



Using Data Science to Choose a Location
for a New Business

- or -

Investigation into Determining the Best
Location for Opening a New Brewery

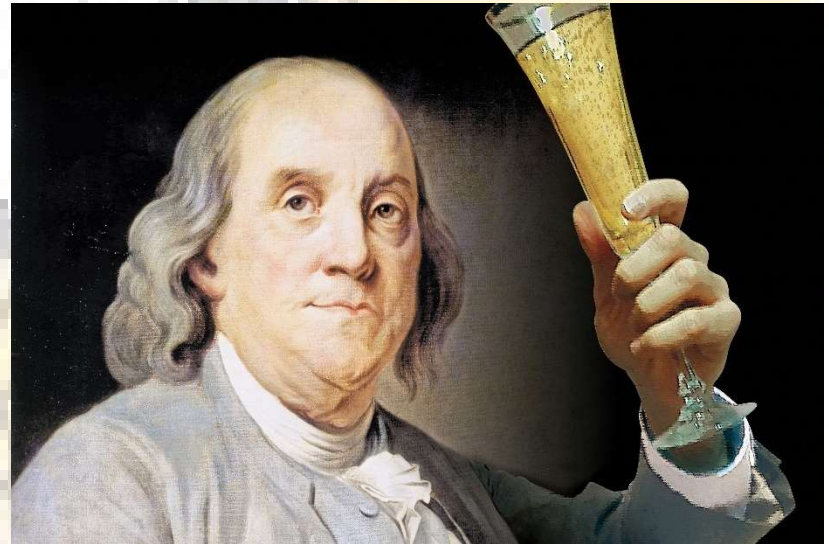
by Tom Kenny

Coursera IBM Data Science Capstone Project

8 FEB 2020

“Beer is proof that God loves us
and wants us to be happy.

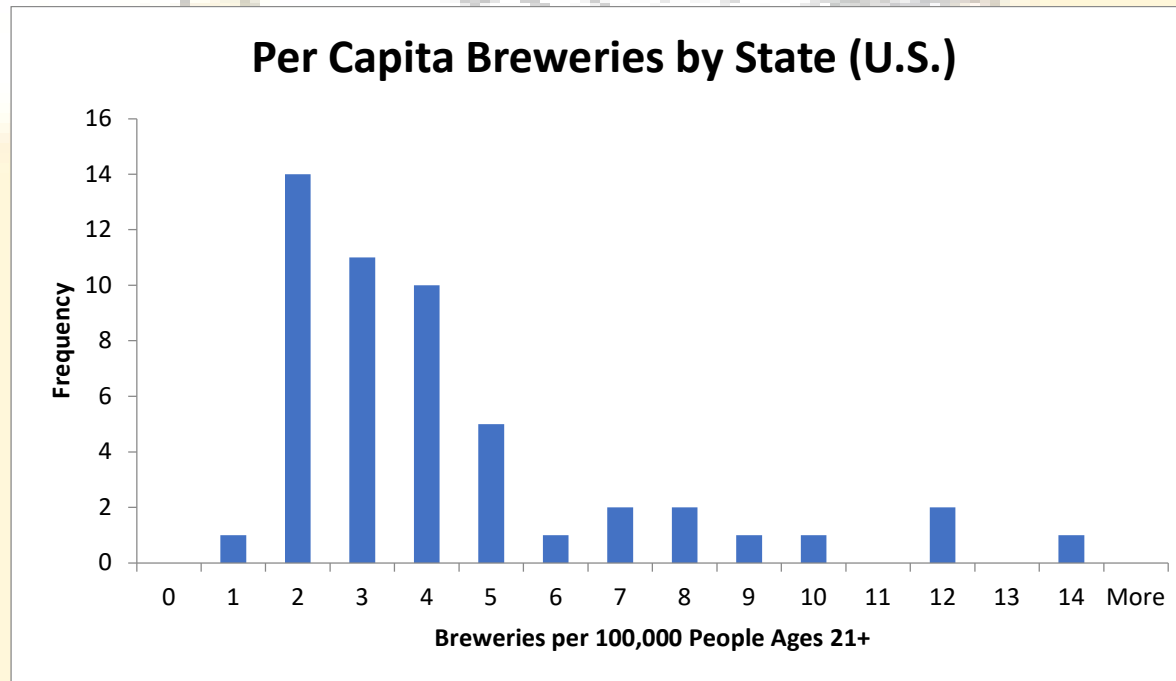
— Benjamin Franklin
(apocryphal quotation)



BEER IS BIG BUSINESS

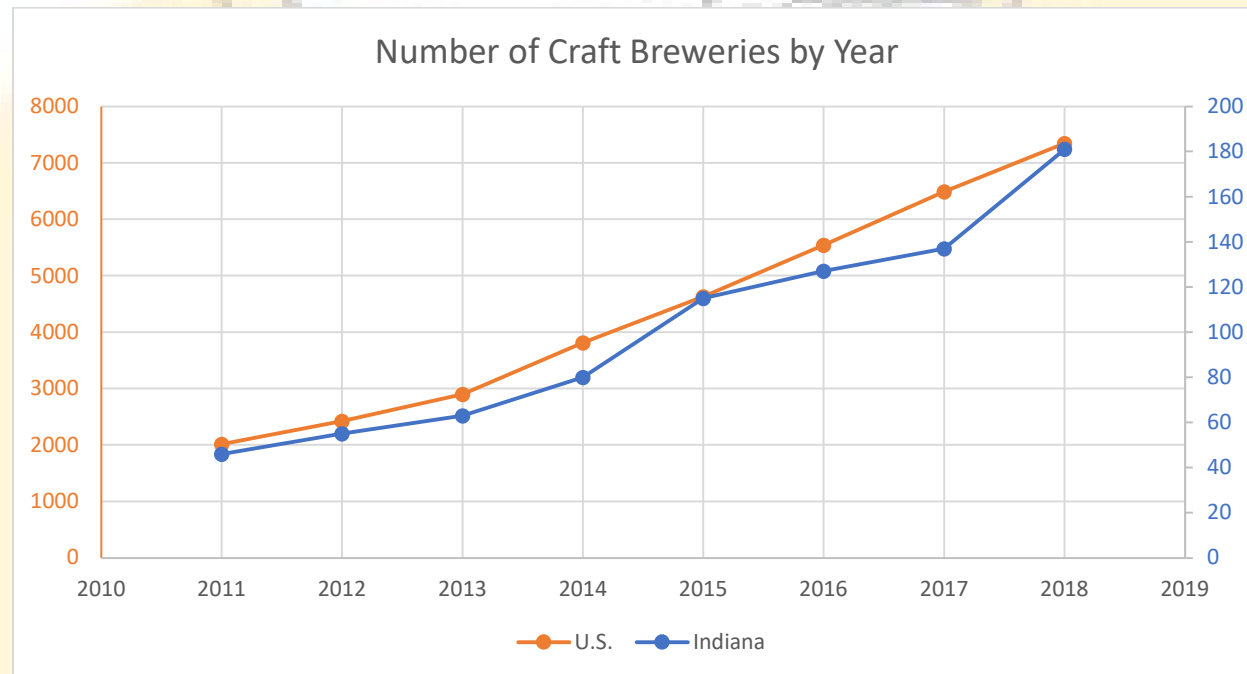
- Craft Brewing Industry
 - o Contributed \$79.1 Billion to the U.S. economy in 2018
- More than 550,000 Jobs

CURRENT STATE OF THE INDUSTRY



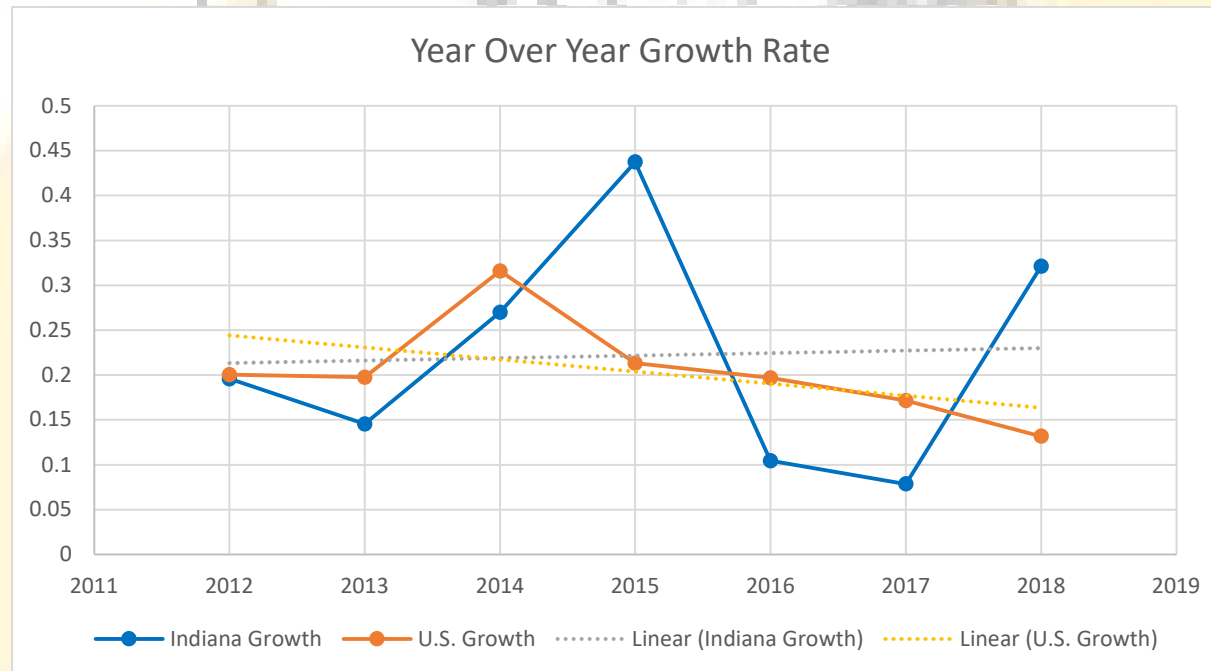
The average state has just under 4 breweries per 100,000 people (age 21+) in the U.S.

INDUSTRY GROWTH



There is still significant growth (nationally and in the state of Indiana).

INDUSTRY GROWTH



Year over year growth is variable,
but in the area of 20%.

ITEMS TO CONSIDER

- Choose a Business Model:
 - Brewpub
 - Microbrewery
 - Contract Brewery
 - Regional Craft Brewery
- Legal Requirements:
 - Federal Laws
 - State Laws
 - Neighboring States' Laws

ITEMS TO CONSIDER

- A Brewery is a Business
- Branding:
 - Upscale Market (High Dollars per Pint)
 - Lower Cost, Higher Volume
- Crunch the Numbers
 - Again, a brewery is a business. You may expect to be losing money for several years

ITEMS TO CONSIDER

- Build Your Brewing Infrastructure
 - Equipment is numerous and expensive.
- Optimize Your Packaging
 - Bottles
 - Cans
 - Kegs
 - What is your target mix?
- Location

LOCATION

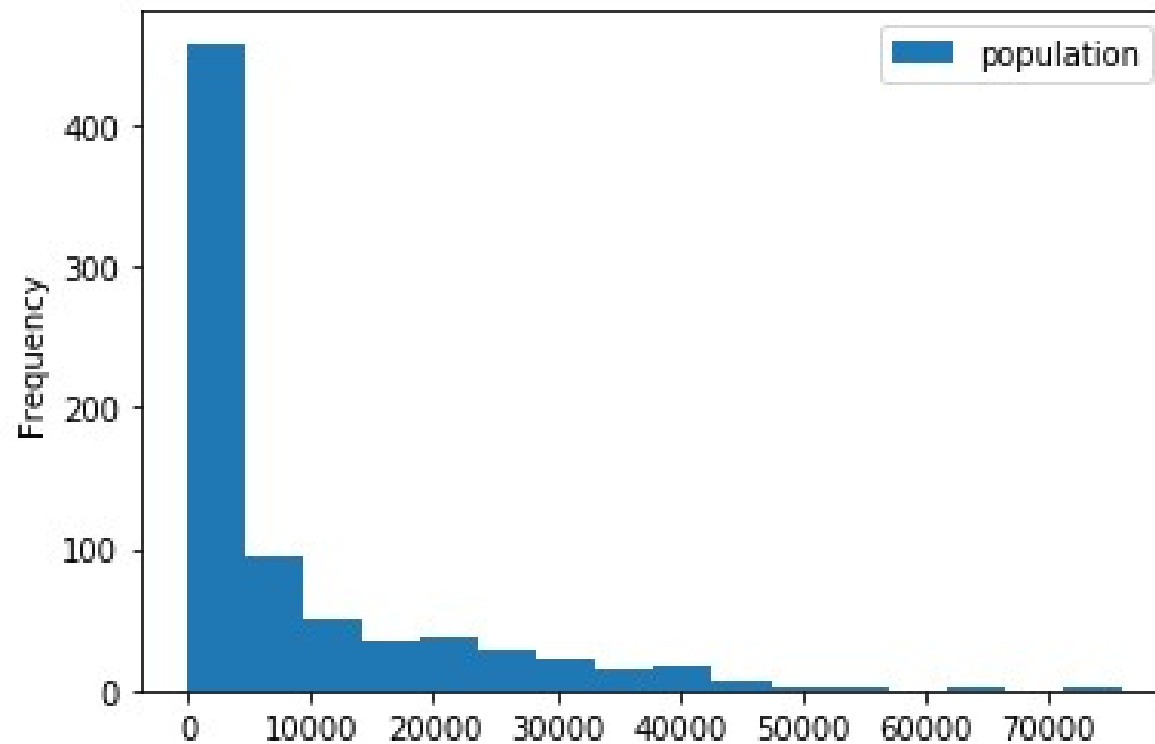
Most brewers begin brewing at home and scale up slowly.

If you are looking to open a brewery in your hometown, then your location is already set.

If looking elsewhere, consider:

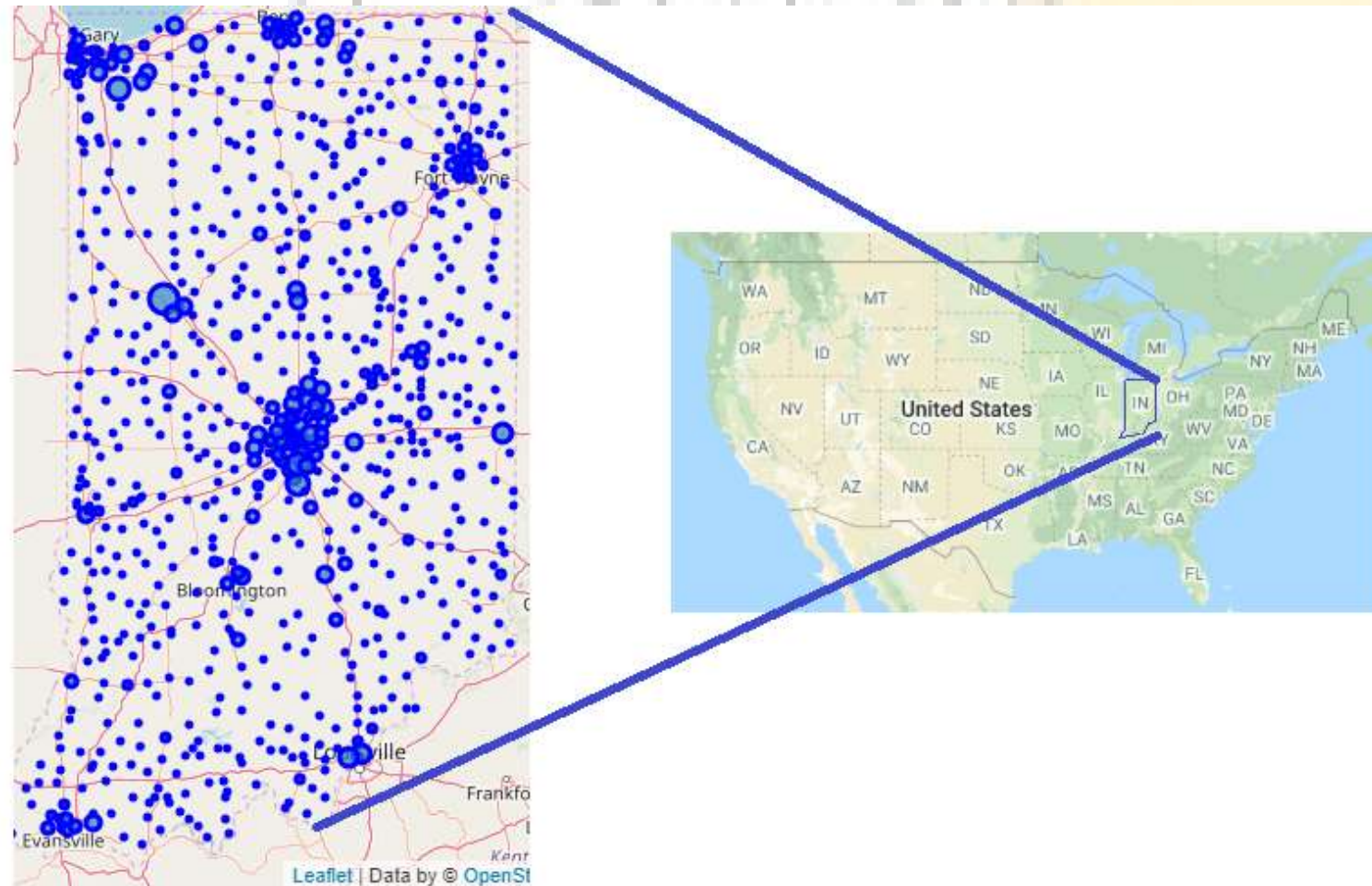
- Potential Market (the Population of an Area)
- Current Venues (Number of Breweries in an Area)

INDIANA POPULATION DISTRUBUTION

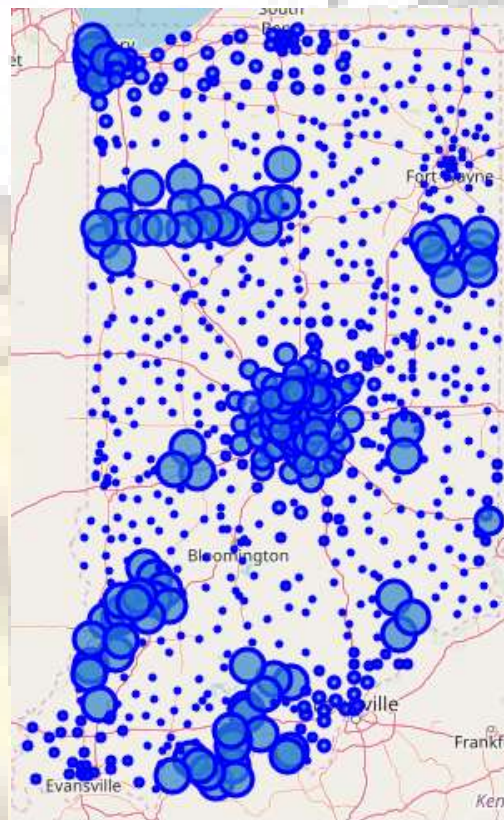


population	
count	775.000000
mean	8564.154839
std	11650.206548
min	0.000000
25%	1060.500000
50%	3142.000000
75%	11408.500000
max	75899.000000

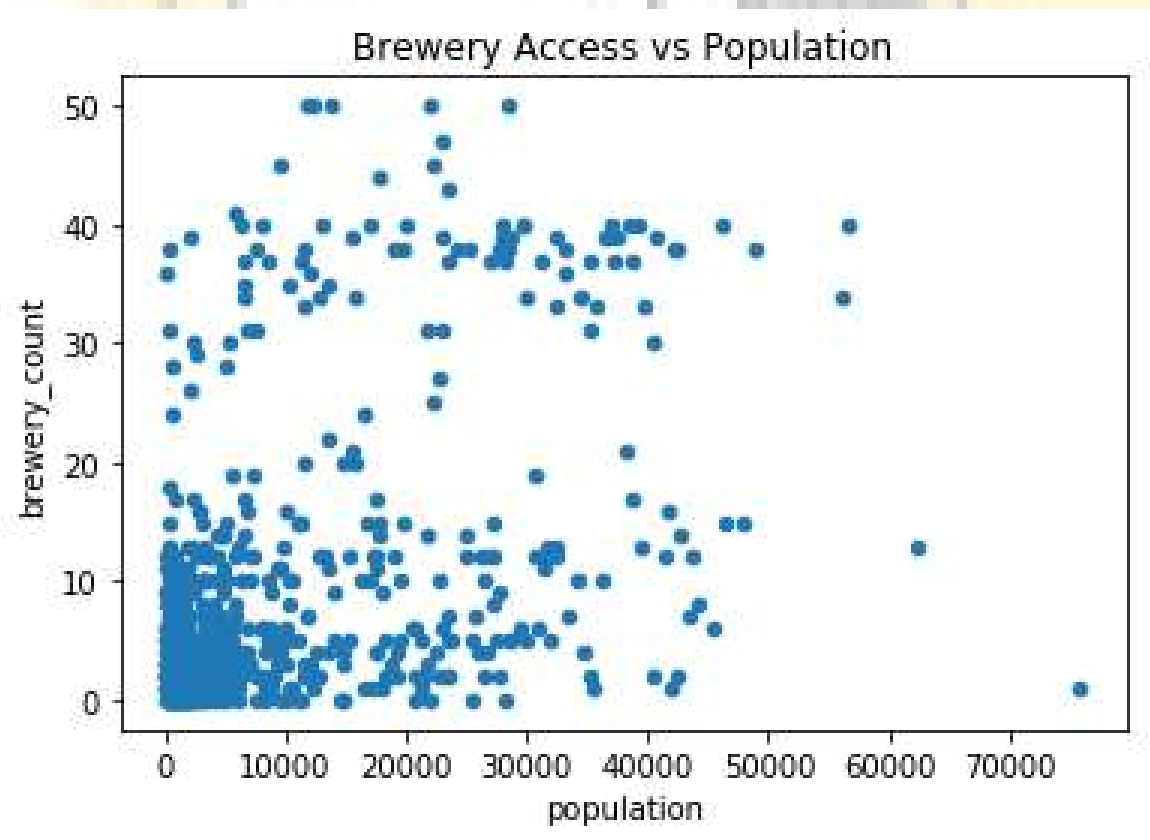
INDIANA POPULATION DISTRUBUTION



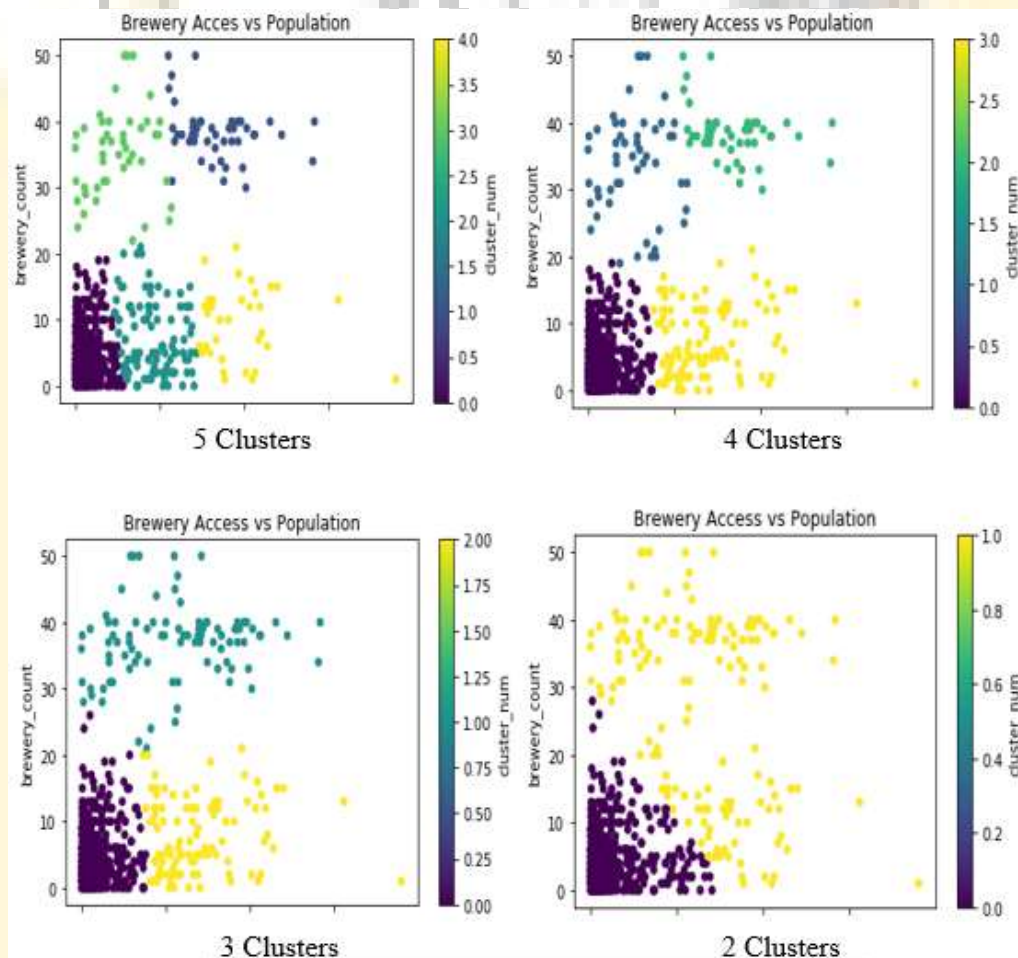
INDIANA BREWERY DISTRUBUTION



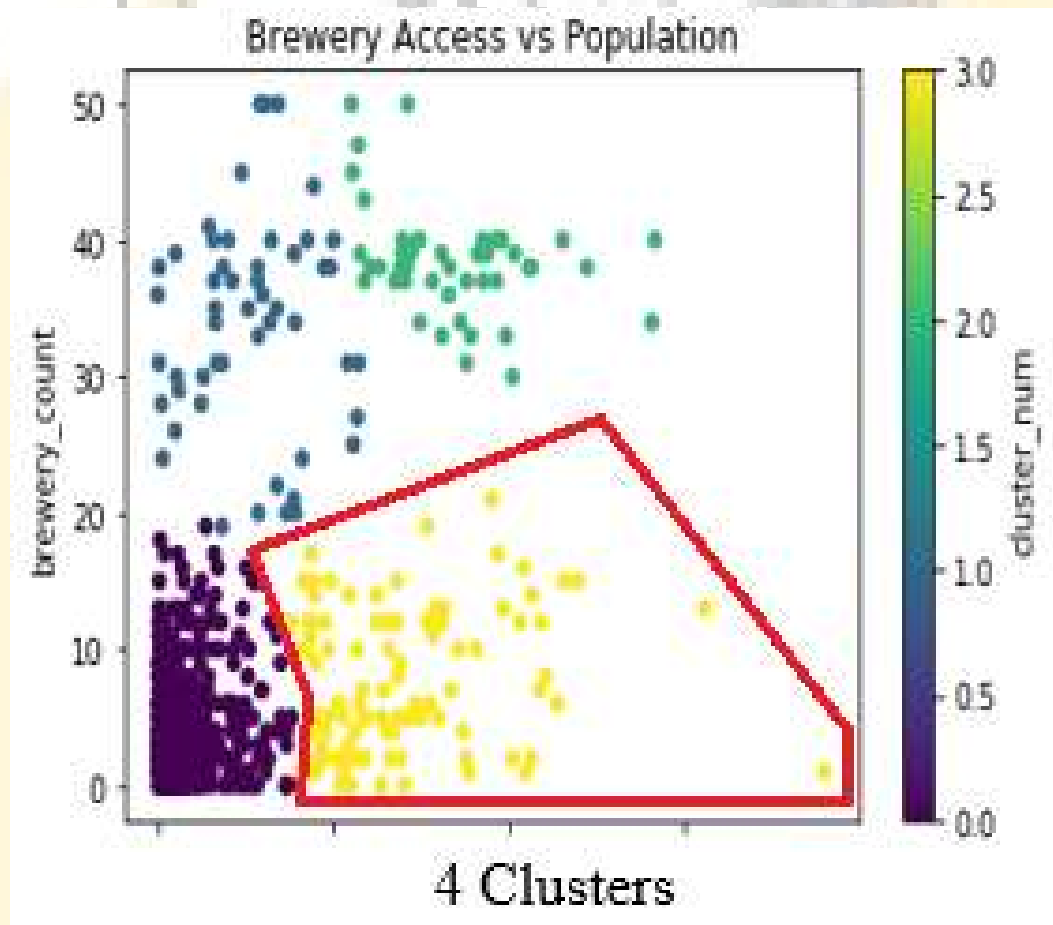
BREWERY AVAILABILITY VS. POPULATION



BREWERY – POPULATION CLUSTER ANALYSIS

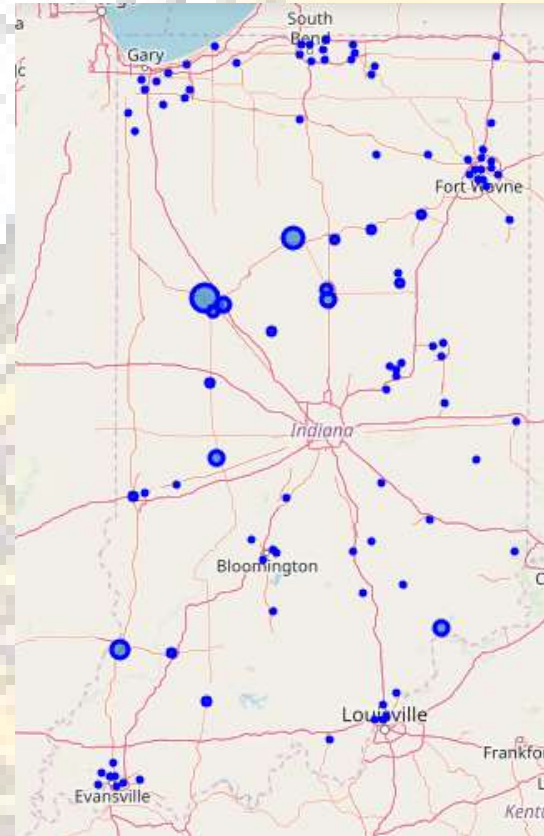


BREWERY – POPULATION CLUSTER ANALYSIS



MAP OF MOST FAVORABLE CLUSTER

Potential locations are spread
wide across the state.
But which is the best?



NARROWING THE RESULTS

Indiana Supports 3.7 Breweries per 100,000 People Age 21+

Indiana is a Growth Market

One State (Vermont) Supports 13.5 Breweries per 100,000

10 Breweries per 100,000 is Reasonable.

BREWERY DEFICIT SCORING SYSTEM

P21: Population Aged 21 plus

= Census Population * 0.75 (estimate)

PBS: Potential Breweries Supported

= Population (21+) / 10,000 (10 per 100,000)

Brewery Count = Number of Breweries found by Foursquare
within the Radius (20 Miles)

Deficit_Corrected = PBS – Brewery Count

In this manner, a “brewery deficit” is calculated, generated from available population, supportable number of breweries, and current number of breweries. Note that this includes also a correction because, as an estimate, 25% of the population is under the age of 21.

RESULTS

- 15 cities (Zip Codes) Resulted in Positive Deficit
- The Top 9 Have a deficit greater than one
- Greater Than 1 is a Good Location for a New Brewery

zipcode	population	address	brewery_count	def_corrected
47906	75899	West Lafayette	1	4.692425
47905	41910	Lafayette	1	2.14325
46947	28125	Logansport	0	2.109375
47591	25416	Vincennes	0	1.9062
46902	35403	Howard County	1	1.655225
47250	21984	Madison	0	1.6488
46135	20800	Greencastle	0	1.56
47909	42532	Norma Jean Addition	2	1.1899
46901	40357	Howard County	2	1.026775
47802	35054	Terre Haute	2	0.62905
47546	21137	Jasper	1	0.585275
47501	18001	Washington	1	0.350075
47904	17225	Eastwitch	1	0.291875
46992	16352	Valley Brook	1	0.2264
47933	27661	Crawfordsville	2	0.074575

DISCUSSION

Deeper Research Shows: Free Datasets are Flawed

But Useful in Narrowing the Field

Simple Searches on Google Maps:
Different Actual Counts of Breweries

Several Top Contenders Eliminated

UPDATED DEFICIT SCORES

zipcode	population	address	brewery _count	original _deficit	actual_ breweries	corrected _deficit
47906	75899	West Lafayette	1	4.6924	3	2.692425
46947	28125	Logansport	0	2.1094	1	1.109375
46901	40357	Howard County	2	1.0268	2	1.026775
47591	25416	Vincennes	0	1.9062	1	0.9062
46902	35403	Howard County	1	1.6552	2	0.655225
46135	20800	Greencastle	0	1.56	1	0.56
47909	42532	Norma Jean Addition	2	1.1899	3	0.1899
47905	41910	Lafayette	1	2.1433	3	0.14325
47250	21984	Madison	0	1.6488	2	-0.3512

UPDATED DEFICIT SCORES

Several Top Choices:

- Same Geographic Area
- Multiple Zip Codes.

West Lafayette, Lafayette, and Norma Jean Addition:

- combined into West Lafayette

Two Howard County entries:

- combined into Kokomo.

UPDATED DEFICIT SCORES

zipcode	population	address	actual_ breweries	corrected _deficit
47906	160341	West Lafayette	3	9.03
46901	75760	Kokomo	2	3.68
46947	28125	Logansport	1	1.11
47591	25416	Vincennes	1	0.91

CONCLUSION

Could be Applied to Other Venue Types

- Seafood Restaurant, Café, Night Club anything in the Foursquare Database.

Location and Search Radius can be Changed

Location is a Key Business Success Factor

A new Brewery Needs a Thirsty Population

Report Yielded a Small Number of Prime Candidates

Will Simplify the Task of Further Research

REFERENCES:

1. <https://www.brewersassociation.org/statistics-and-data/economic-impact-data/#state-impact>
2. <https://www.brewersassociation.org/press-releases/brewers-association-releases-annual-growth-report/>
3. <https://www.crowdspring.com/blog/how-to-start-a-brewery-business/>