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Drivers of collaborative governance for the green transition

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ABSTRACT

Theoretical and empirical studies praise the role of collaborative governance in spurring green transition, but we still know little about how competing constellations of governance factors can support local collaboration between public and private actors. This article uses Qualitative Comparative Analysis of 22 local cases of the collaborative governance of green transitions. The analysis identifies two different pathways to collaborative enhancement of the circular economy that may enable public leaders in different socio-political contexts to use collaborative governance in networks and partnerships as a lever for enhancing environmental sustainability and mitigating the climate crisis.

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KEYWORDS Collaborative governance; circular economy; green transition; metagovernance; leadership

The climate crisis and the governance of change

In 2015, the UN member states unanimously agreed on 'The 2030 Agenda for Sustainable Development' and adopted 17 Sustainable Development Goals (SDGs) that, *inter alia*, address the need to curb the climate crisis and other environmental threats and to transit to a low-carbon, zero-waste circular economy (Dantas et al. 2021; Kirchherr, Reike, and Hekkert 2017).¹ Here, half-way to the 2030 deadline, there is little doubt that, despite noteworthy progress in some countries and areas, the world as whole is far from achieving the SDGs (Zhao et al. 2022). Political decisionmakers seem to have great difficulties affecting key social and economic decisions impacting on the green transition and tend to be more concerned about the short-term of costs of the green transition than the long-term negative consequences of the failure to act (Lazarus 2008).

To accelerate the socio-technical green transition to sustainable economic systems that are not based on fossil fuels and overconsumption of natural resources (Geels et al. 2016), the UN SDGs must be translated into national action plans capable of guiding local action for the green shift. Interestingly, the 17th SDG, 'Partnerships for the goals',

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provides clear instructions for how to enhance sustainability through local action. Public and private actors must collaborate in networks and partnership to co-create innovative solutions (Ansell, Sørensen, and Torfing 2022). Collaborative governance represents a viable strategy, since no single public, private, or civic actor possesses all the knowledge, ideas, and resources required to achieve the green transition single-handedly. Hierarchical forms of government may prompt action, and markets may help to scale new solutions, but the process of fostering creative solutions to the 'super-wicked problems' (Levin et al. 2012) currently facing us requires the exchange and pooling of manifold ideas, competences and resources in collaborative arenas that may spark new green solutions.

Collaborative governance involves public and non-public actors in deliberative processes through which problems are identified and defined and new creative solutions are designed and implemented (Ansell and Gash 2008; Emerson and Nabatchi 2015a; Peters et al. 2022). Theoretical and empirical literatures praise and document the role of collaborative governance in spurring green transitions (Araújo and Franco 2021; Horan 2022; Newig et al. 2023; Ostrom 1990; Vedeld 2022). However, our understanding of the specific drivers of collaborative governance for the green transition is predominantly limited to broad lists of supportive factors provided in general theoretical accounts that highlights the positive impact of national goal setting, digital platforms, blended financing, facilitative leadership etc (Ansell, Sørensen, and Torfing 2022; Hofstad et al. 2021; Pattberg and Widerberg 2016).

In the neighbouring field of network governance, there are both theoretical and empirical studies of the factors conditioning effective network governance, but the focus tends to be on the impact of internal network characteristics such as network composition, network stability and network maturity (Kenis and Provan 2009; Raab, Mannak, and Cambré 2015; Turrini et al. 2010) rather than on the role of proactive attempts of social and political actors to govern and lead collaborative processes aiming to foster joint solutions to common problems (but see Cristofoli and Markovic 2016). The collaborative governance literature pays more attention to the role of institutional design and collaborative leadership, but the empirical studies tend to be limited to single or small-n case studies (see Satorras et al. 2020; Sørensen and Torfing 2022; Hofstad et al. 2019). There are few medium-n studies enabling us to identify the necessary and sufficient conditions for the green transition across different cases of collaborative governance (but see Avoyan 2022; Torfing et al. 2020; Ulibarri et al. 2023). To remedy this problem and deepen the understanding of what drives collaborative governance for the green transition, this article aims to identify the competing constellations of governance factors that support local collaboration between public and private actors engaged in the co-creation of green circulareconomy solutions that aim to mitigate climate change and resource depletion.

Our study of the drivers of collaborative governance for the green shift is supported by insights from the governance network literature, which distinguishes between different collaborative ambitions in networks that may vary cumulatively from cooperative knowledge sharing, via coordination of activities, to collaborative problemsolving (Keast and Mandell 2007, 2014). Our conjecture is that network-based projects must aspire to achieve more than knowledge sharing and coordination of activities and engage in collaborative problemsolving if they want to spur the transition to a green circular economy. However, the ambition to do more than merely sharing knowledge and coordinating distributed actions is not sufficient. Collaborative governance in networks and partnerships must be carefully metagoverned in the sense of being initiated, supported and guided through the use of different tools that seek to influence the process and outcomes without reverting to traditional hierarchical forms of steering based on command and control (Jessop 2002; Meuleman 2008; Sørensen and Torfing 2009). Metagovernance aims to attract relevant and affected actors and bring them together in trust-based collaboration, constructively manage differences and mediate conflicts, catalyze creative problemsolving, provide essential resources and ensure progression towards goal achievement (Peters et al. 2022). It is often exercised by government actors at the international, national, regional or local level, but resourceful social entrepreneurs may also assume the role of metagovernors.

Public sector managers and social entrepreneurs in charge of metagoverning collaborative governance must skilfully combine different hands-off and hands-on tools (Sørensen and Torfing 2009). Hands-off metagovernance tools such as institutional design of the form, function and composition of collaborative arenas and political, economic and discursive framing of the collaborative process can be exercised at a distance from the process of collaborative interaction, whereas hands-on metagovernance tools such as process management, conflict mediation and direct participation in negotiations involves direct interaction with the involved actors. Hence, our expectation is that the exercise of supportive hands-off metagovernance from above (i.e. international, national and or regional government) based on different ways of prompting and scaffolding collaborative interaction will help to set the agenda for local actors, stimulate collaborative interaction and lower the transaction costs of collaborating; and that the exercise of dedicated hands-on metagovernance based on facilitative leadership will help to build trust, resolve conflicts, foster deliberation and drive the collaborative process to successful conclusion. Collaborative governance in networks and partnerships is a relatively self-organized process that enables the involved actors to set their own agenda, define their own goals, create the own ground rules for interaction, etc. It is therefore important to avoid that the combination of hands-off and hands-on metagovernance lead to over-steering whereby the collaborative governance arena is subjected to a heavy-handed metagovernance bordering on command and control that drastically reduces the scope for self-governance and tends for that either pacify them, scarce them off or generate a fierce opposition. Based on these initial reflections, this article aims to address the following research question: What combinations of 'collaborative project ambitions', 'supportive metagovernance from above', 'dedicated local leadership', and 'efforts to prevent oversteering' lead to success in collaborative green transition projects?

This research question is answered based on a Qualitative Comparative Analysis (QCA) of 22 local cases of the collaborative governance of green transitions aiming to promote a low-carbon, zero-waste circular economy based on recycling, regenerative agriculture, zero-emission transport, carbon storage and sustainable energy production. The cases have been studied using mixed methods as part of an EU Horizon Interreg project. In order to learn from the 'best in class', the cases are drawn from northwestern European countries, such as Denmark, Norway, Sweden, and the Netherlands, all of which have lengthy traditions for corporatism and collaborative. The concurrence of strong, modern states and well-organized civil societies has cultivated a collaborative political culture in northwestern Europe wherein problems are solved through networking, and public agencies are well trained in metagoverning collaborative governance arenas. The countries we are focusing on also have ambitious

climate goals and environmental policies and thus tend to see themselves climate policy frontrunners (Hoff 2017). Economic affluence, strong popular support and a consensus-based polity combine to explain the predominance of an ecological modernization discourse in Scandinavia and the Netherlands.

While the study of purposefully selected most-likely cases makes it impossible to generalize the results to a larger population of cases (Seawright and Gerring 2008), our study may identify pathways to the green transition that may inspire local public managers in countries with less favourable conditions for collaborative governance of the green transition. Indeed, contextual translation work may help local public managers in other countries to learn from our identification of alternative paths to the successful collaborative governance of the transition to a green circular economy.

The article is structured as follows. The theory section defines collaborative governance, explains why it may spur the green transition, and further justifies our conjectures concerning the drivers of collaborative governance for the green transition. The methods section accounts for the data collection and briefly explains the principle and procedure of fuzzy-set qualitative comparative analysis (fsQCA). The findings section reports the empirical results of the fsQCA, and the discussion section interprets the results on the basis of a review of the empirical cases and engages in lesson drawing. The conclusion summarizes the argument and results and sets out an agenda for further research.

Theorizing collaborative governance of the green shift

The study of the formal institutions of government has gradually given way to the study of formal and informal governance processes through which common objectives are formulated and achieved (Gjaltema, Biesbroek, and Termeer 2020; Lefèvre 1998; Torfing et al. 2012). It is implicit to the new and expanding governance research that there are different forms of governance. Hence, governance can be delivered by centralized hierarchies, competitive markets, or collaborative networks and partnerships (Howlett and Ramesh 2014). While hierarchies are the obvious choice when making authoritative decisions affecting people's welfare and liberty and markets can be effective when aiming to produce standardized public services, collaborative governance tends to be preferred when it comes to fostering innovative solutions to complex problems (Roberts 2000; Torfing 2016), including the environmental problems that lie behind the green SDGs (van Bueren, Klijn, and Koppenjan 2003). As we shall see, however, the state remains an important convener and orchestrator of collaborative governance in networks and partnerships (Hysing 2009) and competition between collaborative networks may sometimes strengthen their performance (Powell and Grodal 2006). Hence, the different modes of governance may be fruitfully combined.

Collaborative governance is defined as 'the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished' (Emerson, Nabatchi, and Balogh 2012, 2). It owes its ability to solve wicked problems to its involvement and alignment of a diverse group of relevant and affected actors who engage in creative problem-solving (Bryson, Cunningham, and Lokkesmoe 2002). As such, collaborative governance thrives on inclusion, although there is always a limit to how many actors can be involved as the complexity of decision-making and costs of communication tend to grow beyond what is manageable.

Public and private actors are attracted and motivated to collaboration because they recognize their mutual dependency on the knowledge, ideas and resources of the other actors vis-à-vis common problems, challenges and goal (Klijn and Koppenjan 2015). The actors engaged in collaborative governance aim to manage their differences constructively and to foster agreement about the definition of problems, common goals, and tentative solutions (Gray 1989). The collaborative interaction takes place within a relatively self-regulated institutional framework that the participating actors form and revise in the shadow of hierarchy (Scharpf 1994). While the institutional framework helps to structure and stabilize the interaction between the actors, the presence of a diversity of views, opinions, and perspectives may facilitate cross-fertilization of ideas and stimulate mutual learning, thus eventually fostering innovative solutions that break with common wisdom and established practices in a particular context (Bommert 2010). At the same time, the engagement and alignment of the actors in collaborative arenas tends to develop a sense of broad-based ownership over the new and bold solutions that enable their implementation (Torfing 2016).

Collaborative governance may not only help to solve wicked problems but can also help to mobilize societal resources in a resource-strapped public sector, enhance coordination and deepen democracy (Fung and Wright 2003). The downside is that collaborative governance arenas may suffer from a selective participation bias, encounter problems with securing the implementation of joint solutions, and have difficulties with holding the participants to account for governance failures (Sørensen and Torfing 2021). The co-existence of problems and benefits has fostered growing interest among researchers and practitioners in identifying the conditions allowing local actors to reap the fruits of collaborative innovation while mitigating the potential problems. Based on a combination of theoretical knowledge and empirical, case-related observations, we shall here present four conjunctural expectations (conjectures) about how key factors may enable collaborative governance arenas to solve complex environmental problems and thus contribute to the green transition (see Bazzan, Álamos-Concha, and Rihoux 2022).

Our first conjecture is that the successful co-creation of green solutions depends on the project's collaborative ambition,² which vary from cooperative knowledge sharing, via coordination of distributed activities, to collaborative problemsolving (Keast and Mandell 2007, 2014). The project ambition may be stated in a written mandate or remit, discussed when the collaboration was formed, and/or clarified, adjusted and reinforced in subsequent meetings. Some collaborative projects are formed around the modest ambition of sharing knowledge about what the different participants are doing or thinking about a particular problem or challenge (Tsai 2009). Knowledge sharing is useful, as it helps each of the participants to better understand and manoeuvre within the local ecosystem of actors. Knowledge sharing may also inspire the individual actors to develop new ideas and act in new ways (Nissen, Evald, and Clarke 2014). Actors engaged in collaboration may also up their game and aspire to coordinate their activities to avoid gaps and overlaps, prevent conflicts, and create synergies. Pluricentric coordination is important because it enhances the collective effectiveness of the manifold efforts of the actors who may realize the importance of not stepping on each other's toes and supporting each other's actions (Pedersen, Sehested, and Sørensen 2011; Scharpf 1994). For collaborative arenas to co-create innovative

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solutions to environmental problems, they must go beyond knowledge sharing and the coordination of distributed activities. They must identify a common problem and work together to design, test, and implement a joint solution. While not all collaborative endeavours aspire to produce an innovative solution, the emergence of collaborative innovation is contingent upon a shared ambition to solve a common problem that may prompt the development and implementation of new and creative solutions. Hence, we expect projects that are successful in co-creating green solutions to have a shared problem-solving ambition that drives the project and spurs the development of more or less innovative solutions.

The second conjecture is that the hands-off metagovernance through framing provided by the storytelling and goal-setting inherent to the UN SDGs, the Paris Agreement, and national and regional policies and local action plans and by the provision of platforms, expert knowledge and special purpose funding, may help to prompt and support local collaboration aiming to spur the green transition (Fischer and Schläpfer 2017; Hofstad et al. 2022). The impact of global and national storytelling and goal-setting depends on the ability to communicate the goals and storylines in manner that speaks to difference audiences and on the construction of a sense of urgency pertaining to problems and solutions. It also depends on the efforts of regional and local actors to translate the global and national goals by means of connecting them to local problems and opportunities (Ansell, Sørensen, and Torfing 2022). Goalssetting and the narratives in which they are imbedded may be complemented by enabling policies, institutional platforms and funding schemes that further motivate local actors to engage in collaboration. Hands-off metagovernance helps to set the agenda for local public and private actors in multilevel governance systems, lower the transaction costs of participating and legitimize local interaction. For example, by deliberately framing their local circular economy projects as an effort to achieve global and national goals and policies, local actors may receive government recognition and gain access to special-purpose funding.

The third conjecture is that hands-on metagovernance through facilitative leadership exercised by local entrepreneurs is required to convene and motivate actors, spur trust-based collaboration, and drive the collaborative problem-solving processes forward (Sørensen and Torfing 2009). While the mere presence of local leaders assuming responsibility for network management is decisive (Klijn, Steijn, and Edelenbos 2010), the way that network management is organized is of utmost importance. Provan and Kenis (2008) distinguish between three forms of organization of network management: 1) shared management that involves all participants in management decisions through plenary meetings; 2) lead organization management, where a charismatic, entrepreneurial, and resourceful organization assumes responsibility for network management; and 3) the formation of a Network Administrative Organization (NAO), which we interpret here as the formation of a core group consisting of the central actors in the network that is serviced by an administrative secretary who may not be part of the network but assists the core management group in its effort to orchestrate the collaborative process. While shared management has a democratic quality by involving all participants in joint discussions and helps to ensure that all voices are heard, it is a slow, time-consuming management model that fails to provide sufficient agility. The lead organization provides a more agile leadership but may also pursue its own agenda, thereby creating conflicts and reducing legitimacy. In addition, it is vulnerable to the impact of personal contingencies. Finally, the core group NAO model seems to combine effectiveness and legitimacy, as the key actors are involved in making agile management decisions that enjoy broad-based support (Cristofoli, Markovic, and Meneguzzo 2014). Hence, we expect the presence of this management model that engages several actors in the exercise of facilitative leadership to contribute to successful collaboration spurring the green transition.

Our *final conjecture* is that the combined impact of hands-off and hands-on metagovernance may lead to oversteering, which narrows the scope for self-governance and therefore risks demotivating the participants in collaborative governance (Sørensen and Torfing 2009). Hence, successful collaboration leading to the co-creation of green solutions depends on the efforts of local network managers to prevent oversteering; for example, by creating room for self-regulated activities in subgroups, by distributing leadership tasks to a broad range of actors, and by refraining from imposing decisions on the participants and instead involving them in an open search for joint solutions.

Our four conjectures describe how different factors may help to support local cocreation of circular economy initiatives amounting to a green transition. This raises the question of how to assess the green impact of local networks and partnerships. Much can be said about this (Emerson and Nabatchi 2015b; Rogers and Weber 2010), but in line with the literature on formative and summative evaluation (Wholey 1996), we have here settled for assessing whether planned activities (outputs) and selfdetermined goals (outcomes) have been achieved. Knowing how difficult it is to assess broader future impact of collaborative governance, we abstain from any such assessment.

While we are relatively certain that the abovementioned factors may help to drive collaborative governance processes to a successful conclusion, we are uncertain as to how they interact and combine to support the co-creation of impactful, green solutions. To explore the different configurations supporting successful outputs and outcomes of collaborative governance, we shall take a closer look at empirical cases of the collaborative governance of green transitions.

Methodological issues

Before reporting the findings from our explorative empirical study aimed at identifying different pathways to co-created green transitions, we shall briefly account for our case selection, data collection, and data analysis.

Case selection

As mentioned above, we sampled local cases of the co-creation of green solutions from northwestern European countries with strong traditions for collaborative governance and ambitious environmental policies and climate goals: Denmark, Norway, Sweden, and the Netherlands. Based on a combination of desktop studies canvassing municipal websites and tips from expert researchers and practitioners in the different countries, the local cases of co-created green transition were purposively selected from a list of projects based on four criteria: first, the projects should be contemporary to allow data collection based on interviews; second, the projects had to include a range of public and private actors; third, the purpose should be to contribute to the green

Country	Number of cases			
Denmark	5			
Norway	6			
Sweden	7			
The Netherlands	4			

 Table 1. Distribution of cases on countries.

transition; and fourth, there should be mention of circular economy in the project descriptions. Lastly, coherent with the QCA requirements, cases were selected in ways that allowed for variation in the conditions and outcomes. Hence, although the cases that came into view and were selected had drawn considerable public attention, we had no prior knowledge about the outcomes and supporting factors.

The selected cases focus in part on climate change or recycling that are key concerns in many big cities and in part on regenerative agriculture or green tourism that are key concerns in many rural areas (for a full list of the local cases of co-creation for the green transition see Table A1 in Appendices). Cross-case comparability is ensured by the fact that all the selected cases explicitly aim to foster green solutions. Moreover, the cases focusing on green tourism, regenerative agriculture or recycling also had a focus on climate change mitigation through the promotion of green transport of tourists, alterative manure management or reduced resource consumption. The distribution of the 22 cases on countries is shown in Table 1.

Data collection

Data was collected through a combination of a questionnaire filled out by our initial case-contact person, desktop studies of project websites and available documents retrieved online or provided by our case contact, and hour-long interviews with 1-3informants with in-depth knowledge of the project (typically project leaders, facilitators, etc.). The interviews were semi-structured and based on an interview guide with questions covering our main areas of interest. The questions were designed to produce precise knowledge regarding project ambitions, hands-off and hands-on metagovernance, and efforts to avoid over-steering, but the informants were also allowed to tell their story and to raise points they deemed important. Interviews were recorded and partly transcribed. The different types of data then formed the basis for writing case reports. The drafting of the 22 case reports was mainly based on interview transcripts and contained several quotes from the interviews. The questionnaires and retrieved documents provided a secondary data source providing lots of factual information, but the lack of sufficient data richness prevented effective data triangulation with respect to our conditions and the expected outcome. The case reports were coded independently by two researchers, who then compared their codes. When different codes were attributed to the same condition, the researchers engaged in a discussion of the reasons for their choice with the aim to arrive at a shared decision. The coding procedure resulted in the construction of a matrix where, for each case, the main variables were measured and assigned values in accordance with the rules for calibration presented below (Table A2 in the Appendices shows the raw data table with the codes attributed to all cases for all conditions and the outcome).

Data analysis

To analyse the data set, we use Qualitative Comparative Analysis (QCA) (Ragin 2000, 2009; Schneider and Wagemann 2012). QCA is a set-theoretic method that uses Boolean algebra to identify the necessary and sufficient conditions (or combinations of conditions) for the expected outcome. A condition is necessary when, each time the outcome occurs, the condition is also present, and it is sufficient when, each time the condition occurs, the outcome is also present. QCA assumes that the world is causally complex, as conditions do not produce an independent, direct effect on a particular outcome, tending instead to combine in different and sometimes unexpected ways. In short, an outcome is typically the result of the combination of several conditions (the principle of conjunctural causation). Additionally, conditions can combine in multiple ways and create different paths simultaneously leading to the same outcome (the principle of equifinality). In this perspective, QCA is the best approach for the purposes of our study, which seeks to identify the alternative constellations of factors (i.e. 'collaborative project ambitions', 'supportive metagovernance from above', 'dedicated local leadership', and 'efforts to prevent oversteering') leading to success in collaborative green transition projects.

We opted for fuzzy-set QCA (fsQCA, Ragin 2009) to conduct the analysis of the cases of co-created green transition. FsQCA draws on fuzzy-set theory to address those empirical cases that have a partial membership in a particular set of conditions and their ensuing result. Fuzzy sets allow researchers to calibrate the partial membership of cases in sets using values in the interval between 0 (non-membership) and 1 (full membership) without abandoning core set theoretic principles. In this manner, fuzzy-set QCA permits the scaling of membership scores and thus allows partial membership.

Operationalization and calibration

The input for the fuzzy-set QCA is provided through calibration that refers to the process of assigning membership scores to cases based on theoretical knowledge and/ or empirical data. The calibration of the main conditions and the expected outcome shown below is primarily theoretical, although, in some cases, we also take some inspiration from the data.

Collaborative project ambitions (CAMB)

The project ambition is related to the main aim of the network; or, better, to the fact that the network is established to either cooperate, coordinate, or collaborate (the 3Cs discussed by Keast and Mandell 2007). Cooperative networks are established simply to exchange information or expertise in order to facilitate strategic and operational manoevering of the participating actors, coordinative networks aim to align distributed activities in order to improve the joint performance, and collaborative networks take advantage of the partner interdependences to generate new common solutions that single actors cannot produce alone. On this basis, we measured project ambition using an ordered categorical variable ranging from cooperation, via coordination, to collaboration. It was calibrated as (0) if the network ambition is to cooperate, (0.51)

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when it is to coordinate partners' activity, and (1) when the network aspires to collaborate to find joint solutions. The scoring was based on official sources and the interviews that we conducted that were summarized in case reports. In case a network had more than one ambition, we gave the network the highest possible score. Hence, the score would be (1) if it not only aspired to exchange knowledge and coordinate activities, but also engaged in collaborative problemsolving.

Supportive metagovernance from above (METAGOV)

the strength of supportive metagovernance from above aiming to set agendas through storytelling, define political goals, create collaborative platforms and provide special purpose funding was measured by counting the number of institutional levels of governance offering a supportive framework for the project. Some of the circular economy networks were merely supported by local or regional goals, ambitions and funding while others received additional support from national ministries and research institutions. In addition, some networks were financed by the European Union's Horizon 2020 programme and/or took inspiration from the UN SDGs or the Paris Agreement. To capture this variation in supportive metagovernance from above, an ordered categorical variable was thus built and calibrated, taking value equal to (0) in the absence of any form of metagovernance from above, (0.33) when metagovernance comes from the local and/or regional level, (0.67) when the national level is also involved, and (1) when different forms of supportive metagovernance comes from supranational, national, regional, and local levels together.

Dedicated local leadership (DEDLEAD)

local leadership is 'dedicated' when there is an organization within the network that is entrusted with the responsibility to lead the network and is seen to carry out this responsibility to facilitate collaborative interaction and drive the process forward (Provan and Kenis 2008). As discussed above, some ways of organizing the local leadership in networks tend to foster a higher degree of agility and legitimacy and can thus be seen as more effective. Hence, building on Provan and Kenis (2008), and Patrick et al. (2019), we created an ordered categorical variable, ranging from the situation in which leadership is shared among all the network partners to the situation where there is a Network Administrative Organization (NAO) or a core group of actors dedicated to lead the network. On this basis, the condition was calibrated: (0) when leadership is shared and when there is no particular actor responsible for facilitating collaboration and getting results; (0.51) when there is a lead organization in the sense of a network partner who, in addition to performing its own activity within the network, also takes leadership responsibility by aiming to facilitate trust-based collaboration and catalyze creative problemsolving; and (1) when a NAO or coregroup of actors is established for the network leadership, thus involving several key actors take joint responsibility for facilitating collaborative problemsolving and dedicate staff and resources to servicing the network. If a local network made use of more than one governance model, we calibrated it based on its 'highest' category.

Efforts to prevent oversteering (EFFOVER)

to measure the efforts to prevent oversteering, we built a dummy variable taking value equal to (1) when efforts are present and (0) when absent. Consequently, the condition is calibrated as 'in' (1) or 'out' (0). Inspired by the cases, we scored cases (1) if avoiding oversteering was an explicit concern of the network leaders and one or more of the following practices were observed: managing based on knowledge and assessment of when to step back and listen rather than push forward, orchestrating decentralized decisionmaking in subgroups, reliance of joint agreements and procedures, involving of all partners in debates about key decisions, only developing new projects where the energy and resources are, perceiving the participants as the centre of the project, and understanding that the leadership role is that of a playmaker rather than a controlling authority.

Outcome (OUT)

success in collaborative green transition projects was measured by considering the project outcomes. According to our data, some projects produced no results in terms of outputs that help to promote the development of a circular economy by creating new procedures, business models or strategies for sustainable resource consumption, while others produced some results in terms of promising activities and governance structures, and a third group of projects not only produced significant results but also had clear impacts in terms of furthering the green transition by mitigating the use of resources and the emission of greenhouse gases. To illustrate, one case realized that with the present network structure and leadership, it would not be able to achieve its own ambitions. Another case managed to create a viable infrastructure for recycling, but its green impact was limited. A third case has won a prestigious sustainability prize for its contribution to green transition and well-documented emission reduction. Based on the presence of such empirical differences in the production of outputs and outcomes, we calibrated cases as fully-out (0) in cases where no output were produced, (0.51) when some relevant outputs were generated, and as fully-in (1) when the results impacted the entire community in ways that enabled a green transition.

Empirical findings

We used fsQCA as the software for the analysis.³ The first step in a QCA requires an analysis of necessity so as to ascertain whether any of the conditions (or their absence)

Table 2. Analysis of necessity.					
	Consistency	Coverage			
Camb	.796030	.745991			
~camb	.371663	.847114			
Metagov	.642710	.741121			
~metagov	.492813	.771704			
Dedlead	.898015	.726467			
~dedlead	.236140	.875635			
Effover	.791923	.771333			
~effover	.208077	.434286			

The tilde sign (~) stands for the negation (or absence) of the condition.

are necessary for the outcome to occur. A condition is necessary whenever it displays a consistency score higher than 0.9. As shown in Table 2, no condition, in its presence or absence, presents consistency scores higher than 0.9. This means that none of our four conditions (project ambitions, supportive metagovernance, dedicated local leadership, and efforts to prevent oversteering) is necessary to reach the green transitionrelated project outcome. It is nonetheless worth noting that one of the conditions (dedlead) shows a consistency score (0.898) that is very close to 0.9. We have therefore computed the RoN parameter (Relevance of Necessity), which is equal to 0.444 for this condition, that is low enough to conclude that the condition is not likely to be necessary.

The ensuing step involves conducting an analysis of sufficiency so as to identify the conditions or combinations of conditions (in QCA termed 'configurations') that are sufficient for the outcome to occur. A condition (or combination of conditions) is sufficient when, each time it is present, the outcome also occurs. The analysis of sufficiency relies on a minimization process that generates a simpler equation for the conditions, or combinations of conditions, leading to the desired outcome: the so-called 'minimal formula' (Rihoux and Ragin 2009).

Construction of the truth table displayed in Table 3 is the first step in establishing the minimal formula (Ragin 2000, 2008). The truth table displays all logically possible causal combinations of the four conditions and assigns the empirical cases to one of these combinations. At this point, a frequency and consistency threshold must be established to conduct the analysis. The frequency threshold corresponds to the minimum number of cases that must be observed for each configuration in order for that configuration to be considered relevant for the purposes of the sufficiency analysis. As is customary with small-medium samples, we set the frequency threshold to 1 (Ragin 2008). The consistency threshold describes the proportion of cases displaying any particular configuration leading to the expected outcome. Ragin (2008) recommends that it is set to at least 0.75. We adopted a consistency threshold equal to 0.84, since this corresponds to a drop in the consistency scores that is visible in our data.

The Truth Table displays four combinations of conditions (rows 1–4) leading to a positive outcome. The first three rows feature a perfect raw consistency equal to 1. The fourth row, however, shows a raw consistency lower than 1 and a PRI score that is quite distant from the raw consistency score, which may reflect the presence of contradictions. In other words, it is possible that in some of the cases displaying the same combination of factors displayed in row 4, the outcome is not present to different degrees. To address this issue before performing the minimization process, an xy plot

Table 3	3. T	ruth	table.
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CAMB	METAGOV	DEDLEAD	EFFOVER	CASES	OUT	Raw consistency	PRI consistency
0	0	1	1	Р	1	1.000000	1.000000
1	1	0	1	1	1	1.000000	1.000000
1	0	1	1	C, E, H, L, Q, U	1	1.000000	1.000000
1	1	1	1	A, B, D, G, J, K, T	1	.84168	.758621
1	0	1	0	N,V	0	.696429	.037736
0	1	1	0	S	0	.671141	.039216
1	1	1	0	F, M, O, R	0	.555224	.269608

Legend: CAMB = Collaborative project ambitions; METAGOV = Supportive metagovernance from above; DEDLEAD = Dedicated local leadership; and EFFOVER = Efforts to prevent oversteering.

	Path 1	Path 2
САМВ		•
METAGOV	0	•
DEDLEAD	•	
EFFOVER	•	•
Frequency cut-off: 1		
Consistency cut-off: .841680		
Raw coverage	.390144	.425051
Unique coverage	.209446	.244353
Consistency	.920840	.863699
Cases with greater than 0.5 membership in term	L, P, C, E, H, Q, U	G, I, J, A, B, D, K, T
Solution coverage: .634497		
Solution consistency: .863129		

Tab	le 4	I . 1	Γwo	paths	leading	to	success in	colla	borative	green	transition	pro	ects.

Legend: CAMB = Collaborative project ambitions; METAGOV = Supportive metagovernance from above; DEDLEAD = Dedicated local leadership; and EFFOVER = Efforts to prevent oversteering.

was built for this row, which showed that there are no true logical contradictions. The row was then included in the minimization process to obtain the minimal formula.

Once we had ascertained that all the rows could be included in the analysis, we proceeded to the next step, i.e. the minimization process. The minimization process generated three possible solutions: (i) a 'complex' solution that avoids using any counterfactual cases (rows without cases, or logical remainders, i.e. configurations that are not empirically observed); (ii) a 'parsimonious' solution, which permits the use of any remainder that will yield simpler (or fewer) recipes; and (iii) an 'intermediate solution', which only uses the remainders that survive counterfactual analysis based on theoretical and substantive knowledge (which is input by the user). We opted for the complex solution. Despite some recent criticism, the advantage of this solution is that the researcher can refrain from making assumptions about any logical remainders and is exclusively guided by the empirical information at hand (Ragin 2009; Schneider and Wagemann 2012).

The complex solution is expressed by the following minimal formula (Rihoux and Ragin 2009)⁴:

 \sim METAGOV * DEDLEAD * EFFOVER + METAGOV * CAMB * EFFOVER = > OUT

The * sign indicates the logical operator 'and'; the + sign indicates the operator 'or'; and the tilde sign (\sim) is used to indicate the negation or absence of a condition. The notation => denotes the logical implication operator.

The interpretation of the minimal formula is that there are two paths leading to success in collaborative green transition projects (see Table 4 below). The overall solution coverage is 0.634497, showing that 63% of the successful collaborative green transition cases are explained by the two paths, and the solution consistency is 0.863129, indicating that 86% of the empirical data presenting the two configurations is oriented to producing both output and impact (or expected impact) from a green transition perspective. Both configurations have a good raw coverage, higher than 0.25, and a good consistency (see Schneider and Wagemann 2013).

The *first path* displays absent or weak metagovernance from above combined with a dedicated network leadership that assumes the form of a NAO with a core-group of actors and the presence of efforts to prevent the oversteering of the collaborative

process. The ambition of the project in this configuration is not relevant to attain the desired outcome. This path characterizes cases where hands-off metagovernance from above is weak or absent, possibly confined to local-level political support. The project then develops without a strong multi-level framing of its endeavours but with the support and direction of a dedicated local leadership in the form of a NAO or a core group of project partners. The presence of efforts to prevent oversteering reflects a determination among the core group of project partners to involve all project participants in designing and implementing joint solutions; for example, by the emphasis on active listening, the distribution of tasks, a selective activation of marginal actors, and/or the use of plenary and sub-groups meetings.

This first configuration is exemplified by case E (Project Zero), a collaborative network hub in a Danish city aimed at improving energy efficiency and converting fossil energy sources into renewable energy sources. Its mission is not only to share knowledge and coordinate activities among local actors and across all sectors, but also to contribute to the innovation of new products and solutions in the private and public sectors. Originally created by a think tank, the collaborative project is now embodied by a public-private partnership funded by the municipality and supported by a secretariat run by an independent foundation financed by a group of private firms. As far as hands-off metagovernance is concerned, the national government has issued ambitious climate mitigation goals, but they first came after the initiation of the project. Hence, the local framing that seeks to align climate mitigation with economic development goals for a peripheral region has played a more important role. Within this mostly locally supportive environment operates a dedicated project secretariat that takes important day-to-day decisions, while the overall targets are set by the City Council in collaboration with the secretariat and with inputs from participants. Following the acknowledgement that decisions should be owned by network participants, the NAO seeks to be inclusive and provide ample space for dialogue. The secretariat staff works to avoid oversteering to ensure that the participants are perceived to be at the centre of the project, which requires balancing and a clear sense of ethics and good governance together with a sense of mutual respect that will not frighten anyone away from the project. Of central importance to avoiding understeering has also been the effort to obtain results from the emissions-reducing activities faster than the expected two years. Quick wins have helped to avoid conflicts and to encourage continued collaboration.

The *second path* displays the presence of a project ambition regarding collaboration and joint problem-solving combined with supportive metagovernance from above, mostly at multiple levels (supranational, national, regional, and local), and the presence of dedicated efforts to prevent oversteering. The presence (or absence) of a dedicated leadership is not relevant to reach the outcome in this configuration. This path is featured by cases where hands-off metagovernance is present and extends to multiple and perhaps even all levels, from the supranational to the local. Such a strong, multilevel political framing is likely to support and enhance the ambition of the local projects so that they go beyond knowledge sharing and coordination and towards collaboration and the joint production of solutions. We also see efforts to prevent oversteering, which most likely reflect an interest in protecting collaboration processes from influences that are either external (e.g. political pressures arising at different levels) or internal (e.g. from one or more partners wishing to steer the collaboration in a certain direction).

This second configuration is exemplified by case D (Go Green Aarhus), a multipronged climate transition programme with an energy sub-programme aiming for CO₂-neutrality by 2030. Since 90% of the emissions come from sources outside the control of the City Council, the role of the municipality in achieving this transition is largely to help companies and citizens to act. The energy sub-programme is both aiming for increased sustainable energy production and for smart solutions reducing energy use and capturing and storing carbon. The municipal Technical and Environment Department (TED) was the initiator of the programme, which the City Council now champions. A joint stock utility company leads and sponsors the energy sub-programme, while TED has the overall programme management responsibility. The interaction in the sub-programmes is based on the development of agreements among participants aimed at integrating cross-sector system development. As far as metagovernance is concerned, the City Council has played a defining role in framing the network by setting the overarching goal of reaching climate neutrality for the town as a society (not just the municipality as an organization). On the other hand, CO_2 neutrality in 2030' is basically the national government climate goals that are translated to the local level by the City Council. As such, the case features a strong political framing that transcends the local level. Still, the City Council is aware of the risks of oversteering and consciously tries to avoid them: It perceives itself as a metagovernor and playmaker facilitating interaction rather than as a directive and controlling authority, without giving up the virtues of strategic management when needed.

Discussion of findings

An interesting result relates to the importance of metagovernance in our solution, as it plays two opposing roles in the two configurations. Where metagovernance from above is absent, weak, or confined to the local level without a supportive framing from higher levels of governance, dedicated local leadership is important for a successful outcome regardless of the project ambitions (configuration 1). Where metagovernance from above is strong and possibly extending to several levels (configuration 2), a dedicated local leadership is irrelevant for success if the partners aspire to solve common problems through collaboration. Here, the ambition is to work closely together to produce joint results (and therefore not merely to share knowledge or to coordinate distributed action) within a framework that prompts and supports local action and provides clear direction for the collaboration.

If our second conjecture was that the ambition to solve common problems jointly is key for successful green transitions, configuration 1 suggests that success may be reached irrespective of that ambition if – lacking a strong metagovernance from above – a dedicated local leadership and efforts to prevent oversteering are present. Here, the local leadership plays a crucial role in getting the participating actors to engage in joint problem-solving, thereby possibly compensating for the absent or weak, hands-off metagovernance. At the same time, the use of tools to prevent oversteering prevents the local leadership from being too dominant and shrinking the space for effective and inclusive dialogue.

As for our conjectures regarding hands-off and hands-on metagovernance, our results suggest that success may indeed occur despite limited, hands-off metagovernance from above if combined with strong, hands-on metagovernance in the form of a dedicated local leadership. Conversely, when hands-off metagovernance is strong

and possibly multi-level, such dedicated leadership may or may not be present but is irrelevant for success when the partners are committed to a joint search for collaborative solutions. A possible theoretical interpretation of this finding is that local collaboration does not arise spontaneously, not even when actors are set on joint problemsolving, but must be prompted and catalyzed either by international, national or regional goals, narratives and funding opportunities or by dedicated local leaders (Morse 2010).

Our final conjecture relates to the importance of mechanisms to prevent oversteering: whereas the analysis does not show this condition to be necessary, it is indeed present in both our configurations leading to success. Conversely, its presence in two different configurations shows how the same condition may play different roles depending on how it combines with the other conditions (i.e. safeguard the autonomy of the collaboration from internal and/or external influences). This result coheres with other research stressing the need to maintain the integrity of collaborative arenas for the green transition (Meuleman 2018).

Our analysis therefore once again reaffirms the importance of a configurational approach to the study of the possible determinants of successful co-creation of green transitions (see also Fischer and Schläpfer 2017). While we might reasonably expect that certain factors individually affect collaboration processes in a certain way, their combination and interaction may produce unexpected results and uncover (hidden) dynamics that can be leveraged to promote collaboration for the green transition. The principle of equifinality, positing that different combinations of conditions may lead to the same outcome (Ragin 1987) points to the fact that multiple paths to the same outcome may exist. On the other hand, it should be stressed that the configurations identified here are not exhaustive – as they are based on the data gathered for this study – and that other paths to success may exist.

Our findings send an important message to public sector practitioners aiming to use collaboration in networks and partnerships as a lever for the green transition. In both of the identified paths to success in collaborative green transition projects, there have been efforts to prevent the oversteering of the collaborative arena. However, surrendering the control over process and outcome is a tall order for public managers who tend to be steeped in a combination of bureaucratic thinking focused on compliance based on command and control (Du Gay 2005) and New Public Management ideas about managerial direction based on sticks, carrots, and sermons (Bemelmans-Videc, Rist, and Vedung 2011). Hence, public managers acting as metagovernors of collaborative arenas should either govern at a distance by means of political, discursive and economic framing or seek to transform their hands-on leadership practice and embrace the crucial new insight that 'the real power of leadership is not the power of one over others, but the power of the collective; the power leaders build with others in a joint effort' (Adams et al. 2017, 7). Hence, network managers should be good at facilitative leadership (Greasley and Stoker 2008; Mouritzen and Svara 2002; Schwarz 2003; Stamevski, Stankovska, and Stamevska 2018) aimed at convening actors, building relational trust, asking powerful questions, and encouraging the actors to leverage their ideas and resources in joint problem-solving processes while mediating emerging conflicts. The challenge for public managers is to generate emergent collaboration, learning and innovation while at the same time aligning the local co-creation of green solutions with the goals and strategies of their political principals (see Koppenjan, Kars, and van der Voort 2009).

Our findings also bring hope to public managers and local entrepreneurs in countries where 'hands-off from above metagovernance' is weak or absent. Whereas in most European countries, local actors are prompted by a mixture of international, supranational organizations as well as national and regional governments to form collaborative partnerships spurring the green transition, this is not the case in all parts of the world. In the United States, the Trump administration withdrew its commitment to the Paris Agreement and opposed efforts to mitigate climate change, be they in the United States or internationally sponsored by the UN or the World Bank (Jotzo, Depledge, and Winkler 2018). It also rolled back much of the previous environmental regulations (MacNeil and Paterson 2020). While a few US states and cities has aimed to offset Trumps' rejection of environmental and climate policy in the US (Alexander 2020), the overall result is that attempts to foster local collaboration for the green transition find little or no support in federal policies and cannot use the UN SDGs as a lever for action. In the Global South, there has been a similar lack of supportive framing of local green partnerships in countries where the state is either weak or failing, regardless of how international development organizations may set a green agenda. The lack of hands-off metagovernance from above should not lead to despair, however, as a path remains to successful local collaboration on green transition that can be achieved by relying on a combination of a dedicated local leadership delivered by a core group of committed actors together with efforts to avoid oversteering. To illustrate, the Marin Carbon Project in California was formed by local ranchers, agricultural consultants, scientists, environmental NGOs, and public actors who facilitated open and inclusive collaboration that developed new agricultural methods to enhance carbon sequestration. There was no mention of the SDGs and hardly any supportive framing from the federal level (marincarbonproject.org).

In countries with a supportive government framing of local green partnerships, there is no need for dedicated local leadership as long as the local actors are committed to collaborative problem-solving and efforts are made to prevent either local political or economic actors from dominating the collaborative arena. What we need to understand better here is how the national and supranational goals and storylines are translated to the local level and help to convene the local actors around a collaborative, green agenda. Creating local arenas prompted by hands-off metagovernance from above may be a routine task for local governments playing the role as midwives. Alternatively, local entrepreneurs from the business sector or civil society may act as conveners and facilitators while abstaining from playing a dominant role. Our findings do not suggest an absence of leadership, but rather that shared leadership may suffice if the mission is defined from above and there is a strong commitment to collaboration.

Our study and results come with a clear set of limitations. We have only studied cases of co-created green transitions in northwestern Europe, and the conditions for success may be different in other parts of the world, thereby potentially limiting the global relevance of our findings, or at least requiring some critical reflections about how the results can be meaningfully translated across different contexts. Moreover, the analysis of the empirical cases is based on snapshots, which prevents us from assessing the long-term impact of the green solutions and makes the success – failure categorization rather uncertain. Longitudinal studies are required to solve this problem. Finally, drawing on a limited number of interviews and a combination of

questionnaires and desktop studies provided limited opportunity for the triangulation of our observations, although crosschecks of factual information were performed.

Conclusion

While there is growing recognition of the need for co-creating green solutions (see Ansell, Sørensen, and Torfing 2022; Elkjær, Horst, and Nyborg 2021; Sillak, Borch, and Sperling 2021) and a new appreciation of the role of institutional design and leadership of collaborative arenas (Hofstad et al. 2021, 2022), we must go beyond the mere listing of factors that are conducive for successful green partnership and identify the different constellations of factors that generate successful outcomes. We cannot expect practitioners to tick off long shopping lists when aiming to create local green partnerships; instead, we should be providing alternative pathways to success, each of which provides a shortlist of factors that must be in place.

Heeding this call, we have used QCA to analyse a medium-size number of cases from four different countries and discovered two alternative configurations of factors that tend to result in the successful local co-creation of green solutions. The first path emphasizes the combined impact of dedicated local leadership and efforts to avoid oversteering in the absence of hands-off metagovernance from above. The second path reveals that dedicated local leadership is irrelevant if there is a strong supportive framing of the local partnership from higher levels of governance, a group of participating actors committed to collaborative problem-solving, and efforts to avoid oversteering. Hence, while oversteering seems to be poison for collaborative efforts to foster new green solutions, the goal can be achieved through different combinations of hands-off and hands-on metagovernance.

The highly useful results convince us that the configurational approach to the study of the conditions for the collaborative governance of the green transition has a great future. Future research should include more governance factors in the configurational analysis, and that requires more empirical cases. Ideally, the cases should come from all parts of the world, thus allowing us to explore regime differences. Here, the UN SDGs are of great importance, since they provide a unified global framework for the comparative analysis of the green transition. The SDGs and associated targets and indicators are exactly the same all over the world, as is the built-in recipe for how to achieve the goals through collaborative networks and partnerships. It goes without saying that a uniform research design and a system for quality assurance will be a sine qua non for a global comparative study using QCA to identify different pathways to the much-needed green transition. A global research programme will be needed and may sponsor regime-sensitive theory development as well as comparative case studies. The effort and resources required to create such a programme will be enormous, and the risk of failure is considerable; if successful, however, it will demonstrate the value and potential, albeit modest, impact of public administration research.

Notes

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- 2. To avoid misunderstandings, we shall like to emphasize that we are only concerned with the project's collaborative ambition and not with its ultimate goal that may be to advance the use renewable energy, reduced green house gas emissions or promote recycling.
- 3. Ragin, C. and S. Davey. 2014. Fs/QCA (Computer Programme), Version (2.5/3.0). Irvine, CA. University of California.
- 4. In our study, the parsimonious solution is slightly different from the complex solution and generates only one path, whereas the intermediate solution is identical to the complex solution.

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Table A1. List of empirical cases.

Case	Short description	CODE
Destination Bornholm, DK	This collaborative project addresses the need for regional development and enhanced sustainability by developing and marketing green tourism	A
Destination Nord, DK	This collaborative project aims to produce 3.000 new jobs in tourism while contributing to both cultural and ecological sustainability helping local businesses to develop and market sustainable business ideas	В
Gentofte Municipality, DK	This implementation network aims to ensure crosscutting knowledge sharing, mainstreaming and coordination throughout the municipality around climate policy goals	С
Go Green Aarhus, DK	This energy sub-program is both aiming for increasing sustainable energy production and for smart solutions reducing energy use and capturing and storing carbon	D
Project Zero, DK	This governance network aims to solve the climate crisis by transitioning to climate neutrality in Sønderborg while leveraging this transition for long-term local business development and the creation of green jobs	E
Kolumbus, NO	Private firms and researcher work with public sector actors with the specific goal of being able to purchase zero-emission ferries for transport services to the many small coastal islands	F
Mafigold project, NO	This project explores new uses for the nutrients in sludge, both from livestock farming and aquaculture, in order to create a circular economy	G
New Kaupang, NO	This collaborative project aims to boost regional green growth by attracting high-growth industries and innovative low-carbon frontrunner companies to the region	Η
Biogass consortium, NO	This local partnership aims to establish local capacities for biogas production and distribution based on the biomass produced by local livestock farms	Ι
Biogas netværk, NO	Rogaland Biogas Network aims to launch collaborative initiatives that contribute to the green transition and it is based a value chain approach to the promotion of green transitions	J
Klimapartnerskab, NO	This partnership is guided by the vision of achieving climate neutrality by 2030 by means of coupling public and private partners to accelerate green innovation and to create a domino effect throughout supply chains	К
Tourism in Skåne, S	This collaborative project aims to develop green tourism in Skåne, thus combining tourism with the solutions of grand societal challenges such as the climate crisis	L
HUT Skåne, S	To reduce the need for new resources and increase the lifespan of products, this project aims to form a network of purchasing staff that will be better at making such demands in procurement arrangements in order to reduce the carbon footprint	М
RETUNA Eskilstuna, S	The core idea of this collaborative project is to take care of an increasing volume of recycled products from a new recycling park and distribute it to 14 stores in a mall that sell the recycled goods	Ν
VERAPARK Helsingborg, S	This partnership aims to create a waste management system that benefits financially from reducing the amount of waste through recycling rather than from accumulating growing amounts of waste	0
Återbyggnadsdepå, S	To recycle both materials and people, the project supports the creation of innovative solutions and knowledge sharing in the promotion of green transition	Р
Halvin Halmstad, S	This collaborative project aims to stop throwing away furniture by establishing a municipal warehouse in Halmstad for used furniture that the municipal staff can buy to save money and protect the environment	Q
Reco Lab	This collaborative network aims to develop innovative ways of recycling	R
Acceleration HUB, NL	This hub aims to help companies overcome financial, legal, network and knowledge barriers in their transition to circular economy through knowledge diffusion and collective learning	S

,	,	
Case	Short description	CODE
CIRCLES, NL	This collaborative platform aims to get private businesses to collaborate in promoting circular economy in Eastern Netherlands	Т
IPF, NL	This triple helix project aims to promote coordination and dialogue around renewable energy with a special focus on economy, ecology and biosphere	U
SPARK, NL	To create a circular region, a group of individual entrepreneurs decided to involve educational institutions in order to reach out to young people whose skills they considered to be crucial for reaching this goal	V

Table A1. (Continued).

Table A2. Raw data overview.

COD	CAMB	METAGOV	DEDLEAD	EFFOVER	OUT
A	COLL	NAT	NAO	EFFOVER	IMP
В	COLL	NAT	NAO+LEAD	EFFOVER	IMP
С	CO0	LOC	NAO+LEAD	EFFOVER	IMP
D	CO0	NAT+LOC	NAO+LEAD	EFFOVER	IMP
E	COLL	LOC	NAO+LEAD	EFFOVER	IMP
F	COLL	SUPRANAT	LEAD + NAO	NO EFFOVER	NO OUT
G	COLL	SUPRANAT+REG	NAO	EFFOVER	OUT
Н	CO0	REG	LEAD	EFFOVER	OUT
1	COLL	SUPRANAT+REG	SHAR	EFFOVER	IMP
J	COLL	SUPRANAT+NAT	NAO + LEAD	EFFOVER	OUT
K	CO0	NAT	NAO	EFFOVER	IMP
L	CO0	NO METAGOV FROM ABOVE	LEAD+NAO	EFFOVER	OUT
Μ	COO	NAT	NAO	NO EFFOVER	OUT
Ν	COLL	LOC	LEAD	NO EFFOVER	OUT
0	COLL	SUPRANAT+NAT	LEAD	NO EFFOVER	IMP
Р	COOP	NO METAGOV FROM ABOVE	LEAD + NAO	EFFOVER	IMP
Q	COLL	LOC	LEAD	EFFOVER	OUT
R	COLL	NAT	NAO	NO EFFOVER	OUT
S	COOP	NAT	LEAD+NAO	NO EFFOVER	OUT
Т	CO0	SUPRANAT+REG	NAO	EFFOVER	OUT
U	CO0	NO METAGOV FROM ABOVE	LEAD	EFFOVER	OUT
V	CO0	REG+LOC	LEAD	NO EFFOVER	NO OUT

Legend: COOP = cooperative knowledge sharing; COO = coordination of activities; COLL = collaborative problemsolving; LOC = local metagovernance; REG = regional metagovernance; NAT = national metagovernance; SUPRANAT = supranational metagovernance; SHAR = shared leadership; LEAD = lead actor; NAO = network administrative organization; NO EFFOVER = no effort to avoid over-steering; EFFOVER = effort to avoid oversteering; OUT = output detected: IMP = impact detected.

Note: When instances of different codes' attribution arose, the coders discussed their respective arguments on the basis of existing data. When necessary, a search for additional data was conducted until agreement was reached. In case M, for example, on the basis of such data 'The independent organization and the County Council formally make up a "lead group" with some partners, who exhibit extraordinary interest and engagement', Researcher 1 coded the case as LEAD and Researcher 2 as NAO. As an agreement among the researchers was not reached on the bases of the available data, we went to the case M website and looked for additional material about the governance structure. At the end, thanks to supplementary data, both the researchers agreed on the existence of a NAO.

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	Path 1	Path 2
CAMB		•
METAGOV	0	•
DEDLEAD	•	0
EFFOVER	•	•
Frequency cut-off: 1 Consistency cut-off: 1		
Raw coverage	.390144	.113621
Unique coverage	.344969	.068446
Consistency	.920840	1.000000
Cases with greater than 0.5 membership in term	L, P, C, E, H, Q, U	I
Solution coverage: .45859 Solution consistency: .931850		

Legend: CAMB = Collaborative project ambitions; METAGOV = Supportive metagovernance from above; DEDLEAD = Dedicated local leadership; and EFFOVER = Efforts to prevent oversteering.

QCA results. We changed the consistency cut-off point from 0.84 to 1 (as we have only these two acceptable values for the consistency cut-off in the truth table), and the resulted causal paths were similar to the reported ones. More specifically, as expected, we obtained two paths (see table below). The causal path of no metag*dedlead*effover stayed the same, however the other causal path slightly changed in camb*metag* no dedlead*effover. In other words, dedlead moved from being a 'no relevant condition' to an 'absent condition'. However, 1 is a very high requirement for consistency and reduces the number of meaningful cases in analyses in a small-N study like our study is (in our case, 7 cases out of 22 would need to be excluded from the analysis). In fact, the coverage of the solution changed from 0.63 to a 0.45. A consistency level of 0.84 is above the minimum recommended level of 0.75 and has also been widely used in published paper. Therefore, we decided to accept the solution reported in the paper.