**AIRLINE FORECASTING PROJECT REPORT**

The Mean Absolute Scaled Error (MASE) is a metric commonly used to evaluate the accuracy of time series forecasting models. In our case, we have employed three different models for airline forecasting and observed varying MASE values: -

1. Multiplicative Model MASE = 1.521
2. Additive Model MASE = 0.835
3. Additive with Booking Days of Week MASE = 0.643

Below are the reasons why the Multiplicative and Additive models were not as effective as the one incorporating Days of Booking, and why Days of Booking were chosen over Departure days.

**Multiplicative Model :**

* The multiplicative model involves dividing cumulative bookings by final demand to calculate the booking rate.
* This approach assumes a linear relationship between cumulative bookings and final demand, which might not be accurate for airline forecasting.
* If the relationship between cumulative bookings and final demand is not strictly multiplicative, this model can produce inaccurate forecasts.

**Additive Model :**

* The additive model considers the average remaining demand based on days prior to departure.
* This model assumes that the remaining demand is consistent across all flights, which may not be true.
* The simplicity of the additive model might lead to less accurate predictions when dealing with the complexity of airline demand patterns.

We consider **Additive with Booking Days of Week** as the best model because of its superior performance, as indicated by the lowest MASE value (0.643) and other reasons listed below.

**Additive with Days of Booking Model :**

* By incorporating Days of Booking, we have introduced additional features that can help capture more nuanced patterns in the data.
* This could be especially important for airline forecasting, where different days of the week might exhibit distinct booking patterns.
* Days of Booking can be crucial in the airline industry due to various factors such as business travel patterns, leisure travel tendencies, and promotional offers on specific days. Incorporating this information can improve the model's accuracy in predicting bookings.

Below is the graph of Actual bookings on the days prior (days to departure) on Specific days of the week :-

**A graph of different colored lines

Description automatically generated**

**Booking Days of Week vs. Departure Days of Week :**

**Justification for Booking Days:** Prediction based on booking days is often more relevant for airlines because it allows them to plan and allocate resources more effectively. Airlines need to manage factors like crew scheduling, seat availability, and overall operational planning, which are closely tied to when customers make their bookings.

**Practical Considerations:** Departure days of the week might be influenced by factors such as flight schedules, but booking days are more indicative of the demand forecast before the actual departure. This information is valuable for airlines to optimize their operations and resources.

In summary, the choice of the Additive with Days of Booking Model is motivated by the desire to capture more accurate patterns in the data, particularly the influence of different days of the week on booking behavior. The decision to focus on booking days rather than departure days aligns with the practical considerations of airline operations and resource planning.

Thank You!