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RESEARCH ARTICLE

Breaking away from family control? Collaboration among political organisations and social media endorsement among their constituents

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Abstract

Coalitions that engage in political advocacy are constituted by organisations, which are made up of individuals and organisational subunits. Comparing the coalitions formed by organisations to the those formed by their constituent parts provides a means of examining the extent to which their coalition memberships are aligned. This paper applies inferential network clustering methods to survey data collected from organisations engaging in Irish climate change politics and to *X* (formerly twitter) data extracted from both the primary accounts of these organisations and the accounts of the individuals and subunits affiliated with them. Analysis of the survey-based organisation-level policy network finds evidence of an outsider coalition, formed by non-governmental organisations, labour unions and left-leaning political parties, and an insider coalition formed by the two main political parties in government, energy sector organisations, business and agricultural interests, scientific organisations, and government bodies. An analysis of the *X*-based account-level endorsement network finds evidence for a nested coalition structure wherein there are multiple distinct communities, which largely align with the organisation-level coalitions. Most interestingly, the largest and most active community is formed by accounts affiliated with the organisations with agricultural interests—the sector most opposed to ambitious climate action in Ireland. The results show how the somewhat disjoint behaviours of formal organisations and their affiliates give rise to nested coalitions, which can only be identified by disaggregating organisations by their constituent parts.

Keywords Climate change policy · Network analysis · Coalitions · Twitter · Advocacy Coalition Framework · Environmental policy

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Introduction

Politics and policy-making processes are often a power struggle between competing interests, ideas, and beliefs. The actors that represent these can try to influence political discourses, designs, and choices by acting alone, but they often choose to form coalitions with those with similar objectives (Gronow and Ylä-Anttila, 2019; Metz et al., 2021; Nohrstedt et al., 2023). Coalition membership matters because it provides actors opportunities to amplify their views and values and to gain access to information and other resources that can help them increase the likelihood that political outcomes align with their preferences (Nohrstedt et al., 2023).

There is no agreed upon, standardised or best method for identifying coalitions and their memberships. The approach that a researcher takes can be informed by a theoretical framework, be shaped by their personal preferences, dictated by the circumstances of the political domain they are studying, while also being constrained by the resources at disposal. Researchers have used traditional clustering techniques, agent-based models, discourse analysis, network methods, and many other approaches (Elgin & Weible, 2013; Henry et al., 2022a, 2022b; Leifeld, 2014; Malkamäki et al., 2021; Satoh et al., 2023). Researchers have drawn upon a range of data sources and types to identify coalitions, including policy documents, records from public hearings and consultations, newspaper articles, and both interview and observational data, but analysing survey data collected from organisations involved in a policy process—the policy network approach—is perhaps the most common method (Kammerer & Ingold, 2021; Koebele, 2019; Kukkonen et al., 2017; Ritter et al., 2018; Van den Bulck, 2019; Wagner & Ylä-Anttila, 2018). What these approaches have in common is their focus on organisations as the members of coalitions, rather than on the individuals affiliated with them. Research based on such an "organisational state" (Lauman and Knoke, 1987) conception of coalition formation has gone a long way towards understanding political coalitions. However, it can only superficially account for the cognitive processes and concrete actions of the individuals that create the interpersonal relationships, engage in the informal patterns of information exchange, and establish the channels of communication that contribute to the structuring of coalitions, as suggested in the early formulations of the Advocacy Coalition Framework (Sabatier, 1987).

In this paper, we bring the individuals and sub-units that organisations are made of back into the analysis of coalition formation. We do so by investigating how coalitions are enacted on social media. Social media provide individuals and organisations with a platform through which they can engage in political advocacy and build new and alternative forms of coalitions. Social media therefore offer a source of observational data that can be used to examine coalition creation among policy actors, be they an organisation or an individual or a subunit that is part of the organisation. In this paper, we identify the membership of coalitions involved in Irish climate politics by applying inferential network clustering methods to both survey data collected form organisations and to *X* (formerly Twitter) data extracted from the accounts of the organisations in the Irish climate policy network as well as from the accounts of individuals and subunits affiliated with them. More specifically, we analyse the extent to which the structures of organisation-level coalitions and account-level communities align and interact to give rise to a nested coalition structure.

We make two main theoretical contributions. First, we conceptualise nested coalitions as political coalitions that are constituted by organisations, which are made up of individuals and organisational subunits that create smaller communities nested within the larger political coalitions. Previous literature has used the term nested coalitions in several ways:

to refer to overlapping social movements that link different campaigns into broader projects (Della Porta & Diani., 2015), as coalitions being constituted by actors with different types of relationships at the same level (An et al., 2005; Gould, 1991; Simpson, 2015), as the dependence between voters and political parties (Schreiber, 2014), and as how different dimensions of a polity are related (Cook, 2001). In the advocacy coalition literature, the term has been used to refer to how local policy subsystems (such as a local-level climate policy system) and the coalitions therein can be nested in a broader (national climate policy) system (Gabehart & Weible, 2023). More generally, nestedness can also refer to hierarchical organisation of social groups, the members of which further divide into groups of groups (Clauset et al., 2008). In our study, we use the term nested coalitions to point out that within the organisational-level coalitions that we find in the Irish climate policy network, there are subgroups of actors that can be observed by studying the social media behavior of the individuals and the sub-units affiliated with the organisations. All these actors are involved in national-level climate politics. These communities can be difficult to observe using established methods of mapping interaction between organisations such as surveys but can be uncovered using data that comprises more instances of interactions between pairs of actors, such as social media reshare networks. Second, we find that the coalitions in the policy network observed by a survey and the communities on social media strongly overlap. Theoretically, this suggests that social media activity of policy actors corresponds well to their co-advocacy activities elsewhere. At the same time, we see that the individuals we observe online have a certain degree of freedom to go beyond their organization's officially acknowledged co-advocacy relationships.

Methodologically, we contribute by introducing a way of aggregating data on organization-level social media behavior from a set of individual and collective accounts affiliated with an organization, and a method for statistically inferring the coalitions present in a network that is new in the study of policy coalitions. Empirically, we show how network analysis of social media data can uncover politically important communities, exemplified by the presence of the agricultural interests' community in the Irish climate policymaking process, nested in the larger insider coalition, that has a long track record of successfully lobbying decision-makers to limit the share of the emissions reduction burden that falls on the agricultural sector.

Coalitions

The Advocacy Coalition Framework (ACF) is a belief-oriented approach to analysing the policy-making process that was developed as an alternative to the policy cycle approach (Sabatier & Weible, 2019). The framework's primary unit of analysis is a policy subsystem, which is constituted by the range of public, private and third sector actors that participate in the debate over a specific policy issue, such as climate change, in a defined geographical area. The ACF assumes that boundedly rational actors coordinate activities and form coalitions with those with similar beliefs as their own. These advocacy coalitions, then, are made up of "people [actors] from a variety of positions (elected and agency officials, interest group leaders, researchers etc.) that share a particular belief system that is, a set of basic values, causal assumptions, and problem perceptions, and who show a non-trivial degree of coordinated activity over time" (Sabatier and Jenkins Smith, 1993, 25). The coalitions compete with a view to translating their beliefs into policies. The ACF has been applied in all continents and to the study of a wide variety of policy issues and problems, including

at least 67 of which that have examined a climate change policy process (Gabehart et al., 2022).

Much of the literature that draws on the ACF to study policymaking processes has been influenced by Laumann and Knoke's "organizational state" approach. In their study of the US energy and health policy domains, Laumann and Knoke (1987) use network analysis to examine how political decisions are affected by the networked relationships among the organisations with an interest in these two policy domains. In practice, this means that many ACF studies focus on organisations, rather than on individuals, which was the original intended unit of analysis proposed by Sabatier (1987). This deviation commonly occurs in studies that rely on policy network data collected through surveys. While there is certainly much merit to focusing on organisational-level coalitions, the approach does not enable us to understand to what degree advocacy coalitions are nested, that is, the extent to which the individuals and the subunits affiliated with an organisation create coalitions that differ from those created by the organisations themselves. In this paper, we bring the individual and the sub-units that organisations are made of back into the analysis of coalition structures to investigate how coalitions are nested, with organisations at the top level and individuals and organizational subunits at the lower level. We achieve this using social media data.

Political actors can use social media as a tool for networking and for sharing information during a policymaking process, as well as to communicate directly with policymakers and for public outreach (Figenschou & Fredheim, 2020). Research on interest groups' use of social media has examined how they have used it to engage with followers, educate and persuade the public, request donations, facilitate mobilization, and to expand an organisation's support base (Chalmers & Shotton, 2016; Henry et al., 2022a, 2022b; Lovejoy & Saxton, 2012; Obar et al., 2012). Industry groups have been found to be more likely to use it for lobbying those in power, whereas unions and citizens' groups have been found to use it more often for public engagement (Widner et al., 2022). While social media platforms do make it possible in theory for any individual organisation, large or small, to build a community with like-minded others, recent research has found that only well-resourced and well-connected organisations routinely engage in online networked mobilization and lobbying (Figenschou & Fredheim, 2020). The finding that resource-rich organisations are more likely to use social media for political purposes suggests that rather than democratizing the public sphere, the emergence of social media platforms has perhaps instead become an additional tool for those that already have political power. Chalmers and Shotton (2016) argue that the resource-based view doesn't explain what motivates interest groups to use social media for lobbying, providing evidence that users rely on social media to shape their public image and to frame policy debates in a way that aligns with their preferences.

There is now a significant body of literature that has examined how social movements and other advocates for political causes have used social media and for what purposes. For example, this literature has examined how social media has led to new forms of conversations (Seelig et al., 2019), enabled advocacy groups to engage donors (Smithko, 2012), facilitated the creation of new communities (Lovejoy & Saxton, 2012), enabled particular account holders to occupy important network positions (Abul-Fottouh, 2018), contributed to the complexity of coalition structures (Malkamäki et al., 2023), and how hashtags can be used in an activist context (Konnelly, 2015). This literature does not distinguish between the social media accounts controlled by organisations from those controlled by those affiliated with these organisations. This is a significant oversight, given that the amount of resources at the disposal of organisations will generally be much higher than that held by individuals or organisational subunits. It is also the case that organisations are likely

driven by different social norms—perceptions of what other users do, approve of, and expect the user to do on social media (Masur et al., 2023)—about how they manage their official social media behaviour to those of their affiliates. We might expect organisations to have a more conservative approach to how they use their social media accounts as they seek to avoid doing anything that could cause them reputational damage. In contrast, individuals are much freer to say and do what they want online. An important question then, is: *to what extent do the coalitions in a policy network of organisations mirror the communities formed by the various collective and individual social media accounts affiliated with those organisations?* We answer this research question through four steps of analysis:

1. Identifying and categorising the coalitions in the Irish climate change policy network.
2. Identifying and categorising the communities in the Irish social media climate change discussion network.
3. Measuring the extent to which the structures of the organisation-level policy network coalitions and the social media account-level communities align and give rise to a nested coalition structure.
4. Establishing who are the most central actors in the policy network coalitions and in the social media communities.

Case, data and methods

Climate change policy & politics in Ireland

Until quite recently, Ireland's record of taking steps to mitigate and adapt to climate change has been poor compared to other EU countries. In 2017, after years of the Irish state failing to develop a policy response that put the country on a trajectory towards achieving its national and international emissions reduction ambitions and commitments, the Irish parliament took the innovative step of a creating a Citizens' Assembly to deliberate on the topic of how the state could make Ireland a leader in tackling climate change. In April 2018, the members of the assembly published a list of 13 recommendations (Citizens' Assembly, 2018), which were then considered by a Joint Oireachtas (Irish parliament) Committee on Climate Action. In March 2019, the committee published a report that set out over 40 recommendations to steer Ireland towards a low carbon future (Houses of the Oireachtas, 2019). In June 2019, the government published the Climate Action Plan 2019, which detailed how the state intended to meet its EU target of reducing its carbon emissions by 30% by 2030 and to create a resilient, vibrant, and sustainable country (DCCAE, 2019). In 2021, an updated Climate Action Plan was developed to detail how Ireland would achieve a 51% reduction in overall greenhouse gas emissions by 2030 and set itself on a path to reach net-zero emissions by 2050. In 2021, the Climate Action and Low Carbon Development Act 2015 was amended to oblige the Minister for the Environment, Climate and Communications to publish a carbon budget programme that sets sectoral emissions ceilings, the absence of which from the original Act was heavily criticized by environmental campaigners. The government approved first carbon budget programme in April 2022, which details the level of emissions reductions that different sectors of the economy and society are expected to make by 2030.

Despite the positive change in both the breadth and the depth of Ireland's policy response to climate change, GHG emissions are still not decreasing sufficiently to meet

international or national targets. Indeed, provisional estimates for GHG emissions (excluding LULUCF) published by the Environmental Protection Agency indicate that emissions in 2021 were 4.7% higher than in 2020 and over 1% higher than pre-pandemic 2019 figures (EPA, 2022). Emissions per capita in 2021 were 12.3 tonnes CO_2eq/person, compared to 11.8 tonnes in 2020. While emission have come down in some sectors, this has been offset by increases in others. The agriculture sector is the largest contributor to overall emissions, with 37.5% of the total in 2021 (excluding LULUCF). Transport and Energy Industries are the second and third largest contributors at 17.7% and 16.7% respectively. The three sectors combined accounted for 62% of all emissions in 2021.

The extent and the pace that the agricultural sector should reduce its emissions to contribute to meeting Ireland's emissions reductions targets is controversial and hugely contested. The debate that preceded the publication of the carbon budget programme in 2022 largely focused on the extent to which the agricultural sector should be required to reduce emissions. NGOs and scientific organisations argued that significant reductions in agricultural emissions were necessary and put forward the case that they sector needed to change what it produces and how it produces it. Upon conclusion of the debate and the publication of the carbon budget programme, the agricultural sector was set the lowest percentage decrease target of emissions of any sector—only 20%, compared to 60–80% for the electricity sector. In early 2023 at the Irish Farmer's Association AGM, the association's president remarked that "*last summer, we ran a lobbying campaign on sectoral emissions ceilings. Almost every political commentator recognised this as one of the strongest by any organisation*" (Irish Farmers' Association, 2023). This achievement adds to their track record of successfully lobbying decision-makers to limit the share of the emissions reduction burden that falls on the sector (Torney, 2017). Despite their intransigence, it is inevitable that the sector will eventually have to significantly reduce emissions. When and how this occurs remains a matter of political contestation.

Network data

The first set of data used for this study was collected in summer 2021 through a survey of the actors that constitute the Irish climate change policy network. These are the actors that participate in the development of, or attempt to have an influence over, national level climate policies in Ireland. We identified the actors by investigating which organisations made submissions to public consultations or appeared at parliamentary committees related to climate change, and by interviewing experts with a knowledge of Ireland's national climate policy process. The list includes the main political parties in the national parliament, the relevant government departments and agencies, non-governmental organisations, scientific organisations, as well as actors from the energy and agricultural sectors. This approach led us to identify 93 actors, 77 of which responded to our survey (83%). Non-respondents are omitted from our analysis. Through our questionnaire, each of our respondents provided us information about their (i) opinion on a range of policy ideas related to climate change, and (ii) about which other actors in the network they have collaborated with regularly on climate issues over several years.

The second dataset used for this research is drawn from the social media platform *X*, on which users can create textual, audio-visual, and/or interactive "posts", and which other users can respond to in various ways, such as by "liking", "replying to", and "resharing". A network can be constructed from a set of accounts and the interaction/s between them. Our data included all the reshares between the *X* accounts associated with the actors that

constitute the Irish climate change policy network (for the applied protocol, see Chen et al., 2024). There were four types of accounts associated with the policy actors that we study included in our analysis. First, we include the *collective main* account for each of the 93 organisations, which we identified by checking the organisations websites or by conducting an *X* search. Six of the actors did not have an *X* account in January 2022. Second, we included the accounts of the executive personnel of the organisations, who we identified by examining the organisations' websites and by searching on LinkedIn. We categorised these accounts as *individual main*. In addition, we include both *collective side* and *individual side* accounts, which are the accounts that belong to subunits/subfunctions of the main organisations and the identifiable individuals who worked for, or who were affiliated with, one of the organisations, respectively. The *side* accounts are those that: (1) both followed and were being followed by the organisation's *collective main* account; (2) had at least one variation of the organisation's name in their biography; and (3) their *X* biography passed human filtering to verify affiliation with the organisation. This process led us to identify 615 unique accounts across all account types that are affiliated with the 93 organisations.

In February 2022, we extracted all 2,505,084 posts, reshares, quote reshares, and replies related to these accounts from 16 December 2017 to 15 December 2021 (i.e., starting 2 years after the Paris Accord was agreed). As the account information was collected in late 2021, we deliberately chose the upper bound for valid affiliation information at 4 years. Of the 1,318,753 reshares, we then used a list of climate-related keywords to filter out all reshares that were unlikely to be related to climate change.[1] This left us with a corpus of 45,216 reshares, each of which contained at least one of the keywords.

Each clean reshare (i.e., one that does not include an additional comment) captures a deliberate act to endorse (and disseminate) political content that was created by another user, and with which the user resharing the content would tend to agree (Metaxas et al., 2021; Malkamäki et al., 2023). Thus, resharing could be thought of as a concrete tie between a pair of like-minded users, resembling our operationalisation of co-advocacy as the intersection of collaboration and belief homophily (see below).

Network construction

We measured an edge in our survey network if either organisation in a dyad reported the other organisation as a collaborator (see Brewer & Webster, 2000). Since collaboration alone does not necessarily imply similar political goals upon which to build coalitions, we weighed each edge by belief homophily to operationalise an organisation-level co-advocacy network. Belief homophily was operationalized simply as the count of divisive policy ideas (i.e., standard deviation > 1 for ordinal response categories [1–5]) over which the two organisations agreed (i.e., reject [2–1], neutral [3], support [5–4]) in our survey.

We also created an account-level endorsement network, in which we recorded an edge between two accounts as existing if an account had either reshared or been reshared by another account. Edge weight corresponded to the count of reshares, disregarding directionality (i.e., who reshared whom), between a pair of vertices. To perform a minimal activity check, we omitted all vertices that only had a single edge of weight one or fell

[1] Biodiversity|carbon|clean energy|climate|coal|energy|fossil fuel|fracking|fridaysforfuture|global warming|greenhousegas|ghg|gas|heatwave|mass extinction|methane|net zero|oil|paris accord|paris agreement|renewable energy|sea level|solar|sustainability|warming|wind energy|wind power.

outside the largest connected component of the network. Table 1 summarises key properties of our two weighted and undirected networks.

To facilitate the inference of the modular network structure, we pruned each network by removing the least significant ($p > 0.1$), potentially spurious edges according to the marginal likelihood method (Dianati, 2016). The method relies on the marginal distribution of edge weights to assign a significance score to each edge. Notably, the endorsement network lost relatively many edges due to the high frequency of low-weight edges (i.e., high skewness of the edge weight distribution).

Inferring modular network structure

To operationalise coalitions from the organisation-level co-advocacy network and communities from the account-level endorsement network, we inferred the assortative modular structure—groups of vertices that are more connected to one another than to vertices of other groups—from each network by combining two network clustering approaches: modularity optimisation and maximum likelihood-based block modelling, both of which suffer from certain issues when used alone (for an overview, see Newman, 2016). We used the Leiden algorithm by Traag et al. (2019) to optimize modularity—a popular measure of the quality of the partition—for a range of resolution parameters [from 0.00 to 1.50 at 0.01 interval]. Resolution adjusts for the size of modules, and its value is crucial for uncovering meaningful modular structure, but the selection of which has traditionally been left at the discretion of the analyst. Since the modularity values are not comparable across different resolution values (i.e., the relationship with a higher number of modules and the modularity value is generally linear), or could result from random fluctuations in modularity, we performed model selection by passing each solution to a degree-corrected planted partition model to determine the likelihood of the solution under the data (Zhang & Peixoto, 2020). By selecting the model according to maximum likelihood, we gained statistical support for the existence of a modular structure (against alternative solutions, including a single-module solution) and effectively avoided overfitting/underfitting the model (i.e., finding modules where there are not, or vice versa). As the Leiden algorithm is stochastic, for each resolution parameter, we used the majority assignments of vertices into communities over 100 runs of the algorithm (Peixoto, 2021).

As part of the analysis, we also wanted to quantify the "alignment" of the organisation-level co-advocacy coalitions and account-level endorsement communities. To do so, we determined the amount of information (i.e., reduced mutual information, RMI) that one obtains from one set of modules by observing another set of modules (Newman et al., 2020). A value of 1 indicates perfect alignment and a value equal to or below 0 indicates that the associations between vertices are weaker than expected by random chance. However, to perform a meaningful comparison, we had to determine the frequency distribution of affiliated accounts in the endorsement network by each organisation in the co-advocacy network, and accordingly extract the majority assignment for each organisation. In addition, we also looked at the distributions themselves more descriptively to analyse nested coalitions.

Lastly, to rank the vertices within each module by their structural influence, we calculated the eigenvector centrality and its variant, PageRank centrality (i.e., the algorithm underpinning Google's success in guiding browsers to relevant websites), for the undirected co-advocacy network and for the directed version of the endorsement network (since resharing and being reshared contribute to influence in different ways), respectively, before

Table 1 Summary of key network properties

Network	Level	Data source	Vertex count	Edge count	Total edge weight	Edge weight skew	Pre-prune density (%)	Post-prune density (%)
Co-advocacy	Organisation	Survey	77	870	5988	−0.4	29.7	21.3
Endorsement	Account	*X*	534	5347	43,062	12.9	3.8	1.9

pruning the least significant edges. The former gives higher scores to organisations that not only have many ties themselves but share ties with those organisations that also have many ties, while the latter does the same for accounts that are being reshared by other important accounts (Bonacich, 2007; Gleich, 2015). To appropriately account for edge weights, we log-transformed them. Thus, we still considered "stronger" ties slightly more important, but with each additional increase in edge weight increasing the "value" of the tie less than the previous increase. In the co-advocacy network, "value" translates into collaboration with more likeminded organisations presumably granting access to more valuable resources (e.g., confidential information). In the directed endorsement network, "value" is a more mundane concept, but an account that frequently reshares another account's content could be described as a loyalist. Such loyalists, then, are presumably a key conduit in political communication (Youmans & York, 2012).

Results

Coalitions in the organisation-level co-advocacy network

In the first step of our four-step analysis, we identify two organisation-level coalitions in our analysis of the survey data collected from the actors in the Irish climate change policy network (Fig. 1A; Table 2). We label the first of these *the insider coalition*, because it is made up of actors from Ireland's political, economic, and scientific *Establishment*. It includes the two main political parties in government, energy sector actors, business and agricultural interests, scientific organisations, and government departments, agencies, and bodies. We label the second *the outsider coalition*, because is made up of actors that mostly rely on the use of outsider advocacy strategies to influence policy. This coalition contains NGOs, labour unions and left-leaning political parties that hold critical views of the Irish *Establishment's* response to climate change. This distinction between an insider and outsider coalition based on coalition members' institutional positions and the strategies they use to further their policy preferences draws from the literatures on interest groups and advocacy tactics, which routinely makes the distinction between insider and outsider groups (Dür & Mateo, 2013; Hanegraaff et al., 2016; Wagner et al., 2023).

Communities in the account-level endorsement network

In the second step of our analysis, we identify 10 communities in the social media network made up of the individual and sub-unit accounts affiliated with the organisations in the Irish climate change policy network (Fig. 1B; Table 2). The accounts affiliated with the organisations in the outsider coalition separates into five communities, although two of these only contain accounts affiliated with one organisation (7. Sinn Féin and 9. Concern). The members of the largest community affiliated with the outsider coalition are almost all NGOs, while the members of the second largest community are centre left political parties and trade unions. The remaining community is made up of accounts associated with the Green Party and the government departments under their control. The accounts associated with the actors in the insider coalition also divide into five communities. The two main political parties in government (Fine Gael and Fianna Fáil) dominate one community each, while the other accounts in each party's community are associated with the government departments under their party's control. The accounts

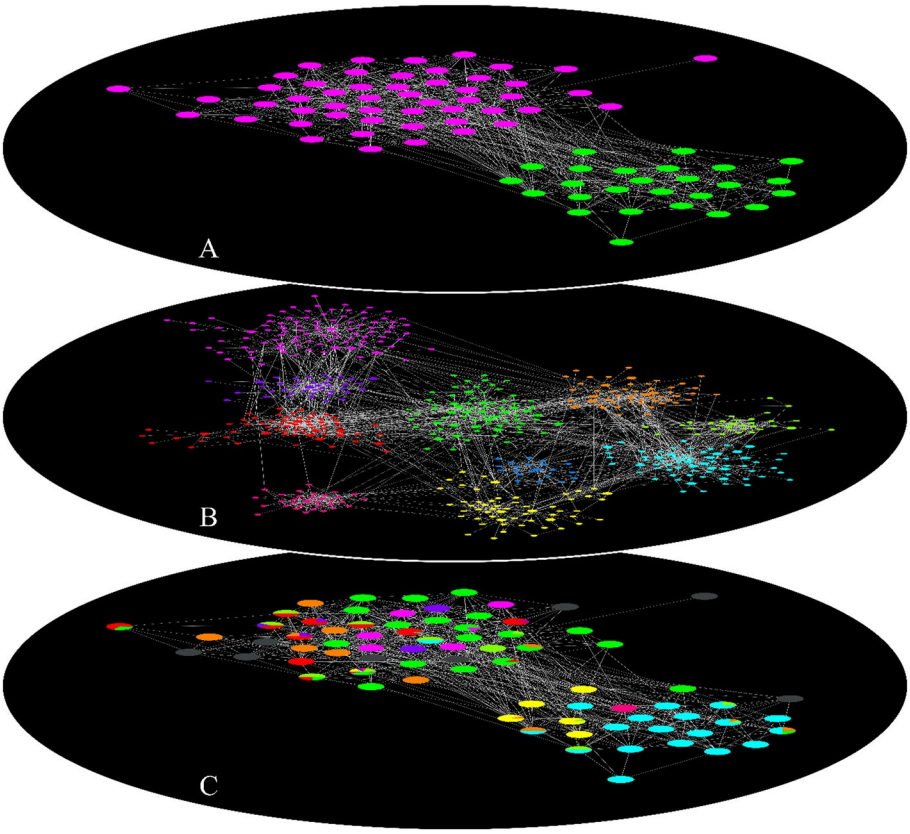

Fig. 1 Coalitions in the co-advocacy network (**A**) and communities in the endorsement network (**B**) that maximise the likelihood of the respective planted partition models (i.e., provide best fit to the respective data), and frequency distribution of accounts in different communities in the endorsement network affiliated with each organisation in the co-advocacy network (**C**), in which edges and vertex positions correspond to (**A**) and vertex colours correspond to (**B**), while grey vertices represent organisations that did not have any affiliated accounts on *X* at the time of data collection

associated with scientific organisations and with the energy sector form two additional and separate communities. Lastly, the members of the largest and most active community in the whole reshare network are accounts affiliated with actors with agricultural interests. This is one of the most interesting findings in our study because the agricultural sector is the largest contributor to Ireland's GHG emissions and as noted above has a successful track record of limiting the amount of emissions that the state has obliged the sector to reduce, and when and at what pace it is expected to reduce them. It also aligns with other research that has found that well-resourced and well-connected organisations are more likely to routinely engage in online networked mobilization and lobbying (Figenschou & Fredheim, 2020). Our finding also offers support for the idea that the owners of individual accounts are freer to say and do what they want online (including trying to shape the online discourse about the role of the Irish agricultural sector in contributing to and mitigating climate change) than those that manage the official accounts of the organisations that they are affiliated with it. Finally, our analysis

Table 2 Most influential organisations and accounts in each coalition and community according to undirected eigenvector score and directed PageRank score, respectively

	Coalition	Organisation	Top vertices	Eigenvector
0	Insider	Sustainable Energy Authority of Ireland	IE080	0.97
		Department of the Environment, Climate and Communications	IE023	0.92
		Department of Housing, Local Government and Heritage	IE025	0.90
1	Outsider	Environmental Pillar	IE037	1.00
		Labour Party	IE069	0.98
		Friends of the Earth	IE047	0.94
	Community	**Organisation**	**Top vertices**	**PageRank**
0	Agricultural Interests	Teagasc	IE089_teagasc	1.00
		Irish Farmer's Association	IE061_ifamedia	0.25
		Teagasc	IE089_cbteagasc	0.19
1	Energy Sector	Sustainable Energy Authority of Ireland	IE080_seai_ie	0.44
		Sustainable Energy Authority of Ireland	IE080_jimmerz50	0.28
		Codema	IE014_pjrudden	0.23
2	Non-governmental Organisations	Birdwatch Ireland	IE004_naturenymph	0.36
		An Taisce	IE001_antaisce	0.30
		Stop Climate Chaos	IE087_scc_ireland	0.27
3	Fine Gael, State, and Business	Department of the Taoiseach	IE028_merrionstreet	0.17
		Ibec	IE051_ibec_irl	0.12
		Fine Gael	IE045_finegael	0.11
4	Centre-left Block	Labour Party	IE069_labour	0.23
		IIEA	IE053_iiea	0.18
		Dublin City Council	IE030_alisongilliland	0.16
5	Scientific Organisations	Environmental Research Institute UCC	IE039_bogallachoir	0.39
		ICARUS Climate Research Centre	IE052_docfloods	0.39
		MaREI	IE071_mareicentre	0.29
6	Fianna Fáil	Fianna Fáil	IE044_fiannafailparty	0.43
		Fianna Fáil	IE044_senatoremurphy	0.20
		Fianna Fáil	IE044_billykellehereu	0.16
7	Sinn Féin	Sinn Féin	IE081_lnbdublin	0.26
		Sinn Féin	IE081_niallsf	0.26
		Sinn Féin	IE081_paul_gavan	0.19
8	Green Party+	Green Party	IE050_greenparty_ie	0.38
		Green Party	IE050_paulinegalway	0.20
		Friends of the Irish Environment	IE048_davidhealyv	0.18
9	Concern	Concern	IE018_concerndebates	0.10
		Concern	IE018_concernactive	0.08
		Concern	IE018_klairemarshall	0.08

The colours refer to the colours in Fig. 1

provides evidence that advocacy coalitions can be nested, with the lower level having individuals or subunits as members.

Nested coalitions in Irish climate politics

Third, to measure the overlap in the policy network coalitions and the social media network communities we begin by assigning each organisation a unique membership based on the community to which most of its affiliated accounts belong. We calculate an RMI value of 0.45 when we measure the congruence of structures A and C in Fig. 1. Since RMI is a rather sensitive measure for such small networks, this is a high value. We corroborate this finding by running an additional analysis and inferring the best-fitting partition from an organisation-level endorsement network, which we constructed by aggregating reshares by organisation, across all affiliated account types. The two-module partition closely resembles the partition in A, with an RMI value of 0.60 for the intersection of vertices. Thus, the

account-level endorsement community structure largely aligns with the organisation-level co-advocacy coalition structure, thereby providing evidence for the presence of nested coalitions, with organisations at one level and individuals and organizational sub-units at a lower level.

Organisations and their affiliates by network centrality

In the fourth and final step of analysis, we investigate the alignment between the policy network and the social media network by comparing which actors are the most central in the two networks. Table 2 shows the most central actors in the organisational-level coalitions and in the account-level communities. The two most central actors in the insider coalition are the Sustainable Energy Authority of Ireland and the Department of the Environment, Climate and Communications. The former is the state organisation charged with leading Ireland's energy transition, while the latter is the government department most responsible for climate policy. The most central actors in the outsider coalition are the Environmental Pillar, who are the officially recognised voice of national ENGOs, the Labour Party, who have ties to trade unions and ENGOs, and Friends of the Earth, who are Ireland's most important climate change NGO. These actors are not just central in their own coalition, but also in the whole network.

The Sustainable Energy Authority of Ireland (SEAI) and the Labour party are the only two actors that are central in one of the organisational-level coalitions and in one of the endorsement communities. The SEAI is the most central actor in community 1 (energy sector), while The Labour Party is the most central actor in community 4 (Centre-left Block). These two actors therefore not only connect to those in their own community, but also to the other communities that are nested within the organisational-level coalitions of which they are a central member. For example, the SEAI is in the same coalition as the actors in the agricultural interests community, and in the Fine Gael, Sate and Business community, whereas the Labour Party is in the same coalition as the actors in the NGO community.

The most central actors in the NGOs community are Birdwatch Ireland, a very large and active conservation organisation, and An Taisce, a large NGO that campaigns for the protection of the country's national and built heritage. Teagasc, a state funded agricultural science agency and education provider, and the Irish Farmer's Association, the national organisation representing farming interests, are the two most central actors in the agricultural interests community. Both actors are well-funded and resourced and play an important and influential role in shaping national climate policy. They lead their own community, but also have ties to many of the actors in the insider coalition.

Discussion and conclusion

This paper applied network clustering methods to organisational-level policy network survey data and to the account-level social media data of the individuals and the subunits affiliated with the policy network actors to investigate the extent to which coalitions are nested. The analysis of the survey data found evidence for the presence of two main coalitions: an insider coalition made up of the actors from Ireland's *Establishment* and an outsider coalition made up of critical oppositional voices. The former contains the two main political parties in government, energy sector actors, business and agricultural interests, scientific organisations, and government departments, agencies, and bodies. The latter is formed

by NGOs, labour unions and left of centre political parties. An analysis that includes the collective and individual *X* accounts affiliated with the policy network organisations finds evidence for ten smaller communities, each of which are closely aligned to one of the two organisational-level coalitions.

The identification of an agricultural interests' community in the reshare network is one of the paper's most interesting empirical findings. The agricultural sector is responsible for the largest share of Ireland's GHG emissions and agricultural lobbyists' have a long and successful track record of blocking or watering down any measures that would require the sector to reduce emissions. Our results show that individuals and subunits from the agricultural actors work together, consciously or not, to shape the online discourse about the sector's role in contributing to and mitigating climate change by amplifying one another's voices through reshares. They do this while the most important agricultural interests actors operate as members of the insider coalition constituted by Ireland's economic, scientific, and political Establishment. This agricultural sectors' actors two-pronged approach—insider lobbying and the use of social media to broadcast and amplify its arguments—to convincing decision-makers to limit the extent and the pace that sector is required to reduce its emissions by 2030 has been successful to date. Ireland's climate long-term climate goals cannot be met until policymakers are able to overcome the sectors resistance to transformative change in the activities it engages in, which will involve working with agricultural interests while also winning the political debate, in whatever medium in which it occurs. There is also a distinct scientific organisations' community and a distinct energy sector community present in the reshare network when we account for the online behaviour of the individuals and subunits associated with the policy network actors. However, unlike the agricultural coalition, these communities favour more climate action, often doing so by amplifying the voices of the organisations that publish scientific evidence that supports the need for a stronger policy response from the Irish government.

Our work has several limitations. First, we only examine one policy network in one country. Future work would examine policy networks in other sectors and countries to investigate the transferability of our approach. Second, there is no rulebook on how best to choose a list of keywords to extract a subset of tweets from a dataset scraped from *X*. However, we are confident in the relevance of the list keywords that we chose based on our knowledge of Irish climate politics before conducting our analysis. Third, some scholars might argue that reshares are not a form of coordinated behaviour amongst like-minded actors, but instead something much weaker. We understand this concern, but we suggest that only by applying our approach in more contexts will be able to determine if there is a body of evidence to support our approach.

This study makes theoretical, methodological, empirical, and practical contributions to the literature on both coalitions and climate change politics. First, by proposing that reshares are not just a form of network tie, but also a means of endorsing a statement by one's political allies, we propose that analysing the responses of policy actors to survey questions on policy ideas should not be the only way that researchers identify coalition memberships and structures. Second, we argue that the "organisational state" approach to identifying coalitions has limitations, and that bringing the individual and organisational subunits back into the analysis can provide a much-needed understanding of the nested nature of advocacy coalitions. Methodologically, we develop a replicable approach for identifying the *X* accounts that are affiliated with the actors that constitute the members of a policy network. We also show which inferential and information-theoretic network methods can be used to identify and then compare the coalitions that are identified by analysing the two types of data. This paper adds to the empirical literature on advocacy coalitions in

climate change policy networks by testing our ideas using two unique datasets. The results also show that our approach enables us to learn a lot more about Irish climate politics than if we were to only analyse survey data collected from the policy network actors (or by aggregating reshares across all levels). Finally, our findings have practical implications because they suggest that policymakers with decision making power should pay attention to how policy actors and their affiliates organise and advocate on social media because their online activity can differ to how they participate in more formalised policymaking processes. These implications pertain not only to the climate change policy domain studied here, but to policy processes more generally.

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