

Business Insights Report

1. Exploratory Data Analysis (EDA) Insights

The **Exploratory Data Analysis (EDA)** on the customer and transaction data uncovered several key business insights.

Customer Data:

- **Regional Distribution:** The **South America** region has the highest concentration of customers, followed by **Asia**, suggesting opportunities for regional-focused campaigns.
- **Signup Trends:** A majority of customers registered in **Q1 2023**, indicating a **new customer base** with growth potential. This suggests a need for **customer retention** strategies to sustain long-term engagement.

Transaction Data:

- **Seasonality:** Transactions and revenue showed significant seasonal fluctuations, with a **spike** in **July 2024** and a **drop** in **December 2023**. This indicates the potential to align marketing efforts with peak months and **promote special offers** during lower months to stabilize income.
 - **Transaction Frequency:** Most customers engage in **1-4 transactions per month**, highlighting the opportunity for **loyalty programs** to increase transaction frequency.
 - **Top Products:** **Books** generated the highest revenue (**\$192,147.47**), followed by **Electronics**, making these categories critical for targeted marketing.
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2. Customer Segmentation via Clustering

Using **KMeans** clustering, we segmented customers into **5 clusters** based on their profiles and transaction behavior. Each group exhibited distinct purchasing patterns:

- **Cluster 4 (Largest):** Customers in this group made **moderate purchases** but with higher spending. This cluster presents an opportunity for **personalized offers** and **loyalty programs** to drive revenue.
- **Cluster 2 (Smaller):** While smaller, this cluster showed fewer transactions but higher spending, indicating a need for **premium offerings** to boost lifetime value.

The **DB Index** of **0.895** and **Silhouette Score** of **0.3559** reflect the effectiveness of the segmentation, showing well-separated, cohesive clusters.

3. Regional Insights and Strategy

The **South America** region, being the highest revenue-generating area, should be prioritized for **targeted marketing campaigns**. The consistent success of **Books** and **Electronics** categories suggests that these products should be highlighted in regional campaigns.

4. Conclusion and Recommendations

- **Focus on South America:** Expand marketing efforts in the **South American** market, as it holds significant growth potential.
- **Product Strategy:** Promote **Books** and **Electronics**, the top-performing categories, through **targeted campaigns**.
- **Loyalty Programs:** Implement **loyalty initiatives** aimed at increasing transaction frequency among **moderate** customers.
- **Leverage Seasonality:** Utilize insights into seasonal sales patterns to optimize marketing strategies during **peak and off-peak months**.

These insights from EDA and segmentation can significantly enhance marketing, product strategies, and customer engagement.