Campus Fryslan

Echo Chambers and Filter Bubbles: A Systematic Literature Review of Political Polarization on Social Media

Bachelor Research Thesis

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Abstract

This thesis explored the mechanisms and concepts of filter bubbles and echo chambers by analyzing their influence on political polarization within social media. To address this question, the study conducted a systematic literature review of 15 peer-reviewed studies published between 2020 and 2025, following the PRISMA 2020 guidelines. The key findings indicated that while filter bubbles and echo chambers did not directly cause political polarization, their mechanisms could contribute to its intensification under certain conditions. Furthermore, echo chambers were supported by strong empirical evidence, especially in relation to network polarization driven by selective exposure and partisan blocking. These effects were most pronounced during politically salient periods and in combination with emotionally provocative content, which showed to reinforce affective polarization. In contrast there was limited support for the filter bubble hypothesis. Although algorithms could amplify ideologically aligned and emotionally resonant content, experimental research suggested that algorithms alone exerted only a modest influence on polarization. Incidental exposure to opposing viewpoints still occured across platforms, challenging the notion of fully enclosed information environments. Future research should broaden the analytical lens to include a more diverse range of platforms and geographic contexts. Emphasis should also be placed on platform-specific features and individualized indicators such as age, in order to better understand how digital environments shape political polarization across societies.

Keywords: echo chambers - filter bubbles - selective exposure - algorithmic selection - political polarization

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1. Introduction

The widespread adoption of the internet and the rise of social media have radically challenged the traditional understandings of how individuals receive news (Newman et al., 2024). As more people turn to social media to access information, these spaces are becoming increasingly relevant sources of political news and are playing a growing role in shaping opinions (Masip et al., 2020; Ludwig et al., 2023). Although definitions of social media can vary, the term can be described as "computer-mediated communication channels that allow users to engage in social interaction with broad and narrow audiences in real-time or asynchronously" (Bayer, Trieu, & Ellison, 2020, p. 472). More generally, any digital platform that fits this description can be considered a form of social media. Common examples include Facebook, Instagram, Twitter (now known as X), and YouTube (Auxier & Anderson, 2021; Jarman et al., 2022). Early research highlighted the positive potential of these platforms to expand access to political information and promote civic and political engagement (De Zúñiga et al., 2012), nevertheless a growing body of literature suggests that they may also contribute to political division and polarization especially within politics (Sunstein, 2018; Rodilosso, 2024). Political polarization refers to a process in which the wide range of social and political differences in a society are increasingly split along a single dividing line, leading individuals to see a "us versus them" dynamic within politics (McCoy et al., 2018). While political polarization is not a new phenomenon (Möller, 2021), it has become an increasingly visible feature in many societies nowadays (Ludwig et al., 2023). A prominent example is the United States, where polarization between democrats and republicans has grown significantly in recent years. The ideological overlap between the two parties has diminished, making ideologically mixed partisans such as liberal republicans or conservative democrats significantly less common (Böttcher & Gersbach, 2020). Concerns have been growing that developments like these may be driven by social media (Levy, 2021).

These fears are often centered around two concepts and their underlying mechanisms: filter bubbles and echo chambers. Even though these two concepts operate differently, they are closely interrelated. A filter bubble describes a digitally curated environment in which algorithms personalize a user's information feed based on previous behaviors like search history or clicks, often resulting in exposure to content that reinforces preexisting beliefs (Pariser, 2011). In contrast, an echo chamber refers to a communicative space where individuals predominantly engage with like-minded others and reinforce shared opinions, minimizing exposure to dissenting views (Nguyen, 2017; Sunstein, 2018; Terren & Borge-Bravo, 2021). While both concepts refer to environments of informational or ideological homogeneity, they may arise from different mechanisms. In this regard, algorithmic selection and selective exposure are widely discussed as mechanisms that may contribute to the formation of such

environments, shaping not only what users see but also how they interact with others online (Pariser, 2011; Thorson et al., 2021; Stroud, 2008).

In this regard, it is important to note that filter bubbles and echo chambers are not universally established as empirical facts. While the concept of echo chambers appears to be more consistently supported in recent empirical research (Cinelli et al., 2021; Terren & Borge-Bravo, 2021), the evidence for filter bubbles remains more limited and contested (Bruns, 2019; Ross Arguedas et al., 2022). To contribute a fresh perspective to this debate and examine how these concepts and their underlying mechanisms relate to political polarization, this thesis addresses the following research question: *"Do social media concepts such as filter bubbles and echo chambers influence political polarization?"*. To explore this, the study conducts a systematic literature review of 15 academic studies, examining how recent research conceptualizes and investigates filter bubbles, echo chambers, and their underlying mechanisms. While the existence of these phenomena is part of the analysis, the primary goal is to understand how they are discussed and empirically addressed in connection with political polarization.

The thesis begins by outlining the theoretical framework, which elaborates on the central concepts of filter bubbles, echo chambers, and relevant types of polarization. This is followed by a methodology section that explains the process and criteria used for selecting and analyzing the literature. The findings and discussion sections present the results of the review, interpret emerging patterns, and address the study's limitations. Lastly, this thesis presents a conclusion derived from the preceding analysis, aiming to make a meaningful contribution to the ongoing scholarly discussion.

2. Theoretical Framework

Building on the distinctions introduced in the introduction, this theoretical framework focuses on two central mechanisms that may drive the formation of filter bubbles and echo chambers, as well as their potential connection to political polarization: Selective exposure (Stroud, 2008) and algorithmic selection (Pariser, 2011; Thorson et al., 2021). Together, these concepts provide the theoretical foundation guiding the analysis in this thesis.

Echo chambers are grounded in Selective Exposure Theory, which posits that individuals tend to seek information that supports their existing beliefs while avoiding content that contradicts them (Stroud, 2008). In political contexts, this selective exposure can result in ideologically homogeneous social environments that reinforce in-group identification and increase hostility toward political out-groups. Filter bubbles, in contrast, are primarily linked to the mechanism of algorithmic selection, which refers to the personalization of digital content through recommendation systems that adapt to users' past behaviors and preferences (Pariser, 2011; Thorson et al., 2021). In this way, users may become passively immersed

in increasingly uniform informational environments, sometimes without being aware of it. Nevertheless, it should be recognized that they often reinforce one another in practice. Algorithmic selection can facilitate entry into echo chambers by shaping users' exposure to like-minded content, thereby laying the groundwork for ideologically homogenous interactions.

Although some prior research has combined the echo chambers and filter bubbles due to their conceptual overlap (Terren & Borge-Bravo, 2021), more recent literature tends to treat them as separate (Ross Arguedas et al., 2022). In line with this trend, this thesis analyzes them independently in order to distinguish more clearly between algorithmic influences and human behavioral tendencies.

To investigate political polarization, this thesis adopts a multidimensional approach. Rather than viewing political polarization as a singular outcome, this review treats it as an umbrella term that includes several interrelated dimensions that often overlap or reinforce each other. Existing research has begun to differentiate between various forms of polarization, though not all of the dimensions discussed below have been addressed in combination (Kelm et al., 2023). Nevertheless, this review includes all of the components below as they emerged most frequently during the initial review of relevant literature in connection with political polarization.

1. **Affective polarization** refers to the growing divide between individuals affiliated with different political camps, particularly between the ideological left and right. While it may stem from policy disagreements, it is primarily characterized by a strong emotional attachment to one's own political group and a simultaneous aversion to the opposing side. This often includes a desire to socially distance oneself from members of the out-group and is reflected in increasing distrust and hostility (Iyengar et al., 2012).
2. **Ideological polarization**, sometimes referred to as **attitude polarization** (Kelm et al., 2023), concerns the extent to which individuals' political positions become more extreme, internally consistent, and resistant to change. This form of polarization centers on specific policy issues or ideological beliefs and is often linked to partisan identity (DiMaggio et al., 1996).
3. **Perceived polarization** describes individuals' subjective sense of how divided society is along political or ideological lines. While perceived polarization does not necessarily reflect actual levels of disagreement, it can contribute to further polarization by heightening feelings of in-group loyalty and out-group threat. This perception can therefore exacerbate both affective and ideological polarization (Yang et al., 2016).
4. **Network polarization** refers to the structural clustering of individuals into ideologically homogeneous networks. In increasingly homophilic networks, the likelihood of encountering

politically dissimilar others is reduced. This limits exposure to alternative viewpoints and strengthens existing beliefs (Kaiser et al., 2022).

5. **Language polarization**, as used in this thesis, is not a standardized term in the literature, Nevertheless it refers to how language itself is used to express and reinforce political division. While closely linked to affective and ideological polarization, the concept is treated separately, due to its methodological relevance (Durrheim & Schuld, 2025).

3. Methodology

A systematic literature review was conducted following the PRISMA 2020 guidelines (Page et al., 2021), which is widely adopted across disciplines for ensuring reproducibility and methodological unity in evidence synthesis. After applying the PRISMA framework, 15 studies were identified, which will be analyzed in the findings. The selection of literature focused on the period from 2020 to 2025, a timeframe chosen to ensure that the review reflects the most current developments in social media dynamics and political media research.

3.1 Systematic Literature Review:

Literature was searched in a combined approach on SmartCat and the Scopus database in April 2025. Given the differences between the two databases, the search strategies were kept as similar as possible. However, more filters were applied in the Scopus database, as it offers more advanced filtering options compared to SmartCat. Thus, the selection of articles went as follows:

First Step:

A first selection filter was applied to limit the search to subject areas relevant to the research focus of this systematic literature review. The search was conducted in both databases using the same parameters. While the Smartcat search was performed across the library of the University of Groningen, Scopus used its entire database. The search terms not only included the obvious terms of “echo chambers” and “filter bubbles” or “polarization” but also broader related concepts such as “misinformation” and “fake news.” This decision was based on initial exploratory research and the assumption that these concepts play an important role in the emergence and reinforcement of political polarization on social media. Moreover, the selection of search terms was informed by the theoretical framework developed in this thesis. Keywords such as “selective exposure” and “algorithmic amplification” were included because they reflect the core mechanisms underlying the formation of echo chambers and filter bubbles. This

initial search identified **884 results in Scopus** and **49 in SmartCat** as of 23 April 2025, forming the basis for subsequent filtering steps.

(TITLE-ABS-KEY ("Social media" OR "social networking sites" OR "online social networks" OR "social platforms" OR "digital platforms") AND TITLE-ABS-KEY ("polarization" OR "political polarization" OR "affective polarization") AND TITLE-ABS-KEY ("misinformation" OR "Disinformation" OR "fake news" OR "echo chambers" OR "filter bubbles" OR "selective exposure" OR "algorithmic amplification" OR "algorithmic curation" OR "algor" OR "confirmation bias))*

Second Step:

In the next step, the search results were refined by limiting the publication years to 2020–2025. This time frame was chosen to ensure that the review reflects the most recent developments in social media platforms. The decision also builds on the prior work of Terren and Borge-Bravo (2021), who conducted a comprehensive review of literature on social media echo chambers up to the year 2020. The publication year filter was applied in both Scopus and SmartCat using the same search structure. After applying this criterion, **755 results remained in Scopus** and **45 in SmartCat** (as of 23 April 2025).

(TITLE-ABS-KEY ("Social media" OR "social networking sites" OR "online social networks" OR "social platforms" OR "digital platforms")
AND TITLE-ABS-KEY ("polarization" OR "political polarization" OR "affective polarization") AND TITLE-ABS-KEY ("misinformation" OR "Disinformation" OR "fake news" OR "echo chambers" OR "filter bubbles" OR "selective exposure" OR "algorithmic amplification" OR "algorithmic curation" OR "algor" OR "confirmation bias))*
AND PUBYEAR > 2019 AND PUBYEAR < 2026

Third Step

In the third step, the selection was narrowed to include only peer-reviewed journal articles, excluding other document types such as books, reviews, and conference papers. This decision was made to prioritize in-depth empirical research and ensure methodological consistency, as journal articles typically provide more detailed and standardized reporting. After applying this filter, **486 results remained in Scopus** and **36 in SmartCat** (as of 23 April 2025).

(TITLE-ABS-KEY ("Social media" OR "social networking sites" OR "online social networks" OR "social platforms" OR "digital platforms")

AND TITLE-ABS-KEY ("polarization" OR "political polarization" OR "affective polarization") AND TITLE-ABS-KEY ("misinformation" OR "Disinformation" OR "fake news" OR "echo chambers" OR "filter bubbles" OR "selective exposure" OR "algorithmic amplification" OR "algorithmic curation" OR "algor" OR "confirmation bias))*
AND PUBYEAR > 2019 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE , "ar"))

Fourth Step

In the fourth step, the selection was further refined to include only articles published in English. This decision was based on both practical and methodological considerations. English remains the dominant language of academic publishing, particularly in the fields of social sciences and political communication. In addition, the theoretical framework of this thesis is primarily based on English-language literature. Therefore, limiting the search to English ensured consistency between the conceptual foundation and the sources analyzed as well as reduced the risk of misinterpretation. After applying this filter, **449 articles remained in Scopus** and **27 in SmartCat** (as of 23 April 2025).

(TITLE-ABS-KEY ("Social media" OR "social networking sites" OR "online social networks" OR "social platforms" OR "digital platforms")
AND TITLE-ABS-KEY ("polarization" OR "political polarization" OR "affective polarization") AND TITLE-ABS-KEY ("misinformation" OR "Disinformation" OR "fake news" OR "echo chambers" OR "filter bubbles" OR "selective exposure" OR "algorithmic amplification" OR "algorithmic curation" OR "algor" OR "confirmation bias))*
AND PUBYEAR > 2019 AND PUBYEAR < 2026
AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English"))

Fifth Step

In the fifth step, additional filters were applied to narrow the results to publications within the field of social sciences and to include only open-access articles. These criteria were selected to ensure that the final set of studies aligned with the disciplinary focus of this thesis and were fully accessible for analysis. However, these filtering options were only available in the Scopus database and could not be applied in SmartCat. As a result, the SmartCat results from Step 3.4 (**27 documents**) were retained without further refinement, while the application of this filter in Scopus reduced the number of results to **147 documents** (as of 23 April 2025).

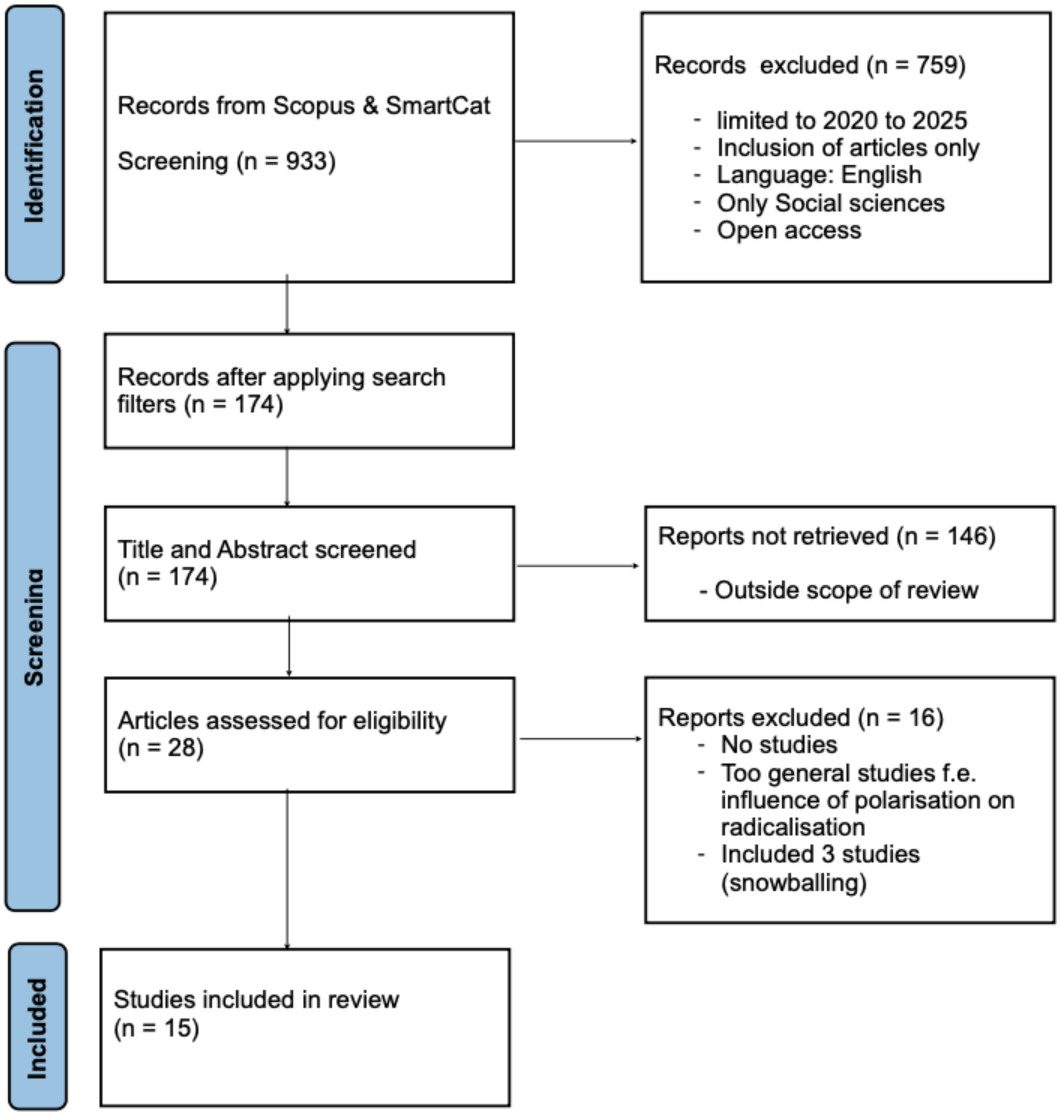
(TITLE-ABS-KEY ("Social media" OR "social networking sites" OR "online social networks" OR "social platforms" OR "digital platforms")
AND TITLE-ABS-KEY ("polarization" OR "political polarization" OR "affective polarization") AND TITLE-ABS-KEY ("misinformation" OR "Disinformation" OR "fake news" OR "echo chambers" OR "filter bubbles" OR "selective exposure" OR "algorithmic amplification" OR "algorithmic curation" OR "algor" OR "confirmation bias))*
AND PUBYEAR > 2019 AND PUBYEAR < 2026
AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SUBJAREA , "SOCI")) AND (LIMIT-TO (OA , "all"))

Sixth Step

After identifying a total of 174 sources across both SmartCat and Scopus, the articles were screened for inclusion through a two-step process. In the first step, eligibility was assessed based on titles and abstracts, with a focus on whether the study included relevant empirical insights to answer the research question “Do social media concepts such as filter bubbles and echo chambers influence political polarization?”. This initial screening resulted in 28 articles selected for full-text review. The full-text screening aimed to determine the extent to which each study contributed to the specific analytical focus of this thesis. Particular attention was given to whether the studies engaged with the core theoretical concepts outlined in the theoretical framework, including echo chambers, filter bubbles, and the various dimensions of political polarization. Sixteen articles were excluded at this stage for being too general or for addressing topics closely related to distinct issues or broader media effects. Although these studies were not included in the final analysis, some provided valuable context for the development of the theoretical framework and will also be used in the discussion to support the interpretation of the findings.

Ultimately, 12 articles were selected through this systematic review process. An additional 3 studies were identified through snowballing, bringing the final dataset to **15 studies**, which form the basis for the analysis presented in the findings chapter.

Figure 1: PRISMA Workflow Systematic Review

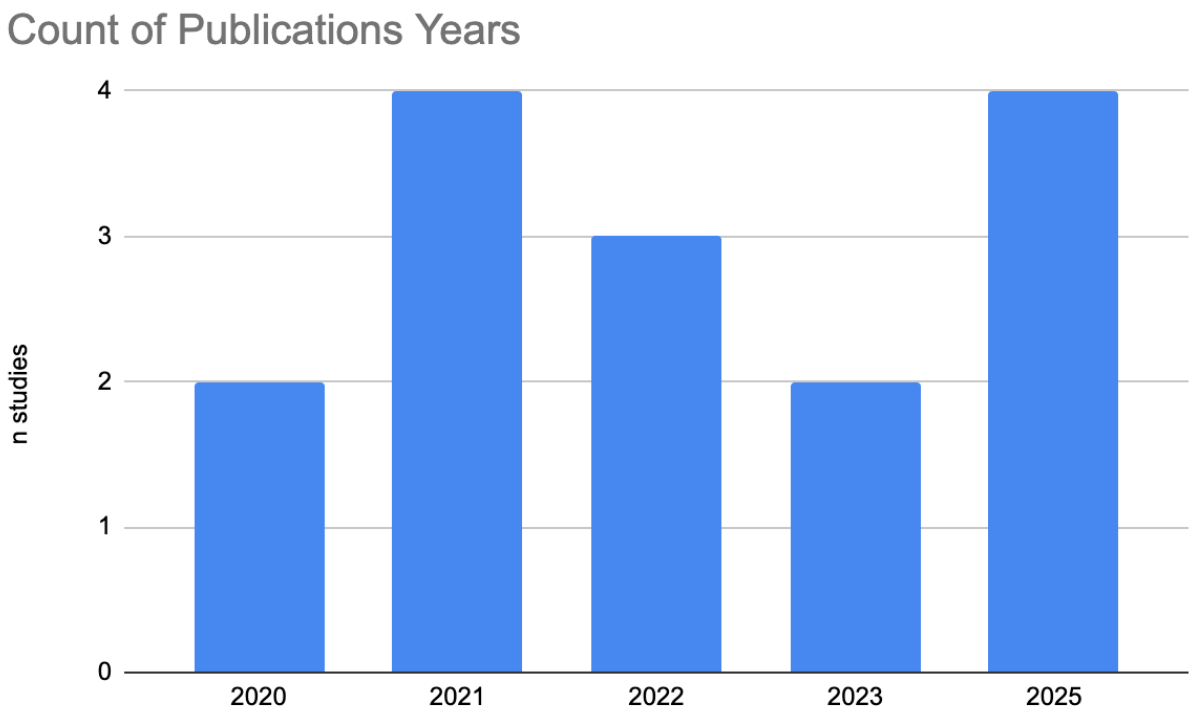


4. Findings

4.1 Bibliometric Overview

To provide a temporal overview of the selected literature, the distribution of publication years for the 15 studies included in this systematic literature review is presented in Figure 3. Within the defined scope and filtering process of this review, the majority of the selected literature appeared in the middle and later part of the review period, with the highest number of studies published in 2021 and 2025 (four studies each). The remaining studies are relatively evenly distributed, with three publications in 2022 and two each in 2020 and 2023. On the other hand, no study included in the final sample was published in 2024.

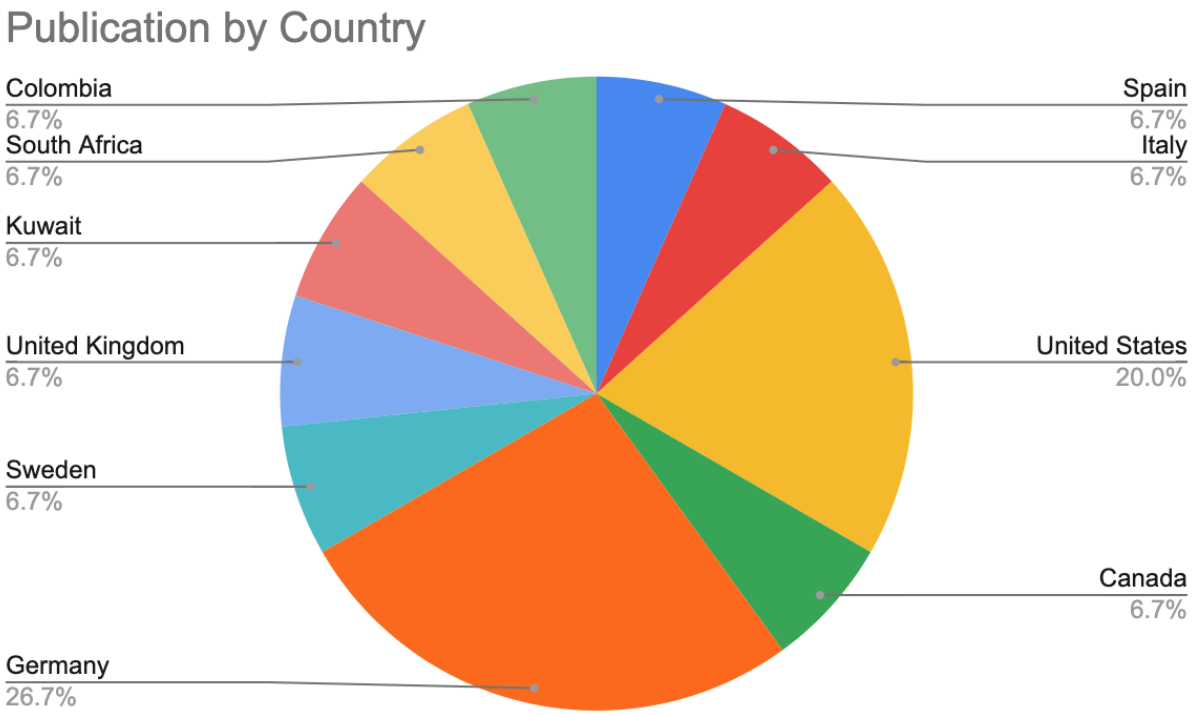
Figure 2: Number of Publications per Year



Furthermore, the distribution of publications across countries, shown in Figure 4, highlights a concentration of research output in specific regions. The largest share of studies stems from Germany, accounting for 26.7 percent of the sample, followed by the United States with 20 percent. The remaining countries, including the United Kingdom, Canada, Spain, Italy, Sweden, South Africa, Colombia, and

Kuwait, each contributed one study, making up 6.7 percent respectively. Although no regional filters were applied, the final selection reflects a strong presence of research from Europe and North America, while studies from East and South Asia, Oceania, and much of the Global South are notably absent.

Figure 3: Distribution of Articles Across Countries



4.2 Analytical Overview

As part of the analytical process, each of the 15 studies was examined in terms of its conceptual focus, methodological approach, and its connection to political polarization. The studies were grouped according to the primary framework they engaged with, resulting in seven studies categorized under echo chambers and eight under filter bubbles. However, this division is not absolute. Due to the conceptual and practical overlap between echo chambers and filter bubbles, as discussed in the theoretical framework, some studies addressed both user-driven behaviors and algorithmic dynamics. In such cases, categorization was guided by the study's primary analytical focus.

To provide further clarity and structure, each framework was subdivided into categories that reflect recurring analytical patterns in how the selected studies approach political polarization.

For filter bubbles, the distinction is based on experimental designs and in-platform dynamics, depending

on whether the study was conducted in a controlled setting or within a social media platform. One exception is Levy (2020), which employed a randomized experimental design within Facebook's live environment. Given its emphasis on real-world algorithmic exposure, it is included under in-platform dynamics.

While the filter bubble studies primarily focus on algorithmic structures and their influence on users exposure to political content, echo chamber research highlights the social and communicative structures that users build themselves and how they amplify polarization dynamics. The following table outlines the classification of all 15 studies and forms the basis for the findings discussed below.

Table 1. Analytical overview

Framework	Category	Topic	Author
Filter Bubble	**Experimental Dynamics**	Testing the filter bubble and the polarizing impact of ideology-based news recommendation: Germany & US	(Ludwig et al., 2025)
		Influence of exposure to algorithmically selected or randomly selected arguments on attitude and affective polarization	(Kelm et al., 2023)
		Impact of content-based news recommendation systems on affective, ideological, and perceived political polarization	(Ludwig et al., 2023)
		Influence of algorithmically curated online environments on attitude/affective polarization and BISO: COVID-19 in Germany	(Neumann et al., 2021)
	In-Platform Dynamics	The effects of social media news exposure on Facebook	(Levy, 2021)
		Effect of commercialized algorithms on platforms like Twitter/X	(Morales et al., 2025)
		Effects of news consumption on affective polarization: US & Japan	(Lee et al., 2022)
		Investigation of incidental exposure to non-like-minded news on social media	(Masip et al., 2020)
Echo Chamber	**Online Discourse**	Analyze social media polarization and echo chambers related to COVID-19 on Twitter	(Jiang et al., 2021)

		Analyzing language differences and network structures: COVID-19 on Twitter in the US	(Durrheim & Schuld, 2025)
		Analyzing the role of memes in shaping political discourse on social media	(AlAfnan, 2025)
		Investigates political memes and fake news on Instagram	(Al-Rawi, 2021)
	User Agency	Investigate users' interaction with posts, pages, and topics on Facebook	(Cinelli et al., 2020)
		Analysis of users visual attention and link selection on search results	(Ekström et al., 2022)
		Influence of network polarization resulting from partisan blocking on attitudinal and behavioral political polarization	(Kaiser et al., 2022)

4.3 Filter bubbles

4.3.1 Experimental Dynamics

The studies by **Ludwig et al. (2025)**, **Kelm et al. (2023)**, **Ludwig et al. (2023)**, and **Neumann et al. (2021)** all employed controlled experimental environments to examine the effects of algorithmic news recommendation systems (NRS) or curated content on polarization.

In **Ludwig et al. (2025)**, participants in Germany and the United States were exposed to either a politically biased or a balanced news recommender system. The biased system suggested content aligned with users prior ideological leanings, while the balanced system deliberately included content from across the ideological spectrum. The study found that ideological polarization increased slightly in both countries among politically moderate users when exposed to biased recommendations. Moderate users are referred to as individuals whose political views are not strongly aligned with either extreme of the ideological spectrum. However, no significant effect on affective polarization was observed overall. Nevertheless, when looking at balanced recommendations, a reduction in affective polarization was found only among German moderates. **Kelm et al. (2023)** similarly studied the effects of algorithmic content exposure in a panel experiment. Participants received either like-minded or opposing arguments, delivered randomly or via an algorithm designed to recommend persuasive content. The study confirmed that attitudinal and affective polarization increased when participants engaged with like-minded arguments. However, the additional effect of algorithmic selection was limited, with only a marginal

increase in polarization observed in one case. Content alignment and individuals' prior attitudes were seen as the primary drivers of polarization, rather than the personalization mechanism itself. **Ludwig et al. (2023)** extend this by testing a content-based recommender system enriched with either negative or balanced sentiment. The system was deployed in an experimental setting focusing on migration-related news in Germany. This study introduced three forms of polarization: affective, ideological, and perceived polarization. Overall, they found no significant main effects of the recommender systems on the types of polarization. However, when time spent engaging with the content was considered, clear patterns emerged. Participants who spent more time reading content from the negative sentiment recommender became more affectively polarized, while those who engaged longer with the balanced sentiment version experienced ideological depolarization. To continue, **Neumann et al. (2021)** examined whether exposure to like-minded or opposing arguments would influence changes in attitude or affective polarization, depending on whether the content was chosen randomly or personalized using an algorithm that recommended arguments based on similar content to the users' preferences. Their results showed no significant effects from either the alignment of the content or the use of algorithmic curation. However, their study also introduced a new dimension: the belief in the importance of silencing others (BISO). They found that, particularly among supporters of COVID-19 restrictions, higher levels of affective polarization were associated with a greater willingness to suppress opposing views. This study indicates that while algorithms may not directly polarize, affective divisions can still lead to more exclusive attitudes.

4.3.2 In-Platform Dynamics

While the previous studies were conducted in controlled experimental environments, the following studies by **Morales et al. (2025)**, **Lee et al. (2022), Levy (2021), and Masip et al. (2020)** examine how exposure to content occurs within actual social media environments.

Morales et al. (2025) provide a broad system-level perspective on how engagement-based algorithms shape political discourse on social media. Their study analyzes user activity on Twitter during the 2020 U.S. presidential election and investigates how the platform's algorithm structured interactions. This study found that Twitter's algorithm systematically amplified high-engagement content, much of which was emotionally charged and polarizing in tone. This caused communities to become more divided, especially along the political lines (Republicans and Democrats). The analysis showed that pro-Trump and anti-Trump groups were not only ideologically split in their political views but also rarely shared or interacted with content across groups. These communities operated increasingly through what the study describes as "acclamation" dynamics, where ideas gained legitimacy not through reasoned debate or

factual accuracy, but through popularity signals. Additionally, sentiment analysis revealed that emotionally charged posts, particularly those reinforcing in-group narratives, were more likely to be amplified by the platform. Further, **Lee et al. (2022)** analyzed a cross-national survey conducted in the United States and Japan. It explored how social media and messaging-app news use relate to affective polarization. Respondents reported their frequency of consuming political news via platforms such as Facebook and Twitter, as well as through messaging apps like WhatsApp, Snapchat, and LINE. The findings showed that social media news use was positively associated with affective polarization in both countries, even when controlling for political interest and partisanship strength. Further, algorithmically curated news feeds on social platforms contributed to the intensification of emotional divides, particularly through mechanisms of content alignment and selective exposure. In contrast, news consumption via messaging apps was negatively associated with affective polarization, especially in the U.S., where the depolarizing effect was more pronounced among individuals with strong partisan identities. **Levy (2021)** offers further insights through a large-scale field experiment conducted within Facebook's live environment. Participants in the United States were randomly assigned to receive prompts encouraging them to follow ideologically diverse news sources, including outlets that challenged their political beliefs. Although many participants subscribed to a wide range of pages, a decomposition analysis revealed that Facebook's algorithm played a major role in limiting the visibility of counter-attitudinal content. The algorithm had a stronger influence on what users saw than their own subscription choices, reinforcing algorithmic selective exposure dynamics. The study further found that exposure to opposing views significantly reduced affective polarization, measured by participants' feelings toward members of the opposing political party. However, no significant changes were observed in political opinions related to specific issues or political figures. Lastly, the study of **Masip et al. (2020)** highlighted that exposure to non-like-minded content generally occurs in social media environments. Their large-scale survey of Spanish social media users found that although many respondents preferred ideologically consistent news sources, a substantial portion (61%) reported encountering content from opposing viewpoints at least occasionally, with 27% doing so frequently or very frequently. Importantly, this kind of unintentional exposure was more common among users who were highly active on platforms like Twitter, particularly those who engaged in sharing or commenting on news posts.

4.4 Echo chambers

4.4.1 Online Discourse

The two studies by **Jiang et al. (2021)** and **Durrheim and Schuld (2025)** investigate COVID-19-related discussions on Twitter to explore how echo chambers contribute to political polarization through patterns of interaction and expression.

Jiang et al. (2021) employed a deep learning model to estimate users' political ideology and map the structure of retweet interactions during the pandemic. Their findings revealed clear evidence of political echo chambers, particularly among right-leaning users, whose retweet activity was almost exclusively limited to ideologically similar accounts. In contrast, left-leaning and centrist users showed more cross-ideological engagement since they were retweeting a broader variety of viewpoints. The study also found that a relatively small group of highly partisan users, situated at the far ends of the ideological spectrum, played a disproportionately large role in shaping conversations on Twitter. Their messages were mostly amplified within their own political communities, rarely reaching across ideological lines. This was particularly evident among right-leaning users. Expanding on this, **Durrheim and Schuld (2025)** introduced a new approach to analyzing online polarization by comparing ideological alignment in both retweet networks and user language during the COVID-19 vaccine rollout. Using a machine learning method, they were able to measure polarization in language independently of social connections. Their findings showed that, prior to the official pandemic declaration, users in the retweet network interacted across a broader range of viewpoints. In this regard, proximity in the network did not necessarily predict linguistic similarity. However, following the declaration of the pandemic, the speaker landscapes became more sharply divided. Republicans and democrats, who had previously shared some linguistic overlap, began using increasingly distinct and polarized language. This shift occurred even without major changes in the network structure. The study also found that users who initially used more moderate language were increasingly drawn into the polarized linguistic environment.

The remaining two studies examine how meme content functions as a vehicle for political discourse. In this regard, memes combine visual and linguistic elements to condense complex political issues into simple and often provocative messages (AlAfnan, 2025). While **Al-Rawi (2021)** focused specifically on Instagram, **AlAfnan (2025)** analyzed meme activity across multiple platforms, including Instagram, Twitter (X), TikTok, and Facebook.

AlAfnan (2025) investigated how memes function within contemporary political communication.

The study found that political memes frequently relied on sarcasm or mockery to delegitimize opponents. This study found that memes predominantly circulated within ideologically homogeneous communities, with little cross-ideological interaction. On the other hand, engagement was highest when memes aligned with users' pre-existing beliefs. A network analysis further revealed that meme-sharing patterns followed partisan lines and reinforced existing ideological divides and minimized exposure to alternative perspectives. Political influencers played a key role in amplifying this content, with their posts generating significantly higher engagement and reach. Adding on to that, **Al-Rawi (2021)** offers an analysis of political meme discourse on Instagram using the #fakenews hashtag, particularly in the context of U.S. politics during the Trump era. The study identified two ideologically opposed communities (pro-Trump and anti-Trump) that used memes as tools of mutual delegitimization. The pro-Trump community was significantly larger, more active, and better coordinated. It relied on recurring symbols and slogans such as MAGA and Trump2020 to construct group identity and reinforce ideological boundaries. Pro-Trump Memes were often targeting liberal politicians and media outlets. Tactics included coordinated posting behavior and the use of coded language, including anti-Semitic symbolism. The anti-Trump community was smaller and less cohesive, though it similarly used memes to critique and satirize right-wing figures and narratives. Al-Rawi's analysis showed that these two communities operated in a highly polarized environment, with little interaction or meme-sharing between their ideological camps.

4.4.2 User Agency

The studies by **Cinelli et al. (2020)**, **Ekström et al. (2022)**, and **Kaiser et al. (2022)** examine how user behaviors sustains echo chambers.

The study by **Cinelli et al. (2020)** provides large-scale evidence of how users' content selection behavior contributes to the creation of echo chambers, independent of algorithmic intervention. Analyzing Facebook data from millions of users over a six-year period, the study found that people consistently engage with a small set of preferred news sources, despite being exposed to a broad range of topics. The findings show that source loyalty, rather than topic avoidance, plays a key role in shaping users' media diets. As users become more active, they tend to concentrate their engagement even further, narrowing the range of perspectives they interact with. Building on this, **Ekström et al. 2022** conducted an experiment using eye-tracking and click data to test how participants responded to politically diverse search results. They found that participants, particularly those with right-leaning views, spent more time looking at, and were more likely to click on, content that aligned with their pre-existing attitudes. Importantly, this occurred in an environment where opposing content was equally available. Trust was a key factor in this regard as participants paid significantly less attention to sources they perceived as untrustworthy. Lastly,

Kaiser et al. (2022) added a social dimension by introducing the concept of “partisan blocking”, meaning the decision to block or unfollow others based on political disagreement. Their study showed how users respond when friends share political misinformation. Through self-reported data, the study found that people were more likely to block friends who held different political views if those friends shared false information. When the same misinformation was shared by friends who had similar political views, people were less likely to block them. This reaction was not driven by whether the misinformation was seen as plausible or not, but rather by the political alignment of the person sharing it. This blocking behavior was more pronounced among left-leaning participants, particularly those with more extreme views. The study argues that this contributes to network polarization by making users' online environments more ideologically homogenous, reinforcing echo chamber-like conditions through the selective removal of dissimilar others.

5. Discussion

5.1 Filter bubbles

Overall, the findings from the reviewed studies present a mixed and context-dependent picture of algorithms and therefore, the filter bubble effects on social media. Studies conducted within real-world platform environments indicate that algorithmic systems tend to prioritize emotionally charged and ideologically consistent content. Thereby, algorithms indeed can reinforce informational homogeneity and contribute to polarization (Morales et al., 2025; Levy, 2021; Lee et al., 2022). However, experimental research paints a more cautious picture. Neumann et al. (2021), for instance, found no significant effects of algorithmic curation on polarization outcomes, and Ludwig et al. (2023) similarly reported no direct impact from different news recommender systems. Still, both studies suggestrd that user engagement and emotionally negative or ideologically aligned content plays a more influential role than the personalization algorithms themselves.

To interpret these findings more systematically, the polarization typology introduced in the theoretical framework offers a helpful structure. The most consistent patterns in the reviewed studies emerge in relation to affective polarization. Several studies found that engagement with like-minded or emotionally negative content was associated with increased emotional hostility toward political out-groups (Ludwig et al., 2023; Kelm et al., 2023). Conversely, exposure to more ideologically diverse or sentimentally balanced content tended to reduce affective polarization, especially among moderate users (Levy, 2021; Ludwig et al., 2023). The evidence for ideological polarization is comparatively limited. While one study observed modest ideological shifts dependent on the analyzed region (Ludwig et

al., 2025), others reported little or no change in core political beliefs (Kelm et al., 2023; Neumann et al., 2021). Perceived polarization was examined less frequently, but there is some evidence that showed that time spent with content may influence individuals' sense of political division (Ludwig et al., 2023).

While these results suggested that affective dynamics are particularly sensitive to emotional tone and the consistency of exposure, it also became evident that exposure to more ideologically diverse content on social media could work as a depolarizer. A central contribution to this debate comes from a large-scale field experiment that tested whether increasing political diversity in Facebook news feeds would reduce polarization. For approximately 20,000 participants, the amount of content from like-minded sources was reduced by one-third, leading to increased consumption of both neutral and counter-attitudinal content, while overall time spent on the platform remained stable. Despite this shift in exposure, the intervention produced no statistically significant effects across eight indicators of polarization, including affective polarization or ideological extremity (Nyhan et al., 2023). This suggests that simply increasing the diversity of content exposure is not enough to reduce polarization on social media. Instead, the evidence indicates that the emotional tone and ideological alignment of the content that platforms amplify may have a greater influence on how polarization unfolds.

Furthermore, although the filter bubble hypothesis generally suggested that algorithmic personalization confines users to ideologically aligned content, research shows that incidental exposure to opposing views still occurs (Masip et al., 2020). These conclusions are also in line with broader findings in the literature suggesting that algorithmic selection on social media platforms often results in slightly more diverse news use than commonly assumed (Ross Arguedas et al., 2022).

Taken together, the findings offer limited support for the filter bubble hypothesis, suggesting that the notion of users being entirely isolated in ideologically uniform information environments is overstated. At the same time, algorithms alone appear to have only a modest effect on political polarization. However, it could reinforce affective polarization under specific conditions, particularly when it is paired with emotionally charged and ideologically aligned content.

5.2 Echo Chambers

Compared to filter bubbles, the findings reviewed in this thesis offered stronger empirical support for the presence of echo chambers in social media environments. This difference may be partly explained by the broader theoretical foundation that supports the natural formation of echo chambers, extending beyond the selective exposure framework. For instance, "cognitive dissonance theory" (Festinger, 1957) suggests that individuals experience discomfort when confronted with conflicting views. Similarly, the principle of "homophily" (McPherson et al., 2001) describes the tendency of individuals to associate with

others who are similar to themselves.

These theoretical insights are reflected in empirical research as well. Across the analyzed studies the consistent pattern emerged that users engage in selective exposure, favor ideologically aligned content, and shape their online networks in ways that reduced contact with opposing views (Cinelli et al., 2020; Ekström et al., 2022; Kaiser et al., 2022). This pattern is also reflected in earlier research. A systematic literature review examined 55 studies from before 2020 found substantial evidence for the existence of echo chambers across platforms (Terren and Borge-Bravo, 2021). One of their main findings highlighted that studies using digital trace data were more likely to identify echo chambers than those relying on self-reported survey data. Given that the majority of studies analyzed in this part also rely on digital trace data, may partly explain the robustness of echo chambers within the findings of this review.

Although these findings provided meaningful evidence for the presence of echo chambers, their existence alone does not necessarily establish a direct link to political polarization. To interpret these findings systematically, the polarization typology introduced in this thesis offers a useful lens. The most clearly reinforced dimension is network polarization. Multiple studies showed that users clustered into ideologically homogeneous communities through behaviors such as selective interaction and partisan blocking (Jiang et al., 2021; Kaiser et al., 2022). These network structures were particularly pronounced among right-leaning users, who engaged almost exclusively with like-minded content (Jiang et al., 2021; AlAfnan, 2025; Al-Rawi, 2021). At the same time, left-leaning users were more likely to engage in partisan blocking when confronted with political disagreement (Kaiser et al., 2022). Affective polarization is also reflected in several studies, particularly those analyzing meme-based political communication. Emotional language and mockery were frequently used to strengthen in-group identity and delegitimize opponents to further foster animosity between camps (AlAfnan, 2025; Al-Rawi, 2021). Evidence for ideological polarization was more indirect. While the reviewed studies did not report significant changes in core political beliefs, confirmation-seeking behavior and selective exposure to ideologically aligned sources were consistently observed (Cinelli et al., 2020; Ekström et al., 2022). Lastly, language polarization appears as a distinct form. During events like the COVID-19 pandemic, partisan groups developed increasingly polarized communication styles (Durrheim & Schuld, 2025).

Observing this dynamic, the question emerged whether politically charged contexts, beyond the COVID-19 pandemic, can intensify political polarization. External evidence suggested that this indeed occurs during election campaigns. A longitudinal field study found that during these periods, voters not only develop stronger preferences for their most preferred political party but also exhibit growing dislike for their least preferred one. This dual movement reinforced initial party loyalties and widened the emotional gap between political camps, thereby deepening affective polarization (Hansen & Kosiara-Pedersen, 2015).

Another emerging theme was that emotionally charged content appeared to play a significant role in fostering polarization, as seen in the case of political memes. Additional support for this dynamic came from external research on social media interactions.

Generally, this section invited reflection on whether ideological clustering is an entirely new development caused by social media. An external perspective offered by Möller (2021) suggested that "the observation that we surround ourselves with voices that agree with us is nothing new or inherently connected to the emergence of the internet.". From this perspective, social media may not have created these dynamics, but instead made them more visible and measurable.

Taken together, the findings offered robust support for the existence of echo chambers. While echo chambers themselves did not directly cause political polarization, their underlying mechanisms could contribute to its intensification. In this regard, selective exposure led to partisan clustering and network polarization. Furthermore, these dynamics seemed to be especially influential during politically charged contexts and in combination with emotionally-rich content and discourse.

5.4 Limitations

Despite the individual limitations of each of the studies that were included in this systematic literature review, the findings of this thesis also contained several challenges. While this literature review offered valuable insights into how filter bubbles and echo chambers related to political polarization, the findings must be interpreted with several limitations in mind.

The first consideration is the general systematic literature review approach. Although a systematic literature review provides a structured method for synthesizing existing research, it relies solely on the availability of studies in the databases of SmartCat and Scopus. As a result, some of the keywords initially included in the methodology, such as "fake news" and "misinformation," were not strongly reflected in the final analysis. While preliminary research indicated that these factors might play a significant role, the selected studies ultimately offered little direct engagement with these topics. In this regard, subjective decisions concerning inclusion criteria clearly shaped what was captured. Along with other things, this led to the situation that the studies included in this thesis were heavily skewed toward Western democracies, especially the United States and Germany. This focus excluded potentially significant variations in social media polarization in other parts of the world, such as the global south. Interestingly, even when the studies were not authored in the United States, researchers from other countries frequently focused their analysis on this country. This is likely due to the abundance of accessible data and the country's prominence in social media research. Nevertheless, it could also partially be related to the English-language filter. Therefore, relevant work in other languages or publication systems may have

been overlooked.

Moreover, the usage of very general search terms such as “social media” led to a very broad range of platforms. Most of the reviewed studies concentrated on a limited number of social media platforms, with some, such as Twitter, appearing more frequently than others. As a result, the findings may not have fully reflected the dynamics present on less frequently studied platforms. In this regard, it is important to acknowledge that each platform operates with distinct technical structures and content formats. This meant that dynamics observed in one environment may not directly translated to others, which made the paper very general instead of social media specific. The selection of the analyzed literature also revealed conceptual imbalances. While the developed typology included affective, ideological, network, perceived, and language polarization, not all types received equal analytical attention. Both echo chamber and filter bubble studies engaged with multiple dimensions of polarization, though with differing emphasis. Echo chamber research more strongly reflected network and language polarization, while filter bubble studies predominantly addressed affective polarization and, to a lesser extent, ideological and perceived polarization. Although these concepts are treated separately in this thesis for analytical clarity, the findings show that they are often interconnected and influence each other in practice. Nevertheless, the uneven attention across polarization types may limit how comprehensively each form of polarization is empirically captured.

Furthermore, some studies relied on controlled experimental settings (Ludwig et al., 2025; Kelm et al., 2023; Ludwig et al., 2023; Neumann et al., 2021), especially in the filter bubble discussion. However, experimental settings can only partially replicate actual online social media dynamics and may not fully capture how polarization unfolds in the more dynamic conditions of everyday online life. Complementing this, some findings were either entirely or only partially based on self-reported data (Ludwig et al., 2023; Kelm et al., 2023; Masip et al., 2020; Kaiser et al., 2022; Neumann et al., 2021; Ludwig et al., 2025; Ekström et al., 2022; Lee et al., 2021; Levy, 2020), which could be affected by the social desirability bias (Tourangeau et al., 2000). This bias refers to the tendency of respondents to present themselves in a favorable light. Participants therefore could report behaviors or attitudes that they believed were more socially acceptable rather than fully accurate. As a result, participants may have unintentionally overstate certain aspects of their behavior or attitudes, which could have led to distortions in how engagement and exposure dynamics were measured.

Adding on that, it was visible that many of the studies that had been selected to investigate political polarization were conducted during moments of heightened political tension. Therefore, events such as elections and the COVID-19 pandemic had been very dominant in the findings. Arguably, these kinds of periods tended to deepen partisan engagement, as they often led people to become more emotionally invested in political issues and also seemingly more aligned with their preferred side. While

these events were analytically rich, they may have also magnified the intensity of observed dynamics within observations.

Lastly, the relatively small number of studies limited the broader generalizability of the findings which highlighted the need for future research to expand the evidence base and validate these insights across different contexts.

5.5 Future directions

Regarding future research, greater attention should be given to further platform-specific analyses, especially beyond the dominant focus on Twitter. Platforms like TikTok have so far been only partially explored, despite their growing role in political communication. In this regard, the influence of short-form video content, which extends beyond memes, presents an interesting area for further investigation, as it may shape user engagement and political polarization in distinct ways. Therefore, exploring the unique features of each social media platform can help clarify how different content formats and social media structures contribute to these dynamics. To gain further insight into this, more qualitative methods, such as interviews or ethnographic research, could be used to support researchers to identify how users engage with polarizing content.

Beyond the characteristics of the platforms themselves, future research should also explore which segments of the population are most susceptible to different forms of polarization. Although some studies already categorized users based on their political orientation, this alone does not provide sufficient insight into the broader societal impact. Including more specific variables, such as age groups, could help address the understanding of how digital polarization shapes political attitudes across generations. Depending on the platform, younger demographics may be especially exposed to certain dynamics due to their higher engagement and user number within social media.

In addition, future research should broaden its geographic scope to include non-Western and Global South contexts, helping to build a more globally balanced understanding of polarization dynamics. In this regard there is also space for further methodologies. Although some work in this area exists, future studies should place greater emphasis on longitudinal research, including periods of low political intensity. This would help determine whether polarization dynamics are a consistent aspect of digital life or primarily escalate during moments of crisis.

Lastly, further studies could place greater emphasis on investigating potential strategies to counteract polarization through interventions such as emotional tone moderation or exposure balancing. The knowledge gained from this could help inform evidence-based policy recommendations aimed at supporting less polarizing interactions on social media platforms.

7. Conclusion

To conclude, this systematic research aimed to answer the question: *"Do social media concepts such as filter bubbles and echo chambers influence political polarization?"*. To explore that, this thesis examined the validity of the filter bubble hypothesis and the presence of echo chambers, with a particular focus on their underlying mechanisms, such as algorithmic personalization and selective exposure. A systematic literature review of 15 recent studies was conducted to assess how these dynamics relate to political polarization. The findings suggested that filter bubbles and echo chambers did not directly cause polarization. Nevertheless, the mechanisms associated with them could contribute to their intensification and influence political polarization given specific contextual conditions. Echo chambers received robust empirical support, particularly in how users self-organized into ideologically homogeneous networks. Mechanisms like selective interaction and partisan blocking drove network polarization. This was especially visible during periods of heightened political salience. Furthermore, when combined with emotionally charged content and discourse, these dynamics could amplify affective polarization by reinforcing in-group cohesion and hostility toward opposing views. In contrast, the filter bubble hypothesis received only limited empirical support. The notion that users are entirely enclosed in ideologically curated information environments was not fully supported by the evidence, as incidental exposure to opposing views still occured. In experimental settings, algorithms appeared to have only a modest effect on political polarization. However, findings from real-world social media environments suggested that algorithms could have reinforced affective divisions, particularly when they amplified content that is both ideologically aligned and emotionally evocative.

Even though these findings were insightful, they should be interpreted with care. The results were shaped by specific contexts and were not easily generalizable across all societies or platforms. Much of the reviewed research focused on Western settings and politically charged moments, often centered around a limited number of platforms such as Twitter. This meant that dynamics present in other cultural or political environments, or on less frequently studied platforms, may not have been adequately captured. Therefore, the conclusions presented here must be understood within these boundaries and should not be overstretched beyond their empirical foundation.

Implications for future research include the need for more platform-specific analysis that goes beyond dominant cases like Twitter, with greater attention to emerging platforms and content formats. Additionally, there is a need for more geographically diverse studies to better capture polarization dynamics in non-Western context. Lastly, future studies should incorporate more individualized indicators, such as age, into the measurement of polarization to better assess the broader societal impact of social media.

Authors Note

To enhance the clarity and readability of this thesis, the AI-based writing assistant Grammarly was used to support the proofreading process. The tool helped identify issues related to grammar, spelling, and sentence structure. All suggestions were critically evaluated and applied only when they aligned with the intended meaning, in order to maintain the academic integrity of the work. Additionally, AI was used to alphabetically organize the references according to APA 7 guidelines. Following this step, each entry was manually reviewed to ensure accuracy and proper formatting.

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