

The background of the slide features a photograph of white sand dunes under a clear blue sky. Overlaid on the right side are several semi-transparent geometric shapes: a large green circle, a smaller blue circle, and a larger blue circle with a green segment. The title 'EXECUTIVE TEAM BRIEF' is centered in a bold, blue, sans-serif font.

# EXECUTIVE TEAM BRIEF

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# PROBLEM IDENTIFICATION



- **There has been an additional chair lift installed to help increase the distribution of visitors across the mountain.**
- **This causes the increase in operational cost by \$1,540,000.**
- **But the investors want to keep the business profit margin at 9.2% given that about 350,000 people ski or snowboard at Big Mountain resort every year.**

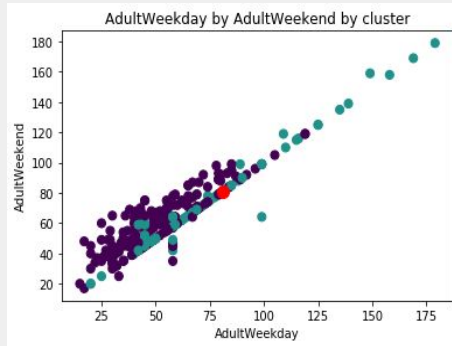
# PROBLEM IDENTIFICATION



- **Our contribution was to find the predicted cost of an adult weekend chairlift ticket based on the data given to us by the database manager.**
- **In fact if the predicted cost of an adult weekend chairlift ticket is higher than the actual one, we will be able to change the price, which will help our revenue to increase.**
- **We used the Linear Regression Model to build our model.**

# RECOMMENDATION AND KEY FINDINGS

- **Our recommendation is to increase the expected cost of an adult weekend chairlift ticket to \$7.**
- **Based on the model we build, the expected cost of an adult weekend chairlift ticket will be closed to \$88. This is \$7 more than the actual cost.**
- **We could also increase the cost of an adult weekay chairlift ticket since there is an increasing linear relationship between the cost of an adult weekend chairlift and an adult weekday chairlift.**



- **We will therefore use the same methodology steps to predict the cost of an adult weekday chairlift ticket.**

# MODELING RESULTS AND ANALYSIS

- Our first big step was to handle the missing and NA values.
- We identified the percentage of missing values for all the columns, then based on the nature of the column we replace the missing value by the mean value or zero.

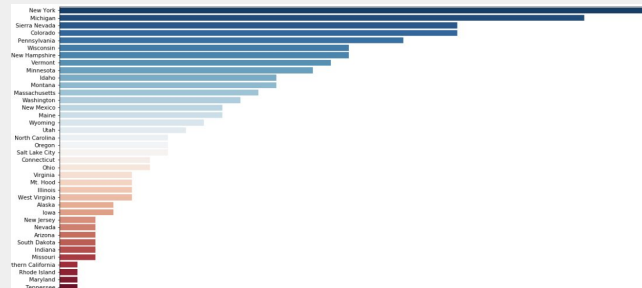
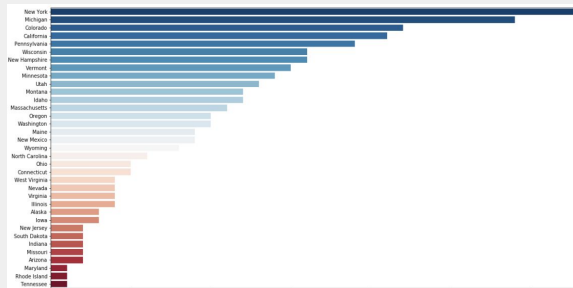
```
nas=pd.DataFrame(df.isnull().sum().sort_values(ascending=False)/len(df),columns = ['percent'])  
pos = nas['percent'] > 0  
nas[pos]
```

	percent
fastEight	0.503030
NightSkiing_sc	0.433333
AdultWeekday	0.163636
AdultWeekend	0.154545
daysOpenLastYear	0.154545
TerrainParks	0.154545
projectedDaysOpen	0.142424
Snow Making_sc	0.139394

- We checked to see if there was any duplicate rows to remove. We did not find any.

# MODELING RESULTS AND ANALYSIS

- Using the bar plot , we showed that the Region feature and the state feature are nearly identical.



- We therefore had to drop one of the feature. We decided to drop the state feature.
- We created pairplots and correlation matrix to see the relationships between features and highly correlated features.



	summit_elev	vertical_drop	base_elev	trams	fastEight	fastSixes	fastQuads	quad	triple	double	surface
summit_elev	1.000000	0.740000	0.680000	0.340000	0.100000	0.280000	0.450000	-0.010000	0.180000	0.110000	-0.040000
vertical_drop	0.740000	1.000000	0.580000	0.590000	0.180000	0.380000	0.680000	0.140000	0.290000	0.170000	0.090000
base_elev	0.680000	0.580000	1.000000	0.230000	0.070000	0.210000	0.340000	-0.060000	0.150000	0.080000	-0.070000
trams	0.340000	0.590000	0.230000	1.000000	0.080000	0.080000	0.630000	0.660000	0.270000	0.070000	0.270000
fastEight	0.100000	0.180000	0.070000	0.080000	1.000000	0.150000	0.100000	0.090000	0.190000	0.100000	0.250000
fastSixes	0.280000	0.380000	0.210000	0.530000	0.150000	1.000000	0.440000	0.120000	0.270000	0.120000	0.370000
fastQuads	0.450000	0.680000	0.340000	0.680000	0.100000	0.440000	1.000000	0.150000	0.300000	0.100000	0.330000
quad	-0.010000	0.140000	-0.060000	0.220000	0.080000	0.120000	0.150000	1.000000	0.140000	-0.120000	0.120000
triple	0.180000	0.290000	0.150000	0.270000	0.190000	0.270000	0.300000	0.140000	1.000000	-0.020000	0.180000
double	0.110000	0.170000	0.080000	0.070000	0.100000	0.120000	0.100000	-0.120000	-0.020000	1.000000	-0.090000
surface	-0.040000	0.090000	-0.070000	0.270000	0.250000	0.370000	0.330000	0.120000	0.180000	0.090000	1.000000
total_chairs	0.300000	0.550000	0.200000	0.650000	0.280000	0.600000	0.760000	0.360000	0.540000	0.370000	0.660000
Runs	0.570000	0.800000	0.450000	0.690000	0.320000	0.650000	0.750000	0.300000	0.370000	0.240000	0.310000
TerrainParks	0.170000	0.340000	0.110000	0.330000	0.150000	0.340000	0.430000	0.240000	0.360000	0.190000	0.320000
LongestRun_mi	0.530000	0.760000	0.410000	0.570000	0.220000	0.370000	0.580000	0.200000	0.290000	0.150000	0.180000
SkiableTerrain_ac	0.470000	0.530000	0.410000	0.540000	0.290000	0.390000	0.590000	0.260000	0.380000	0.080000	0.080000
SnowMaking_ac	0.320000	0.470000	0.250000	0.540000	0.050000	0.320000	0.520000	0.200000	0.330000	0.110000	0.270000
daysOpenLastYear	0.430000	0.530000	0.390000	0.350000	0.060000	0.270000	0.450000	0.190000	0.190000	0.190000	0.140000
yearsOpen	0.020000	-0.030000	-0.020000	0.010000	-0.010000	-0.010000	-0.020000	-0.030000	-0.040000	-0.030000	-0.090000
averageSnowfall	0.690000	0.690000	0.630000	0.290000	0.090000	0.180000	0.400000	0.070000	0.130000	0.090000	0.110000

# MODELING RESULTS AND ANALYSIS



- The highly correlated features we found are the `summit_elev` and the `base_elev`. We decided to keep `summit_elev` and drop `base_elev`.
- We used `explained_variance_score` to measure the discrepancy between our model and the actual data. Our result was 0.93653.
- We used `mean_absolute_error` to measure the average of the absolute values of the difference between the actual value and the predicted value. We had 5.095.
- Based on the linear regression model, the expected cost of an adult weekend chairlift ticket will be closed to \$88.

# SUMMARY AND CONCLUSION



- Our goal during this project was to build a model using the data given to us by the database manager to predict the cost of an adult weekend chairlift.
- 9, deleted highly correlated features, and used the linear regression model to predict our response variable.
- We also noticed that there is a highly positive correlation between the cost of an adult weekend chairlift and an adult weekday chairlift. This helped us conclude that the predicted adult weekday chairlift will increase.
- Even though we cannot guarantee that this result will keep the profit margin at 9.2%, we can confidently say that with a \$7 increase in the cost of an adult weekend chairlift and also the increase of an adult weekday chairlift, the company revenue will increase.