

## Case Study: Data-Driven Insights for Mercedes-Benz Vehicle Churn & Risk Management

This case study presents a simulated business scenario involving Mercedes-Benz, where data analytics is used to identify vehicle segments that are at higher risk of customer dissatisfaction or mechanical issues. The project was carried out to showcase how companies like Mercedes can leverage data-driven decision-making—drawing inspiration from consulting approaches followed by firms such as Accenture.

### Business Objective

Mercedes-Benz, a leading global luxury automobile brand, faces challenges in proactively managing customer satisfaction and operational efficiency. Some vehicle segments may have higher maintenance issues, complaints, or signs of potential customer churn. The goal of this project is to simulate how advanced analytics can help the company better understand vehicle performance, customer behavior, and retention risks. The project aims to extract actionable insights, improve service delivery, and support strategic decision-making.

### Approach

The project was developed in three integrated environments:

- **Excel** was used to store and organize raw data including vehicle specifications, customer feedback, and derived performance metrics.
- **Python** was used to carry out data analysis, feature engineering, machine learning modeling, and clustering. Visualization techniques were also used to help explore relationships between variables.
- **Power BI** served as the visualization platform, delivering business dashboards that help stakeholders understand key metrics like average risk score, churn probability, and segment-wise performance.

The dataset included over 25 Mercedes vehicles with attributes like age, mileage, engine size, fuel type, and number of service complaints. Using statistical formulas and Python scripts, key features such as **risk score**, **efficiency score**, and **churn probability** were engineered. A machine learning model was trained to predict whether a vehicle is likely to result in customer churn, achieving an accuracy of around **80%**. Additionally, an AI-driven segmentation model (using KMeans clustering) grouped vehicles based on performance and risk.

### Outcomes

The insights generated through this project helped identify which vehicles are more likely to lead to dissatisfaction or churn. For example, older vehicles with high mileage and frequent service issues were consistently flagged as high risk. The segmentation model provided a deeper understanding of vehicle categories, helping simulate how a company like Mercedes could tailor servicing strategies or customer engagement based on risk levels.

The Power BI dashboards allowed for dynamic interaction, letting stakeholders filter, visualize, and interpret churn trends using cards, bar charts, pie charts, and slicers—making the results accessible even to non-technical managers.

### Conclusion

This simulated project demonstrates how automotive companies like Mercedes-Benz can integrate data science and business intelligence to make informed decisions. With tools like Excel, Python, and Power BI, and by following enterprise-grade practices like those used at Accenture, organizations can uncover hidden patterns, reduce churn, and enhance customer satisfaction through analytics.