**Group 19**

**Is LCC Really More Dangerous Than FSC? (1-page Summary)**

This project investigated whether Low-Cost Carriers (LCCs) are more likely to have accidents than Full-Service Carriers (FSCs). The team collected global flight and incident data (2021–2022) from the Airports Council International (ACI) and analyzed key factors such as airline type, aircraft age, pilot experience, weather conditions, and operational pressure.

Since aviation accidents are extremely rare, the dataset was highly imbalanced. To solve this, the team used AI-assisted random sampling to select non-incident flights and applied 100× weighting to incident cases. This created a balanced dataset suitable for weighted logistic regression modeling in Python using *statsmodels*.

Main Findings:

- LCCs showed the strongest positive effect on accident likelihood (Odds Ratio ≈ 2.6, $p < 0.001$).
- Pilot experience significantly reduced accident risk ($p < 0.001$).
- Bad weather and older aircraft slightly increased accident odds.
- An important interaction between LCC and weather suggested that LCCs behave more cautiously in poor conditions.
- Coefficient and odds ratio plots confirmed that LCC type is the dominant risk factor, while other variables have smaller effects.

Although the model's pseudo $R^2 = 0.0038$ was low—typical for rare-event models—it still revealed meaningful relative risk patterns rather than exact probabilities. Missing data such as maintenance, fatigue, and route distance were acknowledged as limitations.

Conclusions and Implications:
The results support the initial hypothesis that LCCs have higher accident risk compared to FSCs. This finding challenges the common belief that all airlines maintain similar safety levels.

To improve safety, the team recommends:

1. Enhancing pilot training and operational discipline in LCCs.
2. Improving weather forecasting systems to minimize weather-related risks.
3. Building stronger financial foundations for LCCs to reduce operational pressure.

Finally, through this project, the team learned that data-driven decision making (DDDM) and system-level thinking are essential for understanding complex safety dynamics in aviation.