ORIGINAL PAPER

Transnational municipal networks: Harbingers of innovation for global adaptation governance?

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Abstract

Few studies have examined transnational actors involved in global adaptation governance, despite their growing influence. This paper focuses on 100 Resilient Cities (100RC), a transnational municipal network (TMN) that has created governance instruments with potential for contributing to global adaptation governance. Despite their different nature from international actors (states and intergovernmental organizations), the distinct practices of TMNs and how they might influence global adaptation governance are uncertain. Vague claims suggest that TMNs are innovative, but what this innovation consists of remains unclear. Therefore, the research question here is: how do TMNs innovate in global adaptation governance? This paper strives to answer this question, by building an analytical framework to identify types and features of governance instruments, based on the literature on policy instruments, global environmental governance and global climate governance. It presents a case study of 100RC, based on an in-depth documentary analysis and semi-structured interviews. The results suggest that TMNs can be innovative, if they, like 100RC, create original governance instruments instead of using the existing tools of international or other transnational actors. While some of 100RC's tools favour a more recent, soft and indirect approach, its considerable use of hard practices with significant obligation is particularly interesting considering the general characterization of TMNs as voluntary and soft. The governance practices of 100RC are thus not in stark contrast with those of international actors. Their diversity could provide inspiration for future action to improve the effectiveness of global climate adaptation governance, and the analytical framework developed here could be applied in further studies.

Keywords Transnational municipal networks · Global adaptation governance · Governance instruments · Innovation

Abbreviations
100RC	100 Resilient Cities
ACCCRN	Asian Cities Climate Change Resilience Network
C40	C40 Cities Climate Leadership Group
COP	Conference of the Parties

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CRO   Chief Resilience Officer
ICLEI   ICLEI—Local Governments for Sustainability
IGO   Intergovernmental organization
IPCC   Intergovernmental Panel on Climate Change
PRA   Preliminary Resilience Assessment
TMN   Transnational municipal network
UNFCCC   United Nations Framework Convention on Climate Change

1 Introduction

Global climate governance, understood as the cooperation of actors from more than one state to respond to climate change, has seen the emergence of transnational actors (Bulkeley et al. 2014). At the 21st Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC), parties highlighted the importance of non-party stakeholders (e.g. civil society, private sector, sub-national government) and encouraged them to strengthen their efforts towards climate action (Bäckstrand and Kuyper 2017; Hale 2016). This is not specific to mitigation. Some authors observed this phenomenon in adaptation governance too, although studies on the issue remain scarce (Dzebo and Stripple 2015; see also Chan and Amling 2019; Dzebo 2019). The trend is even clearer regarding cities, which are gradually being seen as crucial actors of local climate governance (Johnson et al. 2015; Bulkeley 2010). Through transnational municipal networks (TMNs), they have also become part of global adaptation governance (Andonova et al. 2009; Kern and Bulkeley 2009).

TMNs are institutionalized spaces where cities from different countries take part to discuss urban issues (Busch 2015). They offer cities diverse resources, e.g. funds, information, knowledge and norms (Betsill and Bulkeley 2004). Previous research considers that TMNs have three distinctive characteristics: (i) they are composed of autonomous cities and local governments that joined voluntarily; (ii) they govern themselves and do not depend formerly on another official authority; and (iii) members execute TMNs' decisions directly (Kern and Bulkeley 2009).

This paper focuses on TMNs dealing directly or indirectly with climate change adaptation. The vast majority of TMNs have expressed concern about mitigation for a long time, but attention to adaptation has been more recent and sporadic. For example, ICLEI—Local Governments for Sustainability (ICLEI),[1] one of the oldest and most well-known TMNs, has been shaped by its mitigation programs and positions (Fünfgeld 2015). More recent climate-related TMNs include the C40 Cities Climate Leadership Group (C40), founded in 2005, and the Asian Cities Climate Change Resilience Network (ACCCRN), created in 2008.

Many actors see adaptation as an issue that goes beyond the scope of climate change and embraces broader global change (Eriksen et al. 2015). This seems to apply to TMNs, which have often worked on adaptation in relation to other questions (Busch 2015), as illustrated by the numerous resilience-related activities led by ICLEI, ACCCRN, or 100 Resilient Cities (100RC). Defining adaptation and how it can be tackled effectively is complex (Hall 2017), and this applies also to identifying TMNs' adaptation measures.

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[1] Formerly known as the International Council for Local Environmental Initiatives.

Several TMNs have built their identity by distinguishing themselves from international actors, i.e. states and intergovernmental organizations (IGOs), arguing that "while nations talk, cities act".[2] Scholars have highlighted the distinct nature of TMNs, networks and transnational actors, suggesting that they employ new and different ways of acting compared with international actors. Against this background, this article considers the following research question: how do TMNs innovate in global adaptation governance? By testing an analytical framework on governance instruments, this paper analyses TMNs' practices and strives to identify how their practices differ from those of international actors. It then discusses the implications of this diversity for global adaptation governance.

The next section reviews the existing literature on how innovative cities, networks and TMNs are in relation to adaptation governance. Since the characterization of innovation by TMNs is incomplete, the third section strives to fill this gap by defining the concept of innovation in relation to the development of governance instruments to steer a population towards a public good. The fourth section then builds an analytical framework that draws on policy studies and global environmental and global climate governance literature. The fifth section details the case study methodology, and the sixth section presents a case study of 100RC, a TMN which has developed a variety of tools to help its members adapt to climate change and enhance their resilience. The analytical framework is tested, and the main instruments used by international actors in global adaptation governance are described. The instruments used by the selected TMN are presented in detail. The concluding section highlights the main findings in terms of 100RC's steering approach. It emphasizes the diversity of the TMN's practices and discusses its implications with regard to the shortcomings of the practices of global adaptation governance.

This study aims to contribute to research in this field, by offering an operational definition of innovation, by studying in depth a major and understudied transnational adaptation governance initiative (100RC), and by testing an analytical framework of governance instruments for global adaptation governance. In the context of this Special Feature, it complements large- and medium-*n* studies of effectiveness of transnational adaptation governance (Chan and Amling 2019; Dzebo 2019) with an in-depth case study of specific governance instruments and the extent to which they represent innovation by transnational actors.

2 Cities and networks as enablers of innovation

Until recently, TMNs have worked mostly on mitigation. They have thus not played a prominent role in adaptation governance, which has only become part of the local agenda not long ago (Fünfgeld 2015). There are few empirical studies on this specific issue (Busch 2015; Bulkeley 2010). To our knowledge, those that have studied adaptation-related TMNs do so as part of broader studies focusing on cities (Bellinson and Chu 2019; Chu 2018; Spaans and Waterhout 2017) or as part of studies on a wider range of transnational actors and partnerships (Dzebo and Stripple 2015). These studies are, however, useful to our reflection as they help gain insight into the innovativeness of TMNs.

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[2] Michael Bloomberg has notably been using this famous C40 motto on Twitter: https://twitter.com/mikebloomberg/status/375346397870313473?lang=fr (last accessed January 31, 2019).

Innovation is becoming a topic of interest among scholars working on urban adaptation governance. They seem to agree that cities can be places of innovation (Hughes et al. 2018; Huang-Lachmann and Lovett 2016; Boyd and Ghosh 2013), despite the existence of institutional obstacles which may hinder the implementation of effective adaptation policies (Patterson and Huitema 2018). Among the different processes to overcome these challenges, scholars have focused considerable attention on experiments. Pilot schemes and trial-and-error processes on a small scale can help mitigate the costs of a possible failure, overcome the inertia of other actors or reconfigure urban dynamics in the face of change (Cloutier et al. 2018; Bulkeley et al. 2015; Castán Broto and Bulkeley 2013; Anguelovski and Carmin 2011).

Networks may also facilitate innovation in urban adaptation governance. Network governance is an important trend in the broader literature on adaptation governance (Biesbroek and Lesnikowski, in Jordan et al. 2018). Generally speaking, networks and partnerships tend to increase trust, commitment, social learning and adaptation (Baird et al. 2016; Chaffin et al. 2016; Bauer and Steurer 2014; Juhola and Westerhoff 2011). Their apparent horizontality and flexibility facilitate the pooling of diverse resources, which benefits their members (Bauer and Steurer 2014). Transnational structures appear to be key when it comes to developing innovation.

Several studies on cities and transnational networks have focused on how TMNs support innovation, albeit mostly in mitigation governance. As networks, TMNs connect horizontally and even vertically local actors to public, private, local and transnational partners: in contrast, international actors, when they engage with such diverse groups of actors, do so in a top-down approach only (Román 2010). In addition, a few authors have underlined the importance of TMNs' role in encouraging novel local climate action (Busch 2015; Reckien et al. 2015). Hakelberg (2014) describes how TMNs steer their members towards adopting climate plans, by disseminating uncoordinated local policies. He calls their strategies "governance by diffusion". Some scholars consider TMNs as an intermediate variable between global cities and climate action (Bulkeley and Schroeder 2008), whereby TMNs help global cities develop and promote their climate actions (Lee 2015, 2013). Lastly, some studies show how TMNs enhance cities' technical and normative innovations (Toly 2008).

TMNs are thus a source of novelty. By entering a state-centred space and claiming an active role in climate governance, they challenge the established norms with regard to who governs and how (Gordon 2013). This calls for a review of the classic distinction between national and international and suggests multilevel governance. By encouraging private actors to cooperate with mayors, TMNs also blur the public–private dichotomy. For instance, C40's partnership with the multinational company Arup has led to the design of several urban climate projects. By combining institutional and market-based elements, TMNs generate a new system of governance from the middle (Román 2010). TMNs are not international or local, public or private, but appear to govern cities from an intermediate space.

Several scholars consider, as well as critique, the innovativeness of TMNs. Regarding TMNs in general, the emergence of this hybrid form of governance, as illustrated above, could lead to a new lock-in (Acuto and Rayner 2016). While TMNs may promote change, they ultimately need states to facilitate change (Hickmann 2015). Some authors refute the change of discourse that TMNs claim to offer (Davidson and Gleeson 2015). Kern and Bulkeley argue that TMNs rarely change the behaviour of less dynamic cities. In other words, they are restricted to "networks of pioneers for pioneers" (2009: 311). Regarding TMNs and adaptation governance particularly, other researchers question the extent to which TMNs can encourage innovation at a local level (Busch 2015; Fünfgeld 2015).

However, other studies seem to show that TMNs do innovate, but they are fewer and they fail to explain precisely *how* TMNs innovate, especially regarding adaptation.

3 Studying innovation in governance practices

3.1 A definition of innovation in global adaptation governance

The literature review above suggests that there is some confusion about the concept of innovation. A clearer definition will help us conduct more focused case studies of TMNs and enable us to determine how they innovate. This is all the more important as transnational actors' impact is a key issue in current adaptation research (Klein et al. 2017; Persson and Dzebo 2019). More generally, it will contribute to theories dealing with innovation in climate governance.

Despite the scholarly interest in innovation, studies often lack independent analysis. Innovation is often linked to other novelty-related concepts, such as experimentation (van der Heijden, in Jordan et al. 2018; Hoffmann 2011), invention, diffusion or evaluation (Jordan and Huitema 2014). Innovation differs from invention. Innovation strives to improve the way to do things, while invention involves making something completely new (Padgett and McLean 2006; Rogers 2003). Experimenting can be part of inventing (Jordan and Huitema 2014). Innovation and experimentation are also linked. Innovation is often the product of a successful experiment, but it can also be part of the experimentation process itself, along with trial and error (Kivimaa et al. 2015; Hoffmann 2011). Once the value of an innovation has been recognized by other actors, the innovation is diffused. When innovation is defined as the first-time implementation of a policy in a given territory (Walker 1969), many policy analysts claim that the significance of an innovation depends on the number of jurisdictions that implement it for the first time (Jordan and Huitema 2014). In policy studies, innovation is also associated with evaluation (Jordan and Huitema 2014; Jordan et al. 2013), on the basis that we cannot observe innovation without evaluating the disruptive effects of a policy. Innovation can also be part of the evaluation process.

Scholars often perceive innovation as a process or a product of invention, experimentation, diffusion or evaluation. However, it can be separated from these concepts in analytical terms. As a process, innovation involves the selection and arrangement of the existing elements into something new. As a product, it is a novel arrangement that has yet to be diffused as the new dominant way to fulfil a given function. As this paper is interested in the instruments created by TMNs, innovation is here defined as a product, in other words a new arrangement of the existing elements designed to fulfil one or several adaptation goals, before it is diffused to other actors or structures involved in global adaptation governance. The innovativeness of TMNs lies in their ability to create new arrangements and instruments instead of using exclusively those created by other actors. It is important to underline the difference between innovation and invention. Innovation is generally the product of earlier innovations that have been diffused over time (Jordan et al. 2013). In a system as complex as global adaptation governance, most elements are interconnected and information is exchanged. Therefore, inventions, i.e. unprecedented and entirely new products, are unlikely.

This article does not consider innovation from a normative point of view, i.e. it is not perceived as good or bad. It discusses transnational innovations in terms of their potential for strengthening global adaptation governance.

3.2 Observing innovation in governance instruments

The global climate governance literature has studied the governance functions of transnational actors (Hsu et al. 2017; Dzebo and Stripple 2015; Bulkeley et al. 2012, 2014; Bulkeley and Newell 2010; Andonova et al. 2009; Chan and Amling 2019; Dzebo 2019). While typologies vary, we can generally identify five TMN governance functions: information sharing, capacity building, target setting, rule making and funding (Bulkeley et al. 2014). The analytical framework of this paper builds on these functions. However, as they tell us little about the technical and social arrangements used by TMNs to guide their members, the framework favours an analysis of the instruments used to implement the functions. Thus, this paper aims to contribute to the characterization of transnational governance practices.

This paper considers the innovativeness of TMNs in terms of their capacity to create governance instruments instead of using the instruments of other international or transnational actors. It draws on the literature on public policy, where instruments are perceived as a manifestation of political change (Auld et al. 2014; Jordan et al. 2013; Eliadis et al. 2005; Lascoumes and Le Galès 2004; Hood 1986). It also draws on studies on global environmental governance and global climate governance (Andonova 2017; Hickmann 2015; Andonova et al. 2009). Thus, it defines governance instruments as social and technical arrangements that an authority uses to steer a population in order to achieve, develop or manage a public good. Some examples include: a political declaration signed by diverse actors to guide their populations towards adaptation; a grant offered to cities seeking to develop urban agriculture to reduce urban heat islands; or a new standard to measure the resilience of small municipalities. Instruments are not neutral (Voß and Simons 2014; Lascoumes and Le Galès 2004). They embody representations and meanings constructed by the governing body (or initiator), which are influenced by its own goals, population and environment. Once the instruments have been identified, further analysis is required to grasp how authority is exercised.

Generally, the numerous existing classifications of policy instruments apply to national or local contexts and focus on public actors (Lascoumes and Le Galès 2004; Bemelmans-Videc et al. 1998; Hood 1986). These typologies are unsuitable for studying governance instruments used in transnational governance arrangements, including by TMNs, since those involve both public and private actors at different political levels. However, they do provide valuable insights into governing traditions, which are discussed below.

4 Analysing governance instruments in global adaptation governance

4.1 An analytical framework to study governance instruments

The analytical framework developed here helps reveal the purpose of the tools used in global adaptation governance, the differences between the tools used by international and transnational actors, as well as how their initiators perceive and exercise authority. It also provides the basis for a discussion of how transnational actors' practices may affect global adaptation governance. As it builds on research that goes beyond adaptation governance, it may be applied to the practices of transnational entities working not exclusively on adaptation but also on related fields, as is the case of 100RC.

Table 1 An analytical framework of governance instruments

Category	Description
Rule setting	Indicates the elaboration of rules to constrain or influence a behaviour
Funding	Indicates the provision of funds to the targeted population
Norm setting	Indicates the elaboration of norms, standards, or best practices
Capacity building	Indicates the enhancement of the constituents' capability
Information sharing	Indicates the diffusion of information and knowledge to the constituents
Obligation	*Indicates the compulsory nature of the instrument*
Directness	*Indicates the direct nature of the instrument (i.e. it is direct if the TMN applies it on cities and indirect if the TMN creates it for cities to use)*

The literature on global environmental governance and global climate governance highlights the features that differentiate traditional tools from more recent ones. Recent tools tend to adopt a managerial approach rather than a "command-and-control" strategy (Hickmann 2015). Thus, they favour a soft and indirect approach: constituents are incentivized, not constrained; and the authority does not directly implement the instrument but expects the constituents to do so. This analysis is shared by the literature on the practices of global governance (Hale and Held 2012; Börzel and Risse 2010).

Furthermore, the literature on policy instruments and global climate governance practices highlights a variety of functions revealing hard or soft approaches to governance (Dzebo and Stripple 2015; Bulkeley et al. 2014; Andonova et al. 2009; Lascoumes and Le Galès 2004). Because these functions are observable in governance instruments, they are part of the analytical framework. First, *rule setting* is the elaboration of "rules intended to guide or constrain constituents" towards adaptation (Andonova et al. 2009: 65). Second, *funding* is the provision of funds by TMNs to their members in relation to the implementation of an adaptation initiative. *Norm setting* deals with the development of norms, standards and best practices for implementing adaptation, also visible through discourse. Here, we consider *capacity building* as enabling cities to implement actions for adaptation. Lastly, *information sharing* is the diffusion of information and knowledge on adaptation to city members and others.

Overall, these functions are similar to Lascoumes and Le Galès's typology of instruments (2004). They differentiate traditional regulatory and economic instruments from more recent instruments, which are agreements or incentivizing, normative or based on the best practice, and information. This paper considers that the first two governance functions are traditional (rule setting and funding), since they display a harder more direct approach. Like Lascoumes and Le Galès's regulatory and economic instruments (2004), they imply intervention and control from the authority. In comparison, the last three (norm setting, capacity building and information sharing) represent a novel, softer and more indirect approach. Although they differ to some extent from Lascoumes and Le Galès's novel instruments, they share a concern for communication rather than for command-and-control approaches.

In addition to these five governance functions, this paper's analytical framework includes two further categories: *obligation*, which indicates whether the use of an instrument is compulsory to members; and *directness*, which indicates whether the TMN directly uses its tool on cities or creates for cities to use. Table 1 summarizes the distinct categories presented to analyse governance instruments.

Before applying the framework to our TMN case study, we review the current governance instruments involved in global adaptation governance.

4.2 The main instruments of global adaptation governance

This subsection draws on the literature to identify the diverse adaptation practices and instruments developed by international actors, considering they have been the predominant actors of global adaptation governance so far.

Bodies involved in global climate governance only began developing adaptation tools recently. Initially, the UNFCCC focused on mitigation (Hall and Persson 2017) and perceived adaptation as "mitigation's poor cousin" (Khan and Robberts 2013: 173). In 2001, the UNFCCC considered adaptation to be an issue that primarily concerned developing countries. It called on developed countries to provide technical and financial tools (Lesnikowski et al. 2016). Today, climate governance tools still tend to focus on mitigation rather than adaptation. As yet, there is no satisfactory definition for adaptation, which means tools for adaptation are also harder to detect (Hall 2017). This may explain why so few studies have focused on the instruments involved in adaptation governance and on global adaptation governance, generally (Hall and Persson 2017).[3]

The most prominent adaptation governance instruments used by international actors tend to focus on rule setting and direct implementation. Agreements and decisions under the UNFCCC are legally binding instruments that set rules. They aim to influence the population directly. However, their vagueness and low level of obligation mean that effectiveness is limited when it comes to adaptation governance (Hall and Persson 2017). Other rule setting-based tools include: the 2001 Marrakesh Accords, the 2007 Bali Road Map and the 2010 Cancun Adaptation Framework. The Marrakesh Accords represented the first substantial attempt to work on adaptation. In comparison, the Bali Road Map revealed concern for more long-term cooperative efforts towards adaptation (Lesnikowski et al. 2016; Khan and Robberts 2013). The Cancun Framework reinforced this commitment, by attributing equal importance to adaptation and mitigation (Lesnikowski et al. 2016). These decisions and declarations set certain rules that they expect their target, i.e. the states that are party to the UNFCCC, to respect. Overall, global climate governance has been based on the universal participation principle (Hoffmann 2005) and the belief in the need for a "global deal", a legally binding treaty that displays strong commitments to climate action that are respected by all states (Falkner et al. 2010). Such an agreement has not been reached so far. The most common rule setting instruments are political declarations. Their low level of obligation and precision also gives them a norm-setting dimension.

Numerous direct funding instruments have been developed in the context of global adaptation governance. Given the focus on developing countries, finance has been central to adaptation, as clearly illustrated by the 1992 creation of the Global Environmental Facility. In addition, the Least Developed Countries Fund, one of the funding mechanisms developed by the Marrakesh Accords, has become an important tool to finance adaptation (Sovacool et al. 2017). By allocating resources to projects that are managed by partner agencies, the fund has a direct implementation strategy.

Although rule setting and funding instruments are common, international actors have also developed several instruments based on information sharing (Hall and Persson 2017).

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[3] Henstra (2016) is an interesting exception.

Thus, the UNFCCC and other IGOs have provided states with guides, databases and frameworks. For example, the UNFCCC Coping Strategies Database provides details of 118 cases of adaptation worldwide (Agrawal, in Mearns and Norton 2010).

The literature also highlights the fact that most instruments of global climate governance operate from the top down (Román 2010), i.e. from international to local actors, in line with command-and-control mechanisms. The tools mentioned above seem to confirm this. The leading countries involved in the UNFCCC want the parties to select certain funding instruments. Local actors from emerging and developing countries are then expected to respect or use the instruments, despite not being involved in the decision-making process. Rule setting instruments follow this top-down pattern.

The predominant instruments of global adaptation governance are thus based on *rule setting* and *funding*. They often use a direct approach to steering. However, studies show that they rarely impose a high degree of obligation. They are complemented by several tools based on *information sharing* and *norm setting*. Given that global adaptation governance is a fairly recent phenomenon, the vision of authority is not entirely traditional, although the main practices reveal a customary command-and-control ambition.

The following sections present an exploratory case study, where the analytical framework is used to compare a specific TMN's tools with those used by international actors in global adaptation governance.

5 Methodology

An exploratory case study was selected as research design (Yin 2018). The 100 Resilient Cities (100RC) initiative was only created in 2013 and has not been studied much yet. This TMN focuses on resilience, for which it has a broad understanding which goes beyond climate adaptation. It indeed implies preparing and strengthening cities in the face of shocks and stresses such as high unemployment, inefficient transport system, violence, floods or epidemics. As climate change can enhance some of these shocks and stresses, adaptation is an important concern of the TMN. This is illustrated by its various partnerships with climate-centred networks, e.g. the C40 and R20 Regions of Climate Action. An observation of 100RC's practices also highlights that adaptation is often dealt with implicitly. Although the TMN seldom refers explicitly to adaptation, interviews reveal its members often link adaptation and resilience and see the former as part of the latter. The documentary analysis shows that several resilience strategies of 100RC members also refer to climate adaptation. Consequently, analysing 100RC's practices is relevant to adaptation research. Furthermore, this case is part of a wider project led by the author on 15 TMNs, which has underlined the fact that 100RC is innovative in relation to its tools and the issues it tackles.

Data were collected mainly through an in-depth documentary analysis. The documents were collected on the TMN's website and social networks as well as through interviewees. Most of the documents described or represented 100RC's governance tools, e.g. the application form that candidates of the 100RC challenge filled in, the Member guide that city members signed, Preliminary Resilience Assessments (PRAs) and reports from agenda-setting workshops. The analysis also included 100RC reports and press releases, as well as blog and newspaper articles on the TMN and its members. This provided information about how 100RC functions, how it relates to members and partners, and the different governance tools it has created. Furthermore, 11 semi-structured interviews were conducted between 2017 and 2019 with the primary goal of corroborating the documentary analysis,

hence their relatively small number.[4] The interviews confirmed and strengthened the findings of the documentary analysis. Furthermore, they provided details about how the TMN created and used its governance instruments, as well as how it works with its members and partners. They also gave crucial information about how 100RC exercises authority. The subsection below presents the most widely used governance instruments, i.e. used on and by all 100RC members according to data collection.

6 An exploratory case study of 100 Resilient Cities

6.1 100RC's governance instruments to enhance urban resilience

The TMN 100 Resilient Cities (100RC) was launched in 2013 by the Rockefeller Foundation to increase urban resilience. Its 100 members include major global cities (e.g. London, Mexico City) and other less connected cities (e.g. Vejle). Its primary goal is to help its members design and implement a Resilience Strategy. Over time, it aims to guide 10,000 cities towards urban resilience.

The documentary analysis shows that 100RC has created diverse instruments to steer its members towards adaptation and resilience. One foundational instrument, the *100RC Challenge*, was designed to select future members. Similar to other TMNs, such as C40, 100RC is exclusive. Its staff chose its members in three distinct selection waves which set specific criteria considered crucial for building urban resilience. Interviews revealed that staff also gave advice to certain contenders, who had failed in the first rounds, to help them get through. They showed that the TMN selects its members strategically, targeting profiles that are most responsive to its approach. Through the challenge and the prospect of exclusive membership, 100RC was able to influence the competitors' framing of their resilience actions, enhance its own resilience discourse to other actors and give visibility to the selected cities. The documentary analysis shows other TMNs have used comparable selection processes for membership, such as ICLEI's Urban-LEDS project, differing mainly in its explicit mitigation strategy.

The documentary analysis also revealed that member cities must sign a *Member Guide*, which sets out rules and guidelines. This represents both an obligation and a commitment between members and 100RC. It outlines communication procedures for 100RC-related activities, indicating a norm-setting function. The Member Guide is direct, i.e. cities have no say in its content.

100RC members can use the *Platform of Partners*, available on 100RC's website. According to the documentary analysis, this tool brings together over 100 public, private, local or global actors. It offers members pro bono resilience-related activities. 100RC estimates that the services offered by Partners represent more than USD 210 million. The platform also helps cities develop strategic links to different actors to enhance their visibility and gain leverage in other political spheres. A respondent explained that the link to the renowned Rockefeller Foundation was valuable because it might increase its city's attractiveness. This implies that cities learn how to navigate the platform and use it to their

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[4] Four interviewees represented city members, five were from 100RC's partner organizations (one of which was close enough to participate in 100RC's staff meetings), and two were employed by 100RC.

advantage. The platform is thus an indirect tool, whose effectiveness depends mostly on how cities use it strategically.

The 100RC also offers its members technical tools to enhance resilience. Some respondents view them as compulsory. One considers that the *agenda-setting workshop* acts as a first demonstration of members' commitment. It involves bringing together numerous local stakeholders to start identifying cities' challenges. Another example is the *PRA*, an in-depth diagnosis of cities setting out how they intend to strengthen resilience based on their weaknesses and opportunities. This assessment is often promoted on the 100RC website. These tools are geared to the development of a *Resilience Strategy*, which sets specific goals to enhance resilience in cities. The documentary analysis shows that the Resilience Strategy resembles ACCCRN's urban climate change Resilience Strategy. This seems natural as ACCCRN was a past Rockefeller Foundation initiative. Differences regarding scope and obligation especially show that 100RC's Resilience Strategy is an innovation according to the definition presented above. All these technical tools are indirect and act as guidelines cities must use to develop their resilience. Interviews show that cities sometimes interpret them to fit their individual characteristics. They thus contain some flexibility.

Appointing a *Chief Resilience Officer* (CRO) also appears to be a compulsory measure cities must comply with. The TMN pays its salary for at least two years, intending for cities to fund the position themselves afterwards. The CRO supervises the design and implementation of the Resilience Strategy and coordinates the city's local resilience-related activities. In the 2017 Urban Resilience Summit, 100RC President Michael Berkowitz presented the CROs' role as unprecedented and crucial, arguing that 100RC's aim is that "you wouldn't run a city without a CRO anymore than you would without a Chief of Police". One interview revealed that the CRO tool may have been inspired by other TMNs, e.g. the C40, which has a similar system called the City Adviser. Important differences exist: having a City Adviser is voluntary, the candidate is part of the C40's staff, and the position is a short-term one. Interviewees explained that cities ultimately choose their CRO, but 100RC may attempt to influence the process. Similarly, the documentary analysis indicates that cities risk being expelled if they appoint a CRO that 100RC considers unfit (Ellson 2015). Interestingly, the CRO tool is gaining visibility outside the network. Several non-100RC members, e.g. the city of Santa Monica, have started hiring CROs to increase their resilience (City of Santa Monica 2017).

6.2 100RC's innovativeness and specific steering approach

The case of 100RC highlights several aspects of the TMN's instruments and transnational governance practices. First, the tools identified in this case study reveal the innovativeness of 100RC. Instead of using tools exclusively created by international or other transnational actors, 100RC has created distinct governance instruments, including the 100RC Challenge, the CRO position and the Platform of Partners. These tools represent an original approach to steering. Some tools, e.g. the 100RC Challenge, use recent governance practices exclusively: norm setting, capacity building, information sharing, voluntary commitment and indirect implementation. Others, like the Platform of Partners, combine several recent practices with a more traditional function. Much like other TMNs, e.g. the C40 (Román 2010), 100RC uses instruments that facilitate cities' resilient activities, which do not require much 100RC intervention. The interviews revealed that 100RC aims to catalyze a much wider movement of urban resilience and that a greater intervention is thus not

Table 2 The analysis of 100RC's most prominent governance instruments

Instrument	Rule setting	Funding	Norm setting	Capacity building	Information sharing	*Obligation*	*Directness*
100RC challenge			X		X		
Member guides	X		X		X	*X*	*X*
Agenda-setting workshop				X	X	*X*	*X*
CRO		X	X			*X*	
Platform of Partners		X			X		
PRA			X		X	*X*	
Resilience Strategy			X		X	*X*	

viable in the long run. Besides, because the selected cities are so diverse, they need some degree of flexibility when it comes to implementing tools.

As shown in Table 2, norm setting and information sharing are the most frequent governance functions in 100RC tools. This corresponds to the findings in other studies on the practices of TMNs in global climate governance, which highlight TMNs' general soft approach (Bulkeley and Newell 2010).

However, some of 100RC's governance practices are not dissimilar to those used by international actors in global adaptation governance. In fact, some 100RC tools correspond to traditional governance practices, i.e. rule setting, funding, obligation or direct implementation (see Table 2). The Platform of Partners includes, for instance, a traditional governance function, funding. Nonetheless, the Platform is also voluntary and indirect. Its funding function offers resources, not through grants and funds, which are common among global adaptation instruments, but through the less traditional form of additional partnerships and pro bono activities. It thus differs from the typical instruments of global adaptation governance. The CRO tool's funding and compulsory dimensions also look traditional. Yet, when the 100RC stops paying the CRO's salary, the tool becomes optional and loses its funding function. Thus, it evolves over time to become exclusively normative.

The study of 100RC's governance tools reveals that it uses a mix of practices, including hard and soft approaches. As interviews revealed, staff impose a broad framework to achieve the goals set and may act directly to obtain results. Rule setting and funding approaches are used, although not alone. Obligation is also used, which contradicts several claims that TMNs and networks, in general, are voluntary initiatives (Kern and Bulkeley 2009). This begs the question: is 100RC a network, or rather a club or a hierarchical organization? Even when using compulsory technical tools, 100RC's staff listen to its members and strive to improve its tools accordingly. In the words of an interviewee, "100RC learns as [cities] learn". Cases of expulsion are rare. Often, 100RC's staff adopt a softer approach, by inducing members to act in a certain way. The 100RC Challenge, for example, is an indirect instrument used to select future members. It is voluntary as the cities participating in it are not members yet. As it frames and promotes cities' actions in 100RC's definition of urban resilience, it is mostly acting through norm setting and information sharing. 100RC's significant use of soft and indirect approaches means it can be characterized as a network. Despite using hard and direct approaches, the essential horizontality and voluntary basis of the network remain important to 100RC.

Global environmental governance is complex and unpredictable (Le Prestre 2017; Young 2017), involving interactions between numerous actors and structures and distinct types of uncertainties. Different techniques are required to mitigate the risks associated with these uncertainties (Young 2017). New and more diverse tools are needed to tackle climate adaptation effectively. While its use of diverse tools is not dissimilar to the practices of international actors in global adaptation governance, 100RC is innovative. It has developed novel governance tools, sometimes drawing inspiration from earlier innovations, e.g. C40 City Adviser's tool and ICLEI's Urban-LEDS competitive process.

The diversity of 100RC's tools may help it be more effective. Its new tools may also diffuse throughout global adaptation governance, but this remains to be seen. Data collection shows that the CRO position is starting to do so. Thus, 100RC could make a positive contribution to global adaptation governance.

7 Discussion and concluding remarks

Based on an exploratory case study, the findings suggest that, as entities of transnational adaptation governance, TMNs can be innovative, not because they are new, but because they create new measures to steer their members. In that sense, this work contributes to the literature on networked governance and innovation theories. In only six years, 100RC has produced several diverse tools to help its members adapt to climate change and to enhance their resilience. Some tools reflect hard practices, which are prevalent in global adaptation governance and used by states and IGOs. For example, TMNs, and other transnational entities, may create obligation, although enforcement mechanisms can only go as far as expulsion of deviant members. However, some 100RC tools adopt a soft, voluntary and indirect approach. This research demonstrates that 100RC combines hard direct constraints with soft indirect incentives.

These preliminary findings do not allow us to make a definite distinction between transnational and international actors in terms of their adaptation governance practices. However, this study sheds light on some interesting features of 100RC. Its use of hard practices is a particularly interesting finding considering the emphasis of the literature on TMNs' voluntary and soft nature (Bulkeley and Newell 2010; Kern and Bulkeley 2009). This work's analytical framework should be applied to other cases (older TMNs, such as ICLEI, but also other TMNs that are not directly related to adaptation), to assess their innovativeness and determine whether they also use a diverse approach to steering. Overall, this should help us strengthen our theories of innovation and governance regarding TMNs.

If we can establish that TMNs' practices differ from those used by international actors in that they are more diverse, it might be possible to improve the current approaches to global adaptation governance. Despite the growing interest in issues related to adaptation, greater commitment and action from all global actors are required. There is no consensus about the best approach to steering. Many have favoured a compulsory global deal, which is a laborious process whose effectiveness has been challenged, as illustrated by the Paris Agreement (Falkner 2016; Falkner et al. 2010). Indeed, the universality principle may not be the answer to improving adaptation governance (Hoffmann 2011). We may need to rethink and diversify our current practices in the face of complexity and uncertainty (Young 2017). The latest IPCC Special Report on Global Warming of 1.5 °C calls for a diversity of policies to strengthen global action (IPCC 2018). While the universal participation principle still prevails in global climate governance, this article's review of global

adaptation governance instruments shows that there is a surge in low-constraining, funding and information sharing approaches. Combining these practices with new and diverse tools with distinct functions, as TMNs seem to be doing, might be a way to strengthen climate action and resilience.

In that sense, the analytical framework presented in this paper could be applied to other TMNs to address the question of the effectiveness of their practices at the local and the global level. More specifically, new contributions could determine how many local policies tackle adaptation and to what effect. TMNs may offer tools that better include cities, consider their needs and guide them towards climate adaptation and resilience. Further research on TMNs' practices could thus make an important contribution to our understanding of transnational adaptation governance and eventually improve the effectiveness of local adaptation measures. Furthermore, new contributions should use a broad definition of effectiveness, considering TMN's potential for launching far-reaching and entrenched adaptation initiatives (van der Ven et al. 2017). This will help assess the global impact of TMNs' practices.

Compliance with ethical standards

Conflict of interest The author declares no conflict of interest.

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