Maneggio
E-ISSN : 3032-7652
https://nawalaeducation.com/index.php/MJ/index
Vol.2.No.4 August 2025

The Utilization of Artifical Intelligence in Optimizing Digital Marketing Strategies in Start-Up Companies

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Input : July 23, 2025
Revised : August 15, 2025
Accepted: August 19, 2025
Pubslished : August 28, 2025

ABSTRACT

This study aims to analyze the use of artificial intelligence (AI) in optimizing digital marketing strategies in start-ups. The research uses a qualitative approach with case study methods in several startup business sectors, such as e-commerce and fintech. Data was obtained through in-depth interviews, observations, and documentation analysis. The results show that the application of AI contributes significantly in five main aspects, namely: (1) personalization of services and user experience, (2) budget efficiency and campaign optimization, (3) increased interaction with customers through chatbots, (4) implementation challenges in the form of limited human resources, high initial investment costs, and data privacy issues, and (5) adaptation strategies carried out by companies through collaboration with AI service providers, internal training, as well as gradual technology investment. These findings confirm that AI has become a strategic instrument for start-ups to increase competitiveness, although its application still faces various limitations. This research contributes to the digital marketing literature by emphasizing the importance of a balance between the use of technology and adaptive strategies that are appropriate to the conditions of startups.

Keywords: *Artificial Intelligence, Digital Marketing, Start-Up, Personalization, Efficiency*

INTRODUCTION

The development of digital technology in the last two decades has brought fundamental changes to various aspects of human life, including the way companies manage their businesses and interact with their consumers. One of the most revolutionary developments is the presence of artificial intelligence (AI), which has now been widely applied in various fields, ranging from healthcare, finance, education, to marketing (Ifadhila et al., 2024). In the context of digital marketing, AI has great potential to transform traditional paradigms into more data-driven, responsive, and personalized. AI's ability to process big data, recognize consumer behavior patterns, and predict market trends makes it one of the strategic instruments in designing more effective marketing campaigns (Putra et al., 2025).

Digital marketing itself has become one of the main approaches used by companies in the era of globalization and digital connectivity. Modern consumers no longer only interact with products through conventional media, but also through various digital platforms such as social media, e-commerce, and internet-based applications. This change in behavior requires companies to adapt their communication and promotion

strategies more quickly and relevantly. It is in this context that AI is present as a technology that is able to bridge the need between complex consumer data and the need for companies to develop marketing strategies that are targeted, efficient, and adaptive (Kandori, 2025).

For start-ups, the application of AI in digital marketing has a much higher urgency than large companies. This is because start-ups generally operate with limited resources, both in terms of capital, labor, and managerial experience. Start-ups also face a very stiff level of competition because they have to compete with large companies that are already established and have a large customer base. Under these conditions, conventional marketing strategies are often not effective enough to provide a sustained competitive advantage. The use of AI technology, such as machine learning, chatbots, sentiment analysis, programmatic advertising, and predictive analytics, can help start-ups optimize resource allocation, improve interaction with customers, while expanding market reach at a more cost-efficient rate.

A number of previous studies have confirmed the great potential of AI in digital marketing. For example, Wedel & Kannan (2016) assert that AI and machine learning allow companies to personalize marketing strategies based on consumer behavior in real-time, thereby increasing the effectiveness of marketing communications. Chatterjee et al. (2020) found that the utilization of AI-based chatbots can improve the quality of customer service and create better interactive experiences. Another study by Davenport et al. (2020) shows that the integration of AI in customer relationship management (CRM) helps companies understand consumer preferences and design more relevant campaigns.

In Indonesia, several studies have also begun to explore the application of AI in the context of digital marketing. Nugroho & Arifianto (2021) found that the use of AI in e-commerce platforms helps improve consumer satisfaction through a more accurate product recommendation system. Meanwhile, Pratama (2022) shows that financial technology-based (fintech)-based startups that apply AI in digital campaigns have experienced a significant increase in customer engagement compared to companies that still rely on manual strategies.

Although research on artificial intelligence and digital marketing has been extensive, most studies still focus on large companies or multinational corporations that have more mature technology infrastructure. Studies that specifically discuss the application of AI in the context of startups are still relatively limited, both in terms of number and depth of analysis. In addition, most of the literature still focuses on the technical aspects of AI technology, such as algorithm efficiency or prediction accuracy, while strategic dimensions, such as how AI can be integrated into start-up business models, how its application affects consumer behavior, and how it contributes to the sustainability of companies, has not been explored much.

This research gap shows the need for further exploration of the use of AI in the context of digital marketing in startups. By understanding how start-ups can optimize these technologies, research can contribute not only to the development of academic literature, but also to more applicable business practices. In addition, this study is expected to enrich perspectives on the role of AI in supporting innovation, efficiency, and competitiveness of start-ups, especially in a highly dynamic and digitally oriented market.

Based on this background, this study aims to analyze the use of artificial intelligence in optimizing digital marketing strategies in startups. The main focus of this research is not only on the extent to which AI can improve marketing effectiveness, but also on how this technology plays a role in supporting long-term growth strategies, strengthening relationships with consumers, and creating sustainable added value. With

this approach, the research is expected to make a theoretical contribution to the development of technology-based marketing studies, while offering practical recommendations for startups in designing innovative, adaptive, and competitive digital marketing strategies.

METHOD

This study uses a qualitative approach with a case study design. This approach was chosen because the research aims to gain a deep understanding of how start-ups utilize artificial intelligence in optimizing digital marketing strategies. Case studies are seen as relevant because they allow researchers to explore experiences, strategies, and dynamics that occur in real life in specific contexts, so as to be able to provide a comprehensive picture of the phenomenon being studied.

The research location is focused on several startups in Indonesia engaged in technology-based sectors such as e-commerce, fintech, edutech, and healthtech. Research informants are determined by purposive sampling techniques, which are selected based on certain criteria, including that the company has been operating for at least two years, has applied a form of artificial intelligence technology in marketing activities (for example, chatbots, recommendation systems, predictive analytics, or programmatic advertising), and informants have at least one year of work experience in the field of digital marketing at the company. The number of informants is not determined exactly, but follows the principle of data saturation, which is that the interview process is stopped when no more new information appears.

Data collection was carried out through in-depth interviews, non-participant observations, and documentation. In-depth interviews were conducted face-to-face and online to explore the company's experience and strategy in utilizing artificial intelligence. Observations were made to see firsthand digital marketing activities, such as the use of chatbots and interactions on social media, while documentation was obtained from relevant company reports, articles, publications, or digital content.

The data obtained were analyzed using thematic analysis methods. The analysis stage includes transcription of interviews, thorough re-reading of data, coding of relevant data, grouping codes into main themes, and preparation of interpretations based on emerging themes. Expected themes include service personalization, cost efficiency, increased customer engagement, technical challenges, and long-term development strategies.

To ensure the validity of the data, this study uses source triangulation techniques and methods by comparing data obtained from interviews, observations, and documentation. In addition, member checking is also carried out by confirming the findings to informants to ensure that the researchers' interpretation is in accordance with their real experience. With this approach, the research is expected to provide a richer empirical and theoretical contribution related to the use of artificial intelligence in digital marketing strategies in startups in Indonesia.

RESULTS AND DISCUSSIONS

RESULTS

Based on the results of data collection and analysis from in-depth interviews with 12 informants consisting of digital marketing managers, data analysts, and operational staff at five technology-based startups (e-commerce, fintech, edutech, and healthtech), as well as supporting data in the form of observation and documentation, five main themes were found related to the use of artificial intelligence in digital marketing strategies.

1. Personalize Services and User Experience

One of the most prominent findings of the study is the use of an AI-based recommendation system that serves to improve service personalization and user experience. Informants from e-commerce companies said that more than 60% of consumer transactions come from product recommendations that appear automatically based on shopping history, previous searches, and preferences recorded in the system. These findings are reinforced by observational results where consumers show a higher tendency to respond to products or offers that suit their interests and needs (Zikry et al., 2024).

AI-based personalization not only provides the practical benefit of increasing sales, but also creates a more relevant and individualized user experience. Consumers feel more "understood" by the system when the products offered are in line with their lifestyle, habits, and personal preferences. Thus, personalization functions not just an additional feature, but a core strategy that is able to increase customer satisfaction, extend the loyalty cycle, and strengthen the emotional bond between consumers and brands (Sepriano & Gunarso, 2025).

Furthermore, AI-powered personalization practices also help startups build a more systematic customer journey, from the acquisition stage to customer retention. Through machine learning algorithms, companies are able to analyze data at scale to predict consumer behavior more accurately. This provides an opportunity for startups to not only target the market more precisely, but also anticipate future customer needs. In this way, AI-based personalization is a key factor in creating a competitive advantage in the midst of increasingly fierce digital market competition (Sulianta, 2025).

2. Budget Efficiency and Campaign Optimization

AI has been proven to make a significant contribution in helping startups allocate marketing budgets more effectively and measurably. Informants from the fintech sector stated that before the implementation of the programmatic advertising system, promotional costs often swelled due to the unclear target market and the use of advertising strategies that were still conventional. Traditional approaches that rely on general demographic segmentation make promotional messages not always on target, resulting in a waste of budget (Wibowo, 2021).

However, after the application of AI technology, startups are able to design more targeted and data-driven marketing campaigns. Programmatic advertising systems allow advertisers to conduct real-time bidding and automatically select ad distribution channels based on consumer behavior and characteristics. Informants said that this change had a real impact on cost efficiency, with a reduction in advertising spend by 25–30%. This finding is also supported by documentation data from one of the startups in the e-commerce sector which shows a 20% decrease in cost per acquisition (CPA) after six months of using AI systems in campaign management (Pattiasina et al., 2025).

In addition to the cost-saving aspect, AI has also been proven to improve the quality of marketing strategies through predictive analysis capabilities. AI algorithms are able to map the most relevant market potentials, predict consumer trends, and measure campaign effectiveness faster than manual methods. This provides flexibility for startups to dynamically adjust their strategies according to market conditions. Thus, budget efficiency is not only achieved through cost savings alone, but also through increased effectiveness of results-oriented campaigns (wijaya et al., 2025).

Furthermore, these findings indicate that AI technology plays a strategic role as a strategic instrument in supporting the sustainability of startups that often face limited financial resources. Optimizing marketing budgets with the help of AI provides space for start-ups to allocate resources to other equally important aspects, such as product development, improved customer service quality, and technological innovation. Thus, the use of AI is not only a technical tool, but also an integral part of startups' growth and competitiveness strategies in the digital era.

3. Increased Interaction with Customers

The results show that most startups have adopted *Natural Language Processing* (NLP)-based *chatbots* as part of their customer interaction strategies. This technology is considered to be able to provide fast, efficient, and consistent responses to common questions, while allowing services to last for 24 hours without interruption. With *chatbots*, startups can increase consumer satisfaction through more responsive services and reduce operational costs because they do not require a lot of additional labor. In addition, *chatbots* also play a role in collecting customer conversation data which is then analyzed to identify patterns of consumer needs and preferences, so that it can support strategic decision-making in digital marketing (Asmala & Barokah, 2025).

However, an in-depth interview with the informant revealed that *chatbot technology* has not been able to completely replace the role of humans. Limitations arise especially when customers are raising complaints that are emotional or require complex technical explanations. In these cases, the presence of human interaction is still considered essential because it is able to provide empathy and more contextual solutions. Therefore, the majority of startups are still implementing a hybrid service model, which is a combination of *chatbots* and human customer service. This approach is considered the most effective to maintain a balance between technological efficiency and the quality of personalized interactions, thereby increasing customer trust and loyalty in the long run (Latifah, 2023).

4. Challenges of AI Implementation in Start-Ups

Although the application of AI has proven to bring many benefits, the results of the study show that startups still face a number of obstacles in their implementation. The informant emphasized that the limitation of human resources who have special expertise in the field of artificial intelligence is one of the main obstacles. Many start-ups do not have expert data scientists or engineers who are able to manage AI algorithms optimally. In addition, the initial investment cost of adopting an AI system, whether in the form of hardware, software, or supporting infrastructure, is considered quite high for newly established startups and is still financially limited. Another obstacle is the issue of data security and privacy. Consumers, especially in the fintech sector, show great concern about the potential misuse of personal data, given that startups often manage sensitive information. These challenges make the AI adoption process not always smooth and require a well-thought-out mitigation strategy (Purwaamijaya et al., 2024).

5. Adaptation and Innovation Strategy

To deal with these various limitations, most startups choose to implement pragmatic adaptation and innovation strategies. One approach is to collaborate with third-party AI service providers, so that companies can take advantage of advanced technology without having to bear the entire initial investment cost. In addition, some start-ups also focus on

internal capacity building by organizing training for staff to have a basic understanding of the use of AI in business operations. A gradual approach to technology investment is also an option, for example by starting with the implementation of simple chatbots or programmatic advertising, then slowly developing the use of more complex AI. This adaptive strategy allows startups to maintain a rhythm of innovation amid financial and technical constraints, while building a stronger foundation for the future use of AI (Judijanto et al., 2024).

DISCUSSIONS

The findings of this study provide a comprehensive overview of how artificial intelligence plays a role in the digital marketing strategy of startups in Indonesia.

Personalization as a Competitive Strategy

The findings of this study reveal that AI-based personalization strategies significantly enhance customer engagement and overall satisfaction, making them an essential element in the digital marketing practices of start-ups. By leveraging machine learning algorithms and big data analytics, companies are able to predict consumer preferences with high accuracy and deliver customized recommendations in real time. This aligns with the argument of Wedel and Kannan (2016), who highlight that personalization through big data insights is no longer optional but a necessity in an increasingly competitive market environment. Such tailored approaches not only improve the relevance of promotional messages but also increase the likelihood of conversion, thereby strengthening brand loyalty. For start-ups with limited resources, this ability to personalize services creates a strategic advantage, allowing them to compete with larger and more established players in the market.

In the Indonesian context, personalization is even more crucial given the diverse consumer behaviors and rapidly growing e-commerce ecosystem. Nugroho and Arifianto (2021) found that Indonesian consumers are more inclined to purchase when product recommendations align with their individual needs, reinforcing the cultural importance of relevance and trust in purchasing decisions. The informants in this study also reported that a significant portion of their sales, in some cases exceeding 60%, were generated through AI-driven recommendation systems. This indicates that personalization is not merely an additional feature but rather a core competitive strategy that directly influences revenue growth and customer retention. Therefore, for Indonesian start-ups, personalization supported by AI is both a technological innovation and a business imperative that ensures sustainability in the evolving digital economy.

Budget Efficiency through AI

AI has increasingly demonstrated its value in enabling budget efficiency, particularly in the field of digital marketing where resource allocation plays a pivotal role in determining campaign success. Through advanced data analytics and predictive modeling, AI allows start-ups to identify the most profitable customer segments, predict consumer behavior, and optimize advertising spend. These capabilities minimize wasteful expenditure by ensuring that promotional activities are more targeted and relevant to the intended audience. Davenport et al. (2020) emphasized that companies utilizing predictive analytics are capable of reducing marketing costs by up to 20%, underscoring the strategic significance of AI as more than just a technological enhancement, but as a managerial tool for decision-making. For start-ups that typically

face tight budgetary constraints, this efficiency becomes a critical factor in ensuring both competitiveness and sustainability in highly dynamic markets.

In the Indonesian start-up context, the role of AI in budget efficiency is particularly relevant given the financial limitations and uncertainties that characterize early-stage ventures. Informants in this study noted a substantial decrease in cost per acquisition (CPA) after the adoption of AI-based tools, indicating that marketing investments became more measurable and performance-oriented. This highlights the dual function of AI, not only as an enabler of technological innovation but also as a mechanism for resource optimization and strategic financial management. Consequently, AI adoption supports start-ups in reallocating savings from reduced marketing costs into other strategic initiatives, such as product development or customer relationship management. Thus, the integration of AI-driven budget efficiency contributes directly to business resilience and growth in competitive digital ecosystems.

The increasing adoption of chatbots in start-ups represents a paradigm shift in customer service management, where efficiency and accessibility are prioritized. Chatbots powered by Natural Language Processing (NLP) allow companies to provide real-time responses, ensure 24/7 service availability, and reduce operational costs. This technological adoption reflects the growing importance of automation in enhancing customer experience, particularly for repetitive and transactional queries. However, as highlighted by Chatterjee et al. (2020), while chatbots significantly improve service speed and consistency, they cannot fully replicate the depth of empathy and contextual understanding that human agents provide. This limitation becomes more visible in emotionally charged interactions or cases requiring complex technical explanations, where human presence remains irreplaceable.

In the Indonesian start-up context, these findings imply that a hybrid model integrating both chatbots and human customer service agents is the most viable strategy. This model balances efficiency with personalization, ensuring that customers receive immediate responses to simple inquiries while still having access to empathetic and tailored assistance when necessary. Such a dual approach not only fosters operational effectiveness but also strengthens customer trust and loyalty critical factors for start-ups seeking long-term sustainability in a competitive digital market. By positioning chatbots as complementary tools rather than replacements, start-ups can optimize both technological innovation and human-centered interaction, creating a more resilient customer relationship management strategy.

Implementation Challenges: HR, Cost, and Data Privacy

The findings of this study reveal that despite the promising potential of Artificial Intelligence, startups encounter substantial barriers in the implementation process. One of the most critical issues is the scarcity of human resources with expertise in AI and data science. Many startups lack specialized personnel who can design, operate, and evaluate AI-based systems, making them heavily reliant on external vendors or consultants. In addition, the initial investment cost of adopting AI technologies including infrastructure, software licenses, and system integration is perceived as a heavy financial burden, especially for startups that operate with limited funding. These financial and technical limitations often force startups to prioritize short-term survival rather than long-term technological innovation.

Beyond technical and financial concerns, data privacy emerges as a particularly pressing issue in the context of AI adoption. This research aligns with Pratama (2022), who found that fintech companies in Indonesia face significant consumer resistance

stemming from fears of personal data misuse. Such findings underscore that consumer trust functions as a central determinant in the success of AI integration. Without robust data governance policies, transparent communication, and strict compliance with privacy regulations, startups risk damaging their reputations and losing customer confidence. Therefore, addressing the challenges of human resource development, financial constraints, and data security is not only a technical necessity but also a strategic imperative for ensuring the long-term sustainability of AI-driven innovations in startups.

Adaptation and Innovation Strategies as a Way Out

Start-ups that manage to overcome the challenges of AI implementation generally adopt adaptation and innovation strategies that combine internal strengthening and external collaboration. One commonly applied approach is building partnerships with third-party AI solution providers to reduce the burden of initial investment and accelerate technology adoption. At the same time, many companies also invest in internal capacity building through structured training and workshops aimed at improving employee literacy in digital technology and data analytics. This dual strategy ensures that technological adoption is not merely superficial, but is embedded within the organization's daily practices and long-term vision. By gradually allocating resources and experimenting with pilot projects, start-ups can minimize risks while continuously improving their business processes.

This adaptive approach is in line with Teece's (2007) Dynamic Capabilities Theory, which emphasizes the importance of an organization's ability to sense opportunities and threats, seize them effectively, and reconfigure its resources in response to rapid environmental changes. The findings from this research highlight that the success of AI implementation does not solely depend on the sophistication of the technology itself, but rather on how well the organization can manage change, learn from experimentation, and institutionalize innovation. Therefore, sustainable competitive advantage for start-ups lies not only in acquiring advanced digital tools, but also in cultivating organizational resilience and agility that allow continuous innovation in the face of dynamic market demands.

CONSLUSION

Based on the results of the research, it can be concluded that artificial intelligence has a significant positive impact on the development of digital marketing strategies in startups. Through the recommendation system, AI is able to improve the personalization of the user experience, which has an impact on customer loyalty and satisfaction. In addition, this technology helps the efficiency of marketing budgets through more targeted campaigns and reduced cost per acquisition. The presence of chatbots has also been proven to increase customer interaction although it still has limitations in handling emotional and technical issues. On the other hand, AI implementation is inseparable from challenges, especially related to limited human resources, high initial investment costs, and data privacy issues. Therefore, adaptation strategies through collaboration, internal training, and a phased investment approach are key to keeping start-ups innovative and sustainable.

SUGGESTIONS

This study recommends several things. First, startups need to strengthen the capacity of human resources through intensive training on the use of AI, so that they are not completely dependent on third parties. Second, it is important for start-ups to adopt a phased implementation model in order to adapt to financial constraints while minimizing the risk of failure. Third, companies need to build a transparent and reliable data protection system to maintain security and increase consumer trust. In addition, further research is recommended to use a quantitative approach in order to measure in more detail the impact of AI application on digital marketing performance indicators, such as increasing sales conversions, customer retention, and return on investment (ROI).

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