Business Insights:

Category-Wise Revenue Analysis
The "Books" category generates the highest revenue among all categories, outperforming Electronics, Clothing, and Home Décor. This highlights its strong market demand. Businesses should prioritize maintaining adequate inventory levels and running targeted promotions in the Books category to further capitalize on its performance and sustain customer interest.

Regional Revenue Contribution
South America leads in revenue generation across all regions, followed by Europe and North America. This dominance suggests a higher customer base or spending power in South America. Companies should concentrate marketing efforts, promotions, and expansion strategies in this region to further drive sales and capture additional market share.

Top Products by Quantity Sold
The "SoundWave Cookbook" and "SoundWave Jeans" emerge as the most sold products, indicating their high customer demand. Businesses should ensure sufficient inventory levels for these products to prevent stockouts and lost sales opportunities. Additionally, targeted marketing campaigns for these products can further enhance sales performance, reinforcing their success.

Customer Behavior Patterns from PCA
The PCA visualization uncovers distinct clusters and linear separations in transaction data, pointing to specific customer behaviors or transaction types. These patterns could represent different customer segments or purchasing trends. Leveraging these insights, businesses can design targeted marketing strategies, offer personalized recommendations, and even detect anomalies for fraud prevention.

Insights from Pairplot Visualization
The pairplot analysis reveals the relationships between price, quantity, and total transaction value. A strong linear relationship between price and total value confirms that higher-priced products directly increase the total revenue. Quantity, however, exhibits discrete values, possibly linked to product unit packaging or selling patterns. Businesses can use these insights to optimize pricing strategies and inventory management while exploring bundling and upselling opportunities.

Key Correlations in Data Analysis
The analysis highlights a strong correlation between product price and total transaction value, as well as a moderate correlation between quantity and total value. However, price and quantity show minimal correlation, indicating that demand is not price-sensitive. These insights suggest opportunities for dynamic pricing strategies to maximize revenue without significantly affecting demand.

Regional Preferences and Opportunities
Region-specific product preferences were observed, such as higher demand for certain products (e.g., P070 and P095) in North America compared to other regions. Tailored

marketing campaigns and region-specific inventory optimization can address these variations. Underperforming products in some regions can also be promoted through strategic advertising or bundled offers to drive sales.