

Article

Impact of Artificial Intelligence on Consumer Purchase Intention in Food Marketing: Mediating Roles of Trust and Engagement

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Abstract

The rapid integration of artificial intelligence (AI) in online food services has transformed consumer behavior, yet the mechanisms through which AI influences purchase decisions remain underexplored. This study examines the impact of AI on consumer purchase intention, with a focus on the mediating roles of consumer engagement and consumer trust in the context of online food purchases in Pakistan. A quantitative research design was employed, collecting data from 239 consumers who have experience using AI-based food applications. Data analysis was conducted using Structural Equation Modeling (SEM) via SmartPLS software to evaluate both the measurement and structural models. The results indicate that AI significantly enhances consumer engagement and consumer trust, which in turn positively affect consumer purchase intention. Mediation analysis confirms that both engagement and trust partially mediate the relationship between AI and purchase intention, highlighting the dual pathways through which AI influences consumer behavior. The findings demonstrate that AI-driven tools can improve consumers' interaction with food brands, increase trust, and ultimately strengthen purchase intentions. These insights provide valuable implications for marketers seeking to leverage AI technologies to enhance engagement, trust, and online sales in the food industry.

Keywords: artificial intelligence; engagement; trust; consumer purchase intention; online food purchases

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1. Introduction

The digital transformation of the food industry has revolutionized the way consumers search, evaluate, and purchase food products. In recent years, artificial intelligence (AI) has emerged as a key technological driver, enabling personalized experiences, predictive analytics, and decision-support tools that improve consumer interactions with online food platforms (Olstad & Boyland, 2023). AI technologies, including recommendation systems, chatbots, and data-driven personalization algorithms, allow food brands to provide targeted information, enhance convenience, and improve overall consumer satisfaction. These capabilities not only facilitate efficient decision-making but also have the potential to build trust and engagement among consumers, which are critical determinants of purchase intention in digital environments (Chinnici et al., 2025).

Consumer behavior in online food purchasing is increasingly influenced by technological innovations (Philp et al., 2022). While traditional models of consumer decision-making emphasize factors such as price, quality, and brand reputation, the integration of AI introduces new dynamics in the form of personalized guidance, automated recommendations, and predictive insights (Kler et al., 2022). Consumers now rely on AI-

based applications to identify food products, compare options, and evaluate nutritional or dietary information, making AI an essential mediator in the online purchasing process (Venkateswaran et al., 2024). Despite the growing adoption of AI in the food sector, empirical research examining its direct and indirect effects on consumer behavior, particularly through mechanisms like consumer engagement and consumer trust, remains limited. Understanding these relationships is essential for both academics and practitioners seeking to leverage AI effectively in digital marketing strategies.

Consumer engagement represents the interactive, participatory, and emotional connection that consumers develop with brands, particularly on digital platforms such as social media (Yang, Li, Ni, & Li, 2021). High levels of engagement not only strengthen brand loyalty but also influence purchase intentions by encouraging consumers to actively seek information, provide feedback, and share experiences. Consumer trust, on the other hand, reflects the confidence that consumers have in AI-driven recommendations and the reliability of brand-provided information (Yaiprasert & Hidayanto, 2023). Trust is particularly important in AI-mediated contexts, as consumers must rely on automated systems for accurate, secure, and privacy-conscious guidance. Engagement and trust act as mediators that enhance the impact of AI on purchase decisions, creating indirect pathways through which technology influences consumer behavior.

The context of online food purchasing in Pakistan offers a unique environment to explore these dynamics. With a rapidly growing digital economy and increasing smartphone penetration, Pakistani consumers are increasingly adopting online food platforms (Nawaz et al., 2023). AI-based applications, such as food delivery apps and brand-specific digital interfaces, are becoming common, allowing consumers to search for products efficiently and make informed purchasing decisions (Ding et al., 2023). However, cultural and socio-economic factors, including income, education, and familiarity with technology, may shape how AI influences engagement, trust, and purchase intention. Investigating these relationships in the Pakistani context not only addresses a significant research gap but also provides practical insights for food brands seeking to enhance consumer experiences in emerging digital markets.

Given these considerations, this study aims to examine the direct and indirect effects of AI on consumer purchase intention, focusing on the mediating roles of consumer engagement and consumer trust. By employing a quantitative approach and analyzing data from consumers who have experience with AI-based food applications, the study seeks to provide empirical evidence on how AI can drive consumer behavior in online food markets. The findings are expected to contribute to both theory and practice, offering a framework for understanding AI's role in enhancing engagement, building trust, and ultimately influencing purchase decisions.

The integration of AI into online food platforms represents a transformative shift in consumer behavior. By investigating the relationships between AI, engagement, trust, and purchase intention, this study addresses an important gap in the literature and provides actionable insights for marketers seeking to leverage technology to improve consumer experiences, satisfaction, and loyalty in the digital food industry.

2. Literature Review and Hypotheses Development

The rapid growth of digital technologies has fundamentally transformed consumer behavior across multiple industries. Among these technologies, AI has emerged as a key driver of change, providing tools that enhance personalization, decision-making, and efficiency in online platforms (Addanki et al., 2022). AI encompasses systems capable of simulating human intelligence to perform tasks such as learning, reasoning, problem-solving, and providing decision support. In the context of online food purchasing, AI can recommend products, track consumer preferences, and provide tailored information, all of which improve the user experience and influence consumer decision-making processes (Wu & Monfort, 2023).

The integration of AI into digital food platforms has created an environment where understanding its impact on consumer behavior is essential (Huang & Rust, 2022). Traditional determinants of purchase behavior, such as product quality, price, and brand reputation, remain relevant. However, AI introduces new mechanisms through which consumer attitudes, perceptions, and behaviors are shaped. In particular, AI can influence consumer engagement with brands and trust in AI-mediated systems, both of which are critical factors in determining purchase intentions. While the adoption of AI in online food applications is growing rapidly, limited research has systematically explored how AI drives consumer purchase intentions through engagement and trust. This study seeks to address this gap by developing a framework that links AI to consumer engagement, trust, and purchase intention in the online food sector.

Although AI is increasingly used in online food platforms, there is limited research examining its dual impact on engagement and trust and their combined effect on purchase intention. Most studies focus on either engagement or trust in isolation, without integrating these constructs into a unified model. Moreover, research in emerging markets, such as Pakistan, is scarce, despite the rapid growth of digital food applications and increasing adoption of AI. Addressing this gap provides valuable insights for both academic research and practical application, helping brands leverage AI to influence consumer behavior effectively.

2.1. Consumer Purchase Intention

Consumer purchase intention represents the likelihood that a consumer will buy a product or service in the near future (Bhagat et al., 2023). In online food environments, purchase intention is influenced by multiple factors, including perceived usefulness, ease of use, engagement with brand content, and trust in AI-mediated recommendations (Qin et al., 2022). High purchase intention is generally associated with increased likelihood of actual purchase behavior. AI enhances purchase intention directly by providing personalized, accurate, and relevant recommendations. Consumers are more likely to purchase food products when AI reduces search costs, facilitates comparison, and provides guidance aligned with their preferences (Rodgers & Nguyen, 2022). Indirectly, AI influences purchase intention through engagement and trust. Engaged consumers actively interact with content, develop stronger brand connections, and are more receptive to purchase messages. Similarly, consumers who trust AI systems perceive lower risk, which positively impacts their intention to purchase (Malhotra & Ramalingam, 2025). The combination of engagement and trust thus represents dual pathways through which AI affects purchase intention. By leveraging AI effectively, brands can strengthen these psychological mechanisms to increase consumer intention to buy, particularly in digital food marketplaces where choice overload and perceived risk can hinder decision-making.

2.2. Artificial Intelligence

AI in consumer settings refers to technologies that assist consumers in making decisions by providing accurate, timely, and personalized information. In online food purchasing, AI applications are widely used in recommendation systems, chatbots, and intelligent interfaces that analyze user preferences and past behavior to suggest products (Chakraborty, 2025). The integration of AI into these platforms offers multiple benefits for consumers. Firstly, AI reduces decision-making effort by narrowing down options based on individual preferences, dietary restrictions, or previous purchases (Phan et al., 2025). Secondly, AI improves the accuracy and relevance of information, helping consumers make informed decisions quickly. Thirdly, AI enhances the overall convenience and efficiency of the online food purchase process. In addition to these functional benefits, AI influences consumer perceptions regarding control, reliability, and personalization (Wang et al., 2025). Consumers perceive AI as a supportive tool that complements their decision-making rather than replacing it entirely. The presence of AI in online food applications allows users to interact with brands in a more efficient and meaningful way, potentially increasing both engagement and trust. Consumers who experience high-quality AI interactions are more likely to rely on these systems and engage more actively with brand content (Lohani Harjani & Batra, 2025). Given these mechanisms, AI is expected to directly influence consumer behavior and indirectly influence purchase intentions through engagement and trust. By providing personalized, accurate, and reliable information, AI can create a positive consumer experience that fosters both interaction and confidence in digital platforms.

H1: AI influences consumer engagement.

H2: AI influences consumer trust.

2.3. Consumer Engagement

Consumer engagement refers to the cognitive, emotional, and behavioral investment a consumer makes in interacting with a brand (Wang et al., 2025). On digital platforms, engagement is demonstrated through behaviors such as visiting brand pages, reading posts, liking and commenting on content, following brand updates, and sharing information with peers (Al Mawahreh et al., 2025). Engagement goes beyond passive consumption and reflects a deeper connection between the consumer and the brand. Engaged consumers are

more likely to develop positive attitudes toward brands, participate in brand-related activities, and exhibit loyalty and advocacy behaviors (Filipović & Šapić, 2025). In AI-mediated environments, engagement can be significantly enhanced. Personalized recommendations, interactive interfaces, and responsive AI-driven features encourage consumers to spend more time interacting with digital platforms (Jayasingh et al., 2025). For instance, an AI-powered food application that suggests meals based on a consumer's dietary preferences or past purchase history can increase the frequency and depth of engagement. This sustained interaction strengthens the consumer-brand relationship and fosters a sense of involvement, attachment, and commitment. Consumer engagement also acts as a bridge between AI and purchase intention. Consumers who are highly engaged are more likely to notice marketing messages, consider brand offerings, and ultimately make purchase decisions. The interactive and personalized nature of AI-enabled applications thus provides a pathway through which technology can increase consumer involvement and intention to buy.

H3: Consumer engagement influences consumer purchase intention.

H4: Consumer engagement mediates the relationship between AI and consumer purchase intention.

2.4. Consumer Trust

Consumer trust reflects the confidence consumers have in the reliability, integrity, and competence of a brand or technological system (Wang et al., 2025). Trust is particularly important in online environments where consumers face uncertainty and risk related to product quality, privacy, and transaction security. In AI-mediated contexts, trust is critical because consumers must rely on automated systems to provide accurate, secure, and personalized recommendations (Xia et al., 2024). Without trust, even the most sophisticated AI tools are unlikely to influence purchase intentions effectively. AI fosters trust by ensuring transparency, accuracy, and privacy protection (Malhotra & Ramalingam, 2025). When consumers perceive AI systems as reliable and capable of delivering personalized guidance without compromising data security, they are more likely to trust the system and the associated brand (Chakraborty, 2025). Trust reduces perceived risks, enhances confidence in decision-making, and strengthens the likelihood of purchase. In addition, trust interacts with engagement; consumers who trust AI tools are more likely to engage actively with brand content, creating a reinforcing cycle that further strengthens purchase intentions.

H5: Consumer trust influences consumer purchase intention.

H6: Consumer trust mediates the relationship between AI and consumer purchase intention.

Figure 1 depicts research model.

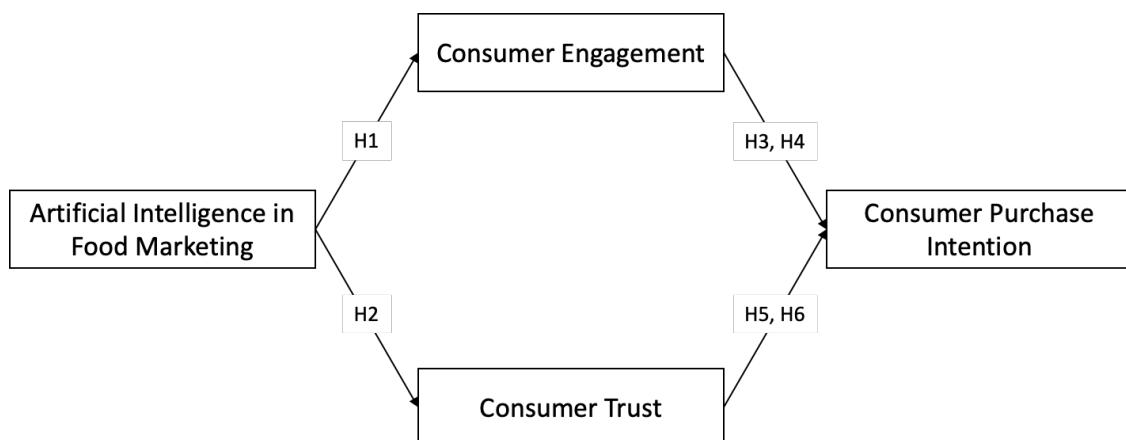


Figure 1. Research model.

3. Methodology

This study employed a quantitative research design to examine the impact of AI on consumer behavior, with a focus on consumer engagement, consumer trust, and purchase intention in the online food sector. Data

were collected from consumers in Pakistan who intended to purchase food online and had prior experience using AI-based food applications. The survey was conducted between June and July 2025, yielding a total sample of 239 respondents.

A structured questionnaire was employed to collect primary data, with all items measured on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The measurement scales were adapted from established studies to ensure reliability and validity. Specifically, six items measuring AI were adapted from Paschen et al. (2019) and Wijayati et al. (2022), six items for consumer engagement were adopted from Gummerus et al. (2012), three items for consumer trust were adapted from Konuk (2019), and seven items for consumer purchase intention were taken from Wang and Chang (2013).

Data analysis was conducted using Structural Equation Modeling (SEM) with SmartPLS software, which allowed for simultaneous assessment of the measurement and structural models. Reliability, convergent validity, and discriminant validity were evaluated for all constructs. The structural model was tested to examine the hypothesized relationships among AI, consumer engagement, consumer trust, and consumer purchase intention, including both direct and indirect effects. This methodological approach provides a rigorous framework for assessing the influence of AI on online consumer behavior in the Pakistani context.

4. Results

Table 1 presents the demographic profile of the 239 study participants. The sample shows an almost equal gender distribution, with males representing 50.2 percent and females 49.8 percent. Participants were predominantly young to middle-aged adults. The largest age group was 25–34 years (38.5 percent), followed by those aged 35–44 years (24.3 percent) and 18–24 years (20.1 percent). Smaller proportions were in the 45–54 age range (11.7 percent) and 55 years or older (5.4 percent). In terms of education, nearly half of the respondents held a bachelor's degree (46.0 percent), while 20.9 percent had a master's degree. Those with diploma or associate qualifications accounted for 15.9 percent, and 13.4 percent had completed high school or less. A minority (3.8 percent) reported holding a PhD. Employment status was dominated by individuals employed full-time (56.1 percent). Part-time employees constituted 11.7 percent, while students represented 14.2 percent of the sample. Smaller groups included the self-employed (10.5 percent), unemployed (5.0 percent), and retired individuals (2.5 percent). Monthly household income levels varied, with the largest share of participants earning between PKR 282,000 and 564,000 (30.1 percent), followed by those in the PKR 140,000–282,000 bracket (28.5 percent). Approximately 16.7 percent earned below PKR 140,000, while 15.9 percent reported income between PKR 564,000 and 1,128,000. The highest-income group (\geq PKR 1,128,000) comprised 8.8 percent of the sample. Regarding online food purchasing behavior, 38 percent stated they often purchase food online, 33 percent reported purchasing sometimes, and 15 percent indicated they always do so. Only 14 percent of participants reported purchasing online food rarely.

Table 2 presents the results of the measurement model assessment, including factor loadings, internal consistency reliability, composite reliability, and average variance extracted (AVE) for all constructs. Overall, the findings indicate that the measurement model demonstrates satisfactory reliability and convergent validity across constructs. For the AI construct, all item loadings exceed the recommended threshold of 0.70, ranging from 0.797 to 0.921, indicating strong indicator reliability. The construct shows robust internal consistency, with a Cronbach's alpha of 0.832 and a composite reliability of 0.817. The AVE value of 0.571 surpasses the 0.50 benchmark, confirming adequate convergent validity. This suggests that the items collectively capture the underlying concept of AI use in the context of food-related decision-making. The consumer engagement construct also demonstrates acceptable psychometric properties. Item loadings range from 0.731 to 0.896, all above the required threshold. Cronbach's alpha (0.759) and composite reliability (0.733) both indicate sufficient internal consistency. The AVE value of 0.706 is well above 0.50, signifying high shared variance among the items and strong convergent validity. These results affirm that the items effectively represent consumer engagement behavior on social networking sites. For consumer trust, the three items display loadings between 0.786 and 0.868, reinforcing their reliability. Both Cronbach's alpha (0.831) and composite reliability (0.899) exceed recommended cutoffs, reflecting excellent internal consistency. The AVE of 0.747 is substantially high, confirming strong convergent validity and indicating that the construct is well measured by its indicators. The consumer purchase intention construct contains seven items with loadings ranging from 0.716 to 0.895, all within acceptable limits. The Cronbach's alpha (0.856) and composite reliability (0.829) demonstrate strong reliability. The AVE value of 0.639 exceeds the recommended level, confirming that the construct exhibits

adequate convergent validity. This indicates that the items collectively provide a coherent representation of consumers' intentions to purchase food products marketed through social networking sites.

Table 1. Demographic of study participants (n=239).

Characteristic	Category	Frequency	Percent
Gender	Male	120	50.2%
	Female	119	49.8%
Age (years)	18–24	48	20.1%
	25–34	92	38.5%
	35–44	58	24.3%
	45–54	28	11.7%
	55+	13	5.4%
Highest Education Attained	High school or less	32	13.4%
	Diploma / Associate	38	15.9%
	Bachelor's degree	110	46.0%
	Master's degree	50	20.9%
	PhD	9	3.8%
Employment Status	Employed full-time	134	56.1%
	Employed part-time	28	11.7%
	Student	34	14.2%
	Self-employed	25	10.5%
	Unemployed	12	5.0%
Monthly Household Income (PKR)	Retired	6	2.5%
	< 140,000	40	16.7%
	140,000–282,000	68	28.5%
	282,000–564,000	72	30.1%
	564,000–1,128,000	38	15.9%
Frequency of Online Food Purchases	≥ 1,128,000	21	8.8%
	Rarely	34	14%
	Sometimes	78	33%
	Often	92	38%
	Always	35	15%

Table 2. Measurement model.

Items with Constructs	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Artificial Intelligence		0.832	0.817	0.571
AI1: AI can help me find lost data about buying food	0.808			
AI2: AI provides accurate data and information about buying food	0.797			
AI3: AI can help me in making important decisions about buying food	0.869			
AI4: AI can help display hard-to-measure data about food	0.801			
AI5: AI can protect the privacy of yourself and others while searching food	0.921			
AI6: AI can help me in searching the food	0.885			
Consumer Engagement		0.759	0.733	0.706
CE1: I often visit pages of food brands I follow on social networking sites	0.896			
CE2: I often read posts of brands I follow on social networking sites	0.815			
CE3: I often use the "like" option on brands posts; I follow on social networking sites	0.731			
CE4: I often comment on brands pages on social networking sites	0.865			
CE5: I follow brands pages of my interest to get information (e.g., new products)	0.776			
CE6: Being part of brands I follow on social networking sites, increased my trust on that brands	0.871			
Consumer Trust		0.831	0.899	0.747
CT1: I trust in AI for food selection	0.838			
CT2: I rely on AI for food selection	0.786			
CT3: I like AI for food selection	0.868			
Consumer Purchase Intention		0.856	0.829	0.639
CPI1: Using social networking sites of food brands help me make decisions better before purchasing products	0.895			

Items with Constructs	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
CPI2: Using social networking sites of food brands increase my interest in buying products	0.875			
CPI3: I am very likely to buy food products recommended by my friends on social networking sites	0.716			
CPI4: I will definitely buy food products as marketed on brand's social networking sites, I follow	0.865			
CPI5: I intend to purchase food products as marketed on brand's social networking sites, I follow	0.787			
CPI6: It is likely that I will purchase food products as marketed on brand's social networking sites, I follow	0.823			
CPI7: I expect to purchase food products as marketed on brand's social networking sites, I follow	0.753			

Table 3 presents the discriminant validity assessment of the study constructs. Discriminant validity examines whether constructs are sufficiently distinct from one another. Following the Fornell-Larcker criterion, the square root of the AVE for each construct is compared with its correlations with other constructs. AI, consumer engagement, consumer purchase intention, and consumer trust are conceptually distinct constructs within the model, supporting the adequacy of the measurement model for further structural analysis.

Table 3. Discriminant validity.

	AI	Consumer Engagement	Consumer Purchase Intention	Consumer Trust
AI	0.826			
Consumer Engagement	0.792	0.841		
Consumer Purchase Intention	0.775	0.788	0.859	
Consumer Trust	0.744	0.691	0.791	0.864

Table 4 presents the structural model results, including path coefficients, standard deviations, t-statistics, and significance levels for the hypothesized relationships. The findings indicate that all proposed hypotheses are supported. The direct effect of AI on consumer engagement is strong and positive ($\beta = 0.792$, $t = 11.652$, $p < 0.00$), supporting H1. Similarly, AI significantly influences consumer trust ($\beta = 0.744$, $t = 6.667$, $p < 0.00$), confirming H2. Consumer engagement positively impacts consumer purchase intention ($\beta = 0.415$, $t = 9.784$, $p < 0.00$), supporting H3. The mediation effect of consumer engagement between AI and consumer purchase intention is also significant ($\beta = 0.329$, $t = 8.711$, $p < 0.001$), confirming H4. Likewise, consumer trust positively affects consumer purchase intention ($\beta = 0.522$, $t = 6.174$, $p < 0.001$), supporting H5, and it also mediates the relationship between AI and consumer purchase intention ($\beta = 0.388$, $t = 7.894$, $p < 0.001$), supporting H6.

Table 4. Path coefficients.

Paths	Beta	Standard deviation	T statistics	P values	Results
AI -> Consumer Engagement	0.792	0.068	11.652	0.00	H1 supported
AI -> Consumer Trust	0.744	0.112	6.667	0.00	H2 supported
Consumer Engagement -> Consumer Purchase Intention	0.415	0.232	9.784	0.00	H3 supported
AI -> Consumer Engagement -> Consumer Purchase Intention	0.329	0.192	8.711	0.00	H4 supported
Consumer Trust -> Consumer Purchase Intention	0.522	0.24	6.174	0.00	H5 supported
AI -> Consumer Trust -> Consumer Purchase Intention	0.388	0.205	7.894	0.00	H6 supported

The R-square values indicate the proportion of variance in the endogenous constructs explained by their predictors in the structural model (Figure 2). Consumer engagement has an R^2 of 0.628, suggesting that 62.8% of its variance is explained by artificial intelligence. Consumer trust has an R^2 of 0.553, indicating that 55.3% of its variance is accounted for by artificial intelligence. The highest R^2 is observed for consumer purchase intention, with a value of 0.830, meaning that 83.0% of its variance is explained collectively by consumer engagement and consumer trust. These results demonstrate that the model has substantial explanatory power, particularly for consumer purchase intention, highlighting the strong influence of AI-driven engagement and trust on consumers' intention to purchase.

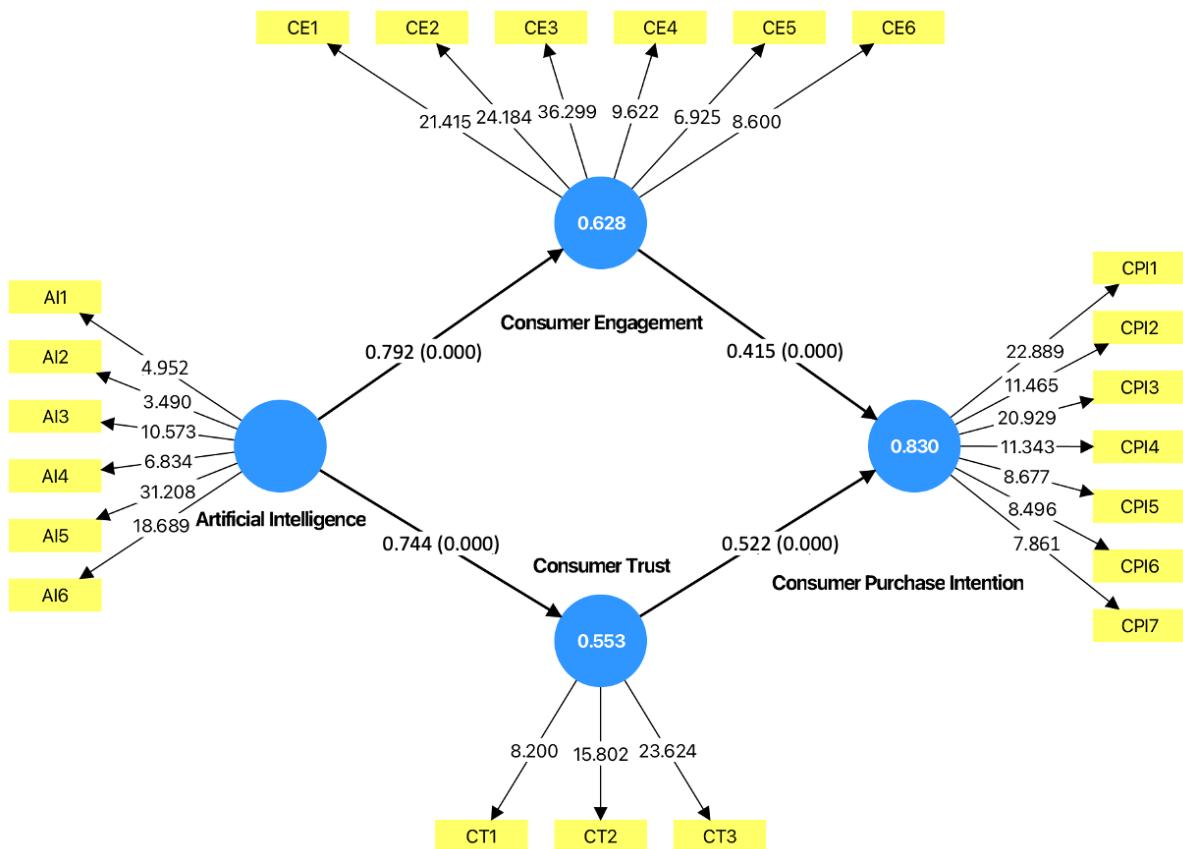


Figure 2. Structural model.

5. Discussion

The findings of this study provide substantial evidence for the influence of AI on consumer behavior in the context of online food purchases. Consistent with previous literature, AI was found to have a strong and positive effect on consumer engagement ($\beta = 0.792$, $p < 0.001$) and consumer trust ($\beta = 0.744$, $p < 0.001$). This suggests that AI-enabled tools, such as recommendation systems and data-driven insights, enhance consumer interaction with food brands and foster trust in AI-mediated food selection. The role of AI in improving personalized experiences and reliability in decision-making (Bhagat et al., 2023).

The study also confirms that consumer engagement and consumer trust significantly influence consumer purchase intention, with path coefficients of 0.415 and 0.522, respectively. This indicates that when consumers are actively engaged with brand content on social networking sites or trust AI-driven recommendations, they are more likely to intend to purchase food products (Rodgers & Nguyen, 2022). Furthermore, the mediation analyses demonstrate that both engagement ($\beta = 0.329$) and trust ($\beta = 0.388$) partially mediate the relationship between AI and purchase intention. These findings emphasize that AI impacts consumer purchase behavior not only directly but also indirectly by fostering engagement and trust, which serve as key mechanisms in the decision-making process (Wang et al., 2025).

The model's R-square values further reinforce these conclusions. With AI explaining 62.8% of the variance in consumer engagement and 55.3% in consumer trust, the results suggest that AI is a significant driver of these constructs. Moreover, the model explains 83% of the variance in consumer purchase intention, indicating a strong predictive power and highlighting the combined importance of engagement and trust in shaping purchase decisions.

These findings underscore the critical role of AI in digital marketing for food brands. By leveraging AI technologies, brands can enhance consumer interaction, build trust, and ultimately drive purchase intentions (Xia et al., 2024). Practically, food companies should focus on implementing AI-driven personalized recommendations, privacy-protective data tools, and interactive content on social media to maximize consumer engagement and trust. These strategies are likely to translate into stronger consumer purchase intentions and improved business outcomes.

This study contributes to the literature on consumer behavior and AI adoption in the food industry by empirically demonstrating the mechanisms through which AI influences purchase intentions. The findings highlight that AI not only directly affects consumer behavior but also indirectly shapes intentions via consumer engagement and consumer trust. This extends existing models of technology acceptance and online consumer behavior by emphasizing the dual mediating role of engagement and trust in AI-mediated decision-making contexts. Moreover, the consumer purchase intention provides strong evidence of the critical role AI plays in influencing online food purchase behavior, offering a robust framework for future research in digital marketing and AI applications.

From a managerial perspective, the results suggest that food brands should strategically invest in AI-enabled tools that enhance both consumer engagement and trust. AI applications, such as personalized recommendations, predictive analytics, and privacy-protective features, can significantly improve user interaction with brand content on social media platforms and increase confidence in AI-driven decision support. Marketers should also focus on creating engaging social media content and interactive brand experiences, as these factors amplify the positive effects of AI on purchase intentions. Ultimately, leveraging AI effectively can lead to higher consumer satisfaction, stronger brand loyalty, and increased online sales in the food industry.

6. Conclusion

This study examined the role of AI in shaping consumer behavior in the context of online food purchases, with a particular focus on the mediating effects of consumer engagement and consumer trust. The results demonstrate that AI has a significant and positive impact on both engagement with food brands on social media and trust in AI-driven recommendations. Specifically, consumers perceive AI as a tool that provides accurate, personalized, and privacy-conscious information, which enhances their interaction with brand content and strengthens confidence in their purchasing decisions. The findings also highlight the critical mediating roles of consumer engagement and consumer trust. Engagement with brand content and active participation on social media platforms significantly influences consumers' intention to purchase, while trust in AI further reinforces their likelihood of making informed purchase decisions. The mediation analyses indicate that AI not only exerts a direct effect on purchase intention but also indirectly shapes behavior through these key psychological mechanisms. The study provides robust evidence that integrating AI into digital marketing strategies can meaningfully influence consumer behavior in the food industry. By leveraging AI to enhance engagement and build trust, food brands can improve purchase intentions, foster loyalty, and achieve better business outcomes. These findings offer valuable insights for both researchers and practitioners interested in the intersection of AI technology, consumer engagement, trust, and online purchasing behavior.

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Formal analysis: Danish Sanwal.

Funding acquisition: Hira Batool, Danish Sanwal.

Investigation: Hira Batool.

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Writing –original draft: Hira Batool, Danish Sanwal.

Writing –review & editing: Danish Sanwal.

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References

Addanki, M., Patra, P., & Kandra, P. (2022). Recent advances and applications of artificial intelligence and related technologies in the food industry. *Applied Food Research*, 2(2), 100126. <https://doi.org/10.1016/j.afres.2022.100126>

Al Mawahreh, M. A. L., Alshar, M. M., Allahham, M., & Ahmad, A. Y. B. (2025, April). The impact of artificial intelligence on purchase intention: The mediating role of digital engagement. In *Proceedings of the 2025 1st International Conference on Computational Intelligence Approaches and Applications (ICCIAA)* (pp. 1–8). IEEE. <https://doi.org/10.1109/ICCIAA65327.2025.11013641>

Bhagat, R., Chauhan, V., & Bhagat, P. (2023). Investigating the impact of artificial intelligence on consumers' purchase intention in e-retailing. *Foresight*, 25(2), 249–263. <https://doi.org/10.1108/FS-10-2021-0218>

Chakraborty, D. (2025). From algorithms to adoption of AI-based online food delivery platforms: The role of technology fit and emotional trust in adoption. *British Food Journal*, 127(7), 2586–2607. <https://doi.org/10.1108/BFJ-02-2025-0143>

Chinnici, P., Bacarella, S., Chironi, S., Naselli, V., & Ingrassia, M. (2025). How will artificial intelligence drive marketing in the beverage industry? A bibliometric literature review. *Future Foods*, 100704. <https://doi.org/10.1016/j.fufo.2025.100704>

Ding, H., Tian, J., Yu, W., Wilson, D. I., Young, B. R., Cui, X., & Li, W. (2023). The application of artificial intelligence and big data in the food industry. *Foods*, 12(24), 4511. <https://doi.org/10.3390/foods12244511>

Filipović, J., & Šapić, S. (2025). Artificial intelligence elements as antecedents of social media consumer engagement and purchase intention. *International Communication of Chinese Culture*, 12(2), 183–204. <https://doi.org/10.1007/s40636-025-00324-3>

Gummerus, J., Liljander, V., Weman, E., & Pihlström, M. (2012). Customer engagement in a Facebook brand community. *Management Research Review*, 35(9), 857–877. <https://doi.org/10.1108/01409171211256578>

Huang, M. H., & Rust, R. T. (2022). A framework for collaborative artificial intelligence in marketing. *Journal of Retailing*, 98(2), 209–223. <https://doi.org/10.1016/j.jretai.2021.03.001>

Jayasingh, S., Sivakumar, A., & Vanathaiyan, A. A. (2025). Artificial intelligence influencers' credibility effect on consumer engagement and purchase intention. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(1), 17. <https://doi.org/10.3390/jtaer20010017>

Kler, R., Elkady, G., Rane, K., Singh, A., Hossain, M. S., Malhotra, D., & Bhatia, K. K. (2022). [Retracted] Machine learning and artificial intelligence in the food industry: A sustainable approach. *Journal of Food Quality*, 2022(1), 8521236. <https://doi.org/10.1155/2022/8521236>

Konuk, F. A. (2019). The impact of retailer innovativeness and food healthiness on store prestige, store trust, and store loyalty. *Food Research International*, 116, 724–730. <https://doi.org/10.1016/j.foodres.2018.09.003>

Lohani Harjani, J., & Batra, I. (2025). Antecedents of artificial intelligence in the food service industry: A meta-analytic review. *Journal of Foodservice Business Research*, 1–26. <https://doi.org/10.1080/15378020.2025.2491861>

Malhotra, G., & Ramalingam, M. (2025). Perceived anthropomorphism and purchase intention using artificial intelligence technology: Examining the moderated effect of trust. *Journal of Enterprise Information Management*, 38(2), 401–423. <https://doi.org/10.1108/JEIM-09-2022-0316>

Nawaz, M. A., Khan, D., & Khan, Q. M. (2023). Role of artificial intelligence in shaping customer demand in e-commerce: A case study of Pakistan. *Annals of Human and Social Sciences*, 4(4), 626–635. [https://doi.org/10.35484/ahss.2023\(4-IV\)60](https://doi.org/10.35484/ahss.2023(4-IV)60)

Olstad, D. L., & Boyland, E. (2023). Towards effective restriction of unhealthy food marketing to children: Unlocking the potential of artificial intelligence. *International Journal of Behavioral Nutrition and Physical Activity*, 20(1), 61. <https://doi.org/10.1186/s12966-023-01458-6>

Paschen, J., Kietzmann, J., & Kietzmann, T. C. (2019). Artificial intelligence (AI) and its implications for market knowledge in B2B marketing. *Journal of Business & Industrial Marketing*, 34(7), 1410–1419. <https://doi.org/10.1108/JBIM-10-2018-0295>

Phan, T. A., Nguyen, T. H. T., & Nguyen, C. (2025). "Hey AI, what should I eat?" Navigating skepticism and trust in AI-powered meal recommendations through personalized persuasion. *International Journal of Human-Computer Interaction*, 1–13. <https://doi.org/10.1080/10447318.2025.2575098>

Philp, M., Jacobson, J., & Pancer, E. (2022). Predicting social media engagement with computer vision: An examination of food marketing on Instagram. *Journal of Business Research*, 149, 736–747. <https://doi.org/10.1016/j.jbusres.2022.05.078>

Qin, M., Zhu, W., Zhao, S., & Zhao, Y. (2022). Is artificial intelligence better than manpower? The effects of different types of online customer services on customer purchase intentions. *Sustainability*, 14(7), 3974. <https://doi.org/10.3390/su14073974>

Rodgers, W., & Nguyen, T. (2022). Advertising benefits from ethical artificial intelligence algorithmic purchase decision pathways. *Journal of Business Ethics*, 178(4), 1043–1061. <https://doi.org/10.1007/s10551-022-05048-7>

Venkateswaran, P. S., Dominic, M. L., Agarwal, S., Oberai, H., Anand, I., & Rajest, S. S. (2024). The role of artificial intelligence (AI) in enhancing marketing and customer loyalty. In *Data-driven intelligent business sustainability* (pp. 32–47). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-0049-7.ch003>

Wang, J. C., & Chang, C. H. (2013). How online social ties and product-related risks influence purchase intentions: A Facebook experiment. *Electronic Commerce Research and Applications*, 12(5), 337–346. <https://doi.org/10.1016/j.elerap.2013.03.003>

Wang, W., Chen, Z., & Kuang, J. (2025). Artificial intelligence-driven recommendations and functional food purchases: Understanding consumer decision-making. *Foods*, 14(6), 976. <https://doi.org/10.3390/foods14060976>

Wijayati, D. T., Rahman, Z., Rahman, M. F. W., Arifah, I. D. C., & Kautsar, A. (2022). A study of artificial intelligence on employee performance and work engagement: The moderating role of change leadership. *International Journal of Manpower*, 43(2), 486–512. <https://doi.org/10.1108/IJM-07-2021-0423>

Wu, C. W., & Monfort, A. (2023). Role of artificial intelligence in marketing strategies and performance. *Psychology & Marketing*, 40(3), 484–496. <https://doi.org/10.1002/mar.21737>

Xia, T., Shen, X., & Li, L. (2024). Is AI food a gimmick or the future direction of food production? Predicting consumers' willingness to buy AI food based on cognitive trust and affective trust. *Foods*, 13(18), 2983. <https://doi.org/10.3390/foods13182983>

Yaiprasert, C., & Hidayanto, A. N. (2023). AI-driven ensemble machine learning to enhance digital marketing strategies in the food delivery business. *Intelligent Systems with Applications*, 18, 200235. <https://doi.org/10.1016/j.iswa.2023.200235>

Yang, X., Li, H., Ni, L., & Li, T. (2021). Application of artificial intelligence in precision marketing. *Journal of Organizational and End User Computing*, 33(4), 209–219. <https://doi.org/10.4018/JOEUC.20210701.0a10>

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