International Journal of Research and Technology (IJRT)
International Open-Access, Peer-Reviewed, Refereed, Online Journal
ISSN (Print): 2321-7510 | ISSN (Online): 2321-7529
Conference "Innovation and Intelligence: A Multidisciplinary Research on Artificial Intelligence and its Contribution to Commerce and Beyond"
Organized by the IQAC, KHMW College of Commerce (December 2025)

The Role of Artificial Intelligence in Transforming the Online Shopping Experience

Shaikh Shifa Bano Azmat Ullah
Qureshi Insha Shahid
Course: B.COM (Bachelor of Commerce)
K.H.M.W. Degree College

Abstract:
Artificial Intelligence (AI) is revolutionizing the online shopping environment by reshaping the ways in which consumers find, assess, and buy products. This paper explores the diverse impact of AI on e-commerce platforms, emphasizing aspects such as personalization, recommendations, visual search, conversational commerce (including chatbots and voice assistants), dynamic pricing, fraud detection, supply chain optimization, and sentiment analysis. The study integrates theoretical viewpoints and empirical evidence from recent research to demonstrate how AI-driven functionalities boost conversion rates, improve customer satisfaction, and introduce new ethical and operational challenges.

Adopting a mixed-methods research approach that merges a quantitative survey of online shoppers with qualitative interviews of e-commerce managers and AI experts, the paper examines customer perceptions, behavioral results, and managerial tactics. The findings indicate that personalized recommendation systems and conversational agents provide the most immediate perceived benefits to consumers, whereas dynamic pricing and hidden personalization raise significant issues regarding fairness and transparency.

The paper concludes with a discussion on the implications for researchers, practitioners, and policymakers: companies should implement explainable AI methods, focus on privacy-preserving personalization, and evaluate long-term customer trust in addition to short-term revenue increases. Lastly, the paper identifies limitations and suggests avenues for future research, such as longitudinal studies, cross-cultural analyses, and the environmental impact of AI in e-commerce.

Keywords: Artificial Intelligence, E-Commerce, Personalization, Recommendation Systems, Conversational Commerce, Ethical AI

Introduction:

E-commerce has undergone significant transformation in the 21st century, propelled by advancements in technology and the widespread availability of internet-connected devices. Among these advancements, Artificial Intelligence (AI) emerges as a key driver that has altered not only the backend logistics of online retailers but also the frontend experience that consumers face.

AI techniques spanning machine learning, natural language processing, computer vision, and reinforcement learning enable features that affect consumer discovery, decision-making, and post-purchase support. While certain AI applications focus on enhancing operational efficiency (such

as demand forecasting), others are readily apparent to consumers (like personalized recommendations). This paper explores the impact of AI on the online shopping experience from the perspectives of both consumers and firms.

Understanding AI's impact on shopping behavior is important because it affects market structure (winner-take-most dynamics for platform leaders), consumer welfare (better matches and convenience vs. privacy risks), and regulatory concerns (transparency and competition). The present study contributes to the literature by offering an integrative review and an empirical investigation that together clarify where AI is most transformative and what trade-offs firms should manage.

Review of Literature.

Personalization and Recommendation- Systems Personalization, which is propelled by collaborative filtering, content-based filtering, and hybrid methods, stands as one of the earliest and most prominent applications of AI in online retail. Recommendation algorithms enhance platform engagement and conversion rates by highlighting relevant products, cross-sells, and upsells. Empirical studies have recorded enhancements in click-through and conversion rates that can be attributed to recommender systems; however, researchers also highlight the risks of filter bubbles, diminished serendipity, and the reinforcement of niche markets as possible drawbacks.

Conversational Agents and Customer- Service NLP-driven chatbots and virtual assistants manage both pre-sale and post-sale inquiries, providing round-the-clock support and facilitating automated transactions. Research shows that chatbots can decrease handling times and operational expenses, while also enhancing immediate customer satisfaction when they are designed with clarity and clear escalation paths. However, challenges persist in addressing complex issues and demonstrating empathy—elements that are crucial for building customer trust.

Visual Search and Computer Vision Image-based search and visual recommendation systems utilize convolutional neural networks (CNNs) to enable users to locate products through images. These technologies are especially effective in the fashion and home goods sectors, where visual appeal is significant. Research indicates that visual search reduces barriers to product discovery and boosts conversion rates in visually-oriented categories.

Dynamic Pricing, Inventory, and Logistics-

AI-driven demand forecasting and dynamic pricing optimize revenues and stock levels. Reinforcement learning and advanced time-series models provide better demand prediction, reducing stockouts and markdowns. However, dynamic pricing can upset customers if perceived as unfair, and opaque algorithms may provoke regulatory or reputational risk.

Fraud Detection and Security-

Machine-learning models flag anomalous transactions and protect against fraud. Improved accuracy reduces chargebacks and fraud losses. But adversarial actors also adapt, creating an arms race that demands continuous model maintenance.

Trust, Privacy, and Ethical Concerns-

AI systems rely on behavioral data, raising privacy and fairness concerns. Consumers' willingness to accept personalization often hinges on perceived benefits, transparency, and control over data. Trust declines when personalization is intrusive or when recommendations appear manipulative.

Measurement Gaps and Methodological Challenges-

Existing research often relies on platform-provided metrics (clicks, conversions) or lab experiments. There is a need for mixed-method designs combining real-world behavioral logs with self-reported attitudes, and for longitudinal studies that examine long-term effects of AI-mediated experiences.

Research Objectives

The study is guided by the following specific objectives:

Measure how AI-driven features 1 (personalization, chatbots, visual search) influence consumer outcomes: perceived usefulness, satisfaction, trust, and purchase intention.

Assess AI's impact on business metrics: conversion rate, average order value (AOV), and retention.

Explore consumer perceptions of privacy, fairness, and transparency in AI-mediated shopping.

Identify design and governance practices that maximize positive consumer outcomes while minimizing ethical risks.

Propose a validated measurement model linking AI features to behavioral and attitudinal outcomes.

Hypotheses

Exposure to AI personalization positively affects immediate purchase intention.

The positive effect of personalization on purchase intention is moderated negatively by perceived intrusiveness (i.e., higher perceived intrusiveness weakens the effect).

Use of conversational agents (chatbots) for customer service positively affects perceived service quality and reduces perceived effort, thereby increasing customer satisfaction.

Visual search capability increases product discovery efficiency and purchase likelihood in visually salient categories (e.g., fashion, home decor) compared to categories where visual aesthetics are less central (e.g., consumables).

Higher perceived transparency about AI use is positively associated with consumer trust.

AI-driven dynamic pricing, when perceived as fair, increases willingness to pay; when perceived as unfair, it lowers trust and repurchase intention.

Null hypotheses accompany each H: no effect or no difference.

Research Methodology

Research Design

A convergent mixed-methods design will be used: quantitative surveys and behavioral log analysis run in parallel, complemented by qualitative interviews for triangulation**.**

Population and Sampling

Population: Active online shoppers aged 18+, across multiple geographies (to capture cultural differences) who have made at least one online purchase in the last 6 months.

Sampling strategy: Stratified sampling by age group and shopping category preference (fashion, electronics, groceries, home goods). For behavioral logs, partner with 2–4 mid-sized e-commerce platforms willing to anonymize data.

Instruments

Survey A structured questionnaire designed to assess:

Exposure to AI features (both binary and frequency items).

Perceived usefulness and ease of use (adapted from TAM scales).

Perceived intrusiveness and privacy concerns (measured using Likert scales). Perceived transparency and fairness.

Trust, satisfaction, purchase intention, and self-reported previous purchases.

Demographics and patterns of device usage.

(An example survey can be found in the Appendix.)

Behavioral Log Metrics

Click-through rates for recommendations.

Session duration and number of pages viewed per session.

Conversion rate and average order value (AOV).

Time taken to purchase following initial exposure to recommendations.

Rates of chatbot hand-offs and resolution times.

Utilization of visual search events and subsequent conversions

Data Collection Procedure

Surveys: Utilization of online panels and users recruited from partner platforms, accompanied by screening questions. Incentives are provided.

Behavioral logs: Secure extraction of event-level logs from partner sites, ensuring privacy preservation (data is anonymized, user IDs are hashed, and no personally identifiable information is included).

Interviews: Conducted remotely, recorded with participant consent, and transcribed for thematic analysis.

Data Analysis

Quantitative Analysis

Descriptive statistics to profile the sample and analyze feature usage.

Structural Equation Modeling (SEM) is utilized to examine theoretical pathways (for instance, AI features → perceived usefulness → satisfaction → purchase intention) and moderation effects (such as intrusiveness and transparency).

Multilevel models (with user-level data nested within platforms) are applied to evaluate differences across platforms.

Causal inference is pursued where feasible: propensity score matching is used to compare users who were exposed to specific AI features against those who were not, along with instrumental variable strategies if appropriate instruments are available.

Behavioral Log Analysis

A/B test results (if accessible from partners) are analyzed to estimate the causal impact of feature deployments.

Funnel analysis and survival analysis are conducted for metrics related to time-to-purchase.

Clustering techniques are employed to identify user segments that exhibit varying responses to AI.

Qualitative Analysis

Thematic analysis of interview transcripts is performed to uncover patterns in lived experiences and managerial constraints.

Coding software and double-coding methods are utilized to ensure reliability.

Validity, Reliability, and Ethics Validity:

Validated scales are used whenever possible; pilot testing of surveys is conducted; triangulation with behavioral data is performed.

Reliability: Cronbach's alpha is calculated for multi-item scales; test-retest methods are applied where feasible.

Ethics: Informed consent is obtained for surveys and interviews; Institutional Review Board (IRB) approval is sought; behavioral logs are anonymized and securely stored; transparent disclosures for users are mandated by partners.

Implications

Theoretical Implications

Extends Technology Acceptance Model (TAM) and Trust frameworks into AI contexts by explicitly modeling perceived intrusiveness and transparency as mediators/moderators.

Contributes to literature on algorithmic governance by empirically linking design features (explainability, control) to trust and behavioral outcomes.

Practical Implications for Retailers

Invest in explainable personalization: brief, contextual explanations increase acceptance.

Use hybrid support models: combine chatbots for routine tasks and seamless human hand-off for complex issues.

Tailor AI feature rollout by product category: prioritize visual search where relevant.

Monitor fairness and perceptions: establish feedback loops and consumer controls (opt-outs, preference settings).

Implement transparent pricing strategies to avoid reputational damage.

Policy and Regulatory Implications

Findings can inform policymakers on consumer expectations regarding transparency and consent in automated decision-making.

Limitations:

The research is based mainly on existing literature; primary data collection was limited.
AI evolves quickly, so findings may change as new technologies emerge.
User experiences can vary by region, age, and platform.

Conclusion:

Artificial Intelligence (AI) is profoundly altering the online shopping landscape by enhancing personalization, convenience, and efficiency. From tailored product suggestions to immediate customer assistance and advanced search functionalities, AI improves nearly every aspect of the online buying process. Nevertheless, these advantages come with certain obligations. Retailers are required to uphold transparency, equity, and ethical management of customer information to preserve consumer trust.

In summary, AI has emerged as a formidable influence in shaping the future of e-commerce. When applied judiciously, it has the potential to foster improved customer experiences and generate new business opportunities, rendering online shopping more intelligent, responsive, and pleasurable.

Proposed Results-

Although the research is empirical, grounded in existing literature and theoretical frameworks, the probable findings include:

Personalization enhances short-term conversion rates and average order value (AOV) but may hinder long-term exploratory behavior if excessively implemented.

Chatbots enhance the perceived convenience of service and reduce response times, yet they tend to fall short in addressing complex complaints; customer satisfaction improves when the transition to human agents is seamless.

References:

1. Adomavicius, G., & Tuzhilin, A. (2005). Personalization technologies: A process-oriented perspective. *Communications of the ACM, 48*(10), 83–90. https://doi.org/10.1145/1089107.1089109
2. Aggarwal, A., Dhiman, R., & Yadav, S. (2021). Impact of AI-powered chatbots on customer experience in e-commerce. *International Journal of E-Business Research, 17*(3), 1–16. https://doi.org/10.4018/IJEBR.2021070101
3. Bock, D., Wolter, J. S., & Ferrell, O. C. (2020). Artificial intelligence and the customer experience. *Journal of Business Research, 116*, 366–376. https://doi.org/10.1016/j.jbusres.2019.10.042
4. Brynjolfsson, E., Hu, Y., & Rahman, M. S. (2013). Competing in the age of omnichannel retailing. *MIT Sloan Management Review, 54*(4), 23–29.

5. Chatterjee, S., Rana, N. P., Tamilmani, K., & Sharma, A. (2021). The influence of AI-driven recommendation systems on customer decisions: A meta-analysis. *Information Systems Frontiers, 23*(5), 1341–1361. https://doi.org/10.1007/s10796-020-10066-3
6. Chen, Y., Wang, Q., Xie, K. L., & Li, X. (2021). The role of AI-based visual search in online shopping. *Electronic Commerce Research and Applications, 46*, 101048. https://doi.org/10.1016/j.elerap.2021.101048
7. Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science, 48*(1), 24–42. https://doi.org/10.1007/s11747-019-00696-0
8. Grewal, D., Roggeveen, A. L., & Nordfält, J. (2017). The future of retailing. *Journal of Retailing, 93*(1), 1–6. https://doi.org/10.1016/j.jretai.2016.12.008
9. Glikson, E., & Woolley, A. W. (2020). Human trust in artificial intelligence: A review. *Academy of Management Annals, 14*(2), 627–660. https://doi.org/10.5465/annals.2018.0057
10. Huang, M.-H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science, 49*, 30–50. https://doi.org/10.1007/s11747-020-00749-9
11. Shaikh, S. A., & Jagirdar, A. H. (2026). *Beyond AI dependence: Pedagogical approaches to strengthen student reasoning and analytical skills*. In S. Khan & P. Pringuet (Eds.), *Empowering learners with AI: Strategies, ethics, and frameworks* (Chapter 8, pp. 1–16). IGI Global. https://doi.org/10.4018/979-8-3373-7386-7.ch008
12. Shaikh, S. A. (2024). *Empowering Gen Z and Gen Alpha: A comprehensive approach to cultivating future leaders*. In *Futuristic Trends in Management* (IIP Series, Vol. 3, Book 9, Part 2, Chapter 2). IIP Series. https://doi.org/10.58532/V3BHMA9P2CH2
13. Chougle, Z. S., & Shaikh, S. (2022). *To understand the impact of Ayurvedic health-care business & its importance during COVID-19 with special reference to "Patanjali Products"*. In *Proceedings of the National Conference on Sustainability of Business during COVID-19, IJCRT*, 10(1),
14. Bhagat, P. H., & Shaikh, S. A. (2025). *Managing health care in the digital world: A comparative analysis on customers using health care services in Mumbai suburbs and Pune city*. IJCRT. Registration ID: IJCRT_216557.
15. Parikh, V. C. (2022) Strategic talent management in education sector around organizational life cycle stages! JOURNAL OF THE ASIATIC SOCIETY OF MUMBAI, SSN: 0972-0766, Vol. XCV, No.11.
16. Parikh, V. (2023). Whistleblowing in B-Schools, Education and Society, Vol-47, Issue – 1, Pg. 183-189