

Original Research Article

An Empirical Study on AI-Driven Consumer Insights

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Abstract:

Artificial Intelligence (AI) is increasingly transforming the way businesses understand consumers, analyse behavioural patterns, and make marketing and business decisions. The present study, “**An Empirical Study on AI-Driven Consumer Insights**,” examines the role of AI in generating consumer insights, analysing consumer behaviour, influencing purchasing decisions, improving personalised marketing, and supporting business decision-making. The study also considers the importance of ethical AI practices, privacy, transparency, trust, and responsible use of consumer data. Primary data were collected from **128 respondents from Mumbai**, and the data were analysed using tabulation and the **Chi-Square test**. The findings indicate statistically significant responses across all six hypotheses. The results suggest that respondents perceive AI as an important tool for generating consumer insights, improving consumer behaviour analysis, influencing purchasing decisions, enhancing personalised marketing, and supporting business decisions. The findings also highlight the importance of ethical AI practices in consumer data collection. The study concludes that AI-driven consumer insights can provide significant value to businesses when implemented effectively, transparently, and responsibly.

Keywords: Artificial Intelligence, Consumer Insights, Consumer Behaviour, Personalised Marketing, Purchasing Behaviour, Business Decision-Making, Ethical AI.

Introduction

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the 21st century, revolutionizing the way organizations collect, analyze, and utilize consumer data. With the rapid growth of digital platforms, e-commerce, social media, and mobile technologies, businesses have access to an unprecedented volume of consumer information. Traditional methods of consumer research, which often rely on surveys, interviews, and focus groups, are increasingly being complemented or replaced by AI-driven analytical techniques capable of processing vast datasets in real time.

AI-driven consumer insights refer to the use of advanced technologies such as Machine Learning (ML), Natural Language Processing (NLP), Computer Vision, Predictive Analytics, and Generative AI to understand consumer behavior, preferences, purchasing patterns, and future trends. These technologies enable organizations to identify hidden patterns, predict customer needs, personalize marketing campaigns, improve customer experiences, and make data-driven business decisions.

In today's highly competitive business environment, consumer expectations are constantly evolving. Customers demand personalized experiences, instant responses, and products or services that align with their preferences. AI empowers businesses to meet these expectations by analyzing structured and unstructured data from multiple sources, including online transactions, customer reviews, social media interactions, website browsing behavior, and customer service communications. This enables organizations to gain a comprehensive understanding of consumer behavior and develop targeted marketing strategies.

One of the most significant advantages of AI-driven consumer insights is predictive capability. AI algorithms can forecast purchasing behavior, customer lifetime value, churn probability, and market trends with greater accuracy than traditional statistical methods. This predictive intelligence allows businesses to optimize inventory, pricing strategies, product recommendations, and promotional campaigns while reducing operational costs and improving customer satisfaction.

The integration of AI into consumer analytics has transformed industries such as retail, banking, healthcare, telecommunications, hospitality, and e-commerce. Companies such as Amazon, Netflix, Google, and Spotify utilize AI-powered recommendation systems to deliver personalized content and product suggestions based on individual customer preferences. Similarly, financial institutions employ AI to understand customer spending habits and provide customized financial products, while healthcare organizations use AI to enhance patient engagement and personalized care.

Despite its numerous advantages, AI-driven consumer analytics also presents several challenges. Concerns related to data privacy, cybersecurity, algorithmic bias, ethical AI practices, transparency, and regulatory compliance have become increasingly important. Consumers are becoming more aware of how their personal data is collected, processed, and utilized. Consequently, organizations must ensure responsible AI implementation by maintaining transparency, obtaining informed consent, protecting consumer privacy, and adhering to data protection regulations.

Furthermore, the effectiveness of AI-driven consumer insights depends on the quality, accuracy, and diversity of the data being analyzed. Poor-quality data or biased algorithms can lead to inaccurate predictions and unfair decision-making. Therefore, businesses must invest in robust data governance, continuous model evaluation, and ethical AI frameworks to maximize the benefits of AI while minimizing associated risks.

The growing adoption of AI technologies has created new opportunities for researchers and practitioners to explore their impact on consumer behavior and organizational performance. Understanding how AI contributes to consumer insights can help businesses improve decision-making, strengthen customer relationships, increase operational efficiency, and gain a sustainable competitive advantage.

This study seeks to examine the role of AI in generating consumer insights, evaluate its impact on marketing and business decision-making, identify the benefits and challenges associated with AI adoption, and explore consumer perceptions of AI-enabled personalization. The findings of this research are expected to contribute to the growing body of knowledge on AI applications in consumer analytics and provide practical recommendations for organizations seeking to leverage AI responsibly and effectively.

Objectives of the Study

- To examine the role of AI in generating consumer insights.
- To identify AI technologies used in consumer behavior analysis.
- To analyze the impact of AI on consumer purchasing behavior.
- To evaluate the effectiveness of AI in personalized marketing.
- To assess the role of AI in business decision-making.
- To suggest recommendations for the effective and ethical use of AI in consumer insights

Hypotheses

H01 (Null Hypothesis): AI has no significant role in generating consumer insights. **H11 (Alternative Hypothesis):** AI has a significant role in generating consumer insights.

H02 (Null Hypothesis): AI technologies do not significantly influence consumer behavior analysis.

H12 (Alternative Hypothesis): AI technologies significantly influence consumer behavior analysis.

H03 (Null Hypothesis): AI-driven consumer insights have no significant impact on consumer purchasing behavior.

H13 (Alternative Hypothesis): AI-driven consumer insights have a significant impact on consumer purchasing behavior.

H04 (Null Hypothesis): AI-driven personalized marketing has no significant effect on marketing effectiveness.

H14 (Alternative Hypothesis): AI-driven personalized marketing significantly improves marketing effectiveness.

H05 (Null Hypothesis): AI-driven consumer insights do not significantly support business decision-making.

H15 (Alternative Hypothesis): AI-driven consumer insights significantly support business decision-making.

H06 (Null Hypothesis): The adoption of ethical AI practices has no significant relationship with the effectiveness of AI-driven consumer insights.

H16 (Alternative Hypothesis): The adoption of ethical AI practices has a significant positive relationship with the effectiveness of AI-driven consumer insights.

Literature Review

- 1. Mohammadkhani et al. (2026)** Mohammadkhani, Majedi, Biniiaz and Sarhadi examined **AI-driven personalization and its impact on consumer engagement in digital markets**. The study explains that technologies such as machine learning, predictive analytics, recommendation systems, conversational AI and generative AI help businesses understand consumers and provide more relevant experiences.

Personalisation can improve **customer satisfaction, trust, purchase intention, loyalty and engagement**. The authors also point out that privacy, algorithmic bias, manipulation and loss of consumer autonomy can reduce the benefits of AI. Therefore, AI should be used in a transparent and responsible manner.

- 2 **Omotoso et al. (2025)** Omotoso and co-authors studied **AI-enhanced consumer insights through behavioural analytics and hyper-personalised marketing strategies**. Their study shows that AI can analyse consumer interactions, purchase history, online behaviour and sentiment to understand individual preferences. This allows businesses to move from traditional, generalised marketing towards **dynamic and personalised marketing**. The study suggests that such personalisation can improve customer engagement, conversion and retention. At the same time, it highlights concerns regarding **data privacy, algorithmic bias, transparency and consumer autonomy**.
- 3 **Markou et al. (2026)** Markou, Serdaris, Antoniadis and Spinthiropoulos investigated **consumer trust and ethical attitudes toward AI in the digital marketplace**. Using data from **505 Greek consumers**, the study found that familiarity with AI increases trust and confidence in AI systems. Greater trust encourages consumers to accept AI-based advertising, which can subsequently influence their intention to make ethical purchases. The study therefore suggests that consumers are more comfortable with AI when companies are **transparent, responsible and ethical** in their use of technology
- 4 **Singh et al. (2025)** Singh, Manochandar, Desale and Gupta examined the **role of AI-driven personalisation in customer empowerment and trust in digital financial services**. Based on a sample of **231 respondents**, the study found that AI can analyse transaction history and customer behaviour to provide customised financial recommendations and predict customer needs. AI-powered chatbots, dashboards and virtual assistants can also make financial information easier to understand and give customers greater control over their financial decisions. The study concludes that AI personalisation can improve **customer engagement, satisfaction, empowerment and trust**, provided that privacy and cybersecurity are properly managed.
- 5 **Mittameedi & Dogra (2026)** Mittameedi and Dogra studied **customer experience in AI-driven e-commerce** and developed the **TAPE framework—Trust, Autonomy, Personalization and Engagement**. Using responses from **400 active e-commerce users**, the study found that all four factors positively influence customer experience, with **personalisation and engagement being particularly strong contributors**. A positive customer experience was further associated with **satisfaction, loyalty and brand equity**. The study suggests that businesses should design AI-based customer journeys that are personalised while still giving customers transparency, control and trust.

Relevance of the Study :

- Examines the growing role of **Artificial Intelligence (AI) in understanding consumer behaviour**.
- Helps understand how AI generates **accurate and useful consumer insights**.
- Highlights the use of **Machine Learning, Predictive Analytics, NLP, Recommendation Systems and Generative AI**.
- Explores how AI can improve **customer engagement, satisfaction, trust and loyalty**.
- Examines the influence of **AI-based recommendations and personalised marketing on purchasing behaviour**.
- Provides insights into the use of AI for **business planning, forecasting and decision-making**.
- Addresses important concerns related to **data privacy, transparency, algorithmic bias and cybersecurity**.
- Emphasises the importance of **ethical and responsible use of consumer data**.
- Useful for businesses seeking to develop **customer-centric and personalised marketing strategies**.
- Contributes to academic research on the relationship between **AI, consumer behaviour and marketing**.

Scope of the Study

- **AI and Consumer Insights:** Examines how AI analyses consumer data to identify preferences, needs and behavioural patterns.
- **Consumer Behaviour Analysis:** Studies the role of AI technologies in understanding consumer actions and preferences.
- **Purchasing Behaviour:** Examines the influence of AI recommendations, personalised advertisements and targeted marketing on purchase decisions.
- **Personalized Marketing:** Evaluates the effectiveness of AI in delivering personalised products, services and marketing communication.
- **Business Decision-Making:** Studies how AI-generated consumer insights support business planning, forecasting and strategic decisions.
- **Consumer Engagement:** Examines the role of AI in improving customer interaction, satisfaction and loyalty.
- **Trust and Transparency:** Considers consumer trust and the need for transparent AI-based decision-making.
- **Ethical AI:** Covers privacy, fairness, cybersecurity, responsible data use and consumer autonomy.
- **Consumer Perspective:** Focuses on consumers' perceptions of the usefulness and effectiveness of AI-driven insights.
- **Overall Focus:** The study connects **AI → Consumer Insights → Consumer Behaviour → Personalized Marketing → Business Decision-Making**, while considering **ethical and privacy concerns**.

Methodology :

Class of respondent : For the purpose of the survey , a total **128** respondents from Mumbai have been selected on a random basis .

AGE	No. of Respondents
18-25	125
26-35	2
36-45	1
46-55	Nil

Sampling Method : For Collection of Primary data non- probability convenience sampling methods will be used .

Method of Data Collection : In this Research researchers will use both Primary and Secondary data .

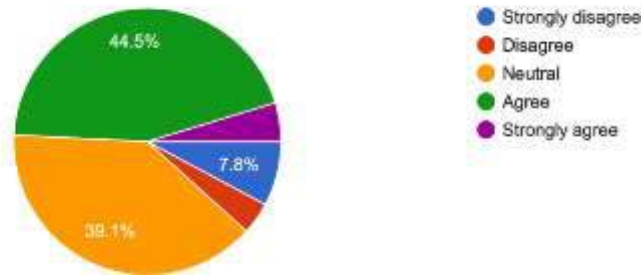
Primary Data : Will be collected from 103 respondents from Mumbai who have been selected on a Random basis .

Secondary Data : Will be used to support the study collected from Journals .

Statistical technique of analysis of data : Tabulation and Chi square test is used to test the Hypothesis .

Data Analysis and Interpretation

AI helps businesses generate accurate consumer insights.
128 responses



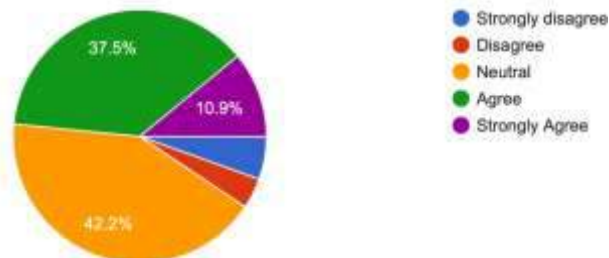
Working Table

Response	Observed (O)	Expected (E)	O – E	(O–E) ² /E
Strongly Disagree	10	25.6	-15.6	9.506
Disagree	5	25.6	-20.6	16.577
Neutral	50	25.6	24.4	23.256
Agree	57	25.6	31.4	38.514
Strongly Agree	6	25.6	-19.6	15.006
Total	128	128		102.859

Result

There is a statistically significant response indicating that respondents perceive AI as having a significant role in generating accurate consumer insights.

AI technologies improve consumer behavior analysis.
128 responses



Working Table

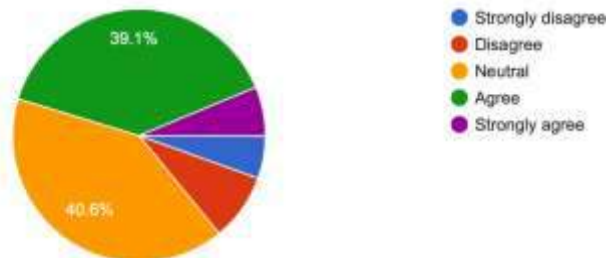
Response	O	E	O – E	(O–E) ² /E
Strongly Disagree	7	25.6	-18.6	13.514
Disagree	5	25.6	-20.6	16.577
Neutral	54	25.6	28.4	31.506
Agree	48	25.6	22.4	19.600
Strongly Agree	14	25.6	-11.6	5.256
Total	128	128		86.453

Result

Reject H02 and accept H12.

The responses indicate a significant perception that AI technologies improve consumer behaviour analysis.

AI-based product recommendations influence my purchasing decisions.
128 responses



Working Table

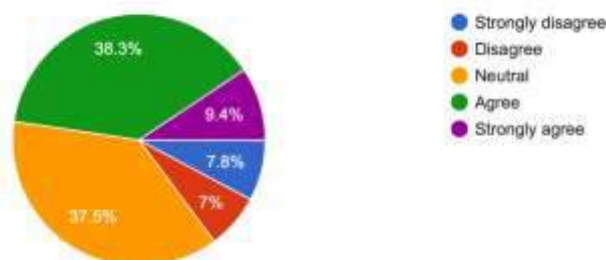
Response	O	E	O – E	(O–E) ² /E
Strongly Disagree	7	25.6	-18.6	13.514
Disagree	11	25.6	-14.6	8.327
Neutral	52	25.6	26.4	27.225
Agree	50	25.6	24.4	23.256
Strongly Agree	8	25.6	-17.6	12.100
Total	128	128		84.422

Result

Reject H03 and accept H13.

The results indicate a significant association in respondents' perceptions that AI-based recommendations influence purchasing decisions.

AI-based personalized marketing is more effective than traditional marketing.
128 responses



Working Table

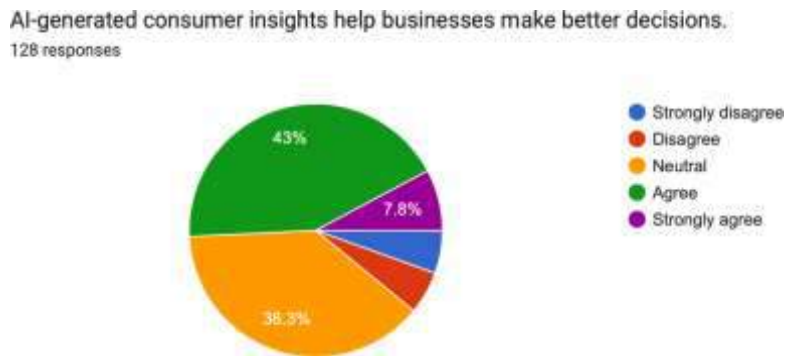
Response	O	E	O – E	(O–E) ² /E
Strongly Disagree	10	25.6	-15.6	9.506
Disagree	9	25.6	-16.6	10.764
Neutral	48	25.6	22.4	19.600
Agree	49	25.6	23.4	21.389

Strongly Agree	12	25.6	-13.6	7.225
Total	128	128		68.484

Result

Reject H04 and accept H14.

The results indicate that respondents perceive AI-based personalized marketing as significantly more effective than traditional marketing.



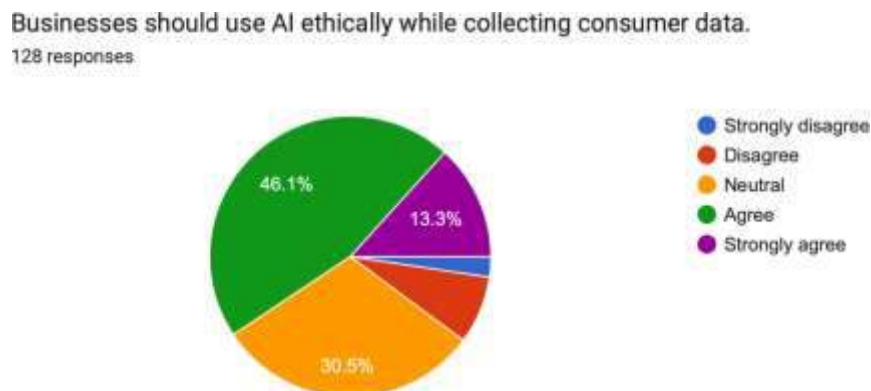
Working Table

Response	O	E	O – E	(O–E) ² /E
Strongly Disagree	7	25.6	-18.6	13.514
Disagree	7	25.6	-18.6	13.514
Neutral	49	25.6	23.4	21.389
Agree	55	25.6	29.4	33.764
Strongly Agree	10	25.6	-15.6	9.506
Total	128	128		91.688

Result

Reject H05 and accept H15.

The results indicate that respondents significantly perceive AI-generated consumer insights as useful for better business decision-making.



Working Table

Response	O	E	O – E	(O–E) ² /E
Strongly Disagree	3	25.6	-22.6	19.952
Disagree	10	25.6	-15.6	9.506
Neutral	39	25.6	13.4	7.014
Agree	59	25.6	33.4	43.577
Strongly Agree	17	25.6	-8.6	2.889
Total	128	128		82.938

Result

Reject H06 and accept H16.

The responses show a statistically significant perception supporting the importance of ethical AI practices in consumer data collection.

Final Conclusion

Based on the Chi-Square analysis, the study concludes that **AI-driven consumer insights are perceived to have a significant role in modern consumer and business practices**. The findings support the view that AI can help businesses understand consumer behaviour, influence purchasing decisions, improve personalized marketing, and support better business decision-making.

The analysis also highlights the importance of **ethical AI practices**. Respondents' responses indicate that responsible collection and use of consumer data, transparency, privacy and trust are important for the effective implementation of AI.

Therefore, **all six alternative hypotheses are supported by the Chi-Square results**, and the study concludes that AI-driven consumer insights have considerable relevance for **consumer behaviour analysis, personalized marketing, purchasing behaviour, business decision-making and ethical data practices**. **Conclusion**

The study concludes that **Artificial Intelligence has become an important tool for generating and applying consumer insights in modern business practices**. The analysis of 128 respondents indicates that AI is perceived to significantly contribute to understanding consumer behaviour, identifying consumer needs, influencing purchasing decisions, and developing personalised marketing strategies.

The Chi-Square analysis supports all six alternative hypotheses. The results indicate that AI technologies can improve **consumer behaviour analysis**, while AI-based recommendations and personalised marketing can influence consumer purchasing decisions and marketing effectiveness. AI-generated consumer insights are also perceived as useful for improving **business planning and decision-making**.

An important finding of the study is the role of **ethical AI practices**. The responses indicate that responsible collection and use of consumer data, transparency, privacy, cybersecurity, and consumer trust are essential for the successful implementation of AI.

Overall, the study suggests that businesses can use AI to develop more **customer-centric, personalised, and**

data-driven strategies. However, technological benefits should be balanced with ethical responsibility and protection of consumer interests. Thus, the effective future use of AI-driven consumer insights depends not only on technological capability but also on **trust, transparency, privacy, fairness, and responsible data management.**

Limitations of the Study :

- Respondents were selected from **Mumbai**, limiting geographical generalisation.
- **Convenience sampling** may introduce sampling bias.
- The sample is mainly from the **18–25 age group**, limiting representation of older consumers.
- The findings are based mainly on **respondents' perceptions** rather than actual AI usage or purchasing behaviour.
- The study primarily uses **Chi-Square analysis**, so further statistical techniques could provide deeper insights.
- Rapid developments in AI may change consumer perceptions and applications over time.

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