

Business Analysis in Retail

Zaheera Hanif

19th of April 2025

Executive Summary Retail Business Analysis

- Top Products:** Few products dominate revenue and sales volume.
→ *Promote best-sellers, launch similar items, ensure stock availability.*
- Pricing & Quantity:** Sales are concentrated in the 0–100 price range. Returns and negative quantities exist.
→ *Focus on low-priced inventory, evaluate high-ticket items, investigate returns.*
- Inventory:** 79 products had zero sales or negative quantities.
→ *Address underperformers, optimize pricing, and improve marketing.*
- Customer Behavior:** A small group of high-value customers drives most revenue; repeat rates vary.
→ *Segment customers and tailor retention strategies per group.*
- Geographic Trends:** UK leads in revenue; Belgium, Switzerland, and Spain underperform.
→ *Expand in weak markets and apply UK's model where suitable.*
- Time-Based Trends:** Revenue peaks on Tuesdays and Thursdays; November is the top month.
→ *Focus promotions on peak days/months and boost off-peak sales.*

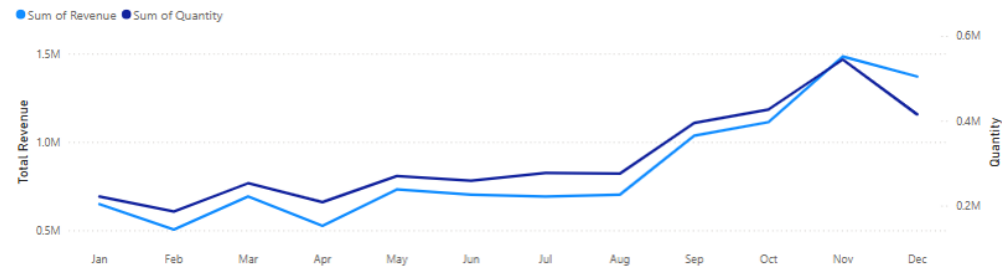
Revenue & Performance Overview

Total Revenue: 10M

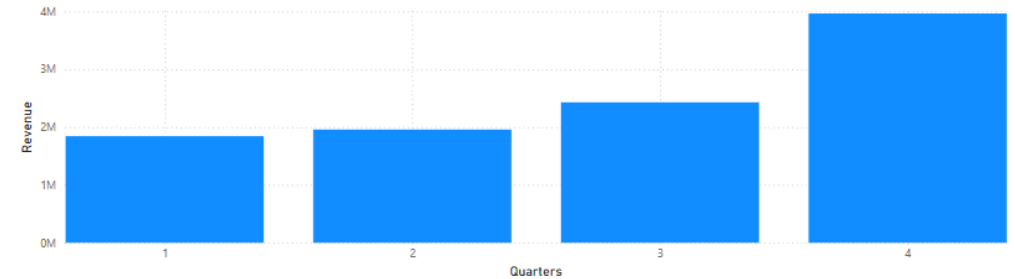
Quantity Sold: 3.73M

Average Unit Price: 3.74

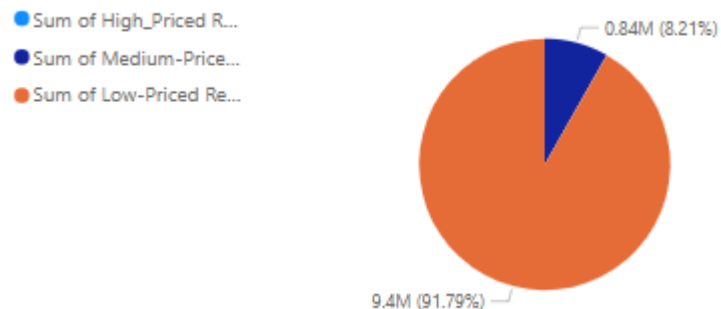
Sum of Revenue and Quantity by Months



Revenue by Quarter



Revenue Contribution by Price Segmentation



Key Take aways

- **Strong total revenue:** The overall revenue reaches 10 million, reflecting solid market performance.
- **High quantity sold:** With 3.73 million units sold, volume plays a crucial role in revenue generation.
- **Dominance of low-priced items:** 91.79% of total revenue comes from low-priced products, while medium-priced items contribute 8.21%, and high-priced items have negligible impact.
- **November peak:** Both revenue and quantity surge in November, suggesting strong seasonal demand.
- **Quarterly growth:** Revenue increases consistently across quarters, culminating in the highest figures in Q4

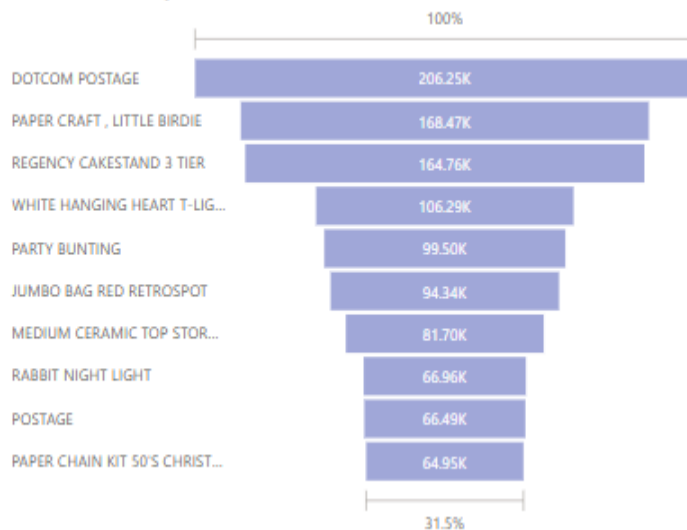
Suggestions:

- **Diversify revenue streams:** Consider strategies to increase the sales of medium-priced products to balance revenue sources.
- **Capitalize on peak months:** Strengthen marketing campaigns and inventory planning around November for maximum profitability
- **Investigate December dip:** Understanding the causes of the revenue slowdown in December can help mitigate future declines.
- **Leverage quarter-wise momentum:** Optimize resource allocation in Q4, where revenue is highest, to sustain performance going into the new year.

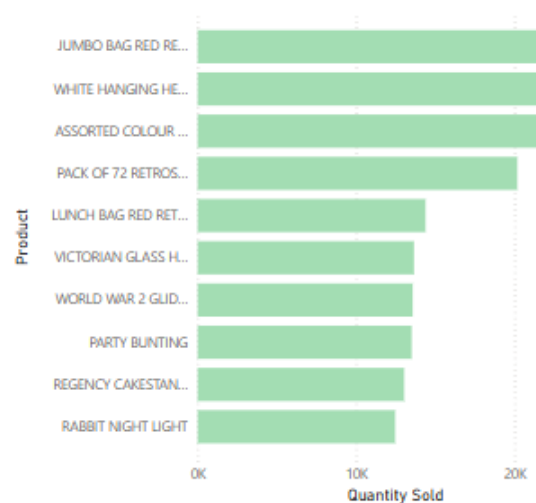
Sales & Product Analysis

Top Product

Sum of Revenue by Product



Sum of Quantity by Product



Key Take aways

- **Top Revenue Products** – *Paper Craft Little Birdie* (\$168.47K), *Regency Cake Stand* (\$164.76K), and *White Hanging Heart* (\$106.29K) generate the highest revenue.
- **Top Selling Products** – *Jumbo Bag Red Retrospot*, *White Hanging Heart*, and *Assorted Color Bird Ornaments* have the highest sales volume.

Suggestions

- **Focus on Promoting High-Revenue Products** – Increase marketing efforts to maintain and grow their sales.
- **Introduce Similar High-Performing Products** – Expanding product lines with similar features can maximize revenue potential.
- **Increase Stock and Promotion for Best-Selling Items** – Ensuring availability and strategic promotions can further boost their revenue.
- **Implement Targeted Marketing for Mid-Range Products** – Enhancing visibility and demand for mid-tier products can improve overall sales.

Unit Price vs Quantity Sold



Key Take aways

- **Concentration of data** – Most of the data points are concentrated around the lower end of price spectrum, particularly between 0-100.
- **Sparsity of High-Priced Data** – As the Unit Price increases the data points sparse and spread out, indicating fewer high-priced items .
- **Negative Quantities** – There are some negative quantities showing in the graph which could indicate return, cancellation or issue with inventory recording.
- **Relationship between Price and Quantity** – The scatter plot shows a general trend where low-priced items have higher quantity sold as compared to high-priced data. This shows typical customer behavior where more affordable items tend to sell in larger volumes.

Suggestions

- **Focus on Popular Low-Priced Items** – Consider maintaining strong inventory of these products to meet the demand.
- **Evaluate High-Priced Items** – Consider reviewing pricing strategies. You could explore promotional discounts or bundled offers to stimulate sales.
- **Address Negative Quantities:** Investigate the reasons behind the negative quantities. These could be due to returns, cancellations, or inventory errors. Implement measures to minimize such occurrences.
- **Diversify Product Range:** While low-priced items are popular, introducing mid-range products that offer good value for money might attract more customers without significantly affecting profitability.

Least Selling Product

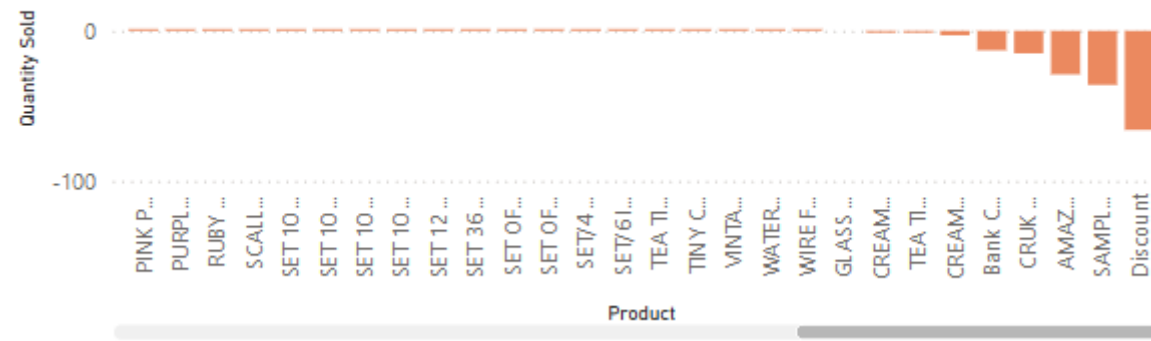
Key Take aways

- Approximately 79 products show a sold quantity of zero, which highlights a significant issue in inventory movement for these items.
- A few products display negative quantities, likely indicating returns, adjustments, or discounts applied.

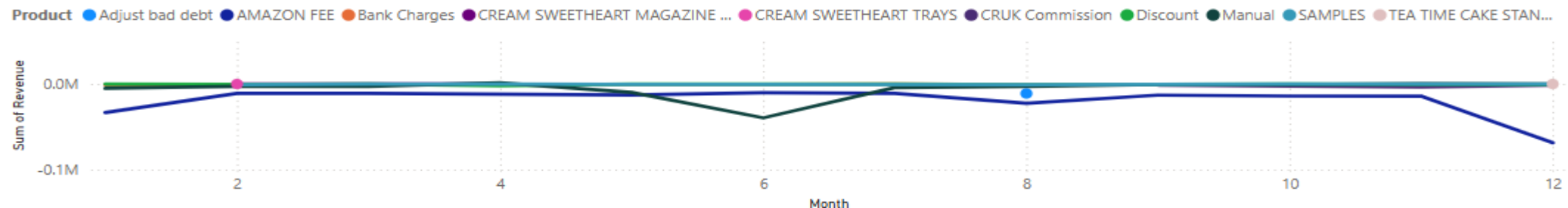
Suggestions

- **Analyze Non-Selling Products** – Investigate why these products are not selling. Issues might include low demand, insufficient marketing, improper pricing, or poor product placement.
- **Focus on Returns or Discounts** – Understand why certain products have negative quantities. Look into customer feedback, product quality, or issues in handling and delivery that might contribute to returns or refunds.
- **Marketing & Visibility** – Strengthen marketing campaigns for underperforming products. Explore techniques such as promotions, social media marketing, or partnerships to boost visibility.
- **Revise Pricing Strategy** – Assess whether your pricing is competitive in the market. Experiment with discounts or bundle offers to attract customers
- **Customer Insights** – Gather feedback from customers on their preferences to ensure you're stocking items that align with demand.
- **Streamline Inventory** – Consider discontinuing products with consistently low or no sales to reduce costs and focus on higher-performing items.

Sum of Quantity by Product



Sum of Revenue by Month and Product



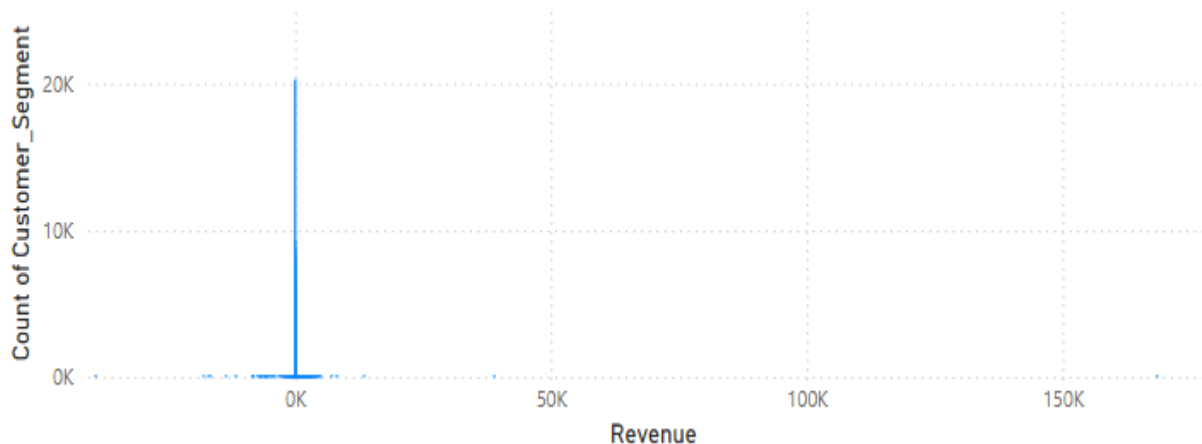
Customer Insights

Total Number of Customers

4349

Average Order Value

262.01M



Key Takeaways:

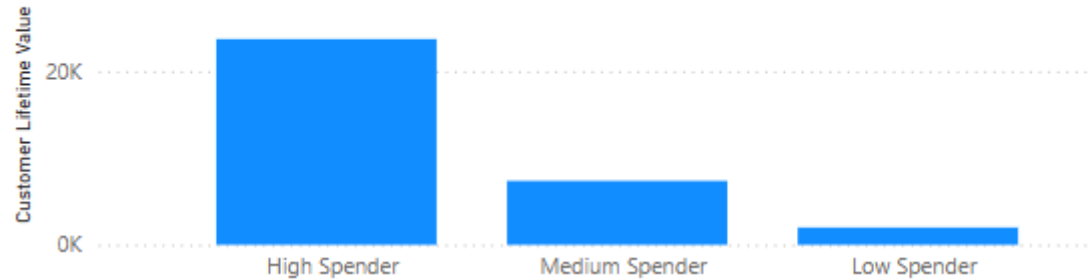
- Total Customers** – The business has **4,349 unique customers** (which is a positive thing for business growth), with an **average order value of 262.01M**.
- High Average Order Value** – The average order value stands at 262.01 million, indicating the presence of either high-value transactions or a few customers contributing significantly to total revenue.
- Revenue Distribution** – The bar chart shows most customer segments clustered at the lower end of revenue. This suggests that a majority of customers are contributing less revenue overall (visible as dots between 0K to 150K revenue).

Suggestions:

- Segment Customers by Value** – Break down your revenue by customer segment to identify high-value segments. and prioritize retention strategies (e.g., loyalty rewards, exclusive offers).
- Investigate the low-revenue segments** – what are the barriers to increasing their contribution? Address these barriers to improve their performance.
- Boost Mid-Low Tier Revenue** – Launch upselling or cross-selling campaigns for customers generating lower revenue.
- Analyze purchasing patterns** in high-revenue segments to replicate successful strategies across others.
- Personalized Marketing** – Use insights from customer segmentation to tailor promotions based on customer behavior and value.
- Track CLV Over Time** – Continue monitoring CLV by month to identify patterns and improve customer targeting strategies.
- Optimize High Average Order Value** – Ensure you're sustaining high-value transactions by maintaining quality and customer satisfaction.

Customer Lifetime Value

CLV by Customer Segment



Customer Lifetime Value by Month



Key Takeaways:

High Spender Dominance: The "High Spender" customer segment has the highest Customer Lifetime Value (CLV), reaching approximately 20K, which likely represents your most profitable group.

Significant Gap Between Segments: There is a substantial difference in CLV between the "High Spender" and the **other two segments, especially the "Low Spender," whose CLV is close to 0K.**

Medium Spender Potential: The "Medium Spender" group, with a CLV of approximately 10K, seems to have the potential to move closer to the "High Spender" category with the right strategies.

Suggestions:

Focus on High Spenders:

Retain these valuable customers with loyalty programs, personalized offers, or exclusive deals.

Regularly engage them with tailored communications to ensure satisfaction

Nurture Medium Spenders:

Encourage this segment to transition into the "High Spender" category by introducing tiered rewards programs or upselling opportunities.

Offer incentives for larger or more frequent purchases

Engage Low Spenders:

Analyze barriers preventing this group from contributing more. Is it product relevance, pricing, or engagement?

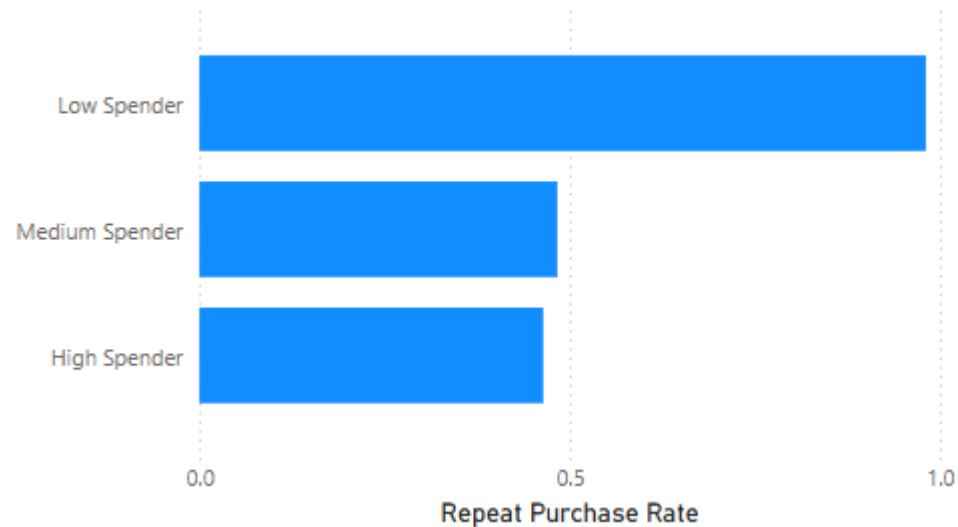
Implement targeted campaigns such as discounts, entry-level products, or bundles to boost their spending.

Analyze Behavior:

Study behavioral patterns across all segments to identify characteristics of high-value customers. Use these insights to refine your marketing and sales strategies.

Repeat Purchase Rate

Repeat Purchase Rate by Customer Segment



Key Takeaways:

Low Spenders Have the Highest Repeat Purchase Rate – Their loyalty appears strong, as they consistently make purchases despite spending less per transaction.

Medium Spenders Have a Moderate Repeat Rate – Sitting around 0.5, this segment has room for improvement.

High Spenders Have the Lowest Repeat Rate – Despite contributing the most revenue, they purchase less frequently, suggesting potential disengagement or reliance on occasional big-ticket purchases.

Suggestions:

Retain Low Spenders – Leverage their strong repeat purchase tendency by offering loyalty programs, small-value incentives, or product recommendations that increase their spending.

Boost Medium Spenders' Engagement – Identify purchase patterns and encourage more frequent transactions using personalized offers, limited-time discounts, or subscription-based models.

Re-Engage High Spenders – Investigate potential barriers discouraging frequent purchases. Strategies like VIP memberships, early-access privileges, or premium bundles could increase retention.

Segment-Specific Strategies – Tailor marketing efforts based on spending behavior rather than broad campaigns. Personalized emails or exclusive promotions could make an impact.

Additional Suggestions:

Conduct Quality Assessments: Regularly evaluate product quality, ensuring it meets customer expectations.

Gather Customer Feedback: Use surveys, reviews, and support interactions to identify pain points.

Improve Post-Purchase Experience: Offer better warranties, return policies, and customer support to enhance satisfaction.

Test Competitor Benchmarks: Compare your product experience with competitors to find potential improvements

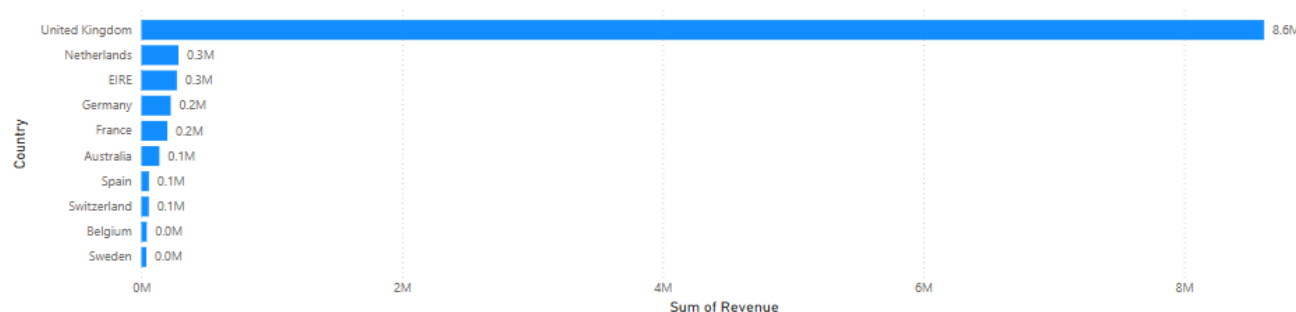
Leverage Data: Identify patterns in returns or complaints to pinpoint specific product weaknesses.

Time & Regional Trends

Sum of Revenue by Country



Top 10 Regions by Revenue



Key Takeaways:

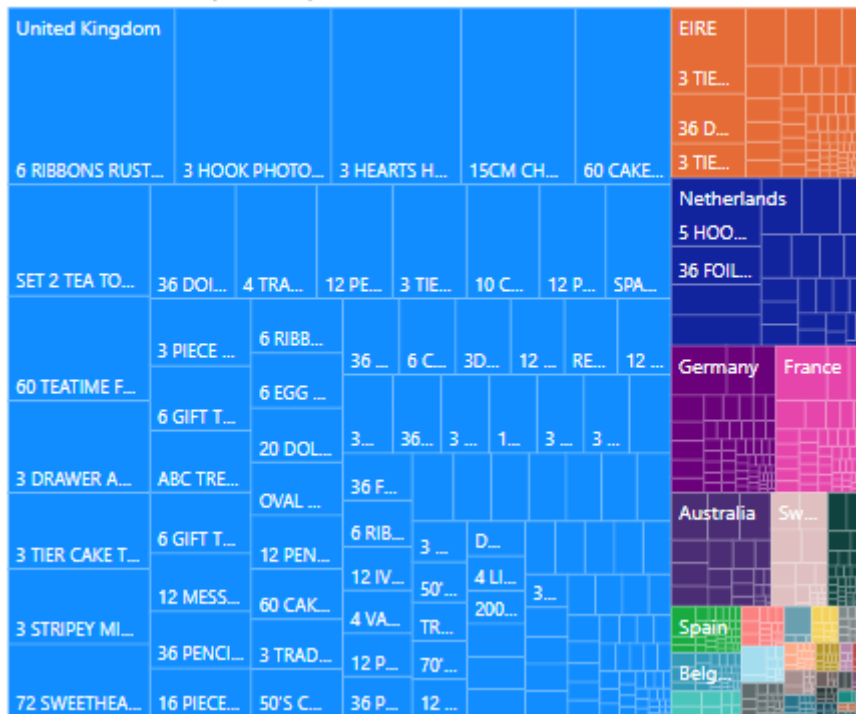
- **United Kingdom dominance:** The UK far outpaces all other listed regions, showing a massive lead in revenue.
- **Sharp disparity:** The revenue gap between the UK and the second-highest region (Netherlands) is striking—8.6M vs. 0.3M.
- **Minimal revenue in lower-ranked regions:** Belgium and Sweden are recorded at nearly zero revenue, indicating very limited business activity or market presence.
- **European focus:** Most regions on the list are European, possibly pointing to a business strategy centered on that market.

Suggestions:

- **Market expansion:** Investing in regions with lower revenue (Belgium, Sweden, Switzerland) could create growth opportunities.
- **Exploring new revenue streams:** Strategies to diversify revenue sources outside the dominant UK market might provide stability.
- **Competitive analysis:** Understanding why the UK performs so well could reveal best practices to replicate in other regions.
- **Regional partnerships:** Collaborating with businesses in underperforming markets might help unlock new potential.

Revenue by Country and Product

Sum of Revenue by Country and Product



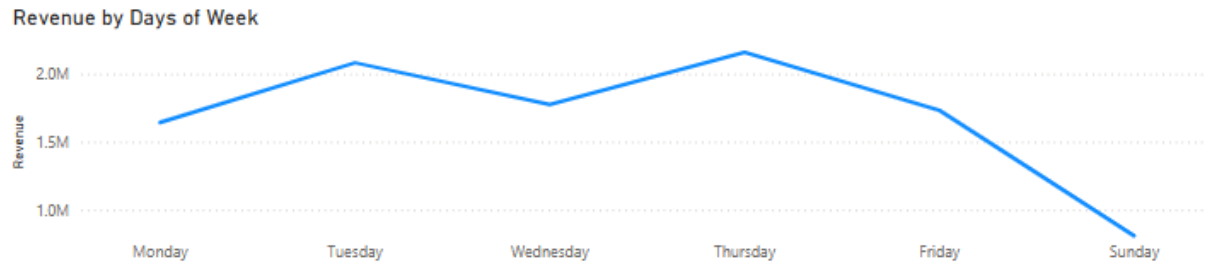
Key Takeaways:

- **United Kingdom leads:** The UK dominates in both product variety and revenue, having the largest area in the treemap.
- **Lower revenue in some regions:** Countries like Belgium, Switzerland, and Spain contribute significantly less revenue compared to top-performing regions
- **Product distribution clarity:** The treemap clearly highlights which products generate the most revenue in each country.
- **Potential for diversification:** While the UK has a strong market presence, other regions might offer untapped opportunities

Suggestions:

- **Boost presence in underperforming countries:** Investing in Belgium, Switzerland, and Spain could open new revenue streams.
- **Leverage UK's success:** Identify the top-performing products in the UK and explore their potential in other markets.
- **Deepen competitive analysis:** Investigate why certain products perform well in specific regions and replicate successful strategies elsewhere
- **Optimize product portfolio:** Consider shifting focus to high-revenue products across all regions for better profitability

Trend Analysis

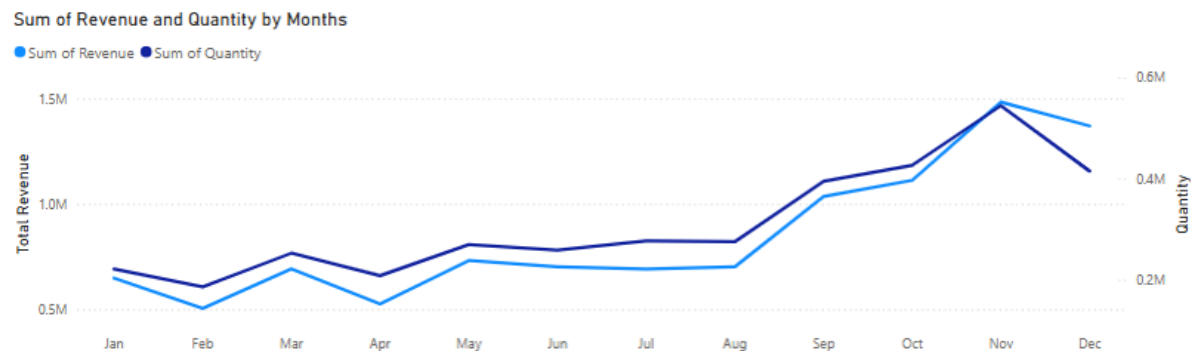


Key Takeaways:

- **Tuesday and Thursday stand out:** These two days show revenue peaks, suggesting they are the most lucrative days.
- **Sunday sees a significant drop:** Revenue declines sharply on Sunday, indicating reduced business activity.
- **Overall stability:** Revenue remains relatively steady from Monday to Saturday, with fluctuations that could be influenced by customer behavior or operational factors.

Suggestions:

- **Leverage peak days:** Increase promotions or sales initiatives on Tuesday and Thursday to maximize revenue during high-earning days.
- **Address Sunday's decline:** Investigate potential causes for the drop—fewer customers, operational restrictions, or weekend patterns—and explore ways to boost engagement.
- **Optimize midweek performance:** While Monday, Wednesday, and Friday perform well, strategic incentives could push them closer to peak revenue levels.



Key Takeaways:

- **Revenue and quantity show overall growth:** Both metrics experience an increasing trend throughout the year, peaking in November before declining in December.
- **November is the strongest month:** This might be due to seasonal factors, promotions, or heightened consumer demand.
- **December decline:** While revenue and quantity drop in December, it could be related to post-holiday slowdowns or changes in purchasing patterns.

Suggestions:

- **Leverage the November peak:** Implement targeted promotions or campaigns to maximize revenue during this high-performing month.
- **Investigate December decline:** Identify whether it's due to seasonal consumer behavior, logistical challenges, or other business factors.
- **Optimize mid-year growth:** Since revenue and quantity grow steadily, reinforcing marketing strategies during early months can further boost performance.
- **Diversify product offerings:** Analyzing which products contribute to revenue spikes may offer insights for expanding successful categories.

Final Recommendation

- To drive sustainable growth, focus on strengthening top-performing products and optimizing pricing strategies.
- Ensure continuous availability of popular low-priced items while assessing the potential of high-ticket products.
- Resolve issues with negative sales and underperforming inventory to reduce losses.
- Segment customers based on spending and behavior to personalize retention strategies especially for high-value and loyal low-spending customers.
- Expand your footprint in underperforming regions by replicating successful UK practices.
- Finally, align marketing and inventory strategies with time-based trends to maximize peak periods and improve performance during sales slumps.
- A strategic, data-driven approach across products, pricing, customers, geography, and timing will significantly boost revenue and efficiency.

Methodology

- Data Source:** Used raw retail dataset containing transactional data, customer details, and product-level information.
- Data Preparation:** Handled missing values, outliers, and created additional features (e.g., Total_Revenue, Product_Age_Group, Cumulative_Revenue).
- Segmentation:** Products grouped by price range; customers segmented into Low, Medium, and High Spenders based on purchase behavior.
- Tools Used:** Analysis performed in Python (Pandas, Matplotlib, Seaborn); Power BI used for interactive dashboarding.
- Analysis Scope:** Covered product performance, pricing impact, customer lifecycle, geographic trends, and time-based revenue patterns.

Appendix A: Python Code

1. Data Cleaning and Preparation

This section includes the Python code used for cleaning the dataset, including handling missing values and filtering the data to ensure it's ready for analysis.

- Remove rows with missing Total_Revenue or Unit_Price **df.dropna(subset=['Total_Revenue', 'Unit_Price'], inplace=True)**
- Convert Date column to datetime format **df['Date'] = pd.to_datetime(df['Date'])**
- Filter data to only include relevant product categories **df = df[df['Category'].isin(['Paper Craft', 'Cake Stand', 'Retrosport'])]**

2. Calculating Customer Lifetime Value (CLV)

This code calculates the Customer Lifetime Value based on the total revenue for each customer.

- CLV Calculation: Total revenue **by customer** **clv = df.groupby('Customer_ID')['Total_Revenue'].sum().reset_index()**
clv.rename(columns={'Total_Revenue': 'Customer_Lifetime_Value'}, inplace=True)
- Merge CLV back to original dataframe **df = pd.merge(df, clv, on='Customer_ID', how='left')**

3. Visualizations

This code generates key visualizations, including product performance and revenue trends.

python

- **import matplotlib.pyplot as plt import seaborn as sns**

Product performance (top-selling products)

- **top_selling_products = df.groupby('Description')['Quantity'].sum().sort_values(ascending=False).head(10)**
- **top_selling_products.plot(kind='bar',**
- **color='skyblue')**
- **plt.title('Top Selling Products')**
- **plt.ylabel('Total Quantity Sold')**
- **plt.xlabel('Product Description')**
- **plt.show()**

Monthly revenue trends

- **df['Month'] = df['Date'].dt.month** **monthly_revenue = df.groupby('Month')['Total_Revenue'].sum()** **monthly_revenue.plot(kind='line',**
color='green') **plt.title('Monthly Revenue Trend')** **plt.ylabel('Revenue')** **plt.xlabel('Month')** **plt.show()**

Appendix B : Dax Code

Appendix B: DAX Formulas

1. Customer Lifetime Value (CLV)

This DAX formula calculates the total revenue for each customer, which is used for the Customer Lifetime Value analysis.

DAX

-- Calculate Customer Lifetime Value (CLV) $CLV = \text{SUM}('Sales'[Total_Revenue])$

2. Revenue per Unit

This formula calculates the revenue per unit for each product.

DAX

-- Calculate Revenue per Unit $\text{Revenue_Per_Unit} = \text{SUM}('Sales'[Total_Revenue]) / \text{SUM}('Sales'[Quantity])$

3. Product Performance (Top Revenue-Producing Products)

This DAX formula ranks products based on total revenue, helping to identify high-revenue items.

DAX

-- Rank products based on total revenue $\text{Product_Revenue_Rank} = \text{RANKX}(\text{ALL}('Sales'[Description]), \text{CALCULATE}(\text{SUM}('Sales'[Total_Revenue])), , \text{DESC})$

4. Customer Segmentation

This formula segments customers into three categories based on their total spending.

DAX

-- Customer Segmentation (High, Medium, Low Spend) $\text{Customer_Segment} = \text{IF}(\text{SUM}('Sales'[Total_Revenue]) \geq 10000, \text{"High Spender"}, \text{IF}(\text{SUM}('Sales'[Total_Revenue]) \geq 5000, \text{"Medium Spender"}, \text{"Low Spender"}))$