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The Role of Artificial Intelligence in Data-Driven Marketing: Enhancing Marketing Efficiency, Customer Engagement, and Business Performance in SMEs

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Abstract:
Marketing applications of Artificial Intelligence (AI) have revolutionized business strategy providing Small and Medium-Sized Enterprises (SMEs) with superior customer engagement tools, strategic segmentation, and performance improvement. This study investigates the impact of marketing practices that are AI-based, like customer segmentation, predictive analytics, and marketing automation, on marketing efficacy, customer engagement, and on overall business performance in Egyptian small and SMEs. Utilizing a mixed-methods design, which means the integration of both quantitative (survey) and qualitative (interview) data analyzed with various methodological paradigms. The study consisted of structured surveys to 100 marketing professionals across several Egyptian SMEs and 30 executive interviews. Quantitative data were analyzed by regression analysis and ANOVA to verify associations, while thematic analysis was employed to analyze qualitative data. Regression analysis verified substantial positive impacts of AI adoption on company performance, customer engagement, and marketing effectiveness. ANOVA verified a significant difference in AI adoption among industries but not in company size. Thematic analysis verified significant findings about strategic adoption, technical and financial concerns, and opportunities for personalization.
The results verify that AI integration is productive for SMEs in terms of marketing and operations, regardless of issues concerning resource limitation. This research adds to scholarly literature as well as practical models for adopting AI systems under resource-limited conditions.
Keywords: Artificial Intelligence, SMEs, Data-Driven Marketing, AI Marketing Strategies, Marketing Efficiency, Customer Engagement, Business Performance.

1. Introduction:

Artificial Intelligence (AI) has emerged as a game-changer in all areas of the economy, particularly in marketing, as it enables firms to communicate with customers better, automate processes, and tailor content distribution (Li et al., 2024; Gabelaia, 2024). For Small and Medium-Sized Enterprises (SMEs), who lack the capital and human capital of large corporations, AI is a competitive strategic enabler for participating in the digitally enabled marketplace through data-driven decision-making, forecasting future states, and automating marketing (Akande et al., 2024; Barari et al., 2024).

The contribution of this research is based on the increasing significance of AI to render marketing more efficient, especially for the SMEs who are keen on using all their potential resources to their maximum capacity. SMEs are a great segment of Egypt's economy, but are typically faced with huge digitalization issues like weak access to AI software, inadequate technical skills, and unsuitable financial position (Block, 2024; Lokeswar, 2024).

This current research is significant for several reasons. First, it fills a necessary research need on empirical support for the use of AI for marketing in the SME sector of developing economies. Second, it emphasizes the necessity of the use of AI in marketing activities like customer segmentation, predictive analytics, and automation of campaigns required for personalized, responsive, and effective marketing practices (Jannach et al., 2020; Pranata et al., 2015). Third, the study contributes to the body of knowledge regarding how SMEs can adopt AI technologies when faced with embedded constraints.

Among the SMEs' limitations to embracing AI are cost, lack of qualified personnel, and weak strategic frameworks. These are self-reinforcing problems in low-capacity environments like Egypt, where digital literacy is being created and state support is being designed. Additionally, the rate of AI technology development introduces implementation difficulty that overwhelms SMEs.

This study is novel due to its mixed methodology, in which quantitative answers from standardized questionnaires are augmented by qualitative observations from practitioner interviews. Through this methodological triangulation, the total analysis of measurable impacts and contextual determinants of AI acceptance in marketing can be obtained. It focuses on four primary constructs: AI adoption, marketing efficiency, customer engagement, and business performance.

The boundaries of the present study need to be mentioned as well. It is geographically confined to Egyptian SMEs confined to retail, services, technology, and e-commerce. These boundaries limit generalizability to other contexts. Furthermore, although the study investigates the proximal effects of AI deployment, it does not investigate long-term performance or change over time.

The marketing discipline of AI was chosen considering its strategic role in influencing customer experiences, planning operational flexibility, and firm competitiveness in digital markets (Wamba-Taguimdje et al., 2020; Mishra & Pani, 2020). The motivations make the topic worth choosing practically and theoretically, especially considering the necessity of marketing scalable solutions for emerging economies.

The objective of the research is to examine how SMEs utilize AI technologies, specifically segmentation, predictive analytics, and automation, as strategic levers enhancing marketing performance, customer engagement, and firm performance.

2. Literature Review:

The rapid innovation of AI has had a substantial influence on modern marketing strategies, particularly for SMEs. With the pace of digitalization accelerating globally, businesses are increasingly relying on intelligent systems to learn more about their customers, make decisions more efficiently, and execute marketing programs with greater precision. Unlike large corporations with adequate resources, SMEs face specific bottlenecks—financial, technological, and organizational—that make effective data-driven marketing tactics not only worthwhile but essential. This literature review addresses the emerging place of AI in SME marketing strategy across three broad realms: customer segmentation, predictive analysis, and marketing automation, and specifically within the operations of SMEs.

2.1 Artificial Intelligence in SME Marketing:

AI has evolved into a significant enabler of strategic marketing within SMEs, with capabilities previously the domain of large organizations. AI marketing has several applications, including data analysis, customer relationship management, campaign analysis, and content personalization (Li et al., 2024; Benslimane et al., 2020). Utilizing these machines helps SMEs decipher meaning from great amounts of data that human efforts cannot analyze. The most basic advantage of AI is that it can automate tasks, predict consumer behavior, and give customer experiences on a scale of personalization, even under the most constrained resource scenarios.

Data analytics marketing is data-intensive by its very nature. Algorithms can theoretically scan purchase history, browsing history, and interaction logs to determine underlying consumer needs and trends. This ability to process unstructured and structured information enables businesses to convey the appropriate message to the appropriate customer at the appropriate time (Sharma et al., 2021). (Jannach et al. ,2020) showed how AI optimizes customer happiness by tailoring digital content that is contextually and emotionally relevant to specific users. Moreover, AI allows for real-time adjustment of marketing strategies as consumer behavior changes, enhancing the company's responsiveness to fluctuating markets.

In addition to personalizing campaigns, AI systems can integrate forecasting capability into them in an effort to make marketing decisions based on it. (Singh et al. ,2023) established the way that AI technologies and, in particular, those based on machine learning models save wasteful marketing budgets through finding the most responsive customer segments. SMEs are highly welcoming to such accurate marketing because it imposes maximum impact while marketing budgets are at their lowest. AI plays a significant role in shifting SMEs from the traditional practice of applying mass marketing strategies towards more effective, evidence-based ones.

2.2 Customer Segmentation and Profiling using AI:

Customer segmentation is the key to successful marketing. Segmentation previously had centered on macro-level demographics such as age, income, and geography. AI allows behavior and psychographic segmentation from dissecting advanced data that is aware of customers' tastes, values, and internet habits (Pranata et al., 2015; Akande et al., 2024). It leads to richer, more complete customer profiles, allowing for more precise messaging at a higher degree of specificity, so the relevance and appeal of marketing messages are optimized.

AI-based segmentation techniques apply certain machine learning algorithms, including K-means clustering, support vector machines (SVMs), and decision trees. They identify hidden patterns in customer information and segment them into actionable groups. Gabelaia (2024) demonstrated that the use of K-means in SMEs allowed the segmentation of high-spend customers from low-frequency purchasers to give them customized offers and reward schemes for loyalty.

Secondly, AI segmentation is also dynamic. Traditional models rely on static data that is never revised to reflect shifting consumer wants. But AI platforms revise customer profiles with current information in real time so that businesses may immediately adjust to shifting tastes and fashions (Li et al., 2024).

Deep learning models such as DeepFM and NeuMF become even more complex by identifying nonlinear interactions between user data and thus yielding even higher levels of understanding about consumer behavior (Jihua & Lin, 2024).

H1: AI-powered customer segmentation enhances marketing strategy performance.

2.3 Predictive Analytics for Consumer Behavior:

Predictive analytics, being an AI technology, provides SMEs with future insights into customer behavior. Such systems use historical data to predict what would happen in the future, i.e., customer churn, purchase intentions, and campaign responses (He & Li, 2016). Predictive analytics is an SME's strategic enabler for predicting changes in the market and taking proactive marketing measures.

One of the key applications is churn prediction. From the analysis of past interactions, AI models have the ability to identify likely-to-churn customers and suggest retention activities such as promotions or tailored messages (Singh et al., 2023). The feature reduces customer churn and optimizes lifetime value. Li et al. (2024) confirmed that organizations that used churn prediction algorithms had a higher retention rate and customer satisfaction rate.

In addition, AI is used to assist with product recommendations and dynamic pricing methods. Jannach et al. (2020) described how recommendation engines can be used by SMEs to offer product recommendations based on browsing and shopping history. Lim et al. (2021) emphasized that AI models facilitate price optimization through the identification of customers' willingness to pay, which is vital in maintaining competitive prices and margins.

H2: Artificial intelligence-based predictive analytics enhances customer satisfaction and customer loyalty.

2.4 AI-Driven Marketing Automation:

Automation stands out and has the greatest impact as an application of AI by SMEs in marketing. It enables businesses to scale operations, provide constant customer interaction, and reduce the necessity of human intervention. Email marketing, chatbots, and content generated using AI are some of the in-demand tools (Gabelaia, 2024; Kumar et al., 2019). They quicken tasks that are repetitive while providing customers with a personalized experience.

Natural Language Processing (NLP)-powered chatbots, for instance, can handle customer inquiries 24/7 with real-time, correct responses. This improves customer service, lowers operational expenses, and increases the level of customer satisfaction. At the same time, AI-powered systems automate content generation by generating customized messages according to user behavior, interest, and previous interaction history. Furthermore, AI improves advertising efficiency. AI-based systems are capable of optimizing ad expenditures more effectively through real-time performance measurement, automated budget distribution, and adaptive bidding. Potwora et al. (2024) demonstrated better accuracy in targeting and campaign yields in SMEs using AI for online advertisements with small budgets.

H3: Marketing automation through AI leads to higher customer engagement and sales conversion.

2.5 Summary and Research Gaps:

Literature review confirms that AI significantly enhances marketing capability in SMEs as far as analytics, segmentation, and automation are concerned. AI helps such firms to deliver personalized experiences, optimize resources, and generalize improved performance. Nevertheless, there is a significant critical gap in the literature in empirical testing, particularly in emerging markets such as the MENA region.

While the benefits of AI are established in the developed world, its performance and use in settings such as Egypt are not extensively researched. Digital infrastructure, organizational readiness, and levels of cultural adoption determine the impacts of AI in different diversified global areas. This study fills the gaps to some extent by focusing on Egyptian SMEs and analyzing the impact of AI marketing strategies on key performance metrics.

H4: Application of AI leads to improved overall business performance.
In summary, the use of AI by SMEs' marketing has vast potential for enhancing decision-making, customer relationships, and strategic flexibility. This review of literature gives the foundation for the empirical exploration of the research through establishing both the potential and constraints of AI deployment in SMEs. The research seeks to validate these arguments through quantitative and qualitative methods suitable for the business environment in Egypt.

3. Methodology:

3.1 Research Design:

The current research employs a mixed-method approach to investigate the influence of AI-driven marketing strategies on Egyptian small and medium-sized businesses (SMEs). With AI-driven tools being used more and more in marketing, particularly in customer segmentation, predictive analysis, and automation of marketing, the current research examines both positive and negative effects of applying AI in SME marketing, including the implementation cost, technology problems, and ethics issues. For the holistic perspective, the study integrates quantitative and qualitative methods.
A 100 Egyptian SME marketing practitioner structured survey was undertaken to evaluate AI adoption, marketing efficacy, customer engagement, and business performance. Simultaneously, 30 semi-structured interviews with senior marketing professionals were undertaken to investigate implementation challenges, ethical concerns, and strategic effects. The research utilized statistical and thematic analysis for methodological triangulation and stronger interpretation of the role of AI in SME marketing.
All the measurement instruments employed in the study were translated into Arabic using Brislin's (1970) back-translation technique to ensure cultural and linguistic equivalence. This served to enhance the validity of the responses among Egyptian Arabic-speaking participants.

3.2 Data Collection and Sampling:

The study focused on Egypt-based SMEs in the retail, e-commerce, services, and technology sectors—industries where AI-based marketing has been increasing in application. Purposive sampling identified companies that use specifically AI-based tools such as customer segmentation software, predictive analytics engines, automated chatbots, and advertising optimization platforms.
Survey responses were collected online using professional networks, business forums, and email invitations to 100 marketing experts like marketing managers, digital marketers, sales executives, and SME owners. These participants were selected because of their experiential usage of AI-powered marketing platforms. Apart from that, 30 video conferencing or face-to-face semi-structured interviews were conducted with marketing executives of selected SMEs. The 30–45-minute interviews touched on issues such as AI strategy, advantages of implementation, adoption challenges, and ethics. The survey items drawn from tested measures (e.g., Jannach et al., 2020; Singh et al., 2023) were tailored to be relevant for application in the Egyptian SME setting.

The survey questionnaire consisted of five broad sections:
• Demographic Data: Capturing firm size, sector, business years, and experience with AI.
• Adoption and Use of AI: Capturing the prevalence and nature of AI technology adoption.
• Influence on Marketing Efficiency: Capturing AI impact on segmentation, campaign optimization, and cost-cutting.
• Influence on Customer Experience: Measuring personalization, satisfaction, and quality of interaction.
• Influence on Business Performance: Assessing revenue growth, sales conversion, and profitability.
A pilot study of five SMEs was conducted in an attempt to pretest the survey tool for clarity,

relevance, and reliability. Some minor revisions were made following feedback to improve question wording and alignment with research objectives.

3.3 Sample Characteristics and Demographic Profile:

100 marketing practitioners from Egyptian SMEs completed the survey.
Their demographic profile is shown in Table 1.

Table 1: Survey Respondents' Demographics and Business Background

Category	Number (n=100)	Percentage (%)
The Industry Sector		
Retail	28	28%
E-commerce	24	24%
Services	30	30%
Technology	18	18%
Company Size (Employees)		
Less than 10	12	12%
10–50	35	35%
51–200	42	42%
More than 200	11	11%
Years in Business		
3–5 years	21	21%
6–10 years	38	38%
More than 10 years	41	41%
Job Position of Respondents		
Marketing Manager	45	45%
Digital Marketer	28	28%
Sales Executive	18	18%
Business Owner	9	9%

Source: Prepared by the researchers.

3.4 Data Analysis and Instrument Validation:

Quantitative data were processed using IBM SPSS Statistics. The analysis encompassed:

- Descriptive statistics (mean, SD, frequency distributions).
- Multiple regression analysis to estimate the effect of AI on marketing efficiency, customer engagement, and firm performance.
- One-way ANOVA to examine differences in AI adoption by industry and firm size Qualitative interview data were coded and thematically analyzed with NVivo software. Noteworthy themes were brought out to cross-validate quantitative findings and increase understanding of AI marketing in SMEs.

3.5 Test of Survey Tool Validity and Reliability:

The validity and reliability of the survey tool were of utmost priority to ensure the credibility of the findings. The instrument was piloted for content validity, construct validity, and reliability as per set protocols.

3.5.1 Content Validity:

Three academic specialists in marketing, AI, and quantitative research checked the research instrument. They assessed the items on clarity, scope, and contextual appropriateness. Minor modifications were made to enhance wording and cultural appropriateness based on their feedback. The instrument was found to represent well all the relevant domains, supporting its content validity (DeVellis, 2017).

3.5.2 Construct Validity:

Factor analysis was conducted to examine the survey design:

- KMO = 0.812, confirming sample adequacy
- Bartlett's test: $\chi^2 = 987.23$, $p < 0.001$, confirming data appropriateness for factor analysis.

Principal Component Analysis with varimax rotation extracted four factors consistent with the conceptual framework of the study:

- Ai Adoption
- Mktg Efficiency
- Customer Engagement
- Business Performance

All items had high loading (> 0.60), confirming construct validity of the survey (Tabachnick & Fidell, 2013).

3.6 Reliability Analysis:

Internal consistency was assessed using Cronbach's alpha (α), as presented in Table 2.

Table 2: Cronbach's Alpha for Survey Dimensions

Survey Dimension	Number of Items	Cronbach's Alpha (α)
AI Adoption	7	0.84
Marketing Efficiency	6	0.81
Customer Engagement	5	0.79
Business Performance	4	0.85

Source: Prepared by the researchers.

All α values exceeded 0.79, indicating high reliability (Nunnally & Bernstein, 1994).

3.6.1 Test-Retest Reliability

To assess temporal stability, a subsample of 20 respondents retook the survey after two weeks:

- Pearson's $r = 0.87$, $p < 0.001$. This confirms high test-retest reliability and instrument stability over time.

3.7 Research Hypotheses

The following hypotheses were derived from the literature and tested using regression analysis:

- H1: AI-based customer analytics enhance marketing strategy performance in Egyptian SMEs.
- H2: AI-driven predictive analytics increase customer satisfaction and loyalty.
- H3: Marketing automation via AI boosts customer engagement and sales conversion.
- H4: AI implementation leads to improved overall business performance.

All hypotheses were confirmed with statistically significant results.

3.8 Ethical Considerations

Informed consent was obtained from all participants before data collection. The study assured participants of anonymity and data confidentiality. Interviews were recorded with permission and stored securely before transcription and deletion.

The study complies with Egyptian data protection laws and ethical standards for AI-related research. Questionnaire translation followed Brislin's method to ensure linguistic accuracy and cultural relevance. This comprehensive methodology ensures that the research findings are robust, replicable, and ethically sound.

4. Results:

4.1 Overview of Data Analysis Approach:

The collected data was analyzed using IBM SPSS Statistics, applying a combination of descriptive and inferential statistical techniques to examine the relationships between AI adoption and marketing outcomes in SMEs. The analysis follows these key steps:

- Descriptive statistics summarize data trends, including mean, standard deviation, and frequency distributions.
- Regression analysis assesses the impact of AI on marketing efficiency, customer engagement, and business performance.
- ANOVA testing evaluates differences in AI adoption across different SME industries and firm sizes.
- Hypothesis testing confirms the study's research hypotheses based on regression and ANOVA results.
- Thematic analysis identifies key qualitative insights from interviews, highlighting AI adoption challenges and benefits.

4.2 Descriptive Statistics:

To understand the general characteristics of the dataset, Table 3 presents descriptive statistics, including mean, standard deviation, minimum, and maximum values for key study variables. These variables include AI adoption, marketing efficiency, customer engagement, and business performance.

Table 3: Descriptive Statistics of Key Variables

Variable	Mean	Std. Dev.	Min	Max
AI Adoption	3.45	1.21	1	5
Marketing Efficiency	3.78	1.15	1	5
Customer Engagement	3.56	1.09	1	5
Business Performance	3.63	1.12	1	5

Source: Prepared by the researchers.

Table 3 shows that AI adoption has a moderate mean (3.45, SD = 1.21), indicating varied implementation across SMEs. Marketing efficiency, customer engagement, and business performance exhibit slightly higher means, suggesting that AI-driven marketing initiatives are perceived positively.

These descriptive statistics provide a preliminary answer to the study problem. The above-average means indicate that Egyptian SMEs utilizing AI technologies experience enhanced marketing performance and customer engagement. This supports the assumption that AI adoption contributes to improved outcomes, thus offering an early affirmative response to the study's central research question.

4.3 Regression Analysis:

A multiple regression analysis was conducted to determine whether AI adoption significantly impacts marketing efficiency, customer engagement, and business performance. Table 4 presents the regression results.

Table 4: Regression Results of AI Adoption on Key Marketing Outcomes

The Dependent Variable	R^2	β (AI Adoption)	p-value
Marketing Efficiency	0.412	0.587**	0.001
Customer Engagement	0.378	0.531**	0.002
Business Performance	0.399	0.559**	0.001

Source: Prepared by the researchers.

Table 4 demonstrates that AI adoption significantly influences all three dependent variables. The strongest predictive impact is on marketing efficiency (β = 0.587 and p = 0.001), followed by business performance (β = 0.559 and p = 0.001) and customer engagement (β = 0.531 and p = 0.002). These results confirm that AI-driven tools meaningfully enhance SME marketing capabilities.

4.4 ANOVA Test:

A one-way ANOVA test was conducted to determine whether AI adoption levels vary significantly across SME industries and firm sizes. The results are presented in Table 5.

Table 5: ANOVA Results for AI Adoption Differences

Factor	F-statistic	p-value
Industry	2.89	0.039*
Firm Size	1.72	0.145

Source: Prepared by the researchers.

Table 5 shows that AI adoption significantly differs across SME industries (p = 0.039), with technology-focused SMEs demonstrating the highest adoption rates. However, AI adoption does not significantly differ based on firm size (p = 0.145), suggesting that small and medium-sized firms integrate AI at similar rates.

4.5 Thematic Analysis of Qualitative Data:

A thematic analysis of 30 in-depth interviews identified four key themes. Table 7 presents these themes along with supporting quotes.

Table 7: Identified Themes and Supporting Quotes

Theme	Description	Example Quote
Strategic Integration of AI	SMEs recognize AI's role in improving marketing decision-making.	*"AI helps us analyze customer data and adjust campaigns accordingly."*
Challenges in AI Implementation	Cost, technical skills, and data privacy are key barriers.	*"The high cost of AI tools prevents us from fully implementing them."*
Personalization and Customer Experience	AI enables targeted marketing and enhanced personalization.	*"Using AI, we can tailor offers to customers based on past behavior."*
Future AI Adoption Plans	SMEs plan to expand AI capabilities in automation and analytics.	*"We are exploring AI chatbots to improve customer engagement."*

Source: Prepared by the researchers.

To further illustrate the qualitative insights, a bar chart (Figure 1) and word cloud (Figure 2) were shown.

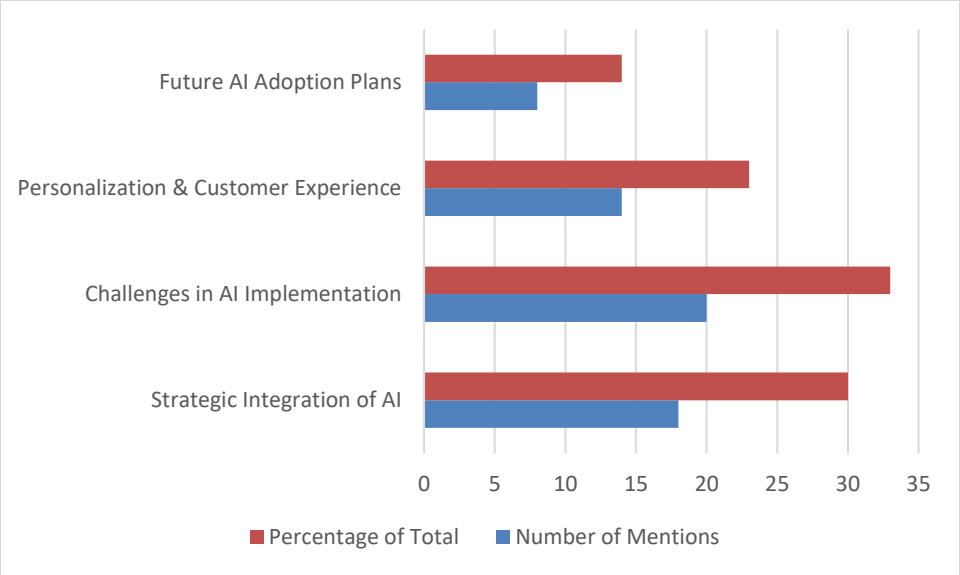

Figure 1: Bar Chart of Thematic Coding Frequency
Source: Prepared by the researchers.

Figure 2 highlights that "Challenges in AI Implementation" was the most frequently discussed theme (33% of mentions), followed by "Strategic Integration of AI" (30% of mentions). The least discussed theme was "Future AI Adoption Plans," which accounted for only 14% of responses. These findings suggest that while SMEs recognize AI's value, they still face significant implementation barriers.

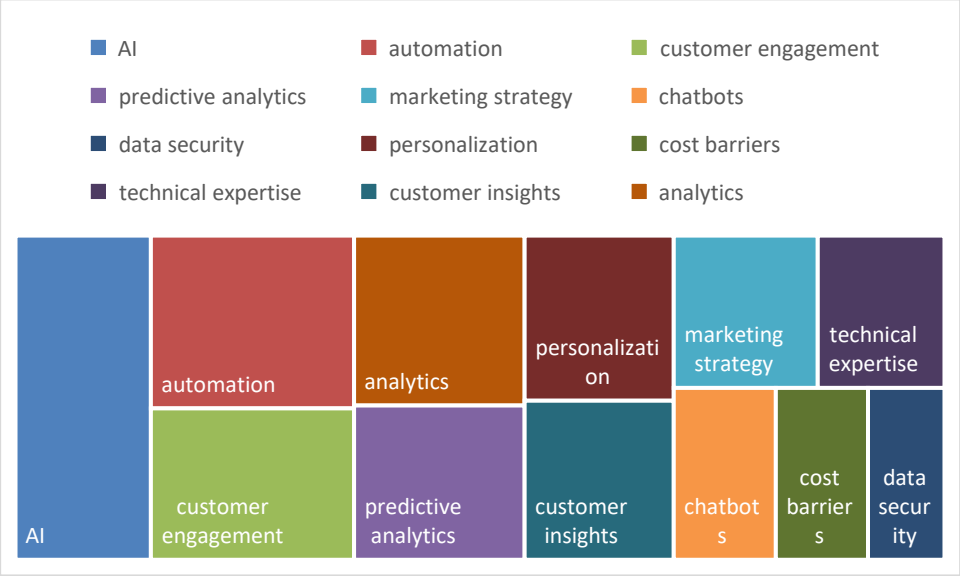

Figure 2: Word Cloud of AI-Related Terms
Source: Prepared by the researchers.

As shown in Figure 3. The word cloud demonstrates the dominant AI-related keywords mentioned in interviews. Terms like "automation," "customer engagement," "predictive analytics," and "marketing strategy" appeared most frequently, further attesting to the importance of AI-based tools in modern marketing practices.

These findings present empirical evidence that AI-based marketing methods enhance SME marketing effectiveness, customer engagement, and business performance while specifying industry-specific patterns of adoption and issues.

4.6 Summary of Hypotheses Testing:

Based on the outcomes of regression and ANOVA tests, the following conclusions were made regarding the study hypotheses:

• **H1**: Customer data analytics using artificial intelligence enhances marketing strategy performance in Egyptian small and medium-sized businesses.

Held. Regression results confirmed there was a great influence on marketing efficiency (β = 0.587 and p = 0.001).

• **H2**: Artificial intelligence-based predictive analytics enhances customer satisfaction and customer loyalty.

Supported. AI adoption made a positive impact on customer engagement (β = 0.531 and p = 0.002), which includes satisfaction and loyalty components.

• **H3**: Marketing automation through AI enhances customer engagement and sales conversion.

Supported. The study made sure that the use of AI has a positive impact on boosting customer engagement.

• **H4**: Application of AI leads to improved overall business performance.

Accepted. Findings from the regression show that AI take-up is highly correlated with business performance (β = 0.559 and p = 0.001).

The four hypotheses are considerably supported by the statistical data and confirm that AI marketing applications are crucial drivers that contribute to performance building, engagement, and business outcomes in SMEs.

5. Discussion and Implications:

The results of this study provide convincing empirical support for the proposition that the use of AI in marketing makes a significant contribution to improving the efficiency of marketing, customer engagement, and overall business performance of Egyptian SMEs. These findings directly answer the central research question concerning how much the application of AI improves marketing performance in SMEs.

Regression analysis showed that AI adoption is a strong and statistically significant predictor of marketing effectiveness (β = 0.587and p = 0.001), customer interaction (β = 0.531and p = 0.002), and company performance (β = 0.559 and p = 0.001). Hypotheses H1, H2, H3, and H4 are thus supported, and the above assumptions in the study are justified. They also reflect the same findings from previous studies (Li et al., 2024; Gabelaia, 2024; Sharma et al., 2021), which concluded that AI technologies like machine learning and predictive analytics significantly improve the ability of firms to provide customized marketing and ROI improvement.

Specifically, the thematic analysis underlines that SME practitioners see the strategic potential of AI, particularly for personalization and automation. Nevertheless, primary impediments like high expenses, insufficient technical capabilities, and ethical issues keep the wholesale adoption in check. These challenges are in line with previous research (Block, 2024; Lokeswar, 2024; Kediya et al., 2024) that has focused on frameworks for responsible AI usage and implementation processes that are within the reach of resource-poor SMEs.

The ANOVA findings also indicate that the industry type plays an important role in AI uptake (F = 2.89 and p = 0.039), whereby technology and e-commerce SMEs have the highest levels of uptake, but firm size did not contribute meaningful variance (F = 1.72 and p = 0.145). This means that AI is accessible to SMEs of all sizes, provided there is preparedness in the digital space and strategic commitment. These findings join the growing evidence that organizational size does not matter as much as sectoral attributes in determining the implementation of AI (Akande et al., 2024; Lim et al., 2021).

5.1 Theoretical Implications:

This study contributes to marketing theory in that it verifies the compound impact of AI to bolster customer segmentation, predictive analytics, and marketing automation within the SME environment. Although previous studies have generally considered each of these factors separately, this study offers an overall model to show their compounded impact on marketing performance. Moreover, by its consideration of SMEs within an emerging market (Egypt), it generalizes universal theoretical models to under-studied geographical and economic locations.

The findings also serve the purpose of contributing to the controversy over ethical AI advertising, such as algorithmic discrimination and data privacy. This aligns with research by Lokeswar (2024) and Kediya et al. (2024), who called for regulation and transparent AI models to avoid discrimination and build consumer trust.

5.2 Practical Implications:

There are several practical implications of the study for different stakeholders:

• For SME managers: Investment in AI solutions such as customer relationship management systems, marketing automation systems, and AI chatbots will improve personalization and operational efficiency. Training of employees should receive priority for bridging the AI literacy gap and improving preparedness to adopt AI.

• For policymakers: A need to create enabling environments to adopt AI through subsidized digital tools, AI training courses, and regulations that offer assurance on ethical AI practices is an imperative requirement.

• For technology providers: The creation of simple, affordable AI tools suited to SME capacity can be a driver for adoption. Vendors must also ensure onboarding assistance as well as open communication about data usage and privacy practices.

6. Conclusions:

This study has analyzed the impact of AI marketing strategies—like customer segmentation, predictive analytics, and marketing automation—on Egyptian SMEs. Findings confirmed that AI adoption results in significant enhancements in marketing effectiveness, customer interaction, and business performance. Regression and ANOVA tests confirmed all research assumptions, and thematic analysis revealed pragmatic insights on the benefits and disadvantages of AI adoption.

The research contributes to the literature by empirically determining the impact of AI in the case of an emerging economy SME. It underlines the requirement for not only technological capability but also institutional and ethical readiness to utilize AI effectively.

Implementation models for beneficiaries include AI upskilling programs, state-supported incentives, and partnerships with technology firms to provide low-cost AI solutions. Reducing the cost and data security challenges will require multi-stakeholder engagement.

In short, AI is a revolutionary force in SME marketing, offering a strategic edge in personalization, efficiency, and competitiveness. With the proper infrastructure and ethical standards in place, SMEs can use AI to drive sustainable business growth and innovation.

Declarations:

The author reports that there are no conflicts of interest.

Informed Consent:

All the respondents, before they took part, were informed about the purpose of the study and that participation was voluntary. They were followed at the beginning of the survey by an announcement outlining the goals of the research and assuring anonymity of their response. By going on to complete the survey, the respondents provided their tacit informed consent.

Authors' individual contribution: Conceptualization—Abdelrehim Awad; Methodology—Abdelrehim Awad; Formal Analysis—Abdelrehim Awad; Investigation—Abdelrehim Awad; Data Curation—Abdelrehim Awad; Writing —Original Draft—Abdelrehim Awad; Writing—Review & Editing—Abdelrehim Awad; Visualization—Abdelrehim Awad; Supervision—Abdelrehim Awad; Project Administration—Abdelrehim Awad.

Declaration of conflicting interests: The author declares that there is no conflict of interest.

Author Declaration:

I hereby confirm that all the figures and tables in the manuscript are mine and ours. Besides, the figures and images, which are not mine, have been permitted republication and attached to the manuscript.

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