

German municipalities as pathmakers for a sustainable future: leaders or followers?

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Abstract

Reducing their impact on and enhancing their adaption to climate change is one of the major challenges of cities in their ambition to increase sustainability. The 21st century has been called the “century of the cities”, emphasizing the role of the local level in sustainability transitions. Thus, there is high interest in understanding municipalities’ capabilities and limitations for creating impact. With this study, we aim to contribute to this field by examining the different roles municipalities embrace as well as their network of interactions with actors outside their administration. Our focus is on climate action as an exemplary field within the transition towards sustainability.

The paper combines two empirical approaches: We contrast in-depth interviews with 17 selected representatives from cities and experts on municipal climate action with a broad survey of 554 German municipalities. Based on the interview study, assumptions are derived regarding the municipalities’ perceptions of their respective roles in contributing to climate action. This also includes how they associate with actors outside their administration, e.g. international climate action, national policy makers, other cities or civil society. Furthermore, the municipalities’ understanding of their central tasks in the field of climate action as well as their perceived scope of action with respect to the influence of higher levels of government is analysed. The findings from the interview study are complemented by the results of the broad survey to check for validity.

We find that climate action is an important issue for German municipalities: In the survey, only 12 % reported rather low or low engagement in this field. The analysis of the interviews shows that the municipalities primarily see themselves as role models. Other than that, they take on various different roles and are in active exchange with citizens and other municipalities. In regards to higher levels of government, interactions are more limited. The comparison with the survey results demonstrates that this especially applies to smaller municipalities, which have more limited interactions overall. A key role, however, is assumed by superordinate levels of government with regards to their provision of funding and the regulatory framework they establish.

Introduction

Achieving climate goals and fostering the energy transition are part of the major challenges to today’s societies. The role of the local level of towns and cities, or more specifically municipalities as the relevant administrative and political structure, have received a lot of attention in the academic literature (e.g. Brugger and Henry 2021; Kemmerzell et al. 2016 for Germany; Amundsen et al. 2018) as well as from practitioners and policy makers (United Nations 2015). This relates to the fact that they play a key role in making the link between individual actors such as citizens or companies and higher political levels (Dütschke and Wesche 2018). Furthermore, the actual implementation of measures to meet these challenges is also executed on the local level (Kemmerzell et al. 2016). While the legislative power and often also the resources of municipalities are limited compared to superordinate levels, they usually

have a strong influence in shaping the local context, for example by infrastructure planning (Bulkeley 2010). Furthermore, Amundsen et al. (2018) see the municipal level in the dual role “to transform within their own organisation, and to act as a catalyst for transformation locally” (p. 23). This paper takes a closer look into the possible roles of municipal administrations with a focus on their self-perceptions regarding their role and how this interacts not only with relations to actors within the municipality but also beyond. Following a short overview of the relevant literature with a focus on the issue of roles and actor interactions we present findings from interviews and a survey study on German municipalities.

Schönberger and Reiche (2016) identified five fields of opportunities for sub-national actors like municipalities in the energy transition: as consumers, as regulators and planners, as energy providers, as providers of information and support, and finally engaging in overarching measures like strategic plans. For the field of electric mobility and municipal roles Burghard et al. (2019) also propose a structure of five potential roles municipalities can take, however, this list differs slightly: municipalities as consumers, as role models, as local networkers, as a link to actors and networks outside the municipal administration and as regulators and implementers. For the purpose of this study we combine these potential roles and propose to differentiate six of them, combining the inward direction from Amundsen et al. (2018) with an outward perspective: Municipalities may act as (1) consumers, (2) role models, (3) networkers, (4) local leaders, (5) regulators, (6) providers of information and services. In the following, we describe in more detail what these roles encompass and also allude to the current state of research.

Municipalities as consumers: Usually municipalities manage a number of properties (e.g. for administration, schools, sports) within their city, have a certain fleet of vehicles (cf. Burghard et al. 2019), sometimes run or at least manage canteens (e.g. for schools and their own staff) and maintain offices for administration; thus, there is a variety of fields where municipalities themselves are consuming goods and services. According to estimates by the OECD, public procurement spending in Germany account for 15 % of the German GDP and 35 % of general government spending. A major part of procurement spending is made by the municipalities and by doing this in a climate friendly way, they therefore can contribute to triggering the demand for sustainable innovations (Beck and Schuster 2013; Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit 2020; OECD 2019).

Municipalities as role models: The consumer role is related to functioning as a role model, i.e. if municipalities make visible how they implement climate friendly behaviours, this can be observed by local companies and citizens. Since Gehne et al. (2019) show, that public trust in local politicians is higher than in politicians at higher levels of government, it can be assumed that their behaviour has rather high impact on civil society. In this regard, Amundsen et al. (2018) discuss cases how communities can ‘lead by example’.

Municipalities as networkers and information brokers: Municipal officials are in regular contact with many societal groups within the municipality, e.g. companies, research organisations, households, associations, and can support the exchange of information and diffusion of knowledge and expertise among

them. Furthermore, they are able to reach out to the superordinate political level or horizontally to other municipalities e.g. by participating in dedicated networks like the Climate Alliance¹ or Covenant of Mayors². Such city networks have received quite some attention in the literature and this discussion goes as far as theorizing in how far such horizontal cooperations could have repercussions on the broader political system (Bulkeley 2010). Heikkinen et al. (2020) show, that municipalities which participate in such networks are more likely to have started earlier with an engagement in climate action and those that are members of multiple networks tend to have achieved higher levels of climate action planning.

Municipalities as local leaders through strategic governance: Municipalities are free to develop strategies and future visions for their region to guide citizens, local companies and other societal actors. This includes for example setting decarbonisation goals or priority areas. Such strategic approaches are mirrored by the high number of goal setting documents like local energy concepts and climate or energy action plans (Schönberger and Reiche 2016). These are very common in European municipalities as is outlined by Reckien et al. (2018) who found that two thirds of them have set up such plans. Kasa et al. (2018) analyse the role of planning guidelines in Norwegian municipalities and conclude that they seem helpful to legitimize climate policy by linking it to other policy areas in earlier phases of climate engagement. In later phases they made little difference, especially in overcoming barriers like financial restraints or lack of manpower. Along these lines, Vogel (2016) brought attention to the tension between growth and sustainability logics that clash on the municipal level and lead to divergence between high ambition and effective implementation.

Municipalities as regulators: In Germany as in other countries, municipalities form the lowest administrative level. German municipalities are responsible for public administration and are responsible for public services (“Daseinsvorsorge”), i.e. the supply of infrastructure goods including electricity and public transport as well as planning issues, e.g. for land use planning.

Municipalities as providers of information and services: A further role that a municipality can take is as an information and service provider. This includes consultancy e.g. on mobility or energy issues, but also by offering certain services – often directly or indirectly through municipal enterprises – like mobility planning, car or bike sharing. Palm and Falldé (2016) describe such a close interaction between a municipality and the local municipality owned energy provider which tried to anticipate the strategy of the municipality in energy terms and adapted its business to match it.

Building on this overview, in this paper we analyse the different roles that the municipalities themselves actively claim in climate action. A more detailed look is taken at the interaction with actors outside the municipal administration and the municipalities’ understanding of their central tasks as well as their perceived scope of action with respect to the influence of higher levels of government.

1. <https://www.climatealliance.org/home.html>

2. <https://www.covenantofmayors.eu/en/>

Data and methods

To address the research interests under study we combined two empirical approaches. We conducted in-depth interviews with 17 selected representatives from cities as well as experts on municipal climate action. The findings from the interview study are then complemented by the results of a broad survey of 554 German municipalities. In the following, we further describe our mixed-methods approach.

INTERVIEW STUDY

A series of interviews on municipal climate action and the municipalities' relation to actors outside the municipal administration serves as a database of this study. The interviews were conducted in Germany between January and April 2020. One part of the interviews was carried out with representatives of cities and another part with experts outside the municipalities. The interviews were semi-structured, based on an interview guideline that was similar for both groups and featured the following topics: The motives and strategies of municipalities to engage in climate action; their understanding of their central tasks in relation to higher levels of government as well as their respective roles in contributing to climate action; and their relationships with actors outside the administration. The interview conversations were digitally recorded and transcribed verbatim.

The recruitment process for the groups of participants was designed to include information-rich cases that provide deep insights into the research interests under study (Patton 2002). For the interviews with representatives of the municipalities, we therefore concentrated our participant recruitment efforts on municipalities with high levels of engagement in the field of climate action. A preliminary selection was made through targeted research of municipalities with prominent activities. In terms of the municipalities' size, geographic location, and structural characteristics, we systematically recruited a diverse set of municipalities to better reflect the different framework conditions of German municipalities. In total, we conducted 13 interviews with representatives of German municipalities. Participants of our study were mayors, heads of environmental offices and climate protection officers or other staff members who are working in the field of climate action. Additionally, four interviews were carried out with representatives of overarching associations such as municipal climate protection networks and consultancies for municipal climate action.

For the research interests under study in the present paper, the interviews were analysed by applying content analysis. In terms of the analysis of the municipalities' perceived roles, a deductive approach was used, building on the insights gained from the literature. If necessary, the coding scheme was adapted inductively according to the findings derived from the data. For the analysis in relation to the further objectives of this study, we adopted an exclusively inductive approach (Mayring 2015). For the coding procedure, a coding frame was developed including main codes and subcodes (Table 1). In a first step, the interviews were coded using a simplified coding scheme on the main research interests under study, which are the local administration's perceived roles in climate action, their network of interactions with actors outside their administration and the municipalities' understanding of their role in relation to higher levels of government. In the following, the quotes were categorized in subcodes according to underlying themes. For the analysis of the data, the software MAXQDA was used.

In this paper, quotes from the interviews are indicated with letters that mark whether the interviewee belonged to the representatives of the municipalities (MU) or to the experts outside the municipalities (EX). In addition, a number is given that allows to identify the respective interview in the sample.

QUESTIONNAIRE STUDY

In our mixed-methods approach, we supplement the findings from the interview study with descriptive results of a broad survey. The survey was carried out using a standardised online questionnaire and focused on the municipalities' climate action activities, their motives and strategies for engagement in this field and their interactions with actors outside their administration. The questionnaire was developed based on the previously described interview study and included sections on the self-reported level of engagement in climate action activities; perceived potential of these activities; institutional and strategic manifestation in the municipality; networks of interactions with actors outside their administration; their understanding of their role in relation to higher levels of government; and the enactment of the different roles of municipalities in climate action. Further information on the framework conditions in the municipalities as well as on the topic of climate adaptation was collected in the last part of the survey.

The relevant population for the study consists of 2,915 German municipalities with more than 5,000 and less than 500,000 in-

Table 1. Overview on main codes and subcodes applied to the interview data.

Main code	Subcodes
Perceived roles in climate action	Consumer Role model Networker Local leader Regulator Provider of information and services
Interaction with actors outside the municipal administration	Higher administrative levels Other municipalities Societal actors/citizens Economy
Perceived role in relation to higher levels of government	Importance of higher governmental levels for municipal climate action Implementation of (inter-)national climate policy requirements

habitants (Statistisches Bundesamt 2019a). Out of this group, all municipalities with more than 20,000 inhabitants (685 municipalities, city-states were not included) were invited to take part in the survey. Of the smaller municipalities with 5,000 to 20,000 inhabitants, a random selection was made of half of the municipalities (1,097). Addressees of the online survey were the mayors. Unique internet links to the online-survey were used to track who had already completed the questionnaire and to connect the information in the questionnaire with structural data, i.e. number of inhabitants (Statistisches Bundesamt 2019b) and the corresponding Federal state. The survey was carried out from July to September 2020.

Of the 1,782 municipalities contacted, 554 (31 %) submitted valid questionnaires. From the group of cities with more than 100,000 inhabitants 59 % took part in the survey. The proportion completing the survey is lower for municipalities of a smaller size and dropped to 27 % for municipalities with 5,000 to 20,000 inhabitants, which still account for the largest share of the sample (53 %). Overall, the municipalities cover all the German federal states in a largely uniform manner, except for the city-states. The share of municipalities with mayors of a Green party in our sample is 5 %, which is higher than the actual share of Green mayors among German municipalities with 5,000 to 500,000 inhabitants³.

Results

In the following, the results of the interview study as well as the broad survey are presented for the three aims of the study: Analysing the roles of municipalities in climate action, the interaction with actors outside the municipal administration, and the municipalities' understanding of their central tasks as well as their perceived scope of action with respect to the influence of higher levels of government.

MUNICIPAL ROLES IN CLIMATE ACTION

In the interview study, many municipalities explained that they perceive themselves as role models for their citizens. Some interviewees further highlighted the importance of this role and also pointed out, that they see a connection between the municipal activities and civic engagement in the field of climate action in their vicinity. Furthermore, they describe their local administration's approach as a role model to be also incorporated in the execution of their role as a consumer, e.g. by electrifying the municipal vehicle fleet. This is shown by statements of some municipalities with one describing the synergy between the administration's climate-friendly corporate mobility management and the accompanying role model effect:

MU1: One example, is that we are now implementing an internal corporate mobility management system where we can try to make it more climate-friendly for employees to get to work or to their workplaces. And that, of course, also has, should have, first and foremost, a role model effect. That you can get to work in a different way.

For one interviewee, however, the motivation for municipalities to act as consumers is not only rooted in being role models for the citizens, but also in decreasing the costs for energy consumption. Following up on that, this person also stated, that climate action activities are expensive and the savings do not amortize the other costs:

MU11: This is partly the function as a role model, but of course it is also in our own interest. So, everything that you do not have to spend money on, energy costs – that of course directly benefits the budget again. Yes, then you have to see whether that pays off with the staff positions or personnel costs. So far, it has not yet paid for itself, so to speak, but that is the point: of course climate action costs money.

For the representative of another municipality, the administration's engagement as a consumer is thus depending on financial subsidies provided by higher levels of government, as this offsets the additional cost of climate action measures:

MU10: We only have an electric car or an electric fleet because we get funding for them. And are therefore below the leasing rates for vehicles with combustion engines. (...) We are already doing a bit of calculation. And that is good in terms of funding. The good thing is that there are relatively good funding opportunities in this area. Also highly funded. (...) So, without funding, our motivation would definitely be lower.

Problems were mentioned in regards to the rather long processing time for funding applications, since cost savings through energy efficiency measures are higher if they are implemented at an early stage. Furthermore, one interviewee perceived the existing regulations for cost-efficient procurement as too strict. As can be seen below, another problem is the limited personnel capacity in the administration as well as insufficient experience with regards to energy and climate action issues:

MU6: Urgent things such as fire protection, which are suddenly required by law. And then, so to speak, things like: Now we are making the lighting energy-efficient. With such things competing with each other in the implementation capacity. Yes. I see that as a major, major stumbling block.

MU12: So the first cases are now emerging where you first have to go through learning processes, with the existing staff in the administration, who, I would say, do not have a great deal of expertise in the field of energy and climate protection.

Nevertheless, several of the municipalities interviewed considered the role as a consumer to be relevant. One motive given by an interviewee for implementing this role is that it is a simple measure, since the municipalities have direct control over this:

MU1: It definitely has a relevance. Because this is of course also anchored as a measure. It is a rather simple measure for us, yes, because we simply have direct control there. So clearly. In procurement, this is an issue. Actually, with everything internal that is purchased directly, so to speak.

As mentioned earlier, the role of local administrations as consumers is linked to their function as role models for citizens. Furthermore, they also use their role model function to en-

3. The share of Green mayors among German municipalities with 5,000 to 500,000 inhabitants is around 1 % and was determined through an online research that was based on the following list: https://de.wikipedia.org/wiki/Liste_der_B%C3%BCrgermeister_von_B%C3%BCndnis_90/Die_Gr%C3%BCnen.

courage other actors to follow their example. This is stated by some of the interviewees, who say that their municipalities do this through concrete measures such as increasing sustainability in catering, e.g. in administration canteens, schools or kindergartens, and at events:

MU2: The city as a role model is a topic that we use, for example, by reporting on relevant measures of the city in our city newspaper, but also in press releases, and we try to encourage imitation there, for example, with regards to building standards, yes.

In addition to the aforementioned, the participants of the interview study also specified other ways in which municipalities inform their citizens and thereby try to motivate them to take climate action. For instance, the municipalities hold competitions in the field of climate action, as well as public events and trade fairs. Furthermore, advisory services are offered that target not only citizens but also other stakeholders. In some of the municipalities examined, these services are provided by dedicated energy consulting centers; in another, on-site consulting is offered:

MU10: (...) a network was founded, where companies, i.e. our craft enterprises, which also include electricians as well as heat installers. In other words, all sorts of activities in the energy sector. They also give lectures to each other and are also open to the public.

MU2: We have now been working on this for two years with an advisory campaign to motivate private building owners to install solar systems by offering free on-site consulting. We have just shifted the focus even further to industry and commerce, because the quantitatively relevant units are more likely to be installed there.

Through their consulting services, municipalities do not only act as providers of information and services, but also as networkers. They interact with other actors inside and outside the municipality and can thereby support the exchange of information and diffusion of knowledge among them. Some respondents stated that their administration's motive for these activities was the adoption of a local leadership role through strategic governance in the field of climate action:

MU5: So this networking, yes, was also partly a means to an end. Where we made use of external actors. To simply be able to advance the topics. Where we knew that internally we would not be able to do that.

In acting as local leaders for their citizens, municipalities in some instances pursue a holistic approach. Operationally, this is being applied by means of concepts or guiding principles:

MU2: And our quasi internal goal is to try to integrate climate action as an integral part in as many areas of the city administration as possible. (...) But as I said, we have to try to see this not only as a task of my department, but as an integrated or integral task of the entire administration. And our department or my department has, I say, a coordinating function and a collecting function and an initiating function there in the city.

When it comes to the use of regulatory measures, the municipalities take different positions. While some municipalities consider the means of binding regulations to be an important instrument and use them extensively within the framework of the legal possibilities, especially in the area of urban land use planning, others favor to lead by example instead or by offering financial incentives.

In this paper, the results of the interview study are complemented by the results of the broad survey to check for validity. In the survey (n=550), 48 % of the municipalities reported high (40 %) or rather high (8 %) levels of engagement in climate action activities, while only 12 % reported rather low (11 %) or low engagement (1 %). The rest of the municipalities is in the midfield. A test for correlation with the municipalities' total population was performed, which revealed no relationship between the two variables, meaning that the size of the municipality is not related to their engagement in climate action.

In respect to the different types of roles that municipalities can take in the field of climate action, the survey participants were asked to assess the extent to which their local administrations are embracing the respective roles (Figure 1). In contrast to the interview study, the role as a provider of information and services was not queried here. This is due to the fact that this role was included in our study after a more thorough examina-

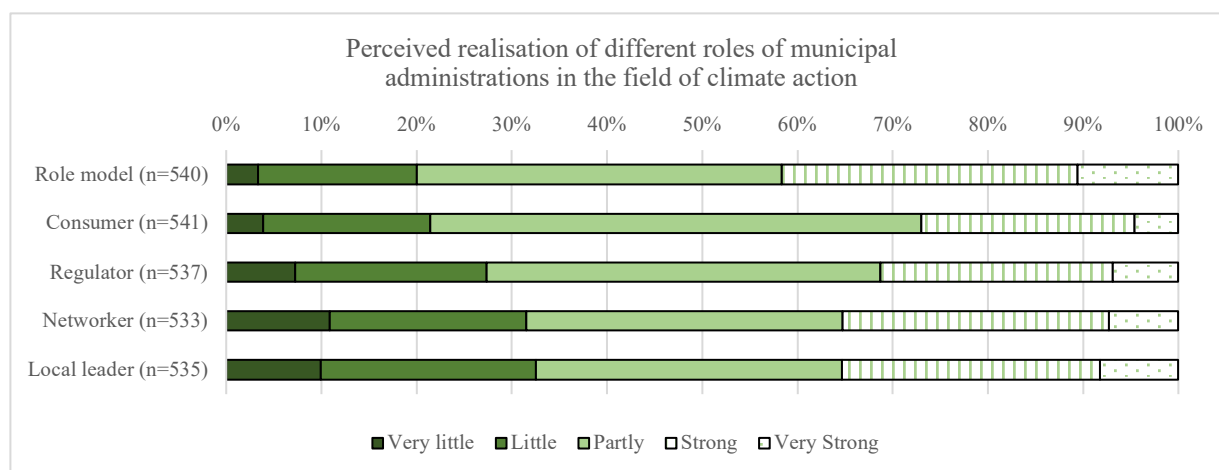


Figure 1. Perceived roles of the municipal administrations in climate action.

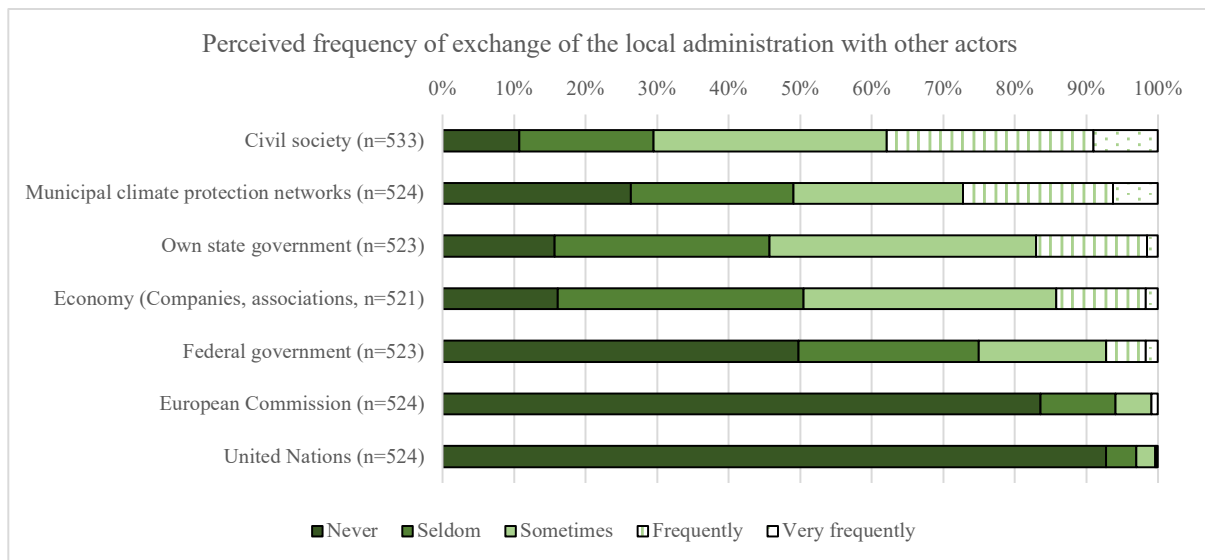


Figure 2. Perceived frequency of exchange of the local administration with other actors in the past five years.

tion of the interview results, which was done after the data collection for the survey study had been completed.

According to the survey participants, the most dominant role of a local administration is to act as a role model for citizens. This approach is realised in 42 % of the municipalities in a very strong or strong manner. Mixed results are found for the other possible roles in the field of climate action. While many municipalities (35 %) strongly or very strongly perceive themselves as networkers and information brokers, as well as local leaders through strategic governance, there is also a high share of municipalities where these roles are of little or very little importance. Municipal roles that are predominantly perceived as partly realised are the role as a consumer (52 %) and as a regulator (41 %). A check for correlation between the different roles of the municipalities shows that all of the corresponding variables are correlated with each other with coefficients ranging from $r=0.365$ to $r=0.681$. This indicates that the various roles municipalities can fulfill with regards to climate action are interconnected, which is supported by the results of the interview study, as these also featured various linkages between the different roles of the municipalities.

The differences between the municipalities that stated to have implemented the listed roles to a greater or lesser extent are also related to different levels of commitment to climate action in general. This is shown by correlation coefficients ranging from $r=0.371$ to $r=0.515$ between the variables on the municipalities' understanding of their respective roles and the subjective assessment of their engagement, indicating a significant moderate correlation. With respect to the size of the municipalities, measured by their number of inhabitants, significant correlations are found only for the local administration's role as networkers and information brokers ($r=0.200$) as well as strategic leaders ($r=0.162$), both of which show weak correlations.

INTERACTION WITH ACTORS OUTSIDE THE MUNICIPAL ADMINISTRATION

In this section, insights on the local administration's networking activities and their most relevant networking partners are presented. Since the focus of this paper is on the interactions of municipalities with outside actors, interactions within the dif-

ferent departments of the local administration as well as with municipal companies are excluded from the analysis.

Regarding the interactions with actors outside the municipal administration, the survey participants were asked to assess how often their local administrations have been in active exchange with various actors on climate policy issues in the past five years (Figure 2). Except for the interactions with supranational actors, the frequency of the exchanges correlates with both the total population of the municipalities ($0.143 < r < 0.316$) and their overall engagement in the field of climate action ($0.206 < r < 0.352$).

According to the participants of the broad survey, their municipal administrations have engaged in an active exchange or dialogue on climate policy issues primarily with societal actors. 38 % of the municipalities have been interacting with actors from civil society very frequently or frequently. Another 33 % have done so sometimes. The interviews further illustrate the importance of this group of actors as exchange partners, since all 13 municipal representatives reported that there is an active exchange with civil society, i.e. citizens, clubs, civil society organisations, in their municipality. In some cases, civil society was also described as a key initiator of the municipalities' engagement in climate action. According to the interviewees, interactions with societal actors occur in the form of cooperation on climate action measures and exchanges of knowledge and ideas, as well as in the context of participation processes or through civil society initiatives.

As can be seen in Figure 2, the least exchange takes place with supranational actors. In the case of the United Nations, 93 % of the survey participants stated that their municipal administrations have never exchanged with this organisation. In the case of the European Commission, the share was 84 %. This is also in line with the findings from the interview study, in which no municipality reported direct interaction with supranational actors. In comparison, there have been more frequent exchange relationships with the federal level, even though 50 % of the respondents still stated that their local governments have never been in active exchange with the national level. As can be seen from the interviews, an exchange with the federal level

takes place in some cases within the framework of funding programmes, such as the *Master Plan 100 % for Climate Action* programme:

MU6: It is actually institutionalised a bit via the Master Plan 100 % for Climate Action project. That is true. Because BMU representatives are also usually represented there, so to speak. And of course they also sort of pick up things. Other than that, not in an institutionalised form.

According to the interviewees, exchange with higher levels often takes place indirectly by participating in city networks that can help to communicate the concerns of the municipalities to higher governmental levels or inform them about innovative approaches through best-practice examples. This is the case both in terms of the international and national level, as well as in terms of the state level. Further potentials of involvement in municipal networks are seen in the generation of spillover effects on other municipalities and in the opportunity to exchange experiences with them. This is illustrated by the following statement by a municipal representative:

MU2: This is a bidirectional matter. On the one hand, to make demands to the outside, so to speak, where framework conditions need to be improved. And then, in line with the global nature of climate protection, to communicate positive experiences to the outside in order to encourage others to do something similar. And thirdly, to really generate ideas from dialog with others.

The importance that the interviewees attach to engaging in municipal networks is underscored by the results of the broad survey. In comparison to their exchanges with other actors, a rather large proportion (27 %) of the municipalities have very frequently or frequently been in active exchange with municipal climate protection networks. According to the interviewees, these networks are operating on an international and national level, as well as at the state and regional level. Networks that are not climate protection networks per se are also perceived to be very important in this context. Other forms of inter-municipal cooperation mentioned in the interviews are city partnerships or exchanges within the framework of funding programmes, as foreseen by the *Master Plan 100 % for Climate Action* programme, for example.

With their own state government, a combined 17 % of the municipalities have been in very frequent or frequent exchange, and another 37 % have been in occasional exchange. This is evident from the results of the broad survey. The information provided by the participants in the interview study indicates that these exchange relationships occur in various forms. Mentioned are interactions through visits by ministers to local events, exchanges in relation to approval processes, and through cooperation in climate action projects with supraregional focus.

Local companies and industry associations are actors with which 70 % of the surveyed municipalities have only seldom or occasionally been in discussion on climate policy issues. In the interviews some municipalities highlighted that interactions with local companies exist, and that these are also necessary, as municipalities can only exert limited influence on climate action measures in the commercial sector. However, another interviewee stressed that it is difficult for municipalities to persuade companies to engage in climate action activities. A pos-

sible explanation for this is provided by another interviewee who sees the strong focus of municipal politicians on the economic development of local companies as an obstacle to the implementation of climate protection measures, which can be cost-intensive.

THE ROLE OF THE LOCAL ADMINISTRATION IN RELATION TO HIGHER LEVELS OF GOVERNMENT

The municipal administration's understanding concerning their central tasks in local climate action as well as their perceived scope of action with respect to the influence of higher levels of government was examined in the broad survey (Figure 3). The results showed that most participants think that their municipal administration can make a significant, independent contribution to climate action. Furthermore, 45 % of the municipal representatives fully or rather agreed with the statement that their administration should act as a leader in regards to climate action, since higher levels are not committed enough. The same share of survey participants, however, reported that more committed action by higher levels is needed in order for municipal climate action to be feasible. The statements, which the least study participants perceived to be applicable to their municipality are the ones stating, that the administration's central task is the support of local climate action initiatives and interests as well as the implementation of national or international climate policy requirements.

The statements listed in Figure 3 were not part of the semi-structured interview guideline, as the purpose of the interview study was to allow for open-ended responses from participants for more in-depth information. By applying this approach, the information obtained from the interviews showed that local administrations partly orient themselves towards national and international climate action targets and that higher level goals are referred to in order to legitimize municipal activities. However, as one interviewee noted, their implementation on the municipal level is perceived as voluntary rather than mandatory. This is in line with the results of the broad survey, in which only a small part of the municipal administrations perceived the implementation of national or international climate policy requirements as their central task.

With respect to the relevance of higher governmental levels for municipal climate action, many of the interviewed municipal representatives emphasized the importance of federal and state funding. The available funding opportunities were described by some municipalities as comprehensive. Deficits were mentioned with regards to the high amount of work required to prepare the funding applications, as well as the short duration of the funded projects. Besides the provision of funding opportunities, some participants of the interview study also highlighted the influence of regulatory frameworks by the state and federal government as well as the level of the European Union on local climate action. In this context, municipalities stated preferences for extended responsibilities on the municipal level, and problems related to the existing regulatory framework were mentioned. In particular, the regulatory framework concerning the development of wind farms and solar plants were perceived as problematic. Regarding the importance of the legal framework provided by higher levels of government, some of the interviewees described the big impact of changes to the legal framework on municipal climate action:

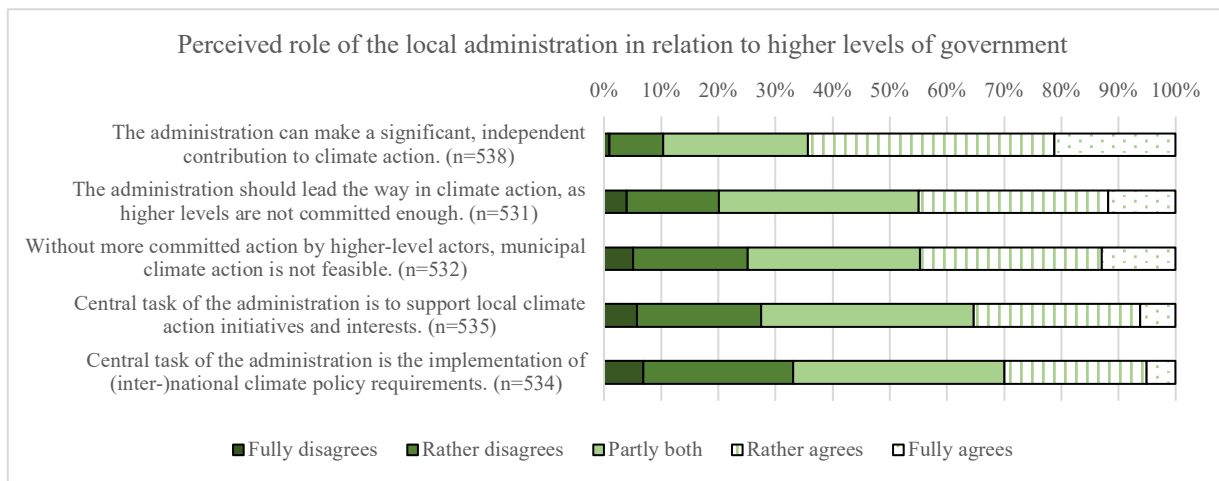


Figure 3. Perceived role of the municipal administration in relation to higher levels of government.

MU6: But of course (...) you are confronted with concrete decisions, for example at the federal level. And somehow, I would say, you deal with it. And integrate it into your work here. And that can sometimes stimulate things all at once. And make things more self-evident, so to speak, for which one might have tried to fight for years otherwise. And on the other hand, of course, sometimes counteract them in some cases, so to speak.

In parts, the presented results are in line with the survey results presented in Figure 3, where many municipalities stated that more committed action by higher-level actors is necessary, in order for municipal climate action to be feasible. Here the interviewees mainly referred to the central role of these actors in municipal climate action both through their provision of funding and the regulatory framework they establish. This, however, contradicts other parts of the survey, where the participants were asked, to what extent the existing legal framework and the legal regulatory jurisdiction of their municipality affected the implementation of climate action in the past five years. In regards to this question, only 11 % of the municipalities (n=493) stated, that municipal climate action measures were very often or often constrained by a lack of legal regulatory jurisdiction. Another aspect of the question was, whether the legal framework had a negative impact on the implementation of municipal climate action. Again, only 11 % of the municipalities (n=492) stated, that the legal framework very often or often had a negative impact. The results are both weakly correlated with the total population of municipalities, indicating that climate action by larger municipalities is both more often constrained by a lack of regulatory jurisdiction ($r=0.226$) and negatively impacted by the regulatory framework ($r=0.179$).

Discussion and Conclusion

The purpose of this paper was to get a better understanding of municipalities' perceptions of their respective roles in contributing to climate action. This also includes how they interact with actors outside the municipal administration and how they perceive their role in relation to higher levels of government. A mixed-methods approach was applied: We combined in-depth interviews with representatives of local administrations as well

as experts on municipal climate action with a broad survey of German municipalities.

The findings presented in this paper indicate that climate action is an important issue for German municipalities. In the broad survey, nearly half of the municipalities rated their level of engagement as high, while many others are in the midfield. Differences in the perceived level of engagement in climate action are not related to the size of the municipality. Since this was not the scope of the present paper, the relationship between the municipal engagement and other local framework conditions was not examined in this study. Regarding the possible roles of municipalities in regards to climate action, the comparison of the survey results with the findings from the interviews showed that among the local administrations perceived roles the most dominant one is being a role model for their citizens. While enacting one role, the municipality is often also exercising another simultaneously; e.g. by acting as a consumer, municipalities also act as role models. Apart of the municipalities' approach as a role model for citizens, the survey featured mixed results regarding the other roles. In the survey, many municipalities only partially assigned themselves to the role as a consumer. The indecisiveness of the municipalities may be due to a variety of factors. On the one hand, benefits of climate-friendly procurement were mentioned in the interviews, which are that it is perceived as a simple measure that municipalities can control directly and that they can use it to lead by example. Problems, however, are partly seen in the high costs of climate friendly procurement measures and a lack of personnel capacities to deal with the issue.

In terms of taking on the role of networkers, there is a dichotomy between the municipalities. While many perceive to fulfil this role, many others do not. This can partly be attributed to the fact that larger municipalities and those with a greater engagement in climate action, are more likely to embrace the role than other municipalities. This is also reflected in the exchange relationships with actors outside the local administration, where smaller municipalities also tend to have more limited interactions. The primary exchange partners for municipalities are actors from civil society. This is the case both in terms of the number of municipalities that are in active exchange with them as well as their importance as key initiators of local cli-

mate action. In conjunction with the relevance of civil society actors as exchange partners, various forms of interactions with this group exist, including the provision of information and services by the local administration. Supranational actors on the other hand are the least important exchange partners for municipalities. In comparison, there are more frequent interactions with the federal level, some of which are institutionalised as part of participating in funding programmes. An open question, which we cannot answer by our study, is whether relevant information is reaching the municipalities through intermediate levels, i.e. national or state level, or if this implies a gap that hampers transition efforts. With regards to their own state-level government, rather strong exchange relationships exist, which occur in various forms. Overall, interactions with higher levels of government often take place indirectly through membership in municipal networks, which serve as a communication platform to these superordinate actors.

The majority of the municipalities perceive themselves to be able to make a significant, independent contribution to climate action, but emphasize that more committed action by higher-level actors is still needed for their activities to be feasible. After all, these actors play a central role in municipal climate action both through their provision of funding and the regulatory framework they establish. Funding opportunities are described to be comprehensive, yet rather bureaucratic. To counteract this, procedures could be simplified or advisory offices could be established to support the municipalities. In regards to the regulatory framework, expanded responsibilities for the municipal level were requested, and problems related to the existing regulatory framework were mentioned by the interviewees. In the broad survey, however, only a small part of the municipalities shared this view. The difference between the two studies could possibly be attributed in parts to the fact that the interviewed municipalities can be considered forerunners in the field of climate action. As some of them have already used many of their options for regulation within the legal framework, these tend to demand further means of regulation. Another explanation could be that many municipalities prefer to lead by example or offer financial incentives in order to motivate civil society actors or local companies, instead of using regulatory options.

Concerning the limitations of the paper, the findings on municipal roles and interactions with actors outside the administration may differ in other countries, since different findings would emerge in different national contexts, e.g. where municipal jurisdiction differs. Another limitation is in the variation of topics that are discussed in the interviews. Since the interviews were semi-structured, it is possible that some issues did not arise during any of the interviews, which play a role for other municipalities. Furthermore, the interview guideline and the questionnaire of the survey study differed in some parts, as both had slightly different research interests under study. In some places, this meant that the corresponding data was not directly comparable. Limitations with regard to the survey study may also exist due to the occurrence of a non-response bias, as municipalities that are more active in climate action may be more likely to participate in the study than others. This is also reflected in the relatively high share of participating municipalities with mayors of a Green party.

Overall, our analysis showed that our proposed six roles of municipalities in climate action are fit to describe the reality of

local climate action in German municipalities. One role that came up in the interviews, which we did not previously include in our concept is that municipalities also enact the role as funding agencies by offering financial incentives to civil society and local companies. By investigating the roles municipalities partake, we showed that municipalities combine various different approaches in contributing to climate change mitigation. By adopting their roles as role models and local leaders as well as their role as networkers between different actors, e.g. civil society and superordinate levels of government, our study further contributes to findings from the literature, in which the municipalities' key role in making the link between local actors and higher political levels has been stressed (Dütschke and Wesche 2018). Furthermore, our findings support that municipalities take up a dual role "to transform within their own organisation, and to act as a catalyst for transformation locally" (Amundsen et al. 2018, p. 23) by combining the aforementioned roles with their role as consumer.

Although our findings show that different levels of engagement in climate action exist among German municipalities, our study does not examine the reasons for these differences in detail. Further research should therefore examine the impact of local framework conditions on the municipal engagement in climate action. Here a focus should also be on the influence of exchange relationships with other actors on municipal engagement, as our research indicated that municipalities with higher engagement also tend to have more exchange relationships.

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