CLIENT: Big Mountain Ski Resort

REPORT: Evaluation of Big Mountain Ski Resort ticket pricing strategy

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Big Mountain Resort is a unique ski resort with spectacular views of Glacier National Park and Flathead National Forest. Every year about 350,000 people ski or snowboard at Big Mountain. Managers at the resort suspect that the resort’s current pricing strategy is not fully capitalizing on its facilities. The current pricing strategy is to charge a premium above the average price of resorts in its market segment. Other metrics to compare Big Mountain’s facilities to those of other ski resorts could help to set a higher ticket price. Evaluating the features and ticket prices of other resorts should help to determine improvements that would justify higher ticket prices or cuts that would decrease costs without the need to discount ticket prices. Our goal is to determine which ski resort features are linked to higher ticket prices and provide guidance both for setting ticket price and for future decisions regarding facility improvement or cuts that would impact ticket price. We evaluated a dataset that included ticket price and other features of ski facilities for 330 other ski resorts across the United States.

We wondered if resorts could be grouped together by state and whether resort statewide pricing was influenced by state land area, density of resorts within a state, or state population. With this in mind, we created a summarized dataset with data averages by state and evaluated this dataset to determine if grouping resorts by state provides valuable insight to ticket price trends. Exploratory analysis using principle component analysis and scatterplot visualization revealed no trends or groupings of thus state borders may not be the best way to evaluate markets for ski resorts (See Fig. 1 below). Some states are smaller and close to population centers that are not within the same state. No further evaluations of ski resorts using state data were explored.

We next looked for trends in ticket price for each ski resort facility feature and even in our preliminary data exploration we found positive correlation between ticket price and vertical drop, fast quads, total chairs, and runs. To further explore the relationship between ticket price and facility features we created two models a linear regression model and a random forest regression model. We then compared their performance as predictors of ticket price to determine which model is best. We used 70% of the data to train the models and held back the remaining 30% of the data to test the models’ predictive accuracy. The random forest model was a better predictor of ticket price with a mean absolute error (MAE) of $9.65 for the test dataset and it outperformed the linear regression model (MAE = 11.79) by approximately $2 and outperformed using the mean as a predictor by approximately $10. Fast quads, number of runs, snow making acres, and vertical drop where ranked respectively as the most influential features in the model. Big Mountain currently charges $81.00 for their weekend ticket price, based on the features of the Big Mountain facility the model predicts that it should be charging $95.87. Even considering that the model has an error of around $10, it is clear that Big Mountain could be charging more for tickets.

We used the model to evaluate several scenarios for improvement and cost cutting. The most promising involves Big Mountain adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift. With these changes Big Mountain could justify increasing ticket price by $8.61 which over the season would amount to $15,065,471. This assumes that the number of visitors to the resort remains unchanged at 350,000 and that visitors buy on average 5 days of passes. Both the scenario for increasing the snow making acres by 2 acres and the scenario for increasing the longest run yielded small and no increase in ticket price. Additionally depending on how much is saved in operating costs the resort could close up to 5 of the least popular runs with less than a 75 cent decrease in ticket price assuming these changes don’t impact vertical drop or longest run (see Fig. 2 below).

Some additional information could have improved the accuracy of the model. The average number of visitors at other resorts and other costs associated with the resort like the cost of overnight accommodations. More information about operating costs such as the average cost for maintaining each run and the cost per acre of snow making would also be useful. The current pricing strategy sets the ticket price based on the mean ticket of other ski resorts. At the very least our model suggests that this is not the best metric for ticket price setting and that Big Mountain could charge more because compared to many other ski resorts it scores higher in what our model suggests are key features including vertical drop, snow making acres, total chairs, fast quads, number of runs, longest run, and skiable area(see Fig. 3-8 below). If these features are the features that visitors will pay a premium for at other ski resorts then Big Mountain can justifiably charge more for their ticket prices.

**FIGURES**

A picture containing timeline

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Fig.1 – Scatterplot of principal component analysis of ski resort data by state with ticket price data displayed in quartile and datapoint size.

Chart, line chart

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Fig.2 – Model predictions for Big Mountain’s ticket price depending on the number of runs closed.

Chart, histogram

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Fig. 3 – Vertical drop comparison of 276 ski resorts with Big Mountain resort represented by the dotted red line.

Chart, histogram

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Fig. 4 – Area covered by snow makers comparison of 276 ski resorts with Big Mountain resort represented by the dotted red line.

Chart, histogram

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Fig. 5 – Total number of chairs comparison of 276 ski resorts with Big Mountain resort represented by the dotted red line.

A picture containing histogram

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Fig. 6 – Number of fast quads comparison of 276 ski resorts with Big Mountain resort represented by the dotted red line.

Shape, rectangle

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Fig. 7 – Skiable terrain area comparison of 276 ski resorts with Big Mountain resort represented by the dotted red line.

Chart, histogram

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Fig. 8 – Number of runs comparison of 276 ski resorts with Big Mountain resort represented by the dotted red line.