

Task 1:

Exploratory Data Analysis (EDA) and Business Insights

Monthly Sales Trends

- **Holiday Surge in December:** Sales rose sharply to 68,000 in December, likely due to holiday shopping and year-end promotions, indicating a strong seasonal peak.
- **Post-Holiday Dip in January-February:** Sales dropped to 51,000 in January and further to 49,000 in February, reflecting reduced consumer spending after the holiday season.
- **Spring Recovery (March-April):** Sales rebounded from 49,000 in March to 62,000 in April, suggesting a recovery phase, possibly driven by spring promotions or new product launches.
- **Mid-Year Volatility (May-October):** Sales fluctuated significantly, with a dip in June (49,000), a peak in July (71,000), and another dip in October (49,000), indicating inconsistent demand during mid-year.
- **Year-End Recovery (November-December):** Sales dropped to 39,000 in November but surged to 60,000 in December, highlighting a strong year-end recovery driven by holiday shopping and festive demand.

Customer Purchase Frequency

- High-Frequency Customers: Customers C0109 and C0156 have significantly higher transaction frequencies (above 10), indicating they are the most loyal or frequent buyers.
- Moderate-Frequency Group: Customers C0141, C0175, C0065, and C0008 have similar transaction frequencies around 9.8, suggesting a consistent purchasing behavior, likely representing a loyal but less frequent group.
- Lower-Moderate Group: Customers C0147, C0093, C0075, C0084, and C0165 have frequencies around 9, indicating they are regular buyers but with slightly lower engagement compared to the moderate group.
- Low-Frequency Customers: Customers C0061, C0073, C0098, C0068, C0104, C0102, C0059, C0004, and C0145 have the lowest transaction frequencies, suggesting they are occasional or infrequent buyers.
- Segmentation Opportunity: The data reveals clear customer segments based on purchase frequency, which can be used for targeted marketing strategies—high-frequency customers for retention, moderate for upselling, and low-frequency for re-engagement campaigns.

Sales by Region

- **South America Dominates Sales:** South America has the highest sales at 200,000, indicating it is the most profitable region, possibly due to higher demand or effective marketing strategies.
- **Europe as Second-Highest:** Europe follows South America in sales, suggesting strong market penetration and customer engagement in this region.
- **North America in Third Place:** North America ranks third, indicating steady but lower sales compared to South America and Europe, which may require targeted strategies to boost growth.
- **Asia Trails Behind:** Asia has the lowest sales among the regions, highlighting potential untapped opportunities or challenges in market penetration that need to be addressed.
- **Regional Focus for Growth:** The disparity in sales across regions suggests the need for region-specific strategies—leveraging South America's success, improving performance in Europe and North America, and exploring growth opportunities in Asia.

Customer Acquisition Trends

- **Major Dip in July 2024:** A significant drop in new customers in July 2024 suggests a potential issue such as reduced marketing efforts, seasonal slowdown, or external economic factors impacting acquisition.
- **Dip After July 2023:** Right after July 2023, the number of new customers dropped to 2, indicating a temporary setback, possibly due to campaign fatigue or market saturation.

- **Recovery Post-Dips:** After both dips (July 2023 and July 2024), the trend shows recovery, suggesting effective corrective measures or seasonal rebounds in customer acquisition efforts.
- **Seasonal Influence:** The recurring dips in July (2023 and 2024) may indicate a seasonal pattern, where mid-year months experience lower customer acquisition due to holidays or reduced spending.
- **Need for Mid-Year Strategies:** The consistent dips in July highlight the need for targeted mid-year campaigns or promotions to counteract seasonal declines and maintain steady growth.

Product Category Performance:

- **Books Lead Sales:** Books have the highest sales, indicating strong demand, possibly due to high customer interest or effective marketing in this category.
- **Electronics in Second Place:** Electronics follow books, suggesting a steady demand for tech products, which are likely high-value items.
- **Clothing at Third Position:** Clothing ranks third, showing consistent but lower sales compared to books and electronics, possibly due to seasonal trends.

- Home Decor Trails Behind: Home decor has the lowest sales, indicating it may be a niche category with limited demand or less marketing focus.
- Category-Specific Strategies: The performance highlights the need for tailored strategies—capitalizing on books and electronics, boosting clothing sales through promotions, and exploring ways to grow home decor demand.