PROJECT :

Inventory Analysis Dashboard

Using POWER-BI

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View in Power BI

INTRODUCTION

- In my project of INVENTORY ANALYSIS , I used inventory data file present in **.xlsx** format. This Excel Workbook contains 2 excel sheets namely **'Past Orders'** and **'Stock'**.

- The 'Past Orders' sheet contains **'Order Date'** , **'SKU ID'** and **'Order Quantity'** as columns. The 'Stock' sheet contains **'SKU ID'** , **'Current Stock Quantity'** , **'Units'** , **'Average Lead Time'** , **'Maximum Lead Time'** and **'Unit Price'** as columns . The 'Stock' data sheet contains 304 rows and 'Past Orders' data sheet contains **33920 rows**.

- I connected this data set to **POWER-BI** and loaded it for cleaning , analyzing and visualization purpose in order to create a POWER-BI Dashboard. This dashboard is dynamic and gives insights about the data and makes decision making easier for the stake holders.

- The feature of **'Power Query'** in POWER-BI help in cleaning and transforming data. This great Business Intelligence Tool allows us to **'Add Columns'**(calculated columns) and **'Measures'** in our data set using **DAX (Data Analysis Expressions) Language**.

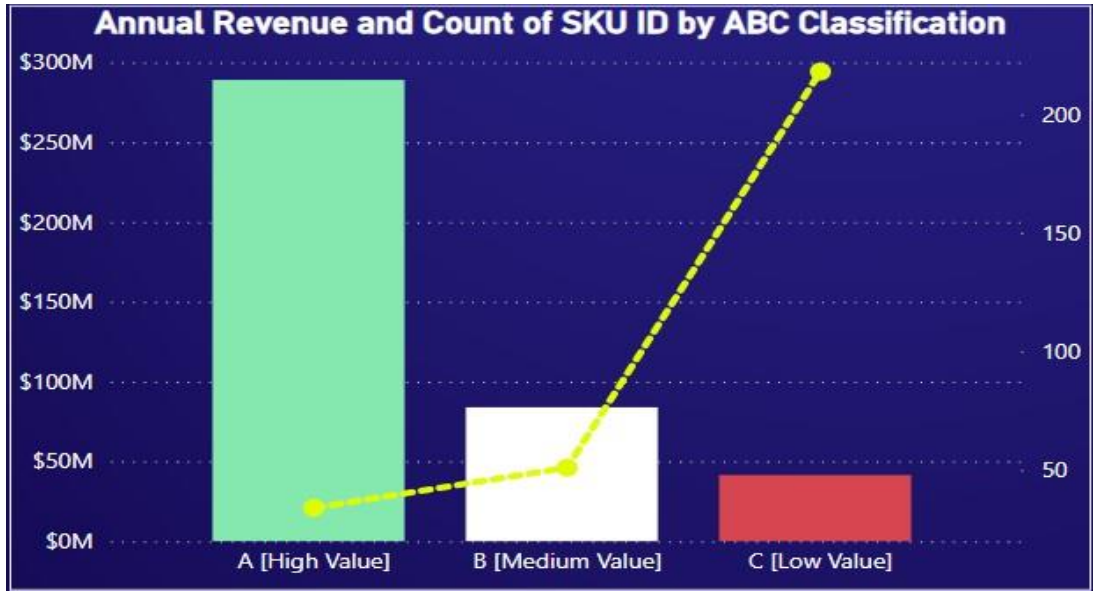
- This tool allows us to establish relationship between different data tables in **'Data Modelling'**. In data modelling we connect 'Primary Key' and 'Foreign Key' to establish and integrate the data tables.

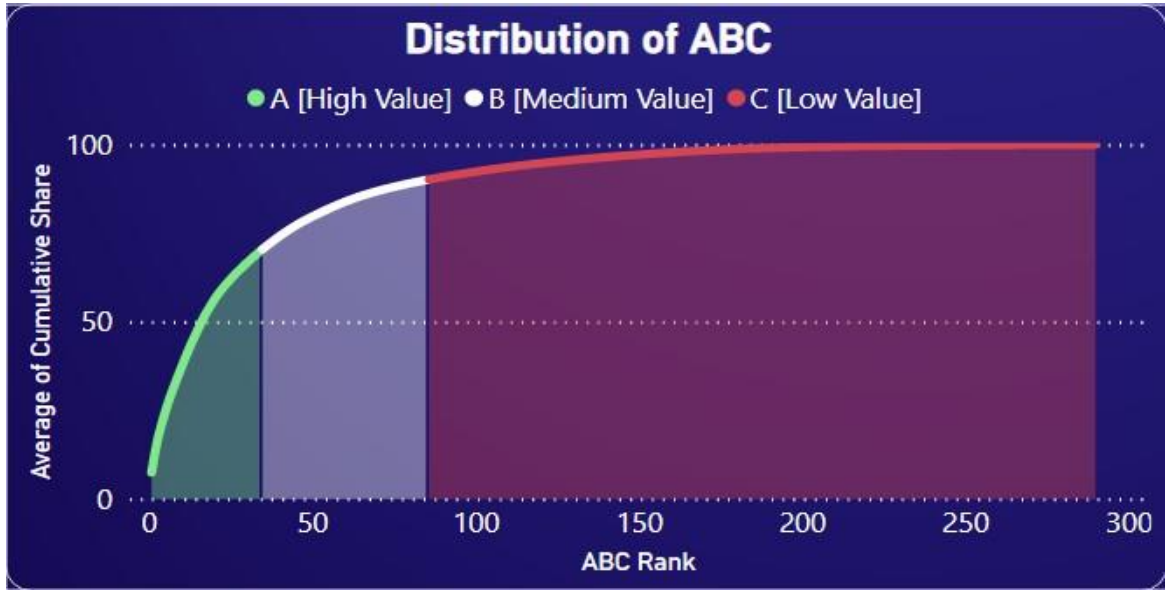
Calculations and Analysis Performed using POWER-BI

Using Power Querying and DAX Language, I performed the following mentioned inventory related classification and calculations. Using these calculations I used the suitable data visuals for each of them, assembled them in POWER-BI Report View and created ‘INVENTORY ANALYSIS DASHBOARD’.

- ABC Classification
- XYZ Classification
- Inventory Turnover Ratio
- Safety Stock Levels
- Re-Order Levels
- Stock Status

ABC Classification





ABC classification is **a ranking system for identifying and grouping items in terms of how useful they are for achieving business goals**. The system requires grouping things into three categories: A - extremely important. B - moderately important. C - relatively unimportant. It follows Pareto principle i.e. 80-20 Rule.

Category	Revenue Share	Volume Share
A	60-70 %	5-10 %
B	15-25 %	10-20 %
C	5-15 %	70-80 %

XYZ Classification

Distribution of Current Stocks

ABC Classification	X [Uniform Demand]	Y [Variable Demand]	Z [Uncertain Demand]
A [High Value]	$4.6M	$10.2M	$9.3M
B [Medium Value]	$0.8M	$4.0M	$25.4M
C [Low Value]	$0.4M	$5.1M	$17.4M

Distribution of Annual Revenue

ABC Classification	X [Uniform Demand]	Y [Variable Demand]	Z [Uncertain Demand]
A [High Value]	$140.58M	$102.28M	$46.15M
B [Medium Value]	$7.36M	$26.79M	$49.73M
C [Low Value]	$4.10M	$13.88M	$23.46M

Distribution of Inventory Turnover Ratio

ABC Classification	X [Uniform Demand]	Y [Variable Demand]	Z [Uncertain Demand]
A [High Value]	30.86	10.00	4.96
B [Medium Value]	9.62	6.61	1.96
C [Low Value]	9.52	2.70	1.35

The **XYZ** analysis is a way to classify inventory items according to variability of their demand.

•**X** – Very little variation: X items are characterized by steady turnover over time. Future demand can be reliably forecast.

•**Y** – Some variation: Although demand for Y items is not steady, variability in demand can be predicted to an extent. This is usually because demand fluctuations are caused by known factors, such as seasonality, product lifecycles, competitor action or economic factors. It's more difficult to forecast demand accurately.

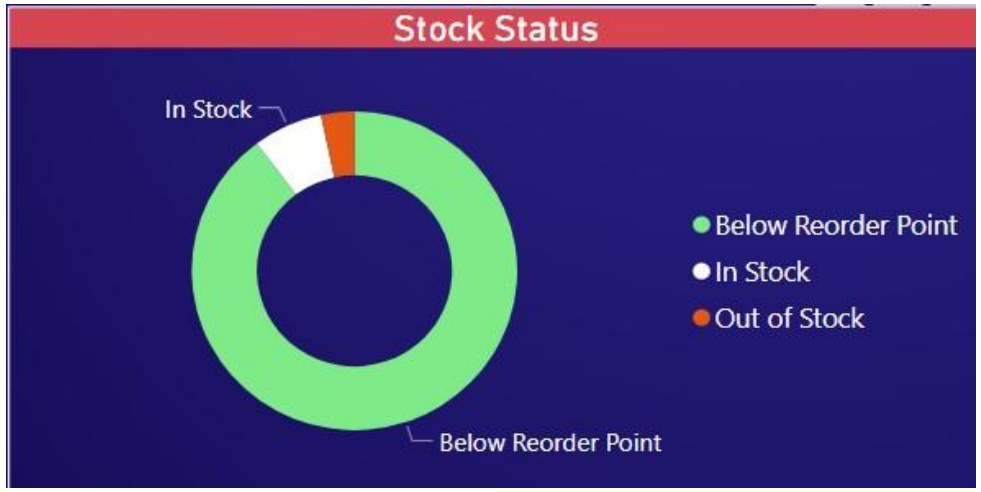
•**Z** – The most variation: Demand for Z items can fluctuate strongly or occur sporadically. There is no trend or predictable causal factors, making reliable demand forecasting impossible.

Inventory Turnover Ratio

- Inventory turnover is the rate that inventory stock is sold, or used, and replaced.
- The inventory turnover ratio is calculated by dividing the cost of goods by average inventory for the same period.
- A higher ratio tends to point to strong sales and a lower one to weak sales. Conversely, a higher ratio can indicate insufficient inventory on hand, and a lower one can indicate too much inventory in stock.
- For most industries, the ideal inventory turnover ratio will be between 5 and 10, meaning the company will sell and restock inventory roughly every one to two months. For industries with perishable goods, such as florists and grocers, the ideal ratio will be higher to prevent inventory losses to spoilage.

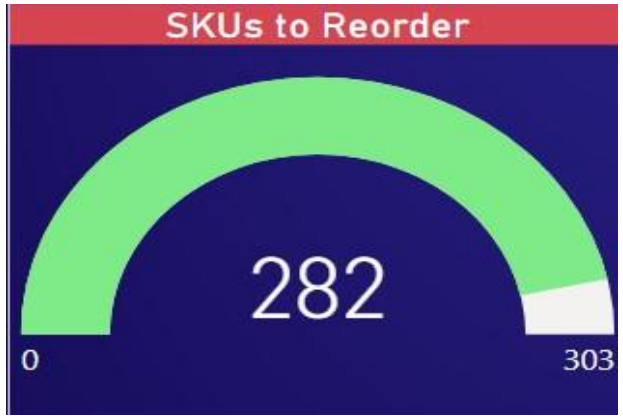
- **Inventory Turnover Ratio = (Cost of Goods Sold annually) / (Average Inventory Value)**

Stock Status



- Stock status shows **what is on hand, what is due in, and what is owed to customers**.
- Here the doughnut chart shows the items out of stock , in stock items and items which are below re-order point.

Re-Order Levels



- Reorder level (or Reorder point) is **the inventory level at which a company would place a new order or start a new manufacturing run**. Reorder level depends on a company's work-order lead time and its demand during that time and whether the company maintain a safety stock.

Safety Stock Level

- **Safety stock** is a term used to describe a level of extra stock that is maintained to mitigate risk of stockouts (shortfall in raw material or packaging) caused by uncertainties in supply and demand. Adequate safety stock levels permit business operations to proceed according to their plans . Safety stock is held when uncertainty exists in demand, supply, or manufacturing yield, and serves as an insurance against stockouts.

- It acts as a buffer stock in case sales are greater than planned and/or the supplier is unable to deliver the additional units at the expected time.

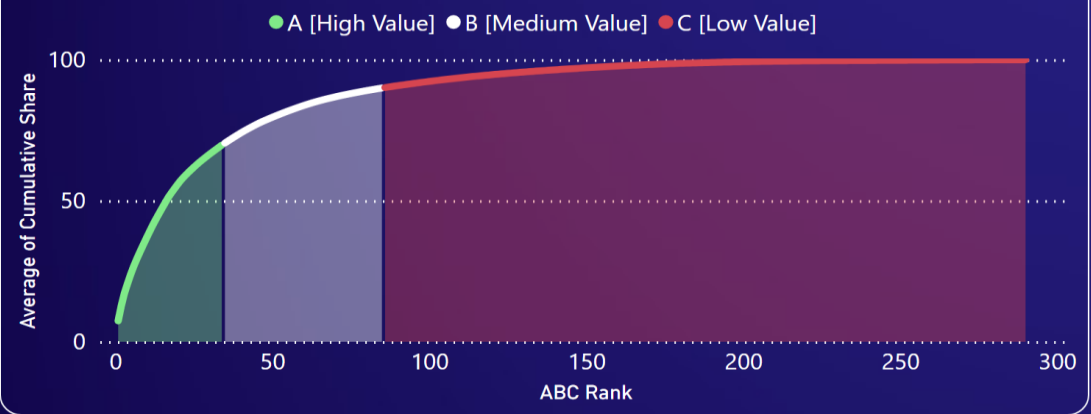
➢ **Safety Stock = (Peak Demand)*(Max Lead Time) - (Average Demand)*(Average Lead Time)**

➢ **Re-Order Point = Safety Stock + (Average Demand)*(Average Lead Time)**

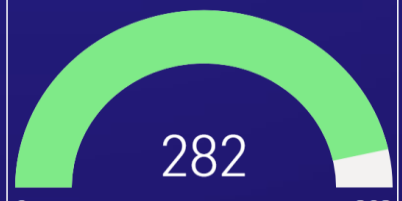
Inventory Analysis Dashboard

303	$77.3M	5.36
Number of SKUs	Current Value in Warehouse	Inventory Turnover Ratio

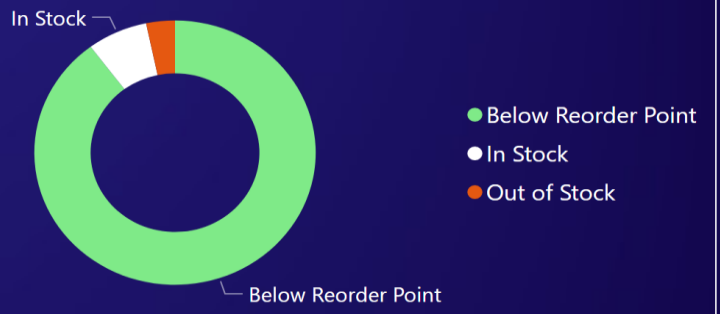
Distribution of ABC



SKUs to Reorder



Stock Status



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SKU ID	Current Stock Quantity	Average Lead Time (days)	Reorder Point	Safety Stock	Stock Status
1491CA	0	30	0	0	Out of Stock
2884AA	690	15	0	0	In Stock
2895CA	470	30	0	0	In Stock
2982AA	200	30	0	0	In Stock
2987AA	15	30	0	0	In Stock
3274CA	0	60	0	0	Out of Stock
3276AA	0	30	0	0	Out of Stock
3291CA	0	60	0	0	Out of Stock
3296AA	0	30	0	0	Out of Stock
3299CA	0	60	0	0	Out of Stock
3300CA	0	30	0	0	Out of Stock
3312AA	0	60	0	0	Out of Stock
3332CA	0	30	0	0	Out of Stock
3038BA	10	15	24	17	Below Reorder

CONCLUSION AND INSIGHTS

- The main conclusion of this project is that by using business intelligence tools such as Power BI we can connect and analyze various data sources, also this tool's desktop version is available for free, hence it is cost effective as well. And paid version is also affordable to organizations.
- This tool provides flexibility with data updating which means as soon as the data values changes and addition of new data values takes place , the Power BI dashboard also gets update and the changes will get applied to all the visual and tables present in the dashboard.
- The overall inventory turnover ratio is 5.36.
- The current value in warehouse is $77.3 M.
- Out of the 303 SKUs 272 SKUs are required to re-order.
- Out of the 303 SKUs 272 (89.77%) of SKU are below re-order point, 21 (6.93%) of SKU are in Stock and 10 (3.3%) of SKU are out of stock.
- Current Stock Quantity is maximum for SKU ID - 2429BA.
- Current value in Warehouse is maximum for SKU ID – 2429BA which is $1.8 M.
- As per current stock distribution B [Mid Value] and Z [Uncertain Demand] SKUs have maximum value which is $25.4 M.

- As per the distribution of annual revenue A [High Value] and X [Uniform Demand] SKUs have maximum value which is $140.58 M.
- Inventory Turnover Ratio is maximum for A [High Value] and X [Uniform Demand] SKUs which is 30.86.
- Inventory Turnover Ratio is minimum for C [Low Value] and Z [Uncertain Demand] SKUs which is 1.35.
- A category product gives revenue of $292 M, B category product generate revenue of $85 M and C category product generate $42 M revenue.
- Count 0f SKUs present in A category are 34, present in B category are 51 and those present in C category are 218 in count.

THANK YOU