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The link has died; long live the link! Cross-platform controversy mapping with the use of URL links

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Research Article

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Abstract

The study of URL link dissemination was popular in the early days of Web 2.0; however, with the rise of platformization, this approach to researching the web has largely been abandoned. While internet studies have since focused on aspects like the epistemologies of search engines, hashtags, and Google Ads, the use of URL links as a means to study public debates has not been revisited. This article demonstrates the continued relevance of URL links for examining cross-platform controversies, treating links as traceable digital objects through which the influence of platform infrastructures becomes visible, using the debate over the construction of a canal through the Vistula Spit in Poland—which unfolded over nearly a decade on Facebook and Twitter (now X). Based on an analysis of 37,995 Facebook posts and 26,4821 tweets, this study shows that URL links can still serve as reliable controversy indicators, but in platform-specific ways: on Twitter, links foreground political sentiment and polarization, while on Facebook, links foreground protest mobilization and local organization. Second, it shows that these differences can be explained by platform affordances, which structure not only the circulation of content but also its meaning within controversies, demonstrating how digital infrastructures shape the ways in which participants engage with contested issues in socio-technical environments. Third, it argues for a methodological return to URL link analysis as a valuable tool for cross-platform controversy mapping, showing that link-based traces make it possible to study how debates unfold across platforms without relying exclusively on discursive analysis, bridging early digital methods with contemporary studies of platformization and CSCW research on socio-technical systems and platform affordances.

Introduction

The study of URL link dissemination was popular in the early days of Web 2.0 when researchers focused on links as objects that could increase a website's visibility and financial value (Galitsky and Levene, 2004). This way of thinking about links as valuable connections within the 2.0 network was also taken up in the early days of digital research, including in studies of online controversies (Rogers, 2019). However, with the rise of platformization (Poell et al., 2019) and the closed ecosystems of these platforms, or so-called "walled gardens" (Helmond, 2015), this method of researching the internet was abandoned. Instead, scholars began to focus on studies confined to individual platforms, especially Twitter (now X) (e.g., Blank, 2017; Bruns and Burgess, 2015); on the content published within platforms (e.g., Bhandari and Sun, 2021; Hawkins and Saleem, 2021); on recurring themes (e.g., Schreiber et al., 2024); or on the communities that formed around them (e.g., Obreja 2022).

As platformization has progressed and content has become increasingly restricted within individual platforms, it has also become necessary to study social media platforms' affordances (Bucher and Helmond, 2017), particularly in relation to the public debates carried out on them. In recent years, researchers have therefore turned to digital spaces not only from a semantic perspective but also by linking the technical features of a given platform to the ways in which debates are conducted and content or knowledge is represented (Niederer, 2016). Within CSCW and related research on socio-technical systems, similar shifts have been observed, with increasing attention paid to how the design of

online platforms shapes interaction practices, information sharing, and collective engagement (Ackerman, 2000; Dourish, 2001; Treem & Leonardi, 2013). Rather than treating digital platforms as neutral channels, this line of this work emphasizes that technical infrastructures, interface features, and algorithmic mechanisms actively influence how users communicate, reference information, and participate in shared activities. This perspective resonates with CSCW research that highlights the mutual shaping of social practices and technical infrastructures in online systems (Star & Ruhleder, 1996; Pipek & Wulf, 2009). This body of work has deepened our understanding of how the epistemologies and ontologies of technological infrastructures shape public discourse. Nevertheless, while scholars have focused on the epistemologies of search engines (Borra, 2023), hashtags (Small, 2011), and Google Ads (Coromina et al., 2023), URL links have rarely been revisited as analytical objects for studying interaction across platforms.

As has been also argued elsewhere (Özkula et al., 2022), researching social media platforms through URL links remains problematic, primarily due to the lack of infrastructure that treats these digital objects as starting points. Most newer digital tools for retrieving and analyzing social media data treat links in a default manner and rarely support research grounded in alternative ontological approaches[1]. As a result, researchers are often pushed to replicate dominant methodologies in internet research, which may carry embedded biases. Yet URL links remain one of the few digital objects that make it possible to track public debates across multiple platforms while also facilitating the study of content dissemination. Studying controversy through URL links makes it possible not only to examine the content being shared by different actors but also to highlight the specific affordances of the platforms involved. From the perspective of CSCW, such traces can be understood as observable artifacts of interaction through which the influence of platform affordances becomes visible, showing how socio-technical infrastructures shape the ways participants orient themselves toward shared issues, sources, and audiences (DeVito et al., 2017; Treem & Leonardi, 2013). Platformization has also transformed the logic of linking—from connections between two sites to links that often connect external sites to social media platforms (Helmond, 2015). In the early days of Web 2.0, websites listed links to other websites. Back then a common way to study who links to whom was for example to analyze links posted on the websites of NGOs, (e.g. Rogers and Marres, 2000). With the rise of platformization however, links to external sites are posted primarily on social media platforms (whether in posts, comments, or so-called “bio” sections on Instagram, for example). This shift underscores the growing relevance of social media platforms as socio-technical infrastructures through which public debates are organized and made visible (Star & Bowker, 1999; Gillespie, 2010).

In this article, I argue that URL links can be treated as cross-platform indicators of infrastructural logic. I demonstrate the relevance of URL links in studying controversy through the example of the debate surrounding the construction of a canal through the Vistula Spit in Poland—a debate that spanned nearly a decade on Facebook and Twitter (now X).

This study makes three contributions. First, it demonstrates that URL links can serve as indicators of how participants position themselves within a controversy, but in platform-specific ways: on Twitter, links

foreground political sentiment and polarization, while on Facebook, links foreground protest mobilization and local organization. Second, it shows that these differences can be explained by platform affordances, which structure not only the circulation of content but also its meaning within controversies. Third, it argues for a methodological return to URL link analysis as a tool for studying interaction across platforms, bringing controversy mapping and digital methods into dialogue with CSCW research on socio-technical systems and online collaboration. By reframing links as active mediators rather than residual artifacts, this study highlights their relevance for understanding how contested issues unfold in a platformized web.

Theoretical background

Controversy mapping

Controversy mapping is often referred to as an empirical version of Bruno Latour's Actor-Network Theory (Venturini, 2010: 258), in which controversies are defined as situations that are "ontologically unstable and not so easily settled in terms of facts" (Moats, 2017: 5). Controversy arises when things taken for granted begin to be questioned—in other words, when actors begin to unpack "black boxes" and discover that they cannot ignore one another.[2] Rather than treating debates as purely discursive, controversy mapping emphasizes that infrastructures, tools, and sociotechnical arrangements actively shape how controversies unfold. Following this perspective, controversies are best understood not only through their content but also through the infrastructures and digital objects that mediate them (Venturini and Munk, 2022). This perspective resonates as well with CSCW research that examines how interaction practices emerge in relation to technical systems and how digital infrastructures influence what users can see, share, and reference (Schmidt & Bannon, 1992; Dourish, 2001; Star & Ruhleder, 1996).

Controversy mapping has been applied to a range of cases involving social media, such as cultural change (Burgess and Matamoros-Fernández, 2016), anti-vaccine movements (Smith and Graham, 2017), environmental disputes (Borch and Munk, 2022; Wu et al., 2023), and the use of nuclear power (Zarrabeitia-Bilbao et al., 2023). The platform most commonly studied in this regard has been Twitter (now X), which often reflects public narratives so well that researchers have used it to predict flu outbreaks (Szomszor et al., 2012), assess sentiments during political uprisings like the Arab Spring (Lotan et al., 2011), and analyze attitudes toward new technologies or policies (Kim et al., 2021). Analyses of Twitter controversies typically focus on the topics or content generated on the platform (Himelboim et al., 2013). Scholars have also studied the relationship between Twitter content and mainstream media coverage, such as in the context of anti-vaccine narratives (Qorib et al., 2023), highlighting how social media users can influence the editorial decisions of major news (Jones-Jang et al., 2019).

As part of the controversy research, both Twitter and Facebook were used to analyze sentiment, engagement in protests, and activism. However, due to its affordances, Twitter is treated rather as a gauge of public sentiment, while Facebook, due to the logic of public groups at the local level, was used

as a platform that reflects grassroots involvement in protest, particularly at the local level. As Borch et al. (2020) show in their analysis of the wind energy controversy in Denmark, Facebook can serve as a space where both opponents and supporters of a given issue engage directly with government representatives. Facebook has been examined in the context of environmental and political controversies, often to assess public acceptance of specific policies (Borch et al., 2020) or to analyze recurring themes and the sentiment surrounding a given issue (Hendriks et al., 2016). Also CSCW research has shown that different platforms support different forms of interaction, depending on their affordances and social structure (Treem & Leonardi, 2013; DeVito et al., 2017).

Early controversy mapping often relied on hyperlink analysis to trace connections between actors and issues across the web (Rogers & Marres, 2000). With the rise of Web 2.0, URL links became important markers of authority and visibility (Helmond, 2015). However, as platforms like Facebook and Twitter became central to online debate, research shifted toward platform-native objects such as hashtags, trending topics, or algorithmic feeds (Poell et al., 2019). While these approaches illuminate platform-specific dynamics, they have contributed to the relative neglect of links as a methodological lens for studying interaction across platforms. This study seeks to fill this gap by focusing on examining the controversy from the perspective of URL link usage on two platforms. Specifically seeking to answer the question of what external sites are linked to by actors involved in the controversy on these platforms, and what link mobilization on these platforms can say about the controversy itself.

URL links and controversy mapping

Uniform Resource Locator (URL) links are among the most basic digital objects on the web and can be defined as “a technological capability that enables one specific website (or webpage) to link with another” (Park, 2003: 49). URL links were especially useful in early web research for rendering the characteristics of relationships within a network, due to their technical structure—one that resonated with then-dominant conception of network infrastructure as *Network 1.0*. As Tim Bernes-Lee, the creator of the URL, explained, the original design of the web envisioned links as neutral references, carrying no inherent meaning (Berners–Lee et al., 2006). However, internet researchers have since shown that links also carry a distinct sociological dimension, representing a range of relationships online (Chien-Leng and Park, 2011). From this perspective, links have been understood as objects that foreground content and actors in various ways: as objects through which institutions are recognized (Rogers and Marres, 2000), as “senders of authority” (Kleinberg, 1999), and simply as vehicles of information (Park et al., 2004). In the early phases of Web 2.0, the study of linking practices – often likened to referencing in scientific literature – formed the foundation for understanding networked content sharing (Park and Thewall, 2003).

Link analysis, accordingly, became a central method for the early study of online controversies, serving primarily as indicators of who was referring to whom and in what context (Venturini et al., 2019: 513). Perhaps the best example of the use of URL links in early controversy research is the issue-crawler[4], a

tool created by the DMI collective to study links between sites that link to each other (either mutually or one-sidedly).

However, as Helmond (2017: 70) points out, Berners-Lee's ideal of link neutrality and referentiality was soon reconfigured by search engines and, later, social media platforms, which began to treat links as indicators of diverse relationships and hierarchies. The first such change was Google's approach to links (PageRank), which began to create a "ranking for each link based on the weight of the sites linking to it" (Helmond, 2017: 71). The idea draws inspiration from the practice of referencing scientific texts, where the significance of a given publication is often assessed based on how frequently it is cited in other recognized works. This hierarchization of links gave rise to the so-called "optimization" of websites, whereby attention shifted to how links to other sites were built. As Helmond notes, this shift effectively inaugurated an "economy of links" in which linking became the currency of trust and popularity of websites.

From a socio-technical perspective, this transformation illustrates how changes in infrastructure reshape the meaning and function of digital objects, as system design influences what becomes visible and how information is evaluated (Star & Ruhleder, 1996; Pipek & Wulf, 2009).

With the expansion of Web 2.0, it was no longer just linking but participation—and, by extension, content creation—that became central to networking. According to Helmond (2017: 74), content sharing today is primarily "mediated" through social buttons, which have transformed linking from a connection between two websites into one between a platform and an external site. The most common example is the use of a "share" button to mediate external content to social media platforms and distribute external content (if a URL link is made public in the post) to the platform, often between different users or groups. This shift required adapting link formats to the logic of platforms—for example, by publishing shortened URL links in tweets (Gillespie, 2010). Helmond and Gerlitz (2013) describe this transformation as a shift from a *link economy* to a *like economy*, wherein social buttons trigger algorithmic processes that assess the "validity" of content based on how often, and by whom, it is shared or reacted to. These metrics, in turn, influence how prominently content is displayed and to which users.

In this article, I follow Helmond's argument that the platformization of the web has changed linking from a connection between two sites to a connection between an external site and a social media platform. This evolution underscores the central role of social media platforms in shaping scientific and social controversies. Additionally, as Helmond and Gerlitz (2013) point out in their study of social buttons on Facebook, the reformatting of URLS for platform use also involves the activation of algorithms behind these social buttons that calculate a link's "validity" based on aggregated sharing metrics. Thus, posts containing such links tend to receive greater visibility compared to those featuring links that rank lower in the platform's hierarchy.

This has important implications for the study of controversies. If linking practices are shaped by platform affordances, then analyzing links can reveal how different systems structure participation, visibility, and engagement. Studying URL links across platforms makes it possible to observe how the

same issue is enacted differently depending on the socio-technical environment, allowing controversies to be examined not only as discursive phenomena but also as activities carried out within specific infrastructures. This perspective connects controversy mapping with CSCW research on socio-technical systems by treating links as traceable artifacts through which the relationship between platform design and user practices becomes visible.

The affordances of social media platforms

To understand why linking practices differ across platforms, it is crucial to situate them in terms of platform affordances—relational possibilities for action shaped by design features, user practices, and cultural expectations (Bucher & Helmond, 2017). The built-in, distinctive features of Twitter (now X[1]) include retweets (RT), replies, mentions (@), and hashtags (#). As a platform, Twitter is characterized by low algorithmic curation, high hypertextuality (the frequent inclusion of links in tweets), high interactivity (especially thanks to its built-in features mentioned previously), and moderate visuality, with a focus primarily on text (Hase et al., 2023: 1502). Twitter also allows for a greater degree of anonymity than, say, Facebook, which tends to encourage the sharing of more radical opinions (Oz et al., 2024). As Colleoni et al. (2014) point out, Twitter often exhibits political homophily, whereby political communities communicate primarily among themselves without creating a broader discourse on a given topic. The character limit on tweets also leads to more frequent linking to other sites and content, as well as relatively laconic expressions of support or opposition to an issue (Kligler-Vilenchik et al., 2020: 4). From the perspective of interaction design, these features encourage rapid circulation of information and make links a practical mechanism through which users reference sources, position themselves within debates, and amplify particular interpretations of an issue. Therefore on Twitter, affordances such as character limits, retweets, mentions, and hashtags encourage brevity, external linking, and the amplification of political sentiment (Colleoni et al., 2014; Oltmann et al., 2020).

Facebook is marked by high hypertextuality (the frequent inclusion of URL links in posts), high interactivity (via built-in buttons such as “like” and emotional reactions), and moderate visuality, with a focus on text and, to a lesser extent, photos (Hase et al., 2023: 1502). However, Facebook differs from Twitter in that it has a much higher degree of algorithmic curation. What a user can see on their “wall” is not only organized chronologically and influenced by trends (as on Twitter) but also shaped by what a user’s “friends” publish (Kligler-Vilenchik et al., 2020: 3). Facebook is also among the platforms with the highest rates of news consumption (Liu et al., 2017: 294), often reflecting a logic of publishing “engaging news” (Hase et al., 2023: 1506). Central to Facebook’s structure is the construction of user profiles, generally grounded in personal or group identities and maintained within networks of close friends and family who can observe a user’s activity (Valenzuela et al. 2017: 5). This architecture has several implications. First, as Liu et al. (2017) have shown, users are often reluctant to share their political beliefs on Facebook, especially if their opinions are controversial or could lead to social exclusion. They describe this dynamic as a “spiral of silence,” stemming from the fact that Facebook operates within a “networked public” (boyd, 2010), where users’ imagined audiences primarily consist of friends and

family. As a result, the expression of controversial opinions is often constrained by concern over how one's "friends" might react. Facebook is thus a platform characterized by a significant degree of surveillance, operating like "a panopticon in which everyone is watching and being watched by their social contacts" (Lui et al., 2017: 296). Second, the content seen on Facebook, with linked posts published by close friends and family, may foster homophily and echo chambers, limiting users' exposure to dissenting opinions (Liu et al., 2017: 296). Finally, these affordances influence how protests manifest on Facebook. Due to its panoptic nature, social pressure plays a major role in driving participation in protest-related activities on Facebook (Valenzuela et al., 2017: 13).

Facebook's platform logic is also reflected in its use of built-in social media buttons. While Twitter privileges hashtags and retweets, Facebook's interaction design centers on users' emotional reactions and likes. This connection between the platform and external content through social buttons provides an opportunity to capture broader content from the internet and mediate it on the platform. As Gerlitz and Helmond (2013: 1354) argue, this setup allows users to engage not only with content created within the platform but also with content from outside it (most often news sites), which the platform can then monetize. From a socio-technical perspective, these interface features shape how users reference information and interact with external sources, turning link sharing into a platform-mediated activity rather than a simple connection between websites. Therefore on Facebook, by contrast, algorithmic feed curation, identity-based friend networks, and emotional reactions foreground localized contexts, protest activity, and social pressure (boyd, 2010; Valenzuela et al., 2017; Liu et al., 2017).

These affordances explain why the same digital object—URL links—can highlight different dimensions of controversy on each platform. On Twitter, links tend to signal alignment and polarization; on Facebook, they tend to anchor grassroots mobilization and community-based action. Understanding these differences requires examining not only the content of debates but also the technological infrastructures through which they unfold. This resonates with Niederer's (2016) call to analyze not only content but also the technicity of platforms, and with Venturini & Munk's (2022) reminder that studying controversies requires studying infrastructures simultaneously.

Key study

Controversy about building a canal through the Vistula Spit in Poland

The construction of a shipping canal through the Vistula Spit in Poland has sparked significant controversy, beginning even before it was officially announced in 2016 by then Law and Justice party chairman Jarosław Kaczyński. The project involved excavating an approximately two-and-a-half-kilometer section of the Vistula Spit between Przebrno and Skowronki to create a new waterway and port. According to the Water Ministry, which was responsible for the project, the main reasons cited were

reducing dependency on Russia—especially in light of previous shipping blockades in the Pilawa Strait—relieving congestion at the port of Gdánsk and stimulating regional economic development.

Initially, debates around the canal centered on political motivations, though they gradually evolved over time into wider discussions encompassing environmental protection in Poland, geoengineering, the canal's projected economic benefits and costs, unemployment levels, and grassroots participation by residents of the Vistula Spit. Protests related to the canal were initiated even before construction began when the "Mierzeja bez przerwy" (Spit without a Break) collective protested at the site of the planned tree cutting. Despite these protests and subsequent actions by provincial authorities, environmental organizations, and local communities—including the submission of more than a hundred questions regarding the environmental decision, proposals for alternative solutions (such as ship crossings without a canal; Sajkiewicz, 2017), and formal appeals by local governments—the project was not halted. Although protesters were barred from gathering at the construction site, resistance continued online, primarily through Facebook and Twitter, and debates about the projected effects of the canal's construction were still published in major Polish news outlets. Through all the debates and controversy, the canal was ultimately completed and officially opened in September 2022.

The Vistula Spit Canal project is one among many environmental controversies that have unfolded in Poland over the past decade. What is of interest here, however, is not the outcome of the controversy but rather the process through which it unfolded. This case offers a compelling research opportunity, not least because it remained a subject of sustained media and public attention—both online and offline—for over a decade. From this perspective, the controversy also serves as a lens through which to observe the shifting technological affordances of social media platforms during that time. Therefore, studying this controversy from the perspective of URL link mobilization made it possible to simultaneously study the content mediated to platforms within this debate, as well as to identify the groups of actors involved in this debate, and its political sentiment.

Methodology

The analysis presented here relied on a mixed-methods approach. The theoretical framework, as described above, was grounded in controversy mapping and applied here to a single digital object—URL links published in posts concerning the controversy over the construction of the Vistula Spit Canal on Facebook and Twitter. These links—embedded in posts or tweets—were extracted from data queried from Facebook and Twitter and linked to the accounts that published them. The quantitative analyses focus primarily on the frequency and distribution of various digital objects (e.g., likes, shares, and URL links) used in the posts on each platform, while the qualitative portions include network analysis and the analysis of the types of links (here referred to as "clusters") that appeared on Facebook and Twitter. By focusing on URL links, the study revives a methodological tradition from early digital research (Rogers and Marres, 2000; Helmond, 2015) while adapting it to the realities of the platformized web.

Data sample

In this study, I adopted a methodological strategy that involved retrieving data using both neutral keywords and terms related to the controversy used by opponents and supporters of the project. Neutral posts are defined here as posts retrieved via non-partisan keywords with no evaluative tone. In contrast, “non-neutral” posts are those retrieved using terms strongly associated with one side of the controversy. Neutrality therefore refers not to tone or sentiment but to the search terms used to capture discourse. This approach was necessary because the controversy surrounding the Vistula Spit Canal was not marked by distinctive keywords clearly associated with one side of the conflict. One of the main comparative axes of this article is the use of digital objects within the debate. As such, this strategy allows for a comparison between a “neutral” debate and one structured around terms associated with either support or opposition to the project. The use of both sets of terms allowed for a comparative analysis between content that was discursively neutral and content that was explicitly positioned.

Twitter data was downloaded using the university's access to the Twitter API via the 4CAT program (Peeters and Hagen, 2022). Facebook data was retrieved via CrowdTangle (2024), which provided access to Facebook and Instagram APIs until 14 August 2024[2]. Identical keywords were used across both platforms, entered using the word search option in quotation marks. The data was downloaded for the time range from 1 January 2016 to 3 February 2023. The downloaded data sample consisted of 37,995 Facebook posts and 26,4821 tweets.

Data Analysis

Clustering of the URL links was carried out using a combination of network visualization and manual coding. Network visualizations were conducted using Gephi software and the Force-Atlas 2 algorithm (Jacomy et al., 2014). Presented networks are in-degree networks based on accounts that shared the same URL links.

Clusters were identified through bottom-up coding and grouped into eight main categories: news, local news, economic news, conservative sites, far-right websites, suspicious websites, and information sites. In some cases, clusters were composed almost entirely of links to a single platform or site and were labeled accordingly (e.g., Twitter or YouTube). Each cluster was assigned a corresponding color in the visualizations, and accounts that shared the highest number of links were bolded. A detailed description of the coding and keywords used to download the data can be found in the supplementary materials.
[1] The description of affordance refers to Twitter as a platform known before its acquisition by Elon Musk in 2022, when it became X. The controversy analyzed in this article took place on Twitter between 2016 and 2023.

[2] It is worth noting that Meta restricted access to CrownTangle in mid-October 2025, replacing it with Meta Content Library (MCL), which is significantly less transparent and accessible.

Findings

A breakdown of activity within tweets and posts

The quantitative breakdown of Twitter activity reveals a high frequency of mentions, retweets, and linking in tweets related to the controversy. Mentioning and retweeting are core features of Twitter—just as liking and commenting are central to Facebook—and are thus embedded in the way this platform functions. However, there was a relatively large discrepancy in the volume of these activities depending on whether the controversy was tweeted about by supporters and opponents or tweeted about it in a more neutral manner. Tweets with a neutral tone had the highest number of likes and mentions. The relatively frequent use of mentions suggests a pattern of tagging other accounts—such as politicians or institutions—particularly in tweets reporting on developments in the project. Likes, on the other hand, represented the category with the lowest level of engagement on Twitter, as they do not result in any visible implementation of the liked content on one's profile (unlike retweets, which share content, or mentions and replies, which prompt visibility or discussion). In this context, a high number of likes may indicate content that is relatively neutral and does not generate broader publicity.

Table 1: Summary of the type of activity in tweets about the controversy for neutral keywords.

Activity	Number of tweets
Mention	**1,758**
Reply	1,048
Retweet	828
Like (heart)	**1,799**
Hashtag	562
URL link	**1,662**
URL link to Twitter	517
Number of tweets with any kind of activity	**3,415**

Tweets by both supporters and opponents of the project were marked by a high level of engagement with key platform features: 89% of tweets included mentions, 86% were retweets, and 61% included a link. More than half of these links referred to other Twitter content. Replies, in comparison, were used relatively infrequently by either side.

Table 2: Summary of the type of activity in tweets about the controversy for words used by supporters and opponents of the controversy.

Activity	Number of tweets
Mention	**117,344**
Reply	8,290
Retweet	**113,167**
Like (heart)	13,685
Hashtag	23,368
URL link	**80,859**
URL link to Twitter	41,790
Number of tweets with any kind of activity	130,831

A quantitative overview of platform features highlights a very frequent use of external linking in tweets about the controversy. This was particularly notable in the tweets of both supporters and opponents, which may be due to the fact that linking is more readily used to support positions on a given issue. By contrast, neutral tweets featured far fewer external links. At the same time, nearly half of the links in both supporters' and opponents' tweets linked back to the platform.

While Twitter encourages hypertextuality—partly due to its character limit for messages, which often necessitates linking to external sites to expand on the topic—its core affordances, such as retweeting, mentioning, and liking, are much more accessible functions that require less user effort. Despite these built-in features and the platform's reliance on hashtags for visibility, URL links emerged as one of the most frequently used digital objects in tweets related to this controversy.

On Facebook, posts related to the Vistula Spit Canal were similarly characterized by a very high percentage of posts containing links—93% for neutral posts and 94% among posts by supporters and opponents. Likewise, the percentage of posts receiving likes was also high—81% for neutral posts and 80% for those by supporters and opponents. As with Twitter, liking is one of Facebook's most basic functions and low-effort functions. However, a smaller share of the links referred back to Facebook itself —36% for neutral posts and 42% for those by supporters and opponents—compared to the higher internal linking seen on Twitter.

Table 3: Summary of the type of activity in neutral posts about the controversy on Facebook.

Activity	Number of posts
Like	**7,532**
Comments	5,670
Shares	5,622
Reaction: Love	4,277
Reaction: Haha	3,287
Reaction: Sad	1,881
Reaction: Wow	2,634
Reaction: Anger	3,290
Reaction: Take care	498
URL link	**8,651**
URL link to Facebook	3,129
Number of posts with any kind of activity	**9,267**

Table 4: Summary of the type of activity in posts by supporters and opponents of the controversy on Facebook.

Activity	Number of posts
Like	**10,090**
Comments	7,660
Shares	7,302
Reaction: Love	5,958
Reaction: Haha	4,478
Reaction: Sad	2,239
Reaction: Wow	3,405
Reaction: Anger	4,082
Reaction: Take care	955
URL link	**11,749**
URL link to Facebook	4,974
Number of posts with any kind of activity	**12,489**

On Twitter, linking activity was strongly associated with controversy. Tweets by supporters and opponents contained links far more often than neutral tweets. This suggests that links serve as markers of political alignment and are mobilized when users take sides. Neutral tweets, in contrast, were more likely to accumulate likes—low-effort engagement that does not amplify content. This pattern aligns with Twitter's affordances: the character limit encourages external linking, while retweets and mentions provide mechanisms for visibility and polarization (Colleoni et al., 2014; Oltmann et al., 2020). On Facebook, over 90% of posts contained links, regardless of whether they were neutral or partisan. This indicates that linking is a default practice on the platform. However, the function of linking was different: links on Facebook were more tied to local news, grassroots organizations, and environmental groups, reflecting the platform's affordances of algorithmic curation, identity-based networks, and emotional reactions (boyd, 2010; Valenzuela et al., 2017; Liu et al., 2017). Here, links anchored mobilization and protest rather than polarization.

Analysis of the URL link clusters

Analyzing the URL link clusters reveals the communities of links referenced by various actors on Twitter and Facebook. On Twitter, the network of published links associated with neutral keywords is characterized by high dispersion, with only a few cohesive clusters and many peripheral nodes. This indicates that a wide range of actors rarely shared the same links. The links that were published most often pointed to general and local news sources (visualized in light blue and purple), including outlets

such as “dziennik.pl” and “tvregionalna24.pl.” Some links also came from accounts focused on pro-environmental politics (“the environment now”/ “teraz środowisko”) or politically oriented accounts (“party of disgust”/ “partia obciachu”). The central cluster of links comprised sites with conservative overtones, which were primarily published by public broadcaster “TVP” as well as public and individual accounts. Along the network’s periphery, links to suspicious websites can also be seen, such as those published by a conspiratorial account, “Polska bez Jankesów” (“Poland without Yankees”).

Fig. 1: Network of links published by Twitter accounts for neutral words.

By contrast, the network of links for keywords related to supporters and opponents of the project is far denser, with overlapping clusters and few peripheral nodes (except for the cluster in orange, which is linked to pages in Russian). This indicates that many actors frequently shared the same content. The two main clusters are one related to news (purple cluster on the left) and one related to conservative content (red cluster on the right), between which a small gray cluster is located, linking primarily to platforms such as Twitter and YouTube. Notably, conservative content and news-related content were both shared exclusively by individual Twitter accounts.

Fig. 2: A network of links published by Twitter accounts for words used by opponents and supporters of the project.

On Facebook, link clusters for both neutral terms and those used by proponents and opponents of the project showed more dispersion than on Twitter. For example, there were several links to external environmental and pro-environmental sites by groups such as “Camp for the Vistula Spit” or “Anthropogenic Climate Change.” The Facebook networks also featured larger clusters linking to far-right sites, shared by numerous scattered accounts, including “right-wing club,” “polska moja ojczyzna,” and “polska niepodległa.” Across both networks, there were relatively large “inbred” clusters—those that primarily link to their own posts or external pages with the same name, such as “hello mierzeja” or “maritime economy.”

Fig. 3: A network of links published by Facebook accounts for neutral words.

For neutral words, the link clusters on Facebook were mostly composed of links to news portals (blue cluster on the right), which were shared chiefly by the official Facebook accounts of these outlets (“onet,” “gazeta wyborcza”), but also by politically oriented accounts such as “I am of the worse sort,” “KOD sympathizers,” “modern and strong Poland.” The second most prominent cluster consisted of links to conservative and far-right websites (red cluster on the left), which were published by accounts associated with conservative news outlets (“lisicki’s weekly,” “weekly network,” “fronda.pl”) and nationalist groups (“knights of the right,” “polska niepodległa”). In addition, there was a cluster of links to environmental and pro-environmental sites, which overlapped with a cluster of links to news portals.

Fig. 4: A network of links published by Facebook accounts for words used by opponents and supporters of the project.

In contrast, for words used by opponents and supporters of the project, the link clusters displayed a more pronounced presence of far-right websites (dark red cluster on the right). These were circulated by politically oriented Facebook accounts such as “I support Zbigniew Ziobro” and “right wing club,” as well as by official news sources like “tvp.info” and “wpolityce.” While the cluster of links relating to news portals (blue on the left) was slightly larger in this case (links in this cluster were also published by similar groups as for neutral words), it did not overlap as much with the cluster of links to environmental and pro-environmental sites.

Cluster analysis revealed that on Twitter, links from partisan users concentrated around polarized clusters, including conservative, far-right, and suspicious sites. This suggests that URL links on Twitter amplify ideological divides and serve as indicators of political sentiment. By contrast, Facebook clusters were more dispersed and included links to local news outlets, environmental initiatives, and protest-related groups. These clusters show how links are mobilized to organize collective action and contextualize debates at the community level.

Discussion and Conclusion

This study has shown that URL links remain a valuable digital object for examining how digital objects and platform infrastructures shape the ways in which participants engage with contested issues in social media environments, particularly when analyzed from a cross-platform perspective. By analyzing the Vistula Spit Canal debate on Twitter and Facebook, the findings demonstrate that links are not neutral carriers of information but socio-technical artifacts whose meaning and function depend on the design of the platform in which they are used. In line with research in CSCW and socio-technical studies of online systems, the results suggest that platform features, interface constraints, and visibility mechanisms actively shape how participants reference sources, express positions, and mobilize around controversial topics, rather than merely providing a neutral medium for communication. From this perspective, linking can be understood as a socio-technical practice through which participants situate their contributions within a broader information environment shaped by platform affordances and digital infrastructures.

URL links as controversy indicators

One of the central findings of this study is that URL links serve as reliable indicators of controversy. On Twitter, linking activity was far higher in posts from supporters and opponents compared to neutral posts, and these links clustered around polarized, often radical sources. This suggests that linking on Twitter functions as a marker of political sentiment and alignment (Colleoni et al., 2014; Usher et al., 2018). On Facebook, by contrast, links frequently pointed to local news outlets and grassroots environmental groups, indicating that linking there is more strongly tied to mobilization and protest activity (Borch et al., 2020; Valenzuela et al., 2017). In both cases, the same digital object—URL links—foregrounded different aspects of the controversy, depending on the platform.

For researchers and designers of online systems, this suggests that link-based analysis can be used as a practical method for detecting highly contested issues and how those unfold across platforms, including identifying which sources become authoritative, which communities form around particular interpretations, and how engagement differs depending on the platform's technical and social structure.

Affordances and platform-specific linking practices

The observed differences between Twitter and Facebook can be explained by the affordances of the two platforms. On Twitter, the character limit encourages users to extend their messages by linking externally, while retweets and mentions foster recirculation and visibility within ideological communities (Oltmann et al., 2020). This explains both the prevalence of linking and the high rate of self-referential links, which reflect the platform's affordances for rapid amplification and homophily. On Facebook, algorithmic feed curation, the prominence of identity-based friend networks, and the availability of "emotional reactions" mean that links are often used to anchor discussion in local contexts or mobilize support for protests (boyd, 2010; Liu et al., 2017). Thus, affordances do not simply "enable" linking but shape the very meaning and function of links in controversies. Such visibility and recirculation mechanisms have been shown to influence how interaction unfolds on social media platforms, as interface features determine what becomes observable to others and how contributions gain attention (DeVito et al., 2017; Gillespie, 2010).

These findings illustrate that affordances do not simply enable linking but shape how linking is integrated into everyday interaction on the platform. The same technical feature – the possibility to share a URL – can support different forms of participation depending on how visibility, circulation, and interaction are structured. This observation aligns with CSCW work emphasizing that seemingly small design decisions can have significant consequences for how people share information, coordinate their actions, and make sense of complex situations in socio-technical systems (Ackerman, 2000; Treem & Leonardi, 2013).

Linking activity as a methodological framework for studying contested issues

Beyond the specific case analyzed here, the study suggests that linking activity can serve as a methodological framework for examining how contested issues develop in socio-technical environments. The cross-platform nature of links allows researchers to compare how the same issue is enacted in different systems. Such cross-platform approaches respond to calls within CSCW to examine interaction across interconnected infrastructures rather than within single systems, as users increasingly engage with multiple platforms simultaneously. Unlike hashtags or platform-specific metrics, URLs can be followed across multiple platforms, making them suitable for studying how discussions move between environments with different affordances. This opens possibilities for developing practical tools that use link patterns to detect emerging controversies, identify influential sources, or map how debates evolve over time. Such an approach may also be useful for the design and evaluation of social media

systems. In this sense, link analysis does not only provide a research method but also points to potential design interventions that could improve how platforms support engagement with complex public issues.

Implications for CSCW and socio-technical design

For CSCW research, the findings reinforce the importance of examining how online interaction is shaped by the relationship between social practices and technical infrastructures. Controversial or high-stakes discussions are not only discursive phenomena but also practical activities carried out within systems whose design affects what participants can do and how their actions become visible to others. The results also suggest that methods focusing on small but traceable digital objects, such as URL links, can complement existing approaches to studying online interaction. More broadly, the study illustrates how the design of social media platforms affects not only how users engage with contested issues but also how such engagement can be studied. Because linking practices leave traceable connections to external sources, they provide a practical way to analyze interaction within socio-technical systems without relying exclusively on manual or large-scale discursive analysis. This approach is especially useful for studying complex or rapidly evolving debates, where traditional content analysis may be difficult to apply across multiple platforms.

Such trace-based methods can support more systematic ways of examining how platform affordances shape participation, visibility, and information sharing. This creates opportunities for developing analytic tools that can help researchers and designers better understand how discussions unfold in online environments, including situations involving controversy, mobilization, or coordinated information campaigns.

The approach may also be relevant for studying the spread of misleading or manipulative content. Since links often point to external sources, tracking their circulation can help identify which domains become prominent within a discussion and how they move between communities or platforms. Such methods could complement existing approaches to the study of misinformation by providing a way to detect emerging narratives or shifts in attention without requiring full semantic analysis of every message. In this sense, link-based analysis offers a practical way to examine how platform design, visibility mechanisms, and user practices jointly shape the flow of information in online systems.

Conclusion and Future Research

This study demonstrates that URL links, when analyzed in relation to platform affordances, provide a way to examine how digital infrastructures and platform features shape the forms of participation through which controversies are enacted in socio-technical environments. Far from being obsolete, links remain a crucial entry point for understanding how controversies unfold in a platformized web. Because these practices are shaped by the design of the platform, cross-platform link analysis makes it possible to observe how the same issue can develop differently depending on the system in which it is discussed.

At the same time, this study has several limitations. The data was drawn from a single controversy situated within the specific political context of Poland, and retrieved using a keyword-based method that

may have introduced bias. Further work is needed to test whether the patterns observed here hold across different types of controversies, geographic contexts, and platforms, including emerging spaces such as TikTok or Instagram.

Future research could also extend the methodological contribution of link analysis. One direction would be to develop computational tools that use linking patterns to identify emerging disagreements, shifts in interpretation, or moments of increased engagement across platforms. Another would be to study how changes in platform design, such as algorithmic ranking of external links or restrictions on link visibility, influence how users reference sources during contested discussions. Such work could inform the design of social media systems that better support informed participation, transparency of sources, and constructive engagement in situations where issues are complex or disputed.

Declarations

Author Contribution

All work was done by a corresponding author.

Acknowledgement

Data visualizations were created by Matteo Bettini and Valentina Pallacci.

Data Availability

Data may be made available upon request.

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References

1. Berners-Lee, T., Hall, W., Hendler, J. A., O'Hara, K., Shadbolt, N., & Weitzner, D. J. (2006). A framework for Web Science. *Foundations and Trends in Web Science, 1*(1), 1–130.
2. Bhandari, A., & Sun, B. (2021). An online home for the homeless: A content analysis of the subreddit r/homeless. *New Media & Society, 25*(9), 2419–2436. https://doi.org/10.1177/14614448211048615
3. Borra, E. (2023). *Object-activity: Repurposing the dual nature of web data for digital research* (PhD dissertation). Amsterdam University of Applied Science.
4. Bucher, T., & Helmond, A. (2017). The affordances of social media platforms. In J. Burgess, A. Marwick, & T. Poell (Eds.), *The SAGE Handbook of Social Media* (pp. 233–253). SAGE Publications

Ltd.

5. Blank, G. (2017). The digital divide among Twitter users and its implications for social research. *Social Science Computer Review, 35*(6), 679–697. https://doi.org/10.1177/0894439316671698
6. Borch, K., Munk, A., & Dahlgaard, V. (2020). Mapping wind-power controversies on social media: Facebook as a powerful mobilizer of local resistance. *Energy Policy, 138*, 111–123.
7. boyd, d. (2010). Social network sites as networked publics: Affordances, dynamics, and implications. In Z. Papacharissi (Ed.), *A Networked Self: Identity, Community, and Culture on Social Network Sites* (pp. 39–59). Routledge.
8. Bruns, A., & Burgess, J. (2015). Twitter hashtags from ad hoc to calculated publics. In N. Rambukkana (Ed.), *Hashtag publics: The power and politics of discursive networks* (pp. 13–27). Peter Lang.
9. Burgess, J., & Matamoros-Fernández, A. (2016). Mapping sociocultural controversies across digital media platforms: One week of #Gamergate on Twitter, YouTube, and Tumblr. *Communication Research and Practice, 2*(1), 79–96.
10. Chien-Leng, H., & Park, H. W. (2011). Sociology of hyperlink networks of Web 1.0, Web 2.0, and Twitter: A case study of South Korea. *Social Science Computer Review, 29*(3), 354–368.
11. Coromina, Ò., Tsinovoi, A., & Munk, A. (2023). Digital marketing as digital methods: Repurposing Google Ads for controversy mapping. *Big Data & Society, 10*(2). https://doi.org/10.1177/20539517231192708
12. Colleoni, E., Rozza, A., & Arvidsson, A. (2014). Echo chamber or public sphere? Predicting political orientation and measuring political homophily on Twitter using big data. *Journal of Communication, 64*(2), 317–332.
13. CrowdTangle. (2024). https://transparency.meta.com/pl-pl/researchtools/other-datasets/crowdtangle/, (Accessed November 8, 2024).
14. Galitsky, B., & Levene, M. (2004). On the economy of web links: Simulating the exchange process. *First Monday, 9*(1).
15. Gerlitz, C., & Helmond, A. (2013). The like economy: Social buttons and the data-intensive web. *New Media & Society, 15*(8), 1348–1365.
16. Gillespie, T. (2010). The politics of 'platforms'. *New Media & Society, 12*(3), 347–364.
17. Hawkins, I., & Saleem, M. (2021). Rise UP!: A content analytic study of how collective action is discussed within white nationalist videos on YouTube. *New Media & Society, 25*(12), 3308–3327. https://doi.org/10.1177/14614448211040520
18. Hase, V., Boczek, K., & Scharkow, M. (2023). Adapting to affordances and audiences? A cross-platform, multi-modal analysis of the platformization of news on Facebook, Instagram, TikTok, and Twitter. *Digital Journalism, 11*(8), 1499–1520.
19. Helmond, A. (2017). *The web as platform: Data flows in social media* (PhD dissertation). Amsterdam University of Applied Science.

20. Helmond, A. (2015). The platformization of the web: Making web data platform ready. *Social Media + Society, 1*(2). https://doi.org/10.1177/2056305115603080
21. Hendriks, C., Duus, S., & Ercan, S. (2016). Performing politics on social media: The dramaturgy of an environmental controversy on Facebook. *Environmental Politics, 25*(6), 1102–1125.
22. Himelboim, I., McCreery, S., & Smith, M. (2013). Birds of a feather tweet together: Integrating network and content analyses to examine cross-ideology exposure on Twitter. *Journal of Computer-Mediated Communication, 18*(1), 40–60.
23. Jacomy, M., Venturini, T., Heymann, S., & Bastian, M. (2014). ForceAtlas2, a continuous graph layout algorithm for handy network visualization designed for the Gephi software. *PLoS ONE, 9*(6), e98679. https://doi.org/10.1371/journal.pone.0098679
24. Jones-Jang, M., McKeever, B., McKeever, R., & Kim, J. (2019). From social media to mainstream news: The information flow of the vaccine-autism controversy in the US, Canada, and the UK. *Health Communication, 34*(1), 110–117.
25. Kleinberg, J. (1999). Authoritative sources in a hyperlink environment. *Journal of the ACM, 46*(5), 604–632.
26. Kligler-Vilenchik, N., Baden, C., & Yarchi, M. (2020). Interpretative polarization across platforms: How political disagreement develops over time on Facebook, Twitter, and WhatsApp. *Social Media + Society, 6*(3). https://doi.org/10.1177/2056305120943064
27. Latour, B. (2005). *Reassembling the social: An introduction to actor-network theory*. Oxford University Press.
28. Liu, Y., Rui, J., & Cui, X. (2017). Are people willing to share their political opinions on Facebook? Exploring roles of self-presentational concern in spiral of silence. *Computers in Human Behavior, 76*, 294–302.
29. Lotan, G., Graeff, E., Ananny, M., Gaffney, D., Pearce, I., & Boyd, D. (2011). The revolutions were tweeted: Information flows during the 2011 Tunisian and Egyptian revolutions. *International Journal of Communication, 5*, 1375–1405.
30. MileSocial. (2024). *Why posting external links on Facebook is bad.* https://milesocial.com/why-posting-external-links-on-facebook-is-bad (Accessed August 20, 2024)
31. Moats, D. (2017). From media technologies to mediated events: A different settlement between media studies and science and technology studies. *Information, Communication & Society, 22*(8), 1165–1180. https://doi.org/10.1080/1369118X.2017.1371786 https://doi.org/10.1386/nl.2.1.83_1
32. Niederer, S. (2016). *Networked content analysis: The case of climate change* (Doctoral dissertation). Amsterdam University of Applied Sciences.
33. Niederer, S., & van Dijck, J. (2010). Wisdom of the crowd or technicity of content? Wikipedia as a sociotechnical system. *New Media & Society, 12*(8), 1368–1387. https://doi.org/10.1177/1461444809346323
34. Obreja, D. M. (2022). The social side of cryptocurrency: Exploring the investors' ideological realities from Romanian Facebook groups. *New Media & Society, 26*(5), 2748–2765.

https://doi.org/10.1177/14614448221092028

35. Oltmann, S. M., Cooper, T. B., & Proferes, N. (2020). How Twitter's affordances empower dissent and information dissemination: An exploratory study of the rogue and alt government agency Twitter accounts. *Government Information Quarterly, 37*(3), 101461. https://doi.org/10.1016/j.giq.2020.101461
36. Oz, M., Shanin, S., & Greeves, S. (2024). Platform affordances and spiral of silence: How perceived differences between Facebook and Twitter influence opinion expression online. *Technology in Society, 76*, 102384. https://doi.org/10.1016/j.techsoc.2023.102384
37. Park, H. W. (2003). Hyperlink network analysis: A new method for the study of social structure on the web. *Connections, 25*(1), 49–61.
38. Park, H. W., & Thelwall, M. (2003). Hyperlink analyses of the World Wide Web: A review. *Journal of Computer-Mediated Communication, 8*(4). https://doi.org/10.1111/j.1083-6101.2003.tb00223.x
39. Park, H. W., Kim, C. S., & Barnett, G. A. (2004). Socio-communicational structure among political actors on the web in South Korea: The dynamic of digital presence in cyberspace. *New Media & Society, 6*(3), 403–423. https://doi.org/10.1177/1461444804042517
40. Peeters, S., & Hagen, S. (2022). The 4CAT capture and analysis toolkit: A modular tool for transparent and traceable social media research. *Computational Communication Research, 4*(2), 571–589. https://doi.org/10.5117/CCR2022.2.006.PEET
41. Poell, T., Nieborg, D., & van Dijck, J. (2019). Platformization. *Internet Policy Review, 8*(4). https://doi.org/10.14763/2019.4.1425
42. Qorib, M., Oladunni, T., Denis, M., Ososanya, E., & Cotae, P. (2023). COVID-19 vaccine hesitancy: Text mining, sentiment analysis and machine learning on COVID-19 vaccination Twitter dataset. *Expert Systems with Applications, 212*, 119069. https://doi.org/10.1016/j.eswa.2022.119069
43. Rogers, R. (2019). *Doing digital methods*. Sage.
44. Rogers, R., & Marres, N. (2000). Landscaping climate change: A mapping technique for understanding science and technology debates on the World Wide Web. *Public Understanding of Science, 9*(2), 141–163. https://doi.org/10.1088/0963-6625/9/2/304
45. Sajkiewicz, S. (2017). Koncepcja transportu statków przez Mierzeję Wiślaną łączącego Zalew Wiślany z Zatoką Gdańską—bez przekopu Mierzei Wiślanej. *Inżynieria Ekologiczna, 50*, 1–10. https://doi.org/10.12912/23920629/74328
46. Schreiber, M., Schwarzenegger, C., & Lohmeier, C. (2024). Historical figures on Instagram: A typology of themes and modes of representation. *New Media & Society, 0*(0). https://doi.org/10.1177/14614448241249101
47. Small, T. A. (2011). What the hashtag? A content analysis of Canadian politics on Twitter. *Information, Communication & Society, 14*(6), 872–895. https://doi.org/10.1080/1369118X.2011.554572
48. Smith, N., & Graham, T. (2017). Mapping the anti-vaccination movement on Facebook. *Information, Communication & Society, 22*(9), 1310–1327. https://doi.org/10.1080/1369118X.2017.1418406

49. Szomszor, M. N., Kostkova, P., & de Quincey, E. (2012). #Swineflu: Twitter predicts swine flu outbreak in 2009. In *3rd International ICST Conference on Electronic Healthcare for the 21st Century*. https://doi.org/10.1007/978-3-642-29734-2_14
50. Usher, N., Holcomb, J., & Littman, J. (2018). Twitter make it worse: Political journalists, gendered echo chambers, and the amplification of gender bias. *The International Journal of Press/Politics, 23*(3), 324–344. https://doi.org/10.1177/1940161218781254
51. Valenzuela, S., Correa, T., & de Zúñiga, H. G. (2017). Ties, likes, and tweets: Using strong and weak ties to explain differences in protest participation across Facebook and Twitter use. *Political Communication, 35*(1), 117–134. https://doi.org/10.1080/10584609.2017.1334726
52. Venturini, T. (2010). Diving in magma: How to explore controversies with actor-network theory. *Public Understanding of Science, 19*(3), 258–273. https://doi.org/10.1177/0963662509102694
53. Venturini, T., & Munk, A. (2022). *Controversy mapping: A field guide*. Polity Press.
54. Venturini, T., Munk, A. K., & Jacomy, M. (2019). Actor-network versus network analysis versus digital networks: Are we talking about the same networks? In J. Vertesi & D. Ribes (Eds.), *Digital STS: A field guide for science & technology studies* (pp. 510–523). Princeton University Press.
55. Weltevrede, E., & Borra, E. (2016). Platform affordances and data practices: The value of dispute on Facebook. *Big Data & Society, 3*(1). https://doi.org/10.1177/2053951716639196
56. Wu, Y., Mo, D., Liu, J., Li, Z., Chen, X., & Xie, L. (2023). Public perception of microplastics on a popular Chinese social media platform. *Journal of Cleaner Production, 414*, 137717. https://doi.org/10.1016/j.jclepro.2023.137717
57. Zarrabeitia-Bilbao, E., Jaca-Madariaga, M., Río-Belver, R. M., & Álvarez-Meaza, I. (2023). Nuclear energy: Twitter data mining for social listening analysis. *Social Network Analysis and Mining, 13*, 29. https://doi.org/10.1007/s13278-023-00957-1
58. Özkula, S. M., Lompe, M., Vespa, M., Sørensen, E., & Zhao, T. (2022). When URLs on social networks become invisible: Bias and social media logics in a cross-platform hyperlink study. *First Monday, 27*(6). https://doi.org/10.5210/fm.v27i6.11731

Footnotes

[1] I am referring here to the APIs of social media platforms or, for example, the CrowdTangle app, which allowed researchers to download and analyze data from Facebook and Instagram until recently.

[2]The black box, within the framework of ANT, is understood as “a creation whose components have been fused together (usually as a result of a painstaking, but erased from its history, construction process) to such an extent that their relationship seems natural and necessary” (Latour 2005, p. 119).

[3]That said, broader reflections on online controversies often compel researchers to engage with the role of non-human actors involved in these controversies. A prime example is Sabine Niederer and Jose van

Dijck's (2010) analysis of bot activity on Wikipedia, which they highlight as particularly relevant in the context of disputes surrounding climate change content on the platform.

[4]https://www.issuecrawler.net/.

Figures

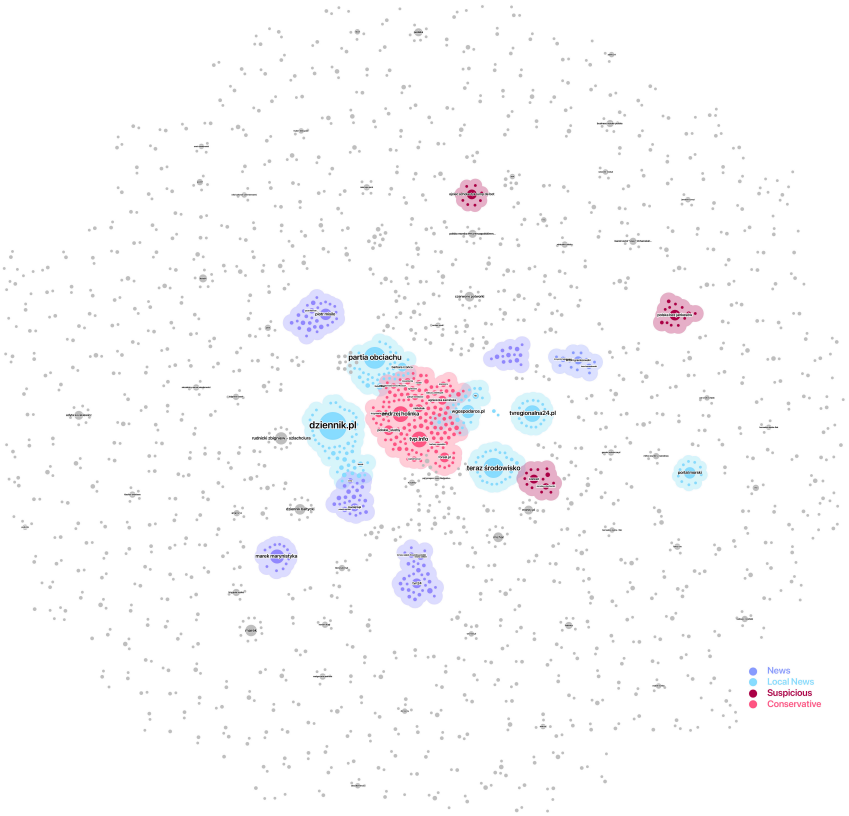


Figure 1

Network of links published by Twitter accounts for neutral words.

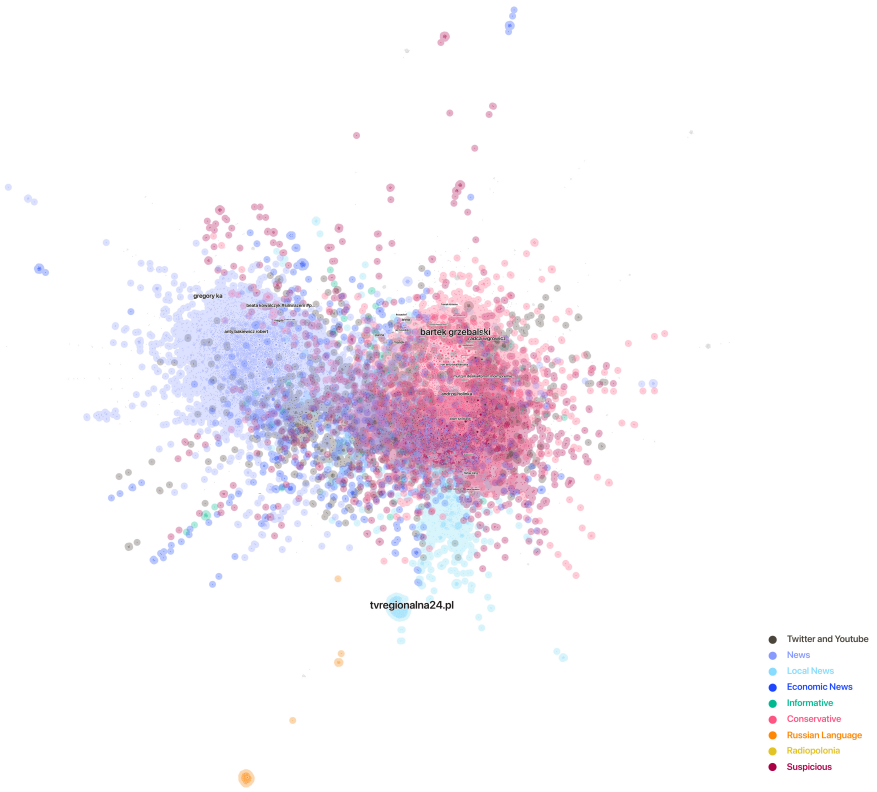


Figure 2

A network of links published by Twitter accounts for words used by opponents and supporters of the project.

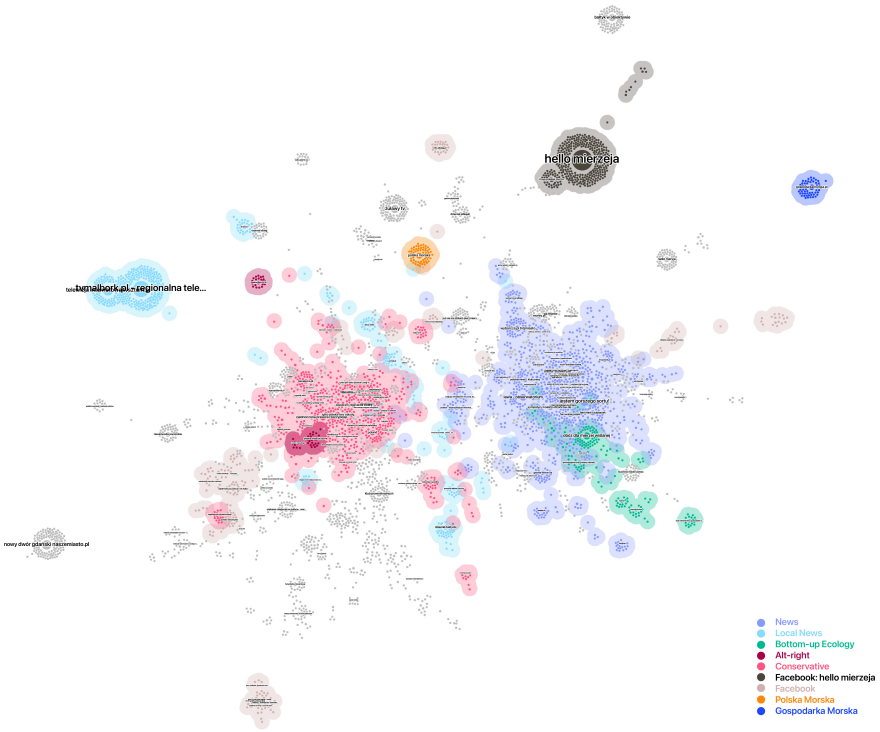


Figure 3

A network of links published by Facebook accounts for neutral words.

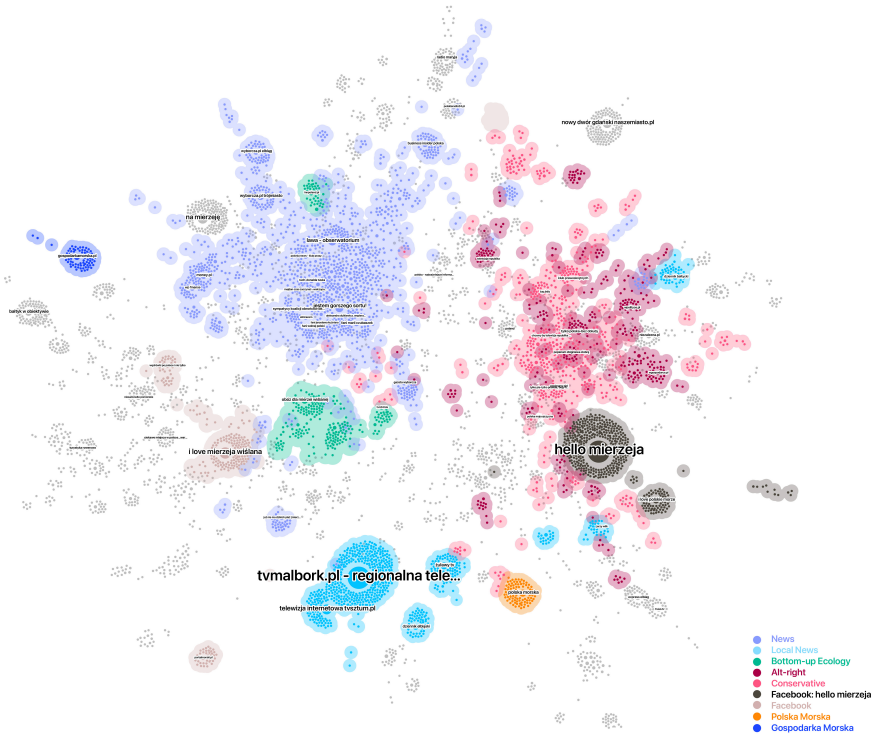


Figure 4

A network of links published by Facebook accounts for words used by opponents and supporters of the project.