



## AI-Based Digital Marketing Strategy to Increase Consumer Loyalty in the Industry 5.0 Era

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**Abstract:** The development of technology in the industrial era 5.0 has encouraged companies to adopt digital marketing strategies based on artificial intelligence (AI) in building consumer loyalty. This study aims to analyze the effect of AI-based digital marketing strategies on consumer loyalty with consumer trust in personal data management as a moderator variable. The research method used is a quantitative approach with a purposive sampling technique on 310 active users of e-commerce platforms in Indonesia. Data analysis was carried out using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the help of SmartPLS 4.0. The results of the study indicate that AI-based digital marketing strategies have a positive and significant effect on consumer loyalty. In addition, consumer trust in personal data management has been shown to strengthen the relationship between AI-based strategies and consumer loyalty. This study emphasizes the importance of implementing ethical and consumer-focused technology in building long-term loyalty. The practical implication of this study is the need for companies to not only develop marketing technology innovations, but also build consumer trust through transparency and personal data protection.

**Keywords:** Digital Marketing, Artificial Intelligence (AI), Consumer Loyalty, Consumer Trust, Industry 5.0

### INTRODUCTION

Digital marketing strategies have undergone significant evolution along with the development of technology, especially artificial intelligence (AI). Entering the era of industry 5.0, the involvement of technology in the business world is not only aimed at efficiency, but also to improve the human experience personally and emotionally (European Economic and Social Committee, 2021). Industry 5.0 emphasizes collaboration between humans and machines, with a focus on customization, personalization, and sustainability, thus driving a paradigm shift in the company's marketing strategy. Amidst increasingly fierce business competition, consumer loyalty is a crucial factor in maintaining business continuity. According to a report from Bain & Company (2023), increasing customer retention rates by 5% can increase company profits by 25% to 95%.

In this context, artificial intelligence offers a great opportunity to increase consumer loyalty through more personalized and predictive marketing strategies. AI technologies such as chatbots, machine learning, natural language processing (NLP), and big data analytics enable companies to understand consumer needs and preferences more accurately (Chatterjee et al., 2023). For example, AI-based predictive analytics can be used to map consumer purchasing behavior, so that companies can offer products or services that suit individual needs in real-time. The implementation of this strategy not only improves the consumer experience but also strengthens emotional attachment to the brand.

Data from McKinsey & Company (2023) shows that companies that use AI in their marketing activities are able to increase customer engagement levels by 20% compared to companies that have not adopted this technology. In Indonesia, the adoption of AI in digital marketing is also showing an increasing trend. According to the e-Conomy SEA 2024 report by Google, Temasek, and Bain, the use of AI to personalize customer experiences in Indonesia's e-commerce sector has increased by 35% in the past two years. This shows that companies in Indonesia are starting to realize the importance of utilizing AI-based technology to maintain customer loyalty amidst increasingly competitive market competition.

However, even though the potential of AI in marketing is quite large, the challenges faced are not few. One of the main challenges is related to consumer trust in the use of their personal data. A survey conducted by PwC Indonesia (2023) found that 64% of Indonesian consumers are concerned about how companies manage their data when using AI technology in marketing. Therefore, in designing an AI-based digital marketing strategy, companies need to pay attention to aspects of transparency, data security, and the ethics of using AI in order to build and maintain consumer trust.

Based on this background, this study aims to analyze AI-based digital marketing strategies that are effective in increasing consumer loyalty in the industrial era 5.0. This study is expected to provide theoretical contributions in the development of digital marketing science as well as practical contributions for companies in designing marketing strategies that are more adaptive to changes in technology and consumer behavior.

## **Framework**

The framework of thought in this study is built on the relationship between the development of artificial intelligence-based technology, the implementation of digital marketing strategies, and increasing consumer loyalty in the industrial era 5.0. The industrial era 5.0, which emphasizes collaboration between humans and technology to create more personalized and sustainable solutions, provides new opportunities in developing a more adaptive and data-driven marketing approach (European Commission, 2021). In the context of marketing, the use of AI-based technology allows companies to gain a deeper understanding of consumer behavior and preferences in real time, and personalize customer experiences more effectively.

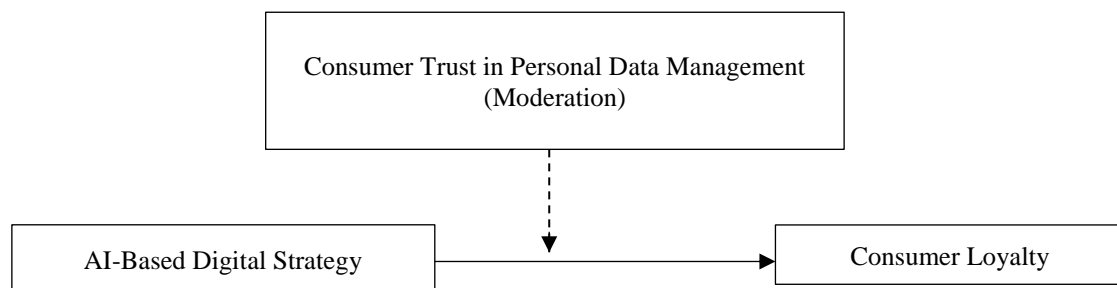
According to a report from the McKinsey Global Institute (2023), the adoption of AI in marketing has improved companies' ability to identify customer needs, predict future behavior, and provide more accurate product recommendations. Technologies such as machine learning, chatbots, predictive analytics, and recommendation engines have been shown to accelerate companies' response to consumer needs, improve the quality of interactions, and create more relevant and personalized experiences. For example, e-commerce companies in Indonesia that have adopted AI technology have reportedly experienced a 30% increase in customer engagement in the past two years (Google, Temasek, & Bain, 2024).

Consumer loyalty is one of the important outcomes of the success of an AI-based marketing strategy. This loyalty is formed when consumers feel that their interactions with a company have personal value, are relevant, and are emotionally and functionally satisfying

(Dick & Basu, 1994). In a study by Chatterjee et al. (2023), it was found that AI-based personalization contributes significantly to increasing emotional loyalty, namely the emotional attachment of consumers to a brand that makes them more likely to make repeat purchases and recommend products to others. In addition, the use of AI in providing 24/7 customer service via chatbots has also been shown to increase customer satisfaction and retention (PwC Indonesia, 2023).

However, in implementing AI-based digital marketing strategies, there are challenges that must be overcome, especially related to the protection of consumer personal data. Anxiety about data privacy is an inhibiting factor in building trust, which in turn can affect consumer loyalty (Statista, 2024). Therefore, companies need to ensure that the use of AI technology in marketing is carried out ethically, transparently, and complies with data protection regulations such as the Personal Data Protection Law (UU PDP) which will come into effect in Indonesia in 2024.

Based on the description, the research framework states that the use of AI-based digital marketing strategies, including personalization, predictive analytics, chatbot services, and relevant product recommendations, has a positive effect on consumer loyalty in the industrial era 5.0, with moderation of consumer trust in personal data management. The relationship between these variables is expected to be tested empirically through a quantitative approach to obtain stronger evidence of the effectiveness of AI implementation in digital marketing.



**Figure 1. Framework**

This model shows:

1. AI-Based Digital Marketing Strategy has a direct impact on Consumer Loyalty.
2. Consumer Trust in Personal Data Management acts as a moderating variable.

## METHOD

This research method uses a quantitative approach with an explanatory research type. This approach was chosen because the study aims to test the causal relationship between artificial intelligence (AI)-based digital marketing strategies on consumer loyalty, with consumer trust in personal data management as a moderator variable. The quantitative approach allows for systematic analysis of relationships between variables based on numerical data and statistical tests (Creswell & Creswell, 2018).

The location of this research is in Indonesia, focusing on active consumers of e-commerce platforms that have adopted AI technology in their services, such as Tokopedia, Shopee, and Lazada. The selection of this e-commerce is based on the e-Conomy SEA 2024 report which shows that the three platforms are the largest online service providers in Indonesia and have implemented AI-based technology in their marketing strategies (Google, Temasek, & Bain, 2024).

The population in this study were all active users of AI-based e-commerce platforms in Indonesia. The sampling technique used the purposive sampling method, namely selecting

respondents with specific criteria, namely consumers aged 18–45 years who actively shopped online at least once in the last three months and have interacted with AI-based features such as chatbots, product recommendations, or content personalization. According to Hair et al. (2020), for structural model analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM), the minimum sample size is 10 times the number of indicators in the model. Considering the number of indicators as many as 30, a minimum of 300 respondents are needed to obtain valid and reliable results.

Primary data were collected through online questionnaires using Google Forms. The questionnaire instrument consisted of three main parts: demographic questions, measurement of AI-based digital marketing strategies, consumer trust in personal data management, and consumer loyalty. Each item was measured using a five-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was designed by adapting indicators from previous studies such as Lemon and Verhoef (2016) for consumer loyalty, Chatterjee et al. (2023) for the use of AI in marketing, and Malhotra et al. (2004) for consumer trust in data privacy.

Before full-scale distribution, a content validity test was conducted through expert judgment from three academics in the field of digital marketing and information technology. In addition, a limited trial (pilot test) was conducted on 30 respondents to test the reliability of the instrument using Cronbach's Alpha. A Cronbach's Alpha value above 0.7 is considered to meet the reliability requirements (Hair et al., 2020).

The data analysis technique in this study used the PLS-SEM method with the help of SmartPLS 4.0 software. This analysis was chosen because it is suitable for predictive and exploratory research models, and can handle models with many latent constructs and indicators. The analysis was carried out in two stages, namely testing the measurement model (outer model) to test the validity and reliability of the construct, and testing the structural model (inner model) to test the relationship between research variables. The evaluation model uses the Average Variance Extracted (AVE), Composite Reliability (CR), path coefficients, and R-square values (Hair et al., 2020).

To maintain data integrity, all respondents were informed about the purpose of the study and were guaranteed the confidentiality of their personal data in accordance with the ethical principles of social research (Bryman, 2016). Data were collected and managed in accordance with the provisions of the Indonesian Personal Data Protection Act (UU PDP) which will be effective from 2024.

## RESULTS AND DISCUSSION

### Descriptive Statistics

Descriptive statistical data and reliability tests for each variable are shown in Table 1 below:

**Table 1. Descriptive Statistics of Research Variables**

Variables	Mean	Standard Deviation
AI-Based Digital Marketing Strategy	4.15	0.65
Consumer Trust in Personal Data	3.87	0.72
Consumer Loyalty	4.20	0.68

Table 1 shows that all research variables have a mean value greater than 3.5. This indicates that in general respondents gave a positive assessment of the use of AI-based digital marketing strategies, their trust in the management of personal data by e-commerce platforms, and their level of loyalty. The standard deviation ranging from 0.65 to 0.72 indicates that the variation in respondents' answers is still within normal limits, there is no extreme distribution of each question item.

## Construct Reliability Test

**Table 2. Construct Reliability Test Results**

Variables	Cronbach's Alpha	Composite Reliability
AI-Based Digital Marketing Strategy	0.912	0.935
Consumer Trust in Personal Data	0.894	0.921
Consumer Loyalty	0.928	0.943

The reliability of the constructs in this study was tested with two main indicators, namely Cronbach's Alpha and Composite Reliability. Cronbach's Alpha measures the internal consistency of the indicators in a construct. The Cronbach's Alpha value for the three constructs is above 0.8, indicating that each construct has a high level of internal consistency (Hair et al., 2020). Composite Reliability is used to evaluate the reliability of the construct as a whole, with a minimum limit of 0.7. In this study, all constructs have a Composite Reliability value above 0.9, which means that the construct is very reliable and is able to provide consistent results when re-measured. Thus, it can be concluded that the measurement instrument in this study has met the reliability requirements.

## Construct Validity Test

### Convergent Validity

**Table 3. Average Variance Extracted (AVE)**

Variables	AVE
AI-Based Digital Marketing Strategy	0.682
Consumer Trust in Personal Data	0.674
Consumer Loyalty	0.699

Convergent validity measures the extent to which indicators in a construct are highly correlated with each other. The Average Variance Extracted (AVE) value indicates the proportion of indicator variance that can be explained by the latent construct compared to variance due to error. According to Hair et al. (2020), the recommended AVE value is at least 0.5, which means that the construct is able to explain at least 50% of the variance of its indicators. In this study, all variables had AVE values above 0.67, indicating very good convergent validity. This indicates that the indicators used to measure AI-based digital marketing strategies, trust in data management, and consumer loyalty truly reflect the constructs being measured.

## Discriminant Validity (Fornell-Larcker Criterion)

**Table 4. Fornell-Larcker Criterion**

Variables	AI-Based Digital Marketing Strategy	Consumer Trust in Personal Data	Consumer Loyalty
AI-Based Digital Marketing Strategy	0.826	0.612	0.645
Consumer Trust in Personal Data	0.612	0.821	0.630
Consumer Loyalty	0.645	0.630	0.836

Discriminant validity measures the extent to which constructs in a model are truly different from each other. The Fornell-Larcker Criterion assesses discriminant validity by comparing the square root of the AVE of each construct with the correlation between constructs. In Table 4, it can be seen that the diagonal value (square root of AVE) for each construct is higher than the correlation value between other constructs. For example, the square



root value of AVE for AI-based digital marketing strategies is 0.826, which is greater than its correlation with trust in personal data (0.612) and consumer loyalty (0.645). Likewise for other constructs. This shows that each construct in this study has adequate discriminant validity, according to the Fornell and Larcker (1981) criteria. In other words, each construct is able to distinguish itself from other constructs in the model, so that the results of the structural analysis can be trusted.

### Structural Model Test Results (Path Coefficient)

Testing the relationship between variables was carried out using the bootstrapping method in SmartPLS 4.0. The results of the path coefficient test are presented in Table 2 below:

**Table 5. Path Coefficient Test Results**

Connection	Path Coefficient	p-value	Information
Digital Marketing Strategy → Consumer Loyalty	0.492	0.000	Significant
Digital Marketing Strategy * Consumer Trust → Consumer Loyalty	0.263	0.002	Significant

Table 5 shows that AI-based digital marketing strategies have a positive and significant effect on consumer loyalty with a path coefficient of 0.492 and a p-value of 0.000 ( $p < 0.05$ ). This means that the application of AI in digital marketing can significantly increase customer loyalty. In addition, consumer trust in personal data management acts as a moderator that strengthens the relationship, with a path coefficient of 0.263 and a p-value of 0.002. These results are consistent with the findings of Chatterjee et al. (2023) and strengthen the theory that trust plays an important role in the success of technology-based marketing strategies.

### Discussion

The results of the study show that artificial intelligence (AI)-based digital marketing strategies have a positive and significant effect on consumer loyalty on e-commerce platforms in Indonesia. This is indicated by the path coefficient value of 0.492 and p-value of 0.000, which indicates a strong direct relationship between the application of AI technology in marketing and increased customer loyalty. This finding strengthens the results of previous research conducted by Chatterjee et al. (2023), which shows that AI-based personalization in digital marketing can increase consumers' emotional attachment to brands, which ultimately leads to loyalty.

In the era of industry 5.0, where human interaction and technology are becoming increasingly close, the use of AI in digital marketing is not only limited to process automation, but also creates a more personalized and relevant consumer experience. Today's consumers, especially millennials and Gen Z, expect an online shopping experience that is fast, convenient, and tailored to their personal preferences (Google, Temasek, & Bain, 2024). By leveraging technologies such as machine learning, natural language processing, and recommendation engines, companies can offer products and services that are highly tailored to consumer needs. This not only increases customer satisfaction levels but also builds sustainable long-term relationships.

In addition to the direct relationship between AI-based digital marketing strategies and consumer loyalty, this study also found that consumer trust in personal data management acts as a moderator variable that strengthens the relationship. The results of the analysis show that the interaction between AI-based digital marketing strategies and consumer trust in personal data management has a path coefficient of 0.263 with a p-value of 0.002. This means that in conditions where consumers have a high level of trust in companies in managing their personal

data, the influence of AI-based digital marketing strategies on consumer loyalty becomes stronger.

This finding is in line with the theory of trust-based relationship marketing proposed by Morgan and Hunt (1994), which states that trust is the main foundation in building long-term relationships between companies and customers. In the context of using AI, trust in the protection of personal data is a key element, considering that AI often requires access to sensitive consumer data to provide more personalized services. If consumers feel safe and confident that their data is being used ethically and responsibly, they will be more willing to continue interacting with the platform and show loyalty.

However, it is important to note that consumer trust in the use of personal data in Indonesia still faces challenges. Based on a PwC Indonesia survey (2023), around 64% of consumers expressed concerns about the practice of collecting and using personal data by digital companies. Therefore, although AI-based strategies have proven effective, full success in building customer loyalty depends on how companies manage privacy and data transparency issues. The implementation of the Personal Data Protection Law (UU PDP) which has been in effect in Indonesia since 2024 is an important step to provide a sense of security to consumers.

Furthermore, the results of this study also indicate that AI-based digital marketing strategies not only function in the context of product promotion, but also in creating a more meaningful and personal customer journey. As stated by Lemon and Verhoef (2016), a seamless and consistent consumer experience across digital touchpoints greatly contributes to the formation of long-term loyalty. In this study, indicators such as chatbot usage experience, product recommendation accuracy, and service speed and personalization were shown to influence consumer perceptions of the quality of the experience they received.

The practical implication of these findings is that companies need to pay attention to two main aspects in developing AI-based digital marketing strategies, namely the technological aspect and the trust aspect. From the technological side, companies need to continue to develop AI systems that are able to dynamically understand consumer needs and provide relevant recommendations. From the trust side, companies must actively build clear, transparent, and communicative personal data protection policies, so as to reduce consumer concerns regarding the use of their data.

In conclusion, this study confirms that the implementation of AI-based digital marketing strategies has a positive effect on consumer loyalty, and this effect is strengthened by consumer trust in personal data management. In the context of increasingly intense digital business competition, companies that are able to integrate technological sophistication with an approach that focuses on ethics and consumer trust will have a better chance of building sustainable loyalty.

## CONCLUSION

This study aims to analyze the influence of artificial intelligence (AI)-based digital marketing strategies on consumer loyalty in the industrial era 5.0, with consumer trust in personal data management as a moderator variable. Based on the results of the analysis of 310 respondents who are active users of e-commerce platforms in Indonesia, several important conclusions were obtained. First, AI-based digital marketing strategies have been shown to have a positive and significant effect on consumer loyalty.

The application of AI technology such as personalized product recommendations, customer service chatbots, and consumer behavior predictions can improve more relevant and personalized consumer experiences, thereby encouraging the creation of stronger emotional relationships between consumers and companies. This supports the view that in the era of industry 5.0, collaboration between advanced technology and a human-centered approach is key to maintaining customer loyalty.

Second, consumer trust in personal data management plays an important role as a moderating variable in the relationship between AI-based digital marketing strategies and consumer loyalty. The results of the analysis show that the higher the level of consumer trust in the protection of their personal data, the stronger the influence of AI-based strategies on their loyalty. This emphasizes the importance of implementing the principles of transparency, data security, and compliance with regulations such as the Personal Data Protection Act (PDP Act) to build and maintain consumer trust in the digital era.

Third, the results of this study provide practical implications that companies need to develop a digital marketing system that not only focuses on technology, but also prioritizes ethical principles in the use of personal data. AI-based personalization must be balanced with responsible data management practices so that consumers feel safe and comfortable interacting with digital platforms. Companies that are able to integrate sophisticated technology with effective consumer trust management will have a competitive advantage in maintaining consumer loyalty amidst increasingly tight business competition.

Thus, this study enriches the literature on AI-based digital marketing and consumer loyalty, especially in the context of the Indonesian digital market. In addition, the results of this study also provide practical guidelines for business practitioners to develop more effective, sustainable, and ethical digital marketing strategies.

## REFERENCES

- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Chatterjee, S., Rana, N. P., Tamilmani, K., & Sharma, A. (2023). The role of artificial intelligence in customer relationship management: A systematic literature review and future research agenda. *International Journal of Information Management*, 69, 102668. <https://doi.org/10.1016/j.ijinfomgt.2022.102668>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Dick, A.S., & Basu, K. (1994). Customer loyalty: Toward an integrated conceptual framework. *Journal of the Academy of Marketing Science*, 22(2), 99–113. <https://doi.org/10.1177/0092070394222001>
- European Commission. (2021). *Industry 5.0: Towards a sustainable, human-centric and resilient European industry*. Publications Office of the European Union. <https://doi.org/10.2777/308407>
- Google, Temasek, & Bain & Company. (2024). *e-Conomy SEA 2024 report: Southeast Asia's digital economy accelerating out of the pandemic*. Retrieved from <https://economysea.withgoogle.com/>
- Hair, J.F., Hult, G.T.M., Ringle, C., & Sarstedt, M. (2020). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). SAGE Publications.
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69–96. <https://doi.org/10.1509/jm.15.0420>
- Malhotra, N.K., Kim, S.S., & Agarwal, J. (2004). Internet users' information privacy concerns (IUIPC): The construct, the scale, and a causal model. *Information Systems Research*, 15(4), 336–355. <https://doi.org/10.1287/isre.1040.0032>
- Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20–38. <https://doi.org/10.1177/002224299405800302>
- PwC Indonesia. (2023). *Consumer intelligence series: Building consumer trust in data protection*. PricewaterhouseCoopers Indonesia. Retrieved from <https://www.pwc.com/id>
- Statista. (2024). *Concerns about personal data use in digital marketing among consumers in Indonesia*. Retrieved from <https://www.statista.com/>