**Introduction**

* **Project Overview:**  
  This project analyzes the sales performance of prestige cars, focusing on profit margins by car make, year, and country. The goal is to identify high- and low-margin segments, understand trends in profitability, and provide actionable insights to optimize financial performance across different markets.
* **Stakeholders:**
  + Sales and Marketing Team
  + Finance Department
  + Dealership Managers
  + Strategic Planning Team
* **Scope:**
  + Evaluation of profit margins by car make, year, and country.
  + Analysis of total profit, revenue, cost, and sales volume across different dimensions.
  + Identification of trends and patterns in profitability to inform pricing, inventory, and marketing strategies.

**Data Requirements**

* **Data Sources:**
  + Prestige Cars Sales dataset (visualized in two Power BI dashboards: "Prestige Cars Sales" and "Profit Margin Analysis," likely sourced from a relational database or ERP system).
* **Data Volume:**
  + Unfiltered: 351 sales, $6.5M profit, $25M revenue, $19M cost.
  + Filtered views (e.g., specific car makes): Ranges from 28 to 127 sales, with profits from $1.6M to $2.4M.

**Data Preparation**

* **Data Cleaning:**
  + Assumed cleaning in Power BI:
    - Handled missing values in key columns (profit, revenue, cost, sales volume).
    - Standardized car make names and country names to avoid duplicates (e.g., "UK" vs. "United Kingdom").
    - Ensured consistency in time periods (e.g., years 2015–2018).
* **Data Transformation:**
  + Aggregated data by car make, year, and country for profit margin analysis.
  + Calculated profit margins:
    - Profit Margin = (Profit / Revenue) \* 100.
    - Unfiltered: Profit = $6.5M, Revenue = $25M, Profit Margin ≈ 26%.
  + Added derived metrics:
    - Average revenue per car = $25M / 351 ≈ $71,225.
    - Average cost per car = $19M / 351 ≈ $54,131.
    - Average profit per car = $6.5M / 351 ≈ $18,519.
  + Categorized car makes by profit margin performance (e.g., high-margin vs. low-margin) and countries by profit contribution (e.g., high-profit vs. low-profit markets).

**Analysis and Design**

* **Business Questions:**
  1. Which car makes and countries have the highest and lowest profit margins, and how do these margins vary over time?
  2. How have profit margins changed year-over-year from 2015 to 2018, and what might be driving these changes?
  3. How do profit margins correlate with total profit and sales volume for each car make and country?
  4. What is the impact of focusing on specific car makes or countries on overall profitability metrics?
* **KPIs and Metrics:**
  1. **Total Profit:** $6.5M (unfiltered).
  2. **Total Revenue:** $25M (unfiltered).
  3. **Total Cost:** $19M (unfiltered).
  4. **Number of Sales:** 351 (unfiltered).
  5. **Profit Margin (Overall):** 26%.
  6. **Profit Margin by Car Make:** Triumph: ~80%, Alfa Romeo: ~0%, Ferrari: ~40%, etc.
  7. **Profit Margin by Year:** 2015: ~25%, 2018: ~15%.
  8. **Profit Margin by Country (Estimated):**
     + UK: ~25.1% (calculated earlier).
     + France: ~29.7%.
     + US: ~8.4%.
  9. **Average Profit per Car:** $18,519 (unfiltered).
* **Visualization Plan:**
  1. A line chart showing profit margin trends by car make ("Profit Margin % by MakeName").
  2. A bar chart illustrating profit margin by year ("Profit Margin % by Year").
  3. A bar chart depicting total profit by car make ("Total Profit by MakeName").
  4. A bar chart showing total profit and sales volume by country ("Total Profit by CountryName" and "Number of Sold Cars by CountryName").
  5. A line chart showing profit, cost, and sales trends over time ("Total Profit Over Time").

**Implementation**

* **Visualizations:**  
  A comprehensive dashboard combining insights from both dashboards:
  1. **Profit Margin by Car Make:** A line chart showing profit margin percentages for each car make (e.g., Triumph: ~80%, Alfa Romeo: ~0%).
  2. **Profit Margin by Year:** A bar chart displaying profit margin trends from 2015 to 2018 (25% to 15%).
  3. **Total Profit by Car Make:** A bar chart showing profit contributions by car make (e.g., Ferrari: $1.37M).
  4. **Profit and Sales by Country:** Bar charts showing profit and sales volume by country (e.g., UK: $2.7M, ~150 cars).
  5. **Profit Trends Over Time:** A line chart showing profit, cost, and sales trends from 2015 to 2018, with a peak in Q3 2016.

**Analysis:**

1. **Profit Margin by Country:**

|  |
| --- |
| * + France: ~29.7% (highest). |
| * + UK: ~25.1%. |
| * + US: ~8.4% (lowest). |
| * + Spain, Italy, Switzerland, Germany, Belgium: Likely between 15–25% (based on profit per car). |

1. **Profit Margin by Car Make:**

|  |
| --- |
| * + Triumph: ~80%. |
| * + Alfa Romeo: ~0%. |
| * + Ferrari: ~40%. |
| * + Aston Martin: ~50%. |
| * + Jaguar: ~60%. |
| * + Porsche: ~50%. |
| * + Bentley: ~40%. |
| * + Mercedes: ~20%. |

1. **Profit Margin by Year :**

|  |
| --- |
| * + 2015: ~25%. |
| * + 2016: ~20%. |
| * + 2017: ~15%. |
| * + 2018: ~15%. |

1. **Profit Trends Over Time:**
   * Q3 2016: Profit = $591,587, Sales = 46 cars.
     + Revenue (estimated) = 46 \* $71,225 ≈ $3.28M.
     + Profit Margin = ($591,587 / $3.28M) \* 100 ≈ 18%.
   * By mid-2018, profit is near zero, aligning with the 15% margin in 2018 from the "Profit Margin Analysis" dashboard.
2. **Correlation Between Country and Car Make:**
   * The UK and France, with high profits ($2.7M and $1.6M) and sales volumes (~150 and ~75 cars), likely have a higher concentration of high-margin car makes like Ferrari (40%) and Aston Martin (50%).
   * The US, with a low profit margin (8.4%) despite ~50 sales, may have a higher proportion of low-margin car makes like Alfa Romeo (0%) or Mercedes (20%).

**Insights**

1. **High-Margin Segments:**
   * **Car Makes:** Triumph (80%), Jaguar (60%), Aston Martin (50%), and Porsche (50%) have the highest profit margins, but Triumph’s low profit contribution ($0.5M) suggests limited sales volume. Ferrari (40%) and Aston Martin (50%) balance high margins with significant profit contributions ($1.37M and $1M).
   * **Countries:** France has the highest estimated profit margin (29.7%), followed by the UK (25.1%). These markets are key drivers of profitability, likely due to a strong presence of high-margin car makes like Ferrari and Aston Martin.
2. **Low-Margin Segments:**
   * **Car Makes:** Alfa Romeo (0%) and Mercedes (20%) have the lowest profit margins, indicating potential cost inefficiencies or pricing issues. Alfa Romeo’s 0% margin suggests it’s operating at a loss.
   * **Countries:** The US has a very low profit margin (8.4%), despite selling ~50 cars. This could be due to a higher proportion of low-margin car makes (e.g., Alfa Romeo, Mercedes) or higher costs (e.g., shipping, taxes).
3. **Profit Margin Trends Over Time:**
   * Profit margins declined from 25% in 2015 to 15% in 2018, aligning with the "Prestige Cars Sales" dashboard’s trend of declining profit and sales volume after Q3 2016. The Q3 2016 peak had a profit margin of ~18%, below the 2015 average, indicating that the peak was driven by volume rather than high margins.
4. **Country-Level Performance:**
   * The UK and France contribute 41.5% ($2.7M) and 24.6% ($1.6M) of total profit, respectively, and have high sales volumes (~150 and ~75 cars). Their profit margins (25.1% and 29.7%) are above or near the overall average (26%), making them key markets.
   * The US, with a 8.4% profit margin and only $0.3M in profit, underperforms despite a decent sales volume (~50 cars). This suggests a need for cost optimization or a shift toward higher-margin car makes in this market.
5. **Correlation Between Sales Volume and Profitability:**
   * High-margin car makes like Triumph (80%) have low sales volumes, limiting their profit contribution.
   * High-volume markets like the UK (~150 cars) don’t necessarily have the highest profit margins (France: 29.7% with ~75 cars), highlighting the importance of optimizing pricing and costs, not just increasing sales volume.

**Recommendations**

1. **Focus on High-Margin Segments:**
   * **Car Makes:** Prioritize Triumph (80%), Jaguar (60%), Aston Martin (50%), and Ferrari (40%) for marketing and inventory. For Triumph, increase sales volume through targeted campaigns while maintaining its premium pricing.
   * **Countries:** Invest in France (29.7% margin) and the UK (25.1% margin) by expanding dealership networks and promoting high-margin car makes like Ferrari and Aston Martin. Analyze France’s cost structure and pricing strategy to replicate its high margin in other regions.
2. **Address Low-Margin Segments:**
   * **Car Makes:**
     + **Alfa Romeo (0%):** Investigate its cost structure (e.g., high production or shipping costs) and consider discontinuing this brand if it’s not profitable.
     + **Mercedes (20%):** Optimize costs or reposition Mercedes as a more premium offering to justify higher prices and improve its margin.
   * **Countries:**
     + **US (8.4%):** Conduct a detailed cost analysis to identify inefficiencies (e.g., shipping, taxes). Shift focus toward high-margin car makes like Ferrari and Aston Martin in this market to improve profitability.
     + **Smaller Markets (Belgium, Germany, etc.):** Evaluate whether their low profit contributions ($0.2M each) and likely moderate margins (15–20%) justify continued investment, or redirect resources to high-margin markets like France.
3. **Reverse the Profit Margin Decline Over Time:**
   * The 10% drop in profit margin from 2015 to 2018 (25% to 15%) aligns with the decline in profit and sales volume after Q3 2016. Investigate:
     + **Cost Increases:** Review cost components (e.g., production, logistics) to identify savings opportunities.
     + **Pricing Pressure:** If competition is driving prices down, differentiate through unique features or exclusive models to justify premium pricing.
     + **Sales Mix:** Promote high-margin car makes (e.g., Ferrari, Aston Martin) to improve the overall margin.
   * Replicate the conditions of Q3 2016 (e.g., a new model launch) to boost sales volume, but focus on maintaining or improving margins.
4. **Optimize Sales Volume and Margin Balance:**
   * **Car Makes:** High-margin, low-volume car makes like Triumph should be paired with marketing campaigns to increase demand. High-volume, moderate-margin car makes like Ferrari and Aston Martin should remain the focus of inventory efforts.
   * **Countries:** The UK and France should continue to drive sales volume, but efforts should be made to increase margins in the UK (e.g., by focusing on high-margin car makes). The US needs a strategic overhaul to improve its margin, possibly by reducing low-margin car make sales.
5. **Leverage Country-Level Insights for Strategic Decisions:**
   * The UK and France’s strong performance suggests they should be prioritized for expansion. Promote high-margin car makes like Ferrari and Aston Martin in these markets to maximize profitability.
   * The US’s low margin (8.4%) indicates a need for a targeted strategy—either reduce costs or shift the sales mix toward high-margin car makes.

**Next Steps**

* **Add Profit Margin by Country to the Dashboard:** Update the "Prestige Cars Sales" dashboard to include a profit margin by country chart, using the estimated margins (e.g., France: 29.7%, US: 8.4%).
* **Cross-Analyze Car Makes and Countries:** Use the filters in both dashboards to analyze which car makes perform best in high-margin countries like France (e.g., Ferrari sales in France).
* **Cost Breakdown Analysis:** If raw data is available, break down costs by country and car make to understand why margins vary (e.g., high shipping costs in the US).
* **Customer Segmentation:** Analyze customer demographics in high-margin markets like France to understand what drives their willingness to pay premium prices, and apply those insights to other regions.
* **Scenario Analysis:** Simulate different sales mixes (e.g., increasing Ferrari sales in the US by 20%) to evaluate their impact on overall profit margins.