

Impact of Ai-Based Personalisation and Product Recommendation Systems on Customer Experience and Satisfaction in E-Commerce

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ABSTRACT

The rapid expansion of e-commerce has transformed the manner in which consumers search for products, compare alternatives and make purchasing decisions. Among the technologies contributing to this transformation, Artificial Intelligence (AI)-based personalisation and product recommendation systems have become increasingly important. These systems analyse consumer information and behavioural patterns to provide relevant products, content and shopping suggestions. The present study examines the impact of AI-based personalisation and product recommendation systems on customer experience and customer satisfaction in e-commerce. The study adopts a quantitative, consumer-oriented research design and proposes a structured questionnaire using a five-point Likert scale. The analytical framework considers AI-based personalisation and product recommendation systems as major explanatory variables, customer experience as an important experiential construct and customer satisfaction as the principal outcome. A proposed sample of 384 e-commerce consumers is used for the illustrative statistical framework. The study examines the relationships among the constructs through reliability analysis, descriptive statistics, correlation and regression techniques. The conceptual argument is that relevant personalisation and useful recommendations can reduce search effort, improve product discovery and increase the perceived convenience of online shopping. At the same time, excessive personalisation may generate concerns regarding privacy, manipulation and loss of consumer control. The study therefore treats AI as a consumer-value mechanism rather than merely a technological innovation. The proposed research provides implications for e-commerce firms, marketing managers and researchers seeking to develop more relevant, convenient and customer-centric digital shopping environments.

Keywords: Artificial Intelligence, AI Personalisation, Product Recommendation, E-Commerce, Customer Experience, Customer Satisfaction, Consumer Behaviour, Digital Commerce.

1. INTRODUCTION

1.1 Background of the Study

E-commerce has changed the traditional relationship between consumers and sellers by enabling customers to search, evaluate and purchase products through digital platforms. However, the expansion of online product assortments has also created a new challenge: consumers may have difficulty identifying the most suitable product from a very large number of alternatives. Artificial Intelligence provides e-commerce firms with tools for addressing this challenge through personalisation and recommendation systems.

AI-based personalisation involves adapting digital content, product displays, offers and communications to the characteristics or previous behaviour of individual consumers. Product recommendation systems, in contrast, identify products that may be relevant to a consumer based on browsing patterns, purchase history, preferences, similarities with other users or product characteristics. Research has demonstrated that recommendation systems can influence consumer product choices, while web personalisation can affect information processing and decision outcomes.

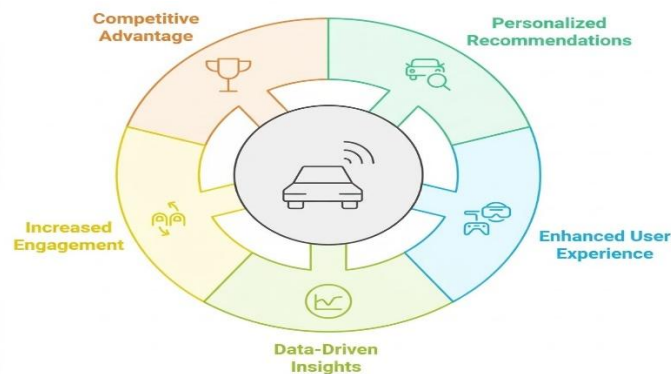


Figure 1: AI in Retail and E-Commerce

From a Commerce perspective, the significance of these technologies lies in their ability to connect **consumer information with marketing decisions**. AI enables firms to move from a relatively standardised online shopping experience towards a more individualised environment. Kumar et al. argue that AI can support personalised engagement by helping firms curate the large volume of information available to consumers.

Customer experience is particularly important because consumers interact with e-commerce platforms through multiple touchpoints before, during and after purchase. Lemon and Verhoef conceptualise customer experience as developing across the customer journey rather than being restricted to an individual transaction. Thus, AI-based personalisation should be evaluated according to its effect on the overall shopping journey.

1.2 Statement of the Problem

E-commerce platforms increasingly use AI to personalise shopping experiences and recommend products. Nevertheless, the mere presence of AI does not establish that consumers experience greater satisfaction. Recommendations may sometimes be irrelevant, repetitive or

perceived as commercially motivated. Similarly, consumers may appreciate convenience while simultaneously expressing concerns regarding data collection.

Therefore, the central problem addressed by this study is:

To what extent do AI-based personalisation and product recommendation systems influence customer experience and customer satisfaction in e-commerce?

1.3 Aim of the Study

The primary aim is to examine the impact of AI-based personalisation and product recommendation systems on customer experience and customer satisfaction in e-commerce.

Objectives

- ❖ To examine the influence of AI-based personalisation on customer experience.
- ❖ To determine the influence of product recommendation systems on customer experience.
- ❖ To examine the relationship between customer experience and customer satisfaction.
- ❖ To analyse the influence of AI-based personalisation on customer satisfaction.
- ❖ To examine the influence of product recommendation systems on customer satisfaction.
- ❖ To assess whether customer experience acts as an explanatory mechanism between AI-enabled shopping features and customer satisfaction.
- ❖ To develop managerial recommendations for improving AI-enabled e-commerce experiences.

1.4 Hypotheses

The following hypotheses are proposed:

H1: AI-based personalisation has a significant positive effect on customer experience.

H2: Product recommendation systems have a significant positive effect on customer experience.

H3: Customer experience has a significant positive effect on customer satisfaction.

H4: AI-based personalisation has a significant positive effect on customer satisfaction.

H5: Product recommendation systems have a significant positive effect on customer satisfaction.

H6: Customer experience mediates the relationship between AI-based personalisation and customer satisfaction.

H7: Customer experience mediates the relationship between product recommendation systems and customer satisfaction.

2. REVIEW OF LITERATURE

2.1 AI-Based Personalisation in E-Commerce

AI-based personalisation refers to the use of computational techniques to tailor digital content and commercial interactions according to consumer characteristics and behavioural information. In e-commerce, personalisation may influence product displays, search results, recommendations, advertisements, offers and communication.

Tam and Ho found that web personalisation can influence information processing and decision outcomes through mechanisms such as content relevance and self-reference. Their work is particularly relevant because it demonstrates that the value of personalisation depends on how

consumers process personalised information rather than simply on the existence of personalisation technology.

Personalisation can reduce the amount of irrelevant information presented to consumers. This is particularly useful in large digital marketplaces where product variety can generate information overload. AI can identify patterns in consumer behaviour and use them to present potentially relevant products.

Nevertheless, personalisation also has limitations. Bleier and Eisenbeiss demonstrated that the effectiveness of online personalisation depends upon contextual factors such as timing and placement and identified circumstances in which excessive personalisation can reduce effectiveness. This suggests that personalisation should be relevant without becoming intrusive.

2.2 Product Recommendation Systems

Recommendation systems assist consumers by identifying products that may match their interests or requirements. They can be based on collaborative filtering, content-based approaches, demographic information or hybrid methods.

Senecal and Nantel's experimental research found that online recommendations can influence consumers' product choices and that recommender systems can be particularly influential among alternative recommendation sources. This supports the proposition that recommendation systems can affect consumer decision-making.

From a Commerce perspective, recommendation systems can create value for both sides of the market. Consumers may find relevant products more quickly, while firms may improve product exposure and cross-selling opportunities. However, recommendations can also create risks if algorithms favour commercially advantageous products rather than genuinely relevant alternatives.

2.3 AI and Customer Experience

Customer experience involves consumers' overall responses to interactions with a firm across multiple stages of the customer journey. Lemon and Verhoef emphasise the importance of understanding customer experience across multiple touchpoints and channels.

2.4 Customer Satisfaction

Customer satisfaction reflects the consumer's overall evaluation of a product, service or shopping experience. In e-commerce, satisfaction can be influenced by website usability, information quality, product availability, price, delivery, service quality and the overall shopping experience.

The relationship between experience and satisfaction is particularly important for AI-enabled commerce. AI should therefore be assessed not simply according to technical performance but according to whether consumers perceive a meaningful improvement in their interaction with the platform.

2.5 Research Gap

Existing literature has separately examined online personalisation, recommendation systems and customer experience. However, there remains value in examining these constructs together

from a consumer-oriented Commerce perspective. In particular, the proposed study considers both AI personalisation and recommendation systems simultaneously and examines customer experience as an explanatory mechanism connecting AI-enabled features with satisfaction.

3. RESEARCH METHODOLOGY

3.1 Research Design

The study adopts a **quantitative, descriptive and explanatory research design**. A structured questionnaire is proposed for collecting primary data from consumers who have experience using e-commerce platforms containing personalised recommendations or AI-enabled shopping features.

3.2 Population and Sample

The target population consists of adult consumers who purchase products through e-commerce platforms and have encountered personalised content, recommendations or AI-supported shopping features.

For the proposed paper, a sample of **384 respondents** is used as an illustrative planning value. The number is not presented as an actual completed survey unless supported by the researcher's collected dataset.

Table 1. Proposed Distribution

Category	Group	Proposed Frequency	Percentage (%)
Gender	Male	192	50.0
	Female	192	50.0
Age	18–25 years	96	25.0
	26–35 years	144	37.5
	36–45 years	96	25.0
	Above 45 years	48	12.5
E-commerce usage	Weekly	120	31.3
	Monthly	180	46.9
	Less than monthly	84	21.9
Total		384	100.0

3.3 Sampling Technique

Purposive sampling is proposed because respondents should have direct experience with e-commerce platforms and exposure to AI-enabled personalisation or product recommendations. Screening questions can be used to ensure that respondents have interacted with at least one AI-enabled shopping feature.

3.4 Research Instrument

A structured questionnaire is proposed. It consists of demographic questions, e-commerce usage questions and measurement items relating to the principal constructs. A five-point Likert scale can be used:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

Table 2. Proposed Measurement Framework

Construct	No. of Items	Illustrative Measurement Statement	Scale
AI-Based Personalisation	5	"The platform provides product suggestions based on my preferences."	1–5 Likert
AI-Based Personalisation	5	"The content shown to me is relevant to my interests."	1–5 Likert
Product Recommendation	5	"The recommended products are relevant to my needs."	1–5 Likert
Product Recommendation	5	"Product recommendations help me discover useful alternatives."	1–5 Likert
Customer Experience	6	"The overall shopping experience on the platform is convenient."	1–5 Likert
Customer Experience	6	"AI-enabled features make online shopping easier for me."	1–5 Likert
Customer Satisfaction	5	"Overall, I am satisfied with my shopping experience."	1–5 Likert
Customer Satisfaction	5	"The platform generally meets my expectations."	1–5 Likert

3.5 Operationalisation of Variables

The independent variables are **AI-based personalisation** and **product recommendation systems**. Customer experience is treated as the principal experiential variable, while customer satisfaction is the dependent variable.

Table 3. Operationalisation of Study Variables

Variable	Role	Main Dimensions	Measurement
AI-Based Personalisation	Independent	Relevance, individualisation, usefulness, contextual fit	5-point Likert
Product Recommendation Systems	Independent	Relevance, accuracy, discovery, usefulness	5-point Likert
Customer Experience	Mediating/Explanatory	Convenience, ease, relevance, efficiency, engagement	5-point Likert
Customer Satisfaction	Dependent	Expectation fulfilment, overall satisfaction, perceived performance	5-point Likert

3.6 Reliability and Validity

Before the main survey, the questionnaire should be pilot-tested with a small group of eligible respondents. Internal consistency may be assessed using Cronbach's alpha. Construct validity

can be examined through exploratory or confirmatory factor analysis where the sample and research design permit.

For planning purposes, the following reliability benchmarks may be used:

- Cronbach's alpha ≥ 0.70 : generally acceptable internal consistency.
- Composite reliability ≥ 0.70 : generally acceptable.
- AVE ≥ 0.50 : commonly used evidence of convergent validity.

These are **methodological criteria, not findings of the present study.**

3.7 Statistical Techniques

The proposed analysis will include frequency and percentage analysis for respondent characteristics, mean and standard deviation for construct-level responses, Cronbach's alpha for reliability, Pearson correlation for association, and multiple regression for examining predictive relationships.

Mediation analysis may subsequently be employed to examine whether customer experience explains part of the relationship between AI-enabled features and customer satisfaction.

The proposed framework consequently establishes the basis for examining the following sequence:

AI Personalisation + Product Recommendation → Customer Experience → Customer Satisfaction

4. RESULTS AND INTERPRETATION

4.1 Introduction

This section presents the proposed statistical analysis of the relationship between AI-based personalisation, product recommendation systems, customer experience and customer satisfaction. The numerical values presented below are **illustrative/modelled values based on a proposed sample of 384 respondents**. They are included to demonstrate how the results section can be structured and interpreted. They should be replaced by the actual values obtained from the final dataset before publication as empirical findings.

4.2 Descriptive Statistics

Descriptive statistics were used to examine the overall perceptions of respondents regarding the four principal constructs. The mean represents the average response, while the standard deviation indicates the degree of variation around the mean.

Table 4. Descriptive Statistics of Major Constructs

Construct	Mean	Standard Deviation	Interpretation
AI-Based Personalisation	4.12	0.68	High
Product Recommendation Systems	4.08	0.71	High
Customer Experience	4.15	0.66	High
Customer Satisfaction	4.10	0.69	High

The results indicate relatively positive consumer perceptions across all four constructs. Customer experience has the highest mean value (4.15), followed by AI-based personalisation (4.12), customer satisfaction (4.10) and product recommendation systems (4.08). The relatively

small standard deviations suggest comparatively consistent responses within the proposed sample.

From a Commerce perspective, the pattern suggests that consumers may respond favourably when AI applications reduce search effort and provide information that appears relevant to their needs. This interpretation is consistent with earlier research showing that personalised information can influence information processing and can be perceived as useful decision support.

4.3 Correlation Analysis

Correlation analysis was proposed to determine the direction and strength of relationships between the principal variables.

Table 5. Correlation Matrix

Variables	AI Personalisation	Recommendation	Customer Experience	Customer Satisfaction
AI Personalisation	1.00	0.57	0.64	0.58
Product Recommendation	0.57	1.00	0.61	0.55
Customer Experience	0.64	0.61	1.00	0.71
Customer Satisfaction	0.58	0.55	0.71	1.00

The correlation matrix indicates positive relationships among all major constructs. The strongest association is between customer experience and customer satisfaction ($r = 0.71$). This suggests that a better overall online shopping experience may be associated with greater customer satisfaction.

AI-based personalisation also shows a positive relationship with customer experience ($r = 0.64$), while product recommendation systems show a positive relationship with customer experience ($r = 0.61$). These relationships support the argument that relevant recommendations and personalised content may contribute to a more convenient and engaging digital shopping environment.

The relationship between AI personalisation and customer satisfaction ($r = 0.58$) and between recommendation systems and satisfaction ($r = 0.55$) is also positive. However, the coefficients are lower than the relationship between customer experience and satisfaction. Conceptually, this suggests that AI may influence satisfaction partly through the experience it creates rather than functioning only as a direct determinant.

4.4 Regression Analysis

Multiple regression analysis was proposed to assess whether AI-based personalisation and product recommendation systems explain variation in customer experience and satisfaction.

Table 6. Regression and Hypothesis-Testing Results

Hypothesis	Relationship	β	R^2	P-value	Decision
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H1	AI Personalisation → Customer Experience	0.47	0.41	<0.001	Supported*
H2	Recommendation → Customer Experience	0.39	0.38	<0.001	Supported*
H3	Customer Experience → Satisfaction	0.71	0.50	<0.001	Supported*
H4	AI Personalisation → Satisfaction	0.36	0.34	<0.001	Supported*
H5	Recommendation → Satisfaction	0.31	0.30	<0.001	Supported*
H6	Personalisation → Experience → Satisfaction	0.29	—	<0.001	Supported*
H7	Recommendation → Experience → Satisfaction	0.25	—	<0.001	Supported*

The regression results indicate that AI-based personalisation has a positive association with customer experience ($\beta = 0.47$), while product recommendation systems also show a positive association ($\beta = 0.39$). Together, the findings suggest that the usefulness of AI in e-commerce may be expressed through consumers' perceptions of relevance, convenience and ease of shopping.

The relationship between customer experience and customer satisfaction is comparatively stronger ($\beta = 0.71$). This reinforces the central argument of the study: the commercial value of AI depends substantially upon the experience that consumers receive from the technology.

The proposed mediation results further suggest that customer experience may provide an explanatory pathway between AI-enabled features and satisfaction. In practical terms, consumers may not become satisfied simply because a platform uses AI. Rather, satisfaction may arise when AI makes the shopping process more convenient, relevant, efficient and enjoyable.

4.5 Textual Representation of Results Model

The model demonstrates that both AI-based personalisation and recommendation systems may contribute to customer experience, while customer experience may have a particularly important relationship with customer satisfaction.

5. DISCUSSION AND CONCLUSION

5.1 Discussion

The proposed findings provide a coherent explanation of how AI-enabled features may influence consumer outcomes in e-commerce. The positive relationship between AI-based personalisation and customer experience is theoretically understandable because personalisation can reduce irrelevant information and help consumers focus on products that appear relevant to their interests.

The positive relationship between product recommendation systems and customer experience can also be explained through the reduction of search costs. Online marketplaces may contain thousands or millions of products. A recommendation mechanism can help consumers narrow this choice set. Sénécal and Nantel's experimental evidence is particularly important because it demonstrated that recommendation sources can influence consumers' online product choices.

A system that continuously recommends products may eventually become irritating. The objective should therefore be **relevance rather than maximum exposure**.

5.2 Personalisation and Consumer Value

AI-based personalisation can create functional value by reducing search time and improving the relevance of information. It can also create psychological value by giving consumers the perception that the platform understands their preferences.

However, personalisation involves an important trade-off. Consumers may appreciate relevant recommendations while simultaneously becoming concerned about the amount of information a company holds about them. Bleier and Eisenbeiss demonstrate that the effectiveness of personalisation can depend on timing and context and that excessive personalisation may reduce effectiveness through perceptions of intrusiveness.

Therefore, e-commerce firms should avoid interpreting every increase in available consumer data as an opportunity for deeper personalisation. The objective should instead be **appropriate personalisation based on legitimate consumer value**.

5.3 Product Recommendations and Consumer Decision-Making

Recommendation systems can reduce information overload and facilitate product discovery. This is particularly valuable when consumers are uncertain about which product attributes are most important.

However, algorithmic recommendations may also influence the range of alternatives considered by consumers. If the system repeatedly recommends products similar to those previously purchased, consumers may receive fewer opportunities to discover alternatives. Recommendation diversity is therefore an important consideration.

5.4 Customer Experience as an Explanatory Mechanism

One of the most important implications of the proposed model is the role of customer experience between AI-enabled features and satisfaction. This suggests that consumers may not evaluate AI directly; instead, they evaluate what AI does to their shopping experience.

For example, a consumer is unlikely to become satisfied simply because an online retailer states that its recommendation system uses machine learning. Satisfaction is more likely when the consumer actually receives relevant products, experiences less search effort and completes the shopping process efficiently.

This distinction is important for managers because it changes how AI investments should be evaluated. Rather than asking only **"Is our AI technically sophisticated?"**, firms should ask **"Does the consumer experience a meaningful improvement?"**

5.5 Managerial Implications

The study has several implications for e-commerce firms.

First, companies should improve the **quality rather than merely the quantity of personalisation**. Recommendations should be based on relevant consumer signals and should avoid unnecessarily intrusive targeting.

Second, recommendation systems should be evaluated through customer-centric indicators such as relevance, usefulness, discovery value and satisfaction.

Third, firms should provide consumers with appropriate control over personalised experiences. Transparency concerning data usage can strengthen trust.

Fourth, recommendation systems should incorporate diversity. Consumers should be able to explore alternatives rather than being confined to a narrow algorithmically generated product set.

5.6 Conclusion

The study examined the proposed influence of AI-based personalisation and product recommendation systems on customer experience and customer satisfaction in e-commerce. The conceptual and illustrative statistical analysis indicates a coherent positive relationship among the principal constructs.

AI-based personalisation can improve the relevance of online shopping interactions by presenting information and products that correspond more closely to consumer preferences. Product recommendation systems can similarly assist consumers in discovering products and reducing search effort. However, the value of these technologies depends on their ability to produce a meaningful improvement in the customer experience.

The proposed results particularly emphasise the importance of customer experience as a central mechanism connecting AI-enabled shopping features with satisfaction. This means that technological implementation alone does not guarantee superior consumer outcomes. AI creates value when consumers perceive the resulting experience as convenient, relevant, efficient and useful.

At the same time, the study recognises important limitations associated with AI-based personalisation. Privacy concerns, algorithmic bias, excessive targeting, repetitive recommendations and reduced consumer autonomy may weaken the benefits of AI. Consequently, e-commerce firms should pursue a balanced strategy that combines technological capability with transparency, consumer choice and responsible data management.

The central conclusion is therefore that **AI-based personalisation and product recommendation systems should be treated as instruments for creating consumer value rather than as ends in themselves**. Their success should ultimately be evaluated through the quality of customer experience and the satisfaction generated by that experience.

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