Ski Lift Case Study

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Ski Park

Cycle

1. Skiers always wait in the queue for a ski lift.
2. Ride the ski lift up the mountain.
3. Ski down the slopes.
4. Repeat.

The total number of skiers in the park is always constant across all locations: Queue, Lift, Slopes.

Problem

Skiers experiencing long queues waiting for a ski lift.

Objective

Reduce amount of time customers spend waiting for a ski lift.

Options			
Lift Type	Lift Rate	Time on Lift	Time on Slopes
Existing Setup			
Faster Lift			
Second Lift			

Options			
Lift Type	Lift Rate	Time on Lift	Time on Slopes
Existing Setup	5 skiers / min	10 min	5 min
Faster Lift			
Second Lift			

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Second Lift			

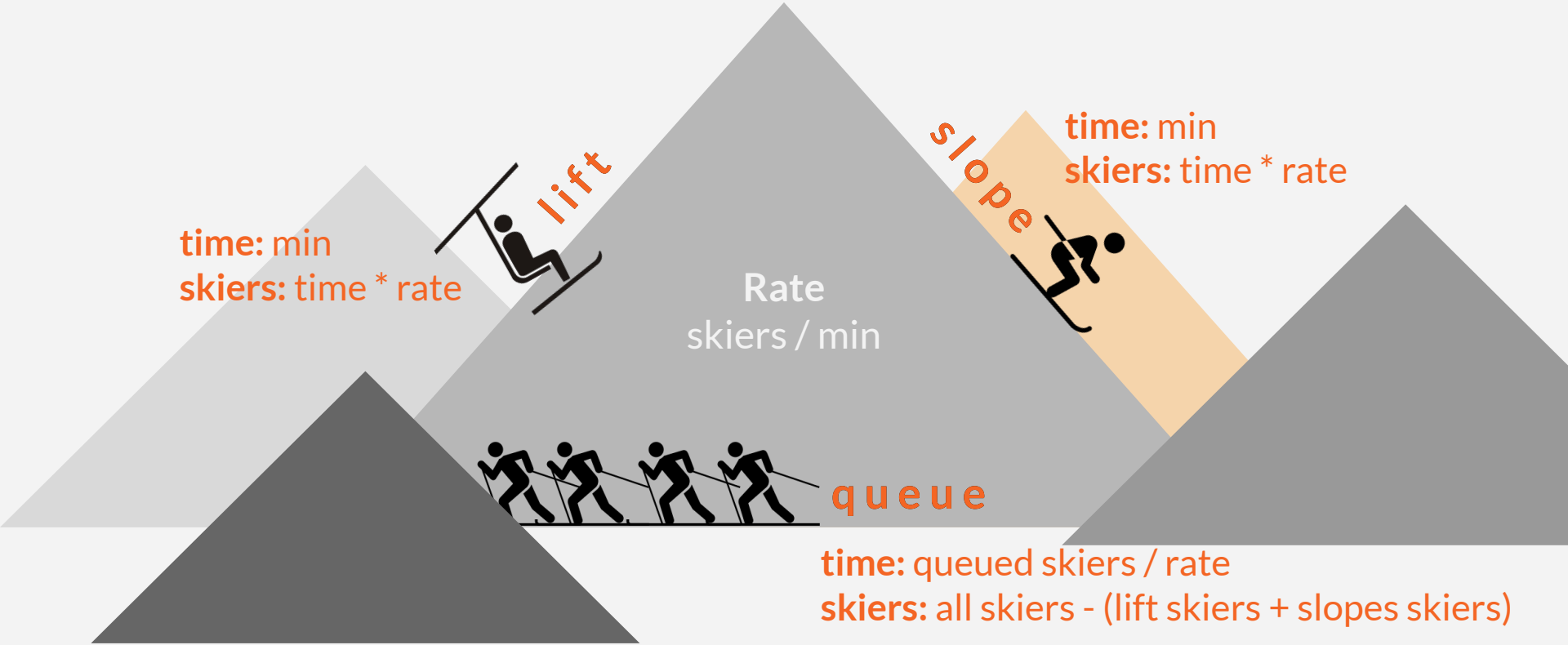
Options			
Lift Type	Lift Rate	Time on Lift	Time on Slopes
Existing Setup	5 skiers / min	10 min	5 min
Faster Lift	5 skiers / min	5 min	5 min
Second Lift	10 skiers / min	10 min	5 min

Options			
Lift Type	Lift Rate	Time on Lift	Time on Slopes
Existing Setup	5 skiers / min	10 min	5 min
Faster Lift	5 skiers / min	5 min	5 min
Second Lift	10 skiers / min	10 min	5 min

Variables

1. Number of skiers at location
2. Time at location

Mountain Metrics



Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	10 min * 5 skiers / min = 50 skiers
Slopes		5 min	5 min * 5 skiers / min = 25 skiers
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		skiers / rate	all skiers - (25 skiers + 50 skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		skiers / rate	all skiers - (75 skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		skiers / rate	(skiers - 75 skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		skiers / rate	(skiers - 75 skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		$\frac{\text{(Skiers - 75)}}{\text{5 skiers / min}}$	(skiers - 75 skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		$\frac{(\text{skiers} - 75)}{5}$	(skiers - 75 skiers)

Existing Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	10 min	50 skiers
Slopes		5 min	25 skiers
Queue		$\frac{(\text{skiers} - 75)}{5}$	(skiers - 75 skiers)

Faster Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	5 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Second Ski Lift			
Location	Rate	Time	Skiers
Lift	10 skiers / min	10 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Faster Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	5 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Second Ski Lift			
Location	Rate	Time	Skiers
Lift	10 skiers / min	10 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Faster Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	5 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Second Ski Lift			
Location	Rate	Time	Skiers
Lift	10 skiers / min	10 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Faster Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	5 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Second Ski Lift			
Location	Rate	Time	Skiers
Lift	10 skiers / min	10 min	Time * Rate
Slopes		5 min	Time * Rate
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Faster Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	5 min	5 min * 5 skiers / min = 25
Slopes		5 min	5 min * 5 skiers / min = 25
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Second Ski Lift			
Location	Rate	Time	Skiers
Lift	10 skiers / min	10 min	10 min * 10 skiers / min = 100
Slopes		5 min	5 min * 10 skiers / min = 50
Queue		skiers / rate	all skiers - (lift skiers + slopes skiers)

Faster Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	5 min	25
Slopes		5 min	25
Queue		skiers / rate	skiers - (25 + 25)

Second Ski Lift			
Location	Rate	Time	Skiers
Lift	10 skiers / min	10 min	100
Slopes		5 min	50
Queue		skiers / rate	all skiers - (100 + 50)

Faster Ski Lift			
Location	Rate	Time	Skiers
Lift	5 skiers / min	5 min	25
Slopes		5 min	25
Queue		(skiers - 50) / 5	50

Second Ski Lift			
Location	Rate	Time	Skiers
Lift	10 skiers / min	10 min	100
Slopes		5 min	50
Queue		(skiers - 150) / 10	150

Ski Lift Comparison			
Option	Rate	Time	Wait Time
Existing	5 skiers / min	10 min	(skiers - 75) / 5
Faster	5 skiers / min	5 min	(skiers - 50) / 5
Second	10 skiers / min	10 min	(skiers - 150) / 10

Ski Lift Comparison			
Option	Rate	Time	Wait Time
Existing	5 skiers / min	10 min	y = 0.2x - 15
Faster	5 skiers / min	5 min	y = 0.2x - 10
Second	10 skiers / min	10 min	y = 0.1x - 15

Ski Lift Comparison			
Option	Rate	Time	Wait Time
Existing	5 skiers / min	10 min	y = 0.2x - 15
Faster	5 skiers / min	5 min	y = 0.2x - 10
Second	10 skiers / min	10 min	y = 0.1x - 15

x = total skiers
y = wait time for lift

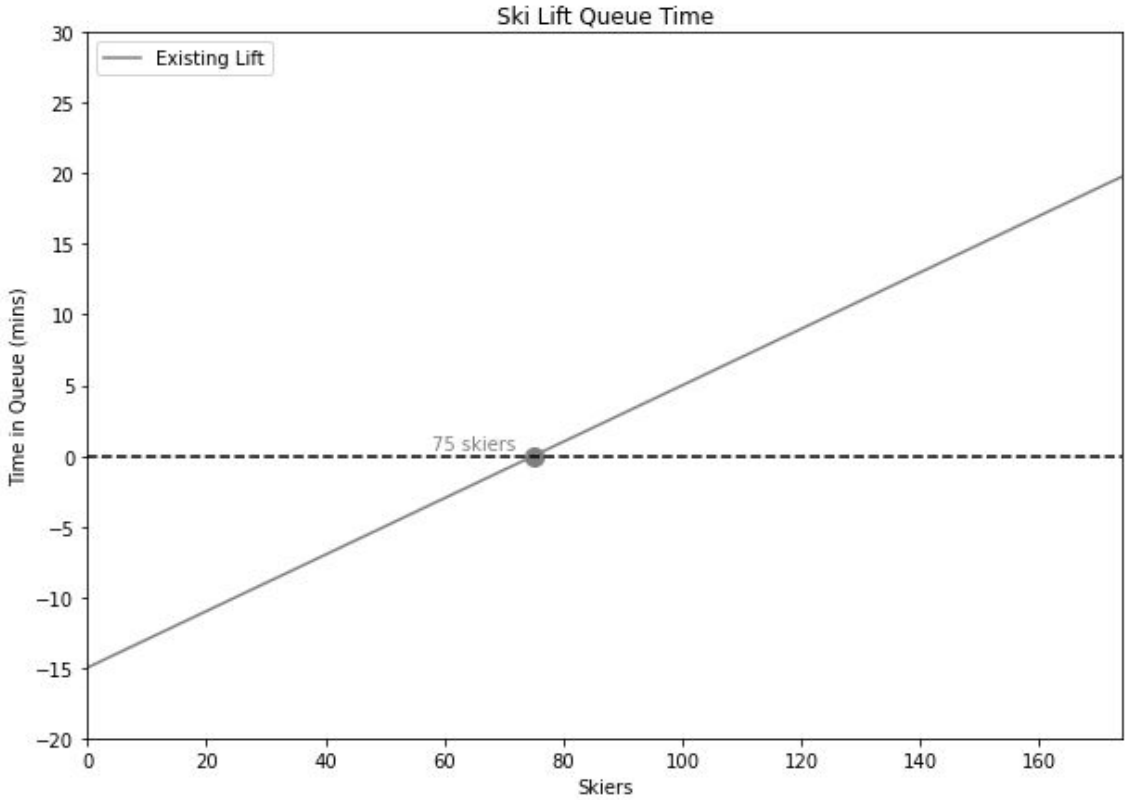
β_0 = skiers not in queue
β_1 = lift rate

Ski Lift Comparison	
Option	Wait Time
Existing	y = 0.2x - 15
Faster	y = 0.2x - 10
Second	y = 0.1x - 15

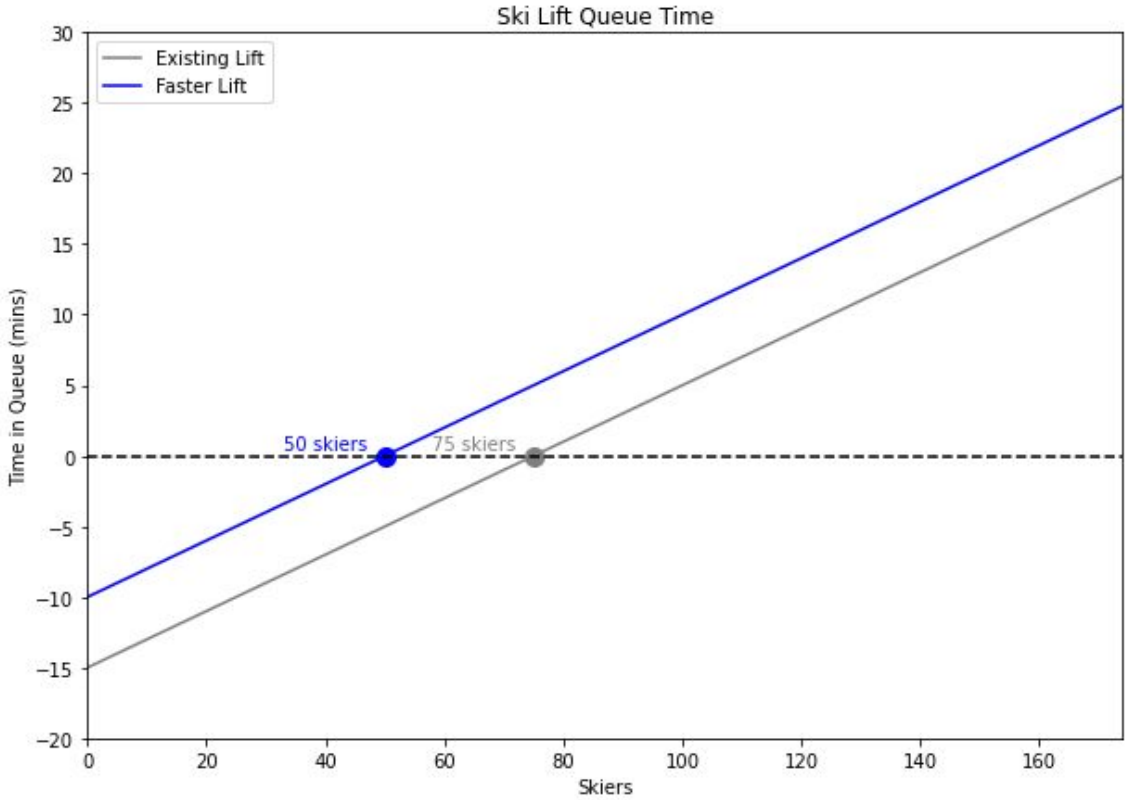
x = total skiers
y = wait time for lift

β_0 = skiers not in queue
β_1 = lift rate

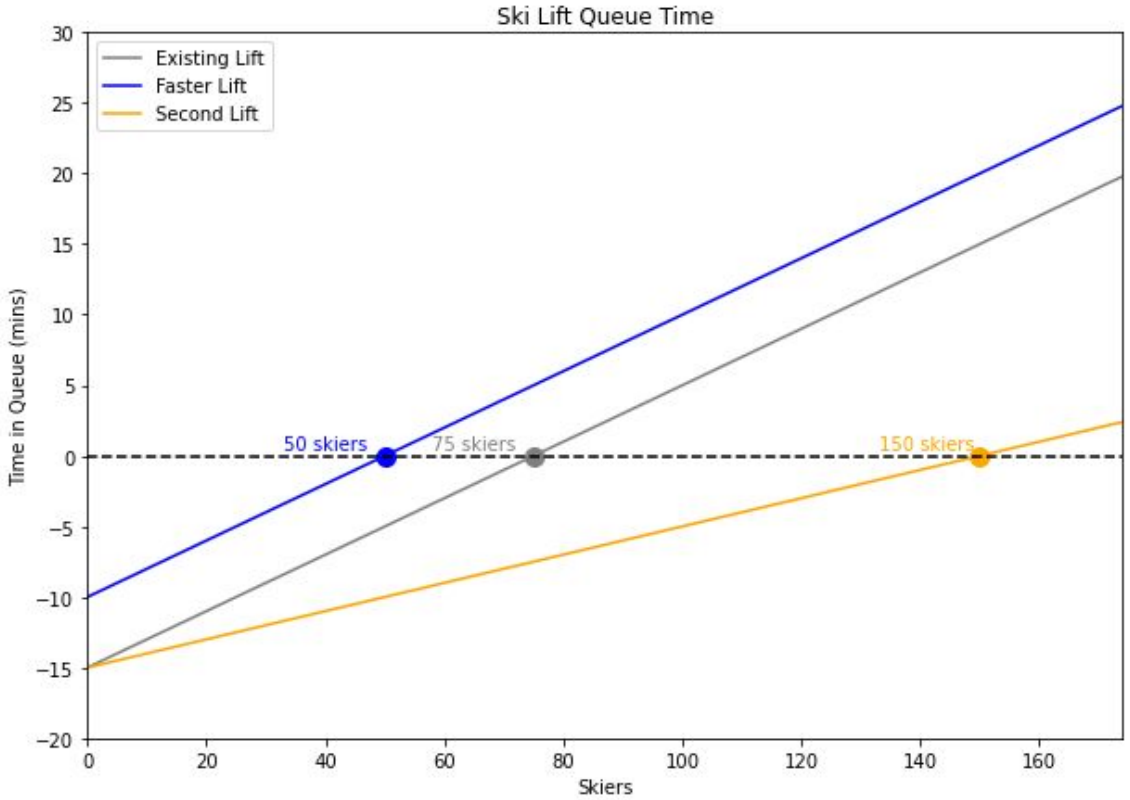
Ski Lift Comparison
Option
Existing
Faster
Second



Ski Lift Comparison
Option
Existing
Faster
Second



Ski Lift Comparison
Option
Existing
Faster
Second



Recommendation

Adding a **second lift** will **reduce wait times** in the queue the most.

Discussion - Second Lift

- How much does a second ski lift cost?
  - Is loss from customer churn greater than the construction cost, staff to operate, and maintenance for a new lift?
- Skiers may avoid long lines during peak hours by spending more time in the lodge gift shop or dining at the restaurant.
  - Would providing discounts or promotions to encourage this behavior be a value add without additional cost?
- Will slopes time descending the mountain be identical for both lifts?
- Relative to a faster lift, additional time is spent sitting on a lift chair traveling up the mountain.
  - Is this better than waiting in line?

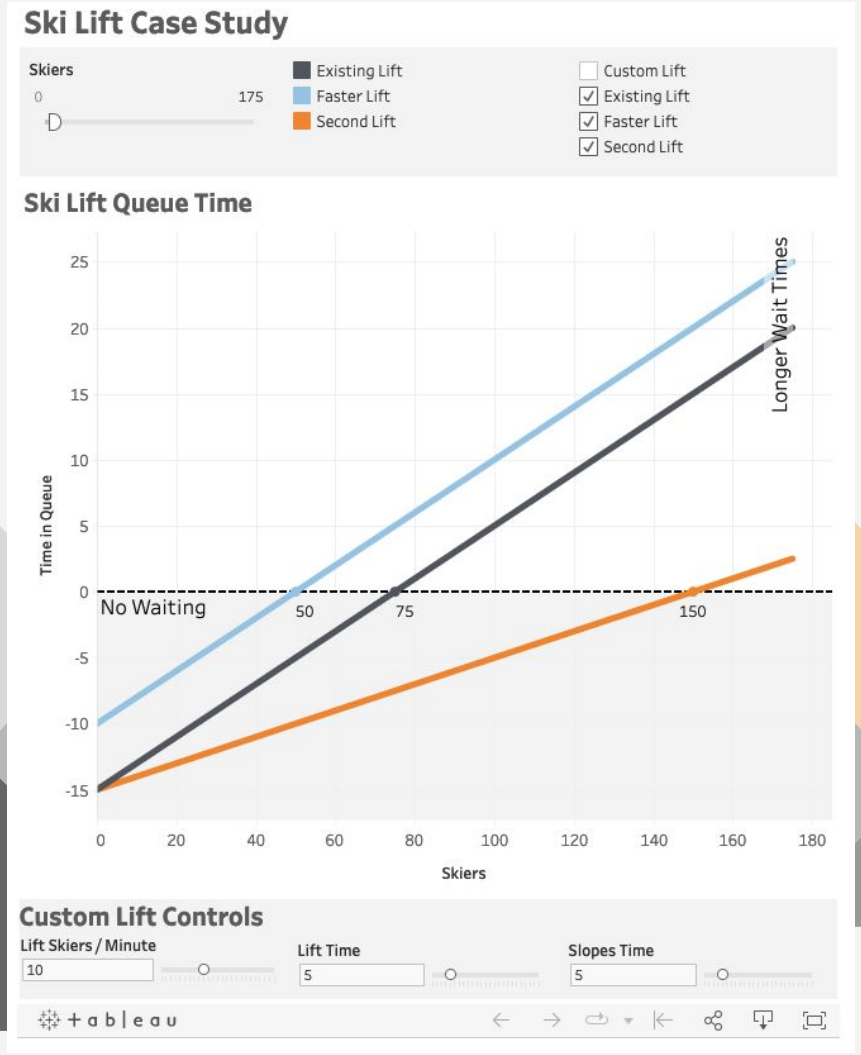
Discussion - Existing Lift, Adjusted

- Will shorter wait times from slowing down the existing lift accomplish the same objective without the added cost?
- Are less experienced skiers more likely to be intimidated by the increase in speed?
- Does risk of injury increase when speeding up the ski lift?
- Will the rate of skiers reaching the peak double due to the increase in speed?
- Will additional maintenance be required?
    - Down time may increase due to additional maintenance requirements.

Discussion - Existing Lift, Adjusted

- On days where wait times will always be 0, would increasing lift speed increase enjoyment for high volume skiers?
- Is increasing the size of the lift chair (thus increasing the rate) a cheaper alternative to replacing an entire lift or installing a new one.

Explore


Ski Lift Case Study
Skiers
0
175
Existing Lift
Faster Lift
Second Lift
Custom Lift
Existing Lift
Faster Lift
Second Lift
Ski Lift Queue Time
Longer Wait Times
Time in Queue
25
20
15
10
5
0
-5
-10
-15
No Waiting
50
75
150
0
20
40
60
80
100
120
140
160
180
Skiers
Custom Lift Controls
Lift Skiers / Minute
10
Lift Time
5
Slopes Time
5
+ableau

thank you!

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