

Retail Sales Performance & Profitability Analysis using SQL & Power BI

Data Analyst / Business Analyst (Simulation Project)

1. EXECUTIVE SUMMARY

This project analyzes multi-year retail sales data to evaluate revenue growth, profitability, customer segments, regional performance, and the impact of discounting on profit margins. Using SQL for data preparation and Power BI for visualization, the analysis identifies profit drivers, loss-making products, and strategic opportunities to improve margin performance.

2. BUSINESS PROBLEM & OBJECTIVES

Business Problems

- Revenue growth visibility across time
- Profit leakage due to discounting
- Regional performance inconsistency
- Customer segment profitability comparison

Objectives

- Analyze revenue and profit trends over time
- Identify high and low profitability regions
- Evaluate customer segment contribution

- Assess discount impact on profit

3. DATA OVERVIEW

Data Source

- Retail transactional dataset (orders, products, customers)

Key Fields

- `order_date`
- `region`
- `customer_segment`
- `product_name`
- `sales`
- `profit`
- `discount`

Data Volume

- Multi-year transactional data (2012–2015)

4. SQL DATA PREPARATION & ANALYSIS

Step 1: Create Clean Fact Table

`SELECT`

```
    order_date,
    YEAR(order_date) AS year,
    MONTH(order_date) AS month,
    DATE_FORMAT(order_date, '%Y-%m') AS month_year,
    region,
    customer_segment,
    product_name,
    sales,
    profit,
    discount
FROM orders
WHERE order_date IS NOT NULL;
```

Step 2: Revenue & Profit Aggregation

```
SELECT
    DATE_FORMAT(order_date, '%Y-%m') AS month_year,
    SUM(sales) AS total_revenue,
    SUM(profit) AS total_profit
FROM orders
GROUP BY month_year
ORDER BY month_year;
```

Step 3: Profit Margin Calculation

```
SELECT
    product_name,
    SUM(sales) AS total_revenue,
    SUM(profit) AS total_profit,
    ROUND(SUM(profit)/SUM(sales), 2) AS profit_margin
FROM orders
GROUP BY product_name
HAVING SUM(sales) > 0;
```

Step 4: Discount Impact Analysis

```
SELECT
    discount,
    SUM(profit) AS total_profit
```

```
FROM orders
GROUP BY discount
ORDER BY discount;
```

Step 5: Regional Profitability

```
SELECT
    region,
    SUM(profit) AS total_profit
FROM orders
GROUP BY region
ORDER BY total_profit DESC;
```

5. DATA MODELING (POWER BI)

Model Design

- **Fact table:** Sales transactions
- **Dimension tables:** Date, Product, Region, Customer Segment

Relationships

- Date → Fact (1:*)
- Product → Fact (1:*)
- Region → Fact (1:*)

A star schema improves performance, simplifies DAX calculations, and aligns with industry best practices.

6. DAX CALCULATIONS

Total Revenue = SUM(sales[sales])

Total Profit = SUM(sales[profit])

Profit Margin % =
DIVIDE([Total Profit], [Total Revenue])

Revenue 12M MA =
CALCULATE(
 AVERAGE([Total Revenue]),
 DATESINPERIOD(
 'Date'[Date],
 MAX('Date'[Date]),
 -12,
 MONTH
)
)

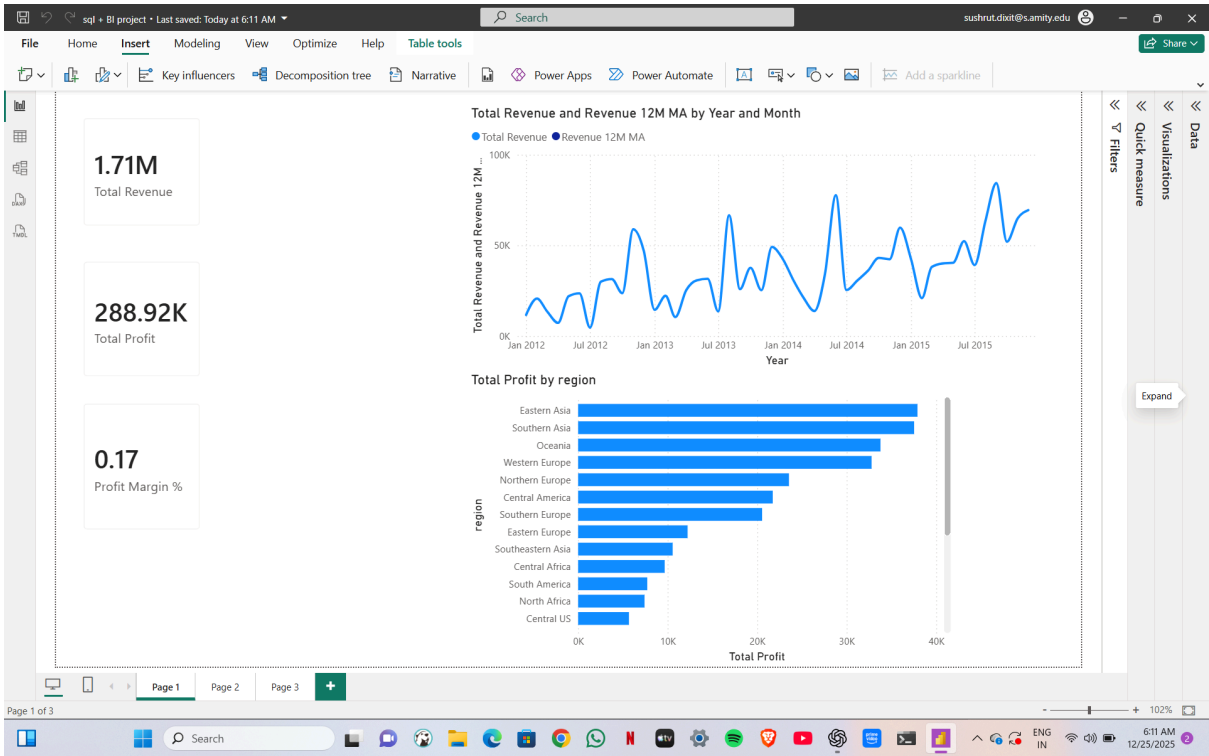
Time-intelligence measures were used to smooth volatility and identify long-term trends.

7. DASHBOARD DESIGN & INSIGHTS

Page 1 – Executive Overview

Insights

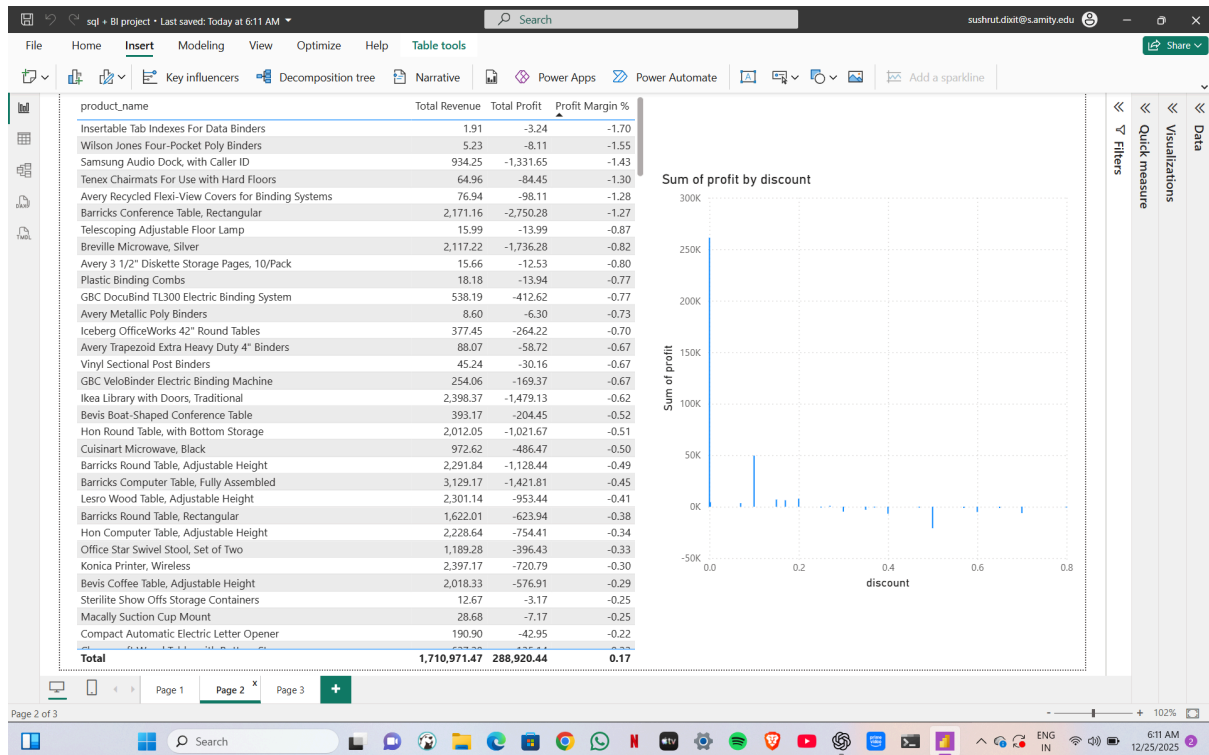
- Revenue shows seasonal spikes with long-term growth
- Profit margin stabilizes despite revenue fluctuations
- Asia regions dominate profitability



Page 2 – Product & Discount Analysis

Insights

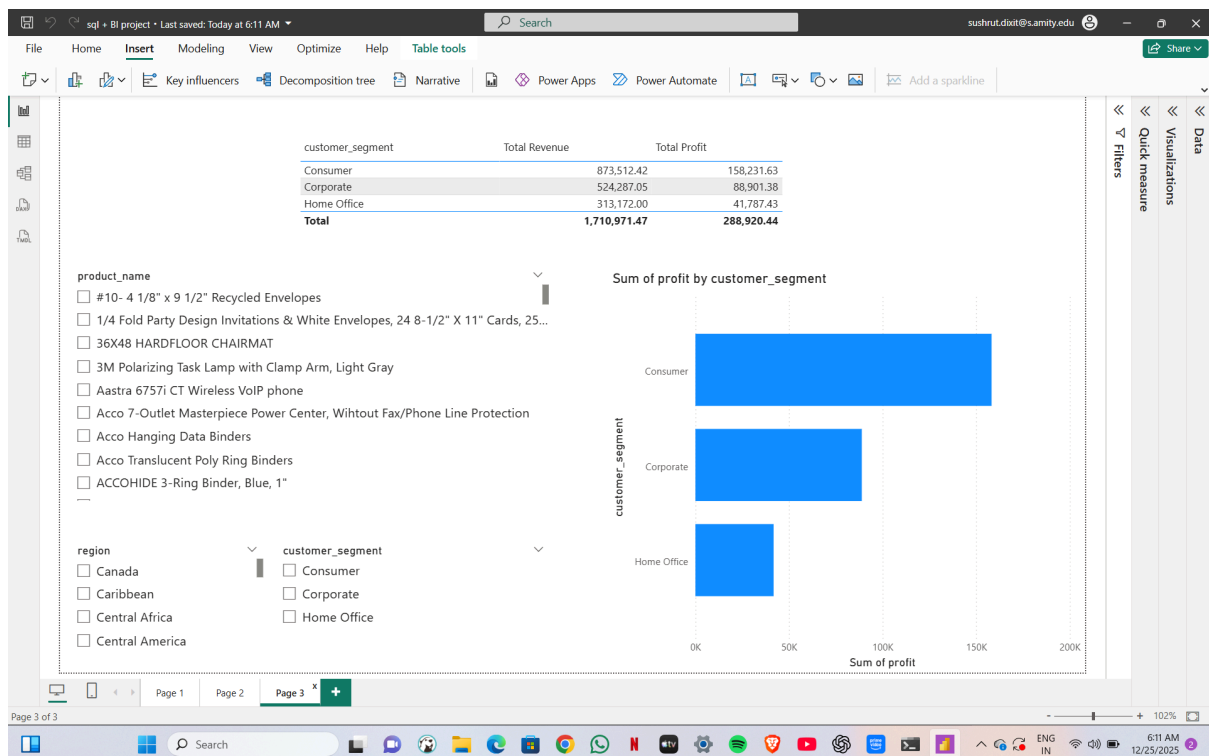
- Several products generate revenue but operate at negative margins
- Aggressive discounting strongly correlates with profit erosion



Page 3 – Customer Segment Analysis

Insights

- Consumer segment contributes the highest absolute profit
- Home Office segment underperforms consistently



8. BUSINESS RECOMMENDATIONS (BIG-4 STYLE)

- Implement discount caps for low-margin products
- Prioritize high-profit regions for expansion
- Rationalize loss-making product portfolio
- Introduce segment-based pricing strategies

9. TOOLS & SKILLS USED

- SQL (aggregation, joins, analytical queries)
- Power BI (data modeling, DAX, visualization)
- Business analysis & storytelling
- Time-series analysis