International Journal of Operational Research in Management, Social Sciences & Education | IJORMSSE
p-ISSN: 2536-6521 | e-ISSN: 2536-653X
Volume 10 Number 1 May, 2024

Leveraging Artificial Intelligence to Enhance Marketing Performance of E-Commerce Platforms in Nigeria

[1]Stanley Akpevwe Onobrakpeya & [2]Theresa Josh-Palmer Bayagbon
[1]*Department of Marketing, School of Business Studies,*
Federal Polytechnic Orogun, Delta State, Nigeria
[2]*Department of Marketing,*
Delta State Polytechnic Ogwashi-Uku, Delta State, Nigeria

Article DOI: 10.48028/iiprds/ijormsse.v10.i1.07

Abstract

The study assessed the effect of artificial intelligence on marketing performance of e-commerce platforms in Nigeria. The chosen research design for this study is the cross-sectional survey research design. The study's population was restricted to employees of e-commerce platforms located in South-South Nigeria. The Cochran formula was used to determine the sample size (384 participants) for the study. The study used the judgmental sampling technique. The data for this study were collected from the primary source using a structured questionnaire. The study used internal consistency reliability to test the effectiveness of the questionnaire items. The data collected were analysed using descriptive and inferential statistical techniques. Findings indicated that chatbots, predictive analytics and personalised contents have a significant positive effect on marketing performance. However, leveraging predictive analytics, e-commerce platforms can gain strategic insights into customer behaviour, preferences, and market trends. The study concluded that artificial intelligence has a significant positive effect on marketing performance of e-commerce platforms in Nigeria. The study recommended amongst others that firms should invest in robust predictive analytics tools and data infrastructure to harness customer data effectively. This enables the development of data-driven marketing strategies that optimize performance.

Keywords: *Artificial Intelligence, E-Commerce, Marketing Performance*

Corresponding Author: **Stanley Akpevwe Onobrakpeya**

Background to the Study

Technological advancements have altered marketing methods, necessitating the use of artificial intelligence (AI) as an essential component in digital marketing processes. Moreover, the implementation of AI has revolutionised operational procedures and had a significant impact on sales channels in both business-to-business (B2B) and business-to-consumer (B2C) contexts (Paschen et al., 2020). In addition to these, AI has offered novel ideas and strategies for firms to enhance the appeal of their brands and effectively reach individual customers through various approaches and technologies (Grover & Kar, 2017). Therefore, they possess the capacity to generate data that facilitates future decision-making processes and the formulation of present and future marketing strategies (Mogaji et al. 2020). AI surpasses individuals in decision making and judging processes in terms of factors like speed and volume. Marketing specialists use several AI applications in digital marketing to enhance performance, efficiency, operational effectiveness, while mitigating failure risk, complexity, and uncertainty. Experts in this industry are using a range of AI applications including machine learning techniques, algorithms, big data, personalisation, and optimisation tools (Wirth, 2018). AI implementations in digital marketing are expected to possess the capacity to articulate the gathered data, acquire knowledge and make logical deductions from it, and ultimately provide predictions that aid in the formulation of future decisions and strategies (Mogaji et al., 2020).

The use of AI has significantly transformed industries globally, including the e-commerce sector. Nigeria, a nation undergoing swift digital change, is ready to use AI technologies to improve the efficiency of its growing e-commerce platforms. Merchants have recognised the benefits of this technology, leading to enterprises adopting and broadening the use of AI. Companies use AI for two main purposes. The first is to predict product demand and create customer profiles on the backend. The second is to enhance the consumer experience, ultimately bolstering the brand and increasing revenue (Sasikumar, 2022). Masnita et al., (2024) added that marketers are currently embracing AI to analyse and understand consumer behaviour. AI technology has the potential to enhance and expedite various marketing tasks, hence enhancing consumer experiences and increasing conversion rates.

AI has the capability to automate commercial operations, extract knowledge from historical data, and produce consumer and market insights using algorithmic programmes (Davenport et al., 2020). Machine Learning (ML), Deep Learning, and Natural Language Processing (NLP) are advanced technologies that enable machines to process large amounts of data and provide market intelligence (Davenport et al. 2020; Morsi, 2023; Yusupa et al. 2023). When it comes to implementing AI in marketing, developing suitable AI-powered marketing analytic tools can help organisations assess how well their product designs align with customer needs and measure customer satisfaction (Dekimpe, 2020). Moreover, AI can aid marketers in the formulation and organisation of marketing endeavours (Susilo & Smith, 2023) by facilitating segmentation, targeting, and positioning (STP). AI can assist marketers in visualising a company's strategic orientation, in addition to STP (Huang & Rust, 2017). Text mining and machine

learning algorithms have practical applications in various areas, including banking and finance, arts marketing, retail, and tourism. These algorithms can effectively identify customer segments that are likely to generate significant profits (Muna et al., 2023; Pitt et al., 2020; Dekimpe, 2020). Data optimisation approaches, machine learning, and causal forests can be used to narrow down target customers (Mardiana, 2023; Simester et al., 2019). Hence, it is evident that the use of technology is an indispensable necessity for business entities due to the inevitable and rapid advancement of technology across many company domains (Kaartemo & Nyström, 2021; Lobschat et al., 2021).

To enhance efficiency, it is imperative to collect personalised data and concentrate on the target customers (Wirth, 2018). As a result, many companies are dedicating considerable resources and spending significant capital in their digital marketing tools, with the aim of reaching specific consumers, using different channels, and implementing effective strategies. Currently, AI is crucial in assisting specialists in identifying prospects, market demands, marketing strategies, target customers, and capabilities (Mogaji et al. 2020). Companies use technology to enhance the consumer experience and optimise the consumer journey. The AI system monitors and analyses consumers' sentiment, transactions, visits, and other relevant data in order to develop machine learning algorithms that can forecast customer behaviour. AI use tailored data, recommendations, and messaging to create consumer engagement and retention strategies.

AI has the capability to make marketing efforts more efficient, improve their performance, and provide reports based on data. The personalised email marketing that many of us are familiar with is primarily the result of AI. A chatbot is an instance of an AI application that emulates human intelligence by comprehending and addressing users' concerns and requests, while also facilitating online purchases (Chaffey & Ellis-Chadwick, 2019). Currently, chatbots are experiencing a surge in popularity. Many firms include bots into their operations through the use of Meta Messenger or their own websites (Polson & Scott, 2018). Companies commonly implement chatbots to enhance the efficacy of their customer support division. Meta Messenger's data analysis skills help improve an organization's digital marketing efficacy (Chaffey & Ellis-Chadwick, 2019).

The relevance of this study lies in its potential to offer valuable insights and practical implications for leveraging AI technologies in e-commerce marketing within the Nigerian context. Given the rapid growth of e-commerce in Nigeria and the increasing adoption of AI in marketing practices globally, understanding the specific effect of AI on marketing performance metrics is crucial for businesses and marketers operating in this dynamic environment. By examining the relationships between AI applications (such as chatbots, predictive analytics and personalised contents) and key marketing performance indicators (e.g., customer acquisition, retention, and engagement), this study aims to provide actionable recommendations that can enhance marketing strategies, optimize customer experiences, and ultimately drive business growth. The findings from this research could inform decision-making processes for e-commerce companies seeking to maximize the benefits of AI technologies in improving their marketing efforts and staying competitive in the digital marketplace.

Statement of the Problem

The e-commerce industry in Nigeria has experienced significant expansion due to the rising usage of the internet, widespread adoption of smartphones, and a change in customer preferences towards online purchasing. Nevertheless, in the midst of this expansion, e-commerce platforms encounter distinctive challenges such as acquiring and retaining customers, as well as implementing personalised marketing strategies. These issues are crucial for maintaining long-term success in a highly competitive market. This presents a chance for AI to play a crucial and influential role. AI technologies such as machine learning, natural language processing (NLP), and predictive analytics provide e-commerce platforms in Nigeria with advanced capabilities to enhance marketing campaigns and enhance customer experiences. Through the analysis of extensive data, AI has the capability to produce significant insights into customer behaviour, preferences, and purchasing habits. This allows for focused marketing efforts, customised recommendations, and improved customer service efficiency.

Furthermore, the incorporation of AI technology is essential for improving the capacity of a system or process to evaluate and forecast data or information. AI technology enables the efficient and accurate processing of enormous volumes of data, facilitating informed decision-making in many scenarios (Al-Jedibi, 2022; Al-Shoteri, 2022; Najmi et al., 2021). Prior to integrating AI technology into a system or process, it is important to consider data security, privacy, and the ability of AI technology to handle high-quality data. It is crucial to bear in mind that AI technology cannot completely supplant human roles. AI is capable of performing a wide range of tasks, yet it lacks the ability to demonstrate compassion or empathy (Huang & Rust, 2021). While technology can aid in improving a system or process, humans are still indispensable when it comes to making decisions and controlling systems or processes (Rezaei, 2015).

The integration of AI can improve customer performance through the use of chatbots that engage in direct text or voice conversations with customers. These chatbots provide customers with essential information, address complaints, and offer personalised solutions (Hariguna & Ruangkanjanases, 2024). Despite this, there remains a notable gap in the existing literature regarding a comprehensive investigation into the specific effect of AI on marketing performance within the e-commerce context. While studies acknowledge the potential of AI to enhance customer engagement, personalized marketing, and overall efficiency, there is a need for deeper analysis into how these AI applications translate into tangible improvements in e-commerce marketing performance, including customer acquisition, retention, and the implementation of personalized marketing strategies. This study aims to address this gap by conducting a detailed exploration of the relationships between AI technologies and marketing performance metrics within the e-commerce sector, providing valuable insights into the practical implications and effectiveness of AI-driven marketing strategies in Nigeria's evolving digital landscape.

Objectives of the Study

The aim of the study is to assess the effect of artificial intelligence on marketing performance of e-commerce platforms in Nigeria. The specific objectives are to:

1. Explore the effect of chatbots on marketing performance of e-commerce platforms in Nigeria.
2. Determine the effect of predictive analytics on marketing performance of e-commerce platforms in Nigeria.
3. Ascertain the effect of personalised contents on marketing performance of e-commerce platforms in Nigeria.

Literature Review

Conceptual Review

Artificial Intelligence (AI)

Artificial intelligence (AI) refers to a computerised machine that replicates the cognitive and emotional abilities of the human mind. AI-enabled systems are specifically engineered to perceive and respond to their surroundings (Russell & Norvig, 2020). They possess a comprehensive understanding of the surroundings and respond accordingly, while also retaining knowledge about potential scenarios that may arise in the near future. Artificial Intelligence is the replication of human intelligence in machines that are programmed to reason and imitate human behaviours. AI refers to a range of technologies and methods that allow computers and systems to carry out tasks that usually require human intelligence, including as learning, reasoning, problem-solving, interpreting natural language, and recognizing patterns. Artificial intelligence, using historical data, has the capability to forecast the occurrence of machine failure and can notify the user of past acts. In addition, data absorption is a crucial aspect of AI since it involves the collection of enormous volumes of data based on specific requirements (Feng et al., 2018; Lim et al., 2023). Organisations such as Google and Amazon manage an immense volume of data that is beyond the capacity of people to analyse. Furthermore, AI systems possess the capacity to accumulate vast amounts of data pertaining to several individuals across multiple devices sourced from diverse origins. All of these events occur in the system either asynchronously or simultaneously. The effort led to significant advancements, including the development of big data analytics and the application of machine learning in various sectors and settings.

AI-powered Apps are not only employed in marketing but also have extensive applications in areas such as medical, e-commerce business, education, legal, and manufacturing. Artificial intelligence (AI) is being increasingly utilised to enhance several sectors. As organisations progress towards Industry 4.0, they are witnessing the simultaneous development of AI and other emerging technologies (Haque et al., 2023; Kaplan & Haenlein, 2019). AI technology was developed with the primary objective of enhancing the quality of human existence (Rabetino et al., 2021). This technology is specifically developed to enhance the efficiency, precision, and effectiveness of order reception by resolving issues at a faster pace. AI has numerous benefits that can be effectively harnessed, even in our daily lives without our awareness.

AI integration focuses on leveraging AI technology to enhance the efficiency and effectiveness of an existing system or process. AI, or artificial intelligence, is a technology

that utilises predetermined algorithms to automatically analyse and manipulate data or information (Jiang, 2020; Kineber et al., 2023). The comprehension of the philosophy of AI technology integration is essential as it might provide a multitude of advantages for the advancement of a system or process. By utilising artificial intelligence (AI) technology, systems or processes can function with greater efficiency and speed, resulting in improved production and quality. Moreover, AI technology can help mitigate the potential for human error, a common occurrence in diverse procedures (Sanchez-Franco et al., 2019). The impact of AI in the contemporary world is seen in several sectors, such as healthcare and finance. Accenture's analysis predicts that the worldwide AI healthcare market would reach $6.6 billion in 2021, with a compound average growth rate (CAGR) of 40% (Al-Shoteri, 2022). AI technology in healthcare improves patient outcomes by analysing extensive medical data and detecting patterns that can be utilised to create customised treatment strategies. AI is employed in the banking sector to better fraud detection, automate financial procedures, and improve customer service. According to a survey by CB Insights, AI companies in the finance sector secured $5.4 billion in funding in 2020 (Da Costa et al., 2022). These examples not only showcase the potential advantages of AI in many sectors but also emphasise the significance of tackling concerns like data security and privacy.

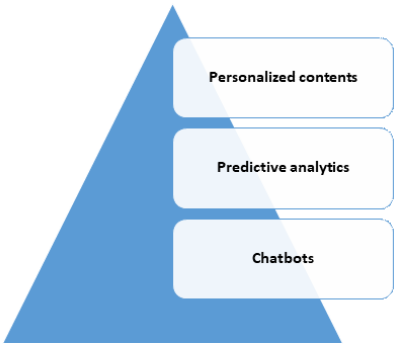

Figure 1: Measures of Artificial Intelligence

By following this strategic pyramid approach, e-commerce platforms in Nigeria can effectively leverage chatbots, predictive analytics, and personalized content to drive marketing performance, improve customer engagement, and achieve sustainable growth in the dynamic digital marketplace. This structured implementation framework ensures a data-driven and customer-centric approach to marketing strategy development and execution.

Chatbots

Chatbots are software programmes specifically created to imitate communication with human users, usually using written or spoken methods. They use AI technology, including natural language processing (NLP) and machine learning, to comprehend and promptly address customer inquiries or requests. A software application is used to provide an online chat session through text or text-to-speech, enabling direct

communication with a human agent in real-time. It facilitates the resolution of consumer inquiries and issues in a prompt manner. Jenny, Slush, and Vainu are among the well-known bots. Jenny and Slush addressed inquiries from almost 20,000 participants. Dominos has developed a Facebook chatbot to expedite the ordering procedure. Eva, an artificial intelligence system developed by HDFC Bank, has successfully addressed over 5 million inquiries from over one million consumers, with an impressive accuracy rate of over 85% (Patel, 2022). AI-Powered Chatbots have the ability to handle many user requests concurrently. Chatbots serve not only as a means of communication, but also as a platform for regulated professionals, such as doctors and lawyers, to offer their services. The following matters are given careful consideration: taxonomy, intellectual property rights (IPR), civil responsibility, consumer protection, cyber security, privacy and data protection, as well as other human rights concerns (Leaua & Didu, 2021).

We acknowledge the utilization of automated responses by businesses for addressing consumer inquiries and gathering data, as well as for keeping the audience informed about products and services. They have the ability to provide service to clients around the clock and store their data for future reference (Thilagavathy, & Kumar, 2021). The applications of chatbots are extensive, and the integration of chatbots with Artificial Intelligence and Machine Learning is a significant innovation. Artificial intelligence-powered chatbots offer immediate customer support, respond to queries, and assist customers in navigating the sales process, hence improving customer service and interaction. Chatbots are essential for lead generation and sales assistance as they interact with website visitors through customized messages and offers. Their purpose is to assess prospects and arrange meetings with sales personnel. Chatbots play a crucial role in leading users through the sales funnel and facilitating transactions, ultimately resulting in increased conversions and revenue development for enterprises (Rodriguez & Gupta, 2018).

Chatbots collect useful data and insights from customer interactions, like as preferences, feedback, and sentiment analysis. Analyzing this data can provide valuable insights into customer behaviour, market trends, and optimisation opportunities. These insights can then be used to guide marketing strategies and decision-making processes. Chatbots and virtual assistants are revolutionizing customer interactions in the field of digital marketing. They provide tailored, streamlined, and adaptable solutions for organizations to effectively connect with customers through several channels (Bhuvaneswari, et al. 2024). In order to remain competitive in the current dynamic economy, firms must incorporate chatbots and virtual assistants into their digital marketing campaigns as essential elements, as these technologies continue to advance. By leveraging chatbots effectively, e-commerce platforms can enhance customer interactions, increase engagement levels, and ultimately drive higher conversion rates, leading to improved marketing performance. The study hypothesized that**:**

H_1: Chatbots has significant relationship with marketing performance of e-commerce platforms in Nigeria.

Predictive Analytics

Predictive analytics is a subdivision of advanced analytics that employs past data, statistical algorithms, and machine learning approaches to anticipate forthcoming events or patterns. Predictive analytics aims to discern patterns, linkages, and correlations in data to enable accurate predictions about future events or behaviours. Predictive analytics is the process of examining past data in order to detect recurring patterns and trends that can be utilised to forecast future occurrences or behaviours (Johnson & Lee, 2018). Marketing analysis sometimes include examining customer data, including previous purchase records, website interactions, demographic details, and analytics measuring social media involvement (Bhuvaneswari, Subadra, Sreekala, Natarajan, Shajahan & Vijai, 2024). Machine learning algorithms are crucial in predictive analytics as they acquire knowledge from past data to forecast future results. These algorithms can be trained to detect correlations, predict future outcomes, and produce valuable insights that assist marketers in making well-informed decisions regarding their marketing campaigns. Artificial intelligence has the capability to forecast the personality characteristics of clients. A significant challenge faced by many marketers is determining how to effectively engage with their target audiences. They are endeavouring to comprehend the most effective approach to reach their target buyers in the very competitive market.

Customer service providers are actively seeking methods to enhance client happiness. AI can be used to automate real-time recommendations, hence enhancing the overall consumer experience. An AI tool can analyse a customer's browsing history in order to provide a range of alternative choices. AI software utilises data and statistical models to forecast future behaviour by analysing past behaviour and characteristics. AI not only provides novel customer insights but also autonomously delivers messages to the appropriate customers at the optimal moment (Brenner, 2020). AI-driven predictive analytics utilise historical data and market conditions to anticipate future trends and results, empowering marketers to optimise tactics and meet the demands of customers proactively. By leveraging predictive analytics, e-commerce platforms can gain strategic insights into customer behavior, preferences, and market trends. This empowers them to make informed decisions, improve targeting precision, and optimize resource allocation to maximize marketing performance. The study hypothesized that**:**

H_2: Predictive analytics has significant relationship with marketing performance of e-commerce platforms in Nigeria.

Personalized contents

Personalised content encompasses individualized information, messaging, or experiences that are specifically created to cater to the distinct requirements, interests, and attributes of individual users or specific audience segments. The objective of personalised content is to augment engagement, pertinence, and overall user contentment by providing content that deeply connects with the recipient on an individual level. Due to intense rivalry in contemporary marketplaces, there has been a significant rise in the adoption of personalisation techniques by organisations. This is done to generate customised

information for consumers that aligns with their specific requirements (Shanahan et al., 2019). Artificial Intelligence plays a crucial part in personalisation by automating consumers' reactions and behaviours to provide personalised ideas. This not only provides a competitive advantage in the market but also enhances performance speed and efficiency (Shankar, 2018). Integrating artificial intelligence (AI) into marketing using personalised approaches has become essential for companies engaged in digital operations to adapt and thrive in the fast-evolving competitive landscape (Gentsch, 2018). In addition to the algorithms and data mining, the implementation also provides advantages for the big data and machine learning aspects of AI. When the volume of data is larger, generating recommendations for customers becomes more efficient and straightforward (Dwivedi et al., 2020). By effectively implementing modern Artificial Intelligence systems, it becomes feasible to acquire extensive insights on client attributes, intentions, behaviours, preferences, and purchasing patterns (Shankar, 2018).

An effective method for enhancing engagement and fostering strong connections between the audience and specific products or services is through the cultivation of client loyalty. This can be accomplished by generating tailored individualized offers for customers following an assessment of their buyer profiles using artificial intelligence (Shanahan et al., 2019). Netflix, a prominent player in the industry, successfully mitigated a significant decrease in customer churn by leveraging personalised algorithms and machine learning. This resulted in an enhanced customer experience. Consequently, the company has enhanced its connections, attachments, and commitment with its audience (Bughin et al. 2017). For instance, companies like Amazon and Google, which are leaders in the digital market, have introduced AI-assistants like Nest, Echo, and Alexa. These assistants provide valuable information and provide recommendations to consumers using digital platforms. Consequently, by employing Artificial Intelligence, businesses are able to establish a robust connection between the audience and the product, thereby enhancing loyalty. These assistants have the ability to customise recommendations through the collection of data, analysis of user history, recording of speech, and study of behaviour capabilities (Dawar & Bendle, 2018).

The examination of past behaviours is the most crucial aspect of the personalisation process. During the process of analysing algorithms, which are frequently utilised in AI, data is gathered from a vast database that contains information about consumers' past activities and purchasing history (Bughin et al., 2017). Spotify has employed a recommendation system that collects and assesses data from the user's past selections on the Spotify music platform. This algorithm monitors customer preferences, namely the kind of music they listen to the most. Consequently, the system generates a customised playlist for the consumer based on their own music preferences. By implementing this strategy, the organisation enhances the level of customer experience (Madathil, 2017). By comprehending the personal tastes, preferences, loves, and dislikes of specific clients, it provides assistance.

By utilising this approach, marketers have the ability to provide consumers a customised and tailored experience. Grammarly is an application that detects grammar errors and provides users with weekly feedback on the progress of their writing skills. Starbucks utilises consumer data to recall their preferred beverages and preferences, and in return, offers them benefits and complimentary items based on their previous interactions. The Tesla automobile retains the individual preferences of each driver, including seat position, steering wheel adjustment, mirror placement, braking characteristics, radio presets, and even the preferred driving style for optimal comfort (Morgan, 2021). Customisation facilitates the delivery of an exceptional client experience. Artificial intelligence has facilitated this achievement. The process involves gathering and examining user data, considering factors such as physiographic, demographic, device-related, and geographical information (Afshan, 2021). Each customer values customised things, whether they are presents, communications, or exclusive promotions. Every firm strives to satisfy its clients by delivering exactly what they desire. Facilitating the collection of customer information is of utmost importance for this objective, as well as investing in Artificial Intelligence (Thilagavathy & Kumar, 2021). Machine learning is employed to study customer behavioural patterns, allowing firms to tailor their products according to specific needs.

AI facilitates customised marketing efforts by using data to provide personalised information, suggestions, and promotions to particular consumers, hence improving their level of involvement and the rate at which they make a purchase. Personalisation has emerged as a fundamental element of contemporary marketing techniques, enabling organisations to provide customised experiences that deeply connect with individual customers. Thanks to the progress in AI and data analytics, marketers can now utilise sophisticated technologies to exploit extensive customer data and generate exceptionally tailored interactions across several touchpoints. Furthermore, personalised marketing has demonstrated the ability to enhance engagement, increase conversion rates, and improve customer happiness. Businesses can cultivate better ties with their audience and enhance brand loyalty over time by exhibiting a comprehension of customers' interests and preferences (Park & Lee, 2020). A prevalent method of personalisation powered by artificial intelligence is collaborative filtering, which examines user behaviour and preferences in order to provide tailored recommendations. Many e-commerce platforms, streaming services, and content websites commonly employ this method to recommend products, movies, or articles to users. These recommendations are based on the customers' previous interactions and are intended to match their particular interests (Bhuvaneswari et al. 2024). Personalized content resonates better with customers, leading to increased engagement, higher conversion rates, and improved customer loyalty. By delivering relevant and personalized experiences, e-commerce platforms can strengthen brand perception and drive sustainable growth in the Nigerian market. The study hypothesized that**:**

H_3: Personalised contents have significant relationship with marketing performance of e-commerce platforms in Nigeria.

Marketing Performance

Marketing performance pertains to the efficacy and productivity of marketing activities and strategies in attaining particular corporate goals and objectives within the e-commerce sector. The key aspects of marketing performance in this context include:

1. **Customer Acquisition**: The efficacy of marketing endeavours in enticing new customers to the e-commerce platform. These techniques include search engine optimisation (SEO), paid advertising (such as PPC campaigns), content marketing, social media marketing, influencer collaborations, and referral programmes.
2. **Customer Retention**: The efficacy of marketing efforts in maintaining current customers and promoting recurring purchases. These strategies include customised email marketing, loyalty programmes, tailored discounts based on consumer behaviour, and outstanding customer service experiences.
3. **Customer Engagement**: The degree of interaction and engagement attained with customers throughout marketing endeavours. These indicators, including click-through rates (CTR), open rates, social media engagement, and general brand awareness and sentiment, can be used to measure this.

Technology Acceptance Model (TAM)

The TAM is a widely recognized theoretical framework in the field of information systems and technology adoption. It can be applied to understand how AI technologies, when integrated into marketing strategies, influence the performance of e-commerce platforms. The TAM posits that the adoption and use of technology, such as AI in marketing, depend on two primary factors:

1. **Perceived Usefulness**: This refers to the extent to which a person believes that using a particular technology will enhance their job performance or task efficiency. In the context of e-commerce platforms, AI technologies like chatbots, predictive analytics, and personalized content are perceived as useful if they improve marketing effectiveness, customer engagement, and overall performance metrics.
2. **Perceived Ease of Use**: This relates to the degree to which a person believes that using a technology will be free from effort or complexity. For AI technologies to positively impact marketing performance, they should be user-friendly and seamlessly integrated into existing marketing processes, requiring minimal training or technical expertise.

E-commerce marketers are more likely to adopt AI tools if they perceive them as valuable for improving marketing performance metrics such as customer acquisition, conversion rates, and customer retention. Marketers recognize that AI-powered chatbots can enhance customer service, reduce response times, and increase engagement, leading to higher sales and improved marketing performance. AI technologies must be user-friendly and seamlessly integrated into e-commerce platforms to facilitate adoption and effective utilization by marketers. Predictive analytics tools that provide intuitive dashboards and actionable insights allow marketers to make data-driven decisions without extensive technical knowledge.

Methodology

Research Design

The chosen research design for this study is the cross-sectional survey research design. Cross-sectional surveys offer researchers the advantage of uncovering the actual occurrences within an organisation, as opposed to solely relying on reported information. They are beneficial for establishing a foundation or conducting a preliminary investigation to have a comprehensive understanding of the challenges that companies are encountering.

Population and Sample Size

The study's population was restricted to employees of e-commerce platforms located in South-South Nigeria. This narrowed down the scope of the study. By focusing solely on South-South Nigeria, the study was able to gain a comprehensive grasp of the specific challenges and prospects in expanding e-commerce services in the region. The researchers are unsure of the exact total population of employees in e-commerce platforms in the region. The Cochran (1977) formula is usually used to calculate the sample size in investigations where the population size is unknown. It entails formulating assumptions regarding the necessary degree of accuracy, the intended level of certainty, and an estimated percentage of the population exhibiting a specific attribute or behaviour.

The formula for the Cochran sample size calculation is as follows:

$n = z\text{^}2(PQ) / e\text{^}2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$

Where:

n = sample size

z = z-score corresponding to the desired level of confidence

p = estimated proportion of the population with the characteristic of interest

q = 1 - p

e = level of precision desired (margin of error)

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2}$$

$$n = \frac{3.8416 \times 0.5 \times 0.5}{0.0025}$$

$$n = 384$$

Sampling Technique

The study used the judgmental sampling technique. We employed judgmental sampling to deliberately choose groups for inclusion in the sample, using our understanding of the population and the precise traits we were seeking. We used our experience to ascertain individuals who are most likely to offer pertinent and important information for the study.

Sources of Data

The data for this study were collected from the primary source using a structured questionnaire with a response format based on the five-point Likert scale. The adoption of

the questionnaire facilitated the researcher in evaluating public opinion at a specific moment in time. The rationale behind selecting this approach was that surveys are optimal for conducting scientific research. Participants were provided with validated questionnaires in person. The covering letter included a thorough explanation of the study's purpose and the necessity for obtaining trustworthy information from it. The purpose of the covering letter was to encourage respondents to submit candid and necessary responses to the survey instrument.

A pilot study was done to subject the research instrument to rigorous examination and identify any potential issues prior to its full-scale implementation. The pilot study entailed distributing 10 copies of the questionnaire to a sample of respondents on a chosen e-commerce platform in South East Nigeria. The purpose was to pretest the questionnaire and conduct validity and reliability testing.

Mitchell and Jolley (2013) stated that three key factors are employed to evaluate reliability: internal consistency reliability, inter-rater reliability, and test-retest reliability. The study used internal consistency reliability to test the effectiveness of the questionnaire items. If these items have a substantial link, there is a notable level of internal consistency. The Cronbach alpha coefficients for internal consistency were calculated. A construct's criteria can be deemed reliable if it possesses a minimum composite reliability value of 0.7 and is further reinforced by a Cronbach's alpha value greater than 0.6 (Ghozali, 2015).

Table 1: Reliability Coefficients of study Constructs

Dimension of study constructs	Items	Cronbach's Alpha
Chatbots	4	0.744
Predictive Analytics	4	0.732
Personalized Contents	4	0.753
Marketing Performance	4	0.722

Source: Field Survey, 2024.

Based on the data shown in Table 1, it can be inferred that the Cronbach's alpha for each variable is greater than 0.7. Based on these results, it can be inferred that each of the variables has satisfied the necessary criteria, leading to the conclusion that all indicators employed to measure the variables are deemed reliable.

Methods of Data Analysis

The data collected were analysed using descriptive and inferential statistical techniques to reach a conclusion. The descriptive statistics used basic percentages to analyse the demographic characteristics of the respondents. The statistical methods used were correlation and multiple regression analysis, which are inferential in nature. Correlation analysis was used to quantify the level of relationship between the variables being examined. Multiple regression was used to test the statistical significance of the relationships between variables. The analysis was conducted using the SPSS for Windows software, namely version 25.

Model Specification

The following model specification was developed for the study:

$$Y = F(X) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$MP = F(CB, PAL, PC) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$MP = \beta o + \beta 1CB + \beta 2PAL + \beta 3PC + \varepsilon \ldots\ldots\ldots\ldots\ldots (4)$$

Where:

β_o = Constant Coefficient

β_1- β_3 = Coefficients

MP = Marketing Performance

CB = Chatbots

PAL= Predictive Analytics

PC= Personalized Contents

Results of Data Analysis

This section is dedicated to the analysis of the data obtained from the participants.

Table 2: Response Rate

S/N	Description of Response	Number	Ratio (%)
1	Total questionnaires administered	384	100
2	Questionnaires retrieved	374	97.4
3	Questionnaires rejected	5	1.3
4	Questionnaires analyzed	369	96.1

Source: Field Survey (2024)

Table 2 displayed a response rate of 96%. The researchers considered a 96% response rate sufficient to continue with the analysis.

Table 3: Sample Demographics (n= 369).

Variable	Category	Number	Ratio (%)
Gender	Male	162	43.9
	Female	207	56.1
Age	18-28	84	22.8
	29-38	89	24.1
	39-48	85	23.0
	49-58	64	17.3
	59-68	47	12.7
Marital status	Single	195	52.9
	Married	163	44.2
	Divorced	11	3.0
Education level	SSCE	44	11.9
	OND	98	26.6
	HND/ B.Sc.	192	52.0
	Postgraduate degree	35	9.5

Source: Field Survey, 2024.

Table 3 shows that 44% of the samples were male, whereas 56% were female. The survey found that 23% of the participants were between the ages of 18 and 28, 24% were between the ages of 29 and 38, 23% were between the ages of 39 and 48, 17% were between the ages of 49 and 58, and 13% were between the ages of 59 and 68. The survey found that 53% of the participants were unmarried, 44% were married, and 3% were divorced. 52% of the respondents possess an educational background consisting of either a Higher National Diploma (HND) or a Bachelor of Science (B.Sc.) degree.

Table 4: Effect of Artificial Intelligence factors on Marketing Performance

Predictors	Standardized Coefficients			Collinearity Statistics		ANOVA[a]		Model Summary	
	Beta	T	Sig.	Tolerance	VIF	F	Sig.	R Square	Adjusted R Square
		-.499	.618			96.037	.000[b]	.441	.437
Chatbots	.361	8.365	.000	.822	1.217				
Predictive Analytics	.137	3.245	.001	.864	1.157				
Personalized Contents	.365	7.917	.000	.721	1.386				

a. Dependent Variable: Marketing performance
Source: Field Survey (2024)

Table 4 indicates that chatbots have a positive effect on marketing performance ($\beta = 0.361$, $p < 0.05$). The use of predictive analytics has a positive effect on marketing performance, as indicated by a significant beta coefficient of 0.137 ($p < 0.05$). Personalised content has a positive effect on marketing performance ($\beta = 0.365$, $p < 0.05$). The analysis revealed that there is no multicollinearity, since the Variance Inflation Factors (VIF) for chatbots (1.217), predictive analytics (1.157), and personalised contents (1.386) in relation to marketing performance are all below the threshold of 10. In addition, the tolerance level exceeds 0.1, whereas chatbots have a tolerance level of 0.822, predictive analytics have a tolerance level of 0.864, and personalised contents have a tolerance level of 0.721.

Nevertheless, the independent variables served as reliable indicators of artificial intelligence. This was corroborated by the F measurement of 96.037 and the p value (0.000), which was below the significance level of 0.05. Hence, the model exhibited statistical significance. Moreover, the dimensions of artificial intelligence were considered to be significant factors in explaining the variances in marketing performance, as indicated by an adjusted R square value of 0.437. Artificial intelligence components, such as chatbots, predictive analytics, and personalised content, accounted for 44% of the variations in marketing performance.

Table 5: Relationship between the Variables

S/N	Predictors	CB	PAL	PC	MP
1	Chatbots	1			
2	Predictive Analytics	0.118*	1		
3	Personalized Contents	0.421**	0.367**	1	
4	Marketing Performance	0.531**	0.313**	0.567**	1

*. Correlation is significant at the 0.05 level (2-tailed).

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

Table 5 indicated that chatbots has a strong positive correlation with marketing performance (r=0.531). However, predictive analytics has a moderate positive correlation with marketing performance (r=0.313). Furthermore, the result indicated that personalized contents has a strong positive correlation with marketing performance (r=0.567).

Discussion of Results

The result indicated that chatbots have a significant positive effect on marketing performance (β =0.361, p< 0.05). Chatbots have a strong positive correlation with marketing performance (r = 0.531). Test of H_1 showed that chatbots has significant relationship with marketing performance of e-commerce platforms in Nigeria (0.000 < 0.05). Chatbots and virtual assistants are revolutionising customer interactions in the field of digital marketing. They provide tailored, streamlined, and adaptable solutions for organisations to effectively connect with customers through several channels (Bhuvaneswari, et al. 2024). Chatbots play a crucial role in leading users through the sales funnel and facilitating transactions, ultimately resulting in increased conversions and revenue development for enterprises (Rodriguez & Gupta, 2018). The result implied that chatbots provide instant and personalised customer support, addressing inquiries and resolving issues promptly. This leads to higher customer satisfaction and retention rates. Chatbots operate round-the-clock, catering to customers' needs at any time. This availability enhances response times and the overall customer experience.

However, the result showed that predictive analytics has a significant positive effect on marketing performance (β =0.137, p< 0.05). Predictive analytics has a moderately positive correlation with marketing performance (r = 0.313). Test of H_2 showed that predictive analytics has significant relationship with marketing performance of e-commerce platforms in Nigeria (0.001 < 0.05). Marketers are currently embracing artificial intelligence (AI) to analyse and understand consumer behaviour (Masnita et al., 2024). Currently, artificial intelligence is crucial in assisting specialists in identifying prospects, market demands, marketing strategies, target customers, and capabilities (Mogaji et al. 2020). The result implied that predictive analytics helps identify customer segments based on behaviour, preferences, and purchasing patterns. This enables targeted marketing campaigns tailored to specific audience segments. By analysing historical data and market trends, predictive analytics can forecast future demand, enabling e-commerce platforms to optimise inventory management and marketing strategies.

Furthermore, the result indicated that personalised contents have a significant positive effect on marketing performance (β =0.365, $p< 0.05$). Personalised content has a strong positive correlation with marketing performance (r = 0.567). Test of H_3 showed that personalised contents have significant relationship with marketing performance of e-commerce platforms in Nigeria (0.000 < 0.05). Due to intense rivalry in contemporary marketplaces, there has been a significant rise in the adoption of personalisation techniques by organisations. This is done to generate customised information for consumers that aligns with their specific requirements (Shanahan et al., 2019). Integrating artificial intelligence (AI) into marketing using personalised approaches has become essential for companies engaged in digital operations to adapt and thrive in the fast-evolving competitive landscape (Gentsch, 2018). The result implied that personalised content resonates better with customers, leading to higher engagement levels and increased time spent on the platform. Tailored product recommendations and content based on customer preferences lead to higher conversion rates and average order values.

Conclusion

The study concluded that artificial intelligence has a significant positive effect on marketing performance of e-commerce platforms in Nigeria. The dimensions of artificial intelligence such as chatbots, predictive analytics and personalized contents explained 44% of the variations in marketing performance. By leveraging chatbots effectively, e-commerce platforms can enhance customer interactions, increase engagement levels, and ultimately drive higher conversion rates, leading to improved marketing performance. However, leveraging predictive analytics, e-commerce platforms can gain strategic insights into customer behavior, preferences, and market trends. This empowers them to make informed decisions, improve targeting precision, and optimize resource allocation to maximize marketing performance. Furthermore, personalized content resonates better with customers, leading to increased engagement, higher conversion rates, and improved customer loyalty. By delivering relevant and personalized experiences, e-commerce platforms can strengthen brand perception and drive sustainable growth in the Nigerian market.

The Technology Acceptance Model helps explain the relationship between AI adoption and marketing performance in e-commerce platforms by emphasizing the importance of perceived usefulness and ease of use: If AI technologies are perceived as useful and easy to use by e-commerce marketers, they are more likely to be adopted and integrated into marketing strategies. The successful integration of AI technologies enhances marketing performance by improving customer engagement, optimizing targeting and personalization, and enabling data-driven decision-making.

Recommendations

i. E-commerce platforms should prioritize the implementation and optimization of chatbots to improve marketing performance. Invest in advanced chatbot technologies capable of handling complex customer inquiries and providing personalized responses.
ii. Firms should invest in robust predictive analytics tools and data infrastructure to

harness customer data effectively. This enables the development of data-driven marketing strategies that optimize performance.

iii. Firms should develop a comprehensive personalized content strategy tailored to customer preferences, behavior, and historical interactions to boost marketing performance.

References

Afshan, S. (2021). *Role of AI in digital marketing*, Retrieved from www.webtrainings.in: https://www.webtrainings.in/role-of-ai-in-digital-marketing/

Al-Jedibi, W., (2022). The strategic plan of the information technology deanship – King Abdulaziz University- Saudi Arabia, *Int. J. Appl. Inf. Manag. 2* (4), 84–94.

Al-Shoteri, A., (2022). The role of methods and applications of artificial intelligence tools in the field of medicine to diagnose and discover various diseases. *J. Appl. Data Sci. 3*(1), 1–14.

Bhuvaneswari, L. Subadra, S. Sreekala, S, P. Natarajan, S. Shajahan, U. S. & Vijai, C. (2024). The impact of artificial intelligence on digital marketing, *Migration Letters, 21*(6), 1132-1142

Brenner, M. (2020). *Retrieved from https*://marketinginsidergroup.com/.

Bughin, J., Hazan, E., Ramaswarry, S., Allas, T., Dahlstörm, P., Henke, N., & Trench, M. (2017). *McKinsey Global Institute - Artificial Intelligence – The Next Digital Frontier?* Available online at https://www.calpers.ca.gov/docs/board-agendas/201801/full/day1/06-technology-background.pdf.

Chaffey, D. & Ellis-Chadwick, F. (2019). *Digital marketing seventh edition*, Pearson. Harlow.

Cochran, W. G., (1977). *Sampling techniques, 3rd ed*, John Wiley & Sons, New York.

Da Costa, R. L., Gupta, V., Gonçalves, R., et al., (2022). Artificial intelligence and cognitive computing in companies in Portugal: an outcome of partial least squares—structural equations modeling, *Mathematics 10* (22), 4358.

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing, *Journal of the Academy of Marketing Science*, *48*(1), 24–42. https://doi.org/10.1007/s11747-019-00696-0

Dawar, N. & Bendle, N. (2018). Marketing in the age of Alexa. Marketing in the age of Alexa. Harvard *Business Review, 96(*3), Harvard Business Review. Available online at https://files.transtutors.com/cdn/uploadassignments/2949852_1_marketing-in-the-age-of-alexa.pdf.

Dekimpe, M. G. (2020). Retailing and retailing research in the age of big data analytics, *International Journal of Research in Marketing*, *37*(1), 3–14. https://doi.org/10.1016/J.IJRESMAR.2019.09.001

Dwivedi, Y. K. Ismagilova, E. Hughes, D. L. Carlson, J. Raffaele, F. & Jacobson, J. et al. (2020). Setting the future of digital and social media marketing research: Perspectives and research propositions, *In International Journal of Information Management, 102168*. DOI: 10.1016/j.ijinfomgt.2020.102168.

Feng, W., Tu, R., Lu, T., & Zhou, Z. (2019). Understanding forced adoption of self-service technology: the impacts of users' psychological reactance, *Behaviour and Information Technology*, *38*, 820–832.

Ghozali, I. (2015). *Partial Least Square, Konsep, Teknik dan Aplikasi Menggunakan Program Smart PLS 3.0. 2nd edition*, Semarang: Badan Penerbit Universitas Diponegoro.

Haque, R., Ho, S. B., Chai, I., & Abdullah, A. (2023). Improved Adam-based Feed forward deep neural network model for personalized asthma predictions, *Journal of System and Management Sciences*, *13*(2), 241–257. https://doi.org/10.33168/JSMS.2023.0217

Hariguna, T. & Ruangkanjanases, A. (2024). Assessing the impact of artificial intelligence on customer performance: A quantitative study using partial least squares methodology, *Data Science and Management 7,* 155–163

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.

Huang, M.-H., & Rust, R. T. (2017). Technology-driven service strategy, *Journal of the Academy of Marketing Science*, *45*(6), 906–924. https://doi.org/DOI: 10.1007/s11747-017-0545-6,

Jiang, X., (2020). Visual design of artificial intelligence based on the image searc algorithm, *J. Appl. Data Sci. 1* (2), 82–89.

Johnson, L., & Lee, S. (2018). Chatbots and virtual assistants: Enhancing customer engagement in the digital age. In K. Davis (Ed.), *Advances in Digital Marketing Technologies, 45*-56

Kaartemo, V., & Nyström, A. G. (2021). Emerging technology as a platform for market shaping and innovation, *Journal of Business Research*, *124*, 458–468. https://doi.org/10.1016/j.jbusres.2020.10.062

Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence, *Business Horizons*, *62*(1), 15–25. https://doi.org/https://doi.org/10.1016/j.bushor.2018.08.004

Kineber, A. F., Othman, I., Oke, A. E., et al., (2023). Value management implementation barriers for sustainable building: a bibliometric analysis and partial least square structural equation modeling, *Construct. Innovat. 23* (1), 38–73.

Leaua, C., & Didu, I. A. (2021). Chatbots. Legal challenges and the EU Legal policy approach, *Perspectives of Law and Public Administration*, 14.

Lim, S. L., Foo, L. K., & Chua, S. L. (2023). Comparing machine learning and deep learning based approaches to detect customer sentiment from product reviews, *Journal of System and Management Sciences*, *13*(2), 101–110. https://doi.org/10.33168/JSMS.2023.0207

Lobschat, L., Mueller, B., Eggers, F., Brandimarte, L., Diefenbach, S., Kroschke, M., & Wirtz, J. (2021). Corporate digital responsibility, *Journal of Business Research*, *122*, 875–888. https://doi.org/https://doi.org/10.1016/j.jbusres.2019.10.006

Madathil, M. (2017). *Music recommendation system spotify-collaborative filtering*, Germany: Aachen University. Available online at http://hpac.cs.umu.se/teaching/sem-mus-17/reports/madathil.pdf.

Mardiana, H. (2023). Lecturers' reasoning in using digital technology: A cognitive approach in learning process, *Athena: Journal of Social, Culture and Society*, *1*(2), 33–42. https://doi.org/10.58905/ATHENA.V1I2.27

Masnita, Y Ali, J. K. Zahra, A. Wilson, N. & Murwonugroho, W. (2024). Artificial intelligence in marketing: literature review and future research agenda, *Journal of System and Management Sciences 14(*1), 120-140. DOI:10.33168/JSMS.2024.0108

Mitchell, M. L., & Jolley, J. M. (2013). *Research design explained* (8th ed.), Belmont, CA: Wadsworth.

Mogaji, E. Soetan, T. O. & Anh, K. T. (2020). The implications of artificial intelligence on the digital marketing of financial services to vulnerable customers, *In Australasian Marketing Journal,* j.ausmj.2020.05. DOI: 10.1016/j.ausmj.2020.05.003.

Morgan, B. (2021). *Retrieved from https://www.forbes.com/:* https://www.forbes.com/sites/blakemorgan/2021/03/29/the-20-most-compelling-examples-of-personalization/?sh=3ab550b071b1

Morsi, S. (2023). Artificial intelligence in electronic commerce: investigating the customers' acceptance of using chatbots, *Journal of System and Management Sciences*, *13*(3), 156–176. https://doi.org/10.33168/JSMS.2023.0311

Muna, A., Ausat, A., Al Bana, T., & Gadzali, S. S. (2023). Basic capital of creative economy: The role of intellectual, social, cultural, and institutional capital, *Apollo: Journal of Tourism and Business*, *1*(2), 42–54. https://doi.org/10.58905/APOLLO.V1I2.21

Najmi, A., Kanapathy, K., & Aziz, A.A., (2021). Understanding consumer participation in managing ICT waste: findings from two-staged structural equation modeling–artificial neural network approach, Environ. *Sci. Pollut. Res. 28,* 14782–14796.

Park, S., & Lee, H. (2020). AI and content Marketing: Strategies for success*, Journal of Content Marketing Strategy, 10*(2), 56-68

Paschen, J., Matthew, W. & Ferreira, J. J. (2020). Collaborative intelligence: How human and artificial intelligence create value along the B2B sales funnel, *In Business Horizons, 63*(3), 403–414. DOI: 10.1016/j.bushor.2020.01.003.

Patel, S. (2022, June 21). *Retrieved from https://www.revechat.com/:* https://www.revechat.com/blog/chatbot-examples/#step1

Pitt, C., Bal, A., & Plangger, K. (2020). New approaches to psychographic consumer segmentation: Exploring fine art collectors using artificial intelligence, automated text analysis and correspondence analysis. *European Journal of Marketing*, *54*, 305–326. https://doi.org/10.1108/EJM-01-2019-0083

Purva, G. & Kumar, K. A. (2017). Big Data Analytics: A review on theoretical contributions and tools used in literature. *In Glob J Flex Syst Manag 18*, (3) 203–229. DOI: 10.1007/s40171-017-0159-3.

Rabetino, R., Kohtamäki, M., Brax, S. A., & Sihvonen, J. (2021). The tribes in the field of servitization: Discovering latent streams across 30 years of research, *Industrial Marketing Management, 95*, 70–84. https://doi.org/https://doi.org/10.1016/j.indmarman.2021.04.005

Rezaei, S., (2015). Segmenting consumer decision-making styles (CDMS) toward marketing practice: a partial least squares (PLS) path modeling approach, *J. Retailing Consum. Serv. 22* (2),1–15.

Rodriguez, M., & Gupta, R. (2018). AI-powered predictive analytics in digital marketing: A review of current trends. *Journal of Predictive Analytics in Marketing, 30*(2), 45-58.

Russell, S., & Norvig, P. (2020). *Artificial intelligence: A modern approach*, Pearson.

Sanchez-Franco, M. J., Cepeda-Carrion, G., & Roldan, J. L., (2019). Understanding relationship quality in hospitality services: a study based on text analytics and partial least squares. *Internet Res. 29* (3), 478–503.

Sasikumar, S. (2022). *How companies are using AI in digital marketing*. Retrieved June 10, 2022, from www.simplilearn.com: https://www.simplilearn.com/how-companies-are-using-artificial-intelligence-ai-in-digital-marketing-article

Shanahan, T. Tran, T. P. & Taylor, E C. (2019). Getting to know you: Social media personalization as a means of enhancing brand loyalty and perceived quality, *In Journal of Retailing and Consumer Services 47,* 57–65. DOI: 10.1016/j.jretconser.2018.10.007.

Shankar, V. (2018). How Artificial intelligence (AI) is reshaping retailing, *In Journal of Retailing, 94* (4), 5–10. DOI: 10.1016/S0022-4359(18)30076-9.

Simester, D., Timoshenko, A., & Zoumpoulis, S. I. (2019). Targeting prospective customers: Robustness of machine-learning methods to typical data challenges, *Management Science*, *66*(6), 2495–2522. https://doi.org/10.1287/mnsc.2019.3308

Thilagavathy, N. & Kumar, E. P. (2021). Artificial intelligence on digital marketing- an overview, *Nat. Volatiles and Essent. Oils, 8*(5), 9895-9908

Wirth, N. (2018). Hello marketing, what can artificial intelligence help you with? *In International Journal of Market Research 60* (5), 435–438. DOI:10.1177/1470785318776841.

Yusupa, A., Manullang, J., Marbun, N., Bill, S., & Ginting, F. (2023). Decision support system for determining the best PAUD teacher using the MOORA Method. *SAGA, Journal of Technology and Information System*, *1*(2), 50–55. https://doi.org/10.58905/SAGA.V1I2.101