# Echo Chambers and Algorithmic Bias: The Homogenization of Online Culture in a Smart Society

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**ABSTRACT**
The rise of smart societies, characterized by extensive use of technology and data-driven algorithms, promises to improve our lives. However, this very technology presents a potential threat to the richness and diversity of online culture. This thesis explores the phenomenon of echo chambers and algorithmic bias, examining how they contribute to the homogenization of online experiences. Social media algorithms personalize content feeds, presenting users with information that reinforces their existing beliefs. This creates echo chambers, where users are isolated from diverse viewpoints. Algorithmic bias, stemming from the data used to train these algorithms, can further exacerbate this issue. The main data in this study were sourced from previous studies (secondary data) which focused on research related homogenizing on online culture. The thesis investigates the impact of echo chambers and algorithmic bias on online culture within smart societies. It explores how these factors limit exposure to a variety of ideas and perspectives, potentially leading to a homogenized online experience. By examining the interplay between echo chambers, algorithmic bias, and the homogenization of online culture in smart societies, this thesis aims to contribute to a more nuanced understanding of the impact of technology on our online experiences.

**Keywords**: Echo Chambers, Algorithmic Bias, Homogenization, Online Culture, Smart Societies

## INTRODUCTION

The internet has fundamentally transformed the way we obtain and utilize information in the modern era of technology. Nevertheless, this progress in technology has also led to a troubling occurrence - the emergence of echo chambers and the magnification of algorithmic prejudice. With the growing personalization of our internet experiences, we are constantly exposed to content that supports our preexisting opinions. This creates a self-reinforcing pattern that might result in the convergence of perspectives and the decline of critical thinking.

The algorithms powering social media platforms and search engines are designed to deliver content that is tailored to our individual preferences, based on our browsing history, search queries, and interactions (Harambam et al., 2018). While this personalization can be convenient, it also has the unintended consequence of shielding us from diverse viewpoints and alternative narratives. As we're exposed to a narrowed range of information, our understanding of the world becomes skewed, and we become increasingly susceptible to misinformation and confirmation bias (McBrayer, 2020).

Due to the rapid evolution of the digital landscape, the occurrence of echo chambers and algorithmic bias has resulted in a concerning uniformity of online culture. Social media platforms, propelled by sophisticated algorithms, have become skilled at curating tailored content streams that reinforce users' preexisting opinions and preferences. The phenomenon of the "filter bubble" has led to a worrisome inclination towards ideological seclusion, as individuals are progressively exposed to a limited spectrum of viewpoints that correspond to their own preconceived notions (Srisermwongse, 2022).

The standardization of online culture has significant consequences for how we interact with information and shape our perspectives (Wahyuni et al., 2021). These echo chambers create an atmosphere of intellectual stagnation by restricting our exposure to varied opinions and challenging ideas. In such an environment, critical thinking and open-mindedness are frequently disregarded in favor of confirmation bias (Reed, 2018). This phenomenon can result in the solidification of opposing viewpoints, making it progressively challenging for individuals to understand and relate to those who possess divergent opinions or to participate in productive conversations.

Moreover, the standardization of online culture can have extensive implications for the structure of our society. As individuals isolate themselves in their own echo chambers, the collective comprehension of reality and the basis for meaningful conversation becomes further fragmented (Nguyen, 2020). The process of fragmentation can exacerbate the breakdown of social cohesion, hence posing difficulties in tackling intricate societal problems that necessitate group effort and a mutual understanding of varied viewpoints.

The algorithms utilized by social media platforms in the current day have a significant impact on determining the information environment that users encounter. These algorithms are specifically created to ensure user engagement, typically by giving priority to content that corresponds with their preexisting ideas and interests. This phenomenon can result in the construction of what are commonly referred to as "echo chambers," wherein users are exposed to a restricted and uniform range of viewpoints, so strengthening their preexisting beliefs and impeding their ability to come across varied or conflicting information (Luzsa, 2019).

The essence of this matter resides in the functioning of social media algorithms. These algorithms examine user behavior by monitoring the information they interact with, the individuals they follow, and the subjects they show interest in. Using this data, the algorithms curate and provide a customized stream of material with the intention of keeping the user browsing and interested. Although this strategy may enhance user retention and platform engagement, it can also have substantial implications for the diversity and caliber of material that individuals encounter (Kuang et al., 2019).

**LITERATURE REVIEW**

Research on social media and echo chambers highlights how these platforms can limit exposure to diverse perspectives and foster the formation of like-minded groups. For instance, a study by (Cinelli et al., 2021) compared content on Facebook, Twitter, Reddit, and Gab, it was found that Facebook and Twitter tend to foster homophilic interaction networks, reinforcing shared beliefs. Algorithmic bias also plays a role in prioritizing content aligned with users' preferences. Additionally, comparisons of news consumption indicate higher segregation on Facebook, suggesting a greater likelihood of echo chambers forming. Research by (Gillani et al., 2018) addresses echo chambers' impact and interventions on Twitter using Social Mirror. Their experiment found recommending opposing political accounts reduced users' perception of network homogeneity but didn't significantly affect shared URL alignment. Those perceiving homogeneity tended to have less diverse connections long-term, highlighting the need for nuanced interventions to foster healthier digital discourse.

(Bruns, 2017) challenges the idea of social media echo chambers, noting limited evidence. While some believe in filter bubbles, a Pew study suggests only 23% of US Facebook users and 17% on Twitter perceive echo chambers. Interactions on social media have prompted 20% to reconsider political or social stances. Large-scale Twitter studies reveal interconnectedness across ideological boundaries, except for select partisan groups. Bruns expands this discourse with new data from the Australian Twittersphere, providing a comprehensive analysis of echo chamber existence.

(Franziska et al., 2019) research told how fake news and echo chambers function on social media. It analyses whether machine-generated filter bubbles contribute to fake news dissemination and how individuals react to them. The findings suggest that while filter bubbles exist, they are driven by user behavior, reinforcing confirmation bias. Responses to fake news are influenced by various cognitive factors, indicating a multifaceted information landscape.

(Baer & Baer, 2019)'s research delves into algorithmic biases in social media, focusing on the selection of posts shown to users. It serves as a case study, demonstrating how different biases can interact and compound each other, leading to dynamic biases that evolve over time through user-algorithm interactions. The chapter highlights how these biases can reinforce each other, ultimately resulting in significant distortions in the content users see. The research by (Neubaum et al., 2021) examine how Facebook users deal with political disagreements. Despite social media's potential for diverse views, users often unfriend dissenters. Through interviews with 20 German users, they find cognitive and behavioral strategies influenced by disagreement severity and relationship closeness, informing understanding of online political homogenization.

(Pettis, 2022) explores the impact of Know Your Meme (KYM) on shaping web history. Pettis analyzes KYM's construction as a cultural authority and warns against overreliance on it, as it can lead to the homogenization of web histories. He suggests researchers contextualize KYM in their work to maintain a nuanced understanding of meme culture. (Moon & Lewis, n.d.)'s study contrasts how U.S. and South Korean journalists use social media, highlighting the risk of homogenization. In the U.S., individuality and personal branding may lead to homogenized news content, while South Korea's collectivist culture fosters a more communal approach to social media, potentially preventing homogenization by promoting equitable distribution of news sources.

(Bansal, 2024)'s study shows how social media and Web 2.0 algorithms contribute to cultural homogenization. Drawing from Glasser's choice theory, it suggests that these platforms tap into human desires for fun and freedom, reshaping cultural landscapes. The Cultural Homogenization Theory of Acculturation through social media and Web 2.0 Algorithms (CHAW) underscores this phenomenon, particularly impacting interdependent societies and fostering short-term orientation. This underscores the concerning trend of cultural homogenization driven by digital technologies. (Nechushtai et al., n.d.)'s study scrutinizes algorithmic recommendation systems on digital platforms like Google, Google News, Facebook, YouTube, and Twitter, focusing on their role as news intermediaries. Contrary to concerns about filter bubbles, the findings reveal a strong tendency towards homogenization in exposure to information across platforms, particularly evident in the prominence of certain types of content like professionally produced news and politically conservative outlets like Fox News.

Subsequently, the researcher utilized the VOSViewer bibliometric analysis method to examine several prior studies, as illustrated in the following image. This investigation aimed to identify trends in research topics under scrutiny and to pinpoint any unexplored areas in previous research, thereby paving the way for novel inquiries.

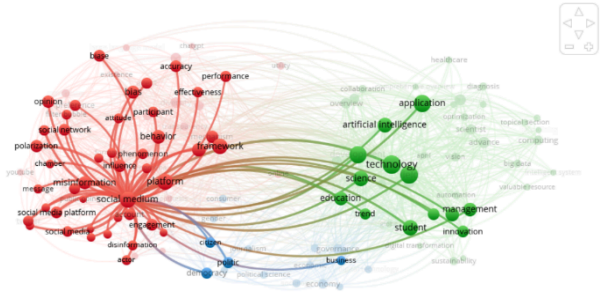


Figure 1. Analysis of bibliometric Vosviewer

Source: Vosviewer software

Social media platforms have become the central hubs of online interaction, connecting individuals across vast geographical distances. Vosviewer visualizations, as demonstrated in the analysis, highlight "social media" as a core entity, with connections to diverse user groups like "consumers" and "students." This centrality underscores the immense influence these platforms wield in shaping online behavior.

However, this interconnectedness presents a significant challenge: the proliferation of misinformation and disinformation. The map reveals a cluster around "misinformation" and "disinformation," linked to terms like "politics" and "governance." This suggests a concerning link between social media and the spread of untruths that can destabilize political discourse and civic engagement.

Further amplifying this issue is the creation of echo chambers. These online environments isolate users within ideological bubbles, reinforcing their existing beliefs and limiting exposure to opposing viewpoints. The map positions "echo chamber" near terms like "polarization" and "technology," implying a connection between social media algorithms and the exacerbation of political divides.

Algorithmic bias plays a critical role in fostering echo chambers. Social media platforms utilize algorithms to curate content for individual users. These algorithms, while designed for personalization, can inadvertently filter out information that contradicts a user's existing beliefs. The map incorporates terms like "artificial intelligence" and "big data," hinting at the technological underpinnings of this bias.

The combined effect of misinformation and echo chambers is a homogenization of online culture. Users are increasingly restricted to online spaces that validate their pre-existing biases, hindering exposure to diverse perspectives and critical thinking. This homogenization can stifle innovation and creativity, as it limits the exchange of ideas and challenges to the status quo. Therefore, this paper examines the concerning trends of echo chambers and algorithmic bias within social media platforms. By analysing the interplay between these forces, we aim to understand how they contribute to the homogenization of online culture in a smart society.

## METHOD

This study utilizes a qualitative case study methodology to examine echo chambers, algorithmic prejudice, and the homogenization of online culture in smart societies. The study used the filter bubble theory as the primary analytical framework, examining how tailored algorithms influence users' online experiences and contribute to the homogenization of information.

The compilation of data mostly depends on secondary sources, including academic literature, reports, and case studies that pertain to echo chambers, algorithmic bias, and online culture. This supplementary material offers a thorough comprehension of current research discoveries and knowledge about the methods by which echo chambers and algorithmic bias function in online contexts.

Data analysis entails a methodical examination and integration of secondary sources to discern significant themes, patterns, and trends. The researcher analyzes the substance, exchanges, and user perceptions in online settings, with a specific emphasis on the workings of echo chambers and algorithmic bias.

The analysis is driven by the filter bubble theory, which highlights how tailored algorithms construct a "bubble" around users, restricting their exposure to varied perspectives and promoting the standardization of online culture (Pariser, 2011). The researcher intends to use the filter bubble theory to examine secondary data and understand how echo chambers and algorithmic bias influence consumers' online experiences in smart societies.

## RESULT AND DISCUSSION

### Filter Bubble Theory

The phrase "filter bubble" was originated by internet activist Eli Pariser in his book, The Filter Bubble (2011). Algorithmic customization of online content refers to the process of tailoring information to individual users, creating an environment that is self-referential. Social media networks utilize advanced algorithms to curate information by analyzing a user's previous actions, including search history, likes, and clicks. Although personalization has the potential to improve user experience by giving priority to pertinent content, it can also result in the construction of echo chambers, where users are predominantly exposed to information that reinforces their own opinions and biases (Pariser, 2011).

Filter bubbles are essentially self-perpetuating information compartments. Social media networks utilize algorithms to monitor user behavior, which encompasses activities such as browser history, likes, shares, and search queries. Using this data, the algorithms select and organize information that corresponds to a user's current interests and opinions (Sapountzi & Psannis, 2018). This can lead to a scenario where individuals are predominantly exposed to material that validates their own worldview, while stuff that questions or opposes their viewpoints is systematically excluded. If a user repeatedly shares articles that criticize a specific political party, they may see that their newsfeed becomes more and more filled with similar information. The algorithm perceives this behavior as a bias and gives priority to such content, even if the user could gain from being exposed to contrasting perspectives for a comprehensive comprehension (Lu, 2020).

The primary factors contributing to filter bubbles are advanced customization algorithms and content selection bias. Personalization algorithms employ data analysis techniques to examine user data, including browsing history, interactions, and preferences, in order to forecast and give priority to content. (Eg et al., 2023). This customized content delivery might establish a feedback loop, strengthening consumers' preexisting prejudices and inclinations. Content selection bias exacerbates this situation by selectively filtering out content that contradicts users' opinions, preferences, or past interactions.

The effects of filter bubbles are diverse and significant. An important consequence is the limitation of analytical reasoning. Users who are primarily exposed to content that confirms their own opinions are less inclined to critically engage with various perspectives or question their own assumptions (Dahlgren, 2021). This might result in a lack of intellectual growth and a resistance to considering different perspectives. Furthermore, filter bubbles exacerbate societal polarization by intensifying divisions among individuals with divergent ideological positions.

Filter bubbles increase societal polarization and undermine empathy and understanding between different ideological groups by strengthening existing prejudices and restricting exposure to alternative ideas (Pizolati, 2024). Moreover, filter bubbles expedite the dissemination of false information and deliberate falsehoods. Exposure to a limited range of opinions and lack of critical examination makes consumers more vulnerable to manipulation through deceptive or inaccurate information (Caled & Silva, 2022). This decreases the trustworthiness of online sources of information and presents a substantial danger to public discussion and democratic procedures.

**Echo Chambers in the Filter Bubble**

Social media networks employ algorithms that are specifically designed to customize user experiences. They examine user data, including as browsing history, preferences, social media interactions, and search requests, in order to select and provide material that is considered highly captivating (Purnomo et al., 2021). Although this method provides ease, it can unintentionally result in the formation of echo chambers.

Echo chambers emerge due to algorithms prioritizing content that corresponds to a user's preexisting ideas and interests (Kitchens et al., 2020). Consider a user who regularly disseminates items that are highly critical of a specific political party. The algorithm perceives this as a preference and gives priority to comparable items, thus excluding contradictory perspectives. This, might strengthening the user's preexisting mindset and restricting their exposure to varied ideas. The emergence of echo chambers is apparent in real-life situations. Social media sites frequently display news feeds that are predominantly filled with items shared by friends and connections who have similar ideas. This can lead to the formation of an illusory consensus, when people are exposed to viewpoints that align with their own (X. Wang et al., 2020).

For example, a user who is interested in organic farming may find that their newsfeed is overwhelmed with articles and videos that endorse organic practices, while being exposed to very little content that discusses the potential disadvantages or the advantages of conventional agriculture. Similarly, a user who supports a specific political figure will mainly encounter postings and articles that speak well of that figure, while seldom encountering any critical viewpoints. These examples demonstrate how echo chambers limit individuals' exposure to other perspectives, impeding their capacity to develop comprehensive viewpoints.

The existence of echo chambers can have profound implications for the diversity of knowledge and the polarization of ideologies, as outlined below:

- Information Limitation: Echo chambers curtail consumers' exposure to a wide range of information. Excluding contradictory opinions may cause users to overlook essential viewpoints that could question their beliefs and expand their comprehension. The absence of a wide range of information might impede the development of critical thinking abilities and render users more vulnerable to manipulation by sources with skewed perspectives.
- Amplifying Polarization: Echo chambers have the potential to intensify social and political polarization. Users who are consistently exposed to information that reinforces their preexisting ideas are less inclined to comprehend or empathize with opposing perspectives. This can result in heightened animosity and a deterioration in the quality of public discussion. Envision two sports teams exulting in different arenas, each firmly confident of their own supremacy and completely unaware of the talents possessed by the opposing squad. Echo chambers engender a comparable dynamic, creating hostility between conflicting beliefs.

**Algorithmic Bias and Content Selection**

The emergence of personalized algorithms on social media platforms offers a customized online experience, responding to individual interests. Nevertheless, this convenience is accompanied by a drawback - the possibility of algorithmic bias affecting the choice of information (Eg et al., 2023). Algorithmic bias is the inclination of algorithms to show preference towards specific forms of material, which typically mirrors the biases found in the data used to train them or inherent in the algorithm's design (Silva & Kenney, 2018). This bias can manifest in several ways:

- Data Bias: The data used to train algorithms can be inherently biased, reflecting the societal prejudices of the data collection methods. Imagine training a map app only on roads used by a specific demographic – it would present a skewed view of the entire transportation network. Similarly, algorithms trained on biased datasets might prioritize content that aligns with those biases.
- Algorithmic Design Bias: The design choices made during algorithm development can introduce unintended biases. For example, algorithms that prioritize user engagement might favor sensationalist content over factual reporting, regardless of the underlying truth.

To comprehend algorithmic bias, one must analyze the elements that contribute to it. One such issue is the potential introduction of bias during the data collection process. Algorithms that are trained on datasets lacking diversity or that disproportionately reflect specific groups will continue to uphold and reinforce such prejudices when it comes to selecting content (Williams et al., 2018). When a social media platform collecting data primarily from users in urban areas, the resulting algorithms might struggle to understand and represent the interests of rural communities.

The choices taken during the process of developing an algorithm can have a substantial influence on the level of fairness. Placing greater importance on engagement metrics could unintentionally magnify the spread of false or exaggerated information (Tucker et al., 2018). For example, an algorithm specifically created to optimize user engagement may give priority to emotionally charged postings that become viral, even if they lack factual accuracy. These elements, when combined, result in a situation where algorithms continue to uphold existing societal biases, thereby restricting the range of information that is shown to users.

Algorithmic bias has serious implications for the diversity of information and perspectives accessible to users. Algorithms limit consumers from meeting alternative ideas by giving priority to content that matches their previous preferences (Bandy & Diakopoulos, 2021). This phenomenon gives rise to echo chambers, which then strengthen preexisting beliefs and impede the capacity to develop comprehensive and balanced viewpoints. Just like a student who relies solely on one textbook for a test, their knowledge will be restricted and vulnerable to scrutiny. Likewise, individuals confined within echo chambers fail to access vital viewpoints that have the potential to expand their comprehension.

Algorithmic biases have the potential to magnify the dissemination of false or misleading information. Content that is sensationalist, validates preexisting biases, or aligns with the algorithm's design decisions may receive higher priority, even if it lacks factual accuracy (Shin et al., 2022). An instance of this phenomenon is when the newsfeed becomes inundated with conspiracy theories because to their ability to generate more hits and shares compared to investigative journalism works. This can have a harmful effect on public discussions and the ability to make well-informed decisions.

Algorithmic bias has the potential to unfairly impact underprivileged groups to a greater extent. Biases in data collecting or design choices can result in the suppression of content from certain groups, so further constraining the diversity of information accessible to users. When a social media platform's algorithm disregards content from minority communities, it creates a digital environment that excludes their viewpoints (Karizat et al., 2021).

A notable example of the influence of social media on political perceptions can be observed in the context of the 2024 presidential election in Indonesia. During this election, supporters of the presidential candidate number 01, Anies Baswedan and his running mate Muhaimin Iskandar, experienced a significant disconnect between their online interactions and the reality of broader public opinion. On X (formerly known as Twitter), these supporters were heavily engaged in echo chambers—interacting almost exclusively with like-minded individuals who shared their political allegiance. As a result, their timelines were filled with posts, comments, and discussions that overwhelmingly favored their candidate, creating a skewed perception of widespread support.

This online environment led them to believe that their candidate enjoyed a broad and enthusiastic base of support across the country. However, when confronted with actual data and grassroots-level observations, it became clear that the number of supporters for Anies Baswedan and Muhaimin Iskandar was, in fact, relatively small. The apparent popularity of their candidate on social media did not translate to real-world support, revealing a significant gap between online activity and electoral viability.

This discrepancy was largely due to the phenomenon of selective exposure, where individuals tend to engage with content and communities that reinforce their pre-existing beliefs. In this case, by interacting primarily with accounts

that echoed their political views, these supporters were insulated from opposing perspectives and broader national sentiment. This created a false sense of security and confidence in their candidate's chances of winning the election, as they mistakenly equated online visibility with electoral success. Ultimately, this case highlights the potential pitfalls of relying on social media as a gauge for public opinion, particularly in the context of political campaigns.

**The Homogenization of Online Culture in a Smart Society**

The rise of smart societies, marked by the widespread use of technology and decision-making based on data, brings up numerous potential and challenges. One of the concerns is the possibility of online culture becoming more uniform, as personalized algorithms and echo chambers create digital environments that strengthen current attitudes and restrict exposure to various perspectives (Qureshi et al., 2022). In these highly evolved civilizations, algorithms and data analytics play a crucial role in optimizing services, customizing experiences, and forecasting customer preferences.

Although personalization offers indisputable ease, it also raises important concerns regarding the variety of online material. Consider, for example, a news program that customizes stories exclusively based on previous browsing activity. While this personalized method may accommodate individual preferences, it runs the danger of disregarding important narratives that fall outside of the user's usual interests (Van Dijck et al., 2018). Similarly, social media systems that selectively manage material based on user preferences unwittingly limit exposure to diverse perspectives and cultural manifestations.

Moreover, the gathering and examination of user data raise concerns regarding individual freedom and the potential for manipulation. Smart technologies facilitate precise and focused advertising and marketing efforts, potentially impacting user behavior and decision-making processes (R. Wang et al., 2023). This focused strategy may inhibit the spontaneous exploration of internet content, promoting a feeling of guided encounters rather than autonomous discovery.

The focus on tailoring and carefully selected information in intelligent communities intensifies the standardization of online culture (Reviglio della Venaria, 2020). Users are increasingly exposed to content that matches their previous tastes, creating a cycle of feedback that strengthens their tendencies. The potential for a decrease in exposure to a wide range of perspectives, cultural manifestations, and artistic techniques may grow. For example, a music streaming service that only suggests tracks that are similar may impede the exploration of different genres and performers.

The criteria utilized by intelligent platforms to assess performance, such as likes and shares, frequently reward sensational, emotionally charged, or readily consumable content. This tendency may exclude or diminish more intricate and intricate forms of online expression, such as in-depth journalism or independent artistic endeavors. In a context where the popularity of content determines its appraisal, the opportunity for varied and intellectually stimulating inventions may decrease.

The deliberate curation of internet encounters in smart societies also reduces the occurrence of serendipity. Previously, browsing the internet often resulted in serendipitous contacts with a wide range of cultural material, stimulating curiosity and expanding one's worldview. Nevertheless, as algorithms increasingly determine how users consume material, the chances of stumbling into diverse cultures by chance decrease, thereby limiting opportunities for engaging with and learning from different cultures.

**CONCLUSION AND RECOMMENDATION**

The digital age presents a double-edged sword. On one hand, the vast expanse of the internet allows us to access and consume information like never before. On the other hand, this technological advancement has fostered concerning trends like echo chambers and algorithmic bias. As our online experiences become increasingly personalized, we find ourselves surrounded by content that aligns with our existing beliefs, creating a self-reinforcing cycle that can lead to the homogenization of perspectives and the erosion of critical thinking.

The algorithms powering social media platforms and search engines are designed to deliver content tailored to our individual preferences, based on factors like browsing history, search queries, and interactions. While this personalization can be convenient, it also has the unintended consequence of shielding us from diverse viewpoints and alternative narratives. As we're exposed to a narrowed range of information, our understanding of the world becomes skewed, and we become increasingly susceptible to misinformation and confirmation bias.

The phenomenon of echo chambers and algorithmic bias has led to an alarming homogenization of online culture. Social media platforms, driven by advanced algorithms, have become adept at curating personalized content feeds that reinforce users' existing beliefs and preferences. This "filter bubble" effect results in a concerning trend towards ideological isolation, where individuals are increasingly exposed to a narrow range of perspectives that align with their own preconceptions (Spohr, 2017).

The homogenization of online culture has profound implications for the way we engage with information and form our worldviews. By limiting our exposure to diverse viewpoints and challenging ideas, these echo chambers foster an environment of intellectual stagnation, where critical thinking and open-mindedness are often sacrificed in favor of confirmation bias (Ranalli & Malcom, 2023). This dynamic can lead to the entrenchment of polarized positions, making it increasingly difficult for individuals to

empathize with those who hold different beliefs or to engage in constructive dialogue.

Furthermore, the homogenization of online culture can have far-reaching consequences for the fabric of our society. As people retreat into their own echo chambers, the shared understanding of reality and common ground for discourse become increasingly fragmented (Nguyen, 2020). This fragmentation can contribute to the erosion of social cohesion, making it challenging to address complex societal issues that require collective action and a shared appreciation of diverse perspectives.

To counter these trends, we must strive for a more balanced online experience. While personalization can be a convenience, it should not come at the expense of encountering diverse viewpoints and challenging information. Increased transparency from social media platforms, media literacy education, and actively seeking out diverse content are all crucial steps towards a more open and informed online environment. The internet holds immense potential for connecting us with a global tapestry of cultures and perspectives. By acknowledging the challenges and actively fostering a more balanced online experience, we can leverage technology to create a truly interconnected and informed world.

## REFERENCE

Baer, T., & Baer, T. (2019). Algorithmic Biases and Social Media. *Understand, Manage, and Prevent Algorithmic Bias: A Guide for Business Users and Data Scientists*, 95–106.

Bandy, J., & Diakopoulos, N. (2021). More accounts, fewer links: How algorithmic curation impacts media exposure in Twitter timelines. *Proceedings of the ACM on Human-Computer Interaction*, *5*(CSCW1), 1–28.

Bansal, G. (2024). Reprogramming the Software of the Mind: A New Framework for Cultural Homogenization. *Journal of Global Information Technology Management*, *27*(1), 1–7. https://doi.org/10.1080/1097198X.2023.2298021

Bruns, A. (2017). Echo chamber? What echo chamber? Reviewing the evidence. *6th Biennial Future of Journalism Conference (FOJ17)*.

Caled, D., & Silva, M. J. (2022). Digital media and misinformation: An outlook on multidisciplinary strategies against manipulation. *Journal of Computational Social Science*, *5*(1), 123–159.

Cinelli, M., De Francisci Morales, G., Galeazzi, A., Quattrociocchi, W., & Starnini, M. (2021). The echo chamber effect on social media. *Proceedings of the National Academy of Sciences*, *118*(9), e2023301118.

Dahlgren, P. M. (2021). A critical review of filter bubbles and a comparison with selective exposure. *Nordicom Review*, *42*(1), 15–33.

Eg, R., Tønnesen, Ö. D., & Tennfjord, M. K. (2023). A scoping review of personalized user experiences on social media: The interplay between algorithms and human factors. *Computers in Human Behavior Reports*, *9*, 100253.

Franziska, Z., Katrin, S., & Mechtild, S. (2019). Fake news in social media: Bad algorithms or biased users? *Journal of Information Science Theory and Practice*, *7*(2), 40–53.

Gillani, N., Yuan, A., Saveski, M., Vosoughi, S., & Roy, D. (2018). Me, my echo chamber, and I: introspection on social media polarization. *Proceedings of the 2018 World Wide Web Conference*, 823–831.

Harambam, J., Helberger, N., & Van Hoboken, J. (2018). Democratizing algorithmic news recommenders: how to materialize voice in a technologically saturated media ecosystem. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, *376*(2133), 20180088.

Karizat, N., Delmonaco, D., Eslami, M., & Andalibi, N. (2021). Algorithmic folk theories and identity: How TikTok users co-produce Knowledge of identity and engage in algorithmic resistance. *Proceedings of the ACM on Human-Computer Interaction*, *5*(CSCW2), 1–44.

Kitchens, B., Johnson, S. L., & Gray, P. (2020). Understanding echo chambers and filter bubbles: The impact of social media on diversification and partisan shifts in news consumption. *MIS Quarterly*, *44*(4).

Kuang, L., Huang, N., Hong, Y., & Yan, Z. (2019). Spillover effects of financial incentives on non-incentivized user engagement: Evidence from an online knowledge exchange platform. *Journal of Management Information Systems*, *36*(1), 289–320.

Lu, S. (2020). Taming the news feed on Facebook: understanding consumptive news feed curation through a social cognitive perspective. *Digital Journalism*, *8*(9), 1163–1180.

Luzsa, R. (2019). *A Psychological and Empirical Investigation of the Online Echo Chamber Phenomenon*. Universität Passau.

McBrayer, J. P. (2020). *Beyond fake news: Finding the truth in a world of misinformation*. Routledge.

Moon, Y. E., & Lewis, S. C. (n.d.). Social Media as Commodifier or Homogenizer? Journalists' Social Media Use in Individualistic and Collectivist Cultures and Its Implications for Epistemologies of News Production. *Digital Journalism*, 1–20. https://doi.org/10.1080/21670811.2024.2303988

Nechushtai, E., Zamith, R., & Lewis, S. C. (n.d.). More of the Same? Homogenization in News Recommendations When Users Search on Google, YouTube, Facebook, and Twitter. *Mass Communication and Society*, 1–27. https://doi.org/10.1080/15205436.2023.2173609

Neubaum, G., Cargnino, M., & Maleszka, J. (2021). How Facebook users experience political disagreements and make decisions about the political homogenization of their online network. *International Journal of Communication*, *15*, 20.

Nguyen, C. T. (2020). Echo chambers and epistemic bubbles. *Episteme*, *17*(2), 141–161.

Pariser, E. (2011). *The filter bubble: What the Internet is hiding from you*. penguin UK.

Pettis, B. T. (2022). Know Your Meme and the homogenization of web history. *Internet Histories*, *6*(3), 263–279. https://doi.org/10.1080/24701475.2021.1968657

Pizolati, A. (2024). *Digital Media, Social Bubbles, Extremism and Challenges Implicated in the Construction of Identity and Respect for Diversity and Cultural Pluralism*.

Purnomo, E. P., Loilatu, M. J., Nurmandi, A., Qodir, Z., Sihidi, I. T., & Lutfi, M. (2021). How Public Transportation Use Social Media Platform during Covid-19: Study on Jakarta Public Transportations' Twitter Accounts? *Webology*, *18*(1).

Qureshi, I., Bhatt, B., Gupta, S., & Tiwari, A. A. (2022). Introduction to the role of information and communication technologies in polarization. In *Causes and Symptoms of Socio-Cultural Polarization: Role of Information and Communication Technologies* (pp. 1–23). Springer.

Ranalli, C., & Malcom, F. (2023). What's so bad about echo chambers? *Inquiry*, 1–43.

Reed, T. V. (2018). *Digitized lives: Culture, power and social*

*change in the internet era*. Routledge.
Reviglio della Venaria, U. (2020). *Personalization in Social Media: Challenges and Opportunities for Democratic Societies*.
Sapountzi, A., & Psannis, K. E. (2018). Social networking data analysis tools & challenges. *Future Generation Computer Systems*, *86*, 893–913.
Shin, D., Hameleers, M., Park, Y. J., Kim, J. N., Trielli, D., Diakopoulos, N., Helberger, N., Lewis, S. C., Westlund, O., & Baumann, S. (2022). Countering algorithmic bias and disinformation and effectively harnessing the power of AI in media. *Journalism & Mass Communication Quarterly*, *99*(4), 887–907.
Silva, S., & Kenney, M. (2018). Algorithms, platforms, and ethnic bias: An integrative essay. *Phylon (1960-)*, *55*(1 & 2), 9–37.
Spohr, D. (2017). Fake news and ideological polarization: Filter bubbles and selective exposure on social media. *Business Information Review*, *34*(3), 150–160.
Srisermwongse, V. (2022). *New Media and Identity*. Pratt Institute.
Tucker, J. A., Guess, A., Barberá, P., Vaccari, C., Siegel, A., Sanovich, S., Stukal, D., & Nyhan, B. (2018). Social media, political polarization, and political disinformation: A review of the scientific literature. *Political Polarization, and Political Disinformation: A Review of the Scientific Literature (March 19, 2018)*.
Van Dijck, J., Poell, T., & De Waal, M. (2018). *The platform society: Public values in a connective world*. Oxford university press.
Wahyuni, H., Purnomo, E. P., & Fathani, A. T. (2021). Social media supports tourism development in the COVID-19 normal era in Bandung. *Jurnal Studi Komunikasi*, *5*(3), 600–616.
Wang, R., Bush-Evans, R., Arden-Close, E., Bolat, E., McAlaney, J., Hodge, S., Thomas, S., & Phalp, K. (2023). Transparency in persuasive technology, immersive technology, and online marketing: Facilitating users' informed decision making and practical implications. *Computers in Human Behavior*, *139*, 107545.
Wang, X., Sirianni, A. D., Tang, S., Zheng, Z., & Fu, F. (2020). Public discourse and social network echo chambers driven by socio-cognitive biases. *Physical Review X*, *10*(4), 41042.
Williams, B. A., Brooks, C. F., & Shmargad, Y. (2018). How algorithms discriminate based on data they lack: Challenges, solutions, and policy implications. *Journal of Information Policy*, *8*, 78–115.