Clickstream: E-Commerce Conversion Funnel Analysis

Executive Summary:

Our e-commerce platform receives thousands of user sessions, but only a small percentage convert into purchases.

This project builds a complete Power BI Clickstream Funnel Dashboard that tracks the customer journey across stages — Homepage → Product Page → Add to Cart → Checkout → Purchase — and highlights exactly where users drop off, on which device, and at what cost to the business.

Using 3 datasets (web events, orders, campaign cost), the dashboard identifies critical friction points such as a high mobile drop-off rate and low checkout completion, enabling data-driven decisions to improve conversions and reduce revenue loss.

Business Objective

Modern e-commerce platforms track millions of user interactions, but raw clickstream data is useless unless transformed into actionable insights.

The business wants to answer:

- Where do users drop off in the funnel?
- Which devices perform poorly in checkout?
- Which marketing campaigns drive conversions?
- What is the cost per acquisition (CPA)?
- How does user behavior vary by device, session, campaign, and date?

Goal: Build a dashboard that provides real-time funnel insights and helps the business identify UX issues, campaign inefficiencies, and revenue leaks.

Key Metrics / KPIs

These KPIs measure the performance of the customer journey, marketing efficiency, and overall business health.

1. Sessions

What it measures:

Total number of unique sessions (visits) on the website.

Why it matters:

Represents total opportunities for conversion. Foundation for funnel analysis.

DAX:

Sessions = DISTINCTCOUNT(fWebEvents[session_id])

2. Total Users

What it measures:

Unique users visiting the platform.

Why it matters:

Helps differentiate between repeat and new visitors.

Users = DISTINCTCOUNT(fWebEvents[user_id])

3. Orders

What it measures:

Number of completed purchases.

Why it matters:

Primary indicator of business success.

Orders = DISTINCTCOUNT(fOrders[order_id])

4. Conversion Rate (CVR)

What it measures:

Percentage of sessions that result in a purchase.

Why it matters:

Shows the efficiency of the funnel.

Conversion Rate = DIVIDE([Orders], [Sessions])

5. Revenue

What it measures:

Total money generated from orders.

Why it matters:

Direct measurement of business output.

Revenue = SUM(fOrders[order_value])

6. Average Order Value (AOV)

What it measures:

Average revenue per order.

Why it matters:

Indicates purchasing power and efficiency of upselling.

AOV = DIVIDE([Revenue], [Orders])

7. Cart Abandonment Rate

What it measures:

Percentage of users who add items to cart but don't complete checkout.

Why it matters:

One of the most critical metrics for e-commerce revenue leakage.

Cart Abandonment =

DIVIDE([AddToCart Sessions] - [Purchase Sessions], [AddToCart Sessions])

8. Device Conversion Rate

What it measures:

Conversion % across Desktop, Mobile, Tablet.

Why it matters:

Highlights device-specific performance issues (often mobile UX problems).

Device CVR = DIVIDE([Orders], [Sessions])

9. Cost Per Acquisition (CPA)

What it measures:

Cost to acquire one customer (per order).

Why it matters:

Used to measure marketing efficiency and ROI.

CPA = DIVIDE(SUM(fCampaignCost[cost]), [Orders])

10. CTR (Click-Through Rate)

What it measures:

Effectiveness of marketing campaigns.

Why it matters:

Shows how well ads attract traffic.

CTR = DIVIDE(SUM(fCampaignCost[clicks]), SUM(fCampaignCost[impressions]))

11. Session-to-Add-to-Cart Rate

What it measures:

How many sessions result in adding a product to the cart.

Why it matters:

Shows product page effectiveness.

AddToCart Rate = DIVIDE([AddToCart Sessions], [Sessions])

Insights & Findings

1. Major Funnel Drop Between Add to Cart → Checkout
    - More than half of users abandon during checkout.
    - Indicates UX/payment flow issues.
2. Mobile Users Have 2–3× Higher Drop-Off Rate
    - Checkout performance significantly worse on mobile.
    - Possible UI/lag issues, layout misalignment, or payment gateway problems.
3. Some Campaigns Drive Traffic but Not Conversions
    - High impressions and clicks
    - Low conversion rate → high CPA
    - Marketing waste
4. Sessions Spike During Weekends But Orders Don’t
    - Indicates browsing behavior, not purchase intent
    - Opportunity for targeted promotional campaigns
5. Cart Abandonment Consistently High
    - Requires retargeting workflows
    - Email/SMS reminders may recover lost revenue

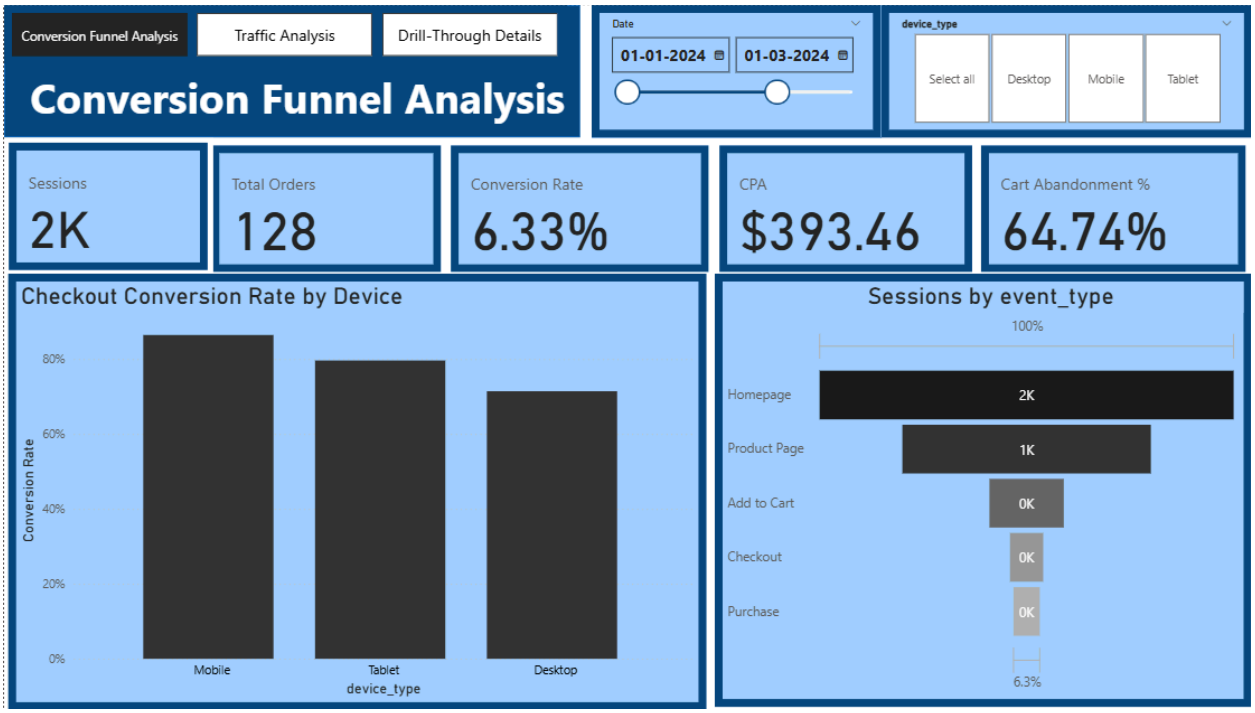
Supporting Visuals

Page 1: Conversion Funnel Overview

Includes:

- Funnel chart (Homepage → Product → Cart → Checkout → Purchase)
- KPI summary bar
- Device slicer
- Date range filter
- Campaign filter

Purpose:
Identify where users drop off and which device performs worst.

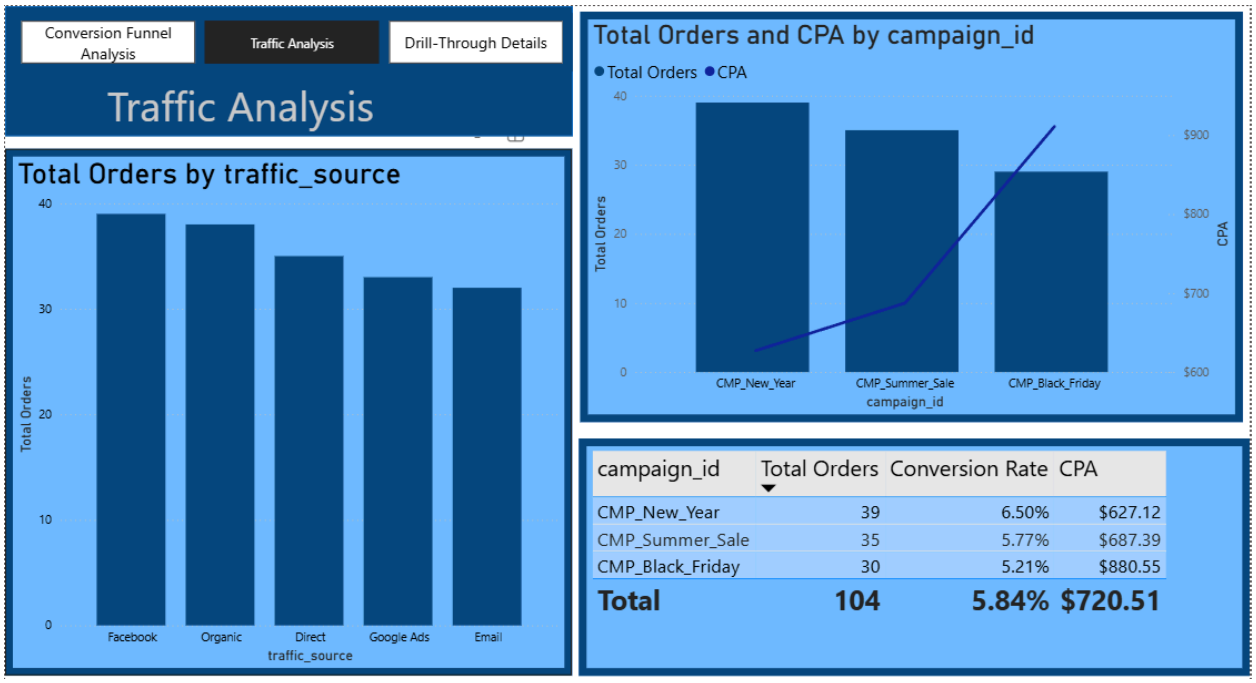


Page 2: Traffic & Campaign Performance

Includes:

- Sessions by traffic source
- Orders by campaign
- CPA & Cost Efficiency
- ROI visualizations

Purpose:
Evaluate marketing performance and optimize budget allocation.



campaign_id	Total Orders	Conversion Rate	CPA
CMP_New_Year	39	6.50%	$627.12
CMP_Summer_Sale	35	5.77%	$687.39
CMP_Black_Friday	30	5.21%	$880.55
Total	**104**	**5.84%**	**$720.51**

Limitations

- No demographic or location data
- Limited behavioral parameters (no scroll depth or heatmap tracking)
- Campaign data may not include ad group or keyword-level granularity
- Sessionization can only be approximate without server logs

Next Steps / Recommendations

- Fix mobile checkout flow
    - Highest priority because mobile drop-off rate is the worst.
- Reallocate marketing budget toward high-converting campaigns
- Introduce A/B testing for product & checkout pages
- Trigger retargeting for users who add items to cart but don't buy
- Add more granular tracking (event_type expansion)
- Integrate user demographic data for better segmentation

Conclusion

The analysis reveals clear behavioral patterns across the user journey, with the most significant drop-off occurring between the Add to Cart and Checkout stages. Mobile users consistently exhibit lower conversion rates, indicating a device-specific friction point likely tied to UI responsiveness or checkout flow performance. Campaign performance analysis shows a mismatch between traffic generation and actual conversions, resulting in elevated CPA for certain marketing channels.

By integrating event-level clickstream data, transactional records, and campaign cost metrics into a unified Power BI model, the funnel visualization provides quantifiable evidence of where the user journey breaks, how device behavior influences outcomes, and which campaigns underperform relative to spend. These insights collectively reveal that the platform's primary bottlenecks are functional (mobile checkout) and strategic (inefficient campaigns).

Addressing these issues—particularly optimizing mobile UX and reallocating marketing spend—would directly increase funnel efficiency, reduce wasted acquisition costs, and improve overall revenue performance.