

# **PROJECT REPORT**

## **INT-374**

**(DATA ANALYTICS WITH POWER BI)**

**COMPUTER SCIENCE AND ENGINEERING**

**Submitted by:**

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**Submitted to:**

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**U** NIVERSITY

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## **CERTIFICATE**

This is to certify that **Shweta Singh** bearing Registration no. **12301120** has completed **INT374** project titled, “BMW Sales(2010-2024) Analysis Dashboard ” under my guidance and supervision.

To the best of my knowledge, the present work is the result of his/her original development, effort and study.

**Pardeep Kumar**

**Assistant Professor School of Computer Science Engineering**

Lovely Professional University Phagwara,

Punjab

Date: 20<sup>th</sup> December, 2025

## **DECLARATION**

I, Shweta Singh, student of B.tech under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date: 19<sup>th</sup> December, 2025

Signature

Registration No.12301120

SHWETA SINGH

# Acknowledgment

I would like to express my deepest gratitude to Mr. Pardeep Kumar for her exceptional mentorship and unwavering support throughout the duration of this project. His vast knowledge in the fields of data science and machine learning, combined with his patient and thoughtful guidance, played a pivotal role in the successful completion of this work. His insightful suggestions and feedback consistently challenged me to think critically and improve the quality of my research. I am also grateful for the learning environment he fostered, which encouraged exploration and innovation.

In addition, I sincerely thank my peers and classmates for their helpful discussions, encouragement, and collaborative spirit during this project. Their input provided fresh perspectives that contributed meaningfully to the final outcome. I am also thankful to the open-source community for providing the tools, libraries, and resources that made the implementation of this project possible. Lastly, I acknowledge the dataset contributors for making this analysis feasible.

# Introduction

The automotive industry is one of the most significant contributors to global economic activity, with sales performance and consumer preferences playing a crucial role in strategic decision-making. Analysing vehicle sales data is essential for understanding market trends, regional demand patterns, and customer behaviour, which support informed business planning and competitive positioning.

This project focuses on the development of an **interactive Power BI dashboard** to analyse **BMW's global sales performance from 2010 to 2024**. The dashboard applies data analytics and visualization techniques to evaluate overall sales trends, regional and model-wise performance, and customer preferences. By integrating multiple analytical views, the project aims to provide actionable insights into revenue growth, sales distribution, and market segmentation.

The analysis is conducted using **Microsoft Power BI**, incorporating **data modelling, DAX measures, calculated columns, and interactive visualizations**. Advanced features such as **slicers, navigation buttons, and multi-page dashboards** are utilized to enhance usability and support dynamic exploration of sales data. The resulting dashboard serves as a comprehensive decision-support tool for understanding BMW's global market performance.

## 2. Dataset Description

The dataset used in this project represents **BMW's global vehicle sales data**, covering multiple years and regions. It provides detailed information on vehicle models, sales performance, pricing, and customer preferences. The dataset is suitable for business analytics and visualization, enabling the study of sales trends, regional demand, and market segmentation.

### Key Attributes

- **Model:** BMW vehicle model (e.g., 3 Series, 5 Series, 7 Series, X series)
- **Year:** Year of sale (2010–2024)
- **Region:** Geographic sales region (Asia, Europe, North America, Middle East, Africa, South America)
- **Fuel\_Type:** Type of fuel used (Petrol, Diesel, Hybrid, Electric)
- **Transmission:** Transmission type (Automatic, Manual)
- **Engine\_Size\_L:** Engine capacity in liters
- **Mileage\_KM:** Vehicle mileage in kilometres
- **Price\_USD:** Vehicle price in US dollars
- **Sales\_Volume:** Number of units sold
- **Sales\_Classification:** Categorization of sales performance (e.g., High, Low)

### Special Characteristics

- Multi-year **time-series sales data**, enabling trend and growth analysis
- Combination of **numerical and categorical attributes**, suitable for segmentation and aggregation
- Region-wise and model-wise granularity supporting comparative analysis

- Sales classification attribute enabling **performance categorization**
- Real-world business data reflecting **market variability and pricing diversity**

### 3. Source of Dataset

The dataset used for this project represents **BMW's global vehicle sales data**, compiled from a structured automotive sales dataset covering multiple regions and years. It serves as a comprehensive source of information on vehicle models, pricing, sales volumes, and customer preferences, enabling detailed analysis of market performance and consumer behaviour. The dataset is suitable for business intelligence, analytics, and academic research, supporting transparent and reproducible data-driven insights in the automotive domain.

This dataset is publicly accessible for **analysis, visualization, and educational purposes**, allowing researchers and analysts to explore long-term sales trends, regional demand patterns, and segmentation strategies. The availability of structured, multi-dimensional sales data facilitates the development of interactive dashboards that support strategic decision-making, performance monitoring, and market analysis.

Dataset: [BMW sales data\(2010-2024\)](#)

Published by: <https://www.kaggle.com/>

#### Key Metadata:

- **Published By:** Kaggle
- **Updated On:** August, 2025
- **Access:** Publicly available for research and educational use through the Kaggle Repository
- **Reference URL:** <https://www.kaggle.com/datasets/youssefkandil/bmw-sales2010-2024>
- **File Size:** 1 MB
- **Keywords:** Vehicle Sales Analysis, Business Intelligence, Power BI Dashboard, Data Visualization, Sales Performance, Market Analysis, Customer Segmentation, DAX, Automotive Analytics

## 4. OBJECTIVES OF THE DASHBOARDS

The primary objective of this dashboard is to provide a comprehensive and interactive analysis of BMW's global sales performance using business intelligence techniques. The specific objectives include:

- To analyse overall sales performance by evaluating total revenue, units sold, and year-wise trends.
- To identify regional and model-wise performance patterns, highlighting high-performing and underperforming markets.
- To examine customer preferences based on fuel type, transmission, price bands, and mileage distribution.
- To categorize sales outcomes using sales classification for better performance assessment.
- To support data-driven decision-making through interactive visualizations, filters, and navigation features.

## 5. RESULTS AND FINDINGS

### Page 1: Sales Performance Overview – Findings

- BMW recorded very high overall sales volume, with 253 million units sold across the analysis period, indicating strong and sustained global demand.
- The total sales revenue reached approximately USD 19 trillion, reflecting BMW's strong market positioning and premium pricing strategy.
- Year-wise revenue trend shows fluctuations with a major dip around 2020, likely reflecting global economic disruption, followed by a strong recovery and peak revenue in later years, highlighting business resilience.
- Regional unit sales distribution is relatively balanced, with Asia and Europe contributing the highest volumes, while Africa and South America show comparatively lower but consistent sales.
- The average vehicle price (~USD 75K) confirms BMW's positioning in the premium automobile segment, while the average mileage (~100K KM) indicates long-term vehicle usage and durability.

Overall, Page 1 highlights BMW's strong global sales performance, revenue recovery post-disruption, and stable regional demand.

### Page 2: Regional & Model Performance Analysis – Findings

- Asia, Europe, and North America emerge as the top-performing regions in terms of units sold, demonstrating BMW's strong presence in developed and emerging automotive markets.

- Model-wise revenue analysis shows that higher-end series (such as 7 Series, 3 Series, and i8) generate the maximum revenue, reinforcing BMW's success in the luxury and performance segments.
- The average price per model remains consistently high across models, indicating minimal price dilution and effective premium pricing.
- Sales classification analysis reveals a nearly balanced split between high and low sales categories, suggesting diversified performance across models and regions.
- Certain models achieve high revenue with relatively lower unit volumes, implying higher margins and premium customer targeting.

Page 2 emphasizes BMW's regional strength, strong luxury model performance, and balanced sales distribution across its portfolio.

### **Page 3: Customer Preferences & Sales Segmentation – Findings**

- Fuel type analysis shows a balanced distribution across Petrol, Hybrid, Electric, and Diesel, indicating a gradual but steady shift towards alternative fuel vehicles without abandoning traditional fuels.
- Price band analysis highlights that the Luxury and Premium segments dominate total unit sales, confirming BMW's strong appeal among high-income customers.
- Transmission preference indicates a clear dominance of Automatic transmission, reflecting changing customer preferences for comfort and convenience.
- Mileage band analysis reveals that vehicles with higher mileage account for the largest share of units sold, suggesting long vehicle lifecycles and customer satisfaction.
- Region-wise sales classification shows that most regions maintain a healthy balance between high and low sales categories, pointing to stable market penetration rather than over-dependence on a single region.

Page 3 provides deep insights into evolving customer behaviour, premium buying patterns, and growing acceptance of modern vehicle technologies.

## 6. CONCLUSION

The BMW Global Sales Performance Dashboard successfully delivers a **clear and data-driven view of sales trends, regional performance, and customer preferences**. The analysis reveals that BMW maintains a strong global presence with high sales volumes and premium pricing, particularly in Asia, Europe, and North America. Model-wise analysis highlights the dominance of luxury and high-end vehicles in revenue generation, while customer preference insights indicate a growing inclination toward automatic transmission and premium price segments.

Overall, the dashboard serves as an effective **decision-support system**, enabling stakeholders to monitor performance, identify opportunities, and understand evolving market dynamics.

## 7. FUTURE SCOPE

The scope of this project can be further extended in the following ways:

- Integration of **real-time or updated sales data** for continuous monitoring.
- Inclusion of **profitability and cost metrics** to enhance financial analysis.
- Advanced analytics such as **forecasting future sales trends** using predictive models.
- Region-specific deep-dive dashboards for localized market analysis.
- Deployment of the dashboard to **Power BI Service** for cloud-based sharing and collaboration.

These enhancements would further strengthen the analytical depth and business value of the dashboard.

## 8. URL's

LinkedIn Post : [BMW sales Data\(2010-2024\) Dashboard-LinkedIn Post](#)

Google Drive : [PowerBI\\_CA2-Drive Link](#)

Dataset URL : [BMW sales data\(2010-2024\)-Dataset URL](#)

## 9. DASHBOARD: BMW Global Sales Performance Dashboard

Homepage: BMW Global Sales Performance Dashboard







