



The Role of AI In Enhancing Dynamic Pricing Strategies and Personalized Product Recommendations in Digital Commerce

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ABSTRACT

The digital commerce landscape is rapidly evolving, and Artificial Intelligence (AI) is at the heart of this transformation. Two key areas where AI has had a significant impact are dynamic pricing and personalized product recommendations. These technologies are reshaping how businesses interact with consumers, optimize revenue, and deliver tailored shopping experiences. AI processes vast amounts of data (e.g., user activity, purchase history, competitor pricing, seasonality) to adjust prices instantly. The primary objective of this study is to examine the role of Artificial Intelligence in enhancing dynamic pricing strategies and personalized product recommendations in digital commerce. This study also evaluates consumer perception and trust in AI-based pricing and recommendation systems. The data was collected from 50 respondents and the results were analysed using tables and percentages. A Convenience sampling method was employed. The findings indicate that a significant portion of consumers are inclined to make purchases based on AI recommendations, suggesting that these tools do influence buying behaviour to some extent. The study aims to contribute to understanding the practical implications of AI adoption for businesses and consumers in the evolving digital marketplace. As AI continues to evolve, its impact on digital commerce will only grow, leading to even more sophisticated and seamless interactions between businesses and consumers

Keywords: Dynamic pricing strategies, personalized product recommendations, digital commerce, consumer perception.

INTRODUCTION

AI-powered product recommendation systems are at the heart of delivering tailored shopping experiences, significantly impacting customer satisfaction and conversion rates. AI achieves this through understanding customer behaviour. AI analyses every click, search, scroll, and interaction a customer has with a website or app. This includes past purchases, browse history, time spent on pages, items added to carts (and abandoned), and even social media activity. This data helps to build detailed customer profiles, mapping their preferences, habits, and intent. AI uses patterns from similar customers to predict what a new user might want next, even before they explicitly search for it. AI models constantly learn and adapt from every new interaction, refining their suggestions over time to become more accurate and relevant. AI recommendation systems are highly effective in suggesting complementary products (cross-selling) or more expensive alternatives (upselling), thereby increasing the average order value. Insights from recommendation systems can also inform inventory decisions, helping businesses anticipate demand for certain product combinations. When users understand why a recommendation is made, their trust in the system increases. Transparency allows users to assess and potentially rectify system decisions, leading to a more satisfying experience. AI keeps customers engaged on the platform for longer periods and fosters a sense of being understood, leading to increased satisfaction, loyalty, and repeat purchases.

REVIEW OF LITERATURE

Kumar, Ramachandran, and Kumar (2021) observe that AI-driven recommendation systems have the ability to increase customer conversion rates by up to 30%. Their study confirms how AI simplifies decision-making by analysing consumer behaviour patterns with machine learning and predictive analysis.

Smith and Johnson (2020) look back at the shift from demographic segmentation to behaviour and real-time personalization, emphasizing that AI enables omnichannel marketing strategies that encourage consistency across digital channels.

Zhang and Li (2020) focus on AI marketing's technological backbone recommendation engines, predictive analytics, and natural language processing. Their work points to the manner in which retailers like Amazon and music providers like Spotify utilize users' information to personalize shopping experiences and drive satisfaction and sales.

STATEMENT OF THE PROBLEM

This study aims to investigate the extent to which AI technologies can enhance dynamic pricing strategies and personalized product recommendations, identify the challenges faced in their deployment, and evaluate the overall impact on business performance and customer satisfaction in digital commerce environment.

OBJECTIVES OF THE STUDY

- To evaluate consumer perception and trust in AI-based pricing and recommendation systems
- To explore ethical considerations and consumer concerns related to price discrimination and data privacy in AI-powered systems.
- To assess the effectiveness of AI-driven personalized product recommendations on consumer engagement and conversion rates.
- To study the factors influencing trust in AI recommendations

SCOPE OF THE STUDY

This study explores the role of Artificial Intelligence (AI) in enhancing dynamic product pricing strategies and personalized product recommendations in digital commerce. The scope includes analysing AI-powered solutions for real-time data analysis, demand forecasting, and price optimization, as well as personalization techniques for tailored product recommendations. Primary data were collected from 50 respondents using a convenience sampling method, and the analysis is confined to tools such as tables and percentage analysis. The study will examine the impact of AI on customer satisfaction, and loyalty, providing insights into the benefits and challenges of implementing AI-driven pricing and recommendation systems in digital commerce. By investigating the applications and limitations of AI in this context, the study aims to contribute to the development of effective strategies for businesses to leverage AI in digital commerce.

RESEARCH METHODOLOGY

Type of Research:

The research methodology employed in this study is descriptive research

Data Collection:

Primary Data

Primary data was collected from the general public was using a structured questionnaire.

Secondary Data

This study relies on secondary data which was collected from existing sources including internet resources, and scholarly articles.

Sample Size

Sample size of the study is 50

Sampling Technique

The sampling technique used in this method is convenience sampling method.

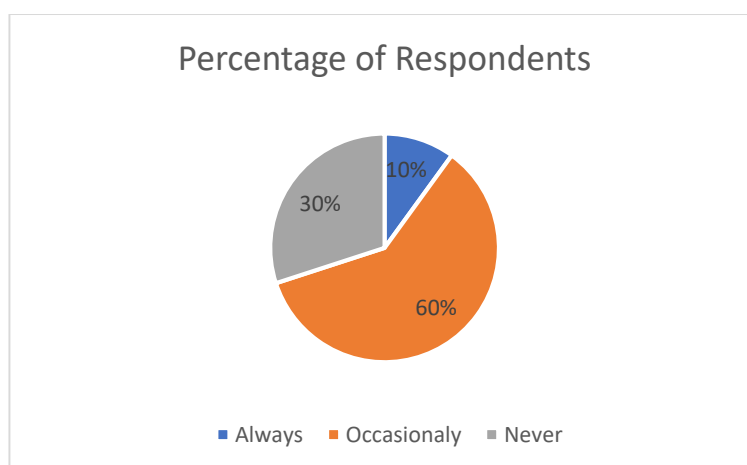
Tools for Analysis

The percentage method was used to analyse the data

RESULTS AND DISCUSSION

Frequency of Encountering AI recommendations during online shopping
Table 1

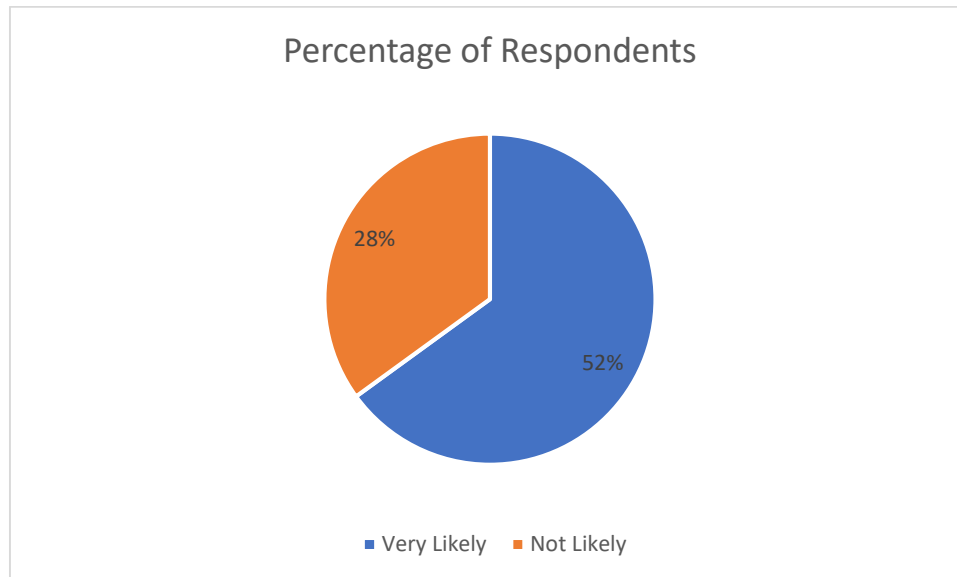
Frequency of Encountering AI recommendations during online shopping	Number of Respondents	Percentage of Respondents
Always	5	10%
Occasionally	30	60%
Never	15	30%
Total	50	100%



From the above table it is clear that 60% of respondents occasionally encounter AI recommendations during online shopping. And 10% of respondents always encounter AI recommendations during a online shopping and 30% of the percentage of respondents never encounter AI recommendations during online shopping.

Table 2**Likelihood of Making an online purchase based on AI recommendations**

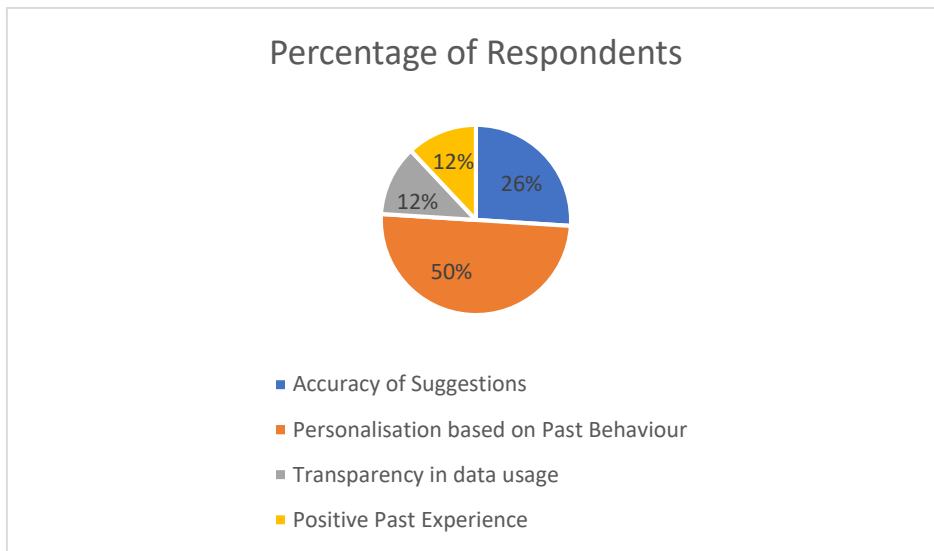
Likelihood of Making a purchase based on AI recommendation	Number of Respondents	Percentage of Respondents
Very Likely	26	52%
Not Likely	14	28%
Total	50	100%



From the table, it is evident that 52% of respondents are likely to make a purchase based on AI recommendations, whereas 28% of respondents are not likely to do so.

Table 3**Factors Influencing Trust in AI recommendations**

Factors Influencing Trust in AI recommendations	Number of Respondents	Percentage of Respondents
Accuracy of Suggestions	13	26%
Personalisation based on Past Behaviour	25	50%
Transparency in data usage	6	12%
Positive Past Experience	6	12%
Total	50	100%

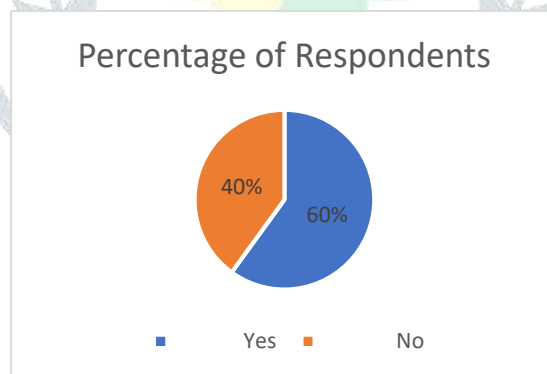


From the above the table, it is clear that 50% of respondents trust in AI recommendations influenced by personalisation based on past behaviour. And 26% of respondents trust is influenced by accuracy of suggestions and 12% of respondents trust is influenced by Transparency in data usage, and positive past experience.

Table 4

Willingness to Pay more for products recommended by AI if it aligns with respondents' preferences

Willingness to pay more for AI recommended products	Number of Respondents	Percentage of Respondents
Yes	30	60%
No	20	40%
Total	50	100%

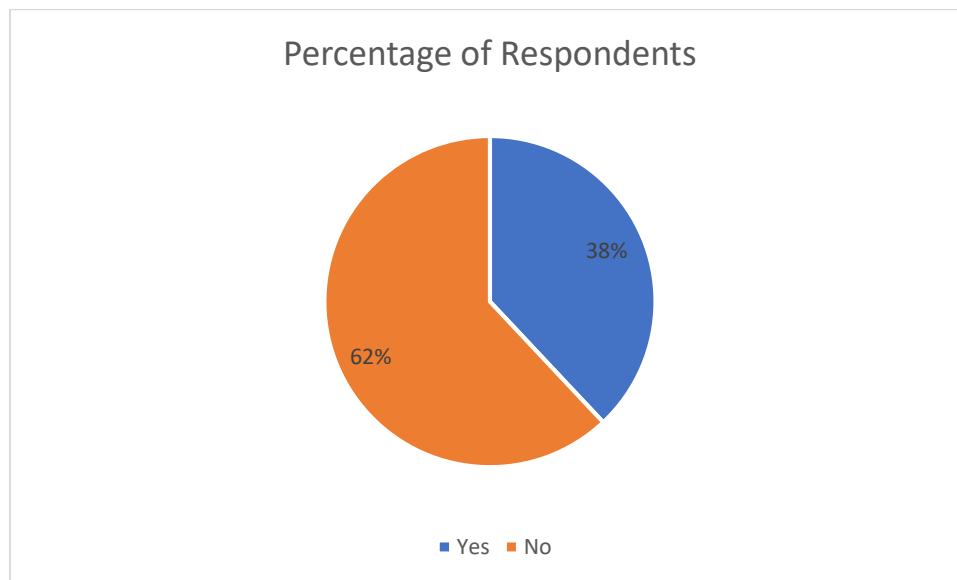


From the above table it is clear that 60% of respondents are willing to pay more for AI recommended products. And 40% of respondents are not willing to pay more products recommended by AI.

Have you felt that you were charged more than others for the same product due to AI based pricing?

Table 5

Have you felt that you were charged more than others for the same product due to AI based pricing?	Number of Respondents	Percentage of Respondents
Yes	19	38%
No	31	62%
Total	50	100%



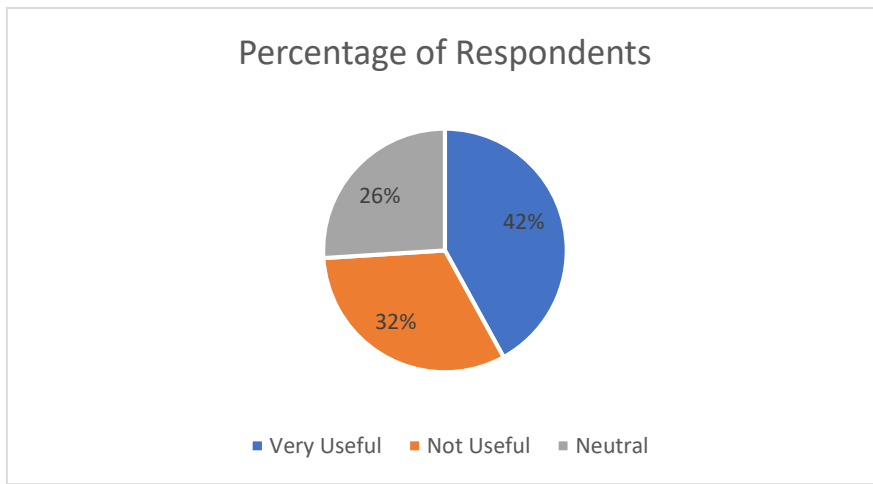
INTERPRETATION

From the above table it is clear that 38% of respondents are felt that they were charged more than others for the same product due to AI based pricing. And majority of respondents don't feel that they were charged more than others for the same product due to AI based pricing.

Perceived usefulness of AI recommendations during online shopping

Table 6

Perceived usefulness of AI recommendations during online shopping	Number of Respondents	Percentage of Respondents
Very Useful	21	42%
Not Very Useful	16	32%
Neutral	13	26%
Total	50	100

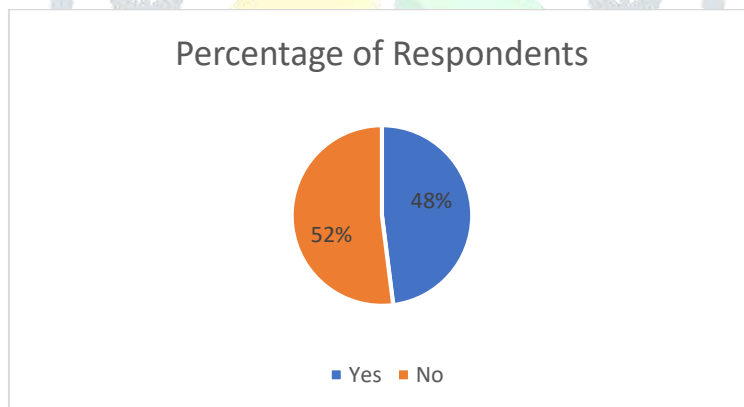


From the above table it is clear that 42% of respondents find AI recommendations useful during online shopping. And 32% of respondents do not find the AI based product recommendation useful, while 26% of respondents find have a neutral opinion about AI based product recommendation during online shopping.

Do you feel AI driven price discrimination is ethical?

Table 7

Do you feel AI driven price discrimination is ethical?	Number of Respondents	Percentage of Respondents
Yes	24	48%
No	26	52%
Total	50	100%

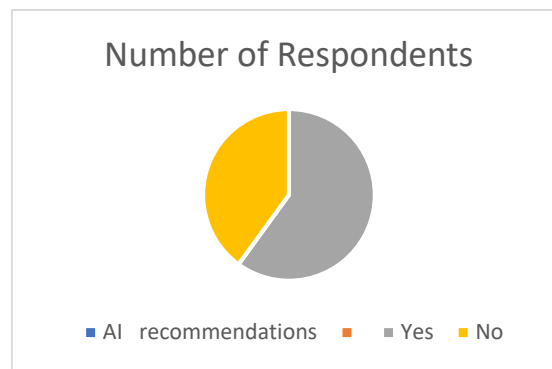


From the above table it is clear that it is clear that 52% of respondents feel that AI driven price discrimination is not ethical, while 48% of respondents feel that AI driven price discrimination is ethical.

Concerns about privacy regarding AI recommendations

Table 8

Concerns about privacy regarding AI recommendations	Number of Respondents	Percentage of Respondents
Yes	30	60%
No	20	40%
Total	50	100%



Interpretation

From the above table it is clear that 60% of respondents are concerned about their privacy regarding AI recommendations. And 40% of respondents are not concerned about their privacy in AI recommendations

FINDINGS

- More than half of the respondents (52%) are likely to make a purchase based on AI recommendations, suggesting that AI has a meaningful influence on consumer buying behaviour
- Trust in AI recommendations is primarily driven by personalization based on past behaviour (50%). Accuracy of suggestions is the second most important factor (26%), while data usage plays a smaller role.
- A majority of respondents (60%) are willing to pay more for products recommended by AI, indicating perceived value in AI-driven suggestions.
- Privacy is a major concern, with 60% of respondents worried about their data in relation to AI recommendations.

SUGGESTIONS

- Online retailers should improve the visibility and integration of AI-driven suggestions across platforms to ensure consistent user exposure
- Organizations should integrate explainable AI tools that allow users to understand *why* a particular product or price is being recommended.
- Organisations should address privacy-related concerns by strengthening their data protection measures and clearly communicating to users how their information is safeguarded.
- Organizations should ensure AI pricing algorithms are regularly audited to avoid unfair or biased pricing.

CONCLUSION

The study offers a clear insight into how consumers perceive and interact with AI recommendations during online shopping. Many respondents report encountering AI-driven suggestions at least occasionally, though not everyone experiences them consistently, indicating that AI is present in many shopping platforms but not universally applied. A substantial proportion of consumers inclined to base their purchasing decisions on AI recommendations, indicating that these tools do influence buying behaviour to some extent Trust in AI recommendations is largely shaped by how well the suggestions are personalized, with additional influence from the accuracy of the recommendations and positive past experiences.

There is also a notable willingness among consumers to pay a premium for products recommended by AI, reflecting the value they associate with personalized suggestions. At the same time, some respondents express concern that they may be unfairly charged more than others due to AI-based pricing, pointing to issues of fairness and transparency. When it comes to the overall usefulness of AI recommendations, opinions are mixed some consumers find them beneficial, while others do not or remain neutral. Ethical considerations also come into play, with a divided view on whether AI-driven price discrimination is acceptable. In summary, while AI is becoming an increasingly influential tool in shaping online shopping behaviour, consumer trust and ethical

concerns remain significant. Addressing these concerns is essential for retailers aiming to enhance customer satisfaction and promote wider acceptance of AI technologies.

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