

Analysis of Transactions, Products, and Customer Behaviour

This report summarizes the findings from an in-depth exploratory data analysis (EDA) of transactions, products, and customer behaviour. The key insights reveal trends in customer distribution, product performance, transaction patterns, revenue generation, and other critical aspects of business operations.

1. Distribution of Customers Across Regions

The distribution of customers across various regions highlights significant geographical insights. **South America** emerges as the region with the highest customer count, indicating its position as a key market for the business. In contrast, **Asia** has the least number of customers, suggesting untapped potential or less marketing focus in this region. These findings call for targeted strategies to either maintain dominance in South America or expand into less represented regions such as Asia.

2. Product Performance Statistics

The analysis of product performance indicates the best-performing products in terms of revenue and demand. **Active Wear Smartwatch** is the top-grossing product, generating a total revenue of 39,096. This suggests high demand for wearable technology among customers, possibly due to its utility and growing popularity. Such insights can inform inventory management and promotional efforts to maximize revenue from high-demand products.

3. Transaction Trends

Transaction trends over time reveal interesting patterns. The year **2024** recorded the most transactions, reflecting a strong year for business. Furthermore, January emerged as the month with the highest transaction volume. This could be attributed to post-holiday sales, promotions, or seasonal factors. Businesses can capitalize on such periods by offering targeted discounts and ensuring adequate stock availability.

4. Revenue Analysis

From the perspective of revenue, **Books** contributed the highest revenue among all product categories. This highlights the popularity and consistent demand for books among customers, making it a critical category for revenue generation. Strategies to sustain this revenue stream could include offering discounts on book bundles or expanding the product portfolio within this category.

5. Customer Signup Trends

The year **2024** also saw the highest customer signups, indicating successful marketing efforts or campaigns aimed at acquiring new customers. These signups could also correlate with the transaction peaks observed in January. Understanding the factors behind this spike can help in replicating similar results in the future.

6. Product Distribution Across Regions

The distribution of product categories across regions provides insights into regional preferences. **Books** showed the widest variety of product categories, suggesting their universal appeal. This insight highlights the need to tailor inventory and marketing strategies based on regional demand. For instance, promoting books in regions where other categories dominate could balance overall sales distribution.

7. Transactions by Price Ranges

The analysis of transaction volumes by price ranges indicates that the majority of transactions occur in the **400–500 price range**. This finding highlights the affordability threshold of the average customer and can guide pricing strategies. Introducing more products within this range or offering discounts to align with this range could boost overall sales.

8. Top Products by Revenue

The top three products by revenue are:

1. **Active Wear Smartwatch**
2. **Sound Wave Headphones**
3. **Sound Wave Novel**

These products demonstrate consistent demand and significantly contribute to overall revenue. Promotional campaigns, upselling opportunities, and bundling strategies involving these products can enhance profitability.

Conclusions and Recommendations

The EDA reveals critical insights that can drive informed decision-making:

1. **Regional Focus:** Expand into underrepresented regions like Asia to broaden customer reach.
2. **Product Optimization:** Focus on top-performing products such as ActiveWear Smartwatch while addressing the needs of high-demand categories like Books.
3. **Seasonal Campaigns:** Capitalize on transaction peaks in January and high customer signup periods by aligning marketing efforts and inventory.
4. **Pricing Strategies:** Cater to the 400–500 price range, which sees the highest transaction volumes.