Big Mountain Resort:
Data-Driven Pricing Strategy and Revenue Optimization

Problem Identification – Business Context

Big Mountain Resort attracts around 350,000 visitors each year, making it one of Montana's largest ski destinations. Recently, operating costs rose by $1.54M due to the installation of a new high-speed chairlift designed to improve visitor distribution. Despite these upgrades, ticket prices have remained unchanged and are still based on general market averages.

Management suspects the current pricing strategy underrepresents the resort's true value and limits investment potential:

• 350,000 annual visitors

• $1.54M added operating costs

• Flat ticket pricing despite facility expansion

• Potential underpricing risk impacting ROI

Problem Identification – Objective & Strategic Focus

The objective of this project was to determine whether Big Mountain Resort's pricing aligns with its facility value and market position. Using a data-driven approach, we developed a predictive pricing model that estimates the fair market price for weekend lift tickets.

This analysis aims to support strategic pricing, improve revenue forecasting, and guide infrastructure investment decisions:

• Define fair market value for lift tickets

• Identify key features driving price differences

• Simulate pricing and investment scenarios

• Align pricing strategy with facility performance

Recommendation & Key Findings

The predictive model indicates that Big Mountain Resort's fair weekend ticket price should be approximately $95.87, compared to the current $81. This suggests an undervaluation of $5–25 per ticket, highlighting an opportunity for revenue optimization:

• Strong facilities (lifts, runs, snowmaking) support higher pricing

• Incremental infrastructure improvements yield measurable return

• A moderate price increase aligns Big Mountain with peer resorts

Recommended Actions:

• Adjust weekend pricing to $90–95 range

• Prioritize lift/run enhancements to maintain premium value

• Introduce dynamic pricing by season and demand

Modeling Results & Analysis – Approach

To develop a reliable pricing model, we analyzed data from 277 ski resorts with 25 features describing elevation, runs, lifts, snowmaking, and state-level demographics. We tested two regression algorithms--Linear Regression and Random Forest:

• Linear Regression: MAE = $11.8, interpretable but less robust
• Random Forest: MAE = $9.5, higher accuracy and stability

The Random Forest model was selected as the final approach for its ability to capture nonlinear interactions and complex facility relationships.

Modeling Results & Analysis – Feature Importance

Feature importance analysis identified several key drivers of ticket pricing across the U.S. ski resort market:

- Fast Quads – efficiency and comfort drive premium perception
- Number of Runs – variety enhances customer experience
- Snowmaking Acreage – ensures reliability and longer seasons
- Vertical Drop – linked to resort challenge and quality

Best random forest regressor feature importances
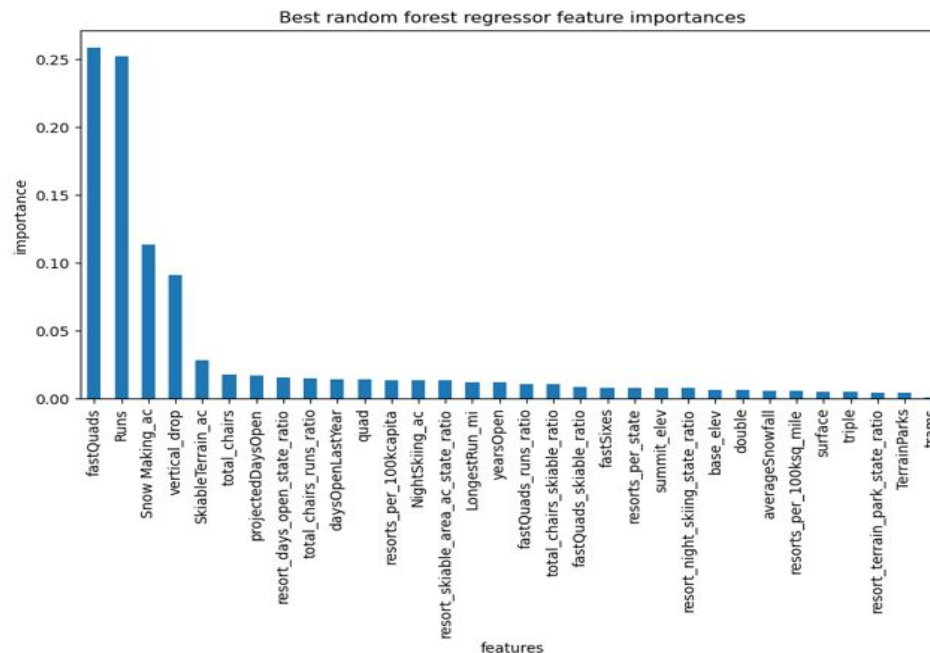
Modeling Results & Analysis – Scenario Simulation

We tested investment scenarios to understand how facility changes would impact the predicted price.

Scenario outcomes:

- +1 Run +1 Lift +150 ft Vertical Drop → +$1.99 per ticket (~$3.5M annual gain)
- Add 2 acres of snowmaking → negligible price impact
- Close 1–3 runs → minimal change
- Close >6 runs → significant price decline

Implication:

- Targeted, moderate investment yields measurable ROI, while aggressive facility cuts reduce pricing power and brand value.

Summary & Conclusion

Big Mountain Resort's current pricing does not fully reflect its facilities' market value. Data-driven analysis supports a $5–15 price increase per ticket, translating into an estimated $3.5M in additional annual revenue.

Strategic Takeaways:

• Adopt data-driven pricing for accuracy and transparency

• Use model insights to plan future infrastructure investments

• Build an interactive pricing dashboard for scenario planning

By aligning ticket pricing with true resort value, management can enhance revenue, competitiveness, and long-term sustainability.