Anusandhanvallari
Vol 2024, No.1
December 2024
ISSN 2229-3388

Role of Artificial Intelligence in Shaping Consumer Behaviour in Digital Environments

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Abstract

Artificial Intelligence (AI) has emerged as a transformative force in digital environments, fundamentally reshaping how consumers search, evaluate, and make decisions. This paper develops a comprehensive conceptual framework to examine the role of AI in shaping consumer behaviour across digital platforms. Drawing on interdisciplinary literature up to 2023, the study integrates key AI-driven mechanisms—personalization, predictive analytics, recommendation systems, and conversational agents—with established behavioural theories, including the Stimulus–Organism–Response (S-O-R) model, Technology Acceptance Model (TAM), and Theory of Planned Behaviour (TPB).The framework conceptualizes AI as a dynamic and adaptive stimulus that influences consumer cognition and affect through mediating variables such as trust, perceived usefulness, and perceived risk. Furthermore, the model incorporates moderating factors including privacy concerns, digital literacy, and cultural context to explain variations in consumer responses. The study also critically addresses ethical considerations, including algorithmic transparency, data privacy, and consumer autonomy. By synthesizing fragmented literature into a unified framework, this paper contributes to both theory and practice by offering a deeper understanding of AI-driven consumer behaviour. The proposed model provides a foundation for future empirical research and offers actionable insights for organizations seeking to leverage AI while maintaining trust and ethical responsibility in digital marketing environments.

Keywords: maintaining, environments, actionable, incorporates

Introduction

The rapid advancement of Artificial Intelligence (AI) has fundamentally reconfigured the landscape of digital consumption, altering not only how firms interact with consumers but also how consumers perceive, evaluate, and make decisions in digital environments. As AI technologies become deeply embedded in platforms such as e-commerce, social media, and mobile applications, consumer behaviour is increasingly mediated by algorithmic systems that curate information, predict preferences, and influence choices in real time (Davenport et al., 2020; Huang & Rust, 2021). This shift marks a departure from traditional models of consumer decision-making, which assume a largely autonomous and rational actor, toward a more complex paradigm where human decisions are shaped through continuous interaction with intelligent systems.In contemporary digital ecosystems, consumers are exposed to vast amounts of information, yet their attention and choices are increasingly guided by AI-driven mechanisms such as recommendation engines, personalized content, and conversational agents. These systems

not only reduce cognitive effort but also actively shape the decision environment by filtering available options and structuring choice architectures. Consequently, consumer behaviour is no longer solely a function of individual preferences or external marketing stimuli; rather, it is co-created through interactions between consumers and algorithmic systems. Emerging research suggests that such interactions can influence not only immediate purchase decisions but also long-term preference formation and behavioural patterns (Mariani et al., 2023).

Despite the growing prominence of AI in digital marketing, the existing literature remains fragmented and largely application-specific. Prior studies have examined discrete AI tools—such as chatbots, recommendation systems, or predictive analytics—without offering a unified understanding of how these technologies collectively shape consumer behaviour. Moreover, much of the literature adopts a technological or managerial perspective, often overlooking the underlying psychological processes through which AI influences cognition, emotion, and decision-making. This lack of integration limits the ability to fully understand the broader implications of AI-driven consumption.

In addition, the increasing reliance on AI raises important concerns regarding trust, privacy, and consumer autonomy. While AI enhances efficiency and personalization, it also introduces opacity in decision-making processes, making it difficult for consumers to understand how recommendations are generated or how their data is utilized (Shin, 2021). This creates a tension between the benefits of personalization and the risks associated with data privacy, commonly referred to as the privacy–personalization paradox (Martin & Murphy, 2017). Furthermore, the potential for algorithmic bias and manipulation raises ethical questions about the extent to which AI systems may influence or even control consumer behaviour.

Given these developments, there is a pressing need for a comprehensive conceptual framework that captures the multifaceted role of AI in shaping consumer behaviour in digital environments. Such a framework must integrate technological capabilities with behavioural theories to explain not only what AI does, but how and why it influences consumer decision-making processes.

This paper addresses this gap by developing an integrative conceptual model grounded in established theoretical perspectives, including the Stimulus–Organism–Response (S-O-R) model, the Technology Acceptance Model (TAM), and the Theory of Planned Behaviour (TPB). By synthesizing insights from marketing, information systems, and consumer psychology, the study seeks to advance theoretical understanding while providing a foundation for future empirical research.

Specifically, the objectives of this paper are threefold: to conceptualize the key AI-driven mechanisms that influence consumer behaviour, to examine the psychological processes through which these mechanisms operate, and to propose a set of testable propositions that can guide future research. In doing so, the paper contributes to the emerging literature on AI in marketing by offering a holistic and theoretically grounded perspective on consumer behaviour in digital environments.

Literature Review

The integration of Artificial Intelligence (AI) into digital environments has fundamentally altered the nature of consumer behaviour, shifting it from a predominantly human-driven process to one increasingly mediated by algorithmic systems. Unlike traditional digital technologies, AI possesses adaptive and predictive capabilities that allow it to learn from consumer data, refine interactions, and continuously optimize decision-making processes (Huang & Rust, 2021). As a result, consumer behaviour in digital contexts is no longer solely determined by individual preferences or firm-driven stimuli, but is co-shaped by intelligent systems that actively curate information and influence choice architectures.

In digital marketplaces characterized by information abundance, consumers face heightened cognitive load when processing available alternatives. AI-driven systems mitigate this complexity by filtering information and presenting curated options, thereby reducing search costs and simplifying decision-making (Davenport et al., 2020). However, this reduction in cognitive effort comes at the cost of increased reliance on algorithmic mediation, where consumers partially delegate decision authority to AI systems. This shift has given rise to a form of algorithmically assisted decision-making, in which consumer choices are influenced not only by intrinsic preferences but also by the logic embedded within recommendation algorithms.

The growing dependence on AI-driven personalization further reinforces this transformation. By leveraging large-scale behavioural data, AI enables firms to deliver highly tailored content, product recommendations, and targeted communications. Such personalization enhances perceived relevance and engagement, leading to improved consumer satisfaction and increased likelihood of purchase (Bleier et al., 2020). At the same time, personalization introduces subtle mechanisms of influence, as repeated exposure to algorithmically selected options can shape consumer preferences over time. This raises important questions regarding the extent to which preferences are endogenous versus externally constructed within digitally mediated environments.

Beyond cognitive efficiency, AI also exerts a significant influence on consumer psychology, particularly in relation to trust, perceived control, and risk. Trust has emerged as a central determinant of consumer acceptance of AI technologies, given the opaque and often non-transparent nature of algorithmic decision-making (Shin, 2021). While AI systems offer functional benefits such as speed and accuracy, their “black box” characteristics can create uncertainty and skepticism among users. Consequently, recent research has emphasized the importance of algorithmic transparency and explainability as mechanisms for fostering trust and enhancing user acceptance.

Simultaneously, the extensive use of consumer data in AI systems has intensified concerns related to privacy and data security. The effectiveness of AI-driven personalization relies heavily on the collection and analysis of personal information, leading to a tension between the desire for customized experiences and concerns about data misuse. This phenomenon, commonly referred to as the privacy–personalization paradox, reflects a fundamental challenge in digital marketing, where increased personalization may undermine consumer trust if perceived as intrusive (Martin & Murphy, 2017). As such, privacy concerns not only influence consumer attitudes toward AI but also moderate the effectiveness of AI-driven strategies.

AI also reshapes the structure of the consumer decision journey by enabling continuous and dynamic interactions across multiple touchpoints. Traditional linear models of consumer decision-making have evolved into iterative and non-linear processes characterized by ongoing engagement with digital platforms (Lemon & Verhoef, 2016). AI plays a pivotal role in this transformation by influencing consumers at various stages of the journey, from initial awareness to post-purchase evaluation. Through predictive analytics and real-time adaptation, AI systems anticipate consumer needs and proactively shape decision pathways, thereby blurring the distinction between firm-initiated and consumer-initiated actions.

Moreover, the emergence of conversational AI technologies, such as chatbots and virtual assistants, has introduced new dimensions of human–machine interaction that further influence consumer behaviour. These systems simulate human-like communication, enhancing interactivity and responsiveness in digital environments (Grewal et al., 2020). The effectiveness of such interactions is contingent upon factors such as anthropomorphism, perceived intelligence, and emotional responsiveness, which shape consumer perceptions and trust. However, the increasing humanization of AI also raises concerns regarding deception and the potential manipulation of consumer emotions.

Despite the rapid expansion of research on AI in marketing, the existing literature remains fragmented and largely focused on specific technological applications. There is a lack of integrative frameworks that capture the combined effects of multiple AI mechanisms on consumer behaviour. Additionally, limited attention has been paid to the

broader ethical and societal implications of AI, including issues related to algorithmic bias, fairness, and consumer autonomy. These gaps highlight the need for a more comprehensive and theoretically grounded understanding of how AI shapes consumer behaviour in digital environments.

In response to these limitations, the present study adopts an integrative perspective that combines insights from marketing, consumer psychology, and information systems. By conceptualizing AI as an active agent in the decision-making process, this paper seeks to advance existing knowledge and provide a unified framework for understanding the complex interplay between technology and consumer behaviour in digital contexts.

3. Research Gap

Despite the rapid expansion of literature on Artificial Intelligence (AI) in marketing and digital environments, several critical gaps remain that limit a comprehensive understanding of its role in shaping consumer behaviour.

First, existing research is largely **fragmented and application-specific**, with a predominant focus on individual AI technologies such as recommendation systems, chatbots, or predictive analytics. While these studies provide valuable insights, they fail to capture the **combined and interactive effects** of multiple AI mechanisms operating simultaneously within digital ecosystems. Consequently, there is a lack of integrative frameworks that explain how these technologies collectively influence consumer decision-making processes.

Second, much of the literature adopts a **technological or managerial perspective**, emphasizing efficiency, performance outcomes, and firm-level benefits. In contrast, relatively limited attention has been paid to the **underlying psychological processes** through which AI affects consumer cognition, emotions, and behaviour. Constructs such as trust, perceived usefulness, and perceived risk have often been examined in isolation, rather than as part of a **dynamic and interconnected system** of influences.

Third, the existing body of research presents **inconsistent and sometimes contradictory findings** regarding the impact of AI on consumer autonomy and decision-making. While some studies suggest that AI enhances decision efficiency and satisfaction, others argue that it may reduce consumer agency by narrowing choices and reinforcing algorithmic biases. This tension highlights the need for a more nuanced understanding of AI as both an **enabler and a constraint** in consumer behaviour.

Fourth, although privacy concerns and ethical issues have been acknowledged, they are often treated as **peripheral considerations rather than central components** of consumer behaviour models. The increasing reliance on personal data in AI systems raises critical questions regarding privacy, transparency, and algorithmic fairness, yet these factors are rarely integrated systematically into conceptual frameworks.

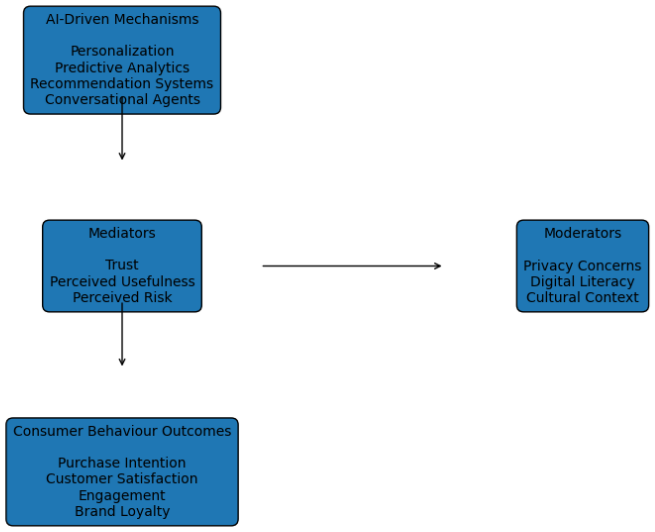
Fifth, there is a notable lack of attention to **contextual and moderating variables**, such as digital literacy, cultural differences, and individual-level heterogeneity, which may significantly influence consumer responses to AI. The omission of these factors limits the generalizability of existing findings across diverse consumer segments and digital contexts.

Finally, current research has not sufficiently addressed the **evolving nature of consumer–AI interaction**, particularly in environments characterized by continuous, real-time engagement. Traditional models of consumer behaviour, which assume linear and discrete decision stages, are inadequate for explaining behaviour in AI-driven ecosystems where interactions are dynamic, iterative, and often system-initiated.

In response to these gaps, the present study proposes a **comprehensive and integrative conceptual framework** that positions AI as an active agent in shaping consumer behaviour. By incorporating technological mechanisms,

psychological mediators, and contextual moderators within a unified model, this paper seeks to advance theoretical understanding and provide a foundation for future empirical research in digital consumer behaviour.

4. Conceptual Framework



Source: Author's compilation

Building on the identified research gaps and extant literature, this study proposes a comprehensive conceptual framework that positions Artificial Intelligence (AI) as a central force shaping consumer behaviour in digital environments. Unlike prior studies that examine isolated technological applications, the present framework adopts an integrative perspective, conceptualizing AI as a **multi-dimensional stimulus system** that interacts with psychological and contextual factors to influence behavioural outcomes.

At its core, the framework is grounded in the **Stimulus–Organism–Response (S-O-R) paradigm**, where AI-driven technologies act as external stimuli, influencing internal cognitive and affective states (organism), which subsequently drive behavioural responses. However, extending beyond traditional applications of the S-O-R model, this study conceptualizes AI not merely as a static stimulus but as a **dynamic and adaptive agent** that continuously learns from and responds to consumer interactions.

The framework identifies four primary AI-driven mechanisms—**personalization, predictive analytics, recommendation systems, and conversational agents**—as key stimuli that shape consumer experiences in digital environments. These mechanisms do not operate independently; rather, they collectively create a digitally mediated decision environment in which consumer behaviour is influenced both directly and indirectly.

Personalization enhances perceived relevance by tailoring content and offerings to individual preferences, thereby increasing engagement and reducing information overload. Predictive analytics extends this influence by anticipating consumer needs and proactively presenting options, often before consumers consciously recognize their own preferences. Recommendation systems further structure the decision environment by filtering available

alternatives and guiding consumer choices, effectively shaping preference formation over time. Conversational agents, such as chatbots and virtual assistants, introduce interactive and relational dimensions to AI, influencing consumer perceptions of service quality, responsiveness, and trust.

The impact of these AI mechanisms on consumer behaviour is mediated by key psychological constructs, namely **trust in AI, perceived usefulness, and perceived risk**. Trust plays a central role in determining whether consumers are willing to rely on AI-driven recommendations, particularly given the opaque nature of algorithmic processes. Perceived usefulness reflects the extent to which AI enhances decision efficiency and overall experience, while perceived risk captures concerns related to privacy, data security, and potential misuse of information.

In addition to these mediating mechanisms, the framework incorporates several moderating variables that influence the strength and direction of relationships. **Privacy concerns** are expected to attenuate the positive effects of AI, particularly in highly personalized contexts. **Digital literacy** enhances consumers' ability to understand and effectively interact with AI systems, thereby strengthening perceived usefulness and trust. **Cultural context** further shapes consumer attitudes toward AI, influencing acceptance, trust, and behavioural responses across different socio-cultural environments.

The framework ultimately links AI-driven interactions to key behavioural outcomes, including **purchase intention, customer satisfaction, engagement, and brand loyalty**. Importantly, the model recognizes that these outcomes are not solely the result of rational evaluation but are shaped by a complex interplay of cognitive, emotional, and contextual factors.

By integrating technological capabilities with behavioural theories, the proposed framework advances the understanding of AI as an active participant in consumer decision-making processes. It provides a holistic perspective that captures both the enabling and constraining effects of AI, thereby offering a more nuanced explanation of consumer behaviour in digital environments.

5. Discussion

The present study advances the understanding of consumer behaviour in digital environments by conceptualizing Artificial Intelligence (AI) as an active and adaptive agent rather than a passive technological tool. The proposed framework highlights that AI not only facilitates decision-making but also fundamentally reshapes the structure, process, and outcomes of consumer behaviour. This shift reflects a transition from traditional consumer-centric models to a more interactive paradigm where decision-making is co-created through continuous interaction between consumers and algorithmic systems.

One of the central insights of this study is the dual role of AI as both an enabler and a constraint. On one hand, AI enhances decision efficiency by reducing information overload, simplifying choice processes, and delivering personalized experiences. These capabilities improve perceived usefulness and contribute to higher levels of satisfaction and engagement. On the other hand, the increasing reliance on AI systems introduces concerns regarding diminished consumer autonomy, as algorithmic recommendations may subtly guide or even restrict available choices. This tension underscores the need to reconsider traditional assumptions of consumer rationality and independence in digital contexts.

The findings further emphasize the critical role of psychological mechanisms, particularly trust, perceived usefulness, and perceived risk, in mediating the relationship between AI and consumer behaviour. Trust emerges as a foundational element, influencing whether consumers are willing to rely on AI-generated recommendations. However, the opaque nature of many AI systems poses challenges for trust formation, as consumers often lack

visibility into how decisions are generated. This highlights the importance of explainability and transparency as key drivers of trust in AI-enabled environments.

Another important insight relates to the personalization paradox. While consumers value personalized experiences that enhance relevance and convenience, they simultaneously express concerns about data privacy and surveillance. This paradox reflects a fundamental trade-off in AI-driven marketing, where increased personalization may lead to discomfort or resistance if perceived as intrusive. The moderating role of privacy concerns in the proposed framework captures this complexity and suggests that the effectiveness of AI is contingent upon how consumers perceive data usage practices.

The discussion also underscores the importance of contextual factors such as digital literacy and cultural differences. Consumers with higher digital literacy are more likely to understand and trust AI systems, thereby deriving greater value from them. Similarly, cultural context influences attitudes toward technology, privacy, and trust, suggesting that AI adoption and effectiveness may vary across different markets. These findings highlight the need for context-sensitive approaches in both research and practice.

Furthermore, the study contributes to the growing discourse on ethical AI by highlighting issues related to algorithmic bias, transparency, and consumer manipulation. As AI systems increasingly shape consumer decisions, concerns about fairness and accountability become more pronounced. The potential for biased algorithms to reinforce existing inequalities or limit consumer choice raises important ethical and regulatory considerations.

Overall, the discussion demonstrates that AI is not merely a technological innovation but a transformative force that redefines consumer behaviour at multiple levels. By integrating technological, psychological, and contextual perspectives, this study provides a more holistic understanding of AI-driven consumption and lays the groundwork for future research in this domain.

6. Implications

6.1 Theoretical Implications

This study makes several important contributions to the theoretical literature on consumer behaviour and digital marketing.

First, it extends traditional behavioural theories, particularly the Stimulus–Organism–Response (S-O-R) framework, by incorporating AI as a dynamic and adaptive stimulus. Unlike conventional stimuli, AI continuously evolves based on consumer interactions, thereby introducing a feedback-driven mechanism into the decision-making process. This extension enhances the explanatory power of existing theories in digital contexts.

Second, the study integrates multiple theoretical perspectives, including TAM and TPB, to develop a unified framework that captures both technological and psychological dimensions of consumer behaviour. This integrative approach addresses the fragmentation in existing literature and provides a more comprehensive understanding of AI-driven interactions.

Third, the paper reconceptualizes consumer behaviour as a co-created process involving both human and algorithmic actors. This perspective challenges traditional assumptions of consumer autonomy and highlights the need for new theoretical models that account for human–AI collaboration.

Fourth, by incorporating mediating and moderating variables, the study advances the understanding of the mechanisms through which AI influences behaviour. The inclusion of trust, perceived usefulness, and perceived risk, along with contextual factors such as privacy concerns and digital literacy, provides a nuanced explanation of consumer responses.

Finally, the study contributes to the emerging literature on ethical AI by integrating ethical considerations into the conceptual framework. This highlights the importance of addressing issues such as transparency, fairness, and accountability in future research.

6.2 Managerial Implications

The findings of this study offer several actionable insights for practitioners and marketers.

First, firms should leverage AI-driven personalization to enhance customer experience while ensuring that it does not become intrusive. Striking the right balance between personalization and privacy is critical for maintaining consumer trust and engagement.

Second, organizations should prioritize transparency and explainability in AI systems. Providing clear information about how recommendations are generated can help build trust and reduce perceived risk.

Third, businesses should invest in the design of human-like conversational agents that enhance engagement and improve service quality. However, care must be taken to avoid deceptive practices that may undermine trust.

Fourth, firms should adopt a customer-centric approach to AI implementation, taking into account variations in digital literacy and cultural context. Tailoring AI strategies to different consumer segments can enhance effectiveness and acceptance.

Fifth, organizations must adopt ethical AI practices, including responsible data management, bias mitigation, and compliance with regulatory standards. Ethical considerations should be integrated into AI design and deployment processes rather than treated as an afterthought.

Finally, firms should view AI not only as a tool for efficiency but as a strategic asset that shapes long-term customer relationships and brand perceptions.

6.3 Policy Implications

From a policy perspective, the increasing influence of AI on consumer behaviour necessitates the development of robust regulatory frameworks.

Regulators should focus on ensuring transparency in AI systems, particularly in how consumer data is collected and used. Clear guidelines on data privacy and consent are essential for protecting consumer rights.

Additionally, policies should address algorithmic fairness and accountability to prevent discriminatory outcomes and ensure equitable treatment of consumers. Mechanisms for auditing AI systems and ensuring compliance with ethical standards are critical.

Furthermore, there is a need for consumer education initiatives aimed at improving digital literacy and awareness of AI technologies. Empowering consumers with knowledge can enhance their ability to make informed decisions and reduce vulnerability to manipulation.

Overall, policy interventions should aim to balance innovation with consumer protection, fostering a trustworthy and sustainable digital ecosystem.

7. Conclusion

Artificial Intelligence has emerged as a central force shaping consumer behaviour in digital environments, fundamentally altering how decisions are made, preferences are formed, and interactions are experienced. By moving beyond traditional perspectives that view technology as a passive tool, this study conceptualizes AI as an

active and adaptive agent that influences consumer behaviour through complex psychological and contextual mechanisms.

The proposed framework integrates AI-driven mechanisms with established behavioural theories, providing a comprehensive understanding of how personalization, predictive analytics, recommendation systems, and conversational agents shape consumer outcomes. The inclusion of mediating variables such as trust, perceived usefulness, and perceived risk, along with moderating factors such as privacy concerns, digital literacy, and cultural context, offers a nuanced and multidimensional perspective.

The study also highlights the dual nature of AI, emphasizing its potential to both enhance and constrain consumer decision-making. While AI improves efficiency and personalization, it also raises important ethical concerns related to privacy, transparency, and autonomy. Addressing these challenges is essential for ensuring the responsible and sustainable use of AI in digital marketing.

In conclusion, this paper contributes to the growing body of literature on AI and consumer behaviour by providing an integrative and theoretically grounded framework. It offers valuable insights for researchers, practitioners, and policymakers, while also identifying important directions for future research. As AI continues to evolve, understanding its impact on consumer behaviour will remain a critical area of inquiry in the digital age.

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