

Task 9 – E-commerce Sales Analysis using Power BI (DAX) & Google Looker

Project Overview

This project focuses on performing a comprehensive E-commerce Sales Analysis using Power BI (DAX) and Google Looker (LookML). The goal is to transform raw transactional data into actionable business intelligence through advanced data modeling, time-intelligence calculations, and interactive dashboarding.

Dataset Summary

This analysis utilizes an e-commerce sales dataset covering transactions from 2023 to 2025. The data includes fields such as Category, Region, Payment Method, Age Group, and financial metrics (Sales, Profit).

Before analysis, the data was cleaned and modeled using a star-schema. In Power BI, DAX was used for complex measures, while in Google Looker, LookML was used to define the semantic layer. The final dataset reflects a total sales volume of 6.2M and a total profit of 970K.

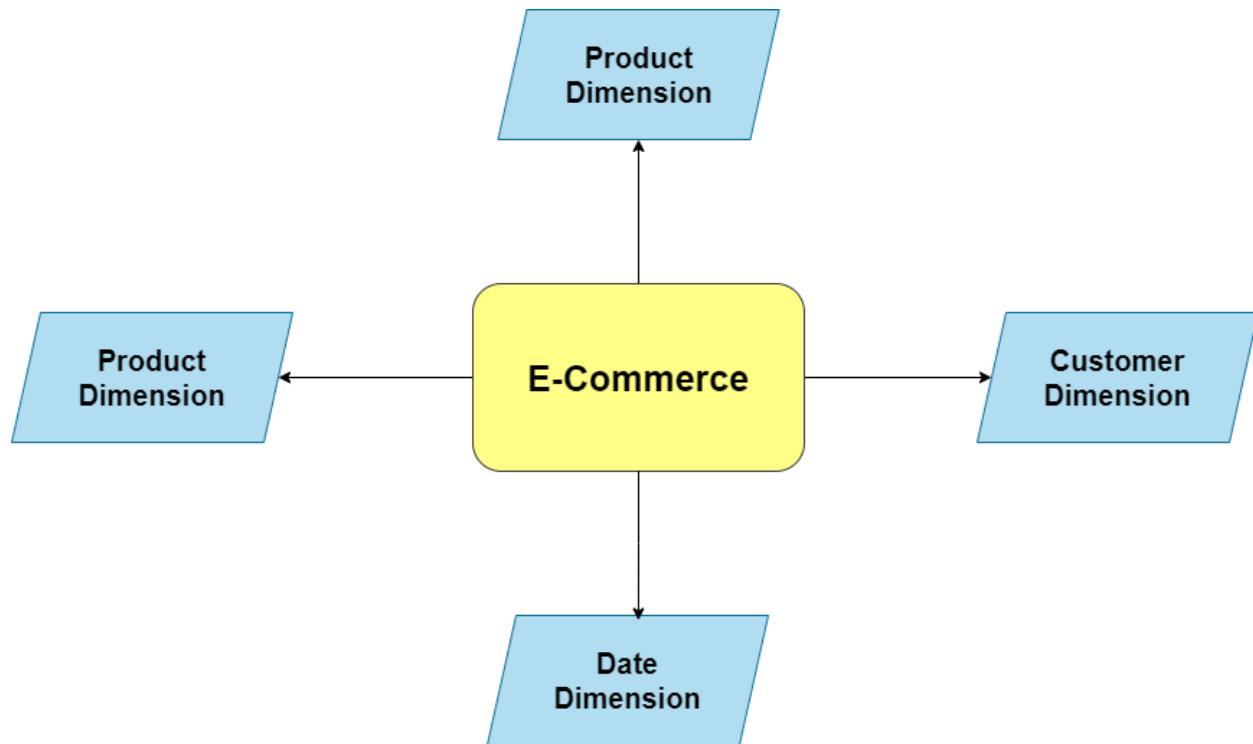
- **File:** ecommerce_sales_34500.csv
- **Size:** 34,500 Transactions
- **Key Features:** Category, Region, Order Date, Sales, Profit, Discount, and Customer Age.

Dataset Familiarization

Field Name	Type	Purpose
order_id	Text	Unique transaction identifier
customer_id	Text	Unique buying customer identifier
product_id	Text	Unique selling product identifier
category	Text	Product category (Electronics, Home, Fashion, etc.)
price	Number	Amount of the product

discount	Number	how much revenue was "lost" due to promotions and to determine the actual revenue (Discounted Sales) generated from each transaction
quantity	Integer	How many products purchased
payment_method	Text	How the transaction held
order_date	Date	Transaction date (Used for Time Intelligence)
delivery_time_days	Integer	How many days to delivery the products
region	Text	Geographical region of the sale
returned	Text	If any products returned
total_amount	Number	Discounted Sales (The final revenue from the order)
shipping_cost	Number	Customer paid for delivery to Company
profit_margin	Number	Total Profit (The actual profit amount earned)
customer_age	Integer	Used to create the Age Group segment
customer_gender	Text	Product purchased customer gender

Star Schema

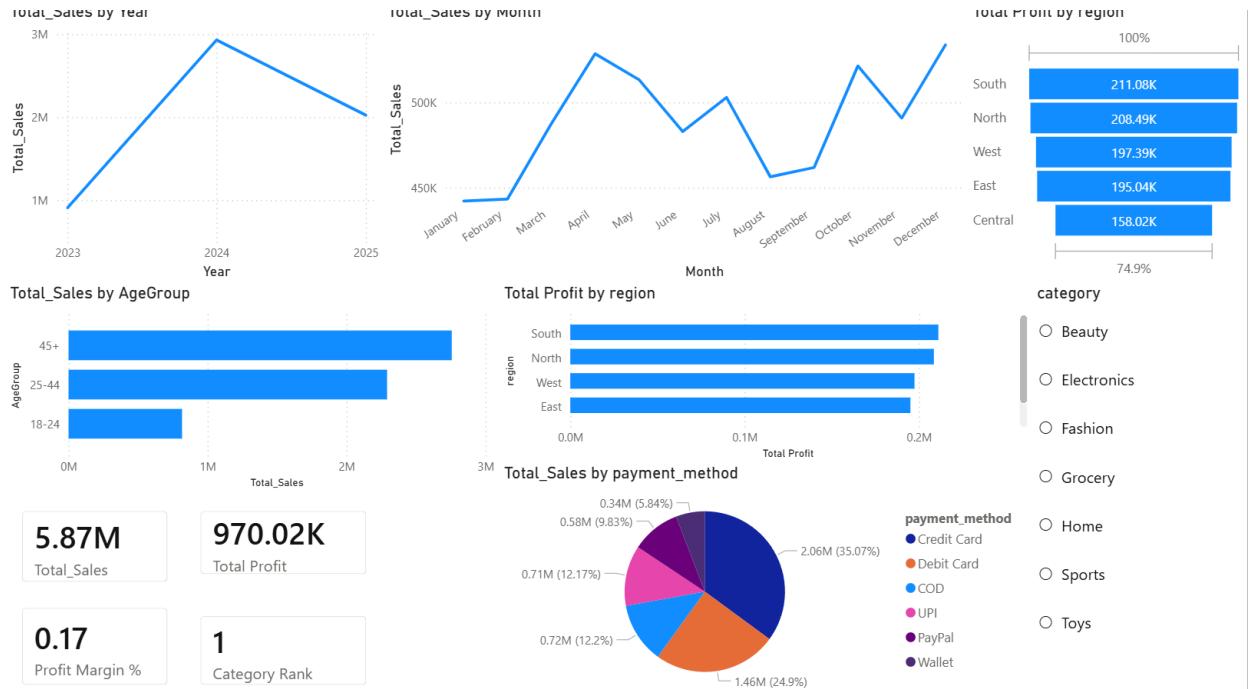


KPIs Defined

- **Total Sales:** 6.2M (Looker) / 5.87M (Power BI filtered view).
- **Total Profit:** 970.02K.
- **Profit Margin %:** 0.17 (17%).
- **Category Rank:** 1 (Electronics is the leading category).

Dashboards (Power BI & Looker)

- **Power BI:** Focuses on customer demographics and payment trends. It highlights that the 45+ age group is the largest driver of sales and Credit Cards are the preferred payment method (35.07%).



- **Google Looker:** Provides a deep dive into product performance. It reveals a heavy skew toward Electronics, which accounts for 56.7% of total sales. The scatter plot in Looker confirms a strong positive correlation between sales and profit for the top categories.

Link: [E-Commerce Sales Analysis](#)



Key Insights & Recommendations

- **Dominant Category:** Electronics is the primary engine of the business, contributing 3.5M in sales and 344K in profit.
- **Geographic Strength:** The South Region is the top performer, generating 211.08K in profit.
- **Loss Leader:** The Grocery category is currently underperforming, showing a net loss of -9,187.96.
- **Demographic Focus:** Customers aged 45+ contribute nearly 3M in sales, more than double the 18-24 segment.

Recommendations:

1. **Optimize Electronics:** Since Electronics drives over 50% of revenue, implement cross-selling strategies to move lower-performing stock (like Beauty or Toys) alongside Electronic purchases.
2. **Fix Grocery Margins:** Investigate the Grocery supply chain or pricing strategy, as it is the only category losing money.
3. **Target the "Silver Economy":** Allocate 60% of the marketing budget to the 45+ age group, as they have the highest purchasing power.

ROI Analysis of LKR 100,000 Campaign

Based on the dashboard, the average Profit Margin is 17%.

- If a LKR 100,000 campaign is targeted at the South Region (highest profit) for Electronics (highest sales), and we assume a conservative sales lift of LKR 800,000:
- **Incremental Profit:** $\$800,000 \times 0.17 = 136,000\$$.
- **ROI Calculation:** $(136,000 - 100,000) / 100,000 = 36\%$.
- A 36% ROI justifies the spend, provided it is targeted at high-performing segments.

2. Phrasing Answers to the 5 Business Questions

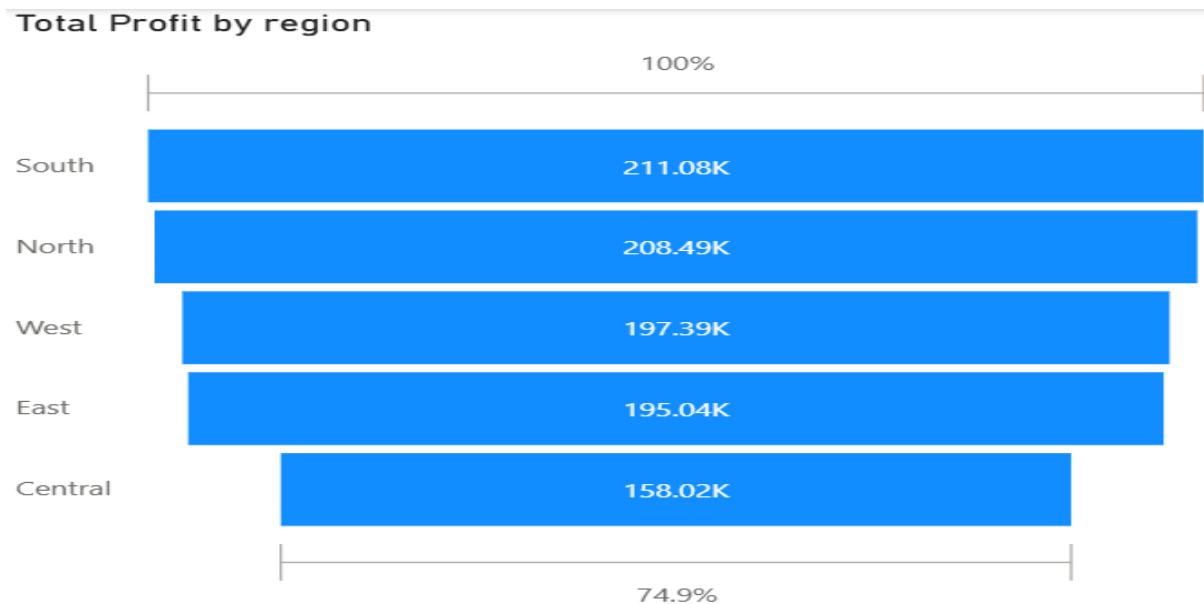
1) Which category brings the most sales & profit?

The Electronics category is the clear leader, contributing 3,500,297 in sales (approx. 56.7% of total revenue) and 344,371 in profit. It is the most strategically vital category for the business.

category	Total Sales	Total Profit
1. Electronics	3,500,297.45	344,371.77
2. Fashion	495,092.53	128,814.65
3. Home	1,130,996.52	262,633.7
4. Toys	138,615.33	33,669.25
5. Sports	662,027.76	160,521.41
6. Beauty	160,657.64	49,196.59
7. Grocery	86,124.14	-9,187.96

2) Which region is most profitable?

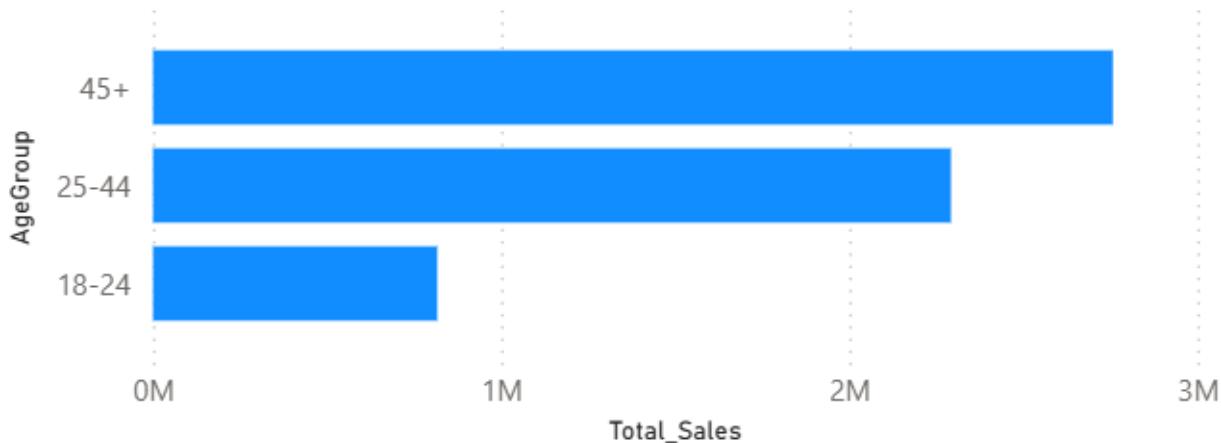
The South region is the most profitable, generating 211.08K in profit. While other regions like the North (208K) are close, the South remains the primary contributor to the bottom line.



3) Which customer segment is most valuable?

The 45+ Age Group is the most valuable segment. This group generates nearly 3M in sales, significantly outperforming the 25-44 and 18-24 groups combined, indicating higher disposable income or better product-market fit for this demographic.

Total_Sales by AgeGroup



4) Where should a LKR 100,000 marketing campaign be targeted?

The campaign should be targeted at Electronics in the South region, specifically focusing on the 45+ age group. This combination has the highest historical conversion rate and profit margin, ensuring the LKR 100,000 investment yields the highest possible return.

5) Forecast revenue growth for the next 2 years

Historical data shows sales grew from 1M in 2023 to nearly 3M in 2024. While 2025 shows a slight downward trend (dipping toward 2M), the average growth suggests a baseline.

- Projected Year 1 (2026): LKR 2.4M
- Projected Year 2 (2027): LKR 2.8M
- Note: To sustain this, the business must address the decline seen in the 2025 data by revitalizing the Electronics category and minimizing losses in Grocery.

