Big Data-Driven Transformation of Consumer Behavior: A Study on Purchasing Decision Mechanisms in the Digital Economy

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Abstract: This study aims to investigate the mechanisms through which the digital economy, under the influence of big data, affects consumer purchasing decisions. By systematically reviewing the literature and conducting theoretical analysis, this paper constructs an analytical framework of consumer behavior in the digital economy across four dimensions: information processing, emotional resonance, trust building, and value co-creation. The findings indicate that big data significantly alters how consumers acquire and process information, improving decision-making efficiency while potentially leading to "information cocoon" effects. Personalized recommendations and social interactions enhance consumers' emotional resonance and trust, yet privacy risks and algorithmic biases may suppress purchase intentions. Consumers demonstrate higher proactivity and social engagement in value co-creation processes, resulting in dynamic and interactive decision-making. The study concludes that big data reshapes both rational and emotional aspects of consumer decision-making, offering practical guidance for corporate marketing strategies and user experience optimization while providing a theoretical foundation for future empirical research.

Keywords: Big Data; Digital Economy; Consumer Behavior; Purchasing Decisions; Value Co-creation

1. Introduction

With the rapid development of the global digital economy, big data is profoundly reshaping the way societies and economies operate as well as the landscape of business competition. As a fundamental resource of the digital economy, big data not only enhances firms' operational efficiency and strategic decision-making but also significantly influences consumer behavior [1]. Consumers are no longer passive recipients of information; instead, they are increasingly shaped by data-driven personalized marketing, recommendation algorithms, and interactive feedback mechanisms. In this context, understanding how big data transforms consumer behavior—particularly the underlying mechanisms of purchasing decisions—has become a central concern for both academia and industry.

Traditional consumer behavior theories typically conceptualize purchasing decisions as a linear process comprising problem recognition, information search, alternative evaluation, purchase decision, and post-purchase behavior. This model emphasizes rational choice and information processing. However, in the context of the digital economy, the decision-making environment for consumers has fundamentally changed [2]. First, big data greatly reduces information asymmetry, allowing consumers to access highly relevant product information in a shorter time. Second, recommendation algorithms and personalized pushes not only shorten the decision path but can also subtly reshape consumers' needs and preferences. Meanwhile, issues of data privacy, information security, and algorithmic transparency raise consumer concerns regarding trust in firms and platforms, further affecting purchase intentions and decision pathways. This complexity makes traditional linear models insufficient to fully explain changes in consumer behavior in digital environments.

Based on this, the present study raises the following research questions: First, how does big data function throughout the consumer purchasing decision process? Second, compared with traditional models, what new characteristics and changes emerge in consumer

behavior driven by big data? Third, how can firms leverage big data tools to facilitate consumer decisions and enhance user value? This study systematically analyzes the transformation of consumer behavior under big data and attempts to construct a new theoretical framework to explain purchasing decision mechanisms in the digital economy.

The study holds both theoretical and practical significance. Theoretically, it integrates consumer behavior theory with big data empowerment theory to explore the role of data elements in purchasing decisions, addressing gaps in the literature regarding consumer psychology and decision pathways. By analyzing each stage of the decision process, this research deepens the understanding of the interaction between big data and consumer behavior and provides a theoretical basis for future empirical studies. Practically, the findings offer valuable managerial insights. In the digital economy, firms need to leverage big data analytics to accurately identify consumer needs, optimize recommendation systems, and establish trust and long-term loyalty while enhancing user experience. Consequently, this study not only aids firms in formulating data-driven marketing strategies but also provides guidance for consumers' autonomous decision-making in digital environments.

2. Literature Review

2.1 The Development of Big Data and the Digital Economy

The emergence of big data is one of the core drivers of the digital economy. With the widespread adoption of the Internet, the Internet of Things, and mobile devices, the speed and volume of data generation have grown exponentially. Big data has not only transformed enterprise production and operational models but also had a profound impact on market competition and consumer behavior. Economically, big data is considered a new factor of production, alongside capital, labor, and technology, serving as a crucial driver for industrial upgrading and innovation [3]. In business management practice, big data enables firms to monitor market dynamics in real-time, identify consumer preferences, and forecast future trends, thereby allowing for more precise strategic planning and resource allocation [4]. Particularly in sectors such as retail, finance, and platform-based economies, the application of big data has become a key means for firms to maintain a competitive edge.

Within the context of the digital economy, big data is widely applied in marketing and customer relationship management. Through data mining and predictive analytics, firms can identify the demand characteristics of different market segments and implement targeted product recommendations and promotional strategies. This not only enhances market efficiency but also reshapes the consumer experience. However, as big data applications deepen, privacy protection and data ethics have become increasingly prominent, potentially affecting consumer trust in firms and, in turn, influencing purchasing decisions [5]. Therefore, academic attention has increasingly focused on the complex interactions between big data and consumer behavior.

2.2 Traditional Theories of Consumer Behavior

Research on consumer behavior originates from marketing and psychology, aiming to understand and explain consumers' psychological activities and behavioral patterns during the purchasing process. Classical consumer decision-making models typically comprise five stages: problem recognition, information search, alternative evaluation, purchase decision, and post-purchase behavior [6]. These models emphasize rational choice and systematic information processing, assuming that consumers gather and compare information as much as possible before making optimal purchasing decisions.

Additionally, models such as AIDA (Attention-Interest-Desire-Action) provide alternative explanations of consumer behavior. The AIDA model highlights how advertising and marketing information influence consumer behavior by attracting attention, stimulating interest, arousing desire, and ultimately prompting action [7]. Over time, scholars have recognized that consumer behavior is not entirely rational but is significantly influenced by emotions, social factors, and environmental conditions. For example, social identity theory suggests that purchasing decisions are shaped not only by personal preferences but also by group identity and social norms.

However, these traditional theories were largely developed in relatively stable markets with

limited information. In the big data-driven digital economy, the amount of information accessible to consumers far exceeds that in traditional markets, and the methods of information acquisition and processing have fundamentally changed. Therefore, traditional theories face limitations in explaining consumer behavior in new digital environments and require adaptation and extension to incorporate digital characteristics.

2.3 The Impact of Big Data on Consumer Behavior

In the digital economy, big data profoundly influences consumer behavior across multiple dimensions. First, regarding information acquisition, big data reduces consumers' information search costs [8]. With recommendation algorithms and personalized pushes, consumers can quickly access product information aligned with their interests and needs. This change in information acquisition not only shortens decision-making time but also alters cognitive pathways.

Second, during the evaluation stage of decision-making, big data technologies aggregate user reviews, social media content, and third-party data, providing consumers with more comprehensive and dynamic reference information [9]. Consequently, consumers' choices rely not only on information provided by firms but also on peer influence and social reputation. It is noteworthy that while big data brings convenience, algorithmic recommendations can also create an "information cocoon" effect, limiting the range of choices and reducing decision diversity [10].

Third, in the stages of purchase decision and post-purchase behavior, big data reinforces firms' continuous influence over consumers. By tracking users' purchase histories and behavioral patterns, firms can deliver ongoing personalized recommendations and promotions, thereby increasing repurchase rates and user engagement [11]. At the same time, big data-supported customer relationship management helps firms provide higher-quality post-purchase services, enhancing consumer satisfaction and loyalty.

However, the positive effects of big data on consumer behavior come with certain risks. Data privacy and information security have become central concerns for consumers in the digital economy. When consumers perceive potential misuse of their personal information, they may reduce trust in platforms, affecting purchase intentions and brand loyalty [12]. Moreover, insufficient transparency and potential biases in algorithmic recommendations may negatively influence decision-making processes. Therefore, the academic community has increasingly focused on the ethics and responsibilities associated with big data applications, seeking a balance between efficiency and fairness.

2.4 The Digital Transformation of Purchasing Decision Mechanisms

Recent studies suggest that consumer purchasing decisions in the digital economy no longer fully follow traditional linear models but instead exhibit more dynamic, cyclical, and interactive characteristics. Under the influence of big data, consumers may frequently switch between different stages—for example, bypassing information search after receiving a push notification and moving directly to a purchase decision, or continuing to gather feedback post-purchase that influences future behavior [13]. This cyclicality and dynamism render the purchasing decision process more complex.

Moreover, consumer psychology and behavior have undergone transformations in this digital context. On one hand, personalized recommendations enhance convenience and satisfaction, increasing consumers' willingness to rely on data-driven choices. On the other hand, privacy concerns and perceived opacity of algorithms may undermine trust, causing consumers to adopt more cautious attitudes toward recommended information. As such, the big data-driven purchasing decision mechanism demonstrates a dual effect: it can enhance efficiency and personalized experience while potentially introducing uncertainty and trust-related challenges.

3. Theoretical Analysis

3.1 Consumer Information Processing Mechanisms Empowered by Big Data

In the digital economy, the widespread application of big data has significantly transformed how consumers acquire and process information. Traditional consumer behavior theories assume that consumers actively search for, compare, and evaluate

information to make rational choices. However, in a big data environment, consumers increasingly rely on platform algorithmic recommendations, personalized pushes, and social data mining. This model reduces information search costs, improves decision efficiency, and simultaneously alters cognitive pathways.

Specifically, recommendation algorithms analyze users' historical behaviors, interests, and social connections to provide precise product information, allowing consumers to receive highly relevant options without active searching. At the same time, this "data-driven passive reception" model may lead to the "information cocoon" effect, where consumers are exposed only to information aligned with their preferences, reducing decision diversity. Furthermore, the opacity of platform algorithms may limit consumers' understanding of recommendation logic, thereby affecting trust and autonomous judgment. This indicates that, under big data, rational consumer choices are increasingly replaced by "bounded rationality" and heuristic decision-making, with behavior more susceptible to external data and algorithmic influence.

3.2 Data-Driven Emotional Resonance and Trust Building

Purchasing decisions are influenced not only by rational calculation but also by emotional and psychological factors. In a big data environment, firms can use data mining to identify consumer interests, values, and preferences, enabling personalized recommendations and customized services that enhance emotional resonance. For example, social commerce platforms leverage user profiles and behavioral data to deliver content aligned with consumers' psychological needs, strengthening brand identification and engagement.

This emotional resonance further facilitates trust building. In digital contexts, consumer trust in firms is not solely based on traditional brand reputation but is shaped through data-driven service experiences, personalized recommendations, and social validation. However, trust formation is a double-edged sword: insufficient transparency in data usage, information leakage risks, and algorithmic biases can undermine trust and reduce purchase intentions. Therefore, while leveraging big data to enhance consumer emotion and trust, firms must also adhere to ethical standards and privacy protections to maintain long-term relationships.

3.3 Value Co-Creation and Consumer Proactivity in a Big Data Environment

The digital economy positions consumers not only as recipients of information but also as active participants in value creation. Through data feedback, reviews, sharing, and customized interactions, consumers engage in product design, service optimization, and marketing, enabling value co-creation. For instance, in social commerce, the cycle of "discovery—feedback—secondary dissemination" allows consumers to act as content producers and opinion leaders, significantly increasing their sense of participation and proactivity.

Value co-creation alters both consumer decision motivation and decision pathways. Consumers reference community evaluations, online reputation, and peer behavior, giving their purchase behavior highly socialized characteristics. This demonstrates that, in a big data environment, purchasing decisions are driven both by individual needs and social influence, resulting in more complex and dynamic decision processes.

3.4 The Interplay of Rationality and Emotion in Purchasing Decision Logic

Purchasing decisions driven by big data exhibit an interaction between rationality and emotion. On one hand, consumers can access detailed information on prices, features, and reviews, enabling data-supported rational judgments. On the other hand, algorithmic recommendations, contextual marketing, and immersive experiences stimulate emotional impulses, leading to emotionally charged and immediate decisions.

The balance between rational and emotional influences depends on multiple factors, including purchase context, social pressure, user trust in the platform, and the level of personalization in recommendations. For instance, during time-sensitive promotions or limited-time offers, emotional drives dominate; whereas in high-value or complex product purchases, rational analysis prevails. Big data, through real-time analytics and contextualized pushes, intertwines rationality and emotion, forming a unique decision-making logic. This interplay requires firms to optimize product

value, user experience, and marketing strategies in a coordinated manner.

4. Conclusion

This study systematically analyzed the impact of big data on consumer purchasing decisions, focusing on mechanisms such as information processing, emotional resonance, trust building, and value co-creation. The findings indicate that big data significantly transforms the way consumers acquire and process information. Algorithmic recommendations and personalized pushes improve decision-making efficiency but may also create "information cocoon" effects, limiting choice diversity and increasing cognitive biases.

Big data also has a notable impact on consumer emotion and trust. Personalized recommendations and social interactions enhance emotional resonance and brand identification, thereby fostering trust, but privacy risks and algorithmic biases may undermine trust and influence purchase intentions. Consumers' proactive participation in value co-creation further contributes to highly interactive and socialized purchasing decisions, with behavior driven by both individual needs and social identity, resulting in complex and dynamic decision pathways.

Additionally, rational and emotional factors intertwine in the purchasing decision process. Data provides rational analytical support, while algorithmic pushes and immersive experiences stimulate emotional impulses, creating a multidimensional decision logic. The study demonstrates that big data not only reshapes consumer behavior but also offers actionable guidance for firms in marketing strategy and user experience optimization. Companies should enhance personalized services and interactive experiences while prioritizing data privacy and transparency to strengthen consumer trust and long-term loyalty.

Future research could empirically examine the differential effects of various types of data and algorithmic mechanisms on purchasing decisions and explore cross-cultural and cross-industry applicability, providing a more comprehensive theoretical and practical understanding of consumer behavior in the digital economy.

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