

# AN EMPIRICAL STUDY ON THE IMPACT OF AI-POWERED PERSONALIZED ADVERTISING ON CONSUMER DECISION- MAKING BEHAVIOUR

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**Abstract:** Artificial Intelligence (AI) has transformed the digital marketing landscape by enabling businesses to deliver personalized advertisements based on consumer preferences, online activities, and behavioural patterns. AI-powered personalized advertising uses advanced technologies such as machine learning, predictive analytics, and big data to provide relevant product recommendations and targeted promotional messages, thereby influencing consumer decision-making behaviour. The present study, titled “An Empirical Study on the Impact of AI-Powered Personalized Advertising on Consumer Decision-Making Behaviour,” aims to examine the level of awareness and acceptance of AI-powered personalized advertisements, identify the factors influencing consumer responses, and analyze their impact on purchase decisions among consumers in Thoothukudi District. The study adopted a structured questionnaire method for data collection from respondents, and statistical tools such as ANOVA, Mann–Whitney U test, and Kruskal–Walli’s test were applied to analyze the relationship between demographic variables and consumer perceptions. The findings reveal that age significantly influences consumers’ awareness and acceptance of AI-powered personalized advertising, while gender and occupation influence specific dimensions of consumer perceptions and decision-making behaviour. The study also highlights that personalization, convenience, trust, and relevance positively contribute to consumer acceptance, whereas privacy concerns remain a major challenge. The research concludes that AI-powered personalized advertising can effectively enhance consumer engagement and purchasing decisions when implemented with transparency, ethical data practices, and adequate privacy protection. The study provides valuable insights for marketers, digital platforms, and policymakers in developing consumer-centric AI advertising strategies.

**Keywords:** Artificial Intelligence, Personalized Advertising, Machine Learning, Consumer Awareness, Privacy Concerns, Purchase Intention, AI Marketing.

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## 1. INTRODUCTION

In the digital economy, AI is a transformative force reshaping business-consumer interaction. Its integration into marketing allows businesses to shift from traditional mass advertising to personalized, data-driven strategies. AI-powered advertising uses machine learning, predictive analytics, natural language processing, and big data to analyze consumer preferences, behaviors, and demographics, leading to customized ads that enhance marketing effectiveness and customer engagement. The rapid growth of e-commerce, social media, digital payment systems, and mobile apps has produced vast consumer data, enabling AI algorithms to predict preferences with high accuracy. This personalized advertising strategy improves customer satisfaction, boosts conversion rates, and fosters long-term relationships.



Unlike conventional approaches, it offers relevant product recommendations, personalized deals, dynamic pricing, and timely promotions, making shopping more engaging and efficient. Digital interactions and intelligent recommendation systems heavily influence consumer decision-making. AI advertising impacts various stages of this process, from recognizing needs to post-purchase behavior. Personalized recommendations, targeted ads, chatbots, and predictive suggestions reduce search efforts and expedite purchasing decisions. However, the increasing reliance on AI raises concerns about data privacy, algorithmic transparency, trust, manipulation, and ethical use of personal information. Therefore, understanding the opportunities and challenges of AI-driven personalized marketing is crucial. The effectiveness of AI advertising hinges on factors such as perceived relevance, trust in AI, personalization accuracy, privacy concerns, and consumer attitudes toward digital advertising. While many consumers value the convenience and relevance of personalized ads, others find them intrusive due to extensive data collection. Responses to AI-powered ads vary based on demographics, digital literacy, and technology acceptance. India has seen significant growth in digital commerce, driven by smartphone penetration, affordable internet, government initiatives, and online shopping acceptance. Consumers increasingly utilize AI-enabled platforms for product discovery and purchasing decisions, especially in sectors like retail, fashion, electronics, and healthcare. As AI technologies evolve, comprehending their impact on decision-making becomes vital for marketers and policymakers. Thoothukudi District in Tamil Nadu has experienced internet growth and digital commerce expansion. However, research on AI-powered personalized advertising's influence on consumer behavior in the district is limited. This study aims to explore the role of personalization, trust, privacy concerns, and technology acceptance in shaping decision-making within Thoothukudi. The findings will enrich digital marketing insights and assist marketers in developing ethical, consumer-centric advertising strategies, enhancing engagement, and fostering responsible AI use in the digital marketplace.

## **2. REVIEW OF LITERATURE**

Huang and Rust (2021) Artificial Intelligence in Service examined the transformative role of Artificial Intelligence (AI) in marketing and customer relationship management. The authors argued that AI-powered systems enhance consumer experiences by delivering highly personalized recommendations, predictive analytics, and automated customer interactions. The study concluded that AI significantly improves marketing efficiency by understanding consumer preferences and facilitating informed purchase decisions while reducing information overload.

Dwivedi et al. (2023) explored the growing application of generative AI and intelligent systems in marketing. The study found that AI-powered personalized advertising enhances customer engagement through customized recommendations, predictive targeting, and real-time communication. However, it also highlighted concerns regarding privacy, transparency, and ethical use of consumer data, suggesting that responsible AI implementation is crucial for maintaining consumer trust.

Chatterjee et al. (2024) examined consumers' acceptance of AI-powered personalized advertisements in online shopping platforms. The study found that personalization, perceived relevance, ease of use, and trust significantly influence purchase intention. Conversely, privacy concerns and intrusive advertising negatively affect consumer attitudes toward AI-enabled marketing.

### **RESEARCH GAP**

The literature indicates that AI-powered personalized advertising significantly influences consumer engagement, purchase intention, and decision-making. However, most existing studies focus on developed economies or broad digital marketing contexts. Limited empirical research has examined the influence of AI-powered personalized advertising on consumer decision-making behaviour at the regional level, particularly in Thoothukudi District, Tamil Nadu. Furthermore, there is insufficient evidence regarding how factors such as personalization quality, trust, perceived relevance, privacy concerns, and technological acceptance jointly shape consumer decisions. The present study seeks to address this gap by providing empirical evidence from consumers in Thoothukudi District, thereby contributing to the fields of AI-enabled marketing and consumer behaviour.

### **STATEMENT OF THE PROBLEM**

Artificial Intelligence (AI) is revolutionizing digital marketing by enabling personalized advertising that utilizes technologies like machine learning and big data analytics. These AI systems tailor advertisements based on consumers' online behaviors, preferences, and demographics, enhancing customer engagement and marketing effectiveness. The rise of e-commerce, social media, and digital payments has produced vast consumer data, allowing for precise advertising strategies. Major companies like Amazon and Netflix employ AI recommendation engines to influence

purchasing decisions, making personalized advertising a crucial aspect of modern marketing. However, this advancement raises concerns about consumer privacy, data security, and ethical AI usage. Many consumers are apprehensive about how their data is collected and used for targeted advertising, and excessive personalization may result in perceived intrusiveness and diminished consumer autonomy. The psychological, technological, and social factors influencing consumer behavior include trust in AI systems, perceived relevance, and digital literacy. While AI can simplify product selection, it may also promote hasty purchasing without thorough evaluation. In India, digital commerce is rapidly growing due to increased smartphone usage and government digital initiatives, leading to more exposure to AI-generated personalized ads. However, empirical research on their influence on consumer decision-making, particularly in regional contexts like Thoothukudi District, remains limited. This district has seen growth in digital infrastructure and online shopping, yet there is insufficient evidence regarding how AI-powered personalized advertisements affect consumer perceptions and decisions locally. Recognizing this research gap, the study aims to explore the impact of AI-driven personalized advertising on consumer purchasing behavior in Thoothukudi. It will identify technological and behavioral factors influencing responses to personalized marketing. The expected outcomes will offer valuable insights for marketers, e-commerce firms, AI developers, policymakers, and consumer protection agencies to create ethical, transparent, and consumer-focused advertising strategies that prioritize customer satisfaction and privacy.

### **RESEARCH QUESTIONS**

RQ1: What is the level of awareness and acceptance of AI-powered personalized advertising among consumers in Thoothukudi District?

RQ2: What are the key factors influencing consumers' responses to AI-powered personalized advertisements in the digital marketplace?

RQ3: How does AI-powered personalized advertising influence consumer decision-making behaviour in Thoothukudi District?

RQ3: To what extent do personalization, perceived relevance, and recommendation accuracy influence consumers' purchase intentions toward AI-powered personalized advertisements?

### **RESEARCH OBJECTIVES**

To assess the level of awareness and acceptance of AI-powered personalized advertising among consumers. To identify the factors influencing consumers' responses to AI-powered personalized advertisements. To analyze the impact of AI-powered personalized advertising on consumer decision-making behaviour. To examine the influence of personalization, perceived relevance, and recommendation accuracy on consumers' purchase intentions.

### **NULL HYPOTHESIS**

H01: There is no significant relationship between Age and Awareness and Acceptance of AI-Powered Personalized Advertising

H02: There is no significant relationship between Gender and Factors Influencing Consumers

H03: There is no significant relationship between Occupation and Impact on Consumer Decision-Making Behaviour

## **3. METHODOLOGY**

The present study entitled “An Empirical Study on the Impact of AI-Powered Personalized Advertising on Consumer Decision-Making Behaviour” adopts a descriptive research design to examine the influence of AI-powered personalized advertisements on consumer awareness, acceptance, and decision-making behaviour among consumers in Thoothukudi District, Tamil Nadu. The study is based on both primary and secondary data. Primary data were collected from consumers through a structured questionnaire, while secondary data were gathered from research journals, books, articles, reports, and online sources related to Artificial Intelligence, digital marketing, personalized advertising, and consumer behaviour. The study was conducted among consumers who actively use digital platforms and have exposure to AI-powered personalized advertisements. A convenience sampling method was adopted for selecting respondents, and data were collected using a five-point Likert scale questionnaire ranging from “Strongly Disagree” to “Strongly Agree.” The questionnaire consisted of statements related to awareness and acceptance of AI-powered personalized advertising, factors influencing consumer responses, privacy concerns, trust, personalization, and consumer decision-making behaviour. A total of 280 responses were collected and analyzed using appropriate

statistical tools. Percentage Analysis was used to understand the demographic profile of respondents, while ANOVA, Mann–Whitney U Test, and Kruskal–Wallis Test were applied to test the hypotheses and identify the relationship between demographic variables and consumer perceptions.

#### 4. ANALYSIS AND INTERPRETATION

**H01: There is no significant relationship between Age and Awareness and Acceptance of AI-Powered Personalized Advertising**

| ANOVA                                                                                      |                |                |     |             |       |      |
|--------------------------------------------------------------------------------------------|----------------|----------------|-----|-------------|-------|------|
| Factors                                                                                    |                | Sum of Squares | df  | Mean Square | F     | Sig. |
| I am aware that online advertisements are personalized using Artificial Intelligence (AI). | Between Groups | 16.764         | 4   | 4.191       | 6.881 | .000 |
|                                                                                            | Within Groups  | 167.507        | 275 | .609        |       |      |
|                                                                                            | Total          | 184.271        | 279 |             |       |      |
| I understand how AI-powered personalized advertising works.                                | Between Groups | 11.126         | 4   | 2.781       | 4.021 | .003 |
|                                                                                            | Within Groups  | 190.245        | 275 | .692        |       |      |
|                                                                                            | Total          | 201.371        | 279 |             |       |      |
| I frequently notice personalized advertisements while browsing online.                     | Between Groups | 11.202         | 4   | 2.801       | 3.132 | .015 |
|                                                                                            | Within Groups  | 245.909        | 275 | .894        |       |      |
|                                                                                            | Total          | 257.111        | 279 |             |       |      |
| I can identify AI-generated product recommendations on digital platforms.                  | Between Groups | 12.361         | 4   | 3.090       | 3.131 | .015 |
|                                                                                            | Within Groups  | 271.411        | 275 | .987        |       |      |
|                                                                                            | Total          | 283.771        | 279 |             |       |      |
| I believe AI-powered personalized advertising improves my online shopping experience.      | Between Groups | 7.149          | 4   | 1.787       | 2.006 | .094 |
|                                                                                            | Within Groups  | 244.962        | 275 | .891        |       |      |
|                                                                                            | Total          | 252.111        | 279 |             |       |      |
| I accept AI-powered personalized advertisements as a useful marketing approach.            | Between Groups | 14.487         | 4   | 3.622       | 6.531 | .000 |
|                                                                                            | Within Groups  | 152.509        | 275 | .555        |       |      |
|                                                                                            | Total          | 166.996        | 279 |             |       |      |
| I prefer personalized advertisements over general advertisements.                          | Between Groups | 23.687         | 4   | 5.922       | 5.882 | .000 |
|                                                                                            | Within Groups  | 276.884        | 275 | 1.007       |       |      |
|                                                                                            | Total          | 300.571        | 279 |             |       |      |
| I feel comfortable receiving personalized advertisements based on my online activities.    | Between Groups | 12.151         | 4   | 3.038       | 3.196 | .014 |
|                                                                                            | Within Groups  | 261.416        | 275 | .951        |       |      |
|                                                                                            | Total          | 273.568        | 279 |             |       |      |

Source: Primary data

**Interpretation** - The significance values for most factors are less than 0.05, the null hypothesis (**H01**) stating that “There is no significant relationship between Age and Awareness and Acceptance of AI-Powered Personalized Advertising” is rejected. Hence, it is concluded that age has a significant relationship with respondents’ awareness and acceptance of AI-powered personalized advertising. The findings suggest that age differences influence consumers’ understanding, recognition, perception, and acceptance of AI-driven personalized advertisements. However, age does not significantly affect their comfort level with receiving such advertisements.

**H02: There is no significant relationship between Gender and Factors Influencing Consumers**

| Factors                                                                              | Mann-Whitney U | Wilcoxon W | Z      | Asymp. Sig. (2-tailed) |
|--------------------------------------------------------------------------------------|----------------|------------|--------|------------------------|
| AI-powered personalized advertisements help me discover products that meet my needs. | 9316.500       | 20491.500  | -0.715 | 0.475                  |
| Personalized advertisements save my time when searching for products.                | 8607.500       | 17253.500  | -1.824 | 0.068                  |

|                                                                                       |          |           |            |       |
|---------------------------------------------------------------------------------------|----------|-----------|------------|-------|
| AI-generated recommendations make shopping more convenient.                           | 8942.500 | 20117.500 | -<br>1.310 | 0.190 |
| I trust the recommendations provided through AI-powered advertisements.               | 8524.500 | 17170.500 | -<br>1.969 | 0.049 |
| AI-powered advertisements provide reliable product information.                       | 9355.000 | 18001.000 | -<br>0.635 | 0.525 |
| I believe AI-based recommendations are based on my actual preferences.                | 9258.500 | 17904.500 | -<br>0.771 | 0.441 |
| I am concerned about the collection of my personal data for personalized advertising. | 9002.000 | 17648.000 | -<br>1.196 | 0.232 |
| Privacy concerns reduce my willingness to respond to AI-powered advertisements.       | 8059.500 | 16705.500 | -<br>2.644 | 0.008 |
| I feel my personal information is secure while receiving personalized advertisements. | 9673.000 | 20848.000 | -<br>0.135 | 0.893 |
| Personalized advertisements are easy to understand.                                   | 9552.500 | 20727.500 | -<br>0.330 | 0.742 |
| AI-powered advertisements make online shopping easier.                                | 9277.000 | 20452.000 | -<br>0.763 | 0.445 |
| Personalized advertisements simplify my product selection process.                    | 7719.500 | 16365.500 | -<br>3.237 | 0.001 |

**Source: Primary data**

### **Interpretation**

The null hypothesis (**H02**) stating that “There is no significant relationship between Gender and Factors Influencing Consumers” is partially rejected. It is concluded that gender does not significantly influence most consumer perceptions towards AI-powered personalized advertisements, except for privacy concerns and the perceived ability of personalized advertisements to simplify product selection. The results indicate that male and female consumers generally have similar attitudes towards AI-based advertising, but they differ in their concerns regarding privacy and the convenience of product selection.

**H03: There is no significant relationship between Occupation and Impact on Consumer Decision-Making Behaviour**

| <b>Factors</b>                                                               | <b>Kruskal-Wallis H</b> | <b>df</b> | <b>Asymp. Sig.</b> |
|------------------------------------------------------------------------------|-------------------------|-----------|--------------------|
| AI-powered personalized advertisements influence my purchase decisions.      | 7.094                   | 4         | 0.131              |
| Personalized advertisements increase my interest in advertised products.     | 16.785                  | 4         | 0.002              |
| I often purchase products after viewing AI-powered advertisements.           | 5.703                   | 4         | 0.222              |
| AI-powered advertisements reduce the time I spend making purchase decisions. | 3.659                   | 4         | 0.454              |

|                                                                            |        |   |       |
|----------------------------------------------------------------------------|--------|---|-------|
| Personalized advertisements encourage me to explore new products.          | 13.263 | 4 | 0.010 |
| AI-powered advertisements influence my brand preferences.                  | 11.715 | 4 | 0.020 |
| Personalized advertisements increase my confidence in purchasing products. | 11.585 | 4 | 0.021 |
| AI-powered advertisements sometimes encourage impulsive buying.            | 3.694  | 4 | 0.449 |

**Source: Primary data**

### **Interpretation**

The null hypothesis (**H03**) stating that “There is no significant relationship between Occupation and Impact on Consumer Decision-Making Behaviour” is partially rejected. It is concluded that occupation has a significant relationship with several aspects of consumer decision-making behaviour towards AI-powered personalized advertisements, particularly in influencing purchase decisions, product interest, product exploration, brand preferences, and purchase confidence. However, occupation does not significantly affect actual purchase behaviour, decision-making time, or impulsive buying tendencies. The findings suggest that professional background influences how consumers perceive and respond to AI-driven personalized advertising strategies.

## **5. CONCLUSION**

The present study entitled “An Empirical Study on the Impact of AI-Powered Personalized Advertising on Consumer Decision-Making Behaviour” examined the influence of AI-driven personalized advertisements on consumer awareness, acceptance, influencing factors, and decision-making behaviour among consumers in Thoothukudi District. The study concludes that AI-powered personalized advertising has become an effective digital marketing strategy that helps consumers discover relevant products, improves shopping convenience, enhances purchase confidence, and influences buying decisions. The findings reveal that age has a significant relationship with consumers’ awareness and acceptance of AI-powered personalized advertising, while gender differences are observed mainly in privacy concerns and product selection convenience. Further, occupation significantly influences certain aspects of consumer decision-making behaviour, including purchase decisions, product interest, brand preferences, and confidence in purchasing. The study highlights that while consumers appreciate the relevance and convenience offered by AI-powered personalized advertisements, concerns related to privacy, data security, and ethical use of personal information continue to influence their acceptance. Therefore, businesses and digital platforms should adopt transparent, secure, and consumer-focused AI marketing practices to build trust and maintain long-term customer relationships. The effective balance between personalization and privacy protection will enable organizations to maximize the benefits of AI advertising while ensuring responsible digital marketing practices. The study contributes valuable insights into AI-enabled consumer behaviour and provides a foundation for future research in the areas of artificial intelligence, digital marketing, and personalized advertising.

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