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Impact of Product Recommendations on Customer Satisfaction in Online Shopping: A Study of Customers in Sikkim

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ABSTRACT

This study investigates the impact of product recommendation systems on customer satisfaction and loyalty in online shopping, with a specific focus on consumers in Sikkim, India. As e-commerce platforms increasingly leverage artificial intelligence and machine learning algorithms to deliver personalized recommendations, understanding their effect on consumer behaviour becomes crucial — particularly in emerging regional markets that remain understudied in existing literature.

An empirical survey was conducted across Sikkim's districts, encompassing respondents from diverse demographic segments including students, government employees, private sector workers, and business owners. The structured questionnaire, divided into eight sections, explored respondents' e-commerce usage behaviour, awareness of recommendation systems, impact on satisfaction and loyalty, trust and privacy concerns, and purchase decision influences.

The findings reveal that the majority of respondents are aware of personalized recommendation features and frequently encounter 'Customers also bought' and 'Based on your browsing history' suggestions. Platforms like Amazon and Flipkart dominate usage. Respondents generally agree that relevant recommendations save time, improve product discovery, and foster platform loyalty. However, privacy concerns and frustration caused by irrelevant recommendations remain significant barriers. The study recommends that e-commerce platforms improve algorithmic accuracy, increase data transparency, and localize recommendation strategies for Sikkim consumers.

Keywords: Product Recommendations, Customer Satisfaction, E-commerce, Consumer Loyalty, Sikkim, Personalization, AI Recommendations, Online Shopping Behaviour.

INTRODUCTION

The rapid proliferation of internet connectivity and smartphone adoption across India has transformed the retail landscape. E-commerce, once considered a privilege of metropolitan consumers, has now permeated smaller towns and northeastern states such as Sikkim. Consumers in these regions are increasingly turning to platforms like Amazon, Flipkart, Meesho, and Myntra for everyday shopping needs.

At the heart of the modern e-commerce experience lies the product recommendation engine — an intelligent algorithmic system that tracks user behaviour, browsing history, purchase patterns, and preferences to suggest relevant products. These systems have become indispensable tools for platforms seeking to enhance user experience, drive repeat purchases, and foster long-term customer loyalty.

Despite extensive global research on recommendation systems, regional specifics — particularly in northeastern India — remain largely underexplored. Sikkim, with its unique cultural diversity, growing youth population, and increasing digital adoption, presents a compelling context for such a study. This research, conducted at Medhavi Skills University, Sikkim, aims to empirically examine the relationship between product recommendation systems and customer satisfaction, with secondary attention to loyalty, trust, and purchase decision behaviour.

LITERATURE SURVEY

Evolution of Recommendation Systems in E-Commerce

Recommendation systems have evolved significantly since their early collaborative filtering foundations. Resnick et al. (1994) introduced GroupLens, one of the first collaborative filtering systems, paving the way for personalized content delivery. Goldberg et al. (1992) explored how automated systems could predict user preferences based on community ratings. Today's recommendation engines combine collaborative filtering, content-based filtering, and deep learning to deliver highly accurate personalized suggestions.

Impact on Customer Satisfaction

Xiao and Benbasat (2007) argued that recommendation quality directly influences user trust and satisfaction. Kim and Kim (2019) demonstrated that perceived relevance of

recommendations significantly elevates hedonic and utilitarian satisfaction. Pu, Chen, and Hu (2011) developed the ResQue model to evaluate the quality of recommender systems from a user perspective, finding that system accuracy was the primary driver of overall satisfaction.

3.3 Consumer Loyalty and Repeat Purchase Behaviour

Gefen, Karahanna, and Straub (2003) established that personalized interaction fosters trust, which in turn encourages loyalty. Pavlou (2003) found that the ease of navigation facilitated by relevant recommendations reduces cognitive load, increasing the likelihood of return visits. Gupta and Kim (2007) noted that e-commerce platforms with well-calibrated recommendation engines reported significantly higher Net Promoter Scores among millennial consumers.

3.4 Privacy Concerns and Data Trust

Smith, Milberg, and Burke (1996) identified data collection and unauthorized secondary use as primary privacy concerns. In the context of e-commerce, Awad and Krishnan (2006) found that consumers exhibit a 'privacy paradox' — sharing personal data in exchange for personalization while simultaneously expressing anxiety about data misuse. Sharma and Crossler (2014) highlighted that transparency in data usage policies significantly mitigates privacy-related resistance.

3.5 Regional Consumer Behaviour in Northeast India

Research on digital consumer behaviour in northeastern India, particularly Sikkim, remains sparse. Deb (2020) noted that internet penetration in the northeast grew by over 35% between 2018 and 2022. Chettri and Subba (2021) observed that younger consumers in Sikkim increasingly prefer online marketplaces over physical retail, driven primarily by convenience and product variety.

3.6 Research Gaps

While existing literature extensively covers global and metro-centric consumer responses to recommendation systems, there is a significant paucity of studies focusing on emerging regional markets in India, especially Sikkim. This study seeks to bridge these gaps by examining the intersection of recommendation quality, privacy concerns, and regional consumer loyalty.

Research Methodology

Research Design

This study employs a descriptive and analytical research design. A structured questionnaire-based survey was adopted as the primary data collection instrument, designed to capture both quantitative Likert-scale data and qualitative open-ended responses.

Survey Instrument

The questionnaire comprised 26 questions divided into eight sections:

- Section A: Respondent Profile (demographic data)
- Section B: E-Commerce Usage Behaviour
- Section C: Awareness of Recommendation Systems
- Section D: Impact on Consumer Satisfaction (Likert scale)
- Section E: Impact on Consumer Loyalty (Likert scale)
- Section F: Trust and Privacy Concerns (Likert scale)
- Section G: Purchase Decision Influence
- Section H: Open-Ended Feedback

Sampling

The survey targeted residents across various districts of Sikkim, spanning multiple age groups, occupational categories, and educational backgrounds. Purposive and convenience sampling methods were employed. The survey was distributed digitally via Google Forms (Medhavi Skills University) with 120 respondents.

Data Analysis

Collected data was analysed using frequency distribution, percentage analysis, and mean score computation for Likert-scale items. All results are presented as pie charts, bar graphs, and horizontal bar charts for comprehensive visual interpretation.

The following section presents visual analysis of each survey question through pie charts and bar graphs, accompanied by interpretive commentary.

SECTION A: RESPONDENT PROFILE

Q2: Age Group Distribution

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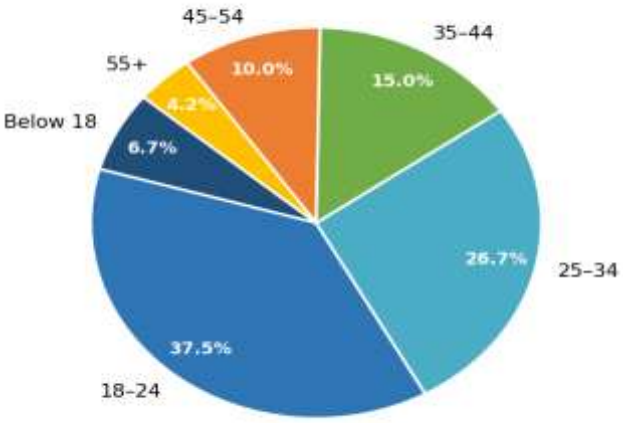
Figure 1: Age Group Distribution

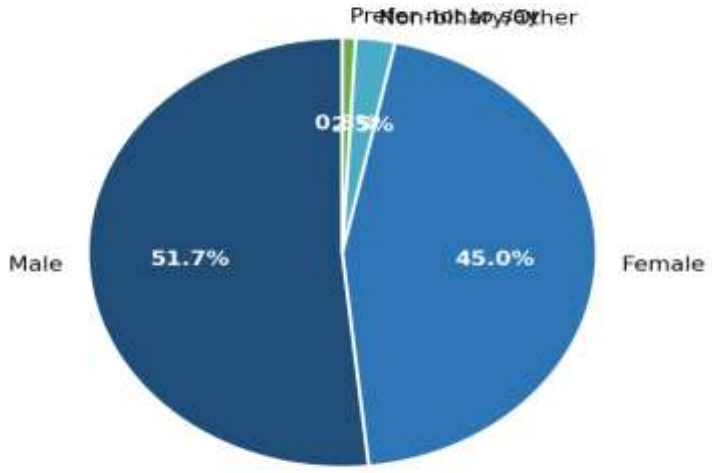


Interpretation: The largest respondent group falls in the 18–24 age bracket (37.5%), followed by 25–34 (26.7%). This indicates that younger consumers dominate e-commerce usage in Sikkim, aligning with national trends of millennial and Gen Z digital adoption.

Q3: Gender Distribution

Interpretation: The gender distribution is nearly balanced with a slight male majority (51.7%). Female respondents account for 45%, demonstrating broad gender-inclusive participation in online shopping.

Figure 2: Gender Distribution



Q6: Occupation of Respondents

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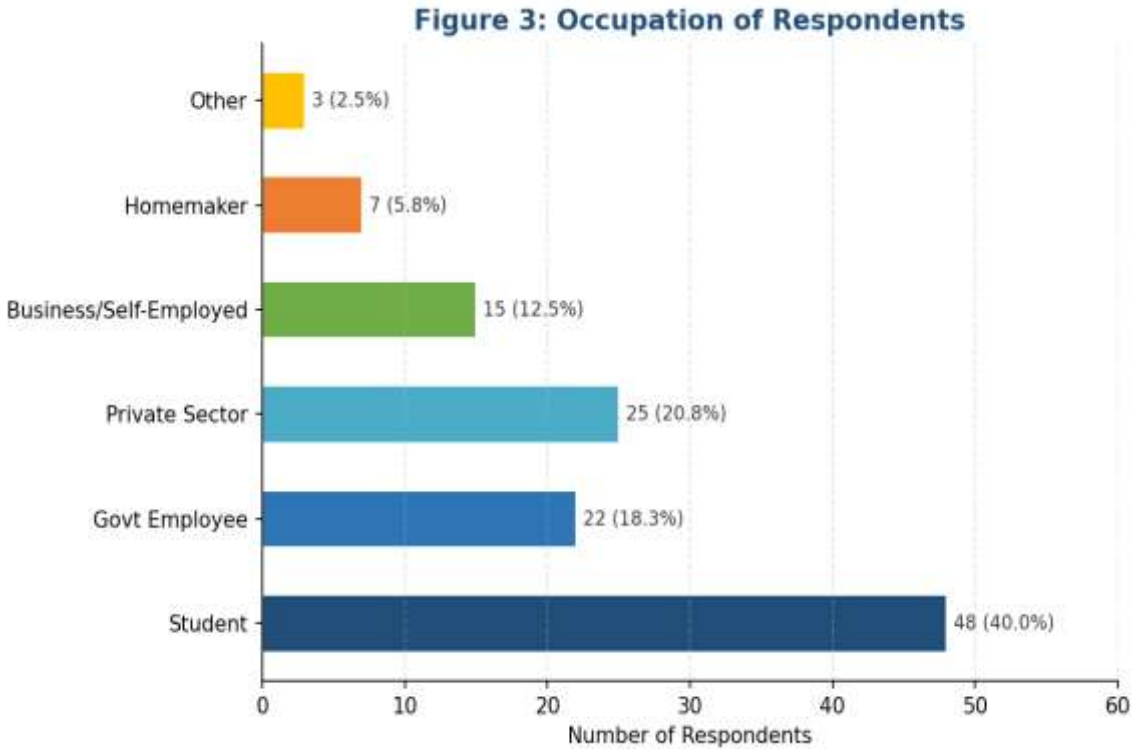
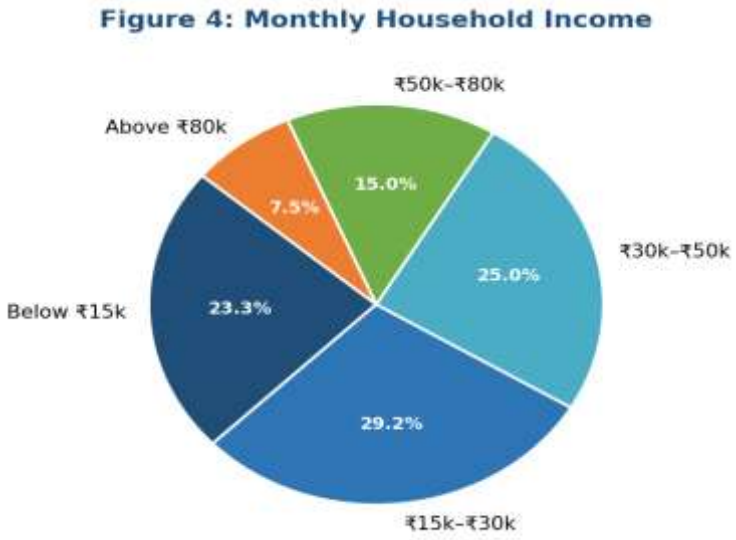


Interpretation: Students constitute the largest segment (40%), emphasizing the dominant role of youth in Sikkim's e-commerce ecosystem. Government and private sector employees together account for 39.1%.

Q7: Monthly Household Income



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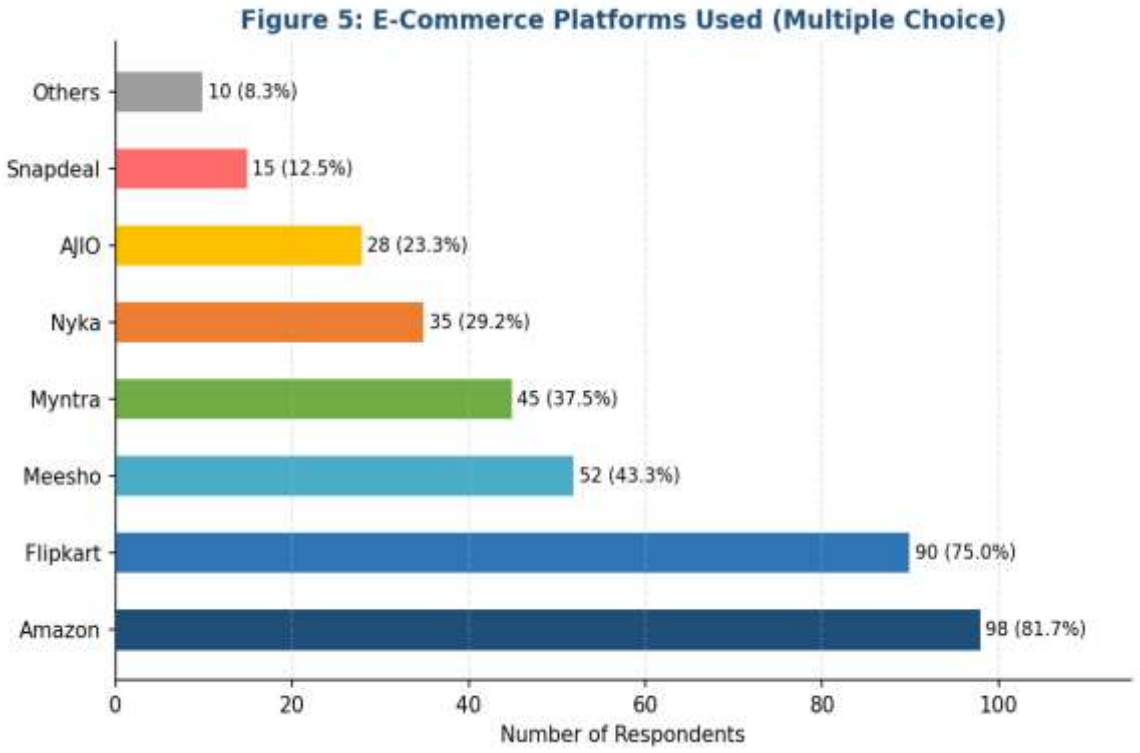
Interpretation: The majority of respondents fall in the ₹15,000–₹50,000 household income range, reflecting Sikkim's middle-income demographic profile and suggesting price-sensitive consumer behaviour.

SECTION B: E-COMMERCE USAGE BEHAVIOUR

Q8: E-Commerce Platforms Used (Multiple Choice)



Interpretation: Amazon (81.7%) and Flipkart (75%) are the most widely used platforms, followed by Meesho and Myntra. This confirms the dominance of established marketplaces among Sikkim's online shoppers.

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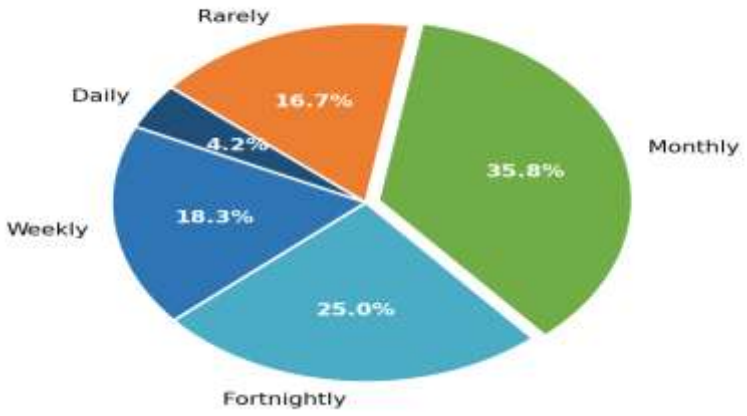
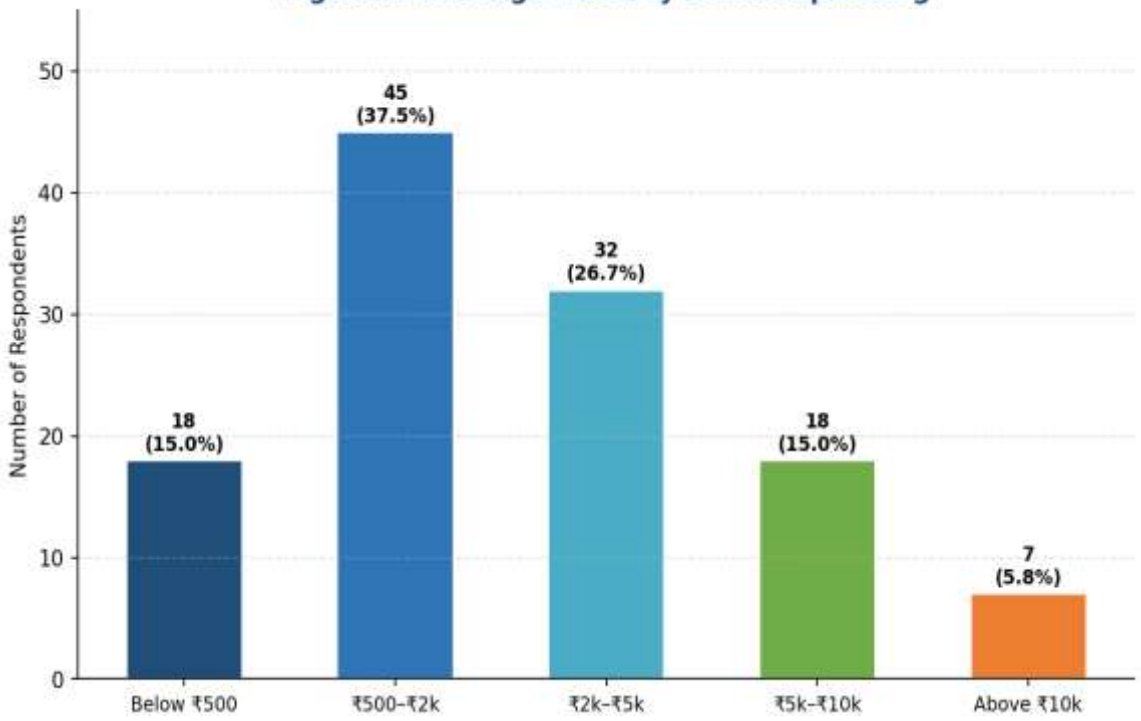
Figure 6: Frequency of Online Shopping



Interpretation: Monthly shopping is the most prevalent pattern (35.8%), followed by fortnightly (25%). This suggests moderate-to-regular online purchase behaviour among Sikkim consumers.

Q11: Average Monthly Online Spending

Figure 7: Average Monthly Online Spending

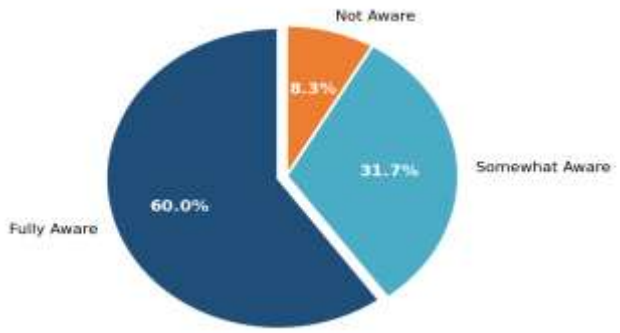


Interpretation: Most respondents (37.5%) spend between ₹500–₹2,000 per month online, indicating a price-conscious consumer base with moderate spending capacity. This has direct implications for discount-based recommendation strategies.

Section C: Awareness of Recommendation Systems

Q12: Awareness of Personalized Recommendations

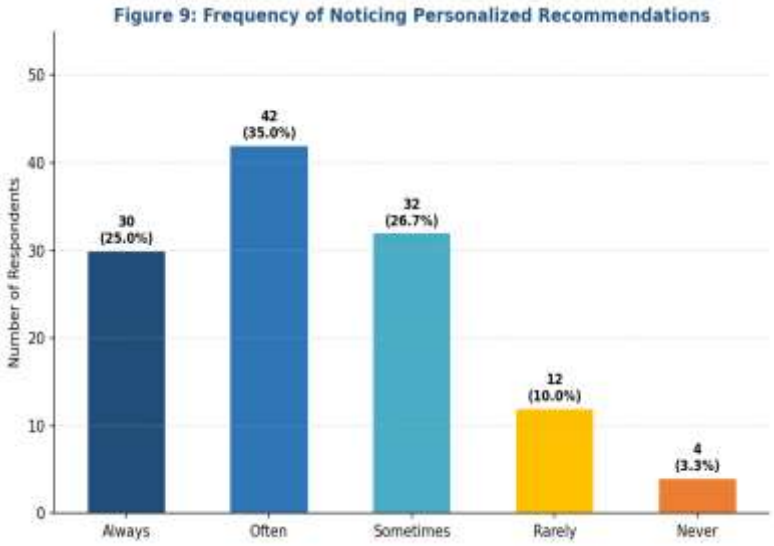
Figure 8: Awareness of Recommendation Systems



Interpretation: 91.7% of respondents are at least somewhat aware of personalized product recommendations, reflecting high digital literacy among Sikkim's online shoppers and validating the importance of recommendation quality.

Q13: Frequency of Noticing Recommendations

Figure 9: Frequency of Noticing Personalized Recommendations

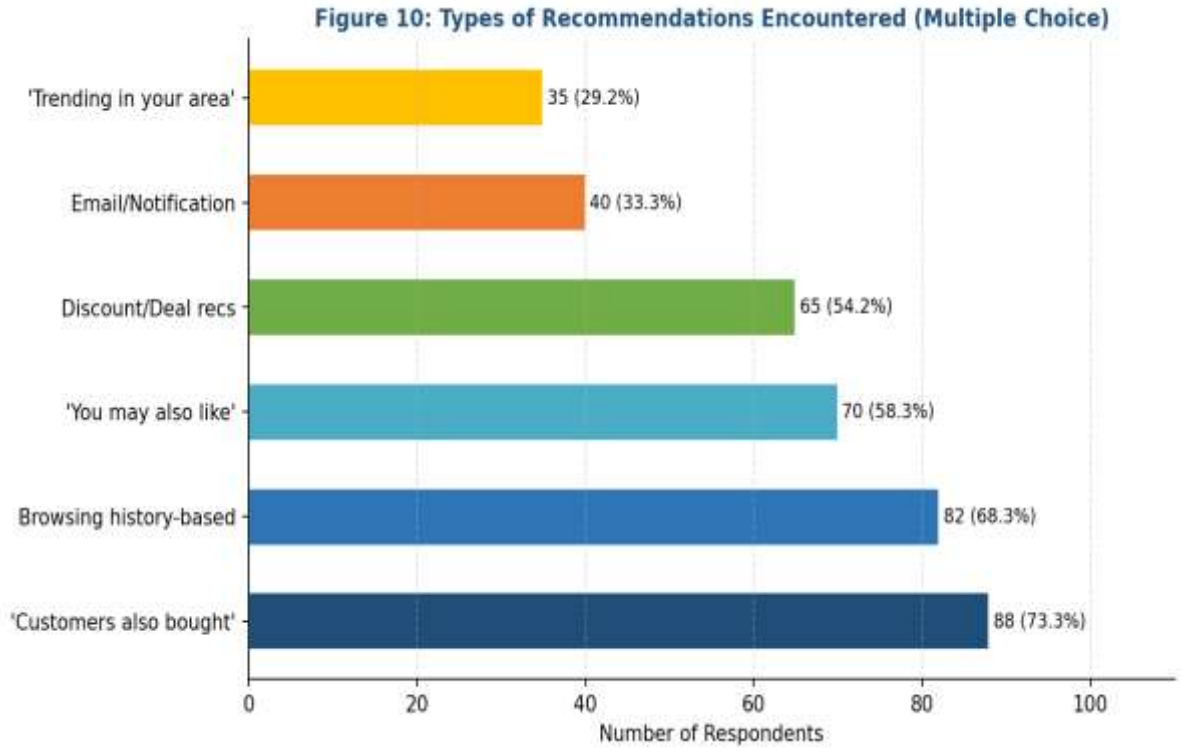


Interpretation: 86.7% of respondents always, often, or sometimes notice personalized recommendations, confirming their ubiquitous presence in the e-commerce experience across

all platforms.

Q14: Types of Recommendations Encountered Most Often (Multiple Choice)

Interpretation: 'Customers also bought' (73.3%) and browsing-history-based suggestions (68.3%) are most commonly encountered, indicating that social proof and behavioural data-driven recommendations dominate the e-commerce landscape.



SECTION D: IMPACT ON CONSUMER SATISFACTION

Q15: Satisfaction Impact — Likert Scale Mean Scores

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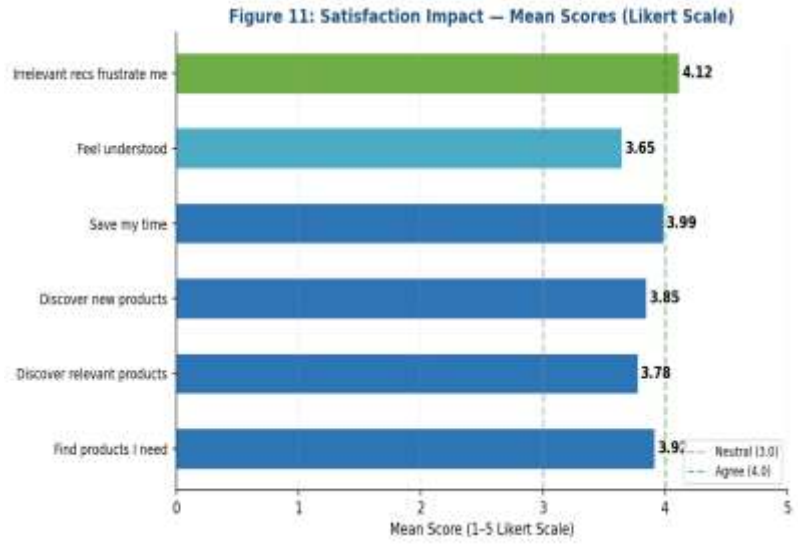


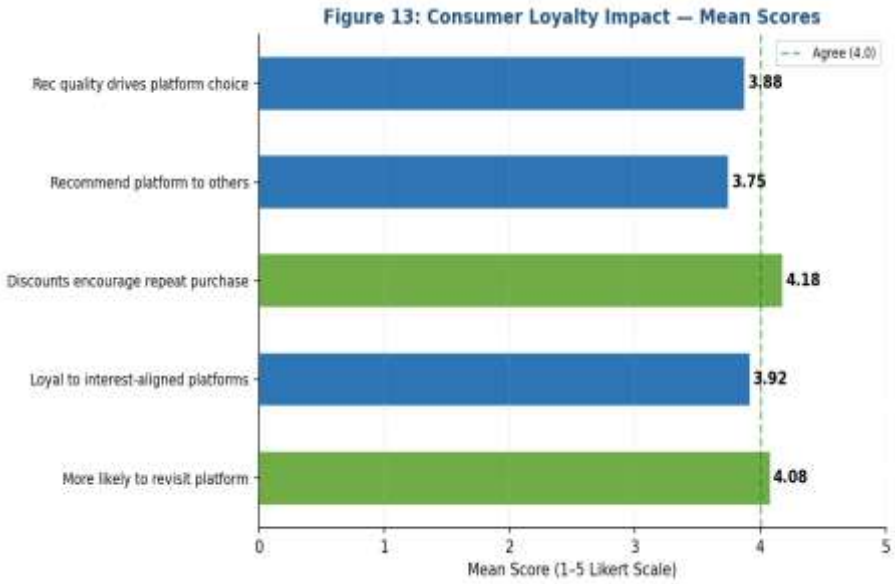
Interpretation: Time-saving was the highest-rated satisfaction benefit (Mean: 3.99), while irrelevant recommendations causing frustration scored highest overall (Mean: 4.12), indicating that poor recommendation quality has a significant negative impact on user experience

Q16: Overall Quality Rating of Recommendations

Interpretation: 60.9% of respondents rated recommendation quality as Good or Excellent (rating 4 or 5), indicating overall satisfaction with current recommendation systems while highlighting room for further improvement

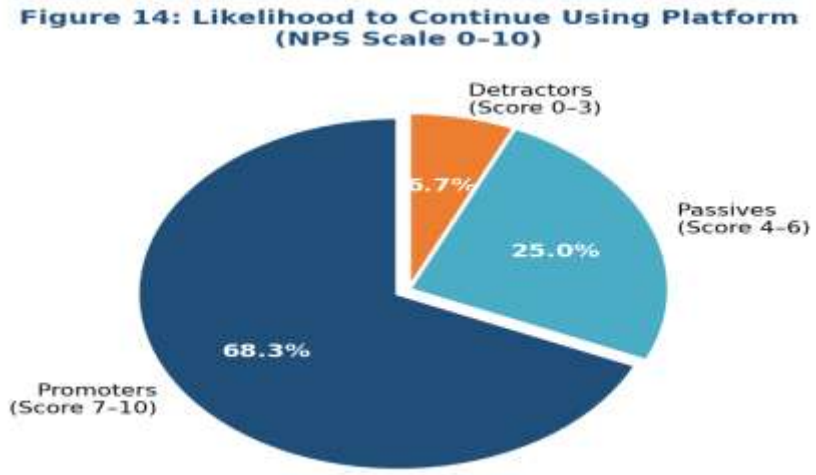
SECTION E: IMPACT ON CONSUMER LOYALTY

Q17: Consumer Loyalty — Likert Scale Mean Scores



Interpretation: Personalized discounts and offers scored highest for loyalty impact (Mean: 4.18), suggesting that price-sensitive Sikkim consumers are particularly responsive to deal-based recommendations. Platform revisit intention also scored strongly (Mean: 4.08).

Q18: Likelihood to Continue Using Platform (NPS Scale 0–10)



Interpretation: 68.3% of respondents are promoters — highly likely to continue using a platform due to recommendation quality — yielding an indicative NPS of approximately +61.6, a strong loyalty signal for e-commerce platforms

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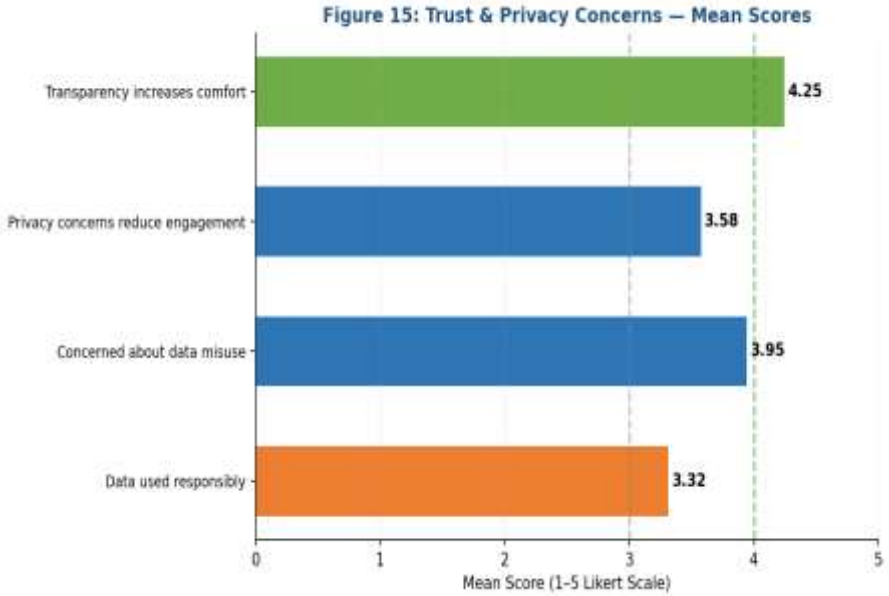
SECTION F: TRUST AND PRIVACY CONCERNS

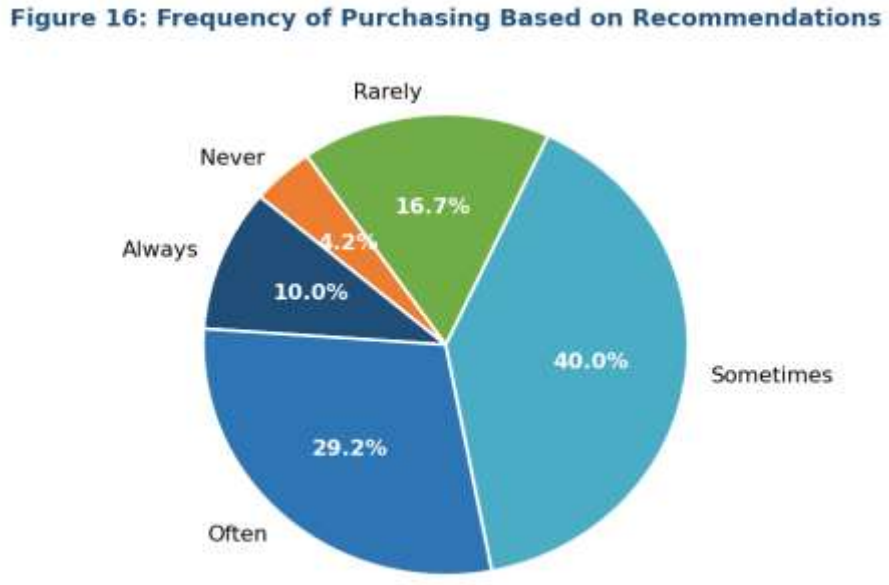
Q19: Trust & Privacy — Likert Scale Mean Scores



Interpretation: Transparency in data policies is the strongest consumer preference (Mean: 4.25), while actual trust in responsible data usage remains moderate (Mean: 3.32). This trust deficit represents a critical strategic opportunity for e-commerce platforms to build deeper consumer confidence.

SECTION G: PURCHASE DECISION INFLUENCE

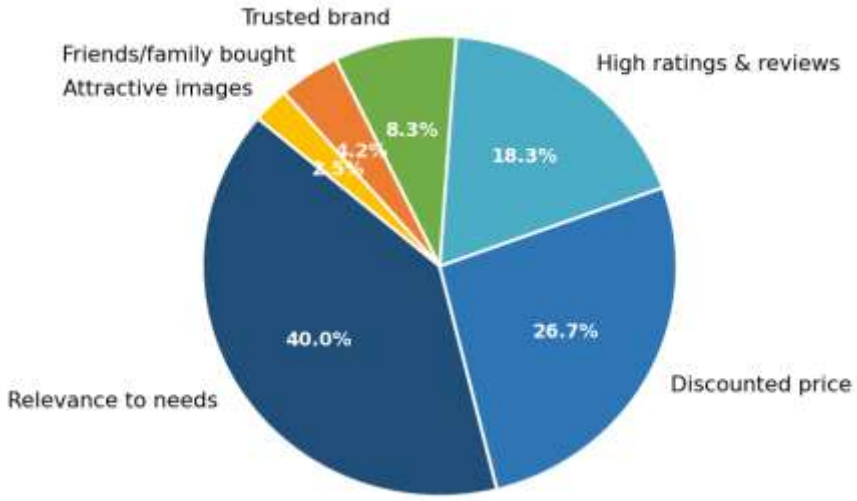
Q20: Frequency of Purchasing Based on Recommendations



Interpretation: 79.2% of respondents sometimes, often, or always make purchases based on recommendations, confirming the direct and significant commercial impact of recommendation systems on actual purchase behavior

Q21: Key Factor Influencing Action on a Recommendation

Figure 17: Key Factor Influencing Purchase Decision



Interpretation:

Relevance to personal needs is the dominant driver of recommendation-led purchases (40%), followed by discounted pricing (26.7%), highlighting the importance of accuracy and value-oriented recommendations for Sikkim consumers

Q22: Overall Satisfaction with E-Commerce

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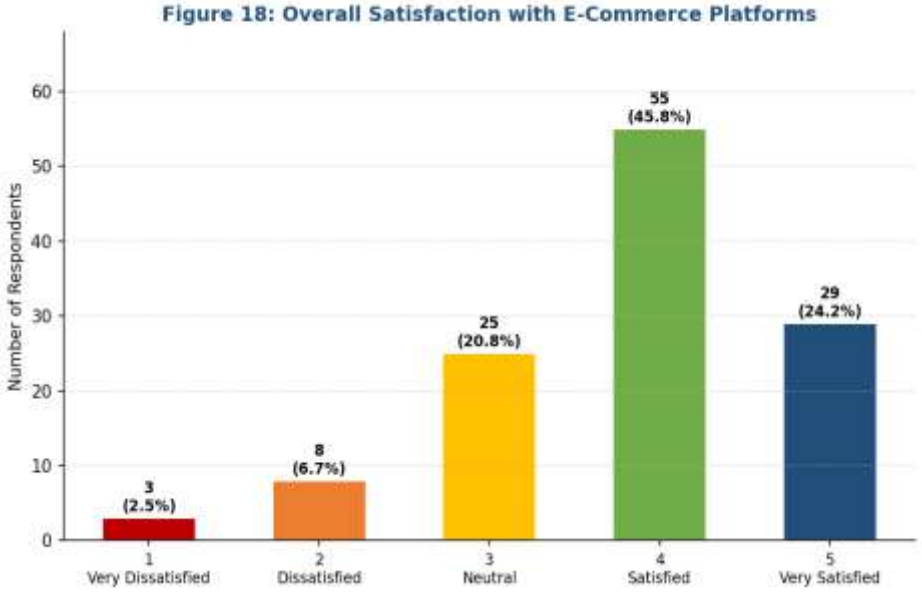
Figure 18: Overall Satisfaction with E-Commerce Platforms



Interpretation: 70% of respondents report being Satisfied or Very Satisfied with their current e-commerce platforms (rating 4 or 5 out of 5), indicating a strong positive overall experience among Sikkim's online shoppers.

FINDINGS AND DISCUSSION

Demographic Profile

Young adults aged 18–34 dominate online shopping activity in Sikkim, supported by high student participation (40%). The near-gender parity indicates broad demographic inclusivity in digital commerce adoption across the region.

Platform Usage and Spending Patterns

Amazon and Flipkart are the preferred platforms. Monthly spending of ₹500–₹2,000 reflects price-sensitive consumer behaviour. This directly implies that value-oriented and discount-based recommendations will resonate more strongly than premium product placements for this demographic.

Recommendation Awareness and Engagement

Over 91.7% of respondents are aware of recommendation systems, and 86.7% notice personalized recommendations with at least some regularity. This high awareness validates recommendation quality as a key competitive differentiator among e-commerce platforms in Sikkim.

Satisfaction Drivers

Time-saving and product discovery are the primary satisfaction benefits attributed to recommendations. The frustration caused by irrelevant recommendations (Mean: 4.12) is the most impactful negative factor, reinforcing the need for improved algorithmic precision and continuous tuning.

Loyalty and NPS

An indicative NPS of +61.6 signals strong platform loyalty influenced by recommendation quality. Personalized discounts are the highest-rated loyalty drivers (Mean: 4.18), suggesting that promotional personalization has particular resonance in Sikkim's price-conscious market.

Trust and Privacy

While consumers express a strong desire for data transparency (Mean: 4.25), actual trust in responsible data usage remains moderate (Mean: 3.32). This gap represents a strategic opportunity for e-commerce platforms to build deeper consumer confidence through clear, accessible privacy policies in regional languages.

RECOMMENDATIONS

- Improve recommendation accuracy by investing in regional machine learning models that account for Sikkim-specific consumer preferences, language, and cultural context.
- Localize recommendation strategies — include products relevant to local festivals, regional brands, and seasonal preferences to improve perceived relevance.
- Enhance data transparency by clearly communicating data usage policies in simple regional language, building consumer trust and reducing privacy-driven disengagement.
- Leverage discount-based recommendations strategically — price-sensitive Sikkim consumers respond strongly to personalized offers and promotional deals.
- Develop user feedback mechanisms that allow consumers to rate or dismiss recommendations, enabling continuous improvement of recommendation quality.
- Expand vernacular and accessibility features to serve older and rural demographic segments who may be underserved by current English-centric recommendation interfaces.
- Invest in post-purchase recommendation quality — relevant complementary product suggestions following a purchase can significantly improve customer lifetime value.

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