Local municipalities and the influence of national networks on city climate governance: Small places with big possibilities

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Reaching the 1.5°C target of the Paris Agreement not only requires ambitious goals from national governments, but also the active participation of local municipalities. It is in cities where climate actions need to be implemented to reduce greenhouse gas emissions and reach international and national climate goals. While the importance of cities and their participation in networks has been well-researched, studies have systematically neglected the committed individual agents in small and medium-sized cities and overlooked the importance of national networks. To address these research gaps, this article looks at how local climate managers use their municipality's membership in national networks to increase action and implementation. This article is based on 12 semi-structured interviews with seven municipal representatives and five representatives of two national city networks, and four informal discussions. Through comparative content analysis, it was identified that the main functions derived from network participation are direct exchanges between the climate managers, mobilization of others in the municipality, accounting of greenhouse gas emissions, and project support. These functions helped overcome key limitations that the actors often faced within the municipality related to a lack of legal competences, administrative resources and internal support for climate work and financial resources. This has implications for city networks which have been focusing on larger cities and not including smaller cities who have less capacity and who can benefit the most from the functions provided by them.

KEYWORDS

climate action implementation, city networks, small and medium-sized municipalities, policy entrepreneurs, Denmark

Introduction

The 2015 Paris Agreement highlighted the role of cities as an essential means to bridging the existing gap between global ambitions to reach the $1.5°C$ temperature reduction goal and the current commitments of nation states (Davidson et al., 2019; Bulkeley, 2021). Cities have understood their important function as early as the 1980s when they voluntarily started to engage in climate activities to combat rising levels of greenhouse gas (GHG) emissions. Nevertheless, cities face several barriers in implementing their planned actions due to a lack of technical knowledge, available funds, and national guidance (Anguelovski and Carmin, 2011; Salon et al., 2014). National goals to curb GHG emissions are not systematically broken down to the local level (Fuhr et al., 2018). The voluntary nature of early commitments results in large variations in the target, scope, and quality of cities' climate action plans.

A potential solution to mitigate these challenges has been the voluntary coordination and collaboration between cities through city networks. From an early stage, this was understood by some pioneering cities who came together in founding city networks like Local Governments for Sustainability (known as ICLEI) and the Climate Alliance as a means of sharing knowledge and exchanging best practices to empower and legitimize other cities to engage in climate initiatives (Kern, 2019; Bulkeley, 2021). Thirty years later, these networks cannot go unnoticed as there are more than a 100 formalized city networks representing over one third of the entire global population (Acuto et al., 2017).

Within literature, there have been different attempts at conceptualizing the impact of transnational municipal networks on local climate governance. Bansard et al. (2017) explains that research on urban climate governance generally falls into three categories: studies focusing on municipalities or regions as the unit of analysis (i.e., local climate governance); studies focusing on transnational municipal networks as the unit of analysis (i.e., horizontal climate governance); and studies linking municipal climate policy with transnational municipal networks as a distinct form of governance (i.e., network governance). Even though urban climate governance has been well-researched, most academics have focused on the two first categories by using case studies of large cities and global city networks like C40 Cities Climate Leadership Group (C40) and Cities for Climate Protection (CCP) as their units of analysis (Kern, 2019). By solely focusing on these aspects, research has systematically overlooked and neglected three important areas: small and medium-sized towns; national networks; and the focus on agency at the network level.

Abbreviations: C40, C40 Climate Leadership Group; CCP, Cities for Climate Protection; DK2020, DK2020 – Climate plans for all of Denmark; ICLEI, Local Governments for Sustainability; GHG, Greenhouse gas.

Researchers have emphasized the importance of both cities as actors and prime sites for climate governance along with the significance of the city networks within the larger umbrella term of urban climate governance (Hoppe et al., 2016; Bansard et al., 2017). Indeed, by analyzing the perceived benefits municipalities have from network participation, this research can help practitioners organize networks in a way that maximizes their value for their members, and it provides them with practical guidance for how other city collaborations can structure their interactions in a meaningful way. It can also help civil servants see how they can use network membership as a means of promoting the climate agenda's implementation. Furthermore, this article intends to contribute to the literature on national climate networks for small and medium-sized towns by focusing on agency, which have all been underrepresented in academia. The research gaps in these three topics will be explained in the section below.

Background to city network research

Research gaps

Small and medium-sized municipalities

When analyzing city networks within a particular national context, a large proportion of researchers have the tendency to establish population thresholds to only focus on the bigger cities who have acted as climate leaders (e.g., Lubell et al., 2009; Burch, 2010a,b; Krause, 2011). Van der Heijden (2019) concluded that the current knowledge base is skewed due to an "*over-representation of a handful of large and highly active cities in the Global North and an over-representation of 'success' cases at the expense of ordinary or even failing examples*" (p. 11). This is problematic because climate actions are crucial not only from large cities but also from small and medium-sized towns if GHG emissions are to be reduced. Smaller municipalities are just as important as larger municipalities to reach international and national goals, especially considering that nearly 60% of the EU's population lives in small and medium-sized towns (EuroStat, 2020).

For instance, only 30% of the Danish population lives in municipalities with more than 100,000 people, which represents only five out of 98 Danish municipalities (Social og indenrigsministeriet, 2020). This skew in knowledge is problematic because it remains unclear whether the climate action trends found in large cities are also applicable to smaller ones (Homsy and Warner, 2015; Van der Heijden, 2019). Notwithstanding the growing interest in small and medium-sized towns by some authors (see Hoppe et al., 2016; Boehnke et al., 2019; Wurzel et al., 2019; Bausch and Koziol, 2020), they remain in the shadows. Therefore, it is crucial to understand the role of smaller cities and municipalities in urban climate governance to build a knowledge base, which can help in also

TABLE 1 Overview of network roles and functions.

Functions	Theoretical framework		
	Bulkeley et al. (2003): 4 ways climate governance is affected	Andonova et al. (2009): soft use of governance instruments	Busch (2015): 4 functions of trans-municipal network impact on local climate governance
1 (Horizontal flow of information)	Knowledge dissemination	Information sharing	Platform for members
2 (Implementation and policies)	Implementation of EU policies	Capacity building and implementation	Consultancy
3 (Rules and commitment)	Policy initiation	Rule setting	Commitment brokering
4 (Lobbying)	Lobbying	–	Advocacy and lobbying

Source: Adapted from Fenton and Busch (2016).

getting small and medium-sized towns on board the climate journey and to reach the 1.5°C target of the Paris Agreement (Hoppe et al., 2016; Kern, 2019).

Importance of national networks

The growing number of transnational local government networks for sustainability demonstrates that cities are increasingly turning to each other for answers (Acuto et al., 2017). Even if national-based networks are the most predominate form of city networks, representing 49% of them (Acuto and Rayner, 2016), most studies are skewed toward global/transnational city networks (Bansard et al., 2017). The literature on city networks has mostly focused on transnational municipal networks to which larger cities tend to participate more in. Thus, there is a neglected focus on national networks in horizontal climate governance (Fuhr et al., 2018; Kern, 2019).

National networks are important to research since they offer more opportunities for collaboration between municipalities due to being closer geographically and they share of a common institutional context regarding the same legal framework and a similar culture and language (Lee and Jung, 2018). This is mostly beneficial for smaller cities and towns who typically participate and benefit more from national networks than in transnational municipal networks (Hoppe et al., 2016; Boehnke et al., 2019; Kern, 2019).

Functions of city networks

Several authors have created frameworks to analyze the different functions of city networks. Over the recent years, three main theoretical frameworks have been presented with similar functions, as seen in Table 1. These frameworks all focus on describing the impacts occurring from the interactions between the network and its members and have the city as the unit of analysis. Four main functions are found across the three frameworks:

horizontal flows of information between cities; functions focusing on the implementation of policies; the rules and the members' compliance with them; and the influence of networks on higher levels of government through lobbying (Busch et al., 2018).

Many authors, especially those with an academic background in international relations or political science, have examined transnational municipal networks from a multilevel governance perspective. While the framework of multilevel governance remains a valid analytical tool, it has some important omissions regarding the limited attention to the multiple forms of agency and modes of governing in urban climate politics (Bulkeley, 2021). There are also different ways to analyze the functions and impacts of city networks, but they are currently all done from a multilevel perspective or focusing on the city level and ignoring the local agents representing the municipality in the network.

Indeed, cities are often treated as internally homogenous actors with a coherent agenda and thus assigning them with collective agency (i.e., agency of collective entities) (Busch, 2016; Busch et al., 2018). By doing so, the actions of individual actors and the internal dynamics within a municipality are not being accounted for in these frameworks, even though the contact person between the municipality and the network has a powerful position since they can retain or steer information in a desired direction (Keiner and Kim, 2007).

Focusing on agency involves looking at who is behind certain changes and to focus on the roles and strategies of the individuals or organizations identified (Meijerink and Huitema, 2010). For example, the presence or absence of a local champion or a committed individual agent has been identified as a key factor for both climate planning and for climate implementation (Betsill, 2001; Krause, 2011; Bedsworth and Hanak, 2013; Salon et al., 2014; Wejs, 2014). These actors can use municipal networks or engage with local stakeholders to bypass a lack of capacity. However, research has mostly focused on the city level and not the individual actors.

Aim and scope of this article

Even considering their importance, climate action implementation in small and medium-sized towns by climate managers and their participation in city networks have consistently been under-discussed and under-represented in practice and in academia. Therefore, this article will contribute to the governance literature by focusing on (i) national climate networks (ii) small and medium-sized towns and (iii) on agency at the municipal level, all of which have been underrepresented in academia. Thus, this article aims to helping tackle the three research gaps identified. By doing so, the overarching purpose of the article is to increase our understanding of how local actors use national municipal network membership to implement more of their municipality's climate policies.

This article will therefore explore the following research question: What are the main functions of national city networks found to be useful by agents in small and medium-sized municipalities?

To conduct this research, the framework brought forward by Busch (2016) will be used to identify which network functions are perceived as most valuable by the climate managers. This framework is unique as uses the climate managers and their departments as their units of analysis and focused on the agency level to analyze network dynamics. Emphasis is thus placed on the agents in city administration and the main actors leading the climate agenda (i.e., climate managers), rather than using a network perspective. Climate managers are be broadly defined as the "*staff in municipalities who work on climate mitigation and/or adaptation issues*" (Busch, 2016, p. 49). This framework was initially used to analyze "*the use of transnational municipal network membership by local actors and an assessment of the importance of these processes*" (Busch, 2016, p. 43).

This article will be applying the framework to a different context by focusing on national municipal networks and on smaller municipalities, which was not initially considered in by Busch (2016) where the emphasis was on German cities of more than 50,000 inhabitants participating in transnational municipal networks. Two nationally based Danish city networks were analyzed as case studies: Energibyerne and DK2020. The climate managers in seven small and medium-sized Danish municipalities that are part of both analyzed networks were selected and represent the embedded units of analysis. The seven municipalities are: Frederikshavn, Høje-Taastrup, Horsens, Middelfart, Ringkøbing-Skjern, Skive, and Sønderborg.

This article will focus solely on municipalities and no other forms of subnational governments (provincial, state, or regional) since they have different incentives and constraints affecting their local climate policies and have, especially in a Danish context, greater power to take action. However, since the term "municipality" could mean different things within different national contexts, its use in this article will be clarified. Municipalities are generally viewed as "*territorial divisions*

with specific administrative functions and legal responsibilities." (Fenton and Linköpings universitet, 2014, p. 6). In Denmark, "municipalities" is the common legal term for the 98 local self-governing units regardless of their size and location. More specifically, this article will focus on small and medium-sized towns. Defining the size of municipalities is a difficult task since it differs considerably per continent and per country. In this case, we have aligned with the EU project called TOWN which defined the administrative units that did not fit in the "cities" category as being small and medium-sized towns which includes the two classes of towns and semi-dense areas and rural areas of the DEGURBA method (Servillo et al., 2014). Thus, in this article, small and medium-sized municipalities represent this definition of small and medium-sized towns.

Denmark was chosen as the focus country because it is a frontrunner in local climate planning and can be considered among the most progressive countries on climate change mitigation and adaptation (Damsø et al., 2016). Therefore, by looking at the Danish case, it may provide important knowledge on the direction local climate action may take place in other countries in the coming years. Also, for the first time, climate change was being treated as a top political issue during Denmark's 2019 national elections (Timperley, 2020). This was caused by a high mobilization of citizens demanding governmental action, a massive heatwave during the previous summer, and international attention to the issue. Danish municipalities are members in various such as Energiforum, Global Covenant of Mayors, and Energy Cities. However, they mostly play a passive role in these organizations and do not actively participate in them.

Background

The scope of this article is delineated to allow for sufficient depth of the topic while taking into account time and resource constraints. As such, a case study design was used and it focuses on the individual agents (i.e., climate managers) in seven SMSTs based in Denmark as the unit of analysis and their participation in two national city networks as the two case studies (DK2020 and Energibyerne). A brief presentation of both networks will be given below to help understand the functions of each network has for the seven municipalities. A comparison of the two networks is given in Table 2—Different characteristics of the networks of Energibyerne and Dk2020.

DK2020 "DK2020-climate plans throughout Denmark," hereinafter DK2020 is a climate partnership that was launched in 2018 in Denmark by C40, the philanthropic funding organization of Realdania and the thinktank CONCITO. C40 is an international city network that typically focuses exclusively on megacities like London and New York. In 2016, C40 published their Deadline 2020 to guide their member cities in how to reduce their emissions to reach the Paris Agreement

TABLE 2 Characteristics of the two national networks being analyzed.

Network characteristics	Energibyerne	DK2020
Goal	Their goal is to make a fossil free environment in their cities as soon as possible and to do so they have started sharing and exchanging knowledge about energy-efficient solutions, citizen engagement, transport, strategic energy planning and other (Energibyerne, 2021)	Their goal is to support municipalities in developing, upgrading or adjusting their existing work on climate action to global best practice, and ultimately developing CAPs in line with the 1.5 degree goal in the Paris Agreement (Realdania, 2020a).
Number of members	7 municipalities	66 municipalities
Member base and level of experience*	Similar level of experience and similar sized municipalities	Heterogenous experience, similar sized municipalities
Governance structure	Public and private actions in steering group	Public and private actions in steering group
Geographical scope	National Danish network	National Danish network
Topical coverage	Specific sectoral interventions in energy	4 pillars of the Climate Action Planning Framework: adaptation, mitigation, inclusivity, and governance
Funding	Funded by the SmartEnCity network which is part of an EU Horizon2020 project.	Funded by Realdania, Danish Regions, and the KKR

* In terms of capacities, ambition level, financial resources, political commitments.

1.5°C target. A common tool was established by a pilot project of eight mega C40 cities: the "Climate Action Planning Framework" (CAPF). DK2020 is the Danish version of the Deadline 2020 report, making it the first time that this C40 CAPF standard is applied and further developed for smaller municipalities (Realdania, 2020a).

DK2020's goal is to "*support municipalities in developing, upgrading or adjusting their existing work on climate action to global best practice, and ultimately developing climate action plans in line with the 1.5-degree goal in the Paris Agreement*" (Realdania, 2020b). This is a first for the C40 network to be involved in a national-level initiative focusing on smaller cities. With this plan, all the municipalities adhere to a common method for preparing climate action plans which makes it possible to compare results with other cities in and outside Denmark. When the project was launched in 2019, there was a call for membership application over three phases: (i) the pilot project with 20 pilot municipalities (September 2019 to April 2021); (ii) the first call with 46 municipalities (from November 2020 to April 2022); and (iii) the second call for applications in April 2021 (officially starting in autumn 2021 to 2023). The municipalities of Frederikshavn, Middelfart, Sønderborg, and Høje-Taastrup were part of first phase, while Horsens, Ringkøbing-Skjern, and Skive were part of the second phase. This network is quite unique as it has managed to get almost all 98 Danish municipalities onboard.

Energibyerne (which means "the Energy Cities" in Danish) is a Danish-based network of seven municipalities, two private companies, and one public-private partnership called ProjectZero. This network is part of the wider European network called SmartEnCity Network which is part of an EU Horizon 2020 project and its aim is to develop "*pan-European replicable strategies to reduce energy demand and*

maximize renewable energy supply with a special focus on small and medium-sized cities" (Rathje et al., 2018, p. 48). Energibyerne have been meeting on a quarterly basis for more than 3 years now. Each municipality has been the host of at least one of these meetings where they typically do an in-depth presentation of their municipality, their climate experiences, accomplishments, and challenges. They discuss how they can learn from each other and promote cities as climate transition drivers and, in cooperation, improve the national political framework. ProjectZero and the SmartEnCity network coordinator have been facilitating and coordinating these meetings. They are both the link between SmartEnCity and Energibyerne.

As previously mentioned, the focus of this article is on the climate managers in seven small and medium-sized Danish municipalities. As can be seen in Table 3, the target municipalities have typical characteristics of small and medium-sized municipalities of the country. The cases were strategically chosen to represent "typical cases" of Danish municipalities by showing that those being studied share similar structural characteristics (Blaikie and Priest, 2019). All of the seven municipalities are small and medium in size with an average population of around 59,560, ranging from 38,853 to 90,966, representing the average population size of a municipality in Denmark (59,415 inhabitants in 2020; Dijkstra and Poelman, 2014). They are also representative of four out of the five regions in Denmark since they are spread out across the country, as can be seen in Figure 1.

Conceptual framework

This study focuses on city network functions and the concept of policy entrepreneurs (i.e., climate managers) within

TABLE 3 Key characteristics of the 7 municipalities.

Municipality (Region)	Danish rural degree (EU degrees of urbanization)	Population (pop density-inhab, /km^2)	Key characteristics
Frederikshavn (Northern Jutland)	Rural (town and suburb area)	59,039 (93)	• Area in km^2: 633 • Declining population • Major companies include two harbors, wind turbine sector and slaughterhouse • Goal of 100% renewable energy by the end of 2030 • Three people working in Energy City Frederikshavn • Coastal municipality
Høje-Taastrup (Capital region)	Urban (town and suburb area)	51,729 (661)	• Area in km^2: 78 • Growth of companies and jobs with many commuters • Companies include IT and services, logistics and heavy goods transport, and regional retail • Goal of fossil free by 2050 • Traffic hub • Four people working with energy planning and climate issues • Landlocked municipality
Horsens (Central Denmark)	Intermediate (town and suburb area)	92,229 (147)	• Area in km^2: 519 • Major population increase • Companies include graphics design and electronic companies and a university college • Goal to reduce CO_2 emissions by two percent every year • Climate manager has been working for over 13 years • Coastal municipality, flood risk
Middelfart (Southern Denmark)	Intermediate (rural area)	39,116 (131)	• Area in km^2: 299 • Suburban municipality of large city Odense • Municipality is the largest employer in the local area • Three main goals: (i) making Middelfart a great place to live; (ii) making Middelfart the green growth municipality of Denmark, and (iii) focusing on concrete results • Climate manager, has been the Head of Climate and Energy since 2007
Ringkøbing-Skjern (Central Jutland)	Remote (rural area)	56,182 (38)	• Area in km^2: 1,471 • Declining population • Denmark's largest municipality in geographical terms, low population density • Companies include 60 green energy sector companies, Vestas largest employer • Energi2020 vision to be self-sufficient and fossil free • Deploying renewable energy, especially wind power • Climate manager the Head of the Energy Secretariat for over 12 years
Skive (Central Jutland)	Remote (rural area)	45,425 (66)	• Area in km^2: 684 • Declining population • Public sector is the main employer • One of Denmark's first "Energy City" • Climate manager is the leader of six-person team • Using alternative energy sources such as solar, wind, and hydrogen power
Sønderborg (Southern Denmark)	Rural (town and suburb area)	73,831 (149)	• Area in km^2: 497 • Decreasing population; increase in elderly people and decrease in proportion of working population • Green technology companies like Danfoss and Linak

(Continued)

TABLE 3 (Continued)

Municipality (Region)	Danish rural degree (EU degrees of urbanization)	Population (pop density-inhab, /km^2)	Key characteristics
			• Agriculture a significant industry sector, especially animal farming, and Danish Crown (i.e., biggest pig slaughterhouse in Denmark)
			• Established 'ProjectZero-transition to a carbon neutral community by 2029'
			• Two climate managers one from the municipality and one from ProjectZero
			• Latter at ProjectZero for 14 years and a founder of Energibyerne

Source: Own elaboration (data from Social og indenrigsministeriet, 2020).

FIGURE 1
Map of Denmark with the 7 analyzed municipalities. Source: Map from (d-maps.com)
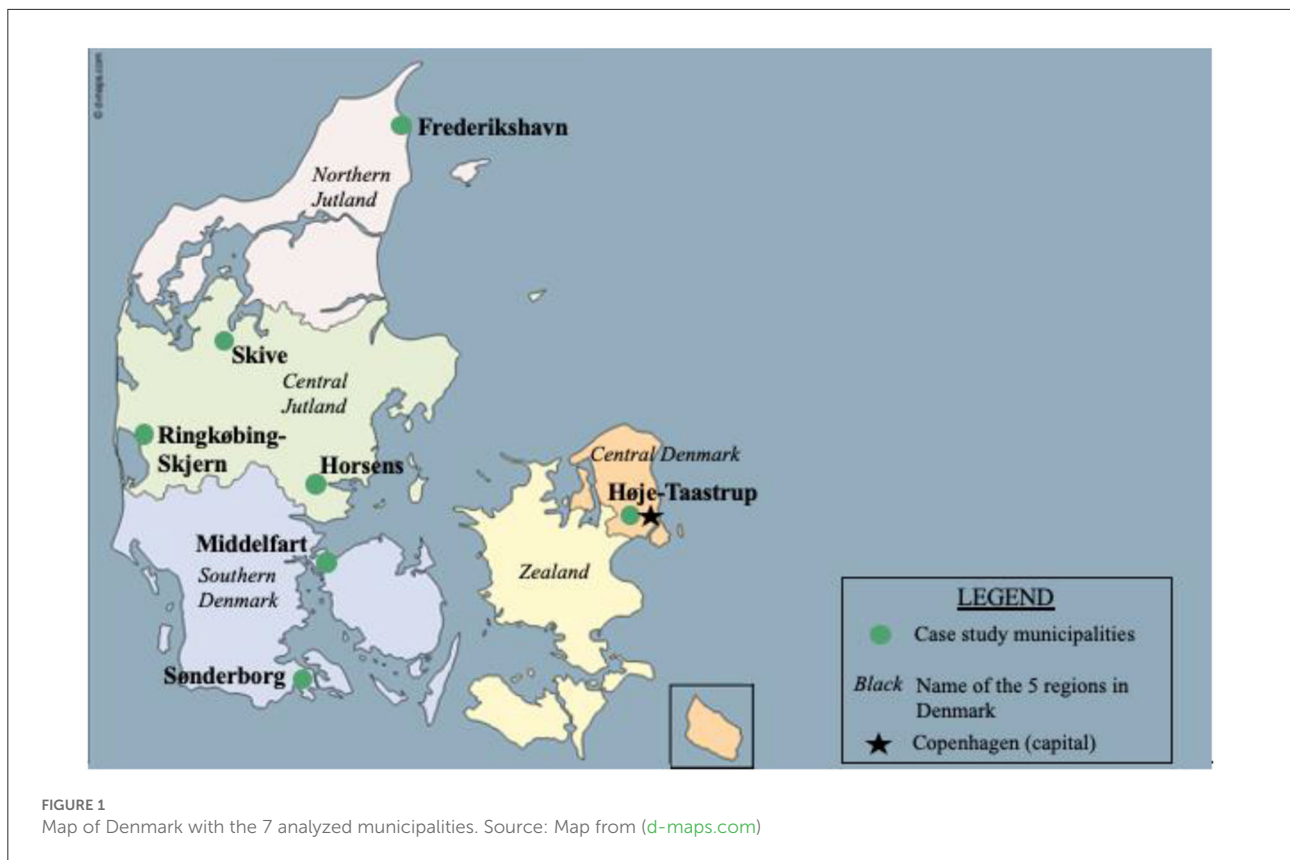
national city networks. The analysis describes the city network functions and supplements this by describing how the policy entrepreneurs have agency for some of these functions.

City network functions framework

To conduct this research, the framework brought forward by Busch (2016) will be used to identify which network functions are perceived as most valuable by the climate managers. As a critic of the three frameworks (i.e., Bulkeley et al., 2003; Andonova et al., 2009; and Busch, 2015) previously presented in Table 1, Busch et al. (2018) pointed out that the frameworks do not include the internal governance process within the member municipalities. This framework is unique as uses the climate managers and their departments as their units of analysis and focused on the agency level to analyze network dynamics. Emphasis is thus placed on the agents in city administration and the main local actors leading the climate agenda (i.e., climate managers), rather than using a network perspective.

These local actors were identified to be climate managers since "*even if the mayors are the actual signatories to networks [...], the actual interest in and impacts of member cities' work with networks are defined and shaped by local climate managers*" (Busch, 2016, p. 59). Climate managers are be broadly defined as the "*staff in municipalities who work on climate mitigation and/or adaptation issues*" (Busch, 2016, p. 49). This framework was initially used to analyze "*the use of transnational municipal*

Functions of city network membership on local climate governance.
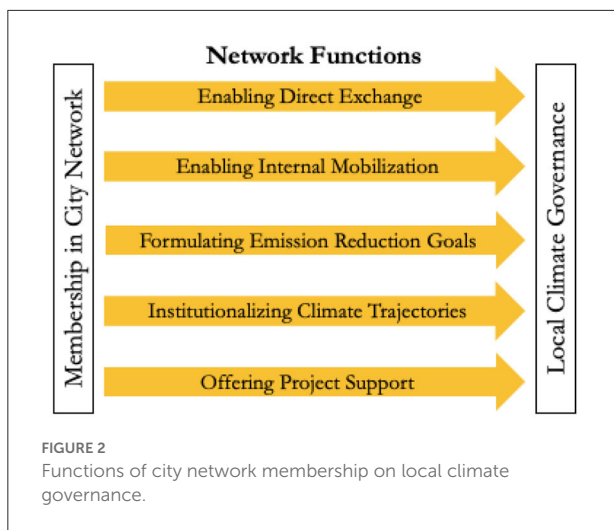
network membership by local actors and an assessment of the importance of these processes" (Busch, 2016, p. 43). However, this article will be applying it to a different context by focusing on national municipal networks and on smaller municipalities, which was not initially considered in the Busch article where the emphasis was on German cities of more than 50,000 inhabitants participating in transnational municipal networks.

This framework differentiates itself from the other frameworks discussed previously in Table 1 since it reflects how actors at the local level use the city's membership in networks. It contrasts with the typical analysis on networks which stresses the multilevel character of urban climate governance and focuses on the interaction between different levels (Busch, 2016). In other words, this framework looks at the impacts of transnational municipal networks as a tool used by local agents (level of analysis: individual agents in cities) as opposed to the impacts on the city from a multi-level governance perspective (level of analysis: local level/city) (Busch, 2016).

While the city networks can offer certain tools to municipalities, it is of no use is the climate managers participating in the networks do not use them. Many networks offer different tools to the municipalities. This study is however based on what each municipal representative finds useful given its individual context. It is about what is actually being perceived as valuable for the small and medium-sized municipalities. What makes these networks productive and dynamic is the entrepreneurial qualities of the climate managers. Thus, city network functions are referred to the "*advantages or services cities gain from being a [network] member*" (Busch, 2016, p. 53). A total of 11 functions were identified and five functions were identified to be the most important, which are visualized in Figure 2.

These five main functions are defined as:

- **Enabling internal mobilization** refers to the climate managers using transnational municipal networks membership to motivate climate governance within the member city to succeed in "*putting climate change-related issues on the local political agenda, raising awareness among the local population or justifying climate change mitigation or adaptation measures by means of the* [transnational municipal networks] *membership*." (Busch, 2016, p. 56).
- **Formulating emission reduction goals** by setting benchmarks, making the municipalities committed to the goals politically accountable for reaching them. Thus, sufficient political support is necessary to have this.
- **Institutionalizing climate trajectories** by means of institutionalizing climate governance through formal decisions which were motivated by the membership in the transnational municipal networks like formal climate strategies or creation of positions in the administration.
- **Enabling direct exchange** between staff from members cities. It encompasses peer learning, direct cooperation between staff members and motivational effects delegates gains from network conferences. This is different from the other functions of the presentation of "best practice examples" or "green city branding."
- **Offering project support/consultancy services** where local governments can access consultancy services through the city network who offers of know-how and tools, management packages for climate-related activities and campaigns, computer programs.

The six other functions (Busch et al., 2018) cited less frequently are:

- **Exchange of best practice examples** promoted by the networks' information systems like homepages, newsletters, and conference presentation.
- **Helping with GHG accounting** to generate knowledge of local emissions by providing methodologies like a software for GHG accounting. The emission data can be used to identify intervention points for local climate policies. This relates specifically to climate action planning.
- **Referring to a global context** where networks influence local climate policies by providing information on international climate policies.
- **Enabling access to funding** since networks typically do not provide funding themselves, but they provide access to funding by other entities.
- **Advocating and lobbying** on behalf of their members at higher administrative levels. This can lead to more favorable conditions for the work of climate managers in municipalities and cities through new funding schemes for local projects. Benefits from this function are not directly visible to actors in the city.

- **Enabling green city branding** by offering cities opportunities to advertise their city through several channels like press releases, newsletters, conferences, and a space on homepages to highlight their efforts.

Policy entrepreneur theory

Policy entrepreneurs (also referred to as institutional and political entrepreneurs, champions, and change agents) have an important role in climate change planning (Betsill and Bulkeley, 2007; Kern and Bulkeley, 2009; Lee and van de Meene, 2012; Wejs, 2014; Busch, 2016). Mintrom and Norman (2009) pointed toward a gap in policy entrepreneur theory where "the motivations of policy entrepreneurs have gained limited attention to date." (p. 661). This gap was picked up by Busch (2016) and included as a fifth element in his approach to investigate the use of transnational municipal networks by climate managers. While policy entrepreneurs are often said to be necessary actors to implement the climate agenda of networks on the local level (Kern and Bulkeley, 2009; Lee and van de Meene, 2012), it is rarely being analyzed from the policy entrepreneur theory perspective (Busch, 2016). There are different types of entrepreneurs depending on the sector and roles (e.g., corporate entrepreneurs, social entrepreneurs, and policy entrepreneurs) (Lovell, 2009).

Within policy, entrepreneurs are found in government as politicians or as civil servants and their main activities involve driving policy change and developing new policy ideas (Lovell, 2009). In particular, policy entrepreneurs are actors participating in the policy-making process and they can be identified by their efforts to promote significant policy change (Kingdon, 1985; Mintrom and Norman, 2009). They distinguish themselves by "their desire to significantly change current ways of doing things in their area of interest" (Mintrom and Norman, 2009, p. 650). Mintrom and Norman (2009) defined four central elements of successful policy entrepreneurship: social acuity, team building, problem definition, and leading by example. All policy entrepreneurs are said to exhibit these characteristics, but some policy entrepreneurs will be stronger in some of these elements compared to others.

Policy entrepreneur elements include:

- **Social acuity**: Refers to the ability of policy entrepreneurs to take advantage of 'windows of opportunity' to promote policy changes (Mintrom and Norman, 2009). This is done through their good use of policy networks which helps them acquire knowledge from the outside and "by understanding the ideas, motives and concerns of others in their local policy context and responding effectively" (Mintrom and Norman, 2009, p. 652).
- **Problem definition**: Refers to the way problems are defined and which attributes are made salient can determine what

individuals and groups pay attention to Mintrom and Norman (2009).
- **Team building**: Regards the fact that policy entrepreneurs are team players and their strength does not come from their ideas alone but from their ability to work effectively with others and their team-building capabilities (Mintrom and Norman, 2009). This is seen through building tightknit teams with people with similar beliefs and values or by using their professional and personal networks for policy change.
- **Leading by example**: The risk aversion of many decision makers is a major challenge for the actors seeking policy change and a common strategy utilized to overcome this barrier is to engage with others to clearly demonstrate the workability and potential implementation of an idea (Mintrom and Norman, 2009).
- **Persistence and motivation**: Previous literature has focused on the motivations of entrepreneurs to offer individual level explanation for their actions. Thus, their motivations are explained through a rational actor guided by career prospects and self-interest (Kingdon, 1985). Furthermore, these entrepreneurs demonstrate considerable perseverance and persistence by working on certain transitions for a significant part of their career (Meijerink and Huitema, 2010). Persistence was also suggested as an important characteristic of policy entrepreneurs (Kingdon, 1985).

Materials and methods

Research design

With the aim of investigating the most important functions of city networks and policy entrepreneurs, this article adopts a qualitative research design that employs a case study approach. In considering the different types of case study designs, the chosen one was an embedded multiple case study. Multiple cases were chosen because it provides a better understanding of the phenomenon since different benefits will be drawn from the two city networks.

Data collection and analysis

To gather different perspectives on the topic and to investigate the most important functions of national city networks and to answer the research question, this article draws data from two sources of data: documents and interviews. The data collection and analysis were conducted in two parts: document sources were first gathered and analyzed and then it was followed by interviews.

The document review of this article fulfilled three main goals: as a complementary method to the interviews as a means of triangulating, i.e., combined; provide background context on the research participants and lastly, it was an effective way to gather data when events that cannot be observed such as previous Energibyerne meetings (Bowen, 2009). Documents, specifically reports, plans like climate action plans, and websites from the practitioner organizations along with news articles on their climate activities, provided a useful basis to complement the information collected during the interviews. These documents were collected from websites, supplemented by Internet search engines. Internet searches included the name of the municipality and terms like "climate action"; "climate action plan"; "DK2020"; "climate"; and "energy."

Some of these documents were in Danish only and were translated to English via free online translators. Moreover, secondary information was sought from the Danish statistical website to provide a descriptive overview of the units on information such as the type of municipality and population growth. For Energibyerne, information from their webpage, private minutes of meetings from the network (11 meetings) and the public summary of the meetings were gathered from the SmartEnCity website. In total, 9 municipal climate action plans, 8 websites, 2 news articles, 1 conference, the minutes of 11 network meetings, along with the review of each of the municipalities' websites were consulted and included in the document review (see Appendix I of the Supplementary materials).

To ensure a comprehensive understanding coming from different perspectives, data was collected from interviews with practitioners and documents of various organizations (i.e., public sector, private and non-profit organizations) that are involved in city networks. The most important consideration in conducting interviews is to identify the persons who may have the best information with which to address the study's research questions (Hancock and Algozzine, 2006, p. 40). In this case, since the goal of this study was to establish the link between the local level and the network level, the person working full-time on the climate agenda within the municipality and representing their municipality in networks was interviewed, aka the local climate manager. It was only feasible to interview one person per municipality even if for three of municipalities there was more than one of these local agents. This limitation was due to time constraints of a master research. In total, 12 semi-structured interviews were conducted in 2021: seven with municipality representatives and five with representatives of networks, along with four informal discussions (see Appendix II of the Supplementary materials). The informal discussions took place with various researchers and ongoing discussions with the SmartEnCity network coordinator. The small number of interviews was due to the focus on a small number of focus cities in the city networks.

Interviews were conducted online via Zoom in English with an approximate duration of 45 to 60 min. All the interviews were video- and audio-recorded in order to retain a full record of the conversation and avoid inaccuracies due to poor recall (Yin, 2014). Computer written notes were also taken during the interviews. After each interview, a memo, i.e., usually a short note to oneself, was written down to capture quick insights, get the "raw feeling" from the interviewee and reflect on the main takeaways (Cope, 2016). Transcribing the interviews was a time-consuming process where nine interviews were done by hand and five with the assistance of transcription software. Moreover, member checking was used to determine the accuracy of the qualitative findings by sending the results back to the interviewee participants for them to verify their accuracy (Creswell, 2014). They were also asked to review the direct quotes used and their unit description. This allowed to mitigate certain difficulties related to the interviewer and interviewee having different native languages.

Data from these different sources was then corroborated in the analysis part rather than analyzed individually where each data source contributes to the researcher's understanding of the whole phenomenon (Baxter and Jack, 2010). To analyze the data between and across, a comparative content analysis was used. The NVivo software was used for the coding of the transcribed interviews and the document review to allow for both a systematic and an efficient analysis. The coding structure used can be found in Appendix III of the Supplementary materials. Quotes from the interviews were allocated to a network function when it corresponded to the definition given in the city network function of this article. A comparative analysis of the two city networks of DK2020 and Energibyerne was conducted to identify the functions of the city networks that are perceived as most valuable for the municipal climate managers.

Analysis

Network results: Functions

A comparative analysis of the two city networks of DK2020 and Energibyerne was conducted to identify the functions of the city networks that are perceived as most valuable for the municipal climate managers. To identify which functions were perceived as most valuable, the analysis was conducted at the agency level, that is the policy entrepreneur (climate manager) perspective. The value was determined based on how important the interviewees viewed certain functions and how frequently they were brought up by different people. The most important functions will be presented below. For each of the identified network functions, the associated policy entrepreneur elements will be highlighted. The most important functions for both city networks differ between themselves, as can be seen in Table 4 below.

These 8 functions were perceived as valuable by the climate managers. As opposed, some of the functions that were being offered by the networks such as "enabling green branding," "exchanges best practices," "access to funding," and "referring to a global context" were not mentioned by any of the interviewees and therefore not seen as bringing value to their work. The impact of city networks on local climate governance can be seen in Figure 3 below. As shown in the Figure, when the climate managers use their policy entrepreneur qualities to utilize network functions, it can lead to a high level of implementation of the municipality's climate agenda. The analytical framework of Busch (2016) for local climate governance was adapted to offer a better visualization of this impact. It is the climate managers that are creating the impact which is reflected in the different elements of policy entrepreneurs.

TABLE 4 Most important functions of the municipal networks.

Energibyerne	DK2020
1) Enabling (external) direct exchange	1) Helping with GHG accounting
2) Offering project support	2) Enabling internal mobilization
3) Advocacy and lobbying	3) Enabling direct exchange
	4) Formulating emission reduction goals
	5) Institutionalizing climate trajectories
	6) Advocacy and lobbying
	7) Enabling (internal) direct exchange

Source: Own elaboration.

Enabling direct exchange

The most important function identified by the climate managers for both national networks was the "enabling of direct exchange." For Energibyerne, this function is reflected more through the exchanges between the climate managers from the different municipalities. Since they are a small group of <20 people, there is a high level of interaction between the participants who are meeting on a regular basis. These exchanges give them knowledge from different areas of expertise, feedback, inspiration, and recognition of efforts. The fact that they are in the same country, has facilitated this exchange: "*they have the same language, the same boundary conditions, same traditions, so they can exchange experiences in an easier way.*" (PlanEnergi representative). They also have similar challenges due to their size. Furthermore, the differences between them, particularly the fact that they are spread out across the country, makes it even more valuable since they rarely collaborate with municipalities outside of their region.

The direct exchanges in DK2020 have not yet really taken place because of COVID-19. There are some conferences and webinars but due to the online set-up, interactions between climate managers are limited. However, one of the civil servants highlighted the future direct exchanges that will derive from DK2020: "*Simply by putting people in the same room and giving them the same homework at the same time will foster new coalitions springing now out of the DK2020.*" (Middelfart's climate manager). Moreover, DK2020 has also been creating external networking opportunities for the municipalities. In DK2020's climate action plan framework, it is a requirement that the plan is formulated in collaboration with key stakeholders in the public, business, and civil society. This type of interaction
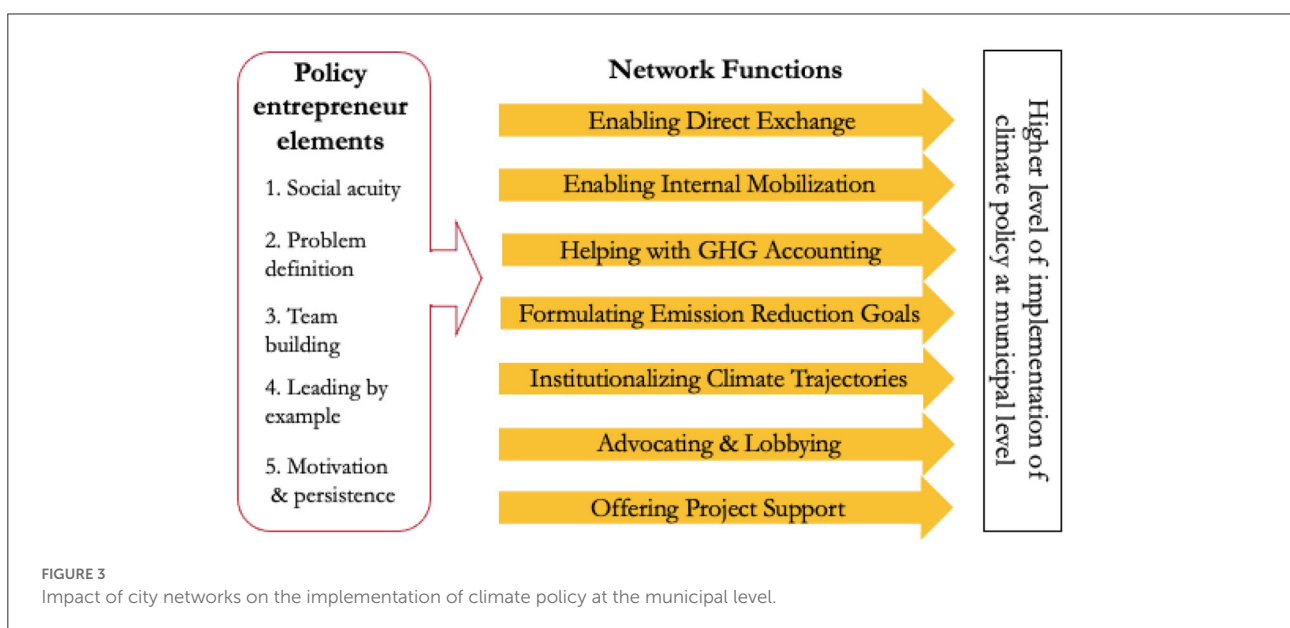

FIGURE 3
Impact of city networks on the implementation of climate policy at the municipal level.

was raised as being beneficial mostly for the municipalities that had not yet been interacting with external actors. Therefore, it enables a different type of direct exchanges than Energibyerne does.

Policy entrepreneur elements

The "enabling direct exchange" function was not only an important reason for cities to participate in city networks, but it is also the function that reflects the most elements of being a policy entrepreneur. Firstly, these policy entrepreneurs demonstrate social acuity through their good use of policy networks to find knowledge outside of their municipality. This is seen in Energibyerne with the function of direct exchange with the peers from different municipalities. Each of the climate managers have their area of knowledge expertise that they bring to the table and share their experience. This is very valuable for smaller municipalities who can have limited access to knowledge and these exchanges reduce the number of resources each municipality because "*we do not need everybody to start with everything, we just need to build up and continue what others have done. By doing so, we can reach the climate goals as soon as possible.*" (Høje-Taastrup's climate manager).

Secondly, policy entrepreneurs are considered team players who work with others to promote policy change. One of the forms of team building is to operate within a tight-knit team composed of individuals with similar ideas, policy beliefs, and value preferences. For Energibyerne, this tight-knit team between the policy entrepreneurs is present. The significance of being a small personal network of people that trust each other and share a common enthusiasm and desire to take climate actions was seen as an important condition for having this tight-knit group. This reflects the mutual support this network provides them through external direct exchanges with the other climate managers. Being a small group was seen as crucial for the actors to be able to directly talk to each other.

Lastly, the regular and direct exchange with others from different municipalities in Energibyerne was seen as beneficial "*to meet and talk to others with the same enthusiasm*" (Ringkøbing-Skjern's climate manager) because "*not so many cities in Denmark have been working on a serious level with how we can solve the problem.*" (Frederikshavn's climate manager). This level of seriousness often came up when the representatives shared what commonalities they have between themselves. All the municipalities have mentioned that Energibyerne has been fruitful for them regarding getting inspiration from the others and sharing knowledge "*we went into the meetings because they [the other municipality representatives] know so much and it is very good to hear what is going on in other municipalities and we take this inspiration and when we bring it home. (...) It is a big inspiration*" (Horsens' climate manager). Thus, the function

of direct exchange played an important role in motivating the policy entrepreneurs.

Enabling internal mobilization

Internal mobilization was named by several respondents (climate managers from Frederikshavn, Skive, Høje-Taastrup, and Horsens) regarding DK2020. The climate managers seemed to use this function to create mobilization in their municipality in two different ways: for convincing and for coordination. This first role of "convincing" can be seen in municipalities it was used a means of overcoming a lack of legitimacy of the local climate agenda. This need for internal mobilization was due to some municipalities not having a broad organization and having limited personnel working in the climate area (e.g., lack of human resources). To compensate, they need to collaborate with other departments to implement certain projects. DK2020 helped the climate managers with the legitimacy and this sense of urgency required to act now to be able to reach the long-term goals. To show, the climate manager from Høje-Taastrup said "*being CO_2 neutral by 2050 is not the problem. The hard part is to convince the other departments that we only have nine years until 2030 so everyone must think and act accordingly for us to reach those goals and DK2020 helps with that.*" (Høje-Taastrup rep). This demonstrate that the climate manager used the network function to implement change in their municipality.

The second role of coordination can be seen in municipalities where climate issues are dealt in a sectorial approach, and where the departments work in silos rather than together. For example, the climate manager in Skive explained: "*like in any large organization, sometimes the right hand does not know what the left hand is doing.*" DK2020 provides them with the opportunity to widen their gaze and help them realize that might be a lot of things they have not been working with but are in the end, relevant to the climate agenda. A perfect example of this is the lack of coordination between climate mitigation activities and climate adaptation since they are often located in different departments. For Energibyerne, they have not provided this function to their members yet. Besides the civil servants assisting to the meetings, the value it provides them doesn't seem to have extended beyond that. Ultimately, internal mobilization function is especially useful to convince and coordinate with other departments to overcome having a lack of human resources only working on the climate agenda.

For Energibyerne, they have not provided this function to their members yet. Besides the civil servants assisting to the meetings, the value it provides them doesn't seem to have extended beyond that. For example, in Horsens, the climate manager explained that "*we see a value in participating in the [Energibyerne] network, but I am not sure that the leaders our department actually know what is going on and the value they could get by assisting to the meetings.*"

Policy entrepreneur elements

The two roles (convincing and coordination) reflect different characteristics of policy entrepreneur shown by the climate managers. Firstly, the role of convincing of the internal mobilization function is reflected in the problem framing element provided by the city networks. The climate managers could point at the wide number of Danish municipalities becoming part of the DK2020 network as a way of justifying that climate issues become a bigger part of the municipalities' political agenda. It was helpful for climate managers that DK2020 has most Danish municipalities onboard and that cities similar (in terms of size) to the climate manager's city are also members. Secondly, the role of coordination is reflected in the policy entrepreneur element of team building. One form of team building is through a coalition of individuals that do not share beliefs or values nor policy preferences but are dependent on each other for realizing their divergent objectives (Meijerink and Huitema, 2010).

Helping with GHG accounting

This function has been highly relevant for DK2020 since the climate action plan framework that members have to follow is "Paris compliant" meaning that all GHG emissions (scope 1, 2, 3) are considered in the emission baseline inventory. In Denmark, there is no framework suggested by the national government of emissions to include and to account for. Currently, many of the Danish municipalities do not account for all greenhouse gases and high emitting activities. Thus, by using the C40 framework, it "*forces them to see if there are any gaps in their current plans*" (C40 representative) since "*by far, most of the climate action plans in Danish municipalities are incomplete in comparison to the [C40] CAP standard.*" (Realdania representative). As such, this function has helped some municipalities overcome a lack of scientific information and help with data management. While this function did not reflect a particular element of policy entrepreneurship, it will allow for better comparison between the municipalities levels of progress and ambitions in the future and provide the climate managers with more leverage to push for more climate actions.

Formulating emission reduction goals

This function was only mentioned for DK2020 since Energibyerne does not require goal commitments from its members. As such, by asking to commit to certain objectives when joining the network, DK2020 sets benchmarks which makes the municipalities politically accountable for reaching them. For DK2020, the main commitment for the municipalities is to have a goal that is aligned with the Paris Agreement. This

function is most valuable to increase the political support of the climate policies.

Policy entrepreneur elements

Problem definition relates to how a problem is presented to other individuals and the attributes that are highlighted as important. This links back to why local governments are engaging in climate action. How the problem is framed depends on the type of actor you are talking to but also the individual's motives and beliefs. In this case, climate action was mostly framed as a development and business opportunity which aligns with the "green growth" dialogue. This local framing was critical for the municipalities that struggled with a decreasing population. When talking with politicians, the policy entrepreneurs seemed to highlight co-benefits like community attractiveness, green job creation, and local industry. For some municipalities such as Sønderborg and Høje-Taastrup the policy entrepreneurs have opted to aim for normative goals like the status as an environmental leader. For instance, it is used in Høje-Taastrup where the mayor has recently expressed a stronger desire to become a leader. Thus, when it came to formulating emission reduction goals, "*we did not need to discuss the goal, because to be ambitious, we need to be at least at the same level as the national level.*" (Høje-Taastrup's climate manager).

Institutionalizing climate trajectories

Closely related to the previously mentioned function of committing to certain goals is the effect it subsequently has within the municipality. This institutionalization was seen through making climate action plan is a topic of discussion for every council meeting and through the employment of new staff members in the municipalities of Middelfart and Frederikshavn who are now responsible for applying the adopted climate action plan from DK2020. Thus, the DK2020 climate action plan mobilizes the political actors in the municipality and is anchored in the city council decisions.

Policy entrepreneur elements

Leading by providing examples is a way that policy entrepreneurs can promote policy change in an effective way. Decision makers can be very risk averse, and it can create a lot of challenges for those seeking policy changes. To overcome such barriers, policy entrepreneurs must communicate the workability of the policies. One way for policy entrepreneurs to show the workability of the suggested policies and reduce the perceived risk is through participation in city networks. Indeed, network membership has been used as a tool for cities to legitimize climate policies and to draw attention to problems related to urban climate governance. For example, in

Horsens municipality, being part of DK2020 seemed to help with institutionalizing climate trajectories and mobilize politicians by pointing toward the proliferation of municipalities joining this climate network for them to be part of it. This was also used in Høje-Taastrup as a means of internally mobilizing other civil servants into putting climate change on their agenda as well.

Advocacy and lobbying

The lobbying function involves the network being a "city advocate" at higher administrative levels. This function has been highlighted for both networks as a means of overcoming barriers due to a lack of legal competences. Thus, the municipalities trying to overcome these challenges can come together through these two platforms to speak with a common voice to the national government. However, this function is reflected differently for both networks.

For Energibyerne, the lobbying and advocacy is for advocating for the needs of smaller ambitious municipalities. They engage directly with organizations, universities, mayors, and the parliament through their participation to Folkemødet Festival. Folkemødet, People's political festival, is an annual Danish Democratic festival which happens every year on the island of Bornholm where Danish citizens come to have dialogue about important issues with Danish politicians (e.g., youth, climate, education).

The difference between the networks is the means through which they communicate to the national government. In Energibyerne, it is through the "*use of each other's networks to get into contact with the important people*" (Frederikshavn's climate manager). On the contrary, DK2020 elevates ideas to the national level through the governance body of the network. DK2020 has "*gotten the attention of the minister of climate [of Denmark], Dan Jørgensen, who has approached DK2020 for seasonal meetings just to know what is going on.*" (Middelfart's climate manager). Thus, it is the network representatives that are talking to the national level and not the municipalities directly. This could explain why it was not mentioned by the municipalities since the benefits are not always directly visible to the actors in the city. The main difference lies in if the network acts as an intermediary organization to discuss with the national level or if it offers them a voice to directly talk with them.

Policy entrepreneur elements

City networks have the potential of bringing together municipalities facing similar challenges and give them a common voice to talk to the national government to promote policy change. This leads to the team building of policy entrepreneurs that may not share the same policy beliefs but share an interest in realizing a particular sort of policy change. The importance of such coalitions is seen through

the network function of advocacy and lobbying which was highlighted for both networks. Thus, when climate managers experience a challenge that is due to a lack of legal competences in a certain area, they can use the networks to "*voice their challenges, draw inspiration and experiences from different cities, businesses, educational institutions and organizations*" (Minutes Energibyerne meeting, 2021). This is particularly helpful for municipalities to overcome institutional barriers.

Offering project support and consultancy services

Project support and consultancy services are deemed useful functions when a municipality lacks financial resources or technical knowledge. Within Energibyerne, one of the main goals of the network is to collaborate on joint projects on chosen focus areas. For one of the joint projects on Power-to-X, the PlanEnergi network representative is the project chairman since he has the technical expertise to evaluate the potential for a Power-to-X project in each municipality. This helps the municipalities since the evaluation for this type of project requires very technical knowledge. However, the technical expertise of the consultants was not highlighted for Energibyerne nor DK2020. A potential explanation is that five of the municipalities out of seven have been using the services and knowledge from PlanEnergi and Tankegang before Energibyerne even started.

Policy entrepreneur elements

A defining characteristic of policy entrepreneurs is that they are good at networking and making connections with other actors. To do so, they make use of their personal and professional networks and drawing from their political experience and contacts, and their professional reputation and expertise. Within Energibyerne, the members of the network their used their own personal networks to help find project support and consultancy services. By having many contacts and good networking skills, the climate managers could invite organizations, other networks, project support providers to present to them at the network meetings their various consultancy services.

Additional to this, both city networks also offer the climate managers platforms to make more contacts, connect with other actors, and to deepen their already existing connections. By expanding their network, it makes it easier to reach out to others when they are faced with a problem and gain from others' knowledge and experience. Moreover, having access to this technical knowledge reflects the element of social acuity of the climate managers. They can use their membership in networks to access expert knowledge which is maybe not found within their municipality.

Discussion

Network functions

To answer the main research question of this article, the most important functions of national municipal networks named by the climate managers are enabling direct exchange, internal mobilization, GHG accounting, and project support. The results of the study showed that climate managers do make direct use of network membership for their own work in implementing the local climate agenda and that interest in city network is shaped and defined by the local climate managers.

Some of the functions that were being offered by the networks such as enabling green branding, exchanges best practices, access to funding and referring to a global context were not mentioned by any of the interviewees. There could be some overlap between "access to funding" and "offering project support" and also because city networks do not offer directly funding but participation in networks can be used as a criterion for receiving funds in certain cases. "Referring to a global context" was also not mentioned even if the SmartenCity network offered it since it has members in various European countries. Same goes for green branding, it is probably perceived as having less value for the climate managers and more for the city mayors which is why it was published on many of the municipality's homepages.

Moreover, there is a difference in two aspects with regards to network functions. Firstly, the seven climate managers have attributed a different importance to certain network functions which signifies a contrast in their perception of what is viewed as valuable. This contrast is because they have different reasons for becoming a network member and the intended benefit each network has. As such, the functions that are most valued by each climate manager depends on the difficulties they are trying to overcome on a local level. To explain, if a climate manager has some difficulties in coordinating the climate agenda with other departments, then by joining the network, the "enabling internal mobilization" would be an important function for them. Such a function would not be as valued by a climate manager from another municipality if the climate agenda is embedded in other departments and the other civil servants are aligned with the overall climate vision. This also reflects the importance of adopting an agency perspective to uncover what is perceived as valuable in the networks and why.

Secondly, there is a difference between the functions considered useful for each network, as seen in earlier in Table 4. Furthermore, the only overlapping functions are "advocacy and lobbying" and "enabling direct exchange." On the latter function, however, the group of actors with whom direct exchange is enabled with is different. Energibyerne enables direct exchanges with the other climate managers (i.e., externally), whereas DK2020 enables direct exchanges with local social actors such as businesses (i.e., internally). This truly highlights the difference between them and why the municipalities do not perceive the networks as competing between each other in their offerings but rather as offering complementary functions. This is surprising since the two networks share certain characteristics, for instance, (i) they both have a hybrid governance structure by having public and private actors in their steering group; (ii) the same geographical scope by being national Danish networks; and (iii) a similar member base since they both focus on small and medium-sized Danish municipalities.

Yet, the two networks have different goals and ambitions which have influenced what they offer to member cities. Indeed, DK2020 has more members (currently 66 municipalities) and a more heterogenous member base with municipalities with different capacities, ambitions, financial sources, and political commitments. This influences the different services they offer to their members. As opposed, Energibyerne has fewer members (7) that share a similar level of climate experience and level of ambition which the network can offer more tailored functions to. Additionally, the benefits induced by DK2020 seem to be "acquired" from the beginning of the membership while for Energibyerne it took some time to build the benefits.

Direct exchanges

The most important function mentioned by the climate managers for both national networks was the "enabling of direct exchange." Three main conditions seemed to have been crucial to facilitate this direct exchange between the climate managers in Energibyerne. Firstly, the municipalities share the same language, boundary conditions, country, challenges, and traditions on a broader level, and a similar level of experience in local climate action (similar context), reflecting the advantages of national networks enumerated by Lee and Jung (2018). While this can help the exchange and reduce transaction costs of collaborating, it is not enough to explain why some collaborations between some actors work and some do not.

Indeed, by focusing on the agency, one can see that it is the personal relations and direct exchanges between the actors are crucial for building trust. This was mentioned by many climate managers, and it was only possible due to being a small intimate group. These findings confirm what Haupt et al. (2020) said: "*social and personal skills of the involved stakeholders will determine the success and evolution of city-to-city learning.*" (p. 156). It also reflects the important role of the climate managers acting as policy entrepreneurs since it is their networking skills and team building capacities that can enable the benefits.

Secondly, the significance of being a **small personal network** of <20 people that trust each other and shared a common enthusiasm and desire to take climate actions was also highly valued. Being a small group was seen as crucial for the actors to be able to talk to each other and to move away from only networking. The common desire and enthusiasm was also a

strong inhibitor since it took almost 3 years of more networking activities to get to the trust level they share now.

Lastly, the two people from ProjectZero in the Energibyerne network acting as **neutral coordinators and mediators** of the inter-municipal exchanges was also seen as necessary to structure and coordinate the quarterly meetings. They organized the different field visits during which the actors could learn about each other's successes but also weaknesses and challenges. Funding was also provided for the travel expenses of the field visits. These actors could be seen as acting as "transition intermediaries" since they link actors and activities, connect visions and demands of actors within existing regimes, as explained by Kivimaa et al. (2020).

Contributions to the field

This article contributed to the literature by further developing the Busch framework. Firstly, the function of "enabling direct exchange" was further separated into internal exchanges within the municipality and externally with other municipalities. Secondly, the function of "internal mobilization" can be seen as creating value to either convince other departments of the climate actions need or to coordinate with other departments on how to implement these actions. These two developments help see the internal dynamics present in a city which cannot be seen when a city is considered a homogenous actor. This development helps to better identify the potential struggles the climate managers may be facing and by doing so the city networks can better tune their offerings to respond to these needs. Moreover, it was a first time that the Busch framework was applied to a different target audience in terms of geographical focus of the network, the size of the municipalities and the country it covered. The article also dived deeper into the connection between this framework and the policy entrepreneur theory. When applying this framework in future research, authors should investigate other countries with different cultures, energy infrastructure history, and a different distribution of power between different levels of government.

Policy entrepreneurs

One of the research gaps this research pointed out was the fact that some authors, by using only the framework of multilevel governance as valid analytical tool, treat cities as internally homogenous actors with a coherent agenda and it has some important omissions regarding the limited attention to the multiple forms of agency (Bulkeley, 2021). By doing so, the actions of individual actors and the internal dynamics with a municipality are not being accounted for. Our article contributed to this gap by using an agency-based perspective of city networks. By adopting a policy

entrepreneur perspective, it also helped uncover the importance of direct exchanges between trusted peers, which turnout to be the most highlighted network function. Indeed, the main finding is that it is not small and medium-sized municipalities that use network membership but the individual representatives that act as policy entrepreneurs to push and steer the implementation of climate agenda of the local level.

All the seven municipalities have pointed toward each other as pioneers with a long track record. The performance of these municipalities on climate issues is often due to the activities of a few individuals within the municipality. Even if there was strong leadership from the mayor who are the actual signatories to networks like DK2020, there has been a turnover in these while the constant variable remains these dedicated civil servants. Thus, it is these individuals who are the climate managers in the municipalities who have been leading and working on the climate agenda ever since the municipality started taking action on this. The actual interest in and impacts of member cities work are defined by local climate managers. Consequently, the climate managers of each of the studied municipality can be regarded as policy entrepreneurs. This is not to say that all climate managers are policy entrepreneurs automatically, but they can become policy entrepreneurs in the use of their municipality's network membership to overcome local struggles.

In the network function analysis, the important role of climate managers was underscored. By being the main actors representing the municipality, the climate managers are in a powerful position to steer the benefits gained from membership by being the link between actions at the municipal level and at network level. The results showed that climate managers do make direct use of network membership for their own work in implementing the local climate agenda and that interest in city network is shaped and defined by local climate managers. When considering the structural factors, this article uncovered that while all the climate managers are policy entrepreneurs (or have the potential to be), not all of them were able to take actions leading to policy changes. Indeed, policy entrepreneurs are also constrained by their specific policy contexts.

Motivation and persistence

The direct exchanges between the climate managers in city network meetings was the most important function that provided them with a motivational boost and inspiration. The exchanges with others give them the feeling of being part of a movement and part of a group of dedicated individuals working toward the same goal and fighting the same battles in their respective cities. While all five elements of policy entrepreneurs are important aspects, it seems that the persistence and motivation of the climate managers was the most crucial element.

The seven policy entrepreneurs in this study were found to be driven and motivated by altruistic and idealistic motives. This confirms with the findings of Busch (2016) and counters the expectations of Mintrom and Norman (2009) that policy entrepreneurs are driven by their self-interests. This may be true for general policy entrepreneurs, but it does not seem to apply for environmental policy entrepreneurs. A strong indicator is that many of them have started working on climate change issues a long time ago, before it became more of a mainstream issue.

This also reflects the persistence element of policy entrepreneurs who are often the individuals in municipalities who have been working on climate issues for many years. They have therefore acquired legitimacy for their work over the years and can take the knowledge and experience they gain from participating in the networks and implement it within their respective municipalities. In some cases, the experiences learned from one municipality was directly implemented in another municipality. This was the case with the replication of the Frederikshavn's Youth Climate Council to the municipalities of Sønderborg and Høje-Taastrup.

Limitations

A number of methodological limitations to this research can be mentioned. Firstly, the focus of this paper was on rather recent networks that are not yet fully established. Because of this, the impacts they have on climate policy implementation were hard to identify. However, since they were highlighted as very beneficial by the interviewees, they were decided to be kept. Also, the municipal units are at different stages of implementing DK2020's CAPF, which may have influenced their perceived benefits of the network. Since DK2020 is still recent and resource demanding to make the CAPs, the perceived benefits may feel greater than older networks. Secondly, interviewing only one civil servant from each municipality only captures one interpretation of the situation which impacts the results of this study. Extending the data collection to include a document review and conduct interviews with the network representatives was expected to offer a broader database and to compensate, to a certain extent, a potential lack of interviews with more local agents.

This article focused on Denmark which could affect the generalizability of the results. Indeed, Danish municipalities seem to have a supportive political and legal context, and a higher level of autonomy and a higher decision-making power to take urban climate action. These two enabling factors have been identified within literature as important for cities to govern their climate actions. This may limit the generalizability of results to countries which have neither.

Conclusion

The overarching aim of this article is to better understand how local actors use national municipal network membership to increase the implementation of their municipality's climate policies. The main research question this article sought to answer was: what are the main functions of national city networks found to be useful by agents in small and medium-sized municipalities? By using network function analysis from an agency perspective, this article shows that the four most important functions for the climate managers are the direct exchanges between them, internal mobilization of municipal employees on the climate agenda, GHG accounting, and project support. Direct exchange was the most important for both networks, while the networks offered different benefits. Energibyerne provided direct exchanges, project support through project collaborations, and lobbying, while DK2020 offered more functions related to internal mobilization, GHG accounting, formulating emission reduction goals, and institutionalizing climate trajectories.

Thus, the climate managers saw different benefits associated with each of the networks, explaining their dual participation in both networks. The main finding is that it is often not small and medium-sized municipalities using network membership but the individual representatives that act as policy entrepreneurs to push and steer the implementation of climate agenda. Indeed, many of the most relevant functions used by climate managers are for the direct purpose of influencing something they are lacking on a local level. These results demonstrate the importance of adopting an agency perspective as it uncovered the important linkage policy entrepreneurs played between local climate governance and horizontal governance which are typically analyzed separately.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author/s.

Author contributions

This study is based on the master research of CC and the results derive from it. CC conceived the study, conducted the interviews, and performed the analysis. DM-D and CC wrote a significant proportion of the article. KM supervised the study and contributed to the revision. All authors read and approved the final manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsc.2022.970968/full#supplementary-material

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