Cities as public agents: A typology of co-creational leadership for urban climate transformation

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A B S T R A C T

This article develops a typology of co-creational leadership for urban climate transformation. The typology is constructed from a combination of governance theory and empirical observations of co-creational leadership in four global, climate-ambitious cities. By applying a framework that differentiates between authority (multilevel or polycentric) and purpose (policy design or implementation) as key dimensions and categories that structure and condition cities' performance of co-creational leadership, the typology draws out four unique yet interdependent ideal types of leadership. The typology serves two aims. First, it allows a more nuanced understanding of the ways in which contextual features present distinct types of challenges and condition co-creational leadership by cities. Second, it provides a framework for investigating what is required by city officials as leaders of co-creation. The typology underlines how co-creation is an intrinsic element of hybrid city climate governance.

Knowing how to lead the 'green shift' is the most challenging part of climate transformation.
Top bureaucrat, City of Oslo.

1. Introduction

Global cities have high climate ambitions. Translating these ambitions into low carbon, sustainable and just urban futures present formidable challenges. Such translation depends on a variety of public and private actors undertaking collaborative climate leadership. As the quote above indicates, knowledge about how cities perform climate leadership is scarce in practice, and this corresponds to a gap in current research. There is little in current climate governance scholarship on the nuanced leadership roles cities play in order to engage other relevant and concerned actors to jointly tackle a changing climate (van der Heijden 2019; Hughes 2017). Similarly, collaborative governance theory seldom highlights the nuances of urban leadership when it comes to the unique challenge posed by the evolving climate crisis (Hofstad and Vedeld 2021).

In response to these gaps in research and practice, we have developed a *typology of co-creational city leadership for urban climate transformation*. This was constructed from a combination of theory and empirical observations of how city officials lead co-creation processes in four climate-ambitious cities. A key objective was to extract a general characterisation of approaches city leadership deploys to inspire, influence and engage actors or 'units' from the wider climate governance system to act and interact (Crosby and Bryson 2018; Sørensen and Torfing, 2019). City leadership plays a crucial role in promoting, supporting and giving direction to co-creation as a necessary and intrinsic component of urban climate governance (Torfing 2019; Brandsen et al., 2018; Sørensen et al., 2021; Anguelovski and Carmin, 2011, 169). The proposed typology offers a stringent structure for achieving a more nuanced understanding of the ways in which distinct governance challenges and opportunities create conditions for specific types of co-creational leadership. Hence, it contributes to broader scholarly debate on collaborative governance and conditions for successful urban climate governance.

The starting point for the typology is the emergence of a new and broader urban climate agenda where climate transformation has gone from being an ideal and primarily an academic concept to becoming practical policy guidelines (Blythe et al., 2018). In the wake of the UN Climate Change Conference Agreements, the Sustainable Development

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Goals and the EU's 'Green Deal' policy, cities have gradually exchanged their narrow, voluntary and strategic approach to climate urbanism for a broader systemic approach. This approach connects climate change to the working of the economy, socio-technical systems, urban infrastructure and the cultures, routines, and practices of daily life (Bulkeley 2021:5). The climate agenda thus creeps into and interlinks a wide set of actors, systems and activities mirroring the call of global institutions and science for fundamental system changes at the local, national, and global scales. This includes deep decarbonisation of energy systems, infrastructures, transport, industry and finance; creating circular economies and adopting sustainable, just living; and preparing and adapting to the changes brought about by climate change (Figueres et al., 2017; Hurlimann et al., 2021).

Decarbonising the economy and radically transforming the urban fabric to pave the way for a zero-emission, resilient and socially just future is almost a utopian ideal. Hence, this ambitious goal must instead be read as a continuous and radical vision for urban development that points towards pathways to climate transformation and sustainability. When treated as a guideline for policy, the climate transformation ideal must relate to and ideally spur change among existing real-life actors, governance schemes and business models, as well as addressing power imbalances and competing agendas (Blythe et al., 2018; Morrison et al., 2017). This endeavour raises increasing conflict and tension as is evident in new climate activism movements, such as Extinction Rebellion and Fridays for Future, as well as in counter-reactions from local and national movements such as the Yellow Vests movement against car restrictions, high gas prices and compact neighbourhoods for low-carbon city development. This mix of ambitious restructuring of urban economies and systems, acute distribution issues and challenges to established ways of living and working calls for public and private leadership (Anguelovski and Carmin 2011; Hofstad et al., 2021a; van der Heijden 2019). Of particular interest is the leadership performed by cities as public agents and key sites for climate transformation (Bulkeley and Betsill 2013; van der Heijden 2019; Bulkeley 2021).

The article starts by explaining the methodological, empirical, and theoretical foundation of the typology. It proceeds by introducing and discussing the dimensions and categories that constitute the typology's theoretical building blocks, which differentiate between authority (multilevel or polycentric) and purpose (policy design or implementation). Subsequently, the article uses these dimensions and categories as a framework from which to compare the experiences of how city leadership navigates through specific governance challenges related to co-creation in the four cities. It identifies general patterns and trends in the distinct leadership strategies and roles, in turn leading to the proposal of four ideal types of co-creational city leadership that constitute the core of the typology. The last part of the article characterises and discusses the typology by analysing and comparing its buildings blocks, and draws out implications for theory and practice.

2. The methodological, empirical, and theoretical foundation of the typology

2.1. Comparative logic

Our comparative logic suggests that the city cases should provide insight into similar sets of modes, patterns and processes of governance and leadership (Ward 2010). To secure such functional equivalence, we selected cities with ambitious climate goals, substantive climate policies and institutional capacities. They also had a known history of city officials engaging actively with collaborative processes in climate policy development through urban networks and arenas, and of participating in different global climate networks with other climate-ambitious cities (e.g., C40, Eurocities, Carbon Neutral Cities Alliance – CNCA, and ICLEI – Local Governments for Sustainability) (Hofstad and Vedeld, 2020; Hofstad et al., 2021b). These features were considered to provide a fruitful laboratory for studying and comparing experience of city leadership and engagement with co-creation processes.

Three of the cities are Scandinavian (Copenhagen, Gothenburg and Oslo), an institutional setting marked by relatively well-functioning institutional relationships, devolved mandates and resources, a high degree of trust between the governed and the governors and a long tradition of co-governance (Rothstein and Stolle 2003). Cape Town, on the other hand, resides in an institutional context that diverges from the Scandinavian one politically, economically, culturally and socially. For example, its institutional capacity and resources at local level are more limited and the city has less devolved authority over key policy areas than its Scandinavian counterparts (Hickmann and Stehle 2019; Hofstad and Vedeld 2020). If Cape Town practices collaborative and co-creational forms of leadership despite these hindrances, it will strengthen the feasibility and application of the typology beyond the North European sphere. Potentially, the comparative logic will help to unpack the 'taken-for-grantedness' of Scandinavian similarity by providing knowledge on leadership across these geographic and social differences.

To establish that the four cities in the present study are representative of relatively climate-ambitious global cities, we consulted different sources that rank cities based on their climate governance performance, while recognising that the ranking of such a complex issue is challenging. In these rankings, Oslo scores on average among the top 15 cities, Copenhagen somewhat lower and averages number 20, while Cape Town is among the five lowest in a ranking of 39 global cities participating in C40 (Wang et al., 2020). Gothenburg does not participate in C40 and, therefore, is not listed here, but the city compares well with the two other Scandinavian cities in other review articles (Hofstad and Vedeld 2020, 2021, Hofstad et al., 2021a,b).[1] In sum, the comparison aims to reveal distinct and generalisable co-creational leadership types that are deployed by city officials in co-creative climate transformation across specific governance contexts, while opening the door for nuanced learning and reflection (Yin 2017; Ward 2010).

2.2. Empirical foundation and methodology

The empirical foundation of the typology is a qualitative study of how city leadership engages with co-creation processes in the development of climate policies and practices in Cape Town, Copenhagen, Gothenburg and Oslo. As presented in Table 3, it consists of *a document analysis* of key plans, strategies, programmes and policies, with a view to capturing each city's intentions and governance measures and how co-creation formed an integrated part of creating these policies. In addition, we conducted *qualitative interviews* in the period 2018–2020 based on a semi-structured interview guide adapted to a variety of key public and private stakeholders. This provided information on the design of and engagement in concrete co-creational arenas, who the participants were, how interactional processes were led and unfolded and what the outcomes were. In total, the interview material consists of 82 interviews and a workshop (22 participants), as shown by Table 1.

Similarity of interviewees was sought across the cases to facilitate comparison.[2] The interviewees represented a mix of city officials charged with climate governance responsibility (mainly leaders and high/medium-level staff); politicians involved in the formulation of

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[1] In a ranking of 64 countries across the globe according to a climate change performance index, the three Scandinavian countries rank highest (but the top three places are left blank as none perform sufficiently well), while South Africa ranks 39th – before the US, Japan, Eastern European countries and Canada (Burck et al., 2022).

[2] Due to the COVID-19 pandemic, data collection in Cape Town was constrained and the number of interviews was more limited. Many interviews were conducted digitally. The data material consists of nine interviews and input from a workshop held on 18 September 2020 attended by 22 representatives of the city and academia on the revision of Cape Town's climate strategy.

Table 1
Empirical overview, data material per city.

Empirical material	Cape Town	Copenhagen	Gothenburg	Oslo
Document Analysis	- Climate Change Strategy (2020) - Urban Regeneration Programme (2019, 2020)	- Climate Strategy and Roadmap (2012, 2020) - Urban Regeneration Plan (2009)	- Climate Programme (2014, 2021) - Social Equality Plan (2018) - Cooperation Agreement for Transport Policy Package (2017) - Plan for Inner-city Renewal (2012)	- Climate Strategy (2014, 2020a) - Governance measures (2019a-e, 2020b) - Cooperation Agreement for Transport Policy Package (2018, 2019) - Car-free city life strategy (2017)
Interviews	9 (22[a])	24	20	29

[a] The number of participants in the workshop alluded to above.

climate goals and policies; private business leaders operating in the cities; various officials in civil society organisations active at the local, regional and/or international level; and a number of public officials at the regional and national level. Each interview lasted approximately 1–2 h and focused on the interviewees' experience relating to the topic. A common code tree guided the project team's analysis of the audio-taped and transcribed interview material.

2.3. Theoretical foundation

The article combines two strains of collaborative governance and urban climate governance literature. Urban climate governance scholarship provides insight into a set of factors and relationships of importance to understanding successful governance. These are the capacity of cities to address climate change mitigation (Broto and Bulkeley, 2013; van der Heijden 2019; Bulkeley, 2021); the specific interplay that unfolds between urban climate policy-making and multilevel government actors and levels (Hickmann and Stehle 2019; Kern 2019); and the emergence of networked experimentation and collaboration as key modes of governance across a diversity of actors and scales within the wider polycentric system (van der Heijden 2019; Smeds and Acuto 2018). However, this scholarship provides limited systematic knowledge about the more precise role of city leadership in engaging and mobilising relevant and concerned actors (van der Heijden 2019; Hughes 2017). Collaborative governance theory and more recent developments in co-creation theory help to fill this gap by providing relevant insights on leadership and the institutional framework within which city leadership is performed (Ansell and Torfing 2021, 2018–2019; Ansell and Gash 2008, 2018; Sørensen and Torfing, 2019; Sørensen et al. 2021).

We build on this scholarship and focus the analysis on the types of leadership, enacted by elected politicians and their administration, which formally govern cities. These city officials are equipped with a mandate and authority to lead on behalf of the city. However, the increasingly more pronounced emphasis on integrative, collaborative and public value-oriented aspects of public leadership in theory development shifts the analytical attention beyond the traditional and narrow focus on intra-organisational leader-follower relationships towards a focus on the leadership of multiple actors in inter-organisational relationships with other concerned actors. We see public leadership as 'the inspiration of others to undertake collective action in pursuit of the common good' (Crosby and Bryson 2018, 1268). This definition is particularly interesting when studying public leadership devoted to creating pathways towards climate transformation, as the city leadership only controls minor domains of the problems at stake and their potential solutions (Hughes et al., 2018; Jordan et al., 2018; Wang et al., 2014; Wurzel et al., 2019).

To understand how co-creational leadership unfolds and can be characterised, we must pay attention to the specific characteristics of co-creation. *Co-creation* is here utilised as an emergent concept under the collaborative governance umbrella representing a distinct form of collaboration across public and/or private actors to tackle complex problems, such as climate change, and which spans sectors, levels and professions (Bryson et al., 2015; Crosby et al., 2017; Scott and Thomas 2017; Ansell and Torfing 2021). Drawing on Ansell and Torfing (2021) and Torfing et al. (2016), we define co-creation as a *'process through which a plethora of public and/or private actors are involved – ideally on equal footing – in a collaborative endeavour to define common problems and design and implement new, better, yet feasible, public solutions'*.

Co-creation possesses a set of characteristic features that condition and shape the exercise of city leadership (Hofstad et al., 2021a, 3–4). It is a problem-driven exercise potentially involving *responsible* (public actors), *affected* (lay actors), *interested* (organised stakeholders) and/or *resource-controlling* actors (experts and companies). Given this heterogeneity, a co-creation process is not linear, but interactive, fluid and dynamic. Co-creation is considered an active form of collaboration that may take place during or throughout policy and implementation processes (Bouvaird 2007; Voorberg et al., 2015; Osborne et al., 2016; Lund, 2018; Fox et al., 2019). The locus of public value creation lies in this interaction or encounters between agencies and not in the individual participants (Osborne et al., 2016). The aim is to generate learning-based solutions built on a joint understanding of the nature of the problem, the necessary goals and the content of the solution to be designed and adjusted to changing institutional contexts. Hence, co-creation is both 'talk-centric' and 'action-centric' (Hofstad et al., 2021a). To unleash the potential for public value creation, participants involved in the process must align their value propositions and negotiate what counts as valuable for society and particular groups of individuals (Bryson et al., 2021).

We suggest that *co-creational leadership for climate transformation* is distinguishable from other forms of leadership in that it aims to disrupt common wisdom and established practices to facilitate innovation (Ansell and Torfing 2021). Successful co-creational leadership rests on the city officials' ability to (Hofstad et al., 2021a, 4):

- *Mobilise concerned actors* – engaging, inspiring and motivating responsible, affected, interested and resourceful actors
- *Convene collaboration* – facilitating and giving direction to interactive processes by issuing a formal mandate or creating persuasive storylines
- *Design collaborative platforms and arenas* – providing physical and/or digital institutional opportunities and rules that lower the transaction cost of co-creation

Ideally, these leadership initiatives create *trust and ownership*, function to *span boundaries* and *resolve conflicts*, and instil willingness to *take risks* and *experiment* (Weber and Khademian 2008; Hambleton 2019; Ansell and Gash, 2008; 2018; Hofstad et al., 2021a). The idea is that collective efforts produce greater value than the sum of benefit streams each actor would have produced in isolation (Torfing et al., 2016, 8).

Co-creation is not without blind spots and potential failures, however. Research shows how co-creation depends on a facilitative environment with an 'inviting' public sector and an aware, able and willing private sector and citizenry (Voorberg et al., 2015). Yet co-creation may be guided by hidden agendas to cut public spending, and it may prove to increase inequalities rather than levelling them and operate too independently of representative democracy (Rossi and Tuurnas, 2019; Steen et al., 2018). Furthermore, co-creation may be ridden by an asymmetric distribution of power, where some actors (often public) hold the power to frame, design and pragmatically develop policies and practices (Morrison et al., 2017). The critique provided by these authors is a reminder not to treat co-creation as an ideal free of failures and dilemmas, but rather to measure and judge its contribution to the creation of public value and innovation (Steen et al., 2018; Voorberg et al., 2015; Wegrich 2019). However, this paper is explorative rather than evaluative, and co-creation is treated as an analytical concept that helps us to understand, disentangle and characterise the relational and interactive features of cities' climate leadership.

3. Identifying the main building blocks of the typology

The methodological literature argues for both empirically and theoretically constructed typologies (Collier et al., 2012; Reiche et al., 2017). We chose a combined strategy that builds on the robustness and solidity of current theoretical research while mirroring these theoretical concepts in the empirical observation of leadership practices in the four cities. In practice, this involved an iterative exchange between theoretical inquiry and empirical observations, which is in line with our explorative ambition.

According to Collier et al. (2012, 217) a typology is 'an organized system of types that makes crucial contributions to diverse analytic tasks: forming and refining concepts, drawing out underlying dimensions, creating categories for classification and measurement, and sorting cases'. In practical terms, this involves identifying underlying dimensions that capture the salient elements of variation in the overarching concept, which in this setting is co-creational city leadership for urban climate transformation (Collier et al., 2012, 223). The first step of constructing the typology is thus to flesh out key categories according to which the dimensions vary.

We suggest that the typology consists of two core *dimensions* with related *categories*:

- Dimension 1: *Leadership authority* – the institutional role, mandate and capacity of the city leadership to stimulate co-creation in two distinct settings; *polycentric* and *multilevel governance* (as core categories)
- Dimension 2: *Leadership purpose* – the engagement with and leadership of co-creation processes with relevant and affected actors through leadership of co-created *policy design* and *implementation* (as core categories)

The combination of these dimensions and categories enables us to identify and propose four ideal co-creational leadership types, as will be elaborated in the subsequent sections.

3.1. Dimension 1: Leadership authority

Inspired by current urban governance literature, the proposed *leadership authority* dimension illustrates how co-creational leadership for climate transformation is conditioned by, and may draw authority from,

two distinct systems of governance and related constellations of actors (Heinen et al., 2021). Both categories under this dimension, *multilevel* and *polycentric governance*, entail dispersed decision-making authority among multiple actors, each of which controls or influences a share of the solution to a concrete common problem handled by multiscalar governance actors (Heinen et al., 2021; van der Heijden 2019; Hickmann and Stehle 2019; Jordan et al., 2018). A basic assumption of the typology is that the systems of polycentric and multilevel governance condition cities' enactment of co-creational leadership in distinct ways. The two perspectives differ in their understanding of how relevant actors interact, regulate relationships and formally depend upon each other to resolve particular issues and design appropriate rules for collaboration (Heinen et al., 2021). They resemble what Hooghe and Marks (2003) refer to as type 1 and type 2 multilevel governance.

Stemming from research on the European Union, multilevel governance initially described a system of continuous negotiation between nested governments to solve interdependent policy problems, while polycentric governance originates from studies of governance arrangements in the United States and denotes a system that spans multiple spheres of authority, sectors and scales with a plethora of different actors and institutions that are simultaneously involved in designing and implementing policy (Ostrom 2010; Jordan et al., 2018; van der Heijden 2019). In current climate governance research, these two systems of governance are sometimes merged into a wider category (Berardo and Lubell, 2019), sometimes used interchangeably (Kern, 2019) and sometimes, as in our case, treated separately (Hickmann and Stehle, 2019). In practice, the distinction between the two perspectives have often been blurred. Although city leaders operate in both systems simultaneously, it is fruitful to distinguish between them analytically as it makes it easier to decipher and delve into the different roles of authority when cities seek to mobilise and convene diverse groups of actors to act and interact in arenas and platforms to pursue different dimensions of climate transformation.

Multilevel governance is defined as a system consisting of a relatively stable set of government levels that maintain key responsibilities and formalised authority (Hooghe and Marks 2003; Heinen et al., 2021). However, the exact distribution of authority over (in our setting) climate change governance across actors is open for negotiation and in need of coordination. Accordingly, the formal multilevel governance system provides city leadership with formal, pre-fixed and institutionally-derived roles, hierarchical relations and authority. A key aspect is the embedded nature of authority as enacted through formal jurisdictions and government (Kern 2019). However, the precise distribution of roles and tasks is constantly under pressure and negotiation. This opens the door for bargaining and co-creation initiatives on the part of the city leadership (Heinen et al., 2021). Leadership action – and thus the analysis of such – becomes concerned with the steering of interactional relationships between multiple formally-interdependent levels and sectors of government, and the adjustments to and integration of higher-level policies at the local level.

Polycentric governance is a non-hierarchical set of interactions between actors operating at multiple levels (Morrison et al., 2017, 2). Roles and regulated responsibilities are less pre-defined, and a main distinguishing aspect is the emphasis placed on self-regulation and self-organisation by various independent or autonomous actors (Heinen et al., 2021; Ostrom 2010). The city is perceived as just one of many nested 'units' within the wider governance ecosystem, with none having discretionary power over another (Kern 2019; Jänicke 2017). The core leadership task is to bring a diversity of public and private actors and networks together in a synergistic and dynamic fashion and align them

for mutual efforts on co-creating innovative solutions. This involves managing a variety of actors from organisations with a multitude of rules, interests and powers when designing platforms and arenas and leading co-creation processes.

Thus, while from a multilevel perspective cities derive their leadership authority from their mandated role and authority in the governance system, from a polycentric perspective, their leadership authority stems from each actor's distinct role and resources in relation to the issue at stake and their willingness to engage as self-organised entities in co-creation processes.

3.2. Dimension 2: Leadership purpose

The second dimension, *leadership purpose*, builds on and nuances insights on core aspects of leadership from collaborative governance and co-creation theory. An awareness of the dependency on contributions from other actors to set climate transformation in motion stimulates city leaders to seek collaboration and devote funding, staff time and capacity to mobilise others and leverage additional resources in accordance with the city's goals and policies (Bryson et al., 2015; Ansell and Gash 2018; Emerson et al. 2012:3; Emerson and Nabatchi 2015:722; Scott and Thomas 2017:194). City leadership engages in collaborative processes in two purposeful ways: *policy design* and *policy implementation*.

Policy design is the 'deliberate attempt to craft a comprehensive set of visions, goals, causal assumptions, rules, tools, strategies and organizations to address a particular policy problem' (Ansell et al., 2017:468). Collaborative governance theory anticipates that climate policy design, as a complex endeavour that radically departs from status quo, depends on co-creation with multiple stakeholders early in the process (Weber and Khademian 2008; Bryson et al., 2021; Ansell and Gash 2008, 2018). In this regard, Ansell et al. (2017:474) contend that public leaders should strive to develop co-creatively designed policies, with early involvement of multiple, relevant stakeholders. This will have several advantages:

- Scrutinisation of the policy problem from multiple perspectives
- Sustained goals, tools and strategies
- Subscription to the storyline of the new policy
- Sufficiently innovative ideas and measures capable of breaking free from trade-offs between competing goals
- Sufficiently open and flexible policies to allow subsequent adjustment to unforeseen challenges

Ideally, co-created policies will provide wide ownership and agreement on transformative pathways. For city leadership, the challenge is to appropriately deal with the substantive and inherently political aspect of developing policies for climate transformation (Ansell et al., 2017:473). To succeed in formulating a common ground, city leadership needs to address and align adverse values, interest conflicts, power games, legitimacy concerns and trade-offs between equally desirable goals early in the process.

Policy implementation focuses on the execution of policies. The scientific understanding of this activity between policy expectations and results has evolved from its early top-down focus to a more context-sensitive and broader approach to implementation that addresses the importance of collaboration between relevant actors inside and outside public organisations (DeLeon and deLeon, 2002; Hill and Hupe 2006; McGuire 2006). In the case of climate policy, the scope also encompasses sectors and scales. According to Ansell et al. (2017:478), the leadership of collaborative implementation should engage front-line staff in the municipal administration to provide hands-on knowledge and identify necessary skills, competences and resources. This is in addition to external stakeholders to secure political support, necessary resources and actions for selected solutions, as well as solicit constructive feedback that may stimulate policy learning, detect problems and provide incremental adjustments. The authors argue that the leadership challenge is

Table 2
Dimensions, categories and ideal types of the typology.

		Leadership authority	
		Polycentric governance	*Multilevel governance*
Leadership purpose	*Policy design*	Ideational leadership	Integrative leadership
	Policy implementation	Distributed leadership	Adaptive leadership

to align actors within and across the municipal organisation and to iteratively adjust and combine policy goals and implementation efforts. Ideally, this will facilitate flexible translation and adoption of policies, and permit calibrated exercise of leadership and deployment of resources, as well as organisational learning and continued experimentation, as also underlined by current urban climate governance scholarship (Bulkeley 2013; van der Heijden 2019; Smeds and Acuto 2018).

4. Ideal types of co-creational city leadership for climate transformation

Within the frames of the abovementioned dimensions and categories, we distinguish a set of ideal leadership types, as illustrated in Table 2:

- *Ideational leadership*: leading co-design of ambitious, common climate visions, goals and policies to mobilise a broad set of relevant and autonomous private, civic and public actors operating according to a polycentric governance logic
- *Integrative leadership*: leading co-design of policy and institutional change to ensure policy integration and alignment across the municipal organisation and widen the local room for manoeuvre within the multilevel governance system for shared climate action
- *Adaptive leadership:* leading co-adjustment and co-implementation of innovation in and transformation of relevant infrastructures and systems of the urban fabric for local implementation as embedded in the multilevel governance system
- *Distributed leadership:* facilitating co-implementation of local experimentation and technology innovations across the wider polycentric ecosystem of distributed and fragmented private, civic, academic and public actors for behavioural change and self-governance

Each leadership type highlights a distinctive approach to collaborative problem-solving in specific climate governance contexts, as observed by how city officials in the four case cities lead and facilitate co-creation processes. In practice, there are many overlaps between the types and roles performed; the tasks and tools associated with each type are often observed to be employed in concert or sequence for specific purposes.

4.1. Ideational leadership for co-created goal setting

Ideational leadership is employed in response to a polycentric context where the city leadership does not have direct authority over

Table 3

Ideals and goals guiding the cities' climate leadership (City of Cape Town 2020; City of Copenhagen, 2012; City of Gothenburg, 2014; 2021; City of Oslo 2020a).

	Cape Town	Copenhagen	Gothenburg	Oslo
Ideal	'Just and sustainable'	'Green innovation and growth'	'Sustainable and fair'[a]	'CO$_2$ reduction'
Goal formulation	To become a city that is climate resilient, resource efficient and lower carbon (…) to enable sustainable and inclusive economic and social development, and environmental sustainability	In 2025, Copenhagen is the world's first CO$_2$ neutral capital	… a sustainable and fair emission of greenhouse gases by 2050 (operationalised as 1.9 tons of CO$_2$ equivalents per inhabitant per year)	To reduce CO$_2$ emissions by 65 percent by 2025, and by 95 percent by 2030

[a] Based on the city's 2014 Climate Strategic Programme. The recently approved integrated environmental and climate programme for 2021–2030 has a similar but broader vision: 'an ecologically sustainable city for nature, the climate and people' (Göteborgs Stad, 2021:8). Most of the interviews took place before the new programme came into effect, and the previous climate programme, valid from 2014 to 2020, has therefore been included in the table (City of Gothenburg 2014).

relevant actors. To lay the foundation for climate action undertaken by a broad array of public and private actors, a main purpose is to engage actors in early co-design of a common vision and/or goals to guide their actions. Climate goal and vision setting is thus conceived as a core leadership task to enhance governance proficiency within the wider governance framework. This is also reflected in theories of leadership and in climate governance research (Anderson and Sun 2017; Meijerink and Stiller 2013; Hofstad and Vedeld 2021).

The comparative analysis of climate leadership in Cape Town, Copenhagen, Gothenburg and Oslo shows how ideational leadership approaches form an active part of these cities' collaborative strategies and that co-creation plays a crucial part in assembling and aligning public and private actors behind the cities' climate goals and visions (see also Hofstad et al., 2021b). Table 3 summarises the ideals expressed in the cities' climate strategies and their exact goal formulations.

There are obviously different ways of conducting ideational leadership, and the outcomes in terms of the goals and visions illustrated in Table 3 reflect the differences in the city officials' engagement with co-creation processes in response to distinct contextual differences. Gothenburg and Cape Town are both cities confronting a combination of relatively high socio-spatial inequalities, limited institutional and operational capacity, and relatively vague political backing and mandate. Both cities chose to target a wide set of actors in the co-design of all-encompassing climate goals with a focus on joint learning and exploration of ideas and goals and the design of elaborate policies (City of Cape Town 2020; City of Gothenburg, 2014; 2021). Oslo and Copenhagen, in contrast, through intense internal and external dialogue, adopted climate goals that are relatively clear and specific. These emanate from the leadership of co-creational processes aligning both professional public and private business stakeholders within sectors with the highest potential for cutting CO$_2$ emissions towards common goals – transport, energy, buildings, construction and circular economy (City of Copenhagen 2012, 2020; City of Oslo, 2016; 2020a). This collaborative approach emanates from a clear political mandate and a dedicated administrative entity assigned the leadership role for coordinating and pushing the cities' climate policy forward.

In each of the cities, these local collaborative processes are combined with active engagement in trans-local and transnational city climate networks, which the cities use to learn, build capacity and influence global policies and markets, as well as stage themselves as green, sustainable and global front-runners. The leadership in Gothenburg and Cape Town leans mostly on experts with minor political and practical influence, while in Oslo and Copenhagen, city officials concentrate on resourceful and responsible actors with major practical influence and interests in the relevant agendas – thus linking talk-centric and action-centric co-creation. However, none of the four cities manage to engage a broad plethora of actors. Most notably, they fail to fully take advantage of the involvement of relevant and affected citizens. This focus on engaging mainly sympathetic and professional actors to a greater degree than lay actors corresponds with a failure to address up front controversial political issues embedded in the stipulated goals and

policies.

4.2. Integrative leadership for institutional change

Integrative leadership operates within the multilevel system of governance consisting of mutually dependent and nested governmental actors. In line with general theories of integrative leadership and governance (Page 2010; Visseren-Hamakers 2018), its purpose is to co-design new or adjusted institutions and policies, and ensure policy integration or mainstreaming of climate policies across departments, entities and sectors. The empirical analysis identifies three distinct approaches to integrative leadership.

Integrative leadership to build local institutional capacity. The leadership in each of the four cities seeks to expand each city's own institutional capacity for climate transformation through various forms of co-creation with key public and private actors. Oslo's adoption of a 'climate budget' process as a key leadership instrument for coordinated approaches is an illustrative case in point (City of Oslo 2020b; Vedeld et al., 2021). To stimulate the realisation of the climate budget's intended reduction of GHG emissions across sectors and projects, the city leadership of Oslo designed internal thematic working groups with representatives from relevant municipal sector entities to address new and GHG emission domains with an innovative potential. These collaborative groups built internal capacity and enhanced aligned approaches across sectors to reduce emissions. The initial suggestions were simultaneously calibrated through external dialogue with relevant private and public actors in a trans-local business for climate networks in order to refine common public-private approaches. Subsequently, the municipality developed common policies across sectors including new procurement rules and new urban planning requirements with climate criteria in order to pursue the climate-friendly actions identified through the climate budget process (City of Oslo, 2019a-e, Vedeld et al., 2021).

Integrative leadership to provide wider institutional leeway. Integrative leadership also relates to bargaining upwards in a variety of city-to-city, regional and national arenas to achieve necessary changes in national policy or regulations that potentially hamper climate transformative action at the local level. For example, all four cities have formed networks or alliances with other large cities in their respective countries to increase their negotiation and conflict-resolution powers. As such, they seek to enhance their own position in order to co-initiate institutional changes and alter or co-design new national regulations that, in turn, enable desired local climate action. Our data material points to such co-creational leadership efforts in relation to changing the institutions of the energy systems (Cape Town), planning and procurement rules (Oslo) and transport regulations (Gothenburg, Copenhagen, and Oslo).

Integrative leadership to design new institutions through trans-local collaboration. A final form of integrative leadership relates to how interactions and co-creation initiatives at the international level lay the foundation for building and strengthening institutions at the city scale, occasionally bypassing national-local hierarchies. All four cities participate in a number of trans-local and transnational climate networks. The

involvement of the three Scandinavian cities in the Eurocities network on climate change is a case in point: city leadership works to develop and change directives and policies, thus conditioning city-level climate change efforts.

Our empirical material shows that integrative leadership for institutional change within the multilevel system works on the one hand to stimulate collaborative innovation in policies and institutions over which the city leadership has direct authority, yet remains dependent on authority and resources held by internal actors to make and/or uphold policy integration and necessary changes. On the other hand, such leadership also aims to pursue change in agencies and policies within the multilevel system outside the direct reach of the city's authority, but with a significant potential impact on its ability to reach its climate goals.

In sum, we find that the cities' integrative leadership is distinguished by engaging public actors with main responsibility at various scales in new or existing co-creational platforms and arenas. Moreover, leaders use their convening authority to expand their own formal mandate and policy influence. Finally, they actively design or invite themselves to arenas and platforms deemed relevant to expand their formal institutional room for manoeuvre by building capacity and new national or international policies and regulations. Thus, they address political blind spots and conflicting concerns that have not been addressed by pre-existing institutions.

4.3. Adaptive leadership for implementation and transformation of the urban fabric

Adaptive leadership is performed within the multilevel governance system and is related to policy implementation and development of the urban economy and the urban fabric. It is highlighted as a key feature of securing resilient structures and systems (Olsson et al. 2004). In our setting, the unique purpose is to lead co-implementation of innovations in infrastructures, energy and transport systems, urban land use and socio-economic systems to enable decarbonisation and sustainability. These infrastructures and systems are deeply dependent on the nation state to formulate national strategies and regulations, and to co-finance investments with city-level actors. Since infrastructures often form part of wider metropolitan systems, cities are also dependent on what neighbouring municipalities do and their willingness to co-operate and co-fund adjacent infrastructures. Moreover, transformation of the urban fabric is dependent on city and regional/state public entities and private companies and entrepreneurs working together to initiate and plan urban development. Thus, cities seek to engage a combination of multilevel and polycentric actors. However, their authority role is at the backbone of adaptive leadership, as they seek to transform formal structures that are dependent on action and support from national authorities and regional actors in control of legal, professional and financial resources.

In this regard, the empirical context for climate governance differs between the city cases. In Cape Town, Copenhagen and Gothenburg, energy production is a key source of emissions, whereas in Oslo, transport is the main emitter given the high level of renewable energy generation in Norway (City of Cape Town 2021; City of Copenhagen, 2020; City of Gothenburg, 2020; City of Oslo 2020; Hanssen and Tønnesen, 2021; Hofstad et al., 2022).

Three adaptive leadership approaches to co-creation stand out in the case material:

Adaptive leadership for blended finance investments in public transport, cycling and walking. The cities of Gothenburg and Oslo are involved in broad 'policy packages' combining and ideally creating synergies between several sector policies (e.g., transport, land-use, climate) and measures to pursue sustainable urban mobility and reduce GHG emissions from the transport sector (Cooperation Agreement Gothenburg, 2017; Cooperation Agreement Oslo, 2018; 2019). The City of Oslo took an especially active leadership role, seeking to adjust the content of the policy package to support local climate ambitions regarding land use and transport (Hanssen and Tønnesen, 2021; Tønnesen et al., 2022).

Adaptive leadership for innovative solutions in energy systems and transport technologies. Copenhagen's adaptive leadership serves as a representative example. As the city's primarily fossil-fuelled heating system could potentially deliver more than 70 per cent of the cuts in CO_2 emissions requested by the city's climate strategy, the publicly-owned metropolitan heating company, HOFOR, was the key entity involved in mobilising and influencing actors in the quest for CO_2 neutrality. To this end, the city administration and HOFOR engaged in what was termed 'joint fact finding' with relevant partners upwards, sideways and downwards to test new ideas and search for potential sources of funding for a shift from the former fossil-fuelled energy production to new fossil-free energy carriers (biomass and wind turbines).

Adaptive leadership for urban renewal. Large-scale urban renewal and densification processes have taken place in all four cities for decades, demanding specific forms of co-creational leadership. Representative projects include the Mayoral Urban Regeneration Programme (MURP) in Cape Town, the Nordhavn project in Copenhagen, Oslo's 'car-free city-life' project and Gothenburg's inner city regeneration area in Älvstaden (City of Cape Town 2019, 2021; City of Copenhagen, 2009; City of Gothenburg, 2012:11; City of Oslo, 2017). These are all collaborative initiatives involving a wide range of public and private actors that seek to combine urban densification, networked experiments and investments in sustainable transport infrastructure, commercial development, recreational areas and community development. A key leadership mechanism is to bring actors together, align approaches and build bridges across sectors, levels and scales. City officials involve national authorities and large corporations in co-designing platforms for effective public and private investments in key infrastructures, while engaging and collaborating in a variety of arenas with community representatives to ensure the adjustment of goals and actions to local demands and needs.

In sum, the adaptive leadership of our four cities involves being a convenor, catalyst and boundary spanner, with emphasis on mobilising responsible actors (public authorities), but also resourceful (companies) and interested actors (organisations) in shared implementation approaches to innovate and transform relevant infrastructures and systems embedded in the multilevel governance system. As such, the collaborative approach addresses controversial issues of resource distribution and diverging values tied to existing infrastructures and their transformation. This is especially evident in Oslo, where the leadership takes active steps to substantially transform current transport systems, entailing a direct impact on people's professional and private lives.

4.4. Distributed leadership for green growth and technology solutions

Distributed leadership denotes how cities perform leadership by and through others operating within a polycentric system of governance to co-creatively implement green innovation and networked experimentation. It is observed as a key city governance strategy in relevant governance scholarship (Bolden 2011; Pearce and Conger 2003) and a dominant strategy for urban climate governance (Bulkeley and Castán Broto, 2013; Smeds and Acuto 2018; Bulkeley, 2021; Jordan et al., 2018; van der Heijden, 2019; Vedeld et al., 2021).

There is an abundance of such co-created and networked initiatives

in the four cities studied here, ranging from large platforms and arenas that address a wide variety of policy or project issues to smaller networked experimentation or projects that seek to solve one acute problem or a single issue. Both trans-local and transnational city networks help to build own capacity and scale up and out innovations nationally and internationally.

The following examples illustrate the variety of arenas, platforms and networks that city officials have designed or engage with. The 'Gate 21' platform operates in the greater Copenhagen region across several municipalities, universities and businesses, and is a jointly-initiated heterogeneous arena designed to serve as a place where 'problems meet solutions' – bridging sectors and scales by connecting actors in a triple helix partnership to stimulate innovation in the form of new climate solutions and green jobs. In the same vein, but as a private sector-initiated network, the 'ElectriCity' platform operating in Gothenburg, created and led by the global company Volvo, aims to develop sustainable and attractive transport in the metropolitan area. It seeks to do so through innovation and testing across 15 partnerships between relevant industry, academia, the public sector and civil society. Likewise, 'Green Cape' in Cape Town, is created and run by a non-profit organisation as a platform that aims to support green economy solutions at regional and local levels in the Western Cape Province by developing the interface between business, government and academia. It receives government funding. The City of Oslo has established a 'business-for-climate' network led by the climate agency (Vedeld et al., 2021). Illustrating a smaller networked experimentation project is Oslo and Copenhagen's engagement and experimentation with fossil-free construction sites. The city leadership works closely with construction firms, entrepreneurs and funding partners, as well as international businesses and C40 members, in co-initiating, co-designing and co-implementing projects.

We find that distributed leadership often involves mobilising a broad-based combination of several public agencies, a variety of private businesses, research/university institutions, civil society/not-for-profit organisations and lay actors (citizens). Different constellations of such actors typically assemble around various types of platforms or arenas or in smaller networks within which the goal of the city leadership is to bridge and connect stakeholders for mutual and practical problem-solving and improved self-governance. These processes typically involve formal or informal processes of interactive learning, joint piloting and exchange of good practices, but also searching for a common approach to problem-solving, experimentation and green technology development. The cities' role in these initiatives is often to be a supporter and active participant in initiatives taken by other distributed actors, rather than the sole initiator and leader.

5. Characterising co-creational climate leadership

The typology represents co-creational leadership as a varied, complex, iterative and continuous activity that takes different forms across multilevel, polycentric scales when applied to the challenge of climate transformation in policy and implementation. Table 4 provides an overview of the typology. Based on the empirical analysis above, it also identifies a unique set of operative aims, actors, mechanisms and challenges linked to each co-creational leadership type. These factors come to the fore when we delve further into and compare the ideal leadership types according to each typology dimension.

5.1. Comparing the ideal types according to the leadership authority dimension

The leadership authority dimension is distinguished by the two categories 'multilevel' and 'polycentric' systems of governance, each representing specific constellations of relevant actors, and, as such, distinct sources of formal/informal authority. The analysis finds that the cities take on different leadership roles that reflect their distinct aims, relationship to core interdependent or independent actors and the instruments available to support their objectives within each of these governance systems.

Within the *polycentric governance system*, where we propose that cities face limited authority and control over relatively autonomous actors, leadership mainly takes on ideational and distributed leadership roles. The empirical examples show how the city leadership engages the most relevant and concerned public and private actors when seeking to create agreement on goals and visions, build trust across actors and scales, leverage resources and implement concrete technologies. The basic intention seems to be that altered ideals and joint, innovative technological experimentation and networked practices will eventually diffuse, potentially scaling out to influence a wider set of actors (Smeds and Acuto 2018; Bulkeley 2021; Vedeld et al., 2021). This indicates that the main instruments of city leaders are inspirational motivation, joint engagement and trust building. Cities cannot easily force autonomous actors to take part in co-creation to formulate new policies or innovate technologies.

When operating within *the multilevel governance system*, in which cities take on integrative and adaptive leadership roles, the main aim is

Table 4

Typology overview: Comparing the four leadership ideal types.

Ideal type	Ideational leadership	Integrative leadership	Adaptive leadership	Distributed leadership
Authority	Polycentric	Multilevel	Multilevel	Polycentric
Purpose	Policy design	Policy design	Policy implementation	Policy implementation
Aim	Co-creating mutual visions and goals	Enabling co-design of institutions and policies across entities	Co-adjusted and place-based decarbonised urban fabrics (energy systems, transport infrastructures, land use) and upscaling	Innovative solutions, co-experimentation, green tech development and scaling out
Core actors	Sympathetic circle of actors	Core stakeholders	Core stakeholders	Sympathetic circle of actors
Co-creational leadership mechanism	Convening and aligning through inspirational motivation	Convening and aligning actors with shared interests, lifting attention to institutional intentions and barriers	Creating a coalition for change through negotiations and co-development of solutions	Mediating and brokering to facilitate and catalyse action and self-governance
Co-creational leadership challenges	To formulate actionable ideas resonating with a broader set of actors with potentially diverging interests	To assert authority over key institutions, expanding the local room for manoeuvre	To assert authority over systems and structures to upscale necessary adjustments and transformations	To relinquish authority by supporting and nudging appropriate action by others

to expand the room for manoeuvre for local climate transformation by ensuring vertical and horizontal policy integration across a city's own governmental entities and other governmental units, which are formally dependent. City leadership seeks to bargain with other public actors to alter or adjust institutions, policy systems and infrastructures to enable local actions and build capacity. Yet institutions and infrastructures represent path dependent and sticky elements that are hard, yet crucial, to transform to attain urban climate goals. Therefore, to enhance authority and the city's capacity, its leadership must be bold and move beyond the sympathetic circle of relevant and concerned actors. City leadership navigates and uses its governmental authority to get a seat at the table and engage in policy processes that involve negotiation, conflicts and compromises with other public actors, and to build 'coalitions for change'. In this regard, we show how institutions and public infrastructures are not static but rather subject to co-creative (re-)design and thus continuously change and influence contingent circumstances for leadership.

5.2. Comparing the ideal types according to the leadership purpose dimension

Within the leadership purpose dimension, the typology distinguishes between the categories 'policy design' and 'policy implementation'.

The *policy design* category denotes how the city leadership mobilises, convenes and creates arenas and platforms for co-creating shared visions, goals and strategies. Ideally, joint early policy design efforts will encourage aligned climate transformative steps by both public and private stakeholders. When comparing the identified types of leadership pursuing co-created policy design, ideational and integrative leadership, focus is on building a solid mutual platform to facilitate action, which involves constant exchange of ideas and measures with experts, city peers and trans-local and transnational climate arenas and networks. The aim is to give direction and a clear mandate through inspirational motivation (ideational leadership), or to develop new policies responding to key institutional barriers for climate change action together with internal and external actors (integrative leadership)., yIdeational and integrative leadership do however diverge in terms of available authority. Cities cannot easily force non-city actors within the wider polycentric system to develop ambitious goals as a guide for their own actions. But they have the authority to regulate or outright restrict certain activities within their jurisdiction and to provide incentives for certain actions. However, the authority and mandate to actually do so may invariably be restricted by national authorities in laws, planning systems or guidelines.

Turning to the *policy implementation* category, the typology shifts focus to co-creational leadership devoted to concrete problem-solving on the ground. Adaptive leadership in this regard seeks adjustment and radical transformation of the urban fabric to match place-based concerns by engaging with national authorities, neighbouring municipalities and service providers, as well as urban developers and/or citizens. The composition of concerned actors mirrors how the infrastructures and systems of the urban fabric cross administrative and sectoral borders, thereby creating interdependence between actors across sectors and scales. Distributed leadership engages in co-creation with an even wider set of actors in finding green-growth and technological solutions to curb climate change – the initiative for collaboration coming just as often from private and civic stakeholders as from the city leadership itself.

A common aspect of these two types of co-creational leadership is how the city officials act as enablers for co-creation by taking a role as boundary spanners (adaptive leadership) or mediators/brokers (distributed leadership). They tie together a fragmented landscape of actors by establishing arenas and platforms, and engage in a variety of networks and partnerships. Perhaps more importantly, the leadership ensures that the conditions for implementation, such as necessary blended funding and regulatory leeway, are in place. However, the two

leadership types differ in some important respects. While adaptive leadership is about asserting authority over key infrastructures by convincing stakeholders to support necessary local transformations, distributed leadership is about relinquishing authority while at the same time supporting and nudging transformative action by others in support of joint agendas through self-governance.

5.3. Key insights arising from the typology

The typology deepens our understanding of co-creation as an instrument for climate transformation. We find that co-creation is both entangled in and evokes a distribution of authority among stakeholders, and thus ways of combining regulative authority with an enabling of self-regulation and self-governance. This insight is generally overlooked by collaborative governance theory in general, and co-creation theory in particular. Existing research tends to place more emphasis on the co-creation process as a virtue and a self-contained goal than as an instrument to achieve other specific goals (Fox et al., 2019:16; Voorberg et al., 2015). Co-creation is, as such, often contrasted with more traditional, regulative and market-driven forms of government, which are perceived to provide few opportunities for, and often hamper, co-creation or active involvement of citizens (Crosby, t'Hart and Torfing, 2017; Wegrich 2019; Ansell and Torfing 2021). However, we observe how the leadership of co-creation both supports and complements, but also depends on, traditional instruments of public governance.

The typology furthermore reveals two main leadership challenges confronting cities that seek to co-creatively develop ideas, institutions, infrastructures and new solutions that point to pathways for climate transformation.

The first challenge is a well-known leadership barrier to goal attainment observed in urban climate governance scholarship, namely to follow up and link good-intentioned policy designs with operationalised and targeted implementation on the ground (van der Heijden, 2019; Bulkeley 2021). For example, as the climate change policy agenda shifts from a focus on making energy systems fossil-free to policy agendas and actions with more direct impacts on citizens' daily life, such as in the conflict-ridden transformation of transport systems or land use, bold leadership with solid anchorage among a wide set of private and civic actors will be required. Hence, a core challenge is to 'walk the talk', making the 'talk' as operative and well-founded as possible, and thereby enabling ambitious collaborative action to follow.

The second challenge is linked to the distinction between leadership within the multilevel and polycentric systems of governance, respectively. On the one hand, the challenge for cities is to distribute and relinquish appropriate authority to citizens, companies, organisations and other public actors to facilitate, incentivise and enable collaborative climate action *and* self-governance. This involves renouncing authority or power to decide and predict necessary action by developing a role as facilitator and mediator. On the other hand, the challenge is the exact opposite; to assert regulative authority over institutions and infrastructures to ensure that a plethora of other actors' self-governance is in support of and complies with the city's climate transformative ambitions. To tackle this dilemma and succeed in this endeavour, they depend on co-creating a common understanding and willingness to act for 'the common good' with both supportive and opposing actors.

6. Conclusions: implications for theory, policy and future research

The article set off to construct a typology that allows for a more nuanced, contextual understanding of how cities perform leadership of co-creation to facilitate climate transformation. Ideal types of co-creational leadership were identified by iteratively drawing on a combination of theory and empirical observations. The findings fill a gap in urban climate governance scholarship and contribute to broader

discussions of collaborative governance. In real-life settings, we find that these distinct types of leadership are connected, interdependent and emerge in a dynamic and iterative fashion in response to contingent circumstances. City officials are found to use a conscious and hybrid mix of roles and instruments to enhance experimentation, innovation and public value outcomes through co-created pathways towards climate transformation.

By drawing on a comparative study of cities that are apparently similar (Scandinavian cities) and different (Cape Town), the typology responds to calls in the urban climate governance literature to move beyond the Global North when conducting empirical studies (van der Heijden, 2019). Firstly, we observe several similar leadership patterns and trends across the four cities when embarking on the same basic climate policy or implementation task with comparable climate ambitions. Secondly, we find that the expected similarity of the Scandinavian cities' approach to climate leadership falls apart upon closer inspection. For instance, the shared perception by city leadership in Gothenburg and Cape Town of key local contextual challenges led to similar ideational leadership approaches. Likewise, the adaptive leadership practices cut across the geographic and institutional differences. This indicates that the co-creational leadership approaches we have identified are generically deployed across the city cases.

Our four city cases were selected to represent cities and leadership with above average institutional capacity. However, we still believe that the typology also has relevance for less capacitated cities, which would be even more in need of mobilising private business and civil society actors through co-creative leadership within polycentric governance i. e., deploying ideational and distributed leadership strategies. Furthermore, cities of the Global South are often confronted by limited or non-supportive multilevel systems for local climate policies, with Cape Town being a case in point. This also directs attention to the relevance of enhancing integrative and adaptive leadership approaches.

Future research should explore how the proposed leadership types unfold in different contexts and how conflicts and path dependencies complicate or hamper the enactment of co-creational climate leadership, while maintaining a focus on the promise and opportunities for comprehensive climate leadership approaches to unfold successfully. Of interest is how city leadership employs a mix of regulative and collaborative instruments in 'hybrid' forms of urban climate governance.

CRediT authorship contribution statement

Hege Hofstad: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Project administration, Funding acquisition. **Trond Vedeld:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition. **Annika Agger:** Conceptualization, Methodology, Investigation, Writing – original draft. **Gro Sandkjær Hanssen:** Conceptualization, Methodology, Investigation, Writing – original draft. **Anders Tønnesen:** Conceptualization, Methodology, Investigation, Writing – original draft. **Sandra Valencia:** Conceptualization, Methodology, Investigation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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