



SQL Data Analysis Case Study: Sales, Marketing, and Profitability Insights

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SQL Case Study Report

Introduction

In this case study, I worked on a dataset to analyze customer sales, marketing expenses, and profitability across different states. The objective was to generate actionable insights using SQL queries and help determine the top-performing products, most profitable regions, and marketing effectiveness.

Dataset Overview

The case study involved three primary tables:

1. **FactTable** - Contains sales-related data with 14 attributes (e.g., Sales, Profit, COGS, Total Expenses, Marketing, etc.).
2. **ProductTable** - Stores product details with attributes such as Product Type, Product, and Product ID.
3. **LocationTable** - Contains geographical data like Area Code, State, Market, and Market Size.

Tasks and SQL Queries

Below are the key tasks along with the SQL queries used to derive insights.

1. Geographic and Product Insights

Q1: Display the number of states present in the LocationTable.

```
SELECT COUNT(DISTINCT State) AS NumberOfStates FROM LocationTable;
```

Q2: How many products are of regular type?

```
SELECT COUNT(*) AS RegularProducts FROM ProductTable WHERE Type = 'Regular';
```

Q3: How much spending has been done on marketing for Product ID 1?

```
SELECT SUM(Marketing) AS TotalMarketing FROM FactTable WHERE ProductID = 1;
```

2. Sales and Profit Analysis

Q4: What is the minimum sales of a product?

```
SELECT MIN(Sales) AS MinSales FROM FactTable;
```

Q5: Display the max Cost of Goods Sold (COGS).

```
SELECT MAX(COGS) AS MaxCOGS FROM FactTable;
```

Q6: Find out the total profit generated by Colorado state.

```
SELECT SUM(Profit) AS TotalProfit FROM FactTable f
```

```
JOIN LocationTable l ON f.AreaCode = l.AreaCode
```

```
WHERE l.State = 'Colorado';
```

3. Performance Metrics

Q7: What is the average sales in area code 719?

```
SELECT AVG(Sales) AS AvgSales FROM FactTable WHERE AreaCode = 719;
```

Q8: Display the average inventory for each product ID.

```
SELECT ProductID, AVG(Inventory) AS AvgInventory FROM FactTable GROUP BY ProductID;
```

Q9: Display the total sales done on date '2010-01-01'.

```
SELECT SUM(Sales) AS TotalSales FROM FactTable WHERE Date = '2010-01-01';
```

4. Ranking and Aggregation

Q10: Display the rank without any gap to show the sales-wise rank.

```
SELECT ProductID, Sales, RANK() OVER (ORDER BY Sales DESC) AS SalesRank FROM FactTable;
```

Q11: Find the state-wise profit and sales.

```
SELECT I.State, SUM(f.Profit) AS TotalProfit, SUM(f.Sales) AS TotalSales
FROM FactTable f
JOIN LocationTable I ON f.AreaCode = I.AreaCode
GROUP BY I.State;
```

5. Advanced SQL Techniques

Q12: Create a stored procedure to fetch the result according to the product type.

```
DELIMITER //
CREATE PROCEDURE GetProductByType(IN productType VARCHAR(50))
BEGIN
    SELECT * FROM ProductTable WHERE Type = productType;
END //
DELIMITER ;
```

Q13: Write a query to classify total expenses as "Profit" or "Loss."

```
SELECT *, CASE
    WHEN TotalExpenses < 60 THEN 'Profit'
    ELSE 'Loss'
END AS FinancialStatus
FROM FactTable;
```

Q14: Apply UNION and INTERSECTION on tables containing Area Code.

```
(SELECT AreaCode FROM FactTable)
```

UNION

(SELECT AreaCode FROM LocationTable);

6. Data Manipulation

Q15: Change the product type from 'Coffee' to 'Tea' where ProductID is 1 and undo it.

```
UPDATE ProductTable SET Type = 'Tea' WHERE ProductID = 1;
```

-- Undo the change

```
UPDATE ProductTable SET Type = 'Coffee' WHERE ProductID = 1;
```

Q16: Delete the records in the Product Table for regular type.

```
DELETE FROM ProductTable WHERE Type = 'Regular';
```

Conclusion

This case study allowed me to apply SQL queries to analyze a dataset effectively, drawing insights into product performance, regional sales trends, and business profitability. The techniques used, including ranking, stored procedures, and user-defined functions, showcase my ability to handle real-world data challenges in SQL.

For more details, you can check out my GitHub repository where I have uploaded the SQL scripts related to this case study.

Feel free to connect with me on LinkedIn to discuss more data science and SQL case studies!