

Analysis of Double-Edged Sword Effect and Cognitive-Emotional Effect on Consumer Loyalty from Algorithmic Recommendation

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Abstract: With the rapid expansion of network interconnection, algorithms are increasingly becoming an important means for consumers to obtain information and goods. Although the algorithm has achieved success in enhancing brand loyalty, it also makes consumers more passive in their brand choices, with both advantages and disadvantages. This paper examines its impacts by analyzing the algorithm's intervention in the consumer decision-making process, including cultivating brand loyalty and inhibiting consumers' independent consciousness and emotional responses. Improving algorithm efficiency enhances brand awareness and consumer satisfaction, thereby consolidating brand loyalty. Nevertheless, in the long run, it can easily create consumers' emotional dependence and cognitive biases towards brands, diminishing their decision-making autonomy and the diversity of choices. When applying the algorithm, enterprises should weigh the benefits and potential risks, and strive to strike a balance between brand loyalty and consumers' independent choice.

1. Introduction

1.1 Research Background

With the advent of the big data era and the rapid development of internet technology, algorithms have gradually become a key tool in digital marketing and promotion. By leveraging large-scale user data for analysis and learning, the system can accurately identify user preferences and match the right products, thereby optimizing the consumer shopping experience and increasing brand contact frequency. Through consumer-brand interactions, the algorithm can effectively foster consumers' loyalty to the brand [1]. Meanwhile, the application of the algorithm also has negative impacts, as consumers' increasing reliance on technology may weaken their ability to make independent choices, forming an "information cocoon".

In recent years, research on the relationship between algorithms and brand loyalty has increased. Scholars not only focus on the positive roles of algorithms in enhancing brand loyalty, but also on the importance of consumers' cognition and emotion. The algorithm works as a double-edged sword. It affects consumers' cognition and emotions, offering a new perspective for improving marketing strategies.

1.2 Research Significance

Research on the dual impact of algorithms on brand loyalty and on consumer cognitive-emotional effects has significant academic and practical value. From a theoretical perspective, the two-tiered role of algorithms in shaping consumer brand loyalty can expand the research frameworks of consumer behavior and brand management. It can also offer a new perspective on consumer decision-making in the digital era. Furthermore, we can apply cognitive psychology and emotion theory to analyze consumers' cognitive and emotional reactions when interacting with algorithms. Finally, it provides an empirical basis for relevant academic discussions. From a practical point of view, analyzing the algorithm's impact on brand loyalty can serve as a reliable reference for enterprises to formulate marketing strategies and help them enhance consumer loyalty while avoiding the risks of

over-reliance on the algorithm. By optimizing algorithm design, enterprises can deliver a positive consumer experience and achieve sustainable brand development. In a word, in the highly competitive market environment, analyzing the double-edged sword effect of algorithms helps enterprises maintain their competitive advantage.

2. The Double-edged Sword Effect of Algorithmic Recommendation on Brand Loyalty

2.1 Theoretical Basis

In terms of cognitive structure, when consumers adopt the algorithm, they construct brand cognition through psychological processing. Their cognition affects the degree of trust in the brand and their loyalty. By providing accurate product information and a customized experience, the algorithm encourages consumers to choose the brands they prefer and strengthens brand loyalty. The same is true of the emotional structure. During the purchasing process, consumers are motivated by a sense of achievement, which can elicit positive emotions and strengthen their loyalty to the brand. In practice, many enterprises use big data analysis to improve recommendation accuracy, make consumers feel better in shopping, and enhance brand appeal. However, over-reliance on algorithms can make consumers' emotional connections to be superficial. Therefore, when designing the mechanism, the brand needs to balance consumers' emotional needs and cognitive changes to sustain continuous improvement in brand loyalty [2].

2.2 Analysis on Specific Impacts

2.2.1 Optimize Reach Efficiency and Consumption Experience

By accurately understanding consumer preferences and needs, the brand marketer delivers the most relevant product information to the target audience at the right time, significantly improving the advertisement's click-through rate and conversion rate. Efficient recommendations effectively reduce the time and energy users spend finding suitable goods in massive amounts of information, thereby strengthening users' preference for brands. Moreover, optimizing the consumption process helps consumers become more loyal to the brand because the brand actively perceives their needs and provides solutions accordingly. It's important to note that relying too heavily on algorithms might lead consumers to have higher expectations. When demand is not met, disappointment is easy to come by. Hence, when applying the algorithm, the brand needs to take into account both efficiency and user experience, and is committed to maintaining consumers' active purchase to achieve lasting consumer loyalty.

2.2.2 Innovative Brand Interaction and Marketing Model

By quickly analyzing users' preferences and behavior patterns, brand marketers can adopt more targeted marketing strategies and enhance user engagement. Using algorithms, enterprises customize promotional plans and actively deliver targeted goods or snap-up information in a limited time that meet consumers' interests, creating interactive opportunities, optimizing the user experience, and consolidating consumers' sense of identity and loyalty to the brand. Furthermore, the algorithm supports data-driven decision-making, enabling managers to quickly adjust marketing content to respond to market changes and fluctuations in consumer demand. In summary, brands build closer ties with consumers through algorithms, create a new model of "consumer-brand" interaction, and affect consumers' decision-making and brand loyalty [3]. Moreover, brands need to continuously optimize their algorithms, maintain innovation and competitive advantage, and enhance brand influence and loyalty in the dynamic market environment.

2.2.3 Enhance Brand Identity and Consumers' Sense of Belonging

Consumers expect accurate product promotion and customized content push, and well-known brands are more likely to establish emotional connections with customers. When customers come into contact with products that meet their preferences, they will enhance their sense of brand identity, which in turn will prompt them to prefer familiar, reliable products and to form strong loyalty. If

consumers actively participate in the brand activities, sharing shopping experiences, or commenting on it, their sense of belonging will be enhanced. In the digital environment, consumers are eager to establish a deeper relationship with brands. The algorithm offers personalized services to consumers by leveraging a feedback mechanism and facilitating social interactions, which help individuals shape their identity when selecting a brand [4]. It is recommended that brand marketers continually refine their strategies and focus on fostering positive consumer interactions to build brand loyalty.

3. Dynamic Mechanism of the Influence of Algorithm Recommendation on Brand Loyalty

3.1 Analysis of Internal Driving Force

With big data and machine learning, the algorithm deeply analyzes the consumption information, browsing trajectory, and social interaction of massive users, identifies their potential consumption motives and preferences, accurately matches the mechanism, and pushes highly relevant products and services to consumers at the appropriate time, greatly enhancing the advertising effect and conversion rate. In addition, customized services optimize consumers' purchasing experience, strengthen the brand's attention to individual needs, and thus enhance brand appeal. The algorithm supports real-time iteration and learning and is continuously optimized to adapt to changes in consumer behavior.

The algorithm provides highly customized services by interpreting users' shopping patterns and tendencies. It allows consumers to quickly locate their favorite products and avoid repeated consideration, significantly improving consumer satisfaction and purchasing efficiency. As a result, consumers get convenient services, their individual needs are met, and they consolidate their loyalty to the brand [5].

A customized experience makes consumers more likely to experience emotional resonance during the shopping process and to build a deep connection with brands. If the algorithm fails to accurately capture consumers' demands and causes an information mismatch, it will weaken consumer satisfaction. Hence, it is necessary for marketers to conduct continuous market research and collect user feedback, enabling algorithms to better adapt to consumers' needs and striving to achieve a harmonious balance between providing personalized products and improving efficiency.

3.2 Analysis of External Driving Force

3.2.1 Traffic Allocation Mechanism and Business Rules

Social media platforms and online retail channels develop traffic allocation strategies to capture users' attention for particular product brands and influence their buying choices. In this process, brand exposure is improved. By enhancing the user's shopping experience, business rules can be established, fostering mutually beneficial cooperation between the platform and the brand, thereby standardizing the brand's actions to some extent. They stimulate customers' desire to consume through promotional activities or product displays. Platforms usually prioritize matching brands based on users' past behavior, making consumers more inclined to purchase familiar products. It restricts consumer choices and fosters an "information cocoon," leading to reduced willingness to explore alternative brands [6]. Therefore, brand marketers need to flexibly adjust their marketing strategies in line with platform traffic allocation rules and business rules to adapt to external environment changes and maintain consumer loyalty.

3.2.2 Intensified Market Competition and the Need for Precision Marketing

There are more consumer choices than ever before, and traditional marketing methods are difficult to meet market needs. Well-known brands are using cutting-edge technology to analyze consumer behavior and formulate customized marketing strategies. Precision marketing significantly improves the efficiency of advertising conversions and enhances consumers' brand recognition.

By analyzing customers' purchase records and preferences, brand marketers can push products that meet their needs at the right time and optimize the shopping experience. Excessive reliance on precision marketing can easily lead to consumer aesthetic fatigue, information overload, and a

weakened brand appeal. Therefore, in fierce market competition, enterprises need to use algorithms flexibly, maintain the diversity and innovation of marketing strategies, adapt to ever-changing consumer needs, and strive to ensure steady improvement in brand loyalty. By implementing effective strategies, brands can build strong relationships with consumers in a complex market environment, thereby enhancing their competitive advantage.

3.3 The Collaborative Mechanisms

3.3.1 Build a "Technology-Demand-Platform-Brand" Model

Utilizing extensive data and intelligent learning, it improves accuracy and personalization, addressing the increasingly diverse needs of customers. It focuses on customers' desire for shopping and brand value, and on users' expectations of convenience and pleasure in consumption, which, in turn, affect brand loyalty. Channel promotion is embodied in the platform rules and the guiding function of the traffic allocation mechanism. How the brand interacts with customers through algorithms affects brand visibility and the probability of user contact. Brand leadership focuses on how brands can deepen their emotional ties with customers and sustain brand loyalty through market competition and strategic adjustments. The four-dimensional driving model emphasizes the interaction between elements, guides brand behavior through technological innovation, and efficiently promotes the construction and evolution of customer loyalty to the brand [7]. When applying the algorithm, brand marketers should consider technology, demand, and platforms in an integrated way to achieve a virtuous circle and lasting brand loyalty.

3.3.2 The Coupling and Transmission Path between the Elements

In the four-dimensional driving mode, we used data analysis and intelligent algorithms to efficiently identify consumer needs, and demand-driven approaches help achieve a more accurate, personalized experience. Technical and demand elements are integrated through algorithms. Meanwhile, a feedback mechanism helps brands better meet consumer expectations. When consumers experience the convenience technology offers, their brand identity will be strengthened, further strengthening brand loyalty. The platform acts as a bridge in this process because its rules and traffic allocation mechanism shape the interaction landscape between brands and consumers and influence brand image and consumers' shopping decisions.

When the effectiveness of brand strategy aligns with consumers' emotions and needs, it forms a powerful transmission channel that consolidates brand loyalty. In a word, when using the algorithm, brand marketers should focus on the relationship among elements to sustain the continuous upgrading of brand loyalty.

4. The Effect of Algorithmic Recommendation on Consumer Brand Loyalty: A Double-Edged Sword with a Cognitive-Emotional Impact

4.1 Optimize Consumer Cognition Path

4.1.1 Information Overload and Limited Resources

In the context of the information explosion, consumers face massive amounts of information, which may lead to confusion and even fatigue, thereby reducing decision-making quality and brand loyalty. To alleviate this phenomenon, the brand should optimize its algorithmic system to achieve accurate positioning and content screening, thereby reducing the amount of information and ensuring its relevance and practicality. Additionally, a concise, intuitive user interface and a clear product description should be created, so that consumers can quickly obtain key information and reduce cognitive burden. For example, brand marketers can guide consumers to make their own judgments and choices by building a user interface with strong interactivity, thereby enhancing their understanding and identity with the content.

In addition, embedding the user feedback mechanism into the system process helps improve the accuracy of algorithmic recommendations and enhances consumers' sense of participation and satisfaction. The effective implementation of proposed strategies will solve the problems caused by

information overload, thereby positively enhancing consumer loyalty and ultimately promoting a benign interaction between brands and consumers.

4.1.2 Promote the Precise Matching of Information and Consumer Cognition

In the digital age, customers generally browse personalized information when choosing products, and brands must do their best to ensure the content they provide closely aligns with consumers' expectations. With the help of the algorithm, the brand side analyzes users' past behavior patterns, identifies potential needs, and delivers accurate information pushes. In this process, brand marketers need to pay attention to the relevance and timeliness of information and adapt to changes in consumer demand through continuous strategy adjustments. Additionally, when transmitting information, they should create a clear, unified brand image and value proposition to help consumers quickly grasp the brand's core positioning and market position. When consumers perceive that brand information aligns with their cognition, their trust and loyalty to the brand will naturally increase. It is suggested that the brand marketer continuously optimize information-matching accuracy in system design and marketing activities, establish stable customer relationships, and enhance brand loyalty.

4.2 Reshape the Emotional Pathway of Consumers

4.2.1 Promote Emotional Links

Supported by algorithms, well-known brands provide customized content to meet customers' needs and expectations, thereby consolidating emotional ties. By analyzing user data, they can identify customers' emotional trigger points and leverage emotional expressions to create a sense of belonging. Moreover, brand marketers can interact with customers on social platforms, encourage users to create original content, covering shopping experiences and daily life, and improve customer participation and brand affinity. In addition, through perceptual narration, the brand value can be integrated with consumers' personal experiences, thereby strengthening their recognition of the brand through emotional resonance. When customers feel emotional depth and sincerity from the brand, their loyalty will improve significantly. Therefore, when using algorithms, brands should focus on deepening emotional connection, building lasting relationships, and thereby fostering interaction and trust between brands and consumers through emotional drive.

4.2.2 A Crisis of Trust

The ongoing use of algorithmic technology often exposes consumers to tailored and promotional content, leading to potential information overload that, in turn, gradually weakens their emotional connection to the brand. If the content is too monotonous or repetitive, consumers may feel bored, have negative emotions, and even trigger a crisis of trust. In the long run, if they cannot get the expected consumption experience, it will alter their perception. On the other hand, consumers perceive that the algorithm lacks transparency or humanistic care, which may lead to doubts and weaken trust. When using algorithms, brands should strike a balance between content diversity and accuracy. Strengthening consumer interaction and feedback will enhance transparency, prevent trust crises, maintain consumer loyalty, and build a long-term, stable relationship.

4.3 Stimulate Cognitive-emotional Impact

4.3.1 A Positive Cycle

Brand marketers analyze customers' behaviors and preferences and provide them with personalized products that accurately match and correlate with their preferences. Because of the algorithm's support, customer information acquisition efficiency is significantly enhanced, and cognitive burden is reduced. Customers will enjoy convenience and pleasure in the shopping process when they get products that meet their own needs. Active experience helps enhance brand value and trust. Optimizing the brand experience to enhance consumers' emotional engagement, thereby forming an emotional bond between the brand and customers, which will promote customers' loyalty to the brand. As a result, consumers perceive that brands attach importance to their needs, get a

satisfactory shopping experience, and their recognition and dependence on brands will be consolidated, forming a virtuous circle. Maintaining a healthy, interactive relationship between brands and customers will effectively enhance customer loyalty and market advantage, create a dual experience of cognitive convenience and emotion, and build a solid foundation for their long-term development.

4.3.2 Cognitive Bias and Emotional Alienation

Against the backdrop of heavy reliance on algorithms, consumers have become over-reliant on specific brands or products, thereby limiting their choice. Because the algorithm's recommendations are repeated continuously, when the information received by consumers is misaligned with their actual demand, cognitive bias will occur, and the overall impression of the brand will worsen. In this case, users tend to feel bored and think that products lack originality and diversity, which reduces their emotional identity and aggravates their emotional alienation. Moreover, consumers' loyalty to the brand will gradually weaken, forming a vicious circle. If the brand does not solve the problem in a timely and effective manner, consumers will lose interest and trust and choose competing brands instead. Therefore, when using the algorithm, efforts should be made to ensure the content is both rich and novel. Consumers should be actively guided to explore new products to maintain brand loyalty.

5. Conclusion

This paper examines the role of algorithms in strengthening consumers' dual cognition and emotional connection to the brand, and explains how algorithms can improve consumer satisfaction and brand loyalty. The diversified contents in digital marketing promotion, along with personalized and efficient strategies, will help enhance consumers' recognition and trust in brands, thereby promoting brand loyalty. If marketers cannot maintain diversity and relevance in their advertisements, consumers may become prejudiced and lose loyalty. In a word, when using algorithms, we should focus on optimizing cognitive convenience and emotional engagement to avoid potential negative cycles.

Future research will examine the impacts of algorithms in various scenarios, offering a comprehensive framework and empirical basis for developing brand marketing strategies. By continuously optimizing its algorithm, a brand can more effectively maintain an emotional connection with consumers, thus strengthening its position in the market.

References

- [1] Obiegbu C J, Larsen G. Algorithmic personalization and brand loyalty: An experiential perspective[J]. *Marketing Theory*, 2024: 14705931241230041.
- [2] Kiang Y J. Impact of AI in Customer Long Term Engagement and Brand Loyalty-Empirical Evidence[J]. *Journal of Accounting, Finance & Management Strategy*, 2024, 19(1).
- [3] Sharma A, Patel N, Gupta R. Enhancing Personalized Loyalty Programs through Reinforcement Learning and Collaborative Filtering Algorithms[J]. *European Advanced AI Journal*, 2022, 11(10).
- [4] Liu B, Kong J L C. Prediction and Realization of Brand Loyalty by Brand Community Content Marketing Based on Digital-Intelligent Algorithm System[C]//International Conference on Big Data Analytics for Cyber-Physical System in Smart City. Singapore: Springer Nature Singapore, 2022: 261-268.
- [5] Su L, Liao H, Huang W, et al. The Relationship Between Brand Image and Consumer Loyalty of Online Platforms Based on Data Analysis[J]. *Revista Ibérica de Sistemas e Tecnologias de Informação*, 2023 (E63): 413-425.
- [6] Xie Y. A Review of Research on Brand Loyalty in Social Media Marketing[C]//2025 International Conference on Financial Innovation and Marketing Management (FIMM 2025). Atlantis Press, 2025:

1023-1030.

[7] Zihan Y H, Islam M S. The Impact of Social Media on Consumer Behavior and Brand Loyalty[J]. Journal of Humanities and Social Sciences Studies, 2024, 6(12): 151-158.