E-Commerce Performance Analysis Report – UK Retailer (2023)

1. Executive Summary

This report provides a comprehensive analysis of e-commerce performance for a UK-based retailer, focusing on transaction-level data from 2023. Leveraging Python for data cleaning and analysis, and Power BI for interactive visualization, the goal was to extract actionable insights related to sales trends, customer behavior, and product performance.

The analysis reveals strong overall performance, with £9.56 million in revenue, 20,000+ orders, and an impressive 64.07% repeat customer rate, indicating high customer satisfaction and loyalty. Monthly sales remained stable through most of the year, with a significant spike in October and November driven by seasonal promotions like Black Friday and early holiday shopping.

Customer segmentation using RFM analysis uncovered that while the retailer has a large base of recent and regular customers, the number of high-value "best customers" remains low. This signals an opportunity to implement loyalty programs to boost long-term customer value.

The report also highlights top-selling products, primarily low-ticket decorative and packaging items and identifies the UK as the dominant market, though international interest from Germany, the Netherlands, and France presents growth potential. The 4.29% cancellation rate, likely tied to product listing issues, underscores the importance of improving descriptions and images.

Key recommendations include optimizing for a high-volume, low-cost business model, enhancing product listings, expanding internationally, and leveraging seasonality through targeted promotions. Future analytics efforts should focus on CLV modeling, cross-selling strategies, and inventory forecasting to support continued growth.

2. *Data Sources & Methodology*

Retailer e-commerce data was extracted from Kaggle and cleaned using Python (handling missing values, outliers, transformations, duplicates), and visualized in Power BI for trend analysis.

Data Sources: Kaggle
Tools Used: Python (Pandas, Matplotlib), Power BI
Data Cleaning & Processing: Handling missing values, outliers, transformations, duplicates
Analysis Techniques: Descriptive stats, RFM Analysis, Trend Analysis, Customer Behaviour

3. Key Finding & Insights

Performance Metrics

Annual Revenue	£9.56 Million
Average Order Value	£489.46
Total Orders	20,000+
Total Unique Customers	376,970
Repeat Customer Rate	64.07%
Order Cancellation Rate	4.29%

Observation: High repeat customer rate suggests niche, loyalty-driven, or relationship-based

Monthly Sales Trends (2023)

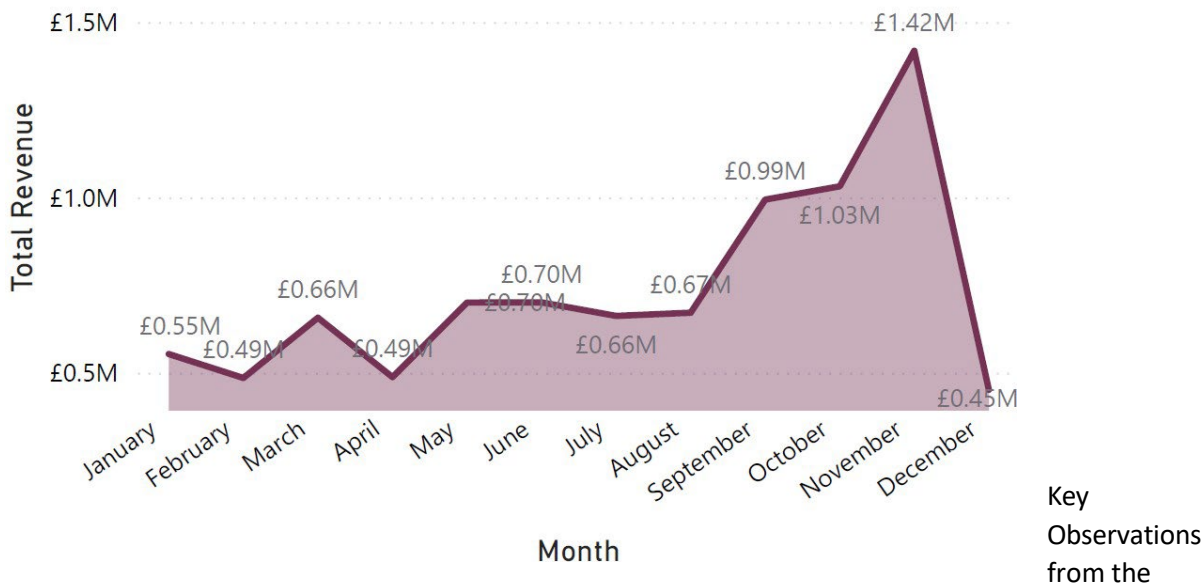## Total Monthly Sales (2023)

Key Observations from the Chart:

1. January - August:

- Sales fluctuate between £0.49M - £0.70M without any extreme spikes.
- Lowest point: February (£0.49M), a post-holiday dip.
- Steady growth from May to August, maintaining around £0.66M - £0.70M.
- Indicates stable, non-seasonal demand during this period.

2. September - November: The Major Growth Phase

- September: Sales remain stable at £0.67M, showing no major movement yet.
- October: Revenue jumps significantly to £0.99M, possibly due to early holiday shopping.
- November: Peak sales month at £1.42M—the highest of the year.

- Likely Causes:

    o Black Friday & Cyber Monday sales.
    o Christmas shopping starts.
    o Increased online promotions and marketing campaigns.
    o Bulk orders for the holiday season.
3. December: Sudden Drop to £0.45M due to limited data

Customer Segmentation Insights

Product Sales Breakdown by Price Category

Price Range (GBP)
- 0-5
- 5-10
- 10-20
- 20-50
- 100+
- 50-100

59K (11.62%)
1K (0.12%)
427K (83.99%)
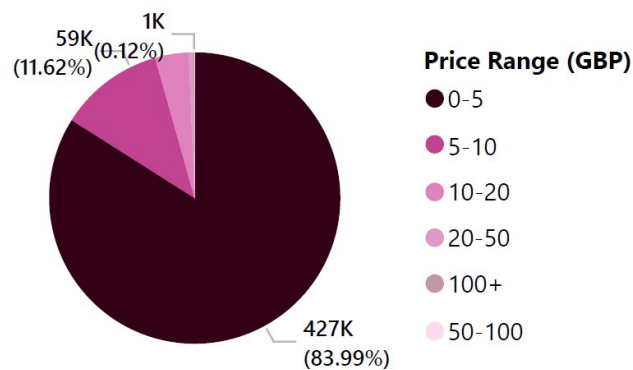
The business is primarily **low-ticket** driven, catering to high-volume, low-price buyers.
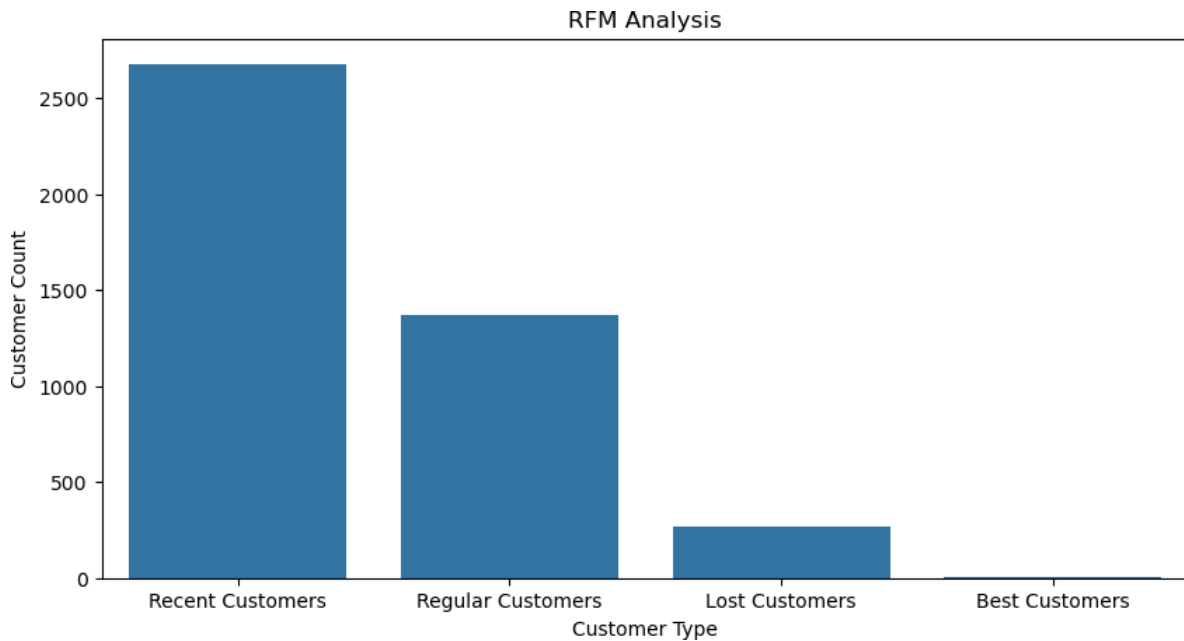
RFM Analysis

This bar chart represents RFM (Recency, Frequency, Monetary) Analysis, categorizing customers based on their purchasing behaviour.

Key Observations:

1. **Recent Customers** (Highest Count – 2677 customers)

- These are new or returning customers who made purchases recently.
- High volume indicates successful marketing efforts or seasonal demand.
- Potential opportunity: Convert them into regular/best customers with follow-up offers or loyalty programs.

2. **Regular Customers** (1371 customers)

- Customers who purchase frequently but may not spend as much as the best customers.
- Important segment to retain through exclusive deals and personalized engagement.

3. **Lost Customers** (269 customers)

- These are customers who haven't made a purchase in a long time.
- Possible reasons:

    o Shift to competitors.
    o Lack of engagement.
    o Seasonal buyers who haven't returned.
- Recommended strategy: Re-engagement campaigns, discount offers, or surveys to understand their needs.

4. **Best Customers** (Very Low Count)

- These are high-value, frequent buyers contributing significantly to revenue.
- Their low number suggests a need to increase customer lifetime value (CLV).
- Strategy: Exclusive loyalty programs, premium offers, and VIP discounts to nurture and grow this segment.

Top-Selling Products by Revenue
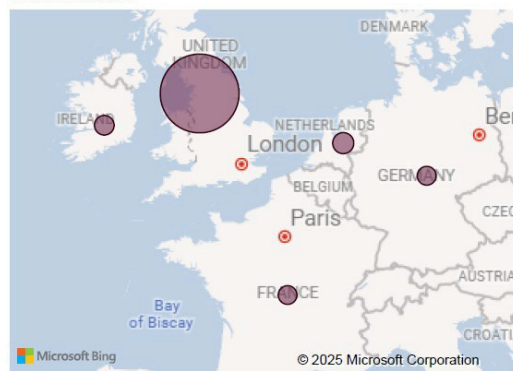
Top 10 Best-Selling Products
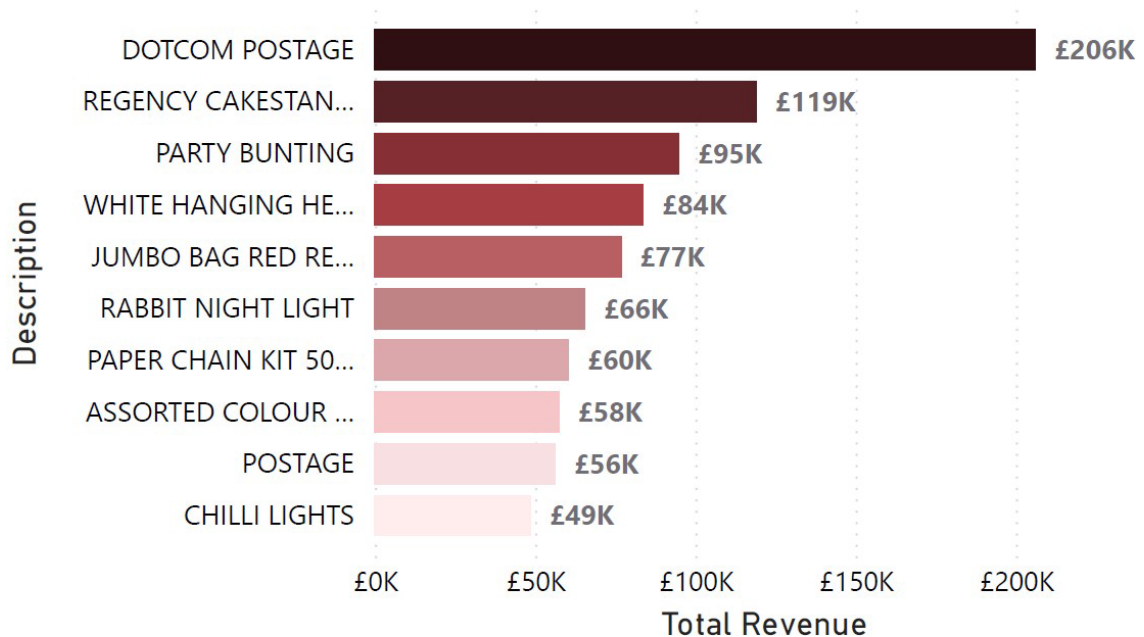
Insights:

- Functional decorative and packaging items lead the sales.
- Many top items are likely gifts or event-related, which aligns with seasonal spikes.

Top 5 Countries by Revenue

Top 5 Countries with Most Revenue Generated

- The UK dominates the revenue base, but there's clear international demand.
- Export strategies to Europe should be further explored.

Returns and Cancellations

- Cancellation Rate: 4.29%
- Cancellation rate is low, although can be reduced more by following up with customers who canceled, or check the descriptions, photos and delivery times of the products

4. Recommendations

1. Optimize for High-Volume Low-Cost Model

- Streamline packaging and logistics for the 0–5 GBP range.
- Consider bundling offers or multi-buy discounts.

2. Leverage Seasonality

- Plan marketing around March and November, aligning with historical demand.
- Launch promotions before high-sales months to capitalize on buyer intent.

3. Explore International Growth

- Expand localized marketing in Germany, Netherlands, and France.
- Optimize shipping and language support for these regions.

4. Improve Product Listings

- Use the high cancellation rate as a signal to review product images and descriptions. There are product anomalies where cancelled products are more than sold product which needs to addressed.
- Consider A/B testing key product pages.

5. Customer Loyalty Programs

- With a 64% repeat customer rate, loyalty programs or tier-based rewards could further increase customer LTV (lifetime value).

5. Future Analytical Directions
- Customer Lifetime Value Modeling
- Market Basket Analysis for cross-selling strategies
- Inventory forecasting to avoid stockouts during high seasons