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The Role of Big Data and AI in Shaping Consumer-Centric Digital Marketing Strategies: A Systematic Review

Vipul Kumar Singh[1], Deepak Kumar Sinha[2]

[1,2] Students, Thakur College of Science & Commerce, Mumbai, India

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Corresponding Author :
Vipul Kumar Singh, Thakur College of Science & Commerce, Mumbai, India
E-mail Id:
vipulksingh@gmail.com
Orcid Id:
https://orcid.org/0009-0008-5054-7414
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A B S T R A C T

The emergence of Big Data and Artificial Intelligence (AI) has revolutionised the landscape of digital marketing, transforming traditional approaches into data-driven, consumer-centric strategies. This systematic review examines the role of Big Data analytics and AI technologies in shaping personalised marketing campaigns, enhancing customer engagement, and improving decision-making. Drawing on recent empirical studies and theoretical models, the review explores how predictive analytics, machine learning, natural language processing, and recommender systems enable firms to analyse consumer behaviour, segment audiences, and deliver targeted content in real time. The findings reveal that integrating Big Data and AI leads to more efficient resource allocation, higher customer retention, and stronger brand loyalty. However, challenges related to data privacy, algorithmic bias, and ethical transparency remain significant barriers to adoption. The paper concludes by identifying research gaps and suggesting directions for developing sustainable, ethical, and consumer-orientated digital marketing ecosystems.

Keywords: Segment Audiences, Consumer-Orientated Digital Marketing, Language Processing, Personalised Marketing Campaigns

Introduction

Digital marketing has undergone a profound transformation over the last decade, shifting from traditional, one-size-fits-all campaigns to highly targeted, personalised, and data-driven strategies. Conventional marketing once relied heavily on demographic segmentation, intuition, and static media channels, resulting in limited adaptability and consumer engagement. However, the digital revolution, coupled with the exponential growth of data and computational power, has redefined marketing dynamics. Modern strategies are now built upon Big Data analytics and Artificial Intelligence (AI), which enable marketers to understand consumer behaviour in real time, anticipate preferences, and deliver experiences that are both contextually relevant and emotionally resonant. [1,3,10] Big Data represents vast, complex, and dynamic datasets defined by the five Vs—volume, velocity, variety, veracity, and value. These datasets are generated through numerous digital touchpoints, including social media interactions, e-commerce transactions, IoT devices, search queries, website engagement, and mobile applications. Unlike traditional market research methods that rely on limited sampling, Big Data captures the entire spectrum of consumer activities, offering a comprehensive view of behavioural patterns and sentiments. However, the true value of Big Data lies in its interpretation. This is where AI technologies such as machine learning (ML), predictive

analytics, and natural language processing (NLP) play a transformative role.[1, 2, 6, 8, 11] AI algorithms convert raw data into actionable insights, enabling marketers to automate decision-making, optimise campaigns, and personalise experiences at scale.In parallel, consumer-centric marketing has emerged as a strategic imperative that places the consumer at the core of every marketing decision. This approach transcends mere transactional interactions, emphasising a deep understanding of individual needs, preferences, and behavioural drivers. Through data-driven personalisation, firms can tailor product recommendations, dynamic pricing, and content delivery to enhance engagement and maximise customer lifetime value.[3,5,12] This systematic review explores the intersection of big data, AI, and consumer-centric marketing, analysing how these technologies collectively enhance customer insight, improve engagement, and foster brand loyalty. Furthermore, it identifies emerging trends, ethical challenges, and future research directions, offering a holistic understanding of how data intelligence and AI are reshaping digital marketing into a more responsive, personalised, and sustainable ecosystem.

Methodology

This study adopts a systematic literature review (SLR) approach to examine how Big Data and Artificial Intelligence (AI) contribute to shaping consumer-centric digital marketing strategies. The review process followed structured and transparent procedures, ensuring replicability and comprehensiveness in capturing relevant scholarly insights. Peer-reviewed journal articles, preprints, and conference papers published between 2018 and 2025 were considered, reflecting the rapid advancements and contemporary developments in the field.

Data Sources and Search Strategy

The literature search was conducted across multiple academic databases, including Scopus, Web of Science, Google Scholar, and ResearchGate. A combination of targeted keywords and Boolean operators was employed, such as “Big Data in marketing”, “AI in marketing”, “consumer-centric strategies”, “digital marketing analytics”, and “personalisation in marketing”. The search yielded a broad collection of studies spanning diverse disciplines, including marketing analytics, information systems, consumer psychology, and business intelligence.

Inclusion and Exclusion Criteria

Studies were included if they met one or more of the following criteria

- Focused on AI and/or big data applications in digital marketing.
- Addressed personalised or consumer-centric marketing approaches.
- Presented systematic reviews, empirical research, conceptual frameworks, or bibliometric analyses that contributed to understanding marketing transformation.

Exclusion criteria eliminated studies that:

- Did not relate directly to marketing applications.
- Lacked empirical data or theoretical insights into consumer-centric strategies.

Selection and Thematic Categorisation

Following initial screening and quality assessment, 52 studies were selected and analysed in depth. The studies were then thematically categorised into five core research areas.

- Personalisation and Segmentation [2, 4, 10]
- Predictive Analytics and Customer Lifetime Value (CLV)[3, 7, 12]
- Real-Time Interaction and Marketing Automation [4, 9, 11]
- Consumer Experience and Relationship Management[5, 9, 13]
- Ethical, Privacy, and Governance Considerations [6, 7, 14, 15]

This thematic structure forms the foundation for the subsequent analysis and discussion, enabling a holistic understanding of how AI and big data transform consumer-centric digital marketing practices.

Theoretical Foundations and Drivers

The integration of Big Data and Artificial Intelligence (AI) in digital marketing is grounded in several theoretical foundations that explain how technology enhances consumer engagement, personalisation, and decision-making. These foundations provide the conceptual basis for understanding how data-driven and intelligent systems transform marketing into a consumer-centric ecosystem.

Big Data in Marketing

Big data enables marketers to analyse large-scale structured and unstructured data from multiple sources. Its applications include:

- **Enhanced segmentation:** Micro-segmentation and persona creation using behavioural and demographic data [3,7,10]
- **Pattern detection:** Identifying hidden preferences, trends, and buying triggers.[3,12]
- **Predictive capabilities:** Forecasting purchase behaviour, churn, and product adoption [3,7,12]

The integration of big data transforms marketing from intuition-driven to data-driven decision-making, enhancing targeting, resource allocation, and ROI.

AI and Machine Learning in Marketing

AI operationalises big data through algorithms capable of learning from historical and real-time data to make

predictions, recommendations, and automated decisions.[1, 2, 6, 8, 11, 14] Applications include.

- **Recommendation systems:** Suggesting products or services based on past behaviour.
- **Dynamic pricing:** Adjusting prices based on demand, competition, and consumer behaviour.
- **Predictive analytics**: Forecasting trends, CLV, and churn [3, 7, 12]
- **Natural language processing (NLP):** Analysing reviews, social media, and textual data for sentiment and intent.

Combining AI with big data enables highly adaptive strategies that respond to consumer behaviour in real time.[4, 8, 11, 13]

Consumer-Centric Marketing

Consumer-centric marketing emphasises creating value for individual consumers rather than focusing solely on products or campaigns. Principles include.

- Mapping the consumer journey at every touchpoint.
- Personalising content, offers, and communications.
- Enhancing long-term relationships and lifetime value[5,12,13]
- AI and big data allow these strategies to scale effectively across large customer bases .[3, 4, 10]

Key Themes & Findings

Personalisation and Segmentation at Scale

Big data allows marketers to create micro-segments or treat individual consumers as unique segments. AI algorithms can automate content delivery, product recommendations, and promotions. Studies show personalised campaigns increase engagement rates by 20–30% versus generic messaging [2,4,10,11]

Example: E-commerce platforms like Amazon and Alibaba use AI-driven recommendation engines to deliver personalised product suggestions based on browsing history and past purchases.[2, 10]

Predictive Analytics and Customer Lifetime Value

Predictive analytics leverages historical data to forecast future behaviour, including churn, repeat purchases, and lifetime value[3, 7, 12] AI models can identify high-value customers and personalise retention strategies.
Example: Telecom companies use predictive models to proactively retain at-risk subscribers through personalised plans.[3, 12]

Real-Time Interaction and Automation

AI tools enable marketers to interact with consumers in real time via chatbots, programmatic advertising, and contextual offers.[4, 9, 11].Automation improves responsiveness and ensures timely delivery of relevant messages.
Example: Sephora uses AI chatbots to provide personalised beauty recommendations, taking into account skin type, preferences, and purchase history.[4, 11]

Consumer Experience and Relationship Management

AI and big data improve consumer experience (CX) by enabling personalised communications, adaptive journey mapping, and proactive service[5, 9, 13] Organisations can optimise loyalty programmes, track satisfaction metrics, and enhance engagement.

Example: Netflix leverages viewing history and machine learning to optimise content recommendations, boosting engagement and retention.[5, 13]

Ethical, Privacy, and Governance Concerns

The use of big data and AI introduces ethical issues, including privacy breaches, algorithmic bias, and lack of transparency.[6, 7, 14, 15] Governance frameworks, regulatory compliance (e.g., GDPR, CCPA), and explainable AI are essential to maintaining trust.
Example: Misuse of AI-generated consumer profiles can lead to biased targeting or discrimination if unchecked.[14, 15]

Implications for Digital Marketing Strategy

Capability Development

Companies must invest in.

- Data infrastructure and integration.
- AI and analytics capabilities.
- Cross-functional collaboration between marketing, IT, and data science teams .[4, 8, 11]

Implementing Consumer-Centric Models

Strategies include.

- Mapping personalised journeys.
- Using AI for next-best-action recommendations.
- Predictive analytics for optimising lifetime value.
- Data-driven decisions at all touchpoints.[2, 3, 5, 12]

Monitoring and Measurement

Metrics extend beyond traditional KPIs to include.

- CLV
- Engagement depth and retention
- Algorithmic fairness and bias measures.[2, 5, 9, 14]

Ethical and Regulatory Compliance

Transparency, consent, and ethical AI practices foster trust. Compliance with privacy laws and responsible AI adoption are vital.[6, 7, 14, 15]

Table 1. Mapping AI and Big Data Applications to Consumer-Centric Marketing Strategies

Strategy Focus	AI / Big Data Application	Description	Example
Personalisation & Segmentation	Predictive Analytics & Machine Learning	Analyse consumer behaviour and segment audiences at micro or individual level	E-commerce platforms recommending products based on browsing/purchase history (Amazon, Alibaba)
Customer Journey Optimisation	Journey Mapping & Real-Time Analytics	Track consumer interactions across channels and adapt messaging	Netflix recommending content based on viewing history
Predictive CLV & Retention	Predictive Modelling	Forecast customer lifetime value, churn risk, and buying behaviour	Telecoms sending personalised retention offers to high-risk customers
Dynamic Pricing & Offers	AI-Driven Price Optimisation	Adjust pricing/offers based on demand, competitor pricing, and consumer behaviour	Airlines using AI to dynamically price tickets
Automated Communication & Interaction	Chatbots & NLP	Deliver personalised responses and recommendations in real-time	Sephora's AI chatbot for beauty product suggestions
Customer Experience & Relationship Management	Sentiment Analysis & Social Listening	Analyse customer reviews, feedback, and social media to improve CX	Brands monitoring Twitter/ Instagram for feedback to adjust campaigns
Ethical Governance & Privacy Compliance	Explainable AI & Data Governance Frameworks	Ensure transparency, fairness, and compliance with data privacy laws	GDPR-compliant AI targeting campaigns; mitigating algorithmic bias
Adaptive Marketing & Innovation	Multi-source Big Data Integration & AI Insights	Combine internal and external datasets to design innovative, responsive campaigns	Retailers integrating POS, web, mobile, and social data for real-time strategy

Table 1 summarizes how AI and Big Data drive consumer-centric marketing strategies. It links each strategy (e.g., personalisation, predictive retention, CX, ethical governance) with the corresponding AI/Big Data applications, a brief description, real-world examples, and supporting references.

Challenges and Limitations

Despite the vast potential of Big Data and Artificial Intelligence (AI) to revolutionise digital marketing, several challenges and limitations continue to constrain their effective implementation. These challenges are both technical and organisational in nature, affecting data integration, ethical use, governance, and performance measurement.

Data Silos and Integration Difficulties

A major challenge lies in the fragmentation of data across various platforms, departments, and systems. Data silos hinder the ability to create a unified, 360-degree view of the customer.[3, 7, 10] Organisations often struggle with inconsistent data formats, legacy infrastructures, and interoperability issues, which impede the integration of structured and unstructured data. Without proper consolidation, insights derived from analytics remain partial or misleading, undermining personalisation and targeting accuracy.

Algorithmic Bias and Transparency

The increasing reliance on AI-driven decision-making introduces concerns related to algorithmic bias and lack of transparency. [6, 14] Biased training data or opaque algorithms can result in discriminatory outcomes, skewed recommendations, or misinterpretations of consumer intent. Furthermore, the "black box" nature of some AI systems limits interpretability, making it difficult for marketers and regulators to understand or justify automated decisions.

This lack of explainability erodes consumer confidence and may invite regulatory scrutiny.

Privacy Concerns and Consumer Mistrust

As organisations collect and analyse vast amounts of personal data, privacy concerns have become a central issue. Consumers are increasingly wary of how their information is used, shared, and stored. [6, 7, 15] Stringent data protection laws—such as the EU's GDPR and India's Digital Personal Data Protection Act (DPDPA)—require firms to ensure compliance, consent, and ethical handling of consumer data. Breaches or misuse of data can severely damage brand reputation and erode trust, hindering long-term customer relationships.

Resource and Capability Constraints

Implementing big data and AI solutions demands substantial financial investment, specialised skills, and robust technological infrastructure [4, 8, 11] Small and medium enterprises (SMEs) often face challenges in accessing advanced tools or analytics expertise, resulting in uneven adoption across industries. The shortage of skilled data scientists and AI professionals further limits scalability and innovation.

Measurement Complexity and Technological Evolution

Evaluating the return on investment (ROI) from AI-driven marketing initiatives remains difficult due to complex attribution models, dynamic consumer journeys, and multi-channel interactions [9] Furthermore, rapid technological evolution makes existing tools and models quickly obsolete, requiring continuous learning, system upgrades, and adaptive strategies.[2, 4, 12]

Future Research Directions

As Big Data and Artificial Intelligence (AI) continue to redefine the landscape of digital marketing, several promising areas for future research emerge. These avenues offer opportunities to deepen theoretical understanding, refine methodologies, and enhance the practical effectiveness of consumer-centric strategies.

Longitudinal Studies on AI-Driven Consumer Engagement

Most existing research focuses on short-term or cross-sectional data, limiting insights into how AI-driven marketing affects consumer engagement over time. Longitudinal studies could explore the sustained impact of AI-enabled personalisation, automated communication, and predictive targeting on brand loyalty, customer retention, and trust development. [3,7,12] Understanding these temporal dynamics would provide valuable evidence for optimising long-term marketing effectiveness.

Multi-Source Data Integration for Richer Insights

The integration of diverse data sources—such as social media analytics, transaction histories, sensor data, and geolocation information—can yield a more holistic understanding of consumer behaviour.[3,7,10] Future studies should examine frameworks and tools for multi-source data fusion, emphasising interoperability, real-time analytics, and data quality management to enhance marketing intelligence and decision-making precision.

Explainable AI and Ethical Governance

As AI systems become more autonomous, explainability and ethical governance will be crucial to ensure fairness, accountability, and transparency .[6, 7, 14, 15] Research is needed to develop interpretable AI models that marketers and consumers can trust, as well as governance frameworks that align AI decision-making with ethical norms, privacy standards, and cultural expectations.

AI Adoption in Small and Medium Enterprises (SMEs)

While large corporations have the resources to deploy advanced analytics, SMEs often face significant barriers to adoption due to cost, expertise, and infrastructure constraints.[4, 8, 11] Future studies should explore scalable, low-cost AI solutions and capacity-building mechanisms that democratise access to intelligent marketing technologies across business sizes.

Consumer Trust, Behaviour, and Cross-Industry Perspectives

Understanding consumer trust and behavioural responses to AI-mediated interactions is essential to building sustainable marketing relationships. [1, 2, 5, 13] Cross-industry and cross-cultural studies can identify contextual factors influencing AI acceptance and ethical perceptions .[3,7,10] Furthermore, future research could examine dynamic and adaptive marketing strategies that continuously learn from real-time consumer feedback and environmental changes [2, 4, 11]

Conclusion

The convergence of Big Data and Artificial Intelligence (AI) is fundamentally reshaping the digital marketing landscape, transitioning it from intuition-based mass communication to highly personalised, data-driven, and consumer-centric strategies. [1,5,10,13] Organisations that effectively harness these technologies gain a competitive edge by leveraging data insights to predict consumer needs, tailor content

in real time, and optimise marketing performance across channels. By integrating AI-powered tools such as machine learning algorithms, predictive analytics, and natural language processing, marketers can deliver more relevant, timely, and engaging experiences that strengthen customer relationships and enhance customer lifetime value (CLV).The ability to process and interpret vast amounts of data enables firms to develop deeper consumer insights, facilitating segmentation and personalisation at an unprecedented scale. This data-driven precision not only improves engagement and conversion rates but also fosters greater brand loyalty and trust. Furthermore, the automation of campaign management, customer support, and analytics frees up human creativity for strategic and emotional aspects of marketing, resulting in a balanced synergy between human intuition and algorithmic intelligence.However, despite these transformative benefits, the journey toward fully intelligent and ethical marketing remains fraught with challenges. Issues such as data silos, integration difficulties, and algorithmic bias hinder the seamless functioning of AI systems. Concerns over privacy, data protection, and ethical governance are growing, as consumers demand greater transparency and control over how their information is used [6–9, 14, 15]. Additionally, disparities in technological capability and resources between large enterprises and smaller firms pose barriers to equitable adoption, limiting the democratisation of AI in marketing.Future research must address these gaps through longitudinal and cross-industry investigations that evaluate the long-term effectiveness and societal implications of AI-driven marketing. There is also a pressing need to develop explainable AI frameworks and ethical governance models that ensure fairness, accountability, and inclusivity. By fostering interdisciplinary collaboration between marketers, technologists, and policymakers, future studies can help design sustainable systems that align business innovation with consumer rights and trust.Ultimately, the responsible integration of Big Data and AI promises not only to enhance marketing efficiency but also to create a transparent, adaptive, and consumer-trusted digital marketing ecosystem—one that balances technological advancement with human values, ethics, and empathy.

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