

MONTHLY HOTEL BOOKING FORECASTING USING EXCEL FOR REVENUE OPTIMIZATION

1. Background and Problem Statement:

A 4-star business hotel located in Pune observed high booking volatility across different months, which affected its pricing and staff scheduling strategy. With only Excel available as an analysis tool, the hotel management requested a structured forecasting model to predict future room bookings and support dynamic pricing decisions.

2. Objectives:

- Forecast monthly room bookings for the next 12 months using Excel
- Apply linear trend forecasting with seasonal adjustments
- Build a flexible forecast template that management can update regularly
- Support decision-making for pricing, promotions, and room allocation

3. Methodology:

3.1 Dataset

- **Period Covered:** January 2021 to December 2023
- **Variable:** Number of rooms booked per month
- **Source:** Front desk CRM exported to .xlsx
- **Format:** Two columns – Month-Year, Rooms Booked

3.2 Data Preprocessing in Excel

- Checked for duplicate or incomplete monthly entries
- Used MONTH() and YEAR() functions to break down date
- Removed one outlier month (March 2021) with 2x bookings due to a special event

3.3 Forecasting Approach

- Built a **linear trend forecast model** using =FORECAST.LINEAR()
- Estimated **monthly seasonal indices** using the ratio-to-moving-average method

- Adjusted the raw forecast by multiplying it with the corresponding month's seasonal index
- Forecasted room bookings for January to December 2024

4. Forecasting Dashboard in Excel

4.1 Excel Tools Used

- FORECAST.LINEAR, AVERAGE, INDEX, MATCH, IFERROR, TREND
- Manual seasonal index estimation via moving average smoothing
- Conditional formatting to flag peak and low occupancy months

4.2 Visualization

- **Forecast vs Actual Line Chart**
- **Heatmap of Seasonal Indexes** (Jan–Dec)
- **Forecast Error Metrics Table:** MAE = 34.2 rooms, MAPE = 5.8%

5. Key Insights

- High booking volumes seen in April, May, and October each year
- Underutilization in July–August due to monsoon and off-season demand
- Seasonal adjustment improved forecast accuracy by 17% compared to raw trendline

6. Excel Deliverables

- Bookings_Trend_Model Sheet with forecasted 2024 values
- Seasonality_Adjustment Sheet with computed monthly indices
- Dashboard_View Sheet with slicers to filter by year and view forecasts vs actuals
- KPI_Metrics Sheet summarizing forecast accuracy

7. Recommendations

- Apply dynamic pricing in April, May, and October using early-booking promos
- Launch retention offers in low-demand monsoon months

- Update forecast monthly using actuals to adjust seasonal index values

8. Stakeholder Relevance

Academic Use:

- Ideal example of seasonal decomposition using Excel
- Teaches linear regression + ratio-to-moving average methods without programming

Corporate Use:

- Helps hotels and seasonal businesses plan staffing and marketing based on demand forecasts
- Enables revenue optimization without reliance on external tools