**Intro**

**Our Motivation-Spencer**

As a team of curious beer lovers - we wanted to get ahead of the data and identify the influencing factors behind a brewery launch. Breweries have become more and more prevalent in the United States. Living in Colorado, a brewery hub, we’ve formed some experienced and educated speculations ourselves.

**Proposal-Spencer**

Prior to our research, we considered median income and total population to be huge demographic impactors for where breweries would decide to open.

Some of our preexisting questions were:

* How have beer sales and the number of breweries in the US changed over time?
* Does a county's total population, age or median income have a strong correlation to the number of breweries in the county?
* Which demographic has the strongest influence on the number of breweries in a county?

The resources we decided to use were:

* Alcohol and Tobacco Tax and Trade Bureau CSVs
* GitHub Open Brewery DB CSVs
* US Capital Latitude and Longitude CSV
* United States Census Bureau API
* Open Weather API
* GMAPS

**Analyzing Data-Spencer**

Follow along with us while we help you streamline this data into a visual.

**Beer Sales-David J**

We wanted to start by taking a step back and looking at the entire US, focussing on beer sales overtime.

As noticed on the line chart, beer sales have surprisingly taken a big drop over the past 10 years. Reasons could be:

-2009 recession

-health

-increase in market share for liquor/wine sales

-recreational drug popularity

-craft beer?

Note CO is highest in sales

**Beer Sales to Brewery Count - David J**

On the contrary, we were delighted to see the Brewery Industry in the US is exponentially progressing.

From this visual it is obvious that the number of breweries in the US has increased over the last decade and does not appear to be slowing down. This made us question

“Where are all these breweries? Are they evenly dispersed? Biased to a certain state?”

Naturally, we dove into a state by state brewery count analysis - which is expressed through this bar graph on the right. Originally we looked at all 50 states, but decided to narrow down to the top 10. 9 of the 10 states are close in brewery count however California seemed to be the outlier.

**Brewery Type - Dave A**

“Brewery” can be quite an umbrella term. So before we dove deeper into our data, we wanted to get a feel for what types of breweries were accounted for in our dataset.

Planning-licensed but not open

Contract -Making other people beer

Regional-large scale

Large - your large staple beer producers like coors and budweiser

Micro- 15000 Barrels or less per year

Brewpub - a micro brewery that serves as a restaurant as well

**Heat Map - Dave A**

Explain - point out some of the top 10 states (California, Colorado, Texas, Florida, Ohio, NC, Washington, etc)

**Max Temp/Latitude - Dave A**

Hops growing region is 45 to 55 degrees latitude

We wanted to see if there was a correlation between a temp increase or decrease depending on where all these breweries were located.

There was a slight correlation that hints there are more breweries closer to colder temperatures.

**WhiskerPlot - Dave A**

Reinforces our findings. Explain chart/outliers?

Median shown in the legend that the 40 degree latitude mark is median and mean for the various types of breweries. We see from our temperature graph that the slight correlation skews more breweries to the north of the US compared to the south. Also the lat and the hops growing region is no coincidence. When one of your biggest ingredients is nearby you have fewer costs on transportation and the overall cost is lower.

**Colorado-Bailey**

We decided to narrow our sample set down to one of the states within the Top 10 Brewery Count List. Naturally, we chose Colorado.

Explain Charts

**Brewery Count and Population-Bailey**

When analyzing where in CO the breweries are, our data returned to us information for 12 different counties.

We then began to dive into the demographics of these counties and compared them to the brewery count - we pulled this info from the US Census Bureau because we knew we could leverage multiple demographic variables to help us draw correlations and conclusions.

These charts were specifically pulled from the 2019 1 year community acs dataset.

Explain Chart

**Brewery Count and Median Age - Joey**

We initially thought the median age of different counties would impact the brewery popularity within that area. As you can see by this scatter plot, there is a very weak negative (maybe even non-existent) correlation between the median age and brewery count per county. Our initial thoughts were inaccurate.

**Brewery County and Median Income - Joey**

We thought that the brewery market may be higher in areas where the median income was higher - hypothesizing more money per county would correlate with more brewery success.

We again were proven wrong - this visual is evidence that there is not a strong correlation between brewery count and median income per county.

**Median household income and higher education -John**

Because our initial thoughts were proven wrong, we began to look at education as a variable to determine if there was correlation between education level attained and brewery clusters. We wanted to make sure this was a good variable to explore so we checked to see if income and education were correlated. Our findings are shown through this chart. There is no relationship.

Because Median Income and Higher Education are not correlated, we thought there would be a chance that education and brewery count could be related.

**Brewery count and education- John**

High School Diploma and Associate's Degree

\*NO RELATIONSHIP

**Brewery count and Education cont. John**

Higher Degree attained, the correlation strengthens with brewery count per county.

-

- Although there did not appear to be a strong correlation between the number of breweries in a county and number of residents with highschool or associate degree levels of education, as we began to analyze the number of residents with higher levels of education, including Bachelors and PhD recipients, we found stronger relationships.

- The plot on the left represents the total number of residents with bachelor's degrees and the number of breweries within the counties they reside. Based on the linear regression, there is a strong positive relationship between the two variables.

- The plot on the right shows the number of residents with PhD level educations and the number of breweries in their respective counties. This relationship appears to have the strongest correlation to the number of brewery counties.

Think this sounds okay???

Sounds good to me. Yes this is good!

**Conclusion - Spencer**

Read Slide

**\*\*\*\*Outlying Questions We Still Have (only if necessary for extra time)**