

# Root Cause Analysis for the Cart Abandonment

## **Problem Statement:**

E-commerce businesses face considerable revenue leakage due to cart abandonment, where customers add items but do not complete the purchase. At the same time, the absence of structured customer segmentation restricts the ability to deliver personalized marketing campaigns, leading to missed opportunities for customer retention and revenue growth.

## **This project aims to:**

1. Predict cart abandonment using machine learning models to proactively identify at-risk customers and minimize lost sales.
2. Segment customers based on purchasing behavior using clustering techniques, enabling targeted campaigns, personalized product recommendations, and stronger retention strategies.

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## **Clarifying Questions for Root Cause Analysis**

- At what exact stage of the checkout funnel do most customers drop off (payment, shipping, order review)?
- Do mobile users abandon more frequently compared to desktop users?
- Are unexpected costs such as shipping charges, taxes, or hidden fees discouraging customers from completing purchases?
- To what extent do competitor discounts or aggressive pricing influence abandonment rates?
- Is the checkout process overly long, requiring excessive clicks or steps?
- Are there technical issues such as slow page loading, app crashes, or payment gateway errors?
- Do products run out of stock during checkout, creating frustration and abandonment?
- Is abandonment more common for high-value or low-utility items?
- Are there variations in abandonment patterns across different customer segments (age, geography, income level)?
- Are high-value customers (frequent or premium spenders) treated differently from low-value customers during checkout?
- Do certain customer groups respond better to incentives like discounts, loyalty points, or free shipping?

## **Summary**

Cart abandonment is a universal challenge across e-commerce, observed across all product categories, devices, and platforms. Analyzing this phenomenon across demographics, user types, and geographies provides businesses with an opportunity to refine strategies, improve engagement, and enhance purchase completion rates.

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## **High-Level Strategic Importance**

Reducing cart abandonment not only safeguards direct revenue but also strengthens customer trust, repeat purchase behavior, and long-term loyalty. By addressing abandonment drivers across pricing, checkout flow, and overall customer experience, businesses can unlock higher conversion rates while building sustainable competitive advantage.

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## **Factors to Consider**

### **1. System-Related Issues**

- Incorrect or unclear metric definition
- Broken data pipelines
- Timeouts, bugs, or technical errors

### **2. External Factors**

- Competitor pricing and promotions
- Market disruptions such as calamities or shutdowns
- Fraud-related disruptions
- Supply chain or stock availability issues

### **3. Internal Factors**

- Introduction of new features impacting the funnel
  - Checkout funnel complexity or journey gaps
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## **Key Observations from Funnel Journey**

### **1. Traffic Sources:**

- Website traffic originates from 3 main channels:
  1. *Organic* – Direct visitors to the app or website
  2. *Inorganic* – Visitors from platforms such as YouTube, social media, etc.
  3. *Paid Search/Google Ads* – Users landing via promoted search results

- **Observation:** Traffic volumes remain stable across all channels, meaning the problem is not related to acquisition.

## 2. On-Platform Discovery Journey:

- Customers browse via:
  - Search functionality
  - Homepage navigation
  - Personalized recommendation pages
  - Product Listing Page (PLP) with filter/sort options
  - Product Detail Page (PDP) with reviews acting as key trust signals
- **Observation:** The browsing and discovery journey is intact, with no major drop-offs identified.

## 3. Metrics Validation:

- Daily active users, sessions per user, search volumes, CTRs on homepage and recommendations remain healthy.
- No significant changes in zero-search results or low recall searches.
- **Observation:** Customers are finding relevant products and continuing into the journey.

## 4. PLP to PDP Conversion:

- Scroll depth on PLPs shows users are engaged and exploring listings.
- PDP views are stable, with no abnormal drops.
- Add-to-Cart (ATC) rates remain healthy at this stage.
- **Observation:** Users are progressing through discovery to product selection without friction.

## 5. PDP Interactions:

- Customers engage with reviews, view ATC buttons, and click on “Add to Cart” or “Buy Now.”
- Impressions and CTR for these interactions remain consistent.
- **Observation:** Engagement on PDP is strong and conversions to cart are not declining.

## 6. Checkout Metrics:

- A significant drop is observed at the payment stage (clicks, impressions, and CTR).
  - **Result:** The primary bottleneck lies in the payment process, leading to cart abandonment.
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### Hypotheses for Drop at Payment Stage

- **Window Shoppers:** Some customers may only be adding products to the cart for price exploration or future purchase intent, not immediate buying.
  - **Competitor Pricing:** Users might be comparing final prices (including delivery and taxes) with competitors and finding better deals elsewhere.
  - **Late Delivery Issues:** Increased delivery times (e.g., shifting from 1–2 days to 7–10 days) can discourage purchase completion.
  - **Price Fluctuations:** Unexpected additional costs or higher-than-expected taxes during checkout may trigger drop-offs, even if not consistently tied to a specific category.
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### Recommendations to Reduce Cart Abandonment

- Simplify the checkout process to minimize steps and reduce friction.
- Provide transparent pricing with no hidden charges, and communicate total cost earlier in the journey.
- Improve delivery timelines through better logistics partnerships or localized warehousing.
- Introduce price-matching guarantees or targeted discounts to counter competitor pricing.
- Leverage personalized nudges like limited-time offers, free shipping thresholds, or loyalty points for hesitant customers.
- Enhance mobile checkout experience with faster load times and simplified payment options.