



# An Analysis of the Influence Paths of Big Data-Enabled E-commerce Live-streaming on Consumer Perception

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**Abstract.** This study systematically explores the impact pathways of e-commerce live-streaming on consumer perception in the context of big data. The article first analyzes three core factors influencing user perception: the professionalism and trustworthiness of the live-stream host, the interactivity and engagement of the live-stream, and social influence and bandwagon effect. The research finds that the host's professionalism is the cornerstone of building consumer trust, while the platform's real-time interactivity deepens consumer engagement through both emotional and cognitive pathways. Additionally, group interactions and social identification within live-streaming environments can trigger herd consumption behavior. Based on this, this paper further explores how big data technology can enhance and optimize these factors through precise recommendations and real-time feedback. Finally, this paper analyzes the challenges currently facing the live-streaming e-commerce model at the consumer, industry, and regulatory levels, such as information overload, false advertising, data privacy and security issues, and regulatory lag. It proposes corresponding countermeasures and recommendations from the perspectives of content quality, internal corporate management, and multi-party collaborative regulation.

**Keywords:** E-commerce Live-Streaming, Big Data, Consumer Perception.

## 1 Introduction

As platforms such as Taobao live broadcast and Douyin live broadcast have become the core channels in the e-commerce ecosystem, the role of e-commerce live broadcast in shaping consumers' cognition has become increasingly prominent. Its disruptive impact stems not only from the interactive form of innovation, but also from the powerful driving force brought by big data technology [1,2].

Through the synergy of anchor guidance, real-time interaction and social influence, consumers change from passive information receivers to active participants in immersive experience. At the same time, e-commerce live broadcast has reshaped the way consumers interact with products and brands by using technologies such as user portraits, recommendation algorithms and behavior tracking, so as to enhance consumers' trust and promote purchase decisions. Therefore, exploring the psychological

mechanism and behavioral logic behind this emerging model has important practical significance for optimizing platform algorithms and business strategies.

This study will systematically analyze the three key elements of anchor professionalism, live interaction and social influence, explore how big data technology can empower these elements through accurate push and real-time feedback, and propose corresponding coping strategies for current challenges, so as to provide scientific reference for industry practitioners.

## **2 The Impact of E-commerce Live-streaming on User Perception**

### **2.1 Streamer Professionalism and Trust**

In the live broadcast of e-commerce, the anchor, as a key information intermediary, can effectively connect consumers with products. Their professional knowledge plays a vital role in influencing consumers' cognitive value of products and the final purchase decision.

The professional quality of the anchor aims to reduce the uncertainty in the minds of consumers. From the perspective of consumer decision-making process, the anchor imparts professional knowledge through product introduction and demonstration to help consumers make wise decisions in many choices [3]. The value-added services they provide, such as product maintenance guidance, after-sales support and on-site product demonstration, enable consumers to directly experience product performance, thereby enhancing purchase confidence and expected satisfaction [3,4]. This effectively reduces the information asymmetry between buyers and sellers, and significantly reduces the information search cost and perceived risk of consumers. The anchor's professional explanation of product details, on-site product display and clear answers to consumers' questions can effectively improve consumers' awareness of the product and build trust in the anchor - that is, they can provide accurate suggestions [5,6]. This is essential to ultimately promote the sale of high priced or complex products and cultivate long-term brand loyalty.

In addition, the professional quality of anchors does not affect consumers in isolation, it will also be affected by the "matching degree" between anchors and products. Research shows that it is very important for the anchor image to be highly consistent with the products promoted [7]. When consumers think that the anchor is "relevant" and "matching" with the product, their purchase confidence and willingness will be significantly improved. For example, an empirical study found that for practical products, anchors with rich professional knowledge and professional image are more persuasive than those star anchors with entertainment [8]. This indicates that a streamer's influence on consumer cognition, emotions and experience is maximized only when their professional image aligns closely with the product's attributes.

## 2.2 Live-stream Interactivity and Engagement

Live streaming interactivity is the core mechanism distinguishing live commerce from traditional e-commerce. It combines real-time interaction between hosts and users with the platform's technological capabilities, profoundly influencing consumer psychology on both emotional and cognitive levels to shape their purchasing decisions.

On the emotional level, live interaction aims to establish an emotional connection between hosts and consumers, stimulating impulse buying behavior. During broadcasts, hosts cultivate a relaxed and enjoyable atmosphere, actively leveraging real-time interaction features—such as encouraging comments, likes, and virtual gift-giving—to engage viewers and enhance emotional resonance. Unlike traditional media's one-way information dissemination, livestreaming's dynamic ambiance is co-created by hosts and their audience. This high-frequency, real-time interaction significantly heightens viewer attention and boosts engagement [6]. Furthermore, real-time chat functions serve as an instant feedback mechanism, not only boosting user interaction satisfaction but also deepening emotional bonds between users, hosts, and brands [4]. Through verbal communication, live-stream interactions actively engage consumers' emotions and cognition. This interactive process fosters a psychological "flow experience," where consumers experience higher engagement and purchase motivation in a highly immersive environment—a key mechanism for influencing user psychology and behavior in digital marketing [3].

On the cognitive path, live streaming interactivity focuses on facilitating rational purchase decisions through efficient information transmission. Unlike the emotional appeal of the emotional path, cognitive communication emphasizes objectivity and rationality [8]. The real-time interactivity of live streaming empowers consumers to access and verify information instantly. When consumers have questions about product specifications, origin, or usage, they could immediately ask through live chat and receive real-time answers from the streamer or other users [3]. This instant question and answer mechanism significantly reduces the time cost and perceived risk for consumers to obtain information.

## 2.3 Social Influence and Conformity

Live e-commerce is essentially a highly interactive social platform. Consumer decision-making behavior is no longer an isolated individual behavior, but is significantly affected by group interaction factors.

The huge audience and their interactive behavior in the live broadcast can have a strong social influence, which can lead to the conformity psychology of consumers. When consumers see other people actively interact and buy in the live broadcast, "herd effect" will occur [5,8]. Consumers no longer rely only on historical sales data or evaluation to make purchase decisions, but more on the group behavior observed in real time. Research shows that people tend to imitate other people's behavior to obtain a sense of belonging and identity [5]. This psychological tendency was significantly amplified in the live broadcast scene, which directly promoted the growth of group consumption [5]. In addition, some studies also pointed out that this trend is particularly

obvious when purchasing "public goods" for showing off, because consumers want to obtain social recognition by purchasing such goods [8].

Emotional contagion is the key driver of this social impact. Real time comments during live broadcasting are an important channel for emotional communication [6]. When the screen is full of positive comments, it will create a warm and excited atmosphere. This atmosphere spreads rapidly among the audience through emotional contagion, making people's views consistent with the group's emotions [7,9]. This enhanced group emotion can be used as a heuristic signal to bypass the complex cognitive process and directly trigger impulsive consumption behavior [4]. At the same time, it is also a powerful way of online word-of-mouth marketing. Data such as real-time comments, compliments and sharing, as visual evidence, can intuitively prove the reliability of products [5]. Sharing behavior is regarded as a strong recommendation signal, representing high recognition and positive evaluation [6]. Due to the authenticity and spontaneity of this real-time user feedback, it can more effectively build trust and reduce the risks perceived by consumers than official marketing [9].

### **3 Big Data Empowerment in Live Streaming and User Experience**

#### **3.1 Precision Delivery for an Optimized User Perception Path**

The main way that big data technology enables the live broadcast platform is to accurately match user preferences by analyzing user portraits, so as to optimize the initial experience of users.

The platform uses data mining technology to integrate various user data, such as browsing history, purchase records and search keywords, so as to build a detailed user portrait [1,2]. These user profiles can reveal users' current preferences and predict their potential needs. Based on in-depth insight into user behavior, the live broadcast platform can provide accurate personalized recommendations. Research shows that the algorithm can actively push the most relevant live content or product information to users [10]. This makes the interaction between users and live content more personalized, thus significantly improving user satisfaction and loyalty. Another study shows that by analyzing user behavior, the platform can continuously optimize the interface layout, recommendation algorithm and payment process, so as to improve the user experience [1]. More importantly, precision marketing has replaced the traditional "wide net" marketing strategy. This substantially reduces marketing costs and boosts return on investment (ROI), proving particularly valuable for resource-constrained small and medium-sized enterprises [9,10]. This data-driven approach ensures marketing messages reach the right users at the right time. Shifting from the traditional "people seeking products" model to intelligent "products finding people" recommendation systems enhances marketing efficiency and perceived user value [11].

### 3.2 Real-time Feedback for Enhanced Interaction and Response

Big data technology enables live streaming teams to dynamically adjust operational strategies, continuously enhance interaction efficiency and user response speed, ultimately converting massive traffic into commercial value.

During live streams, platforms track and analyze data in real time, such as audience retention rates, sentiment analysis of comments, likes and shares, product click-through rates, and conversion rates. This real-time feedback system empowers operations teams and hosts to make swift decisions. When back-end data indicates declining user engagement, hosts can immediately adjust their streaming style, switch products, or launch interactive activities to boost the broadcast atmosphere. This data-driven, real-time strategy adjustment is key to ensuring high retention rates, conversion rates, and user satisfaction [11]. Advanced systems also leverage natural language processing to analyze live comments; if negative comments surge unexpectedly, the system alerts the operations team [12]. This enables live-streaming teams to intervene promptly, clarify issues, or adjust content to effectively manage negative sentiment and prevent reputational damage. Simultaneously, real-time sales data from live streams can be fed back to supply chains, helping businesses adjust inventory and production plans based on market demand [11]. This demonstrates big data's core value in optimizing resource allocation, empowering companies to execute flexible marketing campaigns such as limited-time discounts, bundled product sales, or precision marketing [10].

## 4 Challenges and Recommendations

### 4.1 Challenges and Risks

**Risks at the Consumer Level.** From the perspective of users, the immersive interactive environment of live shopping has two sides. Research shows that, although the likes, comments and sharing emerging in the live broadcast process can attract consumers, it is also easy to exceed the user's cognitive processing ability and cause information overload [4]. This dynamic environment, coupled with the impact of product details and group emotions, may bring excessive cognitive burden or decision-making difficulties to consumers, and ultimately reduce the quality of purchase decisions [4]. In addition, the research shows that the emotional infection effect in live broadcast shows an inverted U-shaped curve [7]. In fact, excessive or insincere expression of positive emotions may lead to consumer suspicion and reduce purchase intention [7]. In addition, the high purchase expectation brought about by the "group effect" may lead to a large gap between "expectation and actual experience" after consumers receive the goods, thus causing dissatisfaction after purchase [4]. The research further indicates that false advertising and data manipulation—such as exaggerating sales figures or fabricating reviews—are prevalent issues in live-stream e-commerce, severely infringing upon consumers' legitimate rights and interests [13].

**Challenges at the Industry and Enterprise Levels.** At the industry and enterprise operational levels, the application of big data and implementation of personalized marketing also face multiple obstacles. The report indicates that the collection and use of vast

amounts of user data have sparked widespread public concern over privacy breaches [9]. Many companies fail to adequately protect user information when implementing personalized marketing, leading to privacy leakage risks that diminish marketing effectiveness and erode user trust [10]. Therefore, balancing data utilization with user information security is a core issue that platforms and enterprises must address [9]. Research further indicates that widespread shortages of specialized talent and insufficient technological application across the industry limit the effectiveness of personalized marketing [9]. Big data application is a highly specialized skill, yet the sector lacks professionals who possess both data analytics capabilities and deep marketing expertise. Although many companies conduct market research, inadequate technical capabilities or the use of unverified data often result in low conversion rates and poor user experiences from personalized marketing efforts [10].

**Challenges at the Regulatory and Legal Level.** From a macro-governance perspective, the current legal and regulatory framework struggles to keep pace with the rapid development of live-streaming e-commerce. On one hand, research indicates that relevant regulations, including the E-Commerce Law of the People's Republic of China, fail to clearly define the rights and obligations of live-streaming hosts. This ambiguity leaves their legal status unclear and makes liability determination difficult [14]. Furthermore, most existing departmental regulations and local statutes are “encouragement-based norms” lacking enforceability, resulting in limited regulatory effectiveness. Research also emphasizes that mechanically applying traditional regulations like the Advertising Law can easily create regulatory loopholes [13]. On the other hand, studies reveal significant uncertainties regarding the legal status and liabilities of live-streaming hosts. Existing laws fail to clearly define their legal standing and lack corresponding differentiated liability mechanisms [13]. The study specifically notes that top-tier live streamers differ significantly from traditional advertising endorsers [14]. They possess autonomy in product selection, pricing, and promotion, with income directly tied to sales performance. Their contractual nature more closely resembles agency agreements, complicating the delineation of their legal liabilities.

## 4.2 Countermeasures and Recommendations

**Recommendations for Addressing Risks at the Consumer Level.** To address issues such as false advertising, information overload, and emotional manipulation that directly harm consumer interests, recommendations include focusing on content quality and consumer guidance. According to a study, an enhancement of professional knowledge by streamers is recommended, alongside honest and objective product introductions, systematic of product claims, and disclosure of potential flaws to avoid misleading consumers [13]. It is also suggested that platforms strengthen content review and quality control, for example by establishing credit assessment systems for streamers and merchants, and penalizing dishonest behavior to ensure the accuracy and reliability of product information [15]. The study additionally recommends that hosts objectively analyze product suitability, patiently address inquiries, and avoid misleading or inducing impulse purchases [15]. Simultaneously, platforms can assist consumers in making

prudent decisions by implementing clear rational shopping prompts within livestream rooms or utilizing pop-up alerts [15].

**Recommendations for Addressing Industry and Enterprise-Level.** In order to meet the challenges of data security and talent shortage, enterprises and platforms must pay attention to internal governance and long-term planning to achieve sustainable development. Research shows that enterprises must establish a comprehensive data lifecycle management mechanism, including a clear data collection authorization process, the use of encryption technology and anonymization standards, and compliance with relevant regulations [11]. Paying attention to consumer privacy protection is not only a legal requirement, but also the key to win customer trust [10,15]. The study suggests that enterprises invest in talent training, such as providing dual track training programs for existing employees to improve their data analysis ability [9]. In addition, enterprises should also strengthen industry university research cooperation with universities to cultivate interdisciplinary talents with both marketing and technical capabilities, so as to bridge the talent gap in the industry [9,10].

**Recommendations for Addressing Regulatory and Legal Level.** In order to solve the problems such as the lag of existing laws and regulations and the unclear responsibility subject, the government, Internet platforms and industry associations must strengthen cooperation and establish a dynamic governance framework that can meet the needs of the development of the digital economy. Research point out that there is an urgent need for lawmakers to fill existing legal gaps, clarify the legal status of live streamers in online sales, and establish differentiated civil liability mechanisms based on their different roles (e.g., endorser, seller) [13]. Existing laws also require adjustments to accommodate the unique characteristics of live-streaming e-commerce, which differ from traditional advertising and sales [14]. The study recommends that platforms, as primary responsible parties, implement rigorous vetting mechanisms for live-streamers and merchants while publicly disclosing review standards to enhance transparency [15]. Another key recommendation involves leveraging artificial intelligence for real-time monitoring, establishing efficient after-sales service and complaint-handling mechanisms, actively protecting consumer rights, and mitigating potential risks such as algorithmic bias [15]. Research encourages the joint development of market conduct guidelines and credibility assessment systems by platforms, industry associations, academia, and consumer protection organizations, and the innovation of regulatory tools, such as using natural language processing and block-chain technologies to build intelligent regulatory platforms to address new types of violations, such as big data discrimination [11].

## 5 Conclusion

This paper systematically reviews existing literature on the impact of e-commerce live-streaming on consumer perception in the context of big data. The research shows that e-commerce live-streaming is not merely a sales channel, but a multidimensional social marketing platform. E-commerce live-streaming primarily reshapes consumer perception through three pathways: host professionalism, platform interactivity and group

dynamics. Among them, the anchor's professional knowledge and product matching degree are the basis for establishing user trust. The real-time interactive platform can enhance user participation through emotional and cognitive levels. The group interaction in the live broadcast room can also effectively stimulate users' herd mentality. In this process, big data technology plays a crucial role in promoting and strengthening through accurate advertising and real-time feedback.

These research results provide valuable guidance for businesses to optimize the live broadcast strategy. On the one hand, businesses should give priority to the live anchors that match the product image, and use big data analysis to accurately target the target audience; On the other hand, they also need to improve the interactivity and content quality of the live broadcast, put an end to false propaganda and create a positive live broadcast atmosphere, so as to enhance user stickiness. When using data for real-time operation adjustment, the platform must pay attention to data ethics and privacy protection to win the long-term trust of consumers.

This study mainly analyzes the existing live broadcast mode and the challenges it faces, so it does not cover all types of live broadcast forms or various changes in the platform ecosystem. Future research can further quantify the specific impact of different interaction strategies on consumers' long-term behavior and brand loyalty. In addition, the research should also explore an optimization model that can take into account business efficiency and consumer rights, protect data privacy and avoid information overload.

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