**Problem Statement**

Big Mountain sees itself as a premium resort. A place the people are more than willing to spend extra money to experience. It’s the highest priced resort in the market in it’s state, and boasts approximately 350,000 visitors per year, many of whom are staying for multiple days. People clearly think the price is worth it.

But what if the resort is actually leaving money, maybe a lot of money, on the table. Would customers be willing to pay more for their tickets? How can we know, and what should the ticket price really be for a resort like Big Mountain in the current market.

**Process**

We approached this problem by trying to determine how much the competition was charging customers for the use of their facilities. This was easy for an individual resort, but we also wanted to understand the larger relationship within the market between what a resort can offer in terms of lifts, runs, etc. and what it can charge. Once we had modeled that relationship, we applied it to the facilities present at Big Mountain to determine if the current ticket pricing is correct for the market.

Before doing the actual modeling for this relationship, we determined that the best target value for our model was weekend ticket prices. Many resorts in the market have separate weekend and weekday ticket prices. They can be the same in some cases as well and since our data set happened to have slightly more data for the weekend price we felt that that data would be a good stand in for pricing overall.

We augmented our data set with basic population and geographic data from the various states in which the resorts in our data set were located. This allowed us to explore the data in various ways. This EDA process was useful for getting a better understanding of our data, but we ultimately decided that the state level data was not a feature we needed to include in the final model. We instead settled on a small number of features which we determined through heat mapping and other processes to be most highly correlated with changes in ticket price. These features were validated throughout the model building process as being the most significant in terms of their effect on ticket price. The features identified were vertical drop, snow making acreage, total chairs, number of fast quads, and number of runs.

To create the actual model, we tried both a linear regression and a random forest approach. After tuning the parameters for both models, the random forest algorithm ultimately prevailed. It providing a lower error rate and less variability in the results when run on the test set.

**Model results**

Once completed, the model indicated that Big Mountain Resort is indeed underpriced relative to the national market given the current facilities. Weekend ticket prices are currently set at $81. As shown below, the model provides a suggested new price of $95.87. This is an increase of $14.87, which is significant and is outside what we would consider the normal error rate for the model. The exact number is open to change but the model does show that an increase would be appropriate.

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If prices were to be increased based on the model recommendations shown above, it would result in approximately $26,000,000 in additional annual sales relative to the current price. This assumes 350,000 visitors staying for an average of 5 days.

In addition to the above findings, we also used the model to look at a number of scenarios that were already under consideration by management. Each scenario is dealt with briefly on the following pages.

Scenario 1

Permanently closing down up to 10 of the least used runs.

This scenario showed promise from a cost saving perspective. With the model indicating no negative effect on ticket prices from closing down one run, and a marginal negative effect (under $1.00 per ticket) from closing down up to 5 runs. As shown below, there was also no difference shown between closing 3 runs vs. closing 5 runs. Closing 5 runs would result in a loss of revenue, which would have to be offset by a reduction in operating costs, or an increase in ticket prices.

Scenario 2

Increase the vertical drop by adding a run to a point 150 feet lower down but requiring the installation of an additional chair lift to bring skiers back up.

pasted-image.tiffThis scenario was shown to support a modest increase in ticket prices of $1.99, resulting in a revenue increase of about $3,500,000. This would be offset of course by the costs of running the additional chair lift.

Scenario 3

Same as number 2, but adding 2 acres of snow making cover

The results for this scenario were identical to those for scenario 2. The snow making cover did not justify the added cost by contributing to a rise in modeled ticket prices.

Scenario 4

Increase the longest run by 0.2 mile to boast 3.5 miles length, requiring an additional snow making coverage of 4 acres.

This scenario did not result in an increase in modeled priced at all. Based on our analysis, this does not seem to be an action management should take.

**Conclusion and Scope of future work**

Based on the model and the available data, it appears that a combination of scenarios 1 and 2 would be most advisable. The cost of the additional chair lift needed for scenario 2 could be offset by closing off a number of the least popular runs. This would simultaneously decrease operating costs and increase sales, hopefully resulting in a net increase in profitability. If the above were also combined with a general increase in ticket prices, the results could be very favorable.

Finally, it should be said that the conclusions above are based on the model and the data that was available to create it. There are significant factors that this data was not able to include. These would be questions related to marketing strategy for Big Mountain, or to costs analysis for the various scenarios. Demographic data for customers should also be considered. Subject matter experts in these areas, as well as any other relevant fields should be consulted as part of implementation of any of the scenarios outlined above.