

LOCAL LEADERSHIP IN CLIMATE CHANGE POLICIES*

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Abstract

The article studies differences in political leadership in local government in Norway and in Poland and how they might contribute to differences in local climate policy – adaptation as well as mitigation. Based on the literature of different political leadership models in Europe, we ask how the different political leadership traditions affect active leadership in policies related to climate change. This is answered by analyzing nation-wide surveys to municipalities in Norway and Poland. The results confirm our basic assumption about the differences in leadership between Norway and Poland as being related to differing political models on the local level. Although other factors also explain variations, the findings illustrate the potential of the models in explaining the role of leadership in new policy fields – as with climate-change policies.

Keywords: climate change, local government, local leadership, local administration.

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1. Introduction

Society is vulnerable to climate change and variability (IPCC, 2014a, 2014b; Bulkeley, 2010). Awareness of the importance of mitigating climate change has been accompanied by recognition of the need to adapt to the climate changes that can be observed today, as well as the changes to come in the near future. Nonetheless, earlier studies have shown that, in local policies, mitigation prevails over adaptation (Hoppe, van den Berg and Coenen, 2014). This has been explained by differences in shaping the national discourses related to these two types of climate policies. Mitigation is officially incorporated in global climate policy, and supported by various national and supranational policies, whereas adaptation tends to get left behind, as an issue which must be tackled locally.

As the consequences of climate change can now be predicted with greater certainty, the necessity of adapting to the expected impacts of a changing climate has increasingly been acknowledged by decision-makers at various levels. Climate change adaptation can be defined as adjustment of natural or human systems in response to actual or expected climatic stimuli or effects, intended to moderate harm or to exploit beneficial opportunities (Berkes, Colding and Folke, 2003; Adger *et al.*, 2009; Shaw and Theobald, 2011). Also, the EU has emphasized the need to adapt to and mitigate climate change. Recently, objectives related to EU climate policy have been included in some operational programmes as elements of EU regional policy for 2014–2020 (Swianiewicz and Szmigiel-Rawska, 2015).

As the effects of climate change – like flooding or avalanches – vary regionally and locally, much adaptation work is presumed to be handled locally (Bulkeley, 2010). Private actors may play important roles in realizing climate adaptation, but public policy is also needed: for instance, by the strengthening of dykes and the widening of river-courses (Meijerink and Stiller, 2013; Osberghaus, Danneberg and Mennel, 2010).

If it is to bring significant results, also mitigation must be dealt with locally. Studies have shown that local institutional capacity to adapt to climate change requires resources, variety, fair governance, learning capacity, room for autonomous change and leadership (Gupta *et al.*, 2010; Meijerink and Stiller, 2013). In this article, the focus is on local leadership. Several studies have pointed out the importance of an active political leadership that can take initiatives and be involved, aware and willing to assume political responsibility for reducing the increased risks caused by climate changes (Orderud and Kelman, 2011; Hanssen, Mydske and Dahle, 2013; see also Meijerink and Stiller, 2013; den Exter, Lenhart and Kern, 2015).

It is our interest to compare and contrast local contexts in different politico-cultural backgrounds, as well as with different top-down support systems for local climate policies – to see if variations emerge. Differences in those two aspects may influence local reactions to climate challenges.

One way in which the politico-cultural context might affect policy-making concerns influencing leadership. Local political system and tradition may favor different positions in taking the lead – perhaps the mayor, councilors, or administrative

managers. Zerbinati (2012; see also Zerbinati and Souitaris, 2005) distinguished between political and administrative leadership. Investigating the implementation of EU funds in Italy and England, she discovered that in Italian local governments, it was usually the mayor who took charge of acquiring EU funds, whereas in England most actions were undertaken by administrative staff. These patterns give rise to different mechanisms in the whole policy-making process, making it more politicized or shifting it towards a technocratic approach. In turn, this may have consequences for the democratic legitimacy of the policy in question.

2. Local political leadership in two countries: Poland and Norway

Local adaptive capacity to climate change requires that climate policy be anchored in all aspects of the organization: how climate policy is structurally placed as regards policy, organization and practical implementation (den Exter, Lenhart and Kern, 2015). Since adaptation to climate change will often necessitate change in existing policies, practices, and institutions, there is a substantial need for leadership that can devise and implement adaptation policies (Kotter, 1990; Meijerink and Stiller, 2013). Several studies have noted the importance of an active local leadership on the part of mayors/councilors as well as chief administrative executives (Orderud and Kelman, 2011; Hanssen, Mydske and Dahle, 2013).

In this article we study how differences in political leadership in local government in Norway and in Poland might contribute to differences in local adaptive capacity, both related to climate change adaptation and mitigation.

We chose Norway and Poland for comparison because local government systems and the wider context in both countries represent a mixture of similarities and differences, but the two countries are of particular interest because they represent two different politico-administrative cultures. Norway has an uninterrupted tradition of local government that dates back to the 19th century and is among the longest in Europe. In Poland, traditions of democratic local government are much shorter, emerging in connection with the post-communist political transition of the late 1980s and the first democratic local elections in May 1990.

Poland has a three-tier sub-national government system, whereas in Norway there are two tiers of subnational jurisdictions. Our focus is on the municipal (*kommune* in Norway, *gmina* in Poland) level. Municipal governments in both countries are among the most autonomous in Europe today. The recent Local Autonomy Index project made possible the construction of an index of autonomy (LAI) for European countries. According to 2014 data, Norway ranked 7th and Poland 9th highest among all 39 European countries analyzed (Ladner, Keuffer and Baldersheim, 2016).

Municipalities in Poland and in Norway are similar in population size. In 2014, average municipal population size was 15.5 thousand in Poland and 12.1 thousand in Norway. However, in Norway there are many extremely small local governing units. In Poland the smallest municipality has 1,300 residents and there are just over a dozen with population lower than 2,000. By contrast in Norway 26 municipalities have less than 1,000 and a further 68 fewer than 2,000 residents.

We can note major differences in the form of local political institutions and horizontal power relations within local governments. The first difference, which is extremely salient to the focus of this article, concerns the position of chief municipal officer (CMO) and heads of departments in local government administration. In Poland the CMO (*sekretarz gminy*) is appointed by the mayor, who also has the power to fire him/her. The position as CMO is in fact auxiliary to that of the mayor, who is the formal head of municipal administration. The same rule of appointment applies to heads of departments. By contrast, in Norwegian municipalities the position of the CMO (*rådmann*) is far more independent of politicians and is much stronger. It is the *rådmann* who appoints heads of departments. Local leadership in Norway is classified as council-manager form, according to the typology of Mouritzen and Svava (2002), and application of their concept in Heinelt *et al.* (2018). Moreover, given Norway's longer tradition of professionalization of local administration, bureaucrats (officials and upper civil servants) may be expected to play a far more important and active role in policy making and policy implementation than in Poland.

The second difference concerns the type of *political leadership*. In Poland, at least since the 2002 introduction of direct popular election of mayors, we find a model of powerful, personal leadership, which can be identified in the Mouritzen and Svava (2002) classification as a strong mayor form. In Norway the mayor is appointed by the local council; there is more collective political steering, with the role of the council in key decision making being much stronger than in Poland. The more personal character of local politics in Poland is further strengthened by the majoritarian system of council elections. Since 2014, in all municipalities but the 66 largest cities, the first-past-the-post (FPTP) system applies in municipal elections. This electoral system, together with the general weakness of political parties in Poland, gives local politics a strongly non-partisan character, with more than 70% of mayors and councilors being independent – not formally affiliated with a political party. Polish local politics is perhaps the least partisan in Europe, whereas Norway comes closer to the other extreme (Fallend, Ignits and Swianiewicz, 2006). Norway operates with a system of basically proportional representation, which strengthens the embedded dominance of political parties.

This difference is also evident when a slightly modified version of the Heinelt and Hlepas (2006) methodology of mayoral strength index is applied (see Heinelt *et al.*, 2018). Norway and Poland occupy very different places in the European ranking. Scores on this index may range from 0 to 14. Mayors in Poland score 10, against 4 in Norway.

3. Theoretical background of climate change discourse and research outline

There is one more clear difference between Poland and Norway – namely the presence of climate change discourse in local politics, which derives largely from upper-tier incentives and programs.

In Norway, mitigation has been high on the agenda for more than two decades, and adaptation for only one decade. The Kyoto Protocol in 2003 boosted mitigation to the top of the political agenda in Norway. The government now refers to the necessity

of a 'green shift', and the Ministry of Climate and Environment has stressed the need for a transition towards products and services that yield significantly reduced negative consequences for climate and the environment than those currently prevalent.¹

According to Norway's commitment under the Kyoto Protocol, emissions do not exceed more than 1% above the 1990 level in the period 2008–2012, and taxes, agreements, new technologies and an emissions trading scheme are to be used to achieve these goals. Norway's target is to reduce its greenhouse gas emissions by the equivalent of 40% of its 1990 emissions by 2020, and become climate-neutral by 2030.

For more than a decade, the national authorities have stressed the need for building the capacity to adapt to the climate changes already underway (Junker, 2015). The Official Norwegian Report on climate change adaptation assessed Norway's vulnerability to the effects of climate change, and the need to adapt (Official Norwegian Reports NOU 2010: 10), and resulted in a White Paper on climate change adaptation (MD, 2013) that was adopted by the Norwegian Parliament in 2013. Before that, the Parliament had also adopted a White Paper on flood and landslide risk (OED, 2012), which included climate-change adaptation. Many municipalities have integrated adaptation concerns in their local planning and decision-making (Orderud and Kelman, 2011; Inderberg, Stokke and Winsvold, 2015; Hovik *et al.*, 2011).

In Poland, the concept is relatively new. Until 2014, very few local governments had started to work on strategies for adapting to climate change. National agreement on climate change policies was promoted after the Kyoto Protocol in 2003 in the Polish Climate Policy (2003). Nonetheless, only recent years have seen large-scale support for specific undertakings to foster an economy based on low emissions and renewable energy. Since the beginning of the 2014–2020 period, all municipalities desiring to receive financial support for climate policies have been required to have local plans for low-emissions economy. All the same, voices questioning the climate change paradigm (macro-uncertainty, in the terminology of Osberghaus, Danneberg and Mennel, 2010) are still relatively common, also among central-level politicians. Not surprisingly, a 2014 survey of local governments in the two countries showed that Polish local government officials and politicians held far more climate-sceptical attitudes than the case in Norway (Swianiewicz and Szmigiel-Rawska, 2015).

The recent gradually growing interest in Poland has been largely related to the availability of EU structural funds accessible for projects connected to climate change adaptation. 28% of the allocation in the 2014-2020 Operational Programme Infrastructure and Environment (or more than 15% of the total EU budget allocation for Poland) is dedicated to goals related to mitigation and adaptation to climate change. In addition, relevant goals consume well over 10% of the funds available to local governments in the 16 Regional Operating Programmes. EU financial support to undertakings like using solar energy or lowering emissions has made such actions very popular.

1 See Ministry of Climate and Environment, [Online] <https://www.regjeringen.no/en/topics/climate-and-environment/id925/>

Our main research question is how differences in institutional structures of local leadership in Poland and Norway are reflected in local policies towards the climate change. Taking these differences we formulate the following specific questions and corresponding hypotheses:

- **Q1.** Who in the municipality is taking the active leadership in climate-change policies? Is the lead role taken by the administrative leadership, or by the political leadership?

H1. We expect to find that – following differences in horizontal power relations – political leadership prevails in Poland and that in Norway climate change policies are more subject to administrative steering. A local government system with a strong role for the mayor is likely to result in political leadership, whereas collective systems are more conducive to administrative leadership. (H1A) Further, we expect to find important differences regarding political leadership itself: in Polish municipalities ‘political’ means the mayor; in Norway, CMEs and councilors are more active. This may be related to the ‘strong mayor – collective type’ cleavage. Marginalization of the council is one of the arguments often mentioned in debates against direct mayoral elections in Poland.

- **Q2.** Apart from horizontal power relations, are there other variables that can explain the variation in local leadership? And if so, how?

H2. We expect leadership to depend on:

H2A *Exposure and perceived exposure to risk of natural hazards* – the higher the risk, the more likely are local politicians to take the lead in climate change policies (see Zahran *et al.*, 2008). Exposure to risk reduces micro-uncertainty (Osberghaus, Danneberg and Menzel, 2010).

H2B *Municipal size (population)* – the larger the municipality, the more numerous and more professional will be its administration, making administrative leadership in climate change policies more likely. We derive this assumption on the influence of size and affluence of local government on climate change policies from studies of other local policies that have shown the relationship of various local undertakings and those features of municipalities (Vabo, 2014; Hanssen, 2018).

H2C *Affluence of municipality* – we expect that the more affluent the municipality is, the more numerous and more professional will its administration be, with a higher probability of administrative leadership in climate change policies.

H2D *Political affiliation of the mayor* – we assume that politics matter; we expect to find that the mayor’s political affiliation may be important, especially in Norway; in Poland, most are non-partisan and political parties play less of a role in local governance. In Norway, the right-wing parties (conservative parties, populist/progressive parties) have been more climate-skeptical than parties on the left side of the political spectrum; the latter have often cooperated with green parties (Orderud and Kelman, 2011).

Our empirical research builds on nation-wide surveys conducted in Polish and Norwegian municipalities. The Norwegian survey questionnaire was sent to all 428 of Norway's municipalities between November 2014 and February 2015. The survey was digital, and was sent to the official municipal e-mail address. The e-mail invited 'the person with overall responsibility for climate change adaptation in the municipality' to take part in the survey. In total, 219 replies were received, yielding a response rate of 51%.

The Polish survey was sent to all 2478 Polish municipalities in the summer of 2014. We received 1,311 responses (i.e. from more than 50% of the municipalities). The study is representative as regards location in various regions of Poland. Most responses (84%) came from administrative officials – employees of various departments dealing with environmental protection, risk management or spatial planning, whereas 16% of the questionnaires were completed by the mayor, his/her deputy or the CME.

Table 1: Municipal survey response rate, by population size

	Poland			Norway		
	Response rate %	Responses	N	Response rate %	Responses	N
>100,000	69.2	27	39	60.0	3	5
50–100,000	54.2	26	48	80.0	8	10
30–50,000	44.0	44	100	50.0	7	14
10–30,000	55.6	387	696	49.4	42	85
5–10,000	51.8	819	1580	23.6	74	220
<2,000	50.0	8	16	23.4	22	94

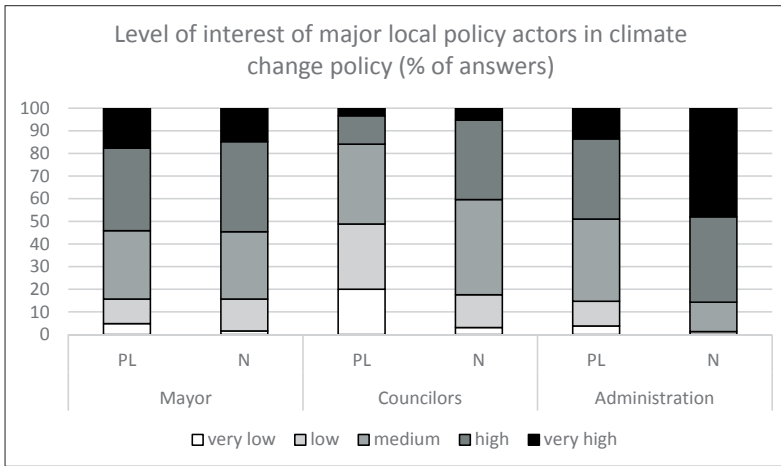
Care should be taken when comparing national mean values of the variables – in Norway there was a strong overrepresentation of large municipalities, whereas in Poland the distribution was basically even. However, the overrepresentation of large municipalities in Norway is proportionally strong, but not strong in actual number of respondents, as Norway has few large urban areas (11 respondents from cities above 50,000 out of 219 respondents). Therefore, since most of the results are presented as frequencies, the results will not be biased in favor of the large cities.

4. Leaders of local climate policies in Poland and Norway

Many of the recent studies describe intense learning and knowledge-transfer processes among municipal officials, for example in planning departments and wastewater departments (Hovik *et al.*, 2011; Rauken, Mydske and Winsvold, 2015; Hanssen, Mydske and Dahle, 2013). Many of these studies have indicated the need for greater involvement of the political leadership, in order to ensure awareness, prioritizing and that the municipality takes action to reduce the risks caused by current and future climate changes. Therefore it is pertinent to examine how the municipal actors most involved in this policy field perceive the engagement of the political leadership here. Respondents were asked whether they felt that the mayor was concerned about mat-

ters related to climate change, likewise regarding the local (elected) council (Figures 1 and 2).

We see that the general level of interest in climate policy is lower in Poland than in Norway. Figure 2 provides also support for our hypothesis of a strong mayor model of Poland, and a weak one in the Nordic countries – also when it comes to climate change policies. Whereas the political leaders (mayors) in Poland are considered to be equally interested in climate change issues as officers (specialists in local administration), the differences in Norway are huge. Here, about half of the respondents consider the mayors to be interested in climate change issues, while over 80% consider officers (specialists in planning and waste water management) to be interested in the same questions.



Note: Norwegian 'Administration' – merged planning and wastewater specialists in local administration

Figure 1: 'To what extent are the following actors in your municipality concerned with issues related to climate change' (N=219 (Norway) and 1,311 (Poland))

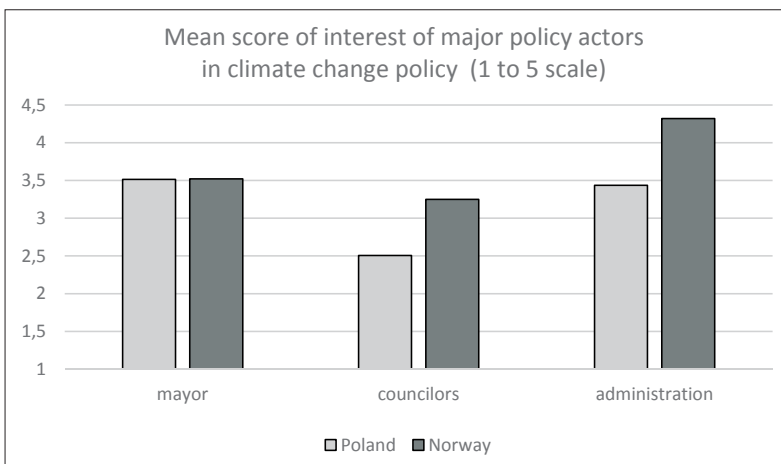


Figure 2: Mean score of interest of major policy actors in climate change policy N=219 (Norway) and 1,311 (Poland)

5. Explaining variation in local leadership – searching beyond the national context

In order to test our hypothesis 2, we conducted a regression analysis (OLS) explaining variation of interest of individual actors. For both countries we calculated correlation coefficients and regression models explaining level of interest of various policy actors. We included the following dependent variables in the model:

- Perceived level of interest of mayor;
- Perceived level of interest of councilors;
- Perceived level of interest of administration (for Norway, highest value of Water and Planning Department and CMO; for Poland, higher value of administration and public utility delivery units).

As independent variables we included in the model:

- Perceived vulnerability of the municipality to extreme weather events (sum of all indicated answers in questions about extreme events perceived in the past, present and expected for the future);
- Population size of the municipality (due to distribution of the variable we used $\ln(\text{population})$);
- Affluence of local governments (in Poland measured by local tax-base per capita, in Norway by ‘free income’ variable);
- Party affiliation of mayor², controlling for the largest political parties (due to the size of the survey material, our test takes into account parties represented by more than 20 mayors in our sample) (Norway: Labour, Agrarian and Conservative; Poland: Law and Justice, Civic Platform and Agrarian Party). For Poland the level of acknowledgement of climate change is generally much lower than in Norway. Even among the most climate-engaged mayors of the center-right Civic Platform (PO) it is much lower than among Norwegian conservative mayors. Polish mayors from the right-wing Law and Justice Party (PiS) and especially from Rural, Conservative Agrarian Party (PSL) are even more climate-skeptical. Even more interestingly, in Poland variation among parties appears greater than in Norway in this respect. In Poland the value of the index for PO is 25% higher than for mayors from the PSL. In Norway the difference between mayors from Labour and Conservative is less than 10%. This confirms that climate change policy is more an issue of disagreement among political groups in Poland than in Norway.

For Poland (Table 2), the R-square and significance of the whole model (OLS analyses; ordinary least square) emerge as relatively low, indicating that our independent variables are not good predictors of the level of interest of various actors in climate

2 Norway: Labour = Arbeiderpartiet, Agrarian = Senterpartiet Conservative = Høyre; Poland: Law and Justice = Prawo i Sprawiedliwość (PiS), Civic Platform = Platforma Obywatelska (PO), Agrarian = Polskie Stronnictwo Ludowe (PSL).

Table 2: Factors explaining interest in climate adaptation policies in Polish local governments – regression models

	Interest of mayor		Interest of administration		Interest of councilors	
R	.125		.166		.186	
R-square	.016		.028		.035	
	Beta	Sign.	Beta	Sign.	Beta	Sign.
Vulnerability index	.111	.001**	.117	.000***	.159	.000***
Ln population	.058	.110	.089	.006**	.045	.265
Affluence	.045	.196	.023	.473	.077	.030*
Mayor/% councilors – Agrarian	–.017	.626	–.046	.147	–.016	.672
Mayor/% councilors – Civic Platform	–.044	.213	.005	.881	–.036	.352
Mayor/% councilors – Law and Justice	–.071	.042*	–.032	.307	–.070	.060

Note: variables and coefficients significant on at least 0.05 level are marked with bold font.

change policy. But there are four main observations to be made concerning statistically significant relationships. First, interest among all actors seems to be higher if perception of the vulnerability to consequences of climate change is higher. Second, in case of local administration, the level of interest is higher in larger local governments – which can reasonably be explained by the greater human resources available. Third, party affiliation matters for the mayor’s level of interest. In particular, mayors affiliated with Poland’s conservative PiS party are statistically less bothered by the climate adaptation policies, which logically follows their (often) macro-skeptical attitude towards the concept of climate change in general. As to the impact of political composition of the council on the level of interest of councilors, none of the variables emerged as statistically significant at the 0.05 level, although in the case of proportion of councilors from the PiS the result is very close to that threshold (councils with more PiS councilors are less inclined to be interested in climate policies). At first glance it might seem surprising that membership in Poland’s PSL (which is even more climate skeptical) is not significant in the regression model. That is probably related to the fact that membership in this party is strongly correlated with other independent variables of the model (in particular with population size), so its significance might be diluted in the multivariate regression. Fourth, we see that councilor interest in climate policies is higher in more affluent municipalities.

The same analyses on the Norwegian data reveal interesting differences (Table 3). In general, the R-square and significance of the whole model is higher for Norway than for Poland. As seen also for the case of Poland, the interest of mayors and municipal administration is higher when vulnerability to the consequences of climate change is perceived as high. However, in contrast to Poland, municipal size does not seem to matter. As noted, in Poland, there was a higher level of interest amongst administrative staff in larger local governments, which can be explained by size being a proxy variable for having a larger administrative staff and thus greater human resour-

Table 3: Factors explaining interest in climate adaptation policies in Norwegian local governments – regression models

	Interest of mayor		Interest of administration		Interest of councilors	
R	0.254		0.348		0.362	
R sq.	0.054		0.121		0.131	
	Beta	Sign.	Beta	Sign.	Beta	Sign.
Vulnerability index	0.206	0.014*	0.271	0.001	-0.065	0.523
Ln population	0.131	0.212	0.153	0.133	0.164	0.216
Affluence	0.038	0.555	0.190	0.048	0.244	0.058
Mayor – Labour	-0.078	0.540	-0.151	0.222	0.480	0.013*
Mayor – Agrarian	0.031	0.775	-0.123	0.245	0.348	0.024*
Mayor – Conservative	-0.052	0.681	-0.088	0.505	0.580	0.003**

Note: variables and coefficients significant on at least the 0.05 level are presented in bold font.

ces and competence. We do not find the same tendency in Norway about municipal size – but we do find it related to affluence. The economic situation of the municipality has a positive effect on the interest of administrative staff in Norway. This can be a proxy for larger administrative staff: affluent municipalities have a larger and more skilled staff and greater resources for climate change adaptation work. In Poland, affluence of the municipalities was found to have a significant effect on councilors. Finally, Table 3 shows that the interest level of the councilors is influenced by the party affiliation of their mayors. Norway’s system of local government can explain this relation between the interest level of councilors and the mayor’s party affiliation, as there is a strong correlation between the composition of the council and the party affiliation of the mayor. Substantially, these results indicate that other small parties, as well as the Party of Progress, are more climate-skeptical than the well-established parties of Labour, Agrarian Party and the Conservatives.

Our data suggest that the larger the population size of the local government, the greater is the dominance of the interest level of the administration over the level of interest of the politicians. This might be explained using the arguments from our second hypothesis – larger municipalities have greater and more professional staff resources, making administration relatively more important on the local scene. Second, the more affluent the local government, the lower is the difference between level of interest of mayors and councilors (in other words, councilors in more affluent local governments are relatively more interested in climate policy). Here the explanation is less obvious. Perhaps in more affluent localities there is a different social structure, with the population being more highly educated and of upper social status. That in turn could mean a similar structure among the councilors, with those who have higher education and higher social status being more interested in climate policy – helping to make the relative position of the mayor weaker.

6. Concluding discussion

By contrasting different top-down support systems, and different politico-cultural backgrounds, our analysis of broad data material from Norway and Poland has shed light on how different leadership traditions affect active political leadership in policies related to climate change.

Our expectations were motivated by the study of Mouritzen and Svava (2002), which categorized local political leadership in Europe in terms of an index of the strength of mayors: Poland was shown to have a strong (personal) mayor form, whereas Norway turned out quite the opposite. Our first expectation (H1) was confirmed: political leadership is dominant in Poland, whereas in Norway climate change policies are more subject to administrative leadership. In Norwegian municipalities, the interest of mayors and local councilors are lower than that of the administrative staff, whereas in Poland the interest level of local administrations is comparable to that of the mayors. This indicates that administrative personnel play a much more active role in policy-making and implementation in Norway than in Poland. One explanation is that in Norway their positions are far more independent of politics and politicians (rules of appointment), together with Norway's longer tradition of professionalization of local administration. These results indicate that also when it comes to new policy fields like climate policies, having a system of local government with a strong mayor is likely to result in political leadership, whereas more collective systems will tend to induce administrative leadership.

In addition, we found a difference within the political leadership with regard to climate change policy in Norway and Poland. Mayors seem to play a dominant role in Poland, while the councilors are of marginal importance. By contrast, in Norway both groups of local politicians reveal similar levels of interest. This supports our hypothesis regarding 'strong mayor' leadership (H1).

Turning to the second research question, we assumed that local leadership would be influenced by certain characteristics of the municipality or key actors. Many studies have found that being exposed to or having experienced the risk of natural hazards raises awareness of climate change, in turn increasing the probability of having a local climate change adaptation policy and having implemented measures (Zahran *et al.*, 2008; Osberghaus, Danneberg and Mennel, 2010). Our research confirmed this hypothesis (H2A). In Poland, the higher the exposure to risk, the more likely is the local leadership (mayors, councilors and administration) perceived as being interested in climate change issues. Similar tendencies are found in Norway, although the effects are not significant for councilors – only for mayors and local administration.

We also expected the size of the municipality to have an influence (H2B), as other studies have shown it can be a good proxy variable for having a sizeable and professional administration – with relevant competence for climate change policies (Vabo, 2014; Hanssen, 2018). Our analysis confirmed this hypothesis only for the local administration in Poland – not for any of the key actors in Norwegian local government. However, another proxy variable for a sizeable and professional administration is

the affluence of the municipality. Therefore, we expected that more affluent municipalities would have correspondingly large and professional administrations, making administrative leadership in climate change policies more likely (H2C). This expectation was confirmed in the analyses of local administrations in Norway, and for local councilors in Poland.

Interestingly, the results for Poland do not provide total confirmation of our second hypothesis. We had assumed that risk exposure would be relevant for politicians and their level of interest, whereas size and affluence would be more important as regards administrative leadership. Only for size was this distinction confirmed – the larger the municipality, the more professional staff it has, and more interest will be among this staff with regard to climate change. However, municipal affluence occurred statistically significant only for councilors, not for staff, whereas risk exposure was found to be significant for all groups, not only for politicians. This indicates that even if the general approach of our search for explanatory variables is correct, the details are less clear. One explanation might be that all the relationships identified in the models are generally quite weak (as measured by R-square).

Finally, we expected that politics matters, i.e. that the political affiliation of the mayors would influence their interest in climate change issues, and also the interests of other municipal key actors (councilors and administration) (H2D). In Poland, rather surprisingly, party affiliation proved significant, although only for the Party 'Law and Justice'. This political party is skeptical to climate change, and our data material showed that it has significant negative influence on the mayors' interest in local climate policies. Otherwise, we had expected political affiliation to make more of a difference, as climate-change policy has now become a mature policy field, at least in Norway. However, in Norway we found no direct effect of party affiliation on the perceived interest of mayors in climate change questions. But we do find that the interest level of the councilors is influenced by the party affiliation of the mayors. If the mayor belongs to one of the three political parties in the analysis (the traditional parties of Labour, Agrarian Party and the Conservative Party) the councilor tends to be perceived as more interested in climate change questions, than in the municipalities where the mayors belong to other, small parties. In terms of methodology, the local government system in Norway can explain the councilor interest by the mayor's party affiliation, as there is a strong correlation between the composition of the council and the party affiliation of the mayor. Substantially, these results indicate that if the mayor belongs to another party, including the climate-skeptical Party of Progress, this tends to have a negative effect on the councilors' interest in climate change questions.

The absence of a significant effect of political party affiliation on the climate change interest of mayors in Norway is a surprising finding. In Norway, the right-wing Party of Progress has gained territory locally and nationally in the last decade, and is currently represented in the coalition government. This party is explicitly skeptical to explanations of climate change as being caused by human action, and to the potentially

severe effects of climate changes on natural hazards. Thus, we had expected that this party affiliation, together with their party in the current coalition (the Conservatives), would influence climate change awareness in the local leaderships. This might be explained by climate change adaptation being framed in connection with purely natural hazards, and not always as an effect of anthropogenically induced climate change. It might also be explained by the fact that climate change adaptation in general has become a more 'mature' policy field at the local level in Norway, and has been mainstreamed into local policies (Rauken, Mydske and Winsvold, 2015).

However, yet another explanation might be that local policies for climate change adaptation are strongly correlated with the presence of dedicated municipal staff with a keen interest in the problem. Many studies of Norwegian local climate change adaptation have emphasized this effect (Dannevig, Rauken and Hovelsrud, 2012; Dannevig, Hovelsrud and Husabø, 2013; Aall, Carlsson-Kanyama and Hovelsrud, 2012), which does not necessarily vary systematically with size and geography.

These propositions are in line with the results for Poland, where we found significant (albeit not strong) relationships of all the variables with political and administrative leadership, in various configurations. In Poland, local climate change policy is not such a 'mature' policy field as in Norway, and has not been mainstreamed into other policy fields. That means that there is great variation in the interest of key actors, depending on the local context, especially as regards risk exposure and adaptation policy.

To conclude, this study has confirmed our basic assumption about the differences in leadership between Norway and Poland as being related to different political models of the local level. Although other factors that may explain variations in political and administrative leadership are less clearly captured by our models, the findings illustrate the potential of the models in explaining the role of leadership in new policy fields – as with climate change policies.

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