

Influence of AI-Powered Personalization on Consumer Purchase Intention: The Mediating Role of Consumer Trust

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Abstract: Artificial Intelligence (AI)-powered personalization has become a cornerstone of modern e-commerce by enabling organizations to deliver customized product recommendations that enhance consumer experiences and influence purchasing decisions. However, the effectiveness of AI-driven personalization depends not only on the quality of recommendations but also on consumers' trust in AI systems. This study examines the influence of **AI-powered personalization, perceived transparency, explainability of AI, and perceived privacy protection on purchase intention**, with **consumer trust** serving as the mediating variable. A quantitative, cross-sectional research design was adopted, and data were collected from consumers who had prior experience with AI-enabled personalized recommendations on online shopping platforms. The proposed conceptual model was analyzed using **Structural Equation Modelling (SEM)** in Jamovi. The findings reveal that AI-powered personalization, perceived transparency, and explainability of AI significantly and positively influence consumer trust, whereas perceived privacy protection does not significantly affect trust. Consumer trust, in turn, exerts a significant positive influence on purchase intention. Furthermore, perceived privacy protection has a significant direct effect on purchase intention, while the direct effects of AI-powered personalization, perceived transparency, and explainability of AI on purchase intention are not statistically significant, indicating that their influence is primarily transmitted through consumer trust. The study highlights the pivotal role of trust as the underlying mechanism linking AI-enabled personalization characteristics to consumers' purchase intentions. The findings contribute to the growing literature on AI-driven consumer behaviour by extending the understanding of trust formation in AI-enabled retail environments and offer practical implications for e-commerce firms seeking to design transparent, explainable, and trustworthy AI recommendation systems that enhance consumer purchase intentions.

Keywords: AI-Powered Personalization; Consumer Trust; Purchase Intention; Explainability of Artificial Intelligence; Perceived Transparency

1. INTRODUCTION

Artificial Intelligence (AI) has transformed the landscape of electronic commerce by enabling firms to deliver highly personalized shopping experiences. Unlike traditional recommendation systems, AI-powered personalization leverages machine learning, natural language processing, and predictive analytics to understand consumer preferences and provide tailored product recommendations in real time. These intelligent systems have significantly enhanced customer engagement, satisfaction, and decision-making while enabling businesses to improve conversion rates and customer retention (Davenport & Ronanki, 2018; Huang & Rust, 2021).

The rapid proliferation of AI-enabled recommendation engines across leading e-commerce platforms such as Amazon, Flipkart, Netflix, and Spotify has fundamentally altered consumer buying behaviour. Personalized recommendations influence product discovery, reduce search effort, and facilitate informed purchase decisions. However, despite the technological sophistication of AI systems, consumers often remain sceptical regarding the fairness, transparency, and privacy implications of algorithmic decision-making (Ameen et al., 2021). Consequently, the effectiveness of AI-powered personalization depends not only on technological capability but also on consumers' willingness to trust AI-generated recommendations.

Consumer trust has emerged as one of the most significant determinants of technology adoption and online purchase behaviour. Previous studies suggest that trust reduces uncertainty and perceived risk associated with AI-driven interactions, thereby increasing consumers' willingness to rely on algorithmic recommendations (Gefen et al., 2003; McKnight et al., 2011). Factors such as transparency in recommendation processes, explainability of AI decisions, and adequate privacy protection have been identified as important antecedents of trust (Shin, 2021; Rai, 2020).

Recent developments in Explainable Artificial Intelligence (XAI) have emphasized the need for AI systems to provide understandable explanations for their recommendations. Explainability enables consumers to comprehend the rationale behind AI-generated suggestions, thereby improving perceived fairness, accountability, and trustworthiness (Adadi & Berrada, 2018). Similarly, transparency regarding data collection and recommendation mechanisms enhances consumers' confidence in AI systems and mitigates uncertainty during online shopping (Shin, 2021).

Privacy concerns continue to represent a major challenge in AI-driven personalization. Although personalized recommendations require extensive consumer data, individuals increasingly demand stronger privacy safeguards and greater control over personal information. Organizations therefore face the challenge of balancing personalization with responsible data governance (Martin & Murphy, 2017).

While prior research has extensively examined technology acceptance and online shopping behaviour, relatively few studies have simultaneously investigate **AI-powered personalization, explainability of AI, perceived transparency, perceived privacy protection, and consumer trust** within a unified framework to explain purchase intention. Moreover, empirical evidence regarding the mediating role of consumer trust in AI-powered personalization remains limited, particularly in emerging economies such as India.

Accordingly, the present study develops and empirically validates a structural model examining the influence of AI-powered personalization, explainability of AI, perceived transparency, and perceived privacy protection on purchase intention through the mediating role of consumer trust. The findings are expected to contribute to AI marketing literature by providing theoretical insights into trust formation in AI-enabled commerce while offering practical recommendations for organizations designing intelligent recommendation systems.

2. LITERATURE REVIEW

2.1 AI-Powered Personalization

AI-powered personalization refers to the ability of artificial intelligence systems to customize products, services, and recommendations according to individual consumers' preferences, behaviour, and purchase history. Unlike conventional personalization techniques, AI continuously learns from consumer interactions to generate increasingly accurate recommendations (Huang & Rust, 2021).

Previous research indicates that personalized recommendations significantly improve customer satisfaction, engagement, and online shopping experiences (Tam & Ho, 2006). AI-driven personalization reduces information overload and assists consumers in identifying relevant products, thereby enhancing shopping efficiency (Bleier & Eisenbeiss, 2015). However, personalization alone may not directly influence purchase behaviour unless consumers perceive AI recommendations as trustworthy and reliable.

Accordingly, AI-powered personalization is expected to strengthen consumer trust, ultimately enhancing purchase intention.

2.2 Explainability of Artificial Intelligence

Explainability of AI refers to the extent to which consumers understand how AI systems generate recommendations and make decisions. Explainable AI (XAI) has emerged as a critical requirement for enhancing transparency, accountability, and user acceptance of intelligent systems (Adadi & Berrada, 2018).

Research suggests that consumers are more likely to trust AI systems when explanations accompany recommendations because explanations reduce uncertainty and improve perceived fairness (Shin, 2021). Explainability also increases users' confidence in automated decision-making, especially in high-involvement purchase situations.

Consequently, explainability is considered an important antecedent of consumer trust in AI-powered recommendation systems.

2.3 Perceived Transparency

Perceived transparency refers to consumers' perception that organizations openly disclose how AI systems collect data,

process information, and generate recommendations.

Transparency plays a crucial role in reducing information asymmetry and uncertainty during online transactions (Schnackenberg & Tomlinson, 2016). Transparent AI systems communicate the basis of recommendations and provide consumers with greater confidence regarding algorithmic decision-making.

Shin (2021) argues that transparency significantly enhances trust by improving consumers' understanding of AI operations. Greater transparency also strengthens perceptions of fairness and accountability, thereby positively influencing behavioural intentions.

2.4 Perceived Privacy Protection

Perceived privacy protection represents consumers' belief that organizations adequately safeguard their personal information and responsibly manage data collected for AI-powered personalization.

Privacy concerns remain one of the most significant barriers to AI adoption (Martin & Murphy, 2017). Consumers increasingly expect organizations to implement robust privacy protection mechanisms before sharing personal information.

Studies have reported mixed findings regarding the relationship between privacy protection and consumer trust. While effective privacy safeguards often increase trust and purchase intention, heightened awareness of privacy issues may simultaneously make consumers more cautious regarding AI-based personalization (Bélanger & Crossler, 2011).

2.5 Consumer Trust

Consumer trust refers to the willingness of consumers to rely on AI systems based on confidence in their competence, integrity, and reliability.

Trust is considered a central construct in electronic commerce because online transactions involve uncertainty and information asymmetry (Gefen et al., 2003). Trust reduces perceived risk, increases confidence in recommendations, and facilitates technology adoption.

Recent AI research similarly identifies trust as the principal mechanism through which AI capabilities influence consumer behaviour (Shin, 2021). When consumers perceive AI systems as transparent, explainable, and competent, they develop greater trust, leading to stronger purchase intentions.

2.6 Purchase Intention

Purchase intention represents the likelihood that consumers will purchase products recommended by AI-powered recommendation systems.

According to the Theory of Planned Behaviour (Ajzen, 1991), behavioural intentions serve as immediate antecedents of actual behaviour. In online retailing, purchase intention has consistently been influenced by trust, perceived usefulness, recommendation quality, and personalization (Pavlou, 2003).

In AI-enabled commerce, purchase intention reflects consumers' willingness to rely on algorithmic recommendations when making purchase decisions.

Research Gap

Although AI-powered recommendation systems have received increasing scholarly attention, existing studies predominantly focus on technological acceptance, recommendation accuracy, or algorithm performance. Limited research has simultaneously examined the combined influence of **AI-powered personalization, explainability of AI, perceived transparency, and perceived privacy protection** on **purchase intention** through the mediating role of **consumer trust**, particularly in the context of AI-enabled e-commerce in emerging markets. Furthermore, empirical evidence regarding the trust-building mechanisms underlying AI-driven personalization remains fragmented. This study addresses these gaps by proposing and empirically validating an integrated conceptual framework that explains how AI-specific characteristics shape consumer trust and, ultimately, purchase intention.

3. RESEARCH METHODOLOGY

3.1 Research Design

The present study adopted a **quantitative, cross-sectional research design** to examine the determinants of consumers' purchase intention towards AI-powered personalized recommendations. A quantitative approach was considered

appropriate as the study aims to empirically examine the causal relationships among latent constructs using Structural Equation Modelling (SEM). Data were collected at a single point in time through a structured questionnaire administered to respondents with prior experience using AI-enabled e-commerce platforms.

3.2 Population and Sample

The target population comprised **consumers who had previously used AI-powered personalized recommendations while shopping on online retail platforms** such as Amazon, Flipkart, Myntra, Meesho, Nykaa, and similar e-commerce applications.

A **purposive sampling technique** was employed to ensure that only respondents familiar with AI-based personalized recommendations participated in the study. The questionnaire included a screening question to verify whether respondents had experience with AI-generated product recommendations. Only eligible respondents were included in the final analysis.

A total of 210 questionnaires were collected. After screening for incomplete responses and response inconsistencies, 200 valid responses were retained for statistical analysis. The sample size satisfied the recommended requirements for Structural Equation Modelling, exceeding the minimum threshold suggested by Hair et al. (2022).

3.3 Instrument Development

Data were collected using a structured questionnaire consisting of two sections.

The first section captured respondents' demographic information, including gender, age, education, occupation, online shopping experience, and frequency of online purchases.

The second section measured the study constructs using previously validated scales adapted from the literature. Minor wording modifications were made to suit the context of AI-powered personalized shopping recommendations.

The constructs included:

Construct	Number of Items
AI-Powered Personalization	5
Explainability of AI	6
Perceived Transparency	6
Perceived Privacy Protection	6
Consumer Trust	6
Purchase Intention	6

All items were measured using a **five-point Likert scale** ranging from **1 = Strongly Disagree** to **5 = Strongly Agree**.

3.4 Measurement of Variables

The study examined four independent variables:

- AI-Powered Personalization
- Explainability of AI
- Perceived Transparency
- Perceived Privacy Protection

Consumer Trust was conceptualized as the mediating variable, while Purchase Intention served as the dependent variable. The proposed conceptual framework is illustrated in Figure 1.

3.5 Data Collection Procedure

The questionnaire was administered online using **Google Forms**. The survey link was distributed through email, WhatsApp, LinkedIn, and other social networking platforms to consumers with prior online shopping experience.

Participation was voluntary, and respondents were informed that their responses would remain anonymous and used solely for academic research purposes.

4. DATA ANALYSIS AND RESULTS

4.1 Measurement Model Assessment

The measurement model was evaluated using Structural Equation Modelling (SEM) in Jamovi. Prior to testing the structural relationships, the adequacy of the measurement model was examined through factor loadings, convergent validity, and discriminant validity. All indicators loaded satisfactorily on their respective latent constructs, with standardized factor loadings ranging from **0.566 to 0.962**, exceeding the recommended threshold of 0.50 (Hair et al., 2022). The majority of the items exhibited loadings above 0.70, indicating good indicator reliability.

The distinct loading pattern of the observed variables confirmed discriminant validity, while the strong factor loadings established convergent validity. These findings suggest that the measurement model adequately represents the underlying constructs of AI-Powered Personalization, Explainability of AI, Perceived Transparency, Perceived Privacy Protection, Consumer Trust, and Purchase Intention.

4.2 Structural Model Assessment

The structural model was estimated using Maximum Likelihood Estimation in Jamovi SEM. Consumer Trust was modelled as the mediating construct between AI-Powered Personalization, Explainability of AI, Perceived Transparency, Perceived Privacy Protection, and Purchase Intention.

Model Fit

The structural model demonstrated an excellent fit to the observed data. The Comparative Fit Index (CFI = **1.000**), Tucker-Lewis Index (TLI = **1.000**), Bentler-Bonett Non-Normed Fit Index (NNFI = **1.002**), and Relative Noncentrality Index (RNI = **1.002**) all exceeded the recommended threshold of 0.90. The robust fit indices also remained above the acceptable level (CFI = 0.941; TLI = 0.934; NNFI = 0.934; RNI = 0.941), indicating that the proposed structural model adequately represents the observed relationships among the study variables.

4.3 Hypothesis Testing

Table X presents the standardized path coefficients of the proposed structural model.

Hypothesis	Structural Path	β	p-value	Decision
H1	AI-Powered Personalization → Consumer Trust	0.413	<0.001	Supported
H2	Explainability of AI → Consumer Trust	0.358	<0.001	Supported
H3	Perceived Transparency → Consumer Trust	0.459	<0.001	Supported
H4	Perceived Privacy Protection → Consumer Trust	-0.087	0.103	Not Supported
H5	Consumer Trust → Purchase Intention	0.592	<0.001	Supported
H6	AI-Powered Personalization → Purchase Intention	-0.078	0.172	Not Supported
H7	Perceived Transparency → Purchase Intention	0.076	0.274	Not Supported
H8	Explainability of AI → Purchase Intention	-0.001	0.986	Not Supported
H9	Perceived Privacy Protection → Purchase Intention	0.586	<0.001	Supported

4.4 Structural Model Results

The results indicate that **AI-Powered Personalization** has a significant positive influence on **Consumer Trust** ($\beta = 0.413, p < 0.001$), suggesting that personalized AI recommendations enhance consumers' confidence in online shopping platforms.

Similarly, **Perceived Transparency** significantly influences Consumer Trust ($\beta = 0.459, p < 0.001$), indicating that consumers are more likely to trust AI systems when they perceive greater openness regarding how recommendations are generated.

Explainability of AI also exerts a positive and significant effect on Consumer Trust ($\beta = 0.358, p < 0.001$), highlighting the importance of providing understandable explanations for AI-generated recommendations.

Contrary to expectations, **Perceived Privacy Protection** does not significantly influence Consumer Trust ($\beta = -0.087, p = 0.103$), indicating that consumers' perceptions of privacy safeguards alone are insufficient to build trust in AI-enabled personalization systems.

Consumer Trust, in turn, significantly predicts **Purchase Intention** ($\beta = 0.592, p < 0.001$), confirming its central role in explaining consumers' behavioural intentions.

Among the direct effects on Purchase Intention, only **Perceived Privacy Protection** exhibits a significant positive influence ($\beta = 0.586, p < 0.001$). The direct effects of AI-Powered Personalization ($\beta = -0.078, p = 0.172$), Perceived Transparency ($\beta = 0.076, p = 0.274$), and Explainability of AI ($\beta = -0.001, p = 0.986$) are statistically insignificant.

These findings suggest that AI-Powered Personalization, Explainability of AI, and Perceived Transparency primarily influence Purchase Intention indirectly through Consumer Trust.

4.5 Mediation Analysis

Consumer Trust was proposed as the mediating mechanism between the four antecedent variables and Purchase Intention.

The structural results reveal that AI-Powered Personalization, Explainability of AI, and Perceived Transparency significantly predict Consumer Trust, while Consumer Trust significantly predicts Purchase Intention. However, the direct effects of these three antecedent variables on Purchase Intention are statistically insignificant.

This pattern is indicative of **full mediation**, suggesting that the influence of AI-Powered Personalization, Explainability of AI, and Perceived Transparency on consumers' purchase intentions operates entirely through Consumer Trust.

In contrast, Perceived Privacy Protection demonstrates a significant direct effect on Purchase Intention but fails to significantly influence Consumer Trust. Therefore, Consumer Trust does **not mediate** the relationship between Perceived Privacy Protection and Purchase Intention. The influence of Perceived Privacy Protection appears to be direct rather than indirect.

Although the pattern of results strongly supports full mediation for AI-Powered Personalization, Explainability of AI, and Perceived Transparency, the significance of the indirect effects should ideally be confirmed through **bias-corrected bootstrapping**.

5. DISCUSSION

The findings demonstrate that **Consumer Trust is the primary mechanism through which AI-related characteristics influence consumers' purchase intentions**. Among the antecedents, **Perceived Transparency** emerged as the strongest predictor of Consumer Trust, followed by **AI-Powered Personalization** and **Explainability of AI**. These results suggest that consumers are more willing to trust AI-driven recommendation systems when they understand how recommendations are generated and perceive that the recommendations are personalized to their needs.

Interestingly, AI-Powered Personalization does not directly influence Purchase Intention. Instead, its influence is channelled entirely through Consumer Trust. This finding implies that personalization alone is insufficient to encourage purchasing unless consumers also trust the AI system providing the recommendations.

Similarly, Explainability of AI and Perceived Transparency do not directly increase Purchase Intention but significantly enhance Consumer Trust, which subsequently drives purchase behaviour. These findings reinforce the importance of designing AI systems that are transparent, interpretable, and user-centric.

Unlike the other antecedents, Perceived Privacy Protection directly influences Purchase Intention but does not significantly contribute to Consumer Trust. This finding suggests that while consumers value privacy protection when making purchase decisions, privacy safeguards alone may not be sufficient to establish trust in AI-powered recommendation systems.

Overall, the study underscores that organizations seeking to increase consumer adoption of AI-driven personalization should prioritize transparency, explainability, and effective personalization strategies that foster trust, as Consumer Trust remains the principal mechanism translating AI capabilities into favourable purchase intentions.

Note

The mediation conclusions above are based on the **pattern of direct and mediator paths**. For publication in a Scopus or ABDC journal, you should also report **bootstrapped indirect effects (5,000 resamples with 95% bias-corrected confidence intervals)** to statistically confirm the mediation effects. This is considered the current best practice in SEM research.

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