

The Impact of Artificial Intelligence on Enhancing Customer Experience Through Social Media Marketing: The Mediating Role of Chatbots, Virtual Influencers, and Augmented Reality (Case Study: Digikala Customers)

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ABSTRACT

The present study aimed to investigate the impact of artificial intelligence on enhancing customer experience through social media marketing, with the mediating roles of chatbots, virtual influencers, and augmented reality. In terms of purpose, this study was applied; in terms of nature, it was descriptive; and in terms of data collection, it employed a cross-sectional survey design. The statistical population consisted of customers of Digikala. Given the unlimited size of the population, the sample size was determined as 384 individuals using Cochran's formula, and participants were selected through convenience sampling. Data were collected using a standardized 29-item questionnaire based on a five-point Likert scale. Data analysis was conducted using partial least squares structural equation modeling (PLS-SEM). The findings indicated that artificial intelligence had a significant effect on enhancing customer experience through social media marketing ($\beta = .311$, $t = 10.080$). Artificial intelligence also had positive and significant effects on chatbots ($\beta = .360$), virtual influencers ($\beta = .524$), and augmented reality ($\beta = .616$). Chatbots ($\beta = .388$), virtual influencers ($\beta = .549$), and augmented reality ($\beta = .345$) also exerted significant effects on enhanced customer experience. The mediating role of all three variables was confirmed. Model fit was supported by a GOF value of .383 and an R^2 value of .576 for customer experience.

Keywords: artificial intelligence, customer experience enhancement, social media marketing, chatbot, virtual influencer, augmented reality, structural equation modeling

1. Introduction

The rapid development of artificial intelligence (AI) has fundamentally altered the architecture of contemporary marketing, particularly by transforming the ways in which firms collect customer data, interpret behavioral signals, personalize communications, automate interactions, and design customer journeys across digital touchpoints. In increasingly competitive markets, customer

experience has emerged as a strategic construct that extends beyond satisfaction with an isolated transaction and encompasses the cognitive, emotional, sensory, behavioral, and relational responses generated throughout the customer-firm relationship. As organizations migrate a growing share of their communication and service activities to digital environments, AI has become increasingly embedded in the design and management of these experiences. AI-based technologies can process large

volumes of structured and unstructured data, recognize patterns in customer behavior, generate real-time predictions, automate service encounters, and adapt marketing content to heterogeneous consumer preferences. Consequently, the contribution of AI to marketing is no longer confined to operational efficiency or back-office analytics; rather, it increasingly influences the quality, immediacy, personalization, and interactivity of the customer experience itself. Recent scholarship has accordingly emphasized the growing convergence between AI technologies, marketing systems, consumer behavior, and customer experience, suggesting that intelligent technologies are progressively becoming central components of value creation in contemporary markets (Divsalar, 2025; Kalantari & Ghasemi, 2026; Khanlari & Abdolhosseini, 2025).

Customer experience has received sustained scholarly attention because it provides a broader lens than traditional constructs such as service quality or customer satisfaction. It reflects the customer's aggregate response to direct and indirect interactions with a firm across multiple stages and channels. In digital markets, these interactions increasingly occur through websites, mobile applications, social media platforms, digital service interfaces, recommendation systems, automated conversational agents, immersive technologies, and algorithmically generated content. The complexity of such environments means that customer experience is shaped not only by the quality of the product or service but also by the ease, speed, personalization, relevance, authenticity, and perceived intelligence of digital interactions. Research on customer experience across service industries has demonstrated the multidimensional and cumulative nature of the construct and has highlighted the importance of integrating technological, emotional, and relational dimensions when explaining how customers evaluate firms (Kim & So, 2022). As a result, firms increasingly seek technologies capable of simultaneously reducing friction and strengthening engagement, and AI offers considerable potential in both respects. Through predictive analytics, natural language processing, machine learning, generative systems, computer vision, and automated personalization, firms can tailor customer journeys in ways that would be difficult to achieve through conventional marketing systems alone (Moghaddasi & Shadman Kahu, 2024; Shiravani, 2024).

The influence of AI becomes particularly significant within social media marketing. Social media platforms have evolved from supplementary communication channels

into complex ecosystems in which consumers discover products, evaluate brands, communicate with firms, interact with other users, follow influencers, consume algorithmically curated content, and increasingly make purchasing decisions. AI supports these processes by identifying customer preferences, predicting reactions to marketing content, optimizing timing and targeting, automating customer communication, and generating or adapting content at scale. From a managerial perspective, this allows organizations to move from standardized mass communication toward increasingly individualized and context-sensitive interactions. In this regard, bibliometric and conceptual analyses have shown that the relationship between AI, social media marketing, and consumer behavior is becoming an important research domain because algorithmic decision-making increasingly structures both the production and consumption of marketing content (Sharifian Esfahani & Mirghaderi, 2026). Research has also suggested that AI can shape purchasing behavior on social media by changing how consumers are exposed to information, how quickly they receive responses, and how effectively firms identify and address individual preferences (Nourian & Bahrami, 2024). These developments indicate that social media marketing should no longer be conceptualized merely as brand communication conducted through digital platforms; it is increasingly an intelligent and data-driven interaction system in which AI technologies actively influence the customer experience.

The application of AI in social media marketing is particularly relevant because customer expectations in digital environments are characterized by immediacy, personalization, continuity, and responsiveness. Consumers frequently expect firms to provide relevant recommendations, immediate answers, individualized offers, interactive content, and seamless transitions across touchpoints. AI enables firms to respond to these expectations through real-time data processing and adaptive communication. Rather than treating customers as homogeneous segments, AI-supported systems can infer preferences from browsing histories, engagement patterns, prior purchases, search behavior, and interaction data. Such capabilities can improve perceived relevance and reduce the informational burden associated with product evaluation. At the same time, AI-based personalization can strengthen brand experience when consumers perceive the resulting content as useful and aligned with their needs. Empirical evidence from social media environments

indicates that AI-based marketing efforts can contribute to brand preference through enhanced brand experience, demonstrating the importance of experiential mechanisms in converting technological capability into favorable consumer outcomes (Koeswara & Nugroho, 2024). Similarly, case-based research on AI-powered personalization has shown that firms may obtain substantial business value from personalized marketing systems, although consumer acceptance remains contingent on perceived usefulness, transparency, control, and the appropriateness of data use (Shiravani, 2024).

Despite its potential, the effect of AI on customer experience is rarely direct or technologically uniform. Rather, AI becomes visible to customers through specific applications, interfaces, and forms of interaction. Among the most prominent of these are AI-powered chatbots, virtual influencers, and augmented reality. These technologies differ considerably in their mechanisms but share a common function: they mediate the way customers encounter, interpret, and interact with intelligent marketing systems. Chatbots primarily transform service communication; virtual influencers reshape persuasive and relational communication; and augmented reality transforms product visualization and immersive engagement. Accordingly, examining AI only as a broad technological construct may conceal the mechanisms through which it actually affects customer experience. Research across industries has increasingly emphasized the need to move from general claims about AI adoption toward more granular analysis of specific technological pathways and customer-facing applications (Divsalar, 2025; Khanlari & Abdolhosseini, 2025). This is especially important in social media environments, where customers may encounter multiple AI-enabled mechanisms simultaneously and where the experiential consequences of those mechanisms can reinforce one another.

Chatbots represent one of the most widespread forms of customer-facing AI. By using natural language processing, machine learning, and automated response systems, chatbots can provide customers with immediate assistance, answer routine questions, facilitate product search, support decision-making, and resolve basic service issues without direct human intervention. Their managerial value derives from scalability and continuous availability, while their experiential value depends on response accuracy, responsiveness, conversational quality, perceived helpfulness, and the extent to which they reduce customer effort. When effectively implemented, chatbots may

shorten waiting times, increase accessibility, and provide standardized yet personalized support. Empirical research in service contexts has shown that chatbot service capabilities can significantly influence customer experience and customer satisfaction, suggesting that the quality of the technological interface is a central determinant of how customers evaluate AI-mediated service encounters (Afshari, 2025). This is particularly relevant for large digital retailers, where the volume of customer inquiries can be substantial and where efficient automated interaction may have a direct effect on the perceived quality of the overall shopping journey. In addition, AI-assisted prediction of customer reactions can enable firms to refine chatbot interactions according to behavioral patterns and expected responses, thereby increasing the strategic value of intelligent service systems (Daraei et al., 2025).

However, chatbot effectiveness cannot be understood only in terms of automation or cost reduction. From a customer-experience perspective, the central issue is whether the chatbot adds value to the interaction. An automated interface that is fast but inaccurate, impersonal, or incapable of understanding customer intent may generate frustration rather than improve experience. Conversely, conversational systems that correctly identify needs, provide relevant responses, and maintain continuity across interactions can function as relational interfaces between the customer and the organization. This distinction is especially important in social media marketing, where service interactions often occur in the same environments in which customers are simultaneously exposed to promotional content, peer communication, and brand-related information. AI-supported chatbots therefore occupy a hybrid role that combines customer service, communication, and marketing. Their influence on customer experience may consequently extend beyond problem resolution to include trust formation, perceived innovativeness, engagement, and brand evaluation (Afshari, 2025; Moghaddasi & Shadman Kahu, 2024).

Virtual influencers constitute another emerging mechanism through which AI is reshaping social media marketing. Unlike traditional human influencers, virtual influencers are digitally created personas whose identities, appearance, narratives, and communication can be designed and managed by organizations or specialized creators. Their increasing prominence reflects both technological innovation and the growing importance of influencer-based communication in social media ecosystems. Virtual

influencers enable firms to exercise high levels of control over brand representation, message consistency, visual identity, and posting behavior while potentially reducing some of the reputational uncertainties associated with human endorsers. At the same time, their effectiveness depends on whether consumers perceive them as credible, engaging, authentic enough to sustain attention, and compatible with the promoted brand. Early research on virtual influencers emphasized the blurring of boundaries between fictional and real social actors and raised important questions regarding how digitally constructed identities can produce meaningful marketing outcomes despite their artificial nature (Moustakas, 2020).

More recent empirical research has provided stronger evidence concerning the determinants of virtual influencer effectiveness. The persuasive influence of these digital agents appears to depend substantially on content quality and source credibility, both of which can affect consumer engagement and purchase intentions. This suggests that virtual influencers should not be treated merely as technological novelties; rather, they function within established mechanisms of social influence, identification, credibility assessment, and persuasive communication (Angmo et al., 2025). When designed effectively, virtual influencers can support continuous brand storytelling, provide highly controlled visual and narrative content, and create innovative forms of interaction that attract digitally oriented customers. They may therefore contribute to customer experience by increasing novelty, entertainment, engagement, and perceived technological sophistication. In social commerce and platform-based retailing, where customer attention is scarce and competition for engagement is intense, such characteristics can become strategically important. Nevertheless, the impact of virtual influencers is likely to depend on the interaction between technological sophistication and social credibility, making them a particularly relevant mediator between AI capability and customer experience.

Augmented reality (AR) represents a third important AI-enabled mechanism capable of transforming customer experience. Although AR is not synonymous with AI, its contemporary marketing applications are increasingly enhanced by intelligent technologies that support object recognition, recommendation, personalization, visual adaptation, and real-time interaction. AR allows digital information or objects to be superimposed onto the user's physical environment, thereby reducing the distance between online product information and direct experiential

evaluation. In retail contexts, AR can enable customers to visualize products, simulate product use, inspect alternatives, or interact with branded content before purchase. Such capabilities are strategically important because one of the persistent limitations of online retailing is the customer's inability to physically inspect or experience products in the same way as in traditional stores. By increasing interactivity and vividness, AR can reduce uncertainty and strengthen perceived involvement in the purchasing process. The broader literature on AI-enabled marketing increasingly positions immersive and interactive technologies as mechanisms through which organizations can create novel and differentiated customer experiences (Divsalar, 2025; Kalantari & Ghasemi, 2026).

The relationship between AI and customer experience also raises broader concerns regarding trust, privacy, and human-machine interaction. AI-based marketing depends heavily on customer data, and its capacity for personalization is often proportional to the breadth and depth of information available about individual users. While data-intensive personalization may increase relevance and convenience, it may also generate concerns regarding surveillance, information control, algorithmic opacity, and misuse of personal data. Consequently, firms must balance technological effectiveness with ethical and privacy considerations. Research examining marketing-oriented AI and human-machine interaction has highlighted that responsible use of intelligent technologies requires attention to privacy protection as well as to the broader social consequences of automated decision-making (Hassanpour & Hassanpour, 2024). These issues are especially salient in social media environments because users generate extensive behavioral data and may not always understand how that information is processed or used to shape personalized content. The experiential benefits of AI may therefore weaken when personalization is perceived as intrusive or manipulative.

These ethical and relational concerns are closely connected to customer acceptance. Technological sophistication by itself does not guarantee positive outcomes; customers must also perceive AI-enabled services as useful, trustworthy, understandable, and compatible with their expectations. This reinforces the importance of examining customer experience as the dependent outcome rather than treating AI adoption as an inherently successful managerial strategy. Firms may invest in advanced AI capabilities but fail to generate experiential value if the technology creates friction, produces irrelevant

recommendations, lacks transparency, or diminishes the perceived human quality of interaction. Accordingly, research on AI-based personalization has emphasized the simultaneous importance of business value and consumer acceptance (Shiravani, 2024), while research on human-machine interaction underscores the need to consider privacy and responsible implementation (Hassanpour & Hassanpour, 2024). These perspectives suggest that the effectiveness of AI in marketing ultimately depends on how technological capability is translated into concrete customer-facing experiences.

Within business-to-business and broader marketing communication research, scholars have also noted that digital technologies do not automatically generate marketing effectiveness unless they are strategically integrated into communication and relationship-building processes. Although much of the AI and social media literature has focused on consumer markets, earlier work on advertising and marketing communication has emphasized significant untapped opportunities in the strategic use of digital and interactive communication systems (Swani et al., 2020). This observation remains relevant to contemporary AI-driven marketing because firms must move beyond simple technology adoption toward purposeful integration of AI into customer journeys. In this sense, chatbots, virtual influencers, and augmented reality should be viewed not as isolated tools but as coordinated elements of an intelligent marketing ecosystem. Their value depends on alignment with customer needs, brand positioning, platform characteristics, communication strategy, and the firm's broader customer experience objectives.

Evidence from recent empirical studies increasingly supports a direct relationship between AI-enabled marketing and improved customer experience. In a social media context, AI has been shown to improve customer experience by enabling more personalized communication, facilitating rapid interaction, and supporting technologically enhanced forms of engagement. Research among Jordanian Millennials, for example, has specifically demonstrated the relevance of AI in improving customer experience through social media marketing, providing a particularly important empirical precedent for examining these relationships in other cultural and market contexts (Omeish et al., 2024). However, consumer behavior and technology acceptance are context-dependent. Cultural expectations, platform usage patterns, digital literacy, trust in technology, market structure, and prior experience with

e-commerce may all influence how customers respond to AI-based marketing tools. Therefore, findings generated in one national or demographic context cannot automatically be generalized to other markets.

The Iranian digital commerce environment provides a particularly relevant context for examining these issues. The rapid expansion of e-commerce, widespread use of social media, growing customer familiarity with digital services, and intensified competition among online businesses have increased the strategic importance of customer experience. Digikala, as a major Iranian e-commerce platform, provides customers with a highly digitalized shopping environment in which data-driven recommendations, online communication, platform interactions, and technology-mediated service processes are central to the customer journey. Within such a context, the ability of AI to enhance experience through social media marketing may influence engagement, satisfaction, continued platform use, and broader customer-brand relationships. Iranian studies have increasingly examined AI in relation to customer service, marketing, consumer reactions, and digital behavior, demonstrating growing domestic interest in the managerial implications of intelligent technologies (Daraei et al., 2025; Moghaddasi & Shadman Kahu, 2024; Nourian & Bahrami, 2024). Furthermore, strategic analyses of AI integration across industries indicate that customer experience is becoming one of the principal domains in which the competitive consequences of AI adoption are expected to become visible (Divsalar, 2025).

Nevertheless, an important research gap remains. Much of the existing literature has either examined AI and customer experience at a broad conceptual level, investigated a single AI-based technology, focused on purchase intention or brand preference rather than customer experience, or analyzed contexts outside Iran. Bibliometric research has documented the increasing intersection between AI and customer experience but also implies the need for more integrated empirical models capable of explaining the mechanisms connecting technological capability to customer outcomes (Khanlari & Abdolhosseini, 2025). Likewise, research on the transformation of social media marketing through AI indicates that consumer behavior is increasingly influenced by algorithmic systems, yet the simultaneous role of multiple customer-facing AI mechanisms remains insufficiently examined (Sharifian Esfahani & Mirghaderi, 2026). Studies focusing on virtual influencers have

demonstrated their effects on engagement and purchase intentions (Angmo et al., 2025), chatbot research has demonstrated their relevance for experience and satisfaction (Afshari, 2025), and emerging work on AI-driven personalization and interactive technologies has highlighted their potential to create novel experiences (Kalantari & Ghasemi, 2026; Koeswara & Nugroho, 2024). However, these streams have often developed separately.

An integrated model is therefore needed to determine whether AI improves customer experience not only directly but also through specific technological and communicative mechanisms. Such a model is theoretically valuable because it clarifies how a broad organizational capability—AI—translates into customer-level outcomes. It is also managerially important because firms do not invest in “AI” in an abstract sense; they invest in concrete applications such as automated conversational systems, digitally generated influencers, intelligent recommendation engines, and immersive interfaces. Identifying the relative contribution of these mechanisms can help managers allocate technological and marketing resources more effectively. For a platform such as Digikala, understanding whether customer experience is most strongly influenced through chatbots, virtual influencers, or augmented reality can inform decisions regarding platform design, social media strategy, customer support infrastructure, and digital content development. Moreover, examining these mediating mechanisms within a single structural model can provide a more comprehensive explanation of AI-enabled customer experience than analyses that focus exclusively on direct effects.

Accordingly, the present study aims to investigate the impact of artificial intelligence on enhancing customer experience through social media marketing among Digikala customers, with particular emphasis on the mediating roles of chatbots, virtual influencers, and augmented reality.

2. Methods and Materials

The present study was applied in terms of purpose, descriptive-correlational in nature, and employed a cross-sectional survey design for data collection. Relationships among the constructs were analyzed using structural equation modeling with a partial least squares approach (PLS-SEM). The statistical population consisted of customers of Digikala. Given the large and effectively unlimited population, the sample size was determined using Cochran’s formula for an infinite population, based on a

95% confidence level, an estimated proportion of .50, and a permissible error of .05, resulting in a sample of 384 respondents. Participants were selected using convenience sampling.

Data were collected using a standardized 29-item questionnaire, with responses to each item recorded on a five-point Likert scale. The questionnaire measured five constructs: artificial intelligence (9 items), chatbots (5 items), virtual influencers (5 items), augmented reality (5 items), and enhanced customer experience (5 items). In the conceptual model, artificial intelligence was considered the independent variable, while enhanced customer experience was considered the dependent variable. Chatbots, virtual influencers, and augmented reality served as mediating variables in the relationship between these two constructs. Social media marketing constituted the context within which customers interacted with brand content and intelligent technologies in the study.

During the data preparation stage, responses were coded, and descriptive statistics were calculated to describe respondents’ characteristics and the study variables. The distribution of the data was assessed using the Kolmogorov–Smirnov test, and data adequacy was evaluated using the Kaiser–Meyer–Olkin (KMO) index. Given the predictive objective of the study, the multidimensional nature of the model, and the distributional characteristics of the data, PLS-SEM was employed for model estimation. This approach is suitable for the simultaneous estimation of measurement and structural models and for analyzing relationships among multiple constructs (Hair et al., 2019; Hair et al., 2022). Data analysis was performed in three stages: evaluation of the measurement model, evaluation of the structural model, and testing of the mediating effects.

In the first stage, the measurement model was evaluated in terms of indicator reliability, internal consistency, and validity. Outer factor loadings were examined to assess item reliability; values of .70 or higher were considered desirable, whereas loadings between .40 and .70 were evaluated with consideration of composite reliability, average variance extracted (AVE), and the theoretical foundations of the construct. Internal consistency reliability was assessed using Cronbach’s alpha and composite reliability, with values of .70 or higher considered acceptable. Convergent validity was evaluated based on the average variance extracted (AVE), with values greater than .50 regarded as acceptable. Discriminant validity was assessed using the Fornell–Larcker criterion, cross-

loadings, and the heterotrait–monotrait ratio (HTMT). The significance of factor loadings was assessed using a t-statistic greater than 1.96 at the 95% confidence level.

In the second stage, the structural model was evaluated using standardized path coefficients, t-statistics, and significance levels. The coefficient of determination (R^2) was used to assess the proportion of variance explained in the endogenous constructs; values of .19, .33, and .67 were considered indicative of weak, moderate, and strong explanatory power, respectively. The model's predictive relevance was assessed using the Q^2 index, with values greater than zero indicating acceptable predictive capability. The effect size of each path was evaluated using the f^2 index, with values of .02, .15, and .35 representing small, medium, and large effects, respectively. The goodness-of-fit (GOF) index was calculated as the square root of the product of the mean communality values of the constructs and the mean R^2 value and was reported as a supplementary measure of overall model fit. GOF values were interpreted within the range of zero to one, with higher values indicating better model fit. Path significance was also assessed using a t-statistic greater than 1.96 and a significance level below .50.

In the third stage, the mediating roles of chatbots, virtual influencers, and augmented reality were examined by analyzing indirect effects. The indirect effect associated

with each mediator was calculated as the product of the path coefficient from artificial intelligence to the mediator and the path coefficient from the mediator to enhanced customer experience. The significance of the indirect effects was assessed using the bootstrap method with 5,000 resamples and a 95% confidence level (Preacher & Hayes, 2008). The direct effect of artificial intelligence on customer experience was also assessed alongside the indirect effects; simultaneous significance of both direct and indirect effects was used as the criterion for identifying partial mediation.

3. Findings and Results

Of the 384 respondents, 260 (67.7%) were men and 124 (32.3%) were women. A total of 251 respondents (65.4%) were married and 133 (34.6%) were single. In terms of educational attainment, 81 respondents (21.09%) held an associate degree, 143 (37.2%) held a bachelor's degree, 147 (38.2%) held a master's degree, and 13 (3.3%) held a doctoral degree. The age distribution indicated that 70 respondents (18.2%) were younger than 30 years, 118 (30.7%) were between 30 and 40 years of age, 132 (34.4%) were between 40 and 50 years of age, and 64 (16.7%) were older than 50 years.

Table 1

Reported Descriptive Statistics for the Study Variables

Construct or Indicator	Type of Statistic	Value	Description
Virtual influencers	Mean	3.712	Highest reported mean
Artificial intelligence	Mean	3.180	Lowest reported mean
Enhanced customer experience	Standard deviation	.913	Highest reported variability

The mean score for virtual influencers was 3.712, while the mean score for artificial intelligence was 3.180. The standard deviation of enhanced customer experience was

.913, indicating the greatest variability among the reported indicators.

Table 2

Results of Preliminary Data Tests

Test or Index	Reported Value	Statistical Interpretation
Kolmogorov–Smirnov test	Significance level for all variables < .05	The test was significant for all variables
KMO index	.808	Sampling adequacy confirmed
Bartlett's test of sphericity	$p < .001$	Adequacy of the correlation matrix confirmed

The significance of the Kolmogorov–Smirnov test at the .05 level and the KMO value of .808, together with the predictive objective of the study, supported the selection of

the PLS-SEM approach. The value of .000 reported in the statistical output for Bartlett's test is conventionally reported as $p < .001$.

Table 3

Reliability and Validity of the Measurement Model

Indicator	Value or Range	Evaluation Criterion	Result
Composite reliability	.882–.905	Greater than .70	Acceptable
Average variance extracted (AVE)	.518–.640	Greater than .50	Convergent validity confirmed
Standardized factor loadings	Greater than .40	t-statistic greater than 1.96	Significant
Discriminant validity	Fornell–Larcker, cross-loadings, and HTMT	Evaluation based on three criteria	Confirmed

Cronbach’s alpha values for the variables were .829 for virtual influencers, .848 for enhanced customer experience, .883 for artificial intelligence, .856 for augmented reality, and .835 for chatbots. Composite reliability for all variables exceeded .70, ranging from .882 to .905, and AVE values exceeded .50, ranging from .518 to .640. The factor loadings of all items exceeded 1.96 in terms of their t-statistics and were greater than .40 in standardized form. Discriminant validity was also confirmed using the

Fornell–Larcker criterion, cross-loadings, and HTMT. Cronbach’s alpha values for the constructs ranged from .829 to .883, with all values exceeding the .70 criterion. The results for Cronbach’s alpha and composite reliability confirmed the internal consistency of the constructs. The AVE values also supported the convergent validity of the constructs. Discriminant validity was confirmed based on the Fornell–Larcker criterion, cross-loadings, and the HTMT ratio.

Table 4

Coefficient of Determination and Predictive Relevance of the Endogenous Constructs

Endogenous Construct	R ²	Interpretation of R ²	Q ²	Evaluation of Predictive Relevance
Chatbots	.130	Weak	.371	Acceptable
Virtual influencers	.275	Weak to moderate	.143	Acceptable
Augmented reality	.380	Moderate	.210	Acceptable
Enhanced customer experience	.567	Moderate to strong	.305	Acceptable

The R² value for enhanced customer experience was .567, indicating that 56.7% of the variance in customer experience was explained by the research model. Q² values for all endogenous constructs were greater than zero,

indicating acceptable predictive relevance of the model. The f² effect sizes for the principal paths also ranged from medium to large.

Table 5

Calculation of the Goodness-of-Fit Index

Calculation Component	Value
Mean communality values of the constructs	.435
Mean R ²	.338
Product of the two means	.14703
GOF = $\sqrt{(.435 \times .383)}$	.383

The GOF index was calculated as .383, indicating an acceptable overall fit of the model.

Table 6

Coefficients for the Direct Paths and the Main Research Path

Hypothesis or Path Type	Structural Relationship	β	t-statistic	p-value	Result
Hypothesis 1; main path	Artificial intelligence → customer experience through the social media marketing pathway	.311	10.080	< .001	Supported
Direct path	Artificial intelligence → enhanced customer experience	.230	5.344	< .001	Significant
Hypothesis 2a	Artificial intelligence → chatbots	.360	8.226	< .001	Supported
Hypothesis 2b	Artificial intelligence → virtual influencers	.524	15.427	< .001	Supported
Hypothesis 2c	Artificial intelligence → augmented reality	.616	19.371	< .001	Supported
Mediating path	Chatbots → enhanced customer experience	.388	7.607	< .001	Significant
Mediating path	Virtual influencers → enhanced customer experience	.549	9.174	< .001	Significant
Mediating path	Augmented reality → enhanced customer experience	.345	8.245	< .001	Significant

All three subpaths associated with the second hypothesis were supported. Artificial intelligence exerted its strongest effect on augmented reality ($\beta = .616$), followed by virtual influencers ($\beta = .524$) and chatbots ($\beta = .360$). Among the paths leading to customer experience, virtual influencers exhibited the largest path coefficient ($\beta = .549$), followed by chatbots ($\beta = .388$) and augmented reality ($\beta = .345$).

4. Discussion and Conclusion

The present study investigated the effect of artificial intelligence on enhancing customer experience through social media marketing, with particular attention to the mediating roles of chatbots, virtual influencers, and augmented reality among Digikala customers. The findings demonstrated that artificial intelligence had a positive and statistically significant effect on customer experience through the social media marketing pathway ($\beta = .311$, $t = 10.080$, $p < .001$). In addition, the direct effect of artificial intelligence on enhanced customer experience was significant ($\beta = .230$, $t = 5.344$, $p < .001$). These findings indicate that AI can improve the quality of customer interactions not only by strengthening the technological infrastructure of digital marketing but also by creating more responsive, personalized, interactive, and data-driven experiences. This result is consistent with previous studies emphasizing the transformative role of AI in customer experience and contemporary marketing. Divsalar argued that integrating AI across different industries can improve customer experience by increasing personalization, responsiveness, and decision quality (Divsalar, 2025). Similarly, Khanlari and Abdolhosseini showed that the interaction between AI and customer experience has become an increasingly important stream of research, reflecting the movement of organizations toward algorithmically supported customer management (Khanlari & Abdolhosseini, 2025). The result also aligns with Kalantari and Ghasemi, who emphasized that algorithmic marketing can generate new forms of customer experience through intelligent targeting, personalization, and adaptive digital interaction (Kalantari & Ghasemi, 2026).

The significant effect of AI on customer experience can be explained by the capacity of intelligent systems to reduce informational and interactional friction throughout the digital customer journey. AI enables firms to process customer data in real time, identify behavioral patterns, anticipate preferences, personalize messages, and automate responses across digital channels. These functions can

make customer interactions faster, more relevant, and more convenient. In social media environments, where consumers are exposed to large volumes of competing content, the capacity to provide individually relevant information can strongly influence perceived value and engagement. The present finding is consistent with Omeish et al., who reported that AI could improve customer experience through social media marketing by enabling more personalized and efficient customer interactions (Omeish et al., 2024). It is also compatible with the findings of Koeswara and Nugroho, who showed that AI-based marketing efforts can improve brand-related outcomes through enhanced brand experience (Koeswara & Nugroho, 2024). Therefore, the current findings reinforce the argument that AI does not merely improve operational efficiency but also contributes directly to the experiential dimension of marketing.

Another important finding was the positive and significant effect of artificial intelligence on chatbots ($\beta = .360$, $t = 8.226$, $p < .001$). This result suggests that AI capability is an important technological foundation for developing more effective chatbot systems. Chatbots depend fundamentally on AI-related technologies, including natural language processing, machine learning, intent recognition, and automated decision rules. As the quality of AI increases, chatbots become more capable of understanding customer inquiries, generating relevant answers, maintaining conversational continuity, and providing customized service. The present finding is in line with Afshari, who found that chatbot service capabilities can improve customer experience and satisfaction, particularly when the system is responsive, reliable, and capable of delivering useful information (Afshari, 2025). The result also supports Moghaddasi and Shadman Kahu, who highlighted the growing role of AI-based customer service in improving business–customer interactions (Moghaddasi & Shadman Kahu, 2024). In this respect, the significant AI-to-chatbot path indicates that investments in AI infrastructure can strengthen the quality and functionality of automated conversational interfaces.

The findings also showed that chatbots had a significant positive effect on enhanced customer experience ($\beta = .388$, $t = 7.607$, $p < .001$). This result confirms that chatbots can function as an important mechanism through which AI improves customer experience. In digital commerce, customers frequently require immediate access to product information, order tracking, service guidance, and problem resolution. Chatbots can reduce waiting time and lower

customer effort by providing continuous access to automated assistance. When chatbot interactions are accurate and contextually appropriate, customers may perceive the service process as more efficient and convenient. This finding is directly consistent with Afshari's study, which demonstrated that chatbot service capabilities can positively affect customer experience and satisfaction (Afshari, 2025). It also accords with the broader arguments of Moghaddasi and Shadman Kahu regarding the contribution of AI-enabled customer service to improved customer interactions (Moghaddasi & Shadman Kahu, 2024). Thus, the findings suggest that chatbots are not merely operational tools for reducing service costs but can also become experiential touchpoints that shape customers' overall evaluations of a digital platform.

Artificial intelligence also had a positive and statistically significant effect on virtual influencers ($\beta = .524$, $t = 15.427$, $p < .001$). This coefficient was stronger than the corresponding effect of AI on chatbots, indicating that AI may have a particularly prominent role in the creation and management of digitally generated influencer content. Virtual influencers are fundamentally dependent on technological systems that support digital character design, automated content creation, behavioral scripting, visual production, and interaction management. AI can increase the consistency, adaptability, and personalization of such influencers by allowing firms to tailor messages and digital personas to audience characteristics. This finding is compatible with Moustakas, who showed that virtual influencers blur the boundaries between fictional and real social actors and may provide new opportunities for marketing communication (Moustakas, 2020). It is also consistent with Angmo et al., who demonstrated that the content and credibility of virtual influencers are important determinants of consumer engagement and purchase intentions (Angmo et al., 2025). The present result extends these findings by indicating that AI capability itself can strengthen the effectiveness and relevance of virtual influencer-based marketing.

The effect of virtual influencers on enhanced customer experience was also positive and significant ($\beta = .549$, $t = 9.174$, $p < .001$), representing the strongest path among the three mediating variables leading to customer experience. This result suggests that virtual influencers may play an especially influential experiential role in social media marketing. One explanation is that virtual influencers combine technological novelty with social and symbolic

features that resemble human influencer communication. They can attract attention, create narrative continuity, increase entertainment value, and facilitate brand storytelling. Compared with conventional digital advertisements, virtual influencers may create a stronger sense of interaction and identity-based engagement. The finding aligns with Angmo et al., who reported that virtual influencer credibility and content quality positively influence consumer engagement and purchase-related responses (Angmo et al., 2025). It is also consistent with Moustakas, who emphasized the potential marketing effectiveness of digitally generated influencers despite their artificial nature (Moustakas, 2020). In the context of Digikala customers, the relatively strong coefficient may indicate that customers respond favorably to socially engaging and visually distinctive forms of AI-mediated content, particularly when these mechanisms are integrated into broader social media marketing activities.

Artificial intelligence exerted its strongest direct effect on augmented reality ($\beta = .616$, $t = 19.371$, $p < .001$). This finding indicates that AI capability is closely associated with the development and utilization of immersive and interactive digital experiences. Augmented reality applications increasingly rely on AI for object recognition, personalization, environmental mapping, recommendation, and real-time adaptation. As firms adopt more sophisticated AI technologies, they become better positioned to offer AR applications that allow customers to visualize products, interact with digital representations, or simulate consumption experiences. This finding is consistent with the broader argument of Kalantari and Ghasemi that AI is transforming customer experience by enabling novel and technologically enriched forms of interaction (Kalantari & Ghasemi, 2026). It also corresponds with Divsalar's strategic analysis of AI integration across industries, which highlighted the importance of advanced technologies in reshaping customer-facing experiences (Divsalar, 2025). Accordingly, the strong AI-to-AR path suggests that immersive digital experiences may be among the most technologically dependent forms of AI-enabled marketing.

Augmented reality also had a positive and significant effect on enhanced customer experience ($\beta = .345$, $t = 8.245$, $p < .001$). This finding suggests that immersive technologies can improve customers' perceptions of online interaction by increasing vividness, product understanding, and experiential involvement. One of the central limitations of online shopping is the absence of physical product inspection. AR can partly overcome this limitation by

allowing consumers to visualize products in more realistic or personally relevant contexts. Such functionality may reduce uncertainty and increase confidence in purchase decisions. The result is consistent with the general conclusions of studies emphasizing AI-enabled personalization and interactive customer experiences (Kalantari & Ghasemi, 2026; Shiravani, 2024). Although the effect of AR on customer experience was weaker than that of virtual influencers and chatbots in the current model, it was nevertheless substantial and statistically significant, confirming that immersive technology can function as an important experiential mediator.

The mediating effects of chatbots, virtual influencers, and augmented reality were all confirmed. This is one of the central contributions of the present study because it demonstrates that the relationship between artificial intelligence and customer experience is not limited to a simple direct effect. Instead, AI creates value through specific customer-facing mechanisms. The significant direct and indirect effects together indicate partial mediation, meaning that AI affects customer experience both independently and through the three mediators. This finding supports the proposition that AI should be understood as a broad enabling capability whose experiential consequences emerge through concrete interfaces and applications. The result is aligned with Omeish et al., who emphasized the role of AI in improving customer experience through social media marketing (Omeish et al., 2024). It also complements the findings of Koeswara and Nugroho regarding the importance of experiential mechanisms in converting AI marketing efforts into favorable customer responses (Koeswara & Nugroho, 2024). By incorporating three mediators simultaneously, the present study offers a more integrated interpretation of how AI translates into customer-level outcomes.

The explanatory power of the model further supports the relevance of these relationships. The R^2 value for enhanced customer experience was .567, indicating that 56.7% of the variance in customer experience was explained by the model. This level of explanatory power can be regarded as moderate to relatively strong and suggests that AI, chatbots, virtual influencers, and augmented reality jointly account for a meaningful proportion of variation in customer experience. The Q^2 values for all endogenous constructs were above zero, indicating satisfactory predictive relevance. In addition, the GOF value of .383 suggested an acceptable overall model fit. These results strengthen confidence in the conceptual model and indicate that the

selected technological mechanisms are theoretically and empirically relevant for explaining customer experience. The model's explanatory performance is compatible with previous research arguing that AI-based marketing creates value through multiple interconnected technological and experiential pathways rather than through a single mechanism (Khanlari & Abdolhosseini, 2025; Sharifian Esfahani & Mirghaderi, 2026).

The findings should also be interpreted in light of broader developments in social media marketing. AI increasingly influences how content is generated, distributed, prioritized, and personalized. Sharifian Esfahani and Mirghaderi documented the growing role of AI in transforming social media marketing and consumer behavior, highlighting a shift toward algorithmically mediated interactions (Sharifian Esfahani & Mirghaderi, 2026). Nourian and Bahrami similarly emphasized the role of AI in shaping customer purchasing behavior in social media environments (Nourian & Bahrami, 2024). The current study extends this literature by showing that AI can influence experience through different technological channels rather than merely through recommendation or targeting. The significance of all three mediators indicates that social media marketing is increasingly becoming a multidimensional technological ecosystem in which service automation, digitally generated social actors, and immersive interaction coexist.

The results also have implications for the personalization–privacy trade-off in AI marketing. Although the current study focused primarily on positive experiential outcomes, effective AI adoption requires responsible use of customer data and careful management of human–machine interactions. Hassanpour and Hassanpour emphasized the importance of considering privacy and broader social implications when implementing marketing-oriented AI technologies (Hassanpour & Hassanpour, 2024). AI-based systems can improve personalization, but excessive or opaque data use may undermine trust. Therefore, the positive relationships identified in this study should not be interpreted as suggesting that more automation or personalization is always beneficial. Instead, customer experience is likely to improve when AI applications provide tangible utility while maintaining transparency, privacy, and a reasonable degree of customer control.

The findings are also relevant to the broader marketing communication literature. Swani et al. argued that digital and interactive communication systems have substantial

untapped potential when strategically integrated into marketing activities (Swani et al., 2020). The current findings support this broader position by showing that AI-enabled communication tools can improve customer experience when deployed through specific mechanisms. From a managerial standpoint, this suggests that technological adoption should be coordinated with communication strategy rather than treated as an isolated IT initiative. AI, chatbots, virtual influencers, and AR create the greatest value when they are aligned with the firm's customer experience strategy, brand identity, customer service processes, and social media presence.

Overall, the findings indicate that artificial intelligence is a significant driver of enhanced customer experience in social media marketing and that this relationship operates both directly and indirectly through chatbots, virtual influencers, and augmented reality. Among the mediators, virtual influencers had the strongest effect on customer experience, whereas AI had the strongest effect on augmented reality. These findings suggest that different AI-enabled technologies contribute to customer experience through distinct mechanisms: chatbots primarily improve responsiveness and service efficiency, virtual influencers strengthen engagement and social interaction, and augmented reality enhances immersion and product visualization. Taken together, the results confirm that AI-driven customer experience is multidimensional and depends on the effective integration of technological, communicative, and interactive tools.

The present study has several limitations. First, the research employed a cross-sectional design, which limits the ability to establish causal relationships or examine how customer perceptions change over time. Second, convenience sampling was used, which may restrict the representativeness of the sample and reduce the generalizability of the findings to all Digikala customers or to customers of other e-commerce platforms. Third, the data were collected through self-report questionnaires, making the results potentially susceptible to common method bias, social desirability, and respondents' subjective interpretations of AI-related constructs. Fourth, the study examined only three mediating mechanisms—chatbots, virtual influencers, and augmented reality—while other AI-enabled mechanisms such as recommendation systems, generative AI assistants, predictive personalization, and voice-based interfaces may also affect customer experience. Finally, the study was conducted within a single organizational and national context, and the

effects may differ across industries, cultural settings, and levels of digital maturity.

Future research should employ longitudinal or experimental designs to more rigorously assess causal relationships and changes in customer experience over time. Comparative studies across multiple e-commerce platforms, industries, and countries would also help determine the extent to which the identified relationships are context-specific. Future models could incorporate additional mediators and moderators, including trust in AI, perceived personalization, privacy concern, perceived usefulness, perceived intrusiveness, technological readiness, digital literacy, and brand familiarity. It would also be valuable to examine whether the effects of virtual influencers, chatbots, and augmented reality differ across demographic groups or customer segments. Researchers may further combine survey data with behavioral data, platform analytics, clickstream information, or experimental exposure to AI-enabled marketing tools in order to reduce reliance on self-reported perceptions and improve the ecological validity of the findings.

From a practical perspective, managers of Digikala and similar digital platforms should integrate AI technologies into customer experience strategy in a coordinated rather than fragmented manner. Investment in chatbots should focus on response accuracy, conversational continuity, natural language quality, and the ability to escalate complex issues to human agents. Virtual influencers should be designed around credible, relevant, and engaging content rather than novelty alone, with careful alignment between the influencer persona and the brand's identity. Augmented reality applications should prioritize practical utility, ease of use, and product visualization functions that reduce uncertainty during purchase decisions. Managers should also integrate these tools across social media channels so that customers experience consistent messaging and interaction. At the same time, transparent data practices, privacy protection, and clear communication regarding AI use should be treated as essential components of implementation, because technological sophistication will not generate sustainable experiential value unless customers also perceive the systems as trustworthy, useful, and respectful of their preferences.

Authors' Contributions

Authors thank all who helped us through this study.

Declaration

A generative artificial intelligence tool was used for English translation, language refinement, structural editing, and consistency checking. The authors reviewed the resulting text and remain responsible for the accuracy of the study description, statistical results, references, and final manuscript. No artificial intelligence system is listed as an author.

Transparency Statement

De-identified data may be made available by the corresponding author upon reasonable request, subject to ethical and institutional restrictions applicable to research involving minors.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

Participation was voluntary, and the anonymous electronic questionnaire collected no directly identifying information. Participants received information about the study purpose, confidentiality, and their right not to participate or to discontinue. Informed consent was reported before questionnaire completion, and data were analyzed in aggregate. No institutional ethics committee name or approval number was recorded in the study documentation available for this report.

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