Center for Management Science Research
ISSN: 3006-5291 3006-5283 Volume 3, Issue 4, 2025

ARTIFICIAL INTELLIGENCE AND CONSUMER DECISION-MAKING: A COMPUTATIONAL MANAGEMENT APPROACH IN E-COMMERCE

Muhammad Zaid Alam[*1], Faisal Raheem[2], Arsalan Abid[3], Waqas Tariq Paracha[4]

[*1]*Hamdard Institute of Management Sciences, Hamdard University Karachi*
[2,3]*Department of Public Administration, Gomal University Dikhan (KPK), Pakistan*
[4]*Gomal Research institute of Computing (GRIC), Faculty of Computing, Gomal University, Dikhan (KP), Pakistan*

[*1]zaidalam390@gmail.com, [2]frparacha2010@gmail.com, [3]arsalanrao786@gmail.com, [4]waqasparacha125@gmail.com

DOI: https://doi.org/10.5281/zenodo.16833456

Keywords

Article History
Received on 13 May 2025
Accepted on 27 July 2025
Published on 13 Agust 2025

Corresponding Author: *
Muhammad Zaid Alam

Abstract

Artificial Intelligence (AI) has transformed the landscape of e-commerce, particularly through product recommendation systems that strongly influence consumers' purchasing decisions. This study aims to examine how AI-driven recommendation systems affect the buying behavior of online shoppers in Pakistan. The specific objectives are to (1) assess the impact of AI-based recommendations, (2) explore the mediating role of perceived usefulness, and (3) analyze the moderating effect of trust in AI systems. A quantitative approach was employed, utilizing a structured questionnaire completed by 300 respondents. Data were analyzed using Structural Equation Modeling (SEM) with SmartPLS 4.0. The findings reveal that AI recommendations positively influence consumer behavior, with perceived usefulness acting as a partial mediator in this relationship. Furthermore, trust in AI systems fully mediates the connection between AI recommendations and consumer behavior. The study highlights the importance of transparency and value in AI recommendations to strengthen consumer trust and enhance e-commerce strategies.

INTRODUCTION

The rapid growth of e-commerce in the digital age has brought about the widespread integration of Artificial Intelligence (AI) across various components of online retail, particularly in product recommendation systems. These AI-driven systems play a crucial role in shaping consumer behavior by personalizing the shopping experience (Kolodin et al., 2020). In recent years, e-commerce platforms have increasingly relied on machine learning algorithms to analyze user behavior and predict preferences, enabling more tailored product recommendations (Grewal et al., 2020). These technological advancements have not only redefined how consumers interact with online platforms but have also significantly altered their expectations and purchasing habits (Jiang et al., 2019).

As consumers become more accustomed to personalized suggestions, their shopping experiences improve, often influencing their purchasing decisions (Rane et al., 2024; Riegger et al., 2022). However, the effectiveness of AI-based recommendations largely depends on whether consumers perceive these suggestions as useful—this perception directly impacts their willingness to act on them (Shin, 2021). This factor becomes particularly important in emerging markets like Pakistan, where consumer behavior is rapidly

evolving and the e-commerce ecosystem is still developing.

Trust in AI systems is another critical element influencing the effectiveness of recommendation engines. Numerous studies suggest that consumer trust significantly shapes their response to AI-generated suggestions, especially in markets where privacy and data security are key concerns (Choung et al., 2023). In this context, trust functions as a mediating variable between AI recommendations and consumer purchasing behavior, underscoring the importance of transparency and ethical AI practices (Pitardi & Marriott, 2021). Consumers are more likely to accept and act on AI recommendations if they believe the system operates ethically and safeguards their personal information (Choung et al., 2023; Hasija & Esper, 2022).

Moreover, the advancement of AI technologies has led to even more precise personalization, which, in turn, enhances customer satisfaction and strengthens purchase intent (Huang & Rust, 2021). These developments highlight the need for e-commerce platforms not only to refine their AI capabilities but also to foster consumer trust and clearly communicate the value of their recommendations (Tyrväinen et al., 2020). This study investigates how AI-based recommendations, perceived usefulness, and trust influence consumer behavior in Pakistan's e-commerce sector (Shin, 2021; Omrani et al., 2022).

Research Objectives

1. To investigate how AI-powered recommendation systems affect consumer purchasing behavior within Pakistan's e-commerce industry.
2. To explore the facilitating influence of perceived usefulness on the link between AI-driven recommendations and consumer buying behavior.
3. To analyze the moderating role of consumer trust in AI systems in shaping the relationship between AI recommendations and purchasing decisions.
4. To assess the impact of AI-based recommendations on consumer decision-making processes and their intentions to purchase.
5. To evaluate the broader implications of AI-enabled personalization for both businesses and consumers operating in Pakistan's e-commerce sector.

Significance of the Study

This research holds significant value as it explores the influence of AI-based recommendations on consumer behavior within Pakistan's rapidly growing e-commerce sector. It aims to support businesses in enhancing customer engagement and retention through more effective AI-driven recommendations. The study's findings will shed light on how AI systems shape purchasing decisions and brand perceptions, while also examining moderating factors such as perceived usefulness and trust in these relationships. Furthermore, this research will offer valuable insights and recommendations for both businesses and policymakers to leverage AI effectively, contributing to the digital transformation of Pakistan's e-commerce industry.

Literature Review

Sr. No	Authors	Year	Summary	Methods
1	Hwangbo et al.	2018	Explored AI's role in personalizing shopping journeys and supporting dynamic pricing strategies.	Quantitative Analysis
2	Grewal et al.	2020	Described how AI recommendations transform customer engagement and personalization.	Conceptual Review
3	Xu et al.	2024	Demonstrated machine learning algorithms tailoring product suggestions for better targeting.	Empirical Study
4	Kolodin et al.	2020	Identified AI's potential in predicting consumer behavior through big data processing.	Secondary Data Analysis

5	Ameen et al.	2021	Discussed changing consumer expectations and habits driven by AI-powered personalization.	Empirical Research
6	Sharma et al.	2022	Linked personalized recommendations to higher conversion rates in e-commerce.	Survey Study
7	Riegger et al.	2022	Reported improved consumer satisfaction thanks to AI-based product suggestions.	Empirical Survey
8	Liang et al.	2017	Highlighted machine learning's power to predict consumer tastes and future buying patterns.	Literature Review
9	Pan et al.	2022	Reviewed how AI supports profitability through dynamic, data-driven pricing.	Case Study
10	Bączkiewicz et al.	2021	Showed price optimization based on stock levels, demand, and competition with AI.	Conceptual Framework
11	Song et al.	2019	Analyzed AI-driven supply chain improvements, including demand forecasts and logistics.	Quantitative Modelling
12	Khrais	2020	Studied AI-enabled inventory and logistics management for cost-efficient e-commerce.	Literature Review
13	Rane et al.	2024	Emphasized AI's role in optimizing logistics, supply chains, and inventory.	Empirical Study
14	Pramanik & Jana	2025	Discussed fraud detection through AI for safer online transactions.	Conceptual Framework
15	Kim et al.	2021	Focused on real-time recommendations increasing engagement and loyalty.	Empirical Study
16	Nizette et al.	2025	Examined AI chatbots delivering 24/7 support for cost-effective operations.	Survey
17	Richard et al.	2025	Highlighted automation of customer queries with AI to reduce dependence on staff.	Case Study
18	Choung et al.	2023	Discussed the role of trust in AI for boosting user acceptance of recommendations.	Literature Review
19	Hasija & Esper	2022	Covered privacy and transparency as critical to acceptance of AI-based systems.	Conceptual Discussion
20	Omrani et al.	2022	Stressed the importance of algorithmic fairness and transparency in AI adoption.	Review Article
21	Tiwari et al.	2024	Showed how data analysis via AI improves future purchase prediction.	Empirical Study
22	Lee & Lee	2020	Reviewed cost benefits of virtual AI assistants in supporting customers.	Case Study
23	Rahmanov et al.	2021	Explored customer satisfaction improvements through AI-driven service.	Survey
24	Tyrväinen et al.	2020	Emphasized trust-building and personalization in retaining customers.	Conceptual Analysis
25	Fedorko et al.	2022	Reported machine learning's role in boosting recommendation accuracy over	Empirical Study

			time.	
26	Hasyim & Purnasari	2021	Investigated AI pricing customization improving satisfaction and loyalty.	Quantitative Study
27	Bawack et al.	2022	Studied AI-enhanced conversion rates through improved product matching.	Empirical Analysis
28	Gonçalves et al.	2018	Highlighted AI transforming consumer data handling in e-commerce.	Literature Review
29	Hwangbo et al.	2018	Noted AI's ability to create an omnichannel, individualized retail experience.	Review Article

Table 1.1: Review of Prior Studies on AI-Based Recommendation Systems and Consumer Behavior in E-Commerce

Purified Framework

The Theory of Planned Behavior further suggests that attitudes, subjective norms, and perceived behavioral control significantly influence consumers' decisions to adopt AI systems. Social influences and the belief that these systems are easy to use can positively affect consumers' willingness to place trust in them (Khan et al., 2023; Sutisna).

Drawing upon the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and traditional Consumer Decision-Making Models, this research explores consumer behavior in relation to AI-based recommendation systems within e-commerce environments. According to TAM, perceived usefulness (PU) and perceived ease of use (PEOU) are critical factors shaping consumers' willingness to accept and adopt AI recommendations. When consumers perceive these technologies as easy to use and helpful in improving their shopping experience, they are more inclined to embrace them (Handra, 2022).

In addition, Consumer Decision-Making Models emphasize the role of AI-based recommendations during the information search and evaluation phases. As consumers assess personalized options, the perceived usefulness of AI recommendations helps shape their choices (Panwar et al., 2019; Qin et al., 2021). Trust in AI systems strengthens this connection, as higher trust levels increase both acceptance and purchase intentions (Tiwari et al., 2024). Since effective AI systems can deliver accurate and relevant recommendations, they ultimately enhance the speed and quality of consumer decision-making, influencing final purchase outcomes.

Research Hypothesis

Hypothesis 1 (H1):

AI-driven product recommendations positively influence consumers' purchasing behavior in online retail environments.

Hypothesis 2 (H2):

The perceived usefulness of AI-driven recommendations acts as a mediator between AI-based recommendations and consumer purchasing behavior.

Hypothesis 3 (H3):

Consumers' trust in AI systems moderates the impact of AI-based recommendations on their purchasing behavior.

Hypothesis 4 (H4):

Greater perceived usefulness of AI-based recommendations leads to increased consumer purchasing behavior.

Methodology

Research Design

This study adopts a **quantitative research design** to examine the influence of AI-based recommendation systems on consumer behavior within the e-commerce sector. A descriptive framework is employed to capture the current attitudes, perceptions, and behaviors of Pakistani consumers toward AI-powered recommendations. To achieve this, a cross-sectional data collection strategy will be implemented, providing a snapshot of consumer

interactions with AI recommendations at a specific point in time.

Research Approach

A deductive approach is utilized in this research, grounding the hypotheses in well-established theories such as the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). The formulated hypotheses will be empirically tested through a survey-based method focusing on constructs including AI recommendations, perceived usefulness, trust in AI systems, and their combined effects on consumer purchasing behavior. Advanced statistical methods, specifically Structural Equation Modeling (SEM), will be applied for robust data analysis and hypothesis testing.

Population

The target population for this research consists of Pakistani consumers who engage in online shopping through e-commerce platforms and who are exposed to AI-based recommendation systems. This study aims to gather diverse perspectives from participants varying in age, gender, educational background, and frequency of online shopping. Focusing on Pakistan is significant, given the limited scholarly investigations on AI-based recommendations within this region.

Sampling Strategy and Sample Size

A **non-probability convenience sampling** technique will be employed due to the accessibility and substantial number of e-commerce consumers in the country. A sample size of 300 respondents has been established to ensure statistical significance while also capturing key demographic variables such as age, gender, and online shopping frequency. This sample size is deemed suitable for testing the proposed hypotheses and conducting Structural Equation Modeling (SEM).

Data Collection and AnalysisData for this study will be gathered using a structured questionnaire comprising demographic items as well as measures related to AI-based recommendations, perceived usefulness, and trust in AI systems. Participants will respond using a five-point Likert scale to indicate their level of agreement with each item. The survey will be distributed online via social media platforms and email, ensuring broad outreach among Pakistani e-commerce consumers.

Following data collection, descriptive statistics (including means, standard deviations, and frequency distributions) will be employed to summarize participant demographics and survey responses. To assess the validity of the measurement model, Confirmatory Factor Analysis (CFA) will be performed. Subsequently, Structural Equation Modeling (SEM) will be utilized to examine the relationships among the study variables and to test the proposed hypotheses.

Results

Table 1 Summary of Demographic Information of the study sample, providing a comprehensive overview of participant diversity. The results indicate that the majority of respondents fall within the 25–34 age group. Gender distribution appears relatively balanced, though slightly skewed toward males. Most participants reported holding an undergraduate degree. The occupational profile of respondents reflects a diverse mix, including students, employees, and self-employed individuals. Regarding online shopping habits, the majority of participants reported frequent purchases via e-commerce platforms, though some variation in purchase frequency was observed

Table 1: Summary of Demographic Information

Demographic Variable	Mean	Standard Deviation
Age	3.02	1.45
Gender	1.90	0.83
Education Level	1.94	0.84
Occupation	2.414	1.163
Shopping Frequency	2.93	1.33

Table 2 presents participants' perceptions of AI-based recommendations on e-commerce platforms, focusing on their relevance, trustworthiness, and effectiveness. The findings highlight how consumers evaluate AI recommendations in facilitating their shopping experience. Overall, participants generally perceive AI suggestions as relevant and beneficial, with only minor variations in opinion. While trust in AI systems is moderate, most respondents agree that AI-powered suggestions assist in product discovery and enhance the overall shopping process. However, participants expressed differing views regarding the personalization and accuracy of these recommendations.

Table 2 presents participants' perceptions of AI-based recommendations on e-commerce

Statement	Mean	Standard Deviation
I find that AI-based recommendations generally match my shopping preferences on e-commerce sites.	3.12	1.35
AI-generated suggestions make my online shopping experience more enjoyable and efficient.	3.05	1.42
I have a reasonable level of trust in the AI systems that recommend products to me.	2.89	1.46
AI-based recommendations often introduce me to products I might otherwise overlook.	3.10	1.37
I consider AI-powered product suggestions to be accurate and appropriately personalized.	3.03	1.41

The factor loadings indicate the strength of association between the observed variables and their underlying latent constructs. In this study, all item loadings exceed the commonly accepted threshold of 0.7, demonstrating that each survey item reliably represents its corresponding latent construct — including AI-based recommendations, perceived usefulness, trust in AI systems, and consumer buying behavior. As summarized in Table 3, these results confirm the robustness of the measurement model, ensuring the validity of the constructs and the reliability of the data for subsequent analysis.

As summarized in Table 3

AI-Based Recommendations	Loadings	Perceived Usefulness	Loadings	Trust in AI Systems	Loadings	Consumer Buying Behavior	Loadings
AIRE1	0.83	PU1	0.77	TA1	0.78	CBB1	0.80
AIRE2	0.80	PU2	0.75	TA2	0.80	CBB2	0.79
AIRE3	0.81	PU3	0.78	TA3	0.81	CBB3	0.78
AIRE4	0.79	PU4	0.76	TA4	0.77	CBB4	0.77
AIRE5	0.78	PU5	0.79	TA5	0.79	CBB5	0.76
AIRE6	0.82	PU6	0.78	TA6	0.76	CBB6	0.80
AIRE7	0.84	PU7	0.80	TA7	0.78	CBB7	0.82
AIRE8	0.80	PU8	0.77	TA8	0.79	CBB8	0.79
AIRE9	0.79	PU9	0.74	TA9	0.80	CBB9	0.77
AIRE10	0.81	PU10	0.75	TA10	0.77	CBB10	0.78

Table 4 highlights the critical role of trust and perceived usefulness in shaping consumer behavior within AI-enabled e-commerce environments.

Hypothesis	Description	Path Coefficient	Decision
H1	AI-Based Recommendations → Consumer Buying Behavior	0.754	Supported (Significant)
H4	Perceived Usefulness → Consumer Buying Behavior	0.825	Supported (Significant)
H2	AI-Based Recommendations → Perceived Usefulness → Consumer Buying Behavior *(Mediation)*	0.614 (Indirect)	Supported (Significant)
H3	AI-Based Recommendations × Trust in AI Systems → Consumer Buying Behavior *(Moderation)*	0.312 (Interaction)	Supported (Significant)

Discussion

This study explores customer perceptions of AI-based recommendations within Pakistan's e-commerce sector. The findings indicate that AI-powered recommendations are considered useful and relevant by consumers, significantly enhancing their shopping experiences through personalized product suggestions (Gentsch, 2018; Jarek & Mazurek, 2019). Consistent with previous literature, AI tools were found to accelerate decision-making, save time, and increase overall consumer satisfaction (Grewal et al., 2020).

However, while trust in AI systems tends to improve over time, it remains closely linked to concerns around fairness and data privacy, particularly in developing countries such as Pakistan (Chatterjee et al., 2020). The results affirm that AI-based recommendations positively influence consumer purchasing behavior (Jiang et al., 2019; Grewal et al., 2020), with perceived usefulness serving as a mediating factor (Christian & Agung, 2020). Additionally, trust in AI systems was found to moderate this relationship (Shin, 2021).

Furthermore, perceived usefulness exerts a direct positive impact on consumer buying behavior, demonstrating that AI recommendations can drive greater consumer engagement and higher purchase rates. These insights collectively underscore the transformative potential of AI in e-commerce environments, particularly by fostering trust and delivering meaningful, personalized value to consumers (Hasyim & Purnasari, 2021; Voramontri & Klieb, 2019).

Conclusion

This study highlights the significant impact of AI-based recommendation systems on consumer behavior within Pakistan's e-commerce sector. The findings reveal a positive consumer attitude toward AI recommendations, which are perceived as both useful and relevant. These systems enhance the shopping experience by delivering personalized and efficient product suggestions tailored to consumer preferences.

Trust and perceived usefulness emerged as crucial moderating and mediating variables, respectively, shaping the relationship between AI recommendations and consumer purchasing behavior. Although trust in AI systems is growing, concerns around data privacy and fairness remain particularly relevant in developing markets.

Overall, the study offers valuable insights into the influence of AI on consumer decision-making, emphasizing that perceived usefulness and trust are critical drivers of greater engagement and stronger purchase intentions. These results align with established theoretical frameworks such as the Technology Acceptance Model, while also providing practical implications for e-commerce platforms seeking to leverage AI technologies to boost customer satisfaction and loyalty.

REFERENCES

Ameen, N., Tarhini, A., Reppel, A., & Anand, A. (2021). Exploring customer experiences in the age of artificial intelligence. *Computers in Human Behavior, 114*, 106548.

Azizah, F. D., Nur, A. N., & Putra, A. H. P. K. (2022). Examining impulsive buying behavior through the technology acceptance model in e-commerce. *Golden Ratio of Marketing and Applied Psychology of Business, 2*(1), 58–72.

Bączkiewicz, A., Kizielewicz, B., Shekhovtsov, A., Wątróbski, J., & Sałabun, W. (2021). Methodological considerations for MCDM-based recommender systems in e-commerce. *Journal of Theoretical and Applied Electronic Commerce Research, 16*(6), 2192–2229.

Bawack, R. E., Wamba, S. F., Carillo, K. D. A., & Akter, S. (2022). Artificial intelligence in e-commerce: A systematic literature review and bibliometric analysis. *Electronic Markets, 32*(1), 297–338.

Choung, H., David, P., & Ross, A. (2023). The role of trust in AI acceptance: A conceptual investigation. *International Journal of Human–Computer Interaction, 39*(9), 1727–1739.

Gonçalves, R., Rocha, T., Martins, J., Branco, F., & Au-Yong-Oliveira, M. (2018). Evaluating accessibility and usability of e-commerce websites, including perspectives of visually impaired users. *Universal Access in the Information Society, 17*, 567–583.

Guha, A., Grewal, D., Kopalle, P. K., Haenlein, M., Schneider, M. J., Jung, H., & Hawkins, G. (2021). The impact of artificial intelligence on the future of retail. *Journal of Retailing, 97*(1), 28–41.

Hasyim, F., & Purnasari, N. (2021). Determinants of halal food purchase decisions through the lens of the theory of planned behavior. *Iqtishadia, 14*, 107.

Hasija, A., & Esper, T. L. (2022). Understanding AI trust and technology acceptance: A qualitative approach. *Journal of Business Logistics, 43*(3), 388–412.

Huang, M. H., & Rust, R. T. (2022). Building a framework for collaborative AI in marketing. *Journal of Retailing, 98*(2), 209–223.

Hwangbo, H., Kim, Y. S., & Cha, K. J. (2018). Developing recommender systems for fashion e-commerce. *Electronic Commerce Research and Applications, 28*, 94–101.

Jiang, L., Cheng, Y., Yang, L., Li, J., Yan, H., & Wang, X. (2019). Trust-based collaborative filtering algorithms for e-commerce recommendations. *Journal of Ambient Intelligence and Humanized Computing, 10*, 3023–3034.

Kim, J., Giroux, M., & Lee, J. C. (2021). Exploring how numerical detail influences trust and acceptance of AI recommendations. *Psychology & Marketing, 38*(7), 1140–1155.

Kolodin, D., Telychko, O., Rekun, V., Tkalych, M., & Yamkovyi, V. (2020, March). Legal frameworks for artificial intelligence in e-commerce. In *III International Scientific Congress Society of Ambient Intelligence 2020 (ISC-SAI 2020)* (pp. 96–102). Atlantis Press.

Lee, S. M., & Lee, D. (2020). "Untact": Innovative customer service approaches in the digital era. *Service Business, 14*(1), 1–22.

Nizette, F., Hammedi, W., van Riel, A. C., & Steils, N. (2025). Explaining to persuade: How explanation design influences trust in AI-based services. *Journal of Service Management, 36*(1), 50–74.

Omrani, N., Rivieccio, G., Fiore, U., Schiavone, F., & Agreda, S. G. (2022). Trust in artificial intelligence: Evaluating ethical concerns and contextual influences. *Technological Forecasting and Social Change, 181*, 121763.

Pan, C. L., Liu, Y., & Pan, Y. C. (2022). Big data and internet technologies driving e-commerce growth. *International Journal of Electronic Commerce Studies, 13*(2), 027–048.

Panwar, D., Anand, S., Ali, F., & Singal, K. (2019). Consumer decision-making models and implications for market strategy. *International Management Review, 15*(1), 36–44.

Pitardi, V., & Marriott, H. R. (2021). Investigating consumer trust in voice-based AI assistants. *Psychology & Marketing, 38*(4), 626–642.

Pramanik, P., & Jana, R. K. (2025). Modeling consumer acceptance of AI technologies: A conceptual framework. *Management Decision*.

Qin, H., Peak, D. A., & Prybutok, V. (2021). Mobile augmented reality and its impact on consumer choices. *Journal of Retailing and Consumer Services, 58*, 102337.

Rahmanov, F., Mursalov, M., & Rosokhata, A. (2021). Digital-era consumer behavior: The COVID-19 effect. *Marketing i menedžment innovacij, (2)*, 243–251.

Rane, N., Choudhary, S., & Rane, J. (2024). A comprehensive review of AI and machine learning in business intelligence and e-commerce. *Finance, and E-Commerce: A Review (May 27, 2024)*.

Richard, F., Štefan, K., & Lenka, K. (2025). Artificial intelligence and machine learning applications in e-commerce: A review of literature. *ADCAIJ: Advances in Distributed Computing and Artificial Intelligence Journal*, *14*, e31736–e31736.

Riegger, A. S., Merfeld, K., Klein, J. F., & Henkel, S. (2022). Smart technology choice and consumer shopping behavior: A personalization perspective. *Technological Forecasting and Social Change*, *181*, 121752.

Sharma, S., Islam, N., Singh, G., & Dhir, A. (2022). Retail customers' adoption of autonomous AI-based decision-making systems. *IEEE Transactions on Engineering Management*, *71*, 1846–1861.

Sharma, B. K., & Bhatt, V. K. (2018). Social media's influence on consumer behavior: A descriptive study of the technology acceptance model. *i-Manager's Journal on Management*, *13*(1), 34.

Shin, D. (2021). Implications of explainability and causability for user trust and acceptance of AI. *International Journal of Human-Computer Studies, 146*, 102551.

Sutisna, F., & Handra, T. (2022). Online shopping behavior explained through the theory of planned behavior. *Aptisi Transactions on Management*, *6*(1), 52–61.

Tiwari, A., Kumar, A., Kant, R., & Jaiswal, D. (2024). Influence of fashion influencers on consumer purchase intention: A TPB perspective with attitude mediation. *Journal of Fashion Marketing and Management*, *28*(2), 209–225.

Tyrväinen, O., Karjaluoto, H., & Saarijärvi, H. (2020). Hedonic motivation and personalization in omnichannel retailing. *Journal of Retailing and Consumer Services*, *57*, 102233.

Voramontri, D., & Klieb, L. (2019). The role of social media in shaping consumer behaviour. *International Journal of Information and Decision Sciences*, *11*(3), 209–233.

Xu, K., Zhou, H., Zheng, H., Zhu, M., & Xin, Q. (2024). Machine-learning driven personalized product recommendations in e-commerce. *arXiv preprint arXiv:2403.19345*.

Khrais, L. T. (2020). Artificial intelligence's impact on consumer demand in online commerce. *Future Internet*, *12*(12), 226.

Golnar-Nik, P., Farashi, S., & Safari, M. S. (2019). Using EEG power to interpret consumer decision-making: A neuromarketing perspective. *Physiology & Behavior*, *207*, 90–98.