BI TOOLS: POWER BI & TABLEAU

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1.0. Section B – Comparison of Tools

1.1. Question 1

When it comes to Business Intelligence (BI) solutions, there are several benefits and limitations in Tableau, as well as Power BI. Nonetheless, the determining factors for providing an organisation with a Business Intelligence solution include the attributes and demands of the organisation's niche, type of staff and what they require, and the customer segmentation that it satisfies. The major focus should be on the most suitable BI solution for the organisation, and the ways the solution can be best applied to resolve its problems should decide which tool to apply; it should not focus on the pros and cons of the solutions only (Wesley et al., 2011).

Currently, Power BI is usually referred to as the new Microsoft Excel upgrade, but with more features than it and other features being consistently added to it. Tableau is the current leader in the BI industry today; having the highest number of users, and it is also referred to as the most superior of the BI tools (Weirich et al., 2018). Currently, Tableau's most powerful contender rival is Power BI; which is also striving to become the number one BI tool in the market. Even though the two BI tools are widely held options, the features of the solutions they provide vary. The dataset utilized in this analysis are already given in an Excel sheet; it was downloaded from the data.gov website https://catalog.data.gov/dataset/county-level-data-sets.

1.1.1. Features of the BI Tools

There are several features that are unique in Tableau and Power BI. However, one major difference of Power BI when compared to Tableau is when dataset is being loaded. When loading the dataset into Power BI, it allows the user to edit the dataset (see figure 1), this is not the case with Tableau; it does not support editing the dataset while loading, it only allows the user to filter the data during visualisation (see figure 2). On the other hand, Tableau assists the data analyst to load more than one dataset and perform a union to integrate the dataset (see figure 2), however, the Power BI does not support union of more than one dataset.
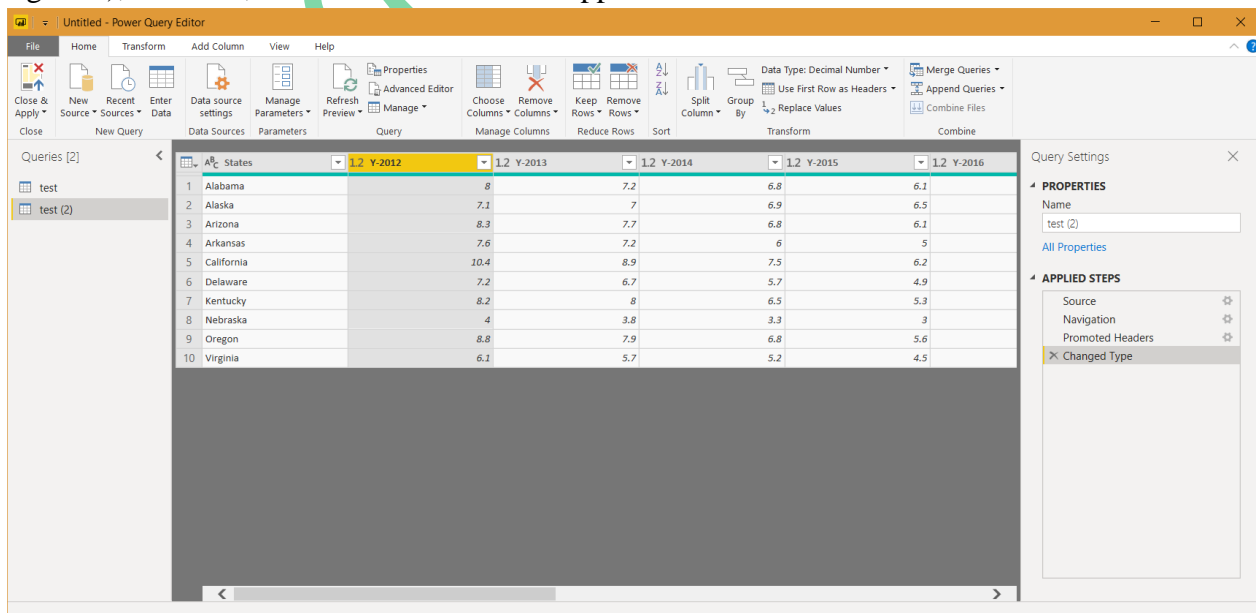

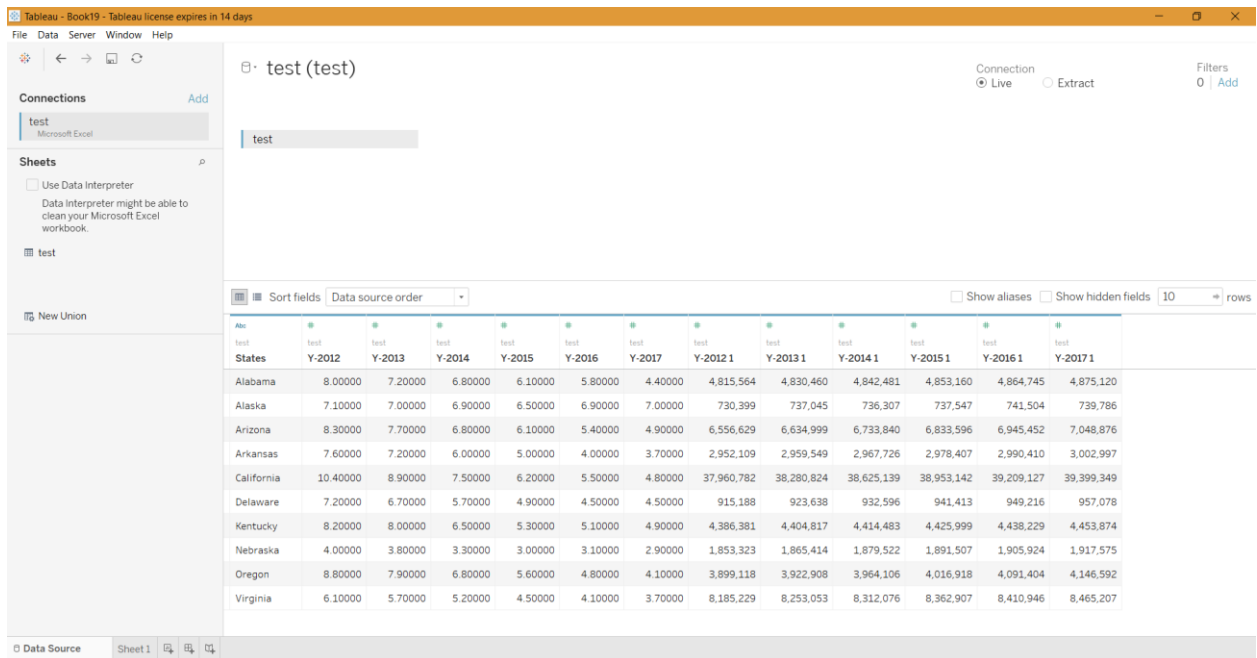*Figure 1: Power BI can edit the dataset while loading them*

Figure 2: Tableau can load more than one dataset and merge them

1.1.2. Visualisations using the BI tools

Tableau: Baseline visualisations such as line charts, heat maps, scatter plots, as well as twenty-one other types, can be created using this solution. Its user-friendly interface allows users to develop advanced and complex visualisations. Also, users have the opportunity to use an infinite number of data points in their analysis.

Power BI: It simplifies the process of uploading datasets. Users are provided with several visualisation options that they can select as a model. Subsequently, from the sidebar, the user can input data into the visualisation. Also, users can use natural languages to ask questions using Cortana personal digital assistant with Power BI Online when creating visualisations. This tool drills down at most 3,500 data points into datasets when analysing.

Conclusion: Business managers can use both Tableau and Power BI to create advanced visualisations that aid the identification of models, minimise costs, make processes faster, as well as ensuring agreements. Nevertheless, Tableau has the edge over Power BI, in that, it makes it possible for its users to make maximum use of any number of data points to carry out an analysis.

The summary of the visualisation tools available in Power BI and Tableau are provided in the table below:

Visualisation	Power BI	Tableau
Stacked bar chart	✓	✓
Stacked column chart	✓	✓
Clustered bar chart	✓	✓
Clustered column chart	✓	✓
100% Stacked bar chart	✓	✓
100% Stacked column chart	✓	✓
Line Graph	✓	✓
Stacked Area Graph	✓	✓

Area Graph	✓	✓
Ribbon chart	✓	X
Waterfall chart	✓	X
Scatter chart	✓	X
Pie chart	✓	✓
Donut chart	✓	X
Treemap	✓	✓
map	X	✓
Filtered Map	✓	✓
Funnel	✓	X
Gauge	✓	X
Card	✓	X
Multi-row card	✓	X
KPI	✓	X
Scaler	✓	X
Table	✓	✓
Matrix	✓	X
R script	✓	X
Python Script	✓	X
Heat map	X	✓
Circle view	X	✓
Side by side bars	X	✓
Packed bubbles	X	✓
Bullet graphs	X	✓
Gantt view	X	✓
Box and whisker plot	X	✓
Histogram	X	✓
Highlight tables	X	✓

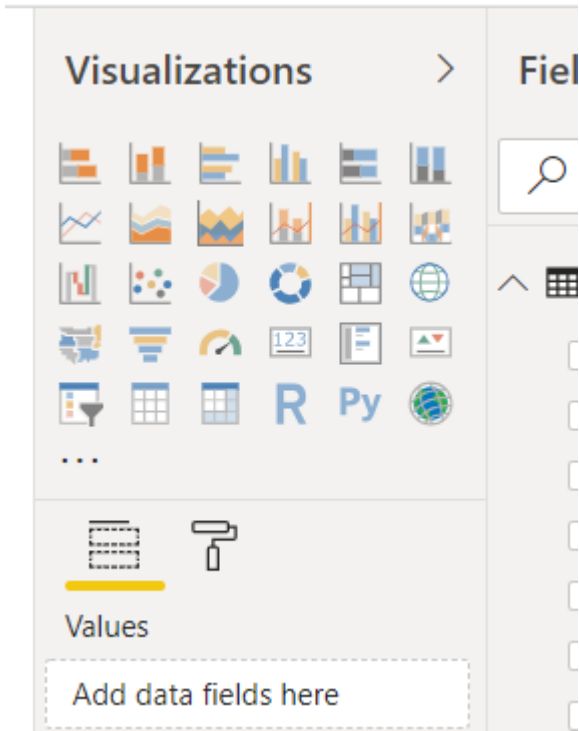The list of all the visualisation options available in the Power Bi and Tableau is provided in figure 3 and 4.
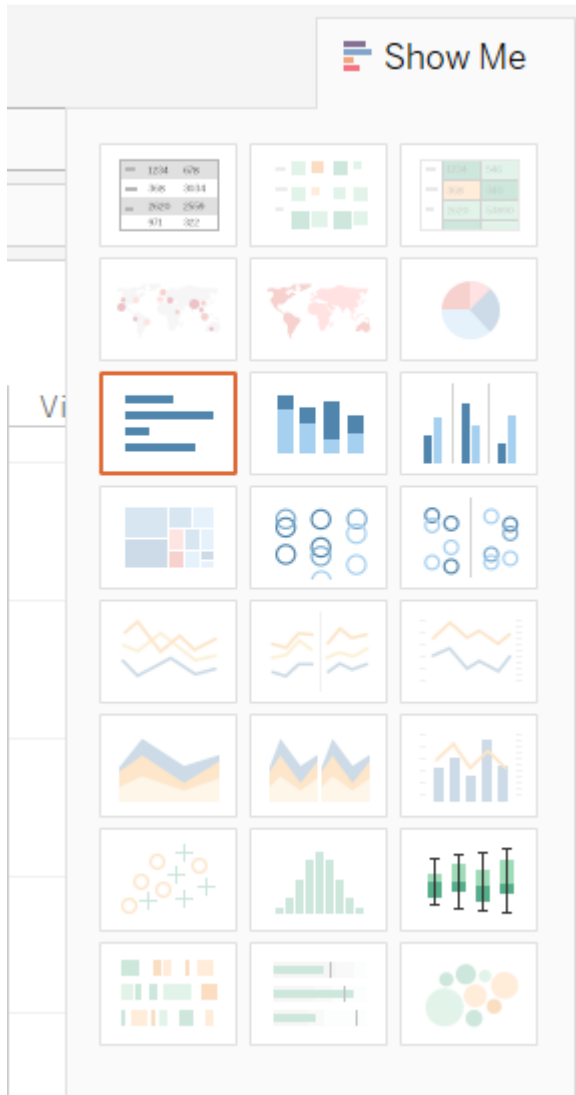
Figure 3: Power BI visualisation options

Figure 4: Tableau visualisation options

1.1.3. Data Sources

Tableau: It supports several data connectors, which includes cloud options, big data options (such as Hadoop, NoSQL) and online analytical processing (OLAP). Tableau determines the relationships of the data that users add from several sources automatically. Besides, based on the preferences of the organisation, users can modify or create data links manually.

Power BI: It can be connected to users' external sources such as JSON, SAP HANA, MySQL, among others. Power BI determines the relationships of data that users add from several sources automatically. Moreover, with it, users can connect to files, third-party databases, Microsoft Azure databases, as well as online services, including Google Analytics, and Salesforce.

Conclusion: Even though it is possible for users to use both Tableau and Power BI to connect to several data sources when it comes to connecting to a separate data warehouse, Tableau is better since Power BI majorly focuses on integrating with Microsoft products such as its Azure cloud platform.

1.1.4. Customer Support

Tableau: Its support can be accessed directly via email, phone, and logging into the customer portal to submit a support ticket. Further, it provides a wide range of database that is classified

based on their subscription groups such as Desktop, Online, as well as Server. It customises support resources based on the users' software version, which includes getting started, proven methods, as well as ways of using the top features of the platform maximally. The tool also allows users to access the Tableau community forum, as well as attend training and other events.

Power BI: Only registered users (free and paid) with Power BI account can access the Customer support functionality. Even though in the system, the submission of a support ticket can be made by every user, nonetheless, only paid users gets faster support. The tool provides robust support resources and documentation, which includes a user community forum, guided learning, as well as samples containing ways in which partners use the platform.

Conclusion: The direct contact of customer support options is more comprehensive in Tableau; it has an edge in this regards. Even though both platforms provide extensive digital resources for self-service customers, the support available to free Power BI users is limited, except you are a paid user.

1.1.5. Summary of Discussion

The data points that users can integrate into their analysis in Tableau is unlimited. Also, the use of the platform provides users with a wide-ranging support option. Tableau offers major advantages in the three aspects described above.

1.2. Question 2

Three different types of visualisations were used to compare Power BI and Tableau.

1.2.1. Pie chart visualisation

The pie chart visualisation in Tableau provides the unemployment rate for each state where else, Power BI does not provide it. Tableau visualisation is easier in comparison to Power BI when identifying ratios for slightly different values. However, Power BI is suitable for quickly identifying the states in the pie chart because the Power BI legend uses the state names as seen below.
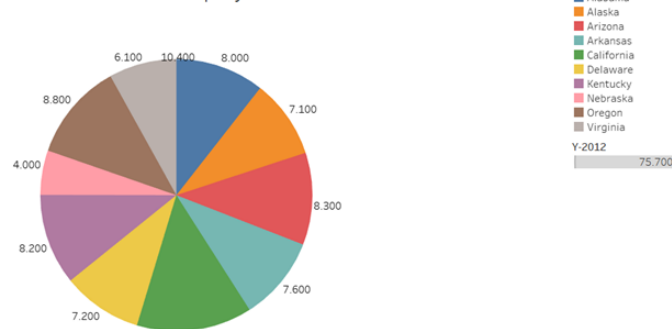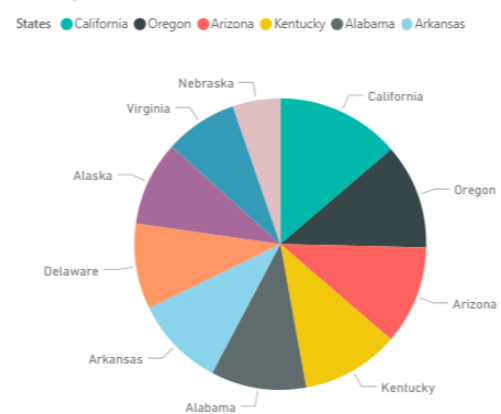

Tableau Pie Chart   Power BI Pie chart

1.2.2. Bar chart

The bar chart generated from Tableau and Power BI are almost the same. However, Tableau allows the data analyst to sort the states in the X-axis in alphabetical order which is missing in Power BI.
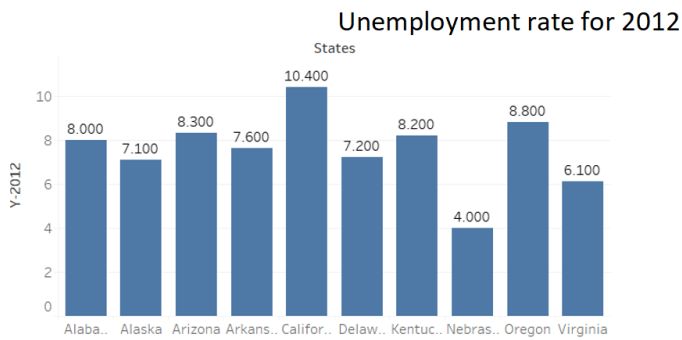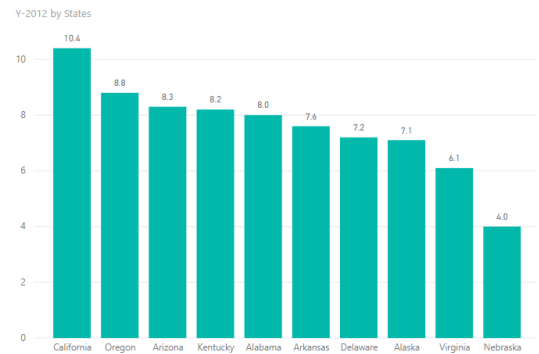
Tableau Bar chart | Power BI Bar chart

1.2.3. Treemap

The Treemap in Tableau provides a colour range (usually between 2 major colours) to indicate the unemployment rate where else, in Power BI different colours were used to identify the blocks. Also, the actual numeric value is can be easily seen in Tableau with the colour range indicative of how close the values are to each other. Therefore, it is easier to relatively compare the values in Tableau generated Treemap than that of Power BI.
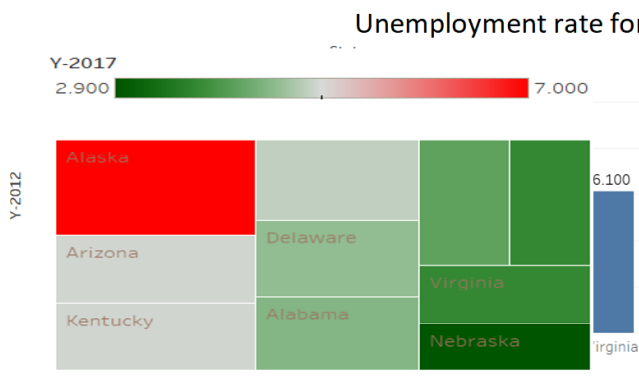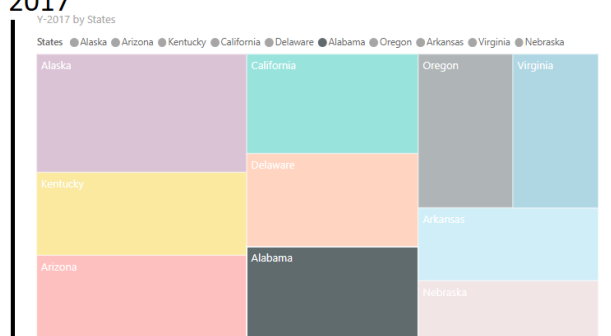

Tableau Treemap | Power BI Treemap

2.0. Section C – Graph Type for Tableau

2.1. Question 1

Tableau support multiple graphs to assist the analyst in visualising the dataset. The graph type is selected according to the dataset values. Therefore, for the dataset downloaded from the data.gov website, Pie Chart, Horizontal Bar Chart, Vertical Bar Chart, Highlight Table, Treemaps, Packed Bubbles and Line graph were selected.

2.1.1. Pie chart

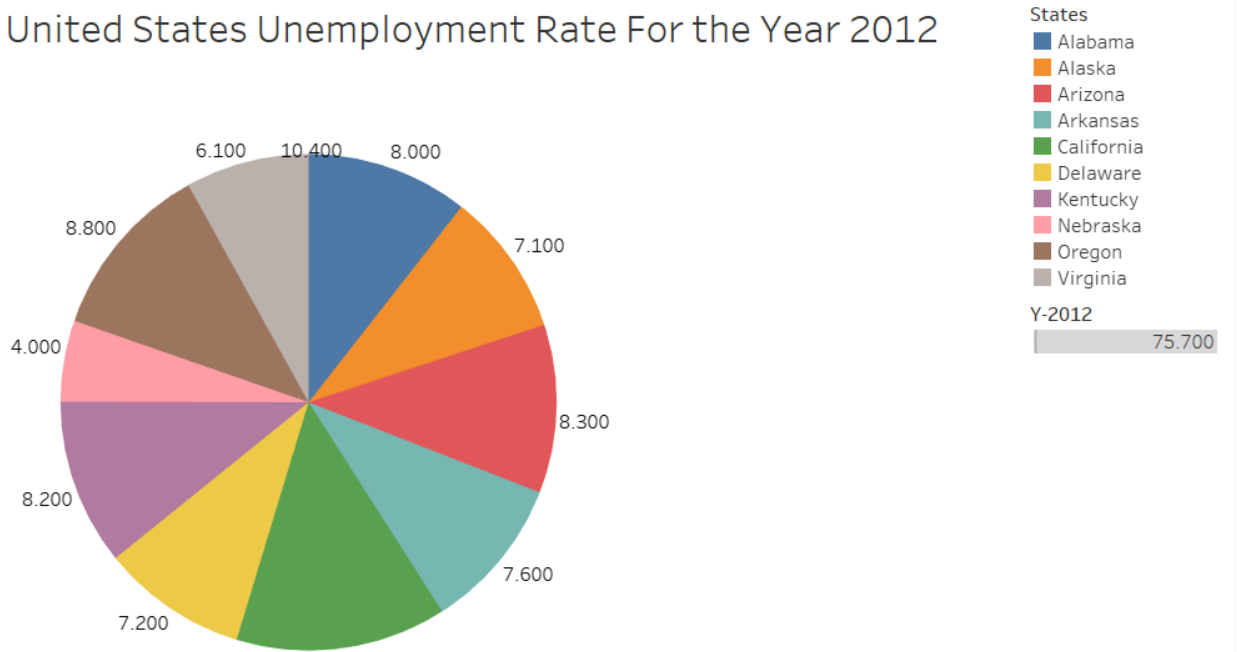## United States Unemployment Rate For the Year 2012

Figure 5: Pie chart

The above figure is a pie chart that represents the states in different colours so that the user can identify the differences. However, the labels at the edges are required to identify the difference in the actual values especially when they are almost the same. Pie chart is suitable for data that has wide differences.
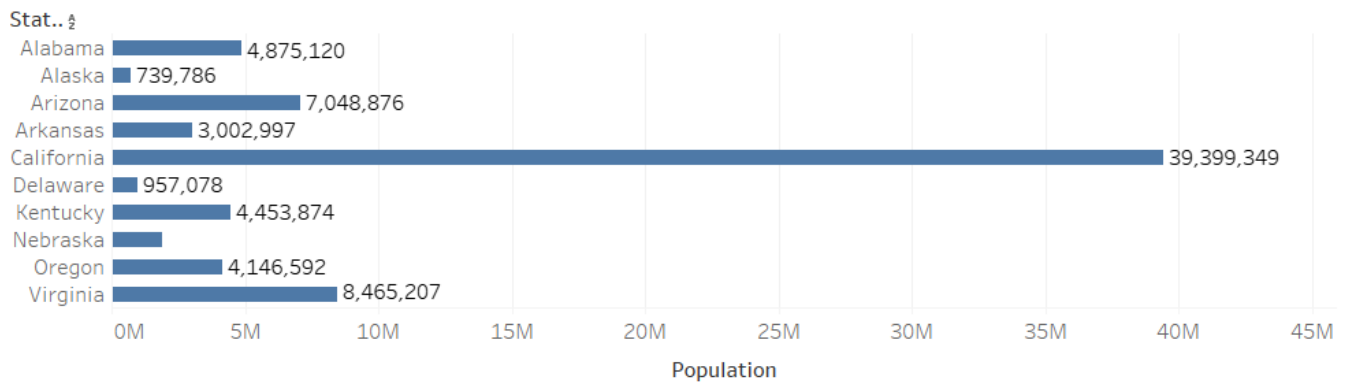
2.1.2. Horizontal bar chart

Figure 6: Horizontal bar chart

The figure above represents a horizontal bar chart of the population of the United States in 2017. The tip of each horizontal bar has numeric values representing the actual quantity of each bar in-case the bar is of similar height. A horizontal bar chart compares things in different groups which in this case is the population in different states in the United States. It is used instead of a vertical bar chart when one or more of the bars is too long to be displayed in a vertical chart e.g. the California bar in the figure above.

2.1.3. Vertical bar chart
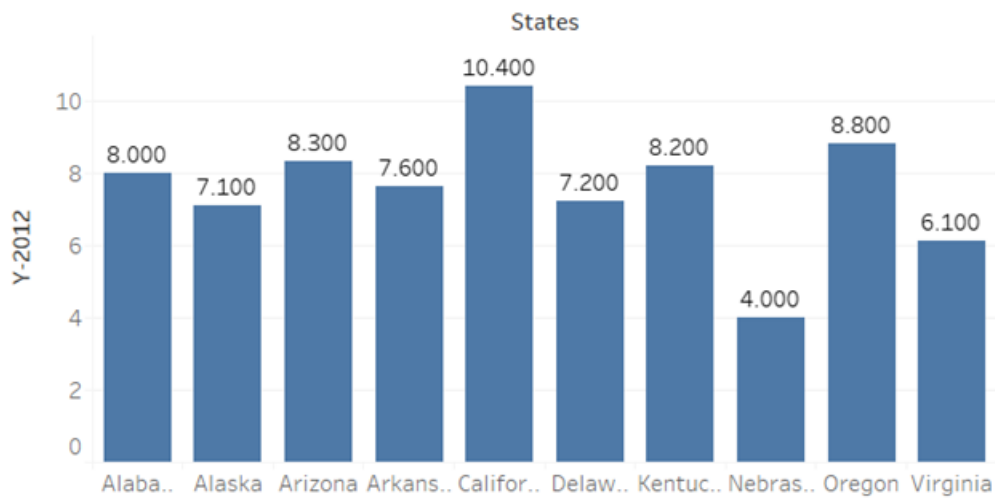
Unemployment Rate 2012 US states

Figure 7: Vertical bar chart

The figure above represents a vertical bar chart of the unemployment rate of the United States from 2012 to 2017. The tip of each vertical bar has numeric values representing the actual quantity of each bar in-case the bar is of similar height. A bar chart compares things in different groups or changes over a period of time which in the figure above is the unemployment rate between 2012 and 2017.

2.1.4. Highlight table

Population of United States for the Year 2017

Y-2017

2.900 ▮ 7.000

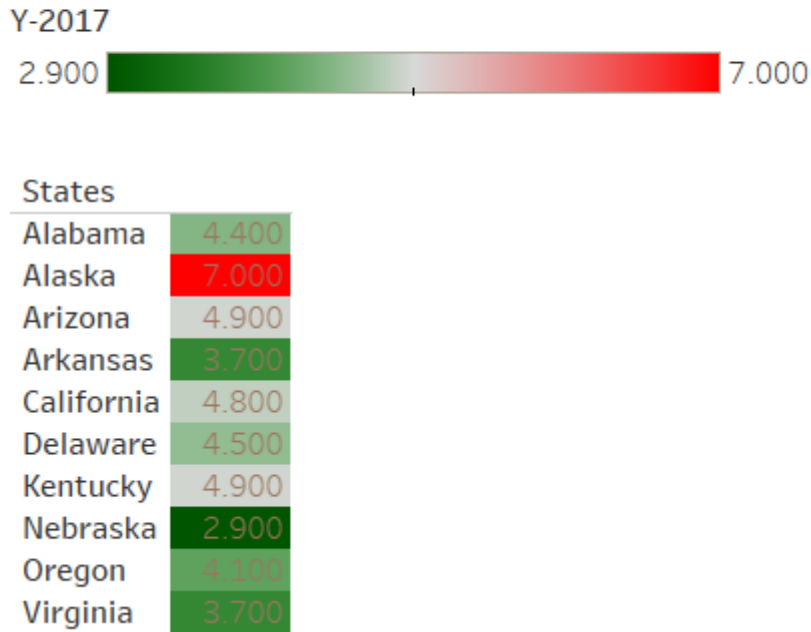| States	
Alabama	4.400
Alaska	7.000
Arizona	4.900
Arkansas	3.700
California	4.800
Delaware	4.500
Kentucky	4.900
Nebraska	2.900
Oregon	4.100
Virginia	3.700

Figure 8: Highlight table

The figure above represents the population of the United States in 2017. This is useful to compare information that fall within the same category and vice-versa. It displays the values also to indicate the actual values for values that are too close to tell. From figure 8 above, it is clear that Alaska belongs in a different category (7000) while California and Kentucky belong to a similar category with values of 4800 and 4900 respectively.
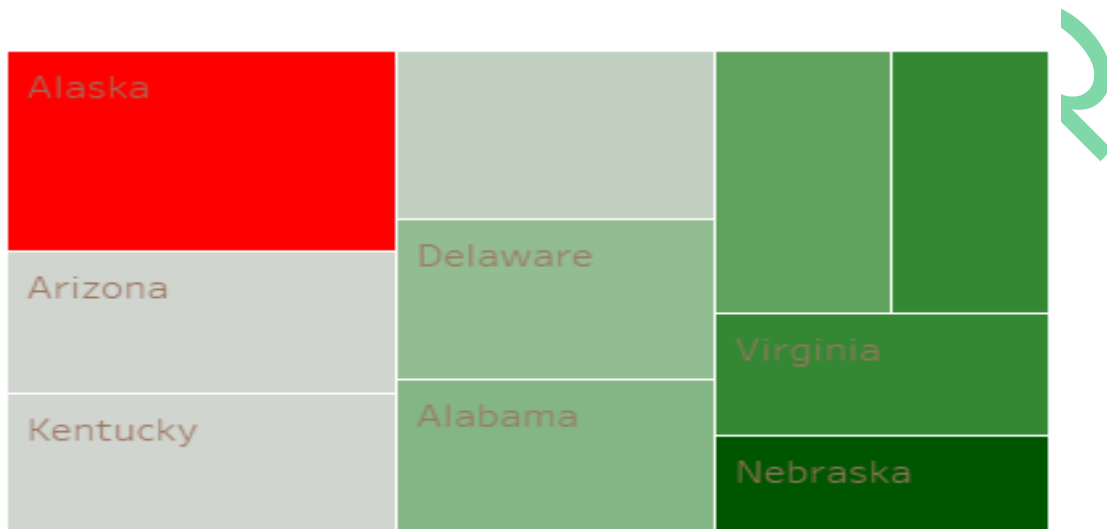
2.1.5. Tree maps

Figure 9: Tree maps

The figure above represents the unemployment rate in the United States in 2017. Treemaps displays data via nested rectangles. It is useful in showing the visual differences in sizes of different data using the rectangle size as well as how close the values are to each other by the various colour coding just like a Highlight table. E.g. Alaska has the biggest population hence the biggest rectangle and a different colour while Arizona and Kentucky have the same value hence the same rectangular size and colour. Tree map is useful in showing quantity-wise relationship without using actual figures.
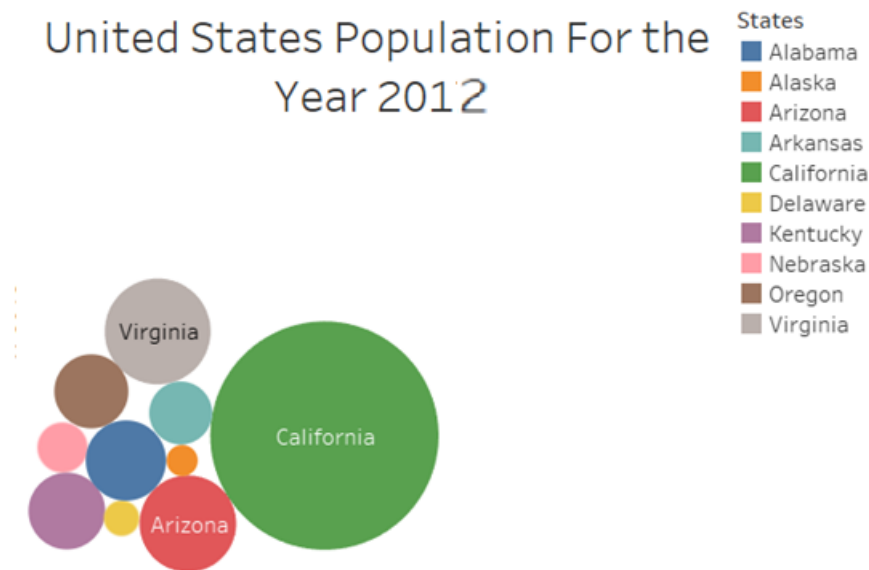
2.1.6. Packed bubbles

Figure 10: Packed bubbles

The above figure represents the population size of the United States in 2012. Packed bubbles have some resemblance to the Tree maps, however, the size of each category of data is represented by the radius of the circle. The larger the radius, the bigger the population and vice versa. In this scenario California has the highest population size followed by Arizona. Packed bubbles are useful in showing quantity-wise relationship without using actual figures.
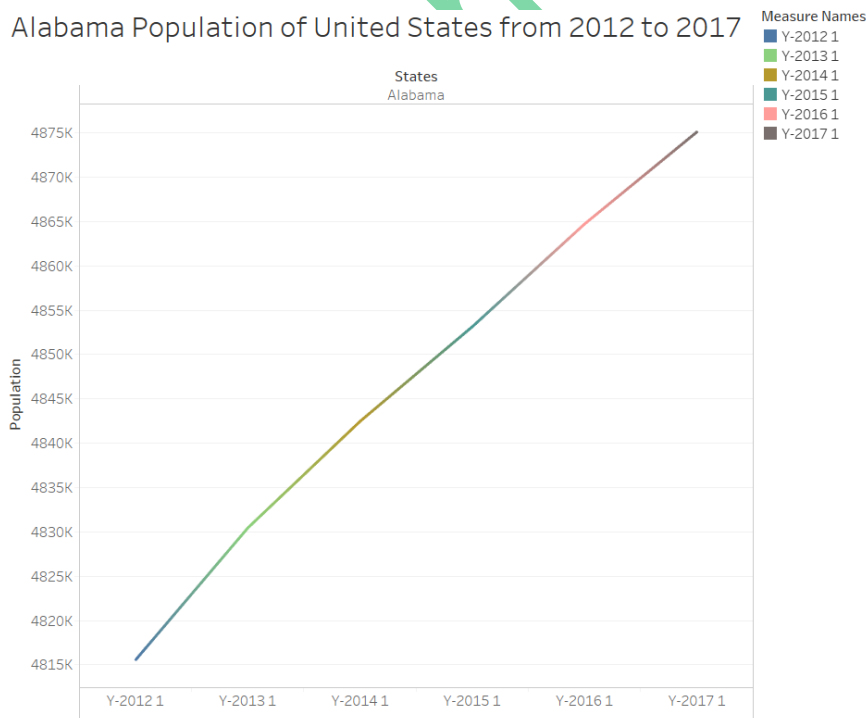
2.1.7. Line graph

Figure 11: line graph

The above figure represents the population size of the United States between the year 2012-2017. A line chart is useful for forecasting and detecting trends over a time period. In the figure above, the population of the United States is seen to increase yearly so one can safely predict that it will continue to increase yearly.

2.2.   Question 2 – Story Telling Dashboard

The story is to study the relationship between the population and the unemployment rate for some of the states in US which are Alabama, Alaska, Arizona, Arkansas, California, Delaware, Kentucky, Nebraska, Oregon and Virginia. The dataset was downloaded from the following link:

https://catalog.data.gov/dataset/county-level-data-sets

The story was created using Tableau Dashboard. There are two major dashboards that demonstrates the dataset.

2.2.1. Dashboard 1
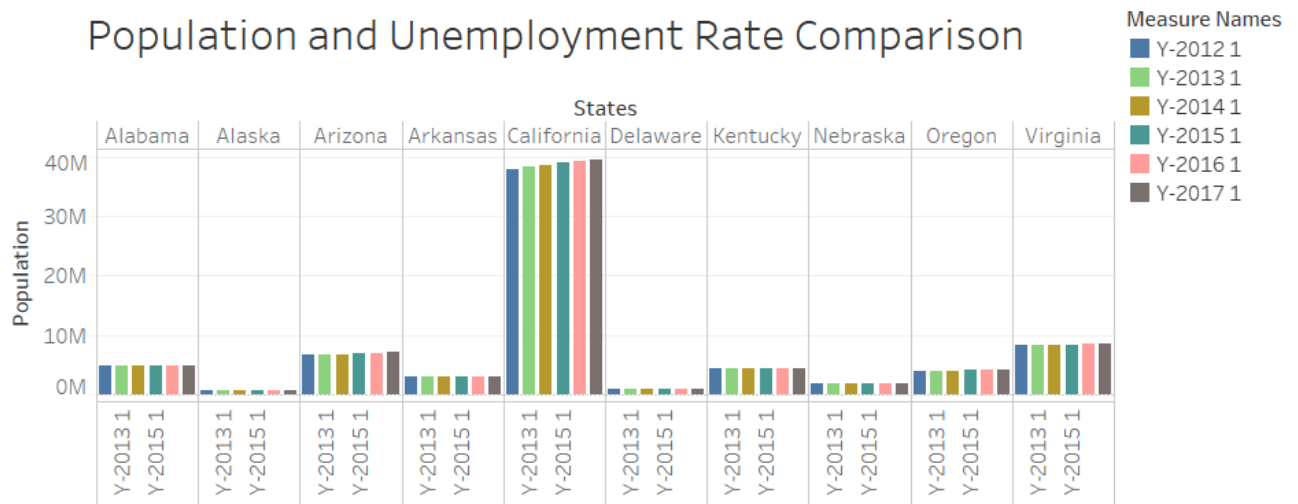
The above graph indicates the population growth of selected US states from the year 2012 to 2017. From the graph it is idenitfied that California has a drastic increased followed by Arizona. However, increase in the other states are very small which reflects in the graph as almost straight line
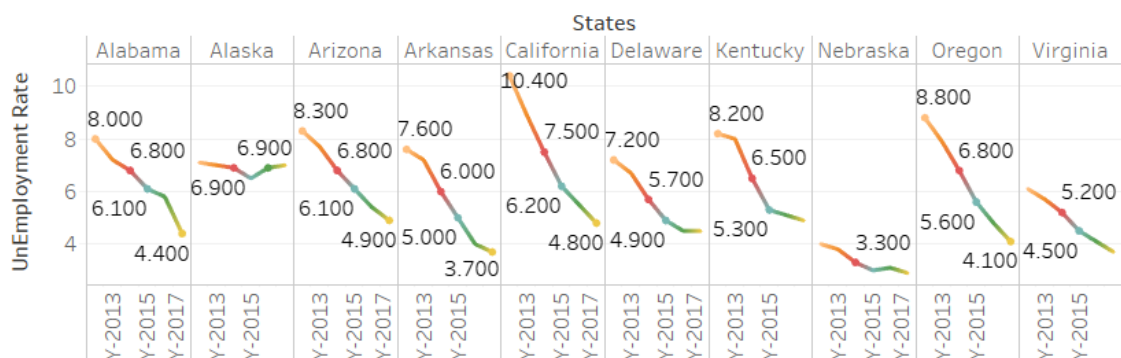
The above graph indicates the unemployment rate of selected US states from the year 2012 to 2017. From the graph it is idenitical that the unemployment rate was decreasing drasstically for all the states except for Alaska

Figure 12: Dashboard 1

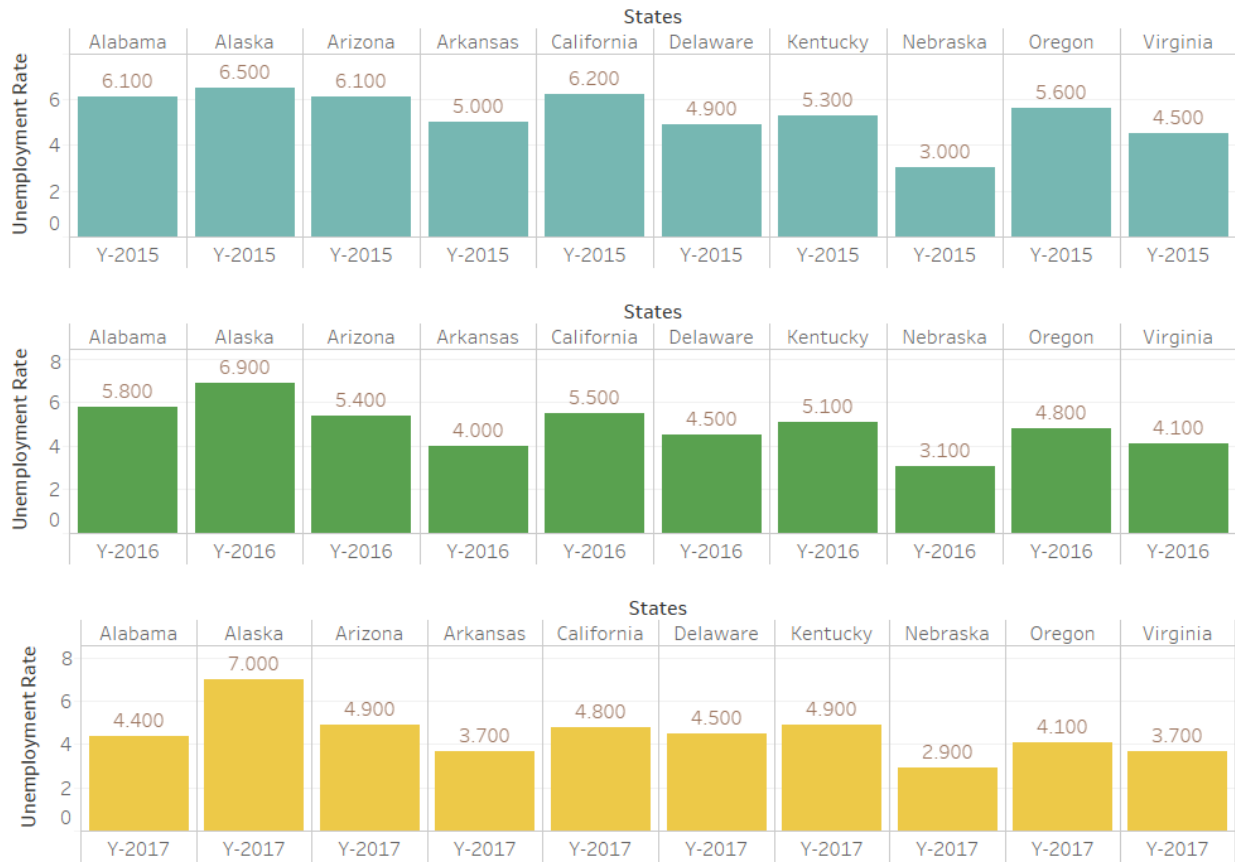# United States Unemployment For the Years 2015, 2016 and 2017..

Figure 13: Dashboard 2

References

Weirich, T.R., Tschakert, N. and Kozlowski, S., 2018. Teaching Data Analytics Skills in Auditing Classes Using Tableau. *Journal of Emerging Technologies in Accounting*, *15*(2), pp.137-150.

Wesley, R., Eldridge, M. and Terlecki, P.T., 2011, June. An analytic data engine for visualization in tableau. In *Proceedings of the 2011 ACM SIGMOD International Conference on Management of data* (pp. 1185-1194). ACM.