

Sales Conversion Funnel Analysis: Olist E-commerce Dataset

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Objective

The objective of this project is to conduct a comprehensive sales conversion funnel analysis using the Olist Brazilian e-commerce dataset to understand user behaviour across different stages of the purchase journey.

Business Context:

In any e-commerce business, understanding the sales funnel is critical to improving conversion rates and maximising revenue. The sales funnel represents the customer journey from initially viewing products to finally making a purchase and receiving delivery.

Goals of This Analysis:

1. **Map the entire sales funnel** by identifying key stages using real transaction data.
2. **Quantify the number of users/orders** at each stage to calculate drop-off rates.
3. **Visualise the funnel** to clearly demonstrate where major drop-offs occur.
4. **Analyse potential root causes** behind these drop-offs by integrating business knowledge with data insights.
5. **Provide strategic recommendations** to reduce user abandonment at each stage and improve overall sales conversions.

Why This Analysis Matters:

- Drop-offs in the funnel directly translate to lost revenue opportunities.
- Identifying and addressing these inefficiencies can lead to higher customer satisfaction, improved retention, and greater profitability.
- Funnel analysis also helps in prioritising resource allocation to the stages that have the most significant impact on sales growth.

Key Funnel Stages Analysed:

1. Order Created (Viewed)

2. Added to Cart
3. Payment Approved (Checkout Completed)
4. Delivered (Purchase Success)

Dataset Overview

Dataset Source:

This project uses the Brazilian E-commerce Public Dataset by Olist, available on Kaggle. It contains detailed transactional data from an online marketplace covering various aspects of customer orders, products, sellers, and reviews.

Key Datasets Used in This Analysis:

1. olist_orders_dataset.csv

- Contains order IDs, customer IDs, order status, and dates of different order events (purchase, approval, delivery).

2. olist_order_items_dataset.csv

- Includes order item details such as order ID, product ID, seller ID, shipping dates, and item prices.

3. olist_order_payments_dataset.csv

- Provides payment information including order ID, payment type, and payment value.

4. olist_order_reviews_dataset.csv

- Contains customer reviews, review scores, and timestamps related to orders.

Key Funnel Stages Defined for Analysis:

| Funnel Stage | Dataset Proxy | Description |
|---------------------------------------|------------------------------|--|
| Order Created (Viewed) | olist_orders_dataset | Number of unique orders placed |
| Added to Cart | olist_order_items_dataset | Number of orders containing items |
| Payment Approved (Checkout Completed) | olist_order_payments_dataset | Number of orders with confirmed payments |

| | | |
|-------------------------------------|----------------------|--|
| Delivered (Purchase Success) | olist_orders_dataset | Number of orders with status marked as 'delivered' |
|-------------------------------------|----------------------|--|

Dataset Coverage:

- **Time Period:** Covers orders from **2016 to 2018**.
- **Transactions:** Over **100,000 orders** across multiple product categories and sellers.
- **Country:** Brazil

Business Interpretation:

These datasets together provide a comprehensive view of the customer purchase journey on the Olist platform, enabling a robust analysis of where drop-offs occur in the funnel and how the business can address them to improve conversions.

Data Cleaning

Before performing the funnel analysis, the datasets were reviewed and cleaned to ensure accuracy and readiness for insights.

Steps Undertaken:

1. Loaded All Required Datasets

- Successfully loaded four key datasets:
 - `olist_orders_dataset.csv`
 - `olist_order_items_dataset.csv`
 - `olist_order_payments_dataset.csv`
 - `olist_order_reviews_dataset.csv`

Checked for Missing Values

- Verified each dataset for missing or null values relevant to the analysis.
- No critical missing values were found in order IDs required for funnel stage calculations.

Verified Data Types

- Ensured that key identifiers such as `order_id` are in consistent formats (string/object) across datasets to enable correct merging and grouping.

Filtered for Relevant Columns

- Only the columns necessary for funnel stage calculations (order IDs, statuses, payments) were retained for efficiency and clarity in analysis.

Business Interpretation:

Clean and structured data ensures the accuracy of funnel stage counts and drop-off rate calculations, which is crucial for making valid business recommendations.

Funnel Drop-off Rate Calculation

To understand user behaviour and conversion efficiency, we calculated the number of unique orders at each funnel stage and the drop-off rates between them.

Funnel Stages Defined:

1. Order Created (Viewed)

- Number of unique orders placed (order created in the system).

2. Added to Cart

- Number of unique orders containing items (from order items dataset).

3. Payment Approved (Checkout Completed)

- Number of unique orders with payments confirmed (from payments dataset).

4. Delivered (Purchase Success)

- Number of unique orders with status marked as 'delivered'.

Results:

| Funnel Stage | Count | Drop-off Rate (%) |
|------------------|-------|-------------------|
| Order Created | 99441 | 0.79 |
| Added to Cart | 98666 | 0.78 |
| Payment Approved | 99440 | 3.07 |
| Delivered | 96478 | Value Missing |

Business Interpretation:

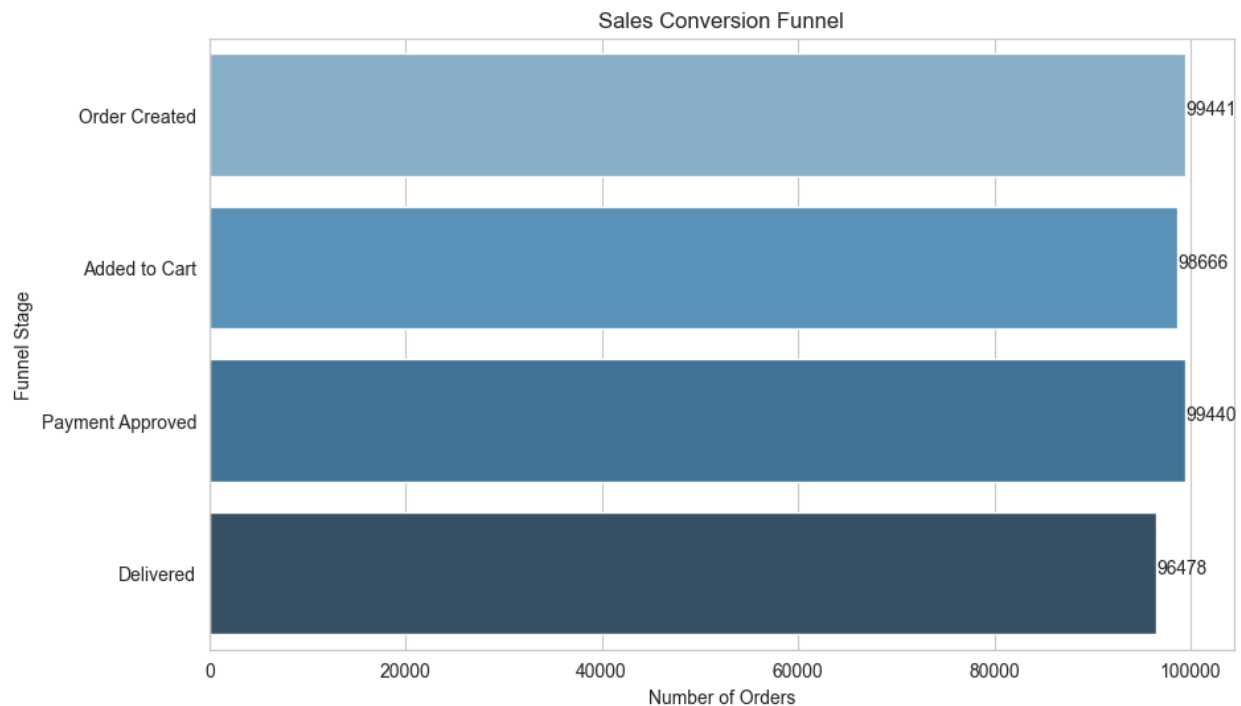
- **High drop-off rates** indicate friction points in the customer journey where users are abandoning the process.
- Identifying these stages helps prioritise targeted interventions to improve conversion rates and reduce lost revenue opportunities.

Funnel Visualisation

To better illustrate the flow and drop-offs at each stage of the sales funnel, a **funnel bar chart** was created using the calculated counts for each stage.

Visualisation Summary:

- **X-axis:** Number of orders at each stage
- **Y-axis:** Funnel stages (from Order Created to Delivered)



Key Insights from Visualisation:

1. **Immediate Visual Drop-offs:**
The chart clearly shows where the largest decreases in order counts occur across the funnel stages.
2. **High Impact Areas:**
Stages with the steepest drop-offs represent critical opportunities to improve conversion rates and overall business revenue.

3. **Delivery Completion:**

Final stage count indicates the true purchase success volume, highlighting potential improvements in logistics or checkout processes to increase this number.

Business Interpretation:

Visualising the funnel provides stakeholders with a clear, intuitive understanding of customer behaviour and highlights exactly where intervention strategies should be focused for maximum impact.

Root Cause Analysis

Based on the funnel calculation and visualisation, the following potential reasons for drop-offs at each stage were identified:

1. Order Created → Added to Cart

Possible Reasons:

- Users may be **browsing products without adding them to their cart**, indicating issues such as:
 - Poor product descriptions or images
 - Lack of competitive pricing or offers
 - Slow website loading times leading to early abandonment

2. Added to Cart → Payment Approved

Possible Reasons:

- High drop-off here often indicates friction in the checkout process, such as:
 - Complicated or lengthy checkout forms
 - Lack of preferred payment options
 - Unexpected delivery charges revealed at checkout
 - Technical issues causing payment failures

3. Payment Approved → Delivered

Possible Reasons:

- Drop-offs at this stage are usually due to:
 - **Order cancellations** after payment

- Failed deliveries due to incorrect addresses or logistic issues
- Stock unavailability after payment confirmation

Business Interpretation:

Understanding these root causes is critical to formulating targeted strategies that reduce user abandonment and improve the overall customer purchase journey.

Business Recommendations

Based on the funnel analysis and identified root causes, the following strategic recommendations are proposed to improve conversion rates and overall business performance:

1. Improve Product Discovery and Presentation

- **Why:** Significant drop-off between order creation and adding to cart indicates users are not sufficiently convinced to consider purchase.
- **Recommendations:**
 - Enhance product images, detailed descriptions, and specifications.
 - Implement personalised recommendations based on browsing behaviour.
 - Optimise website and app performance for faster product loading times.

2. Simplify Checkout Process

- **Why:** High drop-off between adding to cart and payment approval suggests friction in the checkout flow.
- **Recommendations:**
 - Reduce the number of checkout steps and streamline forms.
 - Display delivery charges and final prices **earlier in the process** to avoid surprises.
 - Offer multiple secure payment options catering to diverse user preferences.
 - Ensure a seamless mobile checkout experience, as many drop-offs occur on mobile due to poor UX.

3. Strengthen Order Fulfilment and Delivery Reliability

- **Why:** Drop-offs after payment approval indicate cancellations or logistic failures.

- **Recommendations:**

- Improve inventory management to reduce post-payment stock-outs.
- Enhance last-mile delivery reliability and provide accurate delivery time estimates.
- Communicate real-time order tracking updates to increase customer trust and reduce cancellations.

4. Conduct Further Analysis and A/B Testing

- **Why:** While funnel analysis identifies **where** users drop off, experiments reveal **why** and what works to fix it.

- **Recommendations:**

- Test changes such as simplified checkout flows or free shipping offers to measure conversion uplift.
- Analyse customer feedback and reviews to identify additional hidden friction points.

Strategic Summary

Implementing these recommendations will reduce user drop-offs at each stage, thereby increasing the number of successfully delivered orders and driving higher revenue and customer satisfaction for Olist.

Conclusion

This Sales Conversion Funnel Analysis project provided a comprehensive understanding of customer behaviour across the e-commerce purchase journey on the Olist platform.

Key Takeaways:

- **Funnel Mapping:**
The analysis mapped the entire sales funnel from order creation to delivery, highlighting critical drop-off points at each stage.
- **Drop-off Insights:**
Significant user abandonment was observed between adding items to cart and payment approval, and between payment approval and delivery completion.
- **Root Cause Analysis:**
Potential reasons for these drop-offs include poor product presentation, checkout friction, unexpected delivery charges, and logistic failures post-payment.

Strategic Impact:

By implementing the recommendations derived from this analysis, such as improving product discovery, simplifying checkout processes, and enhancing delivery reliability, Olist can:

- Increase conversion rates
- Reduce revenue leakage due to user drop-offs
- Improve customer satisfaction and loyalty

Final Reflection

Funnel analysis is a powerful tool for any e-commerce business. It enables data-driven decisions to optimise user journeys, maximise conversions, and drive sustainable growth in a competitive online market.