SALES FORECAST, DATA VISUALIZATION AND DECISION SCIENCE FOR MEASURING INSTRUMENTS USING TABLEAU

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Abstract: Sales forecast is very important in Organizational decisions. There are many data analysis and visualizations tools that are helping to visualize and analyze sales. Tableau is a widely used tool for data analysis and visualization. In this journal, Tableau is used to predict sales and to plot and visualize different variables in online sales of Measuring Instruments. A sample data of 141 taken from the sales of measuring instruments during six months of time is used to carry out this study. The data collected is segmented into different categories, tabulated and used. Different variables are plotted to understand the sales phenomenon. Sales forecasting of different products in terms of quantity and in terms of amount of sales were studied separately to predict sales. Different parameters such as cancellation rate, item wise sales, sate wise sales, sales on daily and weekly basis were also discussed in detail.

Key Words: Sales Forecast, Tableau, Organizational Decisions, Data Visualization, Data Analysis, Decision Science.

INTRODUCTION

Sales Forecasting is very important in many Organizations to improve sales. It helps to take appropriate decisions to enhance sales performance. Total sales of Measuring Instruments differ on daily, weekly and monthly basis. From the data gathered over a period of time, it is possible to forecast the sales.

There are different types of data analysis and visualization tools used in organizations. Tableau is one among such tool used. It has many features for statistical calculation and plotting different variables. Visualizing the variables makes the user to easily use it.

Sales prediction helps to identify the different parameters that are playing importance in making changes in the sales. Forecasting helps to identify such parameters that influences sales. It helps to understand the consumer behavior, and expectations from consumer to improve sales.

Important parameters are analyzed in this journal with respect to sales forecast and decision science using Tableau.

LITERATURE REVIEW

S. Scott Nadler & John Kros developed a research on Forecasting using Excel. It explains different methods for prediction using excel with different formulas and functions. This journal helps to understand moving average, trend analysis, linear regression and exponential analysis functions for Sales Prediction using Excel [1].

Douglas J. Dalrymple developed a study on discovering how firms in USA are preparing sales forecast, methods used and accuracy of forecasting. It says the usage of computers and seasonal adjustments for more accurate predictions. Different forecasting techniques used at various situations were also explained [2].

Yuzhen Wang, Dan Chang & Chaojin Zhou proposed an LSTM based sales model for Sales Prediction. This model is using SA for optimizing connection weights at initial of LSTM neural network. The results obtained shows it improves prediction accuracy and reduces the number of iterations with a good prediction effect [3].

Wei Feng carried out a research in sales forecasting based on BP Neural network model based on marketing brand. It explains the advantages of using Artificial Intelligence for infinite mapping and passive learning. It says this method is around 30% more accurate in predicting sales than conventional sales prediction methods [4].

Garud Akshada Anil, Chavan Ritambara Shankar, Bobade Prachi Santosh, Gorad Akshada Rajendra & B.D. Thorat conducted a study on Sales Forecasting using Machine Learning Techniques. It explains the analysis of suitable machine learning technique from different techniques in machine learning to predict Sales. It explains the usage of Intelligent data mining approaches [5].

MATERIALS AND METHODS

Sample Size & Sampling Method

A sample size of 141 was taken for the analysis purpose from the sales of Measuring Instruments. Data collected is for a period of six months. Simple Random Sampling Method is used for collection of Data.

Research Methodology

Sample data collected were tabulated and segregated using Excel and were imported into Tableau. Different Tools available in Tableau were used to do statistical calculations, and for plotting different variables. Forecast Tool in Tableau is used to plot sales forecast.

Software Used

- Excel 2016
- Tableau Public 2022.3

Sales Forecast

Sales Forecasting is a phenomenon of plotting a curve or graph with a set of data available over a period of time, and extrapolating the graph to predict the upcoming sales.

There are many factors that influences the sales, that makes difference in the sales, more understanding on factors that influences sales and defining it in variables can make the prediction of sales more precisely for marketing decisions.

Sales Forecast Using Tableau

Tableau is a Data analysis and Data visualization tool. It is used for various applications in Industries. Sales Forecasting is an important usage of Tableau. Trend Line in Tableau plots the Trend of Sales over a period of time. There are different types of statistical calculations are available to plot the trend lines such as Linear, Logarithmic, Exponential, Power and Polynomial types. Forecasting Feature in Tableau plots the data with the given variables to forecast sales. In this feature there are many options available with a range of variables in time to predict sales. There are also option available to describe the sales forecast and options to write separate stories on sales.

RESULTS & DISCUSSION

Results obtained are in the form of values with statistical calculations and graphs. It is observed that, out of 141 order items, a total of 97 items has been delivered, 33 orders were cancelled and 11 orders were returned with a percentage of 68.79, 23.40 and 7.80 respectively.
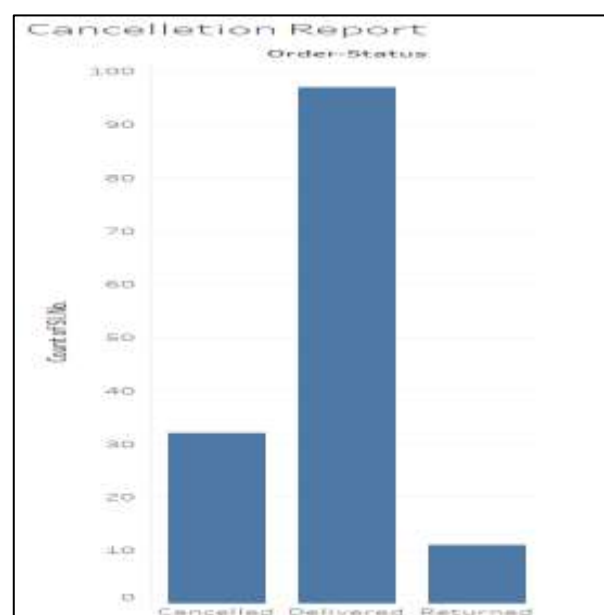

Fig. 1: Orders delivered, cancelled and returned

Daily Sales

From the data collected, a graph is plotted

with date of purchase on X axis and sales on Y axis. Total Sales for Six months is 86,780

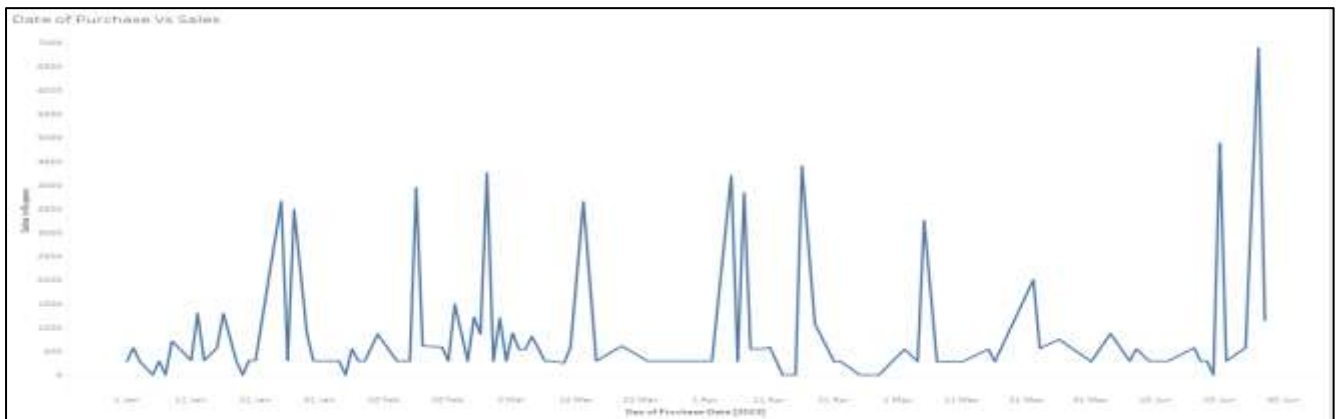Rupees with Maximum Sales is 6,891 Rupees and a Minimum Sales of 249 and No sales for few days.

Fig. 2: Daily sales report

Item wise Sales

Item wise sales shows the sales of different items, with plotting different items on X axis and quantity of sales on Y axis. From the graphical estimation it is found that Wire

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Gauge is having maximum sales with a quantity of 73 numbers and Wire gauge 2 with a quantity of 16 numbers and steel scale with a quantity of 6 numbers.
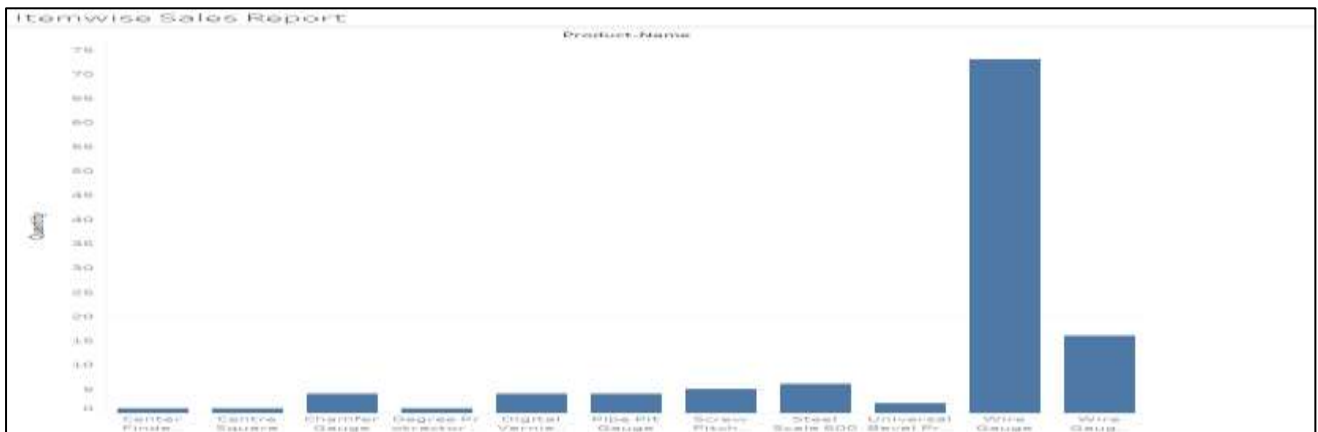

Fig. 3: Item wise sales

State Wise Sales

State wise sales indicates, maximum purchase is from Tamilnadu with a quantity

of 16 numbers, second highest is Karnataka with 15 numbers and third highest is Maharashtra with 14 numbers.
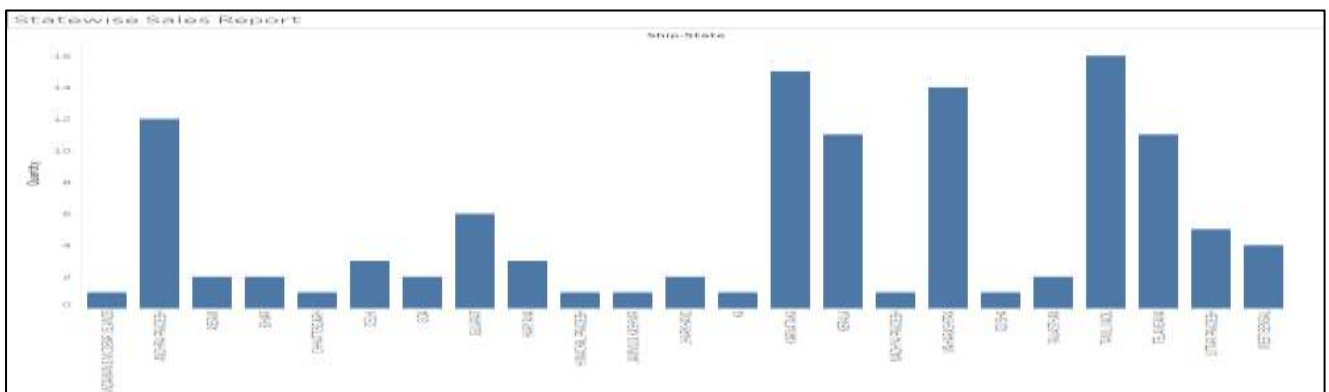

Fig. 4: State wise sales

Weekly Sales Forecast Qty

Weekly Sales Forecast is calculated using graphical plot with weekly sales in X axis and Sales Qty. on Y axis. Trend Line is plotted using Polynomial Type of curve fitting. Forecast is plotted with summary of results.
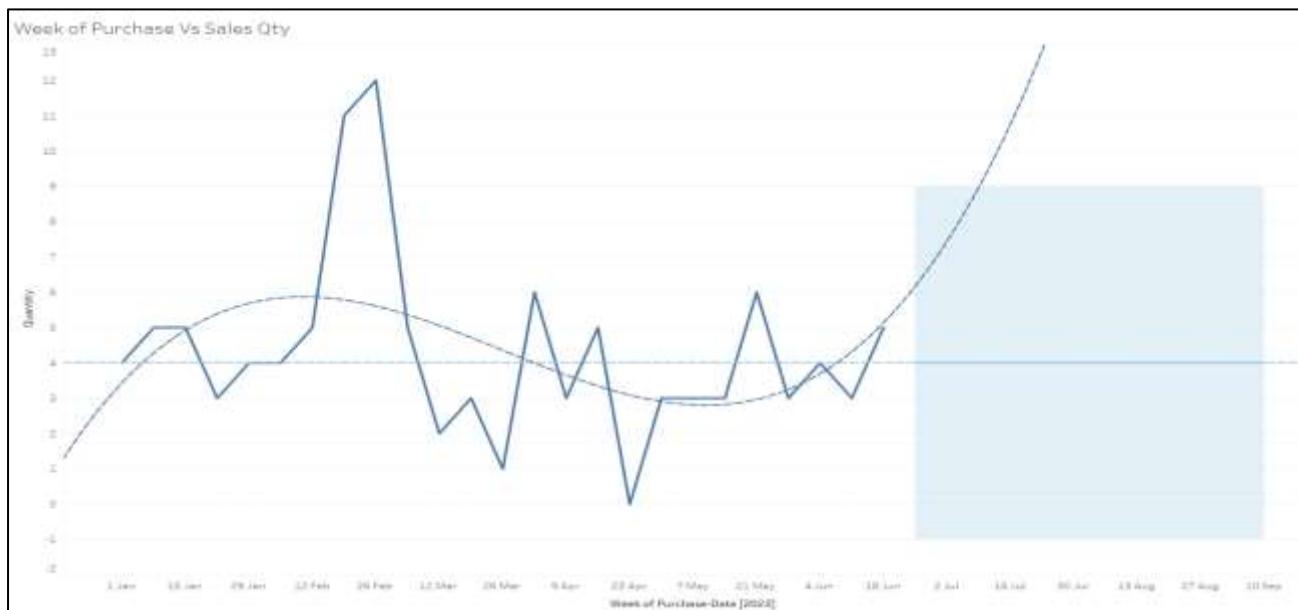

Fig. 5: Sales forecast with qty.

From the graph, Fig. 5, it is observed that there are many changes in sales of items with a maximum quantity of 12 items in a week. Trend Line shows the pattern of change in sales. Plotting the Forecast shows the sales forecast in upcoming weeks.

Options Used to Create Forecasts

Time series: Week of Purchase-Date
Measures: Sum of Quantity
Forecast forward: 12 weeks (25 June 2023 – 10 September 2023)
Forecast based on: 1 January 2023 – 18 June 2023
Ignore last: 1 week (25 June 2023)
Seasonal pattern: None (Not enough data to search for a seasonal pattern recurring every 13 Weeks)

Sum of Quantity

Initial 25 June 2023	Change From Initial 25 June 2023 – 10 September 2023	Seasonal Effect High	Seasonal Effect Low	Contribution Trend	Contribution Season	Quality
4 ± 5	0	None		0.0%	0.0%	Ok

Fig. 6: Sales Forecast with qty. report summary

From the Forecast report shown in Fig. 6, it is observed that, sales prediction in number of items could be 4 ± 5. This prediction is for a period of 12 weeks. Seasonal effects and other factors are not considered in this calculation.

Weekly Sales Forecast Price

Weekly Sales Forecast is calculated using graphical plot with weekly sales in X axis and Sales Amount on Y axis. Trend Line is plotted using Exponential Type of curve fitting. Forecast is plotted with summary of results.
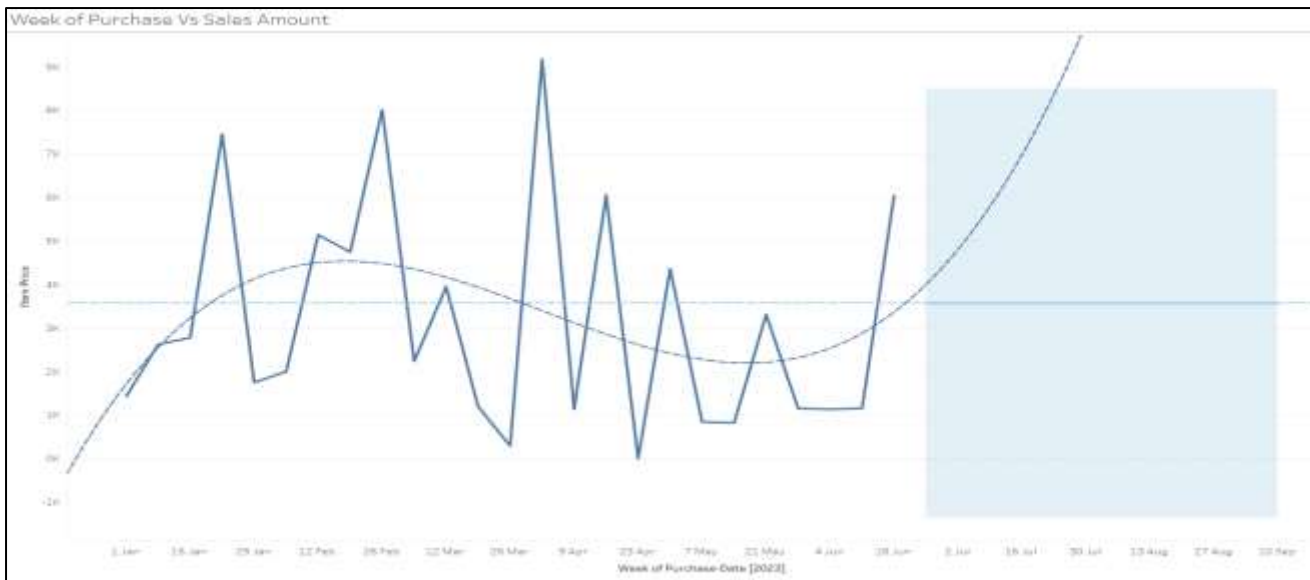
Fig. 7: Sales forecast with sales amount

From the graph, Fig. 7, it is observed that there are many changes in amount of sales with a maximum amount of Rupees 9,370 in a week. Trend Line shows the pattern of change in sales. Plotting the Forecast shows the sales forecast in upcoming weeks.

Fig. 8: Sales forecast with sales amount report summary

From the Forecast report shown in Fig. 8, it is observed that, sales prediction could be 3,569 ± 4,926 Rupees. This prediction is for a period of 12 weeks. Seasonal effects and other factors are not considered in this calculation [1-15].

Future Scope of Study

There are different parameters that affects the sales. Seasonal parameters and many other parameters. Calculating values of such parameters and using it can help to make the prediction more precise. Different Errors in calculation can also be listed and rectified.

CONCLUSION

From the study, it is concluded that, total sales in the upcoming 12 weeks will be 4±5 items and in terms of value it is 3,569 ± 4,926 Rupees. Total amount of sales prediction gives the exact amount of sales prediction. Since the number of quantity plays an important role when more number of sales it is given separately to understand the sales. Plotting different variables shows the highest sales is from tamil nadu, wire gauge is having the maximum number of selling item in terms of quantity. It is observed that Tableau is very useful in data analysis and visualization with an ease of use.

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