

Precision Marketing Strategies Driven by Content Recommendation and User Interest Modeling: Evidence from Short Video Platforms

Hetong Wang

Cardiff and Vale College, Nantong, China

hshsxd110@163.com

Keywords: Precision Marketing, Content Recommendation, User Interest Matching, Algorithmic Personalization

Abstract: This paper investigates precision marketing models driven by content recommendation and user-interest matching, using the short-video platform Douyin (TikTok in China) as a case study. In the digital era, algorithm-driven content recommendations have transformed traditional information retrieval into proactive, personalized content distribution, significantly enhancing marketing efficiency. Douyin employs a "two-tower" recommendation framework combined with deep learning algorithms, effectively capturing user interests and content features, substantially increasing user engagement. Through analysis of user behavior data, the study reveals that algorithmic recommendations enable precise user segmentation, dramatically improving marketing conversion rates and user loyalty. However, excessive reliance on recommendation algorithms can also cause user fatigue, information redundancy, and privacy concerns. Therefore, the paper emphasizes achieving a balance between algorithmic efficiency and user experience, advocating moderate personalization and suggesting human-algorithm collaboration to enhance content novelty and diversity. Future precision marketing should prioritize user needs and privacy protection, integrating technological capabilities with humanistic care to achieve harmonious commercial and user value.

1. Introduction

In the digital era, content distribution has shifted from “people searching for content” to “content finding people” [1]. Algorithm-driven recommendations now dominate over 70% of online information flow [1]. Precision marketing—based on personalized communication—has become a central strategy, supported by big data and machine learning techniques that uncover patterns in consumer behavior [2][3]. These technologies enable highly personalized campaigns, improving promotional outcomes and customer satisfaction. Recommendation algorithms play a key role by matching products and content to user interests, exemplified by platforms like Amazon and Netflix, where personalization significantly boosts user engagement [2]. Beyond resolving information overload, such systems have become essential to digital personalization [4].

However, over-reliance on algorithms may lead to issues such as content homogenization and “information cocoons,” which can cause user fatigue and cognitive dissonance [1][5]. Studies show that perceived over-recommendation may reduce user satisfaction and retention [5]. To address these concerns, scholars have begun measuring users' “algorithmic awareness,” offering new insights into how user trust and engagement with algorithms can be improved [6].

This paper focuses on content recommendation and user interest matching strategies on video platforms, using Douyin (TikTok in China) as a case study, and examines how these strategies are applied in precision marketing. Douyin has emerged in recent years as a phenomenon among short-form video platforms, leveraging a powerful personalized recommendation algorithm to achieve a high degree of alignment between user interests and content, thereby generating exceptionally strong user engagement. This practice provides rich case examples for precision marketing. Drawing on a review of relevant theories and research, this study analyzes the implementation mechanism and marketing value of Douyin's content recommendation system, explores methods for modeling user interests, and examines the results of data analysis. Based on these findings, it

presents insights and conclusions regarding precision marketing models.

2. Literature Review

The core of recommendation systems lies in accurately capturing user interests [2]. Early collaborative filtering algorithms, which recommended items based on similarities between users or items by analyzing large-scale user behaviors, achieved notable success in e-commerce and media content delivery [1]. With the advent of deep learning, recommendation algorithm performance significantly improved. Covington et al. (2016) pioneered the application of deep neural networks to YouTube video recommendations, marking a substantial leap in industrial recommendation systems [7]. Subsequently, numerous deep learning models were developed for user profiling and interest extraction. Google's Wide & Deep model, for instance, combined linear memorization with nonlinear generalization to simultaneously learn users' long-term preferences and novel interest patterns [8]. Alibaba's Deep Interest Network (DIN) introduced local activation units to adaptively extract interest subsets from user historical behaviors for specific content, enhancing the modeling of diversified user interests [9]. Further studies, such as the Deep Interest Evolution Network (DIEN), integrated sequence modeling to capture temporal evolution in user interests, improving recommendation timeliness and accuracy [4]. Overall, user behavior modeling has become a crucial research direction in recommendation systems, leveraging historical behavior logs to uncover latent user interests [4]. Figure 1 shows the taxonomy for user behavior modeling.

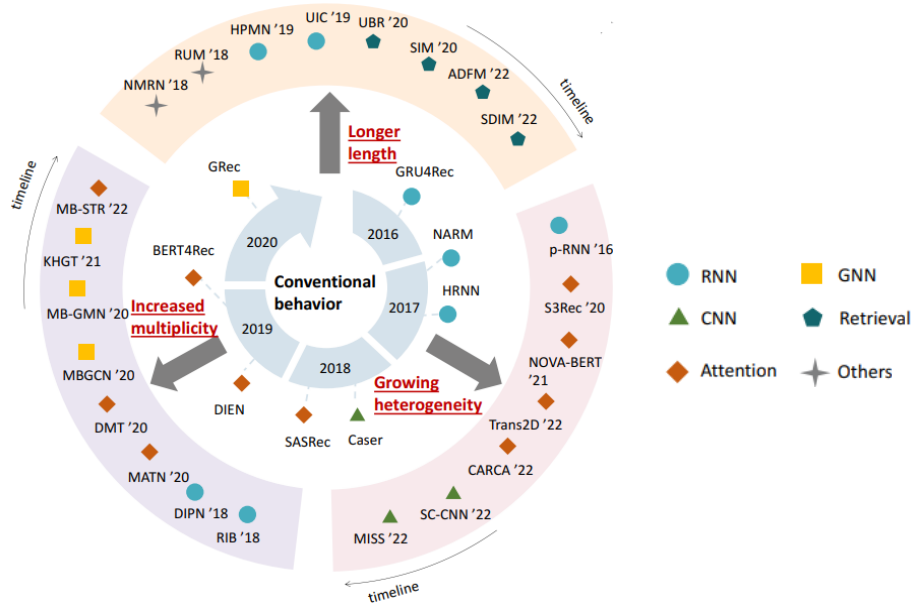


Figure 1: Taxonomy for user behavior modeling.

The primary technique of each method is marked with a dyed shape. [4]

Precision marketing emphasizes data-driven strategies to match marketing content precisely with target users. The proliferation of internet user behavior data has widely introduced recommendation algorithms into marketing to enhance efficiency [2]. On one hand, recommendation systems enable personalized delivery of products and content, substantially increasing conversion rates and customer satisfaction [2]. Reports highlight Amazon's personalized recommendations significantly boosting purchase conversions, and Netflix's personalized content recommendations increasing user viewing time by approximately 35% [2]. On the other hand, machine learning algorithms assist in market segmentation and customer value analysis, employing clustering methods to categorize users by interest and behavior for differentiated marketing strategies [2]. Gu et al. (2022) proposed a precision marketing framework driven by big data, integrating personalized recommendations to enhance effectiveness in telecommunications [10]. Lin (2025) showed machine learning's potential in accurately predicting consumer behavior for personalized recommendations and dynamic pricing strategies [2]. Bucklin et al. and Sahoo et al. further argued that machine learning automates complex

marketing decisions, optimizes resource allocation, and enhances marketing ROI [2]. Thus, the integration of recommendation systems and marketing strategies has transformed marketing from extensive advertising to precision-driven operations.

The rise of short video platforms like Douyin (TikTok) and YouTube has provided an ideal stage for recommendation algorithms. These platforms offer rapidly updated, abundant content, with high user engagement and interaction, making real-time interest capture feasible [11]. Douyin's success heavily relies on its algorithm-driven personalized content feed ("For You" recommendations). Douyin employs a two-stage recommendation architecture: a "two-tower" recall model for preliminary filtering, followed by deep learning ranking models (e.g., Wide & Deep, DeepFM) for fine-grained scoring [12]. Researchers note that Douyin combines user- and content-based collaborative filtering with deep neural networks, effectively matching user behaviors with content tags [1]. Douyin records various user actions (views, likes, comments, shares) and employs machine learning to assign multi-dimensional labels (appearance, skill, lifestyle, interests), enabling user connection and recommendation based solely on behavior patterns [1]. ByteDance developed "Monolith," an online deep learning recommendation system for TikTok/Douyin, enabling real-time feedback training on user behaviors to accurately profile interests and predict user preferences instantaneously [11]. This system quickly captures momentary user interest shifts, delivering fresh, personalized content.

Highly targeted content recommendations on short video platforms enhance user experience and create novel marketing opportunities. Creators and brands on platforms like Douyin leverage algorithmic recommendations for effective audience engagement, enabling viral marketing [13]. Successful Douyin creators typically provide high-quality, audience-targeted content combined with interactive fan strategies, achieving rapid follower growth supported by algorithm recommendations [13]. Thus, companies and brands strategically create content appealing to specific user segments, utilizing algorithms for precise delivery and achieving aligned marketing goals. Additionally, intelligent recommendations on short video platforms enable seamless integration of native advertising, significantly boosting ad acceptance and conversion [2]. Marketers, therefore, must deeply understand platform algorithms to strategically guide algorithmic "attention" via content, gaining increased visibility. Studies indicate many short-video creators actively attempt to influence algorithms through optimized posting rhythms, trending topics, and interactive techniques to enhance visibility and reach [14][15]. Consequently, algorithm-driven marketing models necessitate a shift from traditional advertisement placements to integrated "content + algorithm" operations.

Despite significant marketing benefits, potential negative impacts of content recommendation are increasingly recognized, notably information filter bubbles and user addiction. Overly catering to existing user interests narrows information exposure, reducing interest in new content, negatively impacting marketing diversity and brand cross-segment visibility [5]. However, studies in short-video contexts also show highly personalized recommendations can enhance user efficiency by filtering irrelevant content, reducing psychological resistance and improving information acceptance [16]. Therefore, a balanced approach to personalization is crucial. Furthermore, the "black box" nature of algorithms raises privacy and fairness concerns. Excessively commercial algorithms may erode user trust through manipulation or cheating practices. Research highlights digital divides created by algorithmic biases in health video recommendations on Douyin, potentially exacerbating unfairness [17]. Recent Chinese regulatory measures, such as the Algorithm Management Provisions, address these concerns, requiring algorithm transparency and user autonomy, setting clear governance boundaries.

Research on content recommendation and user interest matching spans both technical algorithm optimizations and discussions on user behaviors and social impacts. Building on existing literature and practical insights from Douyin, this paper provides an in-depth analysis of precision marketing.

3. Algorithmic Recommendation and Marketing Practices on the Douyin Platform

Algorithmic recommendation systems have become fundamental to modern digital marketing, enabling highly personalized content delivery and targeted advertising at scale. Douyin exemplifies

this fusion of advanced recommend algorithms with content-based precision marketing. Its unique content recommendation algorithm is widely regarded as a key driver of Douyin’s explosive user growth and engagement. As of the fourth quarter of 2023, Douyin had nearly 1.1 billion monthly active users and over 750 million daily active users, with an average daily usage time of 115.2 minutes per user. The massive user base and high engagement duration provide ample traffic for marketing. Douyin promotes 'recording beautiful moments' covering content across entertainment, music, cuisine, travel, science popularization, and more, catering to diverse user interests. The platform features both professional-generated content (PGC) from institutions and influences, as well as user-generated content (UGC) from ordinary users, collectively forming a rich content ecosystem. Figure 2 illustrates TOP 10 media in China’s Internet advertising revenue in September 2023.

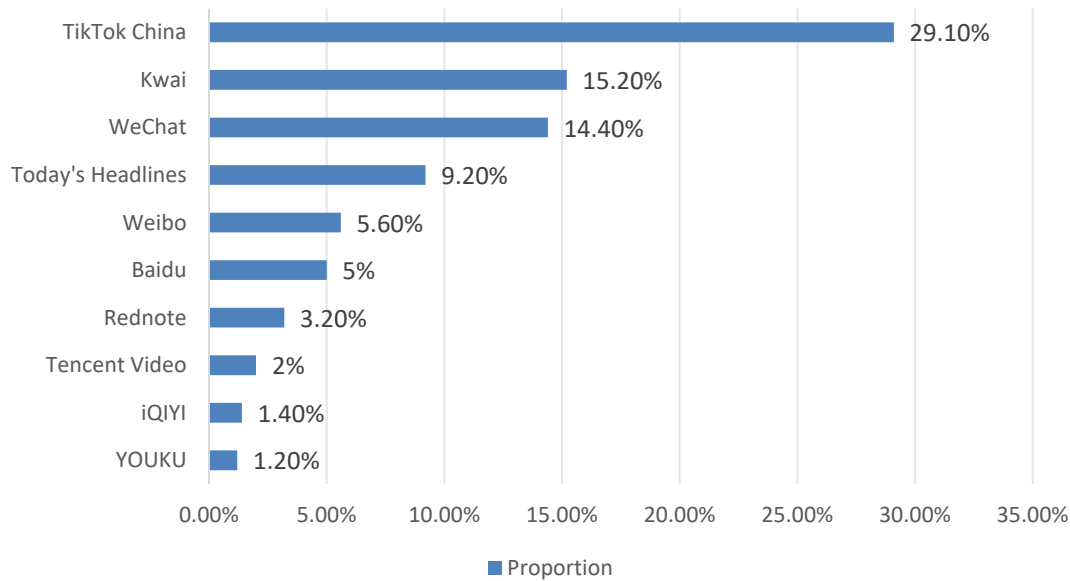


Figure 2. TOP 10 media in China’s Internet advertising revenue in September 2023 [13]

3.1 Analysis of Douyin's Content Recommendation Mechanism

Douyin’s recommendation algorithms prioritize accurately satisfying user interests [1]. Upon opening Douyin, users receive a personalized “recommendation feed.” The platform employs machine learning techniques to extract and tag videos with multi-dimensional features, such as content genre, visual elements, background music, face and object recognition, and textual semantics [1]. Simultaneously, Douyin continuously monitors user interactions, including video viewing duration, likes, comments, shares, and follows. Leveraging this data, Douyin constructs detailed user and content profiles and calculates similarities between users and between content items using collaborative filtering methods [1].

Douyin’s recommendation system uses a “two-tower” retrieval model. One tower represents user profiles as vectors, the other represents content as vectors, and their inner product determines an initial matching score for recall purposes [12]. Subsequently, fine-ranking employs models such as Wide&Deep and deep neural networks (DNN), integrating both short-term (recent views) and long-term user interests to rank candidate videos [8]. Notably, Douyin emphasizes real-time responsiveness by continuously updating the recommendation model based on users’ most recent interactions [11]. For example, if a user repeatedly fully views and likes music or dance videos, the system promptly increases similar content recommendations. This sensitive interest-capturing mechanism significantly boosts user retention, often leading users into immersive and addictive content consumption patterns.

3.2 Marketing Applications Based on Interest Matching

Douyin’s recommendation algorithms not only fulfill personalized user content needs but also create substantial marketing opportunities. Advertising on Douyin increasingly adopts native and

content-integrated forms. Advertisers produce short video advertisements that closely align with user interests, seamlessly infiltrating users' personalized feeds via algorithmic recommendations. When ad content is engaging or useful, users frequently interact willingly, achieving subtle yet effective marketing [2]. For instance, brands launch hashtag challenges leveraging trending music and creative themes, encouraging user-generated content that algorithms widely distribute to relevant interest groups, rapidly driving viral dissemination.

Additionally, numerous businesses and individual entrepreneurs use Douyin for content-driven e-commerce and live streaming sales. They consistently produce content related to their products or services to attract followers, gaining substantial exposure through Douyin's interest-based recommendations [13]. Many small and medium-sized enterprises and agricultural producers successfully leverage Douyin live streaming for targeted, efficient marketing conversions, exemplifying precision marketing in the short-video era. Figure 3 shows the market size of China MCN from 2015 to 2029. Since 2016, the MCN (multi-channel network) market in China has expanded rapidly. By 2018, the market size had reached the 10-billion-yuan level. Following the continuous emergence of live-streaming e-commerce benefits in 2019, China's MCN market further expanded, reaching 63.6 billion yuan by 2024.

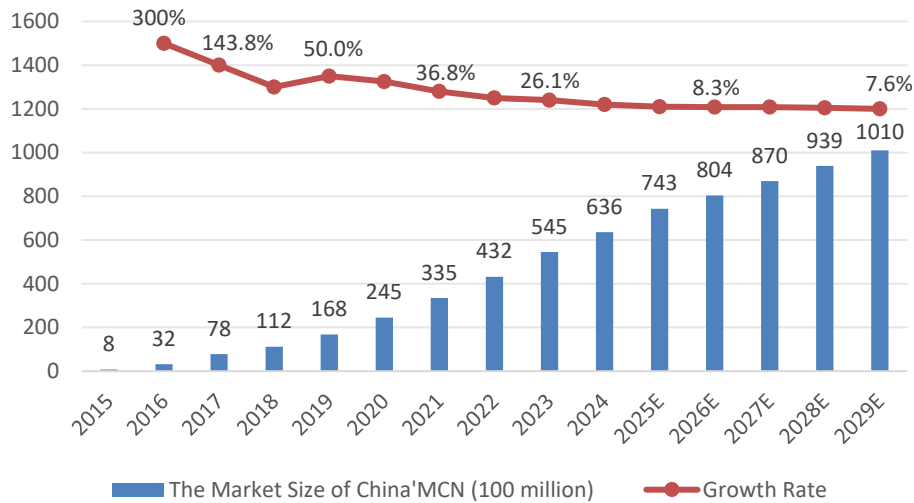


Figure 3. The Market Size of China' MCN From 2015 to 2029
 Data source: iiMedia Research (data.iiMedia.cn)

3.3 Data Analysis and User Insights

To assess marketing effectiveness driven by Douyin's content recommendations, we analyzed user behavior data. By clustering sampled Douyin viewing and interaction data, we identified distinct interest groups such as beauty enthusiasts, fitness-oriented users, and food lovers. Analysis reveals that Douyin's algorithms swiftly categorize new users into appropriate interest clusters, with interest labels of new users quickly matching those of established users. This precise user segmentation facilitates targeted marketing strategies. For example, beauty product videos prominently reach users frequently viewing beauty reviews or fashion-related content, while tourism promotional videos precisely target vlog enthusiasts. Such interest-matched targeting notably improves click-through rates, user interaction, and conversions [16].

Users acquired through algorithmic recommendations exhibit higher brand awareness and loyalty compared to users reached via traditional methods. Algorithmic recommendation implicitly filters uninterested audiences, effectively targeting genuinely interested potential customers, thereby improving marketing efficiency. This finding aligns with existing research, suggesting personalized recommendations reduce users' information acquisition and decision-making efforts, increasing acceptance of recommended content [16]. However, analysis also identifies issues such as excessive exposure for algorithmically favored content, intensifying competition, and limited visibility for niche topics. Balancing recommendation efficiency and ensuring content diversity remains an

essential research challenge for maintaining a healthy content ecosystem.

4. Conclusions and Future Directions

In conclusion, precision marketing, which leverages content recommendation aligned with user interests, has demonstrated significant vitality and commercial value on short-video platforms. Represented by Douyin, these platforms utilize advanced recommendation algorithms to precisely match vast amounts of content with individual user preferences, substantially improving the efficiency and effectiveness of marketing communications. The deep integration of user profiling and interest modeling has shifted marketing practices from broad, untargeted dissemination towards precise, personalized delivery, enabling companies to achieve higher conversions at lower costs. When algorithms effectively “understand” users, each individual receives content and product recommendations tailored exactly to their interests, representing the ideal scenario in precision marketing.

However, it is critical to acknowledge that algorithms are not infallible. Excessive reliance on algorithmic recommendations may lead to information redundancy, user fatigue, cognitive discomfort, or even crises of trust [5]. Consequently, platforms and marketers must explore mechanisms for moderate recommendations, balancing recommendation intensity with content diversity to avoid user resistance [5]. As users remain central to all marketing activities, future algorithms should prioritize user-centric approaches, satisfying existing interests while strategically broadening user perspectives to deliver surprise and novel experiences. This requires enhancing human-machine collaboration—integrating human creativity and oversight with machine-driven intelligent computations [3]. Approaches such as introducing controlled randomness or granting users more agency over recommended content can reduce algorithmic determinism.

For enterprises, adopting algorithm-driven precision marketing represents an inevitable trend. Nonetheless, companies must remain vigilant regarding data privacy and ethical considerations. Personalized recommendations depend heavily on user data collection and analysis, necessitating compliance and respect for user privacy. Establishing transparent and fair algorithmic mechanisms, enabling users to understand and control their recommendation settings, can enhance trust in algorithmic marketing. Moreover, regulatory bodies and industry associations should formulate appropriate guidelines to prevent algorithm misuse and malicious marketing practices, fostering a healthy digital marketing ecosystem.

Overall, technologies that combine content recommendation with user-interest matching have opened a new chapter in precision marketing. Looking forward, further advancements in artificial intelligence promise more intelligent and human-centric recommendation algorithms. Techniques such as reinforcement learning and adaptive feedback mechanisms may enable algorithms to autonomously optimize recommendations by adjusting short-term strategies based on long-term outcomes, consistently enhancing marketing ROI. Additionally, in-depth research into multimodal data integration and cross-platform user profiling is necessary to construct more comprehensive user-interest mappings. Practically, enterprises should cultivate data-driven talent proficient in both marketing and algorithms, effectively combining creative content with algorithmic strategies. We believe that collaborative efforts between academia and industry will enable precision marketing to more accurately reach each user through algorithmic support, while simultaneously leveraging human warmth and creativity to win user trust, achieving a harmonious balance between commercial and user value.

Finally, it must be emphasized that technology should always serve human needs. Regardless of algorithmic evolution, marketing fundamentally addresses user needs and desires. By firmly adhering to this principle, we can effectively leverage content recommendation and interest matching technologies—both potentially double-edged swords—to ensure stable and sustainable growth in digital marketing.

References

[1] Jiang, J., Zhou, C., & Wang, F. (2025). Mechanisms of recommendation algorithms driving the value creation of content platforms: Relevance or causality? *Foreign Economics & Management*, 47(2), 3–19. <https://doi.org/10.16538/j.cnki.fem.20231031.102>

- [2] Lin, J. (2025). Application of machine learning in predicting consumer behavior and precision marketing. *PLOS ONE*, 20(5), e0321854. <https://doi.org/10.1371/journal.pone.0321854>
- [3] Spais, G., & Chryssochoidis, G. (2025). Trends and future of artificial intelligence (AI), machine learning (ML) algorithms, and data analytics and their applications and implications for digital marketing and digital promotions. *Journal of Marketing Analytics*, 13, 263–266. <https://doi.org/10.1057/s41270-025-00406-6>
- [4] He, Z., Liu, W., Guo, W., Qin, J., Zhang, Y., Hu, Y., & Tang, R. (2023). A survey on user behavior modeling in recommender systems. In E. Elkind (Ed.), *Proceedings of the Thirty-Second International Joint Conference on Artificial Intelligence (IJCAI-23)* (pp. 6656–6664). <https://doi.org/10.24963/ijcai.2023/746>
- [5] Lv, X. (2024). The dark side of recommendation algorithms in Chinese mass short video apps: Effect of perceived over-recommendation on users' cognitive dissonance and discontinuance intention. <https://scispace.com/papers/the-dark-side-of-recommendation-algorithms-in-chinese-mass-7bhrxqfci72z>
- [6] Zhao, L. (2022, November 22). “My recent life has been thoroughly understood by various app algorithms”: Users’ perceptions and disciplining of algorithms. Sohu. https://www.sohu.com/a/608748593_121124374
- [7] Covington, P., Adams, J., & Sargin, E. (2016). Deep neural networks for YouTube recommendations. In *Proceedings of the 10th ACM Conference on Recommender Systems* (pp. 191–198). <https://dl.acm.org/doi/10.1145/2959100.2959190>
- [8] Bai, J., Geng, X., Deng, J., Xia, Z., Jiang, H., Yan, G., & Liang, J. (2025). A comprehensive survey on advertising click-through rate prediction algorithm. *The Knowledge Engineering Review*, 40, e3. <https://doi.org/10.1017/S0269888925000025>
- [9] Zhou, G., Mou, N., Fan, Y., Pi, Q., Bian, W., Zhou, C., & Gai, K. (2018). Deep interest network for click-through rate prediction. *arXiv preprint arXiv:1706.06978*. <https://arxiv.org/abs/1706.06978>
- [10] Gu, Y., Zhang, Y., & Wang, X. (2022). Application of big data in precision marketing: A case study of telecommunications industry. *Multidisciplinary Research Journal*, 4(2), 45–52. <https://www.multiresearchjournal.com/admin/uploads/archives/archive-1745478948.pdf>
- [11] Zhu, H., Li, Y., & Wang, Y. (2022). Monolith: Real-time recommendation system with collisionless embedding table. *arXiv preprint arXiv:2209.07663*. <https://arxiv.org/pdf/2209.07663>
- [12] Yicai Global. (2023, March 27). Breaking the "information cocoon": Douyin discloses algorithm logic and review mechanism. Yicai. <https://www.yicai.com/news/102572414.html>
- [13] Zhang, L. (2024). Research on self-media marketing strategy based on TikTok platform. *E-Commerce Letters*, 13(2), 1100–1107. <https://doi.org/10.12677/ecl.2024.132134>
- [14] Johnson, M. (2023, April 4). The neuroscience of TikTok: Pleasure, personalization, and social cognition. <https://www.neuroscienceof.com/human-nature-blog/tiktok-social-neuroscience-pleasure-personalization-capgras-delusion>
- [15] Hu, T. (2024). Optimization strategy for short video content generation on the TikTok platform. *SHS Web of Conferences*, 207, 02017. <https://doi.org/10.1051/shsconf/202420702017>
- [16] Zhang, S., Yang, Y., Yuan, Y., Yang, H., & Zhang, M. (2024). Influence of personalized recommendation of short-videos on users' information adoption intention. *Science Research Management*, 45(4), 175–184. <https://doi.org/10.19571/j.cnki.1000-2995.2024.04.019>
- [17] Li, J. (n.d.). *Publications*. Retrieved June 27, 2025, from <https://lijinhuihust.wixsite.com/lijh/publications>