International Journal of e-Collaboration
Volume 22 • Issue 1 • January-December 2026

Mechanisms of Algorithmic Recommendation on Social Media Opinion Polarization:
An Empirical Analysis Based on Short Video Platforms

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Received: September 2nd, 2025 | **Accepted:** February 2nd, 2026

ABSTRACT

With the rise of short video platforms, algorithmic recommendation systems, while enabling personalized content distribution, have been criticized for fueling social media opinion polarization. This study empirically explores how algorithms drive such polarization on mainstream short video platforms. Integrating user behavior, content distribution patterns, and interactive networks, it examines algorithms' filtering and amplification in information flow. Through a theoretical model and multi-source data, it reveals how algorithms shape viewpoint exposure and extreme opinion spread, identifying varying polarization impacts across algorithms and platforms. Via flowcharts and data models, it elaborates on coupling mechanisms among content push, interaction, and differentiation. Finally, targeted algorithm optimization suggestions reduce polarization risks, aiding governance and healthy online ecosystems.

KEYWORDS

Algorithm Recommendation, Polarization of Public Opinion, Short Video Platform, User Behavior, Polarization Control

INTRODUCTION

With the development of the digital information society, social media platforms have become an important position of public opinion (Ausat, 2023). The rise of short video platforms has undoubtedly greatly changed the way people get information and express their opinions (Chen, 2023). Recent studies have indicated that the use of recommender systems on platforms like TikTok and Bilibili reinforces ideological homophily, intensifying the echo chamber effect. In particular, homogenous content exposure and selective engagement reduce users' interaction with diverse viewpoints, which in turn amplifies emotional reactions and entrenches polarization.

However, Gao et al. (2023) have noted that with the deep embedding of algorithm recommendation technology, the distribution mechanism of information content has also undergone fundamental changes (Li et al., 2023). More and more users find that the topics and opinions they are exposed to tend to be single or even extreme, and the discussion around breaking events shows an obvious

DOI: 10.4018/IJeC.401344

trend of camp (Moernaut et al., 2022). In the long-term homogeneous information environment, the communication barriers between users have gradually deepened, and the differences of public opinion have further expanded (Esau et al., 2025). In this way, it not only affects the space for discussion of public issues but also brings severe challenges to the formation of social consensus (Gulmaliyeva, 2025). Recent empirical studies further highlight that polarization is exacerbated by algorithmic bias in content curation, where machine learning models prioritize engagement metrics over diversity. For instance, a large-scale analysis of eight news platforms revealed that engagement-optimized algorithms increase ideologically aligned content exposure by 37–52% while reducing cross-cutting viewpoints by 43%, with real-time tracking of recommendation drift patterns across 12,000+ user sessions demonstrating progressive homogenization of content clusters. Such findings underscore the methodological rigor needed to quantify these systemic biases and the urgency of developing more balanced recommendation systems (Tsekhmeistruk, 2024).

Both academic circles and the industry have shown strong interest and continue to explore these problems. An in-depth analysis of the influence mechanism of algorithm recommendation on the polarization of social media public opinion will not only help to understand the logic behind the platform content distribution but also provide a theoretical basis for relevant policy formulation and algorithm optimization (Santos et al., 2021). Taking the short video platform as an example, this study focused on revealing the complex coupling relationship among recommendation algorithms, user behavior, and public opinion polarization. The structure of this article is as follows: firstly, the related theories and empirical progress at home and abroad are systematically reviewed; secondly, the core theories, models and mechanism analysis are elaborated in detail, and then innovative modeling and empirical verification schemes are put forward; finally, the research results are discussed and suggestions for improvement are given.

LITERATURE REVIEW

The polarization of public opinion attracted attention long before the popularity of social media (Lim & Bentley, 2022). Cinelli et al. (2021) put forward the theory of the echo chamber effect, which holds that in the process of information dissemination, individuals are more likely to come into contact with content consistent with their own views, which leads to the extreme opinions. Areeb et al. (2023) elaborated on this idea through the concept of the filter bubble, in which personalized recommendation algorithms invisibly weakened users' exposure opportunities to heterogeneous views/ In addition, Fletcher and Nielsen (2018) adopted a big data mining method, which proved that social media algorithm push can significantly aggravate the polarization of political issues. In the Chinese context, Zhang and Wang (2022) put forward a network influence model of opinion leaders based on the empirical study of topic communication on Weibo, and explained the diffusion mechanism of network opinion differentiation. At the same time, R. Wang et al. (2024) found through simulation analysis methods that the news recommendation system leads to an obvious convergence trend in topic diversity at the individual and group levels of users, indicating that the algorithm mechanism has strengthened the aggregation effect of public opinion distribution to a certain extent.

Although existing research has achieved rich results, for the emerging scenario of short video platforms, there are still many problems to be solved in the intrinsic relationship between algorithm recommendation and public opinion polarization (Sun et al., 2025). Despite the progress made in the field, there is a lack of comprehensive studies that address the complex dynamics between recommendation algorithms and the polarization of public opinion, particularly on short video platforms. Existing research often overlooks how algorithmic feedback loops and real-time user behavior interact to influence polarization. Furthermore, many models fail to account for the evolving nature of user interests and the dynamic adjustment of algorithms, which are crucial for understanding how polarization intensifies in these environments. There is a pressing need for more research to