

Unveiling Climate Adaptation: A Comprehensive Analysis of Agenda-Setting Dynamics in the United Kingdom and the Netherlands

Roth, Denise J.; Bai, Nan; Biesbroek, Robbert; Dewulf, Art; Kruikemeier, Sanne; Leur, Daan de; Velden, Mariken A. C. G. van der; Vries, Erik de; Vliegenthart, Rens

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Denise J. Roth¹, Nan Bai^{1,2}, Robbert Biesbroek¹, Art Dewulf¹, Sanne Kruikemeier¹, Daan de Leur¹, Mariken A. C. G. van der Velden³, Erik de Vries¹, and Rens Vliegenthart¹

Abstract

Climate change adaptation occurs within a complex interplay of science, media, politics, policy, and the public. Using comparative longitudinal data (2012–2021) from online newspaper articles, parliamentary debates, policy documents, and social media, we analyze agenda-setting dynamics in the United Kingdom and the Netherlands. Vector autoregression models, incorporating scientific output as an exogenous variable, reveal traditional agenda-setting effects in both countries. In the Netherlands, however, social media positively influences traditional media, while in the United Kingdom, traditional media negatively affects social media. These findings enrich our

Corresponding Author:

Denise J. Roth, Strategic Communication Group, Wageningen University & Research, Hollandsweg I, Building 201, 6706 KN Wageningen, The Netherlands. Email: denise.roth@wur.nl.

¹Wageningen University & Research, The Netherlands

²Delft University of Technology, The Netherlands

³Vrije Universiteit Amsterdam, The Netherlands

understanding of the factors shaping public awareness and policy responses to this critical global issue.

Keywords

climate change agenda setting, mass media, computerized content analysis, social media

Introduction

Global temperature records are continually being shattered, and the impacts observed in 2023 illustrate the consequences: unusually long and devastating wildfires in the Arctic regions, record-breaking summer temperatures in Europe, extreme flooding events in Asia, and crop losses in large parts of Asia and Africa (United Nations Environment Program [UNEP], 2023). These alarming developments underscore the growing urgency of climate action, a message reiterated at the 2024 UN Climate Conference in Baku. Climate change adaptation—the set of strategies aimed at reducing societal and ecological vulnerability to climate impacts—is crucial to combating the climate emergency and enhancing resilience. Despite rising awareness, there remains an "adaptation gap," where implemented measures fail to keep pace with escalating risks (Berrang-Ford et al., 2021; Bloemen et al., 2019; Pörtner et al., 2022).

To understand this gap, it is useful to consider the interplay between climate science, traditional media, politics, policy, and social media. Agendasetting theory provides a lens to explore how attention to adaptation emerges and transfers across these domains, shaping societal priorities (McCombs & Shaw, 1972; Walgrave & Van Aelst, 2006). Although extensive agenda-setting research exists on climate mitigation and extreme events, adaptation remains under-examined (Ford & King, 2015). Its technical and institutional nature suggests unique agenda-setting dynamics (Bromley-Trujillo & Karch, 2021).

The emergence of social media, particularly Twitter/X, further complicates these dynamics. It offers pathways for various actors, including scientists, activists, and citizens, to bypass traditional gatekeepers, thus altering how adaptation is communicated and perceived (Falkenberg et al., 2022; Rogstad, 2016). This raises important questions about whether adaptation agendas are driven by elites or shaped by public discourse.

This study uses comparative, longitudinal data from traditional and social media (Twitter/X), parliamentary debates, and policy documents in the United Kingdom and the Netherlands (2012–2021) to investigate agenda-setting processes. Both countries, despite similar adaptation capacities and democratic structures, differ significantly in media systems and political contexts

(Bednar-Friedl et al., 2022; Esser & Vliegenthart, 2017). By examining these differences, we aim to advance the theoretical understanding of agenda-setting dynamics and enhance the practical knowledge necessary for effective climate communication and policy action. Our central research question is: *How does attention to climate change adaptation emerge and interact across scientific, media, political, and policy agendas in different national contexts?*

Garnering Attention: The Unwavering Agenda-Setting Power of Traditional Media?

Research shows that over recent decades, attention to climate change in the media has increased, though marked by peaks and troughs (Andre et al., 2024; Hase et al., 2021; Schmidt et al., 2013). While much of this coverage has centered on climate mitigation or global warming impacts, climate change adaptation, despite its growing policy relevance, has received significantly less scholarly attention in agenda-setting research (Boykoff & Roberts, 2007; Ford & King, 2015). While debates around the existence and anthropogenic causes of climate change, as well as mitigation policies, have often been marked by visible political conflict, polarization, and emotionally charged imagery (e.g., melting ice caps, endangered species), adaptation tends to be less visually dramatic, more technical, and embedded in institutional routines; it fits the profile of what media scholars call a low-conflict and unobtrusive issue, which typically requires stronger mediation to reach public and political salience (Hase et al., 2021; Soroka, 2002). However, climate change—including adaptation—can gain heightened public and political traction when triggered through immediate, tangible events that affect everyday life, such as flooding, heatwaves, or severe storms, rather than distant or abstract symbols (Sloggy et al., 2021).

In this context, the role of the media in shaping societal priorities becomes particularly relevant. Agenda-setting theory, in its classical form, posits that the media influence which issues the public and political actors consider important—what McCombs and Shaw (1972) termed first-level agenda-setting, or the transfer of issue salience across agendas. This logic underpins many studies on the capacity of the media to foreground topics that might otherwise remain peripheral (Djerf-Pierre & Shehata, 2017; Luo et al., 2019).

Yet, recent developments in agenda-setting theory emphasize that this influence goes beyond issue selection. Second-level agenda-setting introduces the role of attribute salience—how the media emphasize certain aspects or qualities of an issue, such as the economic risks, governance gaps, or health implications of adaptation (Griffin, 2006; Kim et al., 2002; Kim & Sage, 2015; McCombs & Ghanem, 2001). Although our study does not

examine these attribute-level effects empirically, this conceptual layer helps contextualize why certain dimensions of adaptation might resonate more than others in public and policy debates. Attributes such as the perceived urgency and immediacy of adaptation measures, their association with visible and tangible local impacts, their framing as either an economic opportunity or burden, their alignment with broader policy priorities, and their perceived feasibility for implementation at household or community level can all shape how strongly adaptation gains and maintains salience. It also helps explain why adaptation may gain traction following focusing events, such as floods or heatwaves, which suddenly foreground specific problem attributes (Birkland, 1998; Schäfer et al., 2014). Building on this, third-level agendasetting addresses the networks of issue and attribute associations—how media coverage links adaptation to other concerns like migration, energy, disaster preparedness, or public health (Griffin, 2006; Guo, 2015; Vu et al., 2014). Such linkages can influence not only which issues rise to prominence but also how they are interpreted within broader societal narratives. In the context of climate adaptation, these networked connections might integrate adaptation into frames about long-term economic resilience, social equity, environmental justice, or technological innovation. The prominence of such associations can affect the extent to which adaptation is understood as an isolated technical challenge or as part of a larger sociopolitical transformation, thereby shaping how various actors—from policymakers to citizens engage with the issue.

Importantly, this agenda-setting capacity is particularly consequential for scientific issues, including climate change. Given their complexity and high information barriers, many citizens and policymakers rely on mass media to make sense of scientific topics (Schäfer & Painter, 2021). News media play a critical role in translating, framing, and contextualizing expert knowledge; selectively amplifying certain perspectives and sidelining others. News media not only report on scientific developments but also act as knowledge brokers, translating and selectively amplifying expert insights for wider audiences and policy stakeholders (M. Meyer, 2010; Yanovitzky & Weber, 2019). In doing so, journalists navigate between expert communities and the public sphere, filtering information through editorial norms, political contexts, and audience expectations (Reich & Lahav, 2021; Seuri et al., 2023). Vu et al. (2019) show that the portrayal of climate science varies significantly between outlets, shaping public understanding and political receptivity. In the case of adaptation, which often lacks a strong visual or emotional hook, this mediation function becomes even more essential.

All of this takes place in a mediatized political environment, where media logic shapes not only public debate but also institutional decision-making (Grossman, 2022; Strömbäck, 2011). In this context, traditional news media

still play a dominant role: they remain the primary channel through which many citizens and political actors encounter scientific and policy-related information on climate issues (European Commission, 2023; Schäfer & Painter, 2021). Even in today's hybrid media system, legacy outlets continue to define what counts as relevant and newsworthy, especially in high-salience and expert-driven domains such as climate policy (Langer & Gruber, 2021). These insights suggest that traditional media still shape when climate change adaptation captures attention. We hypothesize:

Hypothesis 1: Attention to climate change adaptation within the traditional media agenda positively influences attention to climate change adaptation in the Twitter/X agenda.

First-level agenda-setting theory originally emphasized media influence on public salience; later expanding to include the relationship between media and political agendas (Green-Pedersen & Stubager, 2010; Walgrave & Van Aelst, 2006). Here, political actors are conceptualized not simply as autonomous agenda-setters but as agenda-reactive, particularly in contexts of issue competition, media storms, or high public pressure (Boydstun et al., 2014; Walgrave et al., 2017). Media coverage can therefore act as a signal of what is electorally relevant, what policy issues may require symbolic or substantive response, and what other actors (including competitors) are emphasizing.

The distinction between symbolic and substantive agendas is central in understanding political responsiveness to media. Symbolic attention refers to discursive or performative actions, such as parliamentary questions, speeches, or press releases, used to signal engagement with an issue without committing to concrete policy change (Berrone et al., 2009). Substantive attention, by contrast, implies action-oriented outputs like legislation, funding commitments, or institutional reform. For complex issues like climate adaptation, which lack immediate partisan appeal or widespread public mobilization, symbolic responses often precede—and sometimes substitute for—substantive engagement (Soroka, 2002; Walgrave & Van Aelst, 2006). The media can catalyze both but especially facilitate symbolic uptake by making an issue visible and emotionally resonant.

This dynamic is especially pronounced for unobtrusive, low-salience, and complex issues, all of which apply to climate change adaptation. Adaptation poses challenges to political agenda-setting. Unlike crises or ideologically charged topics, it tends to be institutional, long-term, and often framed as technocratic or apolitical (Bloemen et al., 2019; Moser, 2014). This means political elites may be less inclined to initiate attention themselves and more likely to respond to cues from media or public discourse. As Birkland (1998) and Farley et al. (2007) show, attention to climate-related policy often

depends on focusing on events (e.g., natural disasters) that temporarily increase urgency. Yet such events do not always produce sustained agenda status. Without a crisis, media coverage helps politicians to monitor salience and to justify action or inaction (Boukes, 2019; Van Aelst & Walgrave, 2011).

The responsiveness of political actors to media coverage varies by party characteristics, government-opposition dynamics, and the broader media—politics system (Vliegenthart et al., 2013, 2016). In countries with strong professionalized media like the United Kingdom and the Netherlands, media attention influences parliamentary speech, legislative action, and policy proposals—especially where public expertise is limited and media act as key knowledge brokers (Green-Pedersen & Stubager, 2010; Vliegenthart et al., 2016).

Furthermore, the mediatization of politics implies that political actors increasingly rely on media logic to guide agenda-setting decisions (Strömbäck, 2011). In such systems, visibility in mainstream media becomes a resource in itself, which is necessary for signaling attentiveness, framing issues advantageously, and mobilizing symbolic responses to complex policy areas (Matthes & Esser, 2013). For climate adaptation, this can mean that political attention clusters around highly visible news moments, while long-term policy commitments remain reactive and contingent (Bromley-Trujillo & Karch, 2021; Molder & Calice, 2023).

These dynamics also extend to the policy agenda, including the domain of government reports, strategies, and institutional programs. While political attention often focuses on the symbolic and discursive level (e.g., parliamentary debates, party statements), policy agendas reflect institutional uptake. Media coverage can contribute to policy prioritization both directly (through government responsiveness) and indirectly (by shaping public concern or elite consensus). Prior work has found such effects on environmental policy broadly (Liu et al., 2011) and on climate change mitigation specifically (Walgrave et al., 2017). The extent to which this logic applies to adaptation, however, remains underexplored, therefore making a comparative, longitudinal investigation particularly timely.

Based on this, we propose:

Hypothesis 2: Attention to climate change adaptation within the traditional media agenda is positively influencing the attention to climate change adaptation in (a) the political and (b) the policy agendas.

Hybrid Visibility

Over the past decade, social media like Twitter/X diversified the media land-scape, offering new sources of political and scientific information (Cody et al., 2016; Kitchens et al., 2020). Twitter/X is a vital arena in contemporary

hybrid media systems (Chadwick, 2013), as media stories about climate change adaptation are not merely passed along. Rather, issue visibility increasingly emerges through interactions between traditional and digital platforms, where coverage and engagement circulate, overlap, and mutually reinforce one another. This process, sometimes described as hybrid salience, reflects how the prominence of an issue is shaped by both legacy gatekeepers and networked online communities, making visibility a product of cross-platform amplification rather than a single agenda source (Maniou & Bantimaroudis, 2021). Moreover, stories are often reshared, reshaped, and debated by a mosaic of actors: scientists, activists, policymakers, NGOs, journalists, and concerned citizens. This ecosystem creates visibility by amplifying traditional media and generating original content, including local reports, expert interpretations, campaigns, and hashtag activism.

Some agenda-setting scholars have proposed that Twitter/X can serve as a proxy for public salience (Barberá et al., 2019). Unlike public opinion surveys, social media data offer a dynamic, unsolicited view of the issues that resonate in real time, especially on niche or emergent topics (Becken et al., 2022; Cody et al., 2016). Indeed, Twitter/X has been used to track shifts in public concern on environmental topics. However, scholars caution that Twitter/X is not representative, and reflects highly educated, politically engaged citizens who are affiliated with media, academic, or advocacy circles (Rogstad, 2016; Wojcik, 2019). Hence, Twitter/X functions less as a random sample and more as an elite strategic arena for signaling.

This matters for climate change adaptation, a technical issue that often falls outside the scope of general news reporting (Schäfer & Painter, 2021). On Twitter/X, however, scientific experts, local officials, NGOs, and communicators can directly contribute by disseminating research, visualizations, and practical insights (Anderson & Huntington, 2017). Research suggests that such content circulates differently on social media through traction hashtags, retweets, or amplification by influencers, mixing informational and emotional cues (Hansen et al., 2011; Pressgrove et al., 2018).

Notably, Twitter/X is not simply reactive to traditional media. Several studies show that for environmental issues, and particularly in times of crisis or high public engagement, Twitter can influence the media agenda, thereby reversing the traditional direction of intermedia agenda-setting (Gilardi et al., 2022; Su & Borah, 2019). This is especially evident when public attention on Twitter surpasses the level of coverage in mainstream outlets, creating pressure for journalists and political actors to respond (Luebke et al., 2025). Politicians routinely monitor tweet volumes, trending topics, and viral content as informal indicators of public salience (Jungherr, 2016). In this sense, Twitter/X becomes a tool not just for information dissemination but for agenda surveillance and issue prioritization.

Moreover, Twitter/X's algorithmic structure and low barriers to entry mean that voices alternative to the media-politics system, such as scientists, citizens, and local experts, can compete for visibility with legacy media (Huszár et al., 2022; H. Meyer et al., 2023). Hashtags related to adaptation (e.g., #ClimateAdaptation, #FloodResilience) can trend rapidly, especially when tied to focusing events or supported by influencer amplification. Activist groups such as Fridays for Future and Extinction Rebellion have effectively harnessed Twitter/X as a key organizing platform, not only amplifying their messages but also influencing media agendas and political discourse through sustained online visibility and coordinated offline actions (Becken et al., 2022; Boulianne et al., 2020; Chen et al., 2023). This underscores how Twitter/X functions both as a filter of media logic and as an autonomous civic space, shaped by platform affordances and user communities.

In conclusion, Twitter/X plays a dynamic role in agenda-setting—a mirror, amplifier, and sometimes initiator of climate discourse—particularly for low visibility issues like adaptation. We hypothesize:

Hypothesis 3: Attention to climate change adaptation within the Twitter/X is positively influencing attention to climate change adaptation in the (a) traditional media, (b) political, and (c) policy agendas.

Scientific Knowledge as Feedback in Agenda-Setting

Another significant aspect of agenda-setting research on climate change—particularly for adaptation—is the role of scientific knowledge in shaping attention. As early as 1992, Ingram and colleagues argued that scholars have tended to underestimate the influence of scientists in the political prioritization of climate issues. While scientists often portray themselves as neutral observers, they are frequently embedded within or adjacent to decision-making bodies (Ingram et al., 1992). From the outset, it was scientific communities that provided other societal actors with both a vocabulary and a framework for understanding climate change—not only defining the problem but also supplying solutions and diagnostic tools.

Today, scientific information is disseminated through a variety of channels, including traditional and social media (Liu et al., 2011). These outlets serve as important intermediaries through which the public, journalists, and policymakers encounter scientific findings. However, media coverage of climate change is often politicized, with political actors and strategic framing frequently overshadowing scientific perspectives (Chinn et al., 2020). This means that while

science remains central to the climate conversation, its agenda-setting power is partially mediated by platform logics and elite competition.

Recent scholarship shows that scientific output, such as peer-reviewed publications, can serve as a feedback mechanism that influences media, political, and policy agendas over time (Liu et al., 2011). Particularly in the case of climate adaptation, which depends heavily on scientific and technical insights, this feedback function may help explain how certain topics enter institutional agendas in the absence of mass mobilization or media storms.

Importantly, the salience of climate adaptation can also spike around *focusing events*—sudden, high-visibility developments that momentarily shift public and political attention (Birkland, 1998; Farley et al., 2007). These include not only extreme weather disasters like floods and heatwaves, but also political focusing events such as the United Nations Climate Change Conferences (COP meetings). These moments serve as attention hubs where scientific publications, advocacy, media framing, and elite discourse converge. Scientific output tied to such events—for example, IPCC reports released in advance of COP meetings—can function as structured cues that guide both media narratives and political signaling. A notable example is the IPCC's 2014 report on "Impacts, Adaptation and Vulnerability," which underscored adaptation as a vital global priority and subsequently influenced discussions during the COP21 in 2015, informing central aspects of the Paris Climate Agreement.

Given this, examining science's role in agenda-setting is key. For adaptation—a complex, expert-driven, and underreported issue, scientific salience may help explain the topic's traction across arenas of attention. We thus ask:

Research Question 1: How does scientific attention to climate change adaptation affect attention in the media, public, political, and policy agendas?

Comparing the United Kingdom and the Netherlands

Comparative analyses enhance our understanding by contrasting societies' underlying mechanisms (Luebke et al., 2025), to test certain theories across contexts and to reconsider which theoretical expectations may be generalizable (Esser & Vliegenthart, 2017). This is particularly relevant for agendasetting, where institutional factors such as political and media systems impact agenda-setting dynamics (Vliegenthart et al., 2016). The United Kingdom and the Netherlands differ in multiple respects: while the United Kingdom is a majoritarian system with (in general) a single-party government, the

Netherlands has a system of proportional representation with coalition governments consisting of multiple parties. And while the United Kingdom is classified as a Liberal media system with high degrees of commercialization, the Netherlands is a Democratic-Corporatist system with a more prominent role for the state and less commercialization (Hallin & Mancini, 2004).

Beyond these institutional and media system differences, the two countries also represent distinct cultural and systemic contexts that can shape agendasetting processes. The United Kingdom's more adversarial political culture, characterized by sharper ideological competition and a stronger role for partisan media, contrasts with the Netherlands' consensus-oriented tradition, in which coalition politics and corporatist consultation structures play a greater role in policy deliberation (Aalberg et al., 2012; Blumler & Gurevitch, 2002).

Several studies have considered how these differences might affect agenda-setting processes and the relationship between media and politics. In a cross-national comparative study, Vliegenthart et al. (2016) for example demonstrate that the impact of media on parliament is slightly, yet only marginally significantly, stronger in single-party governments, while Van Noije et al. (2008) demonstrate that for a selection of issues, the two countries are comparable in terms of the impact of media on parliament, while only in the United Kingdom the reversed relationship (from parliament to media) is also found. Specifically for the environmental issue, however, they find a diverging pattern where in the Dutch case, the impact of parliament on media is particularly strong, while it is absent in the United Kingdom. Due to inconclusive evidence, we ask:

Research Question 2: How do agenda-setting interactions vary between the United Kingdom and the Netherlands?

Data and Methods

Data Collection

The data collection process for this study commenced with the identification of climate change adaptation issues from textual sources. The period from 2012 to 2021 was chosen for this study as it encompasses significant legislative efforts and policy developments at both national and transnational levels, including the adoption of the Paris Climate Agreement and the Dutch National Adaptation Strategy in 2016. This timeframe captures pivotal moments in climate governance, providing a rich context to examine agenda-setting dynamics during a period marked by heightened political, scientific, and public engagement with climate change adaptation. A carefully constructed

search string was developed to systematically retrieve relevant information about climate change adaptation. This search string was designed to capture a comprehensive set of documents related to the specific focus of the study, based on previous research (Sietsma et al., 2022). A translated version of this search string was used for collecting the Dutch data. For datasets holding longer documents (media articles and policy documents), a moving window of 500 characters was used to select text blocks of a maximum of 1,000 characters from the larger texts when they qualified for the search string. This segmentation strategy aimed to enhance the contextual analysis by ensuring that the words from the search string related to climate change adaptation were in meaningful proximity. By dividing the text into manageable blocks, the study aimed to capture nuanced relationships and intricate details within the textual data.

The dataset collected includes news articles (media agenda), parliamentary debates (political agenda), policy documents (policy agenda), and Twitter/X posts (social media agenda).

Newspaper data for the United Kingdom were collected using the freely available The Guardian API, resulting in 12,370 text blocks from 8,999 articles. For the Netherlands, online articles from the Dutch public broadcasting organization NOS were collected through Kaggle (Scheijen, 2022), consisting of 531 text blocks from 474 articles. Both news sources are very well established in their respective media landscape, are known to report about climate change, and were accessible for full-text search in their complete database.

Parliamentary data for the United Kingdom were collected through the non-profit organization TheyWorkForYou, which provides structured XML files of all the Minutes of the UK House of Commons. These files were then further processed and parsed using Python and stored in a csv format. Data from the UK House of Commons contained 260 relevant speech fragments. The Dutch parliamentary data were downloaded from the official repository of the Tweede Kamer (officielebekendmakingen.nl), providing public access to all parliamentary proceedings, and yielded 1,156 speech fragments.

Policy documents containing the word climate for the United Kingdom were scraped from the GOV.UK government website and yielded 18,425 relevant text blocks from 3,061 documents after applying the search string. For the Netherlands, the official website repository of the Tweede Kamer (officielebekendmakingen.nl) was used to collect all policy documents that have been provided as Annexes to the parliament, yielding 17,012 relevant text blocks from 3,922 documents after applying the search string.

For both countries, Twitter/X data were collected from the full Twitter database using the search string with the Academic Twitter API. Of the total

of English-language tweets fulfilling the search string criteria, 165,527 tweets could be geoparsed as originating from the United Kingdom, based on a combination of tweet location, user location, and user profile description. For the Dutch-language tweets, 43,615 tweets could be geoparsed as originating from the Netherlands.

Bibliometric data for scientific publications relating to climate change adaptation were collected through the Web of Science platform. The search included 50,203 publications in all Web of Science collections and was confined to the title and the extended keywords, to limit the search results only to relevant journal articles. Furthermore, both IPCC reports on Impacts, Vulnerability, and Adaptation from 2014 and 2022 were included in our dataset.

Case Selection

Both the United Kingdom and the Netherlands face similar threats concerning climate change risks, possess high adaptive capacities, and are among the forerunners in climate change adaptation globally (Bednar-Friedl et al., 2022). Under the 2008 Climate Change Act, the U.K. government adopts a comprehensive, risk-centric and evidence-based approach through their UK Climate Change Risk Assessment (CCRA), Climate Change Committee, and National Adaptation Program (NAP). Key climatic risks include sea level rise, freshwater availability, biodiversity loss, trade, and health (Biesbroek & Delaney, 2020; UK Climate Change Risk Assessment 2022, 2022). The Netherlands, in contrast, has traditionally followed a more technocratic, water-focused approach, with strong institutions like the Delta Program, Delta Law and Delta Fund (Bloemen et al., 2019). Most risks in the Netherlands center around sea level rise, saltwater intrusion, changing river discharge, changing precipitation patterns, decreasing freshwater availability, and increasing droughts (National Climate Adaptation Strategy 2016 (NAS), 2016).

Despite sociopolitical as well as differences in institutional design, the United Kingdom and the Netherlands show numerous of critical structural similarities, making them well-suited for a Most Similar Systems Design (MSSD) approach (Anckar, 2008; Lijphart, 1971; Przeworski & Teune, 1970). Both are consolidated democracies with strong rule of law (Gorokhovskaia & Grothe, 2025), high levels of economic development (World Bank, 2024), and long-standing membership in key international organizations such as the OECD and the UNFCCC. In terms of climate governance, both countries are bound by similar obligations under the Paris Agreement and the EU climate framework (before Brexit in the United Kingdom) and have developed comprehensive national adaptation strategies (Biesbroek et al., 2018; Dupuis & Biesbroek, 2013).

In the media domain, both countries have highly professionalized, pluralistic, and relatively independent media systems (Brüggemann et al., 2014; Hallin & Mancini, 2004). This implies that information environments in both contexts are broadly comparable in terms of access to climate information, the role of journalism, and responsiveness to scientific and political developments.

Notably, their institutional and sociopolitical differences—such as political system structure—provide meaningful explanatory variation within this otherwise comparable context. In the logic of MSSD, such differences become analytically valuable: they allow us to examine how specific institutional configurations shape agenda-setting interactions while holding broader systemic conditions relatively constant. This enhances our ability to draw theoretically informed conclusions about the role of political and media institutions in shaping climate adaptation salience across agendas.

Methods

To examine variation in attention to climate change adaptation and the interplay between media, politics, policy, and Twitter/X, we employed time series analysis. Following Vliegenthart (2014), we aggregated textual data to the monthly level and used vector autoregression (VAR), which enables the analysis of societal-level dynamics and supports stronger causal inference. VAR is particularly suited for detecting potentially multidirectional relationships when the direction of influence is uncertain. Scientific attention was treated as an exogenous variable, as our focus is on its influence on other agendas rather than the reverse. All analyses were conducted in STATA.

Results

Agenda-Setting Dynamics in the United Kingdom and the Netherlands

Establishing stationarity is essential in time series analysis to ensure that the statistical properties of the variables remain consistent over time. To assess this, Augmented Dickey-Fuller tests were conducted. These tests detect the presence of unit roots, indicating non-stationarity. The results confirmed that the endogenous variables met the stationarity condition, providing a solid basis for further analysis. For the exogenous variable—scientific publications—a clear linear trend was observed, and the series was differenced to achieve stationarity.

Lag selection is a critical step in time series modeling, particularly for VAR models. The lag represents the number of past time points that influence

the current value of each variable. Choosing the right number of lags affects the model's ability to capture dynamics while avoiding overfitting. Using multiple criteria—the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and the Hannan-Quinn Criterion (HQC)—a lag order of 2 was selected for both countries. This choice, guided by the SC and HQC, strikes a balance between model complexity and fit.²

Granger Causality Wald Tests. Table 1 presents the Granger causality tests of both of our VAR models. Granger causality tells us whether knowing the past of a variable x helps to improve our predictions of future values of a variable y—and thus whether a causal relationship is present. The results of our analyses suggest that there are both interesting similarities as well as differences in the agenda-setting dynamics of climate change adaptation across the two countries. In both the United Kingdom and the Netherlands, we find that there are indications of traditional media agenda-setting effects, meaning that in both countries the media exerts significant influence on the parliamentary agenda. Furthermore, we see that the social media platform Twitter/X plays differential roles depending on the context. In the Netherlands, the attention paid to adaptation on Twitter/X positively influences the level of attention in traditional media. U.K. Twitter/X, on the other hand, does not exert any influence on the British traditional media, and is in turn positively influenced by the Guardian. There is furthermore an interesting relationship between the British Twitter/X community and the British government agenda in the form of policy documents. The attention paid to adaptation on U.K. Twitter in the past predicts the future attention paid to the issue by the U.K. government. In addition, we can observe that the U.K. government, in turn, has agenda-setting effects on the UK House of Commons, while we see no such interaction in the Netherlands. However, the Dutch government positively influences media attention toward climate change adaptation in the Netherlands. Overall, our results indicate the existence of multidirectional and contextdependent agenda-setting effects in the two countries under study.

Cumulative Item Response Functions. Figures 1 and 2 show the Cumulative Item Response Functions (CIRF) between those endogenous variables in our VAR for which we found significant evidence of Granger causality for the United Kingdom and the Netherlands after eight lags, respectively. CIRFs are used to examine the dynamic response of each variable in the system to a one-unit shock in one of the variables while holding the other variables constant. These functions help in understanding the propagation and duration of changes throughout the system over time.

Table I. Granger Causality Wald Tests.

		٦ آ	United Kingdom			2	Netherlands	
	News Agenda	Twitter Agenda	Parliamentary Government Agenda Agenda	Government Agenda	News Agenda	Twitter Agenda	News Twitter Parliamentary Government Agenda Agenda Agenda	Government Agenda
News		7.25**	7.01**	15.		2.27	7.16**	2.34
Agenda Twitter Agenda	4.		2.87	8.72**	18.54**		10.1	3.91
Parliamentary Agenda	34	4.		1.60	3.72	<u></u>		.05
Government Agenda	10.4	3.99	4.79*		7.28**	1.72	Ξ.	

Note. The values in the table represent chi-square statistics obtained from the Wald tests for each pairwise comparison of agenda domains. *p < .1; **p < .05, ****p < .01.

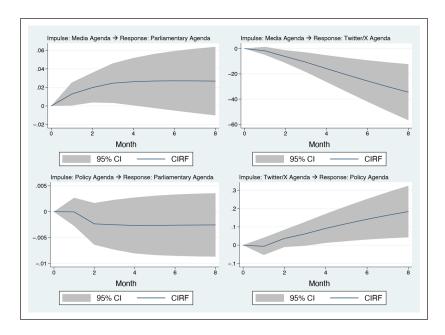


Figure 1. Cumulative Item Response Functions (United Kingdom after Eight Lags).

The graphs for the United Kingdom (Figure 1) show that the influences are somewhat mixed. While the relationship between traditional news media and parliamentary debates appears to be positive and to some extent long-term, it should be noted that the graph also exhibits relatively large confidence intervals, thereby not ruling out negative influences in the long-term. The CIRF for the relationship between news articles and tweets interestingly suggests that positive influences are immediate, but that over time, more news coverage negatively influences the amount of Twitter/X attention paid to climate change adaptation. Long-term news media attention leads to up to approximately 40 fewer Tweets after eight months. In addition, the U.K. government affects the House of Commons' attention to climate adaptation in the form of an immediate increase of up to .06 more speeches on the given issue. However, over time, this effect can no longer be observed. At the same time, there are also small effects stemming from the U.K. government on Twitter/X.

The CIRFs for the Netherlands are presented in Figure 2. Similarly to the United Kingdom, a news article increase in Dutch media leads to an almost one-unit increase in the Tweede Kamer after approximately 1 month. This effect remains relatively steady beyond the first month, over a longer time

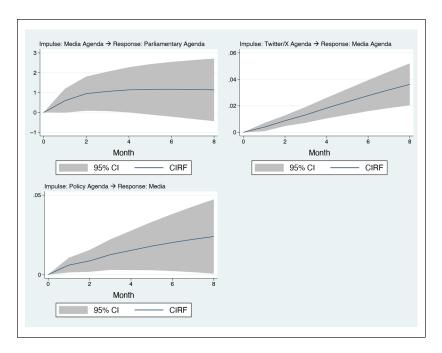


Figure 2. Cumulative Item Response Functions (Netherlands after Eight Lags).

period. In contrast to the United Kingdom, attention on Dutch Twitter/X positively influences attention in the Dutch media; an effect that increases over time, culminating in an increase of roughly .03 articles after 8 months. Furthermore, there is a small, yet observable, increase in media attention in response to an increase in policy attention.

Decomposition of Forecast Error Variance. The Decomposition of Forecast Error Variance (FEVD) is a critical component in understanding the dynamics of a VAR model. This analysis allows us to dissect the sources of forecast variability in each endogenous variable, shedding light on the specific contributions of individual shocks or innovations. It thus provides additional insights into the size of the observable effects. Table 2 shows the FEVD of all variables for both the United Kingdom and the Netherlands after 8 months.

After 8 months, 16% of the difference between the actual and predicted value of the parliamentary agenda in the United Kingdom can be attributed to shocks in the media attention paid to climate change adaptation. In a similar

Table 2. Decomposition of Forecast Error Variance After 8 Months.

		Uni	United Kingdom			~	Netherlands	
	News Agenda	Twitter Agenda	Parliamentary Government Agenda Agenda	Government Agenda	News Agenda	Twitter Agenda	Parliamentary Government Agenda Agenda	Government Agenda
News Agenda	76:	.13	91.	.00	.64	90:	01.	60.
Twitter Agenda	00.	98.	.03	90.	.26	06:	80.	.I3
Parliamentary Agenda	00.	00:	08:	.03	.00	.02	08.	10:
Government Agenda	.00	10:	.02	88.	.07	.02	.02	77.

Note. The values represent the proportion of forecast error variance attributed to each agenda domain. A higher value indicates a larger contribution of the corresponding agenda domain to the forecast error variance.

	United Kingdom	Netherlands
Scientific Publications (Lag I)	17.33***	18.99***
Scientific Publications (Lag 2)	12.22**	17.32***
IPCC Report (Lag I)	3.68	14.91***
IPCC Report (Lag 2)	3.35	5.33
IPCC Report (Lag 2)	3.35	5

Table 3. Test of Equality of Coefficients for Exogenous Variables.

Note. The chi-square statistic follows a chi-square distribution with degrees of freedom equal to the number of lagged (difference) variables being tested. At a significance level (α) of 0.05, the critical value for rejection of the null hypothesis is approximately 9.49. A significant p-value indicates strong evidence against the null hypothesis of equal coefficients for all lagged difference variables.

fashion, this amounts to roughly 10% of the difference in the Netherlands. Other notable effects include that of the Dutch Twitter/X agenda on the agenda of Dutch public broadcasting organization NOS, which amounts to almost 26%. Compared to the Dutch context, the *Guardian* in the United Kingdom is much more autonomous, as 97% of the difference between the actual and predicted value can be attributed to shocks in the *Guardian*'s own attention to the issues.

Overall, the results indicate that there are indeed dynamic agenda-setting effects on the issue of climate change adaptation that differ across country contexts. The results allow us to assert that, although to differing degrees, evidence for traditional media agenda-setting effects can be found. The role of Twitter/X, especially, in the Dutch context, stands out. Comparatively, there seem to be more interactions and interdependences in the Netherlands as opposed to the United Kingdom where most of the actors set their own agenda relatively independently of each other.

Overall, these results provide no support for hypothesis 1: in the Netherlands, we find no impact of media coverage on Twitter/X, while in the United Kingdom there is even a negative impact. Hypothesis 2a is confirmed: in both countries, the media agenda has a small, yet positive influence on the parliamentary agenda. We do not find any direct impact of traditional media on the government, thus hypothesis 2b is not supported. Regarding the impact of Twitter/X, we find partial support for H3a and c, with Twitter/X increasing media attention in the Netherlands and governmental attention in the United

^{*}p < .1; **p < .05; ***p < .01.

Kingdom. We find no impact on the parliamentary agenda, thus rejecting H3b (see Note 2).

The Role of Scientific Feedback

To test whether scientific publications on climate change adaptation affect the agenda-setting dynamics on this issue in the United Kingdom and the Netherlands, we included a differenced exogenous variable in both VAR models.

The results from Table 3 indicate the outcomes of the test of equality of coefficients for exogenous variables in the VAR models applied to both the United Kingdom and the Netherlands. Notably, for both countries, the coefficients associated with scientific publications at lag 1 and lag 2 exhibit statistically significant effects on the dependent variables, as evidenced by the high chi-square statistics (17.33*** and 12.22** for the United Kingdom; 18.99*** and 17.32*** for the Netherlands). This suggests a robust influence of scientific publications on the different agendas in both nations. Similarly, the coefficients related to IPCC reports at lag 1 demonstrate significant effects in the Netherlands, with a substantially high chi-square statistic (14.91*** for the Netherlands), implying a notable impact of IPCC reports on the agendas. However, while the effect of IPCC reports at lags 1 and 2 is significant for the Netherlands, they do not reach statistical significance for the United Kingdom. The respective regression coefficients in our models furthermore highlight the differential effects of scientific publications on the different agendas. In the United Kingdom, scientific publications have a significantly positive effect on the Twitter/X agenda. While we found a similar pattern for the Netherlands, we additionally found a small positive effect of scientific publications on the parliamentary agenda and a positive effect of the publication of the IPCC reports on the government agenda. These findings underscore the significance of scientific publications and IPCC reports in shaping agenda-setting dynamics, emphasizing their role as influential exogenous factors in understanding climate change adaptation agendas in both countries.

Discussion

Our findings reveal indications for cross-national differences and multidirectional causal relationships, with evidence of traditional media agenda-setting in both countries. As suggested by previous research, climate change and the environment are generally considered unobtrusive issues, for which media effects are expected to be stronger (Soroka, 2002; Walgrave & Van Aelst,

2006). Although most previous research focuses either on mitigation or the impacts of climate change (Ford & King, 2015; Swain, 2022), we find similar patterns for the issue of climate change adaptation. In addition, we find that the climate adaptation agenda of the Dutch government helps to predict an increase in Dutch traditional media attention. As we used data from NOS, which is a component in Dutch public broadcasting, we argue that part of this effect may be explained by a strong dependence of this media outlet on government activities, due to its statutory obligation to focus on news in accordance with the Dutch Media Act 2008 (Mediawet 2008, 2008).

Our findings on the agenda-setting dynamics between traditional media and Twitter/X tell a two-fold story. On the one hand, we find that in the United Kingdom, traditional media exert influence on the Twitter/X agenda. According to previous research, Twitter/X agendas indeed mostly function as a mirror of the traditional media, rather than producing novel content (Gilardi et al., 2022; Su & Borah, 2019). Remarkably enough, however, the impact here is negative—showing a detachment of Twitter/X from mainstream media in the U.K. case. In the Netherlands, on the other hand, we find evidence for the reverse case: our model suggests that increased attention paid to climate change adaptation on Twitter/X leads to increases in traditional media attention. Previous research has shown that the issue of climate change and the environment are particularly frequently discussed on social media: at times at higher rates than in traditional media (Rogstad, 2016), leaving room for influence by the former (Conway et al., 2015). Climate change adaptation is considered a rather specialized and niche issue in the broader context of discussions on the climate, where highly educated individuals on Twitter/X are offered space to dominate the discussion on this often-overlooked topic (Rogstad, 2016; Swain, 2022).

These findings contribute to ongoing debates on hybrid media systems (Chadwick, 2013), where traditional and digital media co-evolve and influence one another. Our results suggest that social media platforms like Twitter/X can act not only as mirrors but also as amplifiers of public and expert voices on specialized issues like adaptation; especially in countries where such topics have not yet been fully mainstreamed in traditional media. This aligns with work on the mediatization of science and politics, highlighting how social media platforms enable scientific actors, NGOs, and engaged citizens to bypass legacy gatekeepers and insert adaptation discourse into public debate (Schäfer & Painter, 2021). Twitter/X thus plays a multifaceted role in shaping issue salience, acting both as a conduit for elite discourse and a participatory platform for grassroots engagement. This complex interactivity exemplifies the hybrid media ecosystem's potential to alter traditional agenda-setting hierarchies.

As the United Kingdom introduced its first Climate Change Act as early as 2008, we argue that these cross-country differences may be due to the issue of adaptation having had more time to become part of mainstream media discourse on the climate in the United Kingdom compared to the Netherlands, therefore explaining British Twitter/X's lack of influence on this issue. In addition, we see that the agenda of the U.K. government is relatively autonomous and in turn helps to predict future increases in attention on the parliamentary agenda. We argue that this is potentially due to what we call a "frontrunner" effect. We contest that a long-lasting and elaborate framework such as the 2008 Climate Change Act may enable governments to act more autonomously in allocating a considerable amount of attention to adaptation. The results suggest that these case specific differences might form a better explanation for diverging results, and they are less easily attributed to structural political and media system characteristics alone.

This comparative angle is key to the theoretical contribution of our study. Drawing on a most similar systems design, we selected two countries that are comparable on a wide range of dimensions: both are parliamentary democracies, with high levels of media professionalism, strong climate risks and adaptation capacities, and well-developed scientific and policy infrastructures (Bednar-Friedl et al., 2022; Esser & Vliegenthart, 2017). Yet, by differing in electoral systems, cabinet formation, and the maturity of adaptation policy frameworks, the United Kingdom and the Netherlands provide fertile ground to examine how specific institutional and communicative factors shape agenda-setting dynamics. The comparative approach allows us to theorize how differences in elite responsiveness, media-state relations, and scientific institutionalization shape climate adaptation discourses, thereby offering a blueprint for further large-scale comparative work in other European democracies, that could also statistically test some of the offered explanations for cross-national differences.

These differences in agenda-setting patterns likely reflect not only the maturity of adaptation policy frameworks but also deeper systemic and cultural contrasts between the two countries. In the United Kingdom, where adversarial politics and a more competitive media environment dominate, adaptation appears more embedded in established political and media routines, which may reduce the scope for social media to influence traditional news agendas. In the Netherlands, with its consensus-oriented political tradition and more corporatist governance structures, adaptation coverage in legacy media seems more responsive to signals from actors on Twitter/X, particularly on specialized or emerging topics. This suggests that cultural orientations toward conflict versus consensus, as well as the interplay

between political institutions and media logics, can shape how and when issues move across agendas.

Based on previous studies, we have also included scientific feedback as an exogenous variable in our models. We used scientific publications aggregated to the monthly level and the publication of the IPCC reports focused on Impacts, Vulnerability, and Adaptation from 2014 and 2022. Our results show that in both countries, there are similar patterns, suggesting that scientific feedback may play a role in shaping the agenda-setting dynamics of climate change adaptation. One possible explanation is that this influence occurs not only through direct public exposure to scientific work, but also via knowledge brokering—the process by which scientific findings are taken up, interpreted, and disseminated by other actors such as journalists, NGOs, political elites, or expert commentators. These brokers may reframe complex scientific information into narratives that resonate with ongoing debates, thereby increasing the likelihood of its uptake across agendas.

This pathway would be consistent with the mediatization of science (Peters et al., 2008; Schäfer, 2014), in which the impact of scientific knowledge depends on how it is integrated into media and political discourse. In hybrid media systems, such as those operating in the United Kingdom and the Netherlands, scientific reports like those of the IPCC could trigger attention cascades: first informing knowledge brokers, then circulating through legacy media and Twitter/X, and ultimately influencing policy debates. Given Twitter/X's role in our findings as both a mirror and amplifier of elite discourse, it is plausible that the platform serves as a key venue where brokered scientific messages are amplified, networked, and connected to other issues (Perga et al., 2023).

Limitations and Future Directions

Although our findings are illuminating and give us a better in-depth understanding of how attention to climate change adaptation develops and interacts over time, our study has a number of limitations. We compared two cases that exhibit both sociopolitical and institutional differences, but we propose that further research might try to include cases where climate change impact and adaptation strategies differ. Moreover, we assert that future research may also benefit from including data from more diverse sources. Although we use quality outlets from both countries, a more complete representation of traditional news agendas might be worthwhile. Our analysis is also limited to Twitter/X as a platform; while appropriate for this type of agenda-setting research due to its elite and issue-oriented nature, caution is warranted in generalizing these findings to other platforms, which may be driven by

different logics and actors. A further consideration is our reliance on an explicit search string for "adaptation" and closely related terms when identifying relevant content. While this approach ensures conceptual precision and comparability across agendas, it inevitably excludes measures and initiatives that could be understood as adaptation but are framed in more technical, sector-specific, or politically neutral language. Examples might include policy actions on urban greening, energy efficiency upgrades, or waste reduction initiatives that address climate risks without invoking the term "climate change adaptation" directly. Previous research has further found that a large proportion of the current adaptation strategies rely on multi-level governance (Keskitalo et al., 2012). To include data from different levels of governance and wider journalistic coverage would thus provide further insight into how attention for adaptation develops over time and culminates in policy action. Media attention, characteristically, is furthermore very event sensitive (Boukes, 2019; Soroka, 2002; Walgrave & Van Aelst, 2006). Some of our current findings may be further contextualized by modeling events of various kinds. Protest events, for instance, can play a powerful role in driving and sustaining public and media attention, especially when they meet certain thresholds in size, coherence, or peacefulness (Barrie et al., 2024; Walgrave & Vliegenthart, 2012). In hybrid media systems, such events often gain traction not only via mainstream media but through bottom-up amplification on social media, where activists, journalists, and publics interact in real time. In the case of climate adaptation, typically seen as technical or slow-moving, protests may serve as critical punctuations that elevate long-term concerns into immediate salience.

In addition, while our study primarily examined first-level agenda-setting dynamics, future research could expand toward second- and third-level agenda-setting processes. This would allow researchers to explore not only *whether* climate adaptation receives attention, but *how* it is framed—i.e., which dimensions (e.g., economic risk, social justice, scientific urgency) are emphasized and how these resonate across different agendas. Furthermore, by mapping co-occurrence and networked linkages between issues, actors, and frames, future research could illuminate how adaptation becomes bundled with other societal concerns, potentially uncovering new pathways of influence and misalignment across public, media, and political discourse.

Conclusion

In conclusion, our findings offer more than a comparative analysis; they provide a foundation for understanding how climate change adaptation gains traction across media, political, and policy agendas. Identifying the

key drivers of attention in each country enriches our grasp of how public consciousness and institutional responses evolve in relation to this global challenge.

These insights have broader relevance for climate communication and advocacy. By recognizing the national dynamics that shape agenda-setting, communication strategies can be better tailored to mobilize diverse stakeholders. Our study also underscores the need for interdisciplinary research to address the complex interplay between science, communication, and policy in the adaptation domain.

Finally, a focus on adaptation offers a constructive narrative—one centered on solutions and resilience rather than fear—fostering a greater sense of agency and engagement among publics navigating an uncertain climate future.

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Data and replication materials are available upon request.

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ORCID iDs

Denise J. Roth https://orcid.org/0009-0005-6951-2930
Daan de Leur https://orcid.org/0009-0008-0138-3206
Rens Vliegenthart https://orcid.org/0000-0003-2401-2914

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Notes

- 1. An overview of the search strings and information on validation can be found in Supplemental Appendix A.1.
- 2. Diagnostic tests can be found in Supplemental Appendix A.3.
- Table A.4.1. (Supplemental Appendix A.4.) shows the regression coefficients of the exogenous variables.

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Author Biographies

Denise J. Roth is a PhD Candidate in Political Communication at the Strategic Communication Group at Wageningen University and Research (WUR). Her research focuses on science-politics interactions, the politicization of science, and the use of computational social science methods to study these dynamics. She is particularly interested in how political and media actors communicate about science, and how this shapes public perceptions and democratic legitimacy.

Nan Bai works as an assistant professor in the section Heritage & Architecture, Department of Architectural Engineering and Technology, Faculty of Architecture and Built Environment at TU Delft. He earned his PhD (cum laude) at the UNESCO Chair of Heritage and Values. With a multidisciplinary background in architecture, psychology, heritage studies, policy, data analysis, and AI, he explores computational social science in historic urban settings—especially how social media reflects perceptions of heritage. He has studied and worked in China, Germany, the United Kingdom, and the Netherlands.

Robbert Biesbroek is professor of public governance and climate change adaptation at Wageningen University & Research, the Netherlands. His research examines how state and non-state actors across different governance levels respond to climate change impacts and risks, focusing on the challenges they encounter in adapting and how these can be overcome.

Art Dewulf is professor of "Sensemaking and decision-making in policy processes" at the Public Administration and Policy group (Wageningen University and Research). He studies complex problems of natural resource governance with a focus on interactive processes of sensemaking and decision-making in water and climate governance.

Sanne Kruikemeier is professor of Digital Media and Society at the Strategic Communication Group of Wageningen University & Research. Her research focuses on the causes and manifestations of digitalization and its consequences on society and democracy. She has recently published work on social media and polarization, datadriven political targeting, and digital journalism.

Daan de Leur holds a Master of Science in Governance of Sustainability Transformations from Wageningen University and Research (WUR). She currently works as a Consultant at the United Nations Convention of Migratory Species. She previously studied at Leiden University College.

Mariken A. C. G. van der Velden is associate professor of political communication at the Vrije Universiteit Amsterdam. Her research lies at the intersection of political communication, political behavior, and computational social science, with a particular focus on the legitimacy of political decision-making in contemporary democracies. She studies how political rhetoric and communication strategies influence electoral outcomes and public perceptions, especially in multi-party systems. Her work addresses key challenges facing representative democracy, including political fragmentation and declining trust in democratic institutions.

Erik de Vries is a postdoc in strategic communication at Wageningen University and Research (WUR). His research focuses on journalism studies, political communication, mis-/disinformation, and computational text analysis methods/LLMs.

Rens Vliegenthart is a full professor in strategic communication at Wageningen University and Research (WUR). His research focuses on media–politics relations, sustainability communication, election campaigns, and economic news coverage.