XXXX Co Ltd.

Business Analytics Report

22.03.2025

— **by**

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1. Business Overview

XXXX Co. Ltd. is a retail company that specializes in a diverse range of goods for its customer base. With an international operational footprint, XXXX Co. Ltd is a retail business specialized in decorative/gift items. Success hinges on effective customer engagement, efficient supply chain management, and adaptability to shifting market dynamics. The company's ability to identify and capitalize on key trends, customer preferences, and geographical nuances is vital for sustainable growth. This report provide the stakeholderswith actionable insight for business improvement.

2. Executive Summary

This report provides a data-driven analysis of XXXX Co. Ltd.'s performance, identifying strengths, weaknesses, and opportunities for improvement. Key findings include:

- **UK Market Dominance (Explanation: Business)**: The United Kingdom is the primary revenue generator. This underscores the importance of maintaining a strong market position in the UK through tailored marketing, excellent customer service, and responsive inventory management.
- **Top-Selling Products "23843" and "23166" (Explanation: Business)**: These products drive a significant portion of sales. They should be the focal point of merchandising, promotions, and potential product line expansions or variations.
- **Customer Segmentation and Behaviour (Explanation: Business)**: Cohort analysis reveals patterns in customer retention, highlighting areas where the company can improve its ability to keep customers engaged over time. RFM segmentation provides valuable insight into different customer segments, enabling targeted marketing and loyalty programs.
- **Areas for Development (Explanation: Business)**: This section identifies areas for improvement through maximizing the effectiveness of marketing campaigns and optimizing inventory control.

3. Data Methodology

- **Data Source**: The primary data provided by the client named "Online Retail.csv," contained transactional sales data for his company.
- **Data Cleaning (Explanation: Data Science)**:
  - **Missing values in CustomerID were removed**: The decision to remove the ID with the customer base ensures that the analytical results focus on customer-based insight for marketing.
  - **Rows with negative Quantity (representing returns) were removed**: By removing the rows with negative returns, it ensures that the anaytics is primarily focused to buying aspect with customer to the business.
  - **Data types were converted to the appropriate formats (e.g., InvoiceDate to datetime)**: Ensured that the Data was consistent for use in analytics and prevented run time errors during analytics
- **Feature Engineering (Explanation: Data Science)**:
  - **TotalRevenue was calculated as the product of Quantity and UnitPrice**: This metric allowed measuring each the total revenue contributed by customer during the buying.
  - **CohortMonth was derived to track customer acquisition cohorts**: Cohort analysis allows for tracking groups of customers together over time, and it ensures if there are seasonal or buying trending behavior.
  - **CohortIndex was calculated to determine the number of months since a customer's first purchase**: The cohort index metrics allows tracking the customer to see how long they stay with the company from the acquisition with their first puchase.
- **Analysis Techniques (Explanation: Data Science)**:
  - **Time Series Analysis**: To observe trends in sales revenue over time.
  - **Country-Based Analysis**: To compare sales performance across different countries.
  - **RFM Analysis**: To segment customers based on recency, frequency, and monetary value.
  - **Cohort Analysis**: To understand customer retention rates and purchasing behavior over time.
  - **K-Means Clustering**: To segment customers beyond RFM, using clustering algorithms.

4. Presentation of Results

4.1. Descriptive Statistics

The dataset comprises **397,924** valid entries after cleaning. Key statistics include:

- **Average Quantity Sold**: 13 units per transaction
- **Average Revenue per Transaction**: £22.39
- **Time Frame**: Data spans from December 1, 2010, to December 9, 2011.

4.2. Time Series Analysis

Daily Sales Over Time (2010-2011)

The time series data is displayed in the figure above, showing fluctuating daily sales with some notable peaks. The trend suggests seasonal patterns or promotional events influence sales activity.

- **Explanation**: Sales display consistent performance with regular spikes, such as spikes in holidays. It's also shows that supply chain operations and promotional operations is correlated in sales a shown in **Figure 4.1** below.
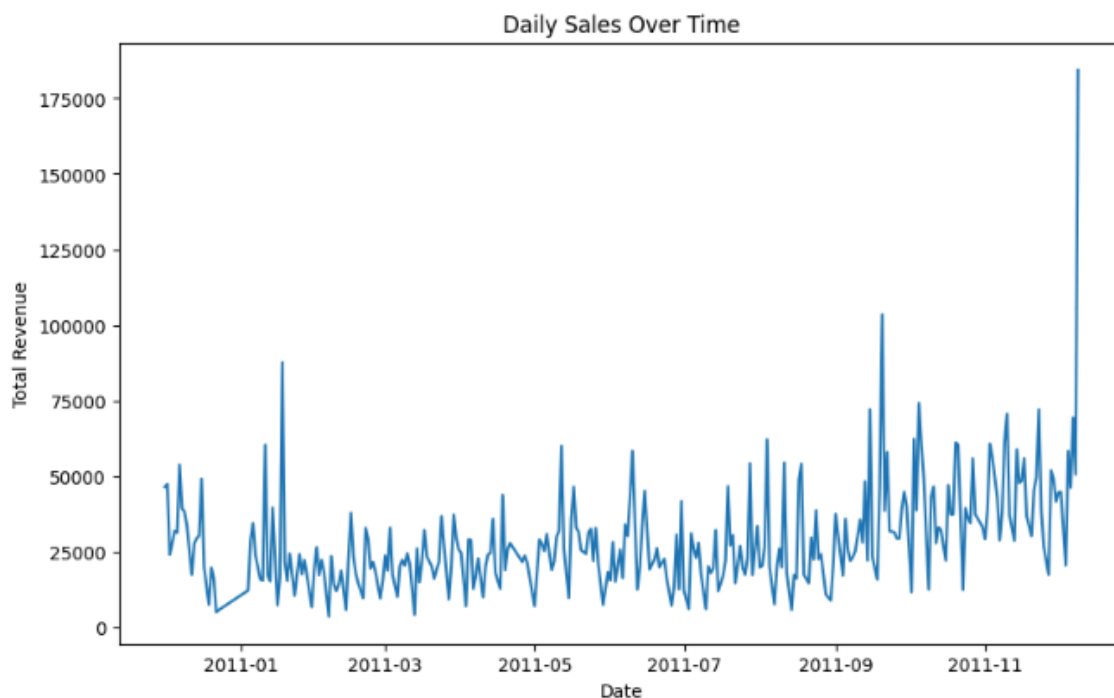

Fig. 4.1: Daily sales over Time

4.3. Country-Based Analysis

Total Sales by Country

As clearly depicted, the United Kingdom dominates sales revenue, far exceeding other countries. This suggests XXXX Co. Ltd. has a strong foothold in the UK market. Other key markets include the Netherlands, EIRE (Ireland), Germany, and France.

- **Explanation (Business Implications)**: Company is heavily reliablt on UK Market and UK drives the operations as shown in **Figure 4.2**. Other countries generate significant revenues. Focus on marketing may help those geographical location to improve the revenue.
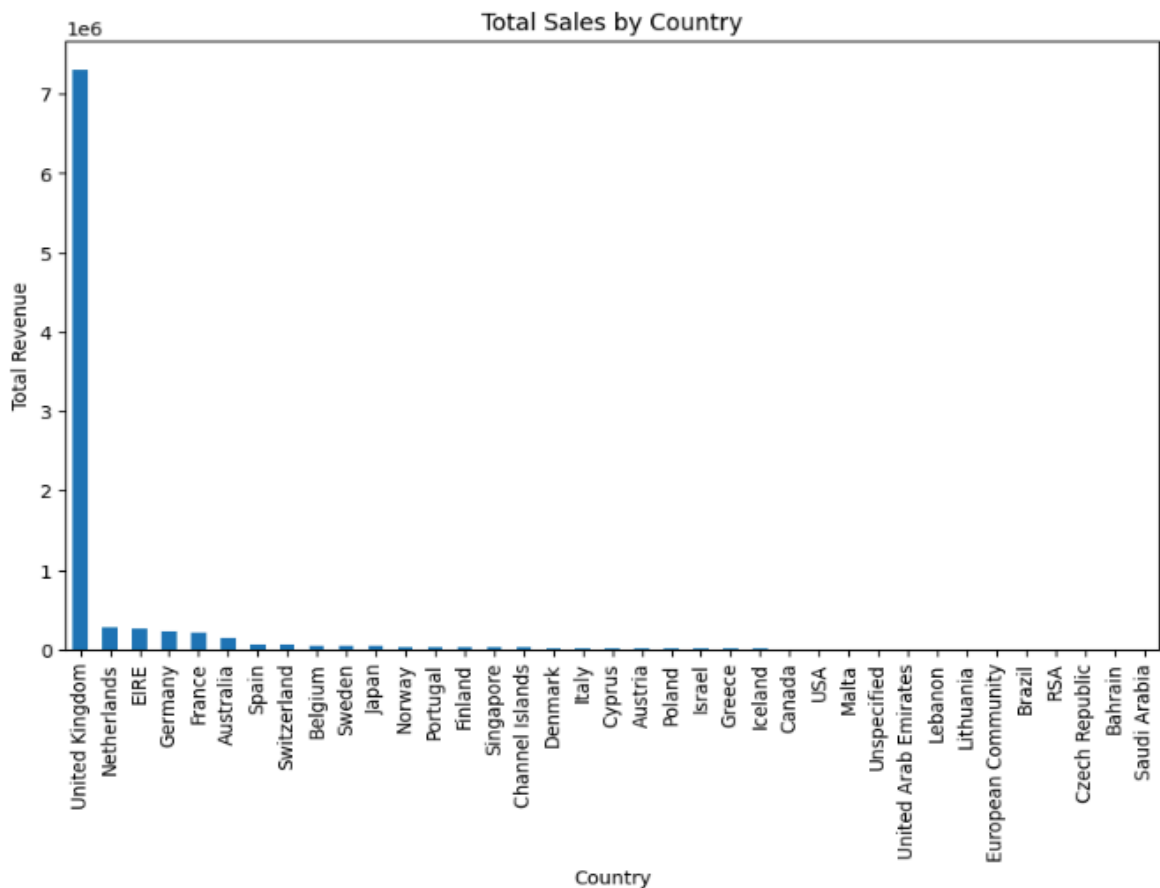

Fig. 4.2: Total sales by country

4.4. RFM Analysis

Distribution of RFM Scores

The RFM score distribution illustrates how customers are spread across different RFM segments as shown in **Figure 4.3**. Understanding this distribution helps tailor marketing efforts to specific customer groups. The data shows a concentration of customers in RFM scores ranging from 3 to 10.

- **Explanation (Business Implications)**: Provides an overview of the customer's recency, frequent and the overall monetary value. Customer retention programs can be targeted at risk customers.
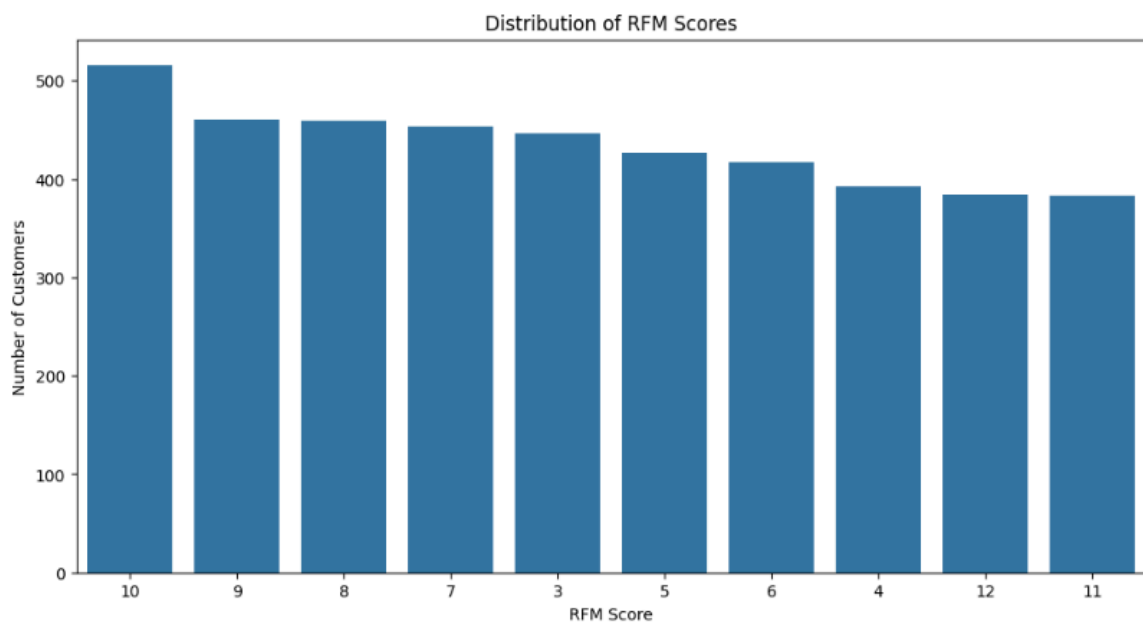

Fig. 4.3: Recency Frequency Analysis

4.5. Top Selling Products

Top 10 Best-Selling Products

The bar graph highlights the top-selling products based on quantity sold as shown in **Figure 4.4**. Stock codes "23843" and "23166" are the clear frontrunners, indicating strong customer demand for these items.

- **Explanation (Business Implications)**: Top selling product contributes a high sales and overall revenue to the company. Marketing is targeted at those products to grow market revenue.
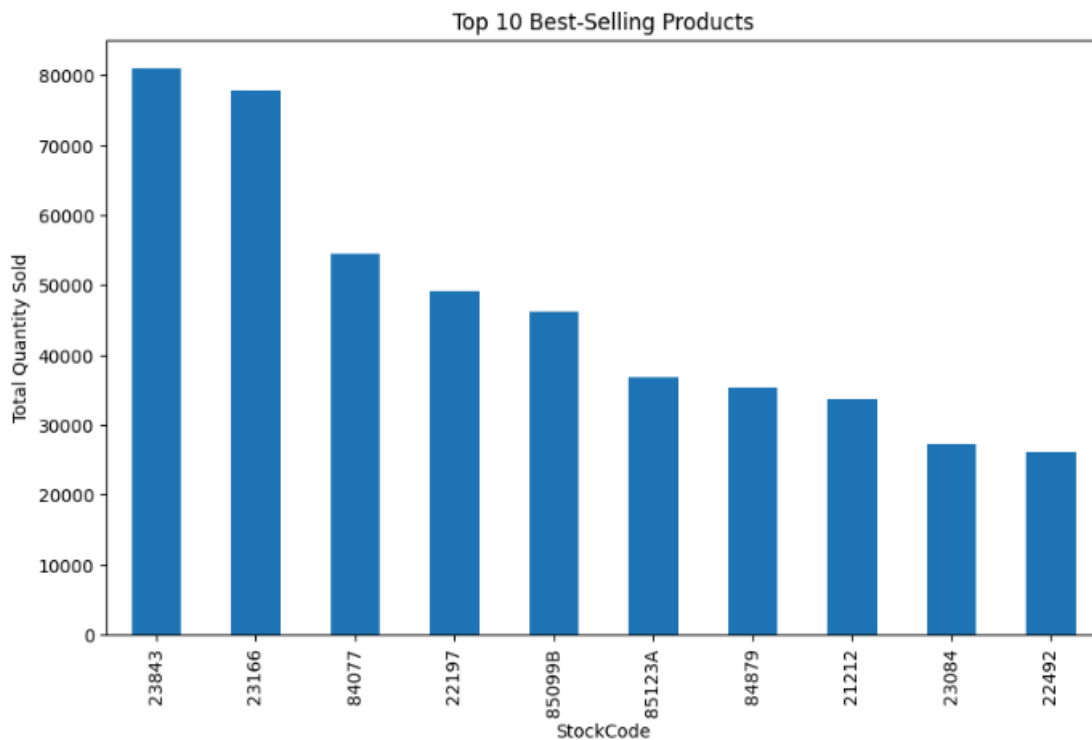

Fig. 4.4: Top selling Products

4.6 Customer segmentation :

Using the elbow method we found out the optimal cluster to be **4** as shown in **Figure 4.5**.

- **Cluster 0 (Low Monetary Value)**: This cluster is characterized by very low monetary value. They also had reasonable purchase frequency.
  - **Explanation (Business Implications)**: Focus on growing this segment by providing premium subscriptions for the customer buying.
- **Cluster 1 (High Monetary Value and low recency)**: Low Monetary Value is characterized by high recency, the people just recently came to start buying
  - **Explanation (Business Implications)**: These are newly acquired customers, they need to be retained at all costs.
- **Cluster 2 (Medium Value and High Value)** These are good customers with above-average monetary value.
  - **Explanation (Business Implications)**: They contribute to reasonable revene and customer loyalty operations are focused on to growing the revenue.
- **Cluster 3 (Low recency, Extremely high frequency)**: This customer have extremely high monetary value as they frequently keep coming to buy.
  - **Explanation (Business Implications)**: These segments provide the best return and drive the most loyalty, so ensuring all business goals are directed to retaining these customers.
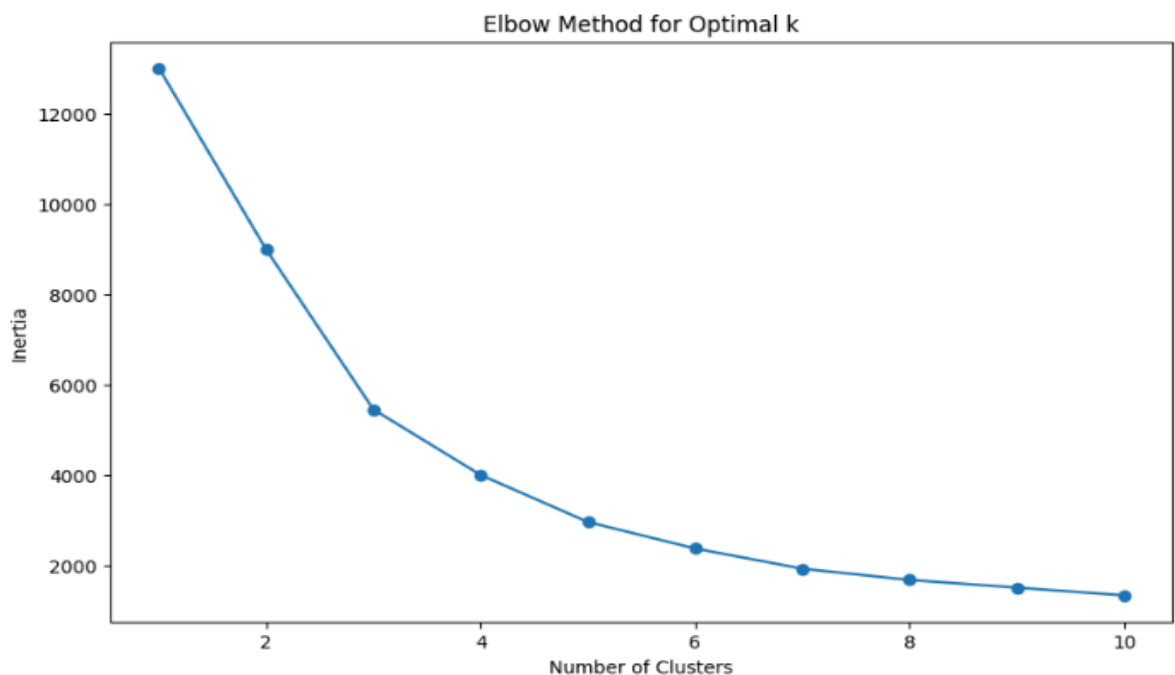

Fig. 5: Showing Customer segmentation Analysis

4.7. Cohort Analysis

Cohort Counts

The section show the customer retention rates for different cohorts over time as shown in **Figure 4.6**. It shows how many customers acquired in a given month continue to make purchases in subsequent months.

- **First Month Retention (Column 0)**: All cohorts start with 100% retention in their first month (this is by definition). This is the baseline.
- **Declining Retention Over Time**: As you move from left to right across each row (cohort), the retention rate generally decreases. This is a common pattern; the longer it has been since a customer's first purchase, the less likely they are to still be actively purchasing.
- **December 2010 Cohort (First Row)**: This cohort shows the highest overall retention rates. Even after 12 months, they retained 27% of their initial customers. This could be due to factors like: Effective initial marketing campaigns, Strong product offerings, Seasonal factors related to the holiday period (December is a big retail month).
- **Recent Cohorts (Bottom Rows)**: More recent cohorts (e.g., November 2011, December 2011) have less data available since they haven't had as much time to churn. We can only see their early retention rates. They appear to be relatively low and not retain beyond one month.
- **Zero Retention (Red Cells)**: As you move further to the right, many cohorts drop to 0% retention. This indicates a point where nearly all of the initial customers from that cohort have stopped making purchases.
- **Inconsistent Retention**: Retention rates are inconsistent across the middle months (e.g. 2011-03, 2011-04, 2011-05 cohorts has different value even during the month 1). This is due to differences in customer acquisition methods or different product mix offerings.

Business Decisions Based on the Insights:

Replicate Success of December 2010 Cohort:

- Action: Investigate why the December 2010 cohort performed so well. Analyze the marketing campaigns used that month, the product offerings, and any other unique factors. Try to replicate these strategies in subsequent months.
- Rationale: Understanding the drivers of the high retention in December 2010 can inform strategies for improving retention across all cohorts.

Address Low Retention in Recent Cohorts:

- Action: Closely monitor the retention rates of recent cohorts (November 2011, December 2011, etc.) in the coming months. If low retention persists, implement targeted interventions.
- Rationale: Early intervention can prevent customer churn and improve long-term retention rates. The red area indicates the the majority of recent cohort are not being retained

Improve Customer Onboarding and Engagement:

- Action: Develop a customer onboarding program that extends beyond the first purchase. This could include:
    - Personalized product recommendations.
    - Loyalty program signup.
    - Educational content about the company and its products.
    - Exclusive offers for repeat purchases.
- Rationale: A strong onboarding program can help customers realize the value of the company's products and services, increasing the likelihood of repeat purchases.

Target Interventions Based on Cohort:

- Action: Implement targeted marketing campaigns based on the age of the cohort. For example:
- For customers who joined 6 months ago and haven't made a purchase recently, send a "we miss you" email with a special offer.
- For customers who are approaching the typical churn point (based on the heatmap), proactively engage them with new product announcements or personalized recommendations.
- Rationale: This tailored approach is more likely to resonate with customers and encourage them to make further purchases.

Re-evaluate Marketing Strategies (Explanation of Red):

- Action: The large areas of red on the right side of the heatmap suggest that a large number of customers, across most cohorts, are churning after a certain number of months. Re-evaluate marketing efforts to focus on longer-term engagement strategies.

- Rationale: Something the business is doing is good to acquire the customer, but has bad retentiion. There's likely a need to improve long term sales and focus on a product where customers will repurchase

Investigate Marketing/Offer Strategy to Improve Customer Repurchase:

- Action: The chart shows most of the customers only buy once every 1-3 month before becoming a 0% retention customer. The business needs to improve or add any items customer can keep repurchasing
- Rationale: By understanding what is the current value, it allows management to better allocate resources that ensures customers are coming back and repurchasing.
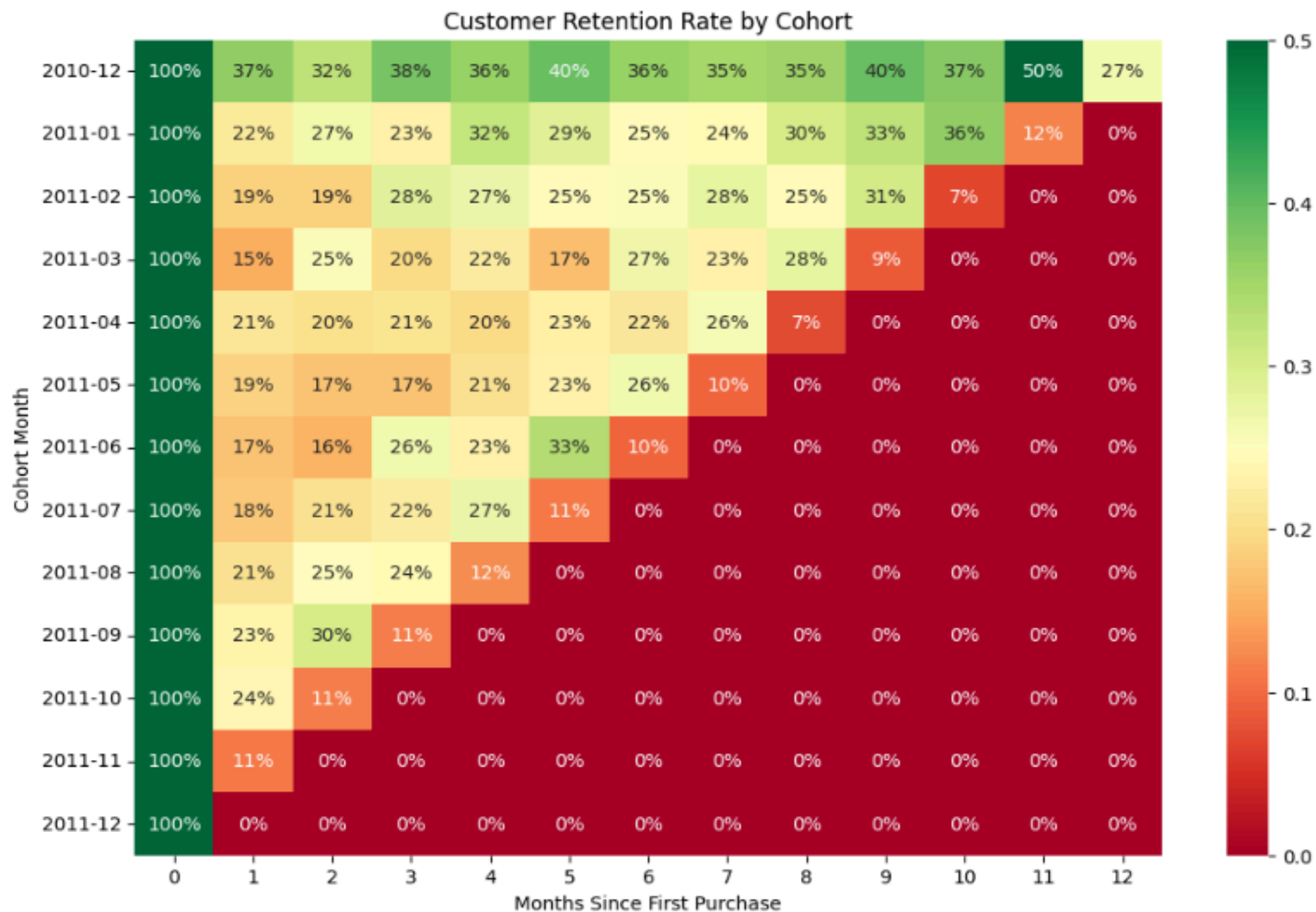

Fig. 4.6: Showing Cohort Analysis

5. Business Insights

- **UK Market Dominance (Actionable Insight)**: The UK market is the primary revenue driver, requiring careful attention to maintain and grow market share through targeted marketing campaigns and enhanced customer service.
- **Product Focus (Actionable Insight)**: "23843" and "23166" are star products and should be a central focus of merchandising and marketing, with consideration for expanding the product line with variations or complementary items.
- **RFM Segmentation Opportunities (Actionable Insight)**:
  - **High-Value Customers**: Implement premium support. These are your most loyal and profitable customers. Treat them accordingly!
  - **At-Risk Customers**: They are showing a decline in recent activity. Targeted campaigns might include exclusive promotions, personalized recommendations, or a "we miss you" communication.
- **Cohort Trends (Actionable Insight)**: Customer retention tends to dwindle after six months. Survey to understand why so that new marketing can be implemented.
- **Cluster Segmentation Opportunities (Actionable Insight)**:
  - **Reward Cluster 3's Loyalty (Actionable Insight)**: Implementing a VIP program tailored to frequent purchasers drives even greater loyalty and spending.
  - **Convert Cluster 1 (Newly Acquired) Customers (Actionable Insight)**: Targeted onboarding, welcome offers, and product recommendations designed to encourage repeat purchases and establish a habit of buying.
- **Pinpoint Successful Acquisition Strategies**: By identifying cohorts with high retention rates (like December 2010), businesses can reverse-engineer successful acquisition strategies. This enables them to replicate those strategies in future marketing campaigns and optimize customer acquisition spend for greater efficiency and ROI.
- **Identify Churn Patterns and Trigger Intervention**: Cohort analysis reveals when customers tend to churn. Understanding these points allows for proactive intervention, such as targeted "we miss you" campaigns, personalized offers, or improved customer service, to re-engage at-risk customers and prevent revenue loss.
- **Tailor Customer Onboarding and Engagement**: Analyze early cohort behavior to understand what factors contribute to initial stickiness or early churn. This information can be used to design more effective onboarding processes, product

education, and ongoing engagement strategies that address specific pain points or needs of new customers.

- **Evaluate Long-Term Marketing Effectiveness**: Monitor the long-term performance of different cohorts to gauge the effectiveness of marketing campaigns, product launches, and customer service initiatives. By tracking customer retention and lifetime value over extended periods, businesses can make data-driven decisions about resource allocation and strategy adjustments to maximize sustainable growth.

6. Strategic Decisions for Business Improvement

Based on the analysis, XXXX Co. Ltd. can take the following strategic actions:

- **Strategic Focus in UK (Strategic Recommendation)**: Concentrate marketing efforts in the UK, emphasizing top-selling products, and providing more customized promotions based on customer segmentation to enhance customer lifetime value and increase ROI.
- **Product Portfolio Optimization (Strategic Recommendation)**: Prioritize marketing and inventory management for the top-selling products to capitalize on their popularity. Explore opportunities to expand the product line or introduce complementary products to drive revenue growth.
- **Customized Marketing using Cluster & RFM (Strategic Recommendation)**: Improve customer experience, retention, and brand recognition by using customized marketing campaigns to bring the customer in at different places using RFM to enhance the profitability in the business
- **Improve Loyalty Program (Strategic Recommendation)**: Tailorthe program to each cluster for better engagement and rewarding different customers to the business
- **Optimize supply chain & Marketing Campaign during seasonal (Strategic Recommendation)**: Improve supply chain efficiency to better meet during sales while adjusting the customer to the advertising during buying

Option 1: Implement Targeted Marketing Campaigns

- **Pros**: Increased customer engagement, potential for higher conversion rates, and better ROI on marketing spend.
- **Cons**: Requires investment in marketing automation tools and skilled personnel, risk of alienating customers with irrelevant offers if segmentation is inaccurate.

Option 2: Optimize Inventory Management

- **Pros**: Reduced holding costs, minimized stockouts, and improved cash flow.
- **Cons**: Requires accurate demand forecasting, investment in inventory management software, risk of lost sales due to insufficient inventory for high-demand products.

Option 3: Expand into New Markets (Carefully)

- **Pros**: Diversified revenue streams, reduced reliance on the UK market, increased brand awareness.
- **Cons**: Requires extensive market research, significant investment in infrastructure, risk of failure due to unfamiliarity with the new market.

7. Conclusion

XXXX Co. Ltd. demonstrates solid performance, especially in the United Kingdom. Utilizing the identified insights to inform strategic actions such as focused marketing, inventory optimization, and customer segmentation will position the company for continued growth and success. Regular monitoring of key performance indicators (KPIs) is essential to track progress and adapt to evolving market conditions.

This report is now structured to provide a high-level overview for executives while also providing detailed data insights and strategic guidance for operational teams. Each point has a clear explanation to contextualize the business implications.