



Store Sales Data Forecasting

Time Series Analysis on Sales Database

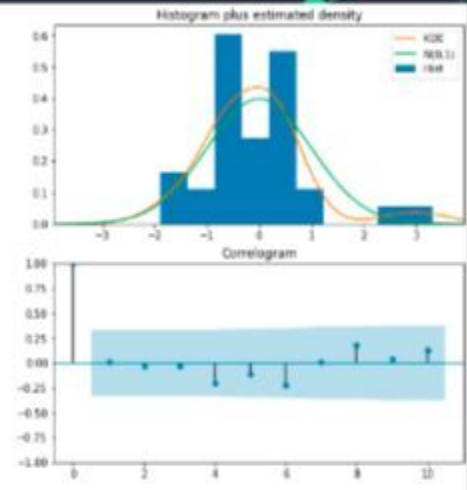
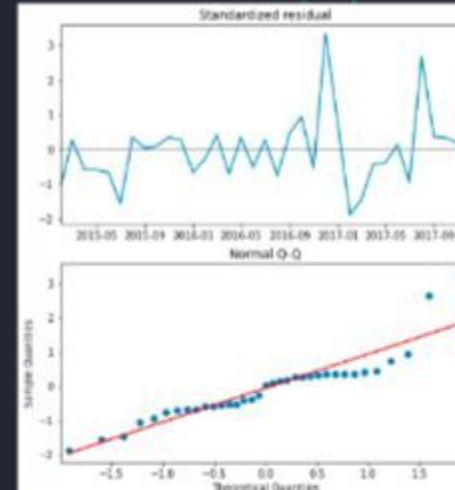
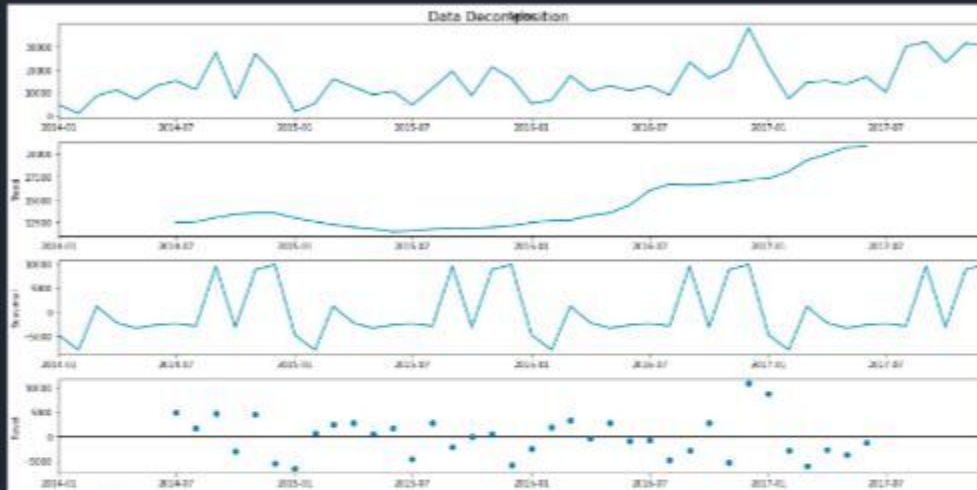


Business Objective

To build a forecast model to predict category-wise sales.



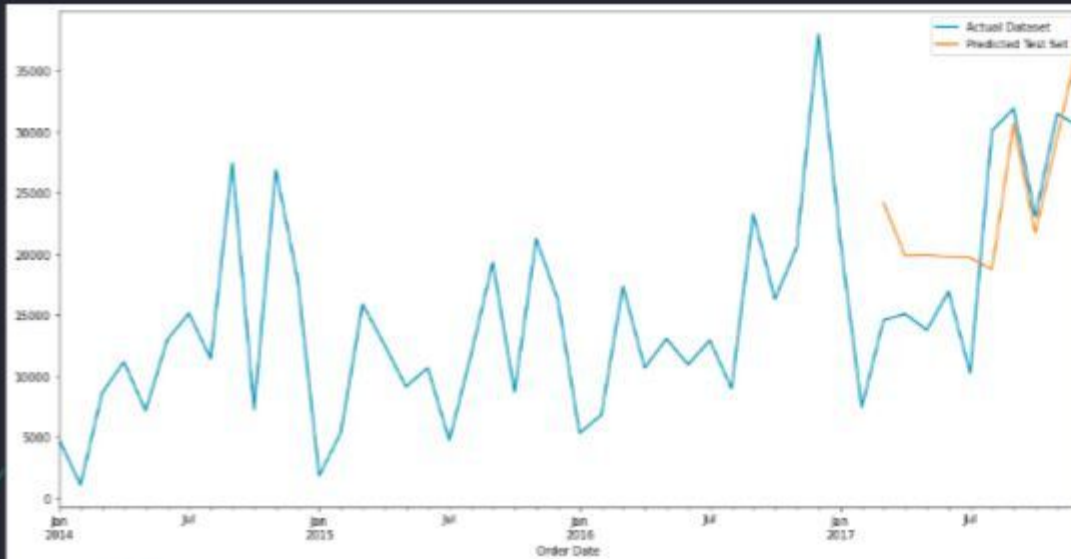
MODEL BUILDING PROCESS



- Time Series Characteristics Seasonality, Trend and Irregularity can be observed in the given data.
- Data is nonstationary.
- Standardised Residuals :
There are obvious patterns in the residuals with no uniform mean and variance.
- KDE Curve:
Doesn't show normal distributions, data is skewed.
- Normal Q-Q:
Most data points are not on the straight line/normal reference line.



MODEL TESTING PROCESS

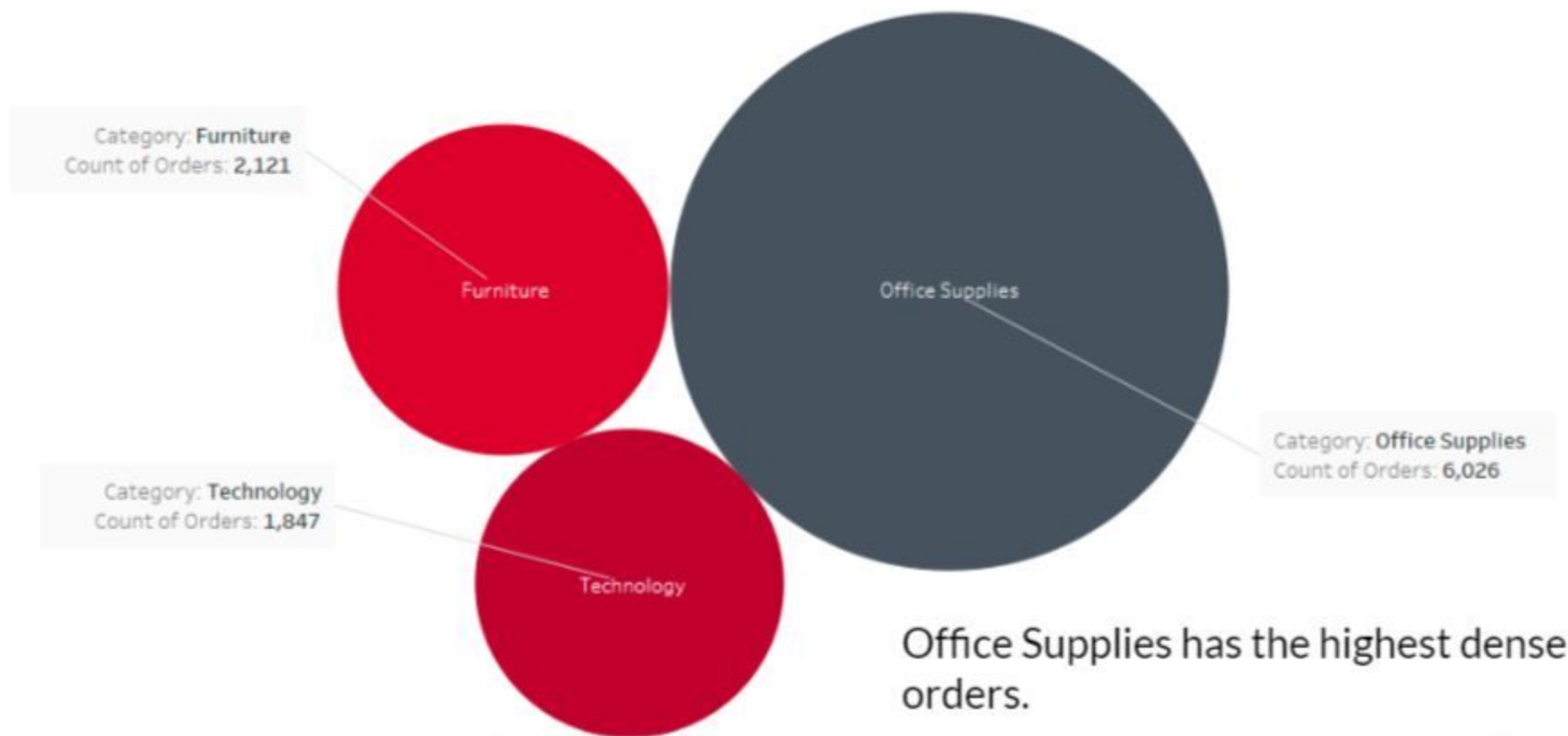


	CATEGORY	RMSE	MAPE
0	OFFICE SUPPLIES	6586.551225	0.327788
1	FURNITURE	6140.841973	0.383515
2	TECHNOLOGY	2721.212192	0.113917

1. SINCE DATA IS NON-STATIONARY WE CAN MOVE WITH EITHER ARIMA OR SARIMA.
2. SINCE THERE IS SEASONALITY PRESENT I HAVE CHOSEN SARIMA MODEL.
3. THE PREDICTED SALES ON TEST DATA IS VERY MUCH SIMILAR TO THE PREVIOUS DATA IN TERMS OF TREND.
4. MEAN ABSOLUTE PERCENTAGE ERROR ARE NOT THAT HIGHER COMPARED TO OVER ALL DATA GIVEN WITH TECHNOLOGY DATA GIVING THE LEAST ERROR PERCENTAGE.

BUSINESS UNDERSTANDING

CATEGORY WISE ORDER COUNT



BUSINESS UNDERSTANDING



Major Supply Demand in the West of US and least in the South Region.

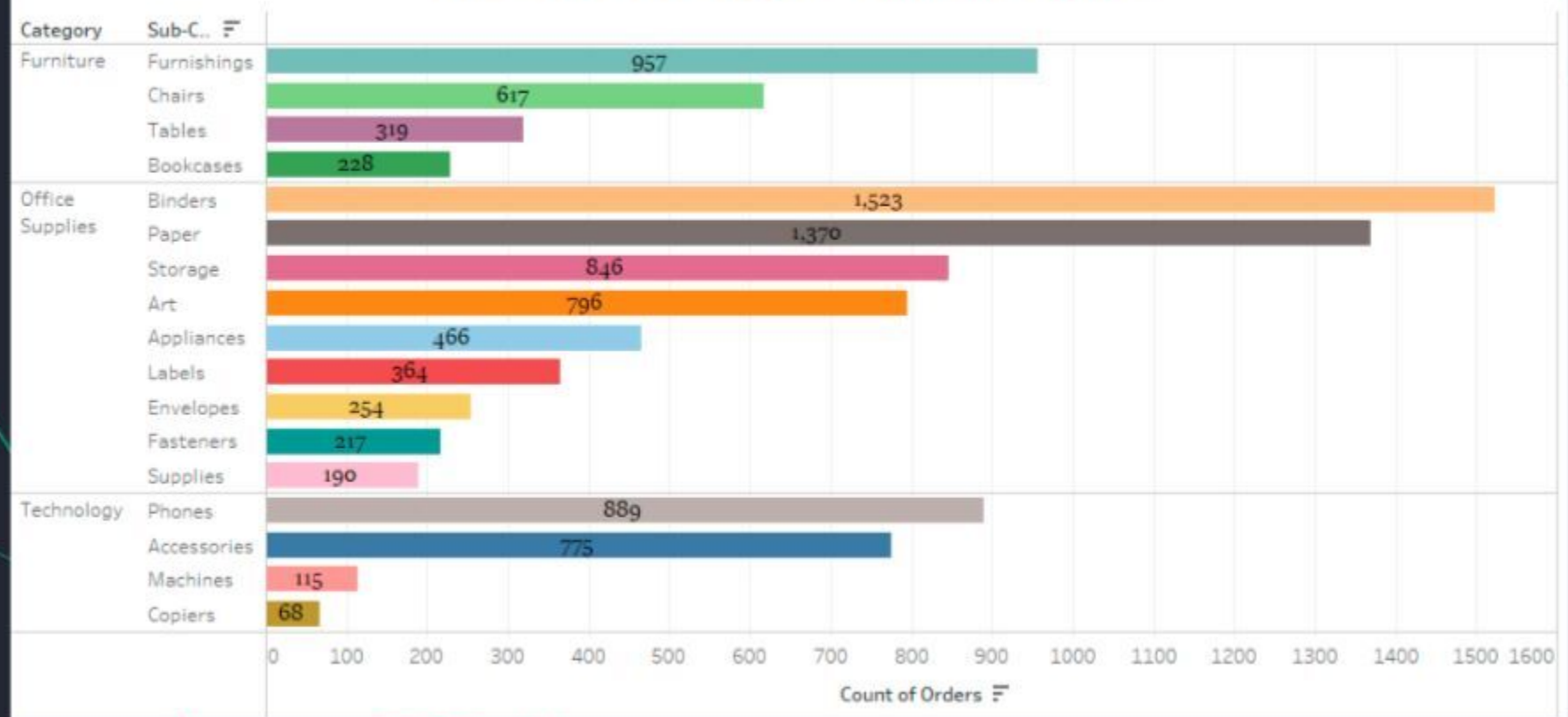
BUSINESS UNDERSTANDING



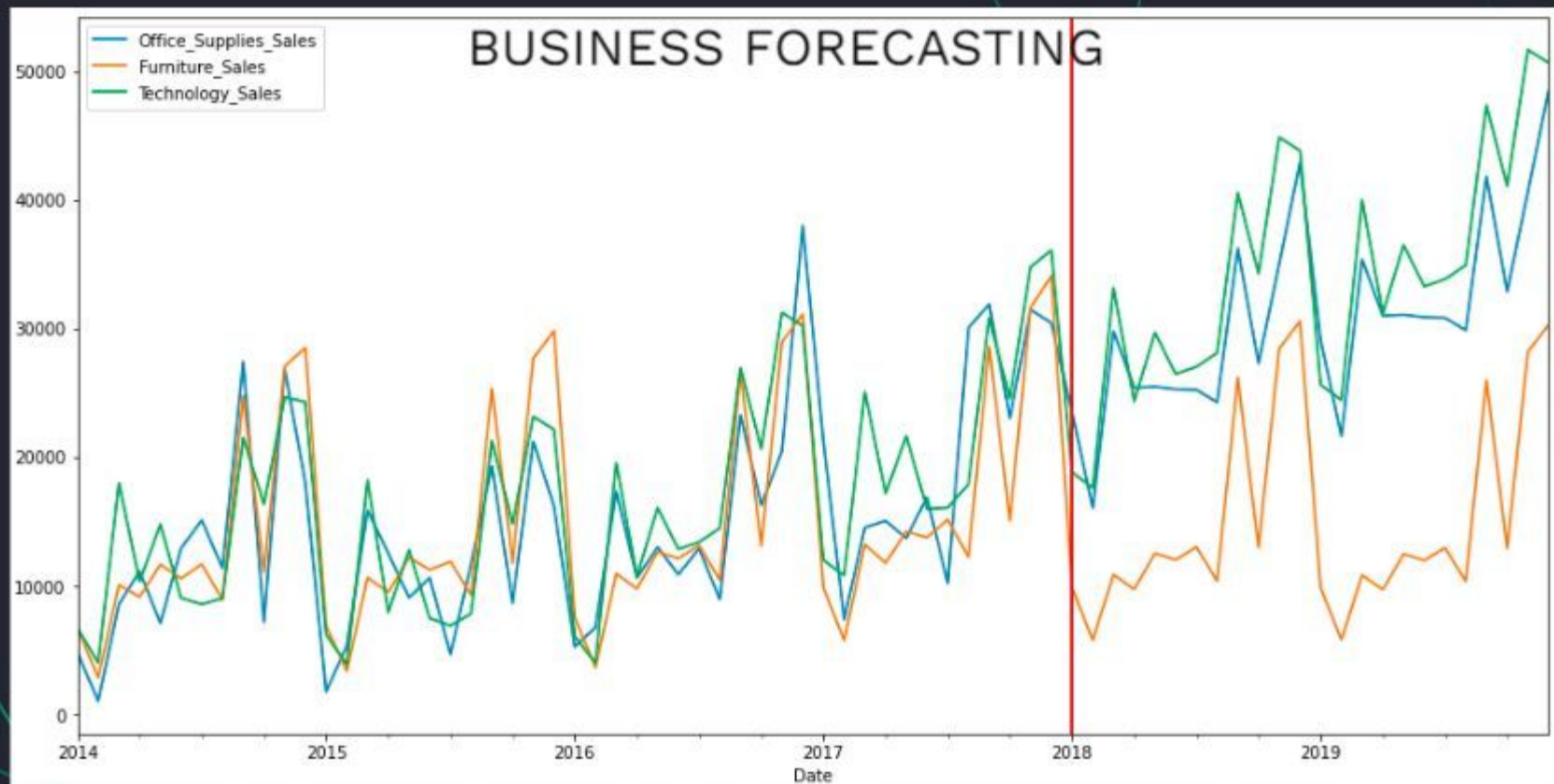
No major difference seen in total sales but there is the major difference in the ratio in terms of average profit. Technology contributes to highest profit for the company.

BUSINESS UNDERSTANDING

SUB CATEGORY WISE ORDER COUNT



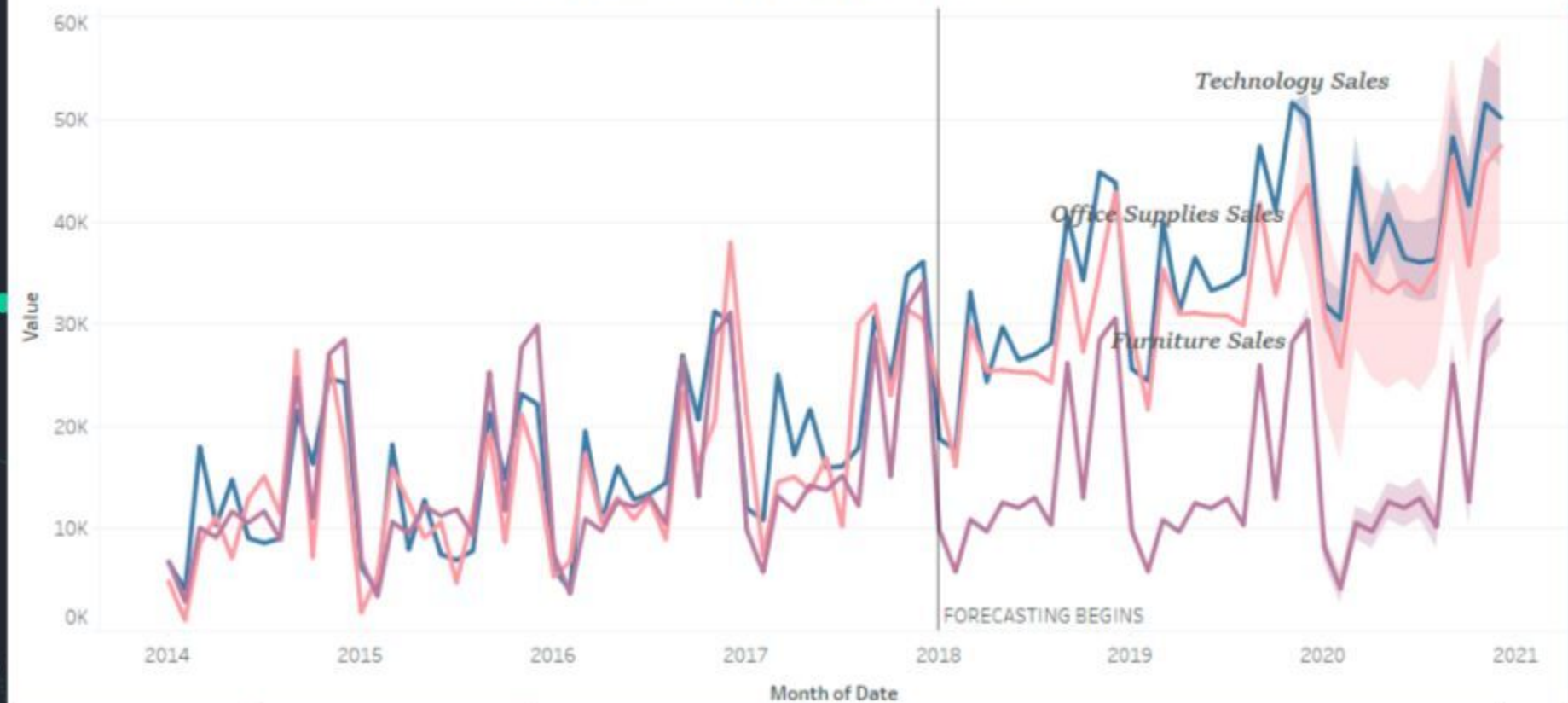
Binders have the highest orders from 2014 to 2018 in Office Supply Category.



- AN UPWARD TREND CAN BE SEEN IN THE OVERALL DATA AND THE DATA FORECASTED.
- PATTERNS ARE VERY SIMILAR TO THE PREVIOUS YEAR SALES RECORD.
- YEAR-END SALES IN THE OFFICE SUPPLY AND FURNITURE CATEGORY ARE COMPARITIVELY MORE.
- DIPS IN SALES CAN BE SEEN 1ST QUARTER IN FURNITURE CATEGORY
- YEAR-END SALES IN TECH SUPPLY CATEGORY ARE COMPARITIVELY MORE.

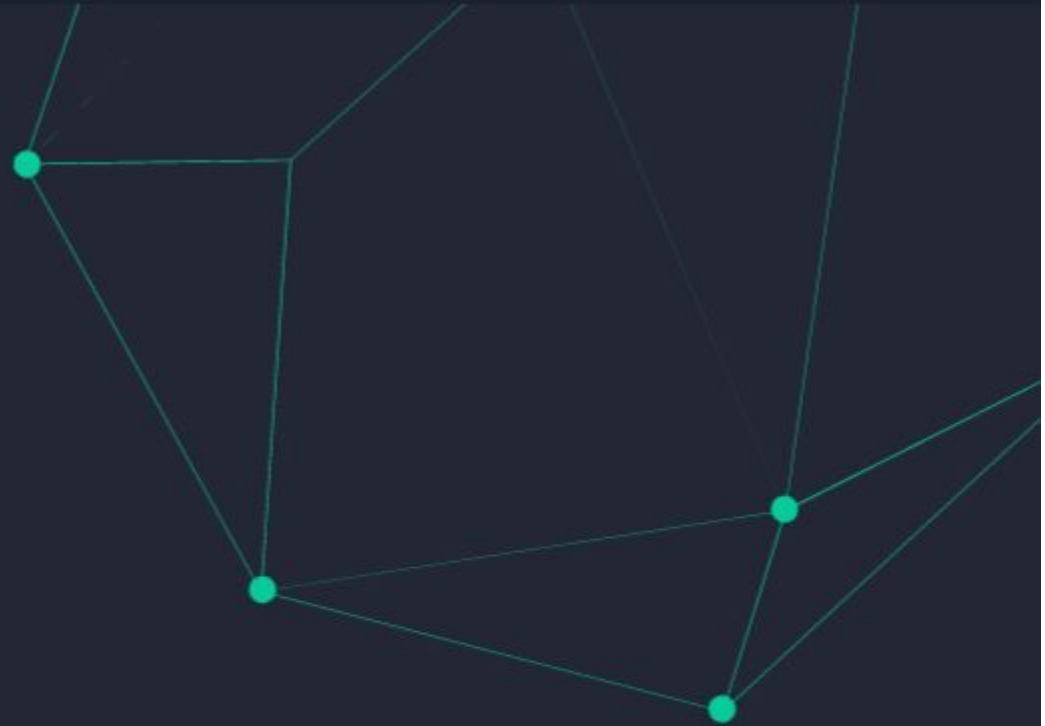
BUSINESS FORECASTING

FORECASTING USING TABLEAU



PROFIT INDUCING BUSINESS SOLUTIONS

1. Since the office supplies category has the highest dense orders more of supply chain management techniques can be implemented here.
2. Major supply demand is seen in the west east and central and least in the south so marketing strategies can be applied to meet our supply demands. Ex: providing month end sales in the South region might attract more customers.
3. Even though technology has the least order count out of all 3 categories, technology plays a major role in providing profit for the company with its share of 78.75% profits.
4. Purchase demand of phones and accessories are more leading to major profits for the company.
5. All three categories have different trends but almost very similar seasonality so month end sales can attract more customers which increases supply, therefore increasing profits and sales for the company.



Thank you!

By: Neha J Kotwal

