*Executive Summary*

**Introduction**

In the fiercely competitive world of Formula 1 (F1), performance is dictated not just by engineering excellence, but by the intelligent use of data. As the 2025 season approaches, McLaren faces the strategic imperative of closing the performance gap with Red Bull — the reigning benchmark in speed, reliability, and tactical execution. Red Bull’s consistent dominance, marked by prize money, sponsorships, and commercial revenue, is a result of deeply integrated data-driven decision-making.

To remain competitive at the pinnacle of motorsport, McLaren must not only understand how Red Bull wins — but why they win. This calls for a deep, analytical dive into the variables that power their success.

**Objective**

As Machine Learning Engineers at McLaren, our objective was to conduct an in-depth exploratory data analysis (EDA) of the 2024 Formula 1 season using Python, SQL, Snowflake, and Power BI. By analysing historical race data, driver performance metrics, and team-level statistics, we aimed to uncover the key performance drivers behind Red Bull’s sustained success and generate actionable insights to inform McLarens’ strategic planning for the 2025 season.

Specifically, we:

* Identified statistical patterns and variables correlated with McLarens’ race outcomes.
* Benchmarked Red Bull’s 2024 performance against McLarens to highlight performance gaps.
* Developed visualisations and dashboards to support insight-driven storytelling for stakeholders.
* Delivered data-backed recommendations to guide McLarens’ competitive strategy and support sponsor and shareholder communications.

**Key Insights & Findings**

* **Qualifying Performance**: Across the three qualifying sessions in the 2024 season, McLaren’s qualifying times, on average, have shown more fluctuation compared to Red Bull. However, McLaren has demonstrated greater consistency during the key, performance-critical sessions. While they typically outperformed Red Bull in overall qualifying, they have struggled to consistently secure pole position. A key next step is to focus on developing a race-winning package that converts strong qualifying performance into front-row starts and race victories.
* **Team Performance Trends (2014–2024)**: Mercedes dominated F1 from 2014 to 2021, with a clear performance lead. Red Bull has shown a gradual improvement since then, with McLaren also displaying steady gains from 2021 through 2024. Notably, Ferrari emerged as the most successful team in the 2024 season, indicating a tightening competition at the top.
* **Points Accumulation (2023–2024)**: McLaren began consistently scoring higher points from Race 10 in the 2023 season. By Race 13 of the 2024 season, they were capturing a significant share of available points, though there was a slight decline toward the end of the year. In contrast, Red Bull maintained dominance throughout 2023 and into the first nine races of 2024, after which McLaren began to outperform them in several key events.
* **Fastest Laps – Driver Performance (2024)**: Oscar Piastri recorded a notably high number of fastest laps during the 2024 season, highlighting his potential as a high-performance driver. This suggests that McLaren may benefit from further analysing and replicating the conditions under which Piastri achieved these laps — with the goal of securing more fastest laps across both drivers, ultimately increasing the likelihood of stronger race finishes.

**Conclusion**

In the 2024 F1 season, McLaren showed fluctuating but increasingly consistent qualifying performances compared to Red Bull, often outperforming them overall but struggling to secure pole positions. While Mercedes dominated from 2014 to 2021, Red Bull and McLaren have steadily improved since, with Ferrari emerging as the top team in 2024. McLaren began collecting more points from the 10th race in 2023 and dominated from the 13th race in 2024, overtaking Red Bull’s earlier lead, though they saw a slight dip at the season’s end. Oscar Piastri stood out with a high number of fastest laps, suggesting McLaren could enhance their race finishes by analysing and replicating the conditions that led to those peak performances.