

Trajectories of how collaborative innovation processes generate public value: insights from an open digital living lab

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ABSTRACT

This article advances understanding of how collaborative innovation processes generate public value in contexts marked by uncertainty, open-endedness, and ambiguity. Drawing on a comparative qualitative study of nine initiatives in an open digital living lab, we adopt a dynamic perspective to trace how shared contextual pressures, institutional backgrounds, and actors' capacities interact in generating public value over time. We process-theorize and visualize three trajectories that reveal how public sector managers build, or fail to build, navigational capacity to turn shared contextual pressures into opportunities for different forms of public value creation.

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Introduction

Collaborative innovation is widely acknowledged in public management research as crucial for generating public value (Ansell and Torfing 2021; J. Bryson et al. 2017; Crosby, t' Hart, and Torfing 2017). These processes involve collective problem-solving among public, civic and private actors, covering the entire cycle, from early ideation to implementation and scaling (Bommert 2010; Torfing 2019). Recent scholarly wisdom suggests a dynamic perspective on collaborative innovation processes that emphasizes how seemingly opposed features of processes, such as convergence versus divergence or causation versus effectuation, interact in relative importance to context (Awan et al. 2025; Callens and Verhoest 2024; Dolmans et al. 2023;

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Kurtmollaiev, Pedersen, and Lie 2024; Wegrich 2019). Yet, as Awan et al. (2025, 1379) note, ‘the inherent dynamic complexity of collaborative innovation remains underexplored’. This observation underscores the need to understand how actors actively navigate and shape such unfolding processes over time.

Despite advances in developing a dynamic perspective on collaborative innovation, we know too little about how such processes generate different forms of public value over time across different contexts (Callens and Verhoest 2024; Wegrich 2019). This is a crucial gap, since public value is both a key analytical lens and a normative benchmark for assessing effectiveness, efficiency, and legitimacy in collaborative innovation (Bryson et al. 2017; Crosby, t’ Hart, and Torfing 2017). An equally dynamic perspective on public value creation emphasizes its processual and contested nature. Public value does lie not only in implementing solutions, but also in the process itself, for example through learning and capacity-building (Page et al. 2015). At the same time, public value is contested, as actors navigate challenges, balance competing demands, and negotiate what can or should count as valuable (Benington 2015). Together, the dynamic nature of collaborative innovation and the processual and contested nature of public value creation constitute an enduring flux that complicates navigation for public sector managers and calls for closer scholarly attention to provide guidance (Vangen and Huxham 2012). Especially contexts that lack conventional ‘maps’ (J. Bryson et al. 2017) or a ‘public value compass’ (Crosby, t’ Hart, and Torfing 2017, 666) challenge public sector managers to navigate towards public value. This leads us to the following research question: *How do collaborative innovation processes generate different forms of public value over time in contexts that unsettle public sector managers’ ability to navigate?*

We address this research question through a comparative qualitative case study of nine collaborative innovation initiatives that emerged within UpdateDeutschland (in English: UpdateGermany), an open digital living lab characterized by uncertainty, open-endedness and mandate ambiguity. These nine initiatives shared the same contextual pressures but evolved in different ways: some produced unintended negative consequences for public value creation, others generated public value in the collaborative process itself, and a few implemented and scaled solutions. This variation offered fertile ground for cross-case analysis and elaboration of the recently proposed dynamic perspective. We employ process theorizing and visual mapping to interrogate these experiences and conceptualize them as trajectories. We propose three trajectories – *Dead Ends*, *Bumpy Rides*, and *New Avenues*. These trajectories map how public sector managers together with citizens build, or fail to build, navigational capacity to turn shared contextual pressures into opportunities for public value creation and to realize them as such.

We contribute to public management research by further elaborating the dynamic perspective of collaborative innovation and by linking it to the processual and contested nature of public value creation. Our proposed integrated dynamic perspective draws on dichotomous explanations (Kurtmollaiev, Pedersen, and Lie 2024), such as shifts from deterministic to open-ended expectations, while integrating them into a dynamic lens that considers shared contextual pressures, actors' navigational capacity, and the relative importance of these elements for public value creation (Callens and Verhoest 2024). Our proposed trajectories make a process-theoretical contribution by tracing and mapping the interdependent coevolution of a higher-level process (public value creation) and sub-processes such as the building of navigational capacity (Cloutier and Langley 2020). Beyond advancing theory, the study also offers practical insights by providing process-sensitive maps that help public sector managers navigate trajectories and by suggesting design principles for open digital living labs as arenas of public value creation.

Theoretical framework

Towards a dynamic perspective on studying collaborative innovation processes

Our theoretical framework shows how collaborative innovation is usually studied and weighs the strengths and weaknesses of existing perspectives. In public management research, two main approaches dominate: a dichotomous perspective and a dynamic perspective. Although more complex conceptual models exist (cf. Sørensen and Torfing 2011), we synthesize the literature around these two empirically applicable views. They are not mutually exclusive, but complementary in highlighting different aspects of collaborative innovation.

The dichotomous perspective explains processes through binary contrasts, which has long served as a heuristic to reduce complexity in social sciences – such as exploration versus exploitation (March 1991) or stability versus change (Farjoun 2010). In public management, dichotomies have clarified concepts and built theoretical foundations. Ansell and Gash (2008), for example, distinguish between antagonistic versus cooperative starting conditions to explain collaboration outcomes. Barrutia and Echebarria (2019) apply the exploration-exploitation lens to show how public managers perceive innovation trade-offs.

Collaborative innovation research also relies on binary contrasts. Bommert (2010) framed open versus closed innovation, while Hartley, Sørensen, and Torfing (2013) drew on sectoral contrasts and categories such as competition versus collaboration. These framings helped differentiate the field, but also embedded dichotomous reasoning into its foundations. More recently,

Kurtmollaiev, Pedersen, and Lie (2024) developed an empirically grounded typology of collaborative innovation archetypes, drawing on causation versus effectuation logics (Sarasvathy 2001). Causation stresses deliberate planning and alignment towards predefined outcomes, while effectuation relies on available resources, emergent partnerships, and adaptive goals. Arranged initiatives typically follow causation, while emergent processes such as living labs rely on effectuation (Kurtmollaiev, Pedersen, and Lie 2024). Their typology maps a variety of archetypes with strong clarity, but also shows that logics may shift sequentially, for instance, from open exploration to structured implementation.

The dynamic perspective emphasizes how shifts in collaborative innovation are shaped by environmental and endogenous factors. Such attempts are not new (cf. Srikanth, Harvey, and Peterson 2016). Langley and Tsoukas (2010), drawing on Porter's (1991) dynamic theory of strategy, highlight the importance of 'process-relational concerns' that capture both path dependence and creative emergence. This resonates with Bledow et al.'s (2009) dialectical view, which emphasizes that binary categories such as exploration and exploitation are not sequentially opposed but mutually dependent, with their relative importance shifting over time. The dynamic perspective does not discard dichotomies but embeds them in evolving processes, tracing how their weight shifts as collaborations unfold. While this introduces analytical complexity, it also offers opportunities for a more reality-attuned lens. In line with this, a growing strand of public management research highlights the need to approach micro-level activity and institutional environments as dynamic processes in order to address complexity and trace interdependencies (Hu et al. 2024; Sundström and Svärdsten 2025).

Building on earlier research that described collaboration as emergent and in constant flux (Bardach 2001; Vangen and Huxham 2012), the dynamic perspective resonates strongly with recent collaborative innovation research. For instance, in smart city development, Dolmans et al. (2023) demonstrate how uncertainty and governance complexity can function both as enablers and as barriers, for instance, by expanding solution spaces in early phases but later constraining innovation as formalization tightens institutional logics. Their longitudinal causal-loop analysis shows that these dynamics are not exogenous conditions, but endogenous processes that continuously reshape collaboration. Similarly, Awan et al. (2025) show that managerial attempts to control such dynamics can trigger 'fixes that fail', where efforts to restore order or accelerate progress feed back into the system, reinforcing the very tensions they seek to resolve.

Drawing inspiration from the dialectical perspective proposed by Bledow et al. (2009), Callens and Verhoest (2024) make one of the clearest steps towards a dynamic understanding of collaborative innovation processes. In their qualitative comparative analysis of nineteen European eHealth partnerships, they show that divergence mechanisms such as idea exploration and convergence mechanisms such as consensus-building often intertwine, co-occur or shift in 'relative

importance' depending on contextual demands. Their study demonstrates that the evolving balance between them is decisive for partnership continuity. Following the authors, this underscores why a 'dichotomous view' might be 'ill-suited' to capture the inherent complexities of collaborative innovation processes (Callens and Verhoest 2024, 1865).

We argue that the choice is not between an ill-suited dichotomous perspective or a superior dynamic one. While the dynamic perspective is more context-attuned, dichotomies can offer distinctiveness (Kurtmollaiev, Pedersen, and Lie 2024). Each approach, however, carries blind spots: As Wegrich (2019, 18) argues, the field must 'move on from either/or questions [the dichotomous perspective] to conceptual and empirical explorations of boundary conditions for various types and forms of innovation and their combination [the dynamic perspective]'. Following this invitation, we suggest that Callens and Verhoest's (2024) notion of *relative importance* provides a useful bridge: it retains the clarity of dichotomous distinctions while integrating them in a dynamic perspective that traces how different mechanisms gain or lose weight in relative importance to public value creation over time.

Understanding collaborative innovation through its relative importance for public value

Building on our synthesis of the complementary perspectives in collaborative innovation literature, we now further synthesize these views in relation to public value creation. The key issue is not only how collaborative innovation processes unfold but also how they generate, reshape or undermine public value along the way.

Framing public value creation as both processual and contested mirrors the dynamics of collaborative innovation itself. Public value in collaborative innovation is processual rather than predefined. It emerges through interaction as problems, actor configurations, and boundary conditions evolve. Public value may be generated as means in the process – such as legitimacy, trust or capacity-building – and as ends in the form of implemented solutions, new services, or policy innovations (Acar, Steen, and Verschuere 2025; Page et al. 2015). At the same time, public value in collaborative innovation is contested. What is deemed valuable is rarely self-evident but subject to negotiating competing interests, shifting interpretations and pluralistic understandings of what constitutes public value (Benington 2015; Jørgensen and Bozeman 2007). Contestation is not merely a barrier but can also be generative. Cinar, Trott, and Simms (2019) show that barriers in public innovation may transform into enablers or learning opportunities.

These insights point to the need for an analytical framework that traces how public value is created, redirected, or undermined in collaborative innovation processes. We propose three interdependent dimensions (Table 1). Our choice of

Table 1. Analytical framework for linking collaborative innovation to public value creation.

Dimension	Unit of analysis	Dichotomous perspective	Dynamic perspective	Relation to public value creation
Collaborative setting	Organizational and interactional context of collaborative innovation	Emergent settings with ambiguous mandates to arranged settings with formal mandates Kim and Sullivan (2024); Kurtmollaiev, Pedersen, and Lie (2024).	Contextual factors recalibrate the relative importance of process elements as settings shift Callens and Verhoest (2024).	Mandates define who holds responsibility, resources, and authority to create value; as they change, what counts as valuable also shifts.
Institutional conditions	Norms, rules, logics, and expectations shaping collaboration	Institutional conditions constrain through institutional lock-in or enable through alignment Sørensen and Torfing (2011).	Dynamic interplay between logics, evolving environments, and micro-level practices Dolmans et al. (2023).	Expectations about public value are shaped by institutional backgrounds yet remain open to reinterpretation.
Actors' capacities	Relational and adaptive capacity to navigate and manage collaboration	Capacities as managerial skills to turn barriers into enablers Moore (1995).	Capacities evolve through collaboration and change with conditions J. Bryson et al. (2017); Cinar, Trott, and Simms (2019).	Capacities are the practices through which actors adapt, align, and contest collaboration, directly shaping emergent forms of value.

a parsimonious lens reflects emphases on collaborative setting (Kurtmollaiev, Pedersen, and Lie 2024; Sørensen and Torfing 2011), institutional conditions (Dolmans et al. 2023), and actors' capacities (J. Bryson et al. 2017; Moore 1995). Its value lies in clarifying how these dimensions coevolve over time without dissolving complexity into mere disorder.

Taken together, our framework shows that dichotomous and dynamic elements have both advanced understanding of collaborative innovation processes and their link to public value creation. Rather than focusing only on binary contrasts or invoking dynamism as an all-encompassing condition, our framework highlights the relative importance of basic elements to processual and contested public value creation.

Research design

Case context: UpdateDeutschland

UpdateDeutschland provides a revelatory context for studying how collaborative innovation processes generate public value, because it exposes

dynamics under extreme conditions (Chen 2015; Yin 2009). Launched in 2021 with support from the German Federal Chancellery and organized by ProjectTogether, a non-profit innovation hub, it was designed as a temporary space for public sector managers and citizens to co-create solutions to societal challenges. Through an open call, the lab mobilized over 4400 participants, including representatives from 63 municipalities, 11 state agencies, and various public organizations – from mayors and administrators to police departments and street-level bureaucrats. Civil society joined both through grassroots initiatives and individual participation. Public sector managers submitted preliminary challenges as questions, spanning domains such as sustainability, digital inclusion, civic engagement, and public administration (e.g. ‘How can we include older generations in the digital society?’). These challenges were opened for responses from civil society and generated 581 proposals that fed into a two-day kick-off hackathon and a four-month follow-up community programme entered by 330 initiatives.

UpdateDeutschland can be described as an open digital living lab, combining three defining features. It was open, following an open innovation approach that drew on atypical knowledge sources and enabled broad cross-sector inclusion (Bogers, Chesbrough, and Moedas 2018; Chesbrough 2006). It was digital, facilitating distributed problem-solving and lowering participation barriers (Bertello, Bogers, and De Bernardi 2021; Mu and Wang 2022). And it was a living lab, embedding experimentation in real-world contexts with public value co-creation as a guiding principle (Criado et al. 2020; Haug and Mergel 2021).

The lab was marked by uncertainty, open-endedness, and mandate ambiguity, which created shared contextual pressures but also opportunities for generating public value. Uncertainty pressured orientation, as many actors lacked prior experience with such unpredictable processes, but also created opportunities because no one held privileged expertise, making collective orientation necessary (Mergel 2018). Open-endedness pressured by leaving both problems and possible solutions undefined, but also enabled experimentation and improvisation unconstrained by pre-set outcomes (Garud, Tuertscher, and Van de Ven 2013). Mandate ambiguity pressured through unclear roles and responsibilities for sustaining initiatives, but also enabled reconfiguration of responsibilities beyond established interfaces (Gegenhuber and Mair 2024). We acknowledge that other contextual boundary conditions, such as resource asymmetries and post-pandemic pressures, may have influenced experiences but we excluded them to focus on shared contextual pressures rather than case-specific conditions.

We consider the case context revelatory because, under shared contextual pressures and opportunities for public value creation, it produced clearly distinguishable experiences across initiatives. Some led to negative

unintended consequences, as participants became frustrated with openness and lack of structure. Others generated value in the form of networks and learning despite absent tangible solutions. A smaller set achieved implementation and scaling. This variation provides fertile ground for exploring how collaborative innovation processes generate, redirect or undermine public value.

Data collection, theoretical sampling and theory elaboration

We conducted a one-year real-time longitudinal qualitative study of UpdateDeutschland between February 2021 and February 2022. The study traced collaborative innovation processes across the pre-programme phase, the kick-off hackathon, the four-month community programme, and the post-programme period, when selected initiatives attempted to consolidate or scale their results. Our goal was to understand how, why, and what kinds of initiatives emerged, or failed to emerge, under conditions of uncertainty, open-endedness, and ambiguity.

Our dataset combines extensive interviews and participatory observation to capture multiple interpretive standpoints. We conducted 109 semi-structured interviews with public sector managers (17), citizen participants (71), lab organizers (10), and other stakeholders such as foundation representatives and thematic experts (11). In addition, we engaged in over 650 hours of participatory observation in community events, organizer meetings, mentoring sessions and interactions on the digital workspace on Slack. These observations were triangulated with documentary sources, including initiative websites, email exchanges, and sketches of prototypes. This allowed us to interpret both intended outcomes and evolving ideas. Weekly debriefings among the research team facilitated reflexive comparison and enabled us to refine coding in real-time and trace how public value was envisioned, contested and reinterpreted across the process.

We adopted a theory elaboration approach, which refines existing constructs by specifying boundary conditions, uncovering mechanisms or offering alternative interpretations in new contexts (Fisher and Aguinis 2017). This abductive approach was well suited to our aim of extending research on the dynamic nature of collaborative innovation (Awan et al. 2025; Callens and Verhoest 2024; Dolmans et al. 2023; Kurtmollaiev, Pedersen, and Lie 2024) and on public value creation (J. Bryson et al. 2017). Rather than developing wholly new constructs, we elaborate how public value is created, redirected or undermined through the evolving interplay of collaborative settings, institutional conditions and actor capacities in open-ended processes.

To capture variation, we used purposeful theoretical sampling (Eisenhardt and Graebner 2007). UpdateDeutschland generated 330 initiatives, of which

roughly 70 remained active after the initial community phase – a funnel typical of open innovation processes (Chesbrough 2006). Of these, we closely followed 30 initiatives that showed sustained engagement and represented varied experiences and implications for public value creation. Within this set, 14 initiatives involved explicit collaboration between public managers and civil society actors. From this subset, we selected nine initiatives for in-depth analysis, chosen for their analytical leverage. They emphasized different experiences: three ended in disengagement and frustration, three highlighted that their participation itself was valuable without tangible solutions, and three achieved implementation and scaling of solutions. This sampling enabled a comparative design sensitive to both variation and process (Eisenhardt 2021).

Rather than presenting each case in full, we emphasize comparative patterns across the nine collaborative innovation initiatives (CII), integrating selective case descriptions where useful (see [Appendix](#)). In total, 53 interviews concerned these nine initiatives directly: 13 with public managers, 22 with citizens or civil society actors, and 18 with organizers, mentors, or foundation partners who commented specifically on those initiatives. Interviews were semi-structured, typically beginning with open prompts such as: How do you perceive the collaboration with your partner at this stage? What have you gained from the participation so far? Would you participate again?

Data analysis

We analysed the nine cases through a multi-step abductive process ([Figure 1](#)). The analysis followed four iterative stages. In the first step, we conducted theory-informed open coding of interviews and observation memos related to the nine initiatives (53 in total). These interviews were our primary source, with observations and documents used to triangulate perspectives and trace dynamics. The remaining 56 interviews with organizers and other stakeholders were excluded from the coding corpus but enriched contextual understanding and enabled real-time reflexivity. This sharpened our sensitivity on boundary conditions and ensured the unit of analysis remained consistently focused on the nine initiatives. We coded how actors described and navigated collaboration under open-endedness, uncertainty, and ambiguity, with attention to interpretations of public value (such as frustration or learning), process elements (such as mandates, expectations), and boundary conditions (such as absent problem definitions). This produced descriptive first-order codes. Open coding was done by at least two researchers per case, with differences resolved through discussion. Biweekly coding workshops refined categories and avoided overlap. To guard against post-hoc rationalization, we tied coding

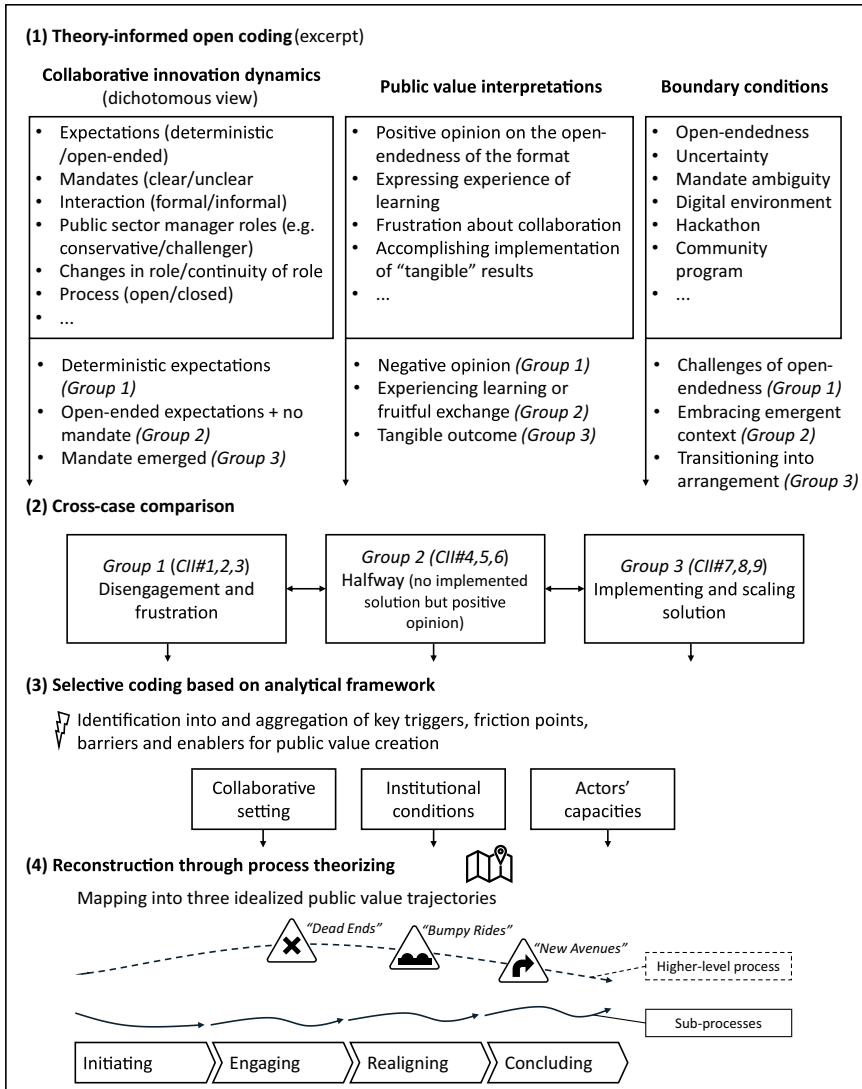


Figure 1. Multi-step abductive analysis.

rules to observable process markers such as duration, intensity or the type of artefacts produced (sketches, prototypes, solutions).

In the second step, we linked first-order codes across cases to identify variation and consistency (Eisenhardt 1989). This showed, for example, how deterministic expectations characterized disengaged initiatives, while ambiguous mandates distinguished ‘halfway’ cases from those that achieved implementation. Filtering out less distinctive elements, such as the mode of

interaction or the digital platform, highlighted mandates, expectations and contextual factors as central dimensions. Early explanations drew on dichotomous contrasts, but abductive reasoning allowed us to reframe these into a dynamic perspective that captures their relative importance for public value creation.

In the third step, we revisited the data through our analytical framework. Selective coding linked descriptive evidence to these dimensions, highlighting triggers, friction points, and enablers. Analytic rigour was ensured by triangulating longitudinal interview waves, which captured evolving participant accounts, with observational fieldnotes and meeting transcripts, which documented enactment and negotiation in practice. Regular team debriefs helped correct analytical emphases (e.g. do we privilege initiatives who achieve solution implementation?).

In the fourth step, we reconstructed how these dimensions interacted over time by applying process theorizing (Cloutier and Langley 2020). We identified four recurring phases. (1) Initiating: Actors enter, formulate expectations, define mandates; (2) Engaging: First moments of joint activity, where interactional patterns form; (3) Realigning: Actors reassess goals, roles, and commitments in response to challenges or opportunities; (4) Concluding: Consolidating and reflecting on experiences. Unlike functional innovation phases, these marked shifts in collaboration dynamics that affected public value creation. Their timing varied across cases, but they served as relational markers in processes of flux rather than strict chronological stages. Visual mapping strategies (Langley 1999) illuminated process and variance across three groups, enabling us to conceptualize three trajectories of how collaborative innovation processes generate public value (Eisenhardt 2021).

Findings

Mapping trajectories of how collaborative innovation processes create public value

Our analysis shows that the different experiences of the three groups of CIIs in UpdateDeutschland are best understood, mapped, and presented as three distinct trajectories. By trajectories, we refer to a processual explanation that borrows from the dichotomous view to show how binary elements in collaborative setting, institutional conditions and actors' capacities sequentially shift across phases, while integrating them into a dynamic perspective that links these elements to the relative importance of public value. We metaphorically refer to these as (1) *Dead Ends*, (2) *Bumpy Rides*, and (3) *New Avenues*.

Trajectory 1: Dead Ends

The first group of initiatives (CII#1, CII#2, CII#3) illustrates a trajectory where early opportunities for public value creation ultimately collapsed into negative unintended consequences (Figure 2). We call this trajectory *Dead Ends* because, despite promising beginnings, deterministic expectations persisted and collaborators lacked the capacity to reframe them. The uncertain, open-ended, and mandate-ambiguous collaborative setting of UpdateDeutschland generated frustration and resentment.

Initiating

The initiating phase opened genuine opportunities for public value creation. UpdateDeutschland attracted both citizens and public sector managers into a novel collaborative setting. Citizens often joined at moments of transition and curiosity. One participant saw the lab as ‘a chance to explore how collaboration with municipalities might work’ (CII#1.C), while another saw it as ‘an opportunity to look in a different direction’ after leaving a corporate career (CII#1.B). Public managers, though shaped by institutional backgrounds, also expressed hope for experimentation: one called her unit a ‘satellite, less bureaucratic than the rest, though UpdateDeutschland could still prove challenging’ (CII#2.A). Another expected it would ‘break open structures and cultures and move toward cooperation’ (CII#3.A). In an early Q&A before the hackathon, public managers raised exhaustive questions about responsibilities, scope, and filtering challenges (*Fieldnotes*). These concerns revealed how institutional expectations of clarity and accountability already shadowed the open format.

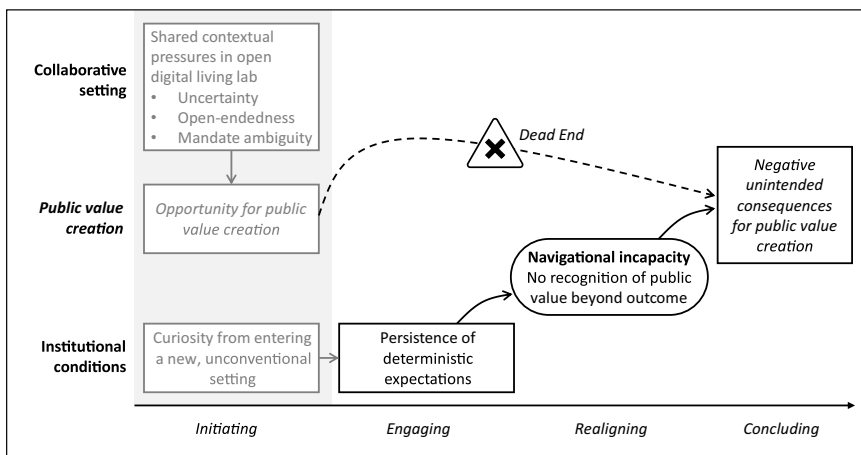


Figure 2. Mapping Trajectory 1 – Dead Ends.

Engaging

Early engagement quickly exposed how curiosity collided with administrative logics. As collaboration moved from talk to tasks, managers emphasized jurisdiction, roles, and product clarity. One explained: ‘We as the administration were very well prepared for the project partner . . . but those representing a project were not prepared for the administration’, warning that overlapping frameworks risked ‘overwhelming people’ (CII#1.A). Another put it bluntly: ‘the biggest problem was understanding how the roles in UpdateDeutschland fit our institutions’ (CII#2.A). Such orientation translated ambiguity into project-management terms. A public sector manager recalled: ‘We had to decide very quickly, assign clear roles, and work on making the product understandable. Without that, such initiatives often collapse’ (CII#2.B). Public managers applied administrative filters on expectations: ‘The first question inside the administration is always, “Are you responsible?” . . . Outsiders have great difficulty navigating jurisdictions in the federal system’ (CII#3.C).

For citizens, these expectations proved difficult. One described feeling ‘totally overwhelmed, I mentally checked out for a bit’, after criticism that their proposal was ‘not really aligned with how the administration works’ (CII#1.C). Another sought to link an idea to a state-level initiative, but the public partner ‘struggled to see how this connection would fit in practice’ (CII#2.D). Engagement thus shifted away from curiosity towards institutional demands for accountability, narrowing the scope for alternative paths.

Realigning

In the realigning phase, frictions accumulated without the capacity to redirect them. Managers stressed missing structures rather than reframing value. As one noted: ‘I already need a minimum set of structures in place that can absorb something like this . . . there should be a directive behind it and resources available’ (CII#2.C). Expectations of planning and resourcing overrode recognition of processual value such as learning or trust-building. While contestation is inherent to public value, here it hardened into non-negotiable expectations. Public managers’ authority allowed them to define value in narrow, solution-oriented terms. Citizens, lacking comparable leverage, had little room to realign. In contrast to Trajectory 2, which adapted, the incapacity to realign marked a turning point towards negative unintended consequences in Trajectory 1.

Concluding

As pressures mounted, neither side reframed expectations or shifted direction. A senior administrator concluded the process was ‘extremely time-consuming and didn’t yield any results’ (CII#1.A). A citizen recalled: ‘we tried to make it more concrete with the city, but it somehow fizzled

out' (CII#1.C). Organizers noted: 'the public sector representative was really driving things at the beginning ... but in the end it was not a positive experience, because she simply didn't know how to handle it anymore' (*Context interview*). CII#2 echoed this: participants felt overwhelmed, while state officials judged the design 'misaligned with bureaucratic cycles ... from the start it was clear we couldn't steer such a complex process at that pace' (CII#2.C). Engagement became sporadic until partners withdrew. In CII#3, citizens continued 'in a much reduced form, as many dropped out', describing the journey as 'exhausting' (CII#3.D).

These initiatives did not simply fail to generate public value; they produced negative unintended consequences. Frustration, resentment, and disengagement undermined trust in open collaboration. In this trajectory, the defining features of UpdateDeutschland – uncertainty, open-endedness, and mandate ambiguity – were not experienced as generative but as problematic. Left unresolved, such dynamics risk leaving a legacy of scepticism that hampers future attempts at open, cross-sector collaboration.

Trajectory 2: Bumpy Rides

The second group of initiatives (CII#4, CII#5, CII#6) illustrates a trajectory in which early opportunities for public value creation were sustained as participants gradually reflected on deterministic expectations, shifted towards more open-ended ones and began to recognize public value in the collaborative process itself (Figure 3). We term this trajectory *Bumpy Rides* because the path was uneven, marked by frictions and setbacks, yet participants still regarded the experience itself as valuable.

Initiating

Similar to Trajectory 1, initiation was fuelled by curiosity, but here it was slightly more framed as experimentation. A citizen in CII#4 described: 'I joined as a private person but also with the perspective: What happens there? What can one learn?' (CII#4.C). Others entered with modest expectations: 'If nothing comes of it, then at least I meet interesting people ... even failure was part of the plan' (CII#4.B). Public sector managers also saw the lab as a testing ground. In CII#5, one explained: 'We already had a project up our sleeve ... and I thought: let's bring this into UpdateDeutschland. It could fit as a challenge' (CII#5.A).

Engaging

Early engagement again exposed institutional frictions, but here they became opportunities for reflection rather than barriers. A mentor in CII#6 noted: 'municipalities need to be guided when unfamiliar processes take place ...

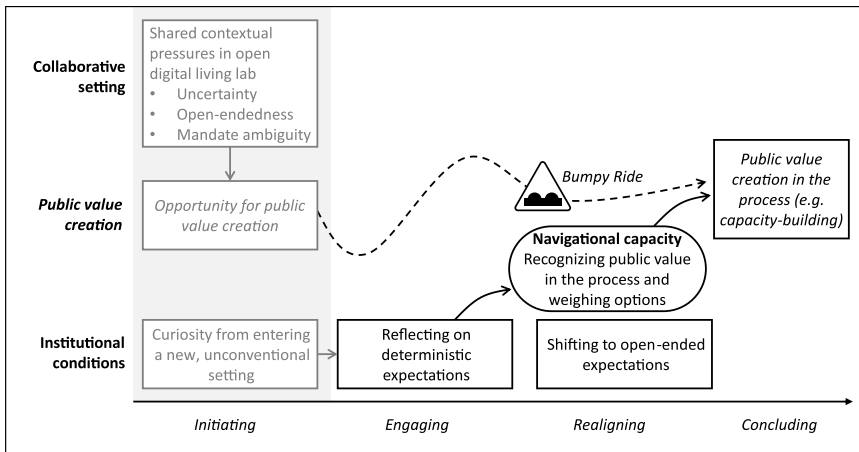


Figure 3. Mapping Trajectory 2 – Bumpy Rides.

their first instinct is “no, we don’t want change” or they are simply afraid of it’ (CII#6.C). Public managers in CII#5 openly acknowledged inward-facing tendencies: ‘As an administration we mostly look inward, rarely outward ... but societal demands have shifted’ (CII#5.A).

These reflections provided the hinge for shifting from deterministic expectations to open-ended exploration. Rather than insisting on deliverables, managers emphasized receptivity: ‘Our openness was crucial in not being tied to a single idea ... the path to achieving our goals remained open’ (CII#5.A). Observations of early Zoom meetings in CII#4 confirmed this ethos, as exchanges highlighted respect and curiosity even when ideas remained unpolished (*Fieldnotes*).

Realigning

The crucial turning point came in the realigning phase, when actors had to sustain process-oriented value while confronting absent mandates, scarce resources, and limited authorizations. In CII#4, the main constraint was leadership: ‘It was less about resources ... What was missing was someone who really took ownership of the project. In other initiatives, there’s a leadership board driving things’ (CII#4.A). In CII#5, financial limitations loomed: ‘Financing is really difficult. Budget lines are empty ... if we keep generating use cases but there’s no money to compensate people, it becomes difficult’ (CII#5.A). In CII#6, political cycles slowed progress: ‘Our municipal council is not particularly decisive ... you present it and then you wait and hope to eventually get into action’ (CII#6.A).

Realigning thus meant affirming means such as learning, relationships, or capacity-building as legitimate public value while preventing drift into

inefficiency due to absent mandates. Navigational capacity lay not in eliminating constraints but in interpreting them and deciding whether continued open-ended engagement enriched collaboration or should instead be concluded on a positive note.

Concluding

In this trajectory, participants affirmed value in the process itself. A manager in CII#4 reflected: ‘We as an administration and personally also learned a lot ... a form of capacity building on both sides. For the initiative too, because they gained an insight into how an administration actually works’ (CII#4.A). Citizens emphasized iterative experimentation: ‘Running test loops ... and learning to deal better with mistakes has potential’ (CII#4.C). Another wondered if such approaches could enter routine practice: ‘Can we implement something like this on a low level in a similar way?’ (CII#4.B). Public managers also reframed ‘failure’ as learning. A manager in CII#5 noted: ‘You learn incredibly much that you carry back into your agency ... mistakes are such important signals. An important impulse to do things differently in the future ... things you cannot measure in the end’ (CII#5.A). In CII#6, a mentor summarized: ‘I am a fan of open processes. It is important to get impulses at all levels ... perspectives you wouldn’t have on your own’ (CII#6.C).

Trajectory 2 shows that constructive rather than destructive outcomes stem not from fewer constraints but from different responses to navigate them. Both trajectories began in uncertainty and faced institutional reservations. But while Trajectory 1 remained locked in deterministic expectations, here actors built navigational capacity to embrace open-endedness while not ending up in inefficiencies of the open-ended process. This capacity itself became public value: the ability to reinterpret contestation not as failure but as learning. By affirming processual and contested forms of public value, participants concluded with constructive lessons rather than resentment.

Trajectory 3: New Avenues

The third group of initiatives (CII#7, CII#8, CII#9) illustrates a trajectory where initially open-ended collaboration with ambiguous mandates evolved into arrangements with clear mandates that enabled the implementation and scaling of solutions (Figure 4). We term this trajectory *New Avenues* because collaborators successfully transitioned from the emergent setting of the open digital living lab into more arranged settings. What distinguishes this trajectory is not a smoother beginning – initiation and engagement resembled the ‘bumpy rides’ of Trajectory 2 – but the boundary condition that mandates could eventually be clarified and pursued.

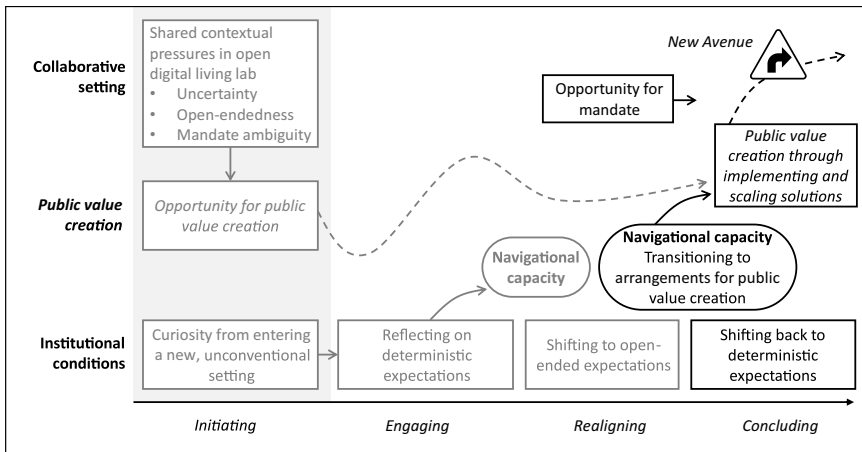


Figure 4. Mapping Trajectory 3 – New Avenues.

Initiating

As in the other trajectories, initiation was marked by openness and mandate ambiguity. A municipal leader joined ‘because it looked exciting’ and chose to ‘let it unfold’ (CII#7.A). A public official in CII#8 entered ‘with no expectations’ to learn how such processes work (CII#8.A). A foundation member in CII#9 recalled the kick-off as ‘pretty chaotic’, with unclear roles and matching, yet still an impetus to explore (CII#9.E).

Engaging

As in Trajectory 2, participants adjusted their expectations to fit the lab’s open-ended character. A public sector manager described the absence of predefined solutions as ‘exciting to examine in such an open process’ (CII#8.A). A citizen called it ‘the pilot phase, it’s about experimenting and learning’ (CII#7.D). At the same time, institutional realities surfaced without derailing collaboration. ‘The biggest challenge is that some processes run very slowly’, one manager admitted (CII#9.A). Citizens adjusted expectations accordingly: ‘In the end, it takes half a year rather than one quarter’ (CII#9.C). Instead of treating these frictions as failures, participants framed them as part of experimentation.

Realigning

The crucial inflection point was realigning. Here, navigational capacity lay in sensing when mandates needed clarification to anchor implementation. Instead of abandoning openness, actors translated opportunities from it into arrangements that combined novelty with clearly allocated roles and resources among collaborators. In CII#9, both sides gradually aligned on roles: ‘The partner said how happy she was that it all went so quickly. For us, it felt the opposite’ (CII#9.

C). Over time, responsibilities became clear: ‘I step back when the founders expand the app to other municipalities. Scaling it across Germany – that’s their job, not mine’ (CII#9.A). Citizens confirmed: ‘Her role throughout the process was communication’ (CII#9.C). In CII#7, formulation of clear roles became explicit: ‘We moved from merely submitting a challenge to actively accompanying the team. We are not shareholders, but we invest time, provide support, and hold weekly calls’ (CII#7.A). In CII#8, navigational capacity was evident when the state agency pivoted after realizing none of its original challenges resonated: ‘Instead of stopping, we took this as a chance to rethink how funding rules are made – that became the real innovation’ (CII#8.A). While foundation partners noted: ‘Who was actually the natural owner of this process?’ (CII#8.E), the agency responded by developing a participatory funding directive ‘together with civil society actors’ (CII#8.A), transforming mandate ambiguity into a structured participatory instrument.

Concluding

Concluding meant leaving the lab’s setting and entering more arranged settings capable of implementation. The solutions carried properties of novelty that might have been unlikely in pre-structured collaborations. In CII#7, a challenge about recruiting talent evolved into a social enterprise offering public services for municipalities. ‘The solution didn’t directly address our initial question, but it turned out to be a solid and very valuable workaround’, the public manager admitted (CII#7.A). In CII#8, the co-created participatory funding directive institutionalized collaboration: ‘An independent funding directive was created ... it will continue to remain in place’ (CII#8.B). An initiative benefitting from it reflected: ‘With the federal state’s funding, we can finally professionalize the model for scaling’ (CII#8.C). Finally, CII#9 illustrated rapid scaling in comparison to usual public sector projects: ‘The speed at which this project has progressed is rare in the public sector’ (CII#9.A).

Trajectory 3 shows that uncertainty, open-endedness, and mandate ambiguity can enable novel solutions when actors develop navigational capacity to translate them into clear mandates. Public value emerged both in the process (learning, experimenting) and in implemented solutions. The lab’s open setting did not block determinacy but allowed for producing solutions as creative workarounds unlikely to arise in pre-structured collaborations.

Discussion

Elaborating a dynamic perspective on collaborative innovation through trajectories

This study makes a process-theoretical contribution by advancing a dynamic understanding of collaborative innovation. We trace how shared contextual

pressures, boundary conditions, and actors' navigational capacities coevolve in relative importance to public value creation. Following Cloutier and Langley's (2020, 10) 'parallel style of process theorizing', our three trajectories aim to 'enrich current understanding of a higher-level process by showing and explaining how sub-processes mutually influence each other, [and] by specifying and explicating alternate trajectories that a process might follow'.

In our proposed trajectories, the higher-level process is the processual and contested public value creation, which depicts a broad, certain, yet adaptive direction emerging from both shared contextual challenges and early opportunities that evolve into different forms of public value creation. We contribute to research that seeks to understand public value creation as trajectories or pathways (Cappellaro, Compagni, and Dacin 2023; Loeffler and Bovaird 2019). Our conceptualized higher-level process goes beyond associating specific contexts with particular outcomes by showing how alternative routes can unfold from similar starting conditions. In particular, we build on Callens and Verhoest's (2024) dynamic perspective. Their study shows how convergence and divergence mechanisms combine and co-occur, and how their importance dynamically adapts to context; they conclude, 'The more volatile the context becomes [...], the higher the relative importance of convergence-related conditions' (Callens and Verhoest 2024, 1865). While we studied a highly volatile environment, we interpreted volatility as shared contextual pressures that set a direction for how public value is and can be generated. The dynamism in our analysis, however, was not only about whether convergence or divergence dominated or combined in certain contexts, but about how navigational capacities, to initiate shifts in expectations or clarify mandates, evolved in relative importance to different forms of public value creation. We argue that focusing on the relative importance to public value creation shifts attention from tracing antecedent conditions to examining how trajectories are shaped through actors' orientations to evolving emergence, unfolding and becoming. In this sense, speaking of public value *creation* underscores that value is not predefined but emerges and comes into being as processes unfold. Building on Garud, Kumaraswamy, and Karnøe's (2010, 770) insight that 'the future (as in the use of the term "creation")' is a key dimension in the dynamic relation between collaborative innovation and public value creation.

The sub-processes in our cases are actors' adaptive navigational capacities to shift between dichotomous elements in expectations and mandates, thereby shaping the higher-level process of public value creation. By tracing how these micro-dynamics coevolve with collaborative setting and institutional conditions, we show how seemingly similar initiatives under comparable starting conditions diverge in terms of public value over time. Our notion of navigational capacity also builds on Awan et al. (2025), who

show how attempts to impose quick fixes in collaborative innovation can reinforce rather than resolve underlying tensions. Navigational capacity, in this sense, entails recognizing and modulating such recursive feedbacks instead of prematurely closing uncertainty. This extends research on the mechanisms of public value creation (Virtanen and Jalonen 2024). We also build on Kurtmollaiev, Pedersen, and Lie (2024), who use archetypes to show how collaborative innovation shifts between causation and effectuation across phases. While they highlight shifts at the archetype level, our study advances this perspective by demonstrating shifts within sub-processes, where actors navigate expectations and mandates to orient collaborative innovation towards public value. Similar to Kurtmollaiev, Pedersen, and Lie (2024), we used dichotomous explanations to precisely account for the variance, inflection points and differences across cases.

Mapping and navigating trajectories

Our mapping of trajectories extends prior efforts to visualize public value creation (Alford and Yates 2014). J. Bryson et al. (2017) stress the need for maps that help public sector managers navigate multi-actor contexts. Building on these insights, our contribution responds to conditions of flux, uncertainty, and mandate ambiguity in inherently dynamic collaborative innovation processes (Vangen and Huxham 2012). We provide not only maps of public value creation but also of negative unintended consequences – still rarely addressed compared to value-generating outcomes (Van Dijk and Steen 2024). For researchers studying open digital living labs, comprehensiveness of mapping may risk overwhelming. What is needed is parsimony that identifies sequences and inflection points in dynamism without simplification. For public sector managers, our mapping clarifies potential routes towards public value creation. J. Bryson et al. (2017), drawing on Moore's (1995, 299) notion of public managers as 'explorers commissioned by society to search for public value', argue that such explorers require practically useful maps to navigate complexity. Our trajectories answer this call by offering process-attuned maps that help managers reflect on their position, and discern when to sustain value in the process and when to push towards concrete solutions.

Yet in contexts of novelty such as UpdateDeutschland, even the best maps may falter because managers lack familiar landmarks. In such 'uncharted waters', what is needed is less a map than a compass. Crosby, t' Hart, and Torfing (2017, 666) call for an 'explicit public value compass', while Callens and Verhoest (2024) emphasize that managers must be *able* to dynamically switch between divergence and convergence as contexts demand. We argue that navigational capacity is not a fixed skillset but an emergent ability:

managers recalibrate institutional expectations, engage with mandate ambiguity, and sense evolving possibilities.

Open digital living labs as arenas for public value creation?

Experimental and open-ended settings remain relatively new to many public sector managers and bring challenges of uncertainty. Such settings are often conceptualized as arenas that enable interaction and experimentation, creating opportunities for public value while also remaining more contested (Ansell and Torfing 2021; Torfing, Sørensen, and Røiseland 2016). Compared to physical living labs, our open digital living lab was likely even more strongly characterized by open-endedness, uncertainty, and ambiguous mandates, which resulted in contestation over various forms of public value creation. This was not always efficient or effective: 330 initiatives were launched, about 70 moved forward, and, based on broad estimates, many fewer solutions were implemented. Understanding how to improve such formats is crucial. They often emphasize processual public value, such as relationship-building, which is likely true for many initiatives in UpdateDeutschland (Yuan and Gasco-Hernandez 2019). Yet they can also reproduce unintended negative consequences for public value (Wegrich 2019). From our comparative analysis of trajectories, we derive two design propositions for open digital living labs to enhance both effectiveness and efficiency (J. M. Bryson, Crosby, and Stone 2015).

Our first design proposition concerns managing expectations as a condition for sustaining public value creation. Expectation management is crucial for sustaining momentum in collaborative arenas (Bardach 2001). Our comparison of Trajectories 1 and 2 shows that many frustrated and disengaged initiatives could have evolved into constructive *Bumpy Rides* had expectations been better aligned. While expectations are partly endogenous, shaped by actors' institutional backgrounds (Sørensen and Torfing 2011), they can also be influenced exogenously through the design and facilitation of open digital living labs. For orchestrators of arenas, this means clarifying from the outset that processes are open-ended, experimental, and that failure is a legitimate outcome, but also specifying what types of value can realistically emerge (Ulvin et al. 2024). For participants, this requires negotiating between institutional routines and the openness of arenas. Managing expectations in this dual sense, encouraging experimentation while keeping goals realistic, helps prevent disillusionment and supports recognition of both processual and outcome-oriented forms of public value.

Our second proposition concerns the promotion of flexible mandates as a precondition for implementation and scaling. In Trajectory 2, initiatives often stalled because scarce resources, limited authorizations and other hurdles left actors' hands tied. In open digital living labs, it should not be

left to chance, or only revealed during collaboration, what is institutionally possible. In Trajectory 3, in CII#7 and CII#9, solutions were advanced mainly through citizen-led vehicles such as a social enterprise or cooperative. While these provided creative ‘workarounds’, they also highlighted the limits of public sector engagement in external arenas (cf. Hansen et al. 2022). To strengthen such collaborations, policies and institutional frameworks are needed that provide clearer authority, legal scaffolding, and resources for adaptive mandates at the intersection of public sector organizations, civil society and other actors.

Conclusion

Our study adopted a dynamic perspective to understand how collaborative innovation processes generate, redirect, or undermine public value under conditions of uncertainty, open-endedness, and mandate ambiguity. By process theorizing three trajectories – *Dead Ends*, *Bumpy Rides*, and *New Avenues* – we mapped how shared contextual pressures interact with actors’ navigational capacities to generate divergent outcomes. This showed that generating value in open digital living labs comes with both opportunities and risks. We highlighted the importance of navigational capacities for channelling unfolding public value into more desirable directions. For researchers, our study underscores the need to move beyond questions of success or failure and instead trace how alternative pathways emerge from similar beginnings, including unintended consequences. For practitioners, the trajectories provide parsimonious maps to reflect on tensions, balance competing demands, and decide when to sustain processual value and when to pursue tangible solutions. In volatile arenas, where conventional maps often falter, navigational capacity offers a compass that helps managers adjust to evolving conditions and reframe what counts as valuable. For orchestrators, design principles that promote expectation management and flexible mandates can further enhance public value creation.

Lastly, our analysis, while conducted in real-time, remains partly retrospective in how we reconstructed the trajectories and bound to a single context. This raises questions of transferability. Future research should pursue in-depth, longitudinal studies across diverse institutional settings to capture trajectories as they unfold and refine how collaborative innovation generates different and sometimes conflicting forms of public value. Complementary quantitative approaches could further attempt to capture variance and process in large samples, such as our 330 initiatives, by using clear processual markers to assess how distinct forms of public value are created, redirected or undermined.

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Appendix. Case descriptions, sampling criteria, and interview data

Name	Case description	Sampling criteria	Interviews
CI#1	A public sector manager from a large city submitted a challenge that quickly attracted a motivated group of citizens during the first hackathon weekend. Initial collaboration was enthusiastic, and participants sketched ideas for a possible prototype. However, within three weeks the process lost momentum when disagreements surfaced around the prototype draft, and the collaboration came to an early end.	Disengagement and frustration: Early motivation collapsed into mutual dissatisfaction, leading to withdrawal and an abrupt end of collaboration.	1x Public sector manager (CI#1.A) 2x Citizens (CI#1.B; CI#1.C)
CI#2	Two public sector managers from a federal state administration joined the community program to explore potential collaborations with citizen initiatives. They attended several networking sessions and initially showed steady interest, engaging in discussions about possible joint projects. Despite repeated exchanges with citizen groups, no commitments were made. What began as curiosity gradually gave way to scepticism, and by the end, the managers regarded their involvement as unproductive and frustrating.	Disengagement and frustration: Initial engagement ended without commitments; managers viewed the process as wasted effort. Concerns with the open format of UpdateDeutschland and its practicality.	2x Public sector managers (CI#2.A; CI#2.B) 1x Other, mentor from a private innovation hub (CI#2.C) 1x Citizen (CI#2.D)

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Name	Case description	Sampling criteria	Interviews
CII#3	A mid-sized city entered UpdateDeutschland through its public sector innovation unit and launched a formal collaboration with a citizen team. Over several months, the partners worked together on developing a prototype, including test interviews with residents to refine ideas. The collaboration had a formal start with some momentum, but gradually slowed.	Disengagement and frustration: Citizens reported feeling drained by the perceived aimless journey and questioned efficiency. The city's engagement quietly diminished, without a clear explanation to the citizens, leaving citizens disappointed	3x Public sector managers (CII#3.A; CII#3.B; CII#3.C) 2x Citizens (CII#3.D; CII#3.E)
CII#4	A public sector manager from a small town collaborated with two citizen teams during the initial sprint weekend, leading to early sketches of potential prototypes. For two to three weeks after the sprint, there was some exchange and joint effort to explore the ideas further, although the momentum remained limited.	Halfway: The collaboration ended without an implementable solution, but both the manager and the citizens reflected positively on the brief interaction.	1x Public sector manager (CII#4.A) 2x Citizens (CII#4.B; CII#4.C)
CII#5	A public sector manager from an administrative authority of a mid-sized city engaged with a citizen team on the submitted challenge. Together, they developed and tested early prototypes within the administration, but did not advance to full implementation. The collaboration lasted about three months, marked by steady but incremental progress.	Halfway: While the first prototype was never properly tested in practice and engagement faded, both the public sector manager and the citizens valued the experience and reported learning from working with the other party.	1x Public sector manager (CII#5.A) 1x Citizen (CII#5.B)
CII#6	A public sector manager from a small town collaborated actively with local citizens over several weeks. The exchange was sustained and constructive, but the process produced only initial conceptual sketches, far from a prototype.	Halfway: Despite absence of implemented solutions, participants viewed collaboration positively, appreciated exchange, and expressed willingness to participate again.	1x Public sector manager (CII#6.A) 1x Citizen (CII#6.B) 1x Other, mentor from a public sector think tank (CII#6.C)

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Name	Case description	Sampling criteria	Interviews
CII#7	A public sector manager of a small town, supported a group of citizens in founding a new social enterprise. The solution turned out differently from what the manager initially expected, yet was still perceived as a very positive alternative pathway. The municipality served as the first prototyping and implementation partner, providing legitimacy. The resulting enterprise offered a scalable innovation for the public sector anchored in a sustainable business model.	Implementation of solution: Development of a scalable public sector innovation with clear mandate (social enterprise). Within months, the solution was adopted in other municipalities, demonstrating its scalability.	1x Public sector manager (CII#7.A) 3x Citizens (CII#7.B; CII#7.C; CII#7.D)
CII#8	A federal state agency collaboratively developed a new policy for supporting social innovation together with citizens and a local foundation. After initial frustration, since none of the submitted challenges could be addressed fruitfully, the agency took an alternative path by collaborating with a local ecosystem. The new path was met with great enthusiasm by all involved stakeholders.	Implementation of solution: Public sector policy instrument offering a novel approach to supporting challenge-driven social innovations with public sector backing – broke with incumbent logics.	2x Public sector managers (CII#8.A; CII#8.B) 2x Citizens (CII#8.C; CII#8.D) 2x Other, local foundation (CII#8.E; CII#8.F)
CII#9	A public sector manager of a medium-sized city supported citizens in professionalizing a hobbyist app into a scalable public service tool tailored to administrative needs. Only minor challenges arose, and the process unfolded as a mostly smooth and synergetic collaboration.	Implementation of solution: A citizen cooperative offered the tool via a subscription model. The city was the first adopter, integrating it into its public service portfolio. In the following months, the solution scaled across municipalities.	1x Public sector manager (CII#9.A) 3x Citizens (CII#9.B; CII#9.C; CII#9.D) 1x Other, local foundation (CII#9.E)