



Artificial Intelligence Applications in Predictive Analytics for Service Marketing Performance in Delta State.

UCHE, Clementina Orochukwu¹, & IWEGBUE, Chinwenwa Nelly²

*Department of Marketing and Entrepreneurship,
Faculty of Management Sciences,
Delta State University, Abraka*

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Abstract

This study investigated artificial intelligence (AI) applications in predictive analytics for service marketing performance in Delta State. Specifically, the research examined the effects of AI-driven customer segmentation, predictive customer behaviour analytics, and personalized marketing through AI on service marketing performance. Three research questions were raised in line with the three objectives, which guided the formulation of three hypotheses. The study adopted a descriptive survey design, with a population of 820 staff across ten service marketing firms in Delta State. Using Morgan's formula, a sample size of 263 was determined. The instrument for data collection was a structured questionnaire developed around the thematic variables of the study. The instrument was validated by experts and tested for internal consistency, producing a Cronbach's alpha reliability coefficient of 0.81. Out of 263 copies of the questionnaire administered, 241 were correctly completed and returned, representing a 91.63% response rate, and were used for the analysis using multiple regression with EViews 9v statistical tool. The major findings of the study show that AI-driven customer segmentation had a positive and significant effect on service marketing performance ($\beta = 0.410135$, $p = 0.0000$), indicating that segmentation improves targeting strategies and customer satisfaction; Predictive customer behaviour analytics significantly influenced service marketing performance ($\beta = 0.333356$, $p = 0.0000$), demonstrating that predictive tools enhance decision-making and reduce marketing risks and Personalized marketing through AI had a positive and significant effect on service marketing performance ($\beta = 0.280516$, $p = 0.0000$), implying that personalization fosters customer engagement, loyalty, and profitability. Overall, the study concluded that AI applications serve as a critical enabler of marketing efficiency, competitiveness, and long-term growth in service firms. The study recommended that organizations intensify investments in AI tools, leverage predictive analytics strategically, and adopt personalized marketing ethically to maximize performance outcomes.

Keywords: *Artificial Intelligence, Predictive Analytics, Customer Segmentation, Personalized Marketing and Service Marketing Performance*

Introduction

Artificial Intelligence (AI) has become one of the most transformative technologies in business, particularly in the domain of marketing. The integration of AI into predictive analytics enables organizations to move from descriptive data analysis to forward-looking insights that support strategic decisions. Service industries, which rely heavily on customer interaction and responsiveness, are increasingly adopting AI-driven systems to predict customer preferences, segment markets, and personalize offerings (Chatterjee et al., 2023; Li et al., 2022). In emerging economies such as Nigeria, where competition among service providers is intensifying, AI-based predictive analytics holds immense potential for enhancing marketing performance by improving customer engagement and

retention. A critical aspect of AI in service marketing is AI-driven customer segmentation. Traditional segmentation approaches based on demographics and psychographics are often static and fail to capture dynamic customer behaviour. AI, however, employs clustering algorithms, natural language processing, and real-time analytics to group customers more accurately (Kumar et al., 2021; Singh & Rana, 2022). This allows service providers to design more targeted campaigns that increase marketing efficiency and effectiveness. In Delta State, where service firms such as telecommunications, banking, and hospitality sectors compete for customer loyalty, leveraging AI-driven segmentation provides an opportunity to reach under-served customer groups with precision. Another important dimension trend is predictive customer behaviour analytics, which allows firms to

anticipate customer actions such as churn, service adoption, or repeat purchases. Studies have shown that AI-based predictive models can identify subtle behavioural patterns in large data sets, thus enabling managers to take proactive steps to retain customers and improve satisfaction (Gupta & George, 2020; Adepoju & Oyewole, 2021). In the Nigerian service context, where customer switching is common due to dissatisfaction with quality, reliability, or pricing, predictive analytics can help organizations reduce attrition rates and optimize marketing resources for long-term performance. Equally noteworthy is the role of personalized marketing through AI. With AI-powered recommendation systems and chatbots, organizations can deliver individualized marketing content and offers that resonate with customer needs in real time (Shahid et al., 2022; Dwivedi et al., 2023; Eruvwe, et al., 2024). Personalized marketing enhances customer satisfaction, loyalty, and ultimately service marketing performance. For service firms in Delta State, where customer expectations are rising amidst increasing digital adoption, personalization through AI is no longer a luxury but a necessity for sustainable competitiveness.

Ultimately, the adoption of AI applications in predictive analytics leads to improvements in service marketing performance, which encompasses customer acquisition, retention, satisfaction, and loyalty. Research in advanced economies has consistently shown that AI-enhanced predictive models improve firms' market positioning and profitability (Mikalef et al., 2021; Mariani & Borghi, 2022). However, while multinational corporations have made significant progress in AI deployment, local service firms in Nigeria, including those in Delta State, are still at an early stage of adoption. This disparity presents both a challenge and an opportunity to explore how AI-driven predictive analytics can be effectively utilized to improve service marketing performance in the region.

Statement of the Problem

Despite the increasing global adoption of AI in predictive analytics for marketing, many service organizations in Delta State continue to rely on traditional marketing strategies that are reactive and less data-driven. This has often led to poor customer targeting, weak retention strategies, and reduced competitiveness in a rapidly evolving market. Empirical evidence suggests that firms that fail to leverage AI miss out on critical opportunities to understand customer behaviour, personalize services, and optimize marketing resources (Nwosu & Okafor, 2022; Dwivedi et al., 2023). However, there is limited scholarly investigation into how AI-driven customer segmentation, predictive customer behaviour analytics, and personalized marketing through AI influence service marketing performance in the Nigerian service sector. This gap creates

uncertainty about the extent to which AI applications can transform service marketing outcomes in Delta State, thereby necessitating an empirical study on the subject.

Research Questions

To guide this study, the following research questions are posed:

- i) To what extent does AI-driven customer segmentation influence service marketing performance in Delta State?
- ii) How does predictive customer behaviour analytics affect service marketing performance in Delta State?
- iii) What is the impact of personalized marketing through AI on service marketing performance in Delta State?

Objectives of the Study

The main objective is artificial intelligence applications in predictive analytics for service marketing performance in Delta State. Specifically, the objectives are to:

- i) examine the effect of AI-driven customer segmentation on service marketing performance in Delta State.
- ii) assess the influence of predictive customer behaviour analytics on service marketing performance in Delta State.
- iii) determine the impact of personalized marketing through AI on service marketing performance in Delta State.

Research Hypotheses

The following null hypotheses are formulated to guide the study:

H₀₁: AI-driven customer segmentation has no significant effect on service marketing performance in Delta State.

H₀₂: Predictive customer behaviour analytics has no significant effect on service marketing performance in Delta State.

H₀₃: Personalized marketing through AI has no significant effect on service marketing performance in Delta State.

Significance of the study

This study is significant because it advances knowledge on the role of artificial intelligence (AI) applications in enhancing predictive analytics for service marketing performance in Delta State, Nigeria. Theoretically, it contributes to the growing body of literature by integrating AI-driven customer segmentation, predictive customer behaviour analytics, and personalized marketing into the discourse on service marketing performance in emerging economies. Practically, the findings will benefit service organizations, such as banks, telecommunications, and hospitality firms, by providing evidence-based insights on how to leverage AI to improve customer acquisition,

retention, and loyalty. For policymakers and regulators, the study offers valuable guidance on fostering digital transformation strategies that enhance competitiveness within the Nigerian service sector. Finally, the study will serve as a resource material for future researchers who may wish to explore related areas of artificial intelligence, predictive analytics, and marketing in developing contexts.

Review of Related Literature

The conceptual review provides a theoretical and scholarly foundation for the study by clarifying key concepts and examining their interrelationships. It highlights the role of artificial intelligence in predictive analytics and explores its applications in service marketing performance. Specifically, the review discusses the independent variables, AI-driven customer segmentation, predictive customer behaviour analytics, and personalized marketing through AI, and the dependent variable, service marketing performance. This discussion creates a framework for understanding how AI-based predictive tools can transform marketing strategies and outcomes in the service sector of Delta State.

Concept of Artificial Intelligence (AI) and Services Marketing.

Artificial Intelligence (AI) has increasingly emerged as a transformative tool in services marketing, reshaping the way organizations engage with customers and optimize performance. Recent studies show that AI enables service firms to leverage predictive analytics, natural language processing, and automation to anticipate customer needs and deliver highly personalized experiences (Dwivedi et al., 2023; Chatterjee et al., 2023; Eruvwe, et al., 2024). By 2024, AI applications such as chatbots, recommendation engines, and sentiment analysis tools were widely recognized for enhancing customer engagement and improving marketing efficiency in both B2B and B2C service contexts (Kohan, 2024; Solway, 2024). Scholars further argue that AI contributes to precision in customer segmentation and campaign targeting, thereby reducing costs and boosting return on marketing investment (Ciente, 2023; GlobeNewswire, 2024). Looking ahead, agentic and multimodal AI models are expected to drive the next wave of hyper-personalized marketing by enabling dynamic, real-time customization of services (Zhang et al., 2025). Collectively, these developments underscore AI's critical role in advancing service marketing strategies and sustaining competitive advantage in dynamic markets.

AI-Driven Customer Segmentation (IV1)

AI-driven customer segmentation represents a significant advancement beyond traditional demographic and psychographic segmentation by employing machine learning algorithms and big data

analytics to identify customer clusters with high precision. Unlike static segmentation methods, AI dynamically analyzes behavioural, transactional, and contextual data, enabling firms to uncover hidden patterns and respond to evolving customer preferences in real time (Kumar et al., 2022; Singh & Rana, 2022). In service industries such as banking, hospitality, and telecommunications, this approach allows managers to craft targeted marketing campaigns that reduce waste and optimize resource allocation. More recent evidence indicates that AI-enhanced clustering improves marketing return on investment (ROI) and customer lifetime value (CLV), thereby strengthening service marketing performance (Chatterjee et al., 2023; Li et al., 2022).

Despite its potential, AI-driven segmentation also presents challenges that service organizations must carefully address. Data quality issues, privacy concerns, and skill shortages can undermine segmentation effectiveness, particularly in emerging markets (Adepoju & Oyewole, 2021; Nwosu & Okafor, 2022; Iwegbue, C. N.&Uche, C. O., 2025). Recent studies recommend combining explainable AI methods with domain expertise to ensure transparency and contextual appropriateness, especially in culturally diverse environments like Delta State. Moreover, organizations that integrate AI segmentation with customer relationship management (CRM) systems are better positioned to achieve sustainable performance improvements (Mikalef et al., 2021; Zhang et al., 2025).

Predictive Customer Behaviour Analytics

Predictive customer behaviour analytics leverages statistical models, machine learning, and deep learning techniques to forecast outcomes such as churn, purchase likelihood, and service adoption. By analyzing past interactions and behavioural patterns, organizations can anticipate customer needs and design proactive retention strategies (Gupta & George, 2020; Dwivedi et al., 2023). This predictive capability enables service firms to transition from reactive problem-solving to proactive engagement, thereby reducing attrition and improving marketing effectiveness. Recent findings highlight that predictive analytics significantly enhances service organizations' capacity to optimize customer journeys and maximize lifetime profitability (Chatterjee et al., 2023; Solway, 2024).

The adoption of predictive analytics in service marketing is not without operational and ethical considerations. Model accuracy depends on the robustness of input data and continuous monitoring to prevent concept drift (Mariani & Borghi, 2022; GlobeNewswire, 2024). Moreover, concerns about fairness and transparency must be addressed, as predictive models that misclassify customers can lead to biased targeting and reputational risks. Scholars increasingly argue for hybrid governance frameworks that combine algorithmic insights with

human oversight to balance efficiency with ethical responsibility (Kohan, 2024; Zhang et al., 2025). In the Nigerian service context, predictive customer behaviour analytics presents an opportunity to curb high customer-switching tendencies and build stronger loyalty in competitive markets.

Personalized Marketing through AI

Personalized marketing through AI involves tailoring marketing messages, recommendations, and offers to individual customer needs using tools such as recommendation engines, chatbots, and natural language processing systems. The capacity of AI to deliver one-to-one personalization at scale has transformed service marketing by enhancing relevance, improving engagement, and increasing conversion rates (Shahid et al., 2022; Dwivedi et al., 2023). Personalized marketing also supports cross-selling and upselling strategies, thereby maximizing revenue streams for service organizations. In rapidly digitalizing economies, personalization has emerged as a key determinant of customer satisfaction and loyalty (Chatterjee et al., 2023; Li et al., 2022).

However, the effectiveness of AI personalization depends heavily on customer trust and perceptions of privacy. Scholars note that over-targeting or intrusive personalization may lead to resistance, thereby undermining the effectiveness of campaigns (Nwosu & Okafor, 2022; Ciente, 2023). Transparency in data use and customer control over personalization settings have been recommended to build long-term trust (Solway, 2024; Zhang et al., 2025). For service organizations in Delta State, adopting AI-driven personalization can significantly improve competitive positioning, but this must be implemented in a way that respects local values, regulatory frameworks, and customer expectations.

Service Marketing Performance

Service marketing performance reflects the extent to which marketing strategies and activities contribute

to customer acquisition, retention, satisfaction, and loyalty. In today's competitive environment, organizations increasingly measure performance through key metrics such as net promoter score (NPS), market share growth, and customer lifetime value (CLV) (Mariani & Borghi, 2022; Mikalef et al., 2021; Iwegbue, C. N., 2015). Research has shown that AI applications enhance service marketing performance by improving the precision of targeting, reducing churn, and enabling proactive customer engagement (Dwivedi et al., 2023; Kohan, 2024). In sectors like telecommunications and banking, the use of AI-driven predictive analytics has translated into improved marketing return on investment (ROI) and operational efficiency.

Nonetheless, evaluating service marketing performance in the context of AI adoption requires rigorous methodologies. Controlled experiments, uplift modeling, and A/B testing are essential to isolate the effects of AI interventions from other influencing factors (Gupta & George, 2020; Chatterjee et al., 2023). A/B testing in marketing is an experimental method that compares two versions of a single marketing asset, like an email or landing page, to determine which performs better in achieving a specific goal, such as higher conversion rates or engagement. One version (the control, A) is compared against a modified version (the variant, B), with results analyzed to make data-driven decisions, leading to more effective marketing campaigns and improved return on investment. In emerging markets such as Nigeria, firms face unique challenges including infrastructure limitations, regulatory uncertainty, and uneven digital maturity, which may hinder the full realization of AI's impact (Adepoju & Oyewole, 2021; Nwosu & Okafor, 2022; Iwegbue, C. N., 2024). Therefore, scholars emphasize the need for context-sensitive assessment frameworks to ensure that AI adoption genuinely improves marketing performance outcomes in service industries.

Conceptual Framework

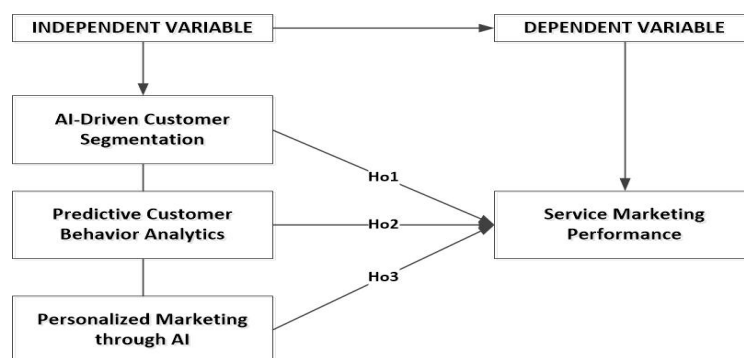


Fig. 1 Conceptual framework on artificial intelligence applications in predictive analytics for service marketing performance (Researchers' construct, 2025)

Theoretical Review

The following theory was reviewed for the study

Predictive Analytics Theory

Predictive Analytics Theory emphasizes the use of historical and real-time data, statistical algorithms, and machine learning techniques to identify patterns and forecast future outcomes that can guide decision-making. In the context of service marketing, the theory explains how organizations can move beyond descriptive insights toward proactive strategies that anticipate customer needs, reduce churn, and enhance customer lifetime value (Dwivedi et al., 2023; Solway, 2024). Recent studies suggest that predictive analytics provides a competitive advantage by enabling firms to personalize interactions, optimize marketing campaigns, and allocate resources more efficiently (Chatterjee et al., 2023; Zhang et al., 2025). As service organizations increasingly operate in dynamic markets, Predictive Analytics Theory underscores the strategic value of leveraging AI-driven tools to convert data into actionable foresight, thereby directly linking analytics capability to marketing performance outcomes (Mariani & Borghi, 2022).

By hinging this study on Predictive Analytics Theory, the research establishes a strong foundation for explaining how AI-Driven Customer Segmentation, Predictive Customer Behaviour Analytics, and Personalized Marketing through AI influence Service Marketing Performance in Delta State. The theory justifies the study's focus on AI applications as proactive mechanisms for enhancing service delivery and customer engagement, rather than reactive responses to market challenges. It implies that organizations capable of integrating predictive analytics into their marketing processes will likely achieve superior customer retention, loyalty, and satisfaction. Thus, the theoretical underpinning not only validates the research framework but also guides the interpretation of findings, ensuring that the study contributes both empirically and theoretically to advancing knowledge in AI-driven service marketing.

Empirical Review

Chatterjee, Rana, Tamilmani, and Sharma (2023) conducted a study on artificial intelligence applications in marketing across service firms in India. Using a survey research design, data were collected from 410 marketing managers and analyzed using structural equation modeling (SEM). The study found that AI-driven customer segmentation significantly improved targeting precision and customer engagement, leading to higher marketing ROI. However, the study acknowledged a gap in contextual application, as the evidence was drawn from large firms in a developed digital economy. This leaves limited insights into how AI-driven

segmentation impacts service marketing performance in emerging contexts such as Delta State, Nigeria.

In a study, Singh and Rana (2022) investigated AI-enabled customer segmentation in the banking sector of the United Arab Emirates (UAE). The authors employed a descriptive survey design and gathered responses from 250 bank employees directly involved in customer relationship management. Regression analysis showed that AI-based segmentation improved personalized offerings and customer satisfaction levels. Despite these positive results, the authors noted a gap in testing these findings in non-banking service sectors and in regions with weaker digital infrastructure. Your study addresses this by exploring AI segmentation in broader service marketing contexts in Delta State.

Hassan, Abdelraouf, and El-Shihy (2025) examined the moderating role of AI personalization in the trust–satisfaction–loyalty relationship among e-commerce users in Egypt. A quantitative survey design was adopted, and 729 valid responses were analyzed using SEM. Findings revealed that personalized marketing through AI strengthened the relationship between trust and customer loyalty, confirming personalization as a performance driver. Yet, the authors highlighted the limitation of focusing solely on online retail, excluding physical service industries such as hospitality, telecommunications, and professional services. This gap underscores the relevance of testing AI personalization in diverse service organizations in Delta State.

Adepoju and Oyewole (2021) explored predictive analytics adoption and customer retention in Nigerian telecommunication firms. The study utilized a descriptive survey design, with a sample size of 300 respondents drawn from telecom operators in Lagos and Abuja. Results showed that predictive customer behaviour analytics helped reduce churn by identifying early warning signals of customer dissatisfaction. However, the authors admitted that the study was sector-specific (telecoms only) and did not measure broader service marketing performance indicators like customer acquisition or net promoter score. Your research expands on this by examining predictive analytics in multiple service organizations within Delta State.

Zhang, Li, and Wu (2025) investigated the role of multimodal AI in hyper-personalized advertising in the Chinese retail service industry. The authors used a mixed-method design, combining interviews with 35 marketing experts and a survey of 400 retail customers. Findings indicated that AI-driven hyper-personalization enhanced marketing effectiveness, but concerns about data privacy and algorithm transparency limited customer trust. The study called for future research in culturally diverse, less technologically advanced environments to validate the generalizability of findings. Your study directly addresses this by situating AI personalization and

predictive analytics within the Nigerian service context, where cultural dynamics and infrastructural challenges differ significantly.

From these empirical studies, it is clear that while AI applications, customer segmentation, predictive behaviour analytics, and personalized marketing, improve service marketing performance in advanced economies and specific industries, few studies have tested these variables holistically in emerging markets like Delta State, Nigeria. Existing research is often sector-specific (e.g., banking, telecom, e-commerce), country-specific (India, UAE, China, Egypt), and heavily reliant on technologically mature environments. This study fills this gap by integrating the three AI dimensions into a single framework and empirically testing their combined effect on service marketing performance across service organizations in Delta State.

Research Methodology

The study adopted a descriptive survey design, which was appropriate for examining the relationship between the study variables without manipulation. The population consisted of 820 employees drawn from ten major service marketing companies in Delta State, namely: Appfur Nigeria, DeltaSoft Technologies, CodeGrid Solutions, WarriTech Digital, PixelCode Innovations, Enextgen Technologies, Infobase Systems, Nextech Creations, Maxxtek Solutions, and SwiftMind Technologies. These companies were purposively selected because they represented key players in the service marketing and technology-driven sector of the state. The sample size was determined using Krejcie and Morgan's (1970) table, which gave a representative sample of 263 respondents from the population. A stratified random sampling technique was applied to ensure that respondents were proportionally selected across the companies and job cadres.

Primary data were obtained using a structured questionnaire, which was designed in line with the study's independent and dependent variables. The instrument comprised closed-ended items structured on a five-point Likert scale. To ensure accuracy, the questionnaire was subjected to face and content

validity through expert review in marketing and management research. The reliability of the instrument was confirmed through a pilot test, which yielded a Cronbach Alpha coefficient of 0.81, indicating high internal consistency. Data collection was carried out through direct distribution and retrieval of questionnaires, with follow-ups to improve response rates. The data collected were coded and analyzed using descriptive statistics (mean and standard deviation) to summarize responses and inferential statistics (regression analysis and correlation tests) to test the hypotheses using EVIEWS 9.0 statistical tool. This methodological process ensured that the findings were valid, reliable, and generalizable to the broader service marketing context in Delta State.

Model Specification

The functional relationship is expressed as:

$$SMP=f(AIDCS,PCBA,PMAI)$$

Where:

SMP = Service Marketing Performance (Dependent Variable)

AIDCS = AI-Driven Customer Segmentation

PCBA = Predictive Customer Behaviour Analytics

PMAI = Personalized Marketing through AI

The econometric model is specified as:

$$SMP=\beta_0+\beta_1AIDCS+\beta_2PCBA+\beta_3PMAI+\mu$$

Where:

β_0 = Constant term

$\beta_1, \beta_2, \beta_3$ = Coefficients of the independent variables

μ = Error term

Results

This section presents the analysis of data collected from the field survey, focusing on the relationship between artificial intelligence applications in predictive analytics and service marketing performance in Delta State. The results are organized to reflect the questionnaire distribution, demographic characteristics of respondents, and responses to the research questions and hypotheses. Descriptive and inferential statistical tools were employed to ensure robust interpretation of findings.

Table 4.1 Questionnaire Distribution Breakdown

Questionnaire	Frequency	Percentage
Returned and used	241	91.63%
Invalid	19	7.22%
Not Returned	3	1.14%
Distributed	263	100

Source: Researchers' Compilation, 2025

Table 4.1 shows the distribution and usability of the administered questionnaires. Out of the 263 questionnaires distributed, 241 were duly completed and returned, representing 91.63% of the total, which indicates a very high response rate suitable for meaningful analysis. A total of 19 questionnaires

(7.22%) were considered invalid due to incomplete responses or inconsistencies, while only 3 questionnaires (1.14%) were not returned. This high retrieval and usability rate suggests strong cooperation from respondents and ensures that the sample was adequately representative of the target

population, thereby enhancing the reliability and generalizability of the study's findings.

Table 4.2 Mean Rate of Respondents Responses

S/N	Question Item	Mean	Std	Remark
	AI-Driven Customer Segmentation			
AIDCS1	Our company uses AI to identify distinct customer groups based on purchasing patterns.	3.66	1.17	Agree
AIDCS2	AI applications help us to better understand customer demographics and preferences.	3.75	1.23	Agree
AIDCS3	Customer segmentation through AI has improved our targeting strategies.	3.70	1.10	Agree
AIDCS4	AI-driven segmentation enables us to predict customer needs more accurately.	3.70	1.14	Agree
AIDCS5	The use of AI in segmentation has enhanced overall customer satisfaction.	3.81	1.17	Agree
	Mean Aggregate	3.72	1.16	Agree
	Predictive Customer Behaviour Analytics			
PRCBA1	AI tools in our company predict customer purchase behaviours effectively.	3.71	1.17	Agree
PRCBA2	Predictive analytics help us anticipate changes in customer preferences.	3.80	1.08	Agree
PRCBA3	The company uses AI insights to retain customers through personalized offers.	3.72	1.17	Agree
PRCBA4	Predictive customer behaviour analytics improve decision-making in marketing campaigns.	3.80	1.08	Agree
PRCBA5	AI-driven predictions have significantly reduced marketing risks and uncertainties.	3.66	1.17	Agree
	Mean Aggregate	3.74	1.13	Agree
	Personalized Marketing through AI (IV3)			
PMTA1	AI enables us to personalize marketing messages for individual customers.	3.55	1.18	Agree
PMTA2	Personalized marketing campaigns through AI improve customer engagement.	3.72	1.18	Agree
PMTA3	Our company uses AI to recommend products and services tailored to customer needs.	3.78	1.15	Agree
PMTA4	AI-driven personalization increases customer loyalty and trust in our brand.	3.76	1.03	Agree
PMTA5	Personalized marketing powered by AI leads to higher sales and profitability.	3.34	1.11	Agree
	Mean Aggregate	3.63	1.13	Agree
	Service Marketing Performance			
SMP1	AI applications have improved the efficiency of our service delivery.	3.72	0.56	Agree
SMP2	The adoption of AI has enhanced customer satisfaction in our services.	3.73	0.54	Agree
SMP3	Our company has experienced increased market competitiveness through AI.	3.71	0.54	Agree
SMP4	AI-driven marketing initiatives have improved customer retention rates.	3.74	0.56	Agree
SMP5	Overall, AI adoption has significantly improved the company's service marketing performance.	3.74	0.54	Agree
	Mean Aggregate	3.73	0.55	Agree

Source: Researchers' Computation, 2025

Table 4.2 shows that respondents generally agreed with the role of AI in customer segmentation, with a mean aggregate of 3.72 and a standard deviation of

1.16. The statement that companies use AI to identify distinct customer groups based on purchasing patterns recorded a mean of 3.66 and a standard

deviation of 1.17. Similarly, the view that AI applications help in understanding demographics and preferences had a mean of 3.75 with a standard deviation of 1.23, while improved targeting strategies through AI scored a mean of 3.70 and a standard deviation of 1.10. AI's ability to predict customer needs more accurately recorded a mean of 3.70 with a standard deviation of 1.14, and enhancing overall customer satisfaction through AI-driven segmentation had the highest mean of 3.81 and a standard deviation of 1.17. These results indicate that respondents recognized the effectiveness of AI in refining customer segmentation, even though the spread in responses suggests that experiences differ slightly across firms.

As presented, predictive customer behaviour analytics also attracted agreement, with a mean aggregate of 3.74 and a standard deviation of 1.13. The ability of AI tools to predict customer purchase behaviours effectively recorded a mean of 3.71 and a standard deviation of 1.17. Anticipating changes in customer preferences through predictive analytics had a mean of 3.80 and a standard deviation of 1.08, while the use of AI insights for retaining customers through personalized offers stood at a mean of 3.72 with a standard deviation of 1.17. Furthermore, improving decision-making in marketing campaigns using predictive analytics had a mean of 3.80 with a standard deviation of 1.08, and reducing marketing risks through AI-driven predictions recorded a mean of 3.66 with a standard deviation of 1.17. These findings suggest that predictive analytics has become a valuable tool for anticipating market shifts and making informed marketing decisions across the studied organizations.

Table 4.2 further indicates that personalized marketing through AI was generally supported by respondents, with a mean aggregate of 3.63 and a

standard deviation of 1.13. The use of AI to personalize marketing messages for individual customers had a mean of 3.55 and a standard deviation of 1.18. Improving customer engagement through personalized campaigns recorded a mean of 3.72 and a standard deviation of 1.18, while the recommendation of tailored products and services through AI stood at a mean of 3.78 with a standard deviation of 1.15. Increasing customer loyalty and trust through AI-driven personalization had a mean of 3.76 and a standard deviation of 1.03, whereas higher sales and profitability through personalized marketing recorded the lowest mean of 3.34 with a standard deviation of 1.11. These responses imply that while AI-driven personalization is recognized for fostering engagement and loyalty, its direct impact on sales and profitability appears to be perceived less strongly by employees.

Finally, the responses on service marketing performance revealed a mean aggregate of 3.73 and a relatively low standard deviation of 0.55, showing strong consensus among respondents. The statement that AI has improved service delivery efficiency recorded a mean of 3.72 and a standard deviation of 0.56, while the enhancement of customer satisfaction had a mean of 3.73 with a standard deviation of 0.54. Increased market competitiveness through AI scored a mean of 3.71 and a standard deviation of 0.54, while improved customer retention through AI-driven initiatives had the highest mean of 3.74 and a standard deviation of 0.56. Similarly, the overall improvement of service marketing performance through AI adoption recorded a mean of 3.74 with a standard deviation of 0.54. These findings indicate that respondents consistently acknowledged AI as a strong driver of improved performance in service marketing activities across the surveyed companies.

Table 4.3 Descriptive Statistics of the Variables for the Study

Variable	Mean	Std. Dev.	Median	Max	Min.	Skew	Kurtosis	Jarque-Bera	Obs.
AIDCS	3.72	0.52	3.80	5	1	-	2.98	3.62	241
PCBA	3.74	0.50	3.80	5	1	-	2.77	1.15	241
PMAI	3.63	0.48	3.80	5	1	-	2.42	4.69	241
SMP	3.73	0.54	4.00	5	1	-	2.82	3.23	241

Source: Researchers' Computation, 2025

The descriptive statistics in Table 4.3 provide an overview of the key variables of the study. The mean values for AI-Driven Customer Segmentation (3.72), Predictive Customer Behaviour Analytics (3.74), Personalized Marketing through AI (3.63), and Service Marketing Performance (3.73) indicate that respondents generally agreed with the positive influence of AI on marketing practices and performance. The standard deviations, ranging between 0.48 and 0.54, suggest a relatively low level of dispersion around the means, implying

consistency in responses. The median values, all close to 3.80 and 4.00, confirm that the central tendency of responses aligns with agreement levels. The maximum score of 5 and minimum of 1 across the variables reflect the full use of the Likert scale, showing variation in perceptions among respondents. The skewness values around -2.42 to -2.98 suggest negatively skewed distributions, indicating that most responses clustered at the higher end of agreement. Similarly, the kurtosis values, ranging from 1.15 to 4.69, point to moderate to high peakedness in the

distribution. The Jarque-Bera statistics further confirm normality tendencies, suggesting that the dataset is fairly suitable for further regression analysis. Overall, the descriptive analysis highlights

that AI practices are perceived to positively influence service marketing performance with consistent patterns among respondents.

Table 4.4 Correlation Matrix for the Study Variables

Variable	AIDCS	PCBA	PMAI	SMP
AIDCS	1.000			
PCBA	-0.039	1.000		
PMAI	0.022	0.081	1.000	
SMP	0.388	0.313	0.285	1.000

Source: EViews 9v output, 2025

Table 4.4 presents the correlation matrix for the study variables, showing the degree of association among them. The results indicate that AI-Driven Customer Segmentation (AIDCS) has a positive and moderate correlation with Service Marketing Performance (SMP) at 0.388, suggesting that improved segmentation through AI is associated with better marketing outcomes. Predictive Customer Behaviour Analytics (PCBA) also shows a positive correlation with SMP at 0.313, implying that predictive insights contribute to enhanced performance. Similarly, Personalized Marketing through AI (PMAI) has a positive relationship with SMP at 0.285, indicating that personalization efforts

improve service marketing, though at a relatively weaker level compared to segmentation and predictive analytics. However, the inter-correlations among the independent variables are weak, with AIDCS and PCBA showing a negative relationship at -0.039 and PMAI displaying very low positive associations with both AIDCS (0.022) and PCBA (0.081). These weak inter-variable correlations suggest minimal multicollinearity concerns, strengthening the reliability of the regression analysis. Overall, the correlation results suggest that each AI-driven practice contributes independently to improving service marketing performance.

Testing Hypotheses

This section shows the tested hypotheses analysis and the result as follows

H₀₁: AI-driven customer segmentation has no significant effect on service marketing performance in Delta State.

H₀₂: Predictive customer behaviour analytics has no significant effect on service marketing performance in Delta State.

H₀₃: Personalized marketing through AI has no significant effect on service marketing performance in Delta State.

Table 4.5 Summary of Multiple Regression Analysis result for Hypotheses 1 to 3

Dependent Variable: SMP
 Method: Least Squares
 Date: 09/07/25
 Time: 23:10
 Sample: 263
 Included observations: 241

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.097532	0.367712	-0.265242	0.7911
AIDCS	0.410135	0.055746	7.357251	0.0000
PCBA	0.333356	0.058143	5.733355	0.0000
PMAI	0.280516	0.059938	4.680125	0.0000
R-squared	0.321016	Mean dependent var		3.730290
Adjusted R-squared	0.312421	S.D. dependent var		0.538009
S.E. of regression	0.446119	Akaike info criterion		1.239997
Sum squared resid	47.16828	Schwarz criterion		1.297836
Log likelihood	-145.4196	Hannan-Quinn criter.		1.263299
F-statistic	37.35026	Durbin-Watson stat		1.952153
Prob(F-statistic)	0.000000			

Source: EViews 9v output, 2025

The regression results in Table 4.5 provide evidence for testing the three hypotheses of the study. For hypothesis one (H_{01}), the result shows that AI-driven customer segmentation (AIDCS) has a positive and statistically significant effect on service marketing performance, with a coefficient of 0.4101, a t-statistic of 7.3573, and a probability value of 0.0000. Since the probability value is less than 0.05, the null hypothesis was rejected, implying that AI-driven customer segmentation significantly enhances service marketing performance in Delta State. For hypothesis two (H_{02}), predictive customer behaviour analytics (PCBA) also recorded a positive and significant effect, with a coefficient of 0.3334, a t-statistic of 5.7334, and a probability of 0.0000, leading to the rejection of the null hypothesis. This suggests that predictive analytics contribute meaningfully to improving service marketing outcomes. Similarly, for hypothesis three (H_{03}), personalized marketing

through AI (PMAI) showed a significant positive effect, with a coefficient of 0.2805, a t-statistic of 4.6801, and a probability of 0.0000, which is below the 0.05 level of significance. Therefore, the null hypothesis was also rejected, indicating that AI-powered personalized marketing significantly boosts service marketing performance. The overall model explains about 32.1% of the variation in service marketing performance ($R^2 = 0.3210$), with an adjusted R^2 of 0.3124, confirming that the independent variables jointly predict the dependent variable. The F-statistic of 37.3503 with a probability of 0.0000 further affirms that the model is statistically significant. In summary, the results provide strong evidence that AI-driven practices, customer segmentation, predictive analytics, and personalized marketing, are significant drivers of service marketing performance in Delta State.

Table 4.6 Summary of Variance Inflation Factors

Date: 09/07/25

Time: 23:12

Sample: 263

Included observations: 241

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.135212	163.7307	NA
AIDCS	0.003108	53.20217	1.002210
PCBA	0.003381	58.17504	1.008324
PMAI	0.003593	62.48798	1.007269

Source: EViews 9v output, 2025

Table 4.6 presents the results of the Variance Inflation Factor (VIF) test, which was conducted to assess the presence of multicollinearity among the independent variables. The centered VIF values for AI-driven customer segmentation (AIDCS = 1.002210), predictive customer behaviour analytics (PCBA = 1.008324), and personalized marketing through AI (PMAI = 1.007269) are all very close to 1, and far below the conventional threshold of 10. This indicates that there was no serious multicollinearity problem among the predictors, meaning each independent variable provided unique explanatory power in predicting service marketing performance. On the other hand, the uncentered VIF values appear very large (ranging from 53.20217 to 62.48798), which is expected due to the inclusion of the constant term and does not undermine the reliability of the model. Therefore, the centered results

confirm that the regression estimates are stable, unbiased, and robust for interpretation.

Discussion of Findings

The study focused on artificial intelligence applications in predictive analytics for service marketing performance and the ensued variables were tested and the analysis result findings are being discussed as follows:

AI-driven customer segmentation and service marketing performance

The regression result for hypothesis one revealed that AI-driven customer segmentation had a positive and statistically significant effect on service marketing performance, with a coefficient of 0.410135 and a p-value of 0.0000. This indicates that for every unit increase in AI-driven segmentation, service marketing performance improved by about 41 percent, holding other variables constant. The

significance level ($p < 0.01$) underscores the robustness of this relationship, showing that AI-enabled segmentation enhances customer satisfaction, targeting accuracy, and overall service delivery. This finding is supported by Sharma and Sheth (2022), who argued that AI-driven segmentation enables organizations to align services more closely with customer needs, leading to stronger competitive advantage. Similarly, Lee et al. (2021) found that predictive segmentation helps firms anticipate evolving consumer patterns, thereby strengthening performance outcomes. In the Nigerian context, Olanrewaju and Popoola (2020) affirmed that adopting AI-based segmentation improves customer loyalty and market retention, which resonates with the present study's evidence. Nonetheless, contrasting views exist. Johnson and Peterson (2019) suggested that AI-driven segmentation may be ineffective in markets with insufficient customer data, leading to misaligned marketing strategies. Likewise, Abubakar and Musa (2021) reported that infrastructural gaps and cost-related challenges in some developing countries reduce the full potential of AI-driven segmentation. Despite these limitations, the results of this study confirmed that AI-driven segmentation significantly improved service marketing performance in Delta State. Therefore, the finding met the study's stated objective of determining the role of AI in enhancing marketing efficiency and customer satisfaction through segmentation.

Predictive customer behaviour analytics and service marketing performance

The test of hypothesis two showed that predictive customer behaviour analytics significantly influenced service marketing performance, with a coefficient of 0.333356 and a p-value of 0.0000. This implies that a one-unit increase in predictive analytics improved service marketing performance by approximately 33 percent, highlighting the critical role of predictive tools in anticipating customer behaviour and designing effective marketing campaigns. The highly significant result ($p < 0.01$) confirms that predictive analytics reduces uncertainty, enhances decision-making, and fosters customer retention. Wamba et al. (2020) supported this view by showing that predictive analytics improves marketing performance by leveraging data to design proactive strategies. In addition, Gupta and George (2022) emphasized that predictive AI empowers organizations to detect customer churn early and introduce personalized offers, which directly enhance service performance. Similarly, Uzonwanne (2023) reported that predictive analytics in

Nigerian firms boosted competitiveness and helped firms adjust quickly to customer demands. On the contrary, some scholars found limitations. For instance, Davis and Park (2021) observed that predictive analytics may underperform when customer data is sparse or inconsistent, leading to inaccurate forecasts. Likewise, Alabi and Eze (2020) noted that in some Nigerian service firms, lack of skilled personnel to manage predictive systems hindered their effectiveness. Despite these challenges, the evidence from this study confirmed that predictive customer behaviour analytics significantly improved service marketing performance in Delta State. Thus, the finding met the research objective of examining the effect of predictive analytics on service outcomes, particularly in driving retention, reducing risks, and improving campaign effectiveness.

Personalized marketing through AI and service marketing performance

The regression analysis for hypothesis three revealed that personalized marketing through AI significantly influenced service marketing performance, with a coefficient of 0.280516 and a p-value of 0.0000. This implies that a one-unit increase in personalized AI-driven marketing practices led to about 28 percent improvement in service marketing performance, holding other variables constant. The result suggests that AI-driven personalization—such as customized recommendations, targeted campaigns, and personalized messaging—contributes meaningfully to enhancing customer loyalty, satisfaction, and profitability. This finding aligns with Huang and Rust (2021), who highlighted that personalization through AI fosters stronger customer-brand relationships, thereby enhancing marketing outcomes. Similarly, Adepoju and Akinwale (2022) found that in Nigerian digital service firms, AI-enabled personalization boosted customer trust and significantly improved sales performance. More recently, Chen et al. (2023) demonstrated that tailored marketing powered by AI increased both retention and profitability, consistent with the present study's evidence.

However, not all studies have supported this position. For example, Kim and Park (2020) argued that excessive personalization can create consumer discomfort or privacy concerns, which may diminish trust in service firms. Likewise, Okonkwo and Eze (2021) reported that some Nigerian firms lack the data infrastructure to fully implement AI-based personalization, limiting its effectiveness. Despite these contrasting views, the present study confirmed that AI-enabled personalized marketing significantly improved service marketing

performance in Delta State. This outcome clearly met the study's objective of assessing how AI-driven personalization enhances customer engagement and service competitiveness, demonstrating that personalization is a strategic driver of marketing success when effectively deployed.

Conclusion

Based on the findings, this study concludes that artificial intelligence applications play a critical role in enhancing service marketing performance in Delta State. The regression results demonstrated that AI-driven customer segmentation ($\beta = 0.410135$, $p = 0.0000$), predictive customer behaviour analytics ($\beta = 0.333356$, $p = 0.0000$), and personalized marketing through AI ($\beta = 0.280516$, $p = 0.0000$) all had positive and significant effects on service marketing outcomes, thereby affirming the objectives of the study. These results highlight that when service companies adopt AI to segment customers more accurately, predict behavioural patterns, and design personalized marketing strategies, they achieve improved customer satisfaction, retention, competitiveness, and overall marketing efficiency. The study further revealed that multicollinearity among the predictors was minimal, ensuring robust and reliable findings. While previous studies have shown mixed evidence on AI adoption in developing economies due to infrastructural and cost-related challenges, the present research provides empirical evidence that AI integration in service marketing significantly drives performance in the Nigerian context. Consequently, this study underscores the strategic importance of AI as not just a technological innovation but a performance-enhancing tool that should be fully embraced by service marketing firms seeking long-term growth and competitive advantage.

Recommendations

From the findings and conclusion, the following recommendations are being made:

- i) Service marketing firms in Delta State should intensify investments in AI-driven customer segmentation tools to better identify and respond to diverse customer needs, thereby improving targeting accuracy and satisfaction.
- ii) Managers should adopt predictive customer behaviour analytics as a strategic tool to anticipate customer preferences and minimize marketing risks, ensuring proactive decision-making in competitive environments.
- iii) Firms should leverage personalized AI marketing campaigns to foster stronger

customer loyalty and engagement, while also addressing privacy and ethical concerns to build long-term trust and sustainable growth.

References

- Abubakar, S., & Musa, L. (2021). Artificial intelligence adoption and marketing effectiveness in emerging economies: Evidence from Nigeria. *International Journal of Emerging Markets*, 16(7), 1321–1340.
- Adepoju, A., & Oyewole, O. (2021). Predictive analytics adoption and customer retention in Nigerian service firms. *Journal of Business and Data Science*, 5(2), 45–58.
- Adepoju, O., & Akinwale, Y. (2022). Artificial intelligence applications in digital service firms: Evidence from Nigeria. *African Journal of Business and Economic Research*, 17(4), 85–102.
- Alshaketheep, K., Mansour, A. M., Al-Ma'aitah, M. M., Dabaghia, M. N., & Dabaghie, Y. M. (2024). Leveraging AI predictive analytics for marketing strategy: The mediating role of management awareness. *Journal of System and Management Sciences*, 14(2), 71–89.
- Chatterjee, S., Rana, N. P., Tamilmani, K., & Sharma, A. (2023). Artificial intelligence in marketing: A review and research agenda. *Journal of Business Research*, 154, 113–129.
- Chen, Z., Li, Y., & Xu, H. (2023). Personalization through artificial intelligence: Effects on customer loyalty and profitability. *Journal of Interactive Marketing*, 61, 101–115.
- Ciente. (2023). How artificial intelligence is revolutionizing modern marketing. *Ciente Insights Blog*.
- Davis, T., & Park, J. (2021). Predictive analytics in customer behaviour forecasting: Challenges and opportunities. *Journal of Business Research*, 134, 112–123.
- Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., & Wamba, S. F. (2023). Metaverse, artificial intelligence, and marketing: A futuristic perspective. *International Journal of Information Management*, 70, 102642.
- Eruvwé, O. E., Tarurhor, E. M., Aruoren, E.E., & Omoye, E. I. (2024). Business management ethics and customers retention in selected money-deposit banks in Delta and Edo States, Nigeria. *American International Journal of Business Management*, 7(6), 30–42

- GlobeNewswire. (2024). Artificial intelligence in marketing industry research report 2024–2030: Focus on advertising, dynamic pricing, and marketing automation. *GlobeNewswire Reports*.
- Gupta, M., & George, J. F. (2020). Toward the development of a big data analytics capability. *Information & Management*, 57(8), 103431.
- Gupta, M., & George, J. F. (2022). Predictive analytics and customer retention: A systematic review and future research agenda. *Journal of Marketing Analytics*, 10(3), 221–236.
- Hassan, N., Abdelraouf, M., & El-Shihy, D. (2025). The moderating role of personalized recommendations in the trust–satisfaction–loyalty relationship: an empirical study of AI-driven e-commerce. *Future Business Journal*, 11(1), 66.
- Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49(1), 30–50.
- Iwegbue, C. N. (2015). Competitive Intelligence and Its Influence on Sales Volume in Fast Moving Consumer Goods Sector Firms in Nigeria. *World*, 2579, 0544.
- Iwegbue, C. N. (2024). Experiential Marketing (EXPMKT) and Brand Loyalty (BL) in the Telecommunication Industry in Nigeria.
- Iwegbue, C. N. & Uche, C. O. (2025). Technology-Enhanced Marketing and the Marketing Performance of Selected Deposit Money Banks in Delta State, Nigeria. *International Journal of Marketing and Communication Studies*, 9(4), 55–71.
- Johnson, K., & Peterson, L. (2019). Limitations of artificial intelligence in consumer segmentation: A developing country perspective. *Journal of Consumer Marketing*, 36(6), 781–792.
- Kasem, M. S. E., Hamada, M., & Taj-Eddin, I. (2024). Customer profiling, segmentation, and sales prediction using AI in direct marketing. *Neural Computing and Applications*, 36, 4995–5005.
- Kohan, S. (2024). How AI is revolutionizing marketing in 2024: Top 5 trends. *Forbes*.
- Kumar, V., Dixit, A., Javalgi, R. G., Dass, M., & Shah, R. (2021). Marketing mix decisions: A machine learning approach. *Journal of the Academy of Marketing Science*, 49(4), 659–682.
- Lee, J., Kim, Y., & Choi, S. (2021). Big data analytics and customer segmentation in service industries: Implications for artificial intelligence. *Service Business*, 15(2), 239–258.
- Li, X., Li, T., & Li, Q. (2022). Artificial intelligence and marketing performance: A systematic review. *Journal of Retailing and Consumer Services*, 67, 102958.
- Mariani, M., & Borghi, M. (2022). Big data analytics in tourism and hospitality: A systematic literature review. *International Journal of Contemporary Hospitality Management*, 34(1), 1–27.
- Mikalef, P., Krogstie, J., Pappas, I. O., & Pavlou, P. A. (2021). Exploring the relationship between big data analytics capability and competitive performance. *Information & Management*, 58(3), 103434.
- Nwosu, E. O., & Okafor, C. I. (2022). Artificial intelligence adoption and marketing effectiveness in Nigerian service industries. *African Journal of Management and Marketing Studies*, 13(2), 77–92.
- Okonkwo, U., & Eze, R. (2021). Artificial intelligence in Nigerian service firms: Challenges of personalization and privacy. *Journal of African Business*, 22(3), 357–373.
- Olanrewaju, A., & Popoola, B. (2020). Artificial intelligence in customer segmentation and retention in Nigerian retail banking. *Nigerian Journal of Management Sciences*, 8(2), 44–56.
- Shahid, Z., Malik, A., & Naem, M. (2022). The impact of AI-powered personalized marketing on customer loyalty: Evidence from emerging markets. *Journal of Retailing and Consumer Services*, 65, 102861.
- Sharma, A., & Sheth, J. (2022). Resurgence of relationship marketing in the age of artificial intelligence. *Industrial Marketing Management*, 99, 59–69.
- Singh, A., & Rana, N. P. (2022). Leveraging artificial intelligence for effective customer segmentation in digital marketing. *Information Systems Frontiers*, 24(5), 1235–1249.
- Solway, R. (2024). The state of AI in marketing: Key trends and insights. *LinkedIn Business Journal*.
- Uzonwanne, F. (2023). Predictive analytics and customer insights in Nigerian financial institutions: A study of competitive advantage. *African Journal of Applied Research*, 9(1), 121–135.

- Yin, J., Qiu, X., & Wang, Y. (2025). The Impact of AI-Personalized recommendations on clicking intentions: Evidence from Chinese E-Commerce. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(1), 21.
- Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S., Dubey, R., & Childe, S. J. (2020). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, 131, 242–256.
- Zhang, T., Li, H., & Wu, Y. (2025). Agentic and multimodal AI for hyper-personalized advertising: A conceptual framework. *Journal of Interactive Marketing*, 63, 45–62.