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# The analysis of social E-commerce with artificial intelligence

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**Abstract.** Nowadays, with the widespread popularization and development of the internet, the e-commerce industry has begun to rise, among which social e-commerce, as a new community, has become popular on the Internet. At the same time, the field of artificial intelligence is slowly infiltrating into every field of today's society. The diversified data contained in the social e-commerce platform has great potential value, but artificial intelligence, as an important technology of information analysis, is rarely applied in this direction. This paper fundamentally discusses the role of artificial intelligence in e-commerce. Taking Xiaohongshu as an example, the SWOT framework is used to analyze the advantages and drawbacks, potential benefits and risks caused by the application of artificial intelligence in an e-commerce platform with rich user data. The limitation and extensibility of artificial intelligence in e-commerce platforms, finally put forward the application prospect of artificial intelligence in the e-commerce direction. This study recommends that the social e-commerce community establish a robust data privacy protection system, increase investment in technology research and development, and fully leverage the potential of AI technology.

**Keywords:** Social E-commerce, Artificial Intelligence, Xiaohongshu.

## 1. Introduction

In the digital era of the 21st century, technological advancements have deeply influenced global business models. Among these, the development of Artificial Intelligence (AI) and the emergence of new e-commerce models, such as social e-commerce, are two crucial components of this transformation.

Firstly, new e-commerce models, such as social e-commerce, are rapidly gaining traction. Social e-commerce combines e-commerce with social media, leveraging the influence of social media platforms to promote the sales of goods and services through interaction, sharing, and building trust [1]. The emergence of this model signifies a shift in e-commerce from a singular transaction-based approach to a more personalized and social direction. With advancements in internet technology, especially the widespread adoption of social media, social e-commerce has been thriving globally, demonstrating significant market potential [2].

Simultaneously, social e-commerce platforms contain a large amount of data, and the implicit information in these data is particularly important for the development of communities. In recent years, AI-related technologies have received widespread attention from researchers due to their intelligent

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information extraction capabilities. Previously, AI applications were limited to large enterprises and specific industries, but now it has permeated every aspect of our daily lives, including healthcare, education, automotive, finance, e-commerce, and more [3]. The rapid development of AI, particularly in fields like machine learning, deep learning, and natural language processing, has profoundly impacted business models, making it possible for e-commerce systems to predict client demand properly.

The application of Artificial Intelligence (AI) in social e-commerce has seen substantial growth in recent years, playing a vital role in enhancing user experiences and business operations. As a community-driven e-commerce platform, Xiaohongshu benefits from an abundance of user behavioral data and active community interactions, providing rich scenarios and possibilities for AI technology applications [4]. However, introducing AI also comes with a set of challenges, such as data privacy concerns, investment in research and development, technological adaptability, and regulatory compliance issues. These complex environments have increased the application of artificial intelligence technology in the Xiaohongshu.

The purpose of this paper is to conduct a detailed SWOT analysis specific to the application of AI in social e-commerce. By uncovering the platform's strengths, weaknesses, opportunities, and threats related to AI implementation, we aim to provide valuable recommendations for Xiaohongshu and other social e-commerce platforms on how to leverage AI technology effectively.

## 2. Related work

### *2.1. Social E-commerce*

Through the use of technology, e-commerce is experiencing an evolution to increase client engagement and produce more economic value. Social e-commerce is a typical name for this recent development [5] Social e-commerce refers to a novel e-commerce model that combines social media and online shopping, allowing consumers to engage in social activities while making purchases [6]. In social e-commerce, consumers can obtain product information through communication and sharing with others, and they can also make direct purchases on social platforms [5] This approach not only enhances the shopping experience for consumers but also enables businesses to better understand consumer needs and boost sales through targeted marketing strategies [7] consider social e-commerce as a new business model driven by social media that facilitates the buying and selling of various products and services. Social e-commerce involves three main parts: attracting followers through various bloggers, promoting products with a large fan base, and building loyal audiences through strong connections. The content of these bloggers attracts people to watch and follow, and attracts more people to buy their products. Some scholars view social e-commerce as a subset of e-commerce that utilizes social media to promote interaction and enhance the shopping experience [8]. define social e-commerce as "social media"-based e-commerce, allowing people to engage in marketing, product, and service sales in online markets and communities.[9]. regard social e-commerce as a subset of traditional e-commerce that incorporates social media functionalities to support social interactions during the buying and selling of products and services. In such a system with complex data, many pieces of information still need to be explored and utilized, and social e-commerce platforms urgently need methods and technology to enrich user interaction.

### *2.2. Artificial Intelligence*

Artificial Intelligence (AI) is an important branch of computer science with the main goal of designing and constructing machines or systems capable of performing human-like intelligent activities. These activities include but are not limited to language understanding, knowledge representation, reasoning, learning, planning, perception, and manipulation [10]. Artificial Intelligence can be broadly categorized into two types: Weak Artificial Intelligence and Strong Artificial Intelligence. Weak AI (also known as Narrow AI) refers to systems specifically designed to perform specific tasks, such as speech recognition or image recognition [11]. Strong AI (also known as General AI) refers to the ability to understand, learn, and apply knowledge, allowing it to perform any human-like intelligent task [12]. Benotsmane et

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al. concluded, using cointegration test methods, that the AI industry is positively correlated with the regional economy in both the long and short term. Particularly, in mega-cities, the concentration of technological resources has increased the level of automation and intelligence, promoted total factor productivity, and facilitated high-quality economic development. Ullah Z et al. believe that AI directly promotes economic growth through the substitution of labor elements, human-machine integration, and the expansion of the AI industry chain. Indirectly, it promotes economic growth by enhancing human capital and improving technological innovation efficiency, market efficiency, and government governance efficiency.

Now AI has penetrated into all areas of real life, the global AI server market size in 2023 is 21.1 billion US dollars, is expected to reach 31.79 billion US dollars in 2025, 2023-2025 CAGR(compound annual growth rate) is 22.7%, which is enough to reflect the broad development prospects of AI, and has the leading future development trend. It is of great significance to the social e-commerce mentioned in this article.

## 3. The application of AI in social e-commerce: Xiaohongshu as an example

### *3.1. Overview of Xiaohongshu*

Xiaohongshu is a social e-commerce platform that primarily provides users with information sharing on shopping, lifestyle, travel, beauty, and fashion [15]. Users can browse through other users' shares to learn about detailed information on products, such as user experiences and purchasing methods [16]. Xiaohongshu's user base mainly consists of young people, especially young urban women. It helps these users discover and purchase high-quality products from both domestic and international markets while also providing a channel for businesses to understand and connect with this consumer group [17]. The content on Xiaohongshu is highly diverse, users can create posts with images or short videos, sharing their life experiences or product reviews [18]. This user-generated content (UGC) model makes the content on Xiaohongshu more diverse and personalized, catering to different users' needs [19]. Additionally, Xiaohongshu boasts powerful e-commerce features, allowing users to directly purchase their favorite products on the platform without the need to be redirected to other e-commerce websites [19].

Regarding the application of AI technology, Xiaohongshu has implemented various strategies to enhance user experience, improve operational efficiency, and optimize content distribution. Firstly, Xiaohongshu employs AI algorithms for personalized recommendations. By analyzing users' browsing history, purchase behavior, liked and saved content, AI technology can accurately push content that users are interested in [20]. This not only increases user satisfaction but also boosts conversion rates. Secondly, Xiaohongshu also utilizes AI technology for product search and image recognition. Through AI-powered image recognition, users can upload photos of products, and the AI technology can identify the items and provide relevant purchase links. This significantly streamlines the shopping experience for users and increases the platform's transaction volume [18]. In addition, Xiaohongshu utilizes artificial intelligence for managing community content and analysing user actions. By applying machine learning and natural language processing, Xiaohongshu has the capacity to discern and remove content that does not meet the platform's standards. Concurrently, through observing and analyzing user activity on the platform, Xiaohongshu develops an understanding of users' needs and preferences, which facilitates the modification of their operational strategies [16].

### *3.2. Application Analysis of AI in Xiaohongshu (SWOT)*

The strengths, weaknesses, opportunities and threats will be analyzed in this part. For strengths, Xiaohongshu combines the community nature of social software with the shopping form of e-commerce software while having rich user data. However, Xiaohongshu also needs to solve the problem of user information security by investing more in technology and development. As to the opportunities, AI has developed rapidly in recent years, and putting AI into the operation and management of Xiaohongshu can not only meet the industry trends, but also improve the performance of the app from multiple levels.

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Finally, the difficulty in keeping up with technology advancements and the regularity compliance might be the threats for Xiaohongshu.

### *3.2.1. Strengths*

Xiaohongshu holds a wealth of user activity data, spanning over browsing actions, purchasing tendencies, community engagement, and beyond [16]. This information can enable AI systems to decipher user behavioral trends and preferences, consequently resulting in tailored product suggestions and enriched user shopping experiences. Additionally, this wealth of data can fuel more precise advertisement targeting, thereby bolstering ad efficiency.

As a social-focused e-commerce platform, Xiaohongshu thrives on users exchanging shopping experiences, product advice, and life wisdom. This online community interaction mode has opened up new application scenarios for AI. For example, AI tools can be deployed to scrutinize user-created content and emotional cues, unearth trending themes and patterns, and boost user involvement and loyalty [20]. Moreover, through AI, Xiaohongshu can streamline and rank user-generated content, refining the user's experience of information access.

The traits of Xiaohongshu's e-commerce unlock vast AI implementation opportunities for recommendation engines, price forecasting, sales prediction, and more. For instance, AI can support Xiaohongshu in fine-tuning product suggestions according to users' shopping and browsing patterns, thereby elevating conversion rates [18]. Concurrently, AI can help Xiaohongshu in sales projection and stock control, boosting operational productivity.

### *3.2.2. Weakness*

Xiaohongshu is an e-commerce community platform that deals with a vast amount of user personal information, including purchase history, search history, location data, and individual preferences. When utilizing AI technology for data analysis and model training, Xiaohongshu needs to ensure the privacy and security of this data. However, this is a highly challenging issue that requires striking a balance between data usage and privacy protection. Mishandling of data could potentially lead to user privacy breaches, damage user trust, and even result in legal consequences.

The development of AI technology demands significant resource investment, including research teams, computational resources, data storage, and processing capabilities. If Xiaohongshu falls short in these investments, it may impact the application and progress of AI technology. For instance, they might be unable to keep up with the latest advancements in AI, fail to provide high-quality AI services, or be unprepared to address sudden technical issues [19]. These factors could affect the growth of Xiaohongshu's business and user experience, especially in an era of rapid technological advancement where failure to keep up with the pace of technology could result in being surpassed by competitors.

### *3.2.3. Opportunities*

With the continuous development and improvement of AI technology, its scope of application and possibilities are expanding. For instance, through deep learning and machine learning, Xiaohongshu can more accurately analyze users' shopping habits and provide them with more personalized shopping recommendations [16]. Progress in speech recognition and natural language processing also enables Xiaohongshu to better understand and process users' search requests and feedback. Moreover, AI can play a significant role in content moderation, targeted advertising, user behavior prediction, and other areas, enhancing operational efficiency.

As e-commerce and social media sites progressively incorporate AI technology to enhance user interaction and streamline operations, Xiaohongshu is also well-positioned to adopt innovative AI applications. This includes intelligent customer service, voice-activated shopping, and smart fitting, which can be inspired by the success stories of other enterprises [20]. This trend reflects both technological and market movements. With the growing public comprehension and endorsement of AI, there may be an increased openness amongst Xiaohongshu's users to the services and suggestions offered via AI, expanding the potential for Xiaohongshu to integrate and capitalize on AI technology.

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#### *3.2.4. Threats*

The field of AI technology is swiftly advancing, characterized by frequent emergence of innovative models, algorithms, and expeditious updates to various tools and frameworks. If Xiaohongshu cannot promptly adapt to these technological shifts, it risks losing its market competitiveness. For instance, employing outdated technology in Xiaohongshu's recommendation or user profiling systems could potentially lead to imprecise understanding and forecasting of user behavior, which may in turn negatively impact product efficacy and the user experience [20]. Thus, the challenge of staying abreast with evolving technological advancements poses a considerable threat to Xiaohongshu in its application of AI technology.

As issues related to data privacy and AI decision transparency become increasingly prominent, governments of various countries are paying more attention to these matters and may enact stricter regulations to govern company practices [15]. For instance, if Xiaohongshu fails to obtain sufficient user consent while using AI technology to process user data or if its decision-making processes lack transparency, it may violate these regulations and face legal risks. Moreover, these regulations may limit Xiaohongshu's flexibility in data collection and usage, impacting the effectiveness of its use of AI technology. Therefore, regulatory compliance is another threat that Xiaohongshu needs to consider when using AI technology.

### *3.3. Suggestion*

#### *3.3.1. Establishing a Robust Data Privacy Protection System*

Considering the significance and seriousness of data privacy issues, Xiaohongshu must take firm steps to establish comprehensive data protection policies and meticulous procedures to ensure effective and responsible protection of users' personal information [21]. This includes developing transparent and explicit policies regarding the use of user information, enabling every user to understand and accept how their data is processed, thereby enhancing users' trust in Xiaohongshu. Cutting-edge data encryption technology must be employed to rigorously protect all collected data, preventing any unauthorized access or leaks and ensuring data security during storage and transmission processes [22]. Moreover, Xiaohongshu needs to implement strict internal regulations on data access and usage to prevent misuse of permissions and data by internal personnel, safeguarding the confidentiality and integrity of data. Additionally, Xiaohongshu could consider adopting AI technologies with privacy protection features, such as differential privacy and federated learning. Differential privacy can protect individual users' privacy by adding noise, while federated learning enables machine learning without direct access to users' raw data. Both methods maximize the utilization of data while respecting and protecting users' privacy rights [23]. These efforts demonstrate a high level of respect for user privacy and showcase Xiaohongshu's determination and innovative spirit in data privacy protection.

#### *3.3.2. Increasing Investment in Technology Research and Development*

Maintaining a leading position in the field of AI technology application is no easy task for Xiaohongshu. It requires significant investment on both the human and material fronts. In terms of human resources, the company must strengthen the recruitment of AI talent, which means attracting more exceptional individuals with relevant AI-related skills during the hiring process [24]. Regarding material investment, Xiaohongshu needs to make substantial contributions to computing resources, not only providing powerful hardware facilities but also optimizing data storage and processing capabilities to meet the demands of AI technology research and development. Simultaneously, to ensure effective utilization of these resources, Xiaohongshu also needs to establish a robust and efficient technology research and development management mechanism. This mechanism should focus on optimizing resource utilization and must be capable of tracking and managing all research and development processes to maintain clear control over project progress [25].

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### *3.3.3. Maximizing the Potential of AI Technology*

With the continuous advancement of artificial intelligence technology, Xiaohongshu is currently in a phase of exploring new application possibilities. For instance, it can leverage deep learning and machine learning methods to further enhance its product recommendation system, providing users with a more personalized shopping experience [26]. The introduction of speech recognition and natural language processing technologies allows Xiaohongshu to offer improved search and feedback services. This enables better understanding of user needs and more accurate search results, thereby enhancing user satisfaction. Additionally, AI capabilities in content moderation and advertising can boost Xiaohongshu's operational efficiency. AI can efficiently identify and filter out inappropriate content and precisely deliver advertisements, thus increasing ad click-through rates and conversion rates [27]. Therefore, Xiaohongshu needs to remain attentive to the development of AI technology and promptly adopt and utilize new tools and technologies to enhance its platform's user experience and operational efficiency. In the future, AI technology is likely to play an even more significant role in Xiaohongshu, bringing more convenience and value to users and operators.

## 4. Conclusion

This study analyzes the advantages, disadvantages, opportunities, and threats of using AI technology on the social e-commerce platform, Xiaohongshu. Xiaohongshu's abundant user data, community nature, and e-commerce attributes offer ample opportunities for AI application. By studying user behavior patterns and preferences, it can precisely recommend products, enhance advertising effectiveness, and improve operational efficiency. However, data privacy and the level of investment in technology development remain significant obstacles to its growth.

With the advancement of AI technology, Xiaohongshu has greater development prospects. Deep learning and machine learning, for example, can help analyze user shopping habits more accurately, providing personalized shopping recommendations. Nevertheless, Xiaohongshu also faces challenges in keeping up with rapidly evolving technologies and potential threats of stricter regulatory supervision.

Therefore, it is recommended that Xiaohongshu focus on protecting user data privacy, increasing investment in technology development, and fully utilizing the potential of AI technology. Firstly, establishing a robust data privacy protection system is essential to ensure the security of users' personal information. Secondly, more human and material resources should be allocated to AI technology research and development to maintain a leading position in its application. Finally, fully leveraging the possibilities of AI technology to provide more personalized product recommendations, better search and feedback services, and improved operational efficiency. In summary, Xiaohongshu has the potential to achieve greater success in the social e-commerce field by effectively utilizing AI.

## Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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