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Digital disinformation strategies of European climate change obstructionist think tanks

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This study explores how European think tanks with obstructive positions on climate policy use the social network X to advance their agendas. The aim is to understand their digital communication strategies, the issues they address, the use of hyperlinks, and the impact on interaction and online polarization. A mixed-methods analysis was conducted on tweets from twelve organizations known for opposing climate policies. Out of an initial 96,607 tweets, 803 relevant messages were selected to evaluate thematic content and interaction reach. The analysis identified five dominant thematic areas in the tweets: economic impacts of climate policy, ideological perspectives, questioning of official science, proposed technological solutions, and other messages. The higher levels of interaction were generated by messages with a political or ideological focus and those proposing technological solutions. In addition, most hyperlinks directed users to the think tanks' own websites rather than to external sources. European anti-climate change think tanks use social network X to promote their agendas through ideological and technical messages that generate high engagement.

1 Introduction

Think tanks are now presented as actors with great social and political influence on legislators and the policy-making process, as well as in shaping public opinion (Abelson, 2006; Blank, 2003; Cockett, 1995; Denham and Garnett, 1998; Landry, 2021; Lenglet and Vilain, 2011; Li, 2017; Oreskes and Conway, 2010; Stefancic and Delgado, 1996; Williams, 2012). They no longer aim only to interact with public institutions, but also to strategically communicate their analyses and approaches, as well as to participate in shaping the public agenda, projecting specific frames and determining the public interest (Castillo-Esparcia et al., 2020).

Given the great diversity of definitions and the lack of consensus on their delimitation due to the heterogeneous nature of these centers, the authors of this article opt for a descriptive definition of the reality of these organizations, based on the proposals of Castillo (2009) and Xifra (2008). It is understood that these laboratories are made up of various intellectuals, analysts and relevant opinion leaders linked to the political sphere, who, by contract or on behalf of public or private organizations, propose political interventions to public institutions through research; they rely on direct or indirect communication strategies to influence public opinion, always producing expert knowledge that serves the public good (Almirón and Xifra, 2021). If their interventions have a specific purpose, they

are classified as advocacy tanks or think tanks linked to political parties, i.e., those that have an ideology, defend specific interests and carry out political actions linked to interest groups or lobbies (Xifra, 2008).

Meanwhile, climate change is currently attracting considerable attention from various actors seeking to influence the political sphere, media agendas and public opinion in order to delay or obstruct measures that support climate action (Climate Social Science Network, 2021). These include conservative advocacy tanks or corporations willing to exert pressure in favor of their particular interests by investing in think tanks that act as lobbyists to obstruct climate policies (Almirón et al., 2023). This research aligns with the notion of political obstructionism (Almirón and Moreno, 2022) or climate obstructionism (Abellán-López, 2021; Ekberg et al., 2022) as terms that best represent the set of actors that currently dominate narratives against climate action in the United States and Europe (Almirón et al., 2020; Coan et al., 2021). Although there are climate change deniers, the most common argument in these areas in recent decades has been related to the questioning of political-ideological solutions and the discrediting of the climate activist collective. This comes from organizations that see their status quo threatened by policies aimed at solving the environmental problem that go against their interests, mainly ideological and economic (Almirón and Moreno, 2022). On many occasions, these organizations become purveyors of disinformation to benefit their own activities, seeking positive influence on public opinion and image laundering (López, 2023; Olivares-Delgado et al., 2023; Rodríguez-Fernández and Establés, 2023); they even engage in dark PR campaigns (Rodríguez-Fernández, 2023).

Some think tanks, cloaked in scientific legitimacy (Cann and Raymond, 2018; Dunlap and Jacques, 2013; Medvetz, 2012), use their status as prescribers and leaders to create and disseminate messages that contribute to climate obstructionism (Coan et al., 2021; Graham, 2024; Plehwe, 2021). These research centers, under the umbrella of science, promote a position of inaction against climate change, questioning its consequences (Abellán-López, 2021). They use communicative actions based on disinformation, with the aim of discrediting efforts against climate change, so that this climate conspiracy acquires logical reasoning and scientific rhetoric (Jacques and Knox, 2016).

As social networks have been shown to be a favorable scenario for the spread of disinformation (Treen et al., 2020; Vicario et al., 2016), they are often used by agents of climate obstruction (Hassan et al., 2023; Pogson, 2021) to amplify their discourse (Villagra et al., 2023). Moreover, social platforms have become a terrain of ideological polarization (Hahn et al., 2024), with a significant impact on the opinions and attitudes of their audiences, including in the environmental field (Moernaut et al., 2022; Williams et al., 2015), where this segregation has even increased over time (Dunlap et al., 2016). The digital space has become a conflict scenario that contributes to shaping the public discourse on climate change (Kirilenko and Stepchenkova, 2014; Pearce et al., 2014), a highly politicized and polarized issue (Chinn et al., 2020). This high degree of polarization has occurred in large part due to ideologically driven disinformation campaigns (Van der Linden et al., 2017).

Examining the most recurrent discursive lines of anti-climate change actors in digital media reveals the following: 1. Climate change does not exist, it is a fraud and a conspiracy of political, scientific and communicative elites that must be delegitimized—a discourse based on political rather than scientific elements—(Gounaridis and Newell, 2024; Jacques and Knox, 2016). 2. There is a lack of scientific evidence proving the truth of the facts—discrediting conventional science and advocating an alternative—(van Eck and Feindt, 2021). 3. Opposition to the use of renewable energy due to doubts about its reliability (Jacques and Knox, 2016).

It is clear that Twitter (onwards referred as X), among the various social platforms, has played a significant role in the dialogue and debate between climate change activists and opponents (García et al., 2019; Holmberg and Hellsten, 2016; Williams et al., 2015). Some studies even point out that it has become a tool of public influence within the communication strategy of different organizations seeking to challenge and oppose environmental policies (Hunt, 2021; Watts et al., 2016), contributing to significant polarization by motivating strongly segregated attitudes in search of opinions similar to those of the users themselves (Williams et al., 2015). The scientific literature has also shown that the climate change-related posts that generate the most engagement on social networks such as X are those that deny climate change itself, which is assumed to be a natural cycle, those that do not link the environmental problem to human activity or downplay its importance—opponents of the anthropogenic climate change theory—(Al-Rawi et al., 2021), and those that use an aggressive tone and are more politicized (Yuan et al., 2022).

The need for the present research is based on the fact that, while the functions and communication strategies of these obstructionist think tanks have been thoroughly investigated in the United States, despite their existence, this investigation has been significantly less pronounced in Europe. To date, research has mainly focused on alternative dimensions, including the structural dynamics and networking of these think tanks on social platforms (Almirón et al., 2023), as well as a broader examination of their general communication practices, particularly through their documents and reports (Almirón et al., 2020). However, despite the fact that think tanks are recognized as highly influential organizations in European public policy formulation (Moreno, 2024) and public opinion, there are currently no studies that focus on the digital communication tactics employed by these research centers in relation to climate obstructionism on social media. This study aims to explore the digital communication strategy of European think tanks that adopt obstructionist positions on climate policy. The main objective is to examine the discourse of these think tanks on environmental issues in the digital realm, with a particular focus on their activity on the social network X. To fill this gap, the following research questions have been posed:

Q1. What are the main thematic areas and the most recurrent discursive lines in the tweets published by these think tanks on the social network X?

Q2. How do these centers use hyperlinks that provide complementary or additional material to the content published in the posts on this social network?

Q3. What is the reach and type of engagement generated by climate-related tweets?

2 Method

Given the research questions posed that guide the objectives of the study, the approach predominantly leans toward exploration. Moreover, the methodological design entails a mixed-method longitudinal analysis.

Initially, it is necessary to determine the think tanks composing the sample. Twelve research centers were selected based on previous studies on entities opposing climate change (Almirón et al., 2020, 2023). Although these organizations represent only a portion of the denialist groups in Europe, they are considered among the most influential on the continent, according to the cited authors. Their composition and distribution by country, as well as their presence and general activity on X, are summarized in Figure 1.

To conduct the analysis of their digital communication on X regarding climate topics, it is imperative to extract information from the tweets published by these organizations. The data collection process was carried out using web scraping tools developed in R. The "*rvest*" library was employed for extracting tweets and their reach and interaction metrics (Aydin, 2018;

Wickham, 2024), while the "*rselenium*" library was used to import posts and values under analysis (Harrison and Kim, 2024). This yields an initial set of 96,607 tweets from the eleven X profiles of the think tanks registered on the platform.

The next step is to identify which of the 96,607 tweets are relevant to the research. To accomplish this, a multi-stage data cleaning procedure is employed. Initially, it was necessary to exclude tweets that were not originally posted on the think tanks' profiles. This decision was based on the fact that while such messages might contribute to assessing communication strategies, they do not concretely represent the intentions and direct messages of these organizations. Next, the remaining tweets were filtered using a set of 50 keywords to exclude those unrelated to environmental or climate topics. Keywords with multiple possible endings were truncated to enhance the filtering accuracy. The complete list of keywords is available in the Data Availability Statement DOI. After this keyword-based filtering, 1,262 tweets were retained and manually reviewed. Tweets deemed irrelevant to the study's focus were excluded based on the researchers' judgment. Ultimately, a final sample of 803 original tweets was obtained. These tweets, directly pertinent to the study's topics, were published

FIGURE 1
Think tanks that are part of the sample and their presence and activity on X.
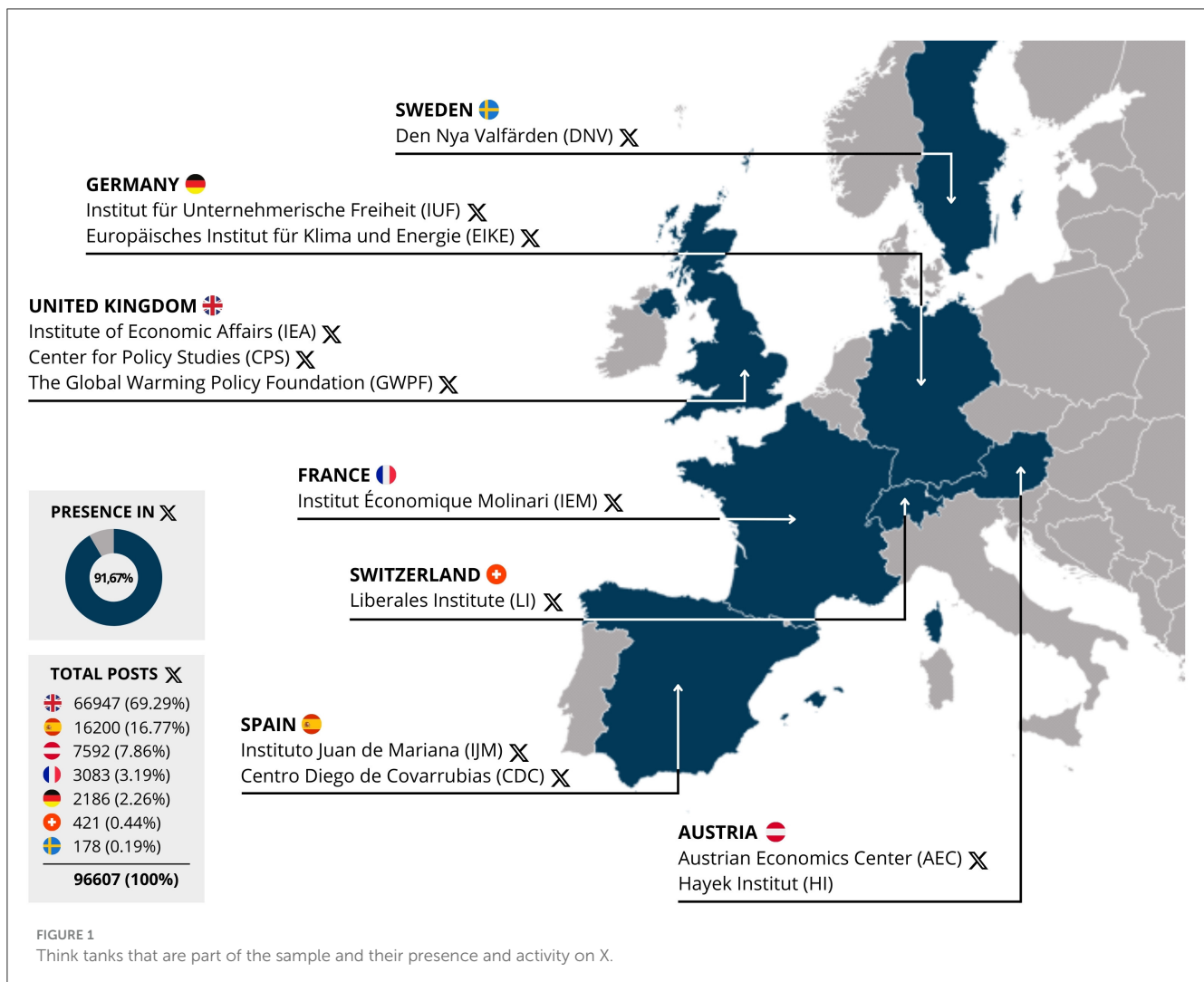
between January 2009 and March 2024 on the X profiles of the think tanks included in the research.

Subsequently, the "*tm*" library is used to remove non-essential words and phrases that could muddy or distort the analysis of the results (Feinerer and Hornik, 2024).

The data analysis unfolds in three phases, which align with the research questions. The first two phases aim to delve into the content of the messages, exploring the topics they address and the presence of hyperlinks to supplementary information. The third stage seeks to assess the degree of interaction generated by the content, establishing differences based on the think tank that publishes it or the thematic area in which it is included. The methodological procedure for each of the phases is detailed below.

In the initial stage, a qualitative data analysis (QDA) of the content of the 803 tweets is undertaken. The objective is to systematically and quantifiably describe the thematic areas within a collection of messages pertaining to a specific topic (Krippendorff, 2018).

For this purpose, first, topic modeling through Latent Dirichlet Allocation (LDA) is utilized (Chen et al., 2023; Grimmer et al., 2022). Five overarching thematic areas have been identified, each accompanied by a list of pertinent terms. To address the limitations of this technique regarding messages of similar nature or topic, the R package developed by Grün and Hornik (2011) is employed. This package considers the multi-thematic nature of each analyzed element and characterizes it based on word distributions. It is important to mention that although categorization is carried out exclusively, the inclusion of content in thematic areas depends on a numerical component defined by a minimum threshold. This threshold is linked to the similarity coefficient of the analyzed content with each of the identified thematic areas.

Once the overarching thematic areas have been identified, the tweets that fit into each of them are extracted, classified according to the mentioned similarity coefficient. In order to obtain specific discursive lines within each area, the software Nvivo 14.23.0 (developed by Lumivero) is used. This tool is designed to organize qualitative data without a defined structure. In this case, considering the enormous specificity of each discursive line and the conceptual and thematic relationships between each of them, only the frequent argumentative themes in each area are identified, without developing a count of messages for each of them.

The process of using the software involved five stages. As previously outlined, the first step was importing and organizing the tweets according to the identified thematic areas. In the second stage, the coding tool was used to identify and classify relevant fragments, developing categories inductively based on emerging themes. Next, the text query function was employed to identify frequent patterns and topics. To analyze the relationships between different themes and confirm their connection with the overarching thematic area, concept maps were utilized. Finally, structured summaries of the findings were generated.

Choosing Nvivo over conducting topic modeling through LDA in each area is justified by the fact that some of the identified general categories contain a reduced number of messages. In this context, Nvivo proves to be more suitable for analyzing small data volumes.

The second phase of data analysis focuses on quantifying the hyperlinks present in original tweets that discuss climate topics from the think tanks sampled for the study. Additionally, there is also an aspiration to classify them according to the webpage to which they redirect the user. The hyperlink types proposed by Vicente-Domínguez and Carballeda-Camacho (2021) are utilized for this categorization, which include six categories of links: curricular, organizational, bibliographic, documentary, terminological, and others. The categorization is carried out manually.

Ultimately, in the third phase of data analysis, the aim is to measure the reach and interactions of the messages obtained. As explained, the data collection process also gathered information on X's interaction metrics (bookmarks, favorites, replies, retweets, and quotes). Based on these values, various statistical analyses are conducted to compare interaction distributions depending on the think tank publishing the tweet or the thematic area to which the message belongs. To delve into the engagement differences among messages from various thematic areas, the sum of engagement values is categorized and a chi-square independence test is conducted. The statistical analyses are carried out using R, and their graphical visualization is done using the software Flourish.

3 Results

The 803 tweets included in the research after the data curation process have been published by nine of the eleven think tanks that have a profile on social network X. The only think tanks that have not posted any tweets related to climate issues are Den Nya Valfärden (DNV) and Institut für Unternehmerische Freiheit (IUF). In both cases, activity on X is very limited, as neither profile has exceeded 200 tweets since its creation, and both have been inactive for several years.

Of the nine think tanks whose messages comprise the sample, the three entities from the United Kingdom represent the largest proportions relative to the total volume. The Institute of Economic Affairs (IEA) is the organization with the highest number of posts on X related to environmental issues ($n = 282$; 35.11%), followed by the Center for Policy Studies (CPS) ($n = 224$; 27.89%) and The Global Warming Policy Foundation (GWPF) ($n = 127$; 14.94%). The distribution is relatively even compared to the total volume of tweets by country. The exceptions are the Europäisches Institut für Klima und Energie (EIKE) and the GWPF, which, being specifically focused on climate and environmental issues, show much higher ratios of included tweets to published tweets compared to other think tanks.

Five general thematic areas have been identified that allow for the classification of messages based on the nature of the topics they encompass. The majority of tweets are associated with aspects related to market dynamics or the economic impact of climate policies ($n = 305$; 37.98%). From the analysis of the discursive lines present in the messages included in this category, a marked concern from these organizations about the economic repercussions and the decrease in efficiency and business competitiveness attributed to environmental policies emerges. Furthermore, there is a recurring emphasis on promoting market autonomy as a means to generate solutions to climate issues.

The second most common thematic area includes messages that address environmental issues from a purely political or ideological

perspective ($n = 167$; 20.79%). In this regard, the argumentative lines tend to associate concerns about climate change and efforts to mitigate its effects with specific ideologies. Generally, they downplay and trivialize these consequences, suggesting that adaptation is the most suitable solution. Based on this adaptive stance, the third general thematic area is proposed, which addresses the technological solutions suggested by these think tanks for environmental problems ($n = 75$; 9.34%). The tweets in this category seek to question the reliability of renewable energies and highlight the benefits and safety of nuclear energy.

Additionally, a significant proportion of the tweets focus on disseminating their scientific viewpoints and attempting to generate debate on the topic ($n = 149$; 18.56%). The specific

discursive lines in these posts question the anthropogenic component of climate change, cast doubt on the reliability of official sources, and highlight economic interests as influencing factors on the climate consensus.

Ultimately, there is a group of messages that could not be categorized into any of the four previous thematic areas ($n = 107$; 13.33%). Most of these are brief tweets accompanied by images, and several are also aimed at promoting the think tank itself. Figure 2 summarizes the overall distribution of the thematic areas.

Regarding the presence of hyperlinks in the posts, it is noted that 77.58% ($n = 623$) of the tweets contain external links. Of these links, two-thirds ($n = 412$; 66.13%) direct the user to the web pages of the think tank publishing the content. As for bibliographic
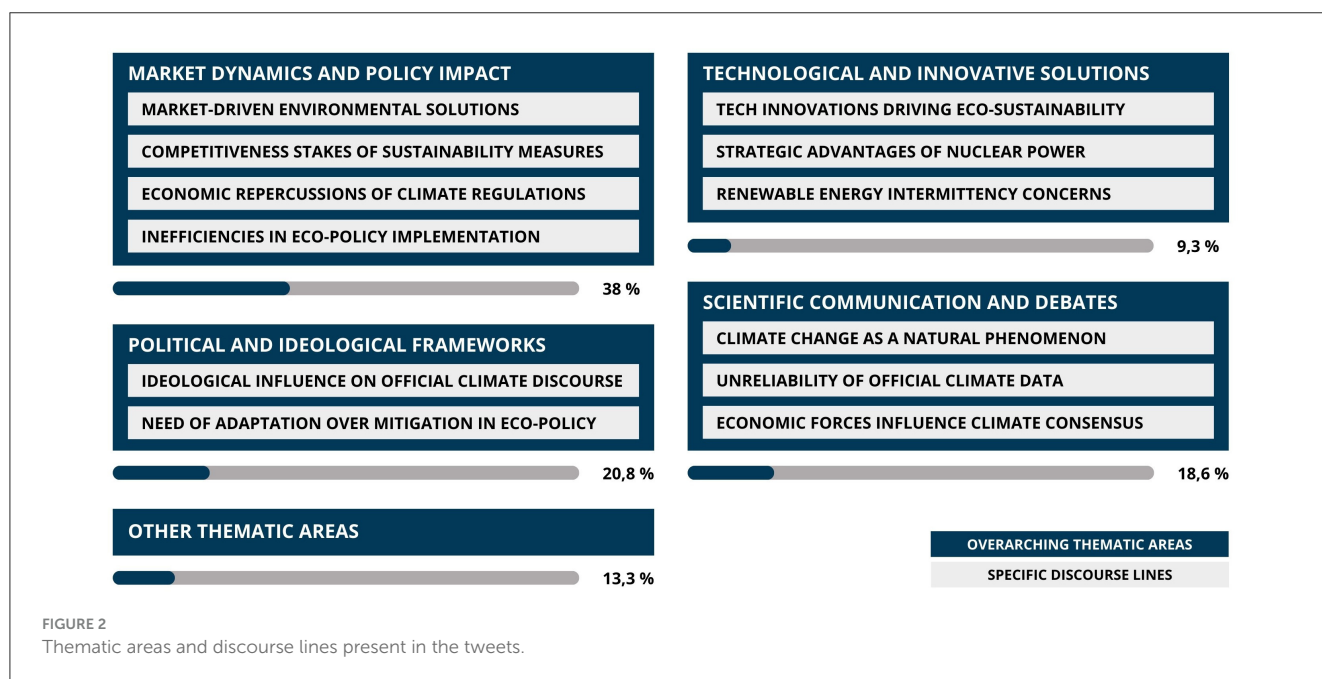

FIGURE 2
Thematic areas and discourse lines present in the tweets.

TABLE 1 Average reach and engagement metrics by think tank.

Think tank	Country	Average per tweet					
		Bookmarks	Likes	Replies	RTs	Quotes	Sum
GWPF	UK	1.54	27.13	3.98	11.44	1.72	45.81
IEM	France	0.00	5.50	0.50	8.00	1.00	15.00
IJM	Spain	0.41	7.34	0.79	4.38	0.69	13.61
IEA	UK	0.22	6.19	2.80	2.72	0.56	12.49
EIKE	Germany	0.22	4.59	0.76	1.24	0.11	6.92
CDC	Spain	0.01	1.83	0.11	1.44	0.17	3.56
AEC	Austria	0.02	1.69	0	1.04	0.09	2.84
CPS	UK	0.02	1.24	0.37	1.02	0.15	2.80
LI	Switzerland	0.00	1.67	0.33	0.67	0.00	2.67
DNV	Sweden	Has an account on X; but no tweets in the sample.					–
IUF	Germany	Has an account on X; but no tweets in the sample.					–
HI	Austria	Does not have an account on X.					–
General		0.35	7.53	1.79	3.44	0.56	13.67

links that refer to scientific material not hosted directly on the organization's website, they represent 8.35% ($n = 52$), while links to other types of documents make up 2.09% ($n = 13$). The remaining 146 hyperlinks (23.43%) include links to press news, YouTube videos, educational resources, and blogs, among others.

Reach and engagement metrics are analyzed both individually and collectively. On average, each message receives 13.67 interactions; however, when comparing different think tanks, the GWPF shows the highest values by a significant margin. The sum of the averages per tweet results in a cumulative engagement value per message of 45.81. The only other three think tanks that exceed the threshold of ten interactions per tweet are the Institut Économique Molinari (IEM), the Instituto Juan de Mariana (IJM), and the IEA. Notably, the IEA's performance in metrics requiring active user response is proportionally very high. Table 1 summarizes these findings.

Besides that, when focusing the comparison to assess engagement differences based on the general thematic area of the messages, it is observed that the categories with the highest levels of interaction are those that address climate issues from a political and ideological perspective and those that encompass tweets presenting environmental solution proposals based on technological development aimed at improving non-renewable energies. The messages from these two categories exceed the average engagement of the sample by 35.48%, reaching 18.52 interactions per tweet (see Figure 3). To delve deeper into this finding, an independence test using the chi-square statistic is conducted. The results of this test (*p*-value: 0.0192; chi-square: 24.18; degrees of freedom: 12) statistically confirm the relationship between the thematic area of the messages and the level of engagement achieved.

4 Discussion

This analytical-exploratory study contributes to the understanding of the digital communication strategies of European think tanks that take an obstructionist stance toward environmental policies. The research has shown that these think tanks attach considerable importance to issues related to the climate crisis within their digital strategy, as they devote considerable space to this topic in their profiles on the social network X.

The results of this study show that the most recurrent themes and their respective discursive lines exhibited by these think tanks on social network X, in line with previous research, comprise different concerns and narratives. Firstly, there are concerns about the economic impact and negative consequences that could result from the implementation of environmental policies (Fownes et al., 2018). In addition, discourses based on the specific ideology or politics of the think tanks are observed (Yuan et al., 2022). They also present controversies about the reliability of renewable energy (Jacques and Knox, 2016), as well as criticisms of the credibility of official sources and proponents of the anthropogenic climate change theory (Al-Rawi et al., 2021).

FIGURE 3
Sum of the engagement metrics of tweets based on the general thematic area.
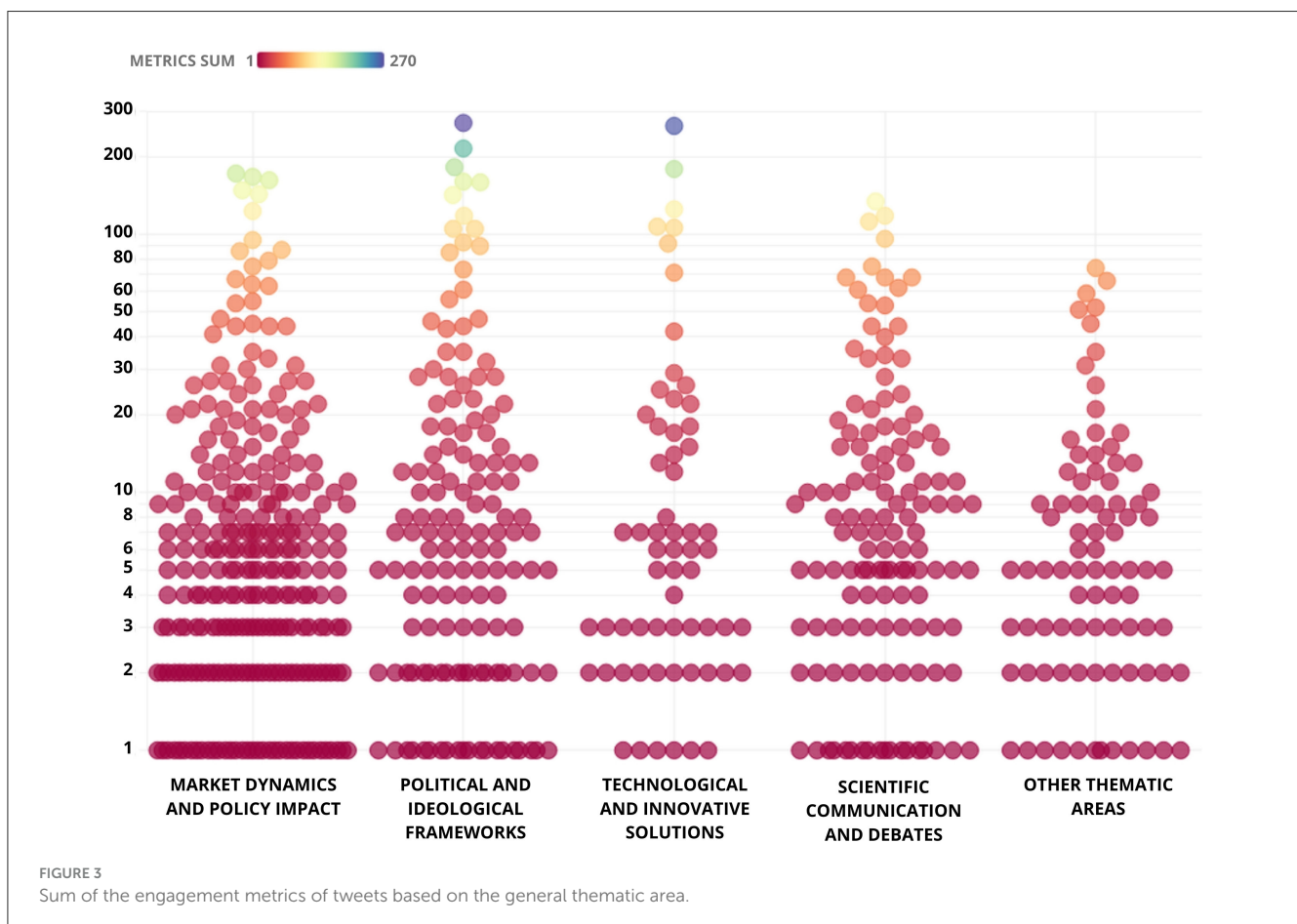
According to the data collected, it is common for these think tanks to include links in their posts, but it is noteworthy that most of them are used to redirect to the think tank's own website. This is what previous research has identified as organizational links (Vicente-Domínguez and Cea-Esteruelas, 2019), which redirect to the URL of the organization itself, relegating links to external bibliographic material that supports and confirms the information being exposed. The scientific literature produced by the climate change denial and obstructionist communities consists mainly of non-peer-reviewed scientific journals and self-published books (Dunlap and Jacques, 2013), which makes it difficult for these centers to redirect to sources that provide credibility to the issues discussed, focusing instead on promoting the center itself and attempting to link the virtual community to their approach and proposals.

Furthermore, the findings align with those of previous studies (Yuan et al., 2022), indicating that messages addressing the issue from a political and ideological perspective elicit the greatest engagement. These messages contribute to significant ideological polarization in two ways. First, they reinforce the beliefs of supporters aligned with a particular ideology and elicit reactions from opponents. Second, they foster affective polarization due to the presence of an emotional component (García-Escribano et al., 2021; Brady et al., 2017). The emotional component intensifies user responses and engagement. Furthermore, in line with other research, it is observed that social network users tend to interact under a significant homophilic condition, where users interact predominantly with those who share their beliefs, which exacerbates polarization in the environmental domain (Williams et al., 2015).

It can be said that the study has achieved its objectives by providing a detailed view of the environmental discourse of obstructionist climate change think tanks on social network X. However, the study has some limitations that should be considered when interpreting its findings. First, it focuses on a single social platform, which may not fully represent the digital communication strategies of these centers across other social networks. Second, while the scope and nature of engagement generated by tweets have been evaluated, there is a lack of in-depth qualitative analysis of interactions between users and think tanks. Third, although efforts were made to identify the primary thematic areas and recurring discursive lines in the messages, the interpretation of these themes may be influenced by subjective biases.

In this regard, future lines of research based on the limitations of this study would be advantageous. Such research could include an analysis of other social networks, like Facebook, Instagram, and LinkedIn, which also play a significant role in the dissemination of messages and the formation of opinions. A more comprehensive study of tweets, coupled with a more detailed analysis of comments, retweets, and replies, would provide a more complete picture of how messages are received and discussed by audiences. Additionally, it would facilitate the identification of think tanks that are capable of acting in concert. Lastly, due to the potential for social polarization and the influence of public opinion on these issues and the interconnectivity between the digital communications of these organizations, it would be beneficial to explore this topic from a multitude of complementary perspectives.

Overall, this research highlights the importance of studying the digital communication of European think tanks due to their influence on public policy formulation. This analysis shows how these actors use social media to influence key debates, contribute to ideological and affective polarization, promote their interests, and conduct disinformation campaigns. Understanding these dynamics is necessary to assessing their impact on public opinion and decision-making. It also highlights the need for future research that considers different digital platforms and uses deeper qualitative methods to gain a more comprehensive view of their influence in the digital realm and in public policy debates.

Data availability statement

Ethics statement

Ethical approval was not required for the study involving human data in accordance with the local legislation and institutional requirements. Written informed consent was not required, for either participation in the study or for the publication of potentially/indirectly identifying information, in accordance with the local legislation and institutional requirements. The social media data was accessed and analyzed in accordance with the platform's terms of use and all relevant institutional/national regulations.

Author contributions

AM-C: Conceptualization, Investigation, Methodology, Project administration, Resources, Supervision, Visualization, Writing – original draft, Writing – review & editing. EC-O: Conceptualization, Investigation, Project administration, Resources, Supervision, Visualization, Writing – original draft, Writing – review & editing. ÁS-O: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Software, Writing – original draft, Writing – review & editing.

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Conflict of interest

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

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