ambiguous variety as for co-creation. For a deeper consideration of social innovation, see Moulaert et al. (2013) and Jessop et al. (2013).

accounts of public engagement with science, technology, and innovation as part of a larger participatory trajectory within the EU. These questions represent the starting point for the first article of my dissertation (Ruess et al. 2023).

2.3.2 Participation In and Throughout Innovation Processes? Empirical Accounts of Co-creating

The recent proliferation of co-creation in policy circles, however, is not limited to its discursive dimension, such as when the EU envisions science-society relations as co-creative interactions, but is also increasingly translated into concrete, predominantly (but not exclusively) local co-creative initiatives. A growing number of scholars from different fields, such as administrative science, planning, and STS, have addressed these enactments of co-creation as a form of participation of publics in science, technology, and innovation in different contexts. These include, for instance, healthcare (Felt et al. 2023; Jo & Nabatchi 2018; Mangai et al. 2018), education (Nyborg et al. 2023; Brand & Rolland 2018; Aquino & Sorrentino 2018), environmental governance (Ranzato 2018; Mees 2018), public safety (Williams et al. 2018; Van Eijk et al. 2018), or urban development (Cuevas-Garcia et al. 2023; Clausen et al. 2021; Leino & Puumala 2021; Delvenne & Macq 2020; Engels et al. 2019; McMullin 2018). The situations in which co-creation is practiced exhibit an enormous diversity and, to name just two examples, range from the collaborative development of a European health data platform (Felt et al. 2023) to the community-based planning of a public sauna (Leino & Puumala 2021).

For these enactments of co-creation, STS research has identified tensions in how co-creation becomes translated into practice at different points in the co-creation process, which can be divided roughly into 3 major strands of inquiry: (1) The first addresses the effects of co-creation on governance processes more broadly. (2) The second focuses on emergent roles and agencies for participating members of the public. (3) The third and closely related strand examines the outcomes of co-creation processes and the wider circumstances that contribute to shaping these outcomes. For now, I consider the following selection of case studies to be particularly instructive illustrations of these areas of tension.

(1) Firstly, a number of scholars have considered co-creation in the broader context of democratic structures and processes exploring how co-creation is embedded in and might contribute to a re-shaping of these structures. A central observation, which also reflects the results of recent discourse-analytical considerations of co-creation as an emergent form of participation (Macq et al. 2020), is that co-creation practices tend to be dominated by capitalist rationales (Cardullo & Kitchin 2019). These tendencies manifest for example in new actor

constellations like public-private partnerships that establish new avenues for feeding corporate interests into governance processes (Kitchin 2014). Some authors have observed that co-creation exercises tend to frame the problems they are designed to address as market demand and in doing so reconcile public issues with corporate interests.

In a similar fashion, these exercises tend to approach citizens as entrepreneurs expected to embrace overarching goals of promoting economic growth (Laurent 2019; Delvenne & Macq 2020). Delvenne and Macq (2020) have addressed this shift towards economic rationales through co-creative participation in more detail in their study of three participatory experiments, which included a hackathon in the Belgian region of Wallonia that encouraged participants to co-create digital solutions to facilitate citizens' quotidian lives in a competitive set up over the course of 48 hours. Such formats, so they note, tend to conceptualize co-creation as an intensive set-up that treats time as a scarce resource. For the hackathon, this meant that participation itself was compressed into 48 hours, with the effect that participants only slept four hours per night on the floor, all in the name of creativity and pushing their projects forward. While such formats are designed to minimize the time devoted to participatory activities and open deliberation, they also seek to maximize the value they extract from their participants. From this, the authors conclude that co-creation is linked to a "relative abandonment of concerns related to democratization" (Delvenne & Macq 2020: 18) and a redefinition of what is considered the public good in entrepreneurial terms. With conflicts and divergent perspectives increasingly tamed by the relocation of engagement practices into highly confined and controlled experimental spaces, thus depriving science-society-policy relations of their political essence, Delvenne and Macq (2020: 20) postulate that we have "'broken bad' with the participatory turn as originally envisaged by STS scholarship at the turn of the millennium". Particularly in light of the increasing proliferation of co-creative formats, this raises questions as to how these economically rationalized formats affect broader governance processes and potentially contribute to their re-shaping following economic ordering principles (Laurent 2019; Laurent 2016).

Similar tendencies emerge for the increasing proliferation of so-called living labs, test beds or real-life laboratories, which are intended to enable the testing of new socio-technological arrangements under real-life conditions, yet in spatially and temporarily confined settings. As Lezaun et al. (2017: 196-197) have argued, these formats tend to reframe participation through a new vocabulary of "experimental practice" and as such, they often involve co-creative interactions between local administrations, corporate actors, and residents. Several authors have

problematized these forms of actor constellations by pointing out how they often fail to ensure that citizens provide their informed consent to become part of the experimental setting, how opt-out possibilities commonly are absent, and how mechanisms of democratic accountability and control are lacking (Engels et al. 2019; Engels et al. 2017; Stilgoe 2017). In a comparative analysis of two German energy living labs, Engels et al. (2019) have recently challenged conventional notions of co-creative living labs as an instrument to test innovation and have suggested that it might rather be society's readiness for specific socio-technological arrangements that is being put to the test. This raises questions about on whose behalf and with which objectives innovation is pursued through co-creative practices, as well as who benefits and who might ultimately find themselves on the losing end of co-creation. The authors also identify for co-creative living labs to conceptualize the prototypical socio-technological arrangements they create "as the template for a scalable transformation by way of expanding the area outward (e.g., in the case of autonomous driving) or best practice transfer to other sites (e.g., smart cities)" (Engels et al. 2019: 3). Such visions about the scalability of co-created outcomes are based on the assumption of generating future added value and can thus be considered part of a broader pattern of economic reasoning that increasingly pervades governance processes (Pfotenhauer et al. 2021). At the same time, a number of authors have emphasized that abstract notions of scalability are in tension with the deeply situated local practices, actor constellations, and contexts in which co-creation is embedded (Pfotenhauer et al. 2021; Engels et al. 2019; Cuevas-Garcia et al. 2023). For local enactments of co-creation, this raises questions about how broader innovation rationales become embedded in local practices and how these practices are in turn shaped by assumptions around their scalability.

The gradual shift of the locus of participation from deliberation and decision-making towards specific enactments of innovation-making stands in stark contrast to STS scholars' earlier visions of public engagement, emphasizing how an unquestioned dominance of the "assumption[] that the primary meaning of science is commercial private exploitation" (Wynne 2006a: 219) is at odds with meaningful dialogical public engagement with science and technology (Pestre 2008; Joly & Kaufmann 2008; Irwin 2006). Instead of presenting a counter model to predominant economic rationales, policymakers have begun to adapt participatory exercises in ways that no longer contradict, but rather promote, overarching entrepreneurial and business goals (Thorpe & Gregory 2010; Delvenne & Macq 2020). This also ties in with broader STS observations at the interface of innovation and policymaking. For example, Laurent (2017) demonstrates through the development of nanotechnology in Europe and the USA how negotiation spaces of private and public actors, including infrastructures for engaging publics,

tend to be designed to serve primarily economic interests, thereby subordinating both public interests and the public good to market-liberal and technocratic ideals. Concomitantly, Pfothner et al. (2019) describe how policymakers tend to frame policy issues in a way that renders them workable through innovation. In doing so, the authors diagnose a new type of deficit model, which portrays a lack of innovation as the central obstacle to social progress and society's ability to address the grand challenges³³ like climate action or the sustainable energy transition. Within this broad imperative for innovation, notions of co-creation as participation seem to assume the role of a "social fix" (Frahm et al. 2021: 174) whenever innovation alone fails to resolve its designated challenges.

(2) Secondly, a number of scholars have explored the emergent roles of members of the public in co-creation. Co-creative innovation projects tend to address publics in ambivalent ways, conceptualizing them both as active participants who may contribute specific and valuable knowledges, but also as test subjects and thus estimators of the prospective market success of innovations (Engels et al. 2019). These conceptualizations in turn influence the agencies of publics, i.e. the extent to which citizens can actually influence the process and results of co-creation. Depending on how co-creation projects frame their co-creators, these agencies range on a spectrum between more or less potential influence on the process and thus on the co-created outcomes (Lipp et al. 2023; Cuevas-Garcia & O'Donovan 2022).

However, the ways in which co-creation practitioners conceptualize the agencies of participating members of the public may differ from the actual roles that participants assume in practice. One important study in this regard comes from Leino and Puumala (2021), who investigated the development of three co-creation projects in the southern Finnish City of Tampere (2014-2019). One of these initiatives focused on young adults with migration backgrounds, who were invited to develop ideas and projects for more inclusive urban environments in a co-creative process. This process consisted of a series of workshops over the course of a year and resulted in the appointment of societal mentors to facilitate integration and an interactive map highlighting the inclusive and exclusionary areas in the city. Through this example, the authors discuss that access to co-creation can be particularly problematic for publics in disadvantaged or vulnerable situations. Within the co-creation process, the authors

³³ As part of Horizon 2020, the EU has identified seven grand challenges: Health, demographic change and wellbeing; food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy; secure, clean and efficient energy; smart, green and integrated transport; climate action, environment, resource efficiency and raw materials; Europe in a changing world – inclusive, innovative and reflective societies; secure societies – protecting freedom and security of Europe and its citizens (European Commission 2024).

repeatedly encountered power imbalances between participants and practitioners, which were reflected in the participants concerned about not having “anything relevant to share or their voices being valued” (Leino & Puumala 2021: 793). Based on this experience, the authors point out that true inclusion cannot be achieved solely by creating access options for target participants, here young adults with migration backgrounds, to take part in co-creation, but requires a sustained effort to create an environment in which they can openly address issues of social justice during and beyond the co-creation process.

Some authors have also pointed out that even within the same co-creation project, not all members of the public necessarily enjoy equal degrees of agency, with their scope of agency depending on the extent to which their perspectives and interests match the pre-established ideas of involved technology developers and policymakers about what a desirable outcome might resemble (Clausen et al. 2021; Nyborg & Røpke 2013). Nyborg and Røpke (2013) have addressed these entanglements between citizens’ agencies, practitioners’ pre-existing imaginaries, and eventual co-creation outcomes using the example of a Danish smart grid initiative that was designed to test a smart grid prototype to manage the electricity demand of home appliances, electric cars, and heat pumps under consumer involvement. During the project, one specific group of participants was repeatedly foregrounded by the energy company that led the project and, e.g., in external communication, mobilized as a strategic argument for positioning smart grid technologies as desirable futures: those consumers who were interested in actively managing the energy demand of their households in the first place. Nyborg and Røpke refer to these actors, whose interests correspond to the technological agenda of the system builders, as “aligned user[s]” (Nyborg & Røpke 2013: 668), and note that co-creation tends to amplify these voices, while sidelining divergent perspectives. In this respect, the question arises whether those members of the public who bring divergent perspectives to the table may contribute to the co-creation process at all. At the same time, one might wonder to what extent the pre-established agendas of co-creation practitioners predetermine the process and outcomes of co-creative innovation initiatives.

(3) Closely related, it is this question of how the framing of co-creation initiatives contribute to determining their outcomes even before actors have entered the co-creative process that a third strand of STS inquiry centers around (Felt et al. 2023; Delvenne & Macq 2020). Most notably, Felt et al. (2023) have recently explored the effects of framings of co-creation activities on their respective realities and outcomes in the context of the co-creation of a digital European health data platform. This project was funded under Horizon 2020 and designed to bring together

citizens and health professionals in co-creative modes of engagement, with the aim of establishing an EU-wide infrastructure through which citizens could manage their health data. Their study demonstrates how the project was framed from the outset in a way that established a digital health infrastructure as a central component of the co-created outcome and thus prevented alternative solutions from surfacing. This framing was primarily fed by an initial problem narrative, here expressed in dramatizing the population's increasing life expectancy, chronification of diseases, and associated potential setbacks for the healthcare system. Accordingly and to match this problem framing, the project also presented a solution narrative at its outset, here a digital health data platform, the latter of which could be tailored to user needs to some degree as part of the co-creation process, but was not intended to be fundamentally questioned. Co-creation, the authors diagnose, tends to operate in powerful problem-solution packages that incorporate into the project framing the problems to be solved as well as specific solution paths or parts of the solution, often linked to strong promissory narratives, right at the beginning of the exercise, thus stabilizing them as non-negotiable. Although Felt et al. (2023: 17) also observed some citizens questioning these ready-made problem-solutions, they highlight that "the issue remains if these forms of critique can be made 'audible' to those involved in the design and development of the technological features of the platform, or if critique has to come in the standard mode or format to feed into co-creation processes".

What these various critical assessments of co-creation practice have in common is that they all, to some extent, raise questions about the roles of members of the public as co-creators, the scopes of agency that result for them, and the extent to which they can genuinely shape the outcomes of co-creation. At the same time, it seems that a number of the tensions around co-creation that different authors have identified for its discursive uptake are also reflected in practical enactments of co-creation (Macq et al. 2020). This pertains in particular to how overarching economic rationales affect the realities and eventual outcomes of co-creation. There is no doubt that the existing scholarly accounts of co-creation, of which I have only reviewed a selection, offer important entry points for examining more closely citizens' agencies as co-creators. What remains to be studied in depth is how these agencies are embedded in a wider network of social dynamics that shape how citizens' agencies come into being, how they unfold over the co-creation process, how they are reflected in the outcomes of co-creation, and which potentially conflicting understandings of both agencies and outcomes might surface. It is these questions that form the starting point for my situated exploration of a co-creation

initiative in a German municipality over the course of three years and thus for the second article of my dissertation (Ruess & Müller in press).

2.4 Summary

In this chapter, I have situated my perspective on co-creation as an emergent understanding of the participation of publics in science, technology, and innovation in the context of a broader trajectory of participation. To this end, I have reviewed the history of public engagement with science and technology through an incomplete chronology of participation, starting from the radical science movement and its ideals of a ‘science for the people’ (Schmalzer et al. 2018). In doing so, I have focused on selected moments and contexts in which this ideal surfaced. I have traced how policy circles have continued to produce novel understandings and formats of enacting science-society relations, which I then have contextualized by reviewing the corresponding STS critique of these understandings and formats. What seems to emerge from my incomplete chronology of participation is a pattern of reciprocal reactions between political action and social science inquiry, whereby forms of critique have given rise to new formats and new formats have in turn given rise to new forms of critique.

One of the most recent formats proposed by policymakers in response to decades of STS research is co-creation. Co-creation constitutes a somewhat unlikely candidate to embody participatory ideals in light of its roots in the marketing and business literature, where it was and continues to be understood primarily as economic value co-creation (Prahalad & Ramaswamy 2000; 2004a; 2004b; Ramaswamy & Ozcan 2014). As such, a number of critical marketing scholars have problematized co-creation as a vehicle to reproduce hegemonic logics of economic dominance under the framing of alleged mutual benefit (Zwick et al. 2008; Cova et al. 2011; 2015; Fontenelle 2015; Laamanen & Skålén 2015; Tesfaye & Fougère 2022). With its recent entry into the public sector, however, co-creation has been ascribed a range of characteristics that extend beyond its original, clearly economically-oriented promises. For example, the EU speaks of a “‘new wave’ of public engagement where ‘co-creation’ is a key notion” (European Commission 2016a: 29). This ‘new wave’ entails a range of promises, such as better aligning science, technology, and innovation with societal need, and enabling more socially robust outcomes by involving publics earlier in and throughout innovation processes. Hence, co-creation appears to be a response to one aspect of the STS critique of public engagement in particular: that publics tend to be involved only at certain moments in the innovation process after important design choices have been made, thus rendering citizens with little to no influence over innovation outcomes. By opening up opportunities to involve publics

earlier in innovation processes, co-creation promises to rectify these shortcomings of public engagement. What remains unanswered, however, is to what extent co-creation can live up to its promises of opening up innovation processes to public scrutiny and, ultimately, ensuring more responsible and equitable forms of doing innovation, or which other effects and logics the concept might introduce.

In light of the increasing popularity of co-creation among policy circles, I have reviewed the few but growing STS accounts of co-creation. At the level of discourse, STS scholarship has discussed co-creation as a phenomenon the emergence of which seems closely linked to broader reconfigurations of the European research and innovation discourse towards ideals of production that entail significant market-liberal overtones (Macq et al. 2020). As STS scholars have increasingly engaged with co-creation through empirical case studies, they have highlighted how co-creation in practice, too, tends to shift local governance practices towards entrepreneurial ideals (Cardullo & Kitchin 2019; Laurent 2019; Delvenne & Macq 2020), whereby a variety of different scopes of agencies for citizens can emerge (Nyborg & Røpke 2013; Cuevas-Garcia & O'Donovan 2022; Lipp et al. 2023). Initial important evidence suggests that strongly pronounced power imbalances seem to be at work in co-creation, amplifying those perspectives that align with policymakers' interests (Nyborg & Røpke 2013), and that the outcomes of co-creation tend to be pre-formed by the way a project articulates problems and corresponding solutions in the first place (Felt et al. 2023).

In my dissertation, building on this existing STS research on co-creation and in light of the STS literature on public engagement, I pose the following overarching research question:

How does co-creation unfold in its recast role as part of the allegedly 'new spirit of participation'³⁴ of publics in science, technology, and innovation?

I further operationalize this question by raising two key sub-questions that also reflect in the two articles I present in what follows:

- Firstly, seeing co-creation as part of a larger discourse of participation of publics in science, technology, innovation, and their governance, prompts me to ask how broader trends within this discourse apply to co-creation, in particular which specific value propositions are tied to co-creation as a concept and which discursive effects these value propositions entail.

³⁴ (Palmer et al. 2019: 247)

- Secondly, I ask how these discursive effects manifest in practical enactments of co-creation, in particular how the situated context and the emergent social dynamics of a co-creation initiative shape the scopes of agencies for citizen co-creators in and throughout the exercise, within a project context that understands participation explicitly as wide participation and an orientation thereof towards the quotidian challenges faced by local citizens.

Attending to these questions allows for a more refined understanding of co-creation as a concept in itself, but also of the potentially problematic value assumptions and tensions co-creation feeds back into the engagement discourse and participatory practice. Through my work and the specific lens of co-creation, I thus interrogate the *gestalt* and effects of the “‘new wave’ of public engagement” (European Commission 2016a: 29) and “new spirit of participation” (Palmer et al. 2019: 247) that policymakers and scholars from some disciplines alike have been invoking for the last decade. I thus hope to make a modest contribution to the STS inquiry into participation and critique thereof by providing a nuanced exploration of co-creation as part of a broader participatory trajectory within how science-society-policy relations are enacted. In doing so, I also hope to contribute to more normative considerations of the emerging roles for co-creation within the quest for more socially robust and responsible forms of innovating.

3. Research Materials and Methods

In light of the literature review preceding this chapter, it becomes evident that the diversity of understandings of the concept of co-creation is partly linked to the different methodological approaches and perspectives with which the literature has addressed and continues to address the concept. It is therefore important to emphasize that I approach co-creation from a social science vantage point and thus consider the concept primarily as a form of participation of members of the public throughout innovation processes. Of the existing studies that work from a social science perspective, two methodological approaches in particular can be identified that scholars use to engage with co-creation. Firstly, a limited number of studies look at the discursive level of innovation and/or innovation governance and policy. Methodologically, these studies work either on the basis of the scientific literature with explorative systematic literature analyses in order to examine how the role of co-creation is understood conceptually and in practice (Elkjær et al. 2021) or with document analysis of (policy) actor-generated documents, whereby co-creation does not itself tend to be the focus of the analysis, but is addressed as part of a larger development of the innovation discourse (Macq et al. 2020). The latter in particular opens up the question of which discursive values are associated with co-creation when we analytically zoom in on the concept. Secondly, there are a growing number of empirical accounts of co-creation practices that use single or comparative case study approaches to explore the tensions associated with co-creation that emerge in practice. These accounts are especially valuable as they reorient the direction of co-creation research to specific local sites, which exhibit unique combinations of “temporality, topography, sociality, and sensory experience” (Watts 2008: 197) and thus condition unique practices (Felt 2016). In doing so, they focus on the specific dynamics of co-creation, ask how these dynamics connect to and unfold within the situated context of each case study, and ultimately delineate the multiplicity of different interpretations hovering around the term by revealing what actors do when they say they co-create.

What has rarely been explored in the literature so far is, on the one hand, a deeper and more detailed examination of the concept of co-creation and the value propositions attached to it at a discursive level as well as the question of how these same value propositions unfold in practice. This includes, in particular, how the values associated with co-creation are linked to specific local settings, how different futures are imagined through co-creation, how co-creation itself becomes part of this imagined future, and how imagined and actual roles of co-creation actors are negotiated as part of this process.

In my dissertation, I build on these aspects by combining two main qualitative methodological approaches: Firstly, my co-authors Ruth Müller, Sebastian Pfotenhauer, and I (Ruess et al. 2023) conducted a discourse analysis of the EU policy context as being one of the central global arenas in which co-creation has assumed an increasingly prominent role within the innovation policy discourse over the last 10 years. More precisely, we looked at a range of EU policy documents, each addressing co-creation in the context of science, technology, and innovation. This allowed us to examine the value propositions associated with co-creation, the ways in which they are inscribed into the discourse and connected to overall ideas and ideals of both innovation and society, as well as how they become (re-)produced and stabilized throughout the EU policy discourse. Secondly, my co-author Ruth Müller and I (Ruess & Müller in press) provide an in-depth analysis of an empirical case study of co-creation, which allowed us to trace the specific social dynamics of co-creation in practice, in particular regarding how actors performed both co-creation and their roles as co-creators within the process.

Although a single dissertation cannot bridge the existing gaps and will probably raise more questions than it can answer, I would still like to contribute to approaching co-creation by tracing its value propositions and their effects through my dissertation. While, for the ethnographic part of my work, I traced the dynamics of one specific co-creation setting in as much detail as possible, my case study does not stand alone, but is embedded in the context of the research consortium *Scaling up co-creation: Avenues and Limits for Integrating Society in Science and Innovation*, or SCALINGS for short. SCALINGS was a comparative research initiative that examined the challenges of mainstreaming co-creation using a range of case studies across eleven European countries and three technological domains over a period of three years (2018–2021). During the first three years of my doctorate, I was employed as a research assistant in SCALINGS, which has produced many interrelations between the project and my research. Whilst my analysis of co-creation has its own specific focus on the value propositions of co-creation and their effects in discourse and practice, my research questions and the research work of the SCALINGS consortium have stimulated and informed each other: As part of this project, my analysis of co-creation contributes to a larger and comparative view of co-creation. At the same time, the project also enriches the methodology of my analysis, as my view of both the co-creation discourse at the European level and the highly specific local dynamics of my case study was continuously informed by the discussions with my SCALINGS colleagues and their work in and across other contexts.

In this chapter, I present the interplay between the different methodological approaches that I used in my dissertation. I thereby adhere to the following structure: Firstly (3.1), I provide an overview of the SCALINGS project as the intellectual and methodological framework in which my dissertation was embedded. In addition to a general introduction into the project and its structure, including its theoretical foundations, methodological approaches, and the actors involved, I focus in particular on how my dissertation ties in with SCALINGS and the contributions I make to the project through my work. Secondly (3.2), I provide insights into the data underlying my dissertation, the methods I employed to analyze my data, and how these analyses contribute to addressing my research questions. Thirdly (3.3), I reflect on what it means to be embedded as a researcher in an empirical study and to what extent my specific forms of being embedded have informed and influenced my work. Fourth and finally (3.4) I include a note on how the global Covid-19 pandemic shaped parts of my fieldwork.

3.1 Scaling up co-creation: Avenues and Limits for Integrating Society in Science and Innovation (SCALINGS)

3.1.1 Overview of SCALINGS

Scaling up co-creation: Avenues and Limits for Integrating Society in Science and Innovation, or SCALINGS for short, was a three-year (May 2018 – July 2021) research initiative under the European Union’s 8th Framework Programme for Research and Innovation *Horizon 2020*. SCALINGS answered to the 2017 call *Integrating Society in Science and Innovation – An approach to co-creation* (SwafS-13-2017) of the *Science with and for Society* (SwafS) Work Programme 2016-2017. The specific challenge set out in the call addressed the growing interest in including societal perspectives into research and innovation, which, according to the call, was part of a “‘new wave’ of public engagement where ‘co-creation’ [was] a key notion” (European Commission 2016a: 29). The call identified a discrepancy and research gap between the “good intentions” of co-creative formats versus their implementation, which would often “fall[] short” (European Commission 2016a: 30). By scrutinizing the dynamics of co-creation initiatives *in-situ*, the funded initiatives should contribute to “a better understanding of co-creation processes and outcomes under various cultural, societal and regulatory backgrounds”, as well as “better-targeted policy support” with a particular focus on “implementable integration” (European Commission 2016a: 30). In SCALINGS, we addressed these objectives through a comparative study focusing on the implementation, uptake, and outcomes of a range of co-creation activities across Europe by posing the following research question: “How [can] we ensure that co-creation processes and outcomes are socially robust and effective when

transferred to other socio-cultural contexts?” (SCALINGS 2018: 149). SCALINGS involved a consortium³⁵ of 40 researchers based in nine European countries as well as a non-for-profit network for social innovation exchange and was coordinated at the Technical University of Munich. It was funded as one of two projects under SwafS-13-2017 with a total funding volume of 4 million EUR (Grant agreement ID: 788359).

In SCALINGS, we approached co-creation primarily from a social-scientific vantage point. This entails that we considered the innovation process a social process (Akrich et al. 2002a; 2002b; Bijker et al. 1987; Pfotenhauer & Jasanoff 2017), whereby co-creation we conceptualized as a constant “mutual reconfiguration and stabilization of techno-scientific and social orders” induced by innovation processes and technological change (SCALINGS 2018: 156; Jasanoff 2004). Within this broad understanding, we based our exploration of and analytical stance towards co-creation on two strands of STS scholarship. Firstly, we considered co-creation as part of larger conceptualizations of both public engagement with science, technology, innovation, and Responsible Research and Innovation. Here, STS scholarship has frequently highlighted how participatory practices are often deployed in instrumental ways, e.g., to bypass public opposition towards novel technologies, while at the same time avoiding substantial and meaningful consideration of public perspectives (Irwin 2001; Wynne 2006a; Stirling 2008). As co-creation in policy contexts adopts many of the promises of public engagement, the question arises as to whether co-creation might, in a similar fashion, contribute to reinforcing existing inequalities or create new ones. Based on these insights, we centered our research focus around questions of how co-creation facilitates or constrains the equitable, inclusive, and diverse participation of publics in innovation, including antagonistic dynamics and tensions that might emerge, as well as how co-creation might be practiced in more responsible and socially inclusive ways (Müller et al. 2021a; SCALINGS 2018).

Secondly, in SCALINGS, we drew on STS research regarding the situatedness of knowledge-production practices (Haraway 1988) and thus considered innovation processes as deeply embedded in their respective contexts. Here, on the one hand, co-creation as a format promises to be able to accommodate the fact that innovation is profoundly shaped by the socio-cultural

³⁵ The consortium involved partners from the Technical University of Munich (Germany), Eindhoven University of Technology (The Netherlands), the Technical University of Denmark (Denmark), ARMINES / MINES ParisTech (France), Wrocław University of Economics and Business (Poland), University College London (United Kingdom), Social Innovation Exchange (United Kingdom), University of Graz (Austria), Imperial College London (United Kingdom), and the International Society for Professional Innovation Management (Spain) as well as the former partners that have transitioned to other institutions during the project duration (the University of Natural Resources and Life Sciences Vienna (Austria), École Polytechnique Fédérale de Lausanne (Switzerland), and ESADE Business School Barcelona (Spain)).

and institutional settings in which it takes place by encouraging assemblages of different actors in inclusive, open, and collaborative modes of working and innovating together. On the other hand, such dependency of innovation practices on their respective contexts implies that the effectiveness and results of co-creation differ from case to case and that the formats themselves may also vary. Consequently, any mainstreaming or scaling of co-creation, albeit frequently desired in policy-contexts, quickly reaches its limits if it is based on one-size-fits-all approaches or standardized instruments that fail to address the specificities of local contexts. Instead of asking how well a co-creation instrument has been implemented in a particular case, we focused on how allegedly similar co-creation instruments have been shaped by their application context, thus exploring the “idiosyncratic ways in which countries and institutions utilize and enact co-creation” (SCALINGS 2018: 148).

More concretely, we translated our overarching research question (“How [can] we ensure that co-creation processes and outcomes are socially robust and effective when transferred to other socio-cultural contexts?” (SCALINGS 2018: 149)) into three objectives, which also corresponded to the three major project phases: Firstly, we aimed to develop an in-depth understanding of the socio-cultural variability of co-creation practice across Europe. Secondly, we performed coordinated interventions to evaluate in cooperation with practitioners how co-creation practices can be attuned to specific contexts. Thirdly and finally, we developed a policy roadmap (Müller et al. 2021a) to guide practitioners in designing and implementing socially inclusive and responsible co-creation formats that take into account the specificities of their respective contexts.

To address these objectives, we explored the implementation, uptake, and outcomes of co-creation practices across three co-creation instruments (public procurement of innovation, co-creation facilities, living labs), three technological domains (robotics, urban energy, autonomous driving), as well as sites in eleven European countries (Austria, Belgium, Denmark, France, Germany, Italy, Poland, Spain, Switzerland, The Netherlands, United Kingdom). The Grant Agreement provides more information on how these instruments, domains, and countries were selected³⁶ (SCALINGS 2018). Within this broad research design, we pursued an in-depth comparative case study approach, whereby one case study refers to the implementation of one specific co-creation instrument in one specific technological domain in one specific location. We selected these case studies either by exploitation of existing

³⁶ With the exception of the autonomous driving domain, which emerged from the ethnographic work of the consortium as an additional valuable opportunity to observe co-creation practices in different situated settings.

collaborations of the consortium members or, as is the case for the practice case I draw on in this dissertation, by open explorative search for and outreach to co-creative projects done by consortium members in their regions. This includes both projects that we considered co-creative and projects that fashioned themselves as such. Over the course of SCALINGS, we have accompanied and engaged with over 30 case studies of different co-creation practices. Table 1 (Annex) provides an overview of these cases.

SCALINGS Phase I: Exploring the State of the Art of Co-creation Practice in Europe

In the first stage of the project, we concentrated on exploring the state of the art of co-creation practice in Europe. Methodologically, this involved a combination of an interpretative qualitative social science approach, a comparative case study design (Eisenhardt & Graebner 2007; Jasanoff 2005; Knorr Cetina 1999), and a constructivist grounded theory analysis as proposed by Charmaz (2006) and Clarke (2005; 2009). Based on an initial analysis of our SCALINGS cases, including analysis of key documents (e.g., proposals, publications, policy and strategic documents, or reports), analysis of related media coverage, as well as 1-2 explorative interviews with members of the organizing teams, we established a detailed account of the history, institutional structure, and context for each case. This initial phase also produced preliminary insights into local imaginaries and policy trends that have driven the conceptualization and implementation of the co-creation initiatives, broader patterns of local cultural identities, institutional developments that have shaped the histories of cases prior to SCALINGS, as well as key moments, decisions or experiences that speak to the unique situated cultures of the cases and thus would prompt further investigation.

These insights also served as a basis for the subsequent short-term “focused” (Knoblauch 2005) ethnographic fieldwork that my SCALINGS colleagues and I conducted at the case sites. By approaching the SCALINGS cases through an ethnographic lens, we aimed to identify both the seemingly mundane routines of co-creation actors as well as taken for granted assumptions and implicit dynamics embedded in co-creation practice in their specific local contexts. Combining these fundamental principles of field immersion and “thick description” (Geertz 1973) with a “multi-sited” (Marcus 1995; 1998) approach allowed us to compare findings across all cases and draw conclusions regarding generalizable patterns of social life and order (Coleman & von Hellermann 2011; Falzon 2009) emerging in co-creative innovation practice. Depending on the nature of the case, in particular its stage of development and the depth of field access granted to us, our ethnographic engagement ranged from anywhere between single or sporadic focused

site visits to a long-term engagement covering the entire life span of the co-creation initiative, like the case study I draw on in this dissertation.

In addition to the ethnographic fieldwork, we used semi-structured interviews to gain deeper insights into “particular rationales, motivations, and experiences of actors who seek to advance co-creative innovation” (SCALINGS 2018: 166). Again, depending on the design of the respective case study of co-creation, these actors included, for instance, representatives of academic institutions, private sector organizations, policymakers, and members of the public. We aimed to conduct 10–15 interviews per case, to the extent possible. However, like the intensity of ethnographic engagement, the number of conducted interviews varied considerably for each case, ranging from only 1–2 explorative interviews to 30 and more interviews for those cases that granted my colleagues and me full and long-term field access – again as is the case for the co-creation initiative that features in my dissertation. To analyze both the key documents collected for each case as well as the data collected through interviews and ethnographic fieldwork, we employed a qualitative approach that was informed by content analysis (Mayring 2008), situational analysis (Clarke 2009), discourse analysis (Keller 2012; Tannen et al. 2015), and grounded theory (Charmaz 2006; Strauss & Corbin 1998).

This process served two main purposes: Firstly, it allowed for situated in-depth analyses of individual cases that focus on exploring the dynamics, negotiation processes, and tensions that shaped specific incarnations of co-creation, as, for instance, presented in the second article included in this dissertation (Ruess & Müller in press). Secondly, the results of these analyses of individual cases formed the basis for qualitative comparison across the SCALINGS cases. Taking a comparative stance allowed for the identification of larger patterns of co-creative innovation practice from complex qualitative data (Jasanoff 2005), quasi-generalizable conclusions as regards the implementation of co-creation in relation to the context it is embedded in, as well as new cross-cutting analytical questions (Eisenhardt & Graebner 2007; Siggelkow 2007; Yin 2014). Examples of to-date published results based on qualitative comparison across several SCALINGS cases include Lipp et al. (2023)’s analysis of end-user roles in co-creation as well as Astola et al. (2022)’s analysis of the relationship between community-driven energy projects and energy justice.

SCALINGS Phase II: Experimental Interventions

In the second project phase, my SCALINGS colleagues and I shifted our roles from being first and foremost participant observers in our case studies to increasingly engaging with them in normative ways. Specifically, based on the core findings from phase I, we performed controlled

interventions for selected cases “with the goal of varying specific parameters (e.g., the process, scope, or scale of the co-creation instrument) and systematically observing the changes in co-creation patterns” (SCALINGS 2018: 170). Methodologically, these interventions employed a similar research design as phase I, yet with an important refinement due to the experimental approach introduced in this phase: We engaged with the co-creation partners in our case studies in a mode of “co-laboration” (Niewöhner 2016) to emphasize both the collaborative and the laboratory relationship between researchers and co-creation actors. In other words, we engaged in collaborative ways by implementing joint adjustments to the co-creation practices, while still maintaining an analytical perspective on the experimental process. This also entailed a pragmatist understanding of experimentation that foregrounds social learning and reflexivity among all co-creation actors.

To study these learning processes and to identify the key aspects that shape successful (in particular in the sense of socially inclusive and responsible) co-creation practice in particular settings, we employed the same qualitative methods as described for phase I. Thus, the second phase intentionally intertwined reflexivity and intervention along “a process of empirical analysis, intervention, and dialogue between the researchers and collaborators” (SCALINGS 2018: 171). For us, this created embedded roles and active participation in co-experimentation with the co-creation actors, whereby their interventions became part of the co-creation practices they studied. Such forms of embedded research (Felt et al. 2016; McLennan et al. 2022) enable not only deepening theoretical and analytical insights, but also foster learning and dialogue among all actors involved. Concrete examples of experimental interventions included, for instance, reflective workshops or brainstorming sessions with co-creation actors focusing either on single cases or on multiple cases brought in conversation in joint activities (SCALINGS 2020a; 2020b; 2020c).

SCALINGS Phase III: Policy Analysis and Roadmapping

In the third and final project phase, we focused on a number of outreach activities, in particular into communities of policymakers and co-creation practitioners. As the central element of this phase, we developed a policy roadmap (Annex) aimed to guide different co-creation actors (including policymakers, co-creation practitioners, and members of the public) in designing and implementing more responsible and socially inclusive forms of co-creation (Müller et al. 2021a). In terms of methodology, the roadmap drew on two major approaches: Firstly, we conducted a deliberative/interpretative policy analysis (Fischer & Forester 1993; Geertz 1973; Yanow 2000; Hajer & Wagenaar 2003) of the policy conditions shaping the use of co-creation

in Europe (SCALINGS 2019d). Secondly, we engaged in an intensive iterative process discussing insights from the SCALINGS case studies in multiple feedback loops with the entire SCALINGS consortium, as well as in an interactive roadmapping workshop with a multinational expert panel and a diverse audience of co-creation practitioners, policymakers, academics, and members of the public. Our analysis and joint discussion of the SCALINGS case studies demonstrated clearly how the socio-cultural context is not only decisive for how co-creation practices unfold, but also for how they ought to be designed in order to enable more diverse and inclusive participation. Consequently, instead of formulating generalized recommendations, we decided to offer a set of criteria, derived from the case studies, and formulated them as assessment questions. This ‘Social Impact Assessment for Socially Inclusive and Responsible Co-creation’ allows different co-creation actors to take different perspectives on what it can mean in their respective contexts to develop and implement co-creative formats in socially inclusive and responsible ways. The roadmap also provides an exploratory analysis of the legal aspects of co-creation conducted by the SCALINGS legal experts (Müller et al. 2021a).

3.1.2 Relations between this Dissertation and SCALINGS

During the first three years of my doctorate, I was employed as a research assistant within the SCALINGS consortium. This work resulted in complex interrelations between SCALINGS and my dissertation. In what follows, I will discuss four of these linkages in more detail: (1) my empirical work with the project *Urban Future Ulm*, which constitutes both one of the SCALINGS case studies I researched as part of the project and the basis of the second article of this dissertation, (2) the genesis of the research question of my discourse analysis, i.e., the first article of this dissertation, (3) my work on the SCALINGS Policy Roadmap, and (4) my involvement in the official project evaluation of *Urban Future Ulm*.

(1) The second article of this dissertation titled “Finding solutions to problems that never existed: A case study of co-creation in the Municipality of the Future” (Ruess & Müller in press) is based on a three-year participant observation of a co-creation case study (*Urban Future Ulm*) and provides an in-depth analysis of the dynamics and practices of co-creation over the entire duration of the project. It is important to note that *Urban Future Ulm*, which I introduce in more detail in chapter 5, was also a SCALINGS case study and my selection of this co-creation project was significantly guided by the research design of SCALINGS. More specifically, in the first months of my work in SCALINGS, I embarked on an exploratory research of the German co-creation landscape with the specific aim of identifying a case study of either public

procurement of innovation, a co-creation facility, or a living lab in the field of urban energy, which would ideally still be in an early project phase, and acquiring it as a project partner for SCALINGS. To fit these requirements, I classified *Urban Future Ulm* as an urban energy living lab within the SCALINGS set of cases. This classification is not obvious on first glance, as the project was neither a pure energy project nor was the term living lab notably used by the executive board in external communication. Nonetheless, especially the focus area energy/environment within *Urban Future Ulm* matched well with the totality of living labs involved in SCALINGS. While this classification was useful for the comparative approach across the SCALINGS cases, I realized during my empirical work that concepts like ‘living lab’ or ‘collective experimentation’ would not serve my analysis, but rather put too many *a priori* constraints on my in-depth and long-term exploration of the social dynamics, negotiation processes, agencies, and resulting tensions in co-creation practice. For this reason, in the context of my dissertation, I decided to depart from this classification and approach *Urban Future Ulm* not as a living lab, but more openly as a practice case of co-creation with a distinct focus on the wide participation of members of the public in a co-creative innovation project in one specific neighborhood.

Likewise, while SCALINGS followed a comparative approach across co-creation instruments, technological domains, and countries, I chose not to work comparatively in the context of my dissertation. Instead, I leveraged the depth of field access granted to me by the City of Ulm through a three-year ethnography, spanning almost the entire duration of *Urban Future Ulm*, to trace in detail the social dynamics and tensions that emerged from the co-creation process. My focus was on how the agencies of members of the public were constructed, performed, and negotiated and how the situated context of the case study contributed to shaping both these agencies and the co-creation process itself. Thus, the analysis of *Urban Future Ulm* my co-author and I provide in the second article of my dissertation produced an empirically rich context-specific account of the lived realities of the actors involved, which, from this very case-specific perspective, raises broader questions about the challenges and opportunities associated with co-creation practice. Notwithstanding my focus on a qualitative single case analysis, I maintained a continuous exchange with my SCALINGS colleagues about our findings based on but also beyond specific case studies. As a result, the detailed insights into *Urban Future Ulm*, which I contributed to SCALINGS through my work, became an important cornerstone for the comparative work of the SCALINGS consortium. At the same time, these exchanges have naturally also informed my own perspective on *Urban Future Ulm*, with many aspects of

my interpretations building on a collective long-term reflection about the situatedness of co-creation across countries, domains, and instruments.

(2) The first article of my dissertation, which is a discourse analysis of EU innovation policy-related documents, is not based on one or several of the SCALINGS case studies. However, the research questions my co-authors and I address in this article stem from a series of discussions in the context of SCALINGS. In particular, our research interest was shaped by a discussion following a presentation³⁷ on a number of very early insights into my work that I delivered at the 2019 Annual Meeting of the Society for Social Studies of Science. The discussion following my presentation was largely dominated by the question of the extent to which co-creation differs from traditional concepts and formats of public engagement and, in relation to this, whether co-creation was merely a new buzzword for familiar formats. In the months that followed, I was repeatedly and persistently preoccupied with this question. And while the SCALINGS case studies were able to approach this question from the perspective of co-creation practices, I found the consideration of the discourse level, in particular the way policymakers frame co-creation, both equally relevant and, with a few exceptions that I address in my literature review, underrepresented in the academic discourse on co-creation to date. As a consequence, I decided to develop this question further together with my co-authors by exploring the discursive formations around co-creation in the EU policy discourse and discussing them along the existing STS literature on public engagement with science and technology. Our analysis of the EU co-creation discourse thus contributes to SCALINGS by opening up a further level of reflection, enabling the case studies to relate from their situated contexts to a more broadly stabilized conceptualization of co-creation. At the same time, and in a similar way to my ethnographic analysis, our interpretative work in the context of our discourse analysis was informed by consistent reflexive exchanges with our SCALINGS colleagues on the situatedness of co-creation, which contributed significantly to the identification of higher-level categories across contexts.

(3) Much of my work in SCALINGS has been as part of the policy team where I was involved in both the deliberative/interpretative policy analysis of the status quo of co-creation in the EU and the development of the SCALINGS roadmap *Co-creating European Futures: Innovation, Participation and Co-creation in Europe 2030* (Müller et al. 2021a). Both tasks were closely

³⁷ The talk was entitled “(De-)Constructing Publics: Living Labs and the *Demos* Problem” and delivered as part of the open panel “Co-creating or Testing Scalable Societies? Test Beds and Living Labs as Emerging Innovation Policy Instruments”, which was organized by my SCALINGS colleagues Gianluigi Viscusi, Jack Stilgoe, Brice Laurent, Sebastian M. Pfotenhauer, and Sophie Nyborg and took place on September 6, 2019 in New Orleans.

intertwined with the analyses I present in this dissertation and contributed to shaping my perspective on co-creation in discourse and practice. For the deliberative/interpretative policy analysis, we followed a bottom-up approach to the SCALINGS cases, which we considered to be representations of important trends in co-creation in the EU. We developed a framework (in the form of a qualitative questionnaire to the responsible SCALINGS researchers) “that serves to analyze interactions of key stakeholders within these [co-creation] activities with regard to policy-relevant issues” (SCALINGS 2019d: 4). To develop this framework, we drew on the existing STS literature on public engagement with science and technology, which we deemed an important precursor of co-creation. In particular, we focused on emergent issues and challenges of public engagement and asked to what extent they resurface in the context of co-creation. Both this review of the public engagement literature and my own reading and structuring of the academic discourse on public engagement have consistently and reciprocally informed each other. The results of this interconnectedness are reflected in how I situate my dissertation within the broader context of STS research.

For the SCALINGS Policy Roadmap, specifically the ‘Social Impact Assessment for Socially Inclusive and Responsible Co-creation’, which constitutes the core of the roadmap, we analyzed the SCALINGS case studies based on the framework derived from our review of the public engagement literature and distilled a set of criteria for diverse, equity-oriented, and inclusive co-creation practice. These criteria we formulated as assessment questions to empower different co-creation actors to interact with co-creation in different ways (e.g., design, implement, reflect upon, or evaluate co-creation activities) while also taking into account the situated nature of co-creation practices (Müller et al. 2021a). We conducted the entire process in numerous feedback loops with the SCALINGS consortium, especially the researchers who worked empirically. Moreover, we discussed and refined an early draft of our roadmapping work in a collaborative workshop³⁸ with an international expert panel and a diverse audience of policymakers, co-creation practitioners, members of the public, and interested scholars. We summarized the results of this process in two formats, namely as a traditional written document (Müller et al. 2021a) and an interactive web-based format (Müller et al. 2021b), both of which we prepared in collaboration with two design professionals to ensure that the formats were not only accessible to a diverse community, but also reflected this diversity visually. Based on this constant and collaborative reflection on issues of recruitment, engagement methods, agency,

³⁸ The workshop took place online on March 19, 2021. Members of the expert panel were Maja Horst (Technical University of Denmark), Alan Irwin (Copenhagen Business School), Sebastian Pfotenhauer (Technical University of Munich), and Jack Stilgoe (University College London).

benefits, risks, outcomes, and upscaling of co-creation, the question of what *doing* co-creation in responsible ways can and should mean has both driven and challenged me throughout my doctorate. This reflects particularly in how I discuss the articles of my dissertation.

(4) Lastly, as part of my ethnographic fieldwork as a participant observer of *Urban Future Ulm*, I was approached by the executive board, whether I would be willing and able to conduct the official project evaluation of the initiative. After consulting with Sebastian Pfothenhauer in his role as SCALINGS coordinator and, later, principal investigator in this project evaluation, I agreed to perform the evaluation³⁹ and appreciated this opportunity for even deeper insights into both the project's trajectories and their uptake by different co-creation actors. Methodologically, this involved additional interactions with project actors, including, for instance, follow-up conversations with the executive board, citizens, and other stakeholders about their thoughts on and evaluation of how the project evolved. The results of this evaluation are summarized in a final report (Ruess & Pfothenhauer 2021). This increased frequency of interactions with the project actors as well as the broad degree of discretion I was given with regard to the design of these interactions (for example, in preparing thematically-oriented group interviews with the executive board) and the resulting depth of my empirical insights can of course not (and does not need to) be separated from my empirical work in the context of SCALINGS nor in the context of my dissertation. Rather, I consider the evaluation additional empirical engagement. In the spirit of being embedded, the normative component of this work and the joint reflection with the project actors have informed both the comparative work conducted as part of SCALINGS – which we framed as Phase II⁴⁰ engagement – and my own interpretations.

3.2 Methodology and Data Analysis

In my dissertation, I examine the overarching research question of how co-creation unfolds in its recast role as part of the allegedly “new spirit of participation” (Palmer et al. 2019: 247) of publics in science, technology, and innovation. To address this question, this dissertation and its two articles draw on a rich combination of qualitative methods, including the analysis of innovation policy documents at the EU level and a qualitative case study approach that integrates the analysis of documents and media articles in the context of my ethnographic site with a three-year participant observation and qualitative interviewing at this ethnographic site.

³⁹ This included that, while conducting the evaluation of *Urban Future Ulm* (05/2020–12/2021), I received 10 percent of my salary through funding by the City of Ulm.

⁴⁰ SCALINGS Phase II was dedicated to active co-experimentation between SCALINGS researchers and their case studies.

This subsection is to elaborate on my methodological and analytical approach. Although some of the methodologies underlying this dissertation overlap with regard to my articles (e.g., document analysis as part of the first and second article), I have chosen to structure my data collection methods in this sub-chapter along the lines of the two articles for the sake of clarity. More specifically, this means that I first provide an overview of the documents I included in my analysis of the EU innovation policy discourse. I then elaborate in more detail on how I employed a qualitative case study approach to the co-creation initiative that I accompanied for three years, including the documents, media articles, ethnographic field notes, and interviews used in my analysis. In a third and final step, I outline my method of data analysis, namely a grounded theory-based approach, which I applied to all the empirical material underlying this dissertation.

3.2.1 Discourse Analysis

In the first article of this dissertation, I present the analysis of the EU innovation policy discourse my co-authors and I conducted with the specific aim of exploring the discursive formations around and value propositions attached to co-creation. To do so, we conducted a qualitative analysis of a range of publicly available documents that discuss co-creation in the context of science, technology, and innovation. These documents constitute my empirical entry point into the co-creation discourse at EU level. While I do not assume that such pre-existing documents reveal an objective truth about the way co-creation is imagined by EU policymakers, I do consider them as representing certain understandings of co-creation that have been at least partially stabilized through both their textual rendering and their publication. At the same time, I consider these documents as textual social products that embody social meaning and discursive power within the larger arena of public policy. In the words of Rose and Miller (1992: 178), political discourse constitutes “a domain for the formulation and justification of idealized framings for representing reality, analysing it and rectifying it”. From this perspective, policy documents emerge as an “intellectual machinery” (Rose & Miller 1992: 182) that is entangled with specific values and – through the translation of social meaning into text – renders the world thinkable and governable. Analyzing such documents thus allows to interrogate the value-laden assumptions underlying policymaking and offers insights into how the discourse constructs co-creation, the discursive formations that push this construction into specific directions, as well as potential conflicting interpretations thereof (Linders 2008; Asdal & Reinertsen 2022).

To obtain my empirical sample, I retrieved documents from the fifteen official EU electronic databases⁴¹ by performing a search for the root word of the term co-creation (i.e., ‘co-crea*’) for each database to be able to also capture its linguistic variations, such as verb or adjective forms. In order to approach our research question about the discursive formations that specifically revolve around co-creation, my co-authors and I decided against including other terms that may be related to co-creation (such as public engagement, Responsible Research and Innovation, open innovation, or co-design) as search terms. In this way, we were able to focus explicitly on co-creation as an allegedly new notion to enter the discursive arena and one of the key concepts in contemporary European innovation policy. Apart from limiting the search to the keyword co-creation, I conducted our search in an open way. To take account of the possibility that co-creation could appear across topics, types of documents, and institutions, we did not predefine specific publishing institutions nor document types as inclusion or exclusion criteria. Furthermore, to acknowledge the relatively recent emergence of co-creation in the European innovation policy discourse, we did not limit the initial search by specifying a date range. I conducted the search on June 8, 2020, yielding a sample of 663 documents published between 2000 and 2020 by the following institutions and bodies: European Parliament, European Council, European Commission, European Economic and Social Committee, and the European Committee of the Regions, as well as by the gazette of record (Official Journal of the EU).

Based on this initial sample, I defined a set of core documents on which my co-authors and I based our analysis. To arrive at this set, I first excluded all duplicates, i.e. publications that appeared identically in several databases. At the same time, I concentrated particularly on those documents that situate co-creation in the context of science, technology, and innovation and which explicitly seek to foster and promote co-creation rather than making only loose references to the concept. This iterative selection process has produced an analytical sample of 34 documents, which I consider representative of the broader set of policy documents and statements on co-creation within the full initial sample. These documents include a concept note (1), a letter (1), a speech (1), a programming document (1), an application document (1), reports (2), studies (2) brochures (2), proposals (2) parliamentary briefings (3), communications (3), opinions (4), and documents related to the EU Framework Programmes for Research and

⁴¹ These include: Official Journal of the EU, European Parliament, European Council, Council of the EU, European Commission, Court of Justice of the EU, European Central Bank, European Court of Auditors, European External Action Service, European Economic and Social Committee, European Committee of the Regions, European Investment Bank, European Ombudsman, and European Data Protection Supervisor, as well as Agencies and other bodies.

Innovation (11), and were published between 2010 and 2020. Table 2 (Annex) provides an overview of the analytical sample. These documents allowed my co-authors and me to trace how co-creation is taken up in documents that explicitly focus on co-creation in the context of science, technology, and innovation. Through our analytical and interpretative work, we scrutinized the explicit and implicit value propositions that are associated with co-creation in these documents as well as the resulting discursive effects. What goes beyond the scope of this analysis is a broader consideration of how this co-creation discourse becomes referenced and articulated in overall EU policy rationales.

3.2.2 Case Study (Participant Observation, Qualitative Interviewing, and Document Analysis)

In addition to my analysis of the EU innovation policy discourse, I studied co-creation at the practice level, following a qualitative case study-based approach. Some of the core aspects and conclusions of this work I present together with my co-author in the second article of my dissertation, while other aspects – for instance, featuring in section 5 – are to become part of a manuscript yet in preparation (Ruess et al. 2024). As part of this case study-based approach, I have conducted three years of ethnographic work (including participant observation, qualitative semi-structured interviews, and document analysis) in a German municipality (2019–2021) to observe and analyze the ways in which this municipality implemented co-creation in practice as part of the concrete local innovation initiative *Urban Future Ulm*. The selection of this case study was closely entangled with my work as a research associate in SCALINGS, as part of which I conducted an exploratory search of German-based co-creation initiatives in the domain of urban energy, with the specific aim of acquiring these initiative as case study partners for SCALINGS.

This research lead me to several smart city initiatives of the municipality of Ulm and, specifically, to *Urban Future Ulm*, which was scheduled to commence only a few months after I conducted the search, with its timeline matching almost exactly the SCALINGS timeline. Moreover, the project placed a strong focus on the co-creative engagement of citizens in their neighborhood. It was in particular this distinct focus on co-creation, combined with the depth of field access I was granted from the moment I reached out to the executive board, that made *Urban Future Ulm* not only an invaluable addition to the SCALINGS set of cases, but also an ideal case for me to scrutinize co-creation through a long-term practice case as part of my dissertation. Looking at co-creation through the lens of this case study allowed me to combine different qualitative methodological approaches to study a specific manifestation of co-creation in its real-life context (Yin 2014).

More generally, municipalities are intriguing settings for research into co-creation as they bring together a diverse range of actors in complex interrelations and socio-material assemblages. Concomitantly, cities represent the governance spaces in which many supranational, national, and regional policies converge and are implemented through situated practice. For this reason, many authors have described cities as places of innovation where many of the current discourses about desirable futures take place (Karvonen & van Heur 2014; Eneqvist & Karvonen 2021) or have referred to cities as ‘truth-spots’ where the legitimacy of different versions of these futures can be tested and affirmed *in-situ* (Gieryn 2006). A central role in such processes of urban future making rests with different constellations of actors of members of the public, policymakers, as well as semi-public and private actors, who come to interact in often co-creative modes of engagement (Engels et al. 2017; Evans & Karvonen 2014). Thus, by focusing in depth on co-creation in a municipal setting and, in particular, the everyday and seemingly mundane dynamics of actors and practices within this case, I was able to draw conclusions about the complex entanglements between participation, technologies, situated conditions, as well as notions of desirable futures. In this way, my case study reveals tensions, challenge, and opportunities that I could in turn relate to both existing research on public engagement with science and technology and the promises of co-creation as a widely desired approach to *doing* innovation.

Participant Observation

My ethnographic work within the municipality of Ulm allowed me to follow the project *Urban Future Ulm* throughout almost its entire lifespan, i.e., from the late planning phase throughout the several stages of implementation up to project completion and evaluation. During this time, I was a participant observer to the project. My specific role was “dual” (Spradley 1980: 54) and entailed different ways of engaging with the co-creation actors. Firstly, serving primarily my analytical interest, I observed several of the key moments within the project. These included the central co-creation workshop, a follow-up workshop, an online participation⁴², the preparatory meetings leading up to these workshops and their debriefings, two public information events in the neighborhood, a meeting of the municipal council, the official opening of one⁴³ of the prototypes of *Urban Future Ulm*, two guided walks for citizens through the neighborhood that focused on the co-created prototypes, as well as a conference where the project presented itself to other municipalities in a cross-regional context. In addition to these key moments, I was also able to observe the project team in their quotidian work practices by

⁴² Replacing another co-creation workshop due to the Covid-19 pandemic

⁴³ Due to the Covid-19 pandemic, only one prototype, the mobility hub, was launched with an official event.

joining them at their offices and attending several of their internal meetings. Moreover, I observed over a dozen of events that related to *Urban Future Ulm* more loosely, such as participatory workshops in other, more mature smart city initiatives of the municipality, or participatory workshops in other neighborhoods of the municipality. I also attended both the local neighborhood café and several cultural events and familiarized myself with the neighborhood by walking all of its streets while documenting my impressions with an audio recorder.

Secondly, as over time I became embedded deeper into the project and more familiar with its actors and practices, I participated more actively in some of its aspects, serving both my analytical and normative interest. For instance, I collaborated with the project team to conduct an online workshop on citizens' expectations towards participation and co-creation, conducted a workshop with senior citizens on participatory research methods in smart cities, or filmed an introductory video about *Urban Future Ulm* together with the project team. I also submitted a joint abstract with the executive board to conduct a collaborative workshop on participation and co-creation with smart city practitioners across Germany at a national conference on digital infrastructural planning (8. Fachkongress IT Planungsrat 2020), which was accepted, but cancelled due to the Covid-19 pandemic. Moreover, I designed and implemented six reflexive group interviews with different co-creation actors, including one reflexive workshop bringing together members of the project team of *Urban Future Ulm* with one of the other SCALINGS urban energy case studies. Table 3 (Annex) provides an overview of my ethnographic engagements.

To describe the degree of a researcher's involvement in participant observation, Spradley (1980) proposed different types of participation along of a continuum of involvement, ranging from non-participation (i.e., collecting data by observation alone) to complete participation (i.e., studying a situation where the researcher has already been part of). Along this continuum, I would consider my involvement between active and moderate, which entailed for me to maintain a balance between differentiating myself from the actors involved in my case study, and producing joint output, like in the form of workshops or conference participation. This combination of being both an observer of my ethnographic site and an active participant in the shaping of some of its aspects has given me uniquely profound insights into my case study. In particular, I was able to follow not only the key moments of its co-creation process or respectively its public representations, but also the seemingly mundane dynamics, processes, rationales, and shifting perceptions that emerged throughout the project.

From a more normative perspective, I was able to address directly with the project team some of the questions that have been driving us in SCALINGS and me specifically around socially responsible participatory approaches to innovation. As a consequence, I developed a deep and quite intimate understanding of some of the challenges of *doing* co-creation. At the same time, this overlap between my role as observer and embedded participant placed me in an ambivalent position, where I did not only produce disciplinary scientific knowledge through observation and analysis of my ethnographic site, but also produced and shared knowledge in the very context of my object of study, thus contributing to its shaping. This ambivalence has confronted me with a number of methodological challenges, for instance, in the several instances when I was approached for practical advice of how to do co-creation ‘better’, in ‘more inclusive’, or in ‘more efficient’ ways. While these interactions gave me important insights into the project actors’ motivations and priorities, they also made it more difficult for me to disentangle my own analytical interests from the prioritizations of the project actors and to justify my research priorities when they diverged from these prioritizations. To contextualize, understand, and, at times, delineate my own role in this process, I found Niewöhner’s (2016: 10) notion of co-laboration particularly helpful:

Co-laboration [...] is not about a joint opus as in cooperation, but about a shared process of labour. And it is always experimental in character: without telos. It is about conducting joint epistemic work, experimenting with formats, without necessary aiming for a shared goal. [...] It is not primarily aimed at changing the world or producing something permanent in between disciplines or actors. It is about experimenting with different ways of seeing and being-in-the-world with the purpose of advancing anthropological knowledge production.

Seeing my empirical engagements with *Urban Future Ulm* as an attempt of co-laboration allowed me to enter a “shared epistemic territory” (Felt et al. 2016: 15) with the project actors that foregrounded the joint reflection on the practices and outcomes of co-creation, as well as the experimental tinkering with alternative approaches over the production of guidelines, let alone (allegedly) generalizable ‘best practices’. With this in mind, I deliberately focused my co-laborative engagement on open formats of knowledge exchange and seized many opportunities to discuss my work-in-progress with a diverse range of project actors. Some of these challenges of being embedded, also in regard to my pre-existing relationships with my empirical site, I discuss in more detail in section 3.3.

In the context of my participant observation, I applied the principle of informed consent as follows: For the internal observations and interactions that exclusively concerned the project team and other formally involved municipal actors, I first obtained informed consent from the project head and asked them to communicate my presence and function to all members of their staff. Furthermore, in specific interactions, especially when new people were involved, I carefully explained my identity and function in the context of the project. I made sure to provide my contact details to all participants and encouraged them to both approach me with any arising questions or concerns and express their refusal if they did not wish to be portrayed in a pseudonymized way as part of this work. At larger public events where it was not feasible for me to obtain voluntary informed consent from all participants, I ensured that the project team would communicate my presence and purpose to the participants at least in a general way. In all personal interactions with individual participants, I took the time to carefully explain my identity and purpose in the project. Whenever these conversations turned out longer or resulted in an interview, I also addressed how I would analyze, store, and protect their data, provided my contact details, and encouraged them to ask any questions and address any concerns they might have as a basis to obtain their informed consent. As part of all of my ethnographic work, I produced jotted notes, which I then transformed into more elaborate field notes in an iterative writing process.

Qualitative Interviewing

Furthermore, the second article of my dissertation draws on a series of qualitative interviews that I conducted between 2019 and 2021 with a range of actors connected to my empirical site, including members of the executive board, members of the public, researchers involved in the project, as well as other involved stakeholders. Like the rest of my empirical material, I approached my interviews from a constructionist perspective. This means that I conceptualized my interviews primarily as conversations in the sense of interactive, iterative, and generative processes between interviewer and interviewee. Rather than an account of what may appear to be objective truth (if such exists), I see interviews as a reflexive, genuinely social process that allows me to understand how my interviewees construct their social realities and make sense of their lived experiences. With this perspective, I draw in particular on the works of Holstein and Gubrium (1995) and Speer (2002), who describe interviews as discursive spaces where interviewee and interviewer encounter as equals who jointly construct narratives and meaning. Hence, in my interviews I focused on how my interviewees interpreted co-creation as a social format, the roles they ascribed to themselves and others, the challenges and conflicts they experienced or expected, the hopes they harbored, the futures they imagined, as well as the

ways in which they saw co-creation intertwined with these challenges, hopes, and futures. At the same time, I allowed myself the space and flexibility to be guided by the topics that my interviewees considered relevant beyond what I had anticipated in preparing my interviews.

In total, I conducted 25 semi-structured interviews of between 26 and 94 minutes, seven semi-structured group interviews / moderated discussions of between 61 and 87 minutes, and eleven ethnographic and street interviews of between 7 and 23 minutes. By ethnographic interviews, I refer to the often more spontaneous and thus shorter conversations I had with project actors, e.g., during events, which I structured around fewer more focused and event-specific probes. By street interviews, I refer to the random outreach to citizens in the neighborhood, which I performed to also include some of those members of the public who did not necessarily fall through the filter of being aware of *Urban Future Ulm* in the first place (as was the case for members of the public who attended the workshops and events related to the initiative). This is also the reason why my ethnographic and street interviews were considerably shorter, one being as short as seven minutes. Naturally, no broad narrative can emerge in such a short time about how, if at all, interviewees position themselves in relation to the co-creation initiative. Nonetheless, I have decided to include these interviews in my empirical material, as they offered insights especially into the non-perceptions of the project and its rationales that were equally prevalent in the project neighborhood.

In some sense, the group interviews or moderated group discussions constitute a unique case within my interview study. This is because they emerged out of my embedded role within the research process, rather than being a planned part of my initial research design. During the course of my fieldwork, in particular with the beginning of the implementation phase, I noticed an increased desire among some of the project actors to engage in a broader reflexive process about their progress, practices, and expectations. In the spirit of collaboration, or, rather, “co-laboration” (Niewöhner 2016), I decided to facilitate this exchange through a series of moderated group discussions. The focus of these group discussions was no longer the dialogical exchange between me the researcher and a single interviewee at a time, but rather the ways in which multiple project actors generated shared narratives about their work as well as the potential conflicting perceptions that emerged. (Although, of course, I am aware that both through my presence and preparation/moderation of the discussions I was still an active part in constructing these narratives). For the project actors, so the feedback I received, these discussions helped facilitate their own collaborations. For me and my research, they provided uniquely profound insights into how these same actors articulated and negotiated their

perspectives among each other and which new interpretations of how they practiced co-creation emerged in the process.

I conducted my interviews in either German or English, depending on the preferences of my interviewees. Some interviews I conducted in person, others online via Zoom and, in one case, in the form of a telephone interview. Prior to each interview, I outlined to my interviewees the purpose and methodology of my study, as well as how I would analyze, store, and protect their data as a basis to collect their informed consent. Whenever possible, I audio-recorded and transcribed these interviews in preparation of my subsequent qualitative analysis. Only in the case of the eleven ethnographic and street interviews, I relied on note-taking and immediate (i.e., on the same day) detailed written elaboration of these notes. For the German interviews, all quotes I use as part of this dissertation are my own translations from German into English. All names used in interview quotes and excerpts from my field notes are pseudonyms, including the name of my case study. In addition, I have decided to only quote directly from those interviews for which I have informed consent to publish the interviewee's real name alongside their position in order to ensure the privacy of my interviewees to the largest extent possible. This decision was primarily due to the fact that Ulm is small enough that, despite my consistent use of pseudonyms, conclusions could be drawn about specific individuals based on their position alone. This notwithstanding, my analysis and interpretation build on the content of all interviews. Table 4 (Annex) provides an overview of these interviews.

Document Analysis

Lastly, I draw on an extensive analysis of a total of 111 documents I collected while engaging with my empirical case. These documents were published between 2019 and 2023 and included internal documents related to *Urban Future Ulm* (such as the complete documentation of its funding application or the project's detailed decision model), external documents related to *Urban Future Ulm* (such as presentations, press releases, and advertisement materials), and documents not directly related to the project but relevant to understand the municipality's wider innovation landscape (such as the municipality's smart city strategy and data ethics concept). Moreover, I analyzed six speeches delivered by the mayor to the citizenry and the municipal council as part of an annual ceremony for the years 2018–2023, video material (on the project and Ulm's smart city landscape), websites (both of the municipality and the funders), and a selection of 66 print media articles released in the local press⁴⁴ between 2015 and 2023 covering

⁴⁴ The majority of these print media articles have been published in the *Südwest Presse*, an Ulm-based daily newspaper covering around two thirds of Baden-Württemberg with a total circulation of just over 228,000 copies

Urban Future Ulm, any of the municipality's other and thus related smart city projects, or its wider innovation landscape. Table 5 (Annex) provides an overview of these documents.

In terms of document collection, I followed a combination of different approaches. Most of the documents I encountered over time during my ethnographic work. This includes documents that the executive board identified to me as relevant (especially internal and some of the external documents related to *Urban Future Ulm*) as well as documents that I myself deemed relevant in the course of my endeavor to better understand the project and its wider context. Already before I began my ethnographic work, I was aware of the speeches, which represent a unique urban political tradition in Ulm⁴⁵. As part of this annual tradition, the incumbent mayor gives an account of important current and future policy developments. For the years of my observation, this included – as I had correctly suspected – concrete references to my empirical site as well as numerous wider reflections on the role of innovation and digitalization in urban society. I analyzed these speeches in their written form and observed them either in person or, for the pandemic year 2020, online via livestream. In addition to my continuous readership of the local press during my ethnography, I searched the archive of the most widely circulated local daily newspaper for articles on the *Urban Future Ulm* project as well as the Ulm's other smart city initiatives and included these in my analysis.

I consider these documents as part of the written discourse surrounding *Urban Future Ulm* and the broader innovation and smart city context of the municipality, including the role that co-creation was ascribed within these contexts (see Asdal & Reinertsen 2022). Analyzing these documents contributed to my understanding of how the executive board imagined and, in analytical interplay with my ethnographic and interview data, practiced and reflected upon co-creation, as well as how imaginations and practices and reflexive accounts of the executive board evolved throughout the project. They also revealed how the executive board communicated all these aspects through different channels and to different audiences, such as members of the public, policymakers, academics, business stakeholders, and funders. The newspaper articles further illustrated how these accounts were reflected in Ulm's wider media landscape and aligned with some of the broader innovation narratives that circulate in the

as at 2022 (Südwest Presse 2023). In the Ulm area, the *Südwest Presse* represents by far the most widely distributed daily newspaper.

⁴⁵ The tradition of *Schwörmontag* (Oath Monday) dates back to the *Großer Schwörbrief* (Great Proclamation of Oath) of 1397. This document settled a dispute between guilds and patricians and granted equal voting rights to all members of the city parliament. With reference to this historical event, the incumbent mayor of Ulm once a year gives public account of recent political developments and concludes his speech (*Schwörrede*) by swearing “to be a common man to rich and poor in all things equal, common and honest without any reservations” (Stadt Ulm 1997: 8).

municipality. As with the EU innovation policy documents underlying the first article of this dissertation, I do not consider these documents to be objective representations of a truth about how the project actors conceptualized co-creation. Rather, I drew on them as partial insights into some of the value assumptions about co-creation advanced in the context of the project (Linders 2008; Silverman 2015; Asdal & Reinertsen 2022). What I found particularly relevant here was the way in which the executive board communicated their value assumptions to members of the public. Complementary to my ethnographic work and the conducted interviews, I thus obtained an ever clearer picture of which specific form of co-creation was practiced in the context of my case study and how some value assumptions of co-creation were foregrounded over others. The documents thus represent one of the central foundations for my analysis of how such articulations, negotiations, and enactments of value assumptions of co-creation affected both the project's outcomes and co-creation practice.

Other documents that are part of my empirical material, but not included in my analysis, are the photos (of events, of the project neighborhood, and of project prototypes) that the executive board made available to me, as well as the photos that I took myself in the context of my work. Although I have not performed a critical visual analysis of these photos (323 in total), I have used a selection of them for the second article of my dissertation as well as for the interlude to give the reader an idea of the project's environments and specific moments of my fieldwork. The photos provided by the executive board are licensed under CC0. Individuals at the co-creation workshop have expressed their informed consent to be photographed. Additionally, I have blurred all faces to protect their privacy to the largest extent possible.

3.2.3 Data Analysis

To analyze and interpret all material within this dissertation, i.e., my sample of EU innovation policy documents as well as my ethnographic field notes, interview transcripts, and documents collected as part of my three-year participant observation of *Urban Future Ulm*, I drew on an iterative inductive approach which was guided by a constructionist grounded theory-based approach as proposed by Charmaz (2006; see also Strauss & Corbin 1998; Corbin & Strauss 1990). Early conceptualizations of grounded theory date back to the 1960s, in particular the works of sociologists Barney G. Glaser and Anselm Strauss. Instead of applying existing theories or concepts on the empirical material in a deductive way, Glaser and Strauss (1967) postulated that the researcher should *ground* her theoretical concepts in, i.e., develop them from her empirical material through inductive reasoning. Other scholars have taken up this methodological framework in the following decades, moving away from its original positivist

assumptions and rigorous codified methods. Instead, they placed the study of practices and approaches to understanding these practices through interpretation at the heart of grounded theory (Charmaz 2006; 2002; 2000; Bryant 2002).

It is this constructionist interpretation of grounded theory that sociologist Kathy Charmaz (2006: 1) invites us to join on what she called a “grounded theory adventure” and I gladly accept her invitation with my dissertation project. Approaching my data through constructionist grounded theory analysis allowed me to move from thick descriptions (Geertz 1973) of my empirical material to a deeper understanding of representations and rationalizations of, as well as emerging meanings associated with co-creation. Instead of following traditionally naturalistic ways of asking *what* co-creation is, I devoted my analytical attention towards questions of *how* co-creation was imagined and enacted in – and through – both discourse and practice. Taking a constructionist stance, I consider social reality as a constant interactive and (re)iterative process between actors and their situated contexts, whereby I, the researcher, neither can nor desire to exclude myself from these interactions. Likewise, I consider my data and analyses as “social constructions that reflect what their production entailed” (Charmaz 2006: 131). Looking at my data through a constructionist grounded theory-inspired lens allowed me to reflect on my own role as a researcher, particularly in how I give specific shape to my material, which at the same time afforded me the openness to adapt my research methods and analytical steps to the circumstances of the ongoing research process. This in turn allowed me to appreciate the contingency inherent in my research and consider my conclusions “practical, intellectual and emotional accomplishments” (Coffey 1999: 1) grounded in both my empirical material and the research process.

I coded all my empirical material assisted by a qualitative data analysis software (MaxQDA), starting with several rounds of initial coding. In this phase, I aimed to remain close to my data and coded as open-endedly as possible for the analytical pathways that emerged from my data. Only for my analysis of EU innovation policy documents, I chose to code for how the term co-creation was taken up already during open coding, thus reflecting my general empirical interest in the material. In my coding, I was particularly attentive to coding data as actions (e.g., ‘framing a social challenge as an economic one’) in order to systematize my material without succumbing to the temptation of prematurely imposing existing concepts on the material. Through these several rounds of initial open coding, I gradually arrived at a coding framework that reflected the most common analytical themes emerging from my empirical material.

Building on these themes, I entered a second phase of more focused coding with the aim of refining and interconnecting my analytical categories until reaching a point of saturation. In the case of my analysis of EU innovation policy documents, I focused on the discursive formations around co-creation. As for my field notes, interview transcripts, and documents related to my case study, I paid particular attention to the co-creation practices that I encountered throughout my empirical material. I proceeded by interpreting my analytical categories. For my analysis of EU innovation policy documents, I did so by asking: “How are different value propositions inscribed into as well as (re-)produced and solidified by the EU co-creation discourse? Which discursive formations revolve around co-creation? And, what are potential implications of co-creation entering the European political arena?” (Ruess et al. 2023: 437). For my field notes, interview transcripts, and documents related to my case study, I asked: “How is co-creation performed? Which relationships form between actors? And what kinds of tensions emerge?” (Ruess & Müller in press). However, following a grounded theory-inspired research design (Charmaz 2006), I did not consider these phases to be separate from each other nor from the data collection itself. Rather, I conceptualized my research and analysis process as iterative and interconnected. Starting my coding work early and continuously going back and forth between analysis and further empirical data collection allowed me to follow-up on tentative analytical ideas in the field and thus sharpen my analysis.

Although I did not orient my coding process around specific preconceived concepts, but aimed to be guided by my empirical material, I recognize that, as a researcher, I always carry pre-existing perceptions, ideas, and skills, which inevitably influence how I interpret empirical data and make sense of what I see. For me, it was the existing STS research on public engagement in particular, which I studied intensely as part of working on my dissertation and thus informed my view of co-creation. The same applies to the several years of continuous exchange on the diversity and situatedness of co-creation practices across Europe, which my colleagues and I have engaged and continue to engage in as part of the SCALINGS consortium. But what do these inescapable lenses through which I view both the world and my research do to the idea of a method of analysis that is supposed to feed purely and impartially on empirical data? Kathy Charmaz (2006: 48) constructs her answer by quoting Dey (1999: 251): “There is a difference between an open mind and an empty head”. I agree with both of them. Throughout my analytical process, I tried to remain open to what my empirical material offered me. At the same time, whenever I did encounter linkages to existing concepts or debates, I neither suppressed nor immediately embraced their analytical trajectories, but acknowledged them as one of the possible interpretations of my material. Relating the results that emerged from my empirical

material to these linkages and discussing them along previous and existing STS debates – both for the individual articles and in Chapter 7 of this dissertation – helped me situate my own work within this wider research context.

3.3 Seeing Through My Own Eyes: Reflections on Embeddedness

Ring, ring. My colleague and I look up from our screens to the office phone we share. Ring, ring. This time, my colleague is quicker to pick up, only to hand me the receiver a moment later: “Anja, for you.” I am a little puzzled. Less than an hour had passed since I had emailed the head of Urban Future Ulm to inquire whether we could have a conversation in the hope of a potential collaboration between the project and SCALINGS. At the other end of the line is Susanne (who we will encounter frequently in my field accounts). Susanne seems pragmatic; immediately suggests a meeting with us and two other of the project’s executive board members. By video call, that is, to which I respond that I could instead easily step by at her office. After all, that would be just a five-minute walk from my home. “Oh, so you live in Ulm?” I notice how Susanne’s voice brightens. “That’s wonderful! Excellent! Of course, it’s always nicer in person, let’s do it that way!” (field notes, 20190219).

Doing ethnographic research means becoming part of an ethnographic site that is a specific constellation of time, place, actors, and social situations. As researchers, we become part of such settings as we seek to learn about their specific practices and dynamics through what we see, experience, and witness. Becoming part, however, equally means *being* part, relational to and no longer separable from our ethnographic sites. What and how we see, experience, and witness is subject to a mutual shaping of the research context and our presence. In other words, without our presence, the social situations we observe would most likely unfold differently.

Over the course of working on this dissertation, and particularly in the context of my ethnographic work with *Urban Future Ulm*, I experienced in many instances how strongly and complexly my own ethnographic self was intertwined with the context of my work. In certain concrete cases, I also experienced clearly how these entanglements contributed to actively shaping my research context and hence my epistemic object. As the above vignette illustrates, the fact that I myself was a citizen of Ulm at the time of my ethnography likely turned out to be among the most substantial ones. Taking a constructionist stance towards my research, I do not consider such entanglements to constitute a problematic condition or a form of contaminating my research field. On the contrary, I appreciate my active role and performativity in the shaping of data collection and analysis as a form of “withness” (Sørensen 2012: 431; 2009) – in contrast

to common notions of the ethnographer as passive witness, observer, or fly on the wall – with my field and its actors. With this sub-chapter I would like to create a space to reflect on some of the most tangible forms of embeddedness I experienced during my doctorate as well as on the ways in which they have shaped both my research process and the perspectives I advance in this dissertation. These include in particular (1) being both researcher and citizen of my wider ethnographic site, (2) being both researcher and evaluator, as well as (3) augmenting the co-creation discourse by doing research on co-creation.

(1) I was born in Ulm and have lived there for all but 5 years of my life. This includes the time I worked on this dissertation project. I grew up and went to school in Ulm, used to sit on the city's children and youth parliament, am involved in a number of local organizations and many of my friends still live in the city, too. My parents and grandparents (and probably a few generations before them) are and were residents of Ulm. My identity is deeply linked to the city. For me as a researcher, this means that my ethnographic self had already been inextricably interwoven with my ethnographic site before I began my fieldwork. Although I neither live nor have lived in the project neighborhood itself, I had been familiar with the administrative structures of the municipality including many of the local initiatives and actors (e.g., one of the coordinators of a smart city project related to *Urban Future Ulm* went to school with me). Before starting to work on my dissertation, I held certain pre-existing ideas about how my field was structured, which dynamics were at work and which cultural-historical factors could play a role for *Urban Future Ulm*. In other words, 'going native' was never a choice for me, simply because I had been native to my field all along.

In practice, this became particularly noticeable when many doors would open extremely swiftly for me after I revealed to my case study partners that I was from Ulm and still based in the municipality. This was not only the case with Susanne, who responded so positively to my local affiliation in the above vignette. Similarly, with some of my other interview partners, especially those not part of the executive board, I got the impression that they would open up somewhat more to me once they had identified me as a local – that I was not just an alien researcher but shared with them the characteristic of being a fellow citizen⁴⁶. Apart from the fact that living in my (wider) field enabled me to join relevant events easily and, in some cases, also quite spontaneously, the history I share with my ethnographic site made it easy for me to familiarize myself with the conditions, actors, and practices pertaining to my field. At the same time, I

⁴⁶ This went as far as a candidate for the municipal council supplying me with a whole pile of promotional material for himself and his party after an interview that was scheduled a few weeks before the elections, asking me to distribute the material among my family and friends.

realize that my preconceived notions are of course not innocent. As I have explained before, in my work I sought to approach my field and the empirical material that emerged from it with openness and curiosity. This has included the effort of not jumping to hasty conclusions that would present themselves to me, including those arising from the pre-existing assumptions I held about my field. Nonetheless, I am aware that the way I have looked at my field, the ways I have interacted with it, and the conclusions I have drawn from these encounters are a product of my specific form of being in and being part of my field.

(2) Between 05/2020–12/2021, Sebastian Pfotenhauer (SCALINGS coordinator) and I conducted the official project evaluation of *Urban Future Ulm* in addition to my research work. This has not only led to overlaps between SCALINGS and my dissertation, as described earlier, but also influenced the position I held and was attributed in my field. When I started working on the evaluation, I noticed that I was confronted with less skepticism and questions about my role than before – especially in contexts that included actors I had not met in person before and despite me introducing myself with an emphasis on being a researcher who was *additionally* conducting the project evaluation. I believe the latter indicates that I was primarily perceived as an evaluator in these situations. Being both and simultaneously researcher and evaluator of the initiative confronted me with a number of additional expectations and very practical challenges. Suddenly, it was necessary for me to make assessments and value judgments about the project, which also became part of my *raison d'être* in the project. On the one hand, this concerned the formal evaluation reports, i.e., interim report and final report (Ruess & Pfotenhauer 2021). On the other hand, I was also asked for my ad hoc assessment on several occasions. One example of this was a meeting of the municipal council during which I was unexpectedly asked to provide an assessment of the project's innovation potential, albeit attending as an observer. As Amanda Coffey (1999: 35-36) noted in her work on the ethnographic self:

Selves and identities are fragmented and connected; open to shifts and negotiations. They are ambiguous, the outcome of culturally available and defined interactions, actions, meanings and values. The self is not so much complete and rounded, as partial and multiple. This has consequences for the self in the field and the ways in which the self interconnects with others in the field.

Indeed, her accounts reflect much of what I have experienced especially in the context of my work on the evaluation. For me, situations like the municipal council meeting created conflicting perceptions of my identity and form of being in the field, in particular the roles that

my interlocutors ascribed to me. That is, I attempted to practice good research by capturing the social situation in as much detail as possible, while also living up to my role as evaluator by providing a scientifically grounded yet for the audience tangible assessment of the project, informed by joint reflection about learnings, and all of this all at once. Although thinking of my work as co-laboration (Niewöhner 2016) helped me to embrace the fragmentation of my *self* in the field, dealing with my roles in practice was not a straightforward exercise. This was particularly the case because, at least with the evaluation reports, I was expected to deliver a productive component, which would complicate true co-laboration in Niewöhner's sense. Ultimately, being able to tailor the reports strongly to our joint reflections on practices and learnings from the project was the result of numerous conversations with the executive board and not least their genuine interest in both my work and way of working.

However, my work on the project evaluation has not only impacted my own role in the project, but also the project itself. By feeding back into the ongoing project, e.g., through the formalized evaluation reports and the ad-hoc assessments I was asked to provide at various moments, I contributed to actively shaping the project's direction and some of its practices⁴⁷. While from a research perspective I believe it important to deal openly and reflexively with such dynamics, they have made me very aware of how complex it is to swap a purely critical-analytical viewpoint for a pair of normative shoes. And that I, too, cannot advise on how to implement co-creation in a good way, but can at best point out some of the aspects⁴⁸ that ought to be considered on the path towards more responsible and socially inclusive forms of practicing co-creation.

(3) Lastly, it is important for me to acknowledge that through my research on co-creation I contribute to feeding the topic itself back into the discourse at a more general level. This pertains to the academic discourse (through my dissertation, related publications, and presentations at various conferences) as well as discourse among practitioners, policymakers, and publics (through engaging with my case study, working on the SCALINGS Roadmap, and conducting various other outreach formats). I am aware that by focusing on co-creation, I am also augmenting its relevance. Through my work, I hope to make a modest contribution that does

⁴⁷ This became particularly concrete in the case of one prototype of *Urban Future Ulm*, the mobility hub, which I researched with a group of students as part of a seminar on co-creation. We, i.e. my students and I, jointly raised concerns about the lack of multilingual information material on the prototype in a feedback session with members of the executive board. Our feedback resulted in the material being immediately translated into English and made available in the project neighborhood.

⁴⁸ Based on both my work and the work of the SCALINGS consortium.

not simply promote co-creation, but offers empirically grounded critical reflection on co-creation and its effects in discourse and practice.

3.4 Doing Fieldwork in Times of a Pandemic

Parts of the ethnographic work I build my dissertation on have taken place under the conditions of the global Covid-19 pandemic. For my empirical case *Urban Future Ulm*, this entailed that some of the co-creation events could not take place as planned or were replaced by online formats, in particular one large online participation towards the end of the implementation phase, where citizens were invited to evaluate a range of project prototypes by typing their perspectives into an online forum. While I was able to observe and analyze the discussions that evolved within this forum, I am aware that the digital environment affects the participation format and that often only certain parts of society use online services at all. Moreover, written dialogues between co-creation actors do not allow for the same degree of interaction as a physical space would, where co-creation actors don't remain anonymous and bodiless behind plain textual statements, but create intimate interactions, that – beyond the content of the spoken word – become shaped through gesture, facial expression, or intonation. While the results of this online discussion did offer relevant insights into the perceptions and expectations of different members of the public towards the outcomes of my empirical case, I realized through my analytical labor that these written accounts speak less to the dynamics and negotiation processes embedded in co-creative practices than did the central co-creation workshop that initiated *Urban Future Ulm*.

At the same time, the pandemic affected my interviews in different ways. In particular, I had to re-conceptualize a number of interviews that were initially planned in person into online formats. To this end, I mainly used Zoom as well as, in two cases, the municipality's own open-source-based video conference infrastructure. For most of the interviews, this did not entail any significant (or rather noticeable) constraints. Particularly with the project actors I had known personally from my previous work and with whom I therefore shared a certain degree of familiarity, switching to an online format turned out relatively easy. However, a small number of my planned interview partners decided to withdraw from the interview, as switching to an online or telephone format (or any other alternative formats I had offered, such as conducting the interview outside, with physical distance and face masks) was not an option for them. This was part of the reason why I decided to complement the semi-structured interviews and group interviews with street interviews I conducted with citizens that I randomly approached in the project neighborhood and that were eager to engage in a conversation with me. As described

before, most of these street interviews turned out much shorter than my other semi-structured and ethnographic interviews and thus rarely produced narratives. Nonetheless, I appreciated the opportunity to engage in these shorter conversations with members of the public, several of which had not heard of the co-creation initiative, and be able to glimpse into some of their perspectives and life worlds.

4. Article 1

Anja K. Ruess, Ruth Müller & Sebastian M. Pfotenhauer: “Opportunity or responsibility? Tracing co-creation in the European policy discourse”

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ABSTRACT

Co-creation seems to be flourishing across innovation policy discourses: The concept suggests that engaging diverse actors throughout innovation processes will unlock new sources of innovation and conduce robust outcomes. While co-creation seems to embrace new and diverse participation opportunities, it is necessary to interrogate how it affects existing notions of public engagement. In this paper, we explore the discursive uptake of co-creation in European innovation policy. Drawing on a qualitative discourse analysis of European Union (EU) publications, we scrutinize the value propositions of co-creation and discuss them in light of the existing public engagement literature. We find that the EU tends to foreground alleged economic benefits of co-creation over questions of social justice. To that effect, it consistently conflates citizens, consumers, and users and blurs the line between self-motivated opportunity and democratic legitimacy. Countering the prevalent co-creation optimism, we propose a more nuanced outlook on co-creation that should prompt further scholarly inquiry.

Key words: co-creation; collaborative innovation; public engagement; research and innovation; European Union; science and technology studies.

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4.1 INTRODUCTION

Before you leave

Ask the planners, politicians and decision makers to consider me in their future strategies, in all of urban planning and development. Not only me, ask them to consider all of us; we are the common people – who work vital essential humble jobs in local communities. [...]

Yes, we are many. We are different. We are random, but we are not obstacles, we are positive potentials for better future [sic]. Together – we are one. Our unity is our humble diversity. We are unity without uniformity and diversity without fragmentation. [...]

Ask them – kindly with a warm smile – not to divide but to collect us and connect each one of us to the whole society. Encourage them to combine and blend our humble fragments together in the fabric of this world. We may still be random fragments but if you can deliver this message To Whom It May Concern, so you can call us the Blessing Fragments.

(From: A message from a bread baker, Egyptian Pavilion at the 2021 Venice Architecture Biennale)

Over the past decade, *co-creation* has emerged as a new, widely-desired concept in innovation policy, both at the discursive level and in practice. While co-creation can take many shapes, the term broadly denotes the participation “of diverse actors, such as companies, universities, policymakers, and members of the public, in innovation processes” (Müller et al. 2021: 2). Its promises are manifold: On the one hand, co-creation is described as a way of unlocking new sources of innovation, aligning product features with user needs and hence making co-created innovations more successful in the market (Prahalad & Ramaswamy 2004; von Hippel 2006). On the other, co-creation is heralded as an opportunity to enable inclusive, socially robust, and thus more democratic forms of innovation (Bentzen 2021; Robinson et al. 2021). All hopes associated with co-creation revolve around the fundamental belief that connecting diverse individuals, or *humble fragments*, creates a generative space for innovative breakthroughs for the benefit of all. From this perspective, the *bread baker*, whose message welcomed the visitor to the Egyptian Pavilion at the 2021 Venice Architecture Biennale, emerges not only as an

allegory for all members of the public⁴⁹, striving to make their voices heard, but also as the key to *a better future* – both universally and transcending into specific (e.g., planning and innovation) contexts. For the latter, the proliferation of co-creation could be read as a manifestation of her plea.

Co-creation is not an entirely new concept: Since the 1960s, policymakers and social scientists alike have framed public engagement as a new governance mode that invites different actors to consult about technology-grounded matters and thus a central element in decision-making processes in modern democracies. This “participatory turn” (Jasanoff 2003: 235) manifests in a surge of participation activities across technological domains. Policymakers have often portrayed public engagement as a promissory solution to “wicked problems” (Rittel & Webber 1973: 160). Participation, so they hope, would help mitigate techno-political controversies often attributed to irrational publics or the decreasing authority of decision-making institutions, e.g. nuclear risk and waste governance, genetically-modified organisms, or Bovine spongiform encephalopathy (BSE, more commonly *mad cow disease*). At the same time, Science and Technology Studies (STS) scholars in particular, have demonstrated empirically (and criticized) that participation tends to be understood by policymakers as a tool to reduce public opposition towards innovation and restore public trust (Irwin 2006; Wynne 2006a) or as “decision justification” (Stirling 2006: 102). Rather than creating spaces for dialogue (Stirling 2008), participation exercises are often designed to promote and solidify policymakers’ preconceived notions of desired technological outcomes, which raises the question of whether refusal of these technologies is an option at all. Particularly for this reason, the STS community has argued for a shift *from deficit to dialogue* (Irwin 2014, 2006; Stilgoe et al. 2014) and, increasingly, for engaging publics throughout the innovation process (Nowotny 2003; Wilsdon & Willis 2004).

Policy circles seem to progressively acknowledge such need to include societal actors in deliberation processes about the design and implementation of technologies. Particularly in the European Union (EU), this “‘new wave’ of public engagement where ‘co-creation’ is a key notion” (European Commission 2016a: 16) has led to a proliferation of engagement concepts, like open innovation, citizen science, or Responsible Research and Innovation. Co-creation could be considered one response to the desire to include publics early in the shaping of innovation before design choices are made. While this interpretation puts co-creation in a favorable light, it remains to be explored whether this is indeed the predominant understanding

⁴⁹ We use the term ‘members of the public’ to refer to individuals acting in a private capacity; we do so to avoid implying specific connotations as do many of the actors’ categories we have encountered (e.g., citizens holding citizenship, civic rights and responsibilities).

of co-creation emerging in contemporary policy landscapes and – if not – what other versions circulate.

With this article, we contribute to the growing debate about co-creation as a new mode of involving publics in research and innovation. We provide a critical analysis of the discursive formations around co-creation in a selection of EU policy-related documents published between 2010 and 2020. Focusing on publications that discuss co-creation as a primary topic in science and technology, we draw attention to how co-creation is framed in the European policy discourse. We concentrate particularly on the value propositions attached to co-creation, new figurations of citizens as co-creators, and emerging opportunities and responsibilities for members of the public.

We start our article by engaging with the origins of co-creation in the marketing and business literature. We then focus on two major strands of the innovation policy debate, one discussing co-creation as an emerging concept and the other addressing public engagement as a precursor for co-creation. We proceed by presenting our selection of EU policy documents. We examine these documents to identify different ways in which they attach value to co-creation and analyze how these value propositions relate to each other. Building on our analysis, we discuss the discursive uptake of co-creation in the EU in light of the existing STS literature on public engagement and draw conclusions on its role in research and innovation.

4.2 LITERATURE REVIEW: CO-CREATION BETWEEN MARKETING AND PUBLIC ENGAGEMENT

4.2.1 Marketing Research, Open Innovation, and the Origins of Co-creation

In innovation contexts, co-creation has its origins in the marketing and business literature. The term was prominently coined in the academic literature by marketing scholars Prahalad and Ramaswamy (2000, 2004). The authors describe co-creation as the joint development of products, services, and experiences involving customers as “cocreators of value” (Prahalad & Ramaswamy 2000: 80). Following this reasoning, the broader body of business literature depicts co-creation primarily as a method to unlock new sources of innovation, focusing on the creation of economic value in the private sector (Vargo & Lusch 2004; Grönroos 2011). This relationship between co-creation and economic value is based on two main assumptions: First, co-creation increases consumer satisfaction by aligning product features with consumer needs (Grisseman & Stokburger-Sauer 2012; Alves et al. 2016). Second, and as a result, co-created

products are more successful in the market, thus generating competitive advantage (Prahalad & Ramaswamy 2004).

Taking a slightly different focus, the open innovation literature considers co-creation in the context of inter-organizational knowledge flows and user-driven innovation. Here, the integration of external knowledge into innovation processes is described as a means of reducing information asymmetries between consumers and developers, thus making innovation both more effective and democratic (von Hippel 2006; Chesbrough & Schwartz 2007). Various authors have discussed the economic potential of co-creation in specific settings, for instance, university-industry collaborations (Hughes 2014), business incubators (Eriksson et al. 2014), or makerspaces (Lensing et al. 2018). With co-creation at the core of many recent initiatives to improve innovation processes and outcomes, some authors diagnose the arrival of the “co-creation paradigm” (Ramaswamy & Ozcan 2014: 280) and refer to co-creation as a “magic concept” (Voorberg et al. 2015: 1334) or “panacea” (Lystbæk et al. 2019: 4), which would help craft robust solutions to challenges of all kinds.

These promissory elements have been considered problematic by a number of critical marketing and business scholars. Their critique pertains in particular to co-creation as a manifestation of the asymmetric relationships between consumers and producers as well as increasingly blurred boundaries between work and consumption (Fontenelle 2015). According to some authors, co-creation in business contexts is deeply rooted in power imbalances, as consumers invest their time, effort, and knowledge as quasi-suppliers for the benefit of corporate innovation, all under the guise of empowerment, community, and consumer freedom (Zwick et al. 2008; Bauer & Gegenhuber 2015). Other authors criticize co-creation as an enabler of consumer exploitation through the commonly unpaid nature of consumer contribution (Cova et al. 2015; Gabriel et al. 2015) or, at a meta-discursive level, as an empty signifier that reproduces hegemonic logics of governing already disadvantaged communities (Tesfaye & Fougère 2022).

4.2.2 STS Engagement with Co-creation

While co-creation has become a widely-discussed concept in the marketing and business literature, there are also a small but growing number of scholars who address the discursive uptake of co-creation from an STS vantage point, foregrounding societal and political questions of including publics in innovation. These authors draw on decades’ worth of STS research on public engagement with science and technology, which we will partly discuss later. For now, two recent strands of STS inquiry into co-creation seem particularly instructive.

The first interrogates the role of co-creation in participatory innovation governance. In their systematic review of peer-reviewed articles on co-creation in wind energy development, Elkjær et al. (2021) find that the majority⁵⁰ of the literature understands co-creation as a participatory governance instrument. Here, co-creation is often linked to promises of better socio-technical outcomes, increased outcome legitimacy, and, more generally, increased social justice in innovation. They also identify that the literature suggests new roles for citizens: Co-creation opens up design processes to citizens, rather than confining their participation to the agenda-setting phase, while at the same time valuing actors' different, potentially changing interests. As Horst (2021) points out in an essay on the alleged democratizing potential of co-creation, co-creation demands that actors voice their interests rather than abandon their perspectives in the interest of collective agreement. However, it tends to amplify perspectives of the active while excluding those unwilling or unable to participate. Co-creation does therefore not automatically account for equitable participation, nor does it increase participation in itself. As Horst puts it, "the process of co-creation is [...] only as democratic as the participants are able to make it" (Horst 2021: 1). This critique raises questions about how co-creation is used not only in practice but also as a concept with specific connotations and value propositions.

Second, a small number of scholars have focused on co-creation at EU level. Macq et al. (2020) have studied the evolution of public participation in the European Commission's research and innovation policies (1998–2019). They identify a temporal shift within these policies from a focus on deliberation (2000–2010) to Responsible Research and Innovation (2010–2014) and, more recently, to production logics (2014–present). Alongside this shift, co-creation emerges as a key mechanism for involving societal actors in shaping innovation. Publics are constructed "as consumers and potential co-creators of science, technology, and innovation, rather than potential contributors to debates about how to govern them" (Macq et al. 2020: 509). While this analysis provides important accounts of the wider context in which co-creation is situated, the emergence of co-creation within a discursive trajectory that understands participation as production calls for an analysis specifically devoted to co-creation and its value propositions.

Other studies address this gap only partially or with another focus. Over roughly the same investigation period as Macq et al. (2020), Broekema et al. (2021) point to co-creation as an emerging category in the European social innovation discourse. In their 1995–2018 analysis of European policy-related documents, the authors highlight the role of co-creation as both a

⁵⁰ Elkjær et al. (2021) describe three emerging notions of co-creation: co-creation as co-production of identities and interests, co-creation as innovation in socio-technological systems, and co-creation as participatory governance.

participatory process and an indicator for successful social innovation. According to Broekema et al. (2021) co-creation and social innovation are part of the same policy paradigm, which has gained importance over Horizon 2020. This assessment is largely shared by Robinson et al. (2021), who discuss co-creation as a link between “the open science emphasis of H[orizon] 2020 and the open innovation accent of Horizon Europe” (Robinson et al. 2021: 1). While the authors frame co-creation as an opportunity for “fair and equitable” (Robinson et al. 2021: 5) innovation, they also stress that meaningful participation of publics often remains an open question.

These few reviews notwithstanding, there is to date a rather limited amount of studies focusing on the discursive representations of co-creation, both in general and specifically at EU level. While the analyses reviewed earlier are helpful starting points for our analysis, what remains to be examined is the discursive landscape unfolding around co-creation, specifically in light of its value propositions and potential consequences. In particular, it is worth scrutinizing how current debates around co-creation relate to, or could be inspired by, previous work on public engagement with science and technology.

4.2.3 Public Engagement – Deliberation or Legitimization?

STS has a long and rich tradition of studying the roles of publics in so-called public engagement formats. As the lines between public engagement and co-creation are often blurry, conceptually and in practice, we adopt the following basic distinction: In contrast to co-creation, where explicit attention is aimed at the shaping of innovation processes by different actors (Müller et al. 2021), public engagement broadly refers to the inclusion of societal actors in policymaking, usually after design choices have been made. Public engagement opens up traditional governance models of representative democracies, which assign decision-making duties to elected officials, often in consultation with experts, yet without further public reference. This broad idea of involving publics in policy- and decision-making comprises numerous formats for enabling participation. One example is the so-called consensus conferences, which originated in 1987 in Denmark as a form of participatory technology assessment. Following the Danish model, a representative group of approximately fifteen members of the public convene for 4 days to deliberate on a question framed by an advisory committee (Joss & Durant 1995; Dryzek & Tucker 2008). Other formats include citizens’ juries, deliberative opinion polls, or

town meetings⁵¹. Although the participation methods differ across public engagement formats, most of them share an orientation towards collective agreement among representative groups of citizens. In many European countries, public engagement is considered a legitimate route towards democratizing science and technology policy (Hagendijk & Irwin 2006; Felt & Fochler 2010). STS scholars like Wynne (2006a), Irwin (2006), Nowotny (2003), or Felt and Fochler (2010) have critically engaged with such promissory elements. Based on these field-shaping accounts, we summarize four of the core issues emerging from the STS debate on public engagement, which we expect to be pertinent to our analysis of co-creation.

A first central concern of this debate has been the relationship between policymakers' preconceptions of "both democracy and 'the public'" (Chilvers & Kearnes 2019: 3) on the one hand and the design and evaluation of engagement exercises on the other. Several authors have emphasized the performative character of public engagement. Laurent (2011), for instance, describes public engagement instruments as "technologies of democracy" (Laurent 2011: 650) that embody normative ideals, thus performing a distinct version of democracy. Drawing on the concrete example of citizen panels, Voß and Amelung (2016) show that participatory formats generate a kind of leverage effect, whereby epistemic authority grounded in participatory formats in turn enables political authority. As Felt and Fochler (2010) demonstrate, policymakers inscribe visions of society into engagement formats through the construction of mini-publics. Imagining fractions of the public as representative of a larger collective presupposes a classification system of the wider citizenry (Goodin & Dryzek 2006), which can be understood as a means for "making up people" (Hacking 1986: 161).

Second, the question of how publics are (pre-)conceived is related to how members of the public are invited to participate in engagement exercises. While demographic characteristics constitute the most common approach to establishing representativeness and legitimacy (Irwin et al. 2012; Mohr & Raman 2012), STS research has drawn attention to the inequities of demographic attributes and how they may affect engagement processes and outcomes (Reardon 2007; Sovacool et al. 2020). At the same time, policymakers tend to favor invited over spontaneous or uninvited participation, thus neglecting the potentially productive role of dissent (Wynne 2007; Cuppen 2018). As Wynne (2007) points out, the process of invitation can be considered a systematic exclusion mechanism of critical or undesirable opinions. Similarly, Irwin (2006) identifies an implicit commitment to collective agreement at the heart of contemporary scientific governance. This omnipresence of so-called consensus as a seemingly achievable goal

⁵¹ For a typology, see Rowe and Frewer (2005).

suggests the dominance of a homogeneous model of the social structure, where conflicting views are easily marginalized. Nurtured by the concern that public opinion could be captured by activists, the “innocent citizen” (Irwin 2006: 315) is prioritized over those with existing views.

Third, STS research has explored how public engagement is related to conceptions of expertise and legitimacy (Jasanoff 1987; Collins & Evans 2007). Among others, Wynne (1992) has shown how knowledge cultures are often articulated through a deficit logic that subordinates lay knowledge to expert knowledge. As Jasanoff (2005) has argued, these (implicit or explicit) knowledge hierarchies “can be seen in effect as a kind of tacit democratic theory – a theory that presumes ignorant publics in need of rescue by the state and grants science a privileged place in forming, and informing, an educated citizenry” (Jasanoff 2005: 252). In criticizing this deficit model, scholars have argued for a shift from deficit to dialogue (Irwin 2014, 2006; Stilgoe et al. 2014; Parthasarathy 2010) through political deliberation and equal distribution of influence in engagement exercises, particularly in innovation processes, where different actors might have different goals and interests. The deficit framing and its problems have also increasingly reverberated through innovation contexts (Pfotenhauer et al. 2019).

Finally, the STS critique draws attention to engagement outcomes and governance impact. Several authors demonstrate how participatory exercises are deployed to bypass public resistance to innovation (Arnstein 1969; Wynne 2006a; Stirling 2008), to capture public opinion in convenient ways (Stilgoe et al. 2014), or as a means of “decision justification” (Stirling 2006: 102), thus reinforcing incumbent power structures. As Stirling (2008) points out, public engagement often contributes to closing down decision-making rather than opening up spaces for dialog. Frahm et al. (2021) have recently argued that responsabilization efforts at the European Commission and the Organisation for Economic Co-operation and Development (OECD) can be interpreted as a “social fix” (Frahm et al. 2021: 174) to the broken promise of innovation policies and growing innovation skepticism while safeguarding and reifying existing global political-economic orders. Engagement exercises may thus stabilize policymakers’ preconceived notions of desired outcomes, with alternative perspectives being neglected or prevented from surfacing.

Based on the public engagement literature, the question arises of how the STS critique applies to co-creation and which new issues might arise. In the following, we focus on EU policy documents as important frames that legitimize and co-shape practices. By tracing the specific value propositions attached to co-creation, we examine how different notions of co-creation are

inscribed into as well as (re)produced and solidified by EU innovation policy-related documents.

4.3 MATERIAL AND METHODS

To capture the co-creation discourse at EU level, we conducted a qualitative analysis of a range of publicly available document sources published by the EU. While pre-existing documents do not establish an objective truth about co-creation, they represent distinct, at least partially agreed-upon, understandings of it. Analyzing such documents provides insights into the discursive construction of co-creation, the discursive formations that push this construction into distinct directions, and potentially conflicting interpretations (Linders 2008).

To select our empirical material, we proceeded as follows: First, we collected publications from the fifteen official EU electronic databases⁵², searching for the keyword co-creation, including its linguistic variations (e.g., verb and adjective forms). To focus on the specificities of co-creation as a new term entering the discourse – and one of the core terms used by the EU to designate public engagement activities – we did not include other, potentially related keywords (such as public engagement, open innovation, co-design, and co-production) in our search. Acknowledging that co-creation could appear across topics and institutions, we did not pre-define the types of documents or institutions to include in our study. Similarly, due to the relative discursive novelty of co-creation at EU level, we did not limit the initial search results by setting a range of dates. Our search produced a sample of 663 documents published between 2000 and 2020 by the European Parliament, the European Council, the European Commission, the European Economic and Social Committee (EESC), and the European Committee of the Regions (CoR), as well as in the gazette of record (Official Journal of the EU).

Out of the total sample, we determined a set of thirty-four core documents. We arrived at our sample by excluding duplicates (i.e., identical documents appearing in multiple databases) and paying particular attention to those publications that explicitly try to foster and mainstream co-creation (as opposed to those publications that reference the term loosely). We also focused on science, technology, and innovation, since it is the relationship among scientific authority, technical expertise, and democracy that we are interested in from an STS perspective. The

⁵² Official Journal of the European Union, European Parliament, European Council, Council of the European Union, European Commission, Court of Justice of the European Union, European Central Bank, European Court of Auditors, European External Action Service, European Economic and Social Committee, European Committee of the Regions, European Investment Bank, European Ombudsman, European Data Protection Supervisor, as well as Agencies and other bodies.

documents in our sample were published between 2010 and 2020 and include reports, brochures, parliamentary briefings, opinions, concept notes, and documents related to Framework Programme 8 (2014-20). Looking at these documents, which we found to be representative of a wider set of policy documents and statements assessed as part of the full sample, allows us to observe the uptake of co-creation in documents with an explicit focus on co-creation, as well as resulting discursive effects. What goes beyond the scope of our study is tracing how this co-creation discourse is articulated within overall EU policy rationales.

We coded our material inductively, following a grounded theory-based approach (Charmaz 2006; Strauss & Corbin 1998). We first coded for how the term co-creation was taken up in our sample, thus reflecting the general empirical interest of this study. Through several rounds of open coding, we noted three different themes that were common across our sample. In the next step, we interconnected and refined these themes, focusing on the discursive formations around co-creation until reaching a point of saturation. We interpreted the connotations of co-creation by asking: *How are different value propositions inscribed into as well as (re-)produced and solidified by the EU co-creation discourse? Which discursive formations revolve around co-creation? What are potential implications of co-creation entering the European political arena?* While we are aware that our own research perceptions, particularly previous STS research, always shape how we interpret our data, we did not arrive at our analytical themes by applying the existing STS literature to our material as pre-existing codes. Instead and inspired by grounded theory, our analytical themes emerged in the process of our analysis, by examining the discursive uses and effects of co-creation. Discussing these themes in light of the existing STS literature then helps us situate our own work in this broader research context.

While we have kept track of the institutional origins of documents, we do not aim for a systematic analysis of potential differences among intuitions nor of potential changes over time⁵³. Instead, our primary analytical focus remains the relatively young discursive landscape around co-creation that is currently unfolding.

This paper is based on some of the material collected as part of *Scaling up Co-creation: Avenues and Limits for Integrating Society in Science and Innovation* (SCALINGS), a comparative research initiative (2018-21) addressing the challenges of mainstreaming co-creation across Europe in multiple technological domains. Our analytical and interpretive work has been informed by several years of discussion on the situatedness of co-creation practices, which

⁵³ For a temporal analysis of public engagement in the EU, we refer to Macq et al. (2020).

helped identify higher-level categories and concerns that cut across specific local sites and cross-validate findings within a range of contexts.

4.4 EMPIRICAL FINDINGS: TRACING CO-CREATION IN THE EUROPEAN POLICY DISCOURSE

We proceed by examining three themes emerging from our empirical analysis, each addressing crucial aspects of how co-creation is represented within the European policy discourse. First, we discuss co-creation in light of its economic value propositions. Second, we sketch out how co-creation establishes new figurations of citizens. Third, we analyze emerging opportunities and responsibilities for members of the public.

4.4.1 Co-creation as Production

The term co-creation first formally appears in our empirical sample in a 2010 letter by Bruno Lafont, then chairman of the European Round Table of Industrialists' (ERT) Energy and Climate Change Working Group, to the former president of the European Parliament Jerzy Buzek. Lafont outlines the role of ERT member companies in “co-creating in a competitive way” (Lafont 2010: 1) a sustainable European energy economy. While the letter does not provide a definition, it implies an understanding of co-creation as a form of collective work of “industry, government and consumers” (Lafont 2010: 1) towards a seemingly shared vision of the EU energy market. Yet, according to Lafont, more is to be achieved than combating climate change: “To accelerate this transition and enhance European industry’s global leadership and competitiveness, policies designed by governments will play a key role. Side by side, industry and government can leverage knowledge, resources, technology and policy to co-create a sustainable energy economy” (Lafont 2010: 1).

Though as short as 355 words, Lafont’s letter is in several ways paradigmatic for how the documents we have analyzed attach value to co-creation. Lafont describes co-creation as a practice leading to an economic system distinguished by “global (industrial) leadership and competitiveness” (Lafont 2010: 1). He thus expresses his visions of ideal co-creation outcomes in economic terms, foregrounding technological products as desired outcomes of innovation and desirable solutions to major societal challenges.

We find similar instances that focus primarily on desired co-creation outcomes in other documents. In the City of Lisbon’s (successful) application for the European Entrepreneurial

Region (EER) Label to the European CoR in 2015, the city employed co-creation to demonstrate its entrepreneurial vision and capacity to respond to rapid systemic changes in urban development:

The tools used in the co-creation of the initiatives included in this ecosystem are also interactive [...] because they contribute with concrete results to the quality of life of citizens, specially creating new opportunities and adding value and technological solutions which facilitate their participation in city's daily life (City of Lisbon 2015: 9).

Here, the relevance and meaning of co-creation are constructed through the production of 'concrete results', namely, technological innovations and novel products. This is reinforced through a sequence of generative verbs – 'increase' (quality of life), 'create' (opportunities), 'add' (value), and 'facilitate (participation)' – to describe how co-created technologies are expected to feed back into society. While this suggests a positive outlook on co-created technological innovations, it also implicitly questions whether there is space for outcomes not leading to novel products or technologies.

The above-mentioned relationship between co-created ideas and technological outcomes was one of the core topics of a 2015 study on the impact and potential of collaborative internet and additive manufacturing by the Scientific Foresight Unit of the European Parliament. Similar to the previous example, the study depicts co-creation as "increasingly important for creating new products" (European Parliamentary Research Service 2015: 84). Additionally, it provides concrete recommendations for policymakers:

We also recommend increase funding to co-creation initiatives through European research and innovation programmes (notably Horizon2020). However, we believe that it is important to require a review of the legality of using the research results before approving projects, to ensure that project results do not turn out to be un-exploitable at the end (European Parliamentary Research Service 2015: 53).

There is one expression here that offers a particularly striking insight into how co-creation is constructed as valuable: 'to ensure that project results do not turn out to be un-exploitable at the end'. In this subordinate clause, the study establishes the exploitability of co-created ideas as the key criterion for good co-creation. While this reinforces a general orientation towards co-creation outcomes, it also interfaces these outcomes with the promise to "satisfy a fast changing market" and "ensure EU competitiveness" (European Parliamentary Research Service

2015: 84). The study thus shifts our gaze to an emerging monetary reasoning within a number of policy documents that make sense of co-creation in primarily economic terms.

The proceedings of the 2016 high-level conference on the future of work, organized jointly by the EESC and the International Labour Organization, articulate some aspects of this reasoning:

[...] phenomena like intrapreneurship, extrapreneurship and co-creation are being explored and deployed by leading businesses and organisations far from the spotlight and have the potential to become much more important than any platform-based type of activity. They allow for organisational growth and profitability, greater creativity, innovation and satisfaction and a more engaged and better-developed workforce (De Meester 2017: 3).

This excerpt from a speech held by the representative of the International Organisation of Employers and BusinessEurope Kris De Meester, the second sentence in particular, can be read as a summary of the economic value propositions frequently attributed to co-creation throughout our sample. Promises such as ‘growth’, ‘profitability’, ‘creativity’, ‘innovation’, and ‘satisfaction’ all plug into a rhetoric that establishes economic success as an unquestioned goal in contemporary societies. De Meester constructs co-creation by foregrounding its potential to increase growth and depicts ‘businesses’ as its leading role models. This discursive move, although more implicitly, anchors the authority to define good co-creation in the business sector.

Alongside the foregrounding of technological outcomes and the frequent recourse to economic terminology, another dimension of discursive formations keeps reappearing throughout our sample: Already the earlier representations of co-creation, Lafont’s aforementioned letter included, tend to portray co-creation in the context of a specific problem or challenge, such as “the fight against climate change” (Lafont 2010: 1). By positioning co-creation vis-à-vis an alleged solution (‘co-creating a sustainable energy economy’) in several consecutive instances, Lafont creates the impression that co-creation would help achieve this solution.

Similar discursive constructions emerge from more recent accounts of co-creation in the European policy discourse. Annex 2 of the 2017 interim evaluation of Horizon 2020 focuses on the Europe in a changing world – Inclusive, innovative, and reflective societies subprogram, which included a call⁵⁴ dedicated to exploring co-creation approaches and outcomes: “Calls

⁵⁴ H2020-SC6-CO-CREATION-2016-2017: “Co-creation for growth and inclusion” (European Commission 2016c: 9).

like CO-CREATION [...] enable innovation while at the same time responding to societal challenges like inclusion and growth” (Directorate-General for Research and Innovation 2017: 1406). In this one sentence, the evaluators construct co-creation by drawing an explicit link between ‘enabling innovation’ and ‘responding to societal challenges’ while also immediately presenting ‘inclusion and growth’ as key challenges that commensurably exist at the same level and are in no obvious conflict with one another. This connection suggests that co-creation can produce useful outcomes in response to incumbent challenges. At the same time, these challenges delineate a scope for implementing co-creation. With ‘inclusion’ and ‘growth’, the interim evaluation and the original call provide two examples of ‘societal challenges’ that co-creation initiatives should focus on. This is remarkable, since it introduces one of the central economic value propositions of co-creation (‘growth’) explicitly as a social issue on par with the goal of inclusion.

A 2018 opinion of the EESC on the establishment and implementation of the Horizon Europe Framework Programme echoes this framing:

The EESC strongly believes that the co-creation approach, engaging all the stakeholders in the knowledge and innovation community, is the basis to boost European competitiveness, job creation, social cohesion, in particular combating youth unemployment, and environmental protection in line with the UN 2030 Agenda and the Sustainable Development Goals (SDGs) (European Union 2019: 35).

Similar to many of the documents we have presented earlier, the EESC refers to co-creation as the ‘basis’ for a number of desirable, mostly challenge-based innovation outcomes. In addition, the passage constructs co-creation through specific stakeholder communities. What both these aspects have in common is that they position economic terms side by side with non-economic ones: ‘Stakeholders in the knowledge community’ are mentioned in one breath with the ‘innovation community’. ‘European competitiveness’ and ‘job creation’ are enumerated equally in rank with ‘social cohesion’, ‘combating youth unemployment’, and ‘environmental protection’. Such juxtapositions suggest conceptual proximity and intertwine the rhetoric of economic growth, which we have identified earlier as an integral part of the discursive framing of co-creation at EU level, with challenges that are fundamentally social and political in nature.

Many of the documents we have analyzed exhibit similar forms of interfacing the economic with the social as part of the discursive construction of co-creation⁵⁵; some passages even aggregate social and economic value propositions into the promise of “socio-economic value for the European citizens” (European Commission 2016b: 14). This blending of terms creates the illusion that addressing social challenges would be seamlessly compatible with economic growth. Suggesting that the economic dimension goes hand in hand with the social, however, ignores the possibility of tension between the two. Moreover, what is particularly striking is that economic arguments for co-creation can stand by themselves, while the social arguments are always conflated with economic values. This suggests a hierarchy of value propositions whereby the economic value of co-creation emerges as dominant over its social value.

4.4.2 Configuring Participants: Citizens, Consumers, and Users

It is these narratives of value propositions that often include imaginations of the individual as the central figure in co-creation as both contributor and beneficiary. Here, the desired outcomes of co-creation tend to be preceded or followed by plural nouns, such as “civil society” (European Commission 2018b: 91), “citizens”, “consumers”, “users” (European Union 2013: 19), “customers”, “end-users” (European Commission 2018a: 10), or “co-creators” (Directorate-General for Internal Policies 2015: 10). These nouns appear in various constellations to describe members of the public as participants in co-creation. As the CoR states in a 2013 opinion on ‘Closing the Innovation Divide’:

Broad-based innovation policy creates the preconditions for systemic operating models that combine in a co-creation dialogue the needs of users, consumers and citizens, alongside knowledge, creativity and competence (European Union 2013: 19).

The enumeration of users, consumers, and citizens as a tricolon suggests not only a semantic connection but also one with regard to content. This creates the impression that not three distinct groups (users, versus consumers, versus citizens) are invited to participate in co-creation, but that one and the same figure (the citizen who is also a consumer who is also a user) are imagined and invoked in multiple ways. On the one hand, this suggests interchangeability of ‘users’, ‘consumers’, and ‘citizens’. On the other, the boundaries among the original terms in their independent meanings become blurred. This is particularly the case if we read the tricolon as

⁵⁵ Only the public sector negotiates co-creation in partially different ways, focusing more on diversity and good governance (European Commission 2016c). Still, even these passages reveal the economic constraints under which municipalities operate.

an analogy seeking to emphasize the alleged similarities among the terms. Unpacking such analogies helps us understand some of the key discursive instruments through which the European co-creation discourse stabilizes the dominance of economic values. Consider this passage from a 2018 Commission Staff Working Document and Impact Assessment on establishing Horizon Europe:

R&I missions should be easy to communicate, in order to mobilise citizens and end-users in their co-design and co-creation. In turn, this increases the relevance of science and innovation for the society and it would stimulate the societal uptake and deployment of innovative solutions and leverage business investment (European Commission 2018b: 95).

The quote places the figure of the citizen, commonly understood to possess civil, political, and social rights and responsibilities, within the context of primarily economic value propositions, such as ‘stimulat[ing] the societal uptake and deployment of innovative solutions’ or ‘leverage[ing] business investment’. This is done without further explanation of the roles that these rights and responsibilities should play in co-creation. The quote employs an analogy, here ‘citizens and end-users’, to describe the central figure imagined to participate in co-creation. Again, this analogy establishes a connection among citizens with their rights and responsibilities on the one hand and end-users with their perspectives as future consumers on the other. As research on the practices of making analogies has shown (Stepan 1986)⁵⁶, it also provokes a conceptual interaction among the terms that changes both ends of the analogy: By placing ‘citizens’ and ‘end-users’ side by side, the reader’s associations with both terms interact, evoking new meaning that applies characteristics previously belonging to only the ‘citizen’ to the ‘end-user’ and vice versa.

What we see emerging in this and similar documents is a new figure imagined as the central participant in co-creation: a figure constantly oscillating among the citizen, user, and consumer. Such multiple invocations cause slippages, while at the same time, all invocations are changed in relation to each other. This leads to a valorization of consumers and end-users through their association with citizens, in particular, the civic rights held by citizens along with their fundamental role in political representation and the legitimacy of government in democracies.

⁵⁶ Historian Nancy Leys Stepan (1986) shows that analogies provoke an interaction between the subjects they join. For instance, ‘women’ and ‘lower races’ were frequently linked analogically in nineteenth century scientific theorizing, “such that the scientist could use racial difference to explain gender difference, and vice versa” (Stepan 1986: 263).

Conversely, the perception of citizens is also shifting towards an economic understanding, as the qualities of consumers and users of new technologies are now attributed to them.

Interestingly, the documents predominantly invoke the qualities of consumers and users (or, by extension, citizens being understood through these qualities) to illustrate the benefits of their participation in co-creation rather than the other way around: Specific “knowledge, creativity and competence” (European Union 2013: 19) attributed to citizens, “a plethora of new ideas” (De Meester 2017: 3) emerging from dialogue with citizens or an orientation towards users’ needs “to take full advantage of ideas’ cross-fertilisation leading to experimentation and prototyping in real world setting” (Directorate-General for Internal Policies 2015: 78) all plug into principally economic value propositions. This suggests that the discursive shift is asymmetric and that economically relevant qualities of consumers and users are emphasized more strongly than the merely implicit valorization of consumers and users in civic terms.

4.4.3 Co-creation between Opportunity and Responsibility

The framing of participants also provides insights into a more general understanding of the relevance of stakeholder engagement within the European innovation policy discourse. This is well-illustrated by the following excerpt from a 2018 Commission Staff Working Document and Impact Assessment on establishing Horizon Europe:

All EU Institutions stress the importance of involving citizens more profoundly in the co-design and co-creation of R&I contents to maximise the impact generated by the Framework Programme. The European Parliament recognises the importance of society playing a more active part in defining and addressing the problems, and in jointly putting forward the solution (European Commission 2018a: 30).

Through the iteration of the term ‘importance’, citizen involvement is placed at the core of co-creation in the EU’s research and innovation initiatives as an alleged tool to ‘maximize the impact’ of Horizon Europe by ‘putting forward [joint] solution[s]’ to societal problems. This is reinforced by multiple comparative adjective and adverb forms (‘more profoundly’, ‘more active’). Drawing on the comparative rather than the positive forms establishes a future-oriented commitment to strengthening existing forms and enabling new forms of participation. The designation of all EU institutions as responsible entities suggests a cross-institutionally stable understanding of co-creation and a higher level of accountability towards this pledge.

Particularly the desire to facilitate more and novel occasions for participation through co-creation emerges as a dominant rationale. A 2015 study on open innovation in industry, including 3D printing, provided by the Directorate-General for Internal Policies to the Committee on Industry, Research and Energy of the European Parliament states:

[...] open innovation, user innovation and open source also provide new opportunities for citizens and end users, by enabling them to co-create and directly contribute to innovations, but also by providing new impetus for grass-root innovation movements and new alternative ways of organising production and consumption (Directorate-General for Internal Policies 2015: 57).

Here, the study focuses on co-creation as a means to open up spaces for citizens – or rather the blended figure of the citizen-user – to participate in innovation. This is reinforced by an almost inflationary mobilization of the adjective ‘new’, which plugs into the economized value propositions discussed in the first section of our analysis. At the same time, the study employs an empowering rhetoric, shifting the driving force of innovation towards the ‘grass-root’ and thus the citizen.

While several other sources also associate co-creation with empowerment, perhaps no other document sums up this idea as precisely as the CoR’s 2018 brochure on the Future of Europe:

Every European citizen should be given an opportunity to co-create Europe’s future (European Committee of the Regions 2018: 33).

Formulated as a social imperative for participation, the CoR values co-creation as an opportunity for citizens participating in the collective envisioning of desirable futures for the EU. Referring to ‘every European citizen’ suggests inclusion and equitable access to this conversation. However, the term ‘opportunity’ dilutes this imperative from a mandatory political process to a voluntary expression by interested parties, along with the conditional form ‘should’ (which implies advisability rather than determination). While opportunities can create new spaces for participation, they can also aid the closing down of such spaces for some members of the public, requiring citizens to actively make the effort to make their voices heard. This is particularly the case if the discourse lacks reflection about the socio-economic resources needed to enable participation.

While such talk of opportunity permeates the representations of co-creation at EU level, a second layer is drawn into the discourse, placing co-creation at the center of the tension between

opportunity and responsibility. Taking another look at Lisbon's 2015 application for the EER Label to the CoR, this becomes particularly apparent:

Lisbon is promoting local networks in order to give citizens, companies and organizations opportunities to actively participate in the co-creation of ideas and projects to foster the entrepreneurial dimension of the city. This is a regional integration and cooperation strategy aiming to answer to the crisis and jobs creation, mainly targeted to all those citizens who want to be entrepreneurial and co-create innovative projects (City of Lisbon 2015: 9).

There is one notable expression here that demonstrates how the City of Lisbon envisages opportunities for co-creation in light of this tension: 'mainly targeted to all those citizens who want to be entrepreneurial and co-create innovative projects'. With this subordinate clause, 'opportunities' for active co-creation are turned into options for those who want to participate, while questions of equity, representation, or inclusion remain unaddressed. The figure of the entrepreneur is invoked to delineate active citizens from a silenced rest. What remains unclear is if and how the city accounts for this rest, for those who cannot or do not want to take the opportunity to co-create.

The framing of co-creation as an increasingly individualized, discretionary, and economized exercise goes hand in hand with a form of privatization, shifting responsibilities from governments towards civil society. Interest representation in innovation processes therefore arises as an option for only those who want to or can be involved. Nonetheless, in some policy documents, we find an implicit awareness that not all will have the resources to devote and sustain such efforts and that only some can take advantage of the "opportunity to co-create Europe's future" (European Committee of the Regions 2018: 33). For instance, a call for projects in the Horizon 2020 2018-20 Europe in a changing world – Inclusive, innovative, and reflective societies subprogram asks proposals to assess how co-creation "can help overcome the lack of equity as regards [...] the concrete involvement in the innovation process of traditionally underrepresented social groups" (European Commission 2018c: 23). However, this does not seem to have consequences: Already the following sentence reveals that involvement seems to be understood mainly as "attract[ing] different types of stakeholders involved in the innovation value chain" (European Commission 2018c: 24), while there is no substantive deliberation about how to empower these stakeholders to participate in co-creation. It therefore becomes essential to question how practices such as the discursive shifting of responsibilities to the citizens in the name of participation might obscure the complexities of

ensuring participation regardless of the socio-economic position, thus reinforcing existing inequities instead of overcoming them.

4.5 DISCUSSION AND CONCLUSIONS

In this article, we have aimed to illustrate how European policy-related documents discuss co-creation in the context of research and innovation. Departing from the rich tradition of STS research on public engagement with science and technology, which we consider an important precursor to co-creation, we show that many of the questions and concerns STS scholars have raised in relation to public engagement resonate with our observations regarding the discursive uptake of co-creation. While the criticisms of both concepts are quite similar, what we want to foreground in this section is their new, economic guise we have encountered in our analysis.

First, we show that the European policy discourse portrays co-creation as a catch-all solution to a multiplicity of problems, with attention aimed primarily at its alleged benefits. We observe a tendency to formulate these benefits in economized terms, often directly supported by economic value propositions (such as growth, profitability, competitiveness, or added value), the desirability of which remains generally unquestioned. This is consistent with prior observations around the logic of a proliferating “innovation imperative” (Pfotenhauer et al. 2019: 902) and corollary logics of participatory practices as a “social fix” to challenges to this imperative (Frahm et al. 2021: 174). Moreover, our findings resonate with existing analytical accounts of social innovation research. Much like co-creation, the discursive representations of social innovation are shown to promise transformative potential in numerous policy processes (Moulaert et al. 2013) while employing a similar kind of narrow economic terminology (Jessop et al. 2013). Importantly and in addition to its economic benefits, co-creation is framed as a solution to societal challenges. Here, our analysis points to an active blending of societal and economic challenges, creating the illusion of seamless compatibility between the two framings.

Second, our analysis suggests a hierarchy of values in which alleged economic benefits of co-creation can stand by themselves, while social benefits are always connected to the economic ones or imagined as attainable through techno-economic progress. As other studies suggest, such a shift towards ideals of production and entrepreneurship might take place across engagement formats (Macq et al. 2020). The growing attention that policymakers pay to co-creation could thus be considered a symptom of potentially larger political-economic entrenchments or further reconfigurations. To understand the consequences of this shift, we consider Haraway’s notion of narrative fields particularly helpful. As Haraway (1984) has

shown for primatology⁵⁷, placing emphasis on specific versions of a phenomenon gradually rearranges its narrative field and ultimately changes its meaning. For our example, the strong economic overtone we see in co-creation seems to reconfigure the narrative field of stakeholder participation in research and innovation: Engagement formats that do not include economic aspects become increasingly implausible, as does the possibility of rejecting technologies.

Third, we find that the discursive construction of co-creation through its economic value propositions gives rise to a new figure of the citizen as a predominantly economic actor, which we encounter in multiple consubstantial⁵⁸ invocations as the citizen, consumer, and user. As the new figure is framed to always embody all three roles at the same time, these roles appear inseparable from and not conflicting with each other. Based on previous research on the practices of making analogies (Stepan 1986), our analysis shows that the constant oscillation among these invocations blends and changes their original meanings. We consider this slippage problematic on two levels: On the one hand, the growing relevance and valorization of consumers or (end-)users as participants in co-creation gloss over the complex questions of how to ensure democratic representation in participatory processes, which STS scholarship has widely discussed as a sensitive governance issue in the context of public engagement (Felt & Fochler 2010; Irwin et al. 2012; Mohr & Raman 2012). On the other, the blending of citizens, users, and consumers causes subtle alterations to citizens' perceived roles and responsibilities, as their participation in research and innovation is increasingly constructed as a function of consumption.

Fourth and finally, we illustrate the fine line between opportunity and responsibility that co-creation is treading. Employing a rhetoric of empowerment, co-creation tends to be portrayed as a means to open up spaces for citizens to participate in innovation, which – in contrast to the idealization of “innocent” (Irwin 2006: 315) perspectives in deliberation-oriented forms of public engagement – would welcome and value all kinds of different interests. As our analysis shows, the discourse strongly emphasizes the manifold and seemingly equal engagement opportunities that co-creation would offer, whereas substantial considerations of procedural requirements (such as representation, inclusive recruitment, agency in decision-making, accountability, or transparency) are lacking. Co-creation therefore emerges as an increasingly

⁵⁷ In her 1984 essay on primatology as politics by other means, Donna Haraway demonstrates how feminist accounts have gradually restructured the narrative field of primatology (Haraway 1984).

⁵⁸ Consubstantiality refers to being of the same substance, but different in aspect. The term is used in Christian theology to describe the relationship between Father, Son, and Holy Spirit as a threefold, yet inseparable entity (Augustinus 2003).

individualized and discretionary exercise that opens up spaces of participation only for those willing and able to make their voices heard. This notion is highly problematic in itself, as the absence of equity-oriented procedural requirements involves the risk that participation opportunities close down for already underrepresented groups. Once again, our observations resonate with findings from social innovation research, which identify the EU's social innovation policy discourse to shift responsibility from traditional welfare providers to individuals through a rhetoric of empowerment and alleged mutual benefit (Fougère et al. 2017). At the same time, our findings tie into a larger debate about neoliberal reconfigurations of democracy and state (Foucault 2008), parts of which manifest in the privatization of government responsibilities (Kinchy & Perry 2012) and the responsabilization of individuals (W. Brown 2015) for their own political representation.

Our observations capture the discursive formations around and effects of co-creation in the EU within a still relatively young, unfolding discursive landscape. While the methodological choice to study only publications with an explicit emphasis on co-creation limits the scope of our study, it provides some salient entry points for further research into both EU high-level innovation strategies and overall EU policy rationales more broadly.

Meanwhile, our analysis reveals the trade-off that is at stake for democracies, as policymakers increasingly endorse co-creation in research and innovation processes: the possibility of altering innovation following democratic principles and the danger of altering democracy following innovation principles, the latter of which carries significant market-liberal and technocratic overtones (Laurent 2017). Facilitating the former and impeding the latter require authentic commitment to procedural requirements for co-creation oriented towards equity and social justice, for, in the absence of such requirements, co-creation faces the danger of reinforcing existing inequalities under the veneer of participation. Here, the STS literature on public engagement may be a particularly valuable resource and starting point.

So how can we open up avenues towards a *better future*⁵⁹ through co-creation in European innovation contexts if the discursive trend points in a completely different direction? Rather than surrendering to the ubiquity of economic reasoning, we see the results of our analysis as an invitation for social scientists from all disciplines to foreground and address the normative direction currently taken within the European co-creation discourse. Only by tackling these blind spots, may we contribute proactively and normatively to the discussion about what

⁵⁹ As envisioned by *the Egyptian bread baker*, whose plea for inclusion preceded our article

responsible co-creation should (or should not) entail. This will require researchers to examine how practitioners translate abstract ideas of co-creation into practice. At the same time, what we want to emphasize in particular is the need for intervention at the discursive level to develop new visions of co-creation and for substantial deliberation on how participation and co-creation can be enabled in societies where wealth disparities are growing and common good terms increasingly disappear for the benefit of economic impact and growth.

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5. From European Discourse to Municipal Practice

With the first article included in this dissertation, I provide insights into how European policy-related documents discuss co-creation in science and innovation within a relatively young and unfolding discursive landscape. My analysis shows that many of the concerns raised by STS scholars in the context of public engagement with science and technology, which I discuss as an important precursor to co-creation, resonate with my observations around the discursive uptake of co-creation. At the same time, my observations emphasize how co-creation introduces subtle shifts to the narrative field of participation that foreground outcome-oriented economic ideals of production over procedural questions of equity-oriented participation of publics in and throughout innovation processes (Ruess et al. 2023). While these results bring to light important challenges and blind spots that arise from the discursive uptake of co-creation for the ways in which contemporary Western democratic societies conceptualize the participation of publics in science, technology, and innovation, they simultaneously raise a range of additional questions that cannot be addressed by considering the discursive level alone. Rather, they prompt us to explore how practitioners translate abstract ideas of co-creation into practice, and hence the ways in which both the discursive value propositions associated with co-creation and their respective effects are reflected within practical incarnations of co-creation as a social format. These questions constitute the frame in which I situate the second article of my dissertation. With my second article, I interrogate the social dynamics emerging within co-creation practice, specifically how citizens agencies unfold, by exploring in-depth a case study of an urban co-creation project (*Urban Future Ulm*) conducted by the municipality of Ulm between 2019 and 2021.

The step from the EU innovation policy discourse to a medium-sized municipality may seem unusually large, not least since, by taking this step, I skip several governance levels (national, federal, and regional). Certainly, I do not wish to deny the value of approaching understandings and practices of co-creation at these levels, too. However, especially with respect to studying practical implementations of co-creation, I see a number of reasons why the city in particular is a budding focus of analysis: Municipalities unite diverse actors in situated governance spaces where many contemporary discourses about desirable futures take place. Many global issues as well as national and supranational policies and legislation are translated into concrete practices at municipal level. Cities are therefore a pivotal venue for addressing governance issues in general and innovation governance issues in particular up close with local residents. They thus assume a central role in the context of innovation and change-orientation, where ideas about

socio-technological futures are negotiated and tested *in-situ* (Karvonen & van Heur 2014; Eneqvist & Karvonen 2021; Gieryn 2006). To include different constellations of actors (ranging from, e.g., citizens to policymakers, private actors, and semi-public service providers) in processes of urban future-making, municipalities increasingly draw on co-creative modes of engagement (Engels et al. 2017).

As I discuss in my literature review (section 2.3.2), various STS scholars have begun to analyze practical formats of co-creation in terms of what effects they have on governance processes and what roles citizens are ascribed within these formats. A common denominator of these studies is that they raise questions about the scopes of agency citizens can assume within co-creation formats as well as how the outcomes of these formats reflect citizens' agencies: How do these agencies come into being? How are they performed? How do they feature in co-creation outcomes? And what conflicting understandings of both agencies and outcomes emerge? With my analysis, I build actively on the existing empirical accounts of co-creation, and address these questions by drawing on a long-term case study of co-creation. Specifically, I explore these questions based on my three-year ethnographic work in the project *Urban Future Ulm*, which was carried out by the City of Ulm (2019–2021) and aimed to enable wide participation of citizens as co-creators of digital solutions to their everyday challenges. With this transitional section, I provide an introduction to *Urban Future Ulm*, preceded by an overview of the City of Ulm being the project's wider innovation and policy context.

5.1 Interlude

Ulm is a city of approximately 129,000 inhabitants, located in the German state of Baden-Württemberg. It has a university with medical and natural science orientation as well as a university of applied sciences. The main sectors of the local economy include building materials, metal processing, commercial vehicles, electrical engineering and pharmaceuticals. Moreover, Ulm is home to the so-called Science Park, which was founded as a response to the economic structural crisis of the 1980s and brings together application-oriented research institutes in the fields of medicine, electrochemistry, communications technology, and mobility in the immediate vicinity of the university campus (Stadt Ulm 2022). While such parameters provide an important initial descriptive frame for Ulm's innovation context, they do not afford a palpable impression of the ways in which its innovation landscape is unfolding and of how specific culturally situated ideas and ideals of innovation and co-creation permeate the fabric of the city. Therefore, on the following few pages, I take the liberty to invite you, the reader, to join me for an interlude that is – quite literally – a short walk through the city. We begin at Ulm

Central Station and walk for about 10 minutes through the city center to the *Verschwörhaus*, where the administrative department of the City of Ulm that conducted my case study is located and where I spent many hours of fieldwork (Figure 1). Along our way, we stop at three sites that offer glimpses⁶⁰ into situated ways of thinking about innovation and thus allow us to contemplate Ulm as an innovation landscape.

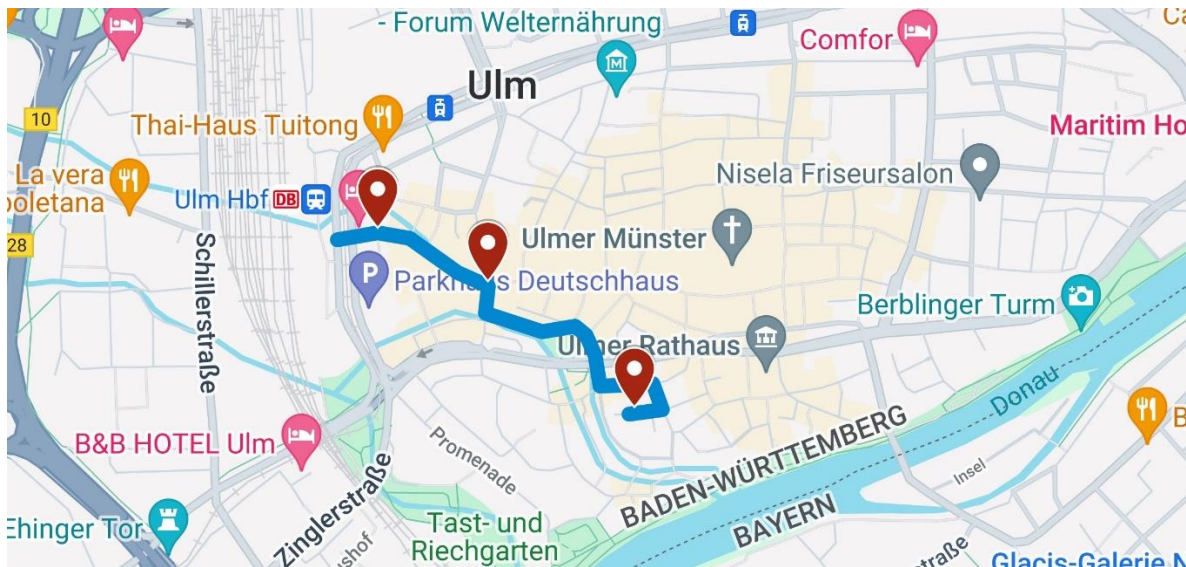


Figure 1: Route Ulm Central Station to the administrative department that conducted my case study (Map data ©2023 GeoBasis-DE/BKG (©2009), Google).

We arrive at Ulm main station after an hour and a quarter on the intercity express train from Munich. After just a few steps, as we walk through the not yet fully completed station underpass towards the city center, a striking orange advertising space catches our eye. On a total of five window panels, the city administration presents its “vision for Ulm” (Stadt Ulm, Figure 2). According to one of the panels, however, this vision does not represent a general vision for the city’s future, but one of a smart city that focuses on “innovative, digital solutions for the sustainable development of a lovable and liveable city” (Stadt Ulm, Figure 2). The advertisement not only features a short introductory text, but also elements that combine written text and visual representations. One illustration dominating the right half of the panel stands out in particular. This illustration consists of three paragraphs centered around the caption ‘Vision for Ulm’ and connected by circles, with each paragraph accompanied by a pictogram: The first, on the top left corner of the illustration, refers to the

⁶⁰ Naturally, these glimpses do not represent comprehensive insights into Ulm’s local innovation culture. Rather, they provide additional analytical streams that have emerged as part of my ethnography, primarily from document analysis. I will discuss these analytical streams in more depth with colleagues in an as yet unpublished manuscript that is not part of this dissertation (Ruess et al. 2024).

people of Ulm as “makers” with catchphrase-like expressions, highlighting the city’s unique “inventive and pioneering spirit” (Stadt Ulm, Figure 2). This paragraph is accompanied by the pictogram of a rocket. The second on the right describes how the city envisions digitalization as a genuinely local project and is accompanied by the image of a bird (the significance of which will be revealed later). This idea of a local way of doing innovation is again reinforced by the use of catchphrase-like expressions such as “By Ulm. For Ulm.”, “with and for the people of Ulm” or “we are going our own way.” Conversely, the third paragraph on the bottom left describes Ulm as a “livable city” and a “community of citizens in solidarity” (Stadt Ulm, Figure 2), where equal participation would be possible for all. This last paragraph is accompanied by the pictogram of two interlocking hands that simultaneously resemble the shape of a heart.



Figure 2: Advertisement for Ulm’s smart city projects at Ulm’s station underpass.

Taken together, these paragraphs evoke three themes that the advertisement suggests as central elements of the here prevalent vision for Ulm – inventiveness, localness, and equity-orientedness – whereby both the citizen and the digital cut across all three elements. The latter dimension in particular appears a second time on the panel: Against a faded skyline of Ulm, which forms the visual frame of the advertisement, the display of two people and a tree in brighter colors stands out in particular. The person on the left is drawn with a beard and sitting in a wheelchair. The person on the right is holding a smartphone, wearing headphones

and is drawn as a person of color, with dark skin and textured hair. This person is also wearing a dress, which, in contrast to the beard of the person on the left, can be conventionally read as feminine. The illustration thus explicitly addresses not one but three layers of diversity (sex, race, and dis-/ability), albeit in a rather stereotypical way, and imagines these layers as part of the city of the future. Concurrently, the smartphone establishes a reference to the digital as a defining component of this future, while the tree could best be read as a representation of the notions of sustainable development mentioned in the introductory text of the panel.

The window panel confronts us with an initial assemblage of values and goals that delineate how the city administration imagines Ulm as a space for innovation and what doing innovation in an Ulm-ian (*ulmisch*⁶¹) way – a term that I encountered repeatedly during my ethnographic work – could mean. For now, we hold onto this assemblage in our minds like fragments of a jigsaw puzzle, as we make our way towards the city center, still pondering what Ulm-ian innovation could mean in more concrete terms.

A City of Inventors?



Figure 3: Brass strip demarcating the original outline of Albert Einstein's birth house.

Shortly after we climb up the stairs from the underpass, our gaze falls on an oddly shaped brass strip of about 10 cm in width and embedded in the pavement of the pedestrian zone, thus demarcating a certain surface area of the ground (Figure 3). A nearby plaque reveals the significance of the brass strip, namely that 'here stood the house where on the 14th of March 1879 Albert Einstein was born'. Albert Einstein (1879-1955), theoretical physicist best

known for developing the special and general theories of relativity, is one of the figures who is repeatedly invoked throughout Ulm's innovation discourse as the "most famous Ulmer" (Czisch 2019: 24) or "most famous son of the city" (Czisch 2018: 18). Even though he only

⁶¹ Ironically and in contrast to the present intended meaning, the most comprehensive German language dictionary that traces the history of a word starting from its first documented written occurrence, the *Deutsches Wörterbuch von Jacob Grimm und Wilhelm Grimm*, defines *ulmisch* as old or musty (Grimm & Grimm 2021).

spent less than the first year of his life in Ulm, Einstein is emphasized as both having “shaped” the city and as a manifestation of Ulm’s “inventive spirit” (Stadt Ulm 2021b: 6).

As was already the case for the vision for Ulm set out in the City of Ulm’s advertising, we again encounter a reference to Ulm as a city of inventors, but this time with reference to another historical figure associated with the city. Einstein, although omnipresent in Ulm’s innovation discourse, is not alone in embodying this alleged inventiveness. Much like Einstein, aviation pioneer Albrecht Ludwig Berblinger (1770-1829), also known as the Tailor of Ulm, is invoked frequently to portray Ulm as a city of inventors through interconnecting historical figures with the modern city. For Berblinger, the innovation discourse centers around his 1811 flight attempt with a self-constructed hang glider, “which ended in misfortune through no fault of his own” (Czisch 2020: 15): Despite successful test runs in better thermic conditions, he crashed into the Danube River during a public demonstration in the presence of the King of Württemberg, for which he was despised as a fool for the rest of his life (Kurz et al. 1986). Today, Berblinger is rehabilitated in his role as an inventor and instead referenced as an example of Ulm’s capacity to “tinkering, trialing, and promoting innovative ideas” (Stadt Ulm 2021c: 3). Both for Einstein and Berblinger, the documents I reviewed as part of my participant observation never make explicit how the alleged mutual shaping between historical personalities and the city’s identity unfolds. Instead, the recurring references to Einstein and Berblinger in semantic congruence with the present-day Ulm suggest a connection in terms of content. This culminates in the use of the term “inventive spirit” (Czisch 2019: 2; Stadt Ulm 2020: 15; Stadt Ulm 2021a: 133), which anchors innovation and inventiveness as part of Ulm’s culture beyond individual personalities, while at the same time attesting Ulm to be a historically proven breeding ground for innovation.

A City of Citizens?

From Einstein’s birthplace, we continue our walk through the busy main shopping street. It doesn’t take long for Ulm’s perhaps best-known landmark to rise into the sky in front of us. At 161.53 meters, Ulm Cathedral (Figure 4) is not only the world’s tallest church tower, but also a symbol that I encountered repeatedly in my empirical work. Here, it is primarily the construction process of the cathedral that is referenced in innovation contexts and employed to illustrate the allegedly historically central role and influence of Ulm’s citizens. Ulm’s smart city strategy, for example, highlights Ulm as a “vibrant civic city”, where the citizens



Figure 4: Ulm Cathedral from main shopping street.

“have accomplished a great deal in the past and stand out in their own way” by pointing out that the city’s landmark cathedral “was built solely by the citizens of Ulm” (Stadt Ulm 2021a: 17) – in contrast to many other cathedrals of the era that were funded by clergy or noble assets. At a later point, the document revisits the narrative of the cathedral’s construction, but this time makes a clearer connection to the present: “The purposeful cooperation of city actors [...], the Ulm Way, has a long tradition and has produced one of the city’s impressive monuments – Ulm Cathedral” (Stadt Ulm 2021a: 90). This referencing of the cathedral as a historical fulcrum frames an active citizenry and

collaboration among city actors as a tradition intrinsic to Ulm. In the context of the cathedral narrative, this collaboration is joined by a productive component, underlined in particular by the adjective ‘purposeful’ (German: *zielführend*, in the sense of leading to a tangible goal). Thus, not only collaboration itself is constructed as a tradition of Ulm, but also and specifically ‘purposeful’ collaboration, with the purpose itself implied as a successful innovation outcome.

Closely linked to the construction of Ulm Cathedral is another narrative that we have, albeit only elusively, encountered earlier on our walk: the Sparrow of Ulm. We recall the pictogram of a bird used by the city administration to visualize their notion of innovation in Ulm as a genuinely local undertaking as part of the advertisement we passed in the station underpass. This same figure reappears in several other instances throughout the local innovation discourse, e.g., in Ulm’s smart city strategy of 2021 (Stadt Ulm 2021a: 31) and an information brochure on digital transformation (Stadt Ulm 2020: 15) published by the city administration in 2020 to set out their vision for Ulm’s digital future. Although nowhere is it made explicit, but the pictogram most likely depicts a sparrow, which is considered to be a symbol of the city. According to the legend about the construction of the Ulm Cathedral, a

group of workers unsuccessfully tried to pass the city gate with a large log until a sparrow with a straw in its beak inspired them to transport the log lengthwise (Baden-Württemberg 2022). Today, in Ulm the sparrow is constructed as a heroic animal and is used in various local contexts (e.g., soccer, music, carnival) to embody Ulm's citizenry. What is new is that the sparrow now also appears in local innovation contexts (especially as the legend of the Sparrow of Ulm probably rather questions than highlights the inventive spirit of the people of Ulm). Nevertheless, and although this link is not made explicit, the image of the sparrow speaks directly to the citizens of Ulm and suggests that they will be given space and agency as part of the city's digitalization strategy.

A City of Inclusion?



Figure 5: Verschwörhaus (on the right), next to the historical Schwörhaus (left).

Still in the shadow of Ulm Cathedral, we set off on the last section of our journey to the City of Ulm's administrative department that conducted my case study. The office is located in the same building complex and shares parts of its premises with the *Verschwörhaus* (Figure 5), a digital city lab and creative space launched by the city administration in 2016 to “enable the involvement of engaged citizens as central actors in shaping the

digital future of the City of Ulm” (Stadt Ulm 2023a: 1). Since then, the lab has hosted several formats, such as seminars on e-governance, programming workshops for adolescents, and educational courses, e.g., for school classes and senior citizens. Several municipal documents and newspaper articles refer to the lab as a “pioneer” (Stadt Ulm 2021a: 106) and “beacon of digital change” (Czisch 2019: 13; Aboul-Kheir 2021; Dirner 2023), as well as a “digital soccer field” (John 2016: 1) and “experimental field for the world of tomorrow” (Stadt Ulm 2020: 23). Two fundamental characteristics shine through in these formulations: On the one hand, the discursive representations of the *Verschwörhaus* emphasize the notion of experimentation, with the expression ‘soccer field’ in particular suggesting a playful engagement of the citizenry with the topic of digitalization. On the other hand, it also reveals an expectation that the city lab would generate decisive outcomes (‘pioneer’, ‘beacon’) in shaping the future (‘world of tomorrow’). These two components do not appear in

contradiction with each other. Rather, their juxtaposition suggests a causal relationship, in that specific and constructive results would follow from experimentation.

No less interesting than this framing is the unusual name of the city laboratory. In German, *Verschwörhaus* literally translates as house of conspiracy. However, the name is also a play on words with the *Schwörhaus* (house of oath), the historical building located right next to the *Verschwörhaus* lab. The historical *Schwörhaus* plays a key role in Ulm's tradition of *Schwörmontag* (Oath Monday), an annual ceremony dating back to the *Großer Schwörbrief* (Great Proclamation of Oath) of 1397, which settled a dispute between the patricians and the guilds by granting equal voting rights to all members of the city parliament. Following this tradition, the incumbent mayor of Ulm gives an account of the recent political developments and swears – from the *Schwörhaus* balcony – “to be a common man to rich and poor in all things equal, common and honest without any reservations” (Stadt Ulm 1997: 8). In innovation contexts, the city administration frequently refers to the ceremony as an expression of “civic self-confidence”, “pride in Ulm's glorious past” and “belief in the future of [the] city” (Czisch 2018: 1). In his speech during the ceremony in 2021, then Mayor Gunter Czisch explicated the meaning of this tradition:

Today, Schwörmontag is a manifestation of civic consciousness and an expression of municipal democracy. These are our deep and strong roots. Firmly anchored with them, we must open ourselves to change, to innovative mediation formats, to a combination of analog and digital elements [...]. Because what matters in the end is that our democratic tradition remains alive for everyone (Czisch 2021: 18).

With this quote, the mayor establishes the tradition of *Schwörmontag* as the basis of urban democracy in Ulm. What is striking here is his expressive terminology (‘deep and strong roots’, ‘firmly anchored’), with which he not only describes the Ulm of the present time as following a democratic order, but also interprets this democracy as a culture that has long been an integral part of the city. The fact that the Great Proclamation of Oath of the 14th century addressed only patricians and guilds, leaving large parts of the citizenry powerless, does not seem to matter here. Instead, the Proclamation becomes a rhetorical symbol for participation ‘for everyone’. From this tradition, Czisch also derives a mandate for the future that requires both ‘innovative’ participation formats and the introduction of ‘digital elements’ to complement existing analog approaches, while from the citizenry, he demands ‘openness to change’. With this outlook on the future, Czisch's mode of expression changes to a more

appeal-like incantation. ‘Openness to change’ and the appreciation of innovative and explicitly ‘digital’ approaches thus become not only firmly situated in the democratic city of the future, but are rather constructed as one of its prerequisites.

From this perspective, the *Verschwörhaus* makes a direct reference to the *Schwörmontag* narrative of equity-oriented participation as part of the fabric of the city, which is reinforced by the *Verschwörhaus* being located in the immediate vicinity of the *Schwörhaus*. At the same time, the play on words with the term conspiracy evokes an abstract image of a forged, secretive, if not even closed community, which might raise questions about who gets access to this community. Ulm’s 2021 smart city strategy envisions the *Verschwörhaus* lab as follows:

In line with the future tasks of an Ulm in transition [...], the focus is also on strengthening togetherness, social participation of citizens and individual development. [...] The Verschwörhaus is already a pioneer in this area, offering assistance to the citizenry in numerous open and freely accessible formats. This community-based approach brings techies and nerds – i.e., digital pioneers – together with less technology-savvy people and ensures an outstanding social mix (Stadt Ulm 2021a: 105).

As the quote illustrates, the document foregrounds the role of the *Verschwörhaus* as an ‘open’ and ‘freely accessible’ space. Linguistically, this is supported by a wording that appeals to the reader on an emotional level. Phrases such as ‘togetherness’, ‘social participation’, and ‘bring [people] together’ all create a sense of community and inclusiveness, which the smart city strategy describes as becoming practical reality in and through the *Verschwörhaus*. This notion of inclusive participation culminates in the term ‘social mix’, which emerges as an explicit participation goal of the city. ‘Social mix’ here explicitly refers to both technologically savvy (‘techies, ‘nerds’) and less savvy citizens, as well as, as specified in two other passages of the document, employees of the city administration (Stadt Ulm 2021a: 12) and local businesses (Stadt Ulm, 2021a, p. 85). This collaboration exhibits a twofold character: On the one hand, the actors are to learn from each other, especially with regard to “digital literacy” (Stadt Ulm 2021a: 105). On the other, they are to experiment together, whereby we encounter this particular notion of experimentation as rhetorically closely intertwined with the invocation of an abstract “digital added value” (Stadt Ulm 2021a: 12). This added value, in turn, is not presented as an optional outcome of

the ‘social participation’ (or, co-creation?) in the *Verschwörhaus* lab, but rather naturalized as its intended and desired outcome.

But what happens if the citizens defy this expectation? Starting from 2022⁶², the rhetoric of the city administration in the context of the *Verschwörhaus* has shifted towards an increased emphasis on the lab as an “open house dedicated to the digital transformation” (Stadt Ulm 2023a: 1; Dirner 2022) for everyone, “from experts to laypeople; whether administration, business, science or civil society” (Dirner 2023: 18). At the same time, a new element enters the discourse: the distinction of this “open house” from a “closed store” (Dirner 2022: 16) or “clubhouse” (Dirner 2023: 18). The background here lies in a dispute between the city administration and the *Verschwörhaus* volunteers. This dispute subsequently led to the dissociation of the volunteers along with several former employees of the city from the municipal structures, a trademark dispute before the courts, the re-staffing of the *Verschwörhaus*, which continues to be run by the city, as well as the re-founding of the volunteer-run *Temporärhaus* (temporary house) as a counter-model to the city.

In contrast to the city’s imagination of a digital city lab, the latter foregrounds “providing the space [...] for something new to emerge [...]. Without expectation. Without a mandate or even a commercial agenda [...] as a counter-model to the despised ‘lighthouses’” (Dirner 2023: 18). Here, the representative of the *Temporärhaus* volunteers directly resorts to the terminology that the City of Ulm used when promoting the *Verschwörhaus* lab as a “beacon of digital change” (Czisch 2019: 13) and, in doing so to a notion of participation that is purposefully linked to expectations and an innovation mandate. With the city not addressing this criticism, but instead continuing to refer, with even greater stringency, to the openness of the *Verschwörhaus* for all citizens of Ulm, the city seems to contradict its own identity claim of being, and having traditionally been an equity- and dialogue-oriented community of citizens. This is particularly the case in view of the *Schwörmontag* narrative, which the *Verschwörhaus* vividly draws on. Instead, it seems that “overcoming what divides us and focusing on what unites us” (Czisch 2018: 26), as Mayor Czisch outlined the meaning of *Schwörmontag* during the very ceremony in 2018, ultimately limits citizens’ agencies to the scope of this alleged consensus.

With the *Verschwörhaus* and the City’s administrative department that conducted my case study, we have reached the end of our journey through the city center – and through some of

⁶² I.e., covering the period after my ethnographic work with *Urban Future Ulm*

the dominant narratives that Ulm's city administration mobilizes to imagine Ulm as a distinct innovation space. On our walk, we witnessed how the city actively draws on historical figures and municipal heritage to construct Ulm as an innovation space 'from time immemorial', where innovation has traditionally come from the citizens and has also traditionally been both inclusive and equity-oriented. We also caught a glimpse of how these narratives are actively linked to current innovation and digitalization projects in order to rationalize and anchor them in urban society. What was surprisingly absent from this local innovation discourse is the term co-creation itself, which only appears explicitly in one instance (outside of *Urban Future Ulm*, the focus of my ethnographic work), namely in Ulm's smart city strategy of 2021. The document describes co-creation as a process that "promotes networking among different groups of actors" by "including the knowledge and experiences of all participants". Moreover, "this approach is particularly well suited to Ulm as a city of inventors and knowledge, where creative ideas have always been able to be rapidly developed into usable applications" (Stadt Ulm 2021a: 131). And yet, this notion of co-creation seems to bring together precisely the elements that make up the 'Vision for Ulm' that welcomed us on the poster in the station underpass and that we have encountered in various narratives during our walk: innovation as a project by and for the citizens oriented towards ideals of inventiveness, localness, and equity-orientedness.

We arrive a few minutes early for our meeting with Susanne, who is a member of the executive board of *Urban Future Ulm* and whom we will encounter more frequently in the second article of my dissertation. While we wait, our gaze wanders over the advertising brochures for ongoing municipal digitalization projects on display in the *Aquarium*, the public indoor space of the *Verschwörhaus* lab. One brochure advertises a flight simulator that "lets you fly over Ulm in 1890 and relive Berblinger's dream", while also "serv[ing] to prepare for the age of digitalization in a playful way" (Czisch 2018: 12). Another particularly colorful edition addresses children and invites them on a digital city walk, where they can learn "about the latest [digital] improvements in the City of Ulm" (Stadt Ulm 2022c: 1) from the Sparrow of Ulm itself. Once again, we encounter fragments of locally situated, highly specific narratives, to which more general notions of desirable digital futures become attached. We begin to ponder whether what is being presented here as an Ulm-ian approach to innovation is in fact so locally specific. Or, are we perhaps confronted with familiar more universal ideals of innovation that that we have previously encountered, not least in the context of my analysis of the European policy discourse? In cases where an allegedly

omnipresent inventive spirit is naturalized as a genuine identity of the city. Or, when the role of citizens in shaping the future of their city is stylized as a source and fixed point, but implicitly contains the *telos* of simultaneously promoting digitalization as a predestined part of this future. We are torn from our thoughts when Susanne opens the door to welcome us to our meeting. What continues to linger in the back of our minds is the question as to what might happen if this narrative of universal desirability does not endure in practice...

With the end of this interlude, we also conclude this arguably unconventional walk-through of Ulm's city center. As we walked, we were able to glimpse into some elements of how Ulm constructs and invokes a supposedly genuinely local innovation identity. Neither do these considerations constitute a yet fully developed analysis, nor do they feature in the second article of my dissertation. That said, one important observation already emerges from these fragmentary tentative insights: What is constructed as an Ulm-ian way of doing innovation seems to emerge as a localization of more universal ideals of innovation and co-creation that become tied to the histories, cultures, and identities of the city through locally highly situated specific narratives. On the one hand, this offers a potentially valuable starting point for future scholarly inquiry to explore the translations between local culture and universal innovation imperatives in more detail and discuss them, for instance, in light of previous work on regional innovation cultures (Pfotenhauer et al. 2023), isomorphic difference (Irwin et al. 2021), and technopolitical identity (Felt 2015). On the other hand, these preliminary observations reinforce the question of how prevalent notions of co-creative innovation, which we see stabilizing in both universal and local discourses, unfold in local practice. This question I address as the focus of the second article of my dissertation.

5.2 Introducing *Urban Future Ulm*

Since 2015, Ulm, like many European cities, has increasingly pursued local innovation projects as co-creative initiatives, all of which closely link their innovation ventures with co-creative public and stakeholder engagement “throughout all relevant project phases” (Stadt Ulm 2018a: 18). Several of these initiatives have attracted national attention with predominantly positive reactions: The German discourse in particular presents Ulm as an enormously successful example of a medium-sized city on the path to becoming a smart city, with the practices of involving members of the public in its smart city initiatives highlighted as a role model for other communities (Bundesministerium des Innern, für Bau und Heimat 2021). One of these

initiatives was the project *Urban Future Ulm* (2019–2021), which received third-party funding from the Ministry of the Interior, Digitalisation, and Local Government⁶³ of the German federal state of Baden-Württemberg. With a total funding volume of 7.6 million euros, the ministry provided financial support to 50 municipalities in developing strategies for digitalizing their municipal structures. Four additional municipalities, Ulm being one of them, received funding to assume “pioneering” roles in piloting “concrete digital applications” (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 2).

In order to select the beneficiary municipalities, the ministry issued a competitive tender and defined a range of criteria for what qualifies as an “intelligent pilot project” in the terms of the funding initiative. These criteria determined the eligibility of municipalities and included different aspects such as “innovativeness”, “cross-municipal networking”, “scalability”, “user-friendliness”, and “sustainability” (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 3). Throughout the call, two criteria received particular attention: Firstly, the call defined “long-term, holistic digital strategies and associated concrete digital applications” (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 2) as overarching objectives for the pilot projects, thereby establishing a clear technological focus on the development, testing, and deployment of digital technologies at municipal level. Secondly, the call emphasized in several instances the critical role of citizens in developing and establishing these digital strategies and applications. To this end, the call specified “the use of co-creative methods and interactive participation and planning formats” as being explicitly desired” (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 4). The way in which the call conflates notions of social participation through co-creation with uncontested technological and digitalization goals is strongly reminiscent of the discursive formations we have encountered for co-creation in European innovation policy documents. This becomes particularly evident when the call presented “modern technologies” and “the digitalization strategy” as preconditions for improved quality of life and as “tangible benefits” for citizens (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 2). From the funders’ viewpoint, here too, co-creation does not appear to be in contradiction with the pre-established digitalization goals of fundable projects, but is rather imagined as a means to developing digital technologies and thus appears hierarchically subordinate to this objective. The question of how this suggested compatibility unfolds in practice is the focus of the second article of my dissertation.

⁶³ Formerly Ministry of the Interior, Digitalisation, and Migration

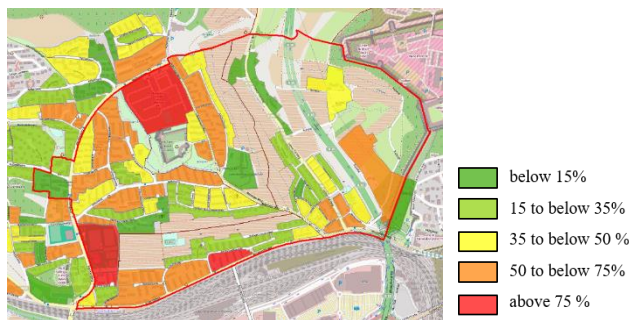


Figure 6: Outline of the project neighborhood with share of population with migration backgrounds (Stadt Ulm, 2018c, p. 4).

Based on a long-term ethnographic study conducted in Ulm, one of the four ‘pioneering’ municipalities funded⁶⁴ by the initiative, my co-author and I examine how the city enacted co-creation within this hierarchical framework. The funded project, *Urban Future Ulm*, was coordinated by an

interdisciplinary team of public servants who refer to themselves as the city’s “think tank for digital strategies and digital change” (Stadt Ulm 2023b: 1) within an administrative unit that answers directly to the mayor. Additionally, the executive board of *Urban Future Ulm* included external consultants and a non-governmental non-profit organization for sustainable economic development.

One of the project’s distinctive features was that it included a particularly strong focus on co-creative citizen participation. More concretely, the project aimed to develop and test digital solutions to citizens’ everyday challenges in one of the city’s neighborhoods, the *Alter Eselsberg* (Figure 6). The neighborhood is located in the north-west of Ulm, between the city center and the university. Approximately 9,000 inhabitants live in the *Alter Eselsberg*, of which an average of 55% have recent migration backgrounds (Stadt Ulm 2018b: 12). The settlement and population structure within the neighborhood, however, is extremely heterogeneous. Terraced houses from the 1950s are interspersed with high-rise buildings and estates built by the municipal social housing companies, built in several re-densification phases in response to the housing shortage. The development of a completely new residential area on the grounds of a former barracks only began in 2019, coinciding with the start of *Urban Future Ulm*. Against this background, the City of Ulm selected the *Alter Eselsberg* as the project neighborhood for *Urban Future Ulm* in order to “better connect the various existing and emerging living spaces [...]” and “add a digital dimension” (Stadt Ulm 2018a: 12).

To do so and to orient this digital dimension towards the life worlds of the citizens, the project envisioned a collaborative approach to redesigning the neighborhood with digital infrastructure through a series of co-creation workshops and in four topic areas: mobility, trade, energy/environment, and social life. Over the course of the project, these digital infrastructural arrangements were to be narrowed down into concrete prototypes that could be tested in the

⁶⁴ The total budget was 2.195 million euros, with the state of Baden-Württemberg contributing 880,000 euros.

neighborhood. Then, if these prototypes were deemed successful, they would be used to produce data for a municipal data platform, the development of which was also part of the project. Moreover, successful prototypes were intended to be scaled up across the city (Stadt Ulm 2018a). From this perspective, *Urban Future Ulm* adhered to the hierarchy we saw embedded in the original funding call: The project's objective was the development of digital infrastructural arrangements, with co-creation imagined as a means to achieve this objective. However, at the same time, the project envisioned these digital technologies to be oriented towards the everyday challenges of citizens and thus provide solutions to these challenges. Within this specific framing, co-creation was imagined to serve as a bottom-up process that would allow for continuous exchange with the citizens to identify their everyday challenges, imagine digital solutions, translate them into concrete digital applications, as well as to test and evaluate their feasibility.

To translate this idea into practice, the executive board envisioned a process involving four major phases: (1) In the recruitment phase, the executive board reached out to citizens in the project neighborhood with the aim to enroll them as co-creators in the project. This recruitment process focused mainly on a (2) central co-creation workshop which the executive board envisioned as the project's public kick-off event. During this workshop, citizens were asked to deliberate about their everyday challenges and develop ideas for solutions to these challenges. Besides the executive board and citizens, this co-creation workshop also included a range of local project partners (e.g., a software company), which the executive board anticipated to become relevant stakeholders in the implementation of these (digital) solutions. (3) Following the central co-creation workshop, initial ideas were assessed, prioritized, and fleshed out as concrete prototypes to be submitted to the municipal council for decision-making. Originally, the project proposal foresaw a range of follow-up co-creation workshops with interested citizens as the main platform for this assessment to take place. However and in contrast to the proposal, this step was performed solely by the executive board and selected project partners as a consequence of one unsuccessful attempt at such a follow-up workshop, in which no citizens took part. (4) Lastly, the prototypes approved by the municipal council were installed in the neighborhood for testing and were subsequently evaluated. Besides the executive board's internal assessment of the prototypes, this evaluation included input from different project partners, citizens (by way of online participation and street interviews), as well as the official project evaluation I conducted as part of SCALINGS.

Within this broader context, which included a total of 12 prototypes⁶⁵ tested over the course of the project, I center my analysis of *Urban Future Ulm* on the emergence of one specific prototype stemming from the topic area energy/environment⁶⁶: the digital garden waste disposal site (*Häckselplatz*). This sub-project aimed to identify use-cases for digital applications in municipal waste management, which ultimately led to the trial installation of three sensors at a garden waste disposal site to detect and report on the fill level of the site in real time. Besides the participating citizens, the executive board involved the local waste management company and a software company as co-creators in the process, both based on their anticipated roles as relevant stakeholders in the context of municipal waste management.

Many of the elements of this arguably rudimentary description of the project and its trajectories speak directly to aspects that my co-authors and I have addressed for co-creation at the discourse level with our analysis of European innovation-policy related documents, in particular the ways in which societal challenges and goals become linked with technological visions, in this case digitalization, in the context of co-creation. This pertains to the original funding call, which portrayed digital technologies as a premise for improved quality of life thereby establishing digital infrastructure as a self-evident component of any desirable future, whereby co-creation is imagined as a means to realize this future. Accordingly, a similar understanding of social participation through co-creation being seamlessly compatible with digital futures also reflected in the project *Urban Future Ulm*: On the one hand, the project adopted the framing of a good future through digitalization from the funding call. On the other, the project simultaneously assigned a decisive role to citizens as co-creators of this future, at least conceptually. Specifically, the project imagined co-creation not only as a means of building digital infrastructure, but also as a way of addressing citizens' quotidian challenges and as a means to increase social cohesion in the project neighborhood. With our empirical case study of *Urban Future Ulm*, my co-author and I examine how co-creation in practice evolved within this specific framing, focusing in particular on emerging social dynamics, how these dynamics shaped the prevalent version of co-creation, specifically the agencies of different co-creation actors and how negotiating these agencies delimited co-creation practices and outcomes (Ruess & Müller in press). The results of our analysis are presented in the second article of my dissertation.

⁶⁵ Digital survey posters, info screen for the social housing facilities, info screen for the neighborhood center, online volunteer exchange platform, mobility hub, digital public transportation stop, climate data and air quality measurements, digital garden waste disposal site, digital urban gardening, digital map of public fruit trees, solar photovoltaic installations for balconies, and a digital farmers' market.

⁶⁶ I focused on energy/environment to contribute with this case study to the SCALINGS urban energy domain.

6. Article 2

Anja K. Ruess & Ruth Müller: “Finding solutions to problems that never existed: A case study of co-creation in the Municipality of the Future”

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ABSTRACT

Over the past decade, *co-creation*, i.e., practices bringing together diverse actors to achieve mutually beneficial outcomes, has emerged as a broadly desired approach to innovation governance. Co-creation takes many shapes and its promises range from more successful innovations to more inclusive and responsible forms of innovating. In this paper, we interrogate co-creation practices by tracing how they shape techno-society relations through the inclusion of publics in smart city contexts. Our analysis focuses on an initiative that aimed to include citizens into the development of smart city technologies. Drawing on ethnographic fieldwork and qualitative interviews, we discuss the social dynamics of *doing* co-creation as establishing a distinct technology versus orienting innovation towards citizens’ needs, and show how pre-made commitments to particular technologies and stakeholders shape citizens’ agency. Understanding these dynamics will contribute to the growing debate about co-creation by providing a nuanced outlook on co-creative innovation practices, their potentials, and challenges.

Key words: co-creation; collaborative innovation; innovation governance; public engagement; smart cities; Science & Technology Studies.

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6.1 INTRODUCTION

Citizens, companies, science, city, and region form a community of fate led into an uncertain future by the rapid pace of technological change. We can, at best, discern rough outlines of this future. [...] This is also why we give the widest possible scope to democratic citizen participation before any decision. [...] The idea is to link our sectoral planning with citizens' wishes, suggestions, proposals, because citizens precisely are experts in their own environment (Czisch 2019a: 6–7, translated by author).

Public engagement seems to play an increasing role in urban development. As Mayor Gunter Czisch describes for Ulm, a German city of approximately 129,000 inhabitants, it is the sheer multiplicity, scope and complexity of possible technological futures that confront municipalities with some of the key challenges in democratic decision-making. The quote above originates from the 2019 *Schwörrede* (oath speech), in which the mayor accounts for the past year and outlines political, social, and economic plans for the coming year. Traditionally, the speech ends with the oath “to be a common man to rich and poor in all things equal, common, and honest without any reservations” (Stadt Ulm 1997: 8). While here, at least discursively, the citizenry is constructed as a benchmark for the direction of urban innovation, the above quote exceeds this promise: By describing citizens as experts in their environment, Czisch ascribes them an active role as co-creators of the municipality.

This understanding of citizen participation in urban development is not unique to Ulm. What the mayor draws on is an increasing discourse around participation and, more recently, *co-creation*. The term broadly describes the recurring involvement “of diverse actors, such as companies, universities, policymakers and members of the public” (Müller et al. 2021: 2) throughout innovation processes. Its alleged promises range from generating – in market terms – more successful innovations (Prahalad & Ramaswamy 2004; von Hippel 2006), to steering the direction of innovation towards societal needs, or more democratic forms of innovation (Bentzen 2021; Robinson et al. 2021). The practices involved in co-creation are equally diverse, ranging from collaborative agenda-setting to public ideation workshops, hackathons, maker spaces, living labs, etc. All of these practices represent prominent approaches to bring together different actors, identify challenges, stimulate innovation, and test new socio-technological arrangements in real-life settings. Particularly in the smart city context, citizen participation seems to be closely intertwined with urban development. For instance, the German *Smart City Charta* highlights co-creation as an integral part of smart cities and a basis for a strong civil society (Bundesministerium des Innern, für Bau und Heimat 2021). Similar claims can be found

at the European level, where the handbook *The making of a smart city* promotes that “stakeholder involvement should always be performed with clear objectives of reaching consensual solutions”, thus recommending cities to “take advantage of the benefit of co-creation approaches” (European Commission 2017: 10). At the practice level, numerous cities of different sizes, such as Barcelona, Dresden, or Ulm, are considered exemplary smart cities (e.g., in media articles or policy reports), as well as pioneers of participatory engagement (Haupt 2021; Berg et al. 2019).

While policymakers often praise such formats for their alleged transformative potential, their recent proliferation has been subject to critical scrutiny, particularly in Science & Technology Studies (STS) and neighboring fields. One aspect of this criticism pertains that co-creation tends to foreground inherently technology-oriented innovation goals as open, civic, and socially inclusive. This has led several authors to call for deeper consideration of the “question of who gets to be involved when and how” (Lipp et al. 2023: 157). In this article, we answer this call by tracing through a case study of urban co-creation the social dynamics and scopes of agency for different stakeholders these practices created. We do so by focusing on the example of a three-year co-creation initiative of the German municipality Ulm (2019–2021). The initiative aimed to address citizens’ everyday challenges by co-creating digital solutions. Drawing on a three-year ethnography, semi-structured interviews, and qualitative document analysis, we provide nuanced insights into how co-creation came into being, how co-creation practices unfolded, and, in particular, how these practices were shaped by and in tension with commitments made to the funders, who envisioned specific digital solutions being the objective of the initiative. The aim of our paper is therefore to analyze at the process level of our case study which specific co-creation practices and social dynamics within these practices emerge and what tensions these entail between ideals and enactments of co-creation. Focusing on how project actors performed co-creation in specific moments that brought this tension to light, we contribute to the growing debate about the potentials and challenges of co-creation as an emerging mode of integrating societal perspectives in urban innovation from an empirically grounded perspective. At the same time, we contribute to the growing debate around co-creation as a potential tool for translating Responsible Research and Innovation into practice. Specifically, our study advances an in-depth account of the social dynamics around co-creation as an emerging version of public engagement on four levels: These include prevalent conceptualizations of citizens as co-creators, imaginaries of desirable futures through co-creation, the formulation of what may constitute a public issue around these futures, as well as the delimitations these futures attach to citizens’ agencies in co-creation. Attending to these

dynamics provides an empirically situated set of some of the aspects that ought to be reflected upon if co-creation is to be envisioned as a meaningful practice of *doing* innovation responsibly.

We start our article by discussing the conceptual dimensions of co-creation as we engage with existing STS analyses of co-creation discourses. In light of these accounts, we consider a selection of STS analyses of co-creation practice cases to examine how emerging tensions on a discursive level can surface empirically. We proceed by outlining our data and methodological approach, followed by an introduction into our empirical case. Based on our observations and interview data, we explore how the case study's situated context shapes co-creative interactions, outcomes and citizens' agencies in the process. Building on our analysis, we discuss the social dynamics emerging from our case and raise broader questions on the role of co-creation in responsible innovation practices.

6.2 LITERATURE REVIEW: CO-CREATION BETWEEN INCLUSIVE ENGAGEMENT AND INNOVATION FOR/BY THE FEW

6.2.1 Conceptual Dimensions of Co-creation

Over the last decade, the term co-creation has increasingly appeared in innovation discourses as a potential tool to translate more abstract ideals of Responsible Research and Innovation into practice⁶⁷ and thus as a desirable way of innovating (Robinson et al. 2021). Etymologically, co-creation combines the Latin prefix *co* (together, jointly) with the Latin verb *creare* (create), thus suggesting a joint effort of diverse actors to collaboratively shape innovation outcomes. Within this broad definition, however, co-creation can take many forms and embody different rationales. On a conceptual level, we can identify two main approaches to co-creation: Firstly, especially the marketing literature describes co-creation as an approach to increase economic success through co-created products. According to Prahalad and Ramaswamy (2004), who first discussed co-creation prominently, this is due to the inclusion of different perspectives in product features, thus addressing the needs of a broader customer base. Secondly, it is precisely this inclusion of different perspectives, in which some authors see the potential for more responsible and socially inclusive forms of innovation (Robinson et al. 2021).

From the latter perspective, co-creation seems related to public engagement with science and technology. Since the 1960s, a number of actors – including policymakers, scientists, and

⁶⁷ For a more comprehensive discussion of the relationship between co-creation and Responsible Research and Innovation, see Jansma et al. (2022).

citizens – have argued for public engagement as a tool to address the growing complexity of relationships between innovation and societies, hoping to increase the democratic legitimacy of emerging technologies. STS scholars in particular have critically discussed such promissory aspects⁶⁸, highlighting, e.g., that public engagement tends to favor invited over spontaneous forms of participation (Wynne 2007) and often functions as “justification” (Stirling 2006: 102) of pre-made decisions (Arnstein 1969; Wynne 2006). While co-creation seems to adopt many of these promises and pitfalls, recent publications focusing on co-creation at a conceptual level identify shifts in how public participation in science and technology is understood paralleling the emergence of co-creation in innovation discourses. At the heart of this development is the increasing economization of participation processes, shifting away from deliberation about emerging technologies to expectations about producing new innovations. Macq et al. (2020) illustrate this shift by focusing on the European Commission’s research and innovation policies, which have gradually evolved from deliberative governance ideals towards production rationales. The latter is characterized by co-creation as a “key notion” (European Commission 2016a: 16) addressing publics as users of technologies rather than stakeholders in governance processes.

A growing number of scholars have problematized this shift addressing the technocratic and market-liberal overtones that dominate co-creation discourses, showing that co-creation tends to diagnose social and policy issues through the lens of a universal innovation imperative and a form of “social fix” (Frahm et al. 2021: 174). With this imperative comes the promise “to solve problems almost independently of their specifics” (Pfotenhauer et al. 2019: 896). These solutions, along with the imagined benefits of co-creation, are framed in predominantly economic terms (Ruess et al. 2023). Such economization rationales link with another aspect of STS critique. This critique pertains to how co-creation discourses emphasize opportunities to participate in innovation by using a rhetoric of empowerment, while largely neglecting questions of equitable access to participation. With such talk of opportunity, responsibility for political representation shifts away from traditional governance and welfare institutions to individuals. In the absence of procedural requirements, this bears the risk of further marginalizing already underrepresented publics, who are unwilling or unable to participate (Ruess et al. 2023).

While these accounts provide insights into the discursive effects of co-creation, they prompt us to ask how actors take up co-creation in practice. Or, as Horst (2021) concludes in a recent

⁶⁸ Stilgoe et al. (2014) provide a detailed introduction.

commentary: “The process of co-creation is [...] only as democratic as the participants are able to make it”. So how do the social dynamics unfold that shape co-creation in situated constellations? It is precisely this question of how participants implement co-creation and to what extent these practices reflect the co-creation discourse that we build our case study analysis on. To situate our analysis, we first consider the existing literature that has critically addressed co-creation practice.

6.2.2 Empirical STS Engagement with Co-creation: City as Co-creation Spot?

Scholars have observed several potentially adverse effects of co-creation at the discursive level that also surface empirically in different contexts. A budding focus of analysis that our article contributes to is the city. Cities are compelling sites for studying co-creation, as they bring together a variety of actors in situated governance spaces where many of the current discourses about desirable futures take place. Various authors discuss urban environments as spaces of innovation and change-orientation (Karvonen & van Heur 2014) where global issues are addressed in concrete practices (Eneqvist & Karvonen 2021), or as ‘truth-spots’ to test and attest the legitimacy of different versions of urban futures *in-situ* (Gieryn 2006). Concurrently, numerous authors highlight the central role of specific actor constellations of citizens, policymakers, (semi-)public service providers, and private actors converging in cities in collaborative engagement modes (Engels et al. 2017; Evans & Karvonen 2014). More recently, the smart city literature has witnessed a surge in the debate around co-creation as an approach to develop and govern municipal infrastructures. For now, two recent strands of inquiry seem particularly instructive: The first interrogates the effects of urban co-creation projects on municipal governance processes, while the second focuses specifically on emerging roles of citizens.

Firstly, a number of authors explore co-creation in the context of municipal democratic structures, focusing on how co-creation re-shapes these structures. One key observation is that co-creative urban innovation practices are often dominated by neoliberal ideals (Cardullo & Kitchin 2019). In particular, this includes the framing of public issues as market demand as well as the proliferation of new actor constellations, such as public-private partnerships, designed to feed corporate interests back into municipal governance processes (Kitchin 2014). Often, such formats tend to approach citizens as entrepreneurs expected to cherish economic growth as an overarching goal (Laurent 2019; Delvenne & Macq 2020). Delvenne and Macq (2020) have addressed these market-liberal overtones by studying a range of participatory experiments,

including a hackathon that invited participants to co-create digital solutions to their everyday challenges in a competitive setup over the course of 48 hours. As the authors point out, such formats tend to maximize not only the time devoted to participation, but also the value extracted from their participants, thus entailing a “relative abandonment of concerns related to democratization” (Delvenne & Macq 2020: 18) and a redefinition of the public good in economic terms. This raises questions as to how the social dynamics emerging within co-creative formats affect broader policy rationales, how they might contribute to re-shaping municipal governance following economic ordering processes, as well as who benefits from co-creative innovation practices and in what ways (Laurent 2019).

Secondly, several authors address the social dynamics around co-creation by focusing specifically on emerging roles of citizens as co-creators in urban innovation. Co-creation initiatives tend to address citizens in ambivalent ways as both active participants contributing experience as a form of expertise, but also and often simultaneously as test subjects with the purpose to provide information about the feasibility of innovations (Engels et al. 2019). Based on such conceptualizations, citizens’ agencies, that is the actual influence they can have on the process and results of co-creation, range on a spectrum between more or less influence and not all projects that fashion themselves as co-creative grant their involved publics the same scopes of agency (Lipp et al. 2023; Cuevas-Garcia & O’Donovan 2022). Other authors emphasize that even within the same co-creation project not all citizens necessarily end up with equal degrees of agency. In particular, their scopes of agency depend on how well their perspectives match the interests and often pre-existing ideas about desirable outcomes of policymakers and technology developers (Clausen et al. 2021; Nyborg & Røpke 2013). Focusing on a Danish smart grid initiative, Nyborg and Røpke (2013) find that co-creation tends to foreground the perspectives of those participants whose interests fit the technological agenda of system builders. For example, in its external communications the energy company leading the project focused primarily on just one group of participants, namely those interested in actively managing their household’s energy demand, while sidelining other perspectives. This “aligned user” (Nyborg & Røpke 2013: 668) was employed as a strategic argument to naturalize pre-established versions of technological futures, here the introduction of a smart grid. Such dominance of specific citizen co-creators raises questions as to whether members of the public with divergent perspectives may contribute to the co-creation process at all. Likewise, it prompts us to ask to what extent the established agendas of co-creation practitioners might predetermine both processes and outcomes of co-creative innovation practices.

What these various critical accounts of co-creation practice cases have in common is that they raise questions about citizens' roles as co-creators, the scopes of agency resulting from these roles, and, accordingly, the influence citizens can ultimately exert on possible outcomes. Here, some of the tensions we encountered at the discursive level seem to reappear in practice, especially as they suggest a dominance of economic rationales to shape co-creation. While these studies provide important entry points for examining citizens' agencies in co-creation more closely, what remains to be explored in depth is how citizens' agencies are embedded within a broader network of social dynamics that shape co-creation processes in practice. This entails specifically, how different agencies come into being, how they are performed, how they feature in co-creation outcomes, and what conflicting understandings of both agencies and outcomes emerge. To address these questions, we turn to a long-term case study of urban co-creation that aimed to widely involve citizens in developing digital solutions to their everyday challenges. As we examine how this specific initiative implemented co-creation, we elucidate how its situated dynamics contributed to shaping both the prevalent version of co-creation and citizens' agencies throughout the process. By tracing these practices closely along and through a specific empirical site, we contribute detailed reflections on co-creation at process level that advance our conceptualization of the social dynamics unfolding within contemporary notions and versions of co-creation, both to this article collection on the challenges for open, responsible, and transformative innovation and to a broader discussion of co-creation as an approach of doing innovation responsibly.

6.3 MATERIAL AND METHODS

We collected our research material as part of SCALINGS, a comparative research project (2018–2021) examining co-creation practices across Europe. While in this article we present an in-depth analysis of one of these case studies, our interpretations build on continuous reflection about the situatedness of co-creation within the wider SCALINGS community, which contributed to the identification of overarching categories beyond local sites and to cross-validation of findings in multiple contexts.

Our analysis follows a qualitative case study approach (Yin 2014) and builds on ethnographic fieldwork in a German municipality over three years, 2019–2021, including participant observation, qualitative semi-structured interviews, and document analysis. One author was a participant observer, which allowed us to follow not only public representations of major decisions, but also stakeholders' seemingly mundane interactions, struggles, and shifting

perceptions. Due to the relatively long duration of our fieldwork, we were able to accompany the project from planning, to implementation, until project completion. In particular, we focused on several key moments, especially co-creation workshops with citizens, including planning and debriefing. Some of these workshops took place in person, while others, particularly towards the project's end, were designed as online discussions due to the Covid-19 pandemic. We also participated in a conference where the project presented itself to other municipalities in a cross-regional context.

Our interviews included 25 semi-structured, qualitative interviews, seven group discussions, and eleven ethnographic and street interviews. As proposed by Holstein and Gubrium (1995), we approached our interviews as reflexive conversations between interviewees as experts in their life worlds and the active interviewer. With the beginning of the implementation phase, we noticed an increased desire among the project team to reflect collectively upon their progress, methods, and expectations. In the spirit of embeddedness, we facilitated this exchange through moderated group discussions, thus entering a “shared epistemic territory” (Felt et al. 2016: 15) with project actors. In addition, we conducted a document analysis of the project's website, online participation results, presentations, advertisements (e.g., flyers, posters), as well as press releases and media coverage of the project in the city and region (07/2018–05/2022).

We transcribed and coded our fieldnotes, interviews, and documents assisted by a qualitative data analysis software (MaxQDA). Following a grounded theory approach (Charmaz 2006; Strauss & Corbin 1998), we performed multiple rounds of open and focused coding to identify emerging themes. We refined our categories as we gained deeper knowledge of our case and interpreted the co-creation practices we encountered in the field by asking: How is co-creation performed? Which relationships form between actors? And what kinds of tensions emerge? The results of our analysis are presented in this article. Approaching our data through grounded theory analysis allowed us to use thick descriptions (Geertz 1973) of our empirical material to gain deeper understanding of both situated co-creation practices and the tensions between ideals and enactments of co-creation that these practices create.

In accordance with EU Regulation 1291/2013 establishing Horizon 2020, our research complies with ethical research principles involving humans and applicable international, EU, and national law. As part of SCALINGS, we have completed an ethics self-assessment, which was approved by the European Commission under Grant Agreement No. 788359. As part of this study, we applied the principle of informed consent in the following ways: As regards the observations and interactions that exclusively concerned the project team or formally involved

municipal actors, we first obtained informed consent from the project head, asking them to communicate our presence and function to their staff. For all interviews as well as in all personal interactions with individual participants, we repeatedly explained who we are and what our research is about, how we would store, analyze and protect their data, and provided our contact details, encouraging participants to approach us with questions or concerns. We also made sure to inform all participants that they could refuse or discontinue participation at any point in time. At larger public events where it was not possible to obtain informed consent from each individual, the project team announced the presence of researchers studying this process, pointed us out to the audience, and instructed all participants to turn to the researchers present if they had any questions or concerns. No persons unable to give informed consent or vulnerable individuals were included in our research.

In our study, we value the anonymity of our interlocutors. However, Ulm is a small city, as is the number of actors involved in our case. Pseudonymizing an interviewee but disclosing their professional position would not guarantee their anonymity. While our analysis builds equally on all data described above, we decided to only quote directly from interviews, where we have informed consent to disclose interviewees' positions *and* real names, to ensure the privacy of our interviewees to the largest extent possible. All names used in the quotes from fieldnotes and interviews are pseudonyms. Moreover, we pseudonymized the co-creation project as an additional measure to protect the data of our interlocutors. All quotes from interviews conducted in German and document analysis⁶⁹ are our own translations from German into English. Images were either provided by the City of Ulm (CC0-license) or taken by the authors. While individuals in the pictures have provided informed consent to be photographed, we have blurred their faces to ensure their privacy to the largest extent possible.

In addition to and emerging from our research, we were requested by the City of Ulm to perform the official project evaluation of the co-creation project we investigated. We welcomed this request as an additional opportunity to interact with project and stakeholders, e.g., through follow-up conversations with the executive board, citizens, and other involved stakeholders about their thoughts on how the project evolved. These interactions informed our analysis.

⁶⁹ Except for the English version of the letter invitation (Stadt Ulm 190426-1)

6.4 EMPIRICAL FINDINGS: CO-CREATING THE MUNICIPALITY OF THE FUTURE

6.4.1 Introducing *Urban Future Ulm*

Our research focuses on the smart-city initiative *Urban Future Ulm* (2019–2021), which received third-party funding by the Ministry of the Interior, Digitalisation, and Local Government of the German federal state Baden-Württemberg. The funding program supported 50 municipalities to develop digitalization strategies and four municipalities to assume “pioneering roles in piloting concrete digital applications” (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 2). The funding volume totaled 7.6 million euros. To select the beneficiary municipalities, the ministry published a competitive call including a set of eligibility criteria, two of which received particular emphasis: Firstly, the call specified “long-term, holistic digital strategies and associated concrete digital applications” (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 2) as key goals, thus prescribing a technological, i.e., digital focus. Secondly, to develop these applications, “involvement of citizens” was highlighted several times, with “the use of co-creative methods and interactive participation and planning formats” being “explicitly desired” (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 4). From the funders’ viewpoint, co-creation did not seem in conflict with the digital focus of fundable projects. Rather, throughout the call, co-creation appeared hierarchically subordinate to digitalization, with the clear objective of developing digital technologies through co-creative engagement. Concurrently, “modern technologies” and “the digitalization strategy” were depicted as a premise for improved life quality and “tangible benefits” for citizens (Ministerium für Inneres, Digitalisierung und Migration Baden-Württemberg 2017: 2). However, as we shall see in our analysis, this vision wasn’t necessarily shared by all citizens.

To examine how co-creation was translated into practice within this hierarchical digitalization-oriented framework we focus on the case of Ulm, which was funded⁷⁰ as one of four ‘pioneering’ municipalities and pursued a particularly strong focus on co-creation. *Urban Future Ulm* was dedicated to collaboratively redesigning one of the city’s neighborhoods with digital infrastructure in four topic areas: mobility, trade, energy/environment, and social life. If successful, these infrastructural arrangements were to produce data for a municipal data platform developed alongside the project and be scaled up across the city (Stadt Ulm 2018a). *Urban Future Ulm* thus reflected the hierarchy embedded in the funding call: Its goal was to

⁷⁰ The total budget was 2.195 million euros, of which Baden-Württemberg contributed 880,000 euros.

develop digital solutions to citizen's challenges, with co-creation envisioned as a means to achieve this goal within this specific framing.

The project was coordinated by a department of Ulm's city administration that answers directly to the mayor. Additionally, the executive board included external consultants and a non-governmental organization for sustainable economic development. The project evolved over four major phases: (1) During recruitment, the executive board enrolled citizens as co-creators of digital applications. (2) In the central co-creation workshop, these citizens were to deliberate with executive board and local project partners (e.g., a software company) about their everyday challenges and develop ideas for solutions. (3) These ideas were assessed and fleshed out as prototypes to be presented to the municipal council for decision-making. Contrary to the project proposal, which foresaw follow-up workshops with citizens, this step was performed solely by the executive board and selected project partners. (4) Approved prototypes were then tested and evaluated by the executive board, with input from project partners and citizens.

Already this rudimentary description of the project's evolution suggests discrepancies between co-creation as an approach to socially inclusive innovation and the challenges in navigating pre-existing structures of the co-creative environment. To explore these discrepancies, we followed *Urban Future Ulm* by focusing on the emergence of one specific prototype of the topic area energy/environment⁷¹: the digital garden waste disposal site (*Häckselplatz*) that aimed to identify use-cases for digitalization in municipal waste management. It therefore included, in addition to executive board and participating citizens, representatives of the local waste management company and a software company as co-creators. We examined how the project performed co-creation within a hierarchical framing that pre-defined digitalization as its objective, how different scopes of agency emerged for different actors, and to what extent negotiating these agencies contributed to channeling both the project and co-creation as a process in specific directions.

We proceed by examining three key moments from our empirical material, each revealing the challenges our case study had to navigate when implementing co-creation: First, we sketch out how notions of wide participation shaped the recruiting of citizens as co-creators. Second, we discuss how the central co-creation workshop became a contested space between the executive board's existing ideas about the project and new input from the citizens. Third, we explore the

⁷¹ We focused on energy/environment to contribute to the SCALINGS energy research domain.

narrowing of desirable outcomes in light of emerging power relations between participating stakeholders in the decision-making phase and analyze how citizens evaluated these outcomes.

6.4.2 Recruiting: Between Wide and Non-participation

Continuous participation of the citizenry was one of the primary goals articulated by *Urban Future Ulm*. According to the project proposal, citizens should “be involved in all relevant project phases, contribute their expertise to the analysis of the status quo in their district, co-develop ideas, [...] use cases [and] prototypes”, and thereby “encounter as few barriers and obstacles as possible” (Stadt Ulm 2018a: 18). To facilitate citizens’ fundamental role, the executive board had set wide participation as its guiding principle for involvement. But how did they enact their idea of wide participation? To explore this question, we examine the recruitment practices leading up to the project’s central co-creation workshop.

A month before the workshop we spoke to Susanne, executive board member and responsible for public relations. As she repeatedly pointed out, “everyone is welcome” (Susanne 201903-6) to participate “without distinctions” and that she was hoping for “a good cross-section” of residents to attend the workshop, so that “ideally all social groups”, would be reflected in the workshop participants. As it became increasingly clear in the conversation, imagining the population as distinct social groups was a core assumption in the project, with the involvement of each of these groups a core objective. The neighborhood, she explained to us, was characterized by migration. Until recently, there had been a housing facility for displaced persons. There was also a lot of social housing with high fluctuation, which contrasted with the long-time inhabitants:

That does make a difference, also in terms of how we tackle the project. The longer you have lived here, the more you identify with the neighborhood and the more likely you want to help shape its future than if, say, you don't know whether you will still be living here in six months. But we want everyone to have a voice. That makes it really complicated (Susanne 201903-6).

Susanne continued by explaining how she advertised the co-creation workshop and how her conception of social groups influenced selected communication channels. These included advertisements in local newspapers, churches, and the neighborhood café – “those tend to be the places, where older residents gather” – as well as flyers, posters, and social media posts, so that “maybe a few younger people will take note of it, too” (Susanne 201904-20). In addition,

younger citizens and residents with recent migration backgrounds were targeted with personalized invitations, as, from Susanne's previous experience, these groups tended to participate less in engagement formats:

Dear Mr./Mrs. «SURNAME»,

[...] A positive change can only be made by initiating a dialog on equal terms. That is why we want you, the residents of [project neighborhood], to tell us how your neighborhood can be improved with the support of digital applications. [...]

I would like to invite you to our workshop at [workshop location, day, date, and time]. You will have the opportunity to express your opinion on four different topics and talk about possible challenges, ideas and solutions. The event is free of charge.

I look forward to seeing you!

Yours faithfully,

Gunter Czisch

Mayor of Ulm (Stadt Ulm 190426-1, English original version).

In addition to a brief summary of the project and its digitalization and participation goals, the letter included a sequence addressing the recipient directly to emphasize the importance of their participation. This becomes particularly evident as the letter shifts from first person plural ('we want you') to first person singular ('I would like / I look forward'). It is no longer the abstract, possibly less familiar executive board speaking, but the mayor being a prominent figure in Ulm's public sphere. This adds significance to the letter and establishes a direct link between the mayor's personal signature and the recipient's likewise personal address, thus evoking the image of two individuals in conversation.

Upon our inquiry, Susanne described to us the process of how she selected the 150 citizens who received personalized invitations. To complement the available statistical data on Ulm's population, Susanne approached local social workers to identify countries of origin particularly represented in the neighborhood. On this basis, she specified the number of letters to be sent to people with certain countries of origin⁷², aiming to reach groups with migration experience in "an adequate ratio". Moreover, she included a distribution of 50% male and 50% female recipients, and a target age range of 30–65 years. An additional 30 letters were sent out to young

⁷² This yielded the following distribution of origins: Russian (30), Turkish (30), Bosnian-Herzegovinian (15), Polish (15), Croatian (10), Kazakhstani (10), and Romanian (10).

(aged 16–29) citizens without taking into account countries of origin. The final recipients were then selected randomly within the aforementioned criteria.

The letter invitations exemplify how important it was for the executive board to ensure that participants would reflect the whole resident population. Concurrently, representation emerged as their key criterion for wide participation. To achieve representation, the executive board took concrete steps on two levels to complement the overall open recruitment process of non-targeted advertisements: First, a sample of traditionally (by the experience of the executive board) underrepresented groups was targeted through personalized invitation. Second, for residents with migration backgrounds, invitations were issued based on statistical indicators in a ratio intended to reflect as closely as possible their origins.

At the same time, we observed how ideals of wide participation increasingly drifted towards narrower conceptions. This became evident from the language aspects of recruitment practices: The letters were issued in German and English (non-professionally translated by the executive board) to take into account the internationality of recipients against the background of English as the modern *lingua franca*. However, offering English as the only alternative to German fails to address the origins of the neighborhood's largest populations (Russian, Turkish, Bosnian-Herzegovinian, and Polish), which could constitute an obstacle especially for older generations or residents with recent migration experiences. This narrowing became even more pronounced during the workshop, where all discussions took place and all materials were provided solely in German with no interpreters present. Despite not being evident from the bilingual invitations or otherwise announced, the monolingual nature of the event had no practical impact on its proceedings, as none of the participants articulated language as an issue. Nevertheless, in contrast to the initial desire for wide participation, knowledge of the German language became a prerequisite, thus making the participation of international publics more challenging, if not impossible for some.

It became clear on the evening of the central co-creation workshop that these recruitment practices turned out only moderately successful. To get an overview of attendees, the executive board had tasked two trainees with counting the participants and inquire how they had learned about the event. Out of the 80 participants, only one person mentioned the mayor's invitation. Later that evening, we spoke with Christine, another executive board member, who seemed rather disappointed with the turnout. However, she was not referring to the letter invitations alone:

It's a pity. How the evening went, I mean. Sure, we filled most of the chairs, which is good. But of all the people, 10 at most were real citizens. And even of those, I know most of the faces from other events (Christine 201904-3).

When inquiring what she meant by ‘real citizens’, Christine referred to those without a role in local politics and those not engaged in voluntary work in the neighborhood. This suggests that the executive board had imagined the figure of the citizen co-creator as having – or rather not having – certain characteristics: Those who held a public function or who have in the past expressed their political stakes in the technologies they were invited to co-create do not seem to conform to the board’s pre-empted idea of who counts as a citizen. Looking at recruitment under this premise reveals a stark contrast between the goal of openness (“everyone is welcome”) and the manufacturing of a specific version of the public being both as diverse as possible (in terms of origin, age, and sex) and “innocent” (Irwin 2006: 315) in terms of the local political discourse. It is Christine’s reference to the dominance of ‘familiar faces’, i.e., participants with stakes and interests rather than innocent citizens, in particular that underpins how the recruitment practices have not succeeded in reconciling these contrasting objectives and instead unfolded as a story of low response.

We will examine in the following section how the workshop proceeded, how co-creation was performed, and how the emerging social dynamics shaped citizens’ agencies.

6.4.3 Co-creating: From Open-endedness to Closed Negotiation

The workshop took place on an April evening in a Lutheran church within the project neighborhood. Displays with information about the project and tables with appetizers dominated the otherwise plain nave. Only at second glance did the religious art of the stained glass windows catch the eye, with altar and cross largely hidden behind a projection screen. There were no classic pews, but rows of chairs facing towards the screen. As the chairs filled up, the mayor stepped to the microphone delivering his opening remarks, followed by an introduction by the executive board, which took over an hour before the audience was invited to gather in breakout groups.

Not only did the length of this introduction strike us, but also the dual discursive framing the executive board and the mayor used to outline citizens’ roles as co-creators: While the executive board addressed citizens as “experts for local challenges and needs, [for] ideas for improvements, [and for] the implementation of solutions in their district”, the mayor had

employed a rather different terminology referring to the citizens as “*Versuchskaninchen*” (fig.: guinea pigs) (Czisch 2019b) only moments before. While the framing of the citizen as expert constructs an active role that values quotidian experiences as legitimate expertise in negotiating urban futures, the image of the guinea pig suggests a far more passive role, alluding to the use of guinea pigs as animal models in biomedical research (Taylor & Lee 2012). Jörg, who was an executive board member, later reflected on the mayor’s wording:

And then there was that moment when the mayor called the citizens guinea pigs. Not really in a patronizing way. I think he meant it as encouragement. He addressed them as guinea pigs three times that evening, can you imagine! My colleagues and I were holding our breaths. How did this term make it into his speech? I immediately turned to the journalist next to me – thank god I knew the guy – and said ‘Don’t write that, mate’ (Jörg 201905-6).

The transcription of this sequence (which does not fully reflect Jörg’s expressive intonation) illustrates the agony that Jörg, being one of those in charge of putting co-creation into practice, must have felt during the speech. Positioning *citizens as experts* directly vis-à-vis *citizens as guinea pigs* creates friction, reinforced by the temporal proximity of both framings within only minutes in front of the same audience. Simultaneously, the rhetorical incongruence between two actors representing the same institution, i.e., the City of Ulm, produces a field of tension around how the roles of citizens as co-creators are actually imagined. All the more important it becomes to examine how the evening unfolded as we move to the workshop’s participatory elements.

After the introduction, participants were asked to split up into four breakout rooms, depending on which of the project’s topic areas interested them most. Based on our own interest, we joined the energy/environment breakout session along with 14 other participants. Some hours before the workshop, Olivia, who coordinated the topic area, had brought us to see the room set up: 40 chairs, arranged around 5 tables, colored paper sheets, pens, whiteboards, and empty posters (Fig. 1). “The citizens should be encouraged to define their everyday challenges first”, Olivia explained to us. “Then we will co-create solutions with them. [...] We don’t specify a particular technology. It’s really cool. It’s really up to them”. One of the posters, however, wasn’t empty: “Digital Level Indicators” (Fig. 2), it said, including a number of points about the benefits of sensors automatically reporting the fill level of waste containers. We asked Olivia where this idea came from: “Sure, we would like the ideas to come from the citizens. But first, we need to give them an idea about what an idea could look like” (Olivia 201904-1).



Fig. 1: Setup of the breakout sessions (Stadt Ulm, CC0).

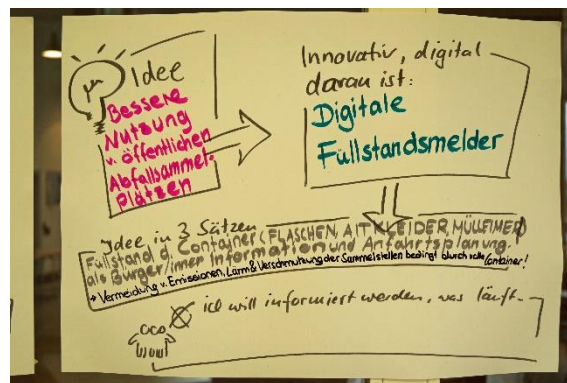


Fig. 2: Pre-formulated poster “Digital Level Indicators” (Stadt Ulm, CC0).

The setup of the room gave us a first impression of how the executive board translated co-creation into practice: The empty posters, pens, etc., as well as the communication-oriented arrangement of tables and chairs created an open space waiting to be filled with citizens’ input. Yet, this openness was at least partially negated by the simultaneous presence of pre-formulated posters. Therefore, through the setup of materials, the citizen was addressed as a conflated figure of both recognized expert and innocent participant, the latter of which must first be exposed to external input to be able to make contributions. This was also echoed in Olivia’s expression “an idea about what an idea could look like”. With this, she constructed the citizen within a new deficit logic valuing citizens’ expertises (in the sense of quotidian experiences), yet simultaneously ascribing them a deficit of ideas.

This dual framing of citizens also surfaced in how the workshop proceeded with *doing* co-creation. The breakout group started with another introductory presentation into the topic energy/environment. This was done by Olivia together with Markus, who worked for a subsidiary of the municipal utility company, specialized in software development for sensors⁷³. Olivia first illustrated the problem definition, i.e., overflowing waste containers that would spoil the neighborhood’s cityscape. Here, she employed phrases like ‘surely, you all are aware of the issue’, making the problem appear as a well-known nuisance while also implicitly preempting the citizens’ agreement to get them on board rhetorically. Olivia also identified the root cause of the problem to lie in rigid, non-needs-based collection schedules. Markus then presented a solution to the problem: sensors that would automatically detect the fill level of waste containers and report them via a software interface (programmed by his company) so that the waste management company could adapt its collection schedule to actual fill levels. Here, the use of

⁷³ The software company participated as a pre-established project partner with the specific role of presenting a pre-defined solution beneficial to their own economic interest.

sensors was not discussed reflexively, but naturalized as the ‘logical answer’ to the problem at hand.

With this introduction, the project’s focus on digital technologies surfaced strongly for the first time. Although this focus was present from the outset, i.e., in the funding call, project proposal, and materials used for recruiting participants, during the workshop the public communication had been dominated by the articulation of a more open-ended co-creation format, suggesting that citizens’ ideas could be accommodated without, as Olivia had explained earlier, “specify[ing] a particular technology”. The sudden shift in communication towards a narrow digital focus also impacted the subsequent discussion. Instead of starting from their everyday challenges, citizens were asked to discuss pre-defined problems and solutions. The citizens, however, reclaimed this discussion space to some extent. While they adopted the problem definition of overflowing waste containers, they rejected the proposed solution. During the discussion, they mainly expressed critical points, e.g., relating to the specific use case of sensor-equipped waste containers. Some citizens questioned whether the waste management company would be willing to change routines at all. Other comments challenged sensor-based technology in general. Or, as Hermann, one of the citizens and particularly active discussant, trenchantly summarized: “I simply don’t understand why the hell we have to put a sensor on everything” (Hermann 201904-26, participating citizen).

The citizens not only criticized the pre-established solution; they also put forward a proposal of their own. This involved residents to use an existing municipal feedback tool for reporting overflowing waste containers to inform the waste management company of mismatches between collection schedule and fill level, similar to sensors. Simultaneously, the citizens would take responsibility themselves and be involved as “living sensors” (Gertrud 201904-26, participating citizen). The discussion thus produced two competing solutions to the problem: a sensor-based approach on the one hand and an extension of an existing tool partly relying on the voluntary engagement of citizens on the other. The citizens’ broad support of the latter social solution led to a shift in Olivia’s role: Instead of facilitating the discussion, she increasingly defended the sensor-based solution. The breakout group thus emerged as the turning point at which co-creation – now also from the citizens’ perspective – drifted towards a closed format, rendering citizens solely with space for agreement rather than for contributing challenges and independent ideas for solutions.

6.4.4 Making Decisions: Of Solutions to Problems that Never Existed

With the workshop still in progress, the discussion was captured in a mind map (Fig. 3). This included elements of both the pre-established sensor-based solution (“digital level indicator for waste collection spots/container with button”, ‘intelligent waste collection’) and citizens’ input (“Ulm’s feedback tool”, “citizen as sensor”) (Stadt Ulm 2019a). However, the proposal to the municipal council deviated from the mind map. Instead of addressing public waste containers, the draft foresaw the provisional “installation of sensors at 3 *Häckselplätze* (garden waste disposal sites)” to “gather information for an optimized, needs-based and rapid response for collection and site cleaning” (Stadt Ulm 2019b: 9).

So how did we end up with the *Häckselplatz*? As described before, the project initially foresaw a series of follow-up workshops with interested citizens and local stakeholders to concretize results from the central co-creation workshop towards prototypes. These prototypes would be presented to the municipal council for voting on implementation. For the first follow-up workshop, the executive board had rented a popular restaurant in the neighborhood and circulated invitations among the participants of the central co-creation workshop and through their previous recruitment channels (media, social media, newspapers, word of mouth). After 45 minutes when no one had joined except an interested member of the municipal council, her dog, and ourselves, the executive board decided to terminate the event. From this experience of non-participation and because, there was “simply no time in the project plan” (Susanne 201907-3) to reflect upon potential causes, the executive board abandoned the idea of holding further workshops. Instead, concretizing inputs from the central co-creation workshop took place in an internal meeting without further public consultation. Besides the executive board, this meeting included Markus, the representative of the software company who had attended the co-creation workshop, as well as representatives of the waste management company, who had supported the project proposal as a cooperation partner but were not present at the workshop.

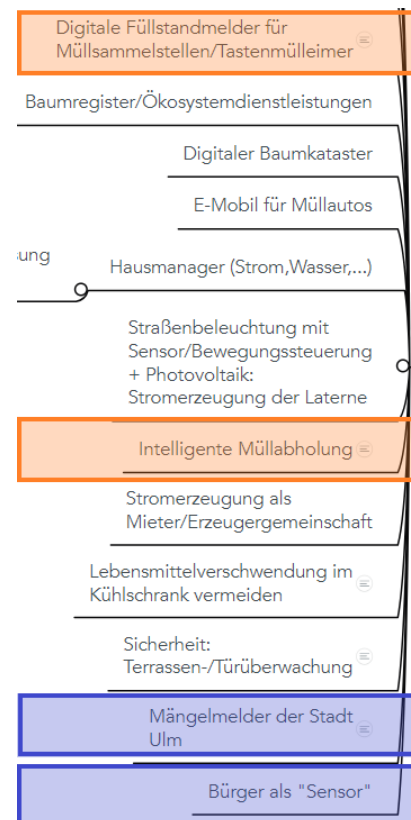


Fig. 3: Mind-map with discussion output. Pre-established ideas shaded orange; citizens’ input shaded blue (Stadt Ulm 2019a).

During the meeting, it became clear that the waste management company was keen on testing sensor-based solutions “in any useful scenario”. However, they disclosed only at this point that they would not be willing to adapt collection schedules. Thus, ironically, one of the core concerns raised by the citizens came to pass. This positioning of the waste management company, which was obviously poorly addressed in the preparation of the co-creation workshop, made the original problem definition (overflowing public waste containers) obsolete, as any waste-based project depended on the company’s support thus making them a gatekeeper in decision-making. Concurrently, we observed the formation of unanimous support for sensor-based solutions among waste management and software company. Suddenly, the sensors took the central role, while the original problem definition proposed by the executive board, and also the one point the citizens had agreed upon, receded into the background. Particularly the waste management company’s expression “in any useful scenario” brings this arbitrariness to the point. The meeting consequently turned into a quest for a problem on the basis of an established solution.

When the waste management company brought in often-full garden waste disposal sites as a viable test site, this led to rapid approval from the executive board and software company, thus stabilizing the ‘digital *Häckselplatz*’. Susanne later reflected on how she made sense of this shift:

The garden waste disposal sites may seem a bit far-fetched now, considering that we went in with waste containers, but it’s actually great, because, as far as we know, we’re the first ones to test this on an open site! [...] And concerning the sensors (hesitates), it’s better to be able to show something new, something that really has a digital component (Susanne 201912-09).

Susanne appreciated the re-fitting of the problem definition by emphasizing the novelty of the solution rather than its usefulness in the context of an agreed-upon problem. Concurrently, with the modification of the problem, the negotiation process shifted entirely towards highlighting a technological solution, both at the expense of the citizens’ proposal to consider a social solution and the very co-creative approach of orienting prototypes to citizens’ ideas.

The subsequent decision in the municipal council turned out as a formality, with all prototypes of *Urban Future Ulm* including the digital *Häckselplatz* approved. A few months later, the sensor company installed three sensors in the first garden waste disposal site (Fig. 4). During installation, we again spoke to Markus, the representative of the software company, asking him about the citizens' input, who had preferred a social solution to a technical one.

“There’s not much difference, right?” he replied. “We just add a sensor; either way, we solve the problem” (Markus 202011-26).



Fig. 4: Garden waste disposal site with sensor (circled in red).

It became clear from the street interviews we conducted with citizens⁷⁴ during the evaluation phase that this seeming compatibility between a digital solution and the citizens' input did not prevail in practice: Two citizens pointed out that they would prefer feeding back the current condition of garden waste disposal sites to the waste management company themselves, thus again emphasizing a social solution that actively includes citizens. Most of the citizens we spoke to did, however, not perceive overflowing garden waste disposal sites as a challenge at all (in contrast to the originally targeted public waste containers) and “have never found the garden waste disposal site to be packed”. As one citizen who had participated in the co-creation workshop proclaimed, not without a cynical overtone: “Congratulations! This project solves a problem that never existed”. The citizens' reactions revealed clearly that they did not identify with the altered problem definition, nor with the eventual solution. Consequently, they rejected both problem and solution, which did not come as a surprise along the process we had witnessed. What becomes apparent is a conflict deeply embedded in this version of co-creation, which was consistently subordinated to a specific innovation goal, i.e., digitalization, but at the same time emphasized citizens' needs as its central benchmark at various moments thereby suggesting an ambivalent openness towards their inputs, envisioned solutions, and agency in the process. It became clear that these two components proved non-reconcilable when the citizens ultimately demanded this openness and no room remained for a shift in direction. What lingers is the question of whether the outcome of this project would have looked any different had the citizens not been involved.

⁷⁴ With one exception, these citizens had not attended the central co-creation workshop.

6.5 DISCUSSION AND CONCLUSION

We set out with this article to analyze the social dynamics unfolding within contemporary visions and versions of co-creation by focusing on co-creation practices at process level as well as on the tensions between ideals and implementations of co-creation these practices create. To do so, we illustrated through a case study of an urban co-creation initiative how the situated circumstances and constraints the initiative was embedded in shaped both co-creation practices and citizens' agency in the process. On the one hand, the initiative was genuinely interested in joint deliberation with citizens about urban futures which would build upon their needs, thus employing many of the buzzwords associated with co-creation. On the other hand, the desire for wide participation was hierarchically subordinated to a technological focus, with the explicit goal of implementing digitalization in municipal waste collection. This focus was strongly influenced by the framing of the funders and the predetermined imagined futures of the project organizers, which was also mirrored in their selection of project partners. Along three key moments (recruitment, co-creation, and decision-making/evaluation), we showed how the project tried to include a wide range of public perspectives. In the co-creation workshop, however, it became apparent that the project's technological focus dominated over citizens' voices that were mainly digitalization-critical. Ultimately, the mere implementation of a digital technology assumed first priority in the project, which increasingly bypassed citizens' life worlds. What we want to raise in this final section are four of the wider concerns pertaining to the social dynamics that shaped the specific version of co-creation we have witnessed. We conclude by proposing that attending to these concerns may contribute to re-thinking co-creation in responsible ways.

Firstly, our analysis suggests that the collective ideation of desirable urban futures was deeply interwoven with pre-existing ideas about alleged technological benefits that profoundly shaped the rationales and scopes for action of, as well as the relationships between co-creation actors. This finding resonates strongly with a recent study on the co-creation of a European health data platform conducted by Felt et al. (2023). Despite their focus on a different technology field and governance setting, the authors have made similar observations as regards the dominance of digitalization narratives as a pre-emptive aspect of any desirable project outcome. To understand this relationship between technologies and notions of desirable futures, we consider Jasanoff and Kim's notion of sociotechnical imaginaries particularly helpful. As Jasanoff and Kim (2009: 122–123) show for nuclear energy policies in the United States and South Korea, the development and implementation of science and technology policies encode "implicit

understandings of what is good or desirable in the social world writ large”. In our case study, already the funding call exhibited such distinct understandings of desirability by presenting digitalization as equivalent of improved quality of life. Accordingly, the project organizers embedded this value assumption into the design of the co-creation process, e.g., through the selection of project partners. This is consistent with previous findings from organizational and management scholars, who have described for externally-funded projects how the actors and goals already determined in project applications delineate the scope of action within these projects, including the impact of the ideas of participating publics (Hodgson et al. 2019, Godenhjelm et al. 2015; Maylor et al. 2006). In our case study, from its very early stages, the notion of digitalization being a necessary part of any good future ran deep in the project, with the project design only allowing for a vision of participants that share this fundamental value assumption and thus extend it to every aspect of life.

Secondly and closely related, such a construction of the citizen as willing to promote digitalization points to a fundamental structural flaw in this version of co-creation: that there was no room for dealing productively with citizens that did not conform to pre-established visions of technology-driven futures. Initially, the project organizers did not contemplate that dissent regarding the desirability of digital technologies would be possible at all. The moment the participating citizens ceased to share this assumption becoming, as it were, unruly, the design of the co-creation process collapsed: Rather than *co-creating* a solution that would address their realities, the citizens could, at best, refine a narrowly defined technological solution. In his opening address of the co-creation workshop, the mayor framed the citizens as guinea pigs, leading the organizers to re-emphasize several times that they considered the citizens as experts in the project. In practice though, accommodating this expertise had sharp limits, when citizens rejected the role of eager adopters of digitalization. Ultimately, they were closer to guinea pigs unable to exert actual influence on the project. Instead, their multiple calls for non-digital alternatives remained unconsidered or were portrayed as seemingly compatible with technological outcomes. This observation resonates with STS discussions on the role of “spontaneous” (Bucchi & Neresini 2008), “uninvited” (Wynne 2007), or “bottom-up” (Powell & Colin 2009) forms of participation. Rather than uninvited forms of participation, our case study points to particular uninvited forms of *participating*, in that the perspectives expressed by citizens deviated from the pre-established goals of both funding call and project. At the same time, this tension between the assumptions about citizens’ perspectives in both funding call and project application on the one hand and citizens’ actual perspectives on the other, prompts

future scholarly inquiry into the responsibilities of funders who tender co-creation projects⁷⁵. Here, our case study demonstrated vividly how the parameters specified by the funders constrained the dynamics, practices, and implementations of co-creation that could emerge at the process level, and thus also constrained responsible versions of these practices.

Thirdly, our analysis shows not only that the perspectives of the participating citizens gradually receded into the background during the co-creation process in favor of a pre-defined solution, but also that the project's original problem definition was retroactively adapted to remain compatible with both the pre-defined solution and the interests of the economic actors involved as project partners. This observation speaks directly to existing STS research into public issue emergence. Here, scholars have shown how forms of public engagement in techno-scientific contexts can be understood as a mechanism to determine what constitutes a public issue as well as to align practical and policy relevance (Marres 2007; Schikowitz 2020). As Walker and Shove (2007: 223) have argued, problems “can be ‘opened’ and closed at will”. In other words, an opening or, like in our case, an outright shift of a project's initial problem definition may effectively represent a form of closure that is often shaped by pragmatic decisions taken under time pressure and in the pursuit of efficiency (van Mierlo et al. 2016; Maylor et al. 2006). As illustrated in our case study, such ex-post openings of the issue at stake can serve to reveal both dominant trajectories (in our case: digitalization) and disproportionately strong decision-making powers (in our case: of the involved economic actors relative to the weight of the perspectives of involved publics), thus serving to stabilize pre-emptive solutions.

Fourthly and finally, our analysis prompts us to ask what co-creation means and can mean when it is embedded in projects that pursue a clear technological agenda, but nevertheless present themselves as co-creative and citizen-driven, even if the citizens reject the eventual outcomes. This question gains particular relevance with similar projects proliferating, not least in light of many of the practice cases we have considered in our literature review. Here, our observations around how a co-creation format operating under tight technological confines and external commitments can shape and delimit emerging social dynamics in that they foreground a previously envisioned outcome – to the detriment of the perspectives, agency, and influence of citizens – is uncannily consistent with many aspects of previous STS work on public engagement with science and technology. Much like our co-creation case study, public engagement exercises have been criticized as a tool to legitimize predetermined decisions

⁷⁵ This is consistent with recent normative guidelines STS scholars have provided to guide policymakers towards responsible forms of co-creation (Müller et al. 2021).

instead of genuinely taking into account the perspectives of publics (Stirling 2006), or to gain trust and acceptance for these decisions (Wynne 2006; Thorpe & Gregory 2010). Consequently, and contrary to their promise to create wide participation opportunities, public engagement formats often close down spaces for public dialogue, as they tend to put up for debate only a small subset of predefined courses of action (Stirling 2008). While co-creation may appeal to the long-held desire to engage publics upstream, seeing these fundamental issues surface so strongly in the context of co-creation indicates that shifting the moment of engagement from decision-making about adopting a technology to the recurring involvement of publics throughout innovation processes does not ensure that these publics can actually influence the process. This is particularly problematic if a co-creative framing is maintained in (external) communication to stabilize and legitimize pre-established visions of technological futures under the veneer of participation. Concurrently, we see a disconnect between the realities of co-creation practitioners versus existing scholarly inquiry into co-creation, public engagement, and related concepts. Ultimately, many of the challenges we and others observe empirically are issues that numerous STS scholars before us have critically reflected on, and more recently, complemented with normative guidance⁷⁶.

Our analysis captures the intricate dynamics of a specific co-creation exercise that we followed in depth over the course of three years. While the methodological choice to base our analysis on a thick description of this single empirical case limits the scope and level of abstraction we can provide with our contribution, it offers a range of salient entry points into empirical co-creation research that prompts further inquiry into the translation processes between abstract ideals of co-creation and its implementations in practice.

Importantly, over the years of observing our case study, we saw clearly how passionate the project team was about taking citizens' perspectives seriously. Much to their own surprise, the participating citizens did not necessarily share the assumption of digitalization being an integral part of a good life. So how can we encourage a debate about the prerequisites and formats for meaningful co-creation that adheres to the normative aspirations set forth in the academic literature, but does not lose sight of the realities of practitioners? Our specific contribution to this question lies in identifying some of the aspects that have driven the social dynamics around co-creation in a narrow direction that subsumed open deliberation in favor of pre-defined technological futures. Conversely, reflecting on these aspects in the planning, implementation,

⁷⁶ Examples include Kuhlmann et al. (2015)'s *Responsibility Navigator* and the *SCALINGS Roadmap for Socially Inclusive and Responsible Co-creation* (Müller et al. 2021).

and evaluation of co-creation exercises could serve to re-think co-creation as a meaningful way of practicing research and innovation responsibly. A first important step and consequence could be that projects intending to implement co-creation be reflexive and transparent from the beginning about what co-creation means in the context of their projects. This explicitly includes stating the limits of their interpretations of co-creation in order to be accountable. To this end, projects need to be aware that they may either foreground open co-creation or specific technological domains, but not both. Meanwhile, especially in light of the imbued passion in both academia and practice for engaging diverse stakeholders in such projects, we see a broader need for spaces where scholars, practitioners, and citizens can meet to formulate versions of these initiatives that can become truly co-creative in their situated contexts.

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7. Discussion: Co-creation as the New Spirit of Participation? A Disenchantment

I embarked on my dissertation project with the aim of critically exploring the promissory notions that co-creation – as part of an allegedly “new wave” (European Commission 2016a: 29) and “new spirit of participation” (Palmer et al. 2019: 247) – has ushered into innovation policy for the past decade. These promissory elements primarily refer to involving members of the public earlier in and throughout innovation processes and, in this way, increasing the social robustness of co-created innovation outcomes. With this, co-creation appears to respond to one central aspect of decades’ worth of STS inquiry into and critique of public engagement: namely that publics frequently only become involved once important design choices have already been made. But how does co-creation live up to this claim? What spirit is it that co-creation actually invokes?

Looking at co-creation as a mode of participation of publics in science, technology, and innovation has prompted me to ask how co-creation imagines and enacts participation and which effects co-creative forms of participation entail. The two articles forming the empirical core of my work each approach this objective in distinct ways. With my discourse analysis of EU innovation policy documents, I explored one of the central early discursive spaces in which co-creation became established outside the marketing and business literature and where co-creation is increasingly conflated with ideas of opening up scientific and technology development, and innovation processes early and in participatory ways for the perspectives of diverse actors. In doing so, I examined the value propositions that co-creation feeds into this discourse as well as its resulting discursive effects. With my ethnographic work, I explored a long-term and highly situated case study of co-creation practice in a German municipality. Here, I focused on the social dynamics that emerged from this co-creation process as well as how these dynamics shaped both the co-creation outcome and the specific prevalent form of co-creation as a social format. My research has shown that co-creation is less about an equity-oriented and open-ended participation of diverse perspectives throughout innovation processes. Rather, co-creation emerges as an optional format exclusive to those willing and able to participate – a format that simultaneously introduces notions of productivity as a non-negotiable component for all participants. In other words, the ‘co-’ in co-creation recedes behind a narrowly defined anticipation of creation that primarily draws on economic terminology. In my concluding discussion, I put the findings from the two articles into conversation with each other and with broader discourses from STS and neighboring fields.

I center my discussion on questions that foreground the participation of publics in science, technology, and innovation processes alongside the alleged promises ascribed to co-creation in this context. I thus actively build on my literature review and, through my contemplation of co-creation, establish interconnections with the critical public engagement discourse that STS has been developing since the 1960s. By adopting this analytical lens, I view co-creation as part of this discourse, in that it reconfigures ideas of and formats for the representation of societal perspectives in science, technology, and innovation. With this, co-creation also emerges as one (of several) analytical entry points into understanding some of the larger shifts in how Western democracies articulate the role of societies in science, technology, and innovation and vice versa.

My discussion chapter has two main parts. With the first one (7.1), I offer a comprehensive discussion of my conclusions of both articles. In light of the rich insights of STS research on public engagement, I reflect on the dynamics that co-creation introduces into notions of the relationships between society and innovation that are currently circulating. Specifically, I discuss how my analysis of co-creation relates to previous STS observations around public engagement with science and technology (7.1.1). Following on from this, I focus on how co-creation introduces techno-economic terminology in visions and versions of participation, thereby raising distinct expectations towards the outcomes and futures co-creative formats would produce (7.1.2). Lastly, through the lens of wider neoliberal reconfigurations of society, I discuss the problematic aspects emerging from the advent of co-creation as a contemporary notion and practice of participation (7.1.3). Summarizing these three aspects, I discuss the role of STS in shaping contemporary notions of participation (7.1.4) and offer a new research agenda for co-creation that I see emerging from the findings of my dissertation (7.1.5). In the second part of this chapter (7.2), based on my findings and informed by the discussions in SCALINGS⁷⁷, I provide a more normative outlook on the potential futures I see for co-creation – specifically, what *doing* co-creation in responsible ways might mean. Here, I actively reference and situate my own work within the findings from our SCALINGS Roadmap for Socially Inclusive and Responsible Co-creation (Müller, et al., 2021a), which my colleagues and I developed on the basis of a comprehensive comparative analysis of all SCALINGS empirical cases⁷⁸.

⁷⁷ See section 3.1

⁷⁸ See section 3.1.2

7.1 Co-creation as Techno-economization of Participation

7.1.1 Same Old, but Different? Co-creation and Public Engagement with Science and Technology

Viewing co-creation as a version of participation that is currently proliferating invites me to interrogate how my analytical accounts of co-creation relate to previous analyses of participatory modes of the engagement of publics with science, technology, and innovation. Here, my work suggests that many of the questions, challenges, and problems I identify for co-creation ultimately turn out to be ‘old acquaintances’ from STS’s rich analyses of public engagement with science and technology. In particular, my work points to the resurgence of three aspects from public engagement research: The first concerns the types of citizens that are constructed as desirable co-creators, the second pertains to how co-creation understands citizen’s local expertise, and the third addresses the scopes in which citizen co-creators can take agency over co-creation outcomes.

(1) The Desirable Co-creator

Firstly, what I see emerging around co-creation is a tension between the promise to enable wide participation versus the ways in which publics become recruited as co-creators, with certain members of the public being constructed as more legitimate participants and certain perspectives as more desirable than others. In this respect, it is my case study that reveals two opposing dynamics: On the one hand, the initiative was strongly characterized by the ideal of achieving the broadest possible participation, accompanied by an awareness that there would be more obstacles to participate for some parts of the population than for others. This awareness significantly shaped the recruitment process, which combined a subset of different ways to address different imagined subgroups of the population. My analysis of how existing assumptions about the population translated into recruitment practices that ultimately determined the composition of a micro-*demos* intended to (co-)create political legitimacy in the name of society at large resonates strongly with previous work on public engagement. Here, numerous scholars have criticized how policymakers inscribe their visions of the population into participation formats and how such pre-established classification systems of the wider citizenry become performative through the mini-publics they create (Felt & Fochler 2010; Goodin & Dryzek 2006; Hacking 1986). This notion of wide participation also echoes some of the insights from my analysis of EU innovation policy documents, as they tend to emphasize the alleged manifold opportunities for citizens to participate in co-creation, yet without specifying how these opportunities could be implemented or accessed by a wide range of

citizens. On the other hand, and contradictory to the vision of ‘participation for everyone’ that was prevalent in my case study, it became apparent during the co-creation process that some participants had their *raison d’être* as co-creators (here, through the expression of ‘not being real citizens’) relativized: namely, those participants with existing functions or previously expressed political stakes in the technologies they were to co-create. This observation resonates with existing STS critiques of public engagement that identify an implicit commitment to consensus as a common ideal in participatory exercises, along with the tendency to prioritize the ideal figure of the “innocent citizen” (Irwin 2006: 315) over those with existing views.

However, my observations around co-creation suggest that the notion of innocence and innocent citizens as the desirable participants in public engagement exercises alters if considered in the context of co-creation: While my case study primarily used the term citizens to refer to those members of the public imagined as co-creators, what became apparent over the course of the co-creation process was that this imagination was strongly intertwined with the assumption of the citizen as willing to promote digitalization and extend it to every aspect of life. This observation is consistent with some of the analytical accounts of my SCALINGS colleagues, who argue that co-creative formats tend to foreground those co-creators whose perspectives conform to the pre-established technological ideals under which co-creation operates, while limiting the agency of co-creators with divergent perspectives or gradually excluding them from the co-creation process entirely (Nyborg & Røpke 2013; Clausen et al. 2021). Such constructions of the citizen as outright proponent of technological innovation around co-creation are at odds with co-creation’s frequently invoked promise of being able to accommodate different and potentially conflicting perspectives (Elkjær et al. 2021; Horst 2021). Paradoxically, these constructions also deviate from previous STS observations around the prioritization of the “innocent citizen” (Irwin 2006: 315) in consensus-oriented public engagement formats, or rather situate innocence within a narrow conditional framework: Only those citizens seem to be considered innocent and thus desirable as co-creators whose perspectives are or can be aligned with pre-existing visions of societal progress through technologies.

At the same time, constructions of the citizen as willing to promote technological innovation also affect which outcomes become plausible – or, respectively, implausible – in co-creation processes. In particular, my discourse analysis of EU innovation policy-related documents reveals how co-creation is positioned within a discursive context that follows a dominant narrative of technological solutionism. Novel technologies are conceptualized as unquestioned

solutions to challenges, many of which, such as ‘environmental protection’ or ‘youth unemployment’, are social or political in nature. This also reflected in the analysis of my practice case; on the one hand, in that the funders took the narrative by presenting (digital) technologies as an unquestioned component of any desirable future, and, on the other hand, in that the co-creation initiative itself enacted the narrative by ultimately only allowing proposals with a digital component as outcomes of the co-creation process. Such dominance of technological solutionism suggests that co-creation, as I witnessed throughout my doctoral research, operates within a broader technological paradigm. From this perspective, the role of consensus (and dissent) in co-creative participation seems to change in relation to previous STS observations around reaching consensus as the primary goal of public engagement exercises (Irwin 2006; Wynne 2007; Horst & Irwin 2010). Instead of being the envisaged goal at the end of deliberative public engagement processes, consensus shifts to the very outset of the co-creation process: namely by assuming and demanding *a priori* that participants consent to the underlying technological paradigm.

(2) Deficient Experts

Secondly, my analysis points to a mobilization of the concept of expertise that ties in with previous STS observations around how knowledge cultures tend to be articulated through a deficit logic with lay knowledge portrayed as inferior to expert knowledge (Wynne 1992; Collins & Evans 2007). Such knowledge hierarchies, whether they be implicit or explicit, “can be seen in effect as a kind of tacit democratic theory – a theory that presumes ignorant publics in need of rescue by the state and grants science a privileged place in forming, and informing, an educated citizenry” (Jasanoff 2005: 252). Here, more recent STS accounts have argued how contemporary engagement formats re-define lay knowledges as “experts by experience” (Skilton et al. 2020: 207; Collins & Evans 2007; Lipp et al. 2023) and in doing so valorize their participation in these formats through their quotidian practices and routines as equally relevant as traditional notions of scientific or technical expertise (Collins 2010). Such valorizations of lay knowledges resonate with my co-creation practice case, where citizens’ participation in co-creation was rhetorically tied to their roles as experts in their neighborhood. However, this form of addressing citizens did not occur without ambiguity. Rather and in parallel, citizens continued to be portrayed as naïve participants in the sense of lacking ideas about concrete (technological) futures. In conflating notions of expertise with naivety, co-creation continues to construct citizens’ roles still as deficient, yet within a slightly altered deficit logic that values their expertises (in the sense of quotidian experiences), while simultaneously ascribing them a deficit of ideas.

(3) Participation Closed Down (Again)

Thirdly, my observations around co-creation resonate with the work of STS scholars who have identified for the governance impact of public engagement formats how these formats often tend to stabilize and justify policymakers' pre-existing visions of desirable futures. As early as the emergence of the first attempts at public engagement in the 1960s, numerous authors have criticized how these formats often serve to evade public resistance to premade decisions about emerging technologies (Arnstein 1969; Wynne 2006a; Stirling 2008), to gain trust for (Wynne 2006a; Thorpe & Gregory 2010) or to justify (Stirling 2006) and legitimize these decisions (Joly & Kaufmann 2008; Davies 2013). Concurrently, the legitimization of pre-established decisions through public engagement entails the legitimization of political authority (Voß & Amelung 2016), thus reinforcing incumbent power structures. Contrary to the promise of ensuring genuine agency for citizens to shape innovation processes by shifting the moment of engagement from the decision-making about the implementation of innovations into the design and planning process of these innovations, co-creation, too, exhibits a strong tendency to "close down" (Stirling 2008: 264) rather than create spaces for public deliberation about desirable futures by putting up for debate only a small subset of pre-defined options for citizens to choose from or refine. This suggests that shifting the moment of engagement alone does not suffice to ensure the perspectives of members of the public can actually shape the direction of innovation processes.

Moreover and importantly, my work demonstrates that the pre-established notions of desirable outcomes co-creation seeks to stabilize tend to promote novel technologies as a non-negotiable part of what may constitute a desirable future, often with the primary goal of fostering economic growth. This is visible from my discourse analysis in how broader discursive rationales at EU level depict the benefits of co-creation in economized terms, supported by value propositions like growth, profitability, competitiveness, or added value. At the same time, the unquestioned desirability of technological of technological outcomes reflects in how my case study established digital technologies as its dedicated goal, the desirability of which remained unquestioned for the project team and funders throughout the initiative. These observations resonate with the findings of several SCALINGS colleagues for their respective case studies as well as other existing analytical accounts of co-creation practice cases that I have considered in my literature chapter: Here, too, co-creation functions as a mechanism that, within the constraints of existing commitments and expectations towards desirable outcomes, limits participation opportunities and favors certain perspectives while preventing others from surfacing (Cuevas-Garcia & O'Donovan 2022; Clausen et al. 2021; Nyborg & Røpke 2013).

This tendency of co-creation to limit citizens' agencies and thus the possible range of co-creation outcomes to a narrow pre-established technological agenda is even more problematic if a co-creative citizen-driven framing is maintained externally, even if, like in my empirical case, the citizens clearly reject the co-creation outcome. From this angle, co-creation acts as a mechanism to both stabilize and legitimize pre-established visions of technology-driven futures and economic rationales under the veneer of participation. While for public engagement, too, STS scholars have described how these formats often exhibit commitments to "economic progress through science" (Irwin 2006: 309; Thorpe & Gregory 2010; Joly & Kaufmann 2008; Pestre 2008), this tendency seems to be even more pronounced for co-creation in that it fundamentally permeates practices and dominates notions of desirable outcomes.

7.1.2 From Politics to Economics: Techno-economic Reconfigurations of Participation

Seeing the critiques of decades' worth of STS research on public engagement with science and technology surface so strongly in the context of co-creation indicates that co-creation, despite shifting the moment of participation 'up the stream' fails to deliver on its promise to open up innovation processes and outcomes to more inclusive and equitable ways for members of the public to shape these processes and outcomes. At the same time, if co-creation does not increase the participation of publics in science, technology, and innovation, this prompts me to ask which other aspects the "new spirit of participation" (Palmer et al. 2019: 247) might introduce to prevalent understandings of participation through co-creation. Thus, while co-creation indeed seems to inherit many of the problematic features of previous public engagement formats, what I want to highlight in this subchapter is their new and troublesome economic guise I have encountered throughout my work. I do so by attending to three specific aspects of how co-creation reconfigures previous notions of participation that I see emerging from my research: The first pertains to how co-creation actively blends economic and social value propositions, the second focuses on how co-creation constructs citizens as co-creators, and the third addresses the shifts from politics to economic reasoning that co-creation introduces to previous notions of participation.

(1) A Discourse of (In)Compatibilities

Firstly, my research has shown that many of the promissory elements of co-creation – ranging from better innovation outcomes in market terms to enabling socially just ways of innovating – feature across a range of EU policy-related documents. Across my sample of these documents, co-creation is portrayed as a catch-all solution for a multiplicity of problems. These include challenges such as 'European competitiveness' that embody market ideals and explicitly seek

to foster economic growth, but also challenges that are situated at the interplay between social structures, cultural norms, and power dynamics, such as ‘social cohesion’ or ‘environmental protection’. The latter challenges are primarily social and political in nature and do not inherently imply economic problem solving narratives. Nevertheless, the documents discuss both economic and social challenges, and co-creation as their alleged solution, in close proximity, often in the same breath. Such discursive conjunction of economic and social dimensions implies proximity between the two in terms of substance, e.g., regarding how these challenges are structured and how they could be addressed. At the same time, the recurring conflation of social challenges with economic aspects creates the illusion of seamless compatibility between social and economic framings, which actively ignores the possibility of conflict between the two. Thus, the discursive formations around co-creation not only recurrently attach economic components to the social dimension, but also naturalize a certain self-evidence that economic and social goals would be compatible and reconcilable.

My observations around the blending of social and economic dimensions and the framing of the social as economic are consistent with earlier findings from STS on the role of innovation in policy contexts. In particular, this research has shown that policymaking increasingly draws on an innovation imperative that would function as panacea for a multiplicity of challenges. In a similar way that I identify for co-creation, this innovation imperative relies on a logic that constructs social challenges as economic ones (Pfotenhauer et al. 2019). To describe this logic, Pfotenhauer et al. (2019: 896) have coined the term “deficit model of innovation”, thus emphasizing how contemporary policy discourses tend to diagnose problems through a lack of innovation. Co-creation seems to plug into this wider rationale of an omnipresent innovation imperative by offering a more concrete conceptualization of and way of thinking about achieving innovative solutions by proposing the inclusion of diverse stakeholders in innovation processes as the key to successful innovation outcomes. From this perspective, it appears that it is precisely co-creation’s promise of engaging publics ‘up the stream’ in innovation, that enables a more profound shift of dominant understandings of participation away from political deliberation about innovation towards ideals of economic production. This entails that co-creation does not allow for a version of participation that could question the overall desirability of marketable innovation outcomes, but rather focuses on the production of such outcomes.

Seeing co-creation in the context of innovation deficit framings and thus as a potential response to and enactment of innovation imperatives links closely with corollary observations from STS research that have highlighted how policy contexts increasingly envision society as a key driver

and enabler of innovation. Society, or rather the consideration of societal perspectives in innovation processes, is constructed as a kind of “social fix” (Frahm et al. 2021: 174) to an innovation imperative that is increasingly failing to deliver on its promise of solving societal challenges (Frahm et al. 2021; Joly & Le Renard 2021). This notion of societies ‘fixing’ innovation not only follows the rationale that the inclusion of societal perspectives could facilitate the introduction of technological developments and establish their political legitimacy, but also puts forward a fundamental market-liberal orientation as a principle to establish and maintain social order (Frahm et al. 2021). Co-creation seems to fit squarely into this logic, taking on the role of a social format conceptualized to enable such inclusion of societal perspectives in innovation processes, while also embodying the market-liberal and pro-innovation/pro-technology ideals associated with broader notions of achieving universal good through innovation (Godin 2015; Soete 2013). At the same time, building on Frahm et al. (2021)’s notion of ‘social fix’, co-creation appears to embody the hopes for a mechanism to tame otherwise unsuccessful, undesirable, or potentially harmful innovations.

Within this framing, it is worthwhile to devote specific attention to the actors involved as co-creators. Discursively, it is above all the citizens who are envisioned as the central figure in co-creation. This is the case for both European innovation policy-related documents and the discursive framing surrounding my practice case. This focus on citizens already represents a fundamental exclusion mechanism that does – at least on a terminological level – not recognize as co-creators those members of the public who do not hold citizenship but are nevertheless affected by innovation. Besides these citizen-co-creators, my practice case anticipated company partners to become relevant co-creators right from the outset and embedded them in the structure of the co-creation process in semi-formalized roles (e.g., by allocating to them presentation slots at the central co-creation workshop). In contrast to the constant foregrounding of the role of citizens throughout the initiative, this embedding was not given special mention, but was simply enacted as a self-evident aspect of the process. These observations around the early and often formalized participation of company partners are consistent with other co-creation case studies conducted by my SCALINGS colleagues. Here, too, most initiatives were designed in such a way that business actors were considered as co-creators and actively involved in co-creation from the outset (Cuevas-Garcia et al. 2023; Lipp et al. 2023; Nyborg et al. 2023; Cuevas-Garcia & O’Donovan 2022). In this naturalization of business actors as participants in co-creation projects, I see yet another manifestation of an active linking of economic and social goals and thus a form of translating ideals of societal benefit through technological and economic progress into practice.

(2) Invoking the Citizen-Consumer-User

Secondly and in light of these actor constellations co-creation seems to produce, considering co-creation as part of an evolution of changing notions of the participation of publics in science, technology, and innovation warrants a closer look at how the actors in co-creation are configured and how their agencies unfold. Many of the rudimentary definitions that consider co-creation in a similar, i.e., participation-oriented context – and here I do not exclude how SCALINGS conceptualized co-creation and thus my own initial understanding of the concept and starting point of my work – concentrate on bringing together diverse actors (including, for instance, policymakers, company and university representatives, and members of the public) throughout innovation processes as the constitutive quality of co-creation and basis of its value propositions (SCALINGS 2018; Müller et al. 2021a; Bentzen 2021; Robinson et al. 2021). While these attempts at defining co-creation foreground the collaboration of different actors, there is one figure in particular that in the context of my work emerges to assume the central role of co-creator both discursively and in practice, namely the citizen⁷⁹, or variations thereof.

The analysis of the European innovation policy discourse my co-authors and I provide with the first article in my dissertation offers a first important entry point into the construction of the citizen as co-creator. The documents in our analytical sample tend to portray individuals as both contributors to and beneficiaries of co-creation. These individuals are referred to in alternation and often in direct discursive proximity by enumeration as ‘citizen’, ‘consumer’, and ‘(end-)user’. It is precisely the frequent prevalence of these terms as tricolon suggesting that they do not refer to three distinct groups, but to one and the same figure, imagined and invoked in multiple versions: the citizen who is simultaneously a consumer, who is simultaneously a user. For the purpose of contextualizing these multiple invocations, I consider the notion of consubstantiality, which I borrow from Christian theology, to be a helpful conceptual source. Consubstantiality refers to sharing the same substance while differing in aspect, and is used by theologians to describe the Christian understanding of the relationship between Father, Son, and Holy Spirit (Holy Trinity) as a threefold but at the same time inseparable entity (Augustinus 2003). Much similar to this idea, the emergent figure of the co-creator is imagined as always fulfilling all of her three roles – being citizen, being consumer, being user – at the same time. What remains unaddressed, however, is that these three roles in their independent denotations encompass both specific and distinct qualities and meanings. In particular, the figure of the

⁷⁹ For reasons of analysis, I stick to the actors’ category ‘citizen’, knowing that this terminology entails specific connotations (e.g., of holding citizenship, civic rights, and responsibilities). A more neutral term to speak of this group of actors would be ‘members of the public’.

citizen can conventionally be understood through her civil, political, and social rights and responsibilities within democratic societies (Gosewinkel 2010). In contrast, the term consumer is primarily associated with the quality of buying goods or services (Cambridge Dictionary n.d.a) with the term user referring specifically to someone who applies these goods or services (Cambridge Dictionary n.d.b). Hence, whereas the figure of the citizen by itself has its roots at the heart of democratic conceptualizations of society, the figures of both consumer and user arise from economic (consumer) and techno-economic (user) contexts respectively.

Constructed through the conflation of these roles, the emerging figure of the citizen as co-creator establishes a conceptual connection between the qualities inherent to the citizen on the one hand and the qualities inherent to consumers and users on the other. Not only does this contribute to the blurring of the independent meanings of the terms themselves, but also – and yet again – of the social (embodied by the citizen) with economic and techno-economic (embodied by consumer and user) dimensions. This is particularly the case if we read the recurring tricolon of citizens, consumers, and users as an analogy and thus stylistic device that emphasizes the alleged similarities between the terms. As previous research on the practices of making analogies has shown, putting inherently distinct terms in direct conversation with each other through analogies provokes conceptual interactions between them, thus changing all ends of the analogy (Stepan 1986). In other words, the readers' associations of these terms change in relation to each other, thereby evoking new meaning that transfers characteristic features previously exclusive to the concept of citizen to both user and consumer and vice versa. Consumers or end-users thus become valorized through their association with citizens, in particular with their inherent fundamental rights and responsibilities in legitimizing democratic governments. In parallel, the understanding of citizens is also shifting towards the primarily economic attributes of being consumers and users of emerging technologies.

Such conflation of these figures emerges as problematic on two levels: Firstly, the mutual reconfiguration of citizens, consumers, and (end-)users creates discursive slippages that actively ignore the possibility of conflicting interests between a co-creator imagined primarily through civic responsibilities in innovation processes versus one constructed through individual interest as a consumer and future user of potential outcomes of this process. From this perspective, the consubstantial invocation of the citizen-consumer-user emerges as another form of suggested seamless compatibility between originally distinct figures. At the same time, the increasing valorization of consumers and users as participants in co-creation glosses over the numerous complex questions about the representation and agency of citizens in participation

processes. This includes, for example, questions concerning the representativeness of publics participating in engagement formats towards the population as a whole, questions of equitable access to and agency in deliberation, as well as the integration of such formats into traditional democratic structures and processes. These questions have been widely discussed as sensitive governance issues by STS scholarship (e.g., Felt & Fochler 2010; Irwin et al. 2012; Mohr & Raman 2012) as well as more generally by large parts of the participatory democracy literature (e.g., Fischer 2003; Rosenberg 2007; Biegelbauer & Hansen 2011). In the context of co-creation, these questions seem to recede behind questions of the economic benefits of co-created outcomes for an elusive group of producers, consumers, and users.

Secondly and closely related, the consubstantial invocation of the citizen-consumer-user appears as asymmetrical: The documents my co-authors and I have analyzed predominantly mobilize the qualities of consumers and users in order to illustrate the alleged benefits of the participation of citizens in co-creation and *not* vice versa. The figure of the citizen-consumer-user is thus primarily anchored within economic value propositions: Citizen co-creators are primarily valorized through their contributions as consumers to the production of innovation outcomes, whereas their roles in deliberating about the politics of these innovation outcomes – and thus citizens’ valorization in civic terms – remains merely implicit. What appears to play a key role in this subtle redefinition of how citizens are imagined to participate in science, technology, and innovation is the temporal shift of participation that co-creation induces by opening up innovation processes earlier for the inclusion of social perspectives. However, the logic behind this shift differs substantially from the arguments of STS scholars, who have called for engaging publics earlier in innovation processes above all to address issues of equity and social justice in innovation by enabling members of the public to shape the design and characteristics of innovations that affect them (Nowotny 2003; Wilsdon & Willis 2004). Instead, co-creation appears to promote and enable the early inclusion of public perspectives into innovation processes primarily in order to employ members of the public as both a workforce in the production of innovations and as an estimator of the subsequent market success of these innovations through their consumer and user roles.

But how does this shift manifest in practice and how does it shape citizens’ agencies as co-creators? Here my work points to a strong construction of the citizen as willing to promote digital technologies within a framing that considered a specific technology objective (digitalization) as part of any desirable project outcome. Accordingly, the project design only allowed for one version of participant to emerge: the techno-positive citizen. As a result, the

initiative's pre-established focus on digitalization also emerged to delimit citizens' agencies as co-creators. This became particularly evident the moment the citizens rejected this fundamental assumption along with their role as eager adopters of digitalization – a form of dissent the project organizers had not contemplated to become possible at all. It was at this key moment that it became clear how the prevalent version of co-creation expected to be both an open format and produce specific technological outcomes was unable to productively engage with citizens' perspectives that did not share the pre-established vision of a technology-driven future.

On a more abstract level, this specific moment within the empirical case my co-author and I analyze as part of the second article of my dissertation reveals that in practice the compatibilities between techno-economic and social value propositions that are discursively linked to co-creation do not necessarily connect as seamlessly as the co-creation discourse suggests: The moment when the citizens disrupted this notion of compatibility between social and technological dimension by proposing a social solution that did not include a technological (digital) component sheds light on how the role of the citizen as co-creator unfolds: In the context of my empirical case, the dominant articulation of these roles considered the citizens as both experts in their live worlds and legitimate participants in the negotiation process about the future of these live worlds. However in practice, their agencies reached sharp limits as soon as their perspectives did not conform to the prevalent vision of a technology-driven future. From this perspective and much like I observe for the multiple invocations of the citizen as consumer and user at the discursive level, the actual predominant role of citizens in co-creation practice appears to drift towards a notion of a citizen, whose capacity to take part in the negotiation processes about her own future is legitimized primarily through her role as a prospective user and consumer of technologies.

This conflation of desirable technological outcomes with the citizen as a co-creator and user of these technologies reveals another troublesome aspect that the discursive configuration of the co-creator entails: The individuals that feature prominently as the central figure in co-creation, either as consubstantial citizen-consumer-users or as citizens alone, seem to become virtually erased from co-creation practice if their perspectives do not align with an overarching techno-economic value system. Citizens who become 'unruly' by not adhering to this value system, do no longer appear to be eligible to be co-creators. Instead, it is an elusive group of future users and consumers of pre-established technologies that becomes invoked or stylized as the legitimate basis of the co-creation process. These consumers and users displace citizens, along with their attributes in civic terms, from the negotiation processes about desirable futures in

favor of economic and technological visions thereof. This prompts me to ask what co-creation as a version of participation can mean when it is embedded in projects that pursue a clear technological agenda, especially with many such projects proliferating across countries and contexts.

(3) Shifting the Field of Participation

Thirdly and closely related, the tendency of co-creation to conflate social with economic value propositions and citizens with consumers/users appears to be more than a discursive construction of seamless compatibility between economic and social arguments or economic and civic terminologies respectively. Rather, the relationship between economic and social arguments emerges as inherently asymmetrical, whereby the economic dimension brought forth by the discourse can stand by itself, while questions of social equity appear always conflated with economic aspects. This is particularly pronounced discursively in the numerous alleged benefits the documents attribute to co-creation in the context of economic *and* societal challenges. These benefits tend to be expressed in economic terms and are often linked to concrete value propositions such as ‘growth’, ‘competitiveness’, ‘added value’, or ‘profitability’, all of which draw on a rhetoric that establishes economic success as an unquestioned societal goal.

To understand the consequences of these shifts, I draw on Donna Haraway’s notion of narrative fields. In her work on primatology as politics by other means, Haraway (1984; 1989) has shown how feminist accounts of primatology have gradually rearranged dominant versions of sociobiological theory: Early primatological research, which was primarily conducted by male scientists, tended to frame primate behavior in terms of male dominance and hierarchy that mirrored prevalent societal expectations towards human gender roles of the time. Feminist primatologists challenged this perspective by emphasizing the active roles of female primates as organizers of social life, thus advancing a more nuanced understanding of primate social structures. These accounts not only gradually restructured the scientific discourse in primatology, but also worked towards deconstructing patriarchal representations of society by exposing the ways in which scientific narratives are shaped by their broader sociopolitical context. Based on this example, Haraway (1984; 1989) demonstrates how emphasizing specific versions of a phenomenon progressively restructures its narrative field in inter-relation among and often in tension with other versions of the same phenomenon. Rather than revolutionizing discourses in an instant, such restructurings occur incrementally, yet they gradually affect the phenomenon in question, destabilizing its meaning, altering it, or crafting entirely new meaning.

For co-creation in particular, the strong economic overtones emerging discursively seem to reconfigure the narrative field of participation in science, technology, and innovation in that desirable outcomes become linked to economic growth through the production and stabilization of technological innovation. Conversely, participation formats that do not conform to economic reasoning – including the possibility to reject technological outcomes – become increasingly implausible. This finding consistent with other studies that observe similar discursive shifts towards ideals of economic production across engagement formats (Macq et al. 2020).

At the same time, my case study illustrates how this shift materialized through the challenges imagined as use cases for co-creation and its expected outcomes respectively: The initiative's original funding call not only inherently linked notions of a better quality of life with digitalization goals (in the sense of concrete technological applications that could function as business models). It also established digitalization as the overarching goal of any fundable initiative, while co-creation was conceptualized as a subordinate means of achieving this goal. Nonetheless and especially in its early stages, the initiative suggested that it would deviate from this hierarchy by orienting the direction of innovation within the project towards citizens' priorities through open co-creation, i.e., without predefining specific outcomes or specific technologies as part of these outcomes. This goal was in sharp tension with the project's external commitments, in particular to the funders and the business actors who had been involved in the initiative as cooperation partners from its outset. Concurrently, the goal of open co-creation collided with the initiative itself, its structures, processes, and assumptions, which, like the funding call, exhibited the fundamental conviction of digitalization being an integral part of any version of a good life. Although the project team – as was my own strong perception during the fieldwork – was genuinely passionate about taking citizens' perspectives seriously, a possible rejection of digital technologies as part of a desirable future simply did not seem plausible to them. The moment the citizens, from the project team's perspective unexpectedly, rejected a digital project outcome, the co-creation process collapsed in such a way that citizens could merely refine and evaluate a narrowly defined technological solution rather than co-create a solution that would address their lived realities. In other words, in the moment of crisis, the project's techno-economic objective took absolute precedence over both the co-creation process and its outcomes, to the detriment of the deliberative elements that were, at least initially in this specific case study, imagined to be part of co-creation.

The role of co-creation, as envisioned in my practice case both in its funding call and the initiative itself, thus largely mirrors the role already emerging from the documents my co-

authors and I consider as part of our analysis of the European innovation policy discourse: namely, a mode of envisioning and establishing a collective future within a framing that links good futures with technological and – here even more explicitly pronounced than my case study did – economically prosperous futures. Therefore, at a more abstract level, co-creation seems closely related to what Hajer & Pelzer (2018: 225) have termed “techniques of futuring”. The authors describe such techniques as “practices bringing together actors around one or more imagined futures and through which actors come to share particular orientations for action”. They reveal specific notions of desirable futures, which determine social interaction in the present, thus rendering these very notions performative (Oomen et al. 2022). Looking at co-creation as a technique of futuring, what emerges is a deeply rooted and discursively established overarching notion of desirable futures through marketable new technological applications, which determines both the possible range of co-creation outcomes and the *gestalt* of co-creation as a social format. At the same time, my analysis of co-creation contributes to the conception of techniques of futuring an important mechanism for making specific versions of desirable futures gradually plausible and thus performative: This mechanism consists in the juxtaposition of specific problems with ready-made solutions in “problem-solution packages” (Fujimura 1987 as cited in Felt et al. 2020: 95) that have permeated the discussions of the co-creation exercise that I have observed as its central ordering principle. The significance of problem-solution packages in the way co-creation establishes pre-determined futures is also largely consistent with recent observations around co-creation in different contexts and at different governance levels (Felt et al. 2023).

Against this background, the shifts that co-creation introduces into earlier understandings of participation emerge as more complex and in parts more subtle than a mere reformulation of the goals of participatory activities in technological or economic terms. Undoubtedly, the orientation of participation away from open deliberation about desirable futures towards an idealization of technological progress and economic growth as a pre-established component of any desirable future represents a central and inherently problematic element of co-creation. This notwithstanding, co-creative rationales seem to change notions and practices of participation on a deeper, more fundamental level. Based on my analyses, I argue that these reconfigurations consist in that co-creation consistently takes up social arguments, interweaves them with economic and technological rationales, and thus naturalizes economic and technological dimensions as self-evident parts of desirable social futures. Concurrently, co-creation mobilizes concrete mechanisms like powerful problem-solution packages intended to produce specific versions of technological and economic futures that shape co-creative modes of participation in

a way that ultimately only these futures are rendered plausible, while holding on to the social dimension as resolved by, yet subordinate to economic and technological rationales. In order to comprehend these complex shifts that co-creation induces in participation, I believe it useful to describe them as techno-economic reconfigurations of participation. By techno-economic I refer to the recurring notion of technological innovation as a driver and essential component of economic productivity that I observe in the context of co-creation. By reconfigurations I refer to the profound shifts co-creation seems to introduce into how participation is conceptualized and practiced.

7.1.3 Co-creation: The New Sprit of *What*?

My observations around how co-creation reconfigures participation in techno-economic terms resonate with larger debates surrounding neoliberal reconfigurations of democracy and the state. Numerous authors have discussed how the (infra)structures and processes that organize and order social life increasingly follow neoliberal reasoning (W. Brown 2015; W. Brown 2016; Rose & Miller 1992; Kinchy & Perry 2011). This notion entails that states, subjects, and their mutual interactions are increasingly shaped by enactments of a market model that extends to every domain of life, also in those aspects that are not inherently monetary in nature, and configures human beings “always, only, and everywhere as *homo oeconomicus*” (W. Brown 2015: 31). This includes the deregulation of the economic sector along with the simultaneous reduction of welfare state safeguards for vulnerable publics, the privatization of public goods, but also a reformulation of all aspects of human life into an economic register that can be addressed by growth and innovation. Recent studies suggest that the penetration of market-liberal reasoning into ever more aspects of social life also pertain to public engagement with science, technology, and innovation and take place across participation formats (Macq et al. 2020; Delvenne & Macq 2020). From this perspective, the increasing focus policymakers place on co-creation may indicate deeper political-economic entrenchments or larger reconfigurations.

It is these broader neoliberal rationales that co-creation seems to take up and feed into prevalent notions of participation that I want to emphasize in this section. From this rich debate (e.g., Schram 2018; Purcell 2008; Peck & Tickell 2002; Flyvbjerg 1998; Dryzek 1996), it is two specific aspects of the critiques of neoliberalism to which my analysis of co-creation speaks in particular and which I will emphasize in what follows: The first concerns the increasing conceptualization of governance processes as problem-solving and the second addresses the shifting responsibilities from traditional welfare providers to individual members of the public.

(1) From Deliberation to Problem-Solving

Firstly, my work shows how co-creation tends to embed participation in challenges or problem narratives. This becomes visible, for example, when the European policy-related documents stylize co-creation as a means of addressing concrete challenges (e.g., unemployment, environmental protection, or social cohesion), or in the problem-solution packages in which I found my case study operating (i.e., offering overflowing waste containers as the problem to discuss while simultaneously providing sensors as the seemingly logical solution). This strong focus of co-creation on specific, often predefined problems mirrors prior observations around broader patterns and dynamics of how neoliberal reason cauterizes Western democratic states and civic life. In her critique of neoliberalism ‘Undoing the Demos’, Wendy Brown (2015) argues, among other things, how neoliberalism reduces political life to a mode of problem-solving that centers on the development and implementation of practicable, feasible, and efficient solutions to technically defined problems. Concurrently, what fades into the background is the political itself, i.e., the power struggles and broader expressions of potentially conflicting positions and desires, as well as the resulting contestation of and deliberation about common values and futures (W. Brown 2015).

Co-creation seems to fit squarely into this logic, as it offers a format that caters precisely to the demands of a neoliberal version of participation and can thus accommodate many of the overarching aspects of neoliberal reasoning. This concerns not only the origins of the concept, which can be located in the marketing and business literature and thus in a traditionally commercially oriented field, but also, as my work demonstrates, the way in which co-creation presents itself as a contemporary version of public engagement with science, technology, and innovation. Much similar to Brown’s wider diagnosis of the state of Western democracies, co-creation – for the specific context of public participation in innovation governance – tends to anchor participation within concrete, narrowly defined challenges and problem-solving contexts. To this end, co-creation reformulates social and normative challenges in such a way that they assume economic or techno-economic shape and thus, in accord with wider neoliberal reasoning, appear ‘workable’ through economic growth and technological progress. From this perspective, co-creation emerges as a form of market mechanism that promises to supply a demand characterized by economic or socio-economic problem definitions with innovative solutions. What disappears with this version of participation, however, is any broader deliberation about the role of science, technology, and innovation within desirable futures, as well as the mere possibility that these futures might not always be characterized by technological progress and economic productivity.

(2) Opportunity or Responsibility?

Secondly, it is particularly the prevalent ways of addressing members of the public as co-creators that reveal yet another troublesome drift around co-creation, which is particularly evident from the analysis of the European innovation policy discourse my co-authors and I provide in the first article of my dissertation: namely, the tendency to frame citizens as entrepreneurial within the context of co-creation. This framing tends to go hand in hand with an emphasis on the allegedly manifold opportunities for participation that co-creation would create for these entrepreneurial citizens. These opportunities, however, are portrayed as options only for those willing and able to make their voices heard, while substantial considerations of procedural requirements for participation, such as representativeness, inclusive recruitment, agency in decision-making, equity, transparency, and accountability are lacking. In this context, the figure of the citizen as entrepreneur is invoked to differentiate active citizens from those silent or silenced. What remains unclear, however, is if and how a version of co-creation that foregrounds opportunities over equity and inclusion can account for this rest. Rather, co-creation emerges as an increasingly discretionary and individualized exercise that opens up potential spaces for participation only for a subsection of the population, possibly the few who can afford to participate.

This tendency of co-creation to foreground allegedly manifold opportunities for members of the public to participate in innovation over procedural requirements for implementing this participation in responsible ways is particularly problematic if we consider previous STS research that has demonstrated how public engagement exercises tend to exclude those publics most negatively affected by techno-economic change: Based on their study of public engagement practices in the context of fracking technologies, Kinchy and Perry (2011) demonstrate, how participatory efforts tend to build momentum only in affluent neighborhoods. For people in poorer areas, however, struggles for their fundamental means of subsistence tend to dominate their lived realities. They thus tend to either lack the time and means to participate in engagement formats entirely or, if they do, the platforms and social network to claim agency in the decision-making process. Based on this imbalance, the authors observe how fracking activities tend to be redirected to precisely those disadvantaged neighborhoods that remained silent or, through the structural inequalities they had been embedded in all along, silenced throughout the engagement process. From this perspective, co-creation, too, runs the risk of closing down spaces of participation for groups that are already underrepresented, particularly if the discourse is dominated by a rhetoric of opportunity and empowerment, while equity-

oriented requirements for how these participation opportunities should or should not be designed are absent.

In this context, my empirical case provides one example for how such absence of procedural requirements for participation can affect the evolution of a co-creation process and its outcomes respectively. In this specific case and in the beginning of the initiative in particular, the project team expected the hurdles to participate to be greater for some members of the public than for others. Based on this reflection, they adjusted their recruitment process to some extent, e.g., by issuing personalized invitations to traditionally (by the experience of the project team) underrepresented groups. However, when these adjustments turned out unsuccessful in terms of the diversity of co-creation participants, the project team nonetheless forwarded the results of the co-creation process to the municipal council, without substantial consideration about who did (or did not) articulate their perspectives in the process, nor how the participants' perspectives reflected in the proposal to the council at all. Particularly in light of previous research on public engagement exercises that operate within an environment of wider structural inequalities (Dawson 2018; Kinchy & Perry 2011), a version of co-creation that lacks procedural requirements for orienting participation towards equity and social justice, but instead foregrounds citizens' own initiative to engage with innovation risks perpetuating existing inequalities under the veneer of participation.

Closely linked to this rhetoric of opportunity and empowerment around co-creation is a form of privatization that shifts the responsibility of representing public interests in innovation governance, which has traditionally fallen into the realm of governments and the welfare state, to individuals. For co-creation, central to these shifts is once again the framing of citizens as entrepreneurial or – as in my practice case – experts in their lived realities. The invocation of a vague entrepreneurial spirit or the expertise that citizens are able to contribute to innovation processes as the basis for their legitimate participation in the negotiation processes about shaping societal futures seems to gradually replace considerations about the equal, universal participation, and representation of publics in these negotiation processes. Not only does this obscure the highly complex questions of how to account for equality, social justice, and fairness in these processes, but also renders citizens responsible for their own political representation.

From this perspective, the expertise frequently attributed to citizens as co-creators takes on a paradoxical twist: Invoking citizens' expertise in co-creation does not seem to establish a notion of a democratized form of socially distributed expertise that would serve to transform traditionally hierarchical innovation governance processes towards more open deliberation

about desirable futures. Nor does it provoke a broader debate that might reveal pre-established assumptions about desirable futures in an effort to render policy decisions more equitable and socially robust, as STS scholarship has repeatedly advocated (Nowotny 2003; Wilsdon & Willis 2004). Rather, the way in which co-creation ascribes expertise to citizens emerges as a mechanism to establish and stabilize their individual responsibility for participation as the default *modus operandi* of participatory innovation governance, in the sense that citizens have to provide for their own representation in innovation processes, while binding them to the trajectories of a narrowly defined techno-economic framework.

7.1.4 Remaking Participation in the Age of Co-creation?

So what remains of the manifold promissory elements – ranging from unlocking new sources of innovation to conducting more socially robust innovation outcomes – of the “new spirit of participation” (Palmer et al. 2019: 247) that co-creation supposedly brings to innovation governance? To summarize, my analysis complements both the scholarly considerations of wider societal transformation processes in general as well as existing work in the context of public engagement with science, technology, and innovation in particular, in that I contextualize how co-creation emerges as one vehicle within a discursive shift through which techno-economic ideals increasingly imbue notions and practices of participation, and shape outcomes of participation processes accordingly. Against this background, the “new spirit of participation” (Palmer et al. 2019: 247), which co-creation claims to evoke, rather appears as yet another manifestation of a “new spirit of capitalism” (Boltanski & Chiapello 2018), which increasingly organizes the ways in which social life becomes possible according to market-liberal rationality. What seems to disappear from prevalent notions of co-creative participation, however, is open deliberation about desirable futures, as well as questions about whether and to what extent certain socio-technological arrangements should be part of these futures.

Meanwhile, with co-creation appearing to speak so directly to one of the central demands of decades of critical STS research on public engagement, namely moving public engagement upstream within and throughout innovation processes, the question arises as to what extent this research has contributed to shaping contemporary notions of co-creative participation (see also Wynne 2006b). Based on their critique of previous formats of public engagement with science, technology, and innovation, many STS scholars have taken on a normative responsibility to actively engage in shaping future participatory formats. In doing so, they have distilled their analytical accounts into concrete demands and recommendations and subsequently communicated these, for instance through policy reports, to policymakers and engagement

practitioners. Some of these recommendations include recognizing diverse, socially distributed forms of knowledge and expertise, creating spaces for broader bottom-up participation of publics and, in particular, integrating societal values and perspectives along the innovation process (e.g., Felt et al. 2013; Renn et al. 2019; Rip et al. 2012; Stirling 2015; Stilgoe et al. 2011).

Indeed, these recommendations seem to reverberate in contemporary policymaking, as they resonate with many of the promises and value propositions associated with circulating notions and versions of co-creation. However, as my work shows, these aspects of co-creation emerge as altered versions of the original recommendations that embed ideals of economic productivity through technological progress, which may not be compatible with STS demands around more responsible forms of participation. Concurrently, the very core of STS accounts, namely to orient the governance of science, technology, and innovation towards societal values in inclusive and equitable ways, becomes a secondary concern or might even disappear entirely. Be it when the experiential expertise of citizens is invoked to establish an individualized responsibility for the representation of public interests in innovation governance. When spaces of participation close down for already underrepresented groups through a rhetoric that emphasizes the opportunity to participate over procedural requirements for participation. Or when publics are included up the stream of innovation processes, but cannot claim agency in these processes if their perspectives do not conform to the pre-established imaginary of a good future through technological innovation and economic growth. Put differently, co-creation could in some sense be seen as a response to many of the STS critiques of public engagement – a response that takes up aspects of these critiques, but at the same time inverts aspirations to social justice and instead extends to all aspects of participation a capitalist lexical and semiotic register, through which market values emerge as the dominant values.

This perspective on co-creation is again consistent with broader sociological analyses of contemporary manifestations of neoliberal capitalism, in particular with respect to capitalism's ability to continuously change shape to incorporate its critiques and adapt them in that they follow and consolidate neoliberal reason⁸⁰ (Boltanski & Chiapello 2018). Against this

⁸⁰ One of the examples that Boltanski and Chiapello (2018) elaborate on in their critique of capitalism is the professionalization of trade union work. In the France of the 1980s, workers and activists alike called for a strengthening of the trade unions, weakened in the face of increasing globalization and the deregulation of labor practices. Among the policy responses was an expansion of the resources available to unions by permitting hours explicitly dedicated to union work. These measures resulted in the emergence of full-time trade unionists who found themselves increasingly detached from workers, which ultimately created a new barrier to the *de facto* representation of workers' rights: "Unions have thus become a matter for professionals, rather than activists. It even seems as if members have in some ways become a burden: they must be listened and attended to, while the

disenchanting backdrop, the question arises as to what extent the proactive normative engagement of STS researchers towards new visions and versions of co-creation, which attempt to anchor innovation to democratic principles and *not* vice versa, can have any effect at all within an environment where wealth disparities are growing and ideals of techno-economic progress increasingly replace common good terms.

Of course, I am not the first STS researcher to interrogate whether STS should proactively work with concepts like co-creation that are integral to problematic profit-oriented imperatives, thus risking co-option of its own well-intended normative engagement. Specifically, STS scholars have raised similar questions about the relationship between STS and innovation (Irwin 2023a; Williams 2019; Stirling 2015; Woolgar et al. 2009). Much like for co-creation, STS research has contributed to contemporary conceptual, empirical, and political understandings of innovation through distinctive normative engagement with innovation in analysis and critique (Laurent 2021; Godin 2019; 2017; Stilgoe et al. 2013; Joly et al. 2010). Some scholars have highlighted how, despite these efforts of normative scholarly engagement, innovation continues to emerge as a reductionist concept that both operates within and reinforces a capitalist ideology that is never impartial, but irrefutably mirrors the structures of power, hierarchies, and inequalities that are deeply entrenched within contemporary societies (Becerra & Hernán 2023; Irani 2023). Others have taken a more pragmatic stance that considers innovation as a potential avenue for articulating critique and reflexivity and thus enable incremental shifts within an otherwise market-liberal innovation paradigm towards more responsible forms of innovating (Pfotenbauer 2023; Horst 2023). Irwin has argued that it is precisely the rich analytical insights our field has to offer that compels “STS researchers [to] approach innovation in a spirit [...] of intellectual self-belief”, and that future STS research “will necessitate a continued willingness to engage with economic logics, competing ideologies, multiple organizations, power and democracy in an age of innovation” (Irwin 2023b: 135). At least for now, in my contemplation of co-creation, as I write down my thoughts on the role of STS in the future for co-creation, I echo his perspective.

So how can we think about such future normative STS engagements with co-creation? Its goal and central challenge alike will be to establish a constructivist perspective on co-creation that, despite the capitalist and technological paradigm, finds ways to accommodate the possibility of change, to genuinely acknowledge learnings from other discourses such as public engagement

law has entrusted numerous duties to trade unionists that can be fulfilled without any need for members” (Boltanski & Chiapello 2018: 290).

with science and technology, to reconsider and value co-creation as a generative space for making visible agonistic dynamics within societies, and ultimately to create room for maneuver.

7.1.5 A New Research Agenda for Co-creation

Among the multiple interconnections between co-creation and existing analytical accounts in and beyond STS that my work demonstrates, there are notably three aspects that I consider particularly interesting and fruitful avenues for future research. (1) The first of these aspects pertains to potential translation processes between broader policy rationales around co-creation and local co-creation initiatives – quasi at the other end of the chain. While I consider my case study to be highly situated in its local context, what seems to surface nonetheless is a striking parallel between the discursive shifts in favor of techno-economic ideals, as my co-authors and I identify them for the European innovation policy discourse, and the actual course of the co-creation process in my case study. This raises the question to what extent and with what effects notions and value propositions around co-creation circulate between different governance levels. In this context, my work suggests that funding institutions that tender co-creative projects play a pivotal role as part of such translation processes between discursive notions of co-creation and their locally situated enactments. In particular, this role consist in the framing of funding calls, which define and delimit both the scope of co-creation exercises and the agencies of publics in co-creation that can emerge within these exercises. Addressing the performativities of funding calls in more depth prompts further research into the roles and responsibilities of funding institutions.

Other recent studies of social participation in innovation likewise indicate that such translation processes might occur and that many of the current efforts to include societal perspectives into innovation governance can be interpreted as a form of aligning local publics with wider innovation imperatives and universal ideals of economic growth and productivity (Frahm et al. 2021). The extent to which co-creation could be part of these broader translation processes, enable, or constrain them, I consider one key avenue for future scholarly inquiry into co-creation as an emerging mode of innovation governance. In particular, previous work on regional innovation cultures (Pfotenhauer et al. 2023), isomorphic difference (Irwin et al. 2021) and technopolitical identity (Felt 2015) could provide an important analytical lens and starting point for future research. In this respect, my transitional section (5.1) suggests that highly situated local cultural-historical narratives could play a central role in how universal innovation imperatives become embedded in local contexts. While my co-authors and I continue this line of analysis in a forthcoming article project (Ruess et al. 2024), I believe that, complementary

to this type of analysis, future comparative work could provide valuable additional insights into how translation processes between universal techno-economic ideals and local co-creation practices unfold.

(2) The second aspect that has occupied me repeatedly throughout the analytical process underlying this work is the question of how co-creation in science, technology, and innovation might relate to broader enactments of democracy. At this point, it is important for me to emphasize that neither participation nor co-creation automatically enhance democratic legitimacy of governance processes and that I cannot make any general statements about contemporary democratic processes and structures on the basis of my analytical accounts of co-creation (nor do I aim to do so). Nevertheless, the rhetoric and practices around co-creation that I explore in my dissertation suggest that co-creation might also be embedded in larger transformation processes of democratic structures and processes. At least in certain specific instances, co-creation, including its value propositions and associated challenges, seems to touch upon enactments of democracy and notions of what democracy can and should mean today (see also Soneryd & Sundqvist 2023). Concretely, co-creation appears to affect democracy on two levels: Firstly, this concerns the reconfigurations of the figure of the citizen, who, in the context of co-creation, is valorized as a market actor responsabilized for her own representation in innovation governance rather than through her fundamental role as the ultimate and legitimate basis of all state power in democratic societies. Accordingly, any demand that shifts from traditional welfare providers onto the shoulders of citizens also impacts democratic processes, especially if the representation of public interests in innovation governance is designed in a way that hinges on the time and ability of citizens to participate in co-creation formats.

Secondly and closely related, my empirical case illustrates that co-creation formats can be explicitly and actively linked to democratically established processes – in this case though the production of a proposal for the municipal council as one outcome of the co-creation process. Such linkages can emerge as problematic when they do not include forms of modest control over and accountability for how the basis for decision-making came into being, in particular in terms of whose perspectives are or are not reflected and to what extent. If the co-creative framing is maintained by presenting an outcome allegedly based on inclusive participation even if this outcome either reflects the perspectives of only a small subset of the public or if public perspectives are completely absent, co-creation may serve to stabilize inherently technocratic, often pre-established decisions under the veneer of democratic participation. The question as to

what extent co-creation might be part of wider reconfigurations of democracies according to market-liberal and technocratic overtones, as discussed by Laurent (2017) for instance, provides ample grounds for future scholarly exploration of the potentially complex entanglements and situated mutual shapings of democratic enactments and co-creative participation processes. Likewise, I consider it fruitful to explore the relations between the neoliberal tendencies co-creation introduces into prevalent notions of public participation in techno-scientific governance and previous analytical accounts within the wider participatory democracy literature, many of which have observed how participatory citizen engagement contributes to the erosion of democracy in favor of neoliberal hegemony (e.g., Cooke & Kothari 2001; Kohl & Farthing 2006; Leal 2010; Walker et al. 2015; Maxton-Lee 2020).

(3) The third and last aspect that I would like to foreground in this new research agenda for co-creation arises from me having made a deliberate decision early in my work to approach my material through a lens that considers co-creation as a conceptual continuation of public engagement with science and technology. While I continue to deem this perspective a valuable approach to advancing our understanding of contemporary notions and practices of co-creation now as my dissertation project draws to a close, the choice *for* this particular lens also entailed a choice *against* other lenses. For example, one alternative route into investigating co-creation could have been its consideration as part of the open innovation (von Hippel 2006) discourse. And indeed, a number of authors, particularly from management and business contexts and innovation studies, have approached the open innovation co-creation nexus. These analyses focus, for example, on the potential importance of co-creation for locating societal impact in open innovation processes (De Silva & Wright 2019), the different forms of knowledge that interact in these processes (Abbate et al. 2019), but also the challenges that embedding co-creation in innovation contexts poses for entrepreneurs and managers (Aquilani et al. 2020; Rayna & Striukova 2015; Ramírez-Montoya & García-Peñalvo 2018). Other authors, particularly within the administrative sciences, have begun to examine co-creation as a tool of administrative problem solving and policy innovation in public service. These studies focus, for example, on the forms of organizational learning (Bentzen et al. 2020) and specifically learning about citizens that co-creation might enable (Magno & Cassia 2014), as well as the obstacles that administrators face in implementing co-creation (Voorberg et al. 2015). In this latter context, some authors diagnose fundamental inconsistencies between the separation of politics and administration inherent in classical Weberian (Weber 2002) bureaucracies on the one hand, and the integrative nature of co-creative approaches on the other (Torfing et al. 2019).

Contemplating such other routes into investigating co-creation leads me to wonder how my own analysis would look had I chosen to approach co-creation not as a conceptual continuation of public engagement, but through one of these other lenses, i.e. presented as a development of innovation or administration. Particularly in many private sector innovation contexts, a notion of co-creation that extends beyond individualization options for products and instead aims to actively consider societal perspectives in innovation processes would in some sense appear to be a revolutionary incision in a discourse that, unlike technoscientific governance processes, cannot look back on decades of tinkering with the engagement of public perspectives. Many of the uncertainties and challenges that co-creation generates would very likely present new and unfamiliar challenges for the protagonists, and public perspectives might even pose a threat to an established economic system that has – arguably within its own capitalist logic – succeeded in the past. I do believe that my analysis of the complexities and pitfalls that co-creation entails would be very similar if it were reflected as a development of innovation. However, the context of this analysis would be fundamentally different: Instead of contributing to the creeping erosion of deliberation about desirable futures, as I observe for public engagement, one could assume that co-creation, if viewed within an innovation discourse that has historically been dominated by market-liberal rationales, might pave the way for fragile shifts towards societal deliberation. Whether this would allow a truly more positive interpretation of co-creation than I am offering from my analytical perspective, or whether co-creation in this context might also primarily function as a fig-leaf for societal participation in innovation, remains for future research.

Perhaps not so unlike this would my analysis present itself, had I contextualized it as a continuation of notions of public administration. While the administrative sciences and administrators alike may have a longer history of engaging with questions of public involvement at the administration policy nexus than is the case in private sector innovation contexts (e.g., Schafer 2019), these administrative discourses tend to remain largely characterized by ideals of efficiency, and the self-efficacy of leadership and administrative habitus (Mergel 2024; Mergel et al. 2021). From this perspective, co-creation could be interpreted as a step towards subtle discursive openings of established bureaucratic structures in favor of increased agility and public deliberation, as well as deeper interconnections between public policy and public administration. Seeing co-creation as a continuation of this administrative discourse also offers an alternative – or rather extended – perspective on my case study: In the context of traditionally rigid bureaucratic structures and under the pressure to produce solutions rather quickly, it seems less surprising but rather a matter of professional

survival that administrators have practical ideas about co-creation outcomes in mind *a priori*. Concurrently, open-ended processes and the inclusion of public perspectives, albeit portrayed as overall desirable, emerge as not only in tension with the efficiency-oriented paradigm under which contemporary administrations operate, but also as an outright threat to the professional status and reputation of individual administrators. Contemplating co-creation through this lens compels us, perhaps to an even greater extent than the analysis I offer, to interrogate the organizational structures within which policymakers operate, highlighting once again that it is not the policymakers themselves who are deficient, but the rationales imposed on them by their professional context and socialization. Nonetheless, the question remains as to why these pre-envisioned solutions keep evolving in technological terms, with no other solutions surfacing.

7.2 A Promise yet Broken? Envisioning a Humble Re-approach to Responsible Co-creation

It was at the 2019 Annual Meeting of the Society for Social Studies of Science where I presented my research work to a wider STS audience for the first time. And when I speak about ‘my work’ in this context, I mean the early and preliminary observations from my case study as well as some of the very first analytic avenues that I had explored at the time. More specifically, in my presentation I focused on the recruitment practices employed in my empirical case and used existing STS literature to critically interrogate how co-creation projects construct a micro-*demos* and, respectively, which narratives about and perceptions of society at large are involved in this construction. Admittedly, a lot of time has passed between this presentation and the finalization of my written dissertation, and of course this time is reflected in how I developed the substance of my analysis of co-creation, yet some points from the subsequent discussion of this presentation have stayed with me to this day. In particular, a criticism from one fairly renowned STS scholar unsettled me at the time (in a positive sense, as I have always interpreted my work as a form of “staying with the trouble” (Haraway 2016: 1) – also in the sense of my own research troubles). In a nutshell, this criticism referred to my very sharp, if not pessimistic, assessment of co-creation with respect to the concept’s inherent promise of making both innovation and ways of innovating more socially just and democratic. Based on my assessment, my critic pointed out that we STS researchers had constantly demanded for more public engagement and earlier involvement of publics upstream the innovation process. And when policymakers and practitioners subsequently offered co-creation as a response to these demands of ours, we would yet again only be concerned with looking for the negative aspects of this response instead of appreciating the progress we have achieved and further advancing its potential.

The discussion of my findings that I offer in this dissertation should leave no doubt that I continue to take a deeply critical stance towards co-creation and its effects on prevalent notions and practices of participation in innovation governance. Nevertheless, I wonder whether a responsible version of co-creation is conceivable and what this version might (and should) look like. Or, in other words, is there a future for co-creation that could offer a genuine response to the decades of STS research on public engagement with science, technology, and innovation that considers – in addition to moving publics up the stream of innovation processes – the other aspects of the STS critique of public engagement that I have outlined in my literature review? In this section, I would like to approach this faint vision of a socially inclusive and responsible version of co-creation based on the results of my work and the findings from the wider SCALINGS research context.

7.2.1 Reflections on the SCALINGS Roadmap for Socially Inclusive and Responsible Co-creation

Over the decades of scrutinizing and critiquing public engagement, STS research in particular has argued for a shift from deficit to dialogue (Irwin 2014; 2006; Stilgoe et al. 2014; Parthasarathy 2010) and, increasingly, for engaging publics early in and throughout the innovation process, i.e., before design choices are made (Wilsdon & Willis 2004; Nowotny 2003). With my dissertation, I show that co-creation, just because it relocates participatory elements to an earlier moment in the innovation process or thinks of it as spanning across the process, does not automatically lead to earlier (or any) agency of public perspectives in innovation governance. On the contrary, I show that many of the promises of co-creation that claim to reconcile ideals of in market terms more successful innovations with ideals of more socially responsible ways of innovating falter in practice. What these promises turn out to be instead are fractures where co-creation tends to drift towards a narrow process that prioritizes techno-economic ideals over the consideration of different and diverse societal perspectives. This notwithstanding, I am reluctant to abandon co-creation entirely. After all, I too consider the early inclusion of diverse perspectives in and throughout innovation processes as one of the central concerns of our field and I share the numerous repeated calls of STS researchers for policymakers and practitioners to open up innovation and innovation governance processes accordingly – not even with the primary aim to innovate in a better way, but to innovate less harmfully, in particular to avoid adverse effects for certain publics such as in the form of hostile design. To this end, co-creation might at least and under certain conditions offer a starting point.

To a certain extent, I saw my work as an invitation to reflect on precisely such conditions and take a normative stance by participating in the proactive shaping of what responsible co-creation can and should mean. However, and the interactions with my case study have demonstrated this to me so very clearly, while constructive criticism is important, finding an adequate response to such criticism is by no means easy. For example, even in cases where co-creation practitioners devote resources in advance of a co-creation exercise to reflecting on which publics might face particular barriers to participation and how these barriers might be addressed, such reflection and subsequent adjustments to co-creation practices do not necessarily result in transformative effects, here increased participation from within these publics and thus wider participation overall. At the same time, in the course of my work on the official project evaluation *Urban Future Ulm*, I experienced first-hand that it is no less trivial to find a language that does justice to both my analytical points and the realities of administrators: While I was explicitly sensitive to linking my criticism with positive and learning aspects of ‘failures’ (in project terms), my project partners would still feed back to me that they read these passages, which I perceived as mild, as overly critical and potentially problematic as regards the project’s image towards funders, the municipal council, and the public. From this experience in particular, I realized that one challenge in taking a normative stance is to continually revisit questions of how STS can communicate critical points in ways that make sense in the conditions that policymakers work with. Therefore, I approach this invitation with humility, aware that normative shoes can be a burden, that people in powerful positions may, too, be vulnerable, and that even good practices that are guided by our current state of knowledge about socially inclusive and responsible ways of innovating and that seek to accommodate the specificities of different local sites can ultimately develop quite unpredictably in practice.

That said, if we draw on existing empirical accounts of co-creation and in relation to previous STS research on public engagement, there are certain aspects that we can say ought to be considered if actors aim to envision and implement co-creation responsibly. As part of the SCALINGS research initiative, we have taken such a normative perspective and on the basis of our comparative analysis of over 30 co-creation case studies developed a roadmap for socially inclusive and responsible co-creation (Müller et al. 2021a). Concretely, our analysis points to five thematic areas around which policy issues of co-creation tend to cluster. These include recruiting participants as co-creators, distributing decision-making power in co-creation exercises, envisioning desirable co-creation outcomes (particularly in regard of whether innovation is envisioned as purely technological versus alternative outcomes being equally

within the range of envisioned desirable outcomes), establishing co-creation as a funding requirement (including adequate capacities to evaluate co-creation exercises in terms of their transformative effects on overall initiatives), as well as scaling up co-creation across local contexts while still accounting for the socio-cultural specificities of each site.

In our roadmap, we depart from these policy areas by offering a social impact assessment that captures the key findings from our comparative work re-formulated as a set of assessment questions. All of these questions address precisely the aspects from within our research that we believe can serve different co-creation actors as practical guidelines to design and implement co-creation activities in a socially inclusive and responsible manner in their respective contexts. With this, our roadmap also provides a first outline of procedural requirements for co-creation, which, as I discuss as part of my dissertation, tend to be absent from prevalent notions of co-creation and translations of these notions into practice. Specifically, our set of assessment questions addresses the recruitment of participants as co-creators, the engagement methods used to co-create, the agency of different co-creation actors, the benefits and risks associated with co-creation exercises, the co-created outcomes, as well as the scaling-up of both co-created outcomes and co-creation as a method. The full roadmap is available in the Annex to this dissertation. In what follows, I would like to take a renewed look at our roadmap's social impact assessment for socially inclusive and responsible co-creation and expand on some of its aspects from the situated perspective of my research, i.e., based on the findings I present and discuss within this dissertation. Specifically, I see my findings as speaking to three aspects of the social impact assessment: (1) recruitment, (2) agency, and (3) outcomes.

(1) Recruitment

With the recruitment section of the SCALINGS social impact assessment for socially inclusive and responsible co-creation, we draw the reader's⁸¹ attention to questions such as which actors are envisioned as participants in co-creation and whether all groups potentially affected by process and outcome are represented in these envisionings. We further prompt a discussion about which implicit or explicit barriers might exist for certain publics, especially disadvantaged groups, and how these barriers might be lowered (Müller et al. 2021a: 16). In doing so, we seek to encourage co-creation practitioners to reflect on their possible pre-established visions about society at large that might influence the composition of the micro-

⁸¹ The roadmap and the social impact assessment in particular are aimed at various co-creation actors, ranging from policymakers to funders, individuals or institutions who aim to design and implement co-creation activities, and members of the public who participate in such activities.

demos in co-creation (Felt & Fochler 2010; Goodin & Dryzek 2006). At the same time, we emphasize the relevance of a diverse group of co-creation actors (Dawson 2018), which can only be achieved in an equitable way if possible obstacles for certain groups are considered and actively addressed in advance of the recruitment process.

In general, my work, particularly the insights I provide through my empirical case study, confirms the relevance of these questions for co-creation practice. In this specific case, the project team had a strongly pronounced idea of those social groups that had been underrepresented in the past based on their own previous experience with participatory formats – here primarily members of the public with recent migration backgrounds and younger residents. In order to decrease potential barriers for these groups, the project team tailored parts of the recruitment process in such a way that these groups were specifically encouraged to participate in the co-creation process, in addition to the general invitations addressed to all residents. These additional recruitment channels coupled with bilingual invitations (to account for those parts of society with international backgrounds) underline the project team's overall commitment to implementing an idea of wide participation that also and explicitly extended to disadvantaged groups.

However, these initial efforts increasingly lost momentum as the co-creation process progressed, for example with no interpreters involved in the co-creation workshop and with no further adjustments made when these efforts turned out to be largely unsuccessful in terms of recruiting within traditionally underrepresented societal groups. The lack of adjustments of this kind might be an indication of how resource-intensive inclusive recruitment truly is, ranging from the time and financial means needed to adequately plan inclusive recruitment practices and to make adjustments to these practices throughout the initiative where needed, as well as adequate training of administrative staff to design and facilitate participatory engagement formats. That these necessary resources do not always seem to be available to municipalities or at least are not made sufficiently available to the responsible administrative staff became even more apparent in my empirical case when no citizens at all attended a follow-up workshop shortly after the central co-creation event. According to the project team, there was “simply no time in the project plan” (Susanne 2019:7-3) to reflect upon potential causes and counteract them with regard to further follow-up workshops. Instead and in response to this unsuccessful recruitment, they abandoned any further workshops and relocated all of the subsequent decisions to internal meetings with selected project partners.

With regard to the roadmap, I would therefore add two points to take account of this complexity and partial unpredictability of recruitment practices in the context of co-creative initiatives. Firstly, I would encourage projects to explicitly create space in their project design for adjustments to recruitment practices and opportunities to repeat formats if the recruitment practices do not meet expectations. These thoughts could be articulated through the following assessment questions: *Does your project have the time and budget to adapt recruitment practices over the course of the project and the flexibility to repeat participatory formats if necessary? How could you achieve such flexibility?* Secondly, I would extend the question relating to the training of project staff to adequately conduct co-creation practices, which we address in the engagement methods section of our social impact assessment, to the recruitment practices section. This could take the form of the following question: *Does your project team have the expertise to identify potentially disadvantaged groups and design adequate recruitment strategies?* Including these questions is certainly important for co-creation practitioners to be able to account from the outset for how much time, space, means, and continuous effort co-creation requires if it is to be taken seriously. I consider these questions to be at least as relevant for funders, to ensure they provide sufficient resources for meaningful co-creation. Conversely, it is particularly relevant that funders adjust their expectations towards successful co-creation to recognize that co-creation is by no means a sure-fire success and that even thoroughly planned recruitment practices require the space for adjustments if they do not work as expected including the space for failure (of practices and outcomes).

My situated reflection of recruitment practices in co-creation also addresses another point that is closely linked to the responsabilization of citizens as I discussed in the previous chapter (7.1.3.) and in relation to my discourse analysis of EU innovation policy documents in particular. Co-creation, through a rhetoric of empowerment and opportunity, tends to shift the responsibility of public interest representation in innovation governance onto individual citizens. This responsibility could be reframed as a burden for citizens, who are expected to sacrifice their time and ideas to participate in co-creation under the narrative that their participation would entail better (or any) representation of their interests in the socio-technological futures that are at stake. Participation thus also emerges as a function of whether one can afford to devote this time at all – an aspect that may pose additional hurdles to participate in co-creation activities for disadvantaged groups in particular. From this perspective, co-creation could be interpreted as an imperative for individuals to engage in unpaid labor for a task that used to fall under the care responsibilities of traditional welfare states. This view resonates in particular with the critical marketing and business literature,

which criticizes versions of co-creation in marketing and business contexts as an enabler of consumer exploitation, e.g. by outsourcing tasks normally conducted by company employees to a usually unpaid crowd (Cova et al. 2015; Gabriel et al. 2015).

For my contemplation of responsible versions of co-creation practices, this raises questions about how the contributions of citizens could be recognized as part of these practices, especially, and this is where I see an explicit link to recruitment practices, in order to reduce the barriers to participation for disadvantaged groups, for example in the form of a modest stipend. Here, a recent participatory workshop of the EU Horizon 2020 project MOSAIC, which involved researchers and public servants and explicitly dealt with questions of fair rewards for citizens' contributions in co-creation, provides some initial considerations that differentiate between material (e.g., vouchers, but also provision of food and childcare during the event) and immaterial rewards (being part of a common project), thereby mainly underpinning the relevance, but also the complexity of these questions (MOSAIC 2022). With this in mind, and knowing that there is a major demand for future research and practical tinkering, I would expand on our social impact assessment by asking: *How will you recognize the contributions of citizens in your co-creation project? Do you foresee some form of compensation and if so, what will it look like?* Asking these questions subsequently builds an important bridge to the legal section of our roadmap, which explores in more detail questions of intellectual property rights in co-creation (Müller et al. 2021a: 20-21), thus further elaborating on the idea that participation also constitutes a form of investment on the part of the co-creation actors involved.

Furthermore, I deduce from my analysis of co-creation that starting with recruitment and extending over the entire duration of the project there must be a certain degree of transparency as to which voices have been included in the process and which social groups, despite any efforts, have not expressed their perspectives. This is particularly relevant if the results of the co-creation process are to serve as a basis for decision-making in institutionalized democratic processes (for example, in the form of a draft resolution for the municipal council, as in my empirical case). I would therefore and accordingly include the following question in our social impact assessment: *How will you keep track of which (groups of) stakeholders participate in your co-creation activity?* Establishing some form of documentation about participating and non-participating groups constitutes the basis for being able to readjust the co-creation process where necessary and collect additional perspectives, for instance by actively approaching organizations that represent specific social or community groups, aware that this raises yet another level of complexity as regards to who gets to speak on whose behalf in participatory

processes (Reardon 2005). Concurrently, open and transparent access to this documentation is a prerequisite for avoiding that a co-creation outcome that reflects only a few engaged voices creates the illusion of diverse and inclusive deliberation.

(2) Agency

Another section of the social impact assessment to which my work speaks in particular focuses on the degrees of agency co-creation participants actually have within innovation processes and over their outcomes respectively. In doing so, we encourage the reader to reflect on power relations and thus on potentially existing explicit or implicit power imbalances between the participants. Following on from this, we prompt the reader to think about how unintended power imbalances can be addressed and how conflicts that may arise in the process will be resolved (Müller et al. 2021a: 16). Hence, with this section we actively address the (potential) reorganization of power through participatory practices, moving away from a monodirectional hierarchical form of power between the ruler and the ruled, but one that circulates between competing ways of knowing of different actors (Masuda et al. 2008) and thus one that is socially mediated (Cruikshank 1999; Rose 1999). The effects of this social mediation are often subtle and potentially adverse, such as unintended constraints for certain actors and actor groups to express their perspectives and exert influence on both the co-creation process and its outcomes. Through our social impact assessment, we aim to bring these subtle effects to the attention of co-creation actors in order to empower them to counteract adverse effects.

Building on my ethnographic work, I focused in particular on the agencies of citizens that emerged from the specific version of co-creation that was prevalent in my empirical case. Like many of the other SCALINGS case studies, my work, too, identifies the conceptualizations and negotiations of the agencies of co-creation actors as one of the central moments at which participation may drift into a version of participation for a few, or, completely into tokenism. In this respect, the results of my dissertation underpin the relevance of the questions we ask in our social impact assessment surrounding the agency and extent of participation of different co-creation actors. That being said, my observations add yet another pivotal dimension to our original considerations. Throughout my work, I have traced how the agency of citizens as co-creators was constructed and (re)negotiated over the course of the co-creation process of my specific case study. In doing so, I demonstrated that this agency was inherently dependent on the pre-established assumption that a technological (here specifically a digital) outcome of the co-creation process would be incontestable and that the citizens would be proponents of such a technological outcome in any particular scenario. The moment it became clear that the citizens'

perspectives did not conform to this idea of a good future through technology, their agency became increasingly limited, to the point where they could only and at best evaluate a previously envisioned technological outcome.

Such curtailment of their agency paralleling the – from the project team’s point of view unanticipated – evolution of the co-creation process represented a sharp rupture to the previously imagined and as such communicated agencies of citizens as both the ultimate source and measure of co-created outcomes. On the one hand, this sequence of events underpins the need to determine methods of conflict resolution in co-creation activities, which we have already addressed in our social impact assessment. On the other hand, from the perspective of my case study, what emerges as an equally important aspect to interrogate is the assumptions about the interests of different actors that might already be embedded in the project and process design and which do not necessarily hold true. This leads me to suggest the following addendum to our social impact assessment: *Do you hold any assumptions about the perspectives and interests of the different (groups of) participants? If yes, which assumptions do you hold and where do they stem from? How will you respond (in terms of the further course of your project) if these assumptions do not materialize?* Considering these questions in advance of a co-creation process could help expose and critically scrutinize existing implicit assumptions about the interests of different participants. Such awareness and critical reflection I consider to be one cornerstone for a space for co-creation to become possible where other perspectives, i.e. perspectives that deviate from pre-existing assumptions, can be accommodated.

At the same time, and here my consideration of the agencies in co-creation builds directly on the recruitment section, I identify a need for transparent documentation that extends over the entire co-creation process, not only about which social groups are (not) represented among the co-creation actors, but also in which ways and to what extent their perspectives actually shape the co-creation process and its outcomes. After all, my work demonstrated clearly that, just because co-creation permits earlier involvement of publics in and throughout innovation processes, it does by no means ensure that publics can actually influence these processes. This may apply to the whole of the citizens involved as co-creators (as in my case study), but is also likewise conceivable for specific groups within the co-creation *demos*. I would therefore complete the agency section of our social impact assessment as follows: *How will you document which (groups of) participants have which influence on the co-creation process and its outcomes?* Contemplating this aspect becomes particularly relevant once again if the results of the co-creation process are to serve as a basis for democratic decision-making processes and/or

if the results ultimately affect larger publics based on the perspectives of the co-creation *demos* (e.g., through infrastructural changes, where opt-out is not possible). In this context, transparency about which groups have shaped the co-creation process and its outcomes to what extent represents one central pillar, both to evaluate the genuine influence of all co-creation actors and if the aim is to expose and counteract potential implicit exclusion mechanisms of underrepresented or disadvantaged groups, which may not only occur through the recruitment practices, but also incrementally over the course of the co-creation process.

(3) Outcomes

Following on from questions pertaining to the agencies of co-creation actors, I see my work as strongly related to a third section of our social impact assessment for socially inclusive and responsible co-creation, namely the section that explicitly addresses the outcomes of co-creation activities. With this section, we prompt readers to reflect on what they envision as a successful outcome, the criteria by which this success is measured, and who was involved in defining these criteria. We also encourage reflection on whether the desirability of co-creation outcomes may hinge on pre-existing visions about technological or social solutions, or whether both technological and social solutions are equally conceivable within the project, which we recommend. With these assessment questions, we reformulate in particular the core ideas of two STS discourses around public engagement, which have also emerged as relevant in the context of co-creation from our comparative analysis of the SCALINGS set of case studies. Concretely, we address the tendency of engagement formats to merely stabilize and not negotiate specific pre-existing ideas about desirable outcomes through the involvement of publics in the attempt to bring closure to decision-making processes (Stirling 2006; 2008). Additionally and closely related, we draw attention to how notions of desirable outcomes are often linked to an overarching innovation imperative under which policy issues of all kinds tend to be re-framed as a lack of and therefore solvable through technological innovation (Pfotenhauer et al. 2019). By making these questions accessible to co-creation actors – ideally in advance of the design and implementation of co-creation activities – we hope to foster a space for reflection about potential pre-established visions of desirable outcomes and encourage a re-thinking of these visions towards a version of co-creation that allows for open deliberation.

From this perspective, my work strengthens the relevance of the question of who gets to define how the problem is constructed. My empirical case study in particular illustrates that focusing on only one possible (in this case technological) type of solution may not be compatible with an open co-creation format if this focus does not correspond with the actual perspectives of the

participating co-creation actors. Building on this observation, the question arises as to what extent the co-creation process can flexibly react to and accommodate alternative types of outcomes emerging from the process itself. For our social impact assessment, I thus propose to add a follow-up aspect to the assessment question that juxtaposes potential technological and social solutions: *How will you respond if the co-creation actors suggest a different type of solution?* On the one hand, it is essential to reflect on these questions at an early stage so that the actual range of possible outcomes in open co-creation formats is not artificially narrowed by a pre-existing commitment to certain types of solutions. On the other hand, these questions are equally relevant for formats that operate within fixed structures (e.g., funding requirements) from the outset and can therefore only allow certain solutions. In the latter case, the assessment questions empower co-creation actors to reflect upon and, for project organizers in particular, communicate the framework conditions of participation transparently from the outset in order to avoid suggesting open deliberation, when only certain types of outcomes are possible, based on implicit assumptions about consensus regarding the desirability of these outcomes.

Such pre-existing assumptions not only affect the desirability of potential co-creation outcomes, but also shape the conceptualizations and definitions of the problems to be addressed through co-creation. Again, my case study illustrates clearly that the ways in which problems are envisioned to be use cases for co-creation as part of the project design do not necessarily correspond to how citizens perceive these problems. In this specific case, the citizens may have supported the originally proposed problem definition; however, as my co-author and I describe in detail in the second article of my dissertation, this original problem definition morphed through internal negotiation and decision-making processes into a significantly altered problem definition and subsequent use case for co-creation in the project. In this altered definition, the citizens did not see a problem at all and consequently no need to change the status quo – neither through a technological solution nor through a social one.

This observation reveals yet another key insight, namely that co-creation processes do not necessarily result in the desire to change the status quo at all. Of course, such a result turns common notions of innovation as always leading to some form of change on their head. At the same time, this highlights that genuinely open co-creation also means allowing for an outcome that might involve maintaining the status quo (in the sense of a *novation*⁸², so to speak), or even *exnovation*, i.e., phasing out existing technologies or socio-technological arrangements. Hence,

⁸² The term *novation* is used by critical innovation scholars to describe the totality of non-innovation behaviors and to accommodate them in innovation theory, for example in a journal entitled ‘Novation – Critical Studies of Innovation’, which has existed since 2019 (Godin & Brandão 2019).

I suggest adding the following to the outcomes section of our social impact assessment: *Do you consider maintaining the status quo or turning away from existing technologies instead of establishing new ones as a possible outcome of your co-creation activity? If not, how will you respond if the co-creation actors wish to maintain the status quo or turn away from existing technologies instead of establishing new ones?* As with the question of whether social and/or technological solutions are envisioned as outcomes, taking these questions into account can help reveal implicit assumptions of all co-creation actors about the construction of problems as problematic and subsequently the desirability of changing current structures at all. Moreover, for project organizers, considering these questions early on in the design and implementation of co-creation activities provides an important basis for rethinking the framework conditions for participation and communicating them transparently to all co-creation actors involved.

7.2.2 Summary

So what might co-creation be able to contribute within STS's quest for a 'science for the people' and, in doing so, establishing more responsible, equitable, and socially inclusive ways of innovating and governing innovation? Jenny Reardon once described social justice as a "gathering concern" (Reardon 2017: 194) – one of "people com[ing] together to make another world possible in the presence of great trouble and enormous difficulties" (Reardon 2017: 207). For me, there could be no stronger way of expressing the enormous moral weight that philosophers, each in their own way, have over the centuries attached to ideal-typical conceptualizations of justice through an active language that places at its center the concrete actor-related enactments of justice. Through this definition, she simultaneously provides a tangible framework in which the practices of doing social justice may be situated, or at least imagined. For the purpose of my contemplation of what responsible co-creation might mean, I take the liberty to draw on this framework by likewise approaching responsible co-creation as a 'gathering concern', where people endeavor to deliberate openly about desirable futures, part of which may or may not involve novel technologies or socio-technological arrangements. And yes, here too, such gathering takes place 'in the presence of great trouble and enormous difficulties'. For co-creation, some of these difficulties lie in the frequent absence of procedural requirements that would orient co-creation activities towards more socially inclusive and equitable practices. In this respect, our social impact assessment for socially inclusive and responsible co-creation, together with my own additions that I have elaborated on in this chapter, represents an important intervention that provides meaning to the discursive vacuum around responsible co-creation while also hopefully providing co-creation actors with tangible starting points to reflect on what responsible co-creation might mean in their specific contexts.

At the same time, however, many of the difficulties and troubles around co-creation lie in the systemic structures co-creation is embedded in and can thus not be considered independently of – neither discursively nor in practice. Against this background, even when considering the aspects presented in our social impact assessment, it remains unclear whether co-creation can truly represent a path towards opening up innovation and design processes towards more responsible, equitable, and inclusive ways of innovating, which STS scholars have long called for. One aspect that leads me to this somewhat cautious outlook is that implementing our social impact assessment into practice requires substantial time and resources (see also Torfing et al. 2019), as well as genuine effort and commitment, while in many cases the responsibility for designing and implementing co-creation activities is delegated to actors like municipalities, who may find themselves working under tight economic constraints already and often do not have adequate expertise or resources at their disposal.

To make matters more complicated, genuinely responsible co-creation entails that no outcome or even turning away from existing technologies rather than establishing new ones must also be within the range of possible results. In practice, however, due to external expectations to produce presentable innovation outcomes, e.g., in relation to funders or in view of a project's broader external image, this is hardly an option for co-creation initiatives. Closely related to this is what I believe to be possibly the greatest difficulty for a responsible version of co-creation, namely, and my work shows this very clearly, that co-creation emerges as closely linked to capitalist ideals of techno-economic productivity in many of its core aspects. This commences with the origins of the term in marketing and business literature, extends over the discursive construction of the concept, through which technology-driven economic growth tends to be placed as superior to social arguments, and culminates in practice, where co-creation frequently serves to stabilize ideals of productivity and a good future through technology, instead of establishing spaces for open deliberation and fundamental struggles over the values and meanings of science, technology, and innovation in contemporary societies. From this perspective, it seems unlikely or doubtful at best that a recasting of co-creation as a responsible mode of innovating, which at least potentially breaks with ideals of technology-driven economic growth, e.g., when citizens reject the deployment of technology to address social challenges, is possible at all. This is especially the case as co-creation – from its origins in marketing and business studies to its discursive effects in EU policy discourses all the way to its implementation in a German municipality of barely 125,000 souls – seems to impose these ideals *a priori*.

8. Epilogue

28 minutes to the next bus. Nothing unusual at this hour. It was just a 3-minute walk from the workshop. Of course, I had to miss the bus regardless. Well, at least that gives me a little extra time to let the evening sink in. I take my notebook out of my bag and lean against the street lamp, the only meagre source of light at the otherwise dark bus stop. It's a little colder than I expected it to be on an April evening. I pull my scarf a little tighter and start reading. Already I'm struggling to decipher my 38 pages of freshly jotted notes, as my reflections on the workshop start to absorb me one by one.

"Excuse me?" I wince. As I look up from my notebook, I find myself directly faces with a woman who must have approached me without me noticing. "Excuse me, but do you know if the display here is correct?" She points to the digital display, where line 5 is now announced to arrive in 21 minutes. "Is this the next connection to the city center?" The woman seems almost shy, even though she is clearly the older of the two of us. How old exactly might she be? Her voice sounds young, but the lines on her sunken face paint a different picture. 40? Maybe 50? Somewhere in between? Under her eyes are thick blue-gray rings. She looks tired. Still, she offers me a strained smile. "Just a second. I'll check to make sure." I put my notes away, pull out my phone and a few moments later confirm what I had already been sure of. "Yes, it will probably be another 20 minutes." After a while, she breaks the silence again. "You know, I haven't lived at the Eselsberg for long." She need not say more. Driven by the enthusiasm of the evening, I tell her vividly (probably too vividly) about Urban Future Ulm, which she, being a new resident of the project neighborhood, obviously hadn't heard of. About how everyone in the neighborhood could participate. That it was about everyday challenges and about shaping the future of the neighborhood together. And also that an intelligent bus stop was discussed as a possible use case just now, during the workshop. That way, the display could not only tell her that the next bus would arrive in 13 minutes, but also how crowded the bus would be. She nods and nods. And I realize far too late that I've been caught up in a torrent of words, while her gaze had long wandered into the distance. She is polite – and I had clearly missed the mark. Oh Anja...

Somewhat chastened, I end my monologue remarking that a move, a new neighborhood, always brings its own challenges, right? It seems to take her a moment to realize that I had stopped talking. A few more times she nods affirmatively into the silence, into the distance.

Then she looks straight into my eyes. Is fully in the moment. Begins to talk. Shares her story. About her time out on the streets. About her apartment in the nearby social housing project, which she was now infinitely happy about. Even though the apartment had no telephone. But that she could make occasional calls from the Bahnhofsmision⁸³. That that was where she was headed now to call her daughter. That being able to talk to her daughter again was the one thing that mattered to her. And how she liked being at the Bahnhofsmision, how it made her feel less alone. For the entire bus ride into the city center, she continues to talk to me. Is fully in the moment. And I am fully in the moment. Listening. Just listening, while Ulm's Urban Future gradually fades from my mind (field notes, 20190426).

It was at this moment in my fieldwork that I first realized how starkly the co-creation exercises that I was able to witness drifted entirely past the realities of many. That those who benefit are not the 'seafarers' and 'dock whores', as Ingeborg Bachmann, whose words I have chosen to precede my dissertation, has referred to those on the margins of our societies, but, if anything, those already privileged. And that maybe, contrary to the way I perceived co-creation to operate, it is precisely the voices of those who are lost at sea, who remain invisible to most of innovation policymaking that we most urgently need to hear when it comes to imagining what a desirable version of a future might entail. I pondered for a long time about what the woman I was fortunate to meet at the bus stop that night would have had to say, had she been a participant of the co-creation workshop. Perhaps her idea would have been the installation of a public phone booth in her neighborhood that would enable low-income residents who do not own a smartphone to make regular phone calls. Perhaps she would also have had suggestions on how to lower the barriers for new residents to visit the existing neighborhood café. Or, perhaps it would have been something completely different. Because after all, I can't and never will be able to fully immerse myself in her perspective and her view of what constitutes an 'everyday challenge'.

For me, this represents precisely the point that makes genuine dialogue between all parts of society so vital if we want to counteract the potentially disadvantageous effects of innovation and instead facilitate inclusive effects thereof. And perhaps, if co-creation exercises were explicitly relocated to the margins of our societies, their central questions would no longer lie in how we can digitally map the fill level of a garden waste disposal site, but in the opening of

⁸³ Charity organization with support services at German railroad stations

genuine and open discourses about desirable futures that work to progressively move the margins of society towards its center. These discourses would have to commence in the present – and this is not new for co-creation, but an old song in the STS critique of public engagement. Without anticipating a solution, these discourses would first have to genuinely listen to the inequalities often invisibly wafting through contemporary societies, to the diverse forms of vulnerability experienced by different publics, and to ways of addressing these vulnerabilities, especially when they do not signify economic or technological progress.

Despite its manifold promises and value propositions, co-creation, at least in light of my analysis, turns out to be more of a ‘doubtful sea’. So, if at all, what hope is there for co-creation? From my perspective, the value of co-creation lies above all in its analytical capacity as a format in which social order is at stake. Hence, co-creation can reveal, at least to a certain extent, the values, norms, practices, and logics by which social order evolves in science, technology, and innovation, as well as the respective inequalities these ordering principles (re-)produce. Accordingly, I see part of my mandate as a critical social scientist as contributing to making visible these principles and their effects. That co-creation would be the solution for good coexistence for all in the specific context of science-society relations and innovation, or would represent some sort of participatory “magic potion for innovation”, as Horst (2021: 1) has cynically put up for debate in a recent essay, I doubt. And my doubts are heightened when I reflect on how strongly market-liberal overtones and ideals of economic growth through technological progress seem to prevail in co-creation, both discursively and in practice, thereby obstructing truly open-ended dialogue.

Nevertheless, I also find myself confronted with a normative question that seems to be forcing its way into the center of my thoughts with increasingly unpleasant vehemence and that is aggravated by my observations around how some aspects of the well-intended scholarly critique of participation, while it has repeatedly been taken up by policymakers, yet drifted into capitalist versions of the original critique. In a way, with this realization, I find myself at an old point where critical social science has to decide between a *vita activa* and a *vita contemplativa* (Arendt 2020), and make their choice between normative commitment and purely analytical observation. Despite my somewhat disenchanted outlook on co-creation, I argue for the former. For my mandate as a critical social scientist, this entails, despite adverse circumstances and structures that are so keen to put a market-liberal halter on participation, feeding back questions of socially responsible and inclusive approaches to participation into the public discourse on the basis of empirical social science analysis. Here, my ethnographic work in particular has

reminded me that this feedback cannot be provided remotely and authoritatively, but consists in participating as a humble part of society in shaping which aspects can and should play a role for good participation. Admittedly and borrowing Bachmann's words one last time, this way we neither bring Bohemia to the sea nor the sea to Bohemia. But perhaps gradually building capacities for re-approaching co-creation in humble ways takes us one step closer to rendering participation less of a 'doubtful sea' and more of a 'land of [our] choice'.

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ANNEX

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Summaries of the Articles and Individual Contribution

Article 1

Anja K. Ruess, Ruth Müller & Sebastian M. Pfotenhauer: “Opportunity or responsibility? Tracing co-creation in the European policy discourse”

Published in: Ruess, A. K., Müller, R., and Pfotenhauer, S. M. (2023) “Opportunity or responsibility? Tracing co-creation in the European policy discourse”, *Science & Public Policy*, 50(3): 433–444.

ABSTRACT

Co-creation seems to be flourishing across innovation policy discourses: The concept suggests that engaging diverse actors throughout innovation processes will unlock new sources of innovation and conduce robust outcomes. While co-creation seems to embrace new and diverse participation opportunities, it is necessary to interrogate how it affects existing notions of public engagement. In this paper, we explore the discursive uptake of co-creation in European innovation policy. Drawing on a qualitative discourse analysis of European Union (EU) publications, we scrutinize the value propositions of co-creation and discuss them in light of the existing public engagement literature. We find that the EU tends to foreground alleged economic benefits of co-creation over questions of social justice. To that effect, it consistently conflates citizens, consumers, and users and blurs the line between self-motivated opportunity and democratic legitimacy. Countering the prevalent co-creation optimism, we propose a more nuanced outlook on co-creation that should prompt further scholarly inquiry.

Contribution Anja K. Ruess: I contributed significantly to this article by co-developing the research question and design in close collaboration with my co-authors Ruth Müller and Sebastian Pfotenhauer. Moreover, I collected and analyzed the data and, as lead author, worked on writing the manuscript, thus significantly shaping the line of argumentation that we present.

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Article 2

Anja K. Ruess & Ruth Müller: “Finding solutions to problems that never existed: A case study of co-creation in the Municipality of the Future”

Accepted for publication in: Ruess, A. K., and Müller, R. (in press) “Finding solutions to problems that never existed: A case study of co-creation in the Municipality of the Future”, *Journal of Responsible Innovation*.

ABSTRACT

Over the past decade, *co-creation*, i.e., practices bringing together diverse actors to achieve mutually beneficial outcomes, has emerged as a broadly desired approach to innovation governance. Co-creation takes many shapes and its promises range from more successful innovations to more inclusive and responsible forms of innovating. In this paper, we interrogate co-creation practices by tracing how they shape techno-society relations through the inclusion of publics in smart city contexts. Our analysis focuses on an initiative that aimed to include citizens into the development of smart city technologies. Drawing on ethnographic fieldwork and qualitative interviews, we discuss the social dynamics of *doing* co-creation as establishing a distinct technology versus orienting innovation towards citizens’ needs, and show how pre-made commitments to particular technologies and stakeholders shape citizens’ agency. Understanding these dynamics will contribute to the growing debate about co-creation by providing a nuanced outlook on co-creative innovation practices, their potentials, and challenges.

Contribution Anja K. Ruess: The article is closely linked to my empirical work in the SCALINGS research project, which formed the larger framework for my methodological approach to the case study that my co-author Ruth Müller and I present. Within this framework, I contributed significantly to the article by acquiring the case study and collecting the empirical data in a fieldwork of over 3 years. Furthermore, I analyzed and – in close conversation with Ruth Müller – interpreted the data and embedded these interpretations conceptually. As lead author, I contributed substantially to the writing of the manuscript.

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Tables

Table 1: Overview of SCALINGS cases; the case this dissertation primarily draws on is highlighted in blue (SCALINGS 2019a; 2019b; 2019c)

Case	Domain	Instrument(s)	Location	Main co-creation actors	Co-creation goal
CLEAN	urban energy	public procurement of innovation, co-creation facility	DK, various	research, public sector, private sector	support the green energy transition and Danish clean tech industry
Cleantech TIPP	urban energy	public procurement of innovation	Øresund, DK	research, public sector, private sector	establish public-private partnerships in climate and energy projects
Jouw Licht Op 040	urban energy	public procurement of innovation	Eindhoven, NL	research, public sector, private sector, publics	develop, test, and implement smart urban lighting solutions
Prusice Renewable Energy	urban energy	public procurement of innovation, living lab	Prusice, PL	public sector, publics	support grants for photovoltaic micro-installations
Bürgerwerke	urban energy	co-creation facility	DE, various	publics	provide electricity from cooperatives to the German energy market
Erneuerbare Energien Rottenburg	urban energy	co-creation facility	Rottenburg, DE	publics	develop community-driven local sustainable energy projects
Co-creation of nuclear waste governance	urban energy	co-creation facility	BE, various	public sector, publics	facilitate dialogue in final nuclear waste governance
DTU Smart Campus	urban energy	co-creation facility, living lab	Lyngby, DK	research, campus staff	use the campus as a testing facility for smart city-like projects
InnoSpace	urban energy	co-creation facility	Eindhoven, NL	students, private sector	develop student skills and entrepreneurial capabilities
Braimport Smart District	urban energy	living lab	Helmond, NL	research, public sector, private sector, publics	develop a liveable, smart, circular, and sustainable neighbourhood
Energylab Nordhavn	urban energy	living lab, co-creation facility	Copenhagen, DK	research, public sector, private sector, publics	develop energy solutions for sustainable cities
Micro-grid Services for Local Energy Communities	urban energy	living lab	Mechelen, BE	public sector, private sector, NGOs, publics	test and establish roles of micro-grid service providers
SoLAR	urban energy	living lab	Allensbach, DE	public sector, private sector	demonstrate micro-grid applications
CleanTech Campus Garching	urban energy	living lab	Munich, DE	research	design and test a new energy concept for the campus
Climate Neutral Campus Stuttgart	urban energy	living lab	Stuttgart, DE	research, public sector, private sector, NGOs	develop and test a climate neutral campus
Distributed Electrical Systems Laboratory	urban energy	living lab	Lausanne, CH	research, public sector, private sector	test the deployment of smart technologies
UEW Green Campus	urban energy	living lab	Wrocław, PL	research, students	establish a green campus
Eckart/Vaartbroek living lab	urban energy	living lab	Eindhoven, NL	public sector, private sector, publics	design an interactive light route
Urban Future Ulm	urban energy	living lab	Ulm, DE	public sector, private sector, publics, NGOs	develop and test digital solutions to citizens' everyday challenges

Svalin	urban energy	living lab	Roskilde, DK	research, publics	manage energy via a peer-to-peer principle
Housing Cooperative Wroclaw	urban energy	living lab	Wroclaw, PL	publics, research	demonstrate photovoltaic modules in residential housing
Nautilus	urban energy	living lab	Amsterdam, NL	publics, public sector	develop sustainable housing
ECHORD ++ PTDI Healthcare ASSESTRONIC	robotics	public procurement of innovation, living lab	Barcelona, ES	public sector, private sector, research	develop a robotic solution for comprehensive geriatric assessment
ECHORD ++ PTDI Healthcare CLARC	robotics	public procurement of innovation, living lab	Vilanova, ES	public sector, private sector, research	develop a robotic solution for comprehensive geriatric assessment
ECHORD++ PTDI Urban Robotics ARSI	robotics	public procurement of innovation	Barcelona, ES	public sector, private sector, research	develop a robotic solution for sewer inspection
ECHORD++ PTDI Urban Robotics SIAR	robotics	public procurement of innovation	Barcelona, ES	public sector, private sector, research	develop a robotic solution for sewer inspection
RIF Bristol	robotics	co-creation facility	Bristol, UK	public sector, private sector, research, publics	transfer knowledge from the robotics lab into industrial sectors
RIF Paris-Saclays	robotics	co-creation facility	Paris, FR	public sector, private sector, research, publics	transfer knowledge from the robotics lab into industrial sectors
RIF Pisa-Peccioli	robotics	co-creation facility, living lab	Pisa, IT	public sector, private sector, research, publics	transfer knowledge from the robotics lab into industrial sectors
Frontiers in Autonomous Systems Technology	robotics	co-creation facility	Eindhoven, NL	research, private sector	investigate AI-based robotics solutions for industrial deployment
OFFIS Integrated Environment for Ambient Assisted Living	robotics	living lab	Oldenburg, DE	research, public sector, publics	develop ambient assisted living technologies
Anchor Robotics Personalised Assisted Living Studio	robotics	living lab	Bristol, UK	research, public sector, publics	develop, test, and implement assistive robots
PAL Robotics Assisted House	robotics	living lab	ES, various Milton Keynes, UK	research, private sector	develop, test, and implement assistive robots
Milton Keynes	robotics	living lab		research, publics	demonstrate smart city robotic solutions
AutOcampus	autonomous driving	living lab	Toulouse, FR	research, private sector	test autonomous vehicles
Test-field Autonomous Driving Baden-Württemberg	autonomous driving	living lab	Karlsruhe, DE	research, public sector	test autonomous vehicles
Digibus	autonomous driving	living lab	Salzburg, AT	research, public sector, private sector	test automated minibuses

Table 1: Overview of SCALINGS cases; the case this dissertation primarily draws on is highlighted in blue (SCALINGS 2019a; 2019b; 2019c).

Table 2: Overview of policy documents included in the analytical sample

Document title	Document type	Database	Year
Opinion of the Committee of the Regions on ‘Closing the Innovation Divide’	Opinion	Official Journal of the European Union	2013
Opinion of the Committee of the Regions on ‘European research area’	Opinion	Official Journal of the European Union	2013
Horizon 2020 interim evaluation: maximising the impact of EU research and innovation	Communication	Official Journal of the European Union	2018
Horizon Europe Stakeholder Consultation Synopsis Report	Report	Official Journal of the European Union	2018
Proposal for a DECISION OF THE COUNCIL on establishing the specific programme implementing Horizon Europe – the Framework Programme for Research and Innovation	Proposal	Official Journal of the European Union	2019
Opinion of the European Economic and Social Committee on a) Proposal for a Regulation of the European Parliament and of the Council establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination and on b) Proposal for a Decision of the European Parliament and of the Council on establishing the specific programme implementing Horizon Europe – the Framework Programme for Research and Innovation	Opinion	Official Journal of the European Union	2019
Co-creating a sustainable Energy Economy – ERT Companies Take the Lead	Letter	European Parliament	2010
The Collaborative Economy Impact and Potential of Collaborative Internet and Additive Manufacturing	Briefing	European Parliament	2015
The Collaborative Economy Impact and Potential of Collaborative Internet and Additive Manufacturing	Study	European Parliament	2015
Open Innovation in Industry, Including 3D Printing	Study	European Parliament	2015
Horizon 2020 Work Programme 2016–2017 16. Science with and for Society	Horizon 2020-related	European Parliament	2016
ANNEX 7 Horizon 2020 Work Programme 2016–2017 5.ii.Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing	Horizon 2020-related	European Parliament	2016
Annex 12 Horizon 2020 Work Programme 2016–2017 9. Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy	Horizon 2020-related	European Parliament	2016
Annex 16 Horizon 2020 Work Programme 2016–2017 13. Europe in a changing world – inclusive, innovative and reflective Societies	Horizon 2020-related	European Parliament	2016
COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT Accompanying the document Proposals for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination DECISION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on establishing the specific programme implementing Horizon Europe – the	Horizon Europe-related	European Parliament	2018

Framework Programme for Research and Innovation COUNCIL REGULATION establishing the Research and Training Programme of the European Atomic Energy Community for the period 2021–2025 complementing Horizon Europe – the Framework Programme for Research and Innovation			
Research and innovation in the EU Evolution, achievements, challenges	Briefing	European Parliament	2018
European Environment Agency Draft Single Programming Document 2020–2022	Programming document	European Parliament	2019
Using technology to ‘co-create’ EU policies	Briefing	European Parliament	2020
COMMISSION STAFF WORKING DOCUMENT INTERIM EVALUATION of HORIZON 2020 ANNEX 2	Horizon 2020-related	European Council	2017
Annex 20 Horizon 2020 Work Programme 2016–2017 17. Cross-cutting activities (Focus Areas)	Horizon 2020-related	European Commission	2016
COMMISSION STAFF WORKING DOCUMENT INTERIM EVALUATION of HORIZON 2020 ANNEX 2	Horizon 2020-related	European Commission	2017
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE, THE COMMITTEE OF THE REGIONS AND THE EUROPEAN INVESTMENT BANK Investing in a smart, innovative and sustainable Industry A renewed EU Industrial Policy Strategy	Communication	European Commission	2017
Annex 6 Horizon 2020 Work Programme 2018–2020 5.i. Information and Communication Technologies	Horizon 2020-related	European Commission	2018
ANNEXES to the Proposal for a DECISION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on establishing the specific programme implementing Horizon Europe – the Framework Programme for Research and Innovation	Horizon Europe-related	European Commission	2018
Annex 16 Horizon 2020 Work Programme 2018–2020 13. Europe in a changing world – Inclusive, innovative and reflective societies	Horizon 2020-related	European Commission	2018
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A New Industrial Strategy for Europe	Communication	European Commission	2020
The future of work High-level EESC-ILO Conference	Speech	European Economic and Social Committee	2017
Workshop: Identities and Polarisation	Concept Note	European Economic and Social Committee	2018
PRELIMINARY DRAFT OPINION Section for Transport, Energy, Infrastructure and the Information Society Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions United in	Opinion	European Economic and Social Committee	2019

delivering the Energy Union and climate action – Setting the foundations for a successful clean energy transition			
Post-Covid crisis recovery and reconstruction	Proposal	European Economic and Social Committee	2020
Lisbon Application form European Entrepreneurial Region (EER) Label	Application	European Committee of the Regions	2015
Participation processes and government communications: ‘Does it improve democratic quality?’	Report	European Committee of the Regions	2017
The Future of Europe	Brochure	European Committee of the Regions	2018
A territorial approach for the implementation of the SDGs in the EU – The role of the European Committee of the Regions	Brochure	European Committee of the Regions	2019

Table 2: Overview of policy documents included in the analytical sample.

Table 3: Overview of ethnographic engagements with *Urban Future Ulm*

Type of engagement	Function	Role	Frequency
Co-creation Workshop <i>Urban Future Ulm</i>	Workshop	Observer	2
Online participation <i>Urban Future Ulm</i>	Online participation	Observer	1
Preparatory meetings	Meeting	Observer	2
Debriefing	Meeting	Observer	2
Public Information	Outreach	Observer	2
Municipal council meeting	Meeting / decision	Observer	1
Prototype opening	Outreach	Observer	1
Conference	Outreach	Observer	1
Office attendance	Quotidian	Observer	10+
Internal meetings	Quotidian	Observer	5+
Guided walks	Outreach	Observer	2
Exploratory walks	Quotidian	Observer	3
Neighborhood café	Quotidian	Observer	1
Citizen meeting	Quotidian	Observer	1
Cultural events	Quotidian	Observer	3
Participatory workshops not related to <i>Urban Future Ulm</i>	Workshop	Observer	11
Online participation not related to <i>Urban Future Ulm</i>	Online participation	Observer	3
Participatory workshops	Workshop	Active participant / observer	2
Conferences	Conferences	Active participant / observer	2
Reflexive workshop	Workshop	Active participant / observer	6
Prototype setup	Quotidian	Active participant / observer	1
Internal meetings	Quotidian	Active participant / observer	3
Introductory video	Outreach	Active participant / observer	1

Table 3: Overview of ethnographic engagements with Urban Future Ulm.

Table 4: Overview of interviews conducted as part of my empirical engagements with *Urban Future Ulm*

Type of interviewee	Type of interview	Number of interviews
Executive board member	Semi-structured	10
Executive board member	Ethnographic	2
Executive board member	Semi-structured, group	2
Citizen	Semi-structured	6
Citizen	Ethnographic	6
Citizen	Semi-structured, group	2
Academia	Semi-structured	2
Academia	Ethnographic	1
Stakeholder, other	Semi-structured	7
Stakeholder, other	Ethnographic	2
Stakeholder, other	Semi-structured, group	3

Table 4: Overview of interviews conducted as part of my empirical engagements with Urban Future Ulm.

Table 5: Overview of documents analyzed as part of my empirical engagements with *Urban Future Ulm*

Type of document	Source	Number of documents
Documents related to <i>Urban Future Ulm</i> , internal	Stadt Ulm	2
Documents related to <i>Urban Future Ulm</i> , external	Stadt Ulm	10
Documents not related to <i>Urban Future Ulm</i> , external	Stadt Ulm	13
Speeches	Stadt Ulm	6
Videos	Stadt Ulm	3
Print media articles	Südwestpresse Ulm (64), Eselsberger (1), Eselsberg (1)	66
Websites	Stadt Ulm	9
Websites	Land Baden-Württemberg	2

Table 5: Overview of documents analyzed as part of my empirical engagements with Urban Future Ulm.

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Letter of Agreement

**Opportunity or responsibility? Tracing co-creation in the European policy discourse**

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SCALINGS Policy Roadmap

SCALINGS CO — CREATING EUROPEAN FUTURES



INNOVATION
PARTICIPATION
CO-CREATION

EUROPE
2030



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Co-creation is a new approach to improving innovation processes and their outcomes. The term “co-creation” broadly denotes the collaboration of diverse actors, such as companies, universities, policymakers and members of the public, in innovation processes. Co-creation is often understood as a way of sparking new ideas for innovation processes and making innovations more user-friendly and hence more successful in the market. However, at the same time, co-creation is also heralded as an opportunity for making innovation processes more socially inclusive and responsible because it allows innovators to integrate diverse actors into the innovation process. It is the latter perspective that we foreground in this roadmap, as it resonates with hopes expressed in many European innovation policy documents.

The purpose of this roadmap is to guide co-creation actors towards designing and implementing socially inclusive and responsible co-creation activities. To this end, we consider co-creation in the context of some of the key challenges Europe is facing today, such as growing social inequality and questions of how to ensure the equal participation of diverse members of the public in key social and political processes in European societies. We start from the assumption that social and technological innovation activities are such key processes: Innovations shape our lives on an everyday basis. Depending on how they are designed and implemented, they can create opportunities for some and challenges for others. It is therefore important to include a diverse range of perspectives in innovation activities to avoid unjust biases and an unequal distribution of risks and benefits. In this roadmap, we provide guidance on how to design and implement co-creation activities in socially inclusive and responsible ways.

For the design of this roadmap, we draw on empirical material from the EU Horizon 2020 project “Scaling up Co-creation: Avenues and Limits for Integrating Society in Science and Innovation (SCALINGS)”. Over the course of three years (2018-2021), SCALINGS investigated the implementation, uptake and outcomes of co-creation activities across Europe. The project included studies of three different co-creation instruments (public procurement of innovation, co-creation facilities and living labs) in three technological domains (robotics, urban energy and autonomous driving) across eleven European countries: Austria, Belgium, Denmark, France, Germany, Italy, Poland, Spain, Switzerland, The Netherlands and the United Kingdom.

Based on this in-depth empirical research, we analyzed the strengths, weaknesses, opportunities of and threats to co-creation as a novel form of innovation in Europe (SWOT analysis). Focusing on questions of social justice, equity and inclusion, our research has shown that policy issues regarding co-creation cluster around five thematic areas: recruitment of participants, distribution of decision-making power, technological vs. social innovation, co-creation as a funding requirement and the possibility of scaling-up co-creation across different sites.

Building on our SWOT analysis, we developed a “Social Impact Assessment for Socially Inclusive and Responsible Co-Creation” to help orient co-creation actors towards more responsible, socially just and inclusive forms of innovation. This assessment tool provides a set of

key questions that co-creation actors can use to provide policy frameworks for socially inclusive and responsible co-creation (policymakers), to support and evaluate applicants in the design of co-creation activities (funders), to guide the design and implementation of co-creation activities (practitioners) and to evaluate their own participation in innovation processes (members of the public). The Social Impact Assessment tool addresses vital issues to ensure the socially inclusive and responsible design of co-creation activities, such as recruitment, engagement methods, agency, benefits, risks, outcomes and scaling-up. We hope that this tool will be taken up by different stakeholders to help to realize the potential of co-creation for more socially inclusive and responsible innovation activities across Europe.

In this roadmap, we further identified key legal challenges for co-creation. These challenges pertain particularly to the domains of public procurement law, intellectual property law and experimental law. Where the law complicates co-creation or conflicts with it, we have formulated concrete recommendations for different stakeholders in co-creation processes in Europe.

Bringing together our policy and legal analysis, we arrive at a set of key recommendations for policymakers, funders, co-creation practitioners and members of the public in Europe:

STAKEHOLDERS	ACTIONS
	▪ Keep in mind that co-creation only fosters socially inclusive and responsible innovation if active efforts are made to include diverse publics in the process. ▪ Be aware that mainstreaming or scaling up co-creation will only be successful if the specificities of local socio-cultural contexts are taken into account. ▪ Draw on the Social Impact Assessment to provide policy frameworks that foster socially inclusive and responsible co-creation. ▪ Encourage the public procurement of innovation, but be mindful of the limits of economic efficiency and equal treatment. ▪ Use experimental law concepts selectively to foster innovation without undermining the rule of law.
	▪ Clearly communicate that public participation in innovation is not a checkbox requirement: Encourage applicants to submit well thought-out plans for their co-creation activities. ▪ Provide applicants with the Social Impact Assessment to support them in the design of their co-creation activities. ▪ Possibly make engaging with the Social Impact Assessment tool a mandatory requirement for the submission of applications.
	▪ Invest time and effort into planning, conducting and evaluating the co-creation activity. ▪ Carefully analyze the specific socio-cultural context in which your co-creation activity takes place. This might require involving social scientists in your project. ▪ Identify disadvantaged groups that might easily be excluded from your co-creation activity and make specific efforts to include them. ▪ Use the Social Impact Assessment to support the socially inclusive and responsible design and implementation of your co-creation activity. ▪ Make sure you are aware of relevant legal issues that might emerge from your project and address them. ▪ Find contractual solutions to acknowledge co-creation inputs that are important but fall outside the scope of IP law.
	▪ Use the Social Impact Assessment to evaluate the co-creation activities you are involved in and to inspire change towards more socially inclusive and responsible practices.
▪ POLICY RECOMMENDATIONS ▪ LEGAL RECOMMENDATIONS	

THE SCALINGS PROJECT

RESEARCHING CO-CREATION IN EUROPE

This roadmap is based on the EU Horizon 2020 project, “Scaling up Co-creation: Avenues and Limits for Integrating Society in Science and Innovation”, or “SCALINGS” for short. SCALINGS is based on the assumption that co-creation practices – and co-creation research – are at a crossroads: More than ever, initiatives to boost innovation through collaboration among diverse actors are flourishing across Europe. Yet, this mainstreaming poses new challenges to better understanding “co-creation processes and outcomes under various cultural, societal and regulatory backgrounds to allow better-targeted policy support” (SwafS-13-17). Pertinent questions include:

What is co-creative innovation in theory and what is it in practice?

How can co-creation be practiced in a socially responsible and inclusive way in different European contexts?

What can policymakers do to promote and scale-up co-creation in Europe responsibly?

Over the course of three years (2018-2021), SCALINGS addressed these questions in different European settings. In the first ever rigorous comparative study, the SCALINGS team investigated the implementation, uptake and outcomes of three co-creation instruments (public procurement of innovation, co-creation facilities and living labs) in three technological domains (robotics, urban energy and autonomous driving) across eleven countries. Using comparative case studies and coordinated cross-country experiments, the project members explored if and how these instruments can be generalized, transferred or scaled up to other socio-cultural, economic or institutional conditions.

To support ongoing EU innovation policy efforts and to highlight the specific opportunities and challenges for socially responsible and just co-creation practices, we have synthesized our findings into the SCALINGS Policy Roadmap “Co-creating European Futures: Innovation, Participation and Co-creation in Europe 2030”.

When diverse actors such as companies, universities, policymakers and members of the public collaborate in mutually enabled or supported innovation processes, they engage in co-creation practices. Co-creation takes many shapes, which is why SCALINGS employed different disciplinary angles to better identify and understand its characteristics and outcomes. To build its analytical framework, the project drew on critical perspectives stemming from Science and Technology Studies (STS).

STS is an interdisciplinary research field that focuses on the relationship between science, technology and society. STS scholars study the means, conditions and processes under which scientific knowledge as well as technological and social innovations are produced, including the specific contexts (e.g. social, political, economic and historical) of research and innovation. For instance, STS explores how innovations such as self-driving cars create new social and political opportunities and challenges for society, examines whose needs and perspectives are included or excluded in the development of these innovations and how both of these issues might vary across different local, national and cultural contexts.

This STS approach to co-creation is complemented by insights from other disciplines such as Innovation Studies, Public Policy and Law, Management and Economics as well as Philosophy and Ethics.

To capture the diverse realities of co-creative innovation practices, SCALINGS studied the implementation, uptake and outcomes of co-creation using a series of comparative case studies. SCALINGS has accompanied more than 20 projects as they engage in different kinds of co-creative innovation practices in different technological domains and European countries.

CO-CREATION INSTRUMENTS

SCALINGS studied three co-creation instruments:

LIVING LABS

Living Labs promise to overcome the confines of traditional innovation settings by piloting – or “testing” – novel technologies under “real-world conditions”. For example, a city district might be declared a living lab for self-driving vehicles, where these new transportation devices come to interact with other traffic participants. Often, living labs invite members of the public to actively provide feedback for and contribute to the innovation process.

PUBLIC PROCUREMENT OF INNOVATION

Public Procurement of Innovation procedures utilize the public sector’s purchasing power to adopt innovative solutions that address public needs. Public end users become co-creators by identifying collective needs and collaborating with solution providers. For example, a city government might partner with robotics researchers and companies to develop technologies for sewer inspection that aim to reduce labor risks, improve precision of inspections or optimize the city’s sewer cleaning resources.

CO-CREATION FACILITIES

Co-creation Facilities are physical or virtual spaces that a range of different actors can use to engage in shared innovation activities. For example, universities might provide laboratory space or testing environments as well as expertise to enable external users (e.g. industry partners, start-ups, members of the public) to engage in co-creation activities.

TECHNOLOGICAL DOMAINS

SCALINGS studied these co-creation instruments in three technological domains:

ROBOTICS

Robotics is increasingly finding its way into our everyday lives. Collaborative robots (“co-bots”) are designed to work closely together with and for humans in a variety of application areas, ranging from education to healthcare to manufacturing. However, their use in social settings is often accompanied by multiple concerns. How can they operate safely in delicate environments such as hospitals or schools? How can we protect them from being hacked or manipulated? Answering these questions greatly depends on co-creation efforts among co-bot developers, operators, end users and affected members of the public.

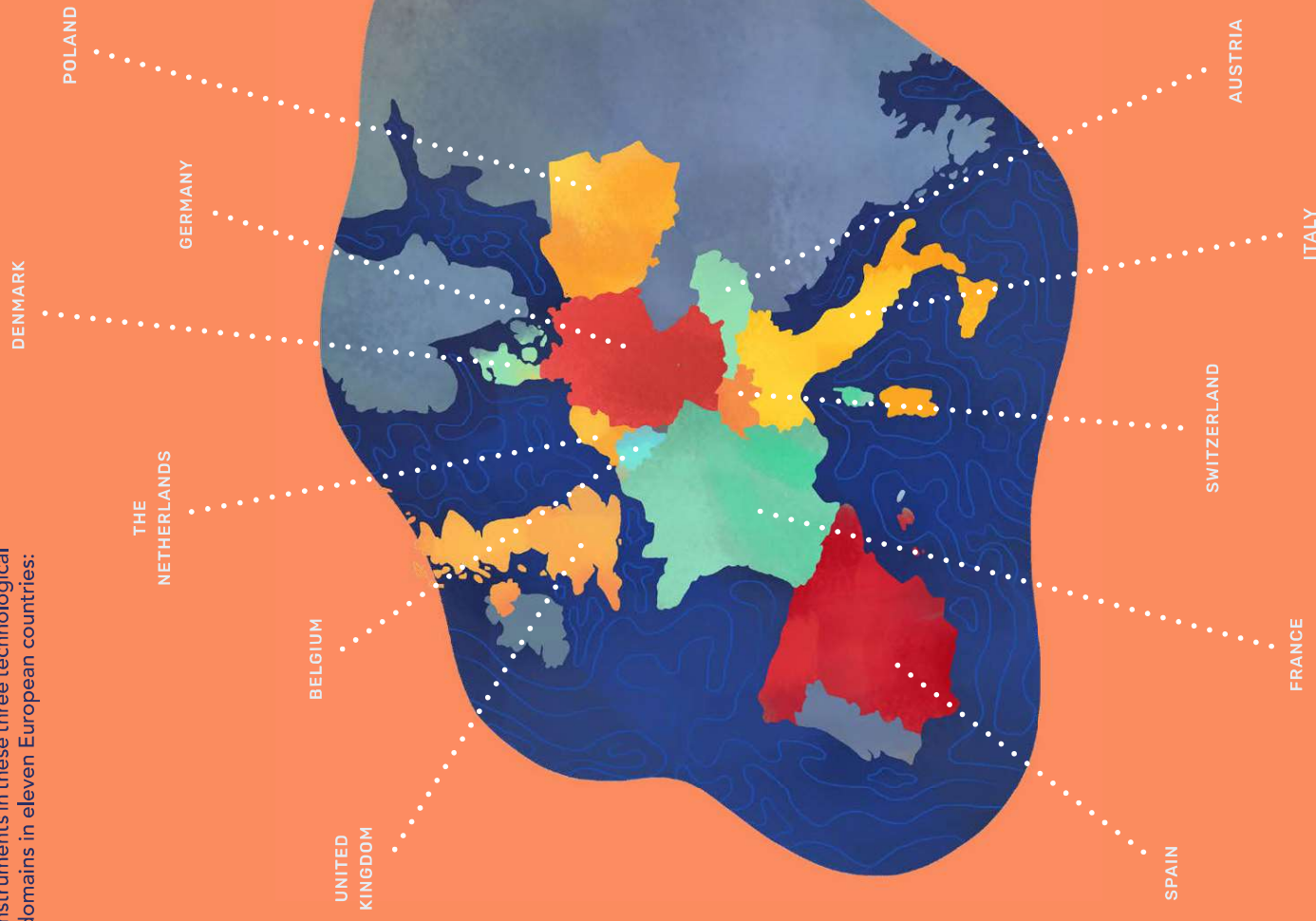
URBAN ENERGY

Urban Energy concepts are implemented to increase the sustainability of energy production and consumption. For example, families install photovoltaic systems on their roofs, home owners introduce smart metering systems to their buildings and communities invest in small local energy production. However, these transformations raise a number of questions. Who is able to participate in these new energy systems? How should these new energy systems be monitored and governed? How do different socio-technological scenarios tie into the sustainable energy transition? How can personal data be protected in increasingly digitalized energy infrastructures? Co-creation activities can help to shape energy transitions in more socially inclusive and responsible ways.

AUTONOMOUS DRIVING

Autonomous Driving is central to smart city discourses. Regardless of the potential benefits, the transition to new modes of transport often raises complex ethical, social and legal questions. Who is accountable in case of an accident? Who has access to this form of transport and when? Who is affected by large-scale infrastructure changes to make roads suitable for autonomous vehicles? Engaging in co-creation practices enables municipalities to consider these questions together with researchers, manufacturers and members of the public.

SCALINGS studied these co-creation instruments in these three technological domains in eleven European countries:



BEYOND COPY & PASTE:

TOWARDS A MAP
OF MULTIPLE ROADS

As part of SCALINGS, we have conducted research about co-creative innovation practices across countries, instruments and technological domains, with the explicit aim to create a policy roadmap for co-creation in Europe. In this roadmap, we consider co-creation in the context of some of the key challenges Europe is facing today, such as growing social inequality and questions of how to ensure the social and political participation of members of the public regardless of their socio-economic position. We thus ask: how can co-creation help to address these challenges by increasing public participation in the development of social and technological innovations for the future of European society? And how can co-creation help to ensure that the benefits of new social and technological innovations serve Europeans equally, no matter their age, ethnicity, socio-economic status, dis/ability, gender or sexual orientation?

To answer these questions, we have drawn on the diversity of case studies that the SCALINGS project offered. These case studies showed how differently co-creation can look when it follows different goals and approaches and involves different stakeholders. Some of these co-creation practices realized the promise of increasing public participation in the development of social and technological innovations - others not so much. We analyzed these case studies in their specific situated contexts and defined dimensions that seemed essential for their success or failure. We operationalized these dimensions through a SWOT analysis that identified important strengths, weaknesses and opportunities of, as well as threats to, the co-creation approach to innovation. Based on this analysis, we arrived at a crucial insight: The specific social context is decisive for how a co-creation activity must be designed in order to achieve successful and diverse participation in innovation activities. This insight was essential to how we designed this roadmap. Instead of prescribing what co-creation must look like in order to achieve successful and diverse participation in innovation activities, we offer a set of criteria formulated as assessment questions that empower co-creation actors to design co-creation activities that will work in their specific context. These criteria are the basis of the Social Impact Assessment that is the core of this policy roadmap.

We complement the Social Impact Assessment with an explorative analysis of key legal aspects that practitioners of co-creation must consider. Co-creation challenges existing legal frameworks in multiple ways by inviting the public into innovation activities that usually happen behind closed doors. Our legal experts have identified three domains of the law that are of particular importance: public procurement law, intellectual property law and experimental law. Where the law complicates co-creation or even conflicts with it, we have formulated concrete recommendations to different stakeholders in the EU.

The SCALINGS roadmap emerged from an intensive iterative process, including continuous dialogue with the SCALINGS researchers and case study partners, as well as multiple feedback loops within the SCALINGS consortium. The last feedback loop opened up the conversation beyond the consortium by including input from a multinational expert panel and a diverse general audience of researchers, practitioners and policymakers.

Co-creation activities are not only able to provide new ideas for innovation, they can also enable meaningful public participation in innovation processes. If these forms of participation are intended to further social inclusion and reflect the diversity of contemporary European societies, it is essential to closely monitor who participates in co-creation activities.

Why is it an important goal to create socially inclusive innovations?

Social and technological innovations shape our lives on an everyday basis. For example, transport infrastructures in urban and rural areas significantly shape who can participate how in social life. If transport infrastructures are highly individualized, for example if they are largely based on individually owned cars, this excludes members of the public who cannot afford to own a car from a range of activities. Particularly if we are designing new technological innovations, for example new transport infrastructures, it is thus important to include a range of voices from the public to avoid introducing unjust biases. Co-creation activities can serve this goal if they are designed to encourage the participation of diverse members of the public. In this roadmap, we want to provide guidance on how to achieve this goal.





CO-CREATION:

STRENGTHS, WEAKNESSES,
OPPORTUNITIES AND THREATS

Co-creation practices can take many shapes. Hence, there are examples of co-creation which indeed pave the way for more inclusive forms of innovation, while in other cases, co-creation might have just the opposite effect. The reasons for such disparities are not always obvious and not always intentional.

Based on our empirical research, we have systematized the various potential effects of co-creation in a SWOT matrix, including strategies for the future of co-creation in Europe. The SWOT analysis served as the basis for the Social Impact Assessment we propose as a targeted, flexible and situated set of guidelines for achieving more responsible and inclusive co-creation.

While we have utilized the traditional, often business-oriented tool of a SWOT analysis in terms of format, the content of our analysis focuses on questions of social justice, equity and inclusion. Our research has shown that policy issues regarding co-creation cluster specifically around five thematic areas:

- 1 RECRUITMENT
- 2 DECISION-MAKING POWER
- 3 TECHNOLOGICAL VS. SOCIAL INNOVATION
- 4 CO-CREATION AS A FUNDING REQUIREMENT
- 5 SCALING-UP

We will therefore elaborate, for each of these areas, the strengths, weaknesses and opportunities of, threats to as well as potential strategies for the future of co-creation in Europe. Additionally, for each section we provide a composite case study vignette to illustrate the tensions that emerge from our empirical cases. While the vignettes are entirely based on our SCALINGS fieldwork, they may combine elements from different case studies and therefore do not represent identifiable singular cases.

OVERVIEW

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS	STRATEGIES FOR THE FUTURE OF CO-CREATION IN EUROPE
1 RECRUITMENT	The opportunity to participate in innovation processes as a member of the public	Opportunities for participation are socially stratified and often exclude socially, economically or politically disadvantaged members of society	Inclusive innovation processes and outcomes	Participation may be limited to socially, economically or politically privileged members of society	Projects must develop socially inclusive recruitment strategies
2 DECISION-MAKING POWER	A multi-stakeholder approach to innovation design	Often, there are stark power differentials between stakeholders	A plurality of perspectives and interests shape innovation design	Participation without decision-making power inhibits inclusive innovation design	Decision-making power must be shared between different actors
3 TECHNOLOGICAL VS. SOCIAL INNOVATION	Innovation aims to address societal challenges	Often, non-technological solutions are excluded from the start	Tackling societal challenges through the most suitable innovations	Choosing second-best innovations because of an exclusive focus on technological solutions	Social and technological solutions must be equally considered, no pre-commitments to technological solutions
4 CO-CREATION AS A FUNDING REQUIREMENT	Increasingly, funding agencies require public participation in innovation processes	Often, projects include public participation only to fulfil funding requirements without adequate planning	Funders can transform innovation practices and build co-creation capacities across Europe by requiring public participation in innovation processes	Without high standards in evaluation, including co-creation in research applications might become a mere check-box without transformative effects	Funders must build capacities to adequately evaluate co-creation activities with regard to their role in and impact on a project's research agenda
5 SCALING-UP	As co-creation becomes more common, there is a considerable potential for knowledge transfer between different co-creation projects	Unfortunately, knowledge transfer is often imagined as a mere copy-paste that does not take the specific situated contexts of the co-creation activity into account	Projects can learn from each other and adapt methods and approaches to their situated contexts	Projects and methods can fail if situated contexts are not taken into account	Projects need to engage in a detailed context analysis to successfully transfer co-creation practices between different local settings; this will often require the inclusion of social scientists as part of the project team

STRENGTHS

Many co-creation initiatives provide opportunities for lay people to participate in innovation processes. They advance the traditional notion of public engagement (engagement with innovations that already exist) by designing active roles for future users in the innovation process itself.

Recruitment

OPPORTUNITIES

Co-creation can create opportunities for socially inclusive innovation processes and innovation outcomes that meet the needs of diverse publics.

Strategies for the future of co-creation in Europe

Co-creation projects must be encouraged to develop detailed recruitment strategies that aim at social inclusion across social strata and groups, paying particular attention to ensure the participation of marginalized groups.

A

WEAKNESSES

However, these opportunities for participation are often socially stratified. The lay participants in co-creation thus tend to represent only fragments of society (e.g. higher income, higher education, no recent migration experiences), although the exclusion mechanisms at play are often unintentional.

THREATS

If social, political and economic barriers to participating in co-creation activities are not adequately addressed and overcome, participation might become limited to socially, economically or politically privileged members of society.

RECRUITMENT: FROM DIVERSE EXPECTATIONS TO NON-DIVERSE REALITIES



PROJECT A explores opportunities for people across social strata to participate in a sustainable energy transition. The project is initiated by an NGO with a focus on sustainable development and green technologies. Together with members of the public, the NGO intends to co-create new applications for photovoltaic modules that do not require property ownership, for example modules that do not need to be permanently installed in a building, but which can be set up on a balcony. As a first step, the NGO conducts an open co-creation workshop to align existing solar photovoltaic technology with the needs of diverse publics. In a second step, two buildings and twelve individual households are selected to further develop and implement these new applications. To approach the public, the NGO selects as their test site a residential area with 1,000 inhabitants, including tenants with diverse social and educational backgrounds.

Planning the co-creation workshop, the NGO opts for an open invitation approach, advertising the event in the local newspaper, on the municipal social media channel and via posters

and flyers spread out across the neighborhood. However, instead of the 50-100 participants they expect, only 20 individual residents and two representatives of a local housing company join the workshop. While the NGO is content that all of the participants exhibit a strong interest in the project, they realize that the participants do not at all reflect the diversity of inhabitants of the residential area. Rather, they all appear to be of retirement age, mostly male, well-educated and without recent migration experiences.

Even though they don't know how they could have proceeded differently, the members of the NGO sense that they have missed parts of the publics they wanted to include. Yet, given the time and resource constraints of the project, the NGO doesn't have the opportunity to thoroughly reflect upon its approach or try to reach out to all of the inhabitants again. Instead, they move ahead with the participants who attended the co-creation workshop, having to abandon their initial aim of including a diverse group of participants.

STRENGTHS

Co-creation gathers different actors in a joint innovation activity that aims to create mutually beneficial outcomes. Such a multi-stakeholder approach can enrich the innovation process through the different perspectives and knowledge that contribute to it.

Decision-making Power

OPPORTUNITIES

Bringing together a multiplicity of stakeholders and perspectives, co-creation can pave the way for a plurality of interests to be represented in innovation practices and their outcomes.

Strategies for the future of co-creation in Europe

In order to benefit from the diverse perspectives that co-creation activities bring into conversation with each other, decision power must be shared between different actors.

B

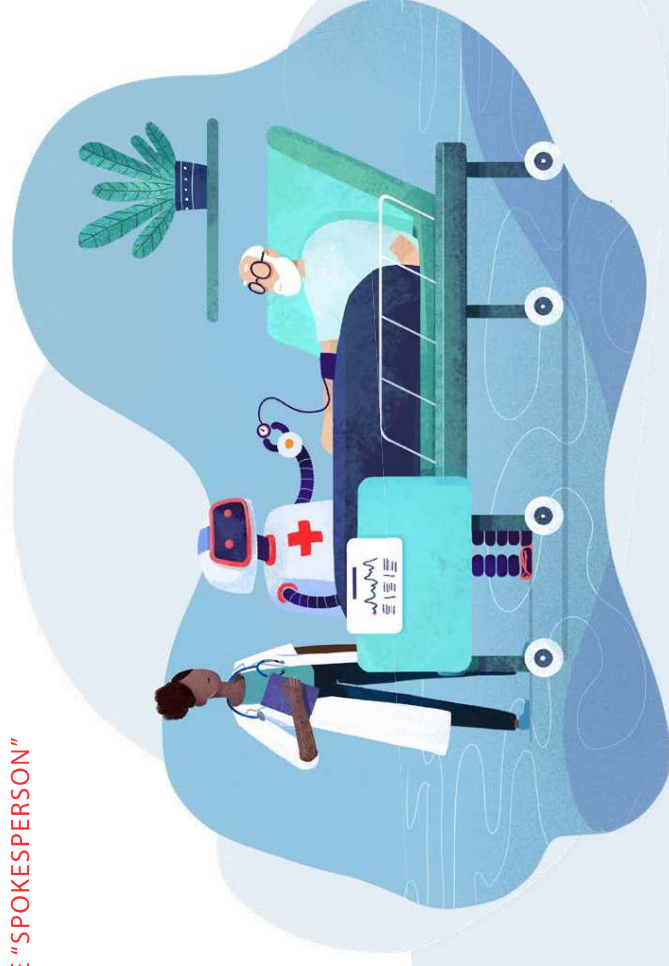
WEAKNESSES

While many co-creation initiatives include a variety of actors, power differentials between stakeholders are common. This may take the form of formalized decision power and/or more informally assigned roles (e.g. experts vs. lay people) or pertain to who is involved in decision-making at which stage of the process.

THREATS

However, if substantial power differentials between stakeholders persist, this inhibits socially inclusive innovation design and leads to innovation outcomes that only suit the needs of some actors in the innovation process.

DECISION-MAKING: DIFFERENT ROLES, UNEQUAL POWER DISTRIBUTION AND THE “SPOKESPERSON”



PROJECT B is a public end-user driven initiative that aims to develop a robotic solution for comprehensive geriatric assessment, i.e. a set of standardized tests to evaluate the health and general living condition of elderly patients. A comprehensive geriatric assessment is time-consuming. A robotic solution would enable the elderly to conduct the assessment themselves and thus allow health professionals to spend more time on individual care plans. The project involves a consortium of engineers, companies and universities as well as a hospital including geriatric physicians, other health care professionals (nurses, doctors, social workers, etc.) and elderly people. The project consortium considers all potential end users to be important sources of knowledge and, as such, central to better aligning robotic solutions with the needs of health care professionals and patients. Simultaneously, the consortium only designates some of these envisioned users as being capable of fully taking part in the development process, including important design

choices. Only the geriatric physician, who the consortium deems to have the required expertise, gets to represent geriatric practices throughout the project. The physician participates in shaping the initial problem definition and the use cases and scenarios that guide the engineers in the development process. Everyone else involved in the daily operations of the geriatric clinic, e.g. other health care professionals, elderly patients and their relatives, are excluded from both the problem definition phase and the development process. Instead, the consortium asks for their feedback only towards the end of the project, when the prototype already exists and only a few changes are still possible. Foregrounding the geriatric physician, who is traditionally perceived as an “expert”, in the decision-making process also foregrounds their specific ideas of a good outcome, while other experiences, insights and types of expertise, despite being formally part of the co-creation activity, are neglected.

STRENGTHS

Many co-creation initiatives aim to address societal challenges and the everyday life problems of European publics.

C

Technological vs. Social Innovation

OPPORTUNITIES

By including diverse publics in the process of defining and addressing these challenges, co-creation projects can arrive at the most suitable innovation solutions to tackle societal problems.

WEAKNESSES

However, social innovations (i.e. non-technological solutions) are often excluded from the start. This can occur explicitly, e.g. through funding requirements, or implicitly, e.g. through the dominance of business or research stakeholders in the process.

THREATS

However, if social innovations are excluded, co-creation projects might promote second-best innovations and might not live up to their full potential for problem solving.

Strategies for the future of co-creation in Europe

In order to benefit from co-creation as a problem-based approach to innovation, social and technological solutions must be given equal consideration. Pre-commitments to technological solutions limit the innovation potential of co-creation.

TECHNOLOGICAL VS. SOCIAL INNOVATION: PREMADE COMMITMENTS



PROJECT C is a municipal initiative that wants to approach challenges people encounter in their daily lives from a problem-based angle. The municipality does not want to pre-determine any specific kind of technology. Instead, it focuses on co-defining problems and challenges together with members of the public. At the same time, the initiative is partly funded by a regional digitalization initiative, which requires the development of potential prototypes to be part of the project, specifically smart technologies that connect to a data platform. The municipality organizes an open co-creation workshop for the members of the public to share their everyday challenges and discuss how the municipality could help to address these challenges. The workshop is well-attended and members of the public contribute a number of challenges across thematic areas. One particularly fruitful discussion is sparked by reports of inefficient waste collection and overflowing public waste containers. The members of the public not only describe this issue, but also discuss potential solutions. At this point, the municipal officials see an opportunity to connect the problem of overflowing public waste bins to a digital solution, as required

by their funders: they propose using sensor technology to measure the fill level of waste containers and automatically notify the utility provider whenever maximum capacity is reached. The members of the public, however, object strongly to the sensor-based solution and instead suggest “publics as sensors” by extending the use of an existing municipal platform for voicing complaints. Concretely, they propose that members of the public notify the officials via a phone call or online form if a bin needs to be emptied. The municipality discusses the results of the workshop and identifies a conflict between the technological, i.e. sensor-based, solution they had in mind and the solution suggested by the members of the public, which draws on an already-existing platform and would not require piloting a new product. With the funding coming from a digitalization initiative and the local sensor company being strong supporters of the project, the public’s suggestion does not seem as attractive or as publicity-effective as the technological alternative. Therefore, they decide to pilot a sensor-based solution, despite the public’s preference for a different solution.

STRENGTHS

Increasingly, funding agencies ask for public participation to be part of applications for innovation projects.

Co-creation as a Funding Requirement

OPPORTUNITIES

By making public participation a requirement for funding, funders can transform innovation practices and build co-creation capacities across Europe.

Strategies for the future of co-creation in Europe

To ensure that requiring public participation as part of research projects has a transformative effect on research and development in Europe, funders must build capacities to adequately evaluate co-creation activities with regard to their role in and impact on a project's research agenda.

D

WEAKNESSES

At the same time, public participation is often only included in projects to fulfil the respective funding requirements. Such an approach neglects sincere considerations about how meaningful participation should be designed and implemented in a case-specific way.

THREATS

However, without high standards in evaluation that take into account the state-of-the-art in co-creation research, the inclusion of co-creation in research applications might become a mere check-box without transformative effects on the research and development agendas of projects.

FUNDING: PARTICIPATION AS A CHECK-BOX?



PROJECT D aims to develop a pilot scheme for the use of autonomous vehicles in pedestrian and road areas. The project is coordinated by a consortium of technological stakeholders (a university, an independent research institute and a group of manufacturers) and intends to hold two field trials in a public space as major milestones. For this, the consortium seeks funding from a public institution. Knowing that the funding institution requires a co-creative element in all innovation projects, the consortium decides to include a co-creation component in their field trials. The project receives funding and is excited to test and refine the properties of autonomous vehicles in what the consortium hopes to be real-life settings.

To achieve this, the consortium decides to conduct two field trials in the carpark of a local shopping mall on regular weekdays. Planning these trials, they invest most of their resources and effort into the technological setup as well

as in meeting the legal conditions. They also put up a small information desk where interested members of the public can inquire about the project. However, the consortium does not reflect upon what co-creation could mean beyond setting up an information desk, such as how they could approach members of the public and how they could incorporate public feedback in the further course of the project in meaningful ways. Instead, they report those who happen to be present at the carpark as the engaged public participating in their trials.

While the funding institution attaches great importance to co-creation, Project D approaches it as a necessity that needs to be fulfilled, but which does not require sincere consideration. As a result, engagement remains a mere buzzword that is not translated into effective practice and fails to have transformative effects on the project's agenda.

STRENGTHS

As co-creation becomes more common in research and development projects across Europe, there is a considerable potential for knowledge transfer between different co-creation projects.

Scaling-up

OPPORTUNITIES

Projects across Europe can learn from each other and adapt methods and approaches to their specific situated contexts.

WEAKNESSES

However, many co-creation projects imagine knowledge transfer as a simple copy and paste activity that does not take the specific situated socio-cultural contexts of their projects into account.

THREATS

However, if local socio-cultural contexts are not taken into account, both individual co-creation projects and co-creation as a novel mode of knowledge production in Europe could fail.

Strategies for the future of co-creation in Europe

Projects need to engage in a detailed context analysis to successfully transfer co-creation practices between different local settings. Transfer always requires adjustments to match the co-creation approach to the specific context. Adequately understanding local socio-cultural contexts often requires the inclusion of social scientists as part of the project team.

SCALING-UP: CONTEXT MATTERS



PROJECT E wants to test ambient-assisted living technologies in a living lab setting that is connected to a residential care home for the elderly. As such, the project is part of a larger robotics consortium that gathers knowledge created at a number of different robotics living labs across Europe.

Unlike most of these living labs, the roboticists from Project E do not consider technology the ultimate solution to the challenges in assisted living and elderly care. Therefore, they decide to involve social scientists and psychologists to accompany the project and provide a critical perspective on the social shaping of robotics. The social scientists also influence the extent of participation in the co-creation process. For instance, they arrange a collaboration with several local civil society organizations, specifically to invite people into the lab who would otherwise have been excluded.

Project E not only advances assisted living together with the local public, but also generates a repository of knowledge about interdisciplinary

and participatory approaches towards new socio-technological arrangements. While this is unique compared to the other living labs existing under the same umbrella, the European consortium starts to acknowledge the experiences Project E is making with their inclusive take on co-creation. For the next large-scale robotics initiative, the consortium requires living labs to map the local landscape of stakeholders, including civil society organizations and the relevant social scientists, and mandates involving them throughout the project.

Despite starting out as the odd exception among the consortium partners, Project E emerges as a role model for inclusive collaboration with a transdisciplinary group of local stakeholders. Here, the European consortium considers scaling-up to be based on the adequate analysis and understanding of local contexts, instead of trying to transfer entire project plans or technologies. This allows future living labs to share knowledge and experience without losing sight of the local particularities their projects are embedded in.

INTRODUCING THE SOCIAL IMPACT ASSESSMENT FOR SOCIALLY INCLUSIVE AND RESPONSIBLE CO-CREATION

Based on our analysis of the strengths, weaknesses and opportunities of, as well as threats to, co-creation as a novel approach to innovation in Europe, we have developed a “Social Impact Assessment for Socially Inclusive and Responsible Co-creation”. This assessment tool aims to guide co-creation actors towards designing and implementing socially inclusive and responsible co-creation activities. We recommend that:

Policymakers draw on the Social Impact Assessment to provide policy frameworks that foster socially inclusive and responsible co-creation.

Funders provide the Social Impact Assessment to potential applicants to support them in the design of their co-creation activities.

Individuals or institutions who aim to engage in co-creation use the questions of the Social Impact Assessment to guide the design and implementation of their co-creation activities.

Members of the public use the Social Impact Assessment to evaluate their participation in co-creation activities and potentially suggest improvements to their co-creation partners.

Our SWOT analysis has shown that five categories (recruitment, decision-making power, technological vs. social innovation, co-creation as a funding requirement, scaling-up) emerge as being particularly relevant. To assess how a project performs with regard to these five categories, we have developed the following sets of questions that address essential aspects of the design and implementation of a co-creation project.

SOCIAL IMPACT ASSESSMENT FOR SOCIALLY INCLUSIVE AND RESPONSIBLE CO-CREATION

1	RECRUITMENT ■ Who do you see as relevant stakeholders for your project? Who do you aim to involve? ■ Who will be affected by the processes and outcomes of your project? ■ Is there a mismatch between affected and relevant stakeholders? If so, why? ■ Does your project involve the participation of members of the public? If so, how will you select the participants? ■ Are there certain members of the public that you consider more attractive as participants than others? ■ Are there explicit or implicit barriers that could exclude certain members of the public from participating? If so, how will you lower these barriers? ■ How will your project ensure the participation of disadvantaged groups, taking into account gender, ethnicity, socio-economic status, age and sexual orientation?
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2	ENGAGEMENT METHODS ■ What kinds of engagement methods does your project involve? At which stages? ■ Does your project team have the adequate expertise to work with these methods? ■ How do these methods correspond with the aims of your project? ■ How will you record the results of the engagement activities? ■ How will you take into account these results in the further course of your project? ■ How will the results influence the process and outcomes of your project?
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3	AGENCY ■ What are the different kinds of agency that the project actors hold? ■ Who has what kind of power over what/whom in the process of co-creation? ■ Are power relations informal or formalized? ■ Are there power differentials between actors? If so, are they intended? If yes, why? If they are not intended, how will you resolve them? ■ How will you resolve potential conflicts?
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4	BENEFITS ■ Who do you see benefitting from your project, now or in the future? ■ Which concrete benefits (e.g. financial, social, political, etc.) might occur for whom?
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5	RISKS ■ Do you foresee any risks or negative effects? If so, please describe them. ■ Who would be affected by risks and negative effects? ■ How will you monitor potential risks and negative effects throughout the project? ■ How will you mitigate risks and negative effects?
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6	OUTCOMES ■ What would you describe as a successful outcome of your co-creation activity? ■ What are the evaluation criteria you apply to determine this success? ■ Who defines these criteria? Will you involve project participants in this definition? ■ Does your project consider social or technological solutions to the problems it addresses, or both?
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7	SCALING-UP ■ Does your project aim to implement knowledge or approaches from any previous or existing projects in other contexts? ■ If so, how does the context of your project differ from the previous or existing projects? ■ Which challenges for socially responsible co-creation might your specific context pose? ■ How are you going to meet these challenges and adjust your approach?
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Co-creation, if taken seriously, requires time, space and continuous effort throughout the innovation process. The Social Impact Assessment provides those who want to co-create with practical guidelines for designing and implementing socially inclusive and responsible co-creation activities. Importantly, these co-creation activities will aim to include diverse publics and will be tailored to their specific local contexts and take into account their socio-cultural specificities. As a result, co-creation may indeed contribute to more inclusive and socially responsible forms of innovation in Europe that will help address the multiple challenges today's societies face as well as create new opportunities.

ADDRESSING LEGAL ASPECTS OF CO-CREATION

Introduction: Co-creation and the Law

Many factors contribute to how co-creation practices are situated in particular socio-political contexts. One of these factors is the applicable legal framework. The law does not just foster or hinder co-creation but allows, enables, complicates or prohibits specific elements of it. Successfully scaling up co-creation practices depends on many legal factors. For policymakers at the European and the national level, three areas are particularly relevant:



PUBLIC PROCUREMENT
LAW



INTELLECTUAL PROPERTY
LAW



EXPERIMENTAL
LAW

RELEVANCE

The primary objectives of public procurement law are to guarantee that the public sector, when acting as a purchaser on the market, spends public money **efficiently and fairly**. Open procurement procedures achieve these aims through **transparency and rigidity**. For example, if the state purchases traffic lights or equipment for public schools, the procurement procedure involves stating the specific product that is required and the selection criteria (e.g. lowest price, best quality/price ratio, etc.).

To stimulate innovation and to create new markets, there are other procurement procedures that are more flexible than open procedures. **Flexible procedures**, in contrast to open procedures, allow for functional definitions, subsequent negotiations and collaborations between the public purchaser and the tenderers during the procedure.



PUBLIC PROCUREMENT
LAW

EXAMPLE 1

The state does not purchase a specific software product but a general technological solution for adequately processing social security applications.

EXAMPLE 2

Instead of purchasing new lamps to replace existing streetlamps, the city administration initiates a partnership with a company to implement an innovative, energy-efficient lighting system for the whole city.

EXAMPLE 3

The municipality purchases an innovative solution for rainwater management in the district rather than using existing products, because those are unfit for the municipality's requirements.

LEGAL FRAMEWORK

Innovative **procurement procedures** include:

- **A competitive procedure with negotiation**, where the subject matter of the public procurement contract is clear but technological details can only be described functionally
- **A competitive dialogue**, where the subject-matter is determined in a dialogue between purchasers and tenderers
- **An innovation partnership**, when there is no solution available on the market for the purchaser's needs, making research and development activities a prerequisite for subsequent purchases

The details of these procedures are defined in **Articles 29-31 of the EU Public Procurement Directive**. The member states have transposed these rules into national law.

FINDINGS AND RECOMMENDATIONS

FINDING 1

Procuring a research & development (R&D) activity without a specified outcome falls under public procurement rules only if the public purchaser reserves the results from the R&D services (e.g. intellectual property rights) for itself. If the public purchaser does not reserve the results for itself, state aid law applies.

FINDING 2

Flexible procurement procedures conflict with economic efficiency and fair competition. The more flexibility the procedures provide, the more risks for discrimination and arbitrary decisions they entail.

FINDING 3

After an innovation has been developed, the market for it tends to close because its developer has a head start in know-how and a potential monopoly on the intellectual property rights. In the procurement context, this is particularly problematic because the development of such closed markets is subsidized with public funds.

RECOMMENDATION 1

The public purchaser should organize the process through a public procurement procedure from the beginning if a purchase after the R&D phase is planned. Otherwise, the participants of the R&D phase would have an unfair advantage as tenderers in the subsequent public procurement procedure.

RECOMMENDATION 2

Legislators should clarify which deviations from the principles of economic efficiency and fair competition in innovation partnerships are necessary and therefore acceptable. This can help to minimize the public purchaser's risk of legal challenges against innovation partnerships by unsuccessful tenderers.

RECOMMENDATION 3

Legislators should promote suitable distribution of the intellectual property rights between the public purchaser and the tenderer, which is key to ensuring that the markets created remain open. If included in the purchasing contract, this safeguard can help to counteract lack of competition in innovative procurement procedures.

RELEVANCE

With innovation generally, it is important to know who owns the intellectual property rights (IP) of the innovation. In co-creation processes, diverse and dynamic circles of people collaborate in makerspaces or innovation hubs at “smart campuses” and have diverse tasks and responsibilities. Here, the clear distribution of IP rights is particularly important.

EXAMPLE 1

A group of students develops a smartphone app for a neighborhood center together with lay people from the community, using resources provided by a university’s innovation hub. Who owns the source code of the smartphone app?

EXAMPLE 2

A research consortium uses a third-party provider’s test facilities to create a health-care robot prototype for use in nursing homes. Who owns the construction plans? Who owns the non-personal data (e.g. performance records, classification results generated through machine learning processes) generated in the test facility and the nursing home?

EXAMPLE 3

A team of entrepreneurs writes a concept note for a sharing economy business idea. One member of the team contributes the key idea during the discussion process but does not co-author the concept note. Who owns the idea?



INTELLECTUAL PROPERTY
LAW

LEGAL FRAMEWORK

The most relevant legal frameworks for protecting innovation outcomes are:

	COPYRIGHT LAW	protects literary works, artistic works, databases and other types of creative works.
	PATENT LAW	protects registered, new inventions that could be used industrially.
	TRADE SECRET LAW	protects business information by keeping it secret.

Apart from these core areas, data protection law and general principles of contract law can be relevant.

The legal sources for these frameworks are sometimes spread out over multiple legal acts on the EU and national level. For example, important sources for copyright law in the EU are the **EU Software Directive**, the **EU Database Directive**, the **EU Term Directive** and many more directives, as well as national laws. In other cases, the sources are more centralized. The basic rules of EU Trade Secret Law, for example, are mainly found in the **Trade Secret Directive**, which has led to a high degree of harmonization of national laws on trade secret protection.

Which legal framework applies depends on the type of innovation outcome. Whereas research papers are protected by copyright, mere ideas without a concrete expression are not. Whereas new software for running robotics applications is usually protected by copyright law, new hardware falls under patent law. Non-personal data are not covered by data protection law. But if the data are structured in a certain way, they may be protected as a database under copyright law.

FINDINGS AND RECOMMENDATIONS

FINDING 1

Some co-creators contribute “only” equipment, infrastructure or ideas without actively taking part in research. These inputs are usually not protected by IP law and do not result in a right to (co-)exploit the innovation or claim any revenues.

RECOMMENDATION 1

Co-creators should be encouraged to contractually determine what kinds of contribution they acknowledge or financially compensate, even if the contribution is not protected by IP law.

FINDING 2

If a data set does not contain personal data, it does not fall within the scope of European Data Protection Law. For specific cases, such as machine-generated non-personal data (e.g. performance data of a robotics prototype or unstructured classification results of traffic sign images), database law or trade secret law may apply. However, in the majority of cases, the (co-)ownership of non-personal data is a matter of contract law.

RECOMMENDATION 2

Co-creators should be encouraged to contractually tailor the terms of data ownership to the specific co-creation project.

RELEVANCE

In some cases, there are legal obstacles to testing innovations under realistic conditions. Temporarily removing such obstacles may be helpful not only for innovators to learn how the innovation performs, but also for policymakers to optimize future regulation. The Council of the EU has recently published conclusions on the usefulness of experimental law instruments.

EXAMPLE 1

Automated cars cannot be tested in public spaces if they are not approved for use on public roads. How traffic participants react to public tests of automated cars could provide insight about if and under what conditions legislators should allow automated cars.

EXAMPLE 2

Healthcare robots cannot be tested in hospitals if the professional obligations of doctors and nurses preclude them from delegating tasks to automated medical devices. Observing specific test situations where healthcare robots are used can inform policymakers if changes in medical device law or professional law are necessary.



EXPERIMENTAL
LAW

LEGAL FRAMEWORK

Different legal instruments can be utilized to remove legal obstacles and inform policymakers about ways to regulate innovation in the future:

	EXPERIMENTAL STATUTES	are laws adopted in parliament only for a limited period of time. At the end of this period, results are evaluated to indicate whether the rule should be extended indefinitely.
	EXPERIMENTAL CLAUSES	are statutory provisions that allow executive authorities to deviate from other specific provisions for the purposes of experimentation.
	REGULATORY SANDBOXES	are administrative experimentation concepts in areas where a license is necessary to participate in the market. The competent supervisory authority may issue individualized authorizations for experiments to sandbox members.

FINDINGS AND RECOMMENDATIONS

FINDING 1

In specific situations, where the purpose of the law and the purpose of the innovation are diametrically opposed, experimental law instruments can help to offer a nuanced regulatory response.

RECOMMENDATION 1

Define the problem that the experimental law instrument ought to solve and find the most suitable approach for each individual situation. For example, experimental clauses and regulatory sandboxes allow more variation in experiments; experimental statutes allow for more transparency and broader public participation.

FINDING 2

Every experimental law instrument requires a statutory basis and can only be adopted on the EU level in areas where EU legislators have the competence to do so.

RECOMMENDATION 2

Policymakers need to determine who is competent to provide the legal basis of an experimental law instrument. Legislators need to make sure that the requirements of the rule of law are met when delegating experimental discretion to the executive branch.

FINDING 3

Generating knowledge is key. This may involve knowledge about the technology to be tested, its impact on society, the applicable law and necessary legislative changes.

RECOMMENDATION 3

Make access to and public participation in the co-creation process as easy as possible but as individualized as necessary. Create effective evaluation and reporting mechanisms.

Co-creation practices have many different legal implications. Depending on the role of actors and the state in the co-creation process, different legal areas are relevant:



Public procurement law is relevant to the relationship **between co-creators and the state as public purchaser**. The state can foster innovation by procuring it, but only within the limits of economic efficiency and equal treatment.



Intellectual property law is relevant to the relationship **among co-creators**. Default rules on co-ownership of intellectual property will not always yield results that represent the importance of each individual contribution. Only individual contractual solutions can mitigate this.



Experimental law is relevant to the relationship **between co-creators and the state as regulator**. Differentiated use of experimental statutes, experimental clauses and regulatory sandboxes can temporarily remove legal obstacles and contribute to optimized regulation in the future.

CONCLUDING RECOMMENDATIONS FOR STAKEHOLDERS

This roadmap has elaborated important social, political and legal opportunities for and challenges to co-creation as a new mode of innovation in Europe. Below we have summarized key recommendations for different stakeholders who might be involved in co-creation activities. This overview indicates different access points for different stakeholders to engage with the SCALINGS Roadmap.

STAKEHOLDERS	ACTIONS
Policy makers	▪ Keep in mind that co-creation only fosters socially inclusive and responsible innovation if active efforts are made to include diverse publics in the process. ▪ Be aware that mainstreaming or scaling up co-creation will only be successful if the specificities of local socio-cultural contexts are taken into account. ▪ Draw on the Social Impact Assessment to provide policy frameworks that foster socially inclusive and responsible co-creation. ▪ Encourage the public procurement of innovation, but be mindful of the limits of economic efficiency and equal treatment. ▪ Use experimental law concepts selectively to foster innovation without undermining the rule of law.
Funding institutions	▪ Clearly communicate that public participation in innovation is not a checkbox requirement: Encourage applicants to submit well thought-out plans for their co-creation activities. ▪ Provide applicants with the Social Impact Assessment to support them in the design of their co-creation activities. ▪ Possibly make engaging with the Social Impact Assessment tool a mandatory requirement for the submission of applications.
Co-creation practitioners public and private	▪ Invest time and effort into planning, conducting and evaluating the co-creation activity. ▪ Carefully analyze the specific socio-cultural context in which your co-creation activity takes place. This might require involving social scientists in your project. ▪ Identify disadvantaged groups that might easily be excluded from your co-creation activity and make specific efforts to include them. ▪ Use the Social Impact Assessment to support the socially inclusive and responsible design and implementation of your co-creation activity. ▪ Make sure you are aware of relevant legal issues that might emerge from your project and address them. ▪ Find contractual solutions to acknowledge co-creation inputs that are important but fall outside the scope of IP law.
Members of the public	▪ Use the Social Impact Assessment to evaluate the co-creation activities you are involved in and to inspire change towards more socially inclusive and responsible practices.
▪ POLICY RECOMMENDATIONS ▪ LEGAL RECOMMENDATIONS	

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