Journal of Cleaner Production 182 (2018) 96–104

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

# Mapping city-to-city networks for climate change action: Geographic bases, link modalities, functions, and activity

Taedong Lee [a, *], Ha Yoon Jung [b]

[a] Department of Political Science, Yonsei University, Yonsei Ro 50 Seodaemun-gu, Seoul, South Korea
[b] Department of Area Studies, Ewha Womans University, Seodaemun-gu, Seoul, South Korea

ARTICLE INFO

*Article history:*
Available online 7 February 2018

*Keywords:*
City-to-city cooperation
Transnational climate governance
Climate mitigation policy
Network function
Translocal relations

ABSTRACT

By forming city-to-city (C2C) transnational networks, cities can take action collectively against climate change. Interaction and collaboration among cities offers policymakers a chance to learn how other cities are conducting climate mitigation and adaptation measures. However, activities of C2C climate networks vary. By analyzing C2C climate networks, this study aims to identify and categorize C2C networks for climate change action, and to link the functions with levels of activity. To understand C2C climate-action networks, we suggest a framework for mapping C2C: geographic bases (domestic, regional, and global C2C), linking modalities (multilateral, and institution-led C2C), and functions (information exchange, networking, lobbying and funding, research, standards and commitments provision, and monitoring and certification). Based on this framework, we analyze the contents of C2C websites to assess current activities. We find that not all C2C networks are currently active. Statistical analysis and case studies suggest that C2C climate networks with advanced functions—such as lobbying, research, climate plans, and monitoring—are likely to actively engage with member cities. However, C2C cooperation focusing mainly on networking or information sharing is less likely to survive. Policy implications suggest that well-designed and advanced C2C networks with research and monitoring functions rather than simple networking functions can enable member cities to actively engage in climate policy cooperation.


## 1. Introduction

Cities with concentrated infrastructure, economic activities, and populations leave large environmental footprints both on their own spaces and on surrounding areas. Due to these characteristics, cities are particularly vulnerable to climate change including extreme weather, floods, droughts, hot temperatures, urban heat island effects, and sea-level rises.

On the other hand, as underlined in this special issue, tangible climate solutions can come from cities. A variety of urban climate change experiments take place in cities across the world (Bulkeley and Broto, 2012). Cities have been places for innovation, increasing interconnection of people, and dealing with climate change and energy issues (Bouteligier, 2012).

Cities do not act alone to tackle climate change. Cooperative local actions for climate change occur beyond state borders. A variety of interactions—including learning, collaboration, and diffusion of innovations—enhance climate policies at the local level (Lee and Van de Meene, 2012). We refer to these interactions as city-to-city (C2C) cooperation for climate change action. For instance, the Connecting Delta Cities network is a network of delta cities, including New York, Rotterdam, Jakarta, Ho Chi Minh City, and others that facilitates climate adaptation cooperation for cities located in delta areas around the world (CDC, 2013). C40 is another example, with 91 affiliated cities that account for 25% of global GDP, one in twelve of the global population, and that have taken more than 10,000 actions to combat climate change (C40, 2017). The collective actions of cities in these networks, instead of a single city, can play a crucial role for mitigation as the special issue of this journal proposes.

Current scholarly and practical attention has focused on transnational climate governance (Abbott, 2012; Bulkeley et al., 2012; Roger et al., 2017). Emerging studies also look at the role of transnational climate governance for cities and local governments (Bansard et al., 2017; Betsill and Bulkeley, 2004; Bouteligier, 2012; Hakelberg, 2014). For instance, Hakelberg (2014) argues that transmunicipal climate governance plays a role as an arena for

* Corresponding author.
*E-mail addresses:* tdlee@yonsei.ac.kr (T. Lee), hayoonj@gmail.com (H.Y. Jung).

https://doi.org/10.1016/j.jclepro.2018.02.034
0959-6526/

climate policy diffusion and climate strategy adoption. By critically assessing the greenhouse gas (GHG) mitigation target of thirteen transmunicipal climate networks, Bansard et al. (2017) argue that transmunicipal climate networks are not yet ambitious (compared to the parties to the Paris Climate Agreement) or representative (their memberships consist of mostly North American and European cities). Despite the value-added contributions of previous research, studies on identifying and categorizing translocal climate governance have been scant. In addition, studies on the activity level of these networks have been rare while the survival of a network is a pre-condition for the network's impacts on an individual city's climate policies as well as for various roles, including the diffusion of local climate actions. To fill this gap and to contribute to this special issue on cities as the core of climate mitigation, we address the following questions: what are the characteristics and functions of translocal climate networks? Why do some C2C networks continue to be active, while do others cease to be active? How are the functions of C2C associated with their current activity? Answering these questions allows us to provide typology of C2C climate networks and to understand underlying attributes of network activities.

The aims of this article are to identify and categorize the attributes of C2C climate networks and to analyze how the identified attributes influence the activities of translocal climate networks. We collect data of 24 already-formed C2C networks and analyze these networks using hypothesis test analyses and case studies.

To this end, first, we identify three ways of mapping C2C: geographic bases (domestic, regional, and global C2C), linking modality (multilateral and institution-led C2C), and functions. Second, we apply this framework to categorize C2C climate networks. Third, we analyze which functions of networks enhance the level of activity.

Having a typology of C2C would be beneficial to enhance our understandings of different types and functions of translocal climate networks. It would also help cities identify and make choose their mode of participation and partnership with C2C networks.

## 2. City-to-city cooperation as horizontal translocal relations

City-to-city cooperation can be viewed from the theoretical perspective of translocal relations. Theories of translocal relations extend existing international relations studies by incorporating local authorities and other local actors as key actors in world politics. Translocal relations look at interactions between local actors (municipal authorities, local businesses, and local civil society organizations) and other local and international actors within and across national boundaries. A local actor is nested within the multi-tiered hierarchy that includes international, national, and regional jurisdictions. Despite the hierarchical attributes, a local actor also has autonomy to horizontally interact with other actors (Lee, 2015).

Among hierarchical and vertical attributes of translocal relations, C2C cooperation primarily takes place in horizontal governance. That is, C2C focuses more on local actors' interactions with other local actors within and beyond state boundaries. C2C cooperation activities encompass socialization, technological transfer, policy learning, business interaction, funding, standards provision, and many other forms. For instance, policy learning refers to the use of information and knowledge to make predictions, which are then used to make decisions (Bennett and Howlett, 1992). Policy learning is inherently relational. Actors seek to learn from other actors to upgrade their policy measures (Lee and Van de Meene, 2012). C2C climate networks provide a number of opportunities for learning, information sharing, and networking on climate change policies and strategies.

Another form of interaction is C2C collaboration. Collaborative activities encompass information, financial and human resource exchange, and common project development (Feiock et al., 2010). C2C collaboration can be facilitated by making networks for shared target, research, lobbying, funding, and monitoring climate policy performance (Lee, 2015).

## 3. Frameworks for classifying city practices in C2C

This study suggests analytic frameworks for comparing city practices. First, one way to compare C2C networks is based on geographic orientation: domestic, regional, and global scope. Second way is about linking modality: multilateral, and institution-led modes. Third method is to focus on different functions—such as information sharing, networking, research, target setting, funding, lobbying, and mitigation procedure—in order to categorize Climate C2C Climate networks. Particularly, we look at how different functions link to the activity level.

### 3.1. Geographic orientation

C2C for climate actions occurs within different geographic scopes. Some C2C cooperation on climate change action takes place at the national level. Another scope of C2C can be facilitated at a regional level. Other C2C cooperative activities arise at the global level. We identify the potential capacities and limitations of each type of C2C in cooperation on climate change issues.

#### 3.1.1. Domestic C2C cooperation

Cities within the same country are likely to have more opportunities to cooperate with each other due to geographic proximity and cultural similarities such as language and history. However, it is also plausible that cities in the same country compete to gain more financial resources and better reputations.

The following are several strengths for domestic C2C in general, but for climate change action in particular. Geographic proximity could reduce the transaction cost of C2C cooperation (Rose, 1991). Similar cultural/institutional contexts could enhance cooperation among domestic C2C networks. Cultural similarity encompasses ways of living, communicating, and thinking (Child and Faulkner, 1998). Those cities that share a language reduce transaction costs of cooperation. In a similar vein, shared institutional contexts could breed links among cities. Cities in one country have mostly coherent legal and administrative frameworks. Despite cultural and institutional similarities, cities in the same country usually differ in terms of size, socio-economic conditions, and political conditions. In addition to socio-economic conditions, political differences, difference partisanship, may impede cooperation among cities. Mayoral partisanship (such as progressive versus conservative party affiliation) may influence the C2C cooperation behind the scenes. Considering strengths and weaknesses, domestic C2C facilitates cooperation by making use of cultural and institutional similarity and geographic advantage to reduce transaction costs of interactions. To overcome weaknesses, grouping by similar types, sizes, socio-economic conditions, and focus areas would be an effective strategy. Furthermore, coordination between local authorities and central governments for fair allocation of financial and human resources will reduce external threat factors and utilize opportunity factors (Parker and Rowland, 2007).

#### 3.1.2. Regional C2C cooperation

Beyond nation-state boundaries, C2C cooperation takes place at the regional level. Beyond national boundaries, cities could choose a variety of partners for collaboration who have differences as well as similarities.