Theoretical framework for GOGREEN

Governing co-created green transitions

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ISBN: 978-87-7349-243-7
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The Governing Green Transitions (GOGREEN) project

Citation for published version (APA):
Ansell, C., Sørensen, E., and Torfing, J. (2022). *Theoretical framework for GOGREEN: Governing co-created green transitions*. Roskilde University.

1. Introduction: How to govern the co-creation of green transitions?

People all over the world are facing dire environmental problems, such as flooding, drought and wildfires caused by climate change, biological degradation of land and oceans, poor air and water quality, loss of biodiversity and resource depletion. While the climate, nature and resource crisis is felt in all parts of the world, the capacity to prevent and mitigate the problems by producing and benefiting from sustainable solutions is unevenly distributed across countries and regions, which further enhances global inequalities. Economic hardship, social problems and political turbulence are likely to follow where the pressure on the natural environment is strongest and the capacity to cope with this pressure is limited. Hence, the environmental problems are both threatening natural ecosystems and testing the robustness of socio-political systems.

It goes without saying that we must act swiftly and decisively if we want to turn the tides and secure a prosperous but environmentally sustainable future while leaving no one behind. We urgently need to foster green transitions that break with our unsustainable consumption, production and transport patterns and develop socio-technical systems that "ensure no one falls short on life's essentials – from food and housing to healthcare and political voice – while safeguarding Earth's life-giving systems, from a stable climate and fertile soils to healthy oceans and a protective ozone layer" (Raworth, 2017: 8). Transitioning away from unsustainable sociotechnical patterns and toward more sustainable ones is difficult due to the presence of strong path-dependencies based on sunk costs and self-reinforcing feedback loops and strong political coalitions aiming to prevent change. Hence, successful green transitions require the development of strategies that trigger robust transformations that are targeted, innovative, adaptable, and progressively expand their social and political support base (Levin et al., 2012).

Green transitions are likely to be complex and multidimensional as they involve the construction, combination and co-evolution of new forms of policy, regulation, production, transport, consumption and social living that aspire to leave a smaller negative environmental footprint and thus help to bring us nearer to a situation where we are no longer damaging the health of the planet. The advancement of green transitions is uncertain, politically contested and conflict-ridden and will be full of obstacles and setbacks. Nevertheless, the green transitions must aim to create disruptive changes in how things are done, since incremental changes are insufficient given the enormity of the environmental problems we are currently facing (Köhler et al., 2019). Nevertheless, green transitions may not always lead to large-scale systemic changes that transform an entire sector or society. By contrast, green transitions are likely to happen at the meso-level of niche-innovation as opposed to the macro-level of systemic innovation and the micro-level of changes in individual choices, attitudes and motivations (Geels, 2004). Examples of green transitions include a shift to sustainable energy production, carbon capture projects, improved watershed management, introduction of sustainable farming and forestry methods, efforts to stop plastic pollution in oceans and waterways, development of low-carbon, compact cities, expansion and electrification of public transport, enhanced recycling of garbage, and the spread of circular economy principles in industrial production and consumption. Although such green transition may emerge within a particular niche, they may subsequently be scaled to enhance their society-wide impact while simultaneously transforming individual behaviors.

The 17 UN *Sustainable Development Goals* (SDGs) provide us with a unified global policy agenda for building a sustainable future based on distributed prosperity. The green SDGs include clean water and

sanitation (SDG 6), affordable and clean energy (SDG 7), sustainable cities (SDG 11), responsible consumption and production (SDG 12), climate action (SDG 13), and the protection of aquatic and terrestrial life (SDGs 14 and 15). The SDGs all come with a series of targets and indicators that allow the measurement of progress toward their fulfillment. In some cases, national governments have supplemented the UN targets and indicators with a set of national targets and indicators that are measured based on national data collection. Rather than merely picking the low-hanging fruits in one area, the SDGs are supposed to be jointly achieved. This holistic perspective on goal attainment may give rise to further complications, since trade-offs may arise between the green goals and the goals of distributed socioeconomic prosperity as well as between the green goals themselves. For example, the attempt to mitigate resource depletion through the introduction of circular economy may generate more CO_2 emissions.

Without neglecting the crucial role of state action and market dynamics for generating green transition, a growing number of researchers suggest that green transitions are best fostered through collaborative governance and co-creation involving stakeholders from state, market and civil society in defining problems and designing and implementing innovative solutions that disrupt the common wisdom and established practices in a particular context (Walker and Salt, 2012; Florini and Pauli, 2018; Köhler et al., 2019; Araújo and Franco, 2021; Lima, 2021; Ansell, Sørensen and Torfing, 2022). In short, green transitions may be fostered in and through processes of collaborative innovation (Hartley, 2005; Torfing, 2016). SDG 17 on Partnerships for the Goals echoes this fundamental insight, stipulating how the first 16 SDGs must be achieved via partnerships and networks, bringing together public and private actors to co-create innovative solutions.

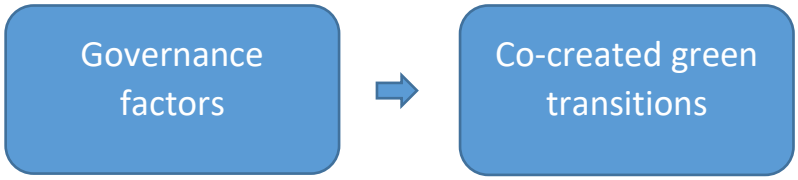
Co-creation is a collaborative (vs. hierarchical or competition-driven) form of governance involving government officials, scientists, private stakeholders and lay actors (e.g., citizens, neighborhoods, community organizations) in distributed action that facilitates the exchange and pooling of experiences, ideas and resources and stimulates mutual learning and bottom-up innovation. The participating actors engage in creative problem-solving that mobilizes actor-specific assets, such as knowledge, expertise, authority, creativity and finance, to forge innovative solutions while promoting joint ownership to facilitate implementation, consolidation and diffusion. The leverage of actors across organizational and sectoral boundaries enables them to create solutions that none of them would have been able to produce single-handedly (Huxham and Vangen, 2013), and it tends to create governance robustness in the face of varying levels of state capacity by flexibly mobilizing societal resources in a challenging situation (Clarke, 2017; Kamara, 2017).

The GOGREEN project starts from the assertion that green transitions emerge through in and through complex co-creation processes that are often better at addressing wicked and unruly problems than top-down government rule, which often fails to mobilize local resources and forms of knowledge, and profit-seeking market competition, which often fails to foster the broad-based ownership of new solutions (Roberts, 2000). While co-creation is a powerful tool for enhancing socioeconomic and environmental sustainability, it does not emerge spontaneously when needed and it may fail to foster much-needed green transitions. In order to further explore the conditions for success and failure, GOGREEN aims to identify the competing constellations of governance factors driving the co-creation of local-level green transitions. Governance factors are structural, strategic or tactical-operational factors that condition the attempt to co-create green transitions; hence, co-creation is a particular type of collaborative innovation taking place in a

multifaceted societal, political and administrative context that will tend to influence the ability to bring relevant and affected actors together in creative problem-solving, leading to effective and legitimate solutions that enhance socioeconomic and environmental sustainability. Different governance factors may influence the co-creation of green transitions in varying ways. We are therefore interested in exploring how different constellations of governance factors promote or hamper the co-creation of enhanced sustainability.

Public and private leaders at different levels may be able to transform the existing governance factors in the short, medium or long term, depending on their precise nature and character. Structural governance factors may be more difficult to transform than strategic governance factors, which in turn may prove more resistant to change than the tactical-operational factors. Experiential learning based on critical reflection is key to transforming governance factors and thereby improving the conditions for the co-creation of green transitions (Torfing and Triantafillou, 2016). GOGREEN will produce valuable knowledge about which governance factors are particularly conducive for the successful co-creation of green transitions and which are not, thus allowing responsible leaders of the green transition to improve the conditions for achieving the green SDGs while hopefully ensuring social inclusion and equality. Figure 1 illustrates the presumed relationship between governance factors and co-created of green transitions.

Figure 1: The basic relationship between governance factors and co-created green transitions



Ostrom (2011) usefully distinguishes between frameworks, theories and models: a *framework* identifies the important elements needed to consider in an analysis and describes their interrelationship; a *theory* is more selective in terms of the explanatory elements it deems relevant to diagnosing a particular phenomenon and tends to develop more specific working assumptions about the form and strength of their impacts; finally, a *model* involves making precise assumptions about how combinations of a limited set of elements predict certain outcomes. A framework is compatible with multiple theories and a single theory is compatible with multiple models.

The purpose of this paper is, first and foremost, to develop a broad theoretical framework that identifies the key governance factors influencing the co-creation of green transition, perceived as a unified process through which relevant and affected actors address an environmental problem and collaborate to design and implement a green solution that sets us on course for a more sustainable future. This framework will distinguish different types of governance factors and identify the most relevant forms included in each of these types. The theoretical framework is intended to guide the common research endeavor and provide a starting point for the inductive analysis of local cases. Based on this framework, different theories about the green transitions can be formulated and explored in a more deductive manner. The ultimate ambition

of GOGREEN is to identify and evaluate alternative models for how to co-create green transitions conditioned upon a certain combination of governance factors.

2. Competing theoretical frameworks and the need for a new, purpose-built framework

There is an extensive body of research on sustainability transitions (for a comprehensive review, see Köhler et al., 2019), which clearly recognizes the importance of multi-actor collaboration. Likewise, there is an equally developed body of research on collaborative governance, some of which focuses on sustainability (Folke et al., 2005; Olsson et al., 2006). The GOGREEN project attempts to deepen our knowledge of the intersection between these two literatures by considering collaborative governance not as one factor among many in advancing green transitions, but as the central engine driving green transitions (Schiller, Gonzales and Flanigan, 2014). Hence, we assert that green transitions are produced in and through co-creation processes that bring a group of interdependent actors together in a collaborative process through which environmental problems are addressed and sustainable solutions are designed and implemented.

In developing a framework for analyzing the co-creation of green transitions, we draw selectively on important existing contributions to our understanding of how collaborative innovation processes are governed: 1) the institutional analysis and development (IAD) framework developed by Ostrom and Kiser (1982); 2) the network management framework developed by Kickert, Klijn and Koppenjan (1997); 3) the collaborative governance framework developed by Ansell and Gash (2008); and 4) the collaborative regimes framework articulated by Emerson, Nabatchi and Balogh (2012).

The IAD framework focuses on collective action taking place within an institutional context that shapes the choices, incentives, constraints and roles of governance actors. In its most general formulation, the framework suggests that biophysical conditions, community attributes and institutional rules will shape how actors make choices and interact to produce environmental governance outcomes. While emphasizing that actors have limited information and operate in complex and uncertain environments, the framework assumes that the choices of institutionally situated actors are driven by the weighing of costs and benefits. To understand how collective action can protect common pool resources (e.g., fisheries, groundwater, forests), Ostrom (1990) identified eight design principles that help communities overcome collective action problems. She argued that communities can govern themselves if they establish working rules that fit the local context and can be monitored and sanctioned by the local actors. This framework also emphasizes the nested, multi-level character of environmental management.

The network management framework builds on the policy network tradition (Kickert, Klijn and Koppenjan, 1997; Klijn and Koppenjan, 2015), and it develops a framework for understanding how interdependent actors form a network to exchange and pool their resources for the purpose of solving complex problems. This perspective is particularly interested in understanding how network structuring and network management can improve how networks function, thereby optimizing their contribution to governing complex societies. Network structuring refers to those included in or excluded from the network, the arena in which they interact, and the ground rules conditioning the network action. Network management refers to efforts to facilitate the collaboration between the participating actors by means of supporting and guiding interaction, mediating conflicts and handling strategic complexities in order to improve

performance and ensure accountability. While network structuring is based on institutional design, network management is based on the exercise of facilitating leadership.

The collaborative governance framework developed by Ansell and Gash (2008) aims to understand how public agencies engage collaboratively with public and private stakeholders in order to enhance the legitimacy of public governance outcomes. The framework emphasizes the importance of the "starting condition," including power, resources and knowledge asymmetries and the prehistory of conflict or cooperation, which jointly effect incentives and constraints for participation in collaborative problem-solving. These factors feed into the collaborative process that is depicted as a social learning process whereby actors in face-to-face dialogue build trust, commitment and shared understanding in order to produce jointly desired outcomes. A successful collaborative process depends on effective facilitative leadership and institutional design.

The collaborative regime framework developed by Emerson, Nabatchi and Balogh (2012) expands the idea of collaborative governance beyond formal state-initiated arrangements to include community-based collaboration regarding collective resource management. They generalize the "starting condition" notion to a more encompassing "system context" for collaboration, proceeding to specify different drivers of multi-actor collaboration (convening power, incentives, interdependence and uncertainty). Collaborative governance regimes have three interrelated collaborative dynamics (principled engagement, shared motivation and capacity for joint action) that produce certain collaborative outputs and outcomes. These features are adapted over time, potentially leading to a changing system context and new collaborative dynamics.

In an effort to create a purpose-built framework for the analysis of the co-creation of green transitions, we combine and customize these frameworks in a manner that builds on their mutual strengths while avoiding what—from our perspective—represents some of their limitations. The particular strengths of the Ostrom framework are its prospective analysis of community self-governance, its emphasis on how the institutional rule-structures affect local interaction and the production of desired outcomes, and its attention to the nested, multi-level character of the institutional context. However, the rational choice focus of her institutional theory of governance leads to greater emphasis on the choices individual actors make rather than on the dynamics of social interaction, and the cost–benefit framework for understanding individual choice tends to underemphasize the value of pro-social motivations and the role of social norms in guiding action. The framework also emphasizes regulatory action rather than innovation. For our purposes, the social learning or collaborative dynamics perspectives appear more appropriate for understanding co-creation.

An important strength of the network management framework is its emphasis on actor interdependence as a driver of collaboration. The focus on the structuring and management of networks is also a valuable contribution and goes beyond the Ostrom framework, which lacks reflection on how managers can proactively improve how networks function over time. However, this framework is limited by how the network concept tends to focus on the structures of interaction and their particular functionality rather than on the intricacies of the collaborative process itself and the conditions for stimulating learning. Coming out of the policy network tradition, this framework also focuses on how to make effective policy but has little to say about how to produce innovative solutions.

The collaborative governance framework reiterates the importance of proactive structure and the management of collaborative processes. A further strength of this framework is its attention to the dynamics of social learning and its articulation of the structural conditions for collaborative governance to emerge and prosper. However, the purpose of social learning in this framework is to enhance mutual understanding and consensus-building rather than to stimulate innovation. This framework is also essentially a stakeholder model emphasizing the role of organized actors and therefore has little to say about the particular roles of individual citizens, users or community groups.

The collaborative regimes framework also stresses collaborative dynamics and the role of leadership and institutional design. Its strength is that it further elaborates the structural factors associated with the system context that shapes the conditions for collaboration. This framework also broadens the collaborative perspective, making it less instrumental so that it is not merely a tool of public agencies aiming to align with stakeholders to avoid trouble. Collaboration is conceptualized as a pattern of cross-boundary interaction that has a value in itself for improving targeted outcomes based on shared theories of action. Like the other frameworks, however, the collaborative regimes framework does not provide specific insights into the innovation process, although it is concerned with the feedback from outcomes to process, which may provide a source of innovation. It also lacks much explicit attention to how existing institutions and rule structures condition and shape collaborative dynamics.

These four frameworks have complementing strengths and limitations. Although they do it slightly different ways, they all emphasize the role of collaborative interaction in public problemsolving and they all point to key governance factors that may affect the process and outcome of collaborative problemsolving. The important governance factors that we want to extract and highlight in our purpose-built framework are the following:

- The collective dynamics of community self-governance, which is important for understanding how local actors can come together to produce green transitions
- Sensitivity to the interlinkages between local and higher-level governance institutions
- Specification of the structural and institutional context and how it affects local interaction and the co-creation of desired outcomes
- Appreciation for actor interdependence as both a precondition and a product of collaboration and how it shapes the co-creation trajectory
- The importance of institutional design and facilitative leadership for improving the functioning of collaborative arenas for co-creation
- Attention to the dynamics of social learning both for improving collaboration and for stimulating innovation
- A broadening of the collaborative governance framework beyond its instrumental value for public agencies and beyond its narrow focus on organized stakeholders.

Since we discovered that these frameworks suffer from various limitations, our purpose-built framework will also emphasize the importance of incorporating public value motivations and social norms and pay explicit attention to the collaborative dynamics that stimulate innovation. We treat these points as key building blocks as we elaborate our framework for studying how the co-creation of green transitions is governed.

Having thus provided a synthesizing overview of the main source of inspiration for the development of a theoretical framework for understanding how collaborative innovation processes are governed, we shall now take a closer look at the explanandum (co-created green transitions) and the explanans (the governance conditioning the co-creation of green solutions).

3. Co-created green transitions

Whether triggered by shocking events, proactive leadership, popular pressure or technical opportunities, green transitions aim to produce transformative change in order to increase the sustainability of socio-technical systems. According to the 1987 Brundtland Commission for the UN, sustainability is enhanced when socio-technical transformations contribute to meeting the needs of the present without compromising the ability of future generations to meet their own needs. Recent discussions of sustainability points to the fuzziness of the concept, but also maintain that sustainable development is about squaring the circle by securing equity, ecology and economy now and in the future (Vos, 2007). Sustainability takes us beyond compliance with existing laws and regulations. With a growing world population sustainability can only be obtained through transformative change involving innovations in technologies, markets, supply and distribution chains, consumer behavior, energy and transport infrastructures, physical planning, as well as in policies, regulations, cultural meanings and community practices. For the purpose of this project, transformative change does not necessarily entail radical or systemic shifts in the sustainability of entire socio-technical systems. Any important niche-innovation that contributes significantly to enhancing environmental sustainability qualifies as a green transition.

According to Köhler et al. (2019), green transitions have several important characteristics. First, multiple social, economic and political elements tend to interact and co-evolve in the transition process, which means that transitions are complex and adaptive processes rather than simple and linear. Second, transitions unfold over long periods of time, from their early emergence in protected niches to their wider consolidation, application and diffusion. Third, the emergent character of green transitions introduces considerable open-endedness and uncertainty, meaning that results and impacts are difficult to predict. Fourth, green transitions are inevitably contested because they challenge entrenched solutions and power relations and because they produce winners and losers without necessarily compensating the latter for their losses. Fifth, there is a strong normative aspect of green transitions because they are ultimately based on claims about which public and private goods or common pool resources should be advanced and also puts a premium on equity and distributional justice within and between generations. Finally, green transitions inevitably counter entrenched ways of thinking and acting and institutionalized path dependencies. The implication of these basic characteristics is that green transitions depend on mobilizing broad-based support from social, political and economic actors that can be maintained in the face of growing societal turbulence and political resistance to change.

Green transitions will be assessed first and foremost in terms of how they enhance environmental sustainability defined narrowly as the contribution to promoting economic growth compatible with the maintenance of ecological balance and future access to clean air and water, fertile land, biodiversity and key resources. However, there is a series of secondary goals that also must be considered when designing and evaluating green transition projects, including effectiveness, efficiency, equity, robustness, diffusion potential and conformance with local values. Tradeoffs are inherent in green transitions, producing difficult

choices between different environmental improvements and social and economic costs. If these tradeoffs are not properly dealt with, green transitions may eventually produce unintended negative consequences. Consequently, transformative change aiming to enhance sustainability must be assessed from a wide and holistic societal perspective.

As stated above, there is broad agreement that green transition are often fostered in and through cross-boundary collaboration that brings together a dedicated groups of public and private actors. Collaboration is particularly useful in turbulent times, where disruptive problems and challenges come and go in uncertain and unpredictable ways, and social and political actors want to share the risks associated with dealing with hard-to-solve problems to reap the fruits of collective problem-solving (Weber and Khademian, 2008; Hutter, 2016). Collaboration helps to make sense of problems, design new solutions, generate broad-based support for transitions, coordinate implementation efforts and navigate the difficult tradeoffs and conflicts entailed by transitions. This is why collaborative governance in networks and partnerships is called for in the current situation, where the natural environment is threatened by negative externalities of unsustainable patterns of consumption, production and transport, and widespread support for green transitions is needed.

While collaborative governance provides an ideal strategy for dealing with complex and turbulent problems and offers a much-needed compliment to hierarchy and markets, there is much to gain from pushing the global debate on collaborative governance slightly further by embracing the new concept of co-creation, which aims to bring out the innovative potential of collaboration. To that end, GOGREEN aims to demonstrate the potential impact of co-creation on achieving the green SDGs. Indeed, co-creation may provide the accelerator we need to cross the UN-defined 2030 finish line for achieving the SDGs while simultaneously strengthening public governance, democratic ownership and the resilience of local communities.

The co-creation concept extends beyond the parent concept of collaborative governance in at least three important respects (Ansell and Torfing, 2021a). First, while collaborative governance is often initiated and facilitated by public agencies seeking to align societal actors and expand their reach beyond what public authorities can normally influence, co-creation is often initiated by community actors or co-initiated by public and private actors who define a joint agenda and mobilize other actors around it. Moreover, public agencies are not always in the driver's seat in co-creation processes that tend to be based on distributed action, meaning that all of the participating actors can contribute and seek to advance joint outcomes. This implies that several (if not all) of the participating actors partake in carrying out important leadership functions (Bolden, 2011). In short, co-creation is less state-centric than collaborative governance and can therefore also be used in countries with weak state institutions providing that societal actors are strong enough to lead the way.

Second, while collaborative governance tends to involve organized stakeholders, including professional civil society organizations, in targeted problem-solving within a particular policy domain, co-creation tends to involve a broader range of actors, including lay-actors such as small businesses, individual citizens and staff members, user groups, neighborhoods, community leaders etc., in order to mobilize the manifold resources needed to spur transformative change across organizational and sectoral boundaries. As such, co-creation tends to be more people-centric than organization-centric, since public agencies, private companies, interest organizations and large donor organization are not alone in getting a seat at the table.

Different groups of people, including youth, women, indigenous people, refugees and people living in extreme poverty, are also invited to join the collective efforts to bring about green transitions. The precise composition of participating actors in co-creation processes obviously depends on the nature of the problem, but the aspiration of co-creation is to go beyond institutional actors and include a broad range of relevant and affected actors.

Finally, while collaborative governance aims to enhance the capacity for societal problem-solving by aligning actor perspectives and facilitating mutual learning and policy coordination, co-creation involves a proactive search for new and emerging solutions to present and future problems. In short, co-creation aspires to involve relevant and affected actors in the creation of innovative outcomes that break deadlocks and solve the massive environmental problems that are threatening life on earth. There are reasons to expect that local collaboration in networks and partnerships can spur the production of innovative green solutions since the constructive management of differences between manifold actors may help them better to understand the problem at hand, to cross-fertilize ideas for how to solve them, to share the risks of innovating, and to generate joint support for the implementation of new and bold solutions.

Based on this brief conceptual clarification, co-creation is envisioned as an inclusive and distributed process of multi-actor collaboration aimed at finding new, effective and legitimate ways of solving pressing problems. As such, we can define co-creation as:

> A distributed and collaborative process of creative problem-solving that proactively mobilizes public and private resources, including those of lay-actors, to jointly define problems and design and implement solutions that are innovative and seek to generate public value such as enhanced sustainability. (Ansell, Sørensen and Torfing, 2022)

In practical terms, this definition of co-creation tends to presume the following conditions and actions:

- A relatively even distribution of the ability to initiate action and the responsibility to carry out leadership tasks (*a distributed process*)
- Persistent efforts to connect actors from different organizations, sectors, levels, jurisdiction, locations, groups etc., who share a common ambition to solve a particular problem or challenge (*proactive resource mobilization*)
- Willingness and courage to think outside the box and pursue emerging solutions that disrupt common wisdom and established practices (*creative problem-solving through emergent solutions*)
- Early involvement of actors who not only get to contribute to the implementation of new and bold solutions but can also partake in the problem definition and the solution design (*continuous influence*)
- Solutions that not only benefit the participating actors but are valued by society at large (*public value production*)

Co-creation is a process unfolding in time and space. While the co-creation of innovative green solutions may expand at the global, national and regional levels, the proximity of manifold public and private actors and the possibility of constructing an imagined “community of fate” vis-à-vis pressing environmental problems enhances the chance that local-level co-creation will emerge. Still, the actors must be prepared to invest considerable amounts of time and energy in the co-creation process, since a few meetings between

a group of relevant and affected actors will not usually increase the probability of improved and innovative outcomes (Ostrom, 2011: 15). The participants will have to meet in smaller and larger groups and carry out a broad variety of field activities in order to produce innovative, green solutions. Hence, co-creation is a multi-tiered and protracted process that challenges the participants to maintain their momentum and keep the flame alive by celebrating small wins and building lasting relationships.

For heuristic purposes, the co-creation process can be divided into three phases, each containing three sub-phases. The *initiation phase* involves: 1) the identification, description and analysis of pressing problems and clarification of goals, opportunities and constraints; 2) efforts to bring together relevant and affected actors and motivate them to participate in the co-creation process; and 3) efforts to align the expectations of the participating actors, build trust between them, and to facilitate collaboration, defined as the attempt to establish a common ground for joint problem-solving.

The *design ph*ase includes: 1) redefinition of problems and goals to facilitate creative problem-solving in the given context; 2) creation of a shared vision for joint problem-solving and desired solutions; and 3) the exchange and cross-fertilization of ideas and the iterative development, testing and revision of prototypes.

Finally, the *implementation phase* involves: 1) mobilization of resources to facilitate the continued operation, consolidation and upscaling of the new solutions; 2) pluricentric coordination between those involved in the implementation of new initiatives in order to avoid gaps and overlaps, create synergies and exploit emerging opportunities for design improvements; and 3) strategic reflection aiming to ensure the integration of new solutions in the existing context and adapt them in the light of changing circumstances.

It goes without saying that, in reality, co-creation processes are complex and messy and subject to gaps, jumps as well as mergers and iterations of the different phases and sub-phases.

For co-creation to succeed in producing green transitions, it must overcome three vital thresholds. First, successful co-creation must overcome a *collective action threshold*. Co-creation requires that relevant and affected actors are identified and motivated to participate in active and committed ways, thus overcoming the challenges of collective action, such as low faith in joint action, lack of time, free-riding, fear of repression, or worries that participation will be too demanding. Once actors become motivated to work together, they must still engage in high-quality collaboration that allows them to overcome the *innovation threshold*. Actors may participate in good faith but suffer from tunnel vision, a lack of creative ideas and risk aversion. They must collectively break out of these patterns to effectively co-create green innovations. Even after they have co-created innovative solutions, they must still overcome a *political support threshold* to properly implement, upscale and diffuse their innovative solutions. For innovative solutions to have a real impact, it is necessary to align those who are interested in pursuing solutions with authoritative political decision-makers and other public authorities who control key institutions, resources and opinions.

Different socio-political regimes face different challenges and opportunities when confronting these thresholds. In authoritarian regimes, local communities may face organizing restraints that render it difficult for them to overcome the collective action and innovation thresholds unless they also overcome the political support threshold early in the process. In developing countries with relatively strong bottom-up organizing traditions, it may be possible to overcome the collective action and innovation thresholds based on community-driven social innovation, but these societies may fail to pass the political threshold test if the central, regional or local state lacks capacity or interest because politics determined by

entrenched systems of clientelism and politicians' short-term concerns for re-election. Other developing countries may lack both strong civil societies and effective and supportive states, therefore having to rely on international donor organizations to help them overcome each of the thresholds. More developed states vary in terms of their degree of state intervention and civil society mobilization, thus creating different constraints and opportunities for overcoming the three thresholds. In sum, socio-political regimes are expected to create highly different conditions for the co-creation of green transitions, which points to the need to develop customized strategies for overcoming the three thresholds.

4. Governance factors conditioning the co-creation of green transitions

The presence or absence of different governance factors may help or hurt the efforts of green co-creation projects to overcome the three thresholds described in the previous section. Governance factors are conditions that are capable of effecting different co-creation processes and that, to varying degrees, social agents are capable of altering. This section delineates three types of governance factors that may be conducive to the co-creation of green transitions. First, *structural governance factors* are inherent to the wider social, economic and political context in which co-creation processes unfold. They are typically perceived as a given set of somewhat distant structural conditions that are taken for granted by co-creation participants, although these structural conditions can change over the longer term. Second, *strategic governance factors* are found in the immediate institutional environment of co-creation and refer to the strategic agendas that institutional actors develop over the medium term. These institutions and agendas are relatively stable but can be changed or directed through pro-active efforts to support co-creation. Finally, *tactical and operational factors* are internal to the co-creation process and pertain to the exercise of collective or distributed leadership of ongoing co-creation processes. These governance factors can be changed in the short term as problems and opportunities emerge.

For each of the three types of governance factors—structural, strategic and tactical/operational—we present five different governance factors that are likely to drive the co-creation of green transitions. Each of these governance factors will be discussed in terms of where they come from, how they are defined, the mechanism through which they impact the co-creation of green transitions, available empirical evidence, and how they are to be studied.

4.1 Structural governance factors

1. *Severity of biosphere conditions*

The severity of biosphere conditions may play a critical role in prompting co-creation efforts. Biosphere conditions refer to real problems of the natural world (e.g., droughts, flooding, threats to biodiversity, soil erosion) and to how they are acknowledged, diagnosed and framed at the political regime level. Ostrom's (2010, 2011) IAD framework considers biosphere conditions as objective states of the natural world relating to atmospheric, terrestrial and aquatic conditions, and she argues that they are key contextual factors shaping environmental regulation. While these objective states of nature are obviously fundamental, we stress the importance of how they are discursively constructed and institutionally embedded at the national or international level. Threatening natural conditions may go almost unnoticed by key policy actors, while less critical conditions may receive more attention. Thus, the severity of biosphere conditions

depends heavily on how natural problems are socially constructed and defined. Hajer (1995) famously points to the importance of "discourse coalitions" that shape and frame environmental problems in ways that may stimulate or suppress environmental action.

Competition between policy problems to draw attention in the media and from government institutions can be fierce. Public arenas have a limited carrying capacity for allowing problems to get on to the policy agenda (Hilgartner and Bosk, 1988). Problems that are framed as severe and that call for urgent action are more likely to receive attention and support (Rochefort and Cobb, 1994), and global and national agenda-setting will create windows of opportunity for local actors to explore prospects for organizing local collective action in response to these issues (Kingdon, 1984). Local evidence or experience with the global or national problem framing will serve to validate the broader agenda and can provide concrete incentives for local action (Wiest, Raymond and Clawson, 2015; Hughes, Runfola and Cormier, 2018). Aligning global and national agendas with local issues and concerns is often important when trying to motivate collective action. While several studies demonstrate how local collaboration is prompted by the constructed severity of problems (Lubell et al., 2002; McGuire and Silvia, 2010; Kalesnikaite and Neshkova, 2021), few studies demonstrate how international and national problem framings impact local collaboration efforts. GOGREEN aims to compensate for this benign neglect by investigating the impact of the social construction of biosphere problems on local co-creation processes. This will be carried out by studying whether and how actors involved in the local co-creation of green solutions refer to global and national problem framings and by tracking how the discursive construction of the severity of biosphere conditions influences the motivation to co-create solutions and the actual efforts to invest time and energy in local collaboration for the green shift.

2. Legislation, programs and formal goals

Global and national policy agendas emphasizing the severity of environmental problems may prompt local collaboration, but so do the presence of legislation, policy programs and formal goals that clearly signal the commitment of higher-level political authorities to environmental action. They also convey more or less explicit expectations regarding the contribution to be made by local actors to finding new solutions. A first issue is whether national governments are officially committed to sustainability transition. Such commitment may help to establish legitimacy of a green agenda at different levels of government. A second issue is whether national governments have established concrete goals and targets for pursuing and prioritizing the sustainability objectives. The concrete goals and targets may motivate local actors to contribute to sustainability transition by generating local action and mobilizing local resources. A third issue is whether government follows up on these commitments by establishing specific legislation and policy programs that advance the formal agenda. National legislation and programs can provide public authority, inspiration, and resources that support local co-creation efforts (Soininen et al., 2021).

While national legislation, policy programs and goals can support local co-creation, much depends on the character of these policy frameworks. In some cases, they are merely symbolic or tokenistic. In other cases, their impact is limited due to unclear goals and definitions, a lack of adequate guidance and insufficient support for local action (Khanna et al., 2014). National frameworks can also be out-of-sync with local agendas, capabilities and priorities; and in some cases, the absence of national support can even stimulate local actors to fill the policy vacuum (Bulkeley and Betsill, 2005). Still, these frameworks can play an

agenda-setting role for local co-creation, creating legitimacy, encouragement and critical resources (Sørensen and Torfing, 2022). GOGREEN will investigate whether and how national legislation, programs and goals create productive conditions and fertile contexts for co-creation.

3. Relative openness of public governance paradigms

The form of the political-administrative regime may impact the local co-creation of green transitions. We have already mentioned how political regimes may be more or less democratic or autocratic; and thus more or less supportive of self-grown local action aiming to produce public solutions. However, the argument here is slightly different, as we are interested in the extent to which political-administrative regimes promote and make room for local interaction between public and private actors by means of decentralizing political responsibilities and tasks to relatively resourceful local political-administrative institutions capable of orchestrating local co-creation processes. The key issue is whether the structure of the state and the administrative apparatus create or inhibit opportunities for engaging with and empowering societal actors in co-creation. Are front-line bureaucratic actors empowered and motivated to deal with pressing problems by working with civil society? Different administrative traditions create different types of state–society relations (Painter and Peters, 2010), some more propitious for stimulating co-creation than others.

The relative openness of the administrative state has been discussed in terms of the impact of shifting public governance paradigms, which vary in how they support the devolution of public problem-solving to local governments and encourage these governments to involve societal partners (Torfing et al., 2020). Classic forms of bureaucracy are based on centralized control and rely on professional public employees at multiple levels to deliver public services, regulate society and the economy and solve pressing public problems (Du Gay, 2000), although federal states are characterized by a vertical distribution of power between multiple levels of autonomous government. New Public Management aimed to devolve administrative decision-making power to relatively autonomous public agencies and service organizations that were deregulated, subjected to competition from other service providers, and held to account for their performance and results (Hood, 1991; Christensen and Lægreid, 2001). Some services were even outsourced to private contractors delivering services to users based on a contract with local authorities, but aside from the involvement of private firms as contractors and individual users in the role as customers in the new service markets, there was no attempt to exploit the enhanced local autonomy to initiate broad-based collaboration with local stakeholders. New Public Governance took one step further by not only devolving political responsibilities to local public organizations but also trying to connect these organizations with each other and with a broad range of local stakeholders through the formation of networks and partnerships (Osborne, 2006, 2010). The contingent transition from centralized and insulated forms of bureaucracy, via decentralized service production in new quasi-markets, to decentralized forms of collaborative governance in networks and partnerships is likely to enhance the motivation of local public managers and local stakeholder organizations to initiate co-creation processes aiming to deal with pressing local problems. Indeed, there are several examples of how strategic management aiming to transform the *modus operandi* of public organizations is used to promote co-creation (Crosby, 't Hart and Torfing, 2017; Ongaro et al., 2021). GOGREEN will study the relative predominance of public governance paradigms at the level of local government to investigate how administrative ideas and structures predispose administrative actors to work with societal actors to co-create green SDG solutions.

4. *Traditions of citizen participation and community mobilization*

For historical reasons, civil society may be more vigorous in some countries than in others and therefore more likely to support co-creation. Some countries have deep traditions regarding public participation and community mobilization that have a legal, institutional, organizational and cultural basis. Some political regimes have legal frameworks that specify rights for citizens to organize and to freely participate in policymaking, such as citizenship laws or regulations allowing citizens to comment on public regulations or to be consulted about local planning decisions. In some countries, the public sector actively tries to promote civic engagement, creating institutions that make it easier for citizens to organize. Public libraries and cultural centers often create places where citizens can meet and resources are available for to help initiate action. Community mobilization is often shaped by how society is organized, both in social groups and in community organizations. Civil rights groups, ethnic communities, business branches and social classes may form organizations that allow them to advance their collective interests. Non-governmental organizations often play a particularly important role in driving citizen participation. Finally, cultural norms may support citizen engagement in local action, building self-reinforcing national narratives about participation. Putnam (2000) and others have pointed to the importance of social capital in active community mobilization.

Since co-creation involves the participation of lay actors, it will tend to thrive with a strong and vibrant participatory tradition (Gaventa and Cornwall, 2006; Gaventa and Barrett, 2010). Of course, in some settings, "participation" takes the form of clientelistic mobilization that leads to mobilization around distributional outcomes that benefit narrow groups. Such mobilization can block efforts to engage a broad spectrum of civil society in the production of innovative public value outcomes. Community-based mobilization that bridges groups, however, can counter the problems associated with clientelism. Such mobilization is often supported by non-governmental organizations with an agenda to promote more general societal goals or broad-based participation. GOGREEN will analyze how legal, institutional, organizational and cultural traditions regarding citizen participation and community mobilization, which are visible at the local level, can support co-creation and the involvement of lay actors herein.

5. *Mechanism for ensuring top-down government and bottom-up social accountability*

Systematic attempts to ensure that the social actors engaged in public governance are held to account for their performance, results and outcomes may help to "keep them on their toes" and ensure that they do their best to use their resources and competences to produce effective, efficient and fair solutions. Accountability mechanisms not only force governance actors to anticipate the wants, demands and expectations of those actors who will eventually hold them to account for their deeds but may also contribute to producing learning based on relevant feedback, enhancing responsiveness vis-à-vis users and affected groups and building legitimacy by strengthening transparency and facilitating sanctioning of cases of misconduct (Bäckstrand, 2006; Weech-Maldonado, Benson and Gamm, 2003; Wu, Liu, Jin and Sing, 2016).

Ensuring the accountability of co-creation arenas hinges on the provision of accessible and non-technical information about the processes and outcomes of co-creation to a particular accountability audience that should be able to scrutinize, pass judgment and sanction the performance and results of the co-creation

process (Bovens, Goodin and Schillemans, 2014). Co-creation arenas may be subjected to a combination of upward and downward accountability. Upward accountability to public authorities and sponsors is particularly important if the co-creation project relies on financial, political and moral support from powerful public and private actors. Failure to provide public authorities and sponsors with information and accounts about relevant activities and important results that allow them to monitor and critically scrutinize these accounts may undermine sponsor support and lead to withdrawal of political support and future funding. Downward accountability flows from a co-creation partnership to those actors who are affected by its interventions. The affected actors include both the potential beneficiaries and those who may be experiencing the negative impacts of the project. Critical feedback from these groups is crucial for designing solutions aiming to achieve one or more SDGs. Empirical studies confirm that accountability vis-à-vis end users helps to improve the relevance and quality of solutions (Sohail, Maunder and Miles, 2004; Kilby, 2006).

Research has clearly demonstrated the many difficulties that governments experience when trying to hold collaborative networks and partnerships to account (Papadopoulos, 2007; Klijn and Koppenjan, 2014). Co-creation processes tend to be opaque and secluded, the range of participants shifts over time, responsibilities and tasks are widely distributed, external public agencies may play a key role in the implementation process, and the sanctioning of governance failures is difficult because the participants are neither formally employed nor democratically elected but rather self-appointed volunteers who are along for the ride. In the face of the problems associated with upward accountability, it has been suggested that downward accountability should be ensured by means of what is now referred to as social accountability (Joshi and Houtsager, 2012; Fox, 2015). Social accountability is a bottom-up accountability mechanism aiming to improve performance and results by empowering service users, affected citizens, NGOs, private business, local media etc. It aims to provide them with brief accounts of the process and results of local co-creation efforts, to facilitate dialogue between the account-givers and the local accountability audience, and to ensure that the actors involved in co-creation respond to criticisms and justify their actions and the results that they have obtained. Fox (2015) rightly observes how, for social accountability to be effective, the information provided to the local accountability audience should be user- and citizen-centric, excluded groups should be given voice in facilitated dialogues, voice must not be constrained by fear of reprisal, and negative and positive sanctions must be used to elicit responsiveness. Most importantly, however, social accountability must be reinforced by upward accountability to add teeth to the local sanctioning of unfair processes and negative results. In sum, downward and upward accountability should work in tandem to improve the co-creation processes and outcomes. GOGREEN will explore whether and how the presence of downward accountability combined with some form of upward accountability helps to enhance the effectiveness, efficiency, legitimacy and fairness of local co-creation efforts aiming to enhance environmental and socioeconomic sustainability.

4.2 Strategic governance factors

a) Strategic agenda-setting by means of translation

Co-creation may be spurred by powerful global and national agendas, but these may not spread easily to local actors. Local governments, stakeholders and citizens might not view the global and national agendas as relevant, meaningful or urgent unless they are properly “translated.” Effective translation entails a

reshaping of the agenda to fit the purpose of local actors, a reinterpretation in light of local forms of knowledge and an alignment with local discourses, belief systems and logics of appropriateness. As pointed out by leading translation theorists, "setting something in a new place is to construct it anew" (Czarniawska and Sevón, 2005). The message from translation theory is that agenda diffusion calls for a strategic endeavor to translate the agenda in a way that renders it attractive, productive and meaningful to local actors (Wæraas and Nielsen, 2016). It is important that agendas such as the promotion of environmental sustainability are translated in a way that frames them as an attractive opportunity for the community as a whole so as to elicit broad-based interest. It is also paramount that the agenda be formulated in a way that speaks to the tacit, practical and situated knowledge and perceptions that the local actors have, and that it makes sense when interpreted through local meaning systems.

It is important to keep in mind that translation is not something that can be done at arms-length from the local context. It requires knowledge of what is at stake for public and private actors, the projects and initiatives already underway, how local actors talk about related issues, and the storylines that may appeal to different actors. Accordingly, it is important for those doing the translation work to invest time and energy in getting to know the local community and to translate the general agenda into problems, goals and projects that speak to what local actors perceive to be important, meaningful and purposeful. The translation work must also appeal to members of the local community who are well acquainted with and strongly committed to a global or national agenda and may play a crucial role as boundary spanners who bring together and align different local agendas and actors (van Meerkerk and Edelenbos, 2018). If there is a strong reaction against a green agenda as promoted by government, it might prove to be difficult for local boundary spanners to frame the SDG agenda in a manner that will mobilize local actors. In that case, the strategy might be to dissociate the local agenda from the official government agenda; for example, a Danish study of how local municipalities translate the SDGs has revealed how public leaders often use a label other than the SDGs when carrying out activities aiming to meet the SDGs (Egelund, 2022). GOGREEN will study how the green SDGs are translated in different localities, who is doing the translation work, what discursive strategies they deploy and, most importantly, how local translation work drives green transition projects.

b) Construction of narratives about successful multi-actor collaboration

While actors from the public sector, the market economy and civil society may sympathize with the green agenda, their decision to participate in problem-focused co-creation activities may be uncertain due to time constraints, other pressing commitments, a lack of resources, and fears that multi-actor collaboration will be too troublesome and fail to produce effective solutions and desirable results. The worries of local actors about the presumed limits to the feasibility and efficacy of collaborative processes of co-creation may prevent these processes from getting off the ground. However, this potential obstacle may be eliminated by the construction of local narratives about successful multi-actor collaboration that helps convince local actors of how co-creation is an exciting and rewarding endeavor that will bring about much needed change.

Ostrom (2005) already had a keen eye for the positive impact of community attributes, such as local traditions for participation and collaboration, which predispose the local actors to contribute to collective problem-solving. Ansell and Gash (2008) have a much broader focus on the starting conditions for collaborative governance, including the prehistory of antagonism and cooperation. Good experiences with

collaborative problem-solving and the ability to solve conflicts and produce effective governance solutions tend to build high levels of trust that make future collaboration more likely. Over time, the accumulation of stories about successful collaboration may gradually build a positive reputation for collaborative governance and co-creation that will help local actors to overcome their worries and invest in joint attempts to solve pressing local problems. Emerson, Nabatchi and Balogh (2012) confirm that repeated interactions based on principled engagement will help to foster trust, mutual understanding, internal legitimacy and shared commitment, which are crucial for generating and sustaining collective motivation to engage in collaborative problem-solving.

Local narratives about how actors come together to solve pressing problems through multi-actor collaboration may prove to be robust in the face of occasional instances of collaborative processes turning sour. However, the persistent erosion of the perceived feasibility and efficacy of local efforts to co-create solutions may eventually cause positive narratives to break down. The strength and longevity of local narratives of successful multi-actor collaboration depend on the ability of local leaders to feed the narrative with new success stories and to portray occasional failures as exceptions to the rule. GOGREEN will explore the role of positive narratives for motivating actors to participate in and commit to collaborative endeavors.

c) Building or harnessing institutional platforms and arenas

Institutional platforms and arenas that foster collective action, collaboration and political intermediation at the community level can enhance the prospects for successful co-creation. Platforms are relatively permanent institutional frameworks that are designed to scaffold collaboration by helping local actors to organize and innovate. They often do so by creating ad hoc arenas where people can easily discuss, debate, brainstorm and create together. The platform concept has developed, in part, through the development of digital technologies that facilitate coordination and exchange between widely distributed actors (i.e., a digital platform), although it is also recognized that platforms can also be organizational or physical structures for promoting multi-stakeholder collaboration (Ansell and Miura, 2020). Arenas are "spaces for participation, communication and joint action" (Ansell and Torfing, 2021b, 97). This concept of arenas developed out of a concern for enhancing deliberative democracy and collaborative governance and the recognition of the need to enhance face-to-face or digitally-mediated communication and interaction in order to facilitate collective action, conflict management and creative problem-solving (Bryson and Crosby, 2017; Ansell and Torfing, 2021b). Platforms may be public, private or hybrid institutions, and they are typically involved in promoting collaboration across multiple communities or sectors. Thus, platforms typically oversee multiple arenas.

Platforms can be thought of as providing infrastructural support for co-creation efforts, often by providing various kinds of organizational templates and tools for communication, analysis or planning that make co-creation easier and more productive. There are several different types of infrastructural support. *Interaction infrastructure* is perhaps the most fundamental, because it makes it is easier and more rewarding for relevant and affected actors to communicate and interact in high-quality ways. The provision of arenas is one critical type of interaction infrastructure. Platforms may also provide participants with a *production infrastructure* that gives them access to tools or technologies that enhance their collective productivity and possibly allow them to achieve results that would not have been possible otherwise. For

example, production infrastructure might include mapping or modeling technologies that allow fishermen to design marine sanctuaries that protect fish breeding. Platforms may also facilitate co-creation by providing *innovation infrastructure* that allows groups to brainstorm together, develop and test porotypes, or to conduct experiments. For example, a platform might provide the expertise, facilities and seed money for farmers to conduct plant-cropping experiments that reduce soil erosion. While a significant body of research has developed around several specific types of platforms, such as urban living labs, agricultural innovation platforms and citizen deliberation platforms, the specific role of platforms in fostering co-creation for sustainability is less developed (Perry et al., 2018; Rehm, McLoughlin and Maccani, 2021). GOGREEN will investigate whether and how platforms enhance co-creation for sustainability by providing effective arenas for co-creation and by providing various types of infrastructural support that enhance the likelihood of co-creation success.

d) Provision of access to blended financing

While the initial stages of co-creation are less expensive, the later stages—where innovative solutions are tested, implemented and scaled—can be costly. The good thing, however, is that parts of the pecuniary and non-pecuniary costs will be covered by the mobilization of the resources of the participants involved in the co-creation process. Still, there is a persistent need for the funding and financing of SDG co-creation; indeed, more funding and improved financing is a key to achieving global sustainability goals (Friedman and Gostin, 2016).

Here, we shall define funding as an amount of money provided by government, donor institutions, corporate firms, community organizations, philanthropists or crowds for a specific developmental purpose and based on an agreement that describes the form and content of a particular project, the planned outputs and outcomes, and the timeline for deliveries. Funding is usually provided free of charge and without requirements to pay the money back. Financing, on the other hand, is an amount of capital provided by public authorities or financial institutions (e.g., banks, investors) to pay for long-term investment in and operation of new solutions, including service production and delivery, regulation of social and economic activities, and the construction and operation of a particular infrastructure. If the money comes from financial institutions, it must be paid back with interest. Public authorities will tend to use the public budget to finance co-created solutions but try to recuperate some of the money through donations, sales tariffs or user fees.

The funding of co-creation projects may come from many different public and private sources, including the participants themselves, who will often contribute considerable amounts of time and energy free of charge, although public or private facilitators may sometimes draw a salary or receive an honorarium from their organization. When it comes to the financing of co-created solutions, the problem is that the amount of money needed to finance green transitions tends to exceed the financial capacity of local, regional and national states, particular in poorer countries. The solution to this problem is often to construct some kind of “blended financing” using money from public budgets and official development assistance provided by international donor organizations and private philanthropic foundations to mobilize private sector financing from multilateral development banks, commercial banks and private pension funds (Havemann, Negra and Werneck, 2020; see also Koppenjan and Enserink, 2009). While blended financing emerged to solve a dire problem in developing countries, it may have a much wider application, since the underlying problem in

many green transition projects is that they require large sums of money but fail to attract sufficient private financing due to the risks associated with projects and the uncertainties related to their future returns. Blended financing solves this problem by strategically using public funds and development assistance to improve the risk and return profile of investments through the provision of basic investments, grants, guarantees, equity, low interest loans, capped return schemes etc. (OECD, 2017). As such, there are encouraging examples of the use of blended financing in both developing (Advani, 2016) and developed countries (Sørensen and Torfing, 2022).

While, in principle, co-created infrastructure projects that are economically viable can be successfully realized through blended finance, other local SDG projects that do not produce a return on investments cannot. However, the basic idea of blended finance might still be relevant since public financing and development assistance will often be able to mobilize monetary or in-kind contributions from the private sector that combined with the resource inputs from the plethora of co-creating actors will help to provide sufficient resources for the realization of local SDG projects. GOGREEN will explore how the access to blended financing helps spur the realization of co-created green transition projects by studying the opportunities to attract pecuniary and non-pecuniary resources from governments, philanthropists and other private donors, financial institutions and local community actors.

e) Intermediation linking local actors with government at multiple levels

The local co-creation of green solutions is conditioned by rules, regulations and policy programs made at multiple levels of government, and the chance that co-creation will take place and be successful grows substantially if these conditioning factors play an enabling (rather constraining) role for the collaboration between local actors (Oosterhof, 2018). Some national, regional and local governments are eagerly engaged in removing red tape that makes it difficult to form innovation partnerships between public agencies, private businesses and NGOs and to build support systems for convening relevant and affected actors around a shared agenda. However, there are also governments that fail to do so. Governance studies suggest that failure is more likely when a traditional state-centric understanding of governance dominates in a given setting (see e.g., Clarke, 2017). Moreover, research suggests that a promising way to make governments more attentive to how they can support local implementation of the SDGs or other global and national governance agendas is to promote close and continuous dialogue between local actors and governments at different levels (Shulla et al., 2020). Dialogue can illuminate for governments when local actors have the capacity to deliver on goals that governments struggle to meet, such as reducing CO_2 emissions or enhancing biodiversity. It can also help governments to understand how they can further local efforts to solve problems and meet goals by removing national-level barriers and constraints. Dialogue not only helps government be more supportive of local sustainability partnerships but can also create opportunities for local actors to better understand government agendas, access valuable resources and locate the support they need. It also helps to build trust and mutual respect between government and civil society (Ma et al., 2020). Hence, the benefits of dialogue flow in both directions: from government to local actors and from local actors back to government.

Yet close and continuous dialogue between governments and local actors involved in co-creation tends to be rare due to the institutional boundaries and decoupled problem-solving between them. The further promotion of dialogue between central and local levels calls for targeted and persistent efforts to build an

institutional intermediation architecture. At the local level, there tend to be relatively few venues and occasions where local government actors such as politicians and leading public administrators engage with local stakeholders and citizens in settings that accommodate productive dialogue. Opportunities for higher-level governments to engage with local actors tend to be even fewer. The current efforts to establish intermediating institutional platforms and digital communication structures can potentially strengthen the conversation between national, regional and local governments and local actors about what can be done to enable local actors to reduce fossil-fuel-based energy consumption, reduce pollution, protect endangered species, adapt local communities to the reality of climate change, and promote more sustainable ways of living (Hoffmann et al., 2013; Ansell and Gash, 2018; Sørensen and Torfing, 2019). GOGREEN will not only study how rules, regulations and policies issued by national, regional and local government condition the local co-creation of sustainable solutions, but also how dialogical intermediation takes place and contributes to enabling local action.

4.3 Tactical and operational governance factors

a) Inclusion and empowerment of relevant and affected actors

Co-creation thrives on inclusion, although the transaction costs of collaborating and the risk of stalemate tend to increase with the number of participants. Still, within the limits of the possible, co-creation aims to bring together a broad range of relevant and affected actors in order to make use of their different experiences, ideas and resources through the co-creation of innovative solutions to common problems (Ansell, Sørensen and Torfing, 2022). Managing and exploiting the differences between public, private and third-sector actors, including different groups of users and citizens, presupposes that all of these actors can participate effectively in the sense of understanding the agenda, introducing themselves, emphasizing their competences, grasping the main points from presentations, engaging in deliberation, trusting their own ability to influence decisions, and maintaining a close connection with the group or organization they represent. This presupposition of effective participation does not always hold in reality as key social, political and economic resources are unevenly distributed across the participating actors due to a combination of socioeconomic inequalities, differences in social and political group status, and varying experiences with participation in collaborative processes. Actors may be strong in many personal respects and be trusted and appreciated by their peers, while lacking political capital defined as the experience, knowledge, skills and resources necessary for effective participation in political debates and social change processes (Sørensen and Torfing, 2003). In order to level the playing field and give all actors a fair chance of being heard and influencing joint decisions, the conveners of local co-creation processes must seek to empower the weaker actors while reminding the stronger actors of how they may marginalize or scare off participants if they fail to make room for their valuable contributions. In fact, the whole group of participants must be empowered in order to make sure that they understand the problem at hand, the conditions for solving it and the basic features of the potential solutions.

The empowerment concept comes from community psychology (Zimmerman, 1995, 2000), which has been preoccupied with how people—most notably poor and oppressed groups—can gain mastery over their own affairs. The United Nations has more recently come to see empowerment as a key means to eradicating poverty and achieving sustainable development. Here, empowerment is defined as capacity-building actions, interventions and conditions that enable individual actors or groups to achieve a desirable outcome (e.g., effective participation) that allows them to influence the results and outcomes of joint

action. At the group level, empowerment may start by providing information about the possibility to become actively involved in co-creation. It may also involve the organization of a pre-meeting with weak, vulnerable or inexperienced participants in order to bring them up to speed with what is going to happen in the meeting and informing them how they can contribute to the process. Other empowerment strategies include the mentoring of weaker actors, selective activation of their skills and knowledge, facilitation of meetings that allow everybody to speak up, and the framing of reflection that allows participants to critically evaluate how the collaborative interaction is framed and conducted. Conveners may also facilitate high-speed information sharing in the early phase of a co-creation process in order to level the playing field by providing the participants with the same basic knowledge about problems and possible solutions. GOGREEN will examine whether and how co-creational leaders aim to empower some or all of the participants in local co-creation processes in order to see whether it helps to harness the manifold experiences, ideas, competences and resources that relevant and affected actors bring to the table.

b) Clarification of interdependence vis-à-vis common problem and joint vision

Although local actors may sometimes collaborate out of a sheer desire to do something meaningful together with others or because habit and logics of appropriateness dictate doing so, the readiness of the actors to stick together in the face of disagreements, troubles and the rising cost of participation is greater when there is a sense of interdependence and shared destiny between them. Perceived interdependence will encourage actors to look for additional leverage and collaborative advantage (Huxham and Vangen, 2013). Sometimes individual actors discover that they cannot achieve their objectives unilaterally but have not yet realized their mutual interdependency. Co-creation develops when actors perceive that the realization of their goals and aspirations depends on the knowhow, resources, connections, ideas and commitment of other actors. Recognition of mutual interdependence will spur collaboration and encourage participants to exchange and pool their respective resources. Interdependence may sometimes emerge spontaneously as part of a process wherein different actors interact without any clear agenda but then formulate goals that can only be realized through a joint effort (Torfing, 2022). However, interdependence can also be revealed through leadership interventions that seek to foster mutual dependence vis-à-vis a particular set of goals.

Theories of metagovernance, defined as the governance of governance, stress the important role of strategic leadership for clarifying, strengthening and creating interdependence in ways that spur collaboration (Kooiman, 2003). Clarifying interdependencies involves pitching the need to solve a pressing problem to a group of relevant and affected actors and asking them to map the resources and competences that they can contribute toward problem-solving. One particular strategy for clarifying interdependence is to demonstrate to powerful and resourceful actors who are tempted to go it alone that they lack something possessed by the weaker actors. Another strategy is to illuminate how the weaker actors can contribute their own experiences, ideas and knowledge in ways that both enhance their influence and improve the overall solution. Strengthening interdependencies involves the creation of a community of destiny that explains to everyone that we are in this together and can only rise and conquer if everyone commits to the process. This strategic boosting of a sense of shared destiny among the members of the local community can be encouraged through the hosting of community events and media communications that turn the attention to joint problems and the resources available for addressing them. Creating interdependencies involves rewarding collaborative problem-solving either by making the

formation of a partnership based on interdependence and resource exchange a condition for receiving public funding or by making the endorsement of co-created solutions dependent on the active contribution and support of all relevant and affected actors. GOGREEN will study the perceived interdependency between the actors participating in co-creation processes and analyze how leaders attempt to clarify, strengthen and create interdependencies in order to build momentum for collaboration.

c) Trust-building and conflict mediation

Getting relevant and affected actors to engage in collaborative problem-solving requires more than individual and collective empowerment of the participants and the clarification and strengthening of their interdependence. There is an ever-present risk that the involved actors will be reluctant to collaborate with each other due to the lack of trust or the presence of conflicts (Ansell, Sørensen and Torfing, 2022). To remove or mitigate that risk, facilitators must first endeavor to build trust, which is defined as the positive but uncertain expectation that other actors will refrain from exploiting a given situation to act opportunistically (Nooteboom, 1995). Facilitators must both build interpersonal trust between the participants as well as institutional trust in the fairness and efficiency of the collaborative process (Vangen and Huxham, 2003). The former is basically a matter of spurring social interaction between the participants so that they get to know each other, understand each other's reasons for participating, and slowly begin to trust that the other participants are prepared to collaborate, share their knowledge and resources, and respect the outcomes of joint deliberation. The latter is very much a question of involving the participants in defining the set of rules, norms and procedures that help to overcome power asymmetries, find and implement fair solutions, and share the benefits they produce and the prestige and honor of having produced them.

Trust is essential for creating sustained collaboration between a diverse set of actors with different backgrounds, perspectives, interests and norms, but conflicts may arise even in relatively trust-based forms of collaborative engagement. Some conflicts may be productive by forcing the participants to clarify and perhaps amend their views and arguments. In contrast, other conflicts are destructive, leading to stalemate and the erosion of trust between the participants. Destructive conflicts may ultimately undermine and ruin the co-creation process and should be mitigated through proactive forms of conflict mediation aimed at turning antagonistic conflicts—where the conflicting parties view each other as "enemies" to be defeated—into agonistic conflicts between "adversaries" competing for influence but playing for the same team. The final goal of conflict mediation is to foster accommodation, compromise or agreement between the conflicting actors (DeChurch and Marks, 2001). Empirical studies show that successful conflict mediation may help to advance the co-creation of environmental solutions (Weber, 2009; Steelman, 2010; Ansell, 2011). In their effort to mediate conflicts and maintain a certain level of trust, the conveners and facilitators of co-creation become mediators who intervene in conflicts in order to create some kind of settlement that facilitates a constructive management of the differences between the involved actors so that they can learn from each other and create new and effective solutions. GOGREEN will study how preemptive conflict management through trust-building and proactive conflict management through intermediation can help to spur the co-creation of green solutions.

d) Use of experimental tools for innovation

Green transitions require innovation in technology, consumption, policy and programs; for not to mention in ways of thinking. As a potential force for green innovation, co-creation projects can innovate by engaging in various types of experimentation that allow them to explore alternative strategies for achieving a more sustainable future. Experimentation takes many different forms, from technical "laboratory experiments" conducted in highly controlled and artificial conditions to "real world" pilot projects that evaluate new strategies at full scale in the field (Ansell and Bartenberger, 2016). Experiments can be "socio-technical" in nature and focused on finding and testing more sustainable technologies or they can be more social or political in nature and focused on developing more sustainable social behaviors, improved public policies or new strategies of governance (Sengers, Wieczorek and Raven, 2019). To conduct such experiments, co-creation projects often require specific types of technical and administrative capacity as well as social and political authorization and support. Research on sustainability transitions has been attentive to the "niche" nature of experimentation, observing how sustainability experiments typically occur in protected spaces that provide support for a particular innovation but can also limit the application to that particular niche.

While experimental innovation is often an output or outcome of co-creation, it is also useful to think about the co-creation process itself as experimental. In a co-creation process, a group of stakeholders and lay citizens will come together to try to make a contribution to the green transition. This process is typically open-ended, emergent and uncertain, and it will often feel experimental to those who participate in it. The experimental nature of co-creation has often been conceptualized as a design process (Sanders and Stappers, 2008). At least two innovation tools—as flagged by the design literature—can help to make co-creation processes more innovative: user-centered design and prototyping. The former stresses the importance of accessing the knowledge and perspectives of those who will ultimately use the product, policy or institution. Since co-creation projects are often composed of diverse participants, this tool often starts by facilitating dialogue among the diverse participants themselves, but it also seeks to extend beyond the co-creation participants to engage a broader set of relevant and affected actors. The latter innovation tool, prototyping, is a process of iteratively improving a design based on continuous user feedback. Prototypes are approximations of a solution ("mock-ups") with various levels of realism. Typically, a co-creation process will begin with relatively crude, easily accomplished approximations and then develop and refine them by moving toward more sophisticated and complete designs. User-centered design and prototyping provide useful insights into co-creation processes, because they capture the emergent, creative and uncertain nature of collective innovation. GOGREEN will investigate how both the context ("niche") and process ("design") of co-creation affect the ability of stakeholders and lay actors to engage in creative action and problem-solving that leads to innovative technologies, behaviors, policies and programs that contribute to sustainability.

e) Ongoing critical self-reflection and learning (e.g., developmental evaluation)

To achieve ambitious agendas that produce significant contributions to sustainability, co-creation projects must find ways of reflecting on their progress and evaluating their achievements so that they can break through stalemates, adapt their strategies and refine their goals. Policies, projects and programs traditionally do so through various well-known monitoring and evaluation strategies. Co-creation, however, presents several challenges to typical evaluation practices, which assume preset goals, well-articulated theories of change, and clear timeframes for achieving specific results. By contrast, and as noted earlier, co-creation projects have an emergent character in which preliminary goals are often fluid, strategies of

change developed only progressively, and project timeframes are unclear from the outset. While the importance of learning and self-reflection are accentuated in such emergent situations, the midcourse and final evaluations of results based on goals, strategies and measures set out at the beginning of the co-creation are often less useful. It is therefore critical to appreciate how green transition projects can build learning and collective reflection into the co-creation process in ways that permit them to adapt in real-time as goals, strategies and results evolve.

While traditional modes of evaluation may still be relevant for co-creation projects, there are several approaches to evaluation that may enhance their specific needs for self-reflection and learning. One such approach is "process evaluation," which seeks to evaluate the ongoing quality of collaboration so as to garner feedback that can be used to improve collaboration in a timely fashion. Since the outcomes of emergent processes rely heavily on the quality of interaction among participants, such process evaluations allow co-creation projects to make quick process corrections to repair negative collaboration dynamics. Another approach to evaluation that mirrors the emergent nature of co-creation is called "developmental evaluation" (Patton, 1994). Developmental evaluation introduces critical diagnostic questions into the co-creation process that encourage participants to address basic assumptions about the direction of the collaboration and to collect information that will enable participants to judge whether their current understandings and objectives are on the right track and whether action theories embedded in provisional solutions produce the expected results. In essence, developmental evaluation is about pushing participants to continue to reflect critically on whether they are in agreement about their future course of action, whether their current objectives are sound, and whether they are on-track to meet them. Data is collected to help them test working assumptions and align their strategies. A crop research program based on developmental evaluation has demonstrated its effectiveness in promoting collaborative innovation while maintaining fidelity to the overall mission (Moore and Cady, 2016).

While co-creation projects may not explicitly adopt "process evaluation" or "developmental evaluation," what is really critical here is whether they are able to build sufficient self-reflection and learning opportunities into the co-creation process. GOGREEN will investigate whether co-creation projects are engaging in continuous critical review of their own working assumptions, timely collection of information that allows them to evaluate these assumptions, and adaptive actions in the face of this information.

5. Theory-driven identification of competing constellations of governance factors

Having presented a long list of governance factors that are likely to influence and drive the co-creation of green transitions, the obvious question becomes how to further explore the relative importance of these factors through empirical analysis. Ostrom (2007) provides a convincing argument in favor of configurational analysis, where the different governance factors are assumed to interact and jointly affect outcomes, and Qualitative Comparative Analysis (QCA) appears to be an obvious method for evaluating alternative configurations of factors that drive the successful co-creation of sustainability solutions. QCA is a technique designed for the comparative analysis of small- and medium-sized batches of qualitative case studies. Using Boolean algebra and set theory, QCA looks for constellations of necessary and sufficient conditions associated with a particular outcome (Marx, Rihoux and Ragin, 2014).

It is possible to learn a lot from QCA simply by inductively exploring the impact of a large number of factors randomly assembled in different clusters. However, it is also valuable to conduct the QCA in a more theory-

driven fashion by exploring different sets of factors that are part of a theory that offers a particular causal interpretation of a particular constellation. We identify three theories, all of which draw on the framework presented above but aim to capture different real-life strategies for successfully co-creating green transitions conditioned by a particular national and local context. The theories differ in terms of who initiates and orchestrates the co-creation of green transitions: Is it state actors, grassroots organizations or an in-between layer of more or less professional entrepreneurs from private corporations, international development organizations or civil society organizations?

The first theory aims to capture *state-initiated co-creation* based on the formation of public–private partnerships that allow state actors to mobilize support and resources from social and economic actors in the pursuit of innovative solutions. While the state might be able to do quite a lot on its own, it may realize that co-creation spurs innovation and helps to build a broad ownership over the green transition. State-initiated co-creation is typically found in the countries of north-western Europe, such as Denmark, which have a strong interventionist state aiming to mobilize the resources of strong and well-organized actors from the economy and civil society. Public actors may play a leading role in the co-creation process, but they often seek to distribute leadership tasks among the participants to ensure buy-in.

The second theory aims to capture *entrepreneur-driven co-creation* where well-trained, skillful and professional entrepreneurs from private corporations, international development organizations or social foundations use their enthusiasm, insights and networking skills to broker and bridge diverse social and political groups while occasionally also involving public actors. Entrepreneur-driven co-creation is typically found in Anglophone countries, such as the USA, which have a liberal state with relatively strong capacities coupled with weak traditions for societal intervention and a strong entrepreneurial culture in civil society and the economy.

The third theory aims to capture *grassroots-based co-creation*, where local activists and community leaders aim to mobilize neighborhoods, communities of faith, ethnic groups or women, exploiting their social hopes and indignation to fuel the development of bottom-up initiatives, which more often than not are formulated in opposition to the central government elites; albeit sometimes in alliance with pockets of progressive civil servants and local politicians. Grassroots-based co-creation is typically found in developing or newly industrialized countries, such as Brazil, where the central state may lack governance capacity and sometimes also interest in the pursuit of ambitious green agendas, but local grassroots organizations and community mobilizations in alliance with progressive local politicians and administrators often play a progressive role in bringing a broad range of committed actors together in self-managed change processes that target social and environmental problems and spur sustainable development.

More theories about how the co-creation of green transitions is spurred in a particular group of countries can be developed, thus allowing us to explore the many worlds of co-created green transitions. However, the three theories presented above provide some interesting archetypal alternatives. While the theories are developed with particular types of countries in mind, various strategies for spurring the co-creation of the green shift are in reality likely to co-exist. A QCA exploring the three theories across a wide spectrum of cases from all parts of the world will help to determine the general validity of the three theories.

The three theories tend to prioritize different sets of governance factors. Table 1 provides an overview of the hypothesized importance of the 15 governance factors associated with each of the three theories.

Table 1: The relative importance of the 15 governance factors for the three theories

Governance factors	State initiated co-creation	Entrepreneur driven co-creation	Grassroot co-creation
1. Severity of biosphere conditions	High	Medium	Medium
2. Legislation, programs and formal goals	High	Medium	Low
3. Relative openness of public governance paradigms	High	Medium	Low
4. Traditions of citizen participation and community mobilization	Low	Medium	High
5. Mechanism for ensuring top-down government and bottom-up social accountability	Medium	High	Medium
6. Strategic agenda setting by means of translation	Medium	High	High
7. Construction of narratives about successful multi-actor collaboration	Low	High	High
8. Building and harnessing institutional platforms and arenas	High	Medium	Medium
9. Provision of access to blended financing	Medium	High	High
10. Intermediation linking local actors with government at multiple levels	Low	Medium	High
11. Inclusion and empowerment of relevant and affected actors	High	Medium	Medium
12. Clarification of interdependence vis-à-vis common problem and joint vision	High	High	Medium
13. Trust-building and conflict-mediation	Medium	Medium	Low
14. Use of experimental tools for innovation	Medium	High	Medium
15. Ongoing critical self-reflection and learning (e.g., developmental evaluation)	Medium	Medium	High

By highlighting the prominent governance factors associated with state-initiated, entrepreneur-driven and grassroots co-creation, Table 1 provides some expectations for conducting a configurational analysis. Specifically, we anticipate that these three different approaches to the co-creation of green transitions might depend on different sets of factors for producing success, which we can briefly elaborate.

In the strategy for *state initiated co-creation*, the following six governance factors are assumed to have a high impact on the successful co-creation of green solutions:

1. Severity of biosphere conditions
2. Legislation, programs and formal goals
3. Relative openness of public governance paradigms
4. Building and harnessing institutional platforms and arenas
5. Inclusion and empowerment of relevant and affected actors
6. Clarification of interdependence vis-à-vis a common problem and joint vision

A plausible interpretation of the role of these factors is that capable governments will eventually put severe biosphere conditions on the political agenda and pass relevant legislation with clear goals and supported by policy programs. These factors will help to pave the way for a significant government investment in fostering sustainable solutions. The openness of public administration to organized stakeholders and lay-actors, such as citizens, neighborhoods and civil society organizations, will then be decisive for spurring the co-creation of committed government agencies aiming to mobilize societal resources for the green transition. The involvement of societal actors may be facilitated by the availability of platforms and arenas that help to lower the transaction costs of collaborating and likely foster collaborative innovation if the actors come to understand and appreciate their mutual resource interdependence.

In the strategy for *entrepreneur-driven co-creation*, the following six governance factors are assumed to have a high impact:

1. Mechanisms for ensuring top-down government and bottom-up social accountability
2. Strategic agenda-setting by means of translation
3. Construction of narratives about successful multi-actor collaboration
4. Provision of access to blended financing
5. Clarification of interdependence vis-à-vis a common problem and joint vision
6. Use of experimental tools for innovation

A reasonable interpretation of the role of these governance factors is that a sandwich strategy for ensuring accountability is important when different private organizations and interest groups join forces to foster green transition. The group of collaborating actors may be more concerned with their own ideas and interests than with the needs of the local community, and this group must be held accountable for its activities. Joint action may be spurred by strategic agenda-setting aimed at translating overall societal goals to a specific context and locality in order to simultaneously build legitimacy and ownership for a particular set of goals. A key tool for bringing together relevant and affected actors and motivating them to co-create solutions is the construction of stories about successful past multi-actor collaborations in order to demonstrate the feasibility and likely impact of collaborative action for the green transition. Moreover, clarification of the potential contributions of each of the participating actors and the common need for sharing and pooling resources will further spur the co-creation of green results. The actors may have very different experiences, ideas and interests, so they must be convinced of the value gained from investing time and resources in collaboration. When collaborating, there will be a risk of tunnel vision and risk that actors fear the costs of innovation failure. The availability of experimental innovation tools may help to overcome this problem by encouraging outside-the-box thinking and prototyping, which may be a useful strategy for "failing small" and in ways that spur fast learning. Finally, since the actors may not themselves possess the resources needed to fund and finance their collective endeavor, it is important for them to gain access to blended financing so that they can implement new co-created ideas that have a real impact.

Finally, in the strategy for *grassroots co-creation*, the following five factors are assumed to have a high impact:

1. Traditions of citizen participation and community mobilization
2. Strategic agenda-setting by means of translation

3. Construction of narratives about successful multi-actor collaboration
4. Provision of access to blended financing
5. Intermediation linking local actors with government at multiple levels
6. Ongoing critical self-reflection and learning (e.g., developmental evaluation)

One way to justify the impact of this particular constellation of governance factors is to note that visible local problems may have a greater chance of spurring collaboration between local actors and of drawing in public actors if they are connected to higher-level government goals that are translated in ways that resonate with the local problems. Grassroots and community actors may want to do something about the local problems provided that there is a tradition for citizens participation and community mobilization and the local actors believe that collaboration is feasible and rewarding. Telling and re-telling stories about positive past experiences will definitely encourage participation and collaboration. When the actors eventually begin to collaborate, they will tend to encounter unforeseen and initially unacknowledged hindrances. Leading upward by linking up with relevant government actors that can help them to get exemptions or find ways to work around restrictive legislation may be helpful in the development of new and innovative green solutions. The co-creation process and the impact of the co-created solutions will be improved if the participating actors constantly ask self-critical questions about whether they have understood the problem or challenge correctly, whether they have found the right solution, or whether they have sufficient data to evaluate results. Finally, since grassroots actors often lack resources beyond their strong commitment and energy, the co-creation of green solutions will be strengthened by access to blended financing.

6. Discussion of the scope of the argument and the limits of our study

The argument of the GOGREEN project is that the co-creation of green transitions can be supported by different constellations of governance factors. As such, we are focusing on what drives the successful co-creation of green solutions rather than comparing co-creation with alternative governance mechanisms such as top-down government imposition, which appears to be successful in China, or market-led strategies, which prevails in the US. Hence, we will not be able to conclude that co-creation is the best strategy for promoting green transitions, but only that competing sets of governance factors seem to be conducive for stimulating the co-creation of green solutions and that the constellations of governance factors may vary across contexts.

GOGREEN will study how different constellations of governance factors impact the co-creation of green solutions in order to discover the combination of factors leading to successful outcomes. We are in that sense searching for the Holy Grail, as it could potentially be very useful for practitioners to have a clearer understanding of the 3–6 governance factors that are critical for successfully co-creating a green and sustainable future. The noble ambition of the project, however, should not blind us to the limitations. We shall here point out four important limitations of our study that we should bear in mind.

First, we treat co-creation as a multi-dimensional compound concept in the sense that we will both look at how different actors are aligned and brought together in collaborative processes and at how innovative solutions are designed and implemented, while we pay less attention to the causal linkages between collaboration and innovation that are inherent in co-creation. The qualitative case analysis will be able to

establish how collaboration unfolds and how it spurs innovation, but the QCA will treat the co-creation of innovative green solutions as the dependent variable.

Second, treating the co-creation of green solutions as the dependent variable collapses the different between the co-creation process and outcome in terms of a steps toward a green transition. In other words, green transition will be seen as internal to the co-creation process through which it is produced. Again, the qualitative case analysis will be able to distinguish the co-creation process from its end result and inductively assess whether factors other than co-creation influence the production of more or less successful green solutions, but in the QCA we will not be able to capture this distinction, merely looking instead at whether the co-created green transition occurs in combination with a particular set of governance factors.

Third, when assessing the more or less successful co-creation of green solutions, we are doing so at a particular point in time and often before we can be completely sure of the real impact in the future. We will be researching contemporary cases of co-creation, but the results and impact of the co-creation process may take a long time to materialize. Hence, initial and expected success, may not hold up over the long-term. Conversely, projects facing an initial failure to gain support for and properly implement a new green solution may later turn out to be highly successful in fostering green transitions when first the initial obstacles are overcome. The study of the subsequent and long term impact of the green co-creation project that we are studying lies beyond the scope of the present project.

Finally, our analysis focuses on governance conditions for niche, project-level innovation in a particular local context. Focusing on the co-creation of green solutions at a particular time and place means that we will not be able to fully track the subsequent evaluation, scaling and diffusion of the innovative solutions and how they interact with other niche innovations to produce systemic innovation.

7. Where to from here?

The theoretical framework presented above will inform the development of a research protocol that governs the design and conduct of global comparative case studies. The research protocol will provide a detailed guide for how the case studies will be conducted, including overall plans, the operational definition of key variables, instructions for mixed-method data collection (desk-top studies, document analysis, interviews, observations of meetings and events, and mini-surveys) and the expected form and content of the final case report.

The cases will be drawn from different countries in different parts of the world. The GOGREEN project partners will produce 17–18 case studies, and associated partners identified through the GOGREEN franchise model will produce another 5–7 case studies. An additional number of cases will be found through an upgrading of suitable cases from the Collaborative Governance Data Bank.

This strategy begs the question of how the cases will be selected together with questions regarding the criteria for case selection in the different countries. We propose a purposive selection of typical local co-creation projects focused on developing innovative solutions in relation to one or more of the (green) SDGs. At least one of these SDGs should focus on either SDG 7 or SDGs 11–15. Purposive case selection requires prior knowledge of suitable cases gathered via the internet and national reputation, as gleaned from researchers and practitioners in the green transition field.

The cases do not necessarily have to have an explicit focus on more than one of the green SDGs but should have clear relevance for them. The cases should incorporate a broad range of actors (including lay actors) in the project, and the collaboration between these actors should be seen as a main driver of in the creation of innovative solutions. In addition, the co-creation projects that we will study must aspire to produce step-change rather than merely incremental improvements to an existing solution.

The selected cases must be accessible in terms of location and transportation to avoid excessive emissions, and there should be genuine commitment from those involved in the co-creation to participate in the study (and this commitment should preferably be established through sufficient dialogue and a written letter of mutual consent). In terms of timing, it would be ideal to study a case from the late midstream of the co-creation process to its near completion so that we can both look back at the initiation of the process, assess the quality of the interaction and evaluate the result and impact, while constantly paying attention to the impact of the conditioning governance factors.

While we cannot pre-judge whether the cases will be successful in co-creating green solutions or fail in their endeavors, we do expect the majority of the cases to end up having varying degree of success, which we will seek to explain based on the qualitative analysis of the co-creation process and the impact of the governance factors. However, the QCA will construct a cut-off point that will create a binary division of the cases in terms of successful/unsuccessful.

The QCA is the ultimate goal of the cross-case analysis and will be based on the data reported in the case reports. The reliability and validity of this data is paramount to the entire analysis and the quality of the final results. Hence, it is important to follow the instructions for data collection and data analysis carefully and to make sure that the reporting of the findings in relation to the different variables is exact and based on the operational definitions provided by the research protocol. The data will be collected based on mixed methods that allow for triangulation. The final reporting of the case analysis will be both qualitative and quantitative, since all variables must be scored on a Likert scale (from 1–7).

The expected result of the QCA will be the identification of competing constellations of governance factors that appear to be conducive for the successful co-creation of green solutions. We will both explore the presence of competing configurations of impactful governance factors inductively and based on the aforementioned attempt to deduce characteristic constellations associated with different types of countries.

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