1. Problem Identification

Big Mountain Resort's current financial objective is to reduce operating expenses by 20%, amounting to $1,540,000, while maintaining or increasing current ticket prices. This reduction is essential for improving profitability and ensuring competitive pricing, aligning with the resort's broader strategy to capitalize on its unique facilities and attract more visitors.

2. Data Wrangling

The dataset used for this analysis included various features related to ski resorts, such as ticket prices, terrain, and lift infrastructure. Key steps in data preparation included:

- **Data Cleaning:** Handled missing values in critical columns like AdultWeekend and AdultWeekday prices by removing rows with missing data in these columns.
- **Outlier Correction:** Corrected outliers in features like SkiableTerrain_ac and Snow_Making_ac.
- **Feature Refinement:** Removed irrelevant features, such as fastEight, and aggregated data at the state level to summarize metrics.
- **Enrichment:** Merged state-level data from external sources, including population and area, to provide a more comprehensive analysis.

3. Exploratory Data Analysis (EDA)

EDA revealed several insights:

- **State-Level Analysis:** States like California and Colorado have the highest number of resorts and skiable areas, which could influence pricing strategies.
- **Correlation with Ticket Prices:** Features like vertical_drop, fastQuads, and Snow_Making_ac showed strong correlations with ticket prices, suggesting that resorts with these features could command higher prices.

4. Predictive Modeling

A Random Forest Regression model was developed to predict the ideal ticket price for Big Mountain Resort, with the following steps:

- **Baseline Model:** Used the average ticket price as a baseline predictor, achieving an R-squared of zero, as expected.
- **Feature Selection:** Used SelectKBest to select relevant features, with fastQuads, Runs, Snow_Making_ac, and Vertical_drop emerging as significant predictors.
- **Model Performance:** The Random Forest model demonstrated a lower mean absolute error (MAE) compared to the linear regression model, indicating higher accuracy and consistency.

5. Scenario Analysis

The model was used to simulate various scenarios to assess their impact on ticket prices and revenue:

- **Scenario 1:** Closing up to three runs results in a reduced supported ticket price, but closing more than three runs has minimal additional impact.
- **Scenario 2:** Adding a run, increasing vertical drop by 150 feet, and installing an additional chair lift could support a ticket price increase of $1.99, potentially increasing revenue by approximately $3,474,638 over the season.
- **Scenario 3 & 4:** Further additions of snow-making coverage or increasing the longest run had minimal impact on the supported ticket price.

6. Recommendations

Based on the analysis:

- **Focus on Scenario 2:** Implementing Scenario 2 (adding a run, increasing vertical drop, and installing a new chair lift) is the most promising strategy, potentially leading to a significant revenue increase.
- **Track Effectiveness:** It is recommended to monitor the effectiveness of these changes in real-time and adjust pricing strategies accordingly.
- **Address Data Deficiencies:** Collect more detailed data on maintenance, staffing, and operational costs related to the new chair lift to ensure the price increase can cover these additional expenses.

7. Further Work

- **Develop Interactive Tools:** Implement dashboards using tools like Power BI or Tableau to allow business leaders to explore different scenarios and their impacts on ticket prices and revenue.
- **Enhance Model Accessibility:** Automate the model updates and provide an interface for business analysts to input different parameters without manual intervention.

Conclusion

This report highlights the importance of data-driven decision-making in achieving Big Mountain Resort's financial goals. By focusing on strategic investments and leveraging predictive modeling, the resort can optimize its pricing strategy, reduce operating expenses, and improve profitability.This report is intended to guide Big Mountain Resort's leadership in making informed decisions to meet their financial objectives. By following the recommendations and considering further work, the resort can ensure its pricing strategy remains competitive and aligned with its broader business goals.