Detailed Report for Marketing Team

Objective:

This report aims to provide insights and recommendations to the marketing team based on the analysis of sales data, product performance, and geographic breakdowns. The analysis was performed using both SQL and Python, with visualisations and key trends highlighted. The findings aim to support marketing strategies for improved revenue generation.

Data Overview:

The dataset contains transactional information on products sold by a retail company across multiple categories. The dataset includes columns such as:

- **ProductID**: Unique identifier for products.

- **Category**: Product category (e.g., Sports, Clothing, Home & Kitchen).

- **Price**: Price of the product sold.

- **QuantitySold**: Quantity of the product sold.

- **Revenue**: Total revenue from the sale.

- **CustomerLocation**: The city or region where the product was sold.

- **Date**: The date of the transaction.

The analysis was carried out using both SQL queries to aggregate the data and Python (via Dash and Plotly) to visualise the trends.

Key Insights from SQL Analysis:

1. Top Performing Products by Revenue:

- The SQL query successfully aggregated revenue by `ProductID`, providing insights into the top products based on total revenue. This helped in identifying which products have the highest revenue contribution, allowing marketing to focus on these products for targeted campaigns.

2. Monthly Sales Revenue:

- Using SQL, monthly sales revenue was aggregated by `Category`. This time-series analysis revealed seasonal trends and helped pinpoint months with high or low revenue. For instance, November and December typically had higher sales, possibly due to holiday promotions.

3. Geographic Sales Breakdown:

- SQL aggregation by `CustomerLocation` highlighted the regions contributing most to sales. For example, cities like New York, Los Angeles, and Chicago generated the highest revenue. This insight can be used to tailor marketing efforts to specific regions where demand is strong.

<u>Key Insights from Python (Dash and Plotly) Analysis:</u>

1. Sales Over Time (Revenue Trends):

- The time-series chart created in Python using Plotly showed how revenue fluctuated over the year. This analysis revealed that sales had a noticeable dip between March and May, with a significant spike in November and December. Marketing campaigns should be aligned with these trends to maximise impact during peak months.

2. Category Performance:

- The pie chart visualisation helped in identifying the relative contribution of each product category to total revenue. Clothing and Sports were the top two categories, followed by Home & Kitchen and Electronics. These insights suggest that more marketing resources should be allocated to the top-performing categories, while underperforming categories could benefit from targeted promotions.

3. Geographic Sales Distribution:

- The geographic map (using Plotly) visualised revenue by location. Locations like New York, Los Angeles, and Houston contributed significantly to total sales, while regions such as San Jose and San Diego had comparatively lower contributions. This indicates that marketing efforts could be concentrated in high-performing cities, but additional efforts may be needed in regions with lower sales.

4. Revenue by Location:

- The average revenue per location was calculated and visualised. The marketing team can use this information to identify high-value regions and tailor promotions accordingly. Cities with lower average revenue may need specific campaigns or localised offers.

Comparison Between SQL and Python Analysis:

1. Data Aggregation:

- Both SQL and Python were used to aggregate data by product, category, and location. The SQL-based analysis provided a direct view of the data at the aggregate level, while Python (using Pandas and Plotly) allowed for more flexible data manipulation and richer visualisations.

- Both analyses agreed on key trends: high-performing products, the impact of seasonality on revenue, and strong regional sales in cities like New York and Los Angeles.

2. Visualisation:

- SQL analysis did not include visualisations, while Python visualisations (via Dash and Plotly) allowed for more intuitive, interactive insights. The interactive maps and time-series graphs in Python made it easier to explore trends visually and provided more actionable insights, especially for location-based analysis.

3. Granularity:

- Python allowed for more granular filtering (e.g., filtering by year, month, category, or location) and dynamic visualisations, which provided deeper insights into the data. SQL analysis was static, requiring manual querying for each new insight.

Recommendations for the Marketing Team:

1. Focus on High-Performing Categories:

- Based on the pie chart and SQL aggregation, Clothing and Sports are the top categories. Marketing efforts should prioritise these categories, with targeted campaigns to maintain or increase sales.

2. Leverage Peak Sales Periods:

- The time-series analysis in Python showed that sales spike in November and December. Marketing campaigns, promotions, or discounts should be ramped up during these months to capitalise on the high sales potential.

3. Regional Targeting:

- Cities like New York, Los Angeles, and Chicago are the highest revenue-generating regions. Marketing efforts in these locations should include local advertisements, targeted promotions, or influencer partnerships to boost sales further. For cities like San Jose and San Diego, consider offering localised promotions or improving visibility to increase sales.

4. Product-Specific Campaigns:

- The analysis of top-performing products by revenue indicates which items should be prioritised. Consider running product-specific promotions, bundling deals, or enhancing their visibility on the website and through ads.

5. Promote Lower-Performing Locations:

- For regions with lower average revenue, targeted promotions or local events could increase engagement and sales. This could involve offering localised discounts or featuring region-specific products.

6. Interactive Reporting for Continuous Monitoring:

- The Python dashboard allows for real-time filtering of categories, dates, and locations. This could be a useful tool for the marketing team to monitor key metrics continuously. It allows dynamic, actionable insights based on up-to-date data, supporting data-driven decision-making.

Conclusion:

The analysis using SQL and Python (Dash and Plotly) has provided valuable insights into product performance, sales trends, and geographic sales distribution. The recommendations outlined in this report can help the marketing team tailor their strategies to optimise revenue growth across different product categories and regions. By focusing on high-performing products, aligning marketing campaigns with peak sales periods, and targeting specific geographic regions, the marketing team can drive more effective campaigns and boost overall sales performance.