

## Task 1: Exploratory Data Analysis (EDA) and Business Insights

Based on the exploratory data analysis (EDA) conducted in the EDA.ipynb, here are business insights derived from the analysis:

Insights:

1. Equal Preference for Books and Electronics:
  - Books and electronics make up 26% each of the product distribution, showing an equal demand for these categories among customers.
2. Clothing is a Close Contender:
  - Clothing represents 25% of the product share, indicating it's also a strong-performing category, closely trailing books and electronics.
3. Home Decor Lags Behind:
  - Home decor accounts for 23% of the distribution, highlighting a relatively lower preference compared to other categories.
4. Balanced Product Portfolio:
  - The close distribution percentages (between 23%–26%) suggest a well-diversified product portfolio catering to varied customer interests.
5. Potential for Growth in Home Decor:
  - The relatively lower share for home decor presents an opportunity to introduce new products or targeted campaigns to increase interest and sales.

## Customer and Product Analysis Report

### Introduction:

This report evaluates customer distribution by region and product category, offering actionable insights to refine business strategies.

### Customer Analysis Insights:

1. South America dominates with the largest customer base, showcasing strong market penetration.
2. Europe, North America, and Asia have balanced but relatively smaller customer shares, indicating opportunities for growth.
3. Targeted regional marketing strategies could increase customer engagement and acquisition.
4. Expansion into Europe and Asia can unlock additional revenue streams.
5. Regional product customization is key to enhancing satisfaction and retention globally.

## **Product Analysis Insights:**

1. Books and electronics lead the product distribution, making up 26% each, reflecting customer demand.
2. Clothing accounts for 25%, indicating it's a high-performing category.
3. Home decor, at 23%, shows potential for growth through improved product offerings.
4. The balanced product portfolio ensures diverse customer needs are met.
5. Focused campaigns for home decor could boost its performance.

## **Recommendations:**

1. Prioritize marketing in South America while exploring expansion in Europe and Asia.
2. Invest in home decor campaigns to enhance its appeal and sales.
3. Introduce new product lines or promotions in top-performing categories (books, electronics, and clothing).
4. Conduct customer feedback surveys to identify preferences for underperforming regions and categories.
5. Diversify product strategies across regions to increase global market penetration.

## **TRANSACTION ANALYSIS INSIGHTS:**

1. The transaction value distribution shows a strong concentration in the \$250-500 range, with the highest peak around \$300-350. This suggests this is the sweet spot for pricing products or services, where customers are most comfortable spending. This information could be valuable for pricing strategy optimization.
2. Monthly sales data reveals significant seasonal variation, with peaks in months 7 and 9 (approximately \$70,000 each) and a notable trough in month 11 (around \$38,000). This 45% difference between peak and low months indicates a need for better inventory and resource management during high-demand periods.
3. Regional analysis shows South America has the highest average transaction value (\$720), while North America has the lowest (\$620). This 16% variation suggests different purchasing power or product preferences across regions, presenting opportunities for region-specific pricing strategies.

## **CUSTOMER PURCHASE BEHAVIOR INSIGHTS:**

1. The purchase frequency distribution reveals that 5 purchases per customer is the most common pattern, with over 40 customers falling into this category. This indicates a strong mid-level loyalty segment that could be targeted for increased engagement and upselling opportunities.
2. There's a clear drop-off in customer numbers after 8 purchases, with very few customers making 9 or more purchases. This suggests a potential customer retention issue at this

threshold, indicating a need for specific retention strategies for customers approaching their 8th purchase.

3. The transaction value distribution shows a long tail extending beyond \$1,500, indicating a small but significant segment of high-value transactions. This suggests the existence of a premium customer segment that could be developed further through targeted marketing and specialized service offerings.

## **RECOMMENDATIONS:**

1. Implement Region-Specific Strategies:
  - Develop targeted pricing strategies for South America, where customers show willingness to spend more
  - Create region-specific marketing campaigns based on average transaction values
  - Consider special promotions in North America to increase average transaction value
2. Customer Retention Focus:
  - Create a special loyalty program targeting customers approaching their 8th purchase
  - Develop incentives to encourage customers to move beyond the 5-purchase threshold
  - Implement a VIP program for customers who make high-value transactions above \$1,500
3. Seasonal Preparation:
  - Build inventory management strategies around the peak months (7 and 9)
  - Develop marketing campaigns to boost sales during low months, especially month 11
  - Consider seasonal pricing strategies to optimize revenue throughout the year.