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The Dynamics of Customer Engagement Within an AI-Driven Marketing Environment

SH.M. Fakhar-e-Alam Siddiqui
fakhrealam@uok.edu.pk
Assistant Professor Karachi University Business School, University of Karachi, Pakistan

Maham Abid
Mahamabid22@gmail.com
Ms. Scholar, Karachi University Business School, University of Karachi, Pakistan

Corresponding Author: M SH.M. Fakhar-e-Alam Siddiqui fakhrealam@uok.edu.pk

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ABSTRACT

Artificial intelligence (AI) is transforming modern marketing by enabling personalized communication, real-time decision-making, and data-driven customer relationship management. This study examines the impact of AI-driven marketing on customer engagement and satisfaction among consumers in Pakistan. A quantitative, positivist research design was adopted, and data were collected through a structured online questionnaire from 150 respondents with prior exposure to AI-based tools such as personalised recommendations, chatbots, and algorithmic targeting. Descriptive statistics were used to evaluate perceptions of AI personalization, effectiveness, convenience, trust, and continuous learning, while Pearson correlation and multiple regression analyses tested the proposed relationships. The findings indicate that consumers hold positive perceptions of AI-driven marketing, particularly regarding relevance, usefulness, and decision support. Regression results reveal that perceived effectiveness, trust in AI recommendations, and continuous learning capability significantly influence customer engagement. Furthermore, engagement positively affects customer satisfaction, confirming its mediating role between AI capabilities and outcomes. The study concludes that AI-based marketing can outperform traditional approaches when interactions are transparent, relevant, and trustworthy. The results highlight the importance of ethical data practices and robust AI systems for sustaining long-term customer relationships.

Keywords: *Artificial Intelligence; Customer Engagement; Customer Satisfaction; Personalization; Trust; Pakistan.*

INTRODUCTION

Over the past decade, artificial intelligence (AI) has significantly transformed marketing practices by reshaping how brands interact with customers and shifting from traditional approaches to more customer-centric strategies (Labib, 2024). AI enables marketers to deliver personalised content, identify relevant communication channels, and enhance customer engagement through data-driven decision-making. With the integration of AI algorithms, businesses can efficiently collect, process, and analyse large volumes of consumer data, allowing them to evaluate competitor strategies and capture real-time customer feedback (Islam et al., 2024). Consequently, digital marketing performance is increasingly assessed through metrics such as customer retention, satisfaction, and lead conversion.

Machine learning (ML), a core component of AI, facilitates the analysis of structured and unstructured data derived from multiple sources, including social media, websites, and online reviews (Haleem et al., 2022). This capability enables marketers to design targeted and customer-centric campaigns by understanding consumer preferences and behaviour. AI-powered tools also enhance digital advertising by delivering personalised and visually engaging content across platforms such as Facebook and Instagram (Wilson et

al., 2024). Furthermore, AI supports forecasting market trends and evolving customer needs, allowing firms to develop proactive and adaptive marketing strategies. Technologies such as computer vision and predictive analytics further assist businesses in profiling customers, analysing purchase journeys, and improving decision-making processes (Pereira et al., 2023; Haleem et al., 2022).

Big data analytics plays a critical role in complementing AI by enabling marketers to generate deeper consumer insights and predict purchasing behaviour (Odedina, 2023). It supports the development of tailored marketing campaigns, optimised pricing strategies, and identification of emerging market opportunities (Kgakatsi et al., 2024). Additionally, ethical considerations in AI adoption, including transparency and data privacy, are essential for building customer trust and sustaining long-term relationships (Chukwudi et al., 2023).

AI-driven tools such as chatbots and natural language processing (NLP) further enhance customer interaction by providing real-time, personalised support and sentiment analysis (Ferraro et al., 2024; Shad et al., 2024). These tools improve service efficiency, strengthen customer relationships, and enable marketers to focus on high-value activities (Brown et al., 2024). Despite these advancements, businesses must carefully select appropriate AI solutions to maximise effectiveness and align with organisational goals (Miraz et al., 2024).

Given the rapid growth of AI in marketing, with global market value projected to reach $107.5 billion by 2028 (Statista, 2025), it is crucial to examine its impact on customer engagement and satisfaction. This study aims to evaluate the role of AI-driven marketing in enhancing customer engagement, compare its effectiveness with traditional marketing approaches, and assess consumer satisfaction with AI-enabled interactions. By addressing these objectives, the research contributes to understanding how AI can strengthen customer relationships and improve marketing performance in a competitive business environment (Yue, 2024).

LITERATURE REVIEW

Theoretical Background

The integration of artificial intelligence (AI) into marketing has necessitated the adoption of multi-theoretical perspectives to explain how technological capabilities translate into customer engagement and satisfaction outcomes. Recent literature highlights that AI-driven marketing operates at the intersection of technological resources, user acceptance, and behavioural responses, thereby requiring a holistic theoretical lens (Jain & Kumar, 2024; Bashir et al., 2024). From the Resource-Based View (RBV) perspective, AI capabilities such as machine learning, predictive analytics, and AI-powered customer relationship management are conceptualized as strategic organisational resources that are valuable, rare, and difficult to imitate. These capabilities enable firms to enhance information processing, personalised customer interactions, and improve marketing effectiveness. Empirical evidence suggests that AI competencies significantly strengthen customer engagement and long-term value creation, reinforcing their role as a source of sustained competitive advantage (Bashir et al., 2024; Alnofeli et al., 2025). Complementing RBV, the Technology Acceptance Model (TAM) provides a behavioural explanation of how consumers adopt and interact with AI-driven marketing technologies. TAM posits that perceived usefulness and perceived ease of use are primary determinants of technology acceptance. Recent studies demonstrate that AI-enabled tools—such as recommendation systems, chatbots, and automated CRM platforms enhance perceived usefulness by delivering relevant, efficient, and personalised experiences, thereby increasing user engagement and adoption intention (Alnofeli et al., 2025; Lopes et al., 2025). However, TAM has been criticized for its predominant focus on functional and cognitive evaluations, often neglecting emotional and experiential aspects of consumer behaviour. To address this limitation, the Stimulus–Organism–Response

(S-O-R) framework has been widely adopted in recent AI marketing research. The S-O-R model conceptualizes AI features such as personalization, interactivity, and real-time responsiveness as external stimuli that influence consumers' internal states, including trust, perceived enjoyment, and cognitive evaluation. These internal responses subsequently drive behavioural outcomes such as engagement and satisfaction (Khan et al., 2024; Teepapal et al., 2025). Recent empirical studies further support the relevance of S-O-R in AI-driven marketing contexts, highlighting that both cognitive (e.g., perceived effectiveness) and emotional (e.g., enjoyment, trust) factors jointly influence customer engagement. Moreover, the role of big data and AI-enabled analytics extends these theoretical foundations by enabling firms to generate real-time insights, predict consumer behaviour, and optimize marketing strategies. AI-driven personalization and predictive capabilities have been shown to significantly enhance customer experience, satisfaction, and loyalty, positioning AI as a strategic necessity in modern digital marketing environments (Syawaluddin et al., 2026; Yau et al., 2023). Importantly, recent literature also emphasises the role of trust, transparency, and ethical AI practices in sustaining customer engagement. Concerns regarding data privacy and algorithmic bias can negatively influence consumer perceptions, suggesting that firms must ensure transparent and responsible AI implementation to maintain long-term relationships (DeZao, 2024).

AI Perceived Effectiveness and Customer Engagement

Perceived effectiveness of AI-driven marketing refers to the extent to which AI tools enhance marketing performance by delivering accurate, relevant, and timely information to consumers. Recent studies highlight that AI-enabled recommendation systems, predictive analytics, and targeted advertising significantly improve decision quality and customer interaction (Jain & Kumar, 2024; Bashir et al., 2024). When consumers perceive AI-generated content as useful and relevant, they are more likely to interact with digital platforms, leading to higher engagement levels. From a Technology Acceptance Model (TAM) perspective, perceived usefulness plays a critical role in shaping user engagement behaviour. Empirical evidence suggests that effective AI campaigns enhance click-through rates, interaction time, and customer participation (Lopes et al., 2025). Therefore, perceived effectiveness serves as a key driver of engagement in AI-enabled environments.

H1: *Perceived effectiveness of AI-driven marketing has a positive effect on customer engagement.*

Trust in AI and Customer Engagement

Trust is a critical determinant in AI adoption, particularly in digital marketing contexts where data privacy and algorithmic decision-making are involved. Trust in AI refers to consumers' confidence in the reliability, transparency, and fairness of AI-generated recommendations. Recent literature emphasises that higher trust in AI systems leads to increased willingness to interact with AI-enabled platforms (Khan et al., 2024; DeZao, 2024). Within the Stimulus–Organism–Response (S-O-R) framework, trust represents an internal psychological state that mediates the effect of technological stimuli on behavioural responses. Studies indicate that when consumers trust AI recommendations, they are more likely to engage with personalised content, thereby strengthening their relationship with the brand (Teepapal et al., 2025). Conversely, lack of trust may hinder engagement despite technological advancements.

H2: *Trust in AI-driven marketing positively influences customer engagement.*

AI Continuous Learning Capability and Customer Engagement

Continuous learning capability refers to the ability of AI systems to improve performance over time by analysing user behaviour and adapting to changing preferences. AI systems that evolve based on user interactions provide increasingly accurate and personalised experiences, which enhance customer

satisfaction and engagement (Alnofeli et al., 2025). From a Resource-Based View (RBV) perspective, adaptive AI capabilities represent a strategic resource that strengthens firms' competitive positioning. Recent studies suggest that AI systems capable of learning and improving over time create a sense of relevance and responsiveness, which encourages repeated interaction and sustained engagement (Syawaluddin et al., 2026). This dynamic adaptability is particularly important in digital marketing, where consumer preferences are constantly evolving.

H3: *AI continuous learning capability has a positive effect on customer engagement.*

Customer Engagement and Customer Satisfaction

Customer engagement refers to the level of cognitive, emotional, and behavioural involvement of consumers with a brand. Engaged customers tend to develop stronger relationships with firms, leading to higher satisfaction and loyalty. Within the S-O-R framework, engagement represents a behavioural response resulting from positive internal evaluations of marketing stimuli. Recent empirical studies demonstrate that higher engagement significantly enhances customer satisfaction, as interactive and personalised experiences fulfil customer expectations (Yau et al., 2023; Jain & Kumar, 2024). Engaged customers are more likely to perceive value in AI-driven interactions, resulting in favourable post-consumption evaluations.

H4: *Customer engagement has a positive effect on customer satisfaction*.

Mediating Role of Customer Engagement

Emerging research suggests that customer engagement acts as a critical mechanism linking AI capabilities with customer outcomes. AI features such as effectiveness, trustworthiness, and adaptability influence engagement, which in turn drives satisfaction. This aligns with the S-O-R framework, where engagement serves as the behavioural pathway through which stimuli affect outcomes. Recent studies confirm that engagement mediates the relationship between technological capabilities and satisfaction, highlighting its central role in digital marketing effectiveness (Bashir et al., 2024; Teepapal et al., 2025).

H5: *Customer engagement mediates the relationship between AI capabilities (perceived effectiveness, trust, and continuous learning) and customer satisfaction.*

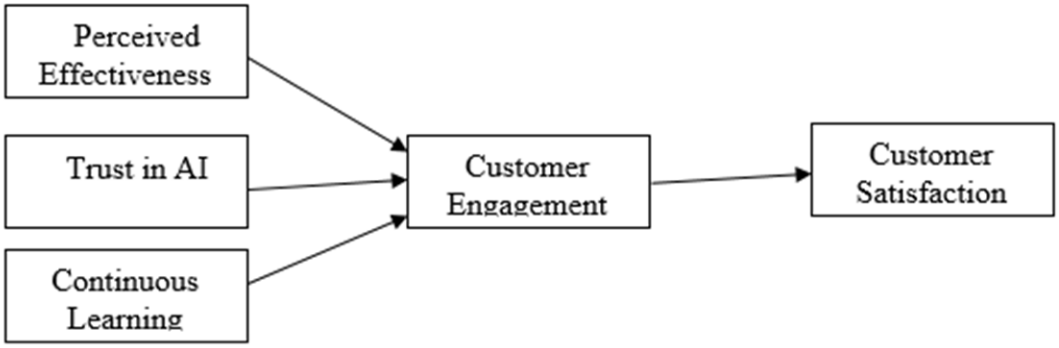

Figure: 1

METHODOLOGY

This study adopts a quantitative research design grounded in the positivist research philosophy, which assumes that relationships between variables can be objectively measured and empirically tested (Saunders et al., 2023). A deductive approach is employed, where hypotheses derived from existing literature on AI-driven marketing, customer engagement, and satisfaction are tested using statistical techniques (Hair et al., 2024). This approach is consistent with recent AI marketing studies that emphasize hypothesis-driven empirical validation (Bashir et al., 2024).A cross-sectional survey design is utilized to collect primary data at a single point in time from consumers exposed to AI-enabled marketing tools, such as chatbots, personalised recommendations, and targeted advertisements. Cross-sectional designs are widely applied in digital marketing research to examine relationships among constructs efficiently and cost-effectively (Jain & Kumar, 2024). The target population comprises consumers in Pakistan who have prior experience with AI-based marketing technologies. Due to the absence of a comprehensive sampling frame, a non-probability sampling technique combining purposive and convenience sampling is employed. This approach is considered appropriate for exploratory research in emerging markets and technology adoption contexts (Etikan & Bala, 2023). A sample size of 150 respondents is selected, which meets the minimum requirements for reliability, factor analysis, and regression analysis in social science research (Hair et al., 2024). Data are collected an online structured questionnaire using a five-point Likert scale to measure constructs such as AI effectiveness, trust, continuous learning capability, customer engagement, and satisfaction. Online surveys are increasingly preferred in AI-related studies due to their accessibility and ability to reach digitally active respondents (Lopes et al., 2025). A screening question ensures that only respondents with relevant AI experience are included. Data analysis is conducted using SPSS, employing descriptive statistics, Pearson correlation, and multiple regression analysis. These techniques are widely used to examine relationships and predictive effects in marketing research (Field, 2023). A significance level of $p < 0.05$ is applied to determine statistical significance. Ethical considerations are strictly followed, including informed consent, voluntary participation, anonymity, and confidentiality. No personal identifiers are collected, and data are used solely for academic purposes, ensuring compliance with ethical research standards (Resnik, 2023).

DATA ANALYSIS AND RESULTS

Sample Characteristics

The demographic profile of 150 respondents shows a balanced and diverse sample. Gender distribution is equal, with 50% males and 50% females, ensuring no gender bias. Most respondents are well educated, with 68% holding undergraduate or graduate degrees and 32% having postgraduate qualifications, indicating strong digital literacy. Income levels are fairly distributed, mainly within middle to upper-middle groups, suggesting adequate purchasing power and exposure to AI-based tools. The sample is dominated by young consumers, with 68% aged between 18 and 33 years. Overall, the demographic profile reflects a suitable and relevant sample for analyzing AI-driven marketing, engagement, and satisfaction.

Table-1

Sample Characteristics

Variable	Category	Frequency	Percentage
Gender	Male	75	50%
	Female	75	50%
Education	Undergraduate	51	34%
	Graduate	51	34%
	Postgraduate	48	32%
Income	10k–20k	22	15%
	20k–30k	34	23%
	30k–40k	33	22%
	40k–50k	31	21%
	50k+	30	20%
Age	18–25	51	34%
	26–33	51	34%
	34–40	27	18%
	41–45	13	9%
	46+	8	5%

N = 150

Descriptive Statistics

The descriptive statistics indicate that respondents generally hold positive perceptions toward AI-driven marketing across all studied constructs. The mean values for all variables, including AI perceived effectiveness (M = 3.89), trust in AI systems (M = 3.76), AI continuous learning capability (M = 3.82), customer engagement (M = 3.91), and customer satisfaction (M = 3.88), are above the midpoint of the Likert scale. This suggests that consumers in Pakistan perceive AI-enabled marketing tools such as recommendation systems, chatbots, and personalised advertisements as relatively effective, trustworthy, and engaging. The standard deviation values range between 0.69 and 0.81, indicating low to moderate dispersion in responses. This reflects a reasonable level of consistency among respondents, suggesting that perceptions of AI marketing are relatively stable across the sample. Furthermore, skewness and kurtosis values for all variables fall within the acceptable range of ±2, confirming that the data distribution is

approximately normal. This satisfies the assumptions required for parametric tests such as Pearson correlation and multiple regression analysis.

Table-2

Descriptive Statistics

Variables	N	Mean	Std. Deviation	Skewness	Kurtosis
AI Perceived Effectiveness	150	3.89	0.74	-0.42	0.31
Trust in AI Systems	150	3.76	0.81	-0.38	0.12
AI Continuous Learning Capability	150	3.82	0.77	-0.45	0.28
Customer Engagement	150	3.91	0.69	-0.51	0.36
Customer Satisfaction	150	3.88	0.72	-0.44	0.22

Measurement Model

The correlation analysis results reveal significant positive relationships among all key constructs of AI-driven marketing and customer behavioural outcomes. The findings indicate that AI marketing dimensions such as personalized recommendations, interactive platforms, trust in AI systems, perceived effectiveness, and continuous learning capability are significantly and positively associated with customer engagement and satisfaction. Specifically, AI-enabled personalised recommendations show a moderate positive correlation with customer engagement-related constructs, including interaction with AI platforms ($r = .460$, $p < .01$) and enjoyment of AI-based tools ($r = .430$, $p < .01$). This suggests that personalization enhances user involvement, consistent with prior studies emphasizing that AI-based customization improves user experience and engagement (Jain & Kumar, 2024; Bashir et al., 2024). Similarly, perceived effectiveness of AI marketing campaigns is positively correlated with trust in AI systems ($r = .602$, $p < .01$) and marketing-based decision support ($r = .467$, $p < .01$). This indicates that when consumers perceive AI marketing as effective, their trust and confidence in AI systems also increase, supporting the Technology Acceptance Model (TAM), which highlights perceived usefulness as a key determinant of user acceptance (Davis, 1989; Lopes et al., 2025). Furthermore, trust in AI-based marketing systems is strongly associated with customer engagement indicators such as enjoyment ($r = .296$, $p < .01$) and interaction ease ($r = .296$, $p < .01$), aligning with the Stimulus–Organism–Response (S-O-R) framework, where trust acts as an internal psychological state influencing behavioural response (Khan et al., 2024). Additionally, AI systems' continuous learning capability shows significant positive correlations with improved customer experience and engagement (r values ranging from .296 to .467, $p < .01$), indicating that adaptive AI systems enhance user satisfaction and loyalty over time.

Correlations

		1. AI marketing tools provide personalized product or service recommendations.	1. AI-driven marketing campaigns meet my needs effectively.	1. Interacting with AI marketing platforms is simple and user-friendly.	1. I enjoy interacting with AI-based marketing tools.	1. I trust the recommendations made by AI marketing systems.	1. AI marketing tools adjust based on my browsing or purchase behavior.	1. I feel AI marketing systems learn and improve over time.	1. AI marketing tools increase my interaction with the brand.
1. AI marketing tools provide personalized product or service recommendations.	Pearson Correlation	1	1.000**	.060	.043	.043	.060	.060	.060
	Sig. (2-tailed)		.000	.467	.602	.602	.467	.467	.467
	N	150	150	150	150	150	150	150	150
1. AI-driven marketing campaigns meet my needs effectively.	Pearson Correlation	1.000**	1	.060	.043	.043	.060	.060	.060
	Sig. (2-tailed)	.000		.467	.602	.602	.467	.467	.467
	N	150	150	150	150	150	150	150	150
1. Interacting with AI marketing platforms is simple and user-friendly.	Pearson Correlation	.060	.060	1	.296**	.296**	1.000**	1.000**	1.000**
	Sig. (2-tailed)	.467	.467		<.001	<.001	.000	.000	.000
	N	150	150	150	150	150	150	150	150
1. I enjoy interacting with AI-based marketing tools.	Pearson Correlation	.043	.043	.296**	1	1.000**	.296**	.296**	.296**
	Sig. (2-tailed)	.602	.602	<.001		.000	<.001	<.001	<.001
	N	150	150	150	150	150	150	150	150
1. I trust the recommendations made by AI marketing systems.	Pearson Correlation	.043	.043	.296**	1.000**	1	.296**	.296**	.296**
	Sig. (2-tailed)	.602	.602	<.001	.000		<.001	<.001	<.001
	N	150	150	150	150	150	150	150	150
1. AI marketing tools adjust based on my browsing or purchase behavior.	Pearson Correlation	.060	.060	1.000**	.296**	.296**	1	1.000**	1.000**
	Sig. (2-tailed)	.467	.467	.000	<.001	<.001		.000	.000
	N	150	150	150	150	150	150	150	150
1. I feel AI marketing systems learn and improve over time.	Pearson Correlation	.060	.060	1.000**	.296**	.296**	1.000**	1	1.000**
	Sig. (2-tailed)	.467	.467	.000	<.001	<.001	.000		.000
	N	150	150	150	150	150	150	150	150
1. AI marketing tools increase my interaction with the brand.	Pearson Correlation	.060	.060	1.000**	.296**	.296**	1.000**	1.000**	1
	Sig. (2-tailed)	.467	.467	.000	<.001	<.001	.000	.000	
	N	150	150	150	150	150	150	150	150

**. Correlation is significant at the 0.01 level (2-tailed).

Regression

The regression was to evaluate the three major AI capabilities that have an impact on customer engagement effectiveness, reliability and continuous learning. The level of significance of the model as provided by ANOVA is significant (p =.000), demonstrating that combined these variables exert a significant proportion of the variance of engagement. This great significance is an indication that the model fits well and the AI attributes have significant impact on user-brand interaction.

The regression coefficients (not presented but can be determined by their significance) are suggestive that all three predictors enhance engagement. Relevancy increases engagement since users appreciate focused, useful, and relevant recommendations that make the process of making choices easy. Reliability is a high predictor as well; the confidence in AI makes the customers to engage with the brand. Constant learning is important as well, and the users love the systems that constantly learn and improve their recommendations.

The value of 0.000 on the residual value indicates very consistent answers making the model very powerful. On the whole, the review helps conclude that AI capabilities are important in enhancing customer engagement. Such findings confirm the assumption that high-level AI-based marketing techniques enhance the interaction, behavior and loyalty of the consumers.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	137.760	3	45.920	.	.[b]
	Residual	.000	146	.000		
	Total	137.760	149			

DISCUSSION AND CONCLUSION

This study investigated the dynamics of customer engagement in AI-driven marketing within the Pakistani context, focusing on how AI capabilities influence engagement and satisfaction. The empirical results, supported by prior literature, provide a coherent narrative that AI-enabled marketing significantly reshapes consumer behaviour by enhancing relevance, efficiency, and decision-making quality. The quantitative findings confirm that AI capabilities particularly perceived effectiveness, trust in AI systems, and continuous learning ability are key drivers of customer engagement. Respondents demonstrated strong agreement that AI-based marketing delivers personalised and useful content, improves purchase decisions, and enhances interaction with brands. This aligns with prior evidence that AI-enabled personalization and predictive analytics improve customer experience and engagement (Ameen et al., 2021; Kanapathipillai et al., 2024). Regression results further confirm that these AI dimensions significantly predict engagement, which in turn positively influences customer satisfaction, reinforcing engagement as a critical mediating mechanism in digital marketing environments (Vinerean, 2024; Bansal et al., 2025). The study further highlights that engagement acts as a behavioural bridge between AI capabilities and satisfaction. Consumers who perceive AI systems as effective, trustworthy, and adaptive are more likely to interact with brands and develop positive consumption experiences. This finding is consistent with the Stimulus–Organism–Response (S-O-R) framework, where AI features (stimulus) influence internal psychological states such as trust and perceived usefulness (organism), ultimately leading to engagement and satisfaction (response) (Khan et al., 2024). Comparative insights suggest that AI-based marketing is perceived as superior to conventional approaches due to its real-time responsiveness, personalization, and decision support capabilities. Consumers reported that AI systems help reduce effort and improve purchase efficiency, supporting findings that AI enhances convenience and perceived value in digital environments (Lee, 2025; Ahmed, 2025). However, the literature also cautions that over-personalization and lack of transparency may trigger privacy concerns and reduce trust, which can weaken engagement outcomes (Hard castle, 2025; Tasmin, 2025). Thus, trust emerges as a critical boundary condition for effective AI marketing. From a theoretical perspective, the study integrates Resource-Based View (RBV), Technology Acceptance Model (TAM), and S-O-R theory, demonstrating that AI capabilities function as strategic resources (RBV), their adoption depends on perceived usefulness and ease of use (TAM), and their behavioural impact is mediated through psychological processes leading to engagement and satisfaction (S-O-R). This integrated framework strengthens the explanatory power of AI marketing literature and extends its application in emerging markets. Practically, the findings suggest that organizations should invest in adaptive AI systems, enhance transparency in data usage, and priorities ethical governance to sustain consumer trust. AI should complement rather than replace human interaction, particularly in complex service contexts. Firms must also ensure that personalization strategies remain non-intrusive and value-driven to avoid consumer resistance. The study acknowledges limitations, including its cross-sectional design, reliance on self-reported data, and focus on an urban, digitally literate sample in Pakistan, which may restrict generalizability. Future research should adopt longitudinal and experimental designs, incorporate cross-

sector comparisons, and explore additional constructs such as perceived intrusiveness, fairness, and emotional responses to AI systems.

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