JOURNAL OF MANAGEMENT AND BUSINESS SOLUTIONS

The Role of Artificial Intelligence–Based Customer Experience in Brand Loyalty: The Mediating Role of Brand Attachment and the Moderating Effect of Perceived Technology Risk

1. Maryam. Ghadiri: PhD Student in Business Management, Department of Management, Se.C., Islamic Azad University, Semnan, Iran
2. Leili. Ghadiri*: PhD Student in Business Management, Department of Management, Se.C., Islamic Azad University, Semnan, Iran
3. Seyed Salman. Hosseini: PhD Student in Business Management, Department of Management, Se.C., Islamic Azad University, Semnan, Iran

*corresponding author's email: leili.ghadiri@iau.ac.ir

ABSTRACT

This study aimed to investigate the effect of artificial intelligence–based customer experience on brand loyalty, with emphasis on the mediating role of brand attachment and the moderating effect of perceived technology risk among consumers in Tehran. This applied, quantitative, cross-sectional study employed a descriptive-correlational design. The statistical population consisted of consumers in Tehran with prior experience using AI-enabled brand services, including intelligent recommendation systems, chatbots, automated customer support, and personalized digital interfaces. A total of 384 valid questionnaires were obtained through convenience sampling with purposive screening. Data were collected using a structured questionnaire measuring AI-based customer experience, brand attachment, perceived technology risk, and brand loyalty on five-point Likert scales. Reliability and validity were assessed using Cronbach's alpha, composite reliability, average variance extracted, the Fornell–Larcker criterion, and the heterotrait–monotrait ratio. Data were analyzed using SPSS and SmartPLS through descriptive statistics, correlation analysis, measurement model assessment, and partial least squares structural equation modeling with 5,000 bootstrap resamples. AI-based customer experience had a significant positive effect on brand attachment ($\beta = 0.68$, $p < 0.001$) and brand loyalty ($\beta = 0.31$, $p < 0.001$). Brand attachment significantly predicted brand loyalty ($\beta = 0.48$, $p < 0.001$) and significantly mediated the relationship between AI-based customer experience and brand loyalty ($\beta = 0.33$, $p < 0.001$). Perceived technology risk had a significant negative effect on brand loyalty ($\beta = -0.17$, $p < 0.001$) and significantly weakened the positive effect of AI-based customer experience on brand loyalty ($\beta = -0.14$, $p < 0.001$). The model explained 46% of the variance in brand attachment and 69% of the variance in brand loyalty. Favorable AI-based customer experiences strengthen brand loyalty both directly and indirectly through enhanced brand attachment, whereas higher perceived technology risk reduces loyalty and attenuates the positive contribution of AI-enabled experiences.

Keywords: Artificial Intelligence, Customer Experience, Brand Loyalty, Brand Attachment, Perceived Technology Risk, Personalization



Article history:
Received 04 August 2026
Revised 07 November 2026
Accepted 13 November 2026
Initial Publish 24 December 2026
Published online 01 November 2027

How to cite this article:
Ghadiri, M., Ghadiri, L., & Hosseini, S. S., (2027). The Role of Artificial Intelligence–Based Customer Experience in Brand Loyalty: The Mediating Role of Brand Attachment and the Moderating Effect of Perceived Technology Risk. *Journal of Management and Business Solutions, 5*(11), 1-20. https://doi.org/10.61838/jmbs.531

© 2027 the authors. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

Introduction

Artificial intelligence has become one of the most consequential technological forces reshaping contemporary marketing, customer relationship management, and brand–consumer interactions. Its applications increasingly extend beyond operational automation to activities directly affecting how customers perceive, evaluate, and emotionally respond to brands. AI-enabled recommendation systems, chatbots, voice assistants, predictive analytics, personalized advertisements, smart service interfaces, and generative AI tools now influence multiple stages of the customer journey, ranging from information search and product discovery to purchase decisions, post-purchase support, and long-term brand engagement. As AI becomes embedded in interactive marketing environments, customer experience is increasingly co-produced through algorithmic systems capable of adapting content, anticipating preferences, reducing search effort, and generating personalized interactions at scale (1, 2). The expansion of these technologies has transformed the customer–brand interface and raised new questions regarding whether technology-mediated experiences can produce durable relational outcomes such as trust, attachment, and loyalty rather than only short-term convenience or transactional efficiency (3, 4).

AI-based customer experience can be understood as the customer's multidimensional evaluation of interactions in which artificial intelligence meaningfully contributes to personalization, responsiveness, relevance, convenience, prediction, service efficiency, and interaction quality. Unlike conventional digital experiences, AI-supported experiences are characterized by adaptive and data-driven functionality. Such systems can learn from prior behavior, predict consumer needs, customize communication, and alter service recommendations in real time. Consequently, the perceived quality of AI-enabled interactions may determine whether customers regard a brand as intelligent, attentive, responsive, and capable of understanding their individual preferences. Research on AI-driven consumer behavior increasingly indicates that the value of artificial intelligence in marketing lies not simply in automation but in its capacity to change customers' cognitive, emotional, and behavioral responses across the customer journey (5). Evidence from AI-driven marketing environments suggests that personalization, interactive convenience, perceived usefulness, and recommendation quality can significantly increase customer engagement and loyalty when technology is perceived as relevant and beneficial (6, 7).

Personalization represents one of the most prominent mechanisms through which AI influences the customer experience. By analyzing behavioral data, purchase histories, browsing patterns, and stated preferences, AI systems can generate individualized recommendations that reduce information overload and increase perceived relevance. In smart tourism environments, for example, perceived recommendation quality and recommendation discovery have been shown to play important roles in translating AI-driven personalization into stronger brand loyalty (7). Similarly, generative AI can strengthen loyalty when personalized interactions are accompanied by transparency and trust, indicating that the effectiveness of AI personalization depends not merely on technical sophistication but also on the extent to which consumers perceive the system as credible and understandable (8). The growing literature on digital transformation likewise suggests that sustainable customer value emerges when AI-enabled services provide functional benefits while simultaneously supporting perceived reliability and relationship quality (9). These findings imply that AI-based customer experience is fundamentally relational because customers interpret algorithmic performance as part of the broader brand encounter.

The role of artificial intelligence becomes particularly important in contexts where consumers repeatedly interact with AI-powered interfaces. Interactive voice assistants, for instance, have been shown to contribute to loyalty

formation through convenience, interaction quality, and relationship-building processes (10). Research on voice-assistant adoption further demonstrates that perceived value and prior technological experience influence consumers' willingness to engage with intelligent interfaces (11). More recent reviews indicate that voice assistants increasingly function as commercial touchpoints rather than simple technological utilities, making their relational and branding consequences especially relevant (4). In hospitality and tourism, voice-assisted interactions may also improve reputation-related outcomes when consumers perceive them as innovative, convenient, and service-enhancing (12). Similarly, perceived ownership of AI assistants can enhance adoption intentions by increasing psychological connection with the technology, suggesting that consumers may develop relational responses not only toward brands but also toward the AI systems representing them (13).

The connection between AI-based customer experience and brand loyalty is therefore increasingly central to marketing research. Brand loyalty reflects a consumer's sustained preference for a brand, willingness to repurchase, resistance to switching, and tendency to recommend the brand despite competing alternatives. Traditional loyalty research has conceptualized loyalty as a developmental process that includes cognitive, affective, conative, and behavioral components (14). In AI-mediated environments, however, the antecedents of loyalty may differ because customer evaluations increasingly depend on algorithmic interactions. Empirical research indicates that AI acceptance can facilitate value co-creation and strengthen loyalty among younger consumers when digital services are perceived as useful and compatible with customers' expectations (15). Likewise, evidence from e-commerce environments suggests that AI can positively affect e-customer loyalty by enhancing service quality, convenience, personalization, and responsiveness (16). AI-driven retail systems may also reinforce loyalty through perceived relational reciprocity when consumers experience algorithmic interactions as synchronized with their needs and expectations (17).

Despite these positive effects, the mechanisms through which AI-based experiences produce loyalty remain insufficiently explained if loyalty is treated only as a direct behavioral outcome. Customer relationships with brands frequently involve emotional bonds that extend beyond utilitarian satisfaction. Brand attachment is particularly relevant because it captures the strength of the emotional and psychological bond connecting a consumer to a brand. Attachment develops when a brand becomes meaningful to the consumer, contributes to self-definition, provides emotional value, or becomes integrated into habitual and symbolic consumption. Studies of functional, symbolic, and hedonic brands indicate that attachment can emerge through different value pathways, depending on the meanings consumers associate with the brand (18). Brand attachment also varies according to product involvement, indicating that the depth of consumer–brand connection depends partly on how important or personally relevant the consumption context is (19). Accordingly, attachment may serve as a critical psychological mechanism through which repeated positive AI-enabled experiences become transformed into enduring brand loyalty.

This mediating logic is consistent with broader research showing that loyalty often results from emotional connection rather than from satisfaction alone. Research on brand love and loyalty indicates that consumers who develop stronger affective relationships with brands are more willing to maintain those relationships across time (20). In AI-mediated environments, emotionally meaningful interactions may emerge when customers perceive personalized systems as responsive to their preferences, supportive of their goals, and consistent with their identities. AI-enabled systems may therefore increase attachment by creating a sense of individualized recognition and relational continuity. However, this process is not uniformly positive. Research on AI recommendations has shown that excessive dependence on algorithmic recommendations may weaken brand–self connections,

particularly when consumers feel that the technology reduces autonomy or encourages behavior driven by fear of missing out (21). In sport and fan contexts, AI also intersects with identity and engagement, indicating that predictive and personalized technologies can influence how consumers connect their sense of self to brands and communities (22). Thus, the relationship between AI experience and brand attachment requires careful examination because the same technology that strengthens relevance and convenience may also interfere with autonomy, authenticity, or identity-based attachment.

The broader literature on parasocial interaction also reinforces the importance of relational mechanisms in technologically mediated marketing. Consumers can develop one-sided but psychologically meaningful relationships with mediated entities, influencers, virtual agents, and branded personalities, and such relationships can influence trust, engagement, and purchasing behavior (23). AI-based interfaces may intensify this phenomenon by creating more responsive and personalized interactions, thereby blurring the distinction between technological functionality and social exchange. Reviews of AI and customer engagement similarly indicate that affective outcomes should be distinguished from behavioral outcomes because consumers may engage with AI systems without necessarily developing deeper emotional connections (24). This distinction is particularly important for understanding brand attachment as a mediator: AI-based customer experience may influence loyalty partly because positive technological interactions become psychologically attributed to the brand itself.

At the same time, the benefits of AI-driven customer experience are constrained by the risks consumers associate with artificial intelligence. Perceived technology risk refers to the uncertainty and potential negative consequences that consumers associate with using AI-enabled systems, including privacy loss, data misuse, security threats, opaque decision-making, algorithmic errors, manipulation, loss of control, and dependence on automated recommendations. The personalization–privacy paradox is especially salient because the same customer data that enable more accurate and relevant personalization can generate concerns regarding surveillance, profiling, and unauthorized data use (25). Research on AI-driven e-commerce similarly shows that consumers evaluate personalization through a trade-off between perceived well-being benefits and privacy concerns, suggesting that trust may deteriorate when personalization becomes intrusive or insufficiently transparent (26). Therefore, favorable AI-based experiences may not produce the same level of loyalty among consumers who perceive greater technological risk.

Risk-related concerns are increasingly central to the literature on digital consumer behavior. Studies of digital financial decision-making show that consumers evaluate digital services not only through benefits and convenience but also through uncertainty, vulnerability, and perceived exposure to adverse outcomes (27). Research on AI-related trust likewise demonstrates that trust in intelligent systems depends on perceived competence, integrity, transparency, predictability, and communication quality (28). In social commerce, trust plays a foundational role in determining whether consumers are willing to participate and engage with digitally mediated commercial environments (29). These findings imply that the psychological interpretation of AI-based experiences may depend heavily on whether consumers believe that the technology is safe, transparent, and aligned with their interests.

The moderating role of perceived technology risk is also theoretically consistent with evidence regarding the negative consequences of artificial intelligence in marketing. Meta-analytic research on the dark side of AI has documented concerns involving privacy invasion, consumer vulnerability, perceived manipulation, loss of autonomy, discrimination, and negative emotional reactions (30). Consumers may therefore respond differently to identical levels of AI-enabled personalization depending on their perceptions of technological risk. A customer who views AI

as reliable and safe may interpret personalization as evidence that the brand understands and values them, whereas a customer who is concerned about surveillance or data misuse may interpret the same personalization as intrusive. This divergence suggests that perceived technology risk may weaken the positive effect of AI-based customer experience on brand loyalty, functioning as an important boundary condition.

Consumer readiness and individual responses to AI further support the relevance of such boundary conditions. Research on AI use readiness in physical retail demonstrates that consumer attitudes toward artificial intelligence and demographic differences can shape willingness to use AI-enabled services (31). Similarly, willingness to purchase AI-related products can depend on both cognitive and affective trust, demonstrating that consumer responses to artificial intelligence are not determined solely by objective product characteristics (32). Broader consumption-value research also indicates that purchase and usage behavior reflect multiple value dimensions, including functional, emotional, social, epistemic, and conditional values (33). Accordingly, consumer evaluations of AI-enabled experiences should be examined as complex value judgments in which perceived benefits coexist with perceived risks.

The evolution of AI-driven commerce further increases the importance of understanding these relationships. Immersive and AI-supported commerce environments increasingly integrate personalization, entertainment, recommendation technologies, and interactive engagement, making technology inseparable from the broader brand experience (34). In live e-commerce, platform features can shape psychological contracts and loyalty by influencing consumers' expectations regarding reciprocity, fairness, and relational obligations (35). AI-supported service environments similarly show that satisfaction may mediate the relationship between AI service and customer loyalty while contextual factors alter the strength of these relationships (36). These developments indicate that customer loyalty in AI-intensive markets is best conceptualized as the outcome of interconnected technological, emotional, and relational mechanisms rather than a simple consequence of technological performance.

Systematic research on AI in customer engagement and social media marketing further reveals that organizations increasingly use AI to manage personalized communication, predict customer needs, facilitate engagement, and enhance relational marketing outcomes (37). In tourism and destination branding, the convergence of social media, mobile technologies, and AI has created new opportunities for highly personalized and interactive brand experiences (38). Yet research continues to emphasize the need for more integrative models that simultaneously examine positive experience mechanisms and negative risk perceptions. A similar need is evident in research on AI-driven marketing, where personalization and engagement are often studied separately from privacy, uncertainty, and emotional attachment. Consequently, the literature remains fragmented across studies emphasizing technological acceptance, customer engagement, trust, satisfaction, personalization, or loyalty without sufficiently integrating these constructs into a coherent relational framework.

This gap is particularly evident in the relationship between AI experience, brand attachment, perceived technology risk, and brand loyalty. Although previous studies have demonstrated that AI can enhance customer engagement and loyalty (6, 16), that personalization quality can strengthen brand outcomes (7, 8), and that trust and risk substantially shape consumer responses to intelligent systems (26, 28), fewer studies have simultaneously examined an emotional mediation process and a technological risk boundary condition. This omission is theoretically important because it is possible for AI-based customer experience to increase loyalty through emotional attachment while the strength of that process is weakened by perceived technological risk. Such an

integrated perspective may provide a more complete explanation of why highly sophisticated AI interactions produce strong loyalty for some consumers but more cautious or resistant responses among others.

The contemporary literature also suggests that customer engagement with AI cannot be understood solely from a utilitarian perspective. AI-driven brand communication increasingly affects perception, identity, relationship quality, and long-term consumer–brand dynamics (2). The growing use of generative AI, predictive systems, voice interfaces, and personalized recommendation technologies has therefore created a need to distinguish technological effectiveness from relational effectiveness. A technologically accurate recommendation system may improve convenience but fail to build loyalty if the customer perceives the interaction as invasive, impersonal, or manipulative. Conversely, an AI-enabled interaction that is perceived as helpful, transparent, responsive, and aligned with consumer preferences may strengthen attachment and ultimately encourage loyalty. This distinction is also consistent with recent systematic evidence showing that affective and behavioral customer responses to generative AI may diverge and that disclosure and human involvement can alter consumer reactions (24).

Taken together, prior research demonstrates that AI-based customer experiences are capable of creating substantial value through personalization, responsiveness, interaction quality, and convenience, but their effects are shaped by psychological and relational processes as well as consumer perceptions of risk. Existing evidence supports the importance of loyalty as a strategic outcome, attachment as a meaningful emotional mechanism, and perceived technological risk as a potentially limiting factor. However, these constructs have rarely been integrated into a single explanatory model examining how AI-based customer experience translates into brand loyalty through brand attachment while simultaneously accounting for the weakening influence of perceived technology risk. Addressing this gap is important both theoretically and managerially because brands increasingly rely on AI to create individualized customer experiences, yet the success of these investments ultimately depends on whether customers transform technological value into durable emotional and behavioral commitment.

Accordingly, the aim of the present study was to investigate the effect of AI-based customer experience on brand loyalty, examine the mediating role of brand attachment in this relationship, and determine the moderating effect of perceived technology risk among consumers in Tehran.

Methods and Materials

This study employed a quantitative, applied, cross-sectional research design with a descriptive-correlational approach. The study was designed to investigate the effect of artificial intelligence–based customer experience on brand loyalty while examining brand attachment as a mediating variable and perceived technology risk as a moderating variable. The statistical population consisted of consumers residing in Tehran, Iran, who had experience interacting with artificial intelligence–enabled services provided by brands, including intelligent recommendation systems, personalized digital services, AI-based customer support, chatbots, automated product or service suggestions, and other algorithmically supported customer interfaces. To ensure that participants were capable of providing informed evaluations of the study constructs, eligibility criteria required respondents to be at least 18 years old, reside in Tehran, have purchased or used products or services from a commercial brand during the previous six months, and have had at least one direct experience with an AI-enabled customer service or digital interaction offered by that brand. Individuals who reported no previous experience with AI-based brand interactions or submitted substantially incomplete questionnaires were excluded from the final analysis. A total of 412 questionnaires were distributed through both online and in-person channels, of which 397 were returned. Following

the screening of responses for missing data, patterned responses, and substantial incompleteness, 384 valid questionnaires were retained for statistical analysis, yielding an effective response rate of 93.20%. The sample size of 384 participants was considered adequate for multivariate analysis and structural equation modeling and provided sufficient statistical power for examining direct, indirect, and interaction effects within the proposed conceptual model. Participants were recruited using a non-probability convenience sampling method combined with purposive screening to ensure prior exposure to AI-based customer experiences. Data collection was conducted in different geographical areas of Tehran to improve the heterogeneity of the sample and reduce the potential concentration of respondents within a particular consumer group. Before completing the questionnaire, participants were informed about the purpose of the research, the voluntary nature of participation, confidentiality of responses, and their right to discontinue participation at any stage without any consequences. No personally identifying information was collected, and all responses were used exclusively for scientific purposes.

Data were collected using a structured self-administered questionnaire consisting of demographic questions and standardized multi-item measures assessing artificial intelligence–based customer experience, brand attachment, perceived technology risk, and brand loyalty. All construct items were measured using a five-point Likert scale ranging from 1, representing “strongly disagree,” to 5, representing “strongly agree.” The artificial intelligence–based customer experience construct assessed consumers’ overall perceptions of their interactions with AI-supported brand interfaces and services. The items were designed to capture core experiential dimensions such as personalization, relevance of recommendations, responsiveness, convenience, perceived intelligence of the system, efficiency, interaction quality, and the degree to which AI-enabled services facilitated a more satisfactory customer experience. Respondents were asked to evaluate the extent to which the AI-based services offered by the focal brand understood their preferences, provided appropriate recommendations, simplified their interactions, delivered rapid and accurate responses, and improved the overall quality of their relationship with the brand. Higher scores indicated a more favorable AI-based customer experience.

Brand attachment was measured as the degree of emotional, psychological, and relational connection that consumers developed toward the focal brand. The items reflected the extent to which the brand was perceived as personally meaningful, emotionally significant, connected to the consumer’s sense of identity, and difficult to replace with alternative brands. This construct was included as the mediating mechanism through which favorable AI-based experiences were expected to translate into stronger brand loyalty. Higher scores indicated stronger emotional attachment to the brand. Brand loyalty was assessed through items measuring both attitudinal and behavioral loyalty, including willingness to continue purchasing from the brand, preference for the brand over competitors, intention to recommend the brand to others, resistance to switching, and likelihood of selecting the same brand in future purchase situations. Higher values represented stronger brand loyalty. Perceived technology risk was measured using items that assessed consumers’ perceptions of uncertainty, vulnerability, and possible negative consequences associated with the use of AI-based technologies. These items addressed concerns related to privacy, misuse of personal information, inaccurate automated decisions, lack of transparency, security threats, excessive dependence on algorithms, and uncertainty regarding the reliability of AI-generated recommendations. Higher scores represented greater perceived risk associated with AI-enabled customer technologies. Because perceived technology risk was conceptualized as a moderator, the measurement focused specifically on the extent to which concerns about AI technology could weaken or alter the relationship between AI-based customer experience and subsequent consumer responses.

To ensure content validity, the initial questionnaire was reviewed by a panel of academic experts in marketing management, consumer behavior, brand management, digital marketing, and information technology. The experts evaluated the clarity, relevance, comprehensiveness, and conceptual correspondence of the items with the intended constructs, and minor wording modifications were made based on their recommendations. A pilot study was subsequently conducted with 30 consumers who met the main inclusion criteria but were not included in the final sample. The pilot findings indicated satisfactory comprehensibility and internal consistency of the questionnaire. Construct reliability in the main study was evaluated using Cronbach's alpha and composite reliability, with values above 0.70 considered acceptable. Convergent validity was assessed using standardized factor loadings and average variance extracted, with factor loadings above 0.50 and average variance extracted values of at least 0.50 considered evidence of adequate convergence. Discriminant validity was evaluated by examining the distinctiveness of the latent constructs using the Fornell–Larcker criterion and the heterotrait–monotrait ratio. These procedures ensured that artificial intelligence–based customer experience, brand attachment, perceived technology risk, and brand loyalty were empirically distinguishable while maintaining satisfactory reliability and validity.

Data analysis was conducted in several stages using IBM SPSS Statistics and SmartPLS. SPSS was initially used for data screening, coding, descriptive statistics, assessment of missing values, detection of potentially problematic responses, and examination of the demographic characteristics of participants. Means, standard deviations, frequencies, and percentages were calculated to describe the sample and the principal study variables. The distributional characteristics of the variables were examined using skewness and kurtosis coefficients, and potential multicollinearity among predictor variables was assessed using tolerance and variance inflation factor values. Correlations among the principal constructs were also examined to provide an initial assessment of the direction and magnitude of the relationships proposed in the conceptual model.

Partial least squares structural equation modeling was subsequently performed using SmartPLS to evaluate both the measurement and structural models. The measurement model was assessed through indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Indicator reliability was evaluated through standardized outer loadings, while Cronbach's alpha and composite reliability were used to determine internal consistency. Average variance extracted was used to evaluate convergent validity, and discriminant validity was examined using the Fornell–Larcker criterion and the heterotrait–monotrait ratio. After confirming the adequacy of the measurement model, the structural model was assessed by examining collinearity statistics, standardized path coefficients, coefficients of determination, effect sizes, predictive relevance, and the statistical significance of the hypothesized relationships. The coefficient of determination was used to evaluate the proportion of variance explained in brand attachment and brand loyalty, while effect size coefficients were used to assess the relative contribution of the exogenous constructs. Predictive relevance was evaluated using the Q^2 statistic obtained through blindfolding procedures, with values greater than zero indicating predictive relevance of the model.

The statistical significance of direct and indirect relationships was evaluated using a nonparametric bootstrapping procedure with 5,000 resamples. The direct effect of artificial intelligence–based customer experience on brand loyalty was first assessed, followed by the effect of AI-based customer experience on brand attachment and the effect of brand attachment on brand loyalty. The mediating role of brand attachment was examined by estimating the indirect effect of artificial intelligence–based customer experience on brand loyalty through brand attachment and evaluating the corresponding bootstrapped confidence interval. Mediation was considered statistically

significant when the confidence interval for the indirect effect did not include zero. To test the moderating role of perceived technology risk, an interaction term between artificial intelligence–based customer experience and perceived technology risk was created within the structural model. The statistical significance and direction of the interaction coefficient were examined to determine whether perceived technology risk altered the strength or direction of the relationship between AI-based customer experience and brand loyalty. Where a significant interaction was observed, the conditional relationship was interpreted at relatively low and high levels of perceived technology risk to clarify the nature of the moderation effect. All hypothesis tests were conducted using a significance level of $p < 0.05$, and standardized path coefficients, t values, p values, confidence intervals, R^2 values, effect sizes, and predictive relevance indices were considered collectively in evaluating the explanatory and predictive adequacy of the proposed model.

Findings and Results

The final sample consisted of 384 consumers residing in Tehran who had previous experience with artificial intelligence–enabled services or interfaces provided by commercial brands. Of the participants, 208 respondents (54.17%) were male and 176 (45.83%) were female. Regarding age, 102 participants (26.56%) were between 18 and 25 years old, 151 (39.32%) were between 26 and 35 years old, 89 (23.18%) were between 36 and 45 years old, and 42 (10.94%) were older than 45 years. Thus, the largest age group consisted of respondents aged 26–35 years. In terms of educational attainment, 54 participants (14.06%) had a high-school diploma or lower level of education, 188 (48.96%) held a bachelor's degree, 112 (29.17%) held a master's degree, and 30 (7.81%) held a doctoral degree. In relation to the frequency of interaction with AI-enabled brand services during the previous six months, 69 respondents (17.97%) reported relatively infrequent interactions, 148 (38.54%) reported occasional interactions, 112 (29.17%) reported frequent interactions, and 55 (14.32%) reported very frequent interactions. Overall, the demographic distribution indicated adequate diversity in gender, age, educational background, and level of exposure to AI-enabled services, while the majority of respondents had sufficient recent experience with AI-based customer interfaces to provide meaningful evaluations of the study constructs.

Table 1. Descriptive Statistics, Reliability, and Convergent Validity of the Study Constructs

Construct	Number of Items	Mean	SD	Cronbach's Alpha	Composite Reliability	AVE
AI-Based Customer Experience	8	3.79	0.71	0.91	0.93	0.64
Brand Attachment	6	3.61	0.76	0.89	0.92	0.65
Perceived Technology Risk	6	2.94	0.83	0.87	0.90	0.61
Brand Loyalty	6	3.73	0.74	0.90	0.92	0.67

As shown in Table 1, the mean score for AI-based customer experience was 3.79 (SD = 0.71), indicating that respondents generally evaluated their interactions with AI-enabled brand services positively. Brand loyalty also demonstrated a relatively high mean value of 3.73 (SD = 0.74), suggesting a generally favorable level of continued preference, repurchase intention, recommendation tendency, and resistance to switching among the respondents. The mean score of brand attachment was 3.61 (SD = 0.76), indicating a moderately strong emotional and psychological connection between respondents and the focal brands. In contrast, perceived technology risk had a mean score of 2.94 (SD = 0.83), suggesting that respondents perceived a moderate level of concern regarding privacy, data security, automated decision-making, transparency, and reliability of AI-enabled technologies. The measurement scales demonstrated strong internal consistency. Cronbach's alpha coefficients ranged from 0.87 for

perceived technology risk to 0.91 for AI-based customer experience, exceeding the recommended threshold of 0.70. Composite reliability coefficients ranged from 0.90 to 0.93, further confirming satisfactory construct reliability. The average variance extracted values ranged from 0.61 to 0.67, and all were above the conventional threshold of 0.50, indicating satisfactory convergent validity. Accordingly, more than half of the variance in the indicators associated with each latent construct was explained by the corresponding construct, providing sufficient evidence that the measurement model possessed adequate reliability and convergent validity.

Table 2. Correlations and Discriminant Validity among the Study Constructs

Construct	1	2	3	4
1. AI-Based Customer Experience	0.80			
2. Brand Attachment	0.68	0.81		
3. Perceived Technology Risk	-0.34	-0.29	0.78	
4. Brand Loyalty	0.71	0.73	-0.38	0.82

Table 2 presents the intercorrelations among the latent variables and the results of the Fornell–Larcker assessment of discriminant validity. AI-based customer experience demonstrated a strong positive correlation with brand attachment (r = 0.68) and brand loyalty (r = 0.71), indicating that more favorable customer experiences with AI-enabled brand services were associated with stronger emotional attachment and greater loyalty toward the brand. Brand attachment exhibited the strongest bivariate association with brand loyalty (r = 0.73), supporting the theoretical assumption that consumers who develop stronger psychological and emotional bonds with a brand are more likely to continue purchasing from it, recommend it, and resist competing alternatives. Perceived technology risk was negatively correlated with AI-based customer experience (r = -0.34), brand attachment (r = -0.29), and brand loyalty (r = -0.38), suggesting that greater concern regarding the risks of AI technology was associated with less favorable experiential evaluations and weaker relational outcomes. With respect to discriminant validity, the square root of AVE for each construct was greater than its correlations with all other constructs. Specifically, the diagonal values ranged from 0.78 to 0.82 and exceeded all corresponding interconstruct correlations. Therefore, the results supported the empirical distinctiveness of AI-based customer experience, brand attachment, perceived technology risk, and brand loyalty. Additional evaluation based on the heterotrait–monotrait ratio produced values below 0.85 for all construct pairs, further confirming that discriminant validity was satisfactory and that substantial conceptual overlap among the latent variables was not evident.

Table 3. Structural Model and Direct Effects of the Hypothesized Relationships

Hypothesized Relationship	β	SE	t	p	95% CI	Result
AI-Based Customer Experience → Brand Attachment	0.68	0.04	16.92	<0.001	[0.60, 0.76]	Supported
AI-Based Customer Experience → Brand Loyalty	0.31	0.05	6.46	<0.001	[0.22, 0.40]	Supported
Brand Attachment → Brand Loyalty	0.48	0.05	9.83	<0.001	[0.39, 0.58]	Supported
Perceived Technology Risk → Brand Loyalty	-0.17	0.04	4.21	<0.001	[-0.25, -0.09]	Supported
AI-Based Customer Experience × Perceived Technology Risk → Brand Loyalty	-0.14	0.04	3.52	<0.001	[-0.22, -0.06]	Supported

The structural model results presented in Table 3 indicated that all of the proposed direct relationships were statistically significant. AI-based customer experience had a strong positive effect on brand attachment (β = 0.68, SE = 0.04, t = 16.92, p < 0.001), demonstrating that favorable interactions with AI-supported brand services substantially strengthened consumers' emotional and psychological connection with the brand. AI-based customer

experience also exerted a significant positive direct effect on brand loyalty (β = 0.31, SE = 0.05, t = 6.46, p < 0.001), suggesting that consumers who perceived AI-enabled brand interactions as personalized, convenient, relevant, and responsive were more likely to demonstrate continued preference and loyalty toward the brand. Brand attachment had an additional strong positive effect on brand loyalty (β = 0.48, SE = 0.05, t = 9.83, p < 0.001), confirming that emotional connection constituted an important relational mechanism underlying loyalty formation. Perceived technology risk had a significant negative direct effect on brand loyalty (β = -0.17, SE = 0.04, t = 4.21, p < 0.001), indicating that stronger concerns about privacy, technological reliability, algorithmic transparency, and data security reduced consumers' loyalty toward brands employing AI-based systems. Importantly, the interaction between AI-based customer experience and perceived technology risk was also significant and negative (β = -0.14, SE = 0.04, t = 3.52, p < 0.001). This finding demonstrates that perceived technology risk weakened the positive relationship between AI-based customer experience and brand loyalty. Therefore, although favorable AI-based experiences increased brand loyalty overall, this effect became less pronounced when consumers perceived relatively high levels of technological risk.

Table 4. Mediation, Moderation, Explanatory Power, and Predictive Relevance of the Structural Model

Effect/Endogenous Construct	Estimate	SE	t	p	95% CI / Model Index	Interpretation
Indirect Effect: AI-Based Customer Experience → Brand Attachment → Brand Loyalty	0.33	0.04	8.19	<0.001	[0.25, 0.41]	Significant mediation
Total Effect: AI-Based Customer Experience → Brand Loyalty	0.64	0.04	15.73	<0.001	[0.56, 0.71]	Significant total effect
Interaction Effect: AI-Based Customer Experience × Perceived Technology Risk → Brand Loyalty	-0.14	0.04	3.52	<0.001	[-0.22, -0.06]	Significant negative moderation
Brand Attachment	R^2 = 0.46	—	—	—	Q^2 = 0.29	Moderate-to-substantial explanatory power
Brand Loyalty	R^2 = 0.69	—	—	—	Q^2 = 0.44	Substantial explanatory and predictive power
Structural Model	SRMR = 0.056	—	—	—	NFI = 0.91	Acceptable model fit

The results in Table 4 provide evidence for both the mediating role of brand attachment and the moderating role of perceived technology risk. The indirect effect of AI-based customer experience on brand loyalty through brand attachment was positive and statistically significant (β = 0.33, SE = 0.04, t = 8.19, p < 0.001, 95% CI [0.25, 0.41]). Because the bootstrapped confidence interval did not contain zero, the mediation effect was confirmed. At the same time, the direct relationship between AI-based customer experience and brand loyalty remained statistically significant after brand attachment was introduced into the model. Consequently, brand attachment represented a partial rather than complete mediator of the relationship between AI-based customer experience and brand loyalty. The total effect of AI-based customer experience on brand loyalty was 0.64 (SE = 0.04, t = 15.73, p < 0.001), showing that the combined direct and attachment-mediated influence of AI-based experience on loyalty was substantial. The interaction effect between AI-based customer experience and perceived technology risk remained significant and negative (β = -0.14, p < 0.001), supporting the hypothesized moderating effect. Examination of conditional effects indicated that the positive relationship between AI-based customer experience and brand loyalty was stronger when perceived technology risk was low and weaker when perceived technology risk was high. The structural model also demonstrated satisfactory explanatory capacity. AI-based customer experience explained 46% of the variance in brand attachment (R^2 = 0.46), while the predictors included in the final model collectively

explained 69% of the variance in brand loyalty (R^2 = 0.69). The Q^2 values for brand attachment (0.29) and brand loyalty (0.44) were greater than zero, indicating satisfactory predictive relevance. Furthermore, the standardized root mean square residual was 0.056, which was below the commonly applied threshold of 0.08, while the normed fit index was 0.91. Taken together, these results indicate that the proposed structural model demonstrated adequate model fit, substantial explanatory power, and meaningful predictive capability with respect to consumers' attachment and loyalty responses.

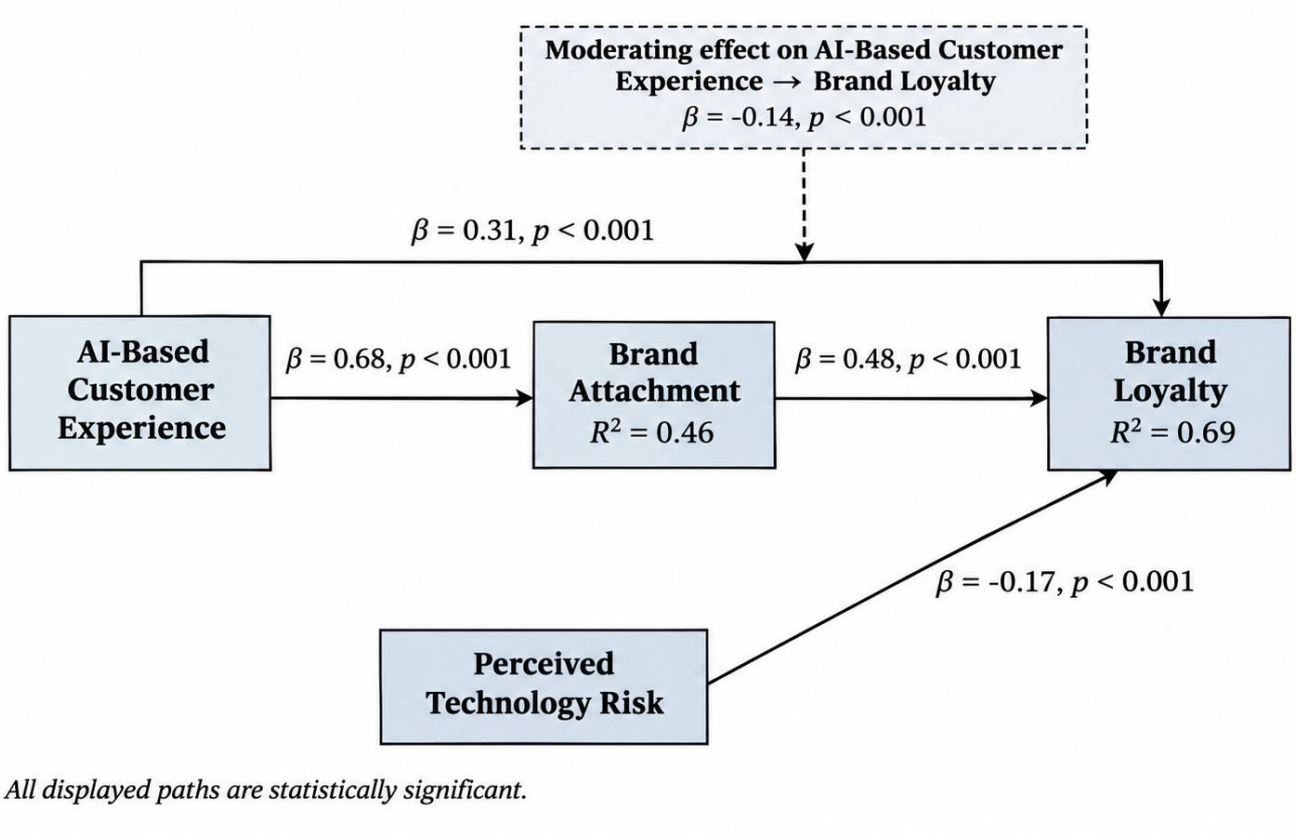


Figure 1. Structural Model of the Relationships among AI-Based Customer Experience, Brand Attachment, Perceived Technology Risk, and Brand Loyalty

Figure 1 summarizes the final structural model and illustrates the standardized relationships among the principal constructs. The model shows that AI-based customer experience positively predicted both brand attachment and brand loyalty, while brand attachment independently contributed to greater brand loyalty. The strongest direct path originating from AI-based customer experience was observed for brand attachment (β = 0.68), emphasizing the importance of favorable AI-enabled interactions in strengthening consumers' emotional relationships with brands. Brand attachment subsequently exerted a substantial positive effect on brand loyalty (β = 0.48), supporting its central mediating function. The remaining direct effect of AI-based customer experience on brand loyalty (β = 0.31) indicates that AI-enabled customer experiences influenced loyalty through both relational and non-relational mechanisms. The model additionally demonstrates the negative role of perceived technology risk, both through its direct negative association with brand loyalty (β = -0.17) and through its negative interaction with AI-based customer experience (β = -0.14). The interaction pattern indicates that consumers who perceived lower levels of technology-related risk translated favorable AI-based experiences into loyalty more strongly than consumers who perceived higher levels of risk. Overall, the structural model supports the proposed theoretical framework in which AI-based

customer experience serves as an important antecedent of brand loyalty, brand attachment functions as a significant psychological mediating mechanism, and perceived technology risk operates as a boundary condition that attenuates the positive effect of AI-enabled experiences on loyalty.

Discussion and Conclusion

The present study investigated the role of artificial intelligence–based customer experience in shaping brand loyalty, with particular attention to the mediating role of brand attachment and the moderating effect of perceived technology risk. The findings demonstrated that AI-based customer experience had a significant positive effect on brand attachment, a significant direct positive effect on brand loyalty, and a significant indirect effect on brand loyalty through brand attachment. Brand attachment itself exerted a strong positive effect on brand loyalty, confirming its mediating role in the proposed model. In addition, perceived technology risk had a significant negative direct effect on brand loyalty and significantly weakened the positive relationship between AI-based customer experience and brand loyalty. Collectively, the model explained a substantial proportion of variance in brand loyalty, indicating that the combination of experiential, emotional, and risk-related mechanisms provides a meaningful framework for understanding how consumers respond to AI-enabled brand interactions.

The first major finding showed that AI-based customer experience significantly and positively influenced brand attachment. This result indicates that consumers who perceive AI-enabled brand interactions as useful, personalized, responsive, relevant, and efficient are more likely to develop stronger emotional and psychological bonds with the brand. This finding is consistent with the emerging literature showing that AI technologies increasingly function not merely as technical service tools but as relational interfaces through which consumers form impressions about the brand itself. AI-driven communication can shape consumers' interpretation of whether a brand understands their preferences, anticipates their needs, and provides individualized value (1, 2). When consumers experience AI-enabled interactions as adaptive and helpful, the technological encounter may become incorporated into the overall symbolic and relational meaning of the brand.

This result is also compatible with research emphasizing the role of personalization in strengthening consumer–brand relationships. Personalized AI recommendations can increase perceived relevance and reduce the cognitive effort required for product discovery, making interactions more convenient and personally meaningful (7). Similarly, generative AI can strengthen favorable brand responses when personalization is accompanied by transparency and trust (8). These mechanisms provide a plausible explanation for the positive relationship between AI-based customer experience and brand attachment found in the present study. When AI systems repeatedly provide recommendations or services that appear congruent with consumer needs, customers may interpret this alignment as evidence that the brand recognizes and understands them. Over time, such repeated recognition can contribute to psychological proximity and emotional attachment.

The positive influence of AI-based customer experience on brand attachment is also consistent with prior research on interactive intelligent technologies. Voice assistants and chatbots have been shown to transform the company–customer interface by making interactions more immediate, personalized, and conversational (3). Interactive voice assistants can strengthen brand loyalty through relational and experiential mechanisms, suggesting that technology-mediated interactions can acquire social and emotional significance rather than remaining purely functional (10). Likewise, research on perceived ownership of AI assistants demonstrates that psychological connection with intelligent systems can influence adoption intentions and continued use (13). These

findings support the interpretation that AI technologies can facilitate attachment when consumers experience them as extensions of the brand relationship.

The second important finding showed that AI-based customer experience directly and positively predicted brand loyalty. This result indicates that favorable experiences with AI-enabled services can independently increase consumers' willingness to continue purchasing from the brand, recommend it to others, prefer it over competitors, and resist switching. This finding is in line with previous research showing that AI-driven marketing strategies can strengthen customer engagement and loyalty in online shopping environments (6). Similarly, empirical evidence from the Saudi Arabian market suggests that AI can positively influence e-customer loyalty by improving service quality, convenience, personalization, and the overall digital experience (16). In logistics services, AI acceptance has also been associated with stronger value co-creation and brand loyalty, particularly among younger consumers who are highly familiar with technology-mediated service delivery (15).

The direct effect of AI-based customer experience on loyalty can be understood through several mechanisms. First, AI can reduce search costs and improve decision efficiency by presenting consumers with more relevant information and personalized alternatives. Second, rapid responsiveness and intelligent automation can decrease friction in the customer journey, thereby enhancing convenience. Third, AI-based systems can generate continuity across multiple interactions by learning from prior consumer behavior. These capabilities can improve perceived service quality and strengthen the consumer's preference for remaining with the same brand. Research on AI-based services has similarly shown that satisfaction mediates the relationship between AI service quality and loyalty, while contextual conditions shape the magnitude of these effects (36). The present findings extend this perspective by showing that AI-based customer experience contributes to loyalty not only through satisfaction-related processes but also through a relational mechanism represented by brand attachment.

The findings further revealed that brand attachment had a strong positive effect on brand loyalty. This result is theoretically important because it confirms that loyalty cannot be fully understood as a rational response to technological convenience or service efficiency. Consumers who develop stronger emotional and psychological bonds with a brand are more likely to maintain the relationship over time, prefer the brand to alternatives, and display greater resistance to switching. This finding aligns with research showing that brand attachment is a meaningful antecedent of long-term consumer–brand relationships across functional, symbolic, and hedonic contexts (18). It also corresponds with evidence that the strength of brand attachment varies across levels of product involvement, suggesting that attachment reflects the degree to which the brand becomes personally significant within the consumer's broader consumption experience (19).

The strong relationship between brand attachment and loyalty is also consistent with studies emphasizing affective mechanisms in loyalty development. Brand love and other forms of emotional connection have been shown to reinforce loyalty because consumers become motivated to preserve relationships with brands that hold personal or symbolic value (20). The present results suggest that AI-based experiences can contribute to this process when technological interactions become associated with recognition, responsiveness, and individualized treatment. In this sense, the AI system does not necessarily become the object of attachment itself; rather, its performance may strengthen the broader relationship with the brand that provides the system. This distinction is important because the relational value of AI may depend on whether consumers attribute positive AI-enabled experiences to the brand.

The mediation analysis showed that brand attachment significantly mediated the relationship between AI-based customer experience and brand loyalty. Because the direct effect of AI-based customer experience on brand loyalty

remained significant after the mediator was included, the mediation was partial. This finding indicates that favorable AI experiences increase brand loyalty through both direct experiential mechanisms and indirect emotional mechanisms. Part of the influence of AI-based customer experience on loyalty can therefore be explained by improvements in convenience, responsiveness, usefulness, and recommendation quality, while another part operates because positive AI interactions deepen consumers' emotional connection with the brand.

This result is consistent with contemporary work showing that customer responses to AI contain both behavioral and affective components. Systematic evidence on generative AI and customer engagement indicates that behavioral outcomes such as usage, interaction, and purchase-related responses should be distinguished from affective outcomes such as trust, emotional connection, and relational engagement (24). The present findings provide empirical support for this distinction by demonstrating that AI-based customer experience can influence loyalty both directly and through attachment. The result also corresponds with research on immersive and AI-supported commerce, where interactive technologies can strengthen consumer engagement by creating emotionally involving and highly personalized experiences (34). Similarly, in fan and sport-related settings, AI can influence identity and engagement, suggesting that technology-mediated experiences can become integrated with consumers' sense of connection to brands and communities (22).

At the same time, the mediating role of brand attachment should not be interpreted as evidence that all AI interactions necessarily enhance emotional connection. Prior research has shown that excessive algorithmic influence can create dependence while simultaneously weakening brand–self connections, particularly when consumers feel that recommendation systems undermine autonomy or encourage compulsive engagement (21). This apparent tension helps clarify the present findings. AI-based customer experience is likely to strengthen attachment when consumers perceive the technology as supportive, relevant, and congruent with their preferences, but the relational benefit may decline when AI is experienced as controlling, intrusive, or excessively influential. Therefore, the quality and interpretation of AI-enabled interaction appear to be central to whether technology strengthens or weakens the consumer–brand bond.

The next major finding was that perceived technology risk had a significant negative effect on brand loyalty. Consumers who perceived greater risks related to privacy, security, data misuse, algorithmic opacity, and technological unreliability reported lower levels of loyalty. This finding is consistent with the broader literature on the personalization–privacy paradox. AI systems often require extensive consumer data to deliver individualized recommendations, yet greater data use can simultaneously increase concerns about surveillance, privacy loss, and unauthorized use of personal information (25). Similarly, the benefits of AI-driven personalization in e-commerce may be offset by privacy concerns, creating a trade-off between perceived well-being and perceived vulnerability (26). These findings provide a strong theoretical basis for the negative association between perceived technology risk and brand loyalty observed in the present study.

The negative role of perceived technology risk can also be explained through trust-related mechanisms. Consumers are more likely to accept and continue using intelligent systems when they perceive them as competent, predictable, transparent, and reliable (28). In social commerce environments, trust is similarly central to consumer engagement and willingness to participate in digitally mediated exchanges (29). When AI systems are viewed as opaque, insecure, or potentially manipulative, consumers may become less willing to maintain the brand relationship even if the technology provides functional benefits. This interpretation is reinforced by research on the dark side of

AI in marketing, which identifies privacy invasion, manipulation, reduced autonomy, vulnerability, and negative emotional responses as important adverse consequences of AI-enabled marketing practices (30).

The most distinctive finding of the study concerned the moderating role of perceived technology risk. The interaction between AI-based customer experience and perceived technology risk was significant and negative, indicating that the positive influence of AI-based customer experience on brand loyalty became weaker as perceived technology risk increased. This finding means that two consumers may experience a similarly efficient or personalized AI service but translate that experience into loyalty differently depending on how risky they perceive the technology to be. When perceived risk is low, the benefits of personalization, convenience, responsiveness, and intelligent recommendations are more likely to strengthen loyalty. In contrast, when perceived risk is high, concerns regarding data security, privacy, transparency, or algorithmic control may dilute the positive effect of the experience.

This moderating result is particularly consistent with research emphasizing that consumer responses to AI depend on the balance between perceived value and perceived risk. AI readiness in physical retail depends not only on technological functionality but also on consumer attitudes and individual differences (31). Similarly, willingness to purchase AI-related products can depend on both cognitive trust and affective trust, indicating that favorable evaluations of technological capability are insufficient when emotional confidence in the system is weak (32). In digital financial services, consumers also evaluate technology through a complex interaction between utility, uncertainty, risk, and trust (27). These studies support the conclusion that perceived technology risk operates as a boundary condition that can reduce the translation of positive AI experiences into loyalty.

The moderation finding is also compatible with research showing that transparency can play a crucial role in AI-based personalization. Generative AI personalization strengthens loyalty more effectively when consumers understand the system and perceive its operations as transparent (8). Likewise, AI recommendation quality may increase loyalty when consumers perceive the recommendation process as credible and valuable (7). These findings suggest that perceived risk may weaken loyalty partly because opacity prevents consumers from fully attributing positive AI outcomes to benign or trustworthy brand intentions. A highly personalized recommendation may be experienced as helpful when data practices are understood and trusted, but the same recommendation may be experienced as invasive when the consumer does not know how the information was generated.

The results also contribute to understanding the broader relational consequences of AI-mediated communication. Systematic reviews indicate that AI has become increasingly integrated into customer engagement, social media marketing, and brand communication, yet outcomes depend on the nature of interaction, disclosure, perceived authenticity, and human involvement (2, 37). AI-supported destination branding likewise illustrates how digital, mobile, and AI technologies can jointly influence brand perceptions and customer relationships (38). The current findings add to this literature by demonstrating that AI-based experience should not be considered an inherently loyalty-enhancing resource. Its relational benefits are conditional: positive experiences can strengthen loyalty directly and through attachment, but perceived technology risk can substantially limit those gains.

Taken together, the findings support a more integrated understanding of AI-enabled consumer–brand relationships. AI-based customer experience appears to function as an important antecedent of loyalty because it improves the functional quality of interactions and also contributes to stronger emotional attachment. Brand attachment represents a key relational mechanism that translates favorable technology-mediated experiences into longer-term consumer commitment, while perceived technology risk acts as a constraining factor that reduces the

strength of this process. This integrated pattern is consistent with the view that AI-driven marketing outcomes emerge from the interaction of technological performance, emotional bonding, trust, perceived value, and perceived vulnerability rather than from technological capability alone (17, 36). Accordingly, the value of AI for brand management depends not only on whether systems can personalize and automate customer interactions but also on whether those interactions are perceived as trustworthy, transparent, safe, and relationally meaningful.

The present study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design does not permit definitive causal inference, even though the structural model was theoretically specified and statistically supported. Second, the study relied on self-reported data, which may be affected by common method variance, recall limitations, or socially desirable responses. Third, the sample was limited to consumers in Tehran, and the findings may not be directly generalizable to consumers in other cities, countries, or cultural settings where familiarity with AI, trust in digital technologies, privacy expectations, and brand relationships may differ. Fourth, the study examined AI-based customer experience at an aggregated level and did not differentiate among specific technologies such as chatbots, recommendation systems, voice assistants, generative AI tools, and predictive service interfaces. Fifth, perceived technology risk was treated as a general construct, although different forms of risk, including privacy risk, security risk, performance risk, psychological risk, and autonomy-related risk, may exert distinct effects. Finally, the study focused on brand attachment as the primary mediating mechanism and therefore did not simultaneously model other potentially important mediators such as trust, satisfaction, perceived value, engagement, or perceived authenticity.

Future research should address these limitations by employing longitudinal, experimental, or panel designs to examine how AI-based customer experience, attachment, and loyalty evolve over time and to provide stronger evidence regarding causal direction. Studies could compare different types of AI technologies to determine whether conversational agents, recommendation engines, generative AI, voice assistants, and automated service systems produce different relational outcomes. Future models could also separate perceived technology risk into multiple dimensions and test whether privacy, security, transparency, autonomy, and performance risks have distinct moderating effects. Cross-cultural and cross-industry comparisons would be particularly valuable because the meaning of personalization, privacy, and technological trust is likely to vary across social and institutional contexts. Additional research could examine serial or parallel mediation through satisfaction, trust, perceived value, engagement, and brand attachment, as well as possible nonlinear effects of personalization. Researchers may also investigate demographic and psychographic moderators such as age, digital literacy, AI familiarity, innovativeness, technology anxiety, and need for control. Finally, integrating behavioral data with self-reported measures could provide a more comprehensive understanding of whether favorable AI experiences translate into actual repurchase, recommendation, retention, and reduced switching behavior.

From a practical perspective, managers should treat AI not only as an efficiency-enhancing technology but as a customer relationship instrument. Brands should design AI-enabled interactions to be personalized, responsive, convenient, and contextually relevant while ensuring that personalization does not become intrusive or excessive. AI systems should be integrated with a consistent brand identity so that positive technological experiences reinforce the consumer's broader emotional connection with the brand rather than being perceived as isolated technical functions. Managers should also actively reduce perceived technology risk by improving transparency, explaining how customer data are used, providing meaningful privacy controls, strengthening security safeguards, and offering accessible human support when automated systems fail or when consumers prefer human assistance.

Recommendation systems and generative AI interfaces should prioritize relevance and consumer autonomy rather than maximizing engagement at any cost. Brands should regularly assess whether customers perceive AI interactions as trustworthy, understandable, and controllable and should monitor not only transactional outcomes but also relational indicators such as attachment, trust, comfort, and willingness to continue the relationship. In this way, organizations can maximize the loyalty-building potential of AI while minimizing the risk that privacy concerns, technological uncertainty, or perceptions of manipulation undermine the customer relationship.

Acknowledgments

We would like to express our appreciation and gratitude to all those who helped us carrying out this study.

Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adheried in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

References

1. Peltier JW, Dahl AJ, Schibrowsky JA. Artificial Intelligence in Interactive Marketing: A Conceptual Framework and Research Agenda. Journal of Research in Interactive Marketing. 2023;18(1):54-90. doi: 10.1108/jrim-01-2023-0030.
2. Vyas Y, Vishwakarma P. Artificial Intelligence in Brand Communication: A Comprehensive Literature Review and Research Outlook. International Journal of Consumer Studies. 2026;50(1). doi: 10.1111/ijcs.70170.
3. Bălan C. Chatbots and Voice Assistants: Digital Transformers of the Company–Customer Interface—A Systematic Review of the Business Research Literature. Journal of Theoretical and Applied Electronic Commerce Research. 2023;18(2):995-1019. doi: 10.3390/jtaer18020051.
4. Wu Z, Aw EC, Tan GW, Ki CW. The Voice of Commerce: A Systematic Review and Integrative Framework for Digital Voice Assistants. International Journal of Consumer Studies. 2026;50(1). doi: 10.1111/ijcs.70159.
5. B.V.Jayanthi. AI-Driven Consumer Behavior: A Systematic Review and Future Research Agenda - A Review Paper. 2026. doi: 10.21203/rs.3.rs-8716423/v1.

6. Wattoo MU, Ma G, Nawaz I, Kadirova Z, Azizova NT, Gazieva S. Exploring the Impact Of <scp>AI</Scp> -Driven Marketing Strategies on Customer Engagement and Loyalty in Pakistan's Online Shopping Sector. Knowledge and Process Management. 2026;33(3):1060-73. doi: 10.1002/kpm.70064.

7. Abdelhamied HHS, Al-Romeedy BS. AI-Driven Personalization and Brand Loyalty: Perceived Recommendation Discovery and Perceived AI Recommendation Quality on Smart Tourism Platforms. Journal of Theoretical and Applied Electronic Commerce Research. 2026;21(10):348. doi: 10.3390/jtaer21100348.

8. Alshiha AA. From Personalization to Loyalty: How Generative AI Shapes Tourist Brand Loyalty Through Transparency and Trust in Smart Tourism Platforms. Journal of Theoretical and Applied Electronic Commerce Research. 2026;21(8):244. doi: 10.3390/jtaer21080244.

9. Yang OS, Kim SH. Digital Transformation and Sustainable Customer Value in Healthcare: Evidence From an AI-Based Diabetes Prognostic Service. Sustainability. 2026;18(2):928. doi: 10.3390/su18020928.

10. Maroufkhani P, Asadi S, Ghobakhloo M, Jannesari MT, Ismail WKW. How Do Interactive Voice Assistants Build Brands' Loyalty? Technological Forecasting and Social Change. 2022;183:121870. doi: 10.1016/j.techfore.2022.121870.

11. Molinillo S, Rejón-Guardia F, Anaya-Sánchez R, Liébana-Cabanillas FJ. Impact of Perceived Value on Intention to Use Voice Assistants: The Moderating Effects of Personal Innovativeness and Experience. Psychology and Marketing. 2023;40(11):2272-90. doi: 10.1002/mar.21887.

12. Ying T, Liu X. Echoes of Innovation: Exploring the Use of Voice Assistants to Boost Hotel Reputation. Journal of Theoretical and Applied Electronic Commerce Research. 2025;20(1):46. doi: 10.3390/jtaer20010046.

13. Zhang X, Chen H, Ma Y. When You Feel You Own <scp>AI</Scp> Assistants: How Consumer Ownership Enhances Consumers' Adoption Intention. Journal of Consumer Behaviour. 2025;24(4):1669-84. doi: 10.1002/cb.2491.

14. Seduram L, Mamun AA, Salameh AAM, Perumal S, Shaari H. Predicting Smartphone Brand Loyalty Using Four-Stage Loyalty Model. Sage Open. 2022;12(2). doi: 10.1177/21582440221099295.

15. Chanthawong A, Imjai N, Nimtrakool K, Usman B, Aujirapongpan S. How Does AI Acceptance in Logistics Services Influence Value Co-Creation Behavior and Brand Loyalty Among Thai Gen Z Consumers? Logistics. 2026;10(4):75. doi: 10.3390/logistics10040075.

16. Beyari H. Assessing Artificial Intelligence's Impact on E-Customer Loyalty in the Saudi Arabian Market. Frontiers in Artificial Intelligence. 2025;8. doi: 10.3389/frai.2025.1541678.

17. Duy PK, Hieu CV, Cong TH, Phang LHV, Nghia NC. Algorithmic Synchronicity and Perceived Relational Reciprocity: A Multi-Method Investigation of Consumer Trust and Loyalty In <scp>AI</Scp> -Driven Retail Ecosystems. Journal of Consumer Behaviour. 2026;25(4):1975-97. doi: 10.1002/cb.70152.

18. Ugalde C, López NV, Boluda IK. Brand Attachment Toward Functional, Symbolic and Hedonic Brands. Journal of Fashion Marketing and Management an International Journal. 2022;27(3):470-88. doi: 10.1108/jfmm-09-2021-0228.

19. Ugalde C, Boluda IK, López NV. Brand Attachment: The Moderating Effect of High and Low Involvement Products. Journal of Consumer Sciences. 2024;9(2):185-205. doi: 10.29244/jcs.9.2.185-205.

20. Puriwat W, Tripopsakul S. Sustainability Matters: Unravelling the Power of ESG in Fostering Brand Love and Loyalty Across Generations and Product Involvements. Sustainability. 2023;15(15):11578. doi: 10.3390/su151511578.

21. Bharti M, Bharti M, Wani TA, Shahid S. The <scp>FOMO</Scp> Effect: How <scp>AI</Scp> Recommendations Drive Consumer Dependence and Weaken Brand-Self Connections. Journal of Consumer Behaviour. 2026;25(3):1078-106. doi: 10.1002/cb.70117.

22. Rebge S, Nevzat R. Between Passion and Prediction: AI, Identity, and Fan Engagement Among Generation Z Football Supporters. Sport Marketing Quarterly. 2026;35(3):247-62. doi: 10.1177/10616934261433377.

23. Nadroo ZM, Islam JU, Naqshbandi MA. Parasocial Interaction in Marketing Domain: Offering Insights Through a Systematic Literature Review. International Journal of Consumer Studies. 2025;49(4). doi: 10.1111/ijcs.70079.

24. Pokhrel S, Somasiri N. Generative AI and Customer Engagement in Digital Marketing: A Systematic Review and Evidence Map of Affective vs. Behavioral Outcomes, Disclosure Effects, and Human-in-the-Loop Moderation. Emerging Media. 2026;4(3):437-56. doi: 10.1177/27523543261461786.

25. Yildirim N, Gündüzyeli B. The Personalization–Privacy Paradox in AI-Driven Programmatic Advertising: Implications for Digital Marketing Sustainability. Journal of Theoretical and Applied Electronic Commerce Research. 2026;21(6):179. doi: 10.3390/jtaer21060179.

26. Aydin S. Brand Trust in AI-Driven E-Commerce Personalization: The Well-Being–Privacy Trade-Off. Sustainability. 2026;18(2):1073. doi: 10.3390/su18021073.

27. Barone M, Bussoli C, Fattobene L. Digital Financial Consumers' Decision-Making: A Systematic Literature Review and Integrative Framework. International Journal of Bank Marketing. 2024;42(7):1978-2022. doi: 10.1108/ijbm-07-2023-0405.

28. Li J, Wu L, Qi J, Zhang Y, Wu Z, Hu S. Determinants Affecting Consumer Trust in Communication With AI Chatbots. Journal of Organizational and End User Computing. 2023;35(1):1-24. doi: 10.4018/joeuc.328089.

29. Asiri AY, Ghani NBA, Hamid SB. Examining the Predictors of Consumer Trust and Social Commerce Engagement: A Systematic Literature Review. Journal of Theoretical and Applied Electronic Commerce Research. 2025;20(3):247. doi: 10.3390/jtaer20030247.

30. Barari M, Ferm LEC, Quach S, Thaichon P, Ngo LV. The Dark Side of Artificial Intelligence in Marketing: Meta-Analytics Review. Marketing Intelligence & Planning. 2024;42(7):1234-56. doi: 10.1108/mip-09-2023-0494.

31. Kolar N, Milfelner B, Pisnik A. Factors for Customers' AI Use Readiness in Physical Retail Stores: The Interplay of Consumer Attitudes and Gender Differences. Information. 2024;15(6):346. doi: 10.3390/info15060346.

32. Xia T, Shen X, Lin-li LI. 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. 2024;13(18):2983. doi: 10.3390/foods13182983.

33. Sharma C, Kushwah SS. Mapping the Theory of Consumption Values: A Systematic Review Using the <scp>TCCM</Scp> Approach. Journal of Consumer Behaviour. 2024;24(2):562-610. doi: 10.1002/cb.2434.

34. Mănescu DC, Gavrila AA, Rădulescu M-C, Croitoru IM, Pavel CD, Marian ML, et al. From Fandom to Checkout: Artificial Intelligence and Immersive Commerce in Professional Sport. Journal of Theoretical and Applied Electronic Commerce Research. 2026;21(10):350. doi: 10.3390/jtaer21100350.

35. Lu K, Chen H, Hamayun M. Engaging the Digital Consumer: Examining How Live E-Commerce Features Shape Psychological Contracts and Loyalty. BMC Psychology. 2026;14(1). doi: 10.1186/s40359-026-05163-4.

36. Gao H, Liu H, Zhang H, Xu W. Artificial Intelligence Service and Customer Loyalty: A Moderated Mediation Role of Satisfaction and Contextual Factors in Human-Ai Interaction. Sage Open. 2026;16(1). doi: 10.1177/21582440261416217.

37. Żyminkowska K, Zachurzok-Srebrny E. The Role of Artificial Intelligence in Customer Engagement and Social Media Marketing—Implications From a Systematic Review for the Tourism and Hospitality Sectors. Journal of Theoretical and Applied Electronic Commerce Research. 2025;20(3):184. doi: 10.3390/jtaer20030184.

38. Chatzigeorgiou C, Christou E, Simeli I. From Brochures to Bytes: Destination Branding Through Social, Mobile, and AI—A Systematic Narrative Review With Meta-Analysis. Administrative Sciences. 2025;15(9):371. doi: 10.3390/admsci15090371.