Big Mountain Resort
Sales Expansion Deck

by

Roger Swartz

Purpose

Big Mountain Resort, a Spectacular ski resort located in Montana with access to 105 trails, 11 lifts, 2 T-bars, 1 magic carpet and 350,000 annual skiing and snowboarding customers at every ability level installed an additional chair lift that increases operating costs by $1,540,000 each season is seeking a strategy to increase profitability. One pricing strategy is to charge a premium above the average price of resorts in its market. Although BMS wonders if they are not capitalizing on their facilities as well as it could. Further, there is not a clear benchmark on how on the relative value of their facilities compared to average price resorts and other resorts and BMS worries they are not profiting as much as they could and thus leads to the worry that their investment strategy is or will become misguided. BMS wants specific guidance to understand the price/value proposition of their lift tickets to increase sales and/or how to cut costs without undermining ticket price/value.

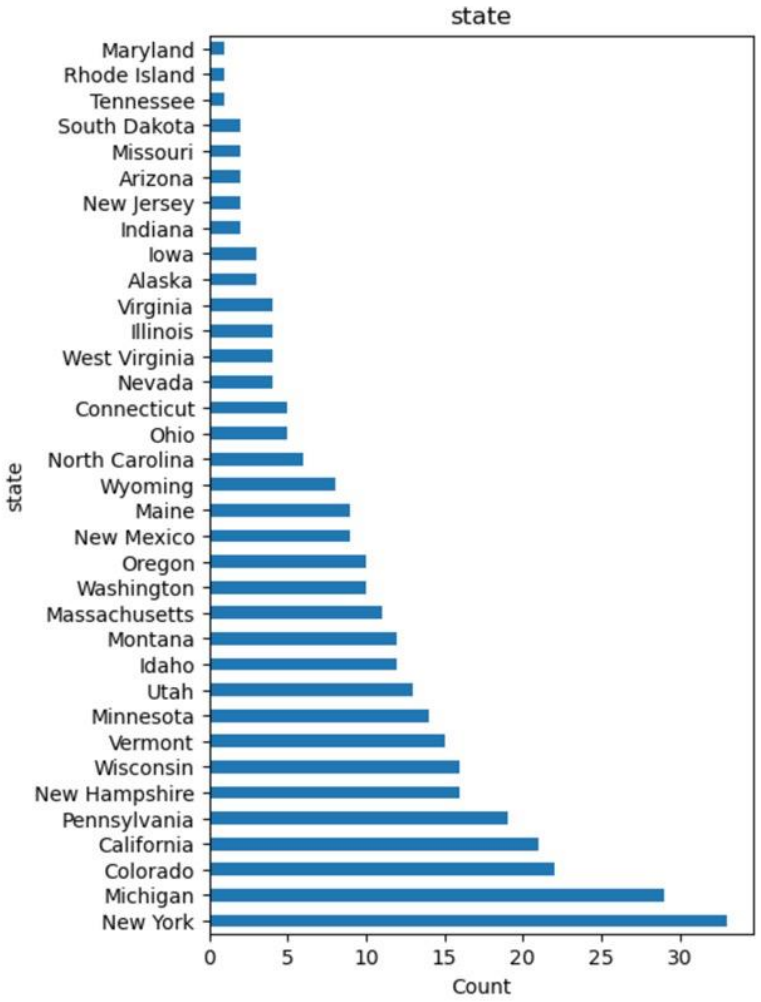


Fig 1. Number of Ski Resorts / Mountains By State

Purpose (cont'd)

- The Purpose of this presentation is to provide a mid to high-level overview of opportunities for Big Mountain Resort to increase annual sales and operating profits.
- Our research and has uncovered an opportunity that is highly tailored to Big Mountain resort. The opportunity potentially positions Big Mountain to increase sales by $15 Million annually within 4 – 6 years.
- We evaluated a spreadsheet consisting of every ski mountain in the country across 21 amenities including:

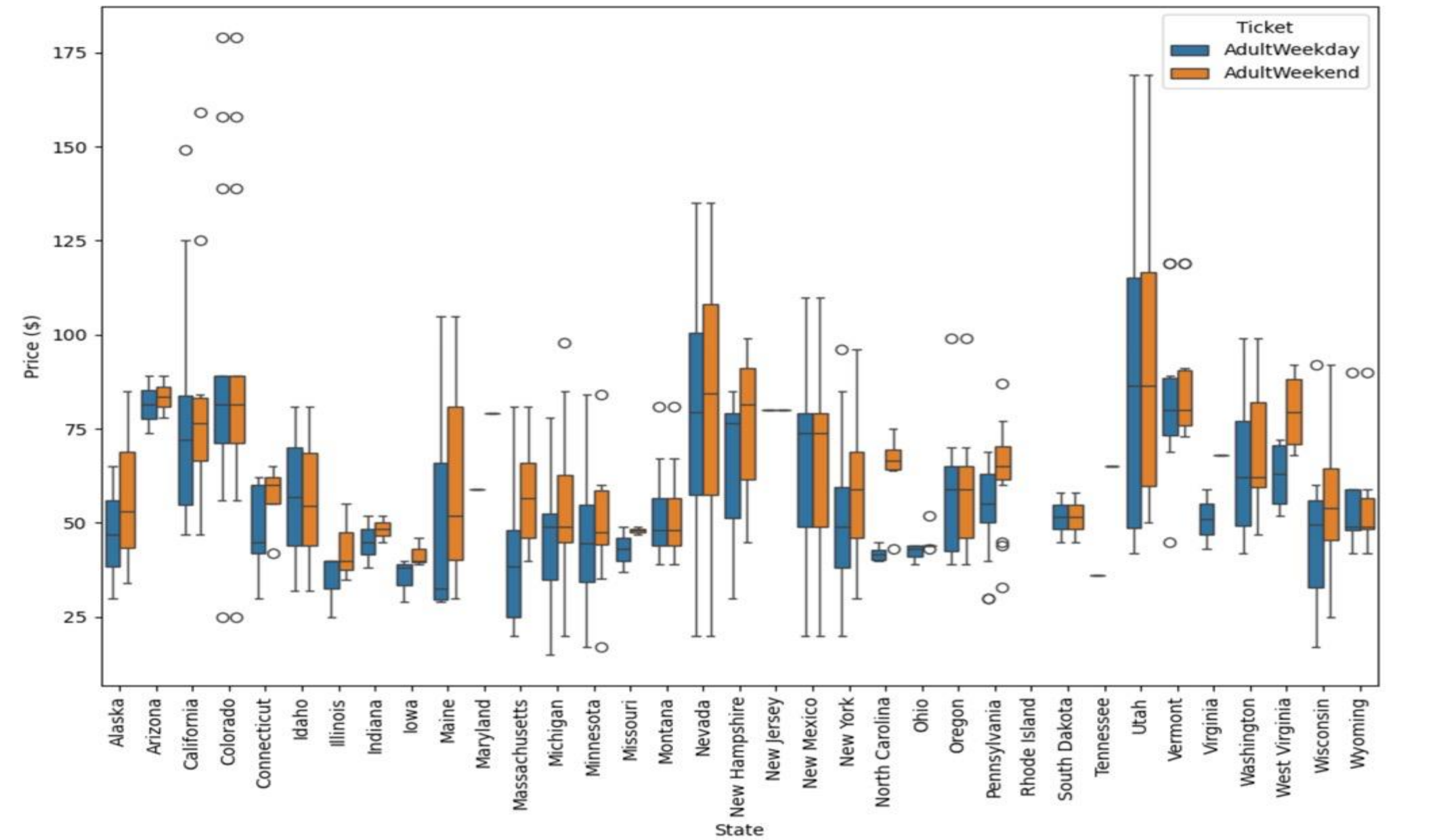
1. summit_elev'
2. vertical_drop'
3. 'trams'
4. 'fastEight'
5. 'fastSixes'
6. 'fastQuads'
7. 'quad'
8. 'triple'
9. 'double'
10. 'surface'
11. 'total_chairs'
12. 'Runs'
13. 'TerrainParks'
14. 'LongestRun_mi'
15. 'SkiableTerrain_ac'
16. Snow Making_ac'
17. 'daysOpenLastYear'
18. 'yearsOpen'
19. 'averageSnowfall'
20. 'projectedDaysOpen'
21. 'NightSkiing_ac'

- Big Mountain Resort has already established itself as the top ski mountain in Montana and has amenities that place it among the finest ski resorts in the country.
- Indeed, Big Mountain Resort boasts a lot of impressive amenities and is by far the finest in Montana. They are at the upper echelon for nearly every ski mountain amenity sought for by the public and customer base of the finest ski mountains including vertical drop, snow making capability, total number of chairs, number of fast quads, total number of runs, longest run and skiable terrain.

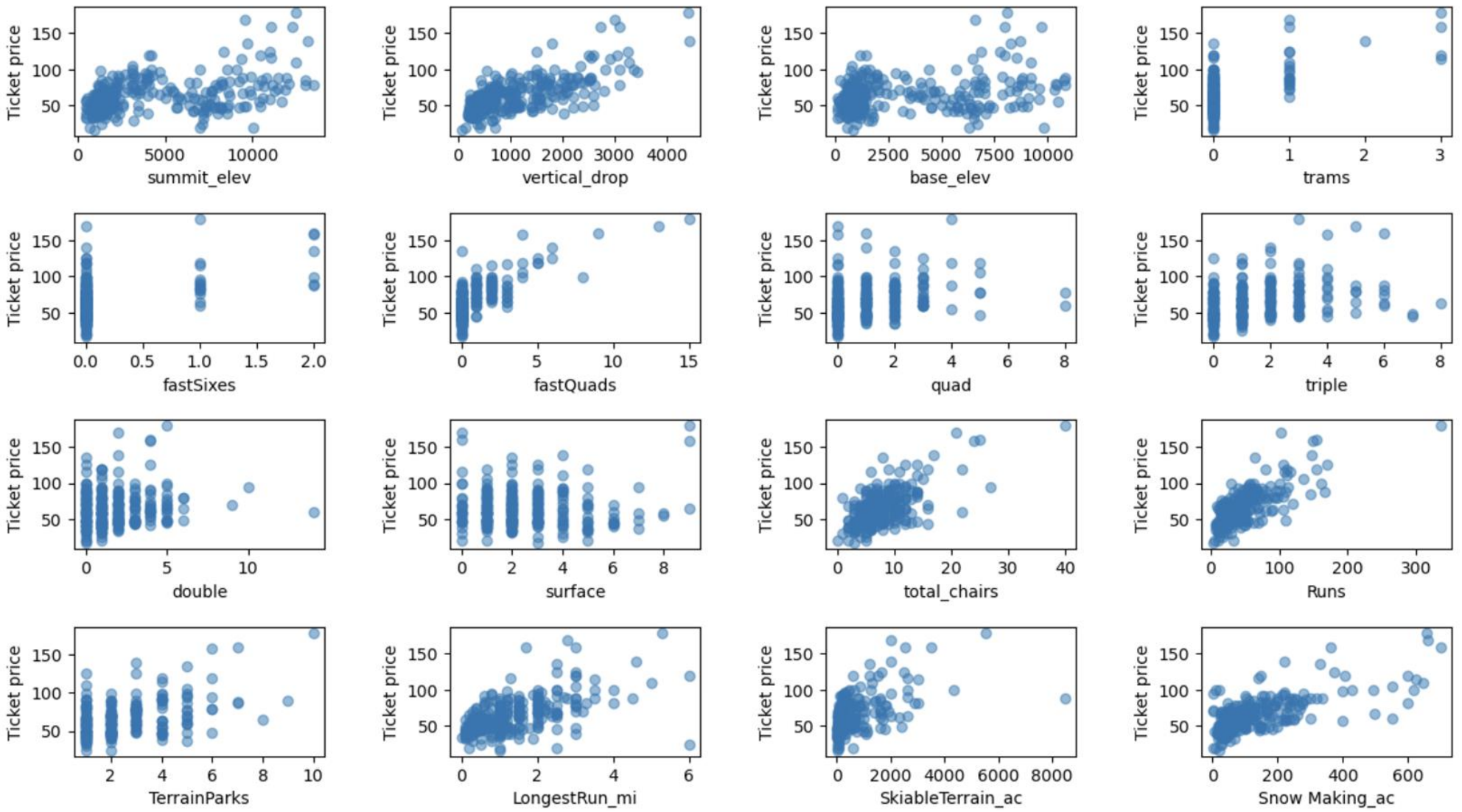
Recommendation and Key Findings
The Solution: Install an $8 to $12 Million Tram

- The Installation of an $8 Million to $12 Million Tram will support a ticket price increase of atleast $15 per Adult Weekend lift ticket
- The Tram will support an increase of 100,000 additional annual lift tickets sold within 4 – 6 years
- Further the tram will offer the potential to be charged as an individual experience during the off season.
- Within 4 – 6 years a revenue increase of $15 Million annually is possible. Essentially, the tram could pay for itself 3 times over in the course of 10 years.

Big Mountain While in a State with a short Boxplot of Adult Weekend lift ticket prices has the potential to break though the ceiling.



Amenity vs. Lift Ticket Price provides some sense of how increasing the incidence of an amenity can increase the price of lift ticket. Our regression models attempted to quantify this amenity by amenity.



Recommendations / Key Findings

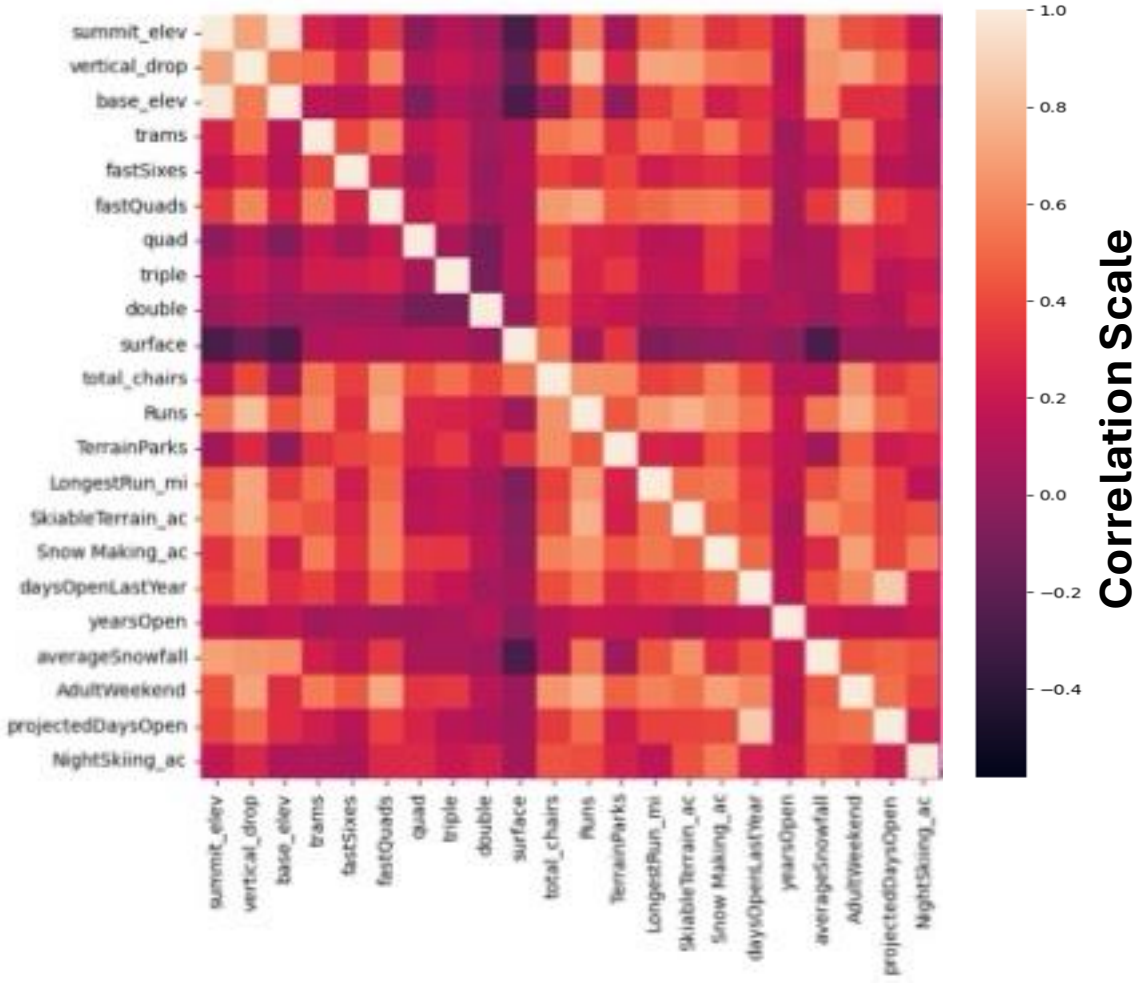
- Installation of a Tram at a budget of between $8 Million and $12 Million will have the greatest Impact on the Bottom Line. Although, upping the budget a bit further to as much as $18 Million might achieve unprecedent results through the wow effect. (Tram cost is likely higher due to inflation and a $12 million dollar tram in 2017 might cost $16 - $18 Million today.
- The second most expensive ski mountain / resort in the state appears to have an influence on the most expensive ski mountain. There appears to be be some maximum difference that a state can tolerate. The relatively small difference between Big Mountain and Red Lodge Mountain supports that ticket prices could be raised atleast $15 following the installation of a tram.

Ski Mountain/Resort	AdultWeekend	State	1st /2nd	#Resorts	Tram Cost
Deer Valley Resort	169.00	Utah	$169/$125	12	$12.5M
Copper Mountain Resort	158.00	Colorado	$179/$158	14	$10M
Sugar Bowl Resort	125.00	California	$159/$125	14	$7M
Snowbird	125.00	Utah	$169/$125	14	$15M
Taos Ski Valley	110.00	New Mexico	$110/$80	9	$10M
Sunday River	105.00	Maine	$105/$99	8	$8M
Crystal Mountain	99.00	Washington	$99/$95	8	$9M
Whiteface Mountain Resort	96.00	New York	$96/$95	33	$7M
Jay Peak	89.00	Vermont	$119/$119	10	$7.5M
Gore Mountain	88.00	New York	$96/$95	33	$8M
Alyeska Resort	85.00	Alaska	$85/$53	3	$11M
Lutsen Mountains	84.00	Minnesota	$84/$60	14	$6M
Big Mountain	81.00	Montana	$81/$67	12	
Mountain Creek Resort	79.99	New Jersey	$79.99	1	$6M
Cannon Mountain	79.00	New Hampshire	$99/$93	14	$5.5M
Ski Apache	74.00	New Mexico	$110/$80	9	$7M
Belleayre	72.00	New York	$96/$95	33	$5.5M
Silver Mountain	62.00	Idaho	$81/$70	10	$10M

1st / 2nd refers to the most expensive and second most expensive ski mountain for that state
Tram Cost in $millions (not inflation adjusted)
#Resorts refers to the number of ski mountains / resorts for that state
AdultWeekend is the cost of an Adult Weekend Lift Ticket

Correlation Heatmap Shows how Amenities Can potentially Obscure the influence of Trams on Ticket Price:

- Isolating the impact of a Tram on the ticket price of a Ski Mountain / Resort is very difficult to model.
- **So How Did we Reach Our Conclusion:**
- First, the correlation Analysis shows that Trams are highly correlated with the amenities that have the greatest influence on ticket price including: 1. Snow Making, 2. Total chairs, 3. Fast Quads, 4. Runs, 5. Vertical Drops and 6. Longest Run. All these factors tend to increase with increasing price.
- But, as the old adage goes "Correlation Does Not Equal Causation."
- Further there are only 22 ski mountains or 7% of all ski mountains / resorts in the country that have a tram. Thus, trams tends to get buried and obscured by amenities that are found at all ski mountains / resorts.
- **The budget for a tram can exceed the entire budget for a smaller ski mountain so they must have meaning and direct impact on the bottom line:**
- Modeling does not handle 0 vales well and if 93% of ski resorts / mountains have a zero value for trams it is hard for modeling to pick up the influence if the factors that most greatly influence ticket price also occur across all resorts and both with and without the incidence of a tram. What is apparent is those factors such as fast quads and runs have a greater impact on price at lower cost mountains and their impact reduces especially at the upper quartile. Although, that is difficult to capture as when we see the incidence of a tram computer modeling erroneously borrows from the trams influence of the ticket price and assigns it to other factors especially fast quads and number of runs.
- But also, part of modeling is done in the context of the state and there are vastly different box plot ranges of ticket price by state.
- Thus, we decided to complete our analysis on a subset of the ski mountain / resorts where trams are most likely to be found: That is in the upper quartile for price for all states.
- We also considered how things change when we eliminate the factors that are most greatly correlated with price that we felt not only obscured the influence of trams on ticket price but also borrowed and even dragged down the influence of trams to negative values. The influence of trams on ticket price was erroneously attributed to be due to runs or fast quads.



Lighter color means more highly correlated

The Linear Regression Model

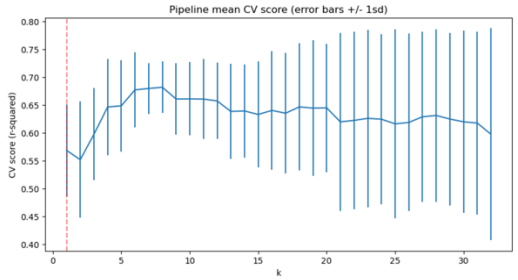
- Several Regression Models were considered. Although, we decided to focus our energy on a liner regression model that uses the coefficient of determination that indicates how well the independent variable, the amenity of the ski resort, explains the variability of the dependent variable the AdultWeekend ticket price.
- The model performs according to the following:

  SimpleImputer → StandardScaler → SelectKBest → LinearRegression
- The standard Scaler – $Value_{Scaled}$ = (Value – mean)/standard deviation – the standard scaler essentially tries to normalize the data so that each amenity has a mean of zero and standard deviation equal to 1. This makes it easier to understand how each factor influences ticket price without having to worry about scale. That is a value of 100 for one variable may have equal influence on price as a value of 3 of another variable and we want to be able to see the relative influence of each variable.
- SelectKBest means we focus on the K (8 in this case) amenities that have the greatest influence on price not worrying too much about the other amenities.
- Linear Regression: Our linear regression minimizes the sum of squares error. We went with this model. Although, given greater time we would have determined the linear regression for each quartile because our theory is that our linear regression will have a different slope for each quartile. Simply put that means that an amenity might more greatly influence price in one situation such as in mountains in the first quartile and then might have a lessor influence on price in another quartile. Determining the linear regression in each quartile would likely yield a superior model. This just means what matters in one quartile of ticket pricing might not mean as much in a different quartile and that difference is real and so it would not be ideal to create a single regression line for all quartiles.

We Applied the Magnifying Glass to The Part of the Linear Regression Modeling where Trams are most likely to be found

Original DataSet weighted factors from linear regression model:

vertical_drop	10.77
Snow Making_ac	6.29
total_chairs	5.79
fastQuads	5.75
Runs	5.37
LongestRun_mi	0.18
trams	-4.14
SkiableTerrain_ac	-5.24



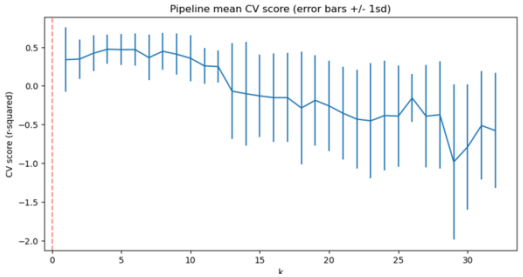
When the entire data set is considered the influence of trams on ticket price is obscured by other factors that borrow from the influence of trams and drag down to the negative the influence of trams – the costliest possible installation at a ski mountain.

Next: We considered only those ski mountains where the ticket price fell in the upper quartile for that state.

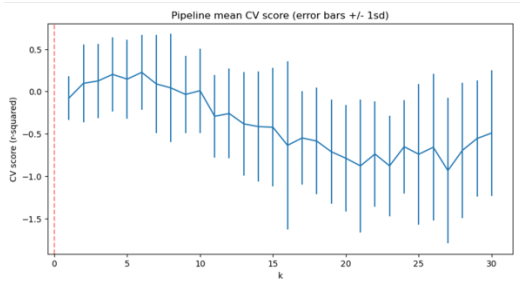
AdultWeekend ≥ 75thQuantile by State weighted factors from linear regression model:

Runs	10.82
fastQuads	5.19
trams	5.18
daysOpenLastYear	1.43

Trams jump from. -4.14 to 5.18 or a change of +9.32 when only considering the upper quartile of ski mountains/resorts.



Next: we removed Fast quads and runs from the equation



AdultWeekend ≥ 75thQuantile by State Weighted factors with Runs and Fast Quads removed:

trams	7.60
total_chairs	5.85
daysOpenLastYear	5.33
summit_elev	4.94
vertical_drop	2.44
SkiableTerrain_ac	-1.64

When fast quads and runs are removed and only the upper quartile is considered trams jumps to the top of the list increasing from 5.18 to 7.60 or a change of +2.12 (overall +11.44) having the greatest influence on ticket price.