ISSN: 2710-0723

Research on the Mechanism of Fraud Risk Generation for Elderly Users in Short-Video Algorithms and Multi-Party Collaborative Governance from the Perspectives of Filter Bubbles, Echo Chambers, and Attention Bubbles in the Attention Economy: A Case Study of Douyin

Yangfanyu Zeng[a]

Unaffiliated Researcher, Xiangtan, Hunan, China

[a]zengyfy07@163.com

Abstract

With short-video platforms deeply integrated into the daily lives of older adults, the attention-economy model based on algorithmic recommendations boosts user stickiness while creating fraud risks targeting elderly users. Taking Douyin as an example, this paper introduces three core concepts: filter bubbles, echo chambers and attention bubbles, to explore how algorithmic mechanisms construct closed, high-risk information environments through traffic orientation and content distribution. According to the latest statistics, China's internet users aged 60 and above have exceeded 150 million, among whom over 80% use short-video platforms. However, the fraud victimization rate of this group is 2.5 times the national average online rate. The study finds that algorithms favor highly emotional content, forming attention bubbles. Repeated delivery of homogenized information creates filter bubbles and echo chambers. The resonance between these two mechanisms and older adults' media habits and cognitive weaknesses significantly raises their risk of being scammed. Accordingly, this paper proposes a multi-stakeholder collaborative governance framework combining family emotional intervention, platform algorithmic benevolence and government regulatory constraints.

Keywords

Attention Economy; Filter Bubbles; Echo Chambers; Attention Bubbles; Elderly Users; Algorithm Governance.

1. Introduction

In the digital age, short-video platforms represented by Douyin have become important venues for older adults to access information and seek entertainment. According to the 52nd Statistical Report on Internet Development in China released by CNNIC, as of June 2023, internet users aged 60 and above accounted for 13.0% of China's total online population, exceeding 140 million, with an annual growth rate above 10%. Yet behind technological empowerment lie substantial risks[6].

Elderly internet user scale: By December 2025, China's internet users aged 60 and above reached 173 million [2], with an internet penetration rate exceeding 53%. The number of senior internet users has grown roughly 18 times in just 15 years [4].

Daily online duration: Older adults spend an average of 4 hours online each day [3], with a monthly internet usage of 129 hours. Short videos and livestreams account for 35.1% of this time [5], ranking first among all types of applications.

ISSN: 2710-0723

High-frequency usage rate: 87.1% of older adults use short videos almost every day[3], and 48.3% spend more than 2 hours watching short videos daily [5]. Over 30% remain online after midnight [5].

Middle-aged and elderly short-video user scale: In 2026, short-video users aged 46 and above reached 237 million, accounting for 21.9% of all users; users aged 50 and above hit 329 million [24].

Algorithmic logic on mainstream platforms generally follows the rules of the attention economy: capturing and monetizing user attention. Without effective supervision and constraints, this mechanism can easily be exploited by criminals. Statistics show that victims aged 50 and above account for nearly 40% of recent telecom [8] and online fraud cases, and their average financial loss is 1.5 times that of younger victims [8]. Frauds targeting the elderly, such as AI face-swapping scams and false marketing of[7] "miracle medicines", occur frequently. These phenomena reveal a severe mismatch between algorithmic recommendation systems and the cognitive capacities of older adults. Therefore, exploring how algorithms build risky environments and why older adults fall victim to scams carries important practical significance[1].

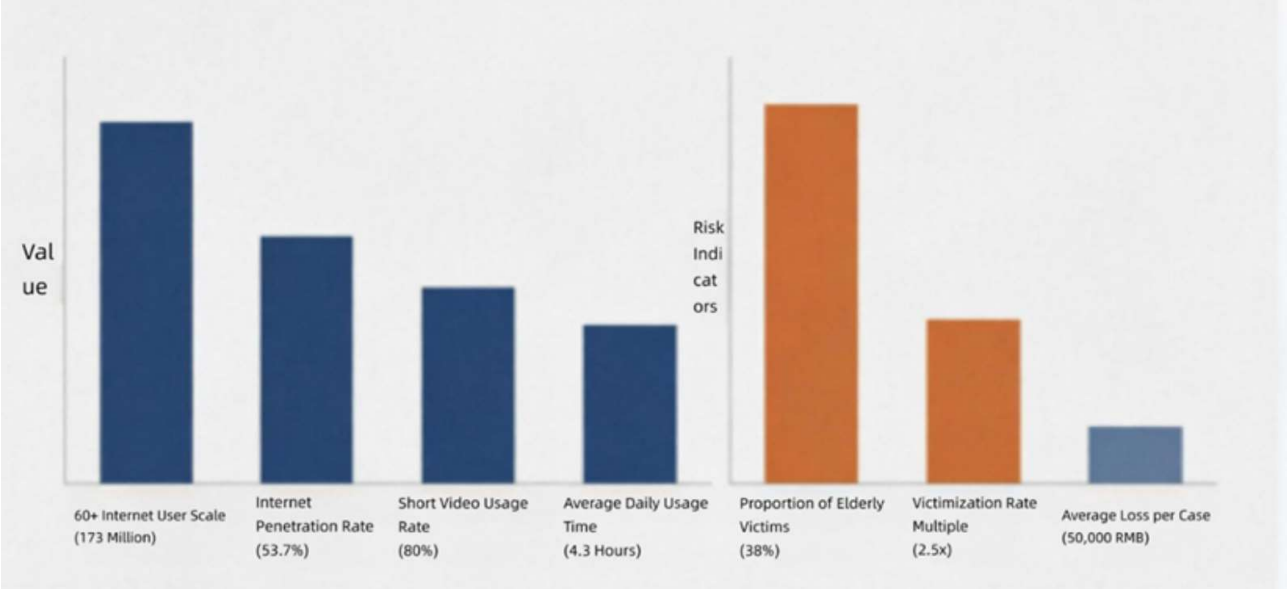


Figure 1. Digital Literacy and Cognitive Shortcomings of Elderly Users

2. Theoretical Framework: Three "Bubble" Metaphors under Algorithmic Recommendation

To understand the underlying reasons why older adults are defrauded on short-video platforms, this paper adopts three "bubbles" as its analytical framework.

2.1. Filter Bubbles: Information Isolation via Personalized Recommendation

A filter bubble refers to a state where algorithms predict user preferences based on behavioral data such as likes, watch duration and comments, and continuously push similar content, trapping users in a bubble built around their own interests. For elderly users, once they click on videos about health preservation or wealth management, algorithms will keep feeding them similar content. Research shows that older adults spend over 120 minutes daily[10] on short-video platforms, and more than 65% of this time is spent passively receiving algorithm-recommended content [11]. While this mechanism reduces information access costs, it blocks fact-checking information and diverse viewpoints. Notably, filter bubbles are not solely created

ISSN: 2710-0723

by algorithms. Users actively selecting information that matches their preferences to avoid cognitive discomfort further reinforces algorithmic bias [9].

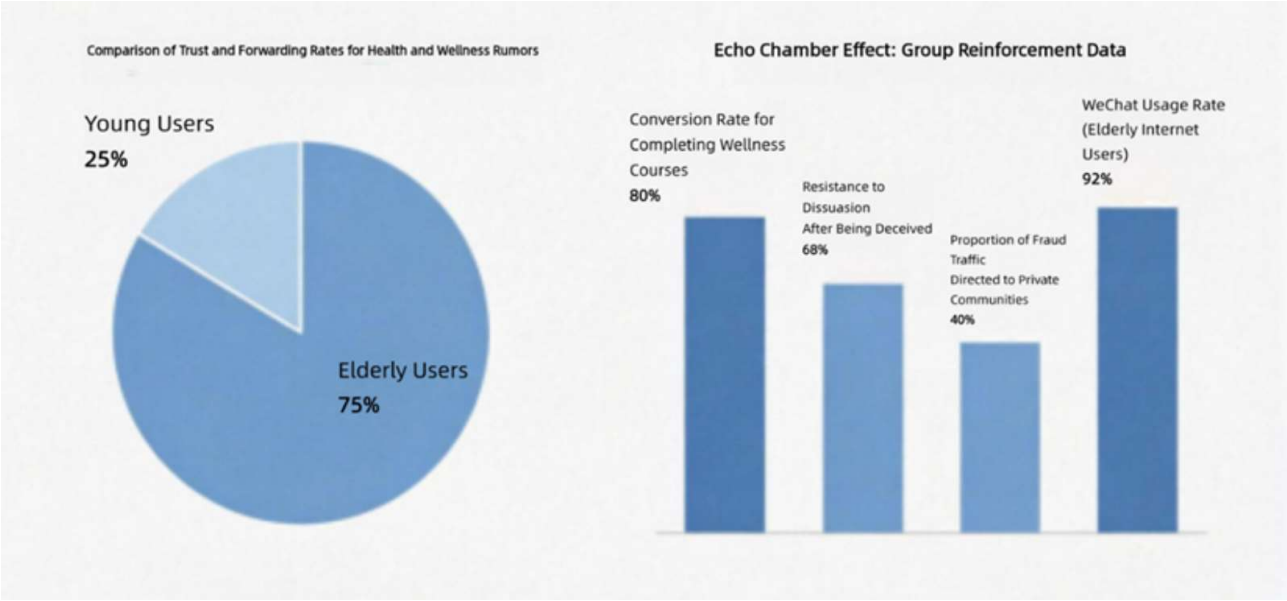


Figure 2. Echo Chamber Effect: Group Reinforcement of Homogeneous Information

2.2. Echo Chambers: Group Reinforcement of Homogenized Information

If filter bubbles represent one-way information isolation by algorithms, echo chambers emphasize the reinforcing effect of group interaction. In comment sections or specific communities on short-video platforms, users holding similar (often false) viewpoints mutually like and comment on posts, creating a false consensus. Empirical studies show that among health and wellness rumours, the trust-and-forward rate of elderly users reaches 75%[12], far higher than the 30% among young people[12]. When older adults see only positive comments under health product advertisements, they gain a sense of identity and lower their psychological defenses. False information circulates and amplifies within the group, while rational doubts are quickly drowned out, forming a self-validating closed world.

2.3. Attention Bubbles: Emotional Manipulation under Traffic Orientation

Attention bubbles are a product of the attention economy. To compete for traffic, creators tend to produce content with strong emotional triggers such as anger, fear and surprise. Fraudulent content targeting the elderly often carries intense emotional appeal. Once favoured by algorithms, it spreads virally and forms attention bubbles. In such cases, content authenticity and quality become secondary; what matters is capturing attention quickly through visual shocks and emotional stimulation. The core platform algorithm rule - higher popularity brings higher rankings - creates a Matthew effect, where highly emotionally charged content is more likely to form massive attention bubbles.

3. Risk Generation Mechanism: Resonance between Algorithmic Logic and Cognitive Deficits

Older adults falling victim to fraud on short-video platforms results from the resonance between the triple-bubble risky information environment constructed by platform algorithms and the cognitive weaknesses of the elderly.

ISSN: 2710-0723

3.1. Algorithmic Mechanism Dimension

3.1.1. Formation of Attention Bubbles: The Hegemony of Emotion and Visuals

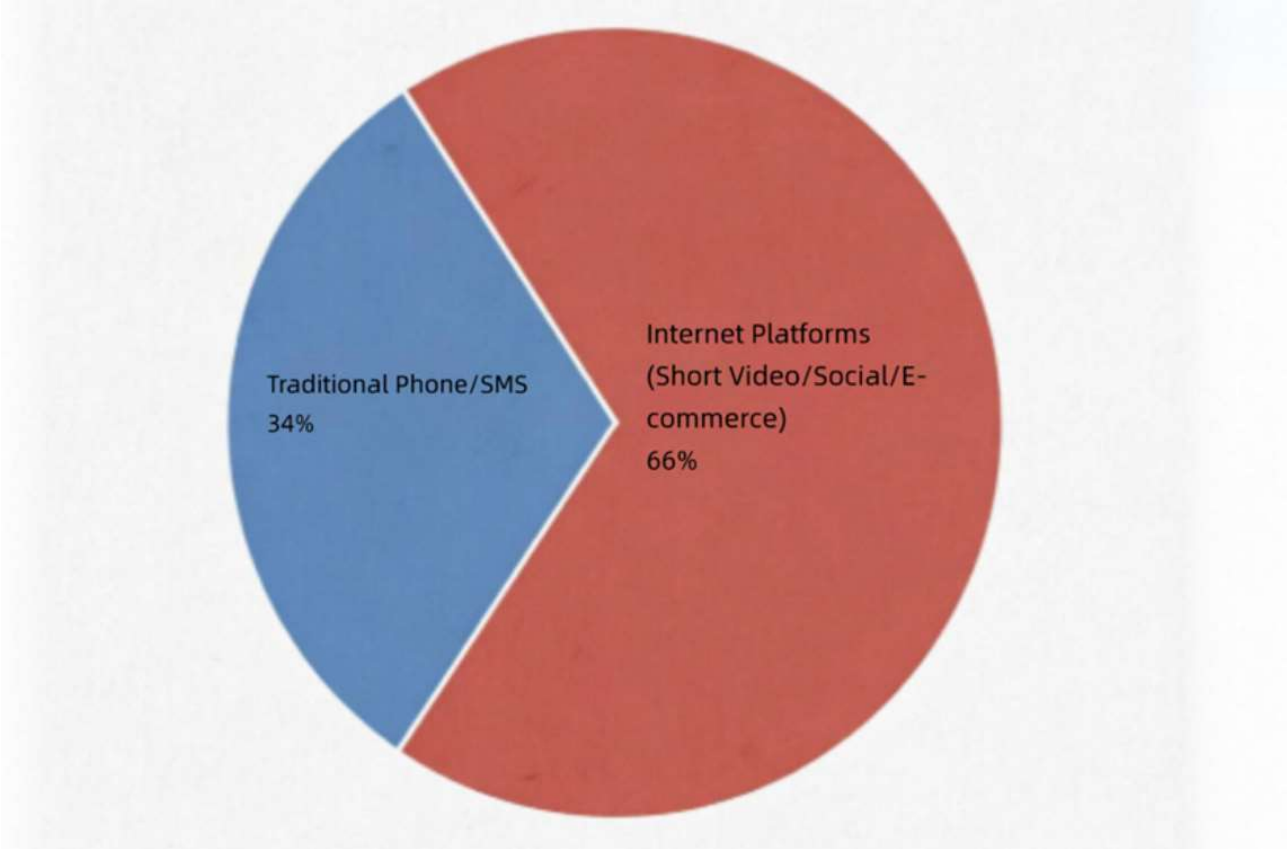


Figure 3. Distribution of Fraud Traffic Channels

According to attention economy theory, core metrics of short-video platform algorithms are user engagement indicators including watch time and interaction rates. Research demonstrates that content with strong emotional cues and visual impacts gains higher rankings. Data shows videos with emotionally provocative headlines such as “Shocking!”, “Urgent!” and “Must Watch!” achieve a click-through rate 3.5 times higher[13] and a completion rate 45% higher than ordinary headlines[13] among elderly audiences. Fraudsters leverage AI technology to forge celebrity livestreams or use exaggerated visual symbols. Platform algorithms cannot easily verify content authenticity and only respond to interaction data, granting high-traffic exposure to fraudulent content and forming attention bubbles. Stimulated by sensory inputs, older adults tend to lose rational judgment, and their “seeing is believing” cognitive habit makes them vulnerable to realistic fake video footage.

Case 1: AI face-swapping scam pretending to be a grandson (Huangshi, Hubei, 2025)

Over 70-year-old Grandma Ding received a call from her “grandson”, who claimed he had injured someone in a fight and needed 40,000 yuan for a private settlement. A man named Wu came to collect the money and called the “grandson” on the spot to prove urgency. Fully convinced, Grandma Ding handed over 20,000 yuan in cash. The investigation found that scammers used AI voice cloning and face-swapping to perfectly replicate her grandson’s voice and appearance. This case reveals that attention bubbles prioritize emotion over facts, and older adults’ “seeing is believing” mindset fails in the face of deepfake technology[17].

ISSN: 2710-0723

3.1.2. Construction of Filter Bubbles and Echo Chambers: Blockade of Fact-checking Information

Algorithmic recommendation follows the Matthew effect. Once an older user shows interest in certain content, algorithms continuously reinforce such recommendations and build solid filter bubbles. To maintain user stickiness, platforms prioritize content users want to see. Dry, rational fact-checking videos lose out in algorithmic competition, so objective information rarely reaches elderly users. Surveys indicate that older adults spend only one-third as much time watching fact-checking videos as fraudulent videos, and fewer than 15% will actively search to verify information. Meanwhile, the echo chamber effect drowns out skeptical voices and solidifies false beliefs.

Case 2: 75-year-old Xu defrauded of 1.98 million yuan by fake customer service (March 2025, Hangzhou)

Xu received a call from a "platform customer service agent", who claimed Xu had accidentally activated a paid membership with automatic deductions. Induced by the scammer, Xu downloaded a meeting app and enabled screen sharing. Ultimately, all 1.98 million yuan in his bank account was transferred away. Scammers exploited older adults' unfamiliarity with smartphone operations and weak cybersecurity awareness, creating panic and inducing remote operations in a layered scam. Filter bubbles limited his access to non-fraud information, while echo chambers strengthened his false beliefs.

3.1.3. Creators' Algorithmic Compliance: Non-neutral Metrics

Platform algorithm metrics are not neutral; they directly shape creator behavior. To obtain recommendations, malicious accounts produce fake scripts specifically targeting the elderly. They follow a narrative template of manufacturing anxiety then offering fake solutions to meet algorithmic demands for high completion rates. This leads to adverse selection, where false marketing content floods the recommendation feeds of elderly users.

Case 3: Serial scam by "health consultants" (2024–2026, Shanghai)

Mr. Liu was targeted by a fraud group after browsing health product advertisements. Gaining trust through fake consultations, the scammers created a layered trap: cheap trial packages → blaming users for poor effects → customized expensive treatment plans. Ordinary health supplements were sold at dozens of times their original price. Some victims lost more than 100,000 yuan. The gang attracted victims through short videos with clear division of labour, with total losses close to 90 million yuan. This case proves that algorithmic preference for completion and interaction rates directly incentivizes the production of false content[16].

3.2. Cognitive Deficits of Elderly Users: The Collapse of Psychological Defenses

Older adults generally face digital divides, and their media literacy lags technological development.

Under the hegemony of visual culture, they tend to trust "what they see" and lack the ability to identify AI-generated fake content [21]. Psychological empirical research shows that older adults have a 40% lower trust threshold for video content than text [20], meaning they are more likely to unconditionally believe videos. In addition, humans tend to accept information consistent with their own opinions (confirmation bias) and reject contradictory information. Due to physical decline, older adults have strong anxiety about health. When algorithmically pushed false health information matches their psychological needs, they resonate strongly. Faced with uncertainty, older adults desire simple, absolute explanations. Fraudsters' so-called "miracle cure" solutions fill this cognitive gap.

ISSN: 2710-0723

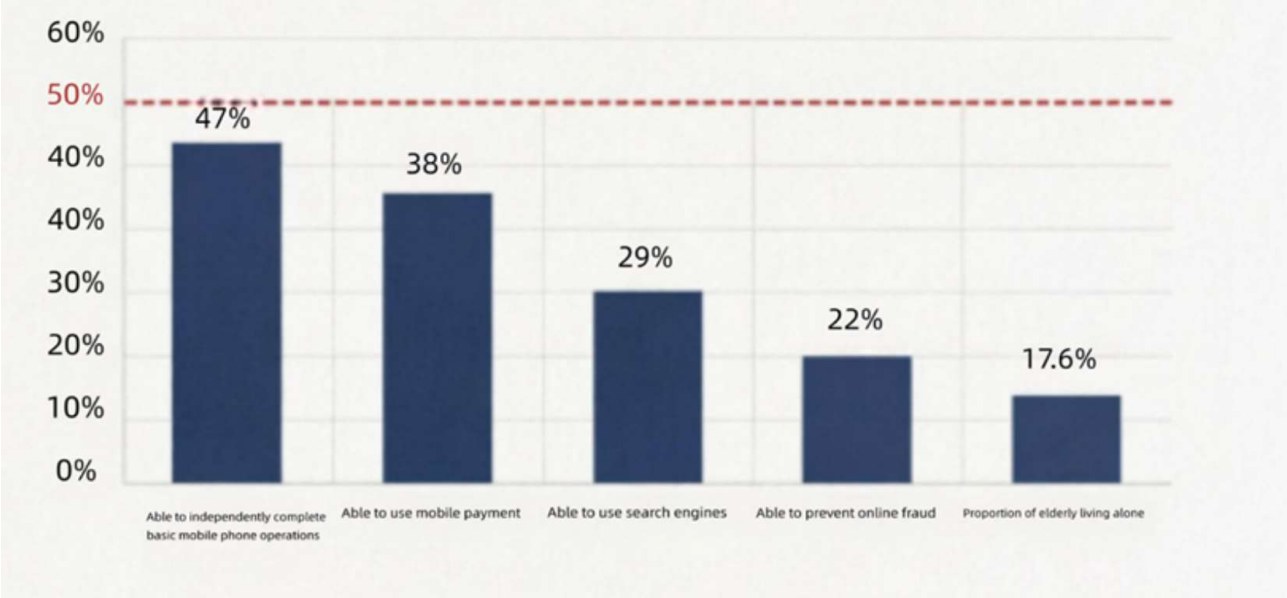


Figure 4. Digital Literacy and Cognitive Shortcomings of Elderly Users

When exposed to fact-checking content, older adults experience cognitive discomfort. To ease this unease, they seldom reflect but instead reinforce existing misconceptions and treat fact-checkers as attackers. Data shows around 68% of scammed older adults strongly resist persuasion [14] from their children or police at first, claiming others are "blocking their path to wealth" or "not caring about their health". Reinforced by echo chambers, this psychological defence mechanism makes defrauded seniors extremely hard to persuade, even creating a "liar's bonus": the more absurd a lie, the more credible it becomes within closed communities.

4. Governance Paths: Multi-stakeholder Collaborative Solutions

Given the risk generation mechanism above, single governance measures are insufficient. A tripartite collaborative governance system integrating families, platforms and governments must be established [22].

4.1. Family Level: Emotional Connection and Digital Reverse Mentoring

Adult children should act as digital guides for older family members. They should not only teach seniors how to use smartphones but also help them identify fake livestreams and health product traps. More importantly, families should provide emotional substitutes. Many older adults become addicted to the internet due to emotional emptiness. More companionship from children can fill psychological gaps and reduce over-reliance on online content. Surveys show older adults who video-call their children more than three times a week are 55% less likely to suffer online fraud than those living alone [4] or rarely contacting family.

4.2. Platform Level: Algorithmic Benevolence and Technological Empowerment

As controllers of algorithms, platforms must assume primary responsibility and shift from traffic supremacy to value supremacy.

1) Improve content review systems: Set up dedicated review mechanisms for sections popular among older adults, focusing on removing exaggerated marketing and AI-generated fake content [21].

2) Optimize recommendation logic: Reduce recommendation weight for high-risk marketing content in medical and wealth-related fields, breaking the single traffic-oriented logic.

ISSN: 2710-0723

3) Proactively burst bubbles: Insert fact-checking information and diverse viewpoints into recommendation feeds to break filter bubbles.

4) Add operational friction: Pop up prominent warning windows before older users share high-risk content or make payments, adding friction to stop impulsive actions. Experiments show adding a fraud-prevention confirmation pop-up can reduce impulsive money transfers by older adults by more than 70%[14].

4.3. Government Level: Institutional Constraints and Literacy Promotion

1) Strengthen supervision and constraints: Issue regulatory rules for algorithmic recommendation, legally punish actors exploiting algorithm loopholes to induce consumption among older adults [15], and raise illegal costs.

2) Improve media literacy: Incorporate elderly media literacy promotion into public services. Community organisations and senior universities can offer case-based courses to help seniors identify online scams and build critical thinking [23].

3) Build collaborative mechanisms: Establish information sharing and joint law enforcement among cyberspace authorities, public security departments and market regulators to precisely crack down on the industrial chain of short-video-related fraud.

5. Research Limitations and Prospects

Although this study systematically analyses the fraud risk generation mechanism for elderly short-video users from filter bubble, echo chamber and attention bubble perspectives, several limitations remain for future research.

First, the theoretical framework requires stronger empirical evidence. Academic debates over whether information cocoons are widespread continue. Some empirical studies argue that algorithmic information narrowing may be overestimated. This study partially adopts a tech-determinist perspective. Future research can introduce more empirical data to distinguish the relative weights of algorithmic recommendation and user voluntary selection in information narrowing [18].

Second, the research mainly uses qualitative analysis without large-scale quantitative verification. This paper relies on statistics and typical cases but does not establish causal relationships through large questionnaires or controlled experiments. Future studies may adopt mixed methods combining large-scale surveys and in-depth interviews to improve the external validity of conclusions.

Third, insufficient attention is paid to heterogeneity within the elderly group. Older adults are treated as a homogeneous sample in this paper. The moderating effects of urban-rural differences, education levels and family structures on fraud risk are not fully discussed. Future stratified analysis can support targeted governance [19].

Fourth, the operability and effect evaluation of governance paths need deeper exploration. The multi-stakeholder governance framework proposed in this paper is mostly macro and qualitative. Future research can further explore implementation costs, obstacles and indicator systems for outcome evaluation to promote the translation of theoretical findings into practice.

6. Conclusion

Short-video algorithms should serve as bridges connecting users and information. Yet wrapped in the logic of attention economy, they are transformed into tools targeting older adults. The superimposed effects of filter bubbles, echo chambers and attention bubbles build a high-risk information ecosystem, while older adults' cognitive weaknesses act as triggers for fraud risks. Addressing this problem requires more than partial technical fixes by platforms. We must

ISSN: 2710-0723

return to a people-centred philosophy. The warmth of families, platform self-discipline and government rule of law can jointly burst these illusory bubbles and build a clean, safe digital space for older adults.

References

[1] China Internet Network Information Center. (2025). The 56th statistical report on the development of the internet in China.

[2] China Internet Network Information Center. (2026). The 57th statistical report on the development of the internet in China.

[3] QuestMobile. (2025). 2025 silver economy insight report.

[4] Renmin University of China Center for Population and Development Research. (2025). Research report on the digital life of the elderly.

[5] Beijing Normal University New Media Communication Research Center. (2025). Research report on short video usage among middle-aged and elderly people.

[6] Douyin Security Center. (2026). 2025 annual anti-fraud governance report.

[7] China Consumers Association. (2025). Analysis of consumer complaints from the elderly.

[8] Ministry of Public Security. (2026). Bulletin on telecom and online fraud crimes nationwide in 2025.

[9] Ji, S. W., & Cheng, F. (2026). Anti-monopoly regulation and collaborative governance of addictive algorithms inducing digital addiction among the elderly-Driven by the attention economy. Journal of Jiangxi Police College, 41(1), 99-108.

[10] Hu, B. (2015). Research on the impact of algorithmic recommendation technology on information dissemination and its governance. Journalism Enthusiast, (8), 45-48.

[11] Chen, C. F., & Huo, J. (2018). Power transfer: Changes in news communication in the era of algorithmic recommendation. Journalism and Writing, (1), 53-57.

[12] Zhang, M. S. (2024). Digital divide in an aging society and the enhancement of information literacy among the elderly. Sociological Studies, 39(3), 112-125.

[13] Jia, Y. (2025). Research on the impact of algorithmic recommendation on short video platform users. Modern Communication, 47(6), 78-83.

[14] Wang, W. H. (2025). Psychological mechanisms of smartphone addiction among the elderly and intervention strategies. Advances in Psychological Science, 33(4), 567-578.

[15] Information on: https://www.cac.gov.cn

[16] Zhao, Y. T. (2026). Legal dilemmas and solutions for the protection of elderly people's online consumer rights. Law Journal, (2), 89-97.

[17] Liu, J. Y. (2025). Cognitive impact of AI-generated content on the elderly and risk prevention. Legal Research, (5), 134-142.

[18] MIT Media Lab. (2024). The impact of algorithmic personalization on information diversity.

[19] Lu, J. H., & Zhang, Y. Y. (2025). Exploring the trust bond of short videos empowering the life satisfaction of rural middle-aged and elderly people. Intelligent Society Research, 4(4), 45-58.

[20] Kircanski, K., Notthoff, N., & Gotlib, I. H. (2026). Emotional arousal may increase susceptibility to fraud in older adults. Stanford Center on Longevity.

[21] Information on: https://www.cac.gov.cn

[22] Information on: https://www.npc.gov.cn

[23] China Internet Network Audio-Visual Programme Service Association. (2025). Research report on the development of China internet audio-visual.

[24] Qianzhan Industry Research Institute. (2025). 2025 China short video consumer portrait.