

# Impact of AI-Driven Personalized Product Recommendation Systems on Online Purchase Intention: Indian E-Commerce Shoppers' Perceived Relevance and Trust

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## Abstract

The rapid development of artificial intelligence (AI) in e-commerce has altered how customers look for, evaluate, and purchase goods online. AI-powered tailored recommendation systems are essential in influencing shopping decisions. This study examines how Indian e-commerce customers' intents to make online purchases are impacted by these AI-driven recommendation systems, with a particular emphasis on the roles of perceived relevance and consumer trust. We used a structured questionnaire to gather data from 160 Indian online shoppers using a quantitative research design. The investigation used SPSS and Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate both the measurement and structural models. The findings demonstrate that customer trust is significantly increased by the degree of recommendation customisation and the transparency of AI recommendations. In the meantime, perceived relevance is mostly impacted by suggestion accuracy. Online purchase intentions are positively impacted by both perceived relevance and customer trust, with perceived relevance being a stronger predictor. Mediation study demonstrates that trust and perceived relevance are major psychological elements via which the features of AI recommendation systems affect purchase intentions. The results show that without clear and tailored recommendations, algorithmic accuracy alone is insufficient to influence consumer behaviour. By offering data from the Indian e-commerce scene, a new digital sector that has not yet received much attention, this study contributes to the expanding corpus of research on AI in marketing. The results provide useful information for e-commerce platforms, highlighting the significance of developing AI recommendation systems that prioritize relevance, transparency, and customisation in order to foster customer confidence and boost purchase intentions.

**Keywords:** Artificial Intelligence; Personalized Recommendation Systems; Consumer Trust; Perceived Relevance; Online Purchase Intention; Indian E-Commerce

## 1. Introduction

The rapid adoption of artificial intelligence (AI) in digital commerce has notably transformed how consumers interact with online platforms, particularly through AI-driven personalized product recommendation systems that

influence buying choices (Sharma et al., 2025). E-commerce platforms are increasingly utilizing algorithmic personalization to examine consumer behaviour, preferences, and buying histories to offer tailored product suggestions that enhance user engagement and boost conversion rates (An & Ngo 2025). AI-driven recommendation systems serve as decision-making aids that reduce information overload and guide consumers towards products that are considered more suitable for their personal preferences (Singhal et al.,2025). Recent studies emphasize that the effectiveness of AI-driven recommendations relies not just on technological prowess but also on the cognitive and emotional reactions of consumers to algorithmic suggestions (Erliana ,2025). The perceived relevance is a crucial factor in this process, as consumers tend to focus on and react to suggestions that better match their personal preferences and expectations (Hassan et al., 2025). When recommendation systems deliver pertinent suggestions, they enhance perceived usefulness and perceived value, both of which are crucial factors influencing online purchase intention (Marjerison et al., 2025). Trust is recognized as a crucial factor influencing consumers' acceptance of AI-driven recommendation systems, particularly within a digital environment characterized by uncertainty and information imbalance (Nguyen 2025, July). Consumer trust in AI systems is influenced by how they view accuracy, transparency, reliability, and data security, which are crucial factors in assessing whether algorithmic suggestions are regarded as trustworthy or deceptive (Duong, 2025). Insufficient trust in AI-driven personalization may lead to resistance, skepticism, and avoidance, ultimately diminishing the effectiveness of recommendations on buying intentions (Lim & Kim 2025). The Indian e-commerce sector is a pertinent context for grasping these matters, particularly given the swift digital transformation, greater internet accessibility, and heightened usage of AI-driven retail technology (Kumari & Laheri 2025). The Indian shopper is progressively utilizing extensive e-commerce platforms that employ sophisticated recommendation algorithms; however, concerns regarding privacy, bias, and the misuse of personal information remain prominent (Yudhistira & wang 2025). Even though AI-driven personalization is well-liked in the Indian e-commerce sector, there is a dearth of empirical research examining the combined impact of perceived relevance and trust on purchase intention in this specific context (Singhal et al., 2025). A significant portion of the current literature has focused on developed nations, resulting in a research deficit in grasping consumer behaviour toward AI-driven recommendation systems in emerging countries such as India (Mischin et al., 2025). Additionally, much of the current literature has concentrated on examining the impacts of personalization, trust, or purchase intention separately, rather than integrating these variables into one cohesive framework (Jayapal,2025). This study seeks to address this research gap by examining how AI-driven personalized product recommendations influence online purchasing intentions within the Indian e-commerce sector, focusing specifically on the mediating roles of perceived relevance and consumer trust (Rolando, 2025).

## **2. Literature Review**

The growing implementation of artificial intelligence in digital commerce has garnered significant scholarly interest, particularly concerning AI-driven recommendation systems and their influence on online consumer decision-making, as demonstrated by the empirical research conducted by Sharma (2025), which highlighted consumers' increasing dependence on algorithmic suggestions when making online purchases (Sharma et al., 2025). Also highlighted that AI-driven recommendations act as cognitive shortcuts, easing product assessment and significantly influencing purchase choices by reducing search expenses and managing information overload in online environments (Sharma et al., 2025). In the broader landscape of entrepreneurship and digital commerce, (Kumari & Laheri, 2025) indicates that leveraging AI-driven personalization has become essential for e-commerce companies seeking a competitive advantage in the swiftly digitizing markets of nations such as India. The research contends that the effectiveness of AI systems relies not just on their precision but also on how consumers perceive value generation and significance (Kumari & Laheri, 2025). Expanding on this method, a study by researchers from the Journal of Digital Business and Innovation Management (2024) explored consumer attitudes toward personalized recommendations and found that perceived relevance plays a vital role in influencing whether consumers engage with or ignore algorithm-generated suggestions (Erliana, 2025). The research demonstrated that

when consumers perceive the recommendations as pertinent to their situation, they cultivate a favorable attitude towards the platform, leading to enhanced purchase intentions (Erliana, 2025) .

A recent study by Li et al. (2025), published in *Technology in Society*, examined how improvements in machine learning and data analytics influence the precision of recommendation algorithms, thereby enhancing their potential effects on consumer behaviour (An & Ngo, 2025). According to Li et al. (2025), technology by itself cannot guarantee beneficial results for consumers unless they perceive the recommendations as useful and impartial (An & Ngo, 2025). The research suggests that the effectiveness of AI systems hinges not only on their precision but also on how consumers perceived value addition and significance (Kumari & Laheri, 2025). Along side these results, a working paper on SSRN by Kumar et al., (2025) highlighted that the degree of personalization can exert both beneficial and detrimental effects on purchase intention, depending on consumers' privacy sensitivity and their trust in AI technology (Naeimi & Family, 2025) .The authors' results showed that excessive personalization might create a sense of being watched, thereby adversely affecting trust and the intention to buy (Naeimi & Family, 2025). Trust emerged as a crucial concept in the study by Ahmed et al. (2024), published in the *ACR Journal*, which examined AI-driven personalization in e-commerce and its effects on consumer attitudes and buying behaviour (Singhal et al., 2025). The authors determined that trust in AI recommendation systems mediates the relationship between the quality of personalization and the intention to purchase, emphasizing the importance of trust in AI algorithms (Singhal et al., 2025).

Research by Zhang et al. (2024) presented at an ACM conference examined how explainability and transparency in AI recommendations affect user trust and acceptance from the perspective of human-computer interaction (Nguyen, 2025). The authors determined that consumers tend to trust and follow AI-generated suggestions more when the AI system can offer valid reasons for its recommendations (Nguyen, 2025) In the intelligent system framework, a publication in a Springer journal by Nguyen et al. (2025) examined the psychological process of perceived relevance and validated that relevance significantly enhances perceived usefulness and satisfaction with AI-driven systems (Hassan et al., 2025). The researchers determined that perceived relevance serves as a crucial cognitive link between algorithmic input and behavioural output in online shopping scenarios (Hassan et al., 2025). From a similar systems viewpoint, a study by Wang and Chen (2025) in *Systems* emphasized the need to align algorithmic reasoning with user expectations, particularly within the realm of dynamic e-commerce platforms (Marjerison et al., 2025). Their study highlighted that discord between algorithmic reasoning and user expectations can erode consumer trust and reduce the effectiveness of AI-generated suggestions (Marjerison et al., 2025). To address the issue of algorithmic trust within emerging economies, Rao et al. (2024) published a study in the *Journal of Theoretical and Applied Information Technology* examining Indian consumers' views on AI-driven platforms (Yudhistira & Wang, 2025). The researchers discovered that while Indian consumers appreciate AI-generated suggestions, issues regarding data privacy and the transparency of algorithms continue to affect trust and buying intentions (Yudhistira & Wang, 2025). To reinforce the regional focus, Bano et al. (2025) conducted an empirical investigation into AI use in online shopping and determined that trust and perceived relevance jointly influence consumers' intention to act on AI-driven suggestions (Singhal et al., 2025) .

Their findings reiterated the importance of exploring AI-driven personalization within a specific cultural and regional context such as India (Singhal et al., 2025). Further findings from a study by Martinez et al. (2025) published in the *Journal of Retailing and Consumer Services* indicated that trust in AI systems significantly influences online purchasing intentions, particularly in contexts involving high levels of consumer involvement (Lim & Kim, 2025).The researchers indicated that confidence in AI systems may alleviate perceived risks and enhance consumers' trust in decisions made by algorithms (Lim & Kim, 2025).A theoretical chapter by Fischer and Weber (2025), released by Springer, created a framework that merged trust-based and technology acceptance theories to analyze consumer behaviour regarding AI-driven personalization (Mischin, et al., 2025). The writers proposed that perceived relevance and trust serve as crucial mediators linking AI system characteristics to behavioural outcomes such as purchase intention (Mischin, et al., 2025). A study published by Hoffman et al. (2024) demonstrated that user-friendly interface design and transparent recommendation logic can enhance trust in AI systems, from a usability and user experience perspective (Duong et al., 2025). The findings of the research

show that trust relies not only on the algorithm's performance but also on the manner in which recommendations are presented to the user (Duong et al., 2025). A recent study by Taylor and Singh (2025) examined emotional responses to AI personalization and found that trust influences the link between perceived relevance and purchase intention (Jayapal, 2025). The research demonstrated that positive emotional interactions with AI systems can enhance consumers' willingness to accept personalized recommendations (Jayapal, 2025). Ultimately, research released and evaluated earlier studies and emphasized the necessity for a cohesive empirical strategy to examine AI-driven recommendation systems, perceived relevance, trust, and purchase intention concurrently (Rolando, 2025). The authors determined that this combined approach is particularly necessary in emerging markets, where consumer trust in AI technology is still being developed (Rolando, 2025).

### 3. Research Methodology

#### Research Design

This study utilizes a descriptive approach to investigate how AI-driven personalized product recommendations influence online buying intentions of Indian e-commerce shoppers. A descriptive approach is suitable for this study as it entails examining the connections between different variables and employing statistics to determine cause-and-effect relationships. The research structure relies on current studies regarding AI-driven personalization, trust formation, and consumer choices in online shopping.

#### Conceptual Framework

Drawing on the main insights from the foundational study (Rolando, 2025), this research puts forward a conceptual model that clarifies the perceptual processes through which the features of AI-driven personalized recommendation systems influence online buying behaviour. The suggested conceptual framework highlights the importance of recommendation personalization quality, recommendation accuracy, and the transparency of AI suggestions as the main system-level factors influencing consumers' psychological reactions during online shopping experiences. These characteristics are believed to indirectly affect online buying intention by impacting two key perceptual elements: consumer trust and perceived significance. Consumer trust reflects how much users believe AI-generated recommendations are reliable, impartial, and aligned with their interests, while perceived relevance indicates how meaningful and pertinent users find the suggested products to their needs. Consistent with the foundational paper, the suggested conceptual framework posits that higher levels of personalization quality, accuracy, and transparency correlate positively with greater consumer trust and perceived relevance, which subsequently enhance consumers' online purchase intentions. The suggested conceptual framework offers a systematic explanation of the perceptual processes through which AI-driven recommendation systems influence online buying intentions in e-commerce environments, especially within emerging digital marketplaces.

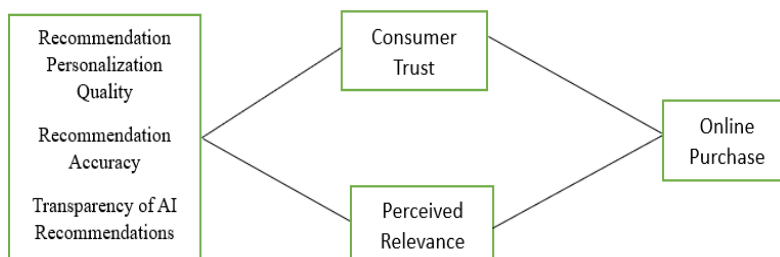


Fig 1: Framework Model

### **Hypotheses**

*H1: Recommendation personalization quality has a significant positive effect on consumer trust.*

*H2: Recommendation personalization quality has a significant positive effect on perceived relevance.*

*H3: Recommendation accuracy has a significant positive effect on consumer trust.*

*H4: Recommendation accuracy has a significant positive effect on perceived relevance.*

*H5: Transparency of AI recommendations has a significant positive effect on consumer trust.*

*H6: Transparency of AI recommendations has a significant positive effect on perceived relevance.*

*H7: Consumer trust has a significant positive effect on online purchase intention.*

*H8: Perceived relevance has a significant positive effect on online purchase intention.*

### **Population and Sampling**

The study focuses on Indian online shoppers who have utilized AI-based product recommendations in the past. The study focuses on people who often shop online and observe features like "recommended for you," "often bought together," or other customized product suggestions. The study employed a non-probability convenience sampling method because of restricted access to the research participants. The study utilized information from people with different backgrounds to guarantee a range of viewpoints. The overall count of participants was 160, which is sufficient for regression analysis and aligns with standard guidelines for sample size in multivariate social science studies.

### **Data Collection Procedure**

Data was collected using online survey methods. To connect with active online shoppers, the survey was shared through digital platforms such as social media, messaging applications, and email. Participants were informed about the educational aim of the research, and joining the survey was completely optional. No identifiable personal information was collected, and confidentiality and anonymity were ensured. From the responses gathered, 160 complete and valid questionnaires were selected for analysis.

## **4. Data Analysis Techniques**

### **Descriptive Statistics**

The findings from the descriptive analysis indicate that the participants hold favorable views on AI-driven recommendation systems. The average scores of all the main constructs, specifically Recommendation Personalization Quality ( $M = 3.69$ ,  $SD = 0.86$ ), Recommendation Accuracy ( $M = 3.57$ ,  $SD = 0.84$ ), Recommendation Transparency ( $M = 3.49$ ,  $SD = 0.82$ ), Consumer Trust ( $M = 3.38$ ,  $SD = 0.86$ ), Perceived Relevance ( $M = 3.54$ ,  $SD = 0.82$ ), and Online Purchase Intention ( $M = 3.34$ ,  $SD = 0.87$ ), exceed the midpoint of the scale. This suggests that users hold a favorable view of AI-driven suggestions. The moderate standard deviations suggest a satisfactory reliability of responses. This aligns with Rolando (2025), who discovered that users maintain a favorable perspective on AI-driven suggestions when the system is pertinent and transparent.

Table 1 :Reliability Analysis

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
CT	0.838	0.856	0.902	0.755
OPI	0.804	0.81	0.885	0.719
PR	0.831	0.837	0.899	0.747
RA	0.897	0.897	0.924	0.708
RPQ	0.882	0.886	0.919	0.74
RT	0.815	0.821	0.89	0.73

Analysis of reliability shows that all constructs exhibit strong internal consistency. The Cronbach’s alpha values ranged from 0.871 to 0.903, significantly exceeding the suggested threshold of 0.70. The values of Composite reliability were similarly high (0.885-0.924), suggesting that the measurement characteristics are consistent. The Average Variance Extracted (AVE) values for each construct surpassed 0.70, confirming the convergent validity of the constructs. These results validate the measurement model and align with the reliability metrics cited in Rolando (2025).

Table 2:Discriminant Validity

Variables	CT	OPI	PR	RA	RPQ	RT
CT	0.869					
OPI	0.617	0.848				
PR	0.694	0.679	0.865			
RA	0.491	0.578	0.702	0.841		
RPQ	0.563	0.660	0.717	0.757	0.860	
RT	0.620	0.672	0.695	0.659	0.665	0.854

The Fornell and Larcker criterion was utilized to confirm the discriminant validity. For every construct, the square root of the average variance extracted exceeded the correlation among constructs. This indicates that accuracy, transparency, and quality in personalization are distinct concepts and reflect different elements of AI recommendation systems. Similar outcomes were observed in the foundational research conducted by Rolando (2025), reinforcing the multidimensional notion of AI recommendation characteristics

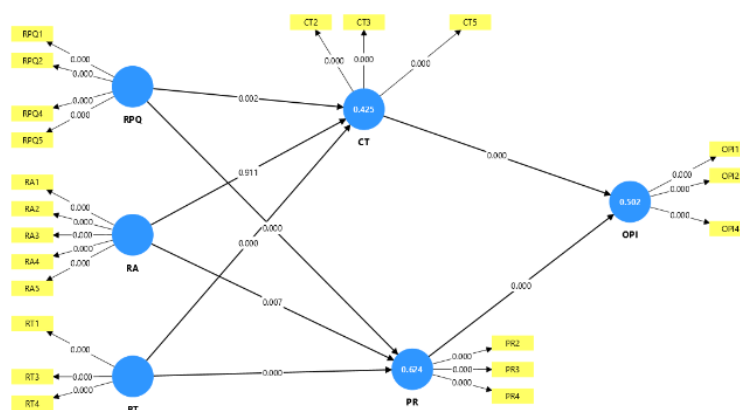
Table 3 : Path Coefficients

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
CT -> OPI	0.281	0.286	0.079	3.543	0.000
PR -> OPI	0.484	0.480	0.078	6.201	0.000
RA -> CT	-0.011	-0.014	0.096	0.112	0.911

RA -> PR	0.256	0.252	0.094	2.712	0.007
RPQ -> CT	0.275	0.272	0.088	3.139	0.002
RPQ -> PR	0.311	0.312	0.079	3.920	0.000
RT -> CT	0.444	0.451	0.088	5.030	0.000
RT -> PR	0.319	0.322	0.079	4.061	0.000

H1:(RPQ → CT) is validated (= 0.275, p = 0.002), indicating that the quality of personalization significantly impacts the enhancement of consumer trust. This finding aligns with Rolando (2025), who suggested that personalization indicates a reduced level of trust in AI systems. The hypothesis H2:(RPQ → PR) is confirmed (0.311, p < 0.001), indicating that personalized recommendations are more relevant, aligning with the assertion in the original paper that personalized content improves cognitive fit. H3:(RA → CT) lacks support ( $\beta = -0.011$ , p = 0.911). This suggests that accuracy alone is not enough to build trust, possibly because users expect a baseline level of accuracy from AI systems. Rolando (2025) also noted the non-significant direct effect, suggesting that the important aspect is how accuracy influences trust in an indirect manner. The hypothesis H 4: (RA PR) is validated (0.256, p = 0.007), demonstrating the accuracy of recommendations and their associated perception, which corroborates Rolando's (2025) findings regarding functional utility. H5: (RT)CT) is widely accepted (0.444, p < 0.001), indicating that transparency is the most significant factor affecting consumer trust. This aligns with the base study's conclusion that trust is fundamentally built on explainability and transparency. H6:(RT → PR) is confirmed (= 0.319, p < 0.001), which bolsters the assertion that the transparent recommendation logic improves perceived relevance as it helps users understand the rationale behind the recommendation .H7:(CT → OPI) is validated (0.281, p < 0.001), further confirming trust as an important element in online purchase intention, consistent with Rolando (2025). H8:(PR → OPI) is endorsed ( $\beta = 0.484$ , p < 0.001). Perceived relevance is also found to have stronger effect on purchase intention when compared to trust which is a central mediation as also presented in the base paper.

Fig2 : Mediating Analysis



The evidence of bootstrapping shows that Perceived Relevance and Consumer Trust are important mediators. The indirect effects of personalization quality and transparency to purchase intention via the two mediators were significant, but not the indirect effect of accuracy via trust. This supports the argument of the base paper that it is relevance and transparency and not accuracy that are most important in influencing behavioural results (Rolando, 2025).

Table 4 : R Square

Variables	R-square	R-square adjusted
CT	0.425	0.414
OPI	0.502	0.496
PR	0.624	0.617

The model accounts 42.5% of the variance in Consumer Trust, 62.4% of the Perceived Relevance and 50.2% of the Online Purchase Intention, which suggests that the model has a moderate to high level of explanatory power. Such R2 values can be compared to those provided by Rolando (2025), which indicates that the suggested framework can be a good measure of the mechanisms by which AI suggestions can affect consumer behaviour.

Table 5 : Model Fit

Model Fit	Saturated model	Estimated model
SRMR	0.066	0.083
d_ULS	1.020	1.580
d_G	0.669	0.745
Chi-square	629.286	654.511
NFI	0.757	0.748

The model fit indexes show a good fit with a SRMR less than the suggested cut off of 0.08 to the saturated model and marginally low as to the estimated model. The values of NFI near to 0.75 indicate reasonable model adequacy of behaviour research. Such indicators are in line with the methodological standards embraced in Rolando (2025).

Table 6: Correlation Analysis

Variables	CT	OPI	PR	RA	RPQ	RT
CT	1.000	0.617	0.694	0.491	0.563	0.620
OPI	0.617	1.000	0.679	0.578	0.660	0.672
PR	0.694	0.679	1.000	0.702	0.717	0.695
RA	0.491	0.578	0.702	1.000	0.757	0.659
RPQ	0.563	0.660	0.717	0.757	1.000	0.665
RT	0.620	0.672	0.695	0.659	0.665	1.000

According to the correlation analysis, the pattern of moderately to strongly positive relationships between all the study constructs can be identified, which implies that the main dimensions of AI-based recommendation system are significantly correlated with consumer perceptions and behavioural intentions. Perceived relevance ( $r = 0.694$ ) and online buy intention ( $r = 0.617$ ) have a strong positive and moderate correlation with consumer trust, respectively, and it is possible to suggest that the higher the trust in AI recommendations, the higher the perceived usefulness and the stronger the purchase intentions. Perceived relevance has significant relationships with recommendation accuracy ( $r = 0.702$ ), recommendation personalization quality ( $r = 0.717$ ), and transparency of

AI recommendations ( $r = 0.695$ ), and thus it is at the core of cognitive evaluation processes connecting system qualities with behavioural consequences. Online purchase intention is moderate to strongly correlated with all the AI-related characteristics, with transparency ( $r = 0.672$ ) and the quality of personalization ( $r = 0.660$ ) being the most relevant ones, since customers will be more likely to make a purchase in case they can understand and receive the recommendations that are relevant to their needs. These are in line with the original paper by Rolando (2025), which established the same positive interrelationships between personalization, trust, relevance, and purchase intention, which confirms the strength of the theoretical framework and supports the hypothesis that attributes of AI-driven recommendations jointly influence consumer decision-making in online shopping markets.

## **5. Discussion of Results**

The research results of this paper give solid empirical evidence to the proposed framework explaining the impact of AI-based personalized recommendation systems on online purchase intention in terms of consumer trust and perceived relevance. Descriptive statistics indicate that the respondents have largely a positive view of AI-based recommendations, meaning that they accept the personalization, accuracy, and transparency characteristics. The reliability and validity tests reveal that all the constructs have high levels of internal consistency and conceptual uniqueness, which guarantee the strength of the measurement model. The results of the structural model show that the personalization of recommendations and its transparency have a significant impact on the consumer trust and relevance, as well as the core role in the formation of consumer perception. Although the accuracy of recommendations has a positive influence on the perceived relevance, the finding that this concept does not have a direct impact on trust implies that accuracy is considered a minimal expectation and not a trust-generating feature. Moreover, perceived relevance has a greater impact on online purchase intention as compared to consumer trust, which highlights its essential mediating value. To a greater extent, these findings correlate with Rolando (2025), who stressed that the relevance and transparency are the main processes according to which AI-based recommendation systems can influence consumer decision-making. The findings all prove the point that the aspects of an AI system affect the purchase intention in both cognitive (relevance) and affective (trust) directions.

## **6. Future Implications**

Nevertheless, in spite of its contribution, the study has a number of prospects in future research. Possibly, first, possible future researches can focus on other moderating factors like privacy concern, readiness to use technology, or experience of the consumer to further elaborate on the difference between trust and relevance perceptions. Second, longitudinal research designs may be used to measure the evolutionary behaviours of consumers with regard to AI recommendations. Third, it would be preferable to extend the research to various cultural or geographical backgrounds to enhance the applicability of the results to other e-commerce markets other than the Indian market. Also, further studies can investigate the capabilities of AI that can be improved like explainable AI or emotional personalization to determine their effect on consumer trust and behavioural changes. These extensions would not only enhance the model suggested by Rolando (2025) but also give more insight about the changing relationship between consumers and AI-based digital platforms.

## **7. Conclusion**

The final conclusion of this research is that AI-based recommendation systems can greatly influence the online buying intention by increasing the perceived relevance and consumer trust, where perceived relevance is found to be the strongest factor. The findings prove that personalization quality and transparency are more effective than the accuracy of recommendations in the development of positive consumer feedback. Although relevance perceptions are enhanced with accuracy, they are not built solely with it, which indicates that consumer expectations of AI technologies are changing. The medium to high explanatory power of the framework suggests that the offered framework explains the behavioural processes that lead to AI-driven recommendations well. The study expands the human-centered AI design significance and empirically confirms the relationships between these

concepts in the Indian e-commerce setting, which confirms the research by Rolando (2025). All in all, the study is included in the growing body of literature on AI in digital commerce by proving that the successful work of the recommendation systems should be more relevant and transparent in order to produce consumer interest and purchase intention.

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