BMW Sales & Performance Analytics using Snowflake & Power BI

End-to-End Cloud Analytics Workflow: From SnowSQL to Interactive Dashboards.

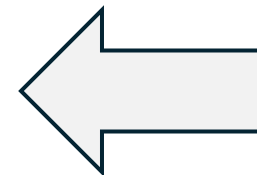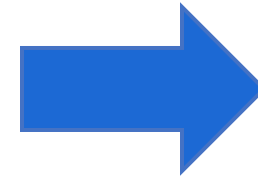MUSTHAQ AHAMED | Aspring Data Analyst

OVERVIEW

- Project Objective
- Project Architecture
- Dataset Overview
- Tools & Technologies
- Snowflake Analysis using SnowSQL & SnowSight
- Power BI Dashboard
- Key Insights & Findings
- Business Recommendations

Project Architecture

End-to-End Data Analytics Pipeline

Project Objective

- Understand **BMW's sales performance** across models, regions, fuel types, and customer preferences.

- Build an **end-to-end data pipeline** using Snowflake for storage + queries.

- Create **interactive dashboards** in Snowsight and Power BI for decision-making.

Dataset Overview

- Total Records: 50,000

- Timeframe: 2010–2024

- Columns: *Car Model, Year, Region, Color, Fuel Type, Vehicle Type, Transmission, Engine Size, Mileage, Price, Sales Volume.*

- Source: BMW Sales Data (simulated for analytics project)

Snowflake Analysis using SnowSQL & SnowSight

- Advanced analytics performed directly in Snowflake cloud platform

Regional Growth Trends

Which regions are showing the fastest growth in BMW sales over the years?

```sql
SELECT REGION, YEAR, TOTAL_SALES,
TOTAL_SALES - LAG(TOTAL_SALES)
OVER (PARTITION BY REGION ORDER BY YEAR) AS GROWTH
FROM
(SELECT REGION , YEAR ,COUNT(*) AS TOTAL_SALES
FROM SALESDATA
GROUP BY REGION , YEAR
)AS YEARLY_SALES
ORDER BY GROWTH DESC;
```

Insight: "Europe and Asia show the fastest YoY growth, while North America remains steady."
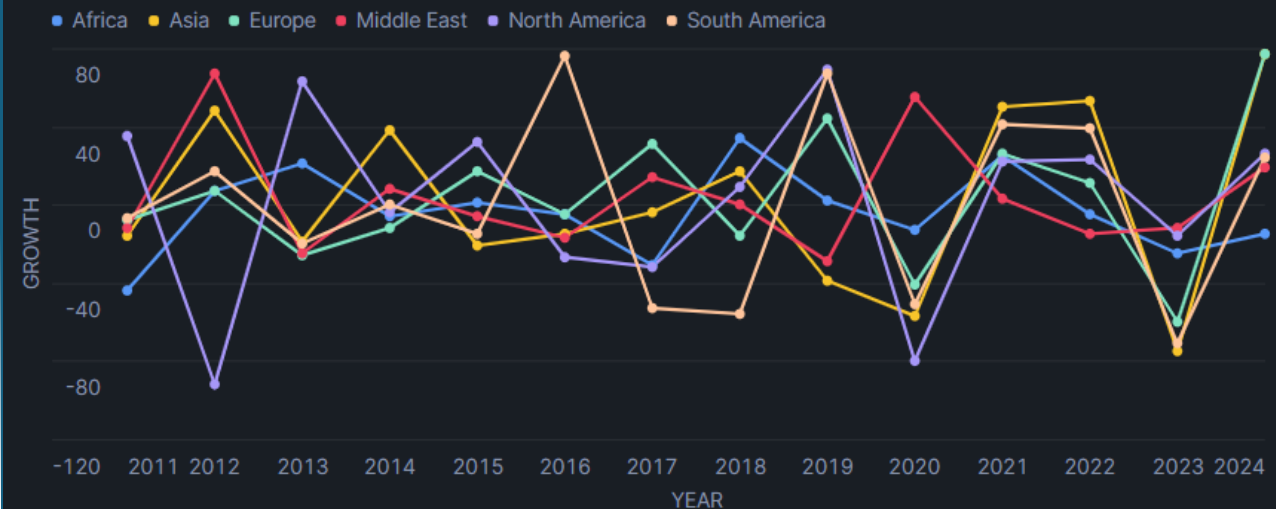
Hybrid & Electric Adoption

What is the sales trend for Hybrid/Electric vehicles?

```
SELECT FUEL_TYPE, YEAR, SUM(PRICE_USD) AS TOTAL_REVENUE
FROM SALESDATA
WHERE FUEL_TYPE IN('Hybrid','Electric') AND
REGION =:REGION_FILTER
GROUP  BY FUEL_TYPE, YEAR
ORDER BY YEAR,TOTAL_REVENUE;
```

Insight: "Hybrid & Electric sales have grown significantly since 2020, showing strong adoption."

TREND BY HYBRID / ELECTRIC
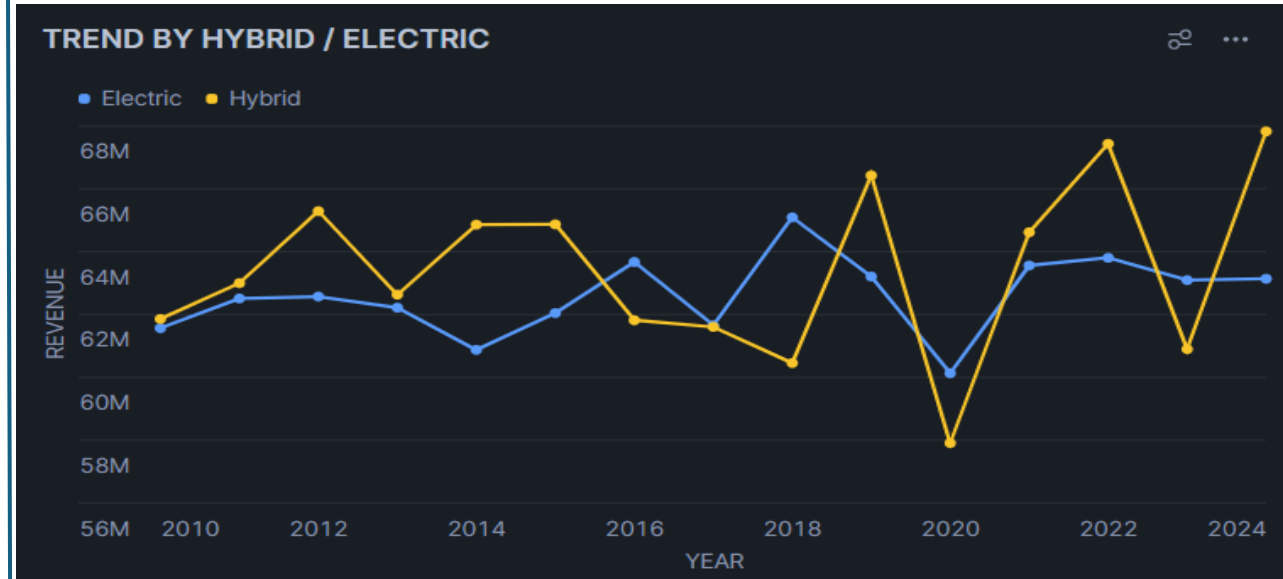
Average Selling Price by Region

Is there a trend where lower mileage cars are sold at higher prices?
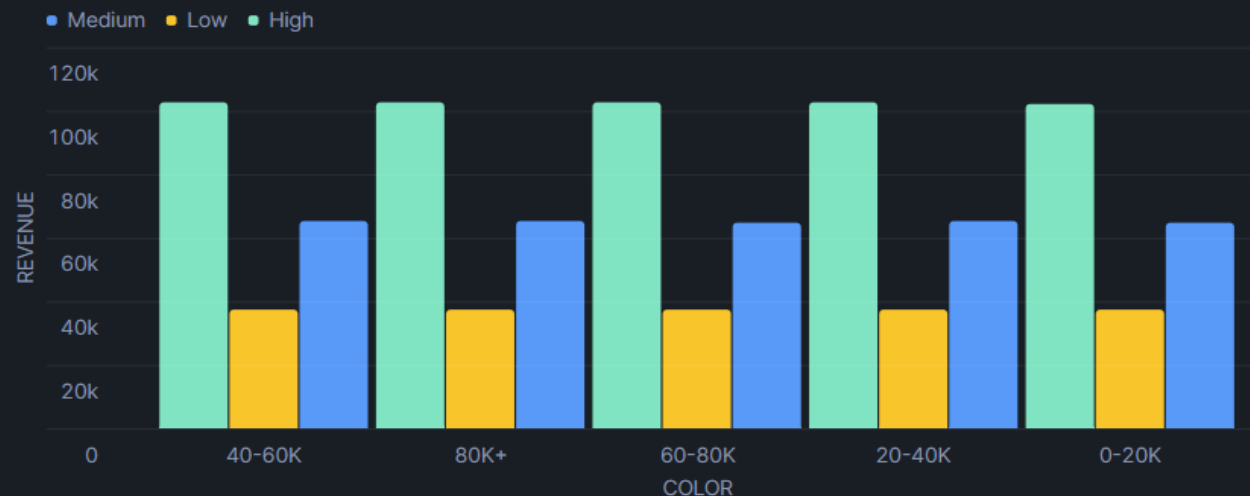
```sql
SELECT CASE WHEN MILEAGE_KM <= 20000 THEN '0-20K'
            WHEN MILEAGE_KM <= 40000 THEN '20-40K'
            WHEN MILEAGE_KM <= 60000 THEN '40-60K'
            WHEN MILEAGE_KM <= 80000 THEN '60-80K'
       ELSE '80K+'
       END AS MILEAGE_BUCKET,

    PRICE_RANGE ,ROUND(AVG(PRICE_USD),2) AS AVG_SP
    FROM SALESDATA
GROUP BY MILEAGE_BUCKET , PRICE_RANGE
ORDER BY CASE WHEN MILEAGE_BUCKET = '0-20K' THEN 1
              WHEN MILEAGE_BUCKET = '20-40K' THEN 2
              WHEN MILEAGE_BUCKET = '40-60K' THEN 3
              WHEN MILEAGE_BUCKET = '60-80K' THEN 4
       ELSE 5
       END;
```

Insight:
- "Low mileage cars (<20K) are mostly sold in the **High price range**."
- "As mileage increases, average selling price shifts towards **Medium/Low ranges**."

Mileage vs Price Range (Average Selling Price)

● Medium ● Low ● High

REVENUE — 120k, 100k, 80k, 60k, 40k, 20k, 0

COLOR: 40-60K, 80K+, 60-80K, 20-40K, 0-20K

Revenue Growth by Fuel Type

How has revenue growth for each fuel type varied over time in the selected region?

```sql
SELECT YEAR , FUEL_TYPE , TOTAL_REVENUE , TOTAL_REVENUE - LAG(TOTAL_REVENUE)
OVER (PARTITION BY FUEL_TYPE ORDER BY YEAR) AS GROWTH ,
ROUND((
(TOTAL_REVENUE - LAG(TOTAL_REVENUE) OVER (PARTITION BY FUEL_TYPE ORDER BY YEAR))
/
LAG(TOTAL_REVENUE) OVER (PARTITION BY FUEL_TYPE ORDER BY YEAR)
)*100,2) AS GROWTH_PERCENTAGE
FROM (
SELECT YEAR , FUEL_TYPE ,   SUM(PRICE_USD) AS TOTAL_REVENUE FROM SALESDATA
WHERE REGION =:REGION_FILTER
GROUP BY FUEL_TYPE , YEAR ) AS YEARLY_REVENUE
ORDER BY YEAR ASC , FUEL_TYPE;
```

- **Emerging vs Mature Markets**: Electric and Hybrid arenewer segments with sharp swings; Petrol and Dieselare established but sensitive to changes.

- **Region-Specific Trends**: Patterns depend on local policies, infrastructure, and consumer behavior.

Insight:
- **Diesel & Hybrid**: Highly volatile growth, impacted by market shifts or external factors.
- **Electric**: Steady, moderate growth indicating increasing adoption.
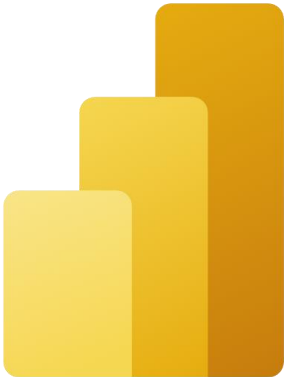- **Petrol**: Relatively stable with fewer fluctuations, showing consistent demand.

Year-over-Year Growth (%) Trend by Fuel Type
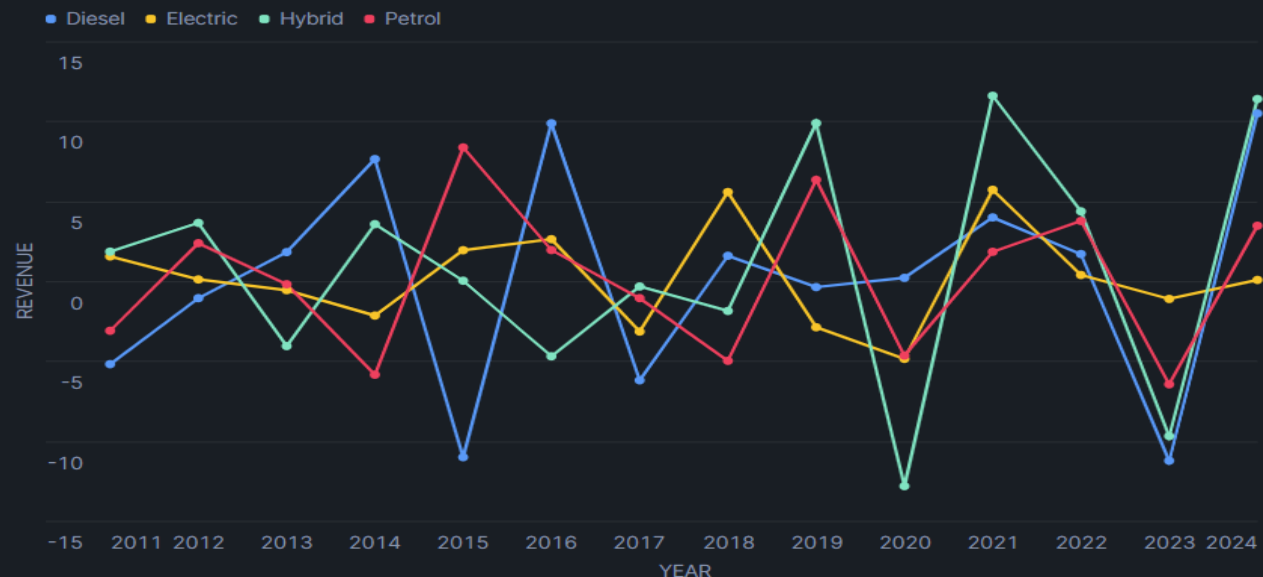
Snowsight Dashboard
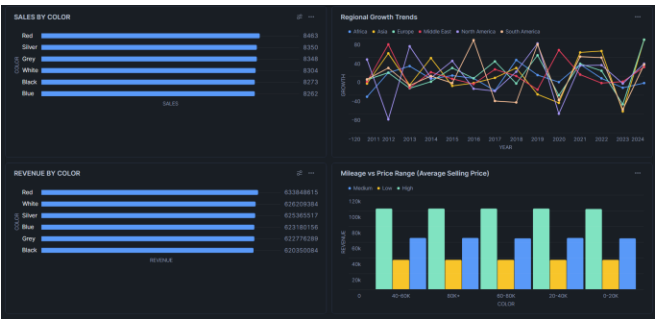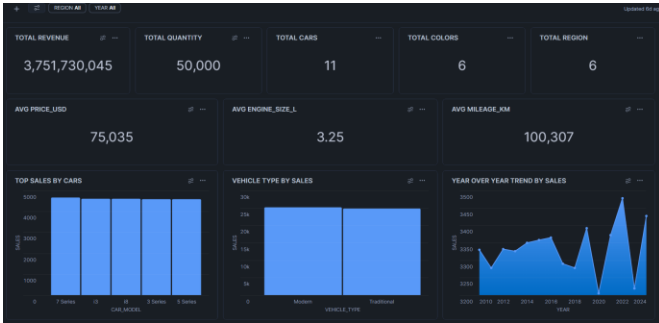
Power BI Dashboard

Key Insights & Findings

- Top Selling Models: *7 Series, i3, i8*
- Revenue Leader: *7 Series ($35M+)*
- Regions with highest sales: *Asia, Middle East*
- Fuel Trend: *Shift towards Hybrid & Electric post-2015*
- Transmission Preference: *Manual still leading, but Auto adoption growing*

Business Recommendations

📈 **Focus on Asia & North America** → highest year-over-year growth, key expansion markets.

⚡ **Accelerate EV/Hybrid Strategy** → strong upward trend in adoption, aligns with sustainability goals.

💰 **Premium Pricing for Low Mileage Cars** → leverage customer willingness to pay for near-new models.

🎨 **Regional Customization** → top colors vary by region; marketing campaigns should align.

🔧 **Product Mix Strategy** → Automatic transmission and 2.0L–3.0L engines dominate, ensure production aligns with demand.