

Data-Driven Business Insights

Analyzing Customer Behavior, Sales, and
Product Performance for 2024

Agenda

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- 1. Introduction**
 - Overview of the project and methodology.
 - 2. Customer Behavior & Retention**
 - Key insights on customer retention, repeat purchases, and reorder trends.
 - 3. Sales & Revenue Analysis**
 - Analysis of total orders, revenue by category, and customer spending behavior.
 - 4. Order Trends & Patterns**
 - Examination of seasonal trends, recent orders, and category growth patterns.
 - 5. Product Demand & Performance**
 - Insights into top-selling products, reorder frequency, and cross-category purchases.
 - 6. Order Composition & Volume**
 - Analysis of order size and purchasing habits.

Introduction

Target Audience:

- U.S.-based business stakeholders and decision-makers (e.g., executives, marketing teams, product managers) in 2024.

Objective:

- To analyze business data using PostgreSQL and Python, answering key business questions through queries, and providing actionable insights to support business decisions.

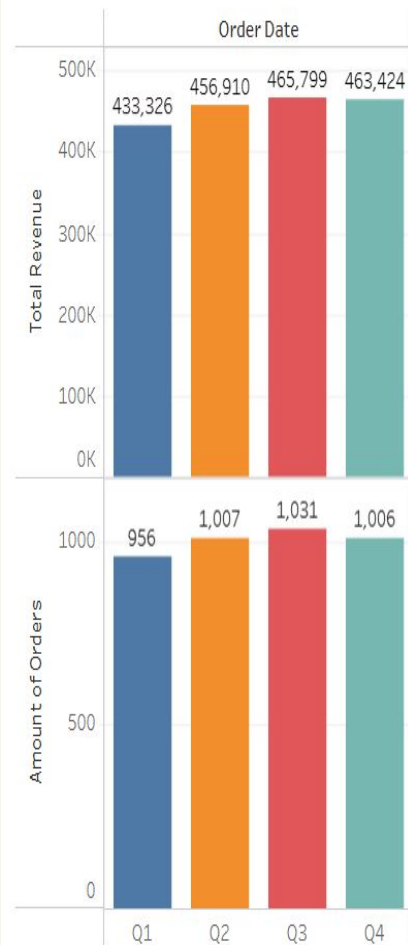
Strategy:

- Created data tables with Python, imported them into PGAdmin 4, and built a database following a custom snowflake schema. Analyzed the data using PostgreSQL to answer critical business questions, and visualized the results using Tableau for better understanding and decision-making.

Goal:

- Provide comprehensive business insights based on data analysis, enabling improved strategic decisions on customer behavior, sales, and product performance.

Orders and Revenue by Quarter



Customer Behavior & Retention



Key Insights

Repeat Orders

Question: How many customers have placed more than one order?

Insight: Identifies customer retention and loyalty.

Product Reorder Preferences

Question: What product does each customer reorder the most?

Insight: Helps understand individual customer preferences and potential upsell opportunities.

Orders per Customer

Question: What customers place the most orders and what is the average number of orders for a customer?

Insight: Measures repeat purchase behavior and customer lifetime value.

Product Reorder Frequency

Question: How often do products get reordered (average months between first and second orders)?

Insight: Helps predict reorder frequency and optimize inventory management.

Time Between Orders

Question: How long, on average, do customers wait between their first and second orders?

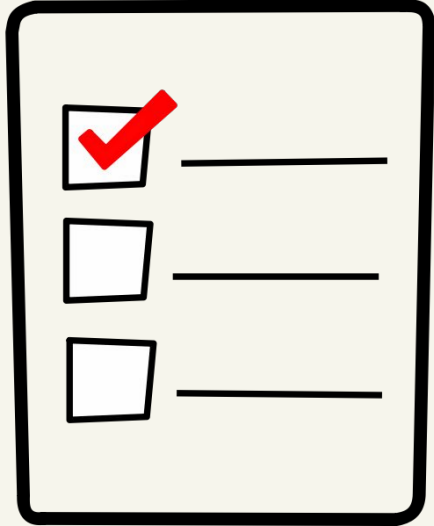
Insight: Provides insight into customer purchase cycles and engagement levels.

Revenue per Customer

Question: What is the total revenue for each customer?

Insight: Helps segment customers by spending levels for targeted marketing.

Results



High Customer Retention:

- 970 out of 1,000 customers are repeat customers, indicating strong retention and loyalty.

Top Customers Identified:

- A list of top customers by order volume is displayed.
- Average orders per customer: 12

Order Frequency Insights:

- Customers reorder approximately every 14.2 days on average.

Product Reorder Trends:

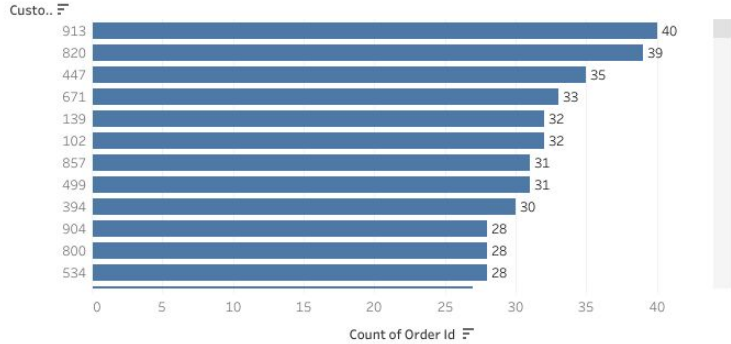
- A graph shows the number of times each product has been ordered per customer.
- Sortable by Customer ID or Product for deeper insights.

Reorder Time Analysis:

- A chart displays product reorder frequency, ranked from shortest to longest reorder time to optimize inventory planning.

Customer Behaviors Dashboard

Orders Per Customer



Revenue per Customer



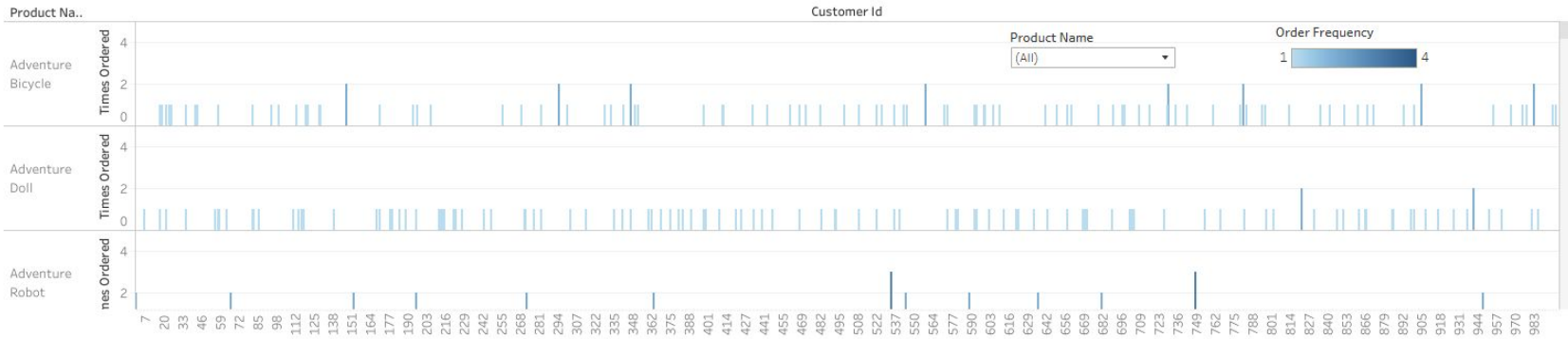
Average Amount of Orders: 12

Average Time between Orders: 14.2 Days

Repeat Customers: 970 (97%)

Product Id: (All)

Customer Product Order Frequency



Time between Orders (Days)

Product Id	Time between Orders (Days)
1004	0.000
1041	0.400
1001	0.500
1007	0.667
1071	0.857
1073	0.857
1038	1.125
1065	1.167
1083	1.250
1044	1.375
1024	1.400
1066	1.500
1070	1.500

Recommendations

Increase Customer Loyalty Programs

- With 970/1000 customers as repeat buyers, implementing a loyalty rewards program could further enhance retention and encourage even more frequent purchases.

Target High-Value Customers

- Since top customers place the most orders, offering them exclusive discounts or early access to new products could increase order frequency.

Optimize Reorder Timing

- With an average reorder time of 14.2 days, sending personalized reminders or automated reorder suggestions around this time frame could boost repeat purchases.

Leverage Best-Selling Products

- Based on the product order frequency graph, promoting the most frequently ordered items in bundles or subscription services can drive additional sales.

Improve Inventory Management

- Using the reorder time chart, businesses can adjust inventory restocking cycles to align with product demand, reducing shortages and overstock issues.

Sales and Revenue Analysis



Key Insights

Average Order Value

Question: What is the average order value for each customer?

Insight: Assesses customer spending habits and informs pricing strategies.

Categorical Quarterly Revenue

Question: What is the revenue per category for the last quarter?

Insight: Measures category performance over a specific period for trend analysis.

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Revenue per Category

Question: What is the total revenue for each product category?

Insight: Identifies which product categories generate the most revenue.

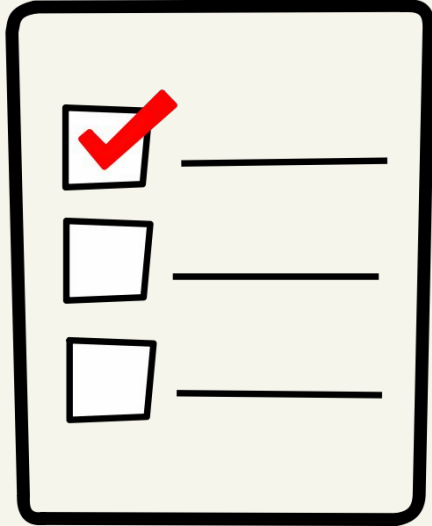
Quarterly Sales and Revenue Trends

Question: How much revenue and how many orders were received for each quarter in 2024?

Insight: Provides a high-level view of business performance over time.



Results



Customer Spending Insights

- Average Order Value per Customer was calculated.
- A ranked list of customers from highest to lowest order value was generated to identify top spenders.

Year-to-Date (YTD) Revenue by Category

- Beauty led in total revenue, followed by Home Appliances and Furniture, which were nearly tied.
- Electronics had the lowest revenue among all categories.

Quarterly Revenue Trends

- Q1 > Q2 > Q3 in total sales, showing a consistent decline.
- Q3 performed best with \$465,799 in sales and 1,031 orders.
- Q4 saw a slight drop, generating \$463,424 in sales and 1,006 orders.

Category Revenue per Quarter

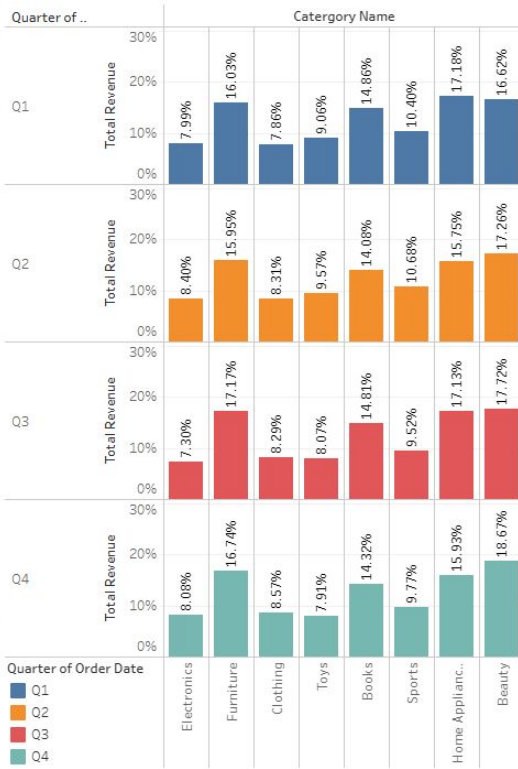
- Beauty was the top category every quarter except Q1, where Home Appliances (17.18%) outperformed Beauty (16.62%).
- Electronics and Clothing had the lowest revenue, each around 8% of total sales.
- Toys also remained low, contributing under 10% of revenue.
- Other categories ranged between 10-16%, aligning with expected performance trends.

Sales and Revenue Dashboard

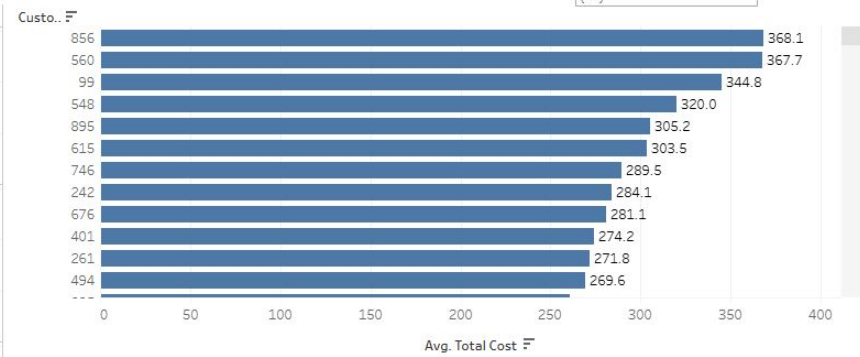
Quarterly Revenue and Orders



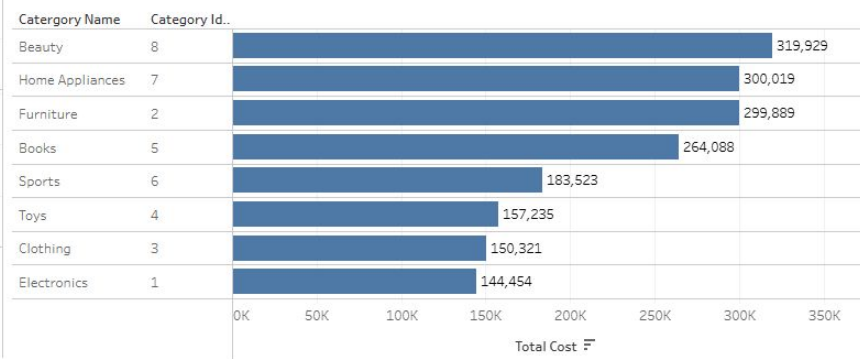
Categorical Revenue per Quarter



Average Order Value



YTD Revenue per Category



Recommendations

Maximize High-Value Customers

- Utilize the ranked customer order value list to create VIP programs, exclusive discounts, or personalized offers for top spenders to increase their lifetime value.

Boost Underperforming Categories

- Since Electronics had the lowest revenue, consider promotional campaigns, bundle deals, or discounts to drive more sales.
- Explore cross-category promotions to encourage multi-category purchases.

Address Q4 Sales Decline

- Since Q4 sales and orders slightly dropped, evaluate holiday marketing strategies to maximize end-of-year performance.
- Consider targeted promotions and limited-time offers to boost sales during peak shopping periods.

Capitalize on Top Categories

- Beauty consistently led in revenue, so investing in ads, influencer marketing, or bundling beauty products could further increase sales.
- Since Home Appliances performed well in Q1, optimize seasonal marketing strategies to maintain strong early-year sales.

Order Trends & Patterns



Key Insights

Orders in the Past Month

Question: How many orders were placed?

Question: How many customers placed an order in the past month?

Insight: Tracks **short-term demand** and measures **customer engagement levels** during a specific period.

Seasonal Trends

Question: What are the seasonal trends in customer orders?

Insight: Helps **forecast demand** and **optimize marketing strategies** during peak shopping seasons.

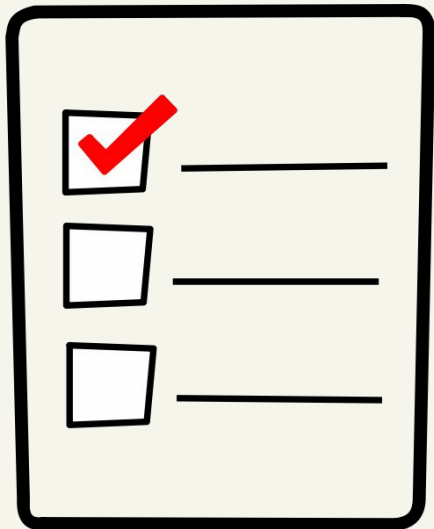
Category Trends

Question: What are the trends in categories by month (sales, quantity sold)?

Insight: Identifies **category-specific growth patterns**, enabling **strategic decision-making** for inventory, pricing, and promotions.



Results



Orders in the Last Month (12/24):

- 345 orders were placed in December 2024, which is lower compared to the previous months (9/24, 10/24, 4/24, and 5/24).
- 287 out of 1,000 customers placed an order during this period, indicating lower engagement.

Revenue in December 2024:

- \$158k in revenue was generated in December, lower than in 9/24, 5/25, 4/24, and 2/24.

Monthly Orders and Revenue Trends:

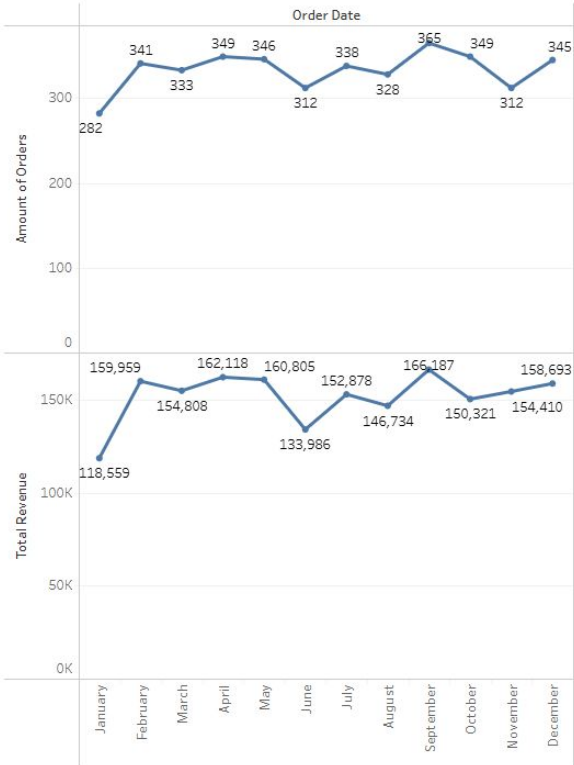
- Top months for orders and revenue were 9/24, 10/24, 4/24, 5/24, and 12/24.
- June (6/24) saw a significant drop, with only 312 orders and \$133k in revenue, the lowest of the year.
- August (8/24) had \$146k revenue with 328 orders, indicating another slower month.

Categorical Trends by Month:

- Beauty led in sales and orders for most months but showed a dip in early months, with stronger performance toward the end of the year.
- Furniture experienced a spike in September (9/24), which significantly impacted monthly trends.
- Other categories remained relatively steady throughout the year.

Order Trends Dashboard

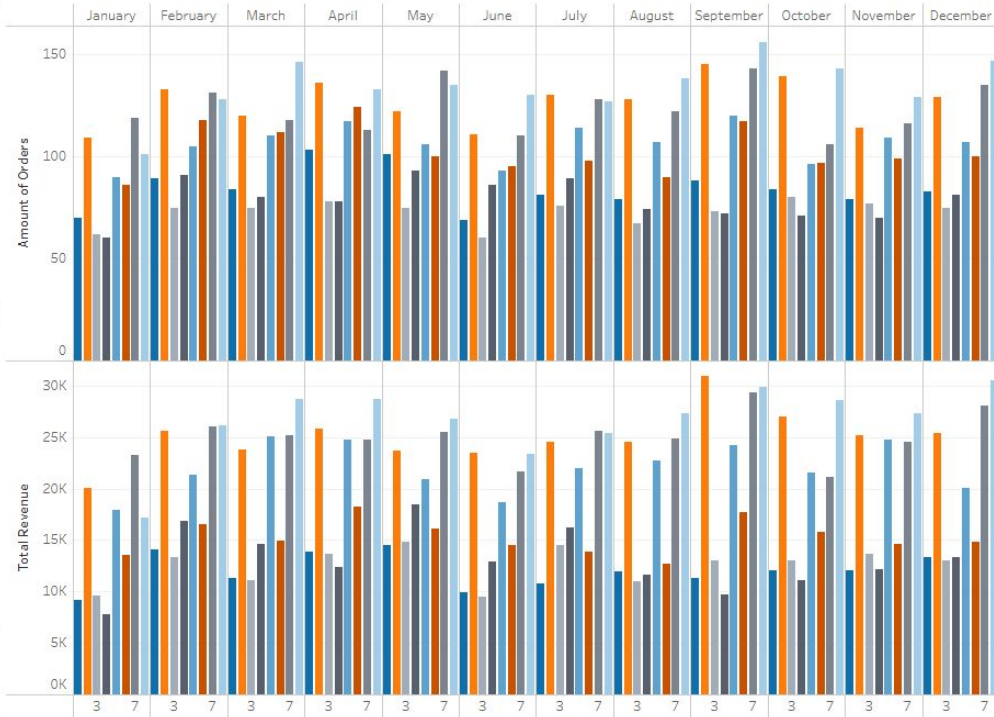
Revenue and Orders by Month



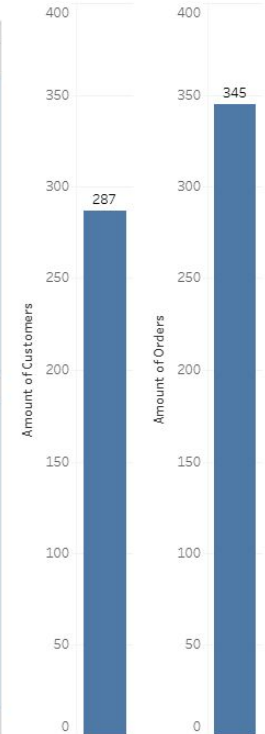
Category Id



Categorical Revenue and Orders by Month



Customers 12/24
 Orders 12/24



Recommendations

Increase Engagement in December

- Since December's orders and revenue were lower than expected, consider implementing end-of-year promotions, holiday marketing campaigns, and customer incentives (e.g., discounts or limited-time offers) to boost sales.

Address Low-Performing Months

- To recover from June's revenue drop, consider running mid-year sales events and increasing marketing efforts in typically slower months like August and June. Leverage targeted ads to boost visibility and engagement during these periods.

Capitalize on Seasonal Trends

- Since Beauty showed stronger performance in the latter months, increase holiday-focused marketing for beauty products to take advantage of the end-of-year spike. Consider creating seasonal bundles that feature beauty items for holiday gifting.

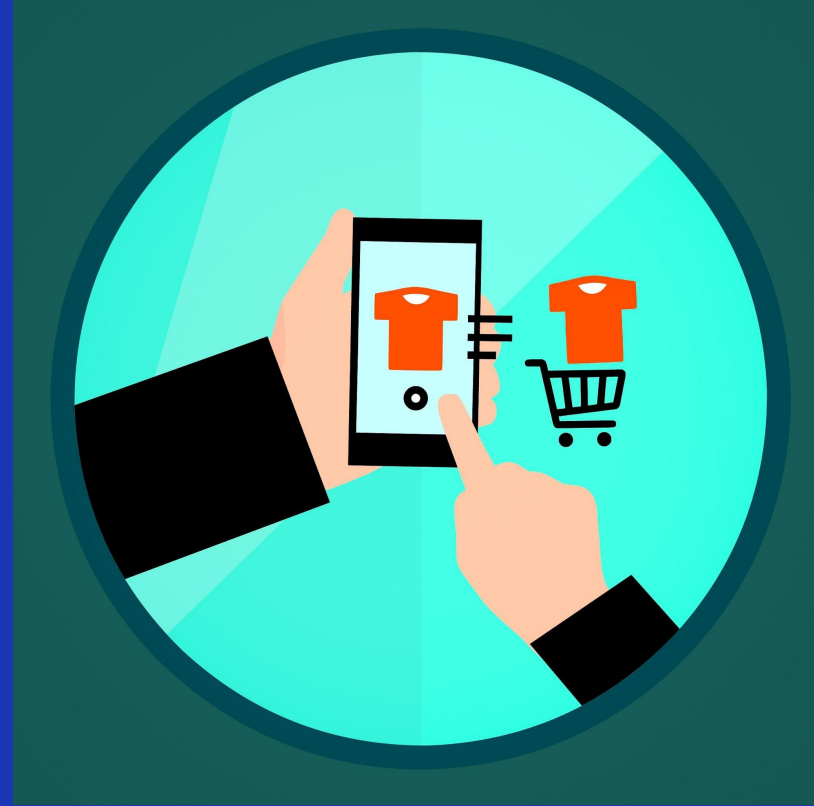
Leverage Furniture's September Spike

- The furniture category's surge in September could be replicated by running similar promotions or campaigns in future years, focusing on back-to-school or fall sales.

Maintain Steady Performance for Other Categories

- Categories like Home Appliances and Electronics maintained consistent performance, so continue with targeted promotions and consistent marketing to sustain steady sales throughout the year.

Product Demand & Performance



Key Insights

Most Ordered Products

Question: What are the top 5 most ordered products?

Insight: Identifies **best-selling products**, enabling **inventory optimization** and **targeted marketing efforts** to maintain product availability and demand.

Most Re-ordered Product

Question: What product gets reordered the most overall?

Insight: Highlights **high-retention products**, suggesting **subscription opportunities** and targeted campaigns to encourage repeat purchases.

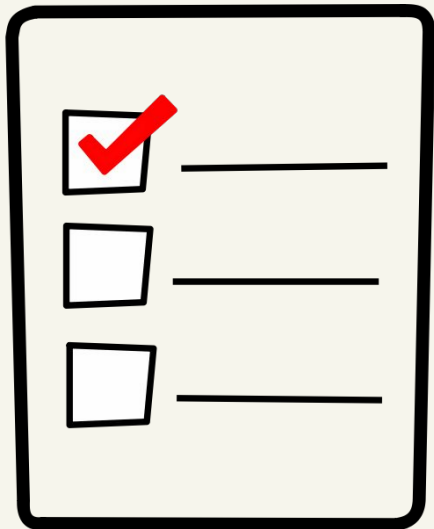
Cross-Category Behavior

Question: What percentage of customers have bought products from multiple categories?

Insight: Evaluates **cross-category purchasing behavior**, helping design **bundling strategies** and personalized offers to increase average order value.



Results



Top 5 Most Ordered Products:

- The top 5 products ranked by total quantity sold were:
 - 1046 (473 sold)
 - 1043 (469 sold)
 - 1025 (436 sold)
 - 1049 (431 sold)
 - 1073 (422 sold)

Bottom 3 Most Ordered Products:

- The bottom 3 products with the lowest sales:
 - 1027 (268 sold)
 - 1088 (287 sold)
 - 1063 (292 sold)

Reorder Patterns:

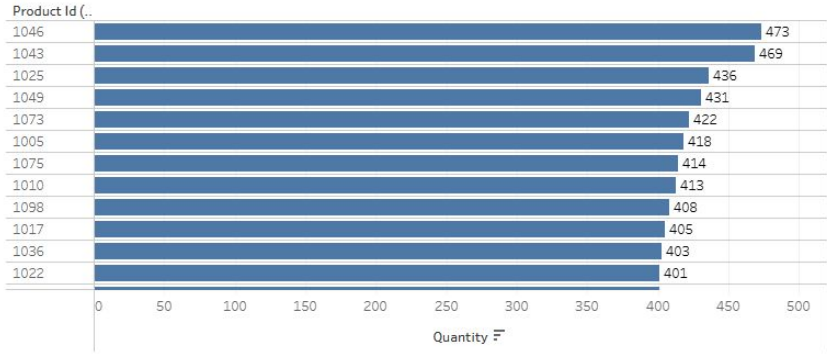
- Most of the top 5 most ordered products were also the top 5 reordered, except 1025, which dropped to 8th in reorders, and 1083, which jumped to 3rd in reorders.
- 1027 remained last in reorders, while 1063 was second last in reorders and third last in total sales.

Cross-Category Purchasing Behavior:

- 97.97% of customers have purchased products from 2 or more categories, indicating a strong trend in cross-category purchasing.

Product Demand Dashboard

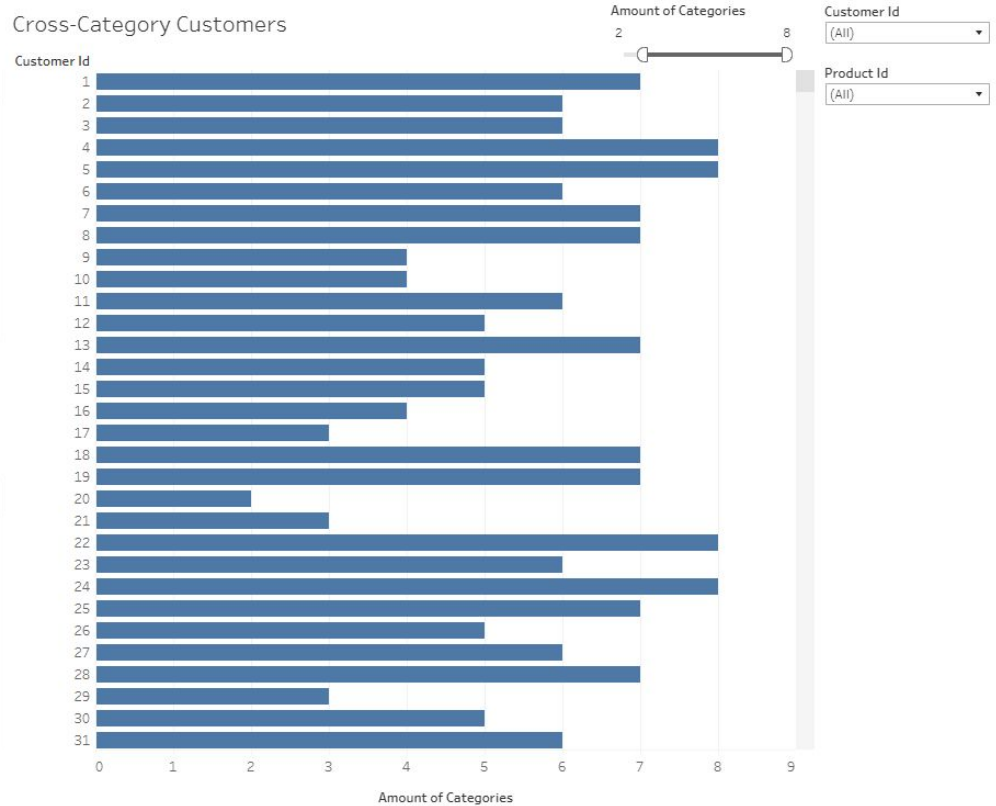
Top Selling Products



Re-Ordered Products



Cross-Category Customers



Recommendations

Focus on Top-Selling Products

- Top 5 products (1046, 1043, 1025, 1049, and 1073) are strong performers. Increase inventory for these products and consider highlighting them in targeted marketing campaigns to sustain their sales momentum.

Improve Reorder Strategy

- 1025 dropped out of the top 5 reordered products, so consider creating special offers or loyalty programs to drive repeat purchases for this product.
- For 1083, which jumped to 3rd in reorders, explore subscription models or automated reordering features to capitalize on its high reorder frequency.

Address Low-Performing Products

- 1027, 1063, and 1088 have lower sales and reorder rates. Consider discontinuing or reworking the marketing strategies for these products. If they are not performing well in specific categories, offer discounts or bundle them with top sellers to increase their visibility and sales.

Leverage Cross-Category Purchases for Bundling

- With 97.97% of customers buying from multiple categories, create category-based bundles or offer cross-category promotions. This can increase the average order value and further engage customers who enjoy shopping across different product types.

Order Composition & Volume



Key Insights



Average Total Quantity per Order

Question: What is the average total quantity of an order?

Insight: Helps assess **order sizes**, which can **optimize packaging, logistics, and inventory planning** to reduce shipping costs and improve fulfillment efficiency.

Average Quantity per Product

Question: What is the average quantity per product for an order?

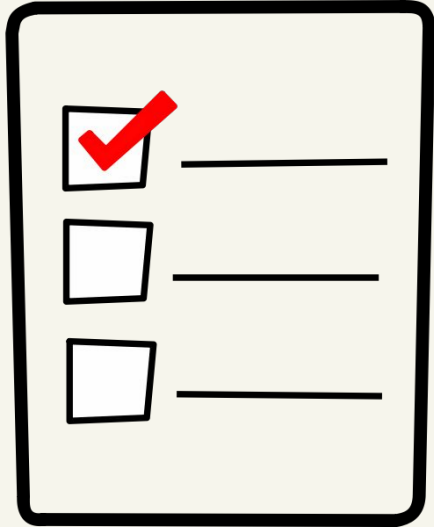
Insight: Provides insights into **customer purchasing habits**, helping businesses refine **bulk pricing strategies, discounts, and promotions** to encourage larger purchases.

Average Quantity per Category

Question: What is the average quantity of products ordered per category?

Insight: Helps identify **high-demand categories**, allowing for better inventory management and strategic marketing to boost sales in underperforming categories.

Results



Average Total Quantity per Order: 8.92

- Displayed on a graph showing the total volume of each order, with a line indicating the average quantity.
- Clearly highlights which orders are above or below the average volume, providing insights into order size distribution.

Average Quantity per Product: ~3

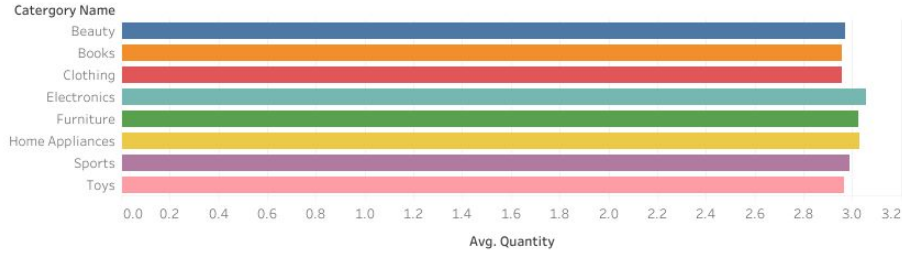
- The quantity per product is fairly uniform at 3, with only slight variations:
 - Some products slightly above (~3.3)
 - Some slightly below (~2.8)
- Indicates consistent purchasing behavior across different products.

Average Quantity per Category: ~3

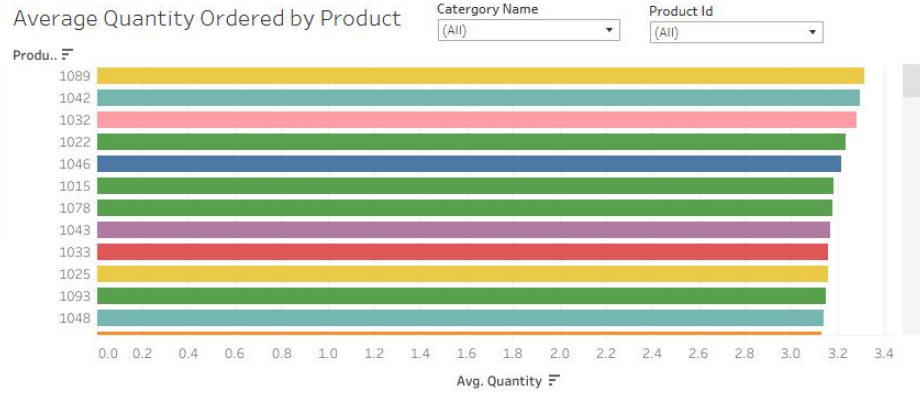
- Similar to per-product trends, category-level quantities are also around 3, with minor variations.
- Suggests steady demand across categories, which helps in predicting inventory needs and bulk ordering trends.

Order Volume Dashboard

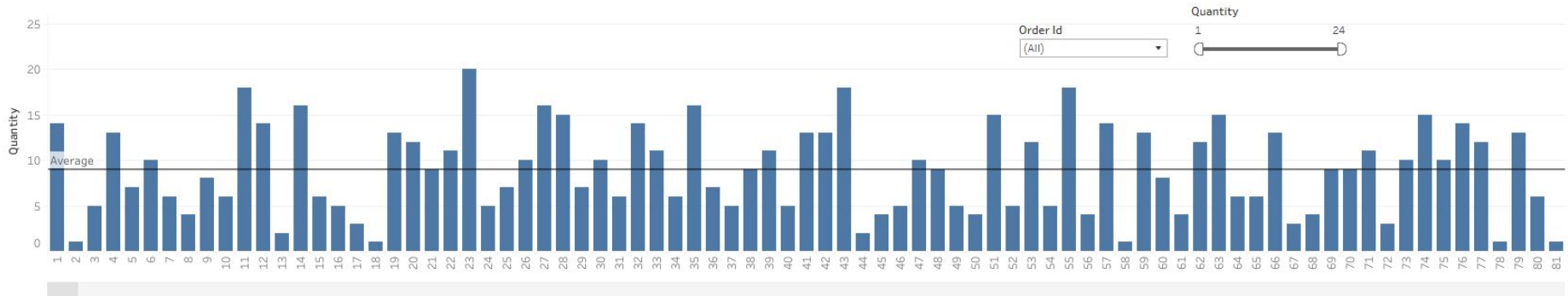
Average Quantity Ordered by Category



Average Quantity Ordered by Product



Average Quantity of an Order



Recommendations

Optimize Packaging & Logistics

- Since the average order quantity is 8.92, consider right-sizing packaging to reduce shipping costs and improve efficiency.
- Offer bulk packaging options for customers who consistently place high-quantity orders.

Leverage Bulk Pricing & Discounts

- With the average quantity per product around 3, introduce "Buy More, Save More" discounts to encourage slightly larger purchases.
- Promote category-based bundle deals to increase total order volume.

Adjust Inventory Based on Demand Patterns

- Since product and category quantities are consistent, maintain steady stock levels while monitoring any shifts in demand.
- Consider priority restocking for products/categories that slightly exceed the average purchase quantity (e.g., 3.3 vs. 3).

Test Upsell Strategies

- Encourage customers to increase order size through personalized recommendations (e.g., "Customers who bought this also bought...").
- Offer free shipping or small discounts for orders exceeding a specific quantity threshold.

THANK YOU

