32558 Business Intelligence

Assignment 2: BI Implementation

Task 1: Choose a data set and describe what you want to explore from it (insights). (word limit range/guideline: 200 - 300).

The previous Business Intelligence Analysis report was formulated on the topic supply chain management but for this Business Intelligence (BI) Implementation report I have chosen an interesting data set of the American multinational retail corporation that operates a chain of hypermarkets, discount department stores, and grocery stores namely Walmart Inc(Wikipedia contributors 2018). to gain insights about the retail industry as one of my current work experience is in the hospitality and retail industry where I work as a customer service assistant in Sydney Cricket Ground and Allianz Stadium at Delaware North.

The Walmart dataset consists of historical sales data for anonymous 45 Walmart stores located in different regions from 2nd May 2010 to 11th January 2012(Thaler 2014). I have extracted this data set from Kaggle.

I would like to explore this Walmart data set to find how other attributes play an essential role on sales of the Walmart Inc and how can we improve their sales. The other interesting attributes provided in this dataset which I will explore are holiday, temperature, fuel price and unemployability rate.

Task 2: Describe what problem would be solved from the insight. (word limit range/guideline: 100 - 200).

As I mentioned earlier in the previous section, I would like to solve the problem of improving the sales of Walmart Inc. by analysing the impact on the Walmart's sale from different attributes provided in the data set namely holiday, temperature, fuel price and unemployability rate. Even though 'Walmart Inc. is the world's largest company by revenue earning over US$500 billion and falls in Fortune Global 500 list'(Wikipedia contributors 2018), by solving this problem, we can also bring an optimising change also in the operations and supply chain management of Walmart Inc by creating knowledge from the following visualised insights further provided in this report.

Task 3: Provide data descriptions or data dictionary (word limit range/guideline: 100 - 200).

The file used for creating insights of the Walmart's sale data through visualisation is named train.csv which contains the following fields(Thaler 2014):

Store: It includes the store number in numeric integer value from 1 to 45.

Dept: It contains the department number in numeric integer value from 1 to 98.

Date: It contains the date in the date format DD/MM/YY. Each date corresponds to a week.

Weekly_Sales: It consists of sales for the given department in the given store in US Dollar in float data type.

IsHoliday: It contains "FALSE" And "TRUE" for satisfying the condition whether the week is a special holiday week or not in Boolean data value type.

Temperature: It consists of average temperature in the region in float or number (decimal) data type.

Fuel_Price: It contains the cost of the fuel in the region in float data type value.

Unemployment: It contains the unemployment rate in float value data type.

Task 4: Find out what other data set(s) can be integrated to create insights and explain why it would be good to combine them (word limit range/guideline: 100 - 200).

The data set consisting of the 45 anonymous store locations and the location's weather dataset from data.gov can be integrated with the current dataset to refine the created insights because the location of the stores can help us know which store number represents which locations and their sales patterns to compare with different locations. Whereas the weather dataset of the location can provide a holistic view of the weather affecting the sales of Walmart rather than just temperature of the location. Therefore, it would be good to combine these two datasets to provide better insights for increasing the sales of the Walmart Inc.

Task 5: Discuss multiple BI tools that help to create insights and support decisions. Provide a comparative analysis of those tools (at least 3 different tools) (word limit range/guideline: 200 - 300).

According to Forbes, 'making better decisions, improving operational efficiencies, growing revenues and increased competitive advantage are the top four BI objectives organizations have today.'(Columbus 2018). Therefore, using the right BI tool today is extremely important.

Figure 1

According to the above figure 1 which is sourced from a report from Gartner in 2018, Tableau,

Microsoft Power BI and Qlik are the leaders for analytics and business intelligence platform.

Hence, I would like to provide a comparative analysis of these three BI tools below:

1. Microsoft Power BI

Product Benefits:

- Free tier and affordable cost(DeMuro 2018).
- 'Rich Personalized Dashboards: MS Power BI provides a unified user experience with the customized dashboards and reports that meet user's exact needs. Also, the dashboard visualizations are best in class and continually updated from the community. Interactive geo-map visualizations are empowered by Bing Maps'(SelectHub 2018a).
- 'Secure Report Publishing: Set up automatic data refresh and rapidly publish reports, allowing all the users to avail the latest information'(SelectHub 2018a).
- 'Integration: MS Power BI integrates seamlessly with existing applications. Adopt analytics and reporting capabilities easily to embed interactive visuals quickly in your applications'(SelectHub 2018a).
- 'No Memory and Speed Constraints: Quickly retrieve and analyse your data eliminating any memory and speed constraints'(SelectHub 2018a).
- 'The Question and Answer (Q&A) function may be the top cited benefit and capability in achieving self-service BI'(SelectHub 2018a).

Product Limitations:

- 'Integration not available for services like Vend POS, Shopify directly'(SelectHub 2018a).
- Doesn't support SQL queries.
- Relatively hard to work with gigantic data sets on Power BI.
- Doesn't give clients build scheduled reports, personalized user views, customized notifications, customized security views, or adaptable reports.

2. Tableau Server

Product Benefits:

- Amazing Visualization Capabilities: 'The product's data visualizing quality is flawless and far superior when compared with its market competitors in Business Intelligence market. It converts unstructured data into comprehensive logical results, which are fully functional, interactive and appealing dashboards'(SelectHub 2018c).
- Ease of Usability: 'The best thing about the tool is its intuitive manner of creating graphics and has a user-friendly interface which allows non-development and non-technical users to use the basic functionality of the tool to the fullest'(SelectHub 2018c).
- High Performance
- Multiple Data Source Connections and Impressive integration: 'The software supports establishing connections with many data sources like HADOOP, SAP which improves data analytics quality'(SelectHub 2018c).
- Mobile-Friendly: Its mobile application is available for both IOS and Android, adds mobility to Tableau users and supports full functionality which Desktop and Online versions have.
- Support: The products technical and customer support is unmatched.

Product Limitations:

- Expensive(DeMuro 2018).
- 'Tableau Server does not support data encryption'(SelectHub 2018c).

- Doesn't provide multi-location support.
- The solution isn't user-friendly, especially the report-builder.
- Doesn't allow users to share datasets and requires a separate subscription package.
- Requires IT support for integrations and other high-end tasks. Users solve using tutorials or self-help videos(SelectHub 2018c).

3. QlikView

Product Benefits:

- 'Control over data: The major reason for this product's popularity is that it enables users to create personalized, data-driven discoveries with guided paths and analysis. It provides guided analytics, a controlled analytic experience which guide employees toward discovering insights and making meaningful decisions'(SelectHub 2018b).
- QlikView is secured.
- Flexibility, Customizable & Combinable: 'QlikView lets develop a custom application with its own scripting and extend development with QlikView Workbench. QlikView allows itself to Integrate into user's business applications and system management software with extensive APIs'(SelectHub 2018b).
- 'Consistency and Global Search: QlikView provides one set of data and apps for use across user's entire organization. QlikView provides the usage of natural search to navigate complex information to accelerate discovery'(SelectHub 2018b).
- 'Data integration and Advanced reporting: QlikView unify data sources for a complete view of information, centrally managed data and applications make it easier to discover insights. With the help of QlikView one can create and distribute consistent reports and templates'(SelectHub 2018b).
- 'Data connectivity: A user can import data from Salesforce, Hive, Teradata, and other popular systems'(SelectHub 2018b).

Product Limitations:

- 'Does not support online analytical processing (OLAP)'(SelectHub 2018b).
- Users cannot predict the profitability of projects or departments using QlikView.
- The solution does not help users identify patterns within data.
- 'Lacks ad hoc reporting functionality'(SelectHub 2018b).
- Doesn't 'allow users to schedule receiving BI reports at specific times in a particular format'(SelectHub 2018b).

Task 6 and 7: Choose at least one BI tool and create visualisations of the insights. Additionally, Interpret the visualisation charts and explain how the chart helps the organisation/industry (word limit range/guideline: 400 – 600).

The Business Intelligence tools which I used to create visualisations of the insights are Microsoft Power BI and Tableau. Following are my created visualisations and their interpretation:

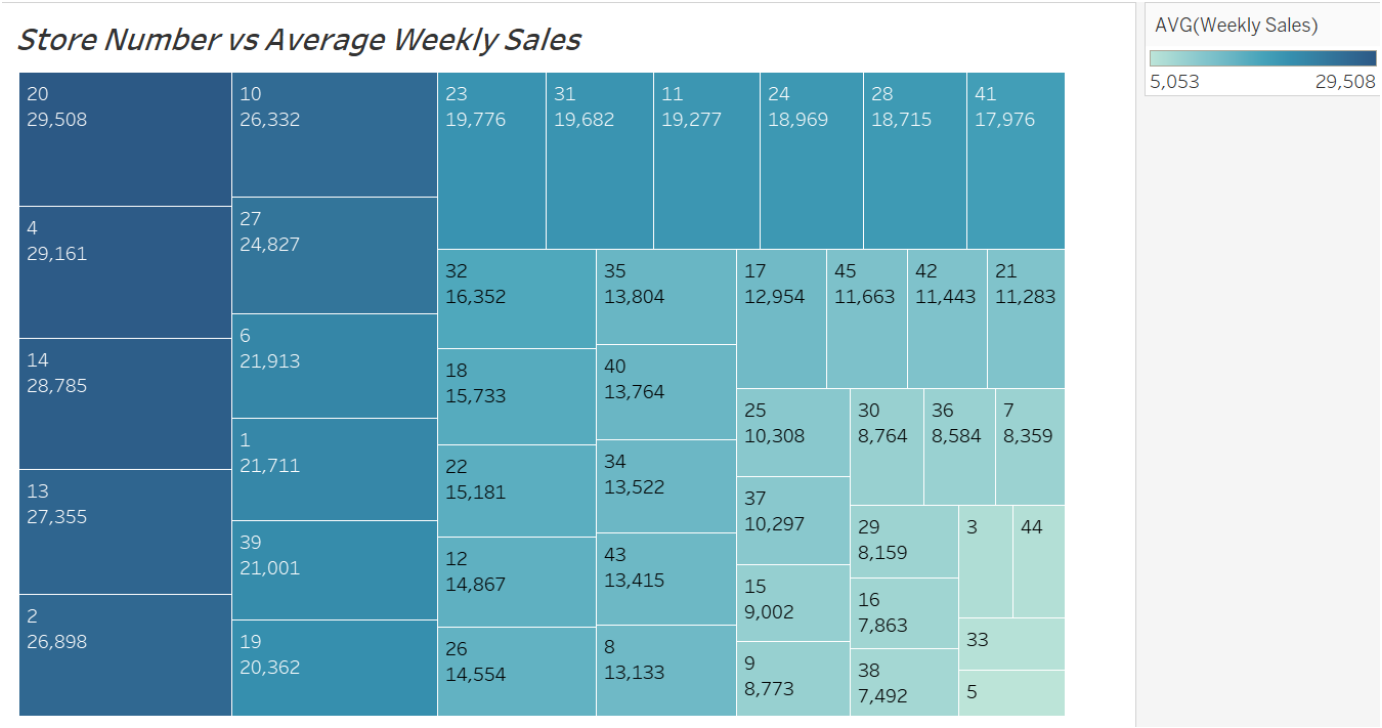

Figure 2

The above figure provides a treemap view of the average of weekly sales and store number. The colour and size represent the average of weekly sales. The marks are labelled by the store number first and then the average weekly sales. For example, 20 is the store number and 29,508 is the weekly sales of the store in US Dollars. Additionally, store number 20 which is at the top left corner has the highest average sales amongst all the 45 stores.

Hence, this figure gives us the analysed information for which stores have the highest average weekly sales and which has the lowest and the average weekly sales of all the stores lie between US$5,5053 to US$29,508 and store 20 has the highest and store 5 has the lowest.

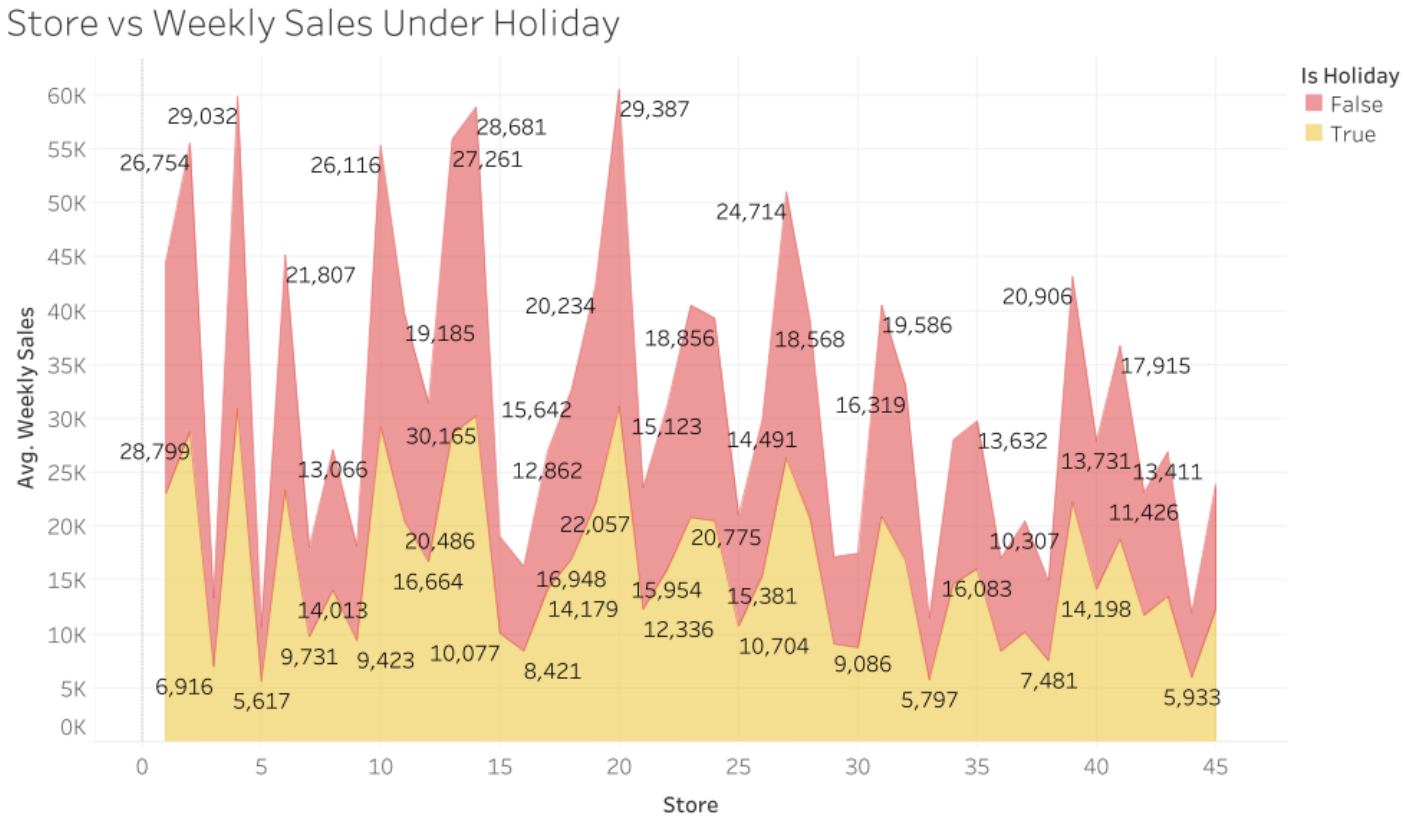

Figure 2

The figure 2 provides the continuous area chart of the weekly sales of all the stores affected by holidays. The x-axis consists of the average weekly sales, the y-axis contains the store number and the colour representation depicts the condition of having a holiday or not. The red colour depicts not having a holiday and yellow represents having a holiday. The labels on the peeks represents the average weekly sales of each store.

This visualisation shows an unusual trend in the American Walmart stores that the sales are high on working days rather than holidays. Hence, the company can use this insight for promotions and marketing purposes and have a full stack inventory in the stores during the working days. Also provide more shifts to employees on weekdays than weekends and additionally save on finances as pays are high on weekends.

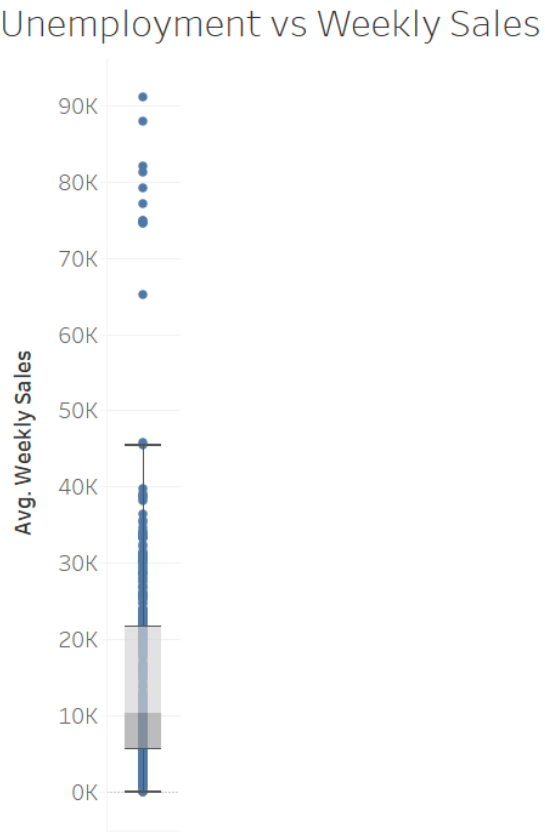

Figure 3

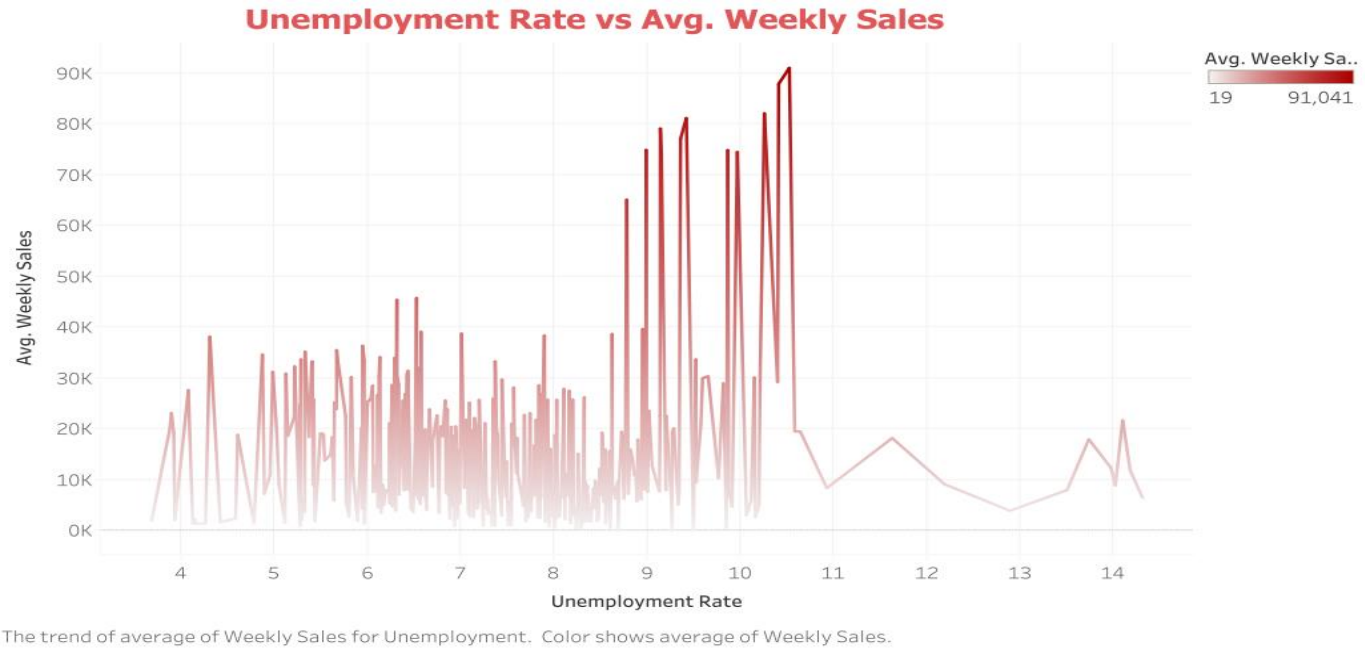

Figure 4

Figure 3 and 4 provides the unemployability rate versus with the average weekly sales of Walmart. Both visualisations were developed in Tableau.
Figure 3 depicts in the box and whisker plots view and figure 4 illustrates the same in line and representation and provides a better view of the information.

This graph shows that the unemployment rate does affect the sales.
If the unemployment rate is between 4 to 8.5 then sales are normally between 30K to 50K.
But interestingly if the unemployment rate is between 8.5 to 10.5 shows the sales are mostly high between 70K to 90K and the sales drop significantly when unemployment rate is between 10.5 to 14.
Hence, sales remain high when unemployment rate is balanced.

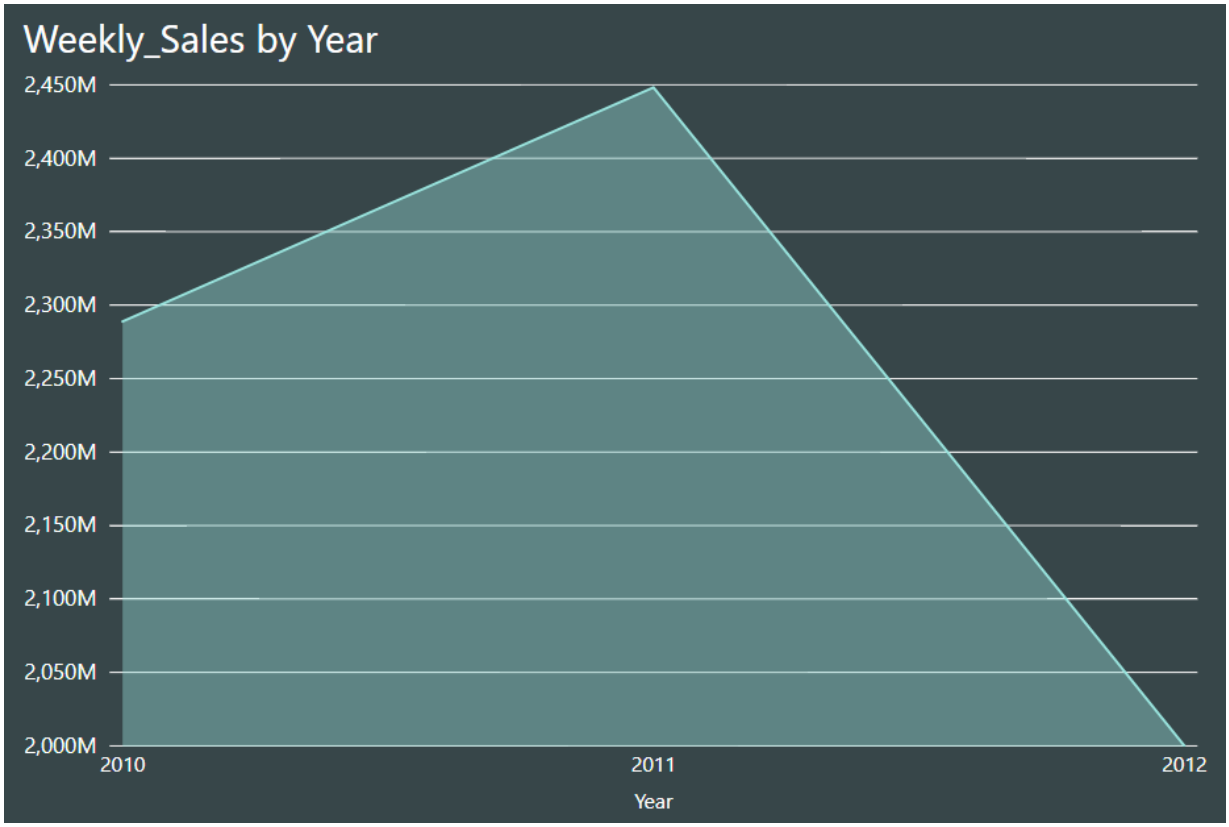

Figure 5

Figure 5 has been developed in Power BI and represents an area graph of weekly sales by year with slicing the start point from 2000 Million. The graph shows a clear indication that 2011 had the highest average weekly sales compared to the other two years. The average weekly sales reached 2,450 US$ in the year 2011 in Walmart.

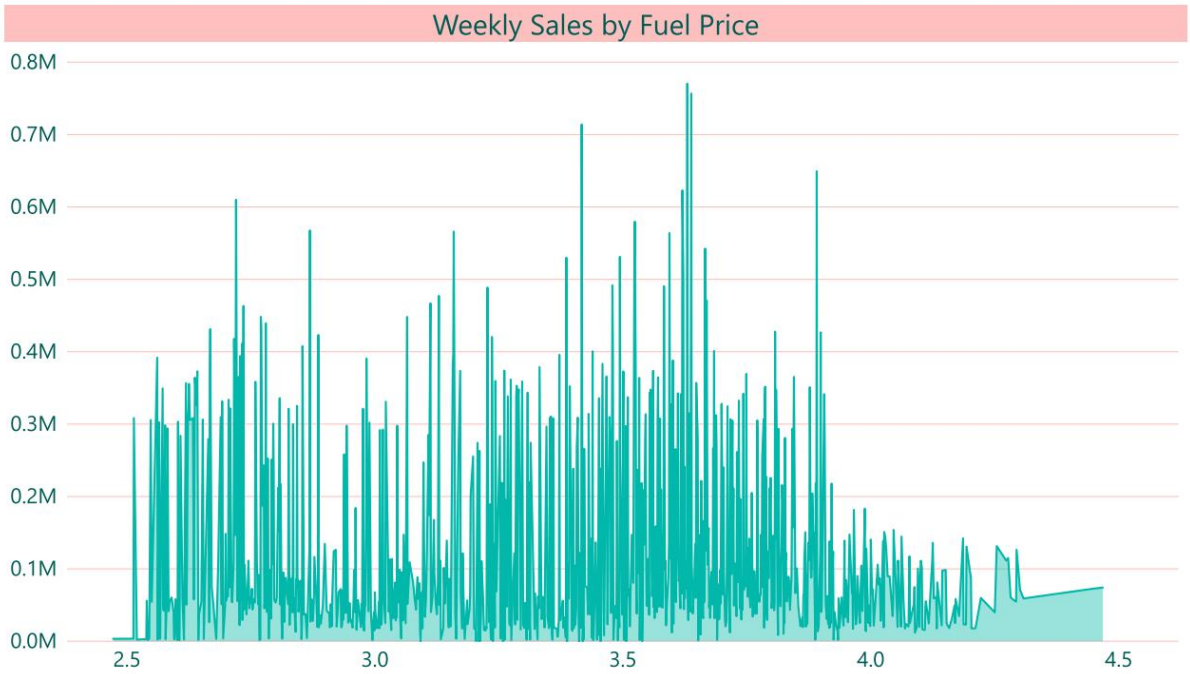

Figure 6

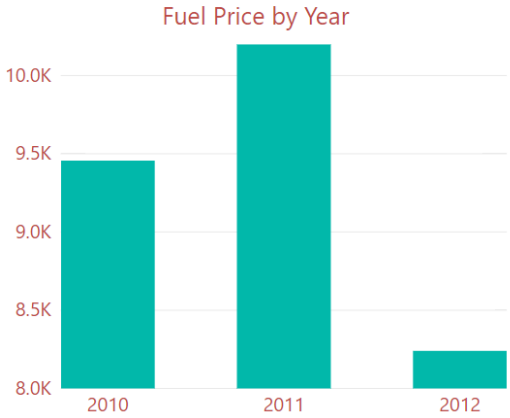

Figure 7

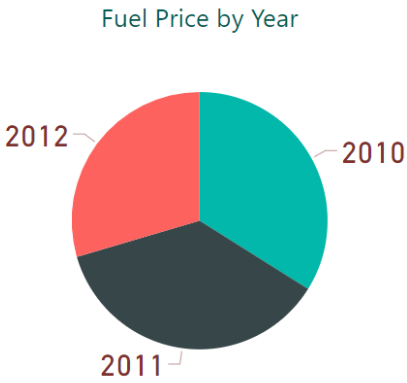

Figure 8

Figure 6, 7 and 8 includes a representation affection of fuel price by year and average weekly sales. All these visualisations were created in Microsoft Power BI.

Firstly, figure 7 and 8 shows the same representation but figure 7 is a better representation of it. They show the effect of fuel price by year and 2011 had the highest fuel price.

Whereas figure 6 shows the representation of fuel price affecting the average weekly sales of Walmart. The graph interprets that when the fuel price is between 2.5 to 3.8 Walmart's weekly sales are mostly between US$ 3 million to US$ 7.5 million but if the fuel price is raised and are between 3.8 to 4.5 the average weekly sales drop significantly to 1-2 million US Dollars.

Additionally, combining insight in figure 5 and figure 7, we can say that even though fuel price was high in 2011, sales were high as well.

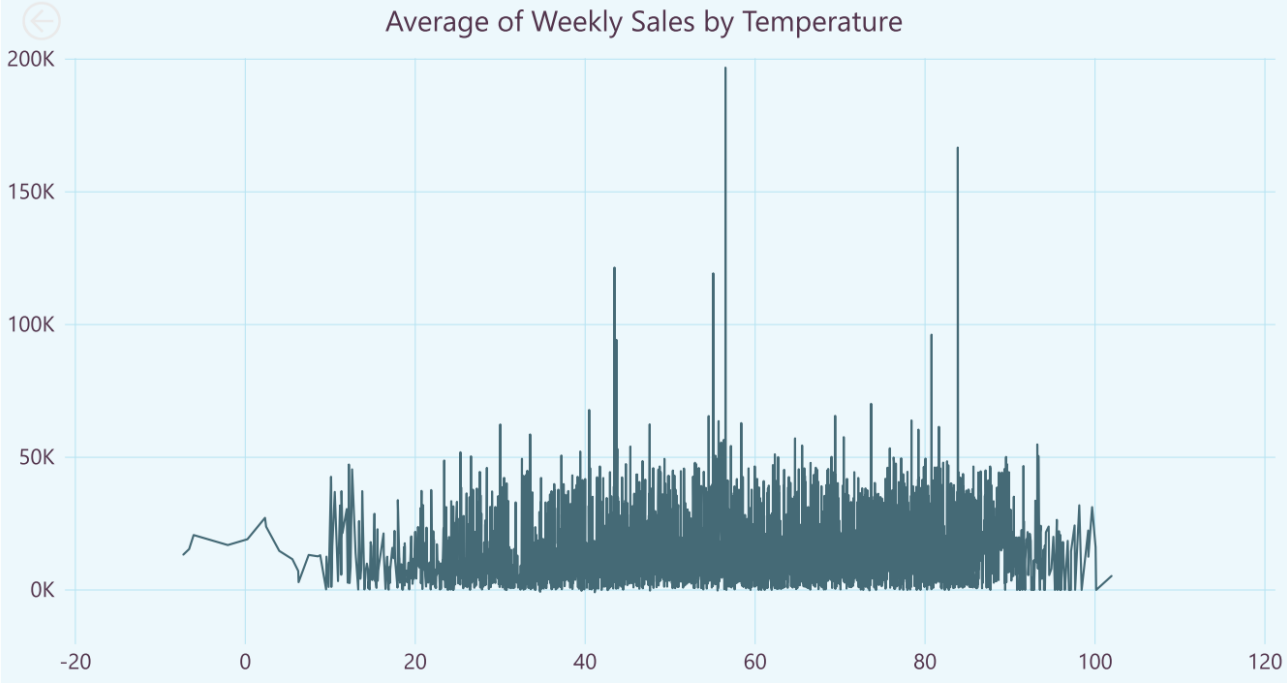

Figure 9

Figure 9 represents the role of temperature on the average weekly sales of Walmart developed in Microsoft Power BI tool.

The x-axis represents the temperature in degree Fahrenheit and the y-axis represents the average weekly sales of Walmart stores.

The graph shows that in a present temperate from 10-degree Fahrenheit to 100-degree Fahrenheit sales are around US Dollar 50 K, but interestingly the sales grew significantly higher at 43.45 F, 54.98 F, 56.36 F (highest) and 83.84 F.

Task 8: Discover other alternative visualisations that can help to enhance the insights. (word limit range/guideline: 100 - 200).

I want to put all the attributes in play namely temperature, unemployability and holidays to have detailed analytics play on how sales will be affected when all act at the same time, but the tools limits us to do this.

References

Columbus, L. 2018, *The State Of Business Intelligence, 2018*, Forbes, viewed 20 September 2018, <https://www.forbes.com/sites/louiscolumbus/2018/06/08/the-state-of-business-intelligence-2018/#23a072b47828>.

DeMuro, J. 2018, *Best business intelligence tools in 2018*, viewed 20 September 2018, <https://www.techradar.com/au/news/best-business-intelligence-tool>.

SelectHub 2018a, *Microsoft Power BI*, viewed 20 September 2018, <https://selecthub.com/business-intelligence-tools/microsoft-bi/?from_category=69>.

SelectHub 2018b, *QlikView*, SelectHub, viewed 20 September 2018, <https://selecthub.com/big-data-analytics-tools/qlikview/?from_category=69>.

SelectHub 2018c, *Tableau Server*, SelectHub, viewed 20 September 2018 2018,

<https://selecthub.com/business-intelligence-tools/tableau-server/?from_category=69>.

Thaler, D. 2014, *Walmart Recruiting - Store Sales Forecasting*, Kaggle, Kaggle, viewed 19 September 2018, <https://www.kaggle.com/c/walmart-recruiting-store-sales-forecasting/data>.

Wikipedia contributors 2018, *Walmart*, Wikipedia, The Free Encyclopedia, viewed 20 September 2018, <https://en.wikipedia.org/wiki/Walmart>.