

## Using Big Data in Consumer Behavior Analysis: A Case Study

**Adrian Ionuț MOȘESCU**

The Bucharest University of Economic Studies  
ionutbz@yahoo.com

**Denisa-Roxana BOTEA-MUNTEAN**

The Bucharest University of Economic Studies  
munteandenisa21@stud.ase.ro

**Daniela MARINICĂ**

The Bucharest University of Economic Studies  
daniela.marinica@mk.ase.ro

**Brîndușa BÎRSAN**

The Bucharest University of Economic Studies  
brindusabirsan@gmail.com

**Daniela Maria STANCIU (FRĂȚILĂ)**

The Bucharest University of Economic Studies  
danielastannciu@gmail.com

**Paul COSMOVICI**

The Bucharest University of Economic Studies  
paul.cosmovici@cosmovici-ip.com

**Ștefan-Claudiu CĂESCU**

The Bucharest University of Economic Studies  
stefan.caescu@mk.ase.ro

### Article history

Received 30 October 2024 | Accepted 07 March 2025 | Published online 11 April 2025.

### Abstract

Based on the new environment of big data, this paper expounds the connotation and characteristics of big data, and analyzes the characteristics of consumer behavior under the application background of big data analysis technology. We discuss various sources of big data, such as online interactions, social media activity, purchase history, and sensor data, emphasizing how each contributes to a deeper understanding of consumer preferences, motivations, and decision-making. In today's fast-paced, ever-changing world, a growing number of consumers rely on online platforms for information, shopping, and banking transactions. Big Data technology enables consumers to find relevant products or information, while helping companies gain insights into customer behavior.

**Keywords:** Consumer behavior, Big data, Data analytics.

**JEL classification:** M31.

### Introduction

Big data analytics has swiftly changed the landscape of how businesses interpret consumer actions. Traditionally, insights were drawn from methods like surveys, focus groups, and direct observations. However, today's analysis leans heavily on real-time information gathered from extensive datasets (Laney, 2011). This exploration highlights the groundbreaking impact big data holds over understanding consumer habits by detailing its applications and advantages while pondering over its academic foundations.

The importance of understanding consumer behavior has been greatly emphasized in the marketing literature. Consumer preferences, purchase decisions, and behavioral trends are central to designing effective marketing strategies (Solomon, 2013). However, with the increasing complexity of consumer journeys in the digital era, traditional methods often fail to fully capture consumer behavior. Big data bridges these gaps by delivering all-encompassing and usable insights that empower marketers to anticipate and understand customer actions with great accuracy.

Starting from the main question of the paper: how big data influences consumer behavior analysis? – we define the role and scope of big data in marketing, exploring how big data impacts consumer decision-making, present case studies demonstrating practical applications and identify challenges and ethical considerations in using big data for consumer research.

## **1. Literature Review**

### **1.1. Defining Big Data in Consumer Behavior**

Big data is widely defined by the "5Vs": Volume, Velocity, Variety, Veracity, and Value (Laney, 2011). These attributes collectively allow businesses to process vast quantities of data to extract actionable insights. Each dimension contributes to understanding and predicting consumer actions.

Gandomi and Haider (2015) argue that big data is not just about data scale but about transforming raw information into strategic value. For marketers, these characteristics enable tracking of consumer footprints across platforms and real-time personalization. By harnessing these characteristics, big data has shifted the paradigm of consumer behavior analysis, offering tools for both descriptive and predictive insights.

### **1.2. Consumer Behavior and Big Data Influence**

Consumer behavior research has historically sought to understand the motivations and decision-making processes of individuals (Solomon, 2013). Using big data, researchers can now study behaviors at scale, incorporating new variables such as online behavior and location data. Big data facilitates both descriptive and predictive analytics, offering marketers tools to anticipate future trends (Erevelles et al., 2016).

Predictive analytics uses statistical algorithms and machine learning models to anticipate consumer behavior. Some online retailers utilize predictive analytics to recommend products based on browsing history and past purchases (Saura et al., 2021). Big data has also enhanced behavioral segmentation by identifying patterns across diverse consumer groups. Marketers can create detailed profiles based on demographics, psychographics, and behavioral data, improving the precision of their targeting efforts. Studies show that such data-driven segmentation increases marketing efficiency and customer satisfaction (Erevelles et al., 2016).

## **2. Case Study Results**

### **2.1. Case Study 1: Local Retail Optimization**

In their study of local retail markets, Jitsoonthronchaikul et al. (2019) demonstrated how big data could refine business strategies. Using location data, transactional records, and consumer feedback, retailers in Thailand tailored product offerings to specific communities. The findings revealed that localized data-driven approaches increased customer satisfaction and operational efficiency. One key finding from this case study is customization of offerings, by analyzing transactional data, retailers identified high-demand products for specific regions and adjusted their inventory accordingly. Another key finding is Improved Accessibility through location data who helped optimize store layouts and product placements, enhancing shopping experience. The last key finding is Consumer Feedback Integration which through

Qualitative insights from surveys provided context to quantitative data, enabling more informed decision-making.

This case study underscores the importance of integrating qualitative insights with quantitative data. For instance, customer feedback on convenience and product variety provided nuanced context to transactional data, enabling more effective inventory and marketing strategies.

## 2.2. Case Study 2: Personalization in Digital Marketing

Zhang and Tan (2020) explored the role of big data in digital marketing personalization. By employing the AISAS model (Attention, Interest, Search, Action, Share), the study illustrated how businesses could engage consumers at every stage of the decision-making process. So, in step Attention, we can capture interest through targeted advertisements tailored to browsing behavior. In steps Interest and Search, we can use data-driven content to sustain engagement by offering information aligned with consumer interests. In step Action we can facilitate purchases through personalized recommendations and streamlined checkout processes. In step Share we can encourage post-purchase sharing to create user-generated content, reinforcing brand loyalty.

## 3. Research Methodology

This research analytically combines the analysis of the specialized literature with the presentation of a case studies, in order to carry out an analysis on the recurring insights and challenges in big data applications related to consumer behavior.

**Specialized literature:** an analytical and exploratory review of the specialized literature on keywords such as consumer behavior, big data, data analytics, predictive analytics, artificial intelligence, behavioral patterns and segmentation established a theoretical basis for this work. This review included academic journals, industry reports and case studies focused on using big data in consumer behavior.

**Case studies:** selected cases provide real-world examples of how theoretical models apply in practice, serving as embedded units of analysis. Analysis were carried out on how big data could refine business strategies and the role of big data in digital marketing personalization. This case studies examined how analyzing transactional data retailers identified high-demand products and adjusted their inventory accordingly and how businesses could engage consumers at every stage of the decision-making process by employing the AISAS model.

Therefore, this approach provides valuable results of both conceptual foundations and practical implications while maintaining academic rigor.

## 4. Results and discussion

This study set out to examine the role of big data in shaping consumer behavior insights and marketing decision-making. The findings from the literature and case analyses confirm that big data analytics is not only transforming how consumer behavior is studied but also how marketing strategies are formulated and executed in practice.

The integration of big data into consumer behavior analysis reshapes how companies strategize marketing activities. Big data offers a new layer to the Theory of Planned Behavior and other decision-making models by incorporating real-time data points. It enables moving from self-reported behavior to observed behavior (Erevelles et al., 2016).

The case study of Thai local retail optimization (Jitsoonthronchaikul et al., 2019) demonstrates how big data operationalizes segmentation and personalization in physical retail settings. By tailoring inventory and layouts based on consumer data, businesses not only

enhance customer satisfaction but also improve operational efficiency. This exemplifies the application of big data in supporting localized marketing strategies.

The digital marketing personalization case (Zhang & Tan, 2020) shows how big data supports dynamic customer engagement using the AISAS model. By automating personalized responses across the attention-to-action journey, businesses can deepen engagement and influence behavior in real-time, strengthening the relevance of content and offers.

The advantages of big data in consumer behavior analysis are substantial. One of them is Enhanced Targeting: through which big data enables businesses to segment consumers more effectively, ensuring that marketing messages resonate with specific demographics and preferences. Real-Time Adaptability represent another advantage through the velocity of big data allows marketers to respond to changes in consumer behavior almost instantly, ensuring relevance in campaigns.

Another advantage is represented by Customer-Centric Strategies through which data-driven insights enable companies to develop marketing strategies that meet customer needs, increasing satisfaction and loyalty. Informed Decision-Making represent an advantage because big data reduces reliance on intuition, providing concrete evidence to support marketing decisions.

The effective implementation of big data analytics in consumer behavior faces several challenges. These challenges are Data Integration which represents combining data from diverse sources requires advanced infrastructure and expertise (Saura et al., 2021). An example is integrating unstructured data such as social media comments with structured data like sales figures remains complex.

Another challenge is Data Quality. Ensuring the reliability of data remains a significant hurdle. Poor-quality data can lead to inaccurate predictions, undermining marketing strategies (Gandomi & Haider, 2015).

Cost and Scalability represent another challenge because developing and maintaining big data systems is resource-intensive, limiting accessibility for smaller businesses (Bughin et al., 2016). Another challenge is the Complexity of Interpretation. The vast volume of data often necessitates specialized skills in data science and analytics. Misinterpretation of results can lead to companies to take wrong decisions.

While big data offers substantial benefits, it also raises ethical concerns, particularly around privacy. According to André et al. (2017) who highlight the boundary conditions of the preference for autonomy in choice: while consumers appreciate tailored experiences, they may also feel their ability to make autonomous choices is compromised by invasive data collection practices.

As consumers become more aware of data collection practices, businesses face pressure to adopt transparent policies. Thus, data privacy regulations, such as the General Data Protection Regulation (GDPR) in Europe and the California Consumer Privacy Act (CCPA) in the United States, have been developed, imposing strict rules on data collection and use (Saura et al., 2021). These regulations emphasize obtaining informed consent, anonymizing data, how data is used by companies or other institutions, and providing consumers with increased control over their information collected by other companies or even government institutions.

## **Conclusion**

This study has shown how big data has changed the role of understanding and influencing consumer behavior. A look at academic literature and analysis of two illustrative case studies, local retail optimization in Thailand and digital marketing personalization via the AISAS model, show that big data gives marketers better ability to monitor, forecast, and influence consumer actions in digital and physical environments.

From the theory point, big data enriches classical models of consumer behavior by offering behavioral insights at a granular and dynamic level, thus forming a new research paradigm of accurate, real-time and predictive stand in decision-making, integrating as well both structured and unstructured data sources. Results indicate that companies who can leverage big data accurately will be able to develop more precise segmentation, messaging and adaptive marketing strategies in line with fast-changing consumer preferences.

Though not without challenges, big data quality, ethical data usage, system scalability, and the complexity of interpreting data continue to be major constraints. Constraints have also extended to the realization of the full potential of big data, with quality and ethical use on data privacy and consumer autonomy, that responsible governance frameworks and practices have become increasingly emphasized.

Big data presents enormous strategic benefits in the context of customer engagement and competitive positioning. However, we must ensure that big data is used strategically, ethically, and with a proper understanding of its limitations. The future of the analysis of consumer behavior, therefore, rests on the ability to balance technological acumen with human-centric values and ethical responsibility.

From this paper result some practical insights for marketing professionals. Companies should investment in data infrastructure and analytics capabilities first. This should include not only technology (for example, cloud platforms and machine learning tools) but also the workforce to work on raw data for marketing insights. Managers should use big data to help create a deeply personalized consumer experience. Analyzing behavioral and contextual data will enable firms to customize product recommendations, communications, and engagement strategies in ways that lead to conversion and loyalty.

The speed at which big data moves gives marketing teams the power to act on consumer signals right away. This agility is key in fast markets because it allows for adaptive pricing as well as promotions, and dynamic content delivery. Getting value from big data requires cooperation from different departments of the organization. Marketing, IT, customer service, and data analytics need to come together to ensure good data quality, relevance, and alignment with the business goals.

By integrating these practices, businesses can improve their marketing effectiveness and also cultivate deeper, trust-based relationships with the consumers. This would eventually turn big data from being a mere technological asset into a sustainable competitive advantage.

However, this paper acknowledges certain limitations in the examples used in the case studies are illustrative but focused primarily on retail and digital marketing contexts. Further studies should consider sector-specific dynamics that shape how big data is utilized in consumer behavior analysis. Also, cultural, regulatory, and consumer behavior patterns vary significantly across regions, which may influence the relevance of certain data strategies. A cross-cultural comparative analysis would enrich the understanding of how big data practices must be adapted in different socio-economic contexts. Big data technologies, platforms, and analytics capabilities are evolving rapidly. Therefore, some tools or methods referenced in this study may become outdated or replaced by more advanced systems in the near future.

## **Acknowledgments**

This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

## **References**

André, Q., Carmon, Z., Wertenbroch, K., Crum, A., Goldstein, W., Huber, J., Boven, L., Weber, B., & Yang, H. 2017. Consumer choice and autonomy in the age of AI and big data. *Customer Needs and Solutions*, 5(1), 28–37.

- Bughin, J., Chiu, M., Manyika, J. 2016. Ten trends redefining enterprise IT infrastructure. *McKinsey Quarterly*.
- Chkoniya, V. 2021. Challenges in Decoding Consumer Behavior with Data Science. *European Journal of Economics and Business Studies*, [e-journal] 7(1). 10.26417/897ovg79t
- Degermen, H., A., & Mohammadabbasi, M. 2023. Using Big Data in Analysis of Consumer Behavior: A Qualitative Study. *Kirklareli University Journal of the Faculty of Economics and Administrative Sciences*, 12(1), 100-122
- Erevelles, S., Fukawa, N., & Swayne , L. 2016. Big Data consumer analytics and the transformation of marketing. *Journal of Business Research*, 69(2), 897–904.
- Fang, Z., Li, P. 2014. The Mechanism of “Big Data” Impact on Consumer Behavior[J].*American Journal of Industrial & Business Management*, 4(1).
- Gandomi, A., & Haider, M. 2015. Beyond the hype: Big data concepts and analytics. *International Journal of Information Management*, 35(2), 137–144.
- Jitsoonthronchaikul, M., Lomprakhon, c., Herabut, W., Chuerdbunmueng, S., & Benjasri, T. 2019. Challenges in using big data for consumer behavior. *MFU Connexion*, 8(2), 63–76.
- Laney, D. 2011. 3D data management: Controlling data volume, velocity, and variety. *META Group*.
- Saura, J.R., Palos-Sanchez, P., & Suarez, L., M., C. 2021. Understanding the digital marketing environment with big data. *Journal of Business Research*, 124, 599–606.
- Yongzhou, W., & Yan, D. 2016. Analysis of Consumer Purchase Decision Behavior Based on Big Data Forecast. *Business Economics Research*. (23).
- Zhang, C., & Tan, T. 2020. The impact of big data analysis on consumer behavior. *Journal of Physics: Conference Series*, 10.1088/1742-6596/1544/1/012165.