UNIVERSITY OF LONDON

BUSINESS ANALYSIS REPORT

TABLEAU VISUALISATION

PREPARED FOR

University of London Senior Management

PREPARED BY

Shelly (200618216)

MODULE

ST2187 Business Analytics, Applied Modelling and Prediction

SUBMISSION DATE: 1 March 2022

WORD COUNT: 1454/1500

*(excluding Table of Contents and Executive Summary)

Table of Contents

Executive Summary

In this report, businesses are brought to discover interesting commercial insights with the Megastore dataset provided using Tableau Software. This includes, finding the most efficient market, the most popular products, discovering customer shopping behaviour through sales trend, knowing preferable shipping mode in each country and applying forecasting method to predict future sales. Further analysis will also be recommended at the end of the report.

Those analyses are displayed in a form of story containing five dashboards that are interactive, informative and user-friendly. The interactive features are done using action filters which bring more interaction to the users when exploring worksheets within a dashboard. When a particular section in one worksheet is selected, the other sheet(s) will only show the related information. A detailed description or further analysis will also appear when an area is hovered.

Introduction

As the world becomes more technologically advanced, the volume of data collected from various sources are incredible large. The evolution of data landscape and technology helps businesses to prepare in a fast-changing world. With the help of data analysts, businesses will be able to possess a Data-Driven approach. Data-Driven approach helps businesses to better serve customers, improve operations and make data-driven decisions in response to volatile market conditions.

This report is done based on the megastore dataset provided containing 51,290 transaction records from December 2016 to December 2020. The conclusion of the analysis is drawn assuming, the value of Profit given is a Gross Profit, Sales provided is a Net Sales and Shipping Cost is a cost to the company. Hence, the new calculated field named "Profit Ratio" is a Gross Profit Ratio.
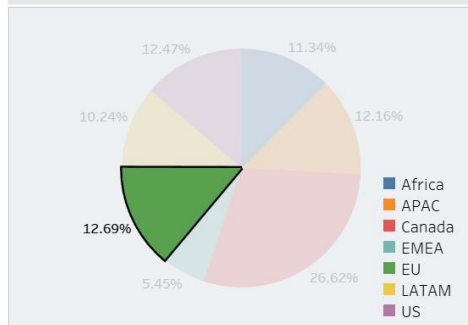
The aim of this report is to provide understanding of how well the business is doing in each market, how the profit trend is changing over the years, giving the idea of selling niche product in each state as well as providing future data-evidence result for a better decision made in the future.
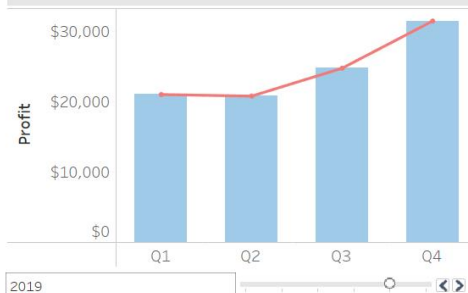
Story (Dashboard Explanation)

Dashboard 1: Market Profit Analysis

To identify the profitability and financial stability of a company, business analysts use Gross Profit Ratio as the Key Profit Indicator (KPI). The greater the gross margin, the better the market. The Donut Chart shows Canada has the largest profit margin which is 26.62% of the total. The second largest represented by the EU with 12.69% and the lowest contribution by EMEA which only 5.45% of the total.

Once the market in pie chart is selected, the action filter will be applied in two areas, the map and the column chart. The map will only shows the countries in the selected market with the profit margin in colours making it easier to spot profitable/unprofitable area. Further to the EU market, the map shows that the business is doing very well in Switzerland shown by the dark green area. While great losses are incurred in both Portugal and Sweden shown by the dark red area. The action also link to the column chart showing the market's profit trend over the quarters. In 2019, the profit trend in the EU is increasing over the quarters. The trend in other years can be explored using the date slider.

Dashboard 2: Product Popularity Analysis
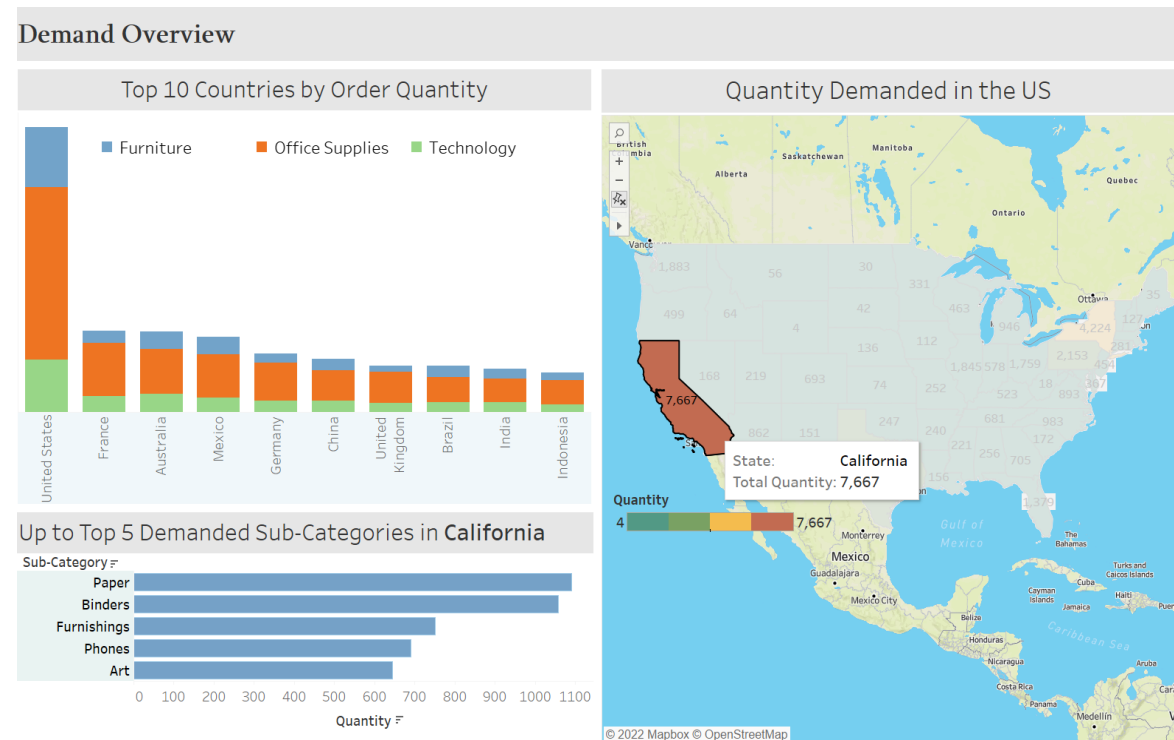
The bar chart shows that the highest order quantity comes from the United States, with Indonesia sitting at the tenth place. Focusing on the United State data, a map visualisation is used to show the distribution of order quantity in each state. The amount of order quantities are expressed with the different shade in colour with red being the highest and green being the lowest. The highest order quantity in the US contributed by California with the total of 7,667 units. An interactive action filter is also added from the map to the horizontal bars showing top five demanded sub-categories in particular state. In California, the top five demanded items are Paper, Binders, Furnishings, Phones and Art.

Dashboard 3: Shipping Cost Analysis
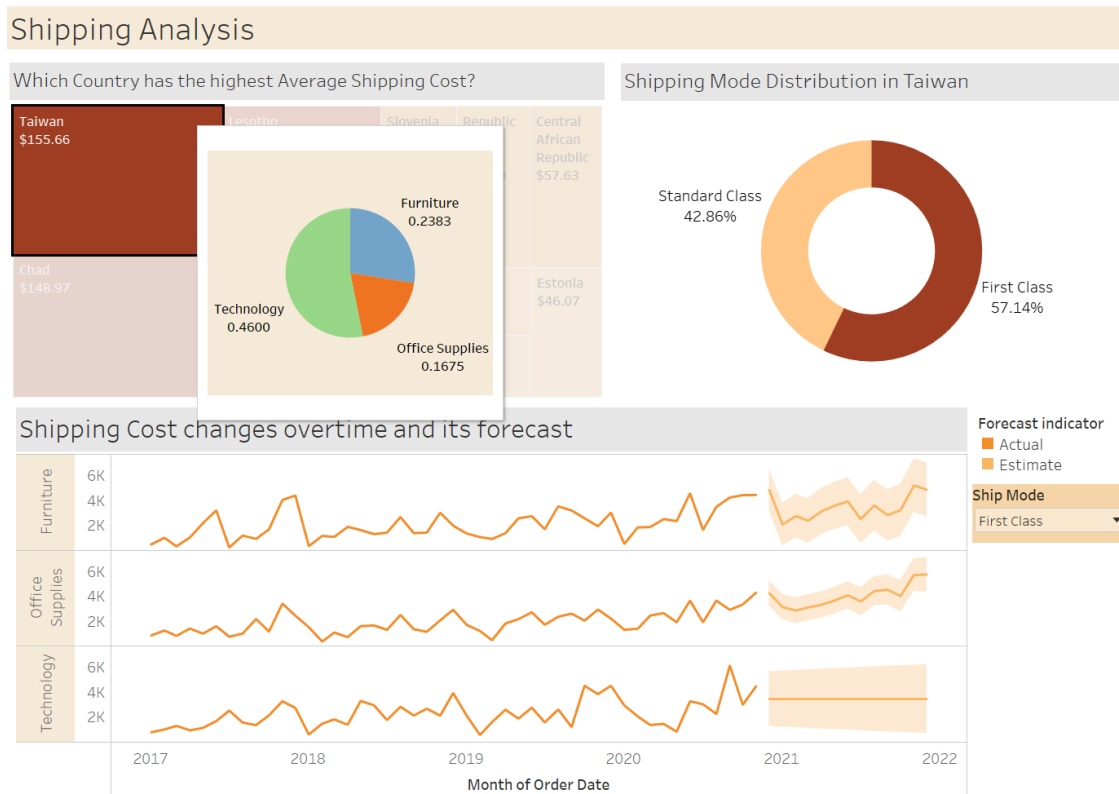
The Tree map shows that Taiwan has the highest average shipping cost of all countries which is $155.66. Hovering over one country gives a further analysis about the profit margin of each category. In Taiwan, Office Supplies have the lowest profit margin with only 0.1675. The figure implies that the product is not generating strong sales relative to its cost. The Donut chart shows the distribution of shipping mode for one country which will change according to the country selected in the tree map. In Taiwan, the shipping mode only distributed into two categories, Standard Class and First Class. It is also shown that First Class is a more preferred option.

The line chart shows how the shipping cost in each category changes overtime. The darker line represent the actual sales value and the lighter line shows the shipping cost forecast for the upcoming 13 months. The shaded area around the forecast line indicates the upper and lower bound with 95% confidence level. Under First Class shipping mode, a potential downfall for both Furniture and Office Supplies in early 2021 is expected. However, the forecast for technology is a constant value follows by a slightly wider confidence interval. This indicates the shipping cost for Technology is unstable. The analysis for other shipping mode can be performed by changing the Ship Mode in the dropdown menu.

Dashboard 4: Customer Sales Analysis
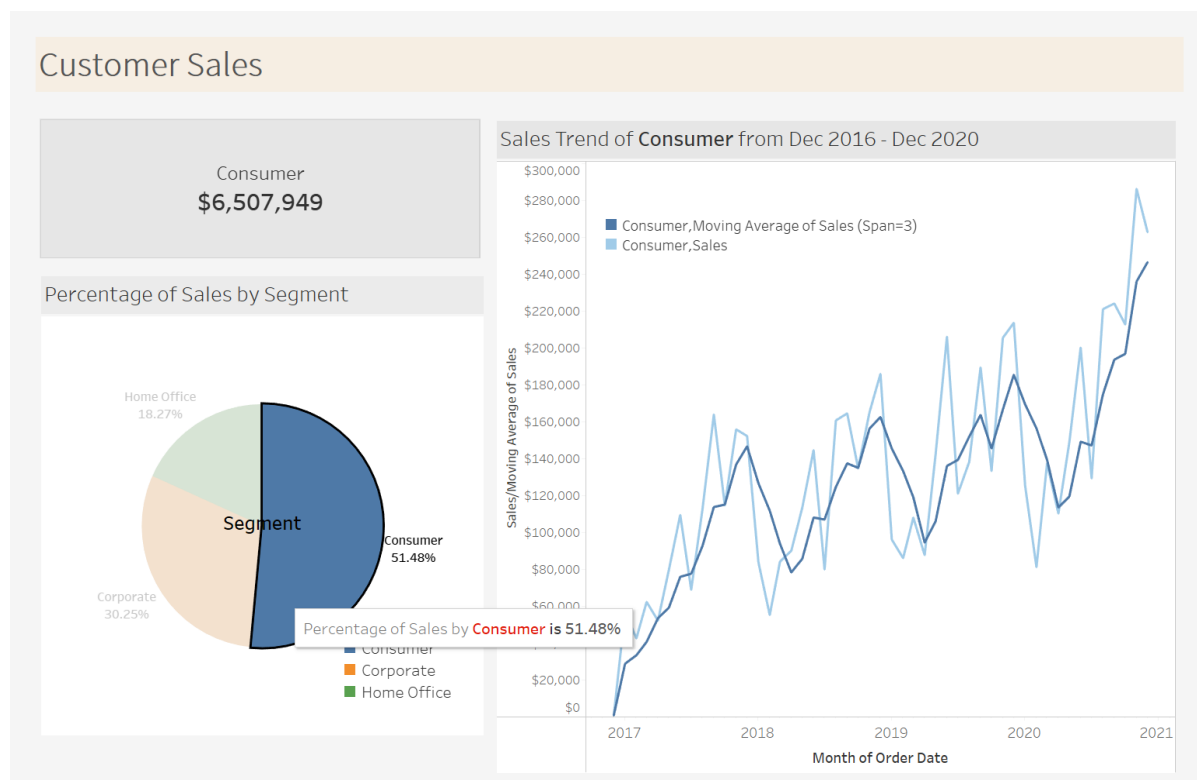
According to the Megastore dataset provided, customer is divided into three segmentations. In the upper left corner, the Total Sales for each segment in dollar is displayed. The percentage sales of each segment can be easily presented using a Donut Chart. The largest percentage sales come from the consumer which is 51.48% of the total. While Home Office has the least sales contribution being only 18.27% of the total percentage sales.

An interactive action filter is also added from the donut chart to the total sales and line chart. Selecting one segment in the Donut Chart will automatically filter the segment's total sales and sales trend for that particular segment. The darker line in the line chart represent the Moving Average Convergence/Divergence (MACD) that tells the trend direction of the sales, while the lighter line shows the value of actual sales generated. The use of MACD makes observation of sales trend much easier as it smoothen the graph (Average sales of the previous three periods is used to calculate each data point in the line chart). From the Consumer line chart, it is obvious that there is a trend pattern repeated over the years, where the sales drops to its minimum on April and rises to its peak on December.

Dashboard 5: Sales Forecasting

Category Sales Forecast in **LATAM** Market
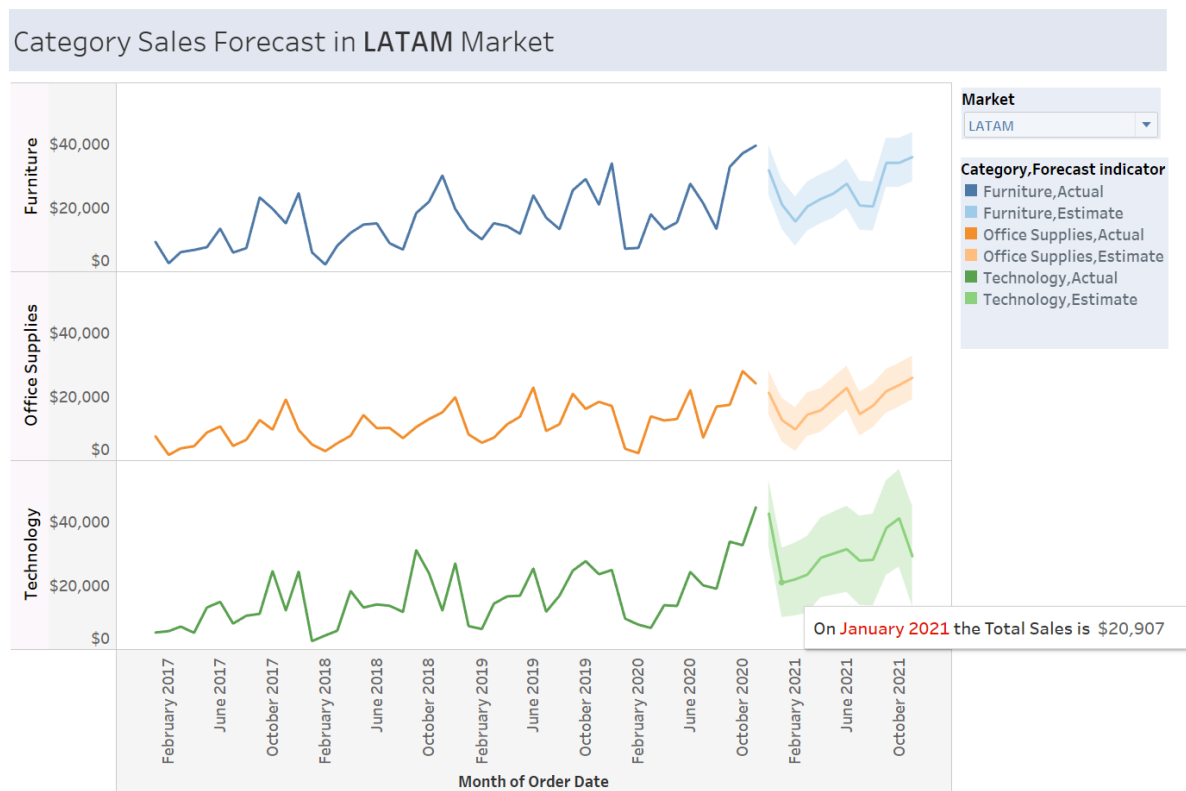
This dashboard shows the line chart plotting the total sales of each category in a particular market. The darker line represent the actual sales value and the lighter line shows the forecast for 13 upcoming months. The shaded area around the forecast line indicates the upper and lower bound estimated sales value with 95% certainty. The forecast is calculated using exponential smoothing method and highly dependent on the trend and seasonality index.

Based on the forecast description for all markets, the trend and seasonal index are 2.9% and 97.1% for furniture, 3% and 97% for Office Supplies and 0% and 100% for technology. This means that the estimated sales for technology follows a seasonal pattern whereas the other two are depend on the trend as well as seasonal pattern.

In LATAM Market, the Actual sales, drops every February. The forecast expects that the sales for both Furniture and Office Supplies will fall to the lowest on February 2021 whereas Technology will fall on January 2021. It is also estimate that the sales will reach its peak on October 2021 for all categories. The forecast in other countries can be explored through the dropdown menu allocated in the filter container.

Conclusion

The analysis of Market Profitability says that the market is doing poorly in the EMEA market especially in Kazakhstan, Turkmenistan and Yemen. While the business is operating well in both Canada, EU and US. This encourages further promotion in the EMEA to boost market sales or discontinuing the business. From Demand Analysis, the US contributes to the highest demand. However, the demand across the state is not equally distributed as low demand is noticed in the upper north-west and mid-west region. Paper and Binders are the popular products among the US Market.

Out of all countries, Taiwan has the highest shipping cost. This might be due to the lack of variations in its shipment mode. With the expected increase of shipping cost under First Class mode starting from July onwards, the profit for both Furniture and Office Supplies are also expected to fall. Further into customer sales, Consumer holds the largest portion of total sales. The analysis discovers a hidden trend pattern which provides valuable evidence to make future decision. Like, when further advertisement is needed and when to apply discount for sales boosting.

The forecast shows that the sales in LATAM is expected to decrease during the first quarter. This forecast helps businesses to better allocate their budget in response to unexpected expenses in the future.

Further Recommendations

For further analysis, listed are the recommended analyses to be conducted:

1. As the country that contributes to the highest demand, does the high demand in the US has always been stable or was it due to the sudden spike in certain time period?

2. Why the profit margin for Office Supplies is relatively low in Taiwan? Is there any other causes aside from the high shipping cost, such as strong competitors?

3. Why do consumer sales always drop on April?

4. Why do Sales in LATAM Market always fall on February? Is there any other possible reason apart from the seasonal and trend effects?

References

Intellipaat. (2018, April). *Forecasting & Trend Analysis in Tableau*. [Video]

Retrieved January 20, 2022, from https://www.youtube.com/watch?v=ZB78DglzyZY

Filter actions. – 2021.4 | Tableau. (n.d.). [Online]

Retrieved January 24, 2022, from https://help.tableau.com/current/pro/desktop/en-us/actions_filter.htm

Thakur, M. *Profit Margin Formula*. [Online]

Retrieved January 30, 2022, from https://www.wallstreetmojo.com/profit-margin-formula/

Gross Profit Margin Ratio Analysis - Financial KPIs | Sisense. (n.d.). [Online]

Retrieved January 30, 2022, from https://www.sisense.com/kpi-library/financial-kpis/gross-profit-margin/

Saha, D. (2020, April 3). Google Cloud BrandVoice: *How The World Became Data-Driven, And What's Next*. [Online]

Retrieved February 14, 2022, from

https://www.forbes.com/sites/googlecloud/2020/05/20/how-the-world-became-data-driven-and-whats-next/