

Review Article

Leveraging Big Data Analytics for Understanding Consumer Behavior in Digital Marketing: A Systematic Review

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The integration of big data analytics in digital marketing has fundamentally transformed how organizations understand and influence consumer behavior. This systematic review explores the potential of big data to offer deep insights into consumer preferences and behaviors. The current literature on big data and consumer behavior showcases its potential in enhancing marketing and customer experiences. However, significant gaps exist, such as longitudinal studies on how continuous big data-driven personalization affects consumer trust and loyalty over time. Addressing these gaps will advance academic understanding and offer practical insights for optimizing marketing strategies and improving customer experiences ethically. Focusing on these areas will contribute to a holistic view of big data's responsible use in digital marketing. By utilizing large datasets, businesses can now tailor their marketing strategies to individual consumers, enhancing customer satisfaction and engagement. Adopting the PRISMA methodology, this review synthesizes recent literature to evaluate the benefits of big data in digital marketing. The research was conducted through a rigorous five-stage process, encompassing the identification of key research questions, database searches, and the critical analysis of selected articles: (1) defining the initial topic, (2) developing the appropriate research questions, (3) identifying the necessary keywords, (4) identifying and searching databases, and finally (5) accessing and reading the articles. The databases that were searched were as follows: Scopus, Web of Science, Emerald Insight, Springer Link, and ScienceDirect. The articles that were selected were 19, in a total sum of 265 identified articles. The findings consolidate current knowledge on how big data analytics can optimize marketing strategies and consumer experiences. Ultimately, this review underscores the transformative potential of big data in digital marketing, highlighting its role in enhancing customer insights and driving more effective marketing strategies.

Keywords: big data; consumer insights; customer experience; digital marketing

1. Introduction

In the current digital landscape, the fusion of big data technologies and digital marketing approaches has revolutionized the way organizations design and implement their overall marketing strategies. Even more so, big data provide unparalleled opportunities regarding the analysis of consumer behavior and the interpretation of the customer's buying journey and experience. Consumer behavior refers to the actions and decision-making processes of individuals in selecting, purchasing, and using goods and services. This variable in our paper is measured through various metrics such as page visits, time spent on page, clicks, and navigation

patterns. Tools like Google Analytics, Semrush, and Adobe Analytics track these interactions to provide insights into consumer behavior. For instance, Google Analytics tracks the number of visits to each page, the average session duration, and the bounce rate, which indicates the percentage of visitors who leave the site after viewing only one page.

The objective for organizations employing sophisticated big data collection methods, which take information from a broad variety of sources, is to acquire insights into customers' behaviors [1]. When it comes to using big data tools, one of the most important components is the thorough monitoring of how people interact with the mobile applications and websites that businesses utilize. Participating in

activities that take place online, in communities or other kinds of fora, also plays an important part in using these methods. The inspection of the pages that were visited, the length of time spent on each page, where most clicks were detected in a website, the search queries, and the navigation patterns are some of the key metrics that are measured during this process [2].

Clicks detected on a website are one of our most valuable metrics and refer to the number and location of clicks on a website, indicating user interest and interaction points. Clickstream analysis is used to measure clicks on a website. Tools like Google Analytics, Azure Stream Analytics, and HubSpot platform track click data to optimize site navigation and user interface design. Search queries are the terms and phrases that users enter into search engines or site search tools. Web analytics tools analyze search queries to understand user intent and improve content relevance. Studies on search engine logs provide insights into common search terms and user behavior patterns. Navigation pattern is another key metric and refers to the path users take through a website. Tools like SimilarWeb provide comprehensive analytics on page visits and navigation patterns. These tools track user journeys, indicating which pages are most frequently visited and the typical sequence of page views. Through these methods, organizations are able to gain a more detailed picture of the digital journey that their clients have completed.

Furthermore, understanding and analyzing the customer journey is greatly influenced by big data. It begins with customers becoming aware of a product or service and continues through their purchase and ongoing engagement. Big data from Google Trends, for example, a powerful free-to-use tool for sure, can be leveraged to gain valuable insights into consumer interests and predict future trends [3]. Businesses can map out these paths meticulously examining every interaction that takes place along the way. This thorough analysis enables companies to identify touchpoints and evaluate how customers respond at each stage. Through this process, organizations can effectively address any challenges that may arise and optimize the conversion process.

The capacity to analyze large amounts of data has facilitated a transition towards tailored marketing strategies that adapt to the distinct interests and habits of individual consumers. In the banking sector, for example, the analysis of spending patterns and transaction data provides a nuanced understanding of customer preferences and financial behaviors, facilitating more effective product recommendations and marketing strategies. Additionally, sentiment and feedback analysis help banks to measure customer satisfaction and identify areas for service improvement [4]. Although this transition has the potential to provide customer satisfaction and participation, it also raises substantial ethical considerations. The primary focus of these concerns revolves around matters pertaining to privacy, consent, data security, and the possibility of manipulation. The crux of ethical quandaries in digital marketing is in the equilibrium between customization and consumer confidentiality [5]. The process of big data analytics frequently entails the gath-

ering, examination, and retention of extensive quantities of personal data, occasionally without explicit agreement or understanding from the individuals involved [6]. This prompts inquiries on the limits of privacy violation and the effectiveness of existing consent methods in fully notifying users about the utilization of their data.

The current literature on big data and consumer behavior highlights the potential of big data analytics in enhancing marketing strategies, customer experiences, and business performance. However, notable gaps remain that warrant further investigation to develop a more comprehensive understanding of the field. While there is extensive research on the applications of big data in digital marketing and consumer behavior, there is a notable lack of studies that deeply explore the longitudinal effects of big data-driven personalization on consumer trust and brand loyalty. Existing studies often provide snapshots of consumer reactions to personalized marketing but fail to address the long-term implications of these strategies. Understanding how continuous personalization influences consumer perceptions over time is critical for developing sustainable marketing practices that foster lasting customer relationships. This gap suggests a need for longitudinal studies that track consumer interactions with personalized marketing over extended periods, examining the evolution of trust and loyalty in response to ongoing data-driven personalization efforts. Addressing research gaps, such as the ones mentioned previously, will not only advance the academic understanding of big data and consumer behavior but also provide practical insights for businesses to optimize their marketing strategies and enhance customer experiences ethically and sustainably.

This systematic review employs the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) [7] approach to synthesize existing literature on the impact of big data and big data analytics tools in digital marketing and how consumer behavior and customer experiences can be measured and interpreted. The PRISMA method provides a structured and transparent approach for conducting systematic reviews, ensuring a comprehensive evaluation of relevant studies while minimizing bias. PRISMA involves a four-phase flow diagram, identification, screening, eligibility, and inclusion, which ensures that the review process is rigorous and replicable. This review is aimed at presenting the current knowledge on how big data analytics can optimize marketing strategies and consumer experiences. By employing the PRISMA framework, this study systematically identifies, evaluates, and synthesizes the contributions of big data to digital marketing over the past decade (2013–2023), providing a detailed understanding of its impact on consumer behavior and marketing effectiveness. The results from the PRISMA approach (the papers identified and used as a guide for this paper) are presented in Table 1, along with the methods used, the outcomes, and the limitations of said papers. We then discuss the results of the related works, and ultimately, we present our own results.

The rest of this paper is structured as follows: Section 2 outlines the methodology, detailing the systematic approach

TABLE 1: Main papers identified and used under the PRISMA approach.

No	Author(s)	Year	Study objectives	Study design	Population/sample	Methods	Outcomes/measures	Key findings	Limitations
1	Sakas et al.	2022	Optimize multichannel digital marketing through big data analytics in the tourism and hospitality industry	Quantitative, mixed methods	10 leading tourism websites	Data extraction using http://Semrush.com and http://Fanpagekarma.com , statistical analysis, fuzzy cognitive map, agent-based simulation	Web analytics KPIs, user engagement metrics	Web analytics and social media engagement significantly impact digital brand optimization	Limited to selected tourism websites, potential for selection bias and generalizability issues
2	Chaudhary et al.	2021	Predict consumer behavior on social media platforms	Quantitative, predictive	3962 social media records	Data collection, data preprocessing, machine learning, mathematical modeling	Consumer engagement, behavior on social media (likes, followers, visits, downloads)	High accuracy (98%) in predicting consumer behavior, effective model for engagement	Limited to social media data, may not generalize to other contexts, potential bias in social media data
3	Grandhi et al.	2021	Examine data-driven marketing (DDM) adoption practices and how companies can enhance shareholder value through customer centricity	Quantitative, survey	180 responses from junior, middle, and senior executives across various industries	Online survey, descriptive analytics	Adoption practices, current and proposed investment in DDM, classification of respondents into four categories (leaders, contenders, dabblers, laggards)	Success of DDM depends on the organization's commitment and investment. Leaders invest significantly and achieve higher customer engagement	Potential for response bias. Data limited to survey responses
4	Figueiredo et al.	2021	Understand the influence of big data analysis on digital marketing strategies and consumer behavior	Systematic literature review and bibliometric analysis	Articles from 2000 to 2020 (bibliometric), articles from 2014 to 2020 (systematic review)	Systematic literature review, bibliometric analysis using VOSviewer	Trends and patterns in digital marketing and big data research	Big data analytics are crucial for defining future digital marketing strategies. Enhanced understanding of consumer behavior through data analytics	Potential publication bias and analysis confined to the data within the timeframe
5	Darmody and Zwick	2020	Explore how digital marketers reconcile the contradiction between consumer empowerment and manipulation in the age of big data and surveillance capitalism	Theoretical, conceptual analysis	N/A	Literature review, theoretical framework	Concepts of consumer empowerment, manipulation, and hyper-relevance	Marketers resolve the contradiction through the notion of relevance, which symbolically combines consumer empowerment and manipulation. Relevance is used to justify surveillance and personalized marketing as empowering rather than manipulative	Lacks empirical data. Potential bias in interpretation

TABLE 1: Continued.

No	Author(s)	Year	Study objectives	Study design	Population/ sample	Methods	Outcomes/measures	Key findings	Limitations
6	Holmlund et al.	2020	Develop a strategic framework for customer experience management (CXM) based on big data analytics	Conceptual, literature review	N/A	Literature review, conceptual framework development	Types of CX data (solicited vs. unsolicited, structured vs. unstructured), types of CX analytics (descriptive, inquisitive, predictive, prescriptive)	Highlights the importance of different types of CX data and analytics in improving customer experience	Lacks empirical data. Applicability may vary across different industries and organizational contexts
7	Chen et al.	2019	Analyze online consumer behavior and psychology in the context of big data	Quantitative	480 online shoppers (college students and corporate employees)	Survey questionnaires, data analysis, model validation	Consumer behavior phases (demand identification, information collection, selection judgment, purchase decision, postpurchase evaluation). Psychological features (cultural taste, personalization, self-expression, avoiding interference)	Big data enhances precision marketing, significantly affects consumer attitudes, and perceived risks. Security factors have a stronger impact on purchase behavior compared to website quality and innovation	Limited to specific demographics. Potential biases in self-reported data. Findings may not generalize to all online consumers
8	Lies	2019	Review the evolution and application of digital marketing techniques and marketing intelligence, highlighting the shift towards social engineering techniques	Conceptual, literature review	N/A	Literature review, conceptual analysis	Marketing intelligence techniques (e.g., search engine marketing, social media marketing, real-time marketing). Paradigm shift in digital marketing	Identifies a shift from traditional marketing techniques to social engineering approaches, emphasizing relevance and personalization in marketing strategies	Lacks empirical data. Broad scope may limit depth of analysis in specific areas
9	Silva et al.	2019	Forecast fashion consumer behavior using Google Trends data	Quantitative, forecasting evaluation	Google Trends data for "Burberry" (January 2004–February 2019)	Parametric and nonparametric forecasting techniques (ARIMA, ETS, TBATS, NNAR), singular spectrum analysis (SSA), hybrid neural network model (denoised NNAR)	Forecast accuracy (RMSE, RRMSE), seasonality, trend analysis	Denoised NNAR model outperforms other models across all horizons, highlighting the importance of denoising for improving forecast accuracy	May not generalize to other fashion brands or sectors. Potential sampling bias in Google Trends data

TABLE 1: Continued.

No	Author(s)	Year	Study objectives	Study design	Population/ sample	Methods	Outcomes/measures	Key findings	Limitations
10	Kitchens et al.	2018	Develop a framework for advanced customer analytics integrating relationship-oriented big data for strategic value	Design science, empirical evaluation	664,737 customers from a US e-commerce and catalog-based retailer	Design science framework, kernel-based machine learning, composite convolution kernel SVM, real-world prototype system	Customer churn, conversion, lifetime value predictions	Proposes a novel framework integrating various data constructs. Demonstrates significant value in predicting customer behaviors. Provides guidelines for data management and integration	Limited to one company. Potential challenges in data integration and management
11	Le and Liaw	2017	Explore and determine the pros and cons of applying big data analytics on customer responses in an e-commerce environment	Quantitative	273 respondents from Vietnam (college students and corporate employees)	Survey questionnaire, data analysis using SPSS and AMOS	Positive factors: Information search, recommendation system, dynamic pricing, customer services. Negative factors: Privacy and security, shopping addiction, group influences	Positive factors significantly enhance customer intention and behavior. Negative factors significantly deter customer intention and behavior	Limited to a specific demographic (Vietnamese college students and corporate employees). Potential biases in self-reported data. May not generalize to other populations or contexts
12	Satish and Yusef	2017	Analyze the role of big data analytics and crowdsourcing in enhancing customer experiences	Conceptual, literature review	N/A	Systematic literature review, conceptual analysis	Big data dimensions (volume, velocity, variety, veracity, value), crowdsourcing methods	Combining big data analytics with crowdsourcing improves customer satisfaction, loyalty, revenue, and employee satisfaction by leveraging diverse inputs and real-time data processing	Lacks empirical data. Potential challenges in practical implementation of integrating crowdsourcing with big data analytics
13	Hofacker et al.	2016	Assess how big data can enhance the study of consumer behavior and decision-making processes	Conceptual, literature review	N/A	Literature review, conceptual analysis	Stages of consumer decision-making (problem recognition, search, alternative evaluation, purchase behavior, consumption, postpurchase evaluation, postpurchase engagement)	Big data provides new opportunities to understand consumer behavior at each stage of the decision-making process. Highlights the potential and challenges of integrating big data in marketing	Lacks empirical data. Potential issues with data quality. Representativeness. Quality

TABLE 1: Continued.

No	Author(s)	Year	Study objectives	Study design	Population/sample	Methods	Outcomes/measures	Key findings	Limitations
14	Hongyan and Zhenyu	2016	Analyze consumer behavior in e-commerce using big data mining techniques	Quantitative	Data from Chinese e-commerce platforms (e.g., Taobao, Dangdang)	Web data mining, collaborative filtering, recommendation systems	Consumer behavior patterns, personalized recommendation accuracy, customer satisfaction	Big data mining enhances the accuracy of personalized recommendations, improves customer satisfaction, and addresses information overload problem	Limited to Chinese e-commerce platforms. Potential biases in data collection. Findings may not generalize to other regions or platforms
15	Erevelles et al.	2016	Develop a conceptual framework for understanding the impact of big data consumer analytics on marketing using resource-based theory	Conceptual, theoretical analysis	N/A	Literature review, conceptual framework development	Processes of collecting and storing consumer activity data, extracting consumer insights, utilizing consumer insights to enhance dynamic/adaptive capabilities	Big data provides significant opportunities for gaining sustainable competitive advantage by leveraging physical, human, and organizational capital. Importance of dynamic and adaptive capabilities in responding to market changes	Lacks empirical validation. Potential challenges in practical implementation of the proposed framework
16	Xiang et al.	2015	Examine hotel guest experience and satisfaction using big data and text analytics	Quantitative, text analytics	60,648 reviews for 10,537 hotels from http://Expedia.com	Text analytics, statistical analysis	Guest satisfaction dimensions, sentiment analysis, topic modeling	Identifies key factors impacting guest satisfaction. Strong association between specific experience dimensions and overall satisfaction	Limited to http://Expedia.com data. Findings may not generalize to other booking platforms or regions. Potential biases in online review data
17	Srivastava and Gopalkrishnan	2015	Examine the impact of big data analytics on the banking sector, with a focus on lessons for Indian banks	Quantitative, case study	Transactional data from 4 cardholders, feedback data from 20,000 customers	Feedback analysis, transactional analysis, behavioral analysis	Customer satisfaction, spending patterns, channel usage, product cross-selling, security and fraud management	Identifies key areas where big data analytics can enhance banking operations, improve customer satisfaction, and prevent fraud. Provides recommendations for Indian banks to leverage big data analytics	Limited to data from one bank in the Middle East. Findings may not generalize to other banks or regions. Potential biases in self-reported data

TABLE 1: Continued.

No	Author(s)	Year	Study objectives	Study design	Population/sample	Methods	Outcomes/measures	Key findings	Limitations
18	Spieß et al.	2014	Explore ways to integrate big data insights with automated and assisted processes to improve customer experience and business performance for communication service providers (CSPs)	Conceptual, case study analysis	Data from multiple CSPs using Alcatel-Lucent and Bell Labs innovations	Case studies, analysis of CSPs using big data analytics	Key quality indicators, key business objectives, net promoter score (NPS)	Big data analytics can significantly enhance customer experience and business performance by identifying key drivers of customer satisfaction and enabling proactive measures	Limited to CSPs. Potential challenges in generalizing findings to other industries. Reliance on specific methodologies and tools from Alcatel-Lucent and Bell Labs
19	Song et al.	2014	Build an intercategory map to analyze the cognitive decision-making structure of consumers by mining big data from social media	Quantitative	Over 112 million blog posts by 3.9 million authors on Naver from 2012	Natural language processing (NLP), text mining, vector space model, Jaccard similarity coefficient, brand mention matrix	Consumer preferences and awareness, intercategory similarity, brand association patterns	Develops an intercategory map revealing consumer preferences across different product categories.	Limited to blog data from Naver. May not generalize to other social media platforms or regions. Potential biases in data collection and processing

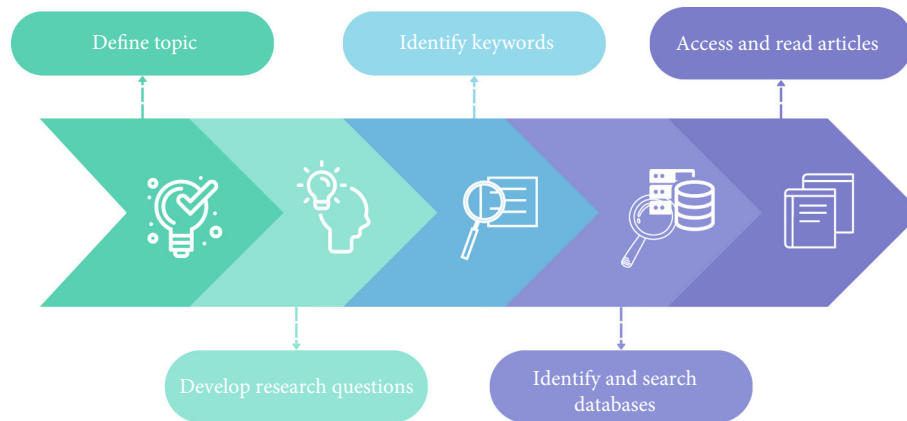


FIGURE 1: Steps of systematic literature review process.

used to collect and analyze the literature through the PRISMA framework. Section 3 presents the literature review, focusing on how big data analytics transforms digital marketing and consumer behavior, including data collection, profiling, and personalized marketing campaigns. Section 4 discusses the results and highlights key insights. Finally, Section 5 concludes with a discussion on the implications of the findings, addressing research challenges, motivations, and suggesting directions for future research.

2. Methodology

2.1. The PRISMA Approach. The systematic literature review represents a methodologically robust approach designed to identify, assess, and integrate comprehensive and relevant research findings on a specific subject. This methodology facilitates an in-depth and nuanced comprehension of the existing studies and their respective conclusions. Moreover, it inherently minimizes the potential for bias, particularly biases stemming from human error. The procedural framework of the systematic literature review is being shown in Figure 1, illustrating the sequential steps involved in this rigorous research process.

This paper specifically examines the literature on big data within the realms of digital marketing, consumer behaviour, and customer experience, employing the PRISMA protocol. PRISMA, an acronym for “Preferred Reporting Items for Systematic Reviews and Meta-Analyses,” provides a framework of guidelines for reporting, initially published in 2009. This protocol mandates that researchers present a clear, comprehensive, and accurate narrative justifying the review’s undertaking, its achievements, and its outcomes. Since its inception, PRISMA 2009 has evolved into PRISMA 2020 [8], reflecting advancements in methods for identifying, selecting, analyzing, and synthesizing scholarly works. This rigorous analysis under the updated PRISMA guidelines aims to enhance the understanding of marketers regarding the advantages, challenges, risks, and applications of big data in their respective fields.

To compile relevant information from diverse sources, a thorough investigation was conducted, guided by the following aims and objectives:

1. To gain a general understanding of how big data can be used in the context of digital marketing.
2. To showcase the impact big data can have in understanding consumer behaviour.
3. To present how big data can help optimize the overall customer experience.
4. To highlight the ethical considerations of using big data in consumer behavior and analysis.

2.2. Research Question Formulation Method. Before initiating the main phase of this paper, the authors developed the primary research questions (Table 2), which consisted of consumers/customers as the population under examination, big data as the main tool used by companies, and digital marketing as its general context.

2.3. The Research Strategy. The methodological framework of this study was structured around three principal elements: keyword selection, the screening methodology, and the criteria for eligibility. The genesis of this research, centered on a specific thematic area, necessitated the formulation of a pertinent keyword list. In this context, the terms identified as instrumental for this analysis included “big data,” “consumer behaviour,” “digital marketing,” “customer experience,” “customer insights,” and “big data analytics.”

The query input that we used was the following:

“Big Data” OR “big data analytics” AND “Consumer behaviour” OR “Customer experience” OR “Customer behavior” OR “Consumer insights” OR “Customer analytics” AND “Digital marketing” AND (LIMIT-TO (DOCTYPE, “ar”) OR LIMIT-TO (DOCTYPE, “re”)) AND (LIMIT-TO (LANGUAGE, “English”)) AND (LIMIT-TO (PUBSTAGE, “final”)).

This scholarly inquiry examines the corpus of literature regarding the application of big data within the realms of

TABLE 2: Systematic literature review under the PRISMA approach.

#	Topic definition	Journal articles on “big data and consumer behaviour,” “big data and customer experience,” and “big data in digital marketing,” published between 2013 and 2023
1	Define research questions	1. How can big data be leveraged to upgrade digital marketing campaigns? 2. What is the impact of big data on consumer behavior? 3. How can big data help in optimizing the digital customer experience?
2	Determine search “keywords”	Big Data, Consumer behaviour, Digital marketing, Customer experience, Customer behavior, Consumer insights, Customer analytics, big data analytics
3	Identify databases and proceed with search	Scopus, Web of Science, Springer Link, ScienceDirect, and Emerald Insight
4	Article selection	Articles published in English, in reputed journals, and in the context of big data and consumer behaviour, digital marketing, and customer experience.
5	Article synthesis	Critical assessment of included studies.
6	Publicize SLR findings	Findings are based on the summary of the data collected or current evidence from findings on various individual studies or articles published in reputed journals.

digital marketing and consumer behaviour, with a focus on publications sourced from Scopus, Web of Science, ScienceDirect, Springer Link, and Emerald Insight. The selection of these databases was made by considerations of access rights, the temporal constraints of the study, and the bibliographies of extant literature related to big data’s role in digital marketing and consumer behaviour over the preceding decade (2013–2023). Notably, these databases are recognized for their substantial repository of peer-reviewed scholarly works. The specific criteria employed in this research are delineated in Table 2. The inclusion criteria (IC) for this study are as follows:

- IC-1: articles that talk about big data in digital marketing, big data and consumer behaviour, and customer experience.
- IC-2: articles published between 2013 and 2023.
- IC-3: articles published in English.
- IC-4: articles published in peer-reviewed journals.
- IC-5: articles that included two or more of our specified keywords in the abstract, title, or keywords.

Papers that were not within the set criteria were excluded (EC) from the research.

The exclusion criteria are as follows:

- EC-1: papers that were published as conference proceedings.
- EC-2: papers that were book chapters.
- EC-3: papers that were not in English.
- EC-4: papers that were published in 2024 (as this research started in 2023).
- EC-5: papers that did not meet the keyword criteria mentioned above.

A general summary of the systematic literature review process under the PRISMA-p approach is shown in Table 2 and Figure 2.

2.4. Analysis and Data Extraction Methods. The four steps listed below were utilized in order to search for and retrieve research data:

1. Article identification through database searches utilized the following keywords “big data,” “consumer behavior,” “digital marketing,” “customer experience,” “customer behavior,” “customer insights,” “customer analytics,” or “big data analytics”. Any duplicate entries were removed.
2. Titles, abstracts, and keywords were searched thoroughly, based on selection criteria, and irrelevant articles were excluded.
3. The articles underwent thorough analysis to ascertain their eligibility, and exclusion choices were made with sound justification.
4. The cross-referenced publications underwent a thorough screening process to conduct a comprehensive investigation, and a final decision was made regarding which papers to incorporate in the systematic review.

Duplicate articles were removed. The selected publications’ titles, abstracts, and keywords were carefully examined for appropriateness. Additionally, the reference lists of chosen publications were searched for any new related research. Chosen publications were then looked at. Figure 3 shows the process followed for this PRISMA-p analysis.

2.5. Findings

2.5.1. Description of Articles Used. This research looked at 19 scholarly publications that had been vetted by other researchers and were sourced from reputable journals and databases. Table 3 presents the total sum of relevant articles, as determined by reputable publishers.

A time distribution analysis on big data in digital marketing, consumer behaviour, and customer experience is presented in Figure 4 (from 2013 to 2023). All articles found, within the set criteria, between 2013 and 2023, were included in the review. The research showed no results, within the

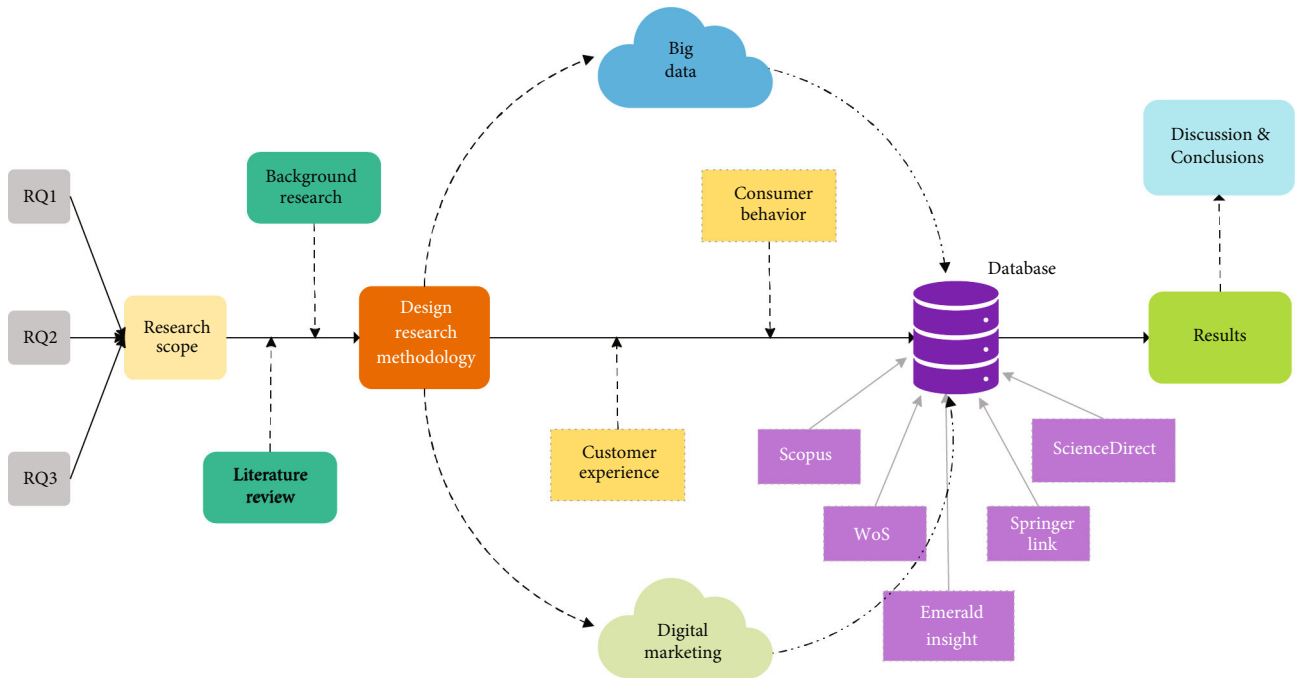


FIGURE 2: Methodology flowchart.

specified criteria, for the years 2013 and 2023. The focus of the research is on the use of big data in digital marketing and the use of big data in regard to consumers' behaviour and overall digital experience.

Having outlined the systematic approach and key stages of our literature review process, we now present a detailed summary of the main findings from the selected studies. Table 1 synthesizes crucial information from each paper, including study objectives, methodologies, sample populations, key findings, and identified limitations. This comprehensive overview not only highlights the diverse applications and insights of big data analytics in digital marketing and consumer behavior but also provides a foundational understanding for further discussion and analysis.

3. Literature Review

3.1. Big Data Analytics: Transforming Digital Marketing and Consumer Behavior. In business, personalizing is the process of customizing goods, services, and marketing plans to fit the particular needs and preferences of certain consumers. Unlike a consistent strategy, personalizing considers the unique traits of the consumer. Data analytics has transformed this process and made it feasible for firms to be more efficient by allowing them to investigate vast amounts of consumer data including behaviors, preferences, and interactions [9]. By means of this approach, comprehensive customer profiles are produced, comprising not only the purchase behavior but also the browsing activity, interaction with content, and preferred communication paths [10]. When companies have access to such complete data, they may go beyond general demographics and customize their strategies to certain client categories. Figure 5 shows the various ways big data analytics is used to transform digital marketing.

3.1.1. Data Collection and Profiling for Consumer Insights. In order to be able to gain insights into consumers' behaviors, businesses utilize complex data-gathering methods, pulling from a wide variety of sources [11]. Businesses carefully monitor how users engage with their mobile applications and websites, which is an essential component of this strategy [12]. Among these are the examination of the pages that were viewed, the amount of time spent on each page, the search queries, and the navigation patterns [13]. Through this process, businesses are able to get a more sophisticated picture of the digital journey that their clients have undertaken. An additional source that is essential is the examination of purchase history. Businesses are able to get insight into their customers' tastes, preferred product categories, and the frequency of their interactions by analyzing the transactions that they have completed in the past [14]. This historical data proves to be quite useful in the process of developing personalized product suggestions, which allows future products to be tailored in order to smoothly correspond with individual preferences [15], for example, exploring the transformative potential of big data analytics in enhancing customer experience and business performance for communication service providers (CSPs). Their study highlights the importance of integrating customer-centric data across various departments to build a holistic view of customer experience, encompassing aspects such as network reliability, billing, and customer care. By employing big data technologies like Hadoop and NoSQL databases, CSPs can manage the high volume, velocity, and variety of data they generate.

Social media platforms like Facebook, X (formerly Twitter), and Instagram offer valuable, dynamic data on customer sentiments, preferences, and interactions. Monitoring these platforms allows businesses to stay informed and quickly adapt to changing trends and public opinions. When it comes

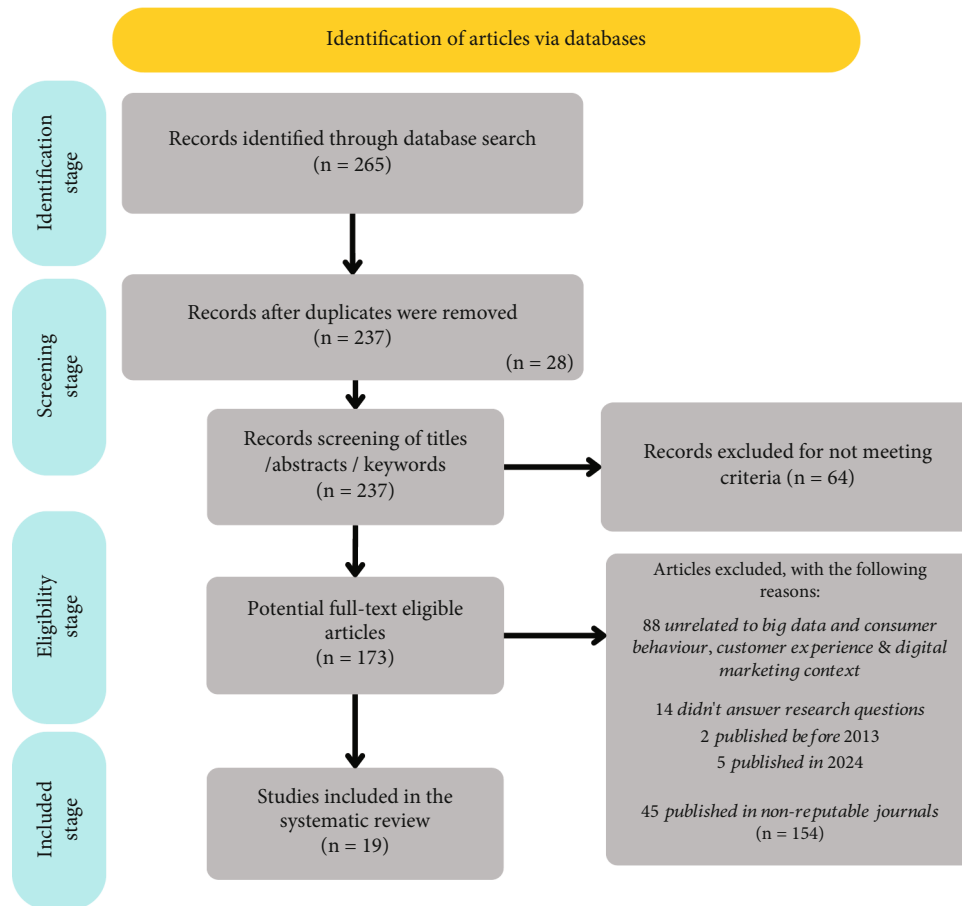


FIGURE 3: Diagram of articles included in the review based on PRISMA.

TABLE 3: Publishers and articles reviewed.

Publisher	Number of relevant articles
Elsevier/Springer	6
Emerald Insight	2
Taylor & Francis/Wiley	2
MDPI	4
Other	5

to social media data, research has suggested that decision trees are the most effective ML algorithm to use for consumer behavior predictions [16]. Customer feedback from surveys, reviews, and direct communication provides insights into satisfaction levels, concerns, and opportunities for improvement [17]. Location data is crucial for businesses with physical locations, offering insights into foot traffic patterns, regional preferences, and the effectiveness of regional marketing efforts [18]. Data from smart devices and browsers help optimize digital experiences by tailoring platforms to commonly used devices. Email interaction metrics, such as open and click-through rates, refine email marketing strategies, revealing content preferences and advertising effectiveness [19]. Customer service interactions, including chats, phone calls, and support requests, highlight common issues, frequently asked questions, and areas where customers need assistance.

The use of demographic information is of the utmost importance to businesses for refining targeted marketing and personalization tactics. This kind of data, which includes factors like age, gender, location, income level, and education, allows companies to group their customers based on traits and their preferences [20]. By knowing the demographics of their target audience, businesses can customize marketing messages and product suggestions and tailor the overall customer experience in a way that meets the needs of each group [21]. For example, a product being offered at teenagers will be marketed quite differently from one aimed at retirees, not only in terms of the product itself but also in the marketing platforms that will be used for promotion, language used in these promotions, and imagery employed. Likewise, geographic location can impact product offerings and promotional approaches due to preferences and cultural distinctions. By making use of customer insights, companies can ensure that their marketing campaigns are more relevant and successful, leading to increased engagement rates, enhanced customer satisfaction levels, and greater loyalty [22]. Apart from utilizing demographic data, companies often turn to third-party data sources to further enhance their understanding of their customers and gain insights into a wider spectrum of market trends. These sources potentially include industry reports, market research studies, and all sorts of data from social media

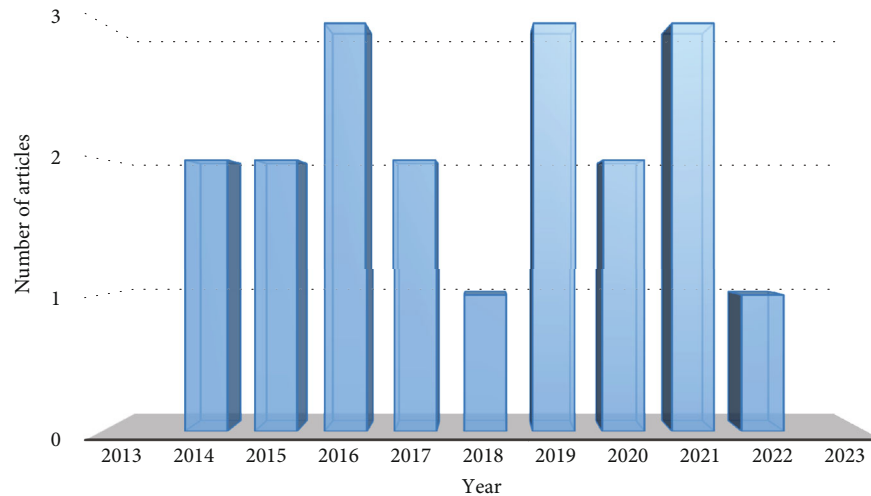


FIGURE 4: Year publication of selected articles.

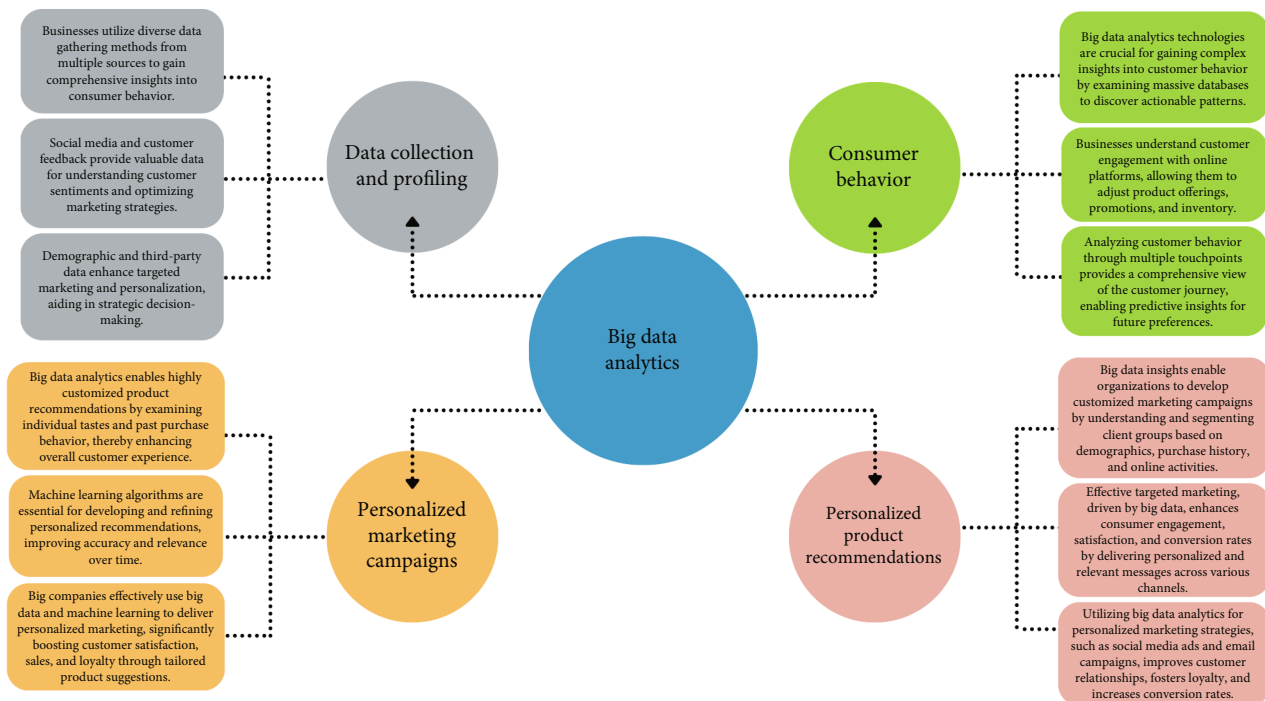


FIGURE 5: Big data utilization overview.

platforms [23]. Such third-party data provides a broader context within which individual customer data can be interpreted. Using big data and advanced analytics to deliver marketing content is so finely tuned to the consumer's preferences and behaviors that it feels intrinsically valuable and empowering to them. This creates a perception that consumers are making autonomous choices, even though these choices are heavily guided by the underlying algorithms [24]. It helps businesses to benchmark their performance against industry standards, identify emerging trends, and uncover opportunities for innovation.

The data reveals a complex network of client preferences, allowing companies to understand which products and ser-

vices consumers favor by analyzing online interactions, valued features, and preferred communication methods. This understanding enables companies to tailor offerings precisely to match consumer tastes. Additionally, analyzing online activities, purchase histories, and marketing interactions uncovers recurring behaviors, helping to predict future actions, refine customer journeys, and optimize user experiences [25]. Combining data from various sources provides a comprehensive view of customer behavior, essential for understanding interactions and preferences. Companies must thoughtfully adhere to data management guidelines and prioritize user privacy throughout the data collection and analysis process [26]. Merging data to build customer

profiles, encompassing preferences, demographics, and behavioral trends, offers rich insights and helps form a detailed picture of the consumers and possible clients [27]. These well-constructed profiles, filled with qualitative and quantitative data, form the foundation for strategic decision-making. With a thorough understanding of individual customers, companies can create highly personalized experiences, enhancing customer satisfaction and fostering long-lasting relationships [28]. Comprehensive customer profiles enable businesses to navigate the evolving consumer landscape with clarity, remaining flexible, responsive, and customer-centric.

3.1.2. Consumer Behavior Through the Lens of Big Data Analytics. The use of big data analytics technologies is becoming increasingly important in the process of gaining complex insights into the behavior of customers. The ability of these tools to delve into massive databases, discover important patterns, and provide organizations with insight that can be put into action is reflected in their capabilities. It is possible for businesses to examine the ways in which customers engage with online platforms by utilizing big data analytics [29]. This allows for the identification of items that customers regularly investigate via the examination of browsing habits. This not only illuminates popular products but also allows businesses to adjust their product offerings, promotions, and inventory in order to better align with the current consumers' interests. Understanding how customers interact with pages can offer valuable insights into their engagement levels [30]. Tracking and measuring the time customers spend on sections of a website or app can be achieved through advanced big data analytics tools. By utilizing this data, businesses can enhance the design, content, and usability of their websites to enhance user experience and drive increased engagement [31].

Analyzing customer behavior with the help of big data tools goes beyond just scratching the surface; it delves deep into understanding the intricacies of how customers navigate their buying journey. By tracking and examining several touchpoints, businesses can get a complete picture of how customers engage with their products, services, and platforms over time [32]. This comprehensive understanding allows companies to map out the customer journey, pinpointing stages, decision-making moments, and areas of interaction. Furthermore, leveraging big data analytics in a predictive manner becomes essential in foreseeing future customer preferences [33]. By identifying patterns and trends within the data itself, businesses can make predictions about which products or services customers may show interest in next [34]. These forecasts enable companies to proactively adjust their strategies, refine their product offerings, and tailor their marketing approaches accordingly to meet evolving consumer expectations [35], exploring the potential of big data analytics to unlock customer insights for customer experience management (CXM). Their paper identifies three main types of CX insights: attitudinal/psychographic, behavioral, and market insights. Attitudinal insights pertain to customer satisfaction and emotional responses, behavioral insights focus on customer actions

and decisions, and market insights assess competitive positioning and brand equity. The authors highlight the importance of using these insights to drive CX actions such as touchpoint monitoring, prioritization, adaptation, and journey design. This aligns with [1], who argue that big data analytics facilitates a deeper understanding of consumer behavior by capturing extensive data points across various touchpoints. Essentially, combining customer journey analysis with insights provides businesses with a strategic edge. It empowers them not only to grasp the current landscape of customer interactions but also to anticipate and prepare for potential shifts in future preferences. This proactive approach helps companies remain adaptable, responsive, and customer-focused in a dynamic market environment.

3.1.3. Personalizing Marketing Campaigns With Precision. Insights collected from big data serve as a foundation for organizations in the process of developing customized marketing campaigns that are designed to connect with particular client segments. Companies have the ability to adjust their marketing efforts to coincide seamlessly with the tastes, behaviors, and characteristics of unique client groups, by harnessing the abundance of information that is received from a variety of sources [36]. For better client targeting, it is important to fully understand the specifics of different client categories. Organizations are able to recognize patterns within the data, through the use of big data analytics tools, which helps them in segmenting their consumer base according to several characteristics, including demographics, purchase history, and online activities. Such segmentation can benefit business in many different sectors, but even more so in the hospitality and tourism industry. Matz and Netzer [37] showed how text analytics may reveal important elements affecting hotel visitor happiness, therefore offering a better knowledge of customer behavior. Using these segmented profiles, businesses are able to develop marketing messages that are highly customized and relevant to their target audiences. The application of this focused strategy encompasses a variety of channels, such as internet promotions, social media advertising, and email marketing [38]. For example, a business may deliver tailored offers to a portion of the population that has demonstrated an interest in particular product categories, or it might modify the content of advertisements on social media platforms based on the preferences of various client groups.

Effective targeted marketing depends much on its capacity to engage the intended audience, therefore fostering customization and importance. Using big data analysis, insights help businesses to better grasp consumer categories and improve their marketing activities, thereby enhancing customer happiness, engagement, and conversion rates [39]. This exact targeting provides companies with an advantage as it delivers customized messages, valued by their customers. By incorporating big data into marketing plans, content and promotions fit to personal tastes and improve consumer connection and loyalty. This customized strategy improves the client journey as a whole [40]. By means of customer feedback analysis, continuous big data analysis helps businesses to instantly adjust to the ever-changing

consumer tastes and trends, thereby helping them to refine their targeting strategies. Utilizing big data insights for targeted marketing enhances customer satisfaction, campaign effectiveness, and resource optimization. By focusing on high-conversion segments, businesses can maximize their marketing ROI, offering personalized experiences that foster deeper customer connections and lead businesses to growth [41]. The shift from generic messaging to tailored interactions signifies a substantial change in customer engagement strategies, equipping companies to navigate complex markets and build lasting relationships. As technology advances, businesses are becoming more adept at using big data analytics for targeted marketing and can better align their communications with customer interests, increasing the likelihood of capturing attention and prompting action. For example, in email marketing, personalized offers and content based on customer engagements and previous purchases enhance the chances of emails being opened and engaged with. This approach results in customized campaigns that drive higher open rates, click-throughs, and overall engagement, contributing to the success of marketing efforts [42].

Big data helps companies to customize social media ads to the interests of possible consumers, therefore increasing the impact and appeal of the advertising [43]. Beyond social media, this data-driven approach includes focused campaigns on websites, apps, and even conventional media. Through emphasizing personal preferences, businesses may design more interesting events that result in increased revenue. This change from a one-size-fits-all strategy to customized marketing techniques improves shopping experience and increases marketing efficacy. Big data analytics ultimately helps to create better consumer relationships, inspire loyalty, and increase conversion rates [44]. Starbucks, for example, has integrated big data analytics into its marketing strategy to enhance customer experience and engagement. Utilizing data from its loyalty program, mobile app, and in-store purchases, Starbucks analyzes customer preferences and behaviors to tailor marketing campaigns and promotions. For instance, Starbucks sends personalized offers and recommendations based on customers' previous purchases and preferences. This data-driven strategy has led to increased customer engagement and loyalty, highlighting the practical benefits of big data in creating a personalized customer experience.

3.1.4. Personalized Product Recommendations With the Use of Big Data. Big data analytics allows companies to offer highly customized product recommendations by using individual tastes and purchase behavior, therefore greatly expanding the possibilities for conversion [45]. Examining past interactions and consumer transactions helps companies to identify trends and guide predictive modeling [46]. This helps companies to suggest products that fit the consumer tastes. For example, e-commerce sites could recommend products that are either similar to or complimentary to the ones bought in the past, therefore increasing the relevance and efficiency of the purchasing process. These customized recommendations improve customer involvement and raise the likelihood that the client will buy by streamlining

the search for products that meet their demands. This enhances the whole client experience in a much more positive way.

Machine learning algorithms are quite important when it comes to developing customized recommendations more effectively over time. By tracking the interactions and comments given by every user, these algorithms ensure that recommendations remain correct and relevant to the always shifting interests of consumers [47]. Driven by statistics, these methods increase conversion rates and help to raise client happiness by providing a more customized shopping experience. Recommendation systems, in the context of e-commerce platforms, streaming services, and other online platforms, are driven by sophisticated machine learning algorithms, which significantly affect the tailored experiences consumers have on these platforms [48]. These algorithms examine massive datasets, including user habits and purchase history, so their recommendations are adjusted depending on them. Through interactions with the platforms, consumers help the system to better understand their preferences and enable it to offer content more relevant for their specific needs [49]. Ultimately, the results are a more customized user experience, from which higher degrees of consumer satisfaction and loyalty follow.

We could consider here the case of Amazon, which has effectively used big data to enhance its personalized marketing efforts. Amazon collects extensive data from customer interactions on its platform, including browsing history, purchase history, and search queries. By employing collaborative filtering and other machine learning algorithms, Amazon's recommendation system offers highly personalized product suggestions, based on browsing and purchase behavior [50]. This approach has significantly increased customer satisfaction and boosted sales by aligning product recommendations with individual consumer preferences. Amazon's success demonstrates the power of big data analytics in predicting consumer behavior and providing a personalized shopping experience that fosters customer loyalty and retention.

3.2. Leveraging Big Data for Customer Journey Optimization.

In the age of data-driven marketing, big data plays a significant role in understanding and analyzing the complete customer journey. Starting from when customers first become aware of a product or service, to their purchase and ongoing engagement, businesses can carefully map this path and examine every interaction along the way. This detailed analysis helps companies identify points of contact and evaluate how customers respond at each stage [51]. By doing so, organizations can effectively address any potential issues that may arise and optimize the conversion process. The ultimate goal is to create an engaging experience that not only meets but surpasses customer expectations. Figure 6 depicts the three stages of the customer journey and the role of big data in it.

3.2.1. Big Data Insights Boost Initial Awareness. It is of the utmost importance to have the capacity to recognize and comprehend client touchpoints at the early awareness phase in the fast-changing marketing environment. Big data analytics is becoming an essential instrument that provides a

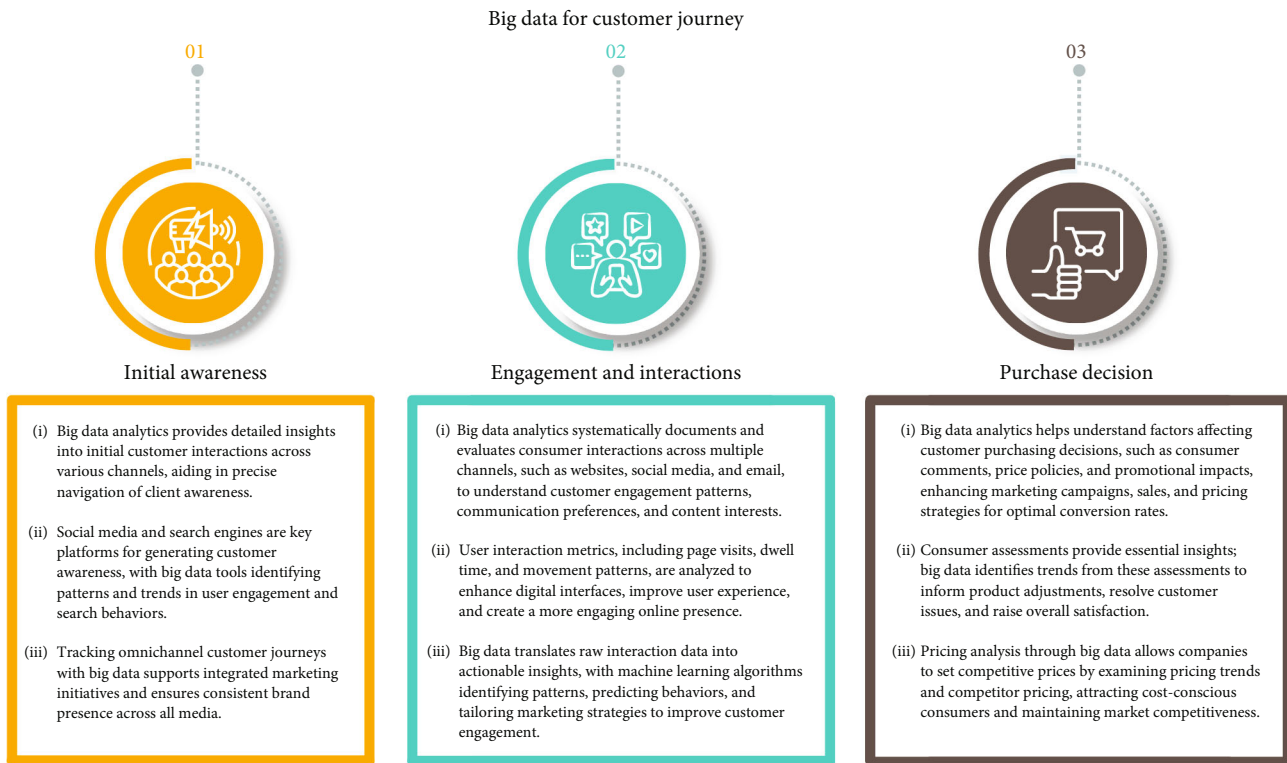


FIGURE 6: Big data for customer journey overview.

detailed perspective on many channels via which potential customers initially interact with products or services [52]. This analytical methodology spans several channels, such as social media and search engines, enabling firms to effectively traverse the intricate landscape of client awareness with accuracy. For example, as proven by [53], who applied natural language processing to examine customer comments, data from social media contacts can provide real-time insights into consumer attitudes and preferences.

Social media platforms are instrumental in generating customer awareness, acting as a conduit for engagement and brand discovery. Through the application of big data analytics, businesses can dissect vast datasets, identifying patterns and trends in user engagement [54]. User engagement is another important variable in our paper and refers to the degree of interaction and involvement a user has with a website or digital platform. User engagement is measured by metrics such as average time spent on a page, the number of pages visited per session, and click-through rates. Clickstream data analysis is often used to measure these metrics, capturing detailed information about user interactions on a website [55]. This level of insight enables the strategic personalization of content, campaign optimization, and influencer partnerships, thus enhancing brand visibility and resonance on social channels. Analyzing social media engagements using big data tools allows for the creation of adaptive and targeted marketing strategies [56]. Businesses nowadays can have access to a plethora of ways of obtaining information as a result of the widespread use of search engines in the information-gathering operations of customers. The utilization of big data tools in order to analyze search behaviors enables businesses

to discover the right keywords and search queries that are driving people towards their products and services [57]. The utilization of this knowledge to optimize website content and search engine optimization tactics, as well as to ensure alignment with user search intent and to improve visibility in search engine results pages (SERPs), has shown to be extremely beneficial for businesses [58]. Not only does this optimization approach attract the attention of potential clients, but it also fits with the information-seeking behaviors that they exhibit, which increases the possibility that they would engage with the brand.

Customers sometimes follow nonlinear routes, including several different media, to learn of a brand. Big data analytics helps companies to see customer engagement touchpoints as a whole, through all kinds of different channels [59]. Tracking clients' omnichannel travels helps one to do this. By means of an all-encompassing strategy, integrated marketing initiatives are supported, thereby ensuring constant presence of the brand across all media and hence strengthening initial awareness. Big data allows businesses to have a strategic knowledge of early client awareness, which in turn helps marketing operations to develop more successfully. Finding channels and touchpoints that have a major influence on consumers helps businesses to maximize their advertising, social media campaigns, and search engine optimization techniques [60]. Establishing brand memory is rather important, and big data may help to assess interactions across touchpoints in order to find trends that can raise brand awareness [61]. Following this path produces a consistent brand message and visual identity, which helps to create an experience that will be unforgettable and interactable for potential customers.

3.2.2. How Big Data Analytics Improves Engagement and Interaction. Big data is a technique for methodically documenting and evaluating interactions occurring over several channels during the consumer journey. These outlets cover visits to websites, social media participation, and email correspondence. These findings help companies to acquire thorough awareness of customer engagement patterns, preferred communication styles or channels, and content preferences [62]. Companies utilize big data analytics to assess user interaction metrics including page visits, dwell time, and movement patterns. An essential touchpoint is website visits; companies use this information to assess user involvement [63]. This in-depth research helps to develop digital interfaces, which in turn boosts navigation and content accessibility and so improves the user experience and generates a more interesting online presence.

In the world of social media, the significance of big data analytics cannot be exaggerated enough when it comes to truly comprehending how consumers engage with a brand. By examining metrics such as user involvement, emotional responses, and demographic details, businesses can tailor their social media tactics to align with the preferences of their target audience. For example, sentiment analysis delves into customer opinions, reviews, and social media posts to measure the sentiment surrounding products or services [64]. This insightful utilization of big data aids in crafting relatable content on social platforms, ultimately enhancing customer interaction. Interpreting customer interactions across all those different touchpoints is quite similar to understanding a complex language of preferences and behaviors [65]. Big data acts as a critical translator, transforming raw interaction data into true insights that can be implemented into a business marketing efforts. Machine learning algorithms, for example, can analyze vast datasets in order to identify patterns and trends in customer behavior, potential churn, conversions, and lifetime value [66], enabling businesses to predict future actions and tailor their digital marketing strategies accordingly. This data-driven approach allows for a more personalized and meaningful engagement with potential customers, optimizing an organization's overall marketing directions.

3.2.3. Influencing the Purchase Decision With Data-Driven Strategies. Big data utilization is quite helpful in learning about the several factors affecting customer purchasing decisions. It examines consumer comments, price policies, and promotional impacts as well as other factors to help companies enhance their marketing campaigns, sales, and pricing strategies so as to maximize the best potential conversion rates [67]. Regarding actual encounters with a product or service, consumer assessments are rather essential indicators. By using big data analytics, attitudes, themes, and concerns, that are derived from these assessments, have the ability to enable the discovery of trends that highlight the influence on purchase decisions [68]. By the use of this data, product adjustments are made, customer problems are resolved, and general user satisfaction is raised.

It goes without saying that price plays a huge role in what consumers decide to buy. Thanks to big data, compa-

nies can now dig deep into pricing trends and what their rivals are charging for similar products [22]. This goldmine of information helps businesses set prices that not only reflect the value of what they are selling but also keep them in the game, in the long run. By comparing their prices with those of their competitors, companies can smartly adjust prices for their products [69]. This strategy is great for catching the eye of consumers who are always on the lookout for a good deal, all while staying a step ahead in the market.

The buying choices of customers are highly influenced by promotional strategies. Big data analytics allows companies to identify which approaches best connect with their target market. Among these techniques are discounts, buy-one-get-one incentives, and combined bundles. When businesses have a great grasp of the interests of their consumers, they may change promotions to fit current trends and improve product appeal. Big data also analyzes sales trends to find favored product combinations, peak buying times, and seasonal influences [70]. These analytics guarantee that promotions match periods when more consumer engagement is happening, therefore improving the management of inventories and the planning of marketing campaigns.

The real worth of big data is its ability to transform intricate datasets into practical insights. By grasping the various factors that influence consumer buying choices, businesses can create focused strategies that deeply connect with their target audience. This continuous process of examining, adjusting, and polishing enables companies to effectively navigate the evolving landscape of consumer preferences, ultimately increasing conversion rates and promoting business expansion.

4. Results and Discussion

Our systematic review, which utilized the PRISMA methodology, identified several key findings regarding the impact of big data on digital marketing and consumer behavior. The integration of big data analytics in digital marketing fundamentally enhances organizations' ability to understand and influence consumer behavior. This analysis focuses on metrics such as page visits, time spent on pages, clicks, navigation patterns, and search queries, which allow marketers to tailor strategies effectively to meet consumer needs. This comprehensive data collection facilitates the creation of highly personalized marketing strategies that resonate with individual consumer preferences and behaviors. Moreover, user engagement, defined as the degree of interaction and involvement a user has with a website or digital platform, is a crucial variable. High levels of user engagement indicate that the content and design of a website effectively capture and retain user interest. By measuring metrics such as average time spent on a page, the number of pages visited per session, and click-through rates, marketers can gain valuable insights into user preferences and optimize their digital content accordingly. This detailed understanding of user interaction helps improve user experience and boosts engagement rates.

Page visits and navigation patterns provide insights into how users interact with a website, which pages are most popular, and how users navigate through the site. This

information is vital for optimizing website design and improving user experience. Tools like SimilarWeb track these metrics to help businesses understand user journeys and enhance the overall effectiveness of their websites. Clicks detected on a website indicate points of user interaction and interest. Also, analyzing click data helps marketers understand which elements of a website are most engaging and how to optimize calls to action and other interactive components. Clickstream analysis is a powerful tool for refining website design and increasing user engagement. In addition, monitoring search queries provides insights into user intent and interests, enabling marketers to create relevant content that addresses users' needs. Understanding the terms and phrases that users search for allows businesses to optimize their content strategy and improve search engine rankings, ultimately enhancing user satisfaction and engagement.

By focusing on these key variables, our analysis demonstrates the significant impact of big data analytics on digital marketing strategies. The findings highlight the importance of understanding and measuring these variables to develop effective marketing campaigns that drive consumer engagement and satisfaction. However, the practical implications here are that the implementation of these strategies must be accompanied by robust ethical standards in order to address the potential risks associated with extensive customer data collection and analysis.

4.1. Practical Applications. The insights gained from our systematic review have several practical implications for businesses and marketers:

- **Enhanced personalization:** Businesses can leverage big data analytics to create highly personalized marketing campaigns. By understanding individual consumer behaviors and preferences, marketers can tailor their messages and offers to better meet the needs of their target audience. For instance, personalized email campaigns that recommend products based on previous purchases can significantly increase engagement and conversion rates.
- **Optimized user experience:** The analysis of user engagement metrics, such as average time spent on a page and navigation patterns, can help businesses optimize their website design and content. By improving the user experience, companies can enhance customer satisfaction and reduce bounce rates. Tools like Google Analytics and SimilarWeb provide valuable data that can guide these optimizations.
- **Predictive analytics:** Big data analytics enables businesses to predict future consumer behaviors and trends. This predictive capability allows companies to stay ahead of market changes and proactively adjust their strategies. For example, e-commerce platforms can use machine learning algorithms to forecast demand for specific products and manage inventory more effectively.
- **Customer journey mapping:** By tracking and analyzing the entire customer journey, businesses can identify

key touchpoints and areas for improvement. Understanding how customers move through the sales funnel enables companies to enhance the customer experience at each stage, from initial awareness to postpurchase support.

4.2. Research Motivations. The primary goal of this research was to systematically review and synthesize existing literature on the application of big data analytics in digital marketing and consumer behavior. Our study responded to this goal by examining 19 relevant scholarly articles from reputable journals and databases, covering various aspects of big data's impact on digital marketing strategies and consumer behavior. The systematic review provided a comprehensive understanding of how big data analytics can be leveraged to enhance marketing effectiveness, personalize customer interactions, and predict consumer preferences. The overall goal is to offer a holistic understanding that helps businesses refine their approaches and enhance customer engagement. Figure 7 shows the main motivations for conducting this research.

One of the main motivations is to deepen the understanding of consumer behavior through the lens of big data analytics. By systematically reviewing existing literature, this research seeks to uncover how big data can reveal intricate details about consumer actions, decision-making processes, and buying journeys. Such insights are crucial for businesses to tailor their marketing strategies more effectively and improve customer satisfaction. Understanding these patterns allows companies to anticipate consumer needs and preferences, thereby fostering a more personalized and engaging customer experience.

Another important motivation is to explore how big data analytics can optimize marketing strategies. With the ability to analyze large datasets, businesses can move beyond traditional marketing approaches and adopt more precise, data-driven strategies. This review is aimed at highlighting how companies can use big data to enhance targeting, personalization, and engagement, ultimately leading to more effective marketing campaigns and higher conversion rates. By leveraging big data, businesses can identify the most impactful marketing channels, fine-tune their messaging, and allocate resources more efficiently, resulting in better ROI and customer retention.

Employing the PRISMA methodology allows for a thorough identification of gaps in the current research landscape. This systematic review not only synthesizes existing knowledge but also points out areas where further research is needed. By doing so, it provides a roadmap for future studies, encouraging more in-depth exploration of under-researched topics and the development of innovative solutions to existing challenges. Identifying these gaps is essential for advancing the field and fostering a deeper understanding of how big data can be used to its fullest potential.

Finally, the motivation for this PRISMA research is to support evidence-based decision-making in the field of digital marketing. By consolidating and critically evaluating existing studies, this review provides a robust evidence base

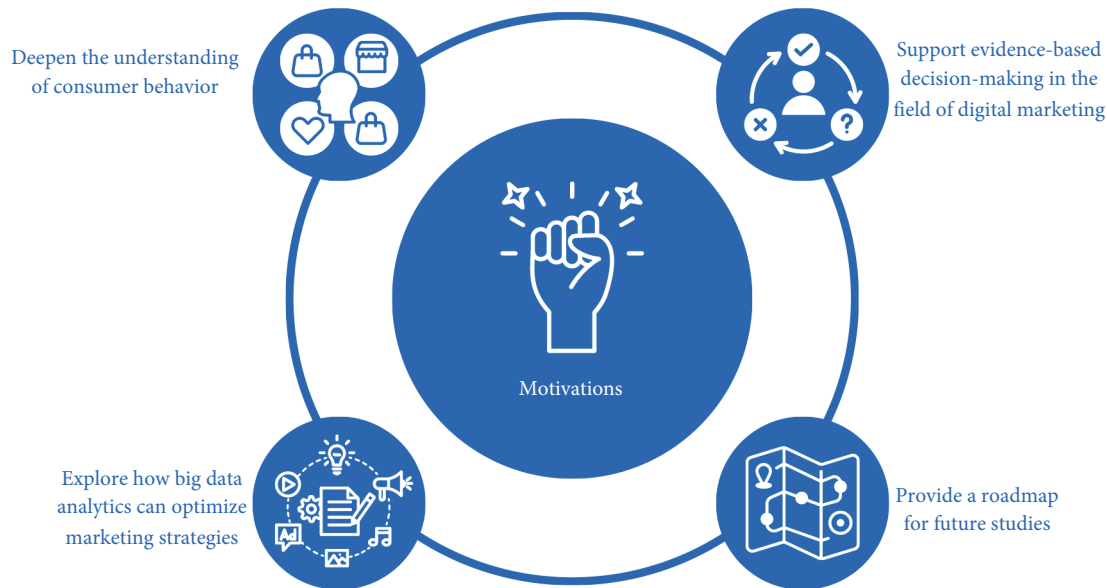


FIGURE 7: Motivations for conducting this research.

that businesses, policymakers, and researchers can rely on to make informed decisions. The insights gained from this research can help shape strategies, policies, and practices that are grounded in empirical evidence, leading to more effective and ethical use of big data analytics in digital marketing. This comprehensive understanding not only benefits individual businesses but also contributes to the overall advancement of the digital marketing industry.

5. Conclusion

The integration of big data analytics in digital marketing has significantly revolutionized how organizations understand and influence consumer behavior. Through the systematic review utilizing the PRISMA methodology, our study has provided a comprehensive overview of the key findings, practical implications, and future research directions in this field. The primary findings indicate that big data analytics enhances the ability of businesses to gain deep insights into consumer behavior, optimize marketing strategies, and improve customer experiences. Metrics such as page visits, time spent on pages, clicks, navigation patterns, and search queries are crucial for tailoring strategies that meet consumer needs. The analysis highlights the importance of understanding user engagement, as high engagement levels signify effective content and design that capture user interest. This understanding facilitates the creation of personalized marketing strategies that resonate with individual consumer preferences, thereby boosting engagement and satisfaction.

5.1. Implications and Originality. The findings of this research have several practical implications for businesses and marketers. Enhanced personalization is one of the most significant implications, as businesses can use big data analytics to create highly tailored marketing campaigns. Understanding individual consumer behaviors and preferences

allows marketers to tailor messages and offers to better meet the needs of their target audience. For example, personalized email campaigns that recommend products based on previous purchases can significantly increase engagement and conversion rates. Another important implication is the optimization of user experience. Analyzing user engagement metrics such as average time spent on a page and navigation patterns can help businesses optimize website design and content. Improved user experience leads to higher customer satisfaction and lower bounce rates. Predictive analytics enabled by big data allows businesses to forecast future consumer behaviors and trends, staying ahead of market changes and proactively adjusting strategies. Customer journey mapping, facilitated by tracking and analyzing the entire customer journey, enables companies to enhance the customer experience at each stage from initial awareness to postpurchase support.

5.2. Future Research Directions. Future research should focus on several key areas to advance the understanding and application of big data analytics in digital marketing. Firstly, in-depth research on how consumers respond to personalized marketing campaigns can provide valuable insights into the benefits and potential drawbacks from the consumer's perspective. Additionally, further analysis into the long-term effects of data-driven personalization on consumer trust and brand loyalty is necessary to determine the sustainability of these practices. Exploring advanced machine learning algorithms to enhance data analysis techniques is another promising avenue for future research. Integrating emerging technologies like artificial intelligence (AI) and the internet of things (IoT) to understand and enhance the customer journey can also provide new insights. Comparative studies across different industries and cultural contexts could uncover how big data's impact on consumer behavior varies globally. Furthermore, the development of more effective consent mechanisms that ensure genuine informed

consent is crucial. Research into technological advancements that enhance data security without compromising user convenience is also needed. Exploring the psychological impact of data breaches on consumer trust and behavior could offer valuable perspectives on recovery strategies for affected brands.

5.3. Limitations. This study has several limitations that should be acknowledged. The research is limited to articles published between 2013 and 2023, which may exclude relevant studies outside this timeframe. Additionally, the selected articles were limited to those published in English, which may introduce language bias. The study also primarily focuses on digital marketing and consumer behavior in the context of big data, potentially overlooking other significant areas of application. Future research should address these limitations by including a broader range of studies and exploring additional contexts and applications of big data analytics.

Data Availability Statement

The articles that provided the data used for this paper's findings are available upon request from the corresponding author.

Conflicts of Interest

The authors declare no conflicts of interest.

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