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Tippie College of Business

BAIS:6050 Final Project:
Analyzing Iowa's Liquor Retail Environment

Group 1: Ben Ahnen, Michael Gerot, Ethan Hahn, Blake McClung, Dylan Sambrano

November 16, 2020

Executive Summary

Introduction to Problem and Dataset

- *Description of problem, scope, key questions, and data used*

E-R Diagram and Relational Schema

- *Conceptual data relationships, data base structure, and normalization*

Data Analysis – SQL and Tableau

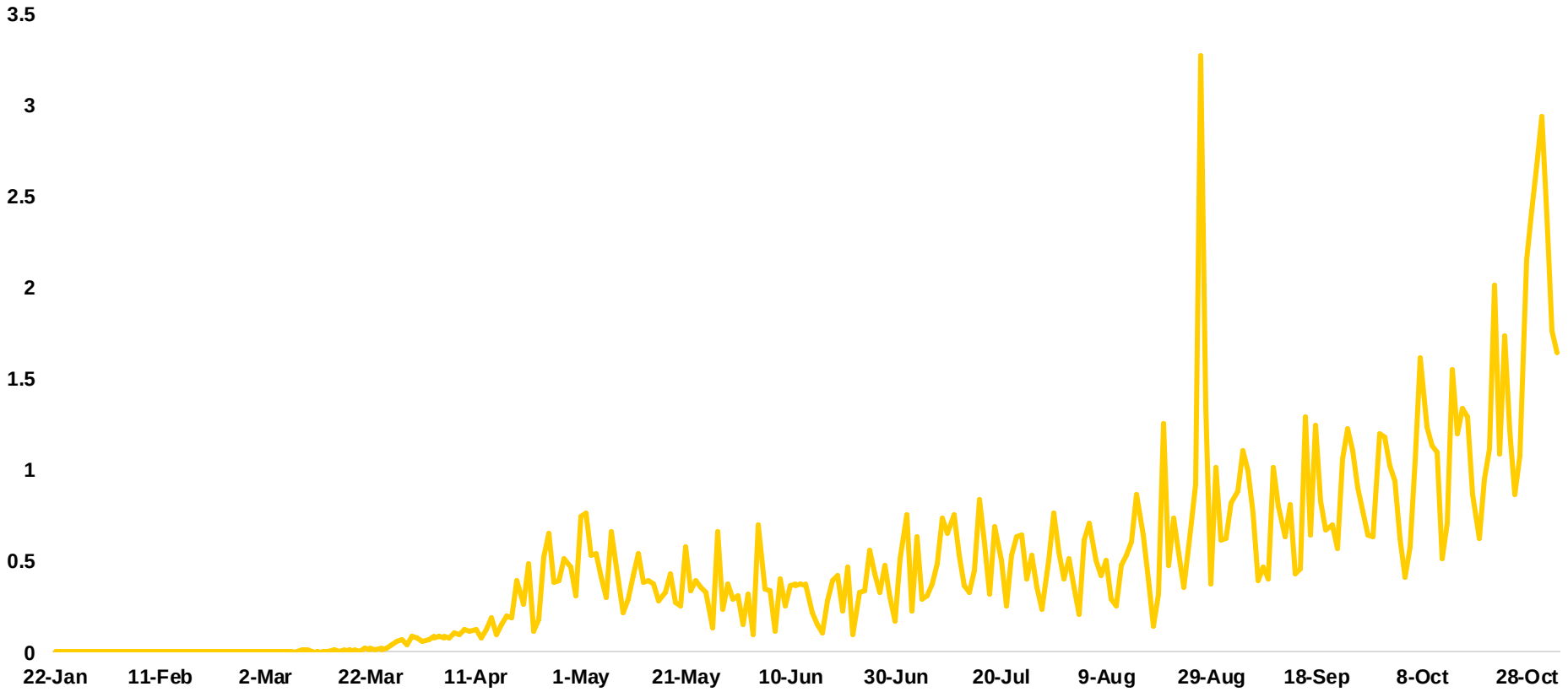
- *Sample queries and visualizations to answer our questions*

Key Findings

- *Main takeaways and usefulness of analysis*

Introduction to Problem and Dataset

COVID-19 New Cases to Date



Source: Center for Disease Control (CDC) Note: All case data presented in thousands

COVID-19 Impact on Liquor Market

Rapid Increase in Sales during Pandemic

- Nielsen study finds 38.6% increase in retail liquor sales compared to last year

Shifting Consumer Trends in Alcohol Purchases

- Less comfortable going out to bars and crowded restaurants in foreseeable future
- Nielsen found 441% increase in online liquor purchases (fastest growing sector)
- Iowa recently legalized to-go alcohol sales

Rapidly changing liquor sales environment presents an opportunity for entrepreneurs

- Must understand current dynamics before entering the market
- We narrowed our scope to Iowa as a more specific market opportunity

Key Questions

<u>Goal:</u> Understand the dynamics of Iowa's liquor retail market and consumer preferences

1. What is the size and make-up of Iowa's current liquor retail market?
2. Who are the largest liquor vendors in the state by sales?
3. Which retailers have the strongest market position?
4. Which liquor products are the most popular?
5. Which regions purchase the most liquor?

Background on Data Set

- Our team utilized the “Iowa Liquor Sales” data set collected by the Iowa Alcoholic Beverages Division (data.iowa.gov)

- This source included the last two years of vendor invoice data for the individual transactions of all Class E Liquor Licenses in the State of Iowa
  - Approximately 4 million records in the database

- Our data consisted of the following information regarding alcohol purchases:
  - Location of sale
  - Stores and vendors involved in the transaction
  - Product descriptions and categories
  - Sale quantity, containers per package, and volume of containers

Based on these entities and relevant business rules, we transformed our data set into an E-R model.

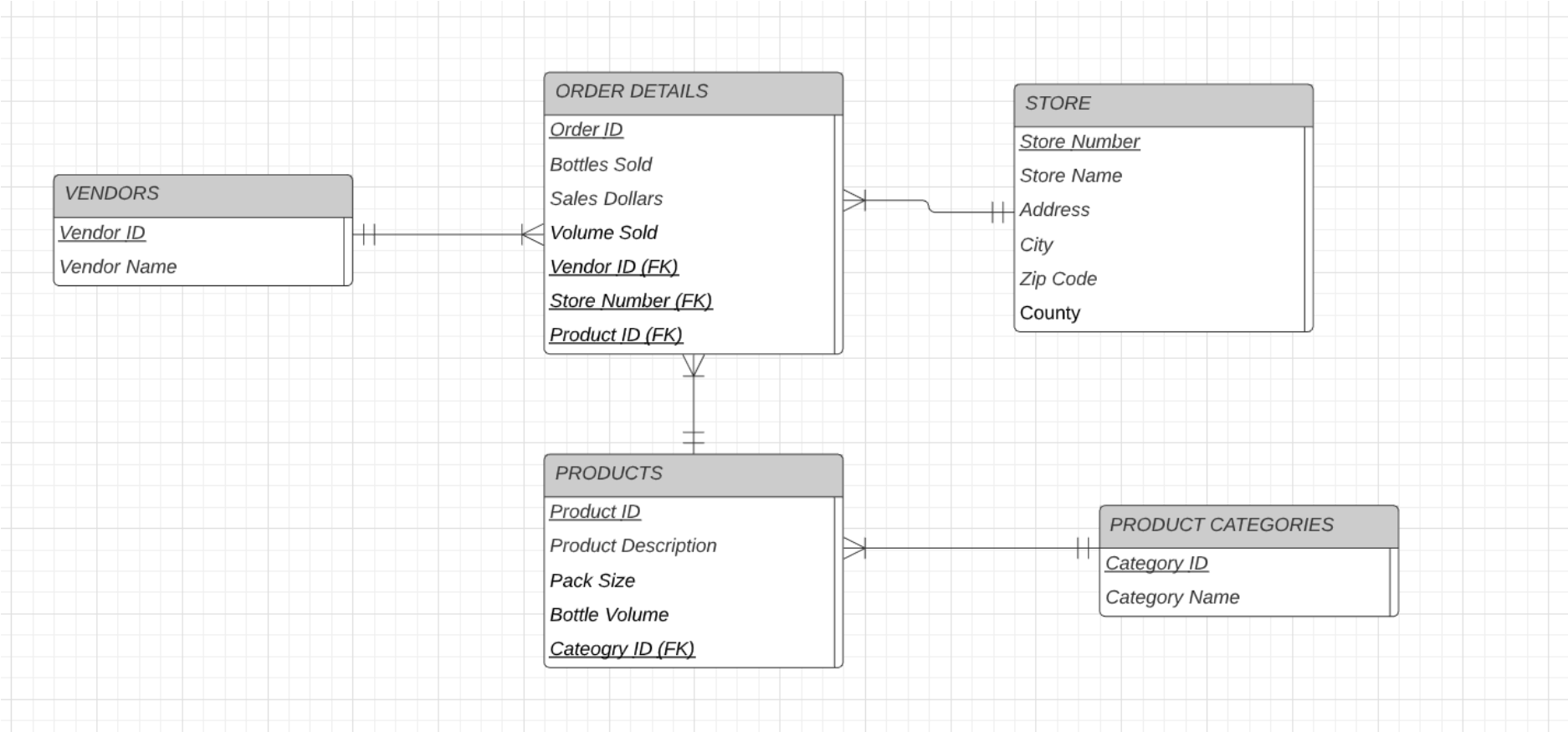
E-R Diagram and Relational Schema

E-R Diagram

When creating our E-R Diagram, we made the following changes to the data to create a well-structured conceptual model.

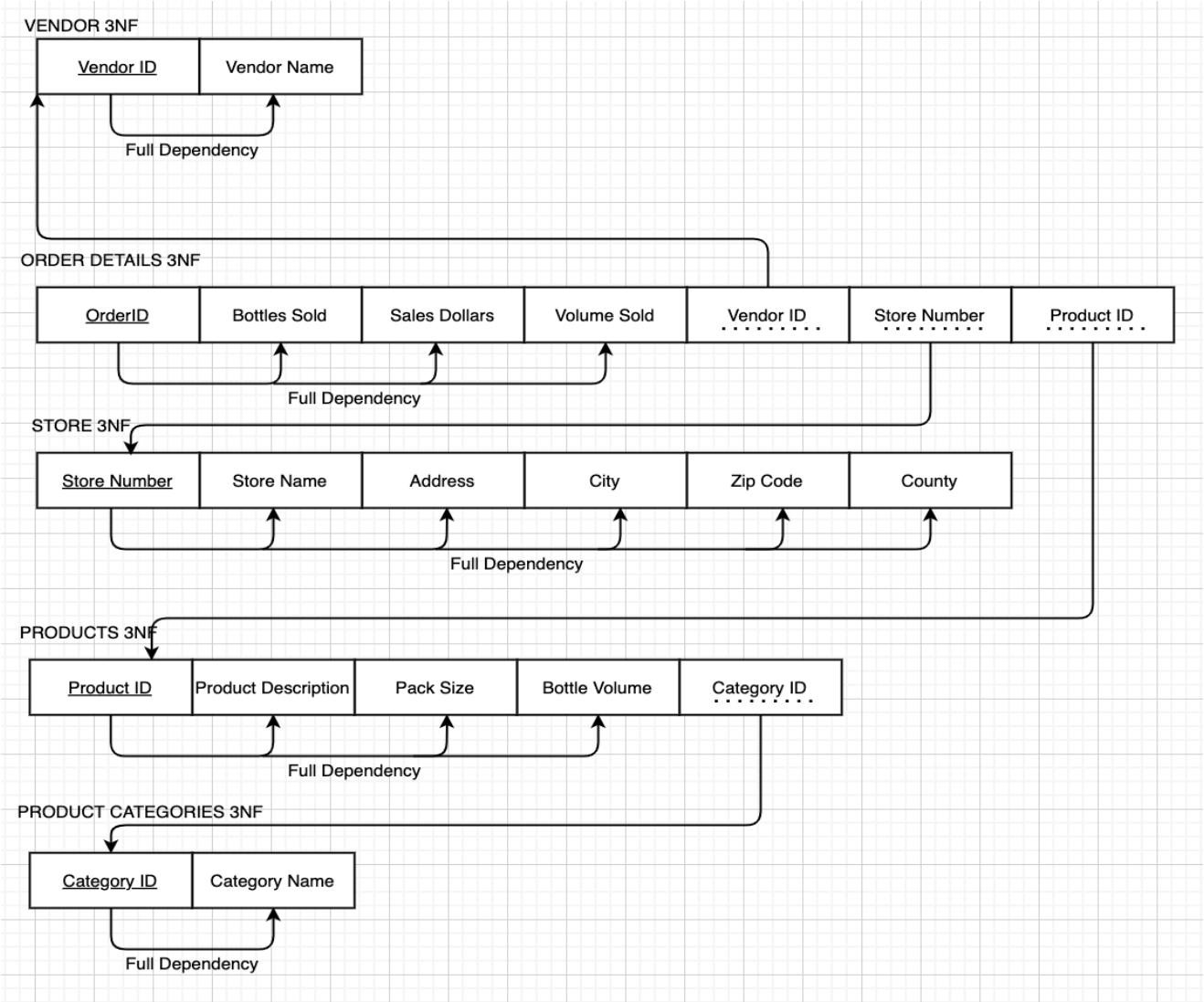
- Added surrogate primary key to Order Details table to create unique identifier for all purchases
- Removed all partial and transitive dependencies, normalizing data to third normal form (3NF)

E-R Diagram



Note: Foreign Keys denoted by an underline and (FK) following field name

Relational Schema – Graphical Representation



Data Analysis – SQL and Tableau

1) Size and make-up of Iowa liquor market?

First, we queried of the data to count the main entities and to determine the size and competitive landscape of the market over the past two years

	STATISTIC	MEMO
1	Total Bottles	6666937
2	Total Sales	86415304.75
3	Total Volume	5735350.44

```
Select 'Total Sales' as Statistic, Sum(Sales_Dollars) as Memo
From Order_Details
UNION
Select 'Total Bottles' as Statistic, Sum(Bottles_Sold) as Memo
From Order_Details
UNION
Select 'Total Volume' as Statistic, Sum(Volume_Sold) as Memo
From Order_Details
```

2) Who are the largest liquor vendors in the state?

Then, we analyzed the different vendors in our data. We identified which vendors had the most orders and largest amount of sales.

	VENDOR_NAME	TRANSACTIONS	SUM(SALES_DOLLARS)	SUM(BOTTLES_SOLD)
1	DIAGEO AMERICAS	99355	18222305.14	987470
2	Jim Beam Brands	56048	6689675	467639
3	LUXCO INC	49188	4425061	555370
4	SAZERAC COMPANY INC	45407	7128217.75	855954
5	CONSTELLATION BRANDS INC	37573	5400068.53	545023
6	PERNOD RICARD USA	35734	6291062.43	356339
7	SAZERAC NORTH AMERICA	28870	2856771.35	373058
8	Heaven Hill Brands	26389	2327786.21	208693
9	BACARDI USA INC	24291	3331870.18	193839
10	PROXIMO	22553	2979472.78	199796

```
Select Vendor_Name, Count(Distinct Order_ID) as Transactions, Sum(Sales
_Dollars), Sum(Bottles_Sold)
From Vendor v, Order_Details o
Where v.Vendor_ID = o.Vendor_ID
Group By Vendor_Name
Order by 2 DESC
```

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3) Which retailers have the strongest market position?

Next, we analyzed the stores in our dataset. We determined which stores generated the most sales on a total and per order basis.

	STORE_NAME	TRANSACTIONS	SUM(SALES_DOLLARS)	SUM(BOTTLES_SOLD)
1	Hy-Vee #3 / BDI / Des Moines	5215	2746632.71	158900
2	Central City 2	4557	2986311.2	168587
3	Central City Liquor, Inc.	4121	507052.81	34777
4	Hy-Vee Wine and Spirits / Iowa City	3932	1434187.54	97659
5	Hy-Vee Wine and Spirits / Bettendorf	3857	517852.74	35831
6	Hy-Vee #4 / WDM	3388	562709.68	34512
7	Hy-Vee Food Store / Coralville	3345	688682.86	42645
8	Hy-Vee Food Store #1 / Ames	3265	413381.11	28276
9	Benz Distributing	3116	893588.35	49969
10	Hy-Vee Food Store / Cedar Falls	3008	268773.61	17117

```
Select Store_Name, Count(Distinct Order_ID) as Transactions, Sum(Sales_
Dollars), Sum(Bottles_Sold)
From Store s, Order_Details o
Where s.Store_Number = o.Store_Number
Group By Store_Name
Order by 2 DESC
```

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3) Which retailers have the strongest market position?

Additionally, we drilled down into our data to evaluate branches of specific large retailers that we identified.

	STORE_NAME	TRANSACTIONS	SUM(SALES_DOLLARS)	SUM(BOTTLES_SOLD)
1	Hy-Vee #3 / BDI / Des Moines	5215	2746632.71	158900
2	Hy-Vee Wine and Spirits / Iowa City	3932	1434187.54	97659
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5	Hy-Vee Food Store / Coralville	3345	688682.86	42645
6	Hy-Vee Food Store #1 / Ames	3265	413381.11	28276
7	Hy-Vee Food Store / Cedar Falls	3008	268773.61	17117
8	Hy-Vee Wine & Spirits #2 / Davenport	2987	699754.59	42688
9	Hy-Vee Food Store / Muscatine	2844	256456.35	16783
10	Hy-Vee #1044 / Burlington	2841	393591.08	26122

```
Select Store_Name, Count(Distinct Order_ID) as Transactions, Sum(Sales_
Dollars), Sum(Bottles_Sold)
From Store s, Order_Details o
Where s.Store_Number = o.Store_Number
AND Store_Name LIKE '%Hy-Vee%'
Group By Store_Name
Order by 2 DESC
```

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4) Which liquor products are the most popular?

We queried the data's products to determine the categories and types of products that generated the highest amount of sales.

	PRODUCT_DESCRIPTION	TRANSACTIONS	SUM(SALES_DOLLARS)	SUM(BOTTLES_SOLD)
1	Titos Handmade Vodka	11825	4429026.84	230591
2	Black Velvet	17304	3338496.88	322708
3	Crown Royal	8326	2806258.23	111034
4	Jack Daniels Old #7 Black Label	7602	2644939.44	103632
5	Captain Morgan Spiced Rum	7603	2537329.68	148090
6	Hennessy VS	7035	1819947.47	101762
7	Jameson	4199	1664348.68	61673
8	Crown Royal Regal Apple	6563	1635439.07	75814
9	Hawkeye Vodka	15036	1548721.21	236705
10	Fireball Cinnamon Whiskey	6490	1485404.79	109458

```
Select Product_Description, Count(Distinct Order_ID) as Transactions,
Sum(Sales_Dollars), Sum(Bottles_Sold)
From Order_Details o, Product p
Where p.Product_ID = o.Product_ID
Group by Product_Description
Order By 3 DESC
```

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4) Which liquor products are the most popular?

We queried the data's products to determine the categories and types of products that generated the highest amount of sales

	CATEGORY_NAME	SUM(SALES_DOLLARS)
1	100% Agave Tequila	2844599.04
2	Mixto Tequila	2043188.71

```
Select Category_Name, sum(Sales_Dollars)
From Order_Details o, Product p, Product_Categories c
Where p.Product_ID = o.Product_ID
AND p.Category_ID = c.Category_ID
AND Category_Name like '%TequiIa%'
Group By Category_Name
```

5) Which regions purchase the most liquor?

Finally, we determined which cities lead alcohol sales within the state per dollar and per volume.

	CITY	TRANSACTIONS	SUM(SALES_DOLLARS)	SUM(BOTTLES_SOLD)
1	Des Moines	52507	11084121.46	876327
2	Cedar Rapids	34497	4668046.68	396559
3	Davenport	29064	4982648.38	428860
4	Council Bluffs	20074	3184273.31	258012
5	Sioux City	19367	3074332.7	239022
6	Waterloo	18741	2885868.48	255747
7	West Des Moines	18486	3358565.07	218402
8	Ames	15428	2218574.42	151568
9	Iowa City	13966	2397592.04	178215
10	Dubuque	13960	2020829.54	152071

```
Select City, Count(Distinct Order_ID) as Transactions, Sum(Sales_Dollar
s), Sum(Bottles_Sold)
From Store s, Order_Details o
Where s.Store_Number = o.Store_Number
Group By City
Order by 2 DESC
```

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Key Findings

Conclusions & Takeaways

- Organizations compete based on volume or price – important to identify competitive strategy
- Strong relationship between sales and number of products offered
- Weak relationship between sales and vendors
- Urban areas of state lead in sales; opportunity to enter a less concentrated market in other areas of state outside of Des Moines
- Heavy corporate influence in some cities and less concentrated in other; identify markets with less corporate influence

Sources:

- https://data.cdc.gov/Case-Surveillance/United-States-COVID-19-Cases-and-Deaths-by-State-o/9mfq-cb36/data
- http://med.stanford.edu/psychiatry/about/covid19/anx.html
- https://www.thedrinksbusiness.com/2020/05/may-us-alcohol-sales-rise-at-highest-rate-since-lockdown-peak/