Business Analysis and Marketing in the Context of Big Data: From Consumer Behavior to COVID-19

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Abstract: With the development of big data technology, new changes have occurred in the relationship between business analytics and marketing. From a consumer behavior perspective, this article discusses new content, new challenges, and new strategies for business analytics and marketing in the context of Big Data. This article argues that the integration of big data and business analytics has brought about new changes in marketing and provided consumers with diversified, intelligent and personalized services and products. At the same time, Big Data also leads to marketing chaos, consumer confusion, and derivative risks. Therefore, business and marketing analytics are needed to address these challenges. This article lays out strategies such as two-way upgrading, common sharing, and value reversion, aiming to correct big data, improve marketing, and achieve high-quality business analytics and marketing development.

1. Introduction

Business analytics is one of the primary responsibilities of marketing and a general term for data-driven decision-making. It can be divided into basic and non-basic business analytics, consisting of descriptive and predictive analyses. Business analytics commissions artificial intelligence to generate multimodal content to improve marketing effectiveness. Due to the development of big data technology, business analytics has become the key to marketing, and consumer behavior has become an evaluation indicator. Unlike traditional marketing, business analytics emphasizes personalization, intelligence, and socialization. Therefore, we propose a topic about new changes in business analytics and marketing. Big data provides new possibilities for business analytics and marketing.

Big data originates from consumer-centered marketing. Its value includes data mining, data analysis, and data application. It is also a tool for business analytics. From the perspective of big data structure, big data pursues scale, speed, and variety, and the combination of structured and unstructured data realizes information modernization. However, this is only at the technical level. Today, big data has implemented a unique value-oriented path. COVID-19 not only changes consumer behavior and reflects the innovation of business analytics and marketing but also increases social risks and challenges big data governance. Therefore, discussing business analytics and marketing in the context of big data needs a global perspective and pattern. Researchers have put forward the proposition of high-quality development in the new era. In short, integrating big data and business analytics is a necessary condition and guarantee for the high-quality development of marketing. From a practical point of view, big data and business analytics have progressed, but some things could be improved. Business analytics has yet to find a practical path to meet consumer demand and continues progressing. Therefore, business analytics and marketing need two-way upgrading, sharing, and value reversion, which is not only about technology but also value.

Based on the above analysis, this paper proposes a theoretical framework of business analytics and marketing based on consumer behavior, aiming to explore the new content, challenges, and strategies for business analytics and marketing in the context of big data while addressing theoretical gaps and practical dilemmas through literature and case studies [1]. The main content is divided into four parts: The first part introduces the "fusion" of big data and business analytics to realize new changes in marketing. The second part explains the challenges that big data brings to marketing. The third part

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puts forward coping strategies. Finally, we summarize the article's content and highlight research limitations and prospects. This paper effectively deals with the risks and opportunities faced by business analytics and marketing in the context of big data and has theoretical innovation and practical guiding significance.

2. The Integration of Big Data and Business Analytics Brings New Changes in Marketing

2.1 The Innovation of Business Analytics in Content

Business analytics is a concept developed with big data, reflecting the concept of data-driven decision-making, highlighting the value of marketing, and reflecting the changing strategies of consumer behavior in the new era [2]. However, it isn't easy to get consistent results when we construct the definition and nature of business analytics with some traditional criteria. The point of this article is that business analytics content needs to be renewed with the growth of big data to better adapt to the needs and challenges of marketing. This paper expounds on the innovation of business analytics content from the following three aspects. First, the meeting point between big data and business analytics is that big data provides business analytics with rich data sources, powerful data processing capabilities, and various data application scenarios. Second, the generation of multimodal business analytics, that is, business analytics, can not only generate text, graphics, and other traditional forms of content but also use artificial intelligence technology to generate output images, audio, video, and other multimedia content. Third, business intelligence marketing and analytics can use artificial intelligence technology to achieve intelligent recommendations, intelligent optimization, and intelligent content interaction, thereby improving the efficiency and effectiveness of marketing. The process of big data digitization on business analytics content is shown in Figure 1.

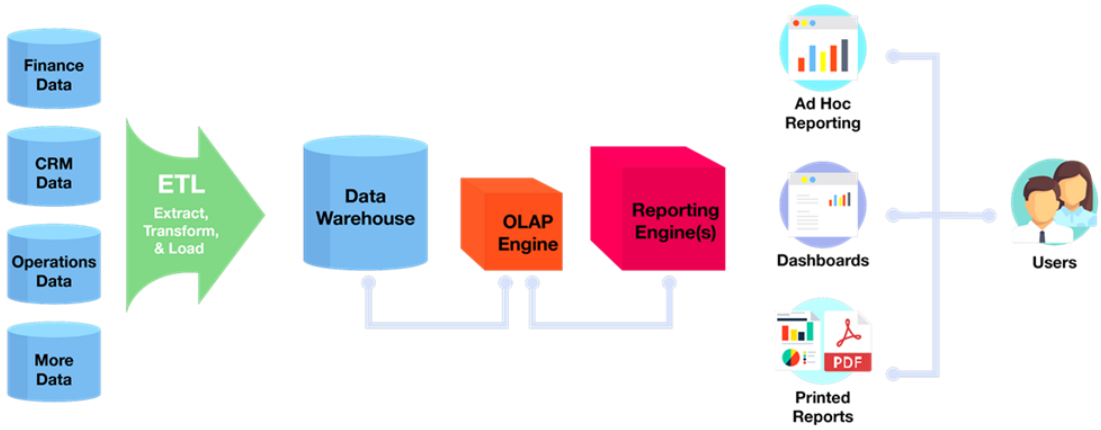

Figure 1 The process of big data digitization on business analytics content

2.2 Business Analytics, Marketing and Consumer Behavior

Business analytics, marketing, and consumer behavior are three interrelated concepts that together constitute the core of marketing. Business analytics collects, processes, analyzes, and applies big data to support marketing decision-making and execution. Marketing is formulating and implementing effective strategies to meet and create consumer needs and value. Consumer behavior refers to consumers' psychological, social, and physical activities in purchasing, using, and disposing of a product or service. This paper describes the relationship between business analytics, marketing, and consumer behavior from three aspects: First, business analytics impacts marketing. Business analytics can help marketing departments understand, predict, and influence consumer behavior, improving marketing performance and efficiency. Second, marketing affects consumer behavior. Marketing can guide and motivate consumer behavior by providing valuable information, incentives, and rewards, which increase consumer satisfaction and loyalty. Third, consumer behavior responds to business analytics. Consumer behavior can respond to business analytics by generating data, reflecting opinions, and expressing emotions, helping to improve and innovate business analytics [3].

3. Marketing Challenges Brought by Big Data and Business Analytics

3.1 The Chaos of Marketing: The Over-exploitation of Big Data Causes the Imbalance of Market System

In the research of business analytics and marketing in the context of big data, the descriptive and predictive analysis of consumer behavior was previously considered, and the influencing factors and motivations of consumer behavior were ignored. Therefore, the research results on consumer behavior are inaccurate, and the marketing effect is not good. Based on the above, we have improved the influence analysis and incentive mechanism design for consumer behavior, mainly using social network analysis technology and incentive compatibility model, and deeply optimized the traditional consumer behavior framework structure to make the influence and incentive of consumer behavior better. The specific steps are as follows. First, an influence network model based on the relationship between consumers is built using social network analysis technology. The consumer's influence and communication ability in the network are assessed by calculating the centrality, proximity, and inter-consumer level. Second, with the help of the incentive compatibility model, an incentive mechanism scheme based on consumer preference and cost is designed, and reasonable rewards and punishments are set to stimulate consumers' internal and external motivations and promote positive changes in consumer behavior [4]. Third, the combination of the influence network model and the incentive mechanism forms a comprehensive framework for analyzing the influence of consumer behavior and the design of the incentive mechanism. Simulation experiments verify its effectiveness and superiority. Finally, the framework is applied to business analytics and marketing practice in the context of big data, which provides strong support for improving marketing efficiency and performance. The incentive compatibility model is based on game theory, which makes the individual optimal strategy of participants consistent with the socially optimal strategy. The function of the incentive compatibility model is expressed as follows.

$$U_i(s_i, s_{-i}) = v_i(s_i, s_{-i}) - t_i(s_i) \tag{1}$$

Among them, U_i is the utility function of the participant i, s_i is the participant's strategy choice, s_{-i} is the strategy choice of other participants, v_i is the payoff function of participant i under a given strategy, t_i is the transfer payment that the participant i needs to pay under a given strategy. The over-mining of big data is shown in Figure 2.

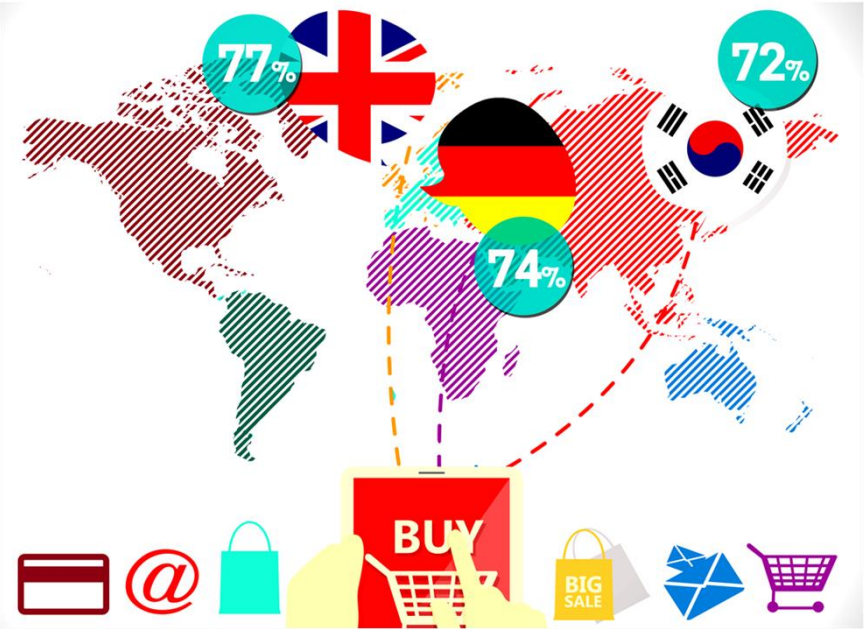

Figure 2 The over-mining of big data

3.2 Consumers' shackles: Personalized Operation under the Influence of Big Data

Compared with traditional marketing, marketing in the context of big data emphasizes the interrelationship between personalization and intelligence and has the characteristics of being data-driven and value-oriented. Although some researchers question the lack of a direct relationship between personalization and intelligence, personalization can allow for reasonably assessing intelligence. Peppers et al. proposed a personalized classic relationship marketing model with three elements: one-to-one communication, differentiated service, and continuous relationship. [5] Since then, the model has become a typical tool for personalization, thus developing the concept of intelligence. Scholars believe that personalization is dynamic and "a process". When consumers' needs, preferences, and behaviors constantly change, marketing will continue to adapt and optimize. Thus, intelligence is the result of personalization. In addition, some scholars have summarized personalization as a two-layer model, a rule-based and a data-based personalization model. The former focuses on consumers' subjective wishes. In contrast, the latter focuses on consumers' objective behaviors, that is, "what to say" and "what to do." Although it has experienced some practical failures, from the perspective of big data, it can improve consumer satisfaction and loyalty. To sum up, intelligence has gradually become the consensus of marketing research and practice under the influence of big data.

The personalized model of market data is shown in Figure 3.

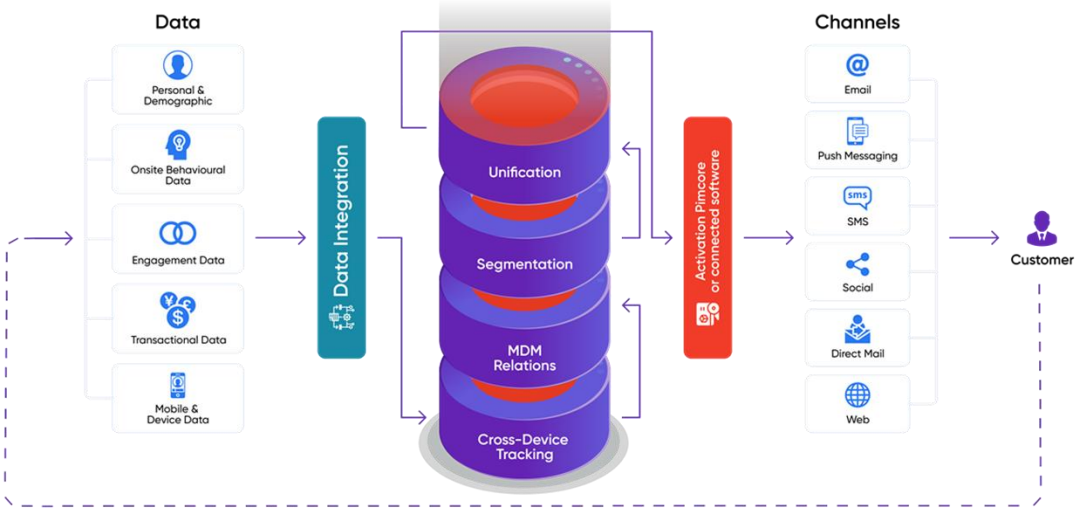

Figure 3 The personalized model of market data

3.3 The Birth of Derivative Risks under the Domination of Big Data

The nature of the birth of derivative risks under the domination of big data focuses on the threat of big data to personal privacy and social equity. Big data is applying information technology thinking in data management and analysis. It has entered the research field as a new model-big data governance framework to overcome the shortcomings of traditional data protection and ethics. The framework's basic concepts include that big data should ensure the practical realization of personal privacy and social equity and set professional standards for big data output. Capture the risks of big data through technologies such as encryption, desensitization, and auditing. In addition, assess, monitor, and account for the impact of big data. The big data governance framework reconstructs big data, emphasizing the transparency, legality, rationality, and controllability of big data [6].

4. Countermeasures for the Innovation and Development Process of the Marketing Industry under the Influence of Big Data Technology

4.1 Two-way Upgrade: Business Analytics Get Rid of Marketing Challenges

A two-way upgrade is the primary strategy for business analytics to eliminate the challenges brought by marketing, which reflects the innovation ability of business analytics. The changes in the

quality and efficiency of business analytics directly reflect the optimization of the effectiveness and value of marketing. Some elements in the development of business analytics have gradually formed, and data quality, security, ethics, and evaluation systems have gradually received attention. However, in the context of big data, some business analytics practices remain in data collection and description, contrary to the logical framework and generation mechanism of big data, resulting in data redundancy, data misleading, and data abuse.

4.2 Joint Commitment: The Optimization of Marketing System and the Method of Big Data Governance

From the perspective of big data governance, the primary responsibility of marketing is the basics of big data governance and the embodiment of big data governance. Therefore, marketing takes value as the primary generation logic. Big data governance is a challenge to marketing and a marketing factor. At this point, the marketing department enforces big data governance controls in a self-disciplined and compliant manner in three main ways. The first is the establishment of a big data governance committee. Ensure marketing strikes a balance and coordination between big data collection, processing, analysis, and application. The second is to develop governance standards. The standardized control of big data is completed by formulating data quality and security standards and disclosing data usage standards to consumers. The third is to optimize the internal process reengineering of big data governance [7]. In recent years, Amazon and Alibaba have improved their big data management capabilities and marketing effects through artificial intelligence. However, compared with setting goals, the transparency and controllability of marketing need to be further improved. The optimization of the marketing system and the results of big data governance are shown in Figure 4.

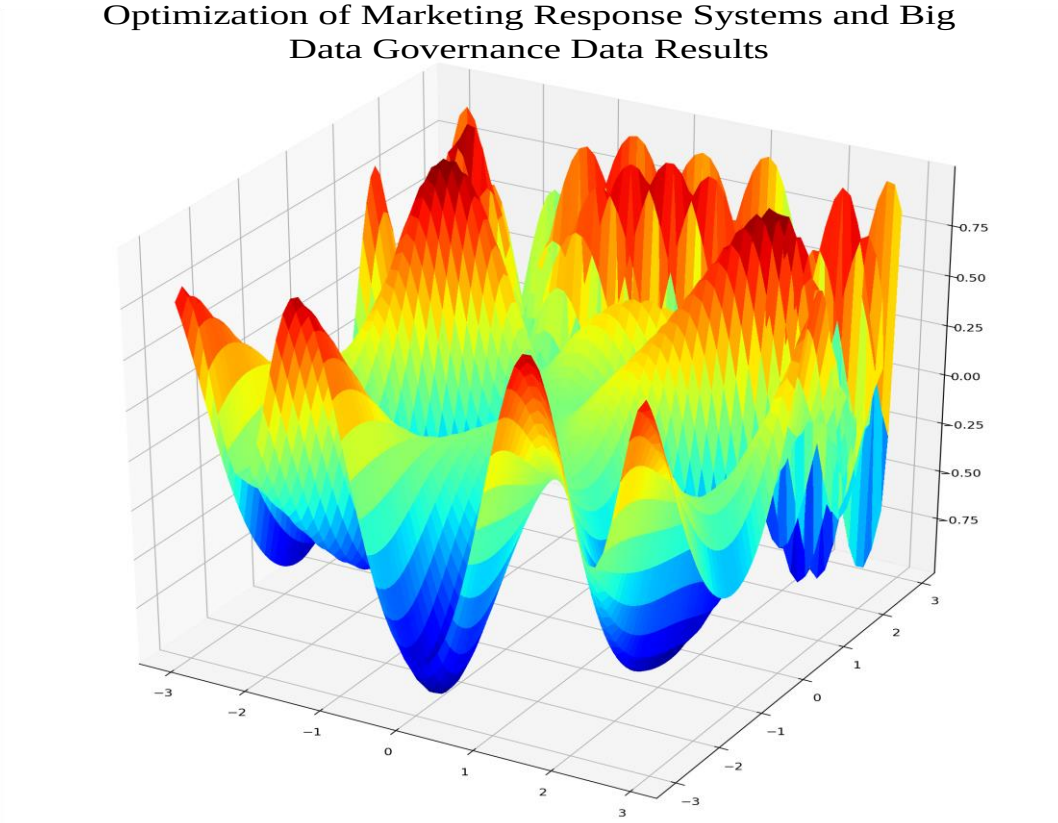

Figure 4 The optimization of the marketing system and the results of big data governance

4.3 Value Return: Big Data Repair and Marketing Recovery

Repair big data and restore marketing essentially based on its valuable properties. Big data's marketing and value standards are geared towards efficiency and performance. The growth of big data is mainly based on data and value. In the value return framework of marketing, accurately

understanding, respecting, satisfying, and creating consumers' needs and values is the core value and criterion of marketing development [7]. Nowadays, the diversity of big data types and the differentiation of marketing activities lead to diversifying and personalizing marketing activities. Although big data provides marketing with rich data sources and powerful data processing capabilities, big data governance is imperfect, and marketing needs practical evaluation and supervision mechanisms. Therefore, big data harms personal privacy and social equity, and the ethics and responsibilities of market managers need to be strengthened.

5. Conclusion

Business and marketing analytics in the context of big data is one of the new changes in modern marketing, posing new challenges and demands in marketing theory and practice. Business analytics is a symbol of the "value" of big data and an essential means of marketing, which meets the urgent needs of consumers' needs and values, maintaining personal privacy and social equity. It embodies the value orientation of marketing. Two-way upgrade, sharing, and value return are the theoretical analysis framework and practical mechanism for building business analytics and marketing under the guidance of big data. In recent years, modern information technologies such as artificial intelligence have promoted the creation of multimodal and intelligent development in business analytics, improving the quality and efficiency of business analytics, improving the effectiveness and value of marketing, and enhancing the influence and incentive effect of consumer behavior. Its value fits the internal logic of big data governance. Therefore, governance based on big data also offers a new approach to business analytics and marketing. To sum up, the sustainable improvement and development of business analytics and marketing will help to better meet and create consumer demand and value, optimize big data, and restore marketing.

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