RETAIL STORE STOCK INVENTORY ANALYTICS

NALAIYA THIRAN PROJECT BASED LEARNING

on

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

A PROJECT REPORT

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BACHELOR OF ENGINEERING
IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

Retail inventory management is the process of ensuring you carry products that shoppers want, with neither too little nor too much on hand. By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply. Inventory management is vital for retailers because the practice helps them increase profits.

They are more likely to have enough inventory to capture every possible sale while avoiding overstock because too much inventory means workingcapital costs, operational costs, and a complex operation.
Based on the inventory management analysis we can manage how much inventory is required for selling the product based on which they can calculate the profit and losses.

Our dataset contains a lot of historical sales data of a Brazilian top retailer

Basic Questions of every retailer: How much inventory should I carry? Too much inventory means working capital costs, operational costs and a complex operation, lack of inventory leads to lost sales, unhappy customersand a damaged brand.

This is why short-term forecasting is so important in the retail andconsumer goods industry.

1.2 PURPOSE

A good Inventory Management System will alert the retailer when it is time to reorder. Inventory Management System is also an important means of automatically tracking the stocks of their product. For example, if a business orders ten pairs of socks for retail resale, but only receives nine pairs, this will be obvious upon inspecting the contents of the package, and error is not likely.

On the other hand, say a wholesaler orders 100,000 pairs of socks and 10,000 are missing. Manually counting each pair of socks is likely to result in error. An automated Inventory Management System helps to minimize the risk of error. In retail stores, an Inventory Management System also helps track theft of retail merchandise, providing valuable information about store profits and the need for theft-prevention systems. The product quantity is updated by the store operator every time a product is bought/received. This information is then tracked by a central computer system.

The Inventory Management System can serve a variety of functions in this case. It can help in identifying the overstock and understock products prior. It also provides sales insights and stock reports in the form of graphs/ charts which will be useful for easier visualization. All of this data works in tandem to provide businesses with real-time inventory tracking information. Inventory Management Systems make it simple to locate and analyze inventory information in real-time with a simple database search.

Retail Sales measures the gross receipts of a retail store by selling durable and nondurable goods. The main components of retail sales are grocery, food & clothing and shoe retailing. In India, consumer spending roughly accounts for over 60% of GDP and is therefore, a vital element in the country’s economic growth. Any change in retail sales pattern is importantand is seen as the timeliest indicator of wide consumption patterns. Retail sales may have short term and long term goals in nature. Short term retail sales goals are supposed to support and merge into long term goals

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

- Retail store and Inventory management System deals with the communicating between the all users in this system.

- In existing manual huge expenditure and a lot of time is spent in collecting the inventory of information and doing the bill based on category he choose.

- So, there is a need for an integrated automated system, which centralized control over the entire process.

The following drawbacks of the existing system emphasize the need for Retail store and inventory management system:

- Conventional system makes use of huge amount of time for providing the information about the inventory to the manager.

- Difficulty in tracking and retrieving data from the related inventory. So, there is a need computerization. With computerized systems paper work drastically reduces, data retrieval becomes easy and duplication of work is avoided.

2.2 REFERNCES

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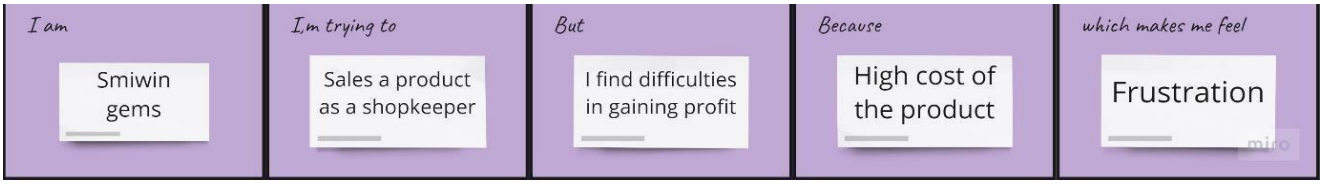
2.3 PROBLEM STATEMENT DEFINITION

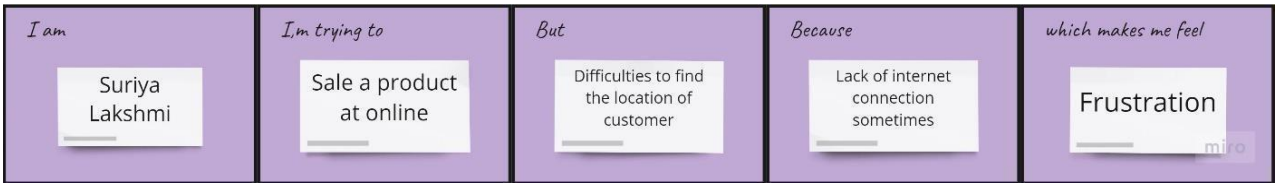
Problem Statement 1:

Problem statement 2:

Problem statement 3:

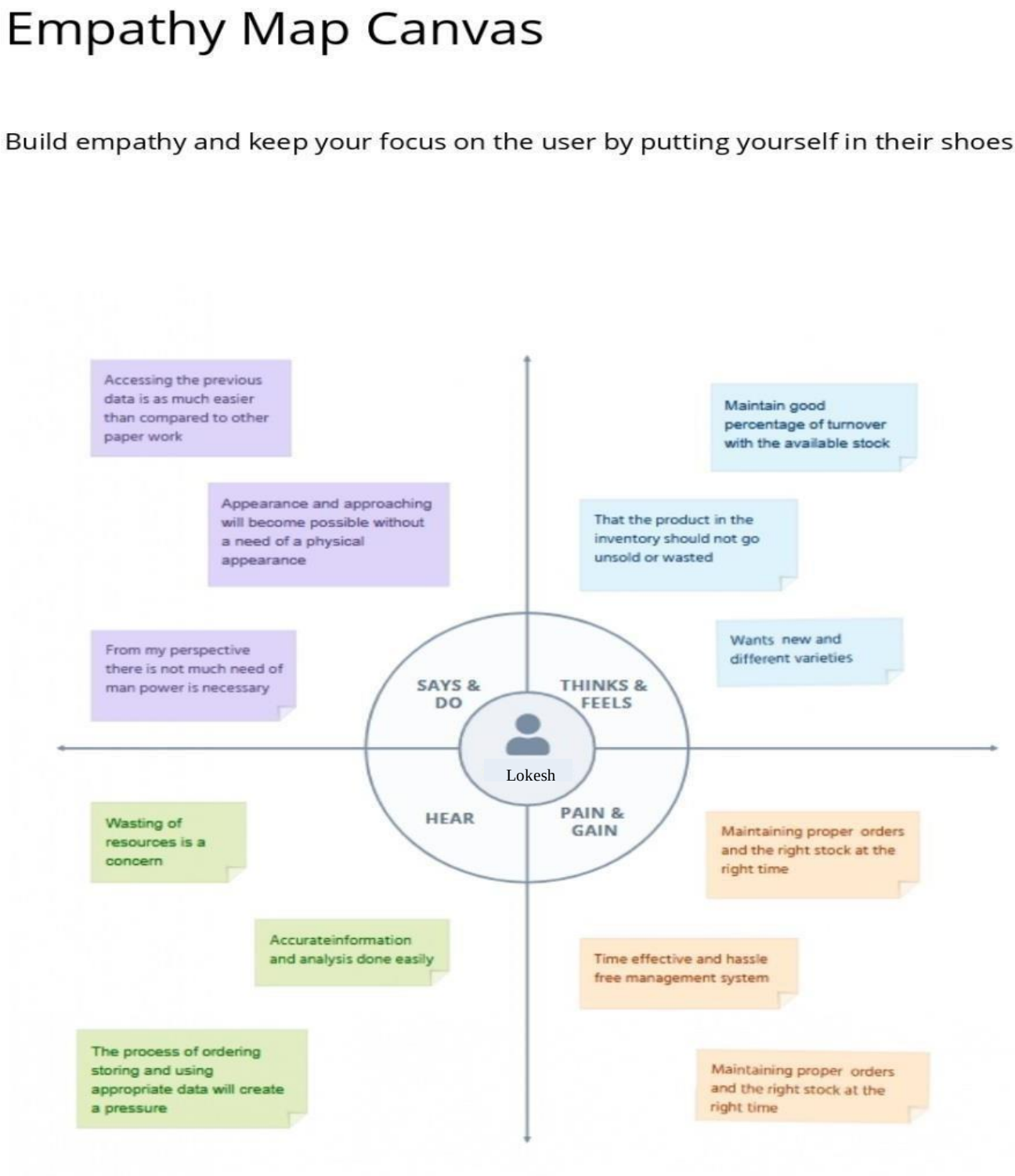


Problem statement 4:



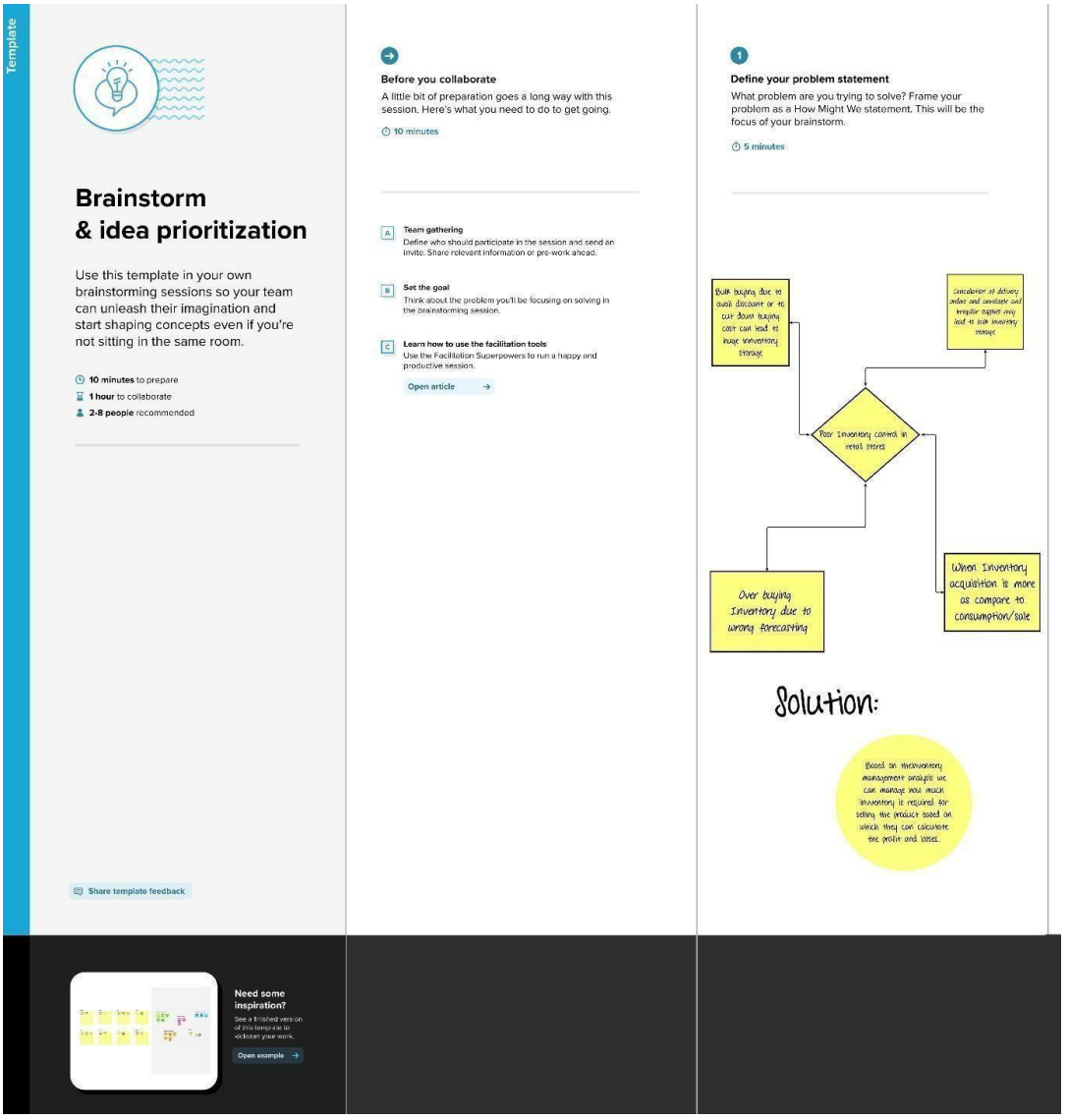
3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP



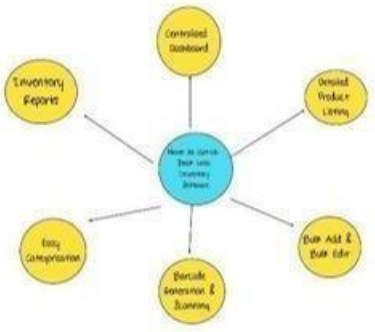
3.2 IDEATION PHASE AND BRAIN STORMING

Step 1:

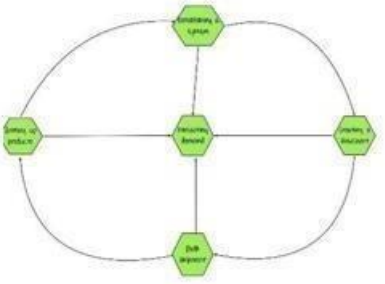


Step 2:

IDEA 1
LOKESH G

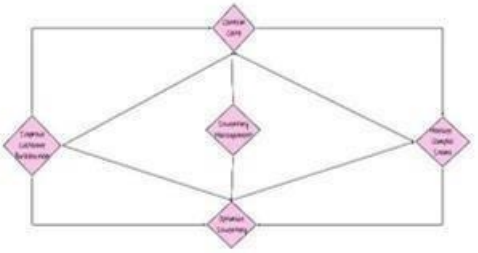


IDEA 2
KAMALESH D



IDEA 3
PRASANTH B

IDEA 4
MADHANRAJ P

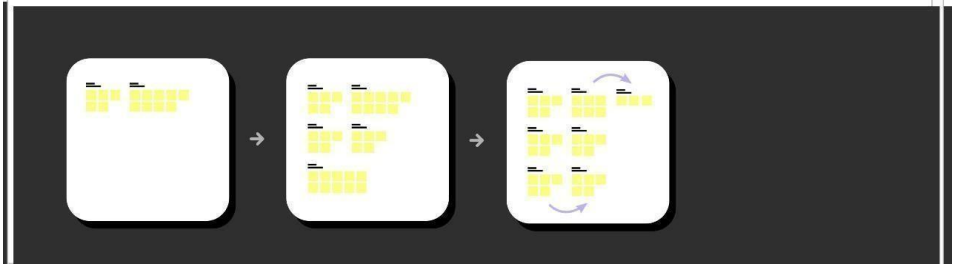


3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes



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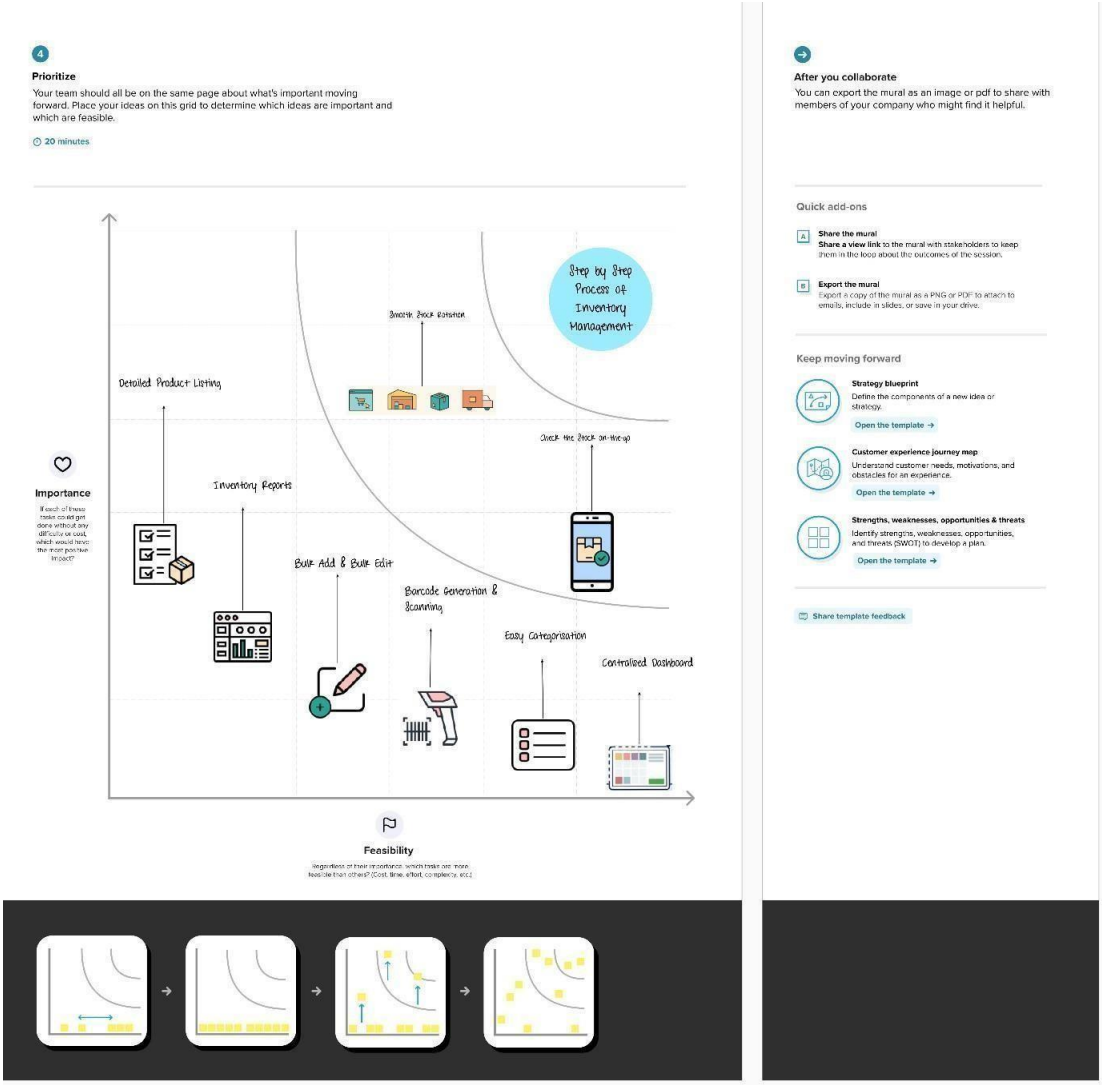
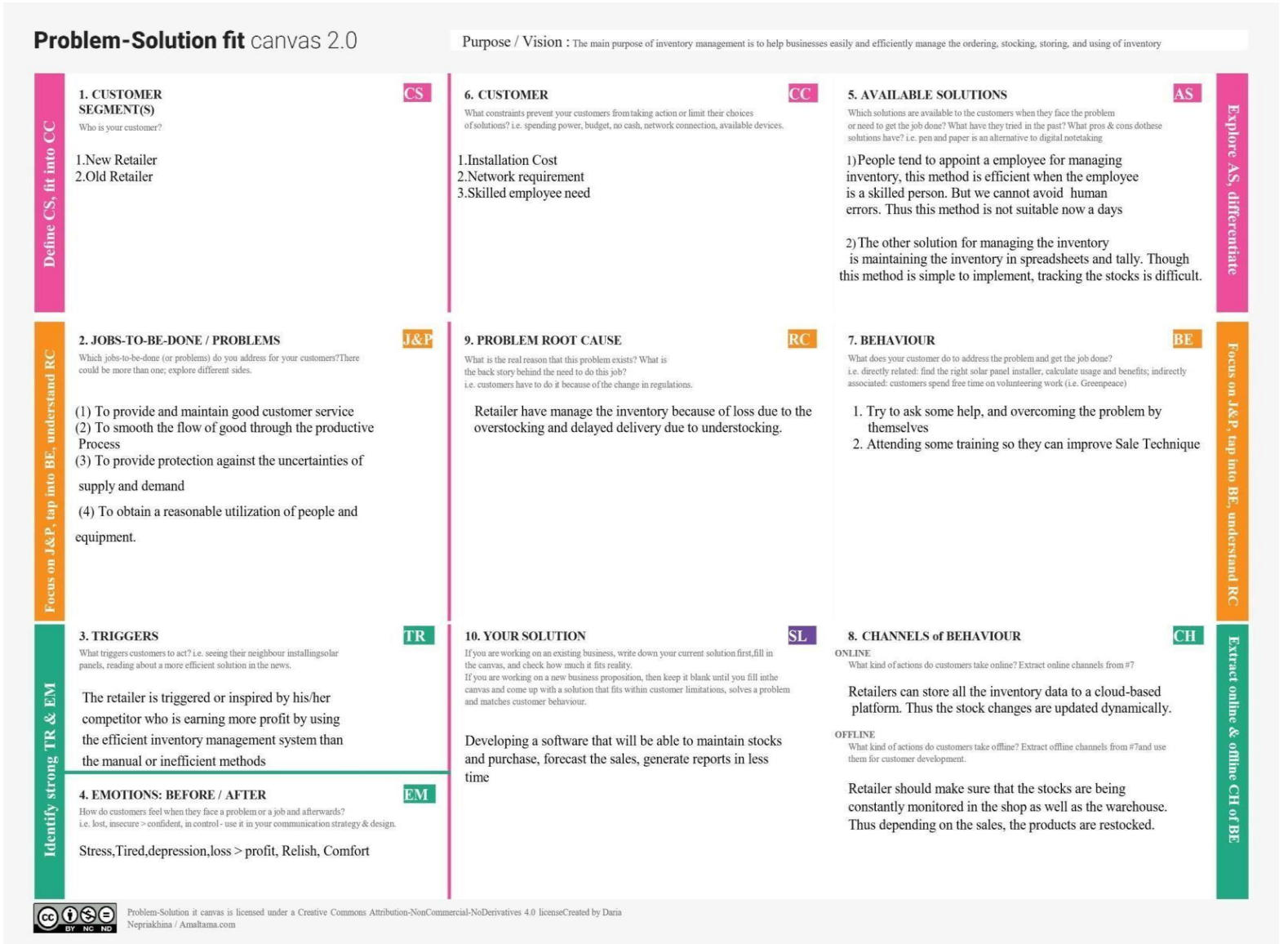

4
Prioritize
Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.
20 minutes
Step by Step Process of Inventory Management
Detailed Product Listing
Inventory Reports
Bulk Add & Bulk Edit
Barcode Generation & Scanning
Easy Categorisation
Centralised Dashboard
Importance
Feasibility
After you collaborate
You can export the mural as an image or pdf to share with members of your company who might find it helpful.
Quick add-ons
Share the mural
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
Export the mural
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.
Keep moving forward
Strategy blueprint
Define the components of a new idea or strategy.
Open the template
Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template
Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template
Share template feedback

3.3 PROPOSED SOLUTION

S .No	Parameter	Description
1.	Problem Statement	The problem faced by the retail store is they do not have any systematic system to record and keep their inventory data. It is difficult for the admin to record the inventory data quickly and safely because they only keep it in the logbook and not properly organized.
2.	Solution description	The goal is to utilize the given data set about the Retail Store Stock Inventory and store the data in the cloud ,So the retail store can use this information to easily predict the inventory easily and quickly.
3.	Novelty / Uniqueness	Complete a thorough analysis of our store; it leads to avoiding overstock and also analysis of the competitive relevant market. Gathering customer feedback and measuring our business results.
4.	Social Impact / Customer Satisfaction	When customers get the products they want faster with fewer mistakes or out-of-stocks, it increases customer loyalty.
5.	Business Model	Ad based Revenue model- Awareness can be created for Optimize the use of inventory, reduce handling cost, optimize cash flow
6.	Scalability of the Solution	Retail store stock inventory can be predicted easily with the data's stored in the retail stores. It gives the best user experience and maintains the details

3.4 PROBLEM SOLUTION FIT



4.REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login	Login with username Login with password
FR-4	Profile update	Update the user credentials Update the Contact details
FR-5	Uploading Data	Collect the customer details as well as product details Upload the product details This model predicts the best sold products and also it analysis the available stocks
FR-6	Recommendation	User will request for Item Get the Item recommendations
FR-7	Ratings and Reviews	The user i.e retailer of any shop can give their ratings and view of this models

4.2 NON- FUNCTIONAL REQUIREMENTS

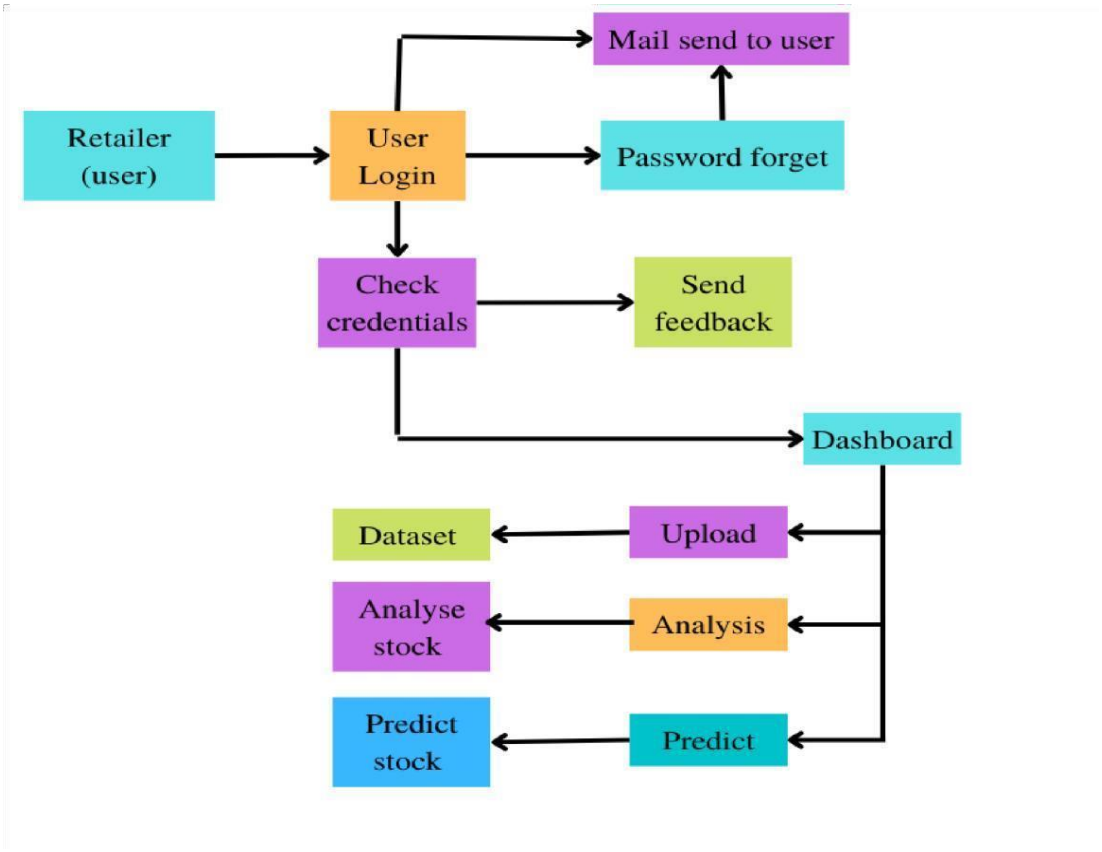
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	They are more likely to have enough inventory to capture every possible sale while avoiding overstock and minimizing expenses.
NFR-2	**Security**	This can be used only by the users who have their proper login credentials
NFR-3	**Reliability**	Avoid over or understocking Ensure accurate inventory valuation Prevent order delays Reduce dead stock
NFR-4	**Performance**	From this, the model can predict the dead stocks and highly profitable stocks. The accuracy of this model will be ensured by checking multiple times.
NFR-5	**Availability**	This model is suitable for all kinds of retail stores. It can give retailers real-time visibility into stock levels, avoidstockouts, keep inventory carrying costs low and help meet customer expectations
NFR-6	**Scalability**	More users can be accessed at the same time without any issues. The feedback of the users will be taken and be proceeded further up to the satisfaction of the user.

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

Data Flow Diagram:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2 SOLUTION & TECHNICAL ARCHITECTURE

Technical Architecture:

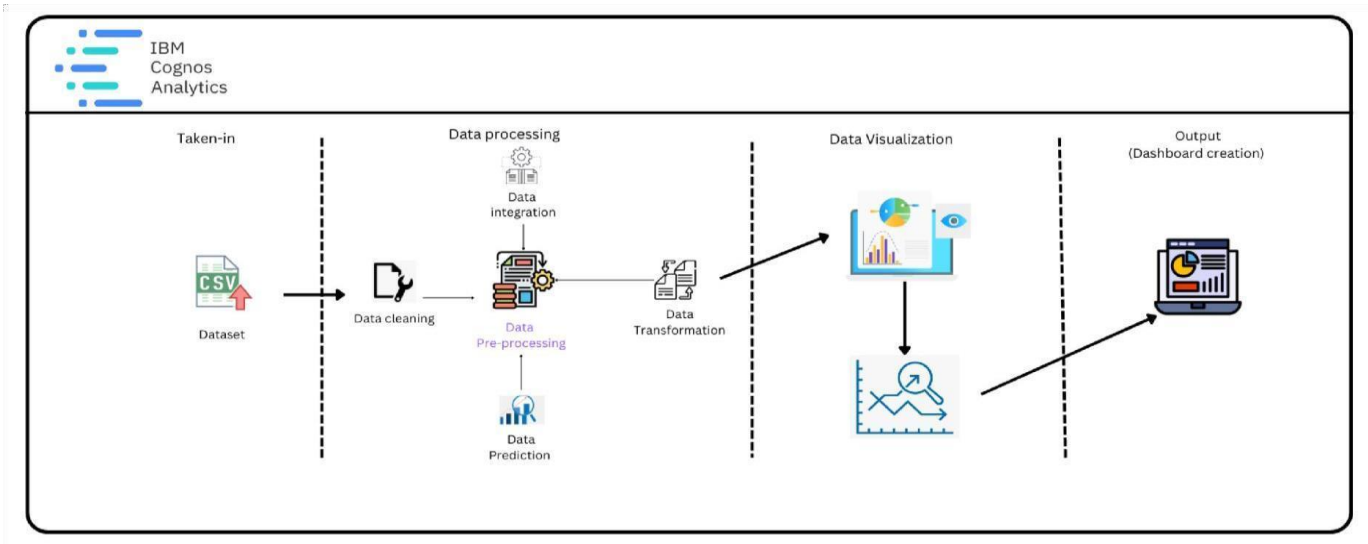


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user interacts with application using Web UI	HTML, CSS, JavaScript
2.	Data Processing	The data from the dataset is pre-processed	IBM Cognos Analytics
3.	Cloud Database	The clean dataset is stored on IBM Cloud	IBM Cloud
4.	Data visualization	The data is visualized into different forms	IBM Cognos Analytics, Python
5.	Prediction	These Algorithm techniques are used to predict the proper way to make the stock in store.	ML algorithms – Logistic Regression, Linear Regression, Random Forest,ABC.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open-source frameworks used	IBM Cognos Analytics, Python
2.	Security Implementations	Request authentication using Encryptions	Encryptions
3.	Scalable Architecture	Scalability consists of 3-tiers	Web Server – HTML, CSS, Javascript Application Server – Python Database Server – IBM Cloud
4.	Availability	The application is available for cloud users	IBM Cloud Hosting
5.	Performance	The user can know how to maintain the inventory to increase profits.	ML algorithms

5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the web application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, after completing the registration I will receive confirmation email once I have registered for the web application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the web application through LinkedIn	I can register & access the dashboard with LinkedIn Login	Low	Sprint-2
		USN-4	As a user, I can register for the web application through Google account	I can register & access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password after installing the web application	I can access the dashboard by login into the application	High	Sprint-1
	Dashboard	USN-6	As a user, I can view the charts and graphs representation of the dataset and the information shown in the dashboard	I can analyse the stocks in my retail store.	High	Sprint-1
Customer (Web user)		USN-1	As a user, I can register for the web application entering my email, password,confirming my password.	I can access my account / dashboard	High	Sprint-1
Customer Care Executive		USN-2	As a user, after completing the registration I will receive confirmation email once I have registered for the web application	I can receive confirmation email & click confirm	High	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Administrator		USN-3	As a user, I can register for the web application through LinkedIn	I can register & access the dashboard with LinkedIn Login	Low	Sprint-2
		USN-4	As a user, I can register for the web application through Google account	I can register & access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the web application by entering email & password after installing the application.	I can access the dashboard by login into the application	High	Sprint-1
	Dashboard	USN-6	As a user, I can view the charts and graphs representation of the dataset and the information shown in the dashboard.	I can analyse the stocks in my retail store.	High	Sprint-1
Customer Care Executive		CCE-1	As a customer care executive, I will always be available for the interaction with the customer to clarify the queries.	An executive will analyse the customer complaints, rectify their problems	High	Sprint-2
Administrator		ADMIN-1	As an administrator, I will manage backup and recovery, data modelling and design, distributed computing, database system, and a data security	Administrator can evaluate, design, review and implementing a data,they are also responsible for updating and maintaining the data.	High	Sprint-2

6.PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

Product backlogs, Sprint schedule, Estimation(4 marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	The dataset is collected and the understanding of dataset is done to present the analytics to the user	2	High	Lokesh G Kamalesh D Prasanth B Madhanraj P
Sprint-1	Data Preparation	USN-2	As a user, I can view the accurate analytics of data by prepared data. The data preparation is done to restructure and clean the data.	3	High	Lokesh G Kamalesh D Prasanth B Madhanraj P
Sprint-2	Data Exploration	USN-3	As a user, I can view the visualized data to get the better understanding about the sales, stock, revenue and price.	8	High	Lokesh G Kamalesh D Prasanth B Madhanraj P
Sprint-3	Dashboard Creation	USN-4	As a user, I can view the different visualization in the dashboard about the sales, stock, revenue and price.	8	High	Lokesh G Kamalesh D Prasanth B Madhanraj P

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-4	Report creation	USN-5	As a user, I can view the detailed report of the sales, stock, revenue and price. The user can get the report of the particular data.	8	High	Lokesh G Kamalesh D Prasanth B Madhanraj P
Sprint-4	Story creation	USN-6	As a user, I can view the story to get the better understanding of the sales, stock, revenue and price. The user can make decisions based on the story.	8	High	Lokesh G Kamalesh D Prasanth B Madhanraj P

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	6 Days	24 Oct 2022	29 Oct 2022	5	29 Oct 2022
Sprint-2	8	6 Days	31 Oct 2022	05 Nov 2022	8	05 Nov 2022
Sprint-3	8	6 Days	07 Nov 2022	12 Nov 2022	8	12 Nov 2022
Sprint-4	16	6 Days	14 Nov 2022	19 Nov 2022	16	19 Nov 2022

6.2 SPRINT DELIVERY & SCHEDULE

Project Development Phase:

Sprint-1:

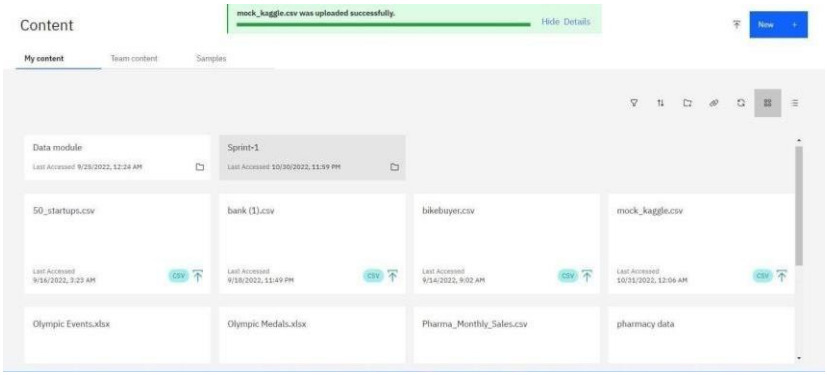
- ➢ Data Collection ➢ Data Preparation **Sprint-2:**
- ➢ Data Exploration **Sprint-3:**
- ➢ Dashboard Creation **Sprint-4:**
- ➢ Report Creation
- ➢ Story Creation

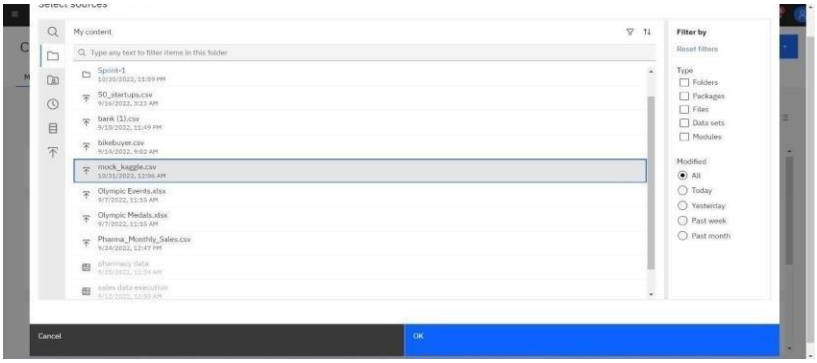
Sprint-1:

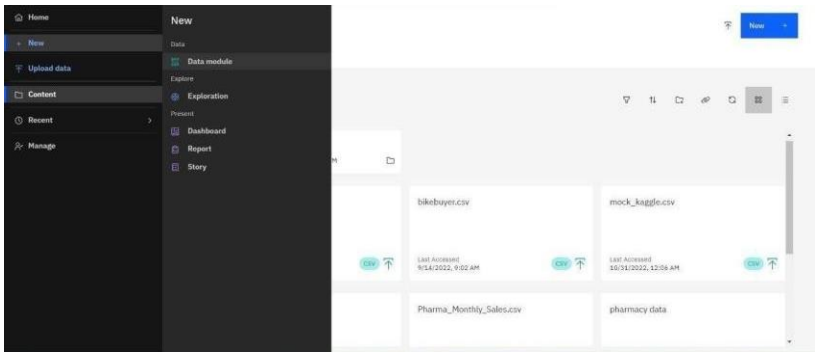
Data Collection:

Load the Dataset:

Tool used – IBM Cognos







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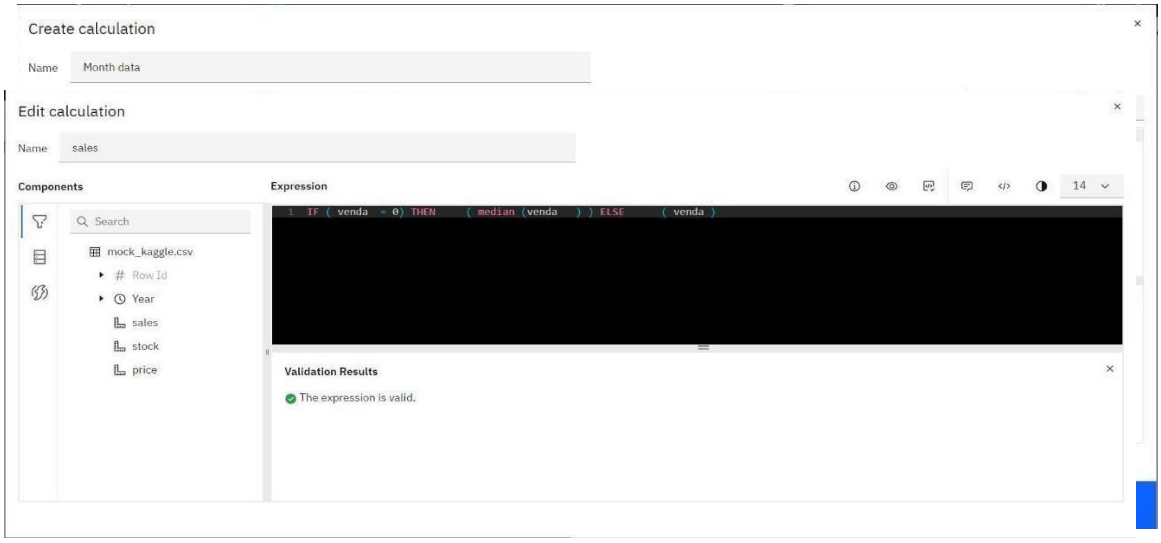
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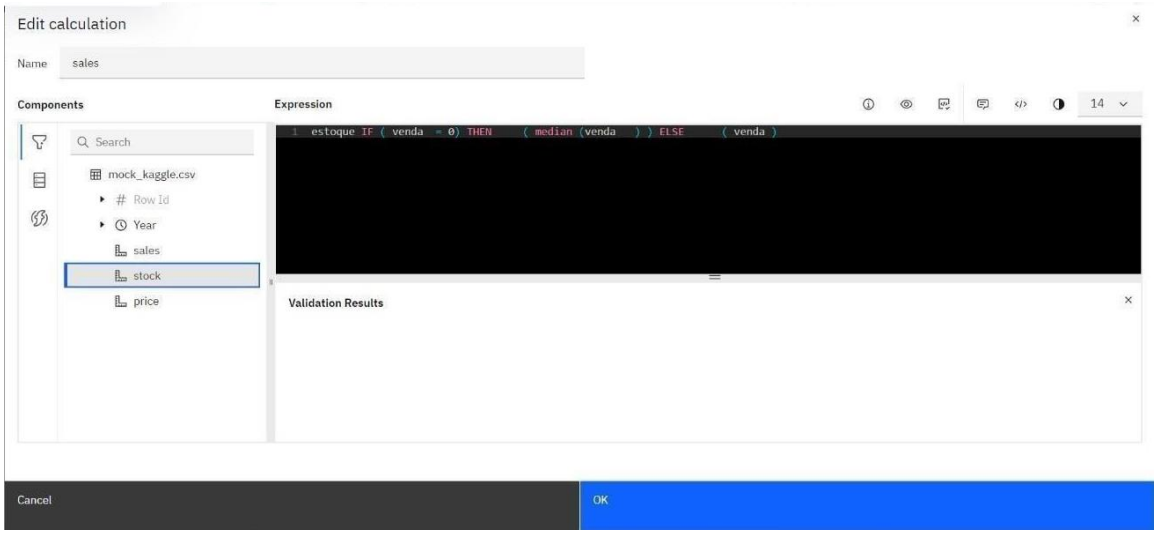
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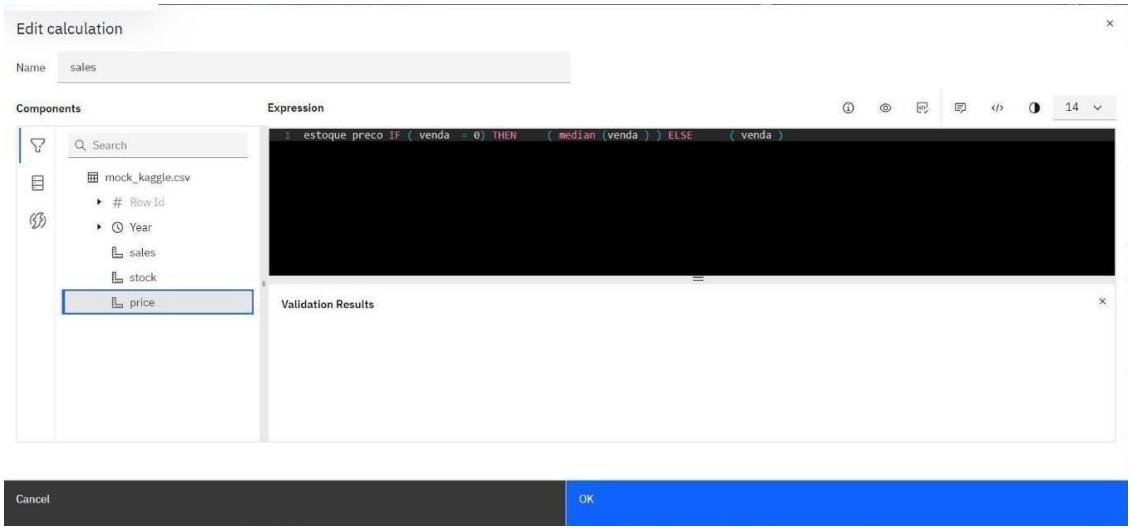
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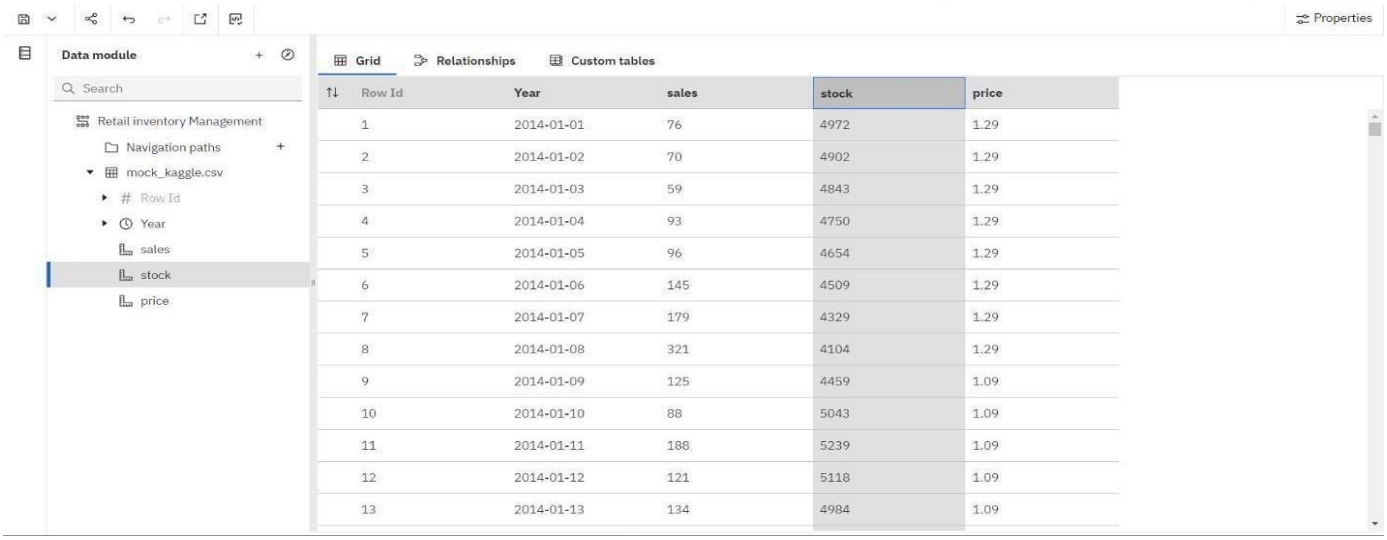
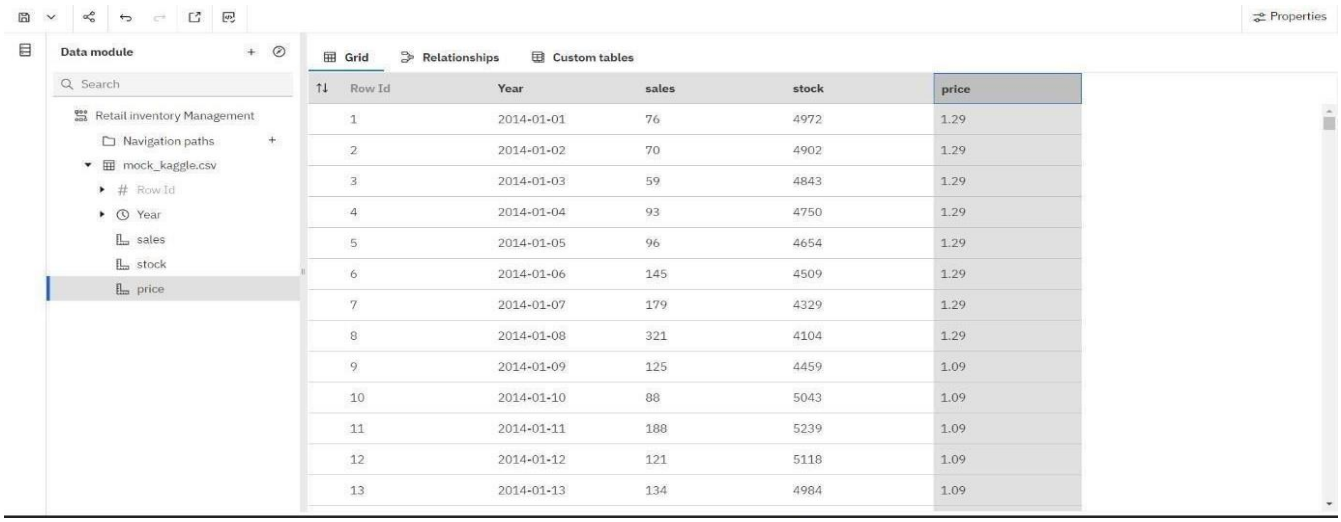
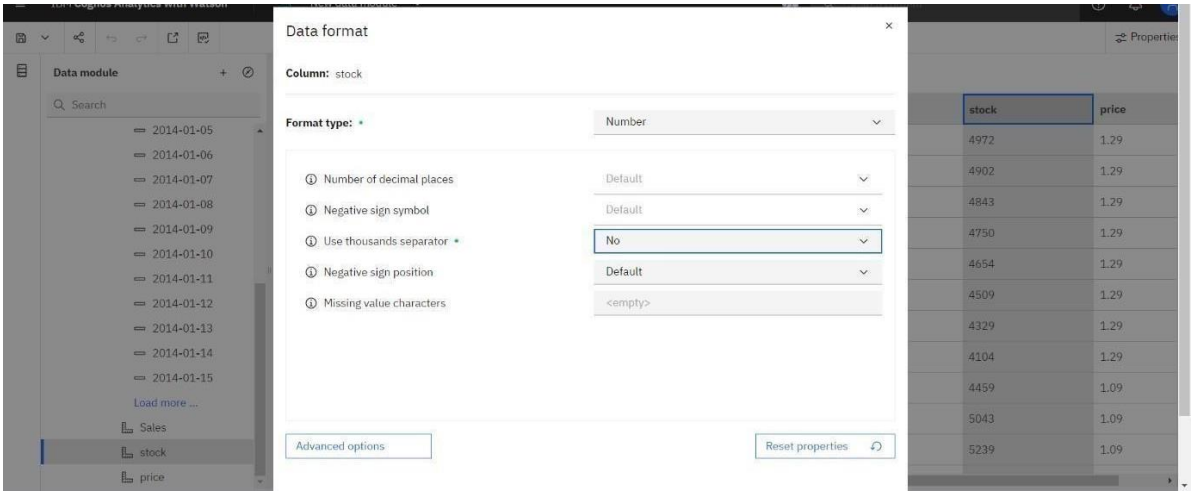


Row Id	Year	sales	stock	price
1	2014-01-01	76	4972	1.29
2	2014-01-02	70	4902	1.29
3	2014-01-03	59	4843	1.29
4	2014-01-04	93	4750	1.29
5	2014-01-05	96	4654	1.29
6	2014-01-06	145	4509	1.29
7	2014-01-07	179	4329	1.29
8	2014-01-08	321	4104	1.29
9	2014-01-09	125	4459	1.09
10	2014-01-10	88	5043	1.09
11	2014-01-11	188	5239	1.09
12	2014-01-12	121	5118	1.09
13	2014-01-13	134	4984	1.09

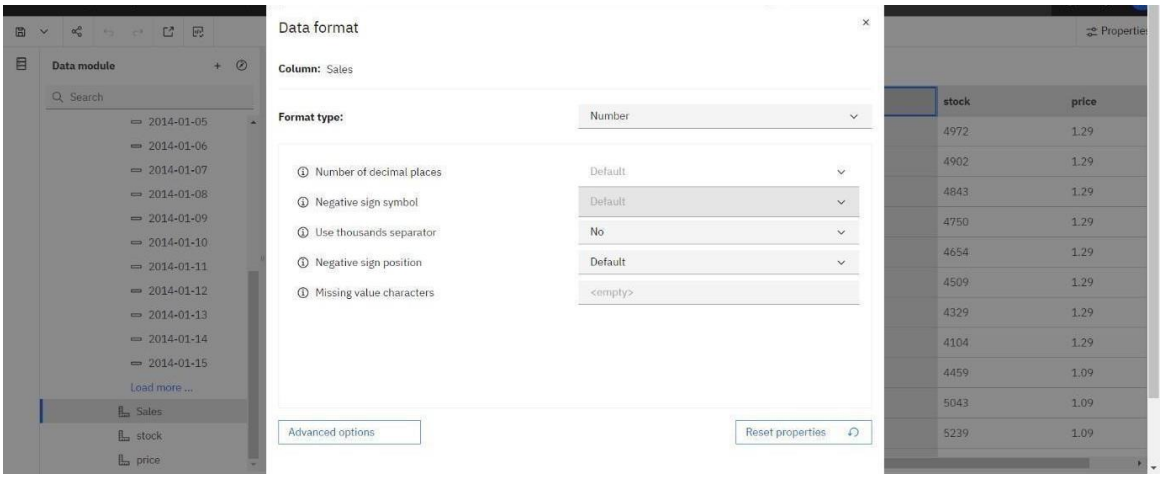


Row Id	Year	sales	stock	price
1	2014-01-01	76	4972	1.29
2	2014-01-02	70	4902	1.29
3	2014-01-03	59	4843	1.29
4	2014-01-04	93	4750	1.29
5	2014-01-05	96	4654	1.29
6	2014-01-06	145	4509	1.29
7	2014-01-07	179	4329	1.29
8	2014-01-08	321	4104	1.29
9	2014-01-09	125	4459	1.09
10	2014-01-10	88	5043	1.09
11	2014-01-11	188	5239	1.09
12	2014-01-12	121	5118	1.09
13	2014-01-13	134	4984	1.09

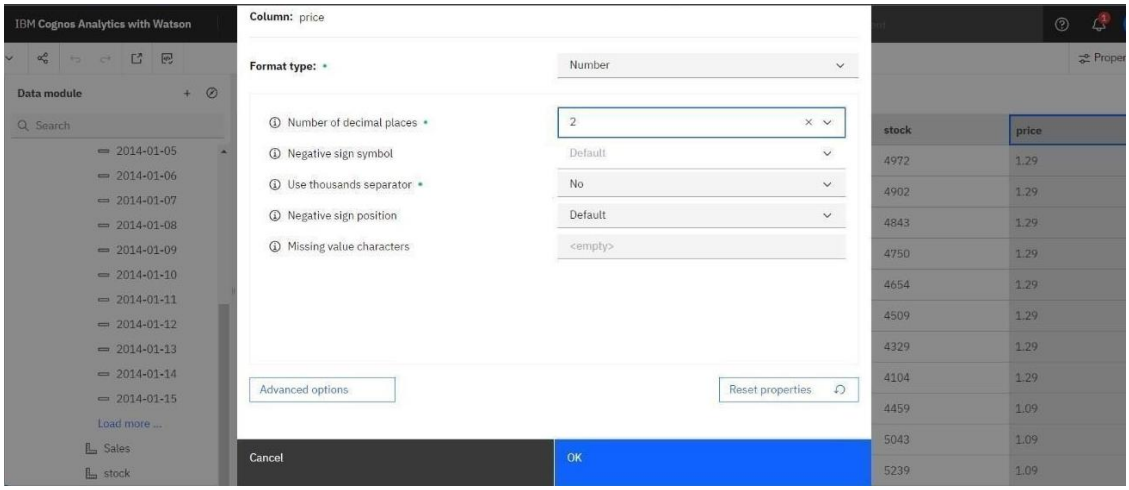
Stock format Data:



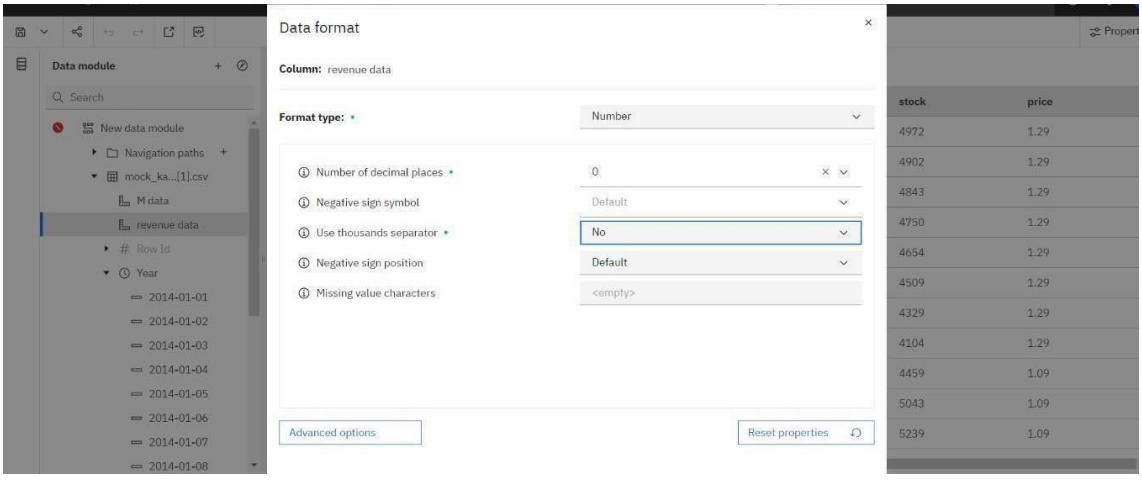
Sales Format Data:



Price Format data:



Revenue format data:



SPRINT-2

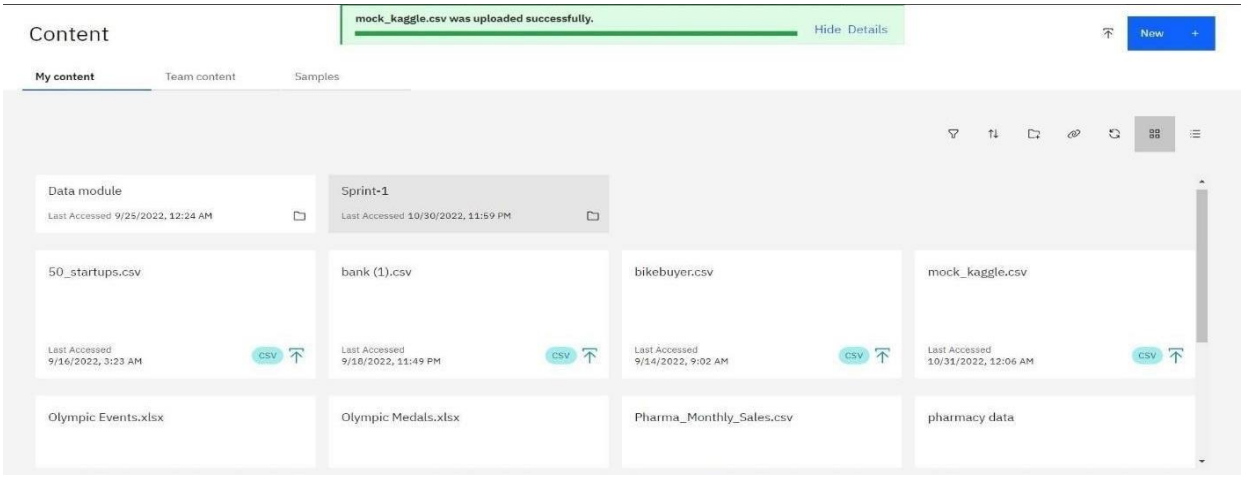
DATA EXPLORATION

- ✓ LOAD THE DATASET
- ✓ SALES ANALYSIS
- ✓ PRICE ANALYSIS
- ✓ STOCK AND PRICE FOR YEAR COLORED BY PRICE PRICE FOR YEAR COLORED BY YEAR
- ✓ STOCK AND SALES FOR YEAR COLORED BY YEAR
- ✓ YEAR COLORED BY YEAR SIZED BY STOCK
- ✓ STOCK TREE SUNBURST
- ✓ SALES TO PRICE WITH LINE WIDTH PRICE
- ✓ STOCK USERS
- ✓ YEAR SIZED BY SALES
- ✓ PREPARED DATA LINK

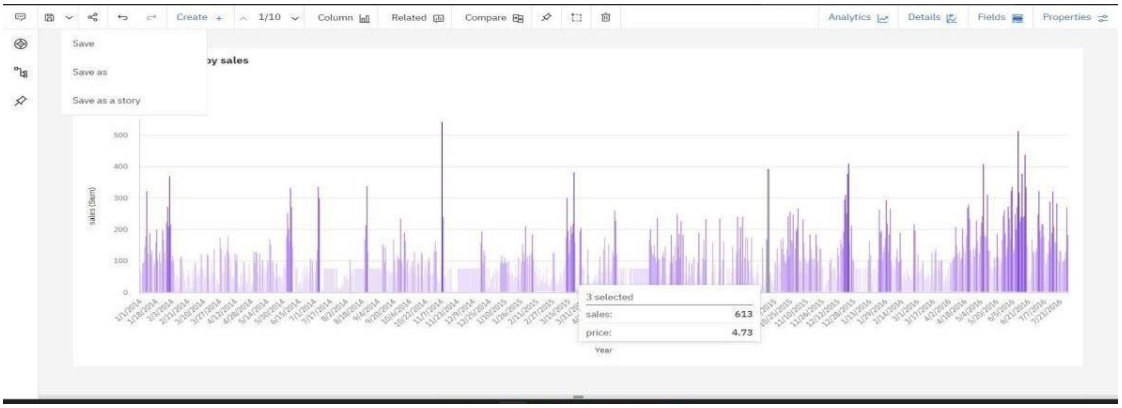
DATA COLLECTION:

Load The Dataset:

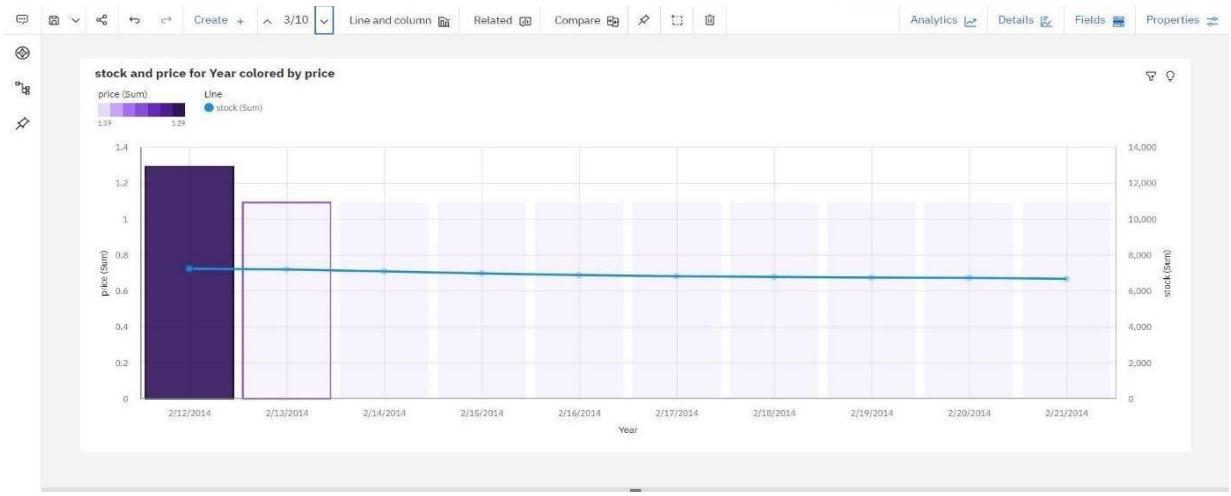
Tool Used – Ibm Cognos



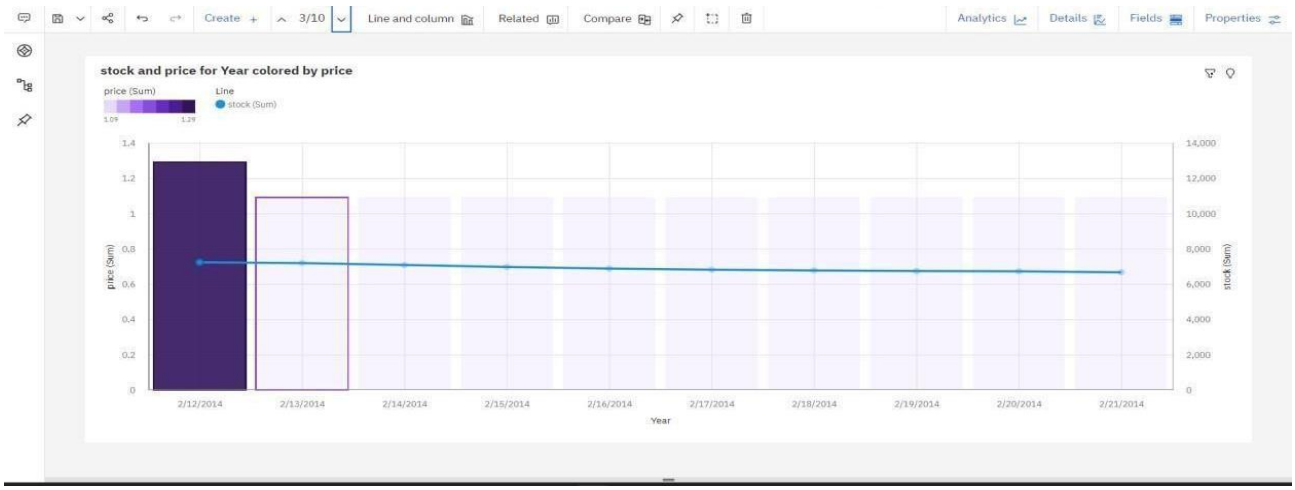
Sales Analysis:



Price Analysis:



Stock And Price For Year Colored By Price:



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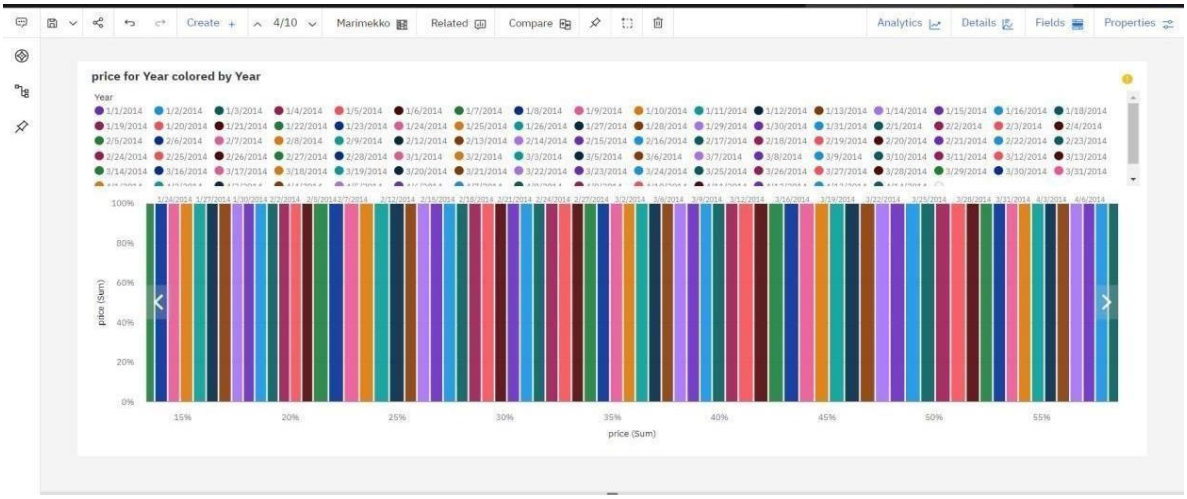
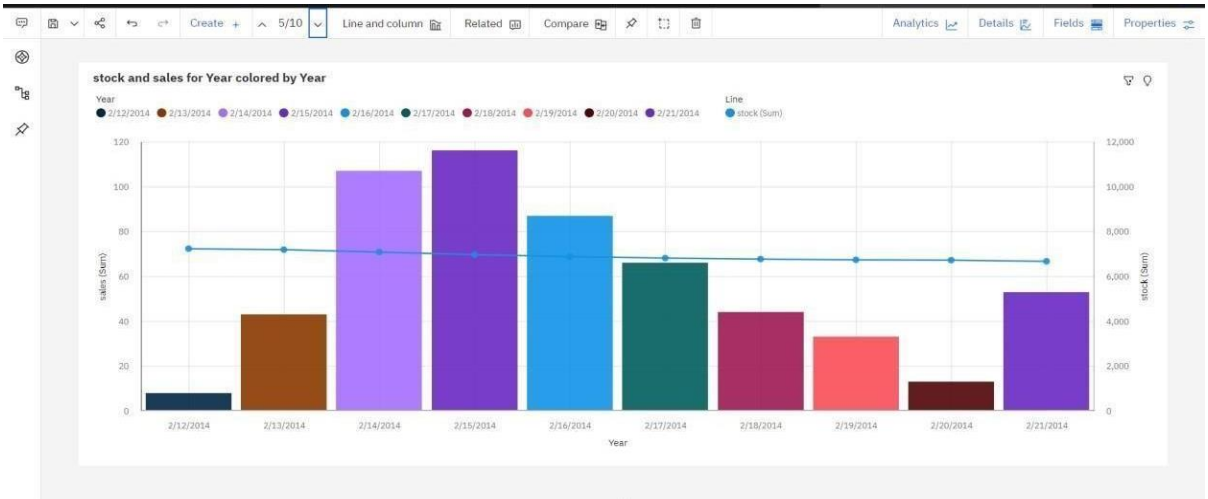
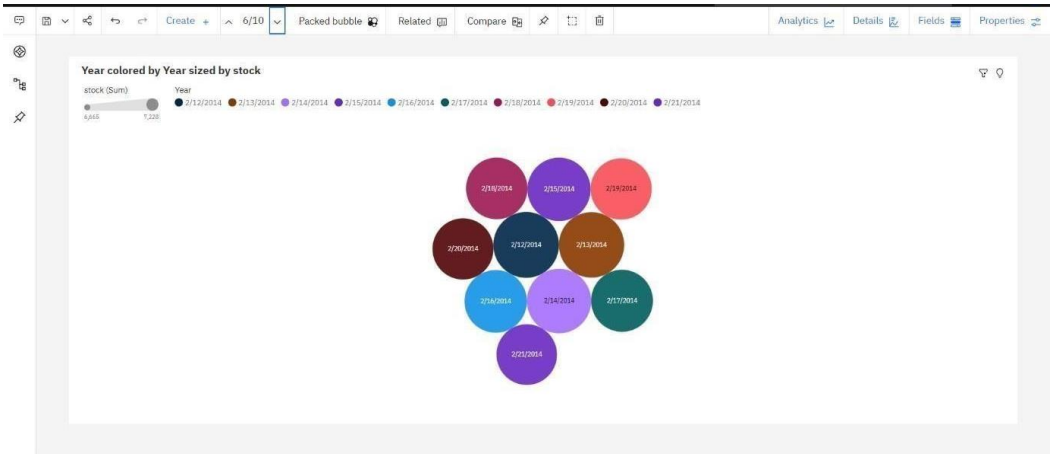


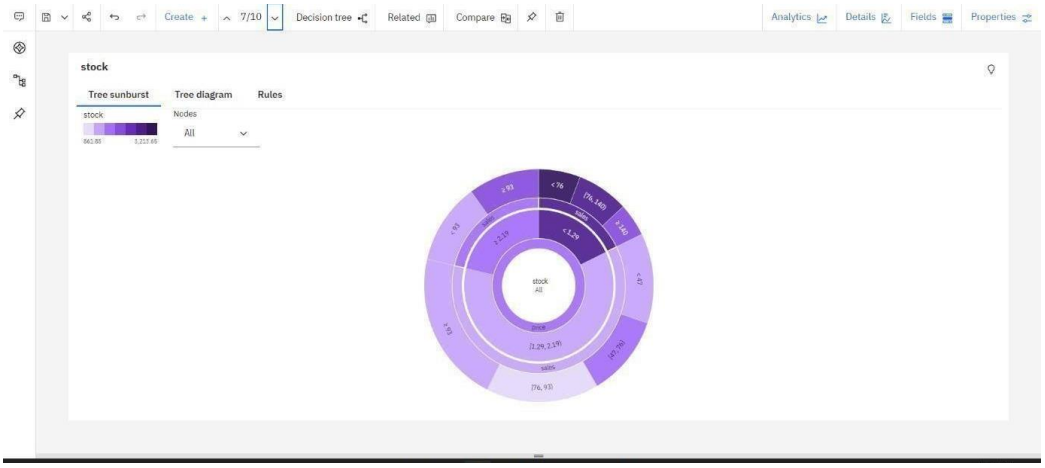
Stock And Sales For Year Colored By Year:



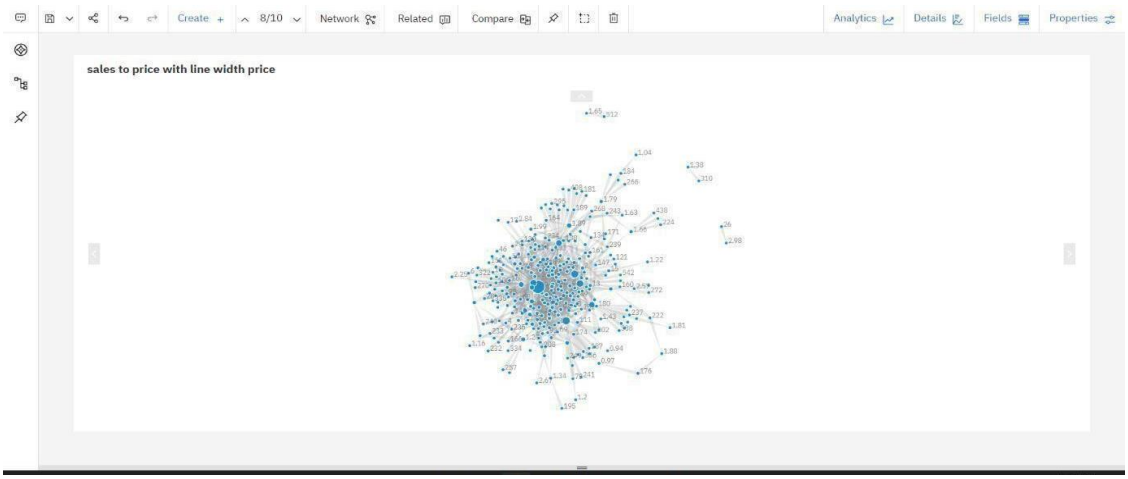
Year Colored By Year Sized By Stock:



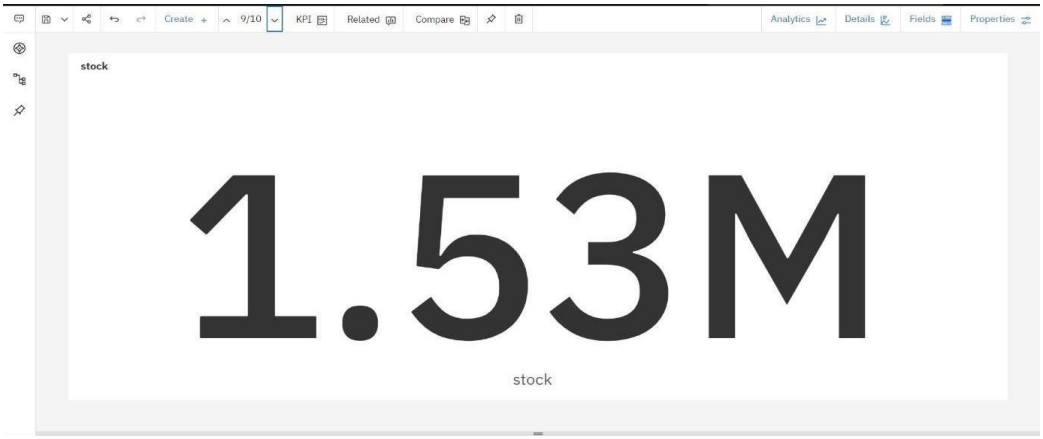
Stock Tree Sunburst:



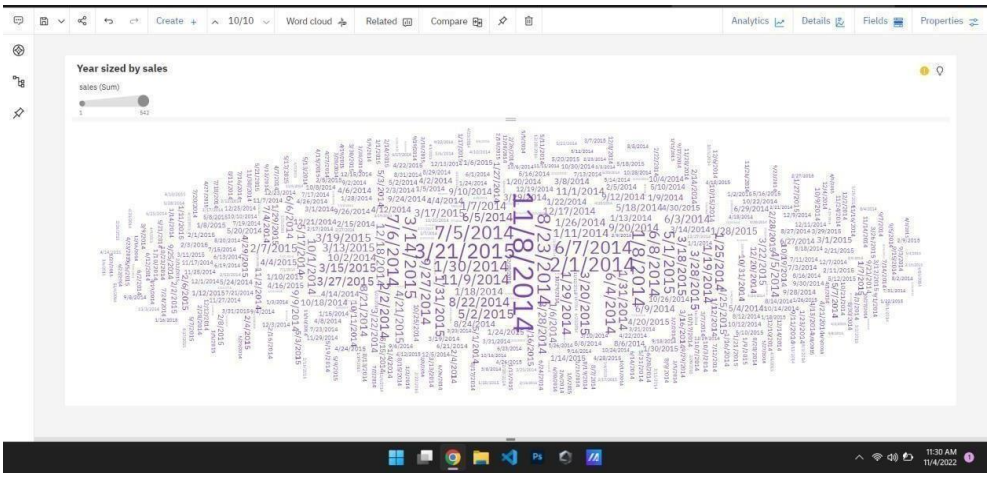
Sales To Price With Line Width Price:



Stock Users:



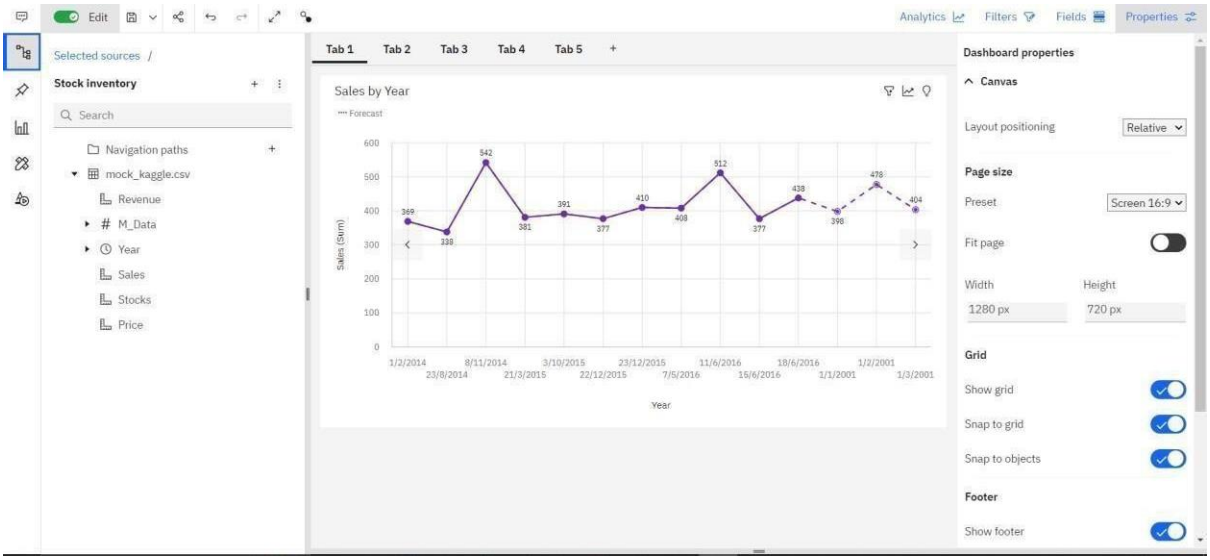
Year Sized By Sales:



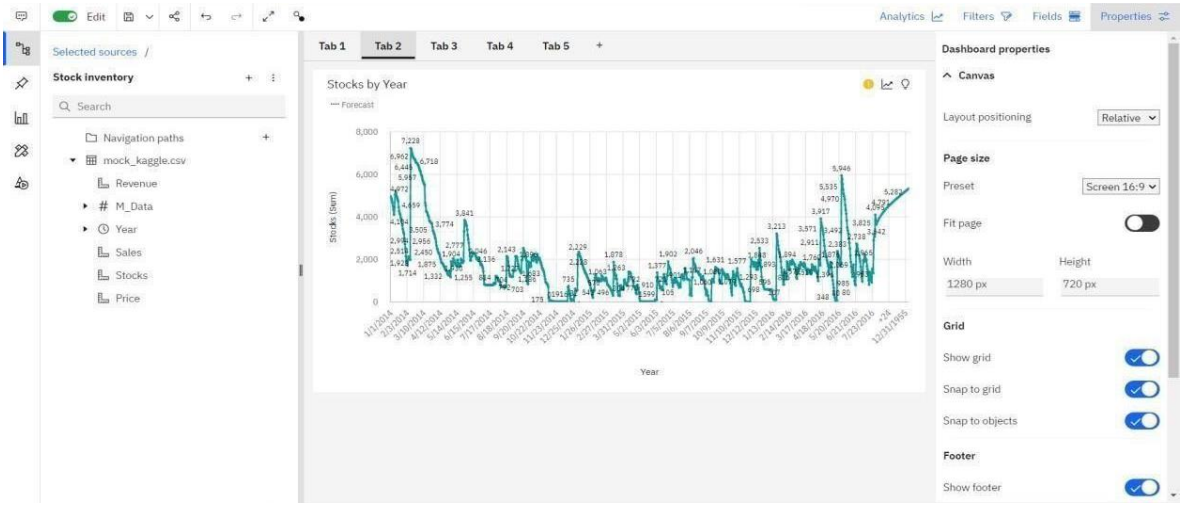
SPRINT 3

Dashboard Creation:

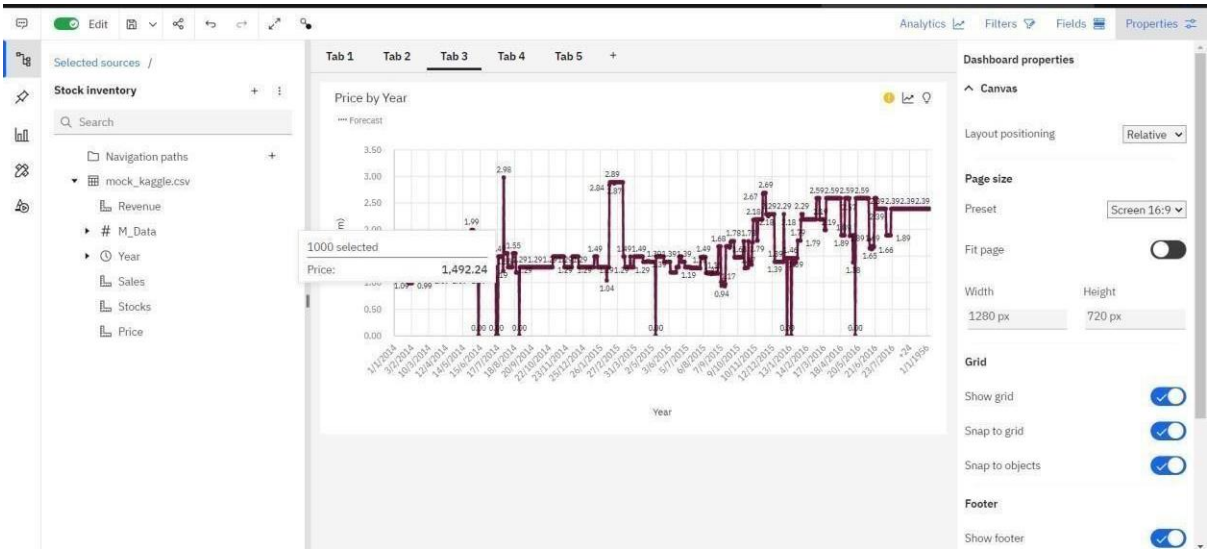
Sales by Year Line Chart



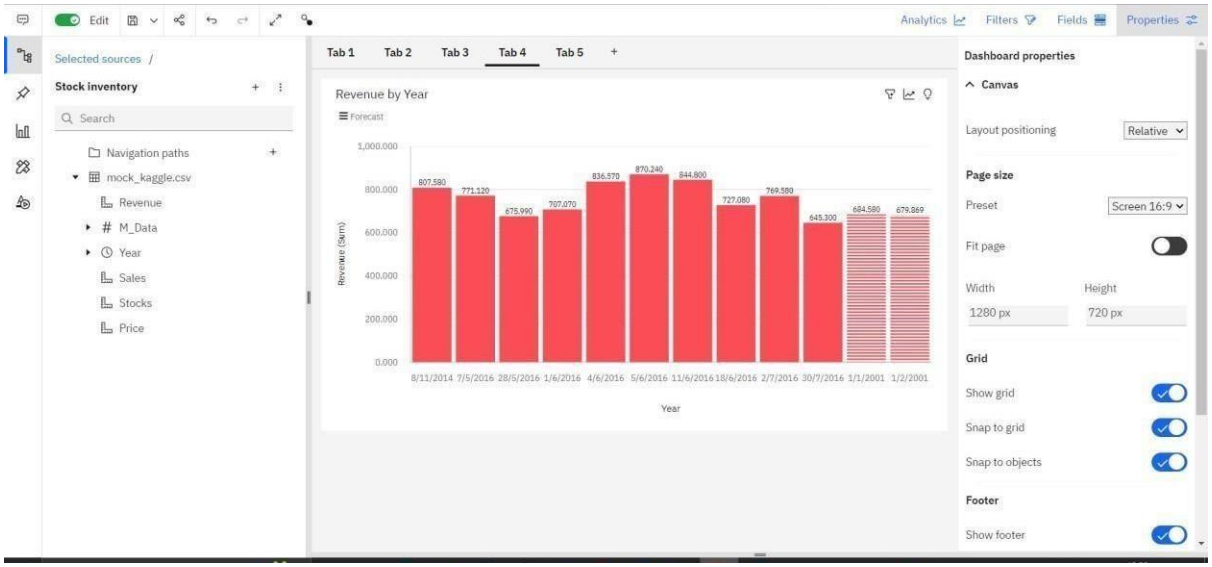
Stock by Year a Line Visual



Price by Year Line visual

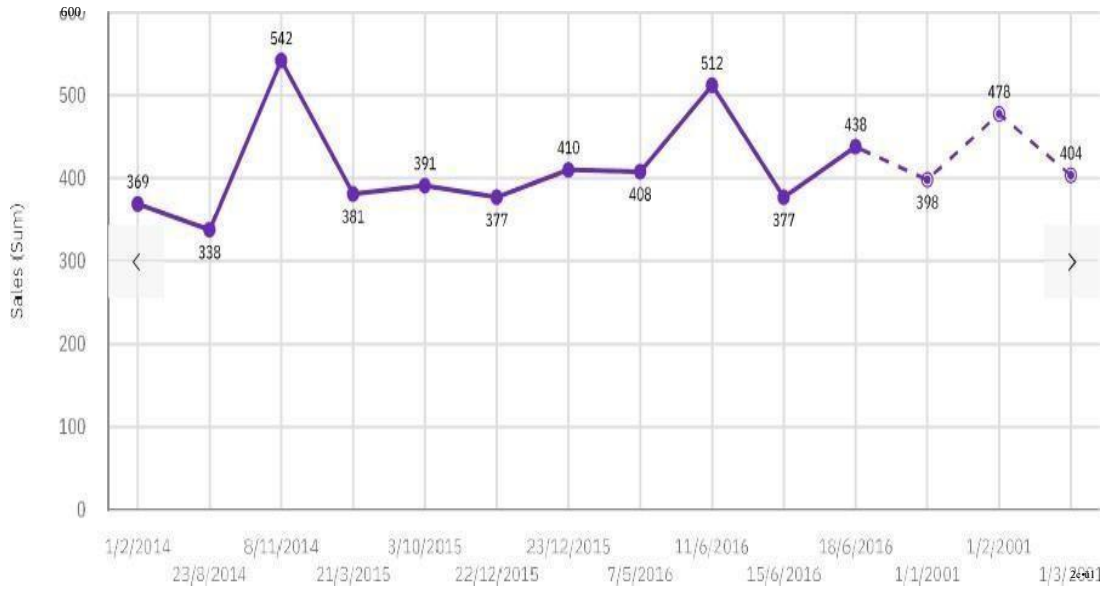


Revenue by Year Column Forecast visual.

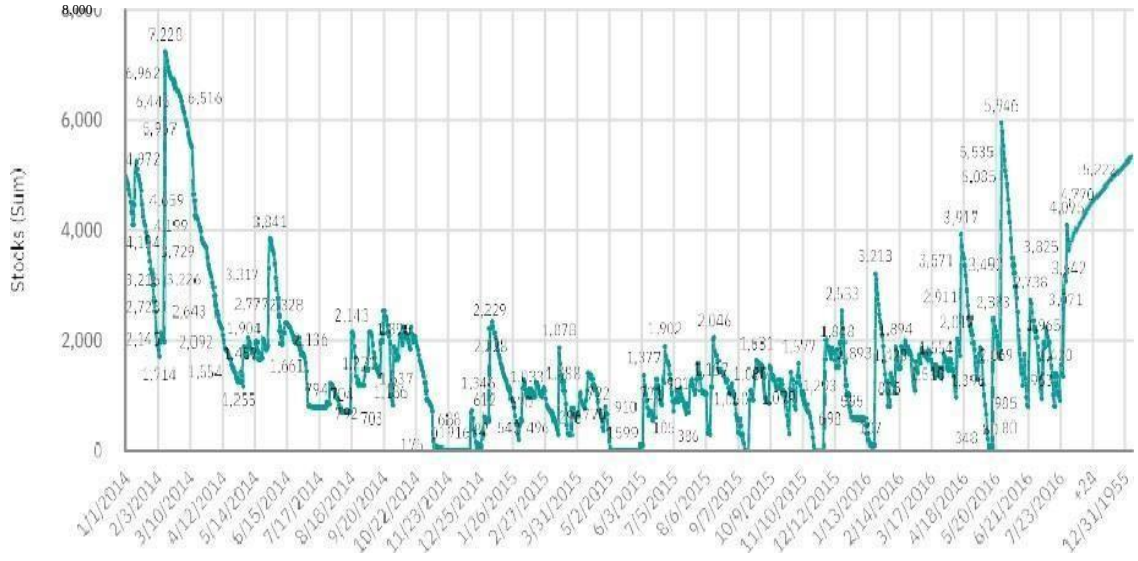


Dashboard:
Stock inventory dashboard

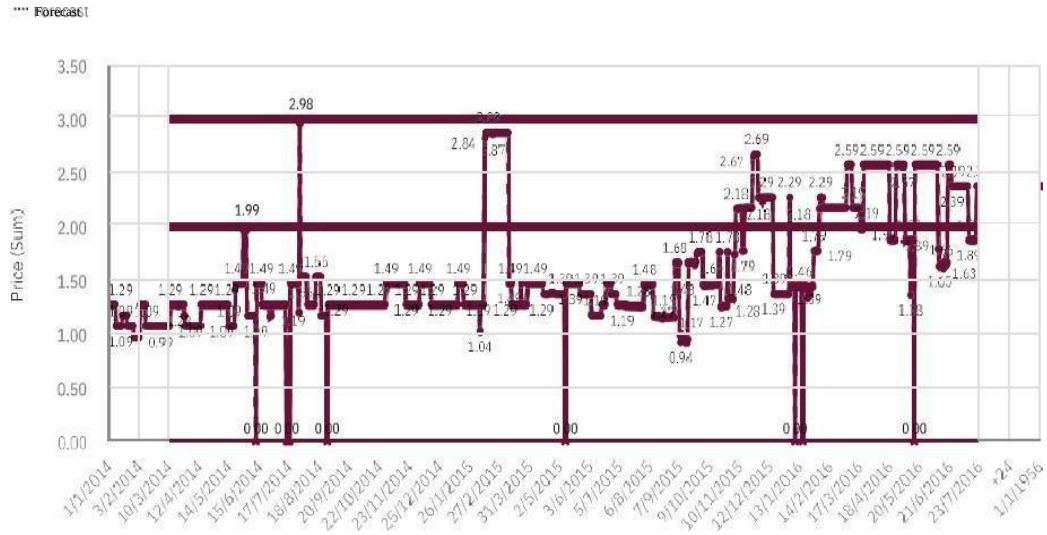
1) Forecast by years:



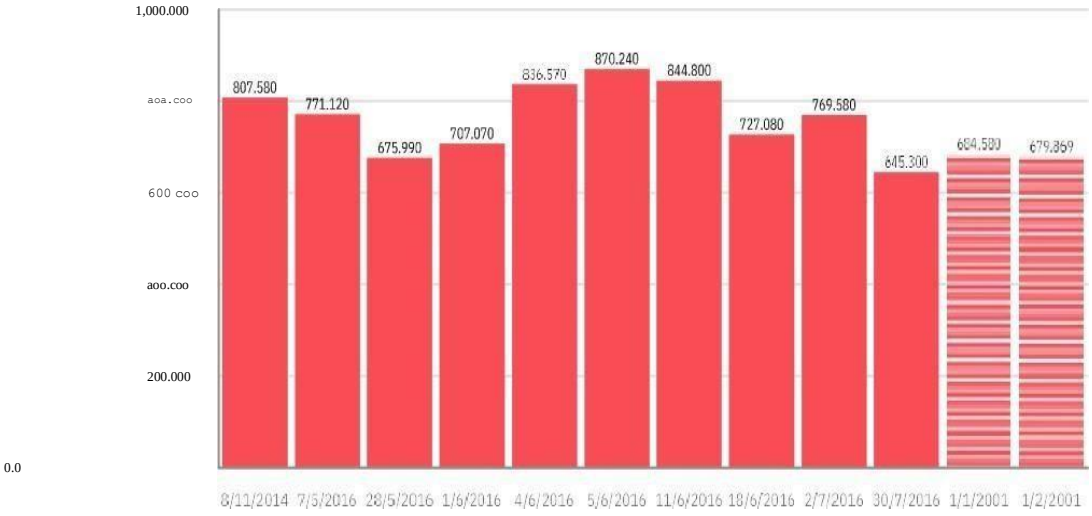
2) Stocks by years:



3) Price by years:

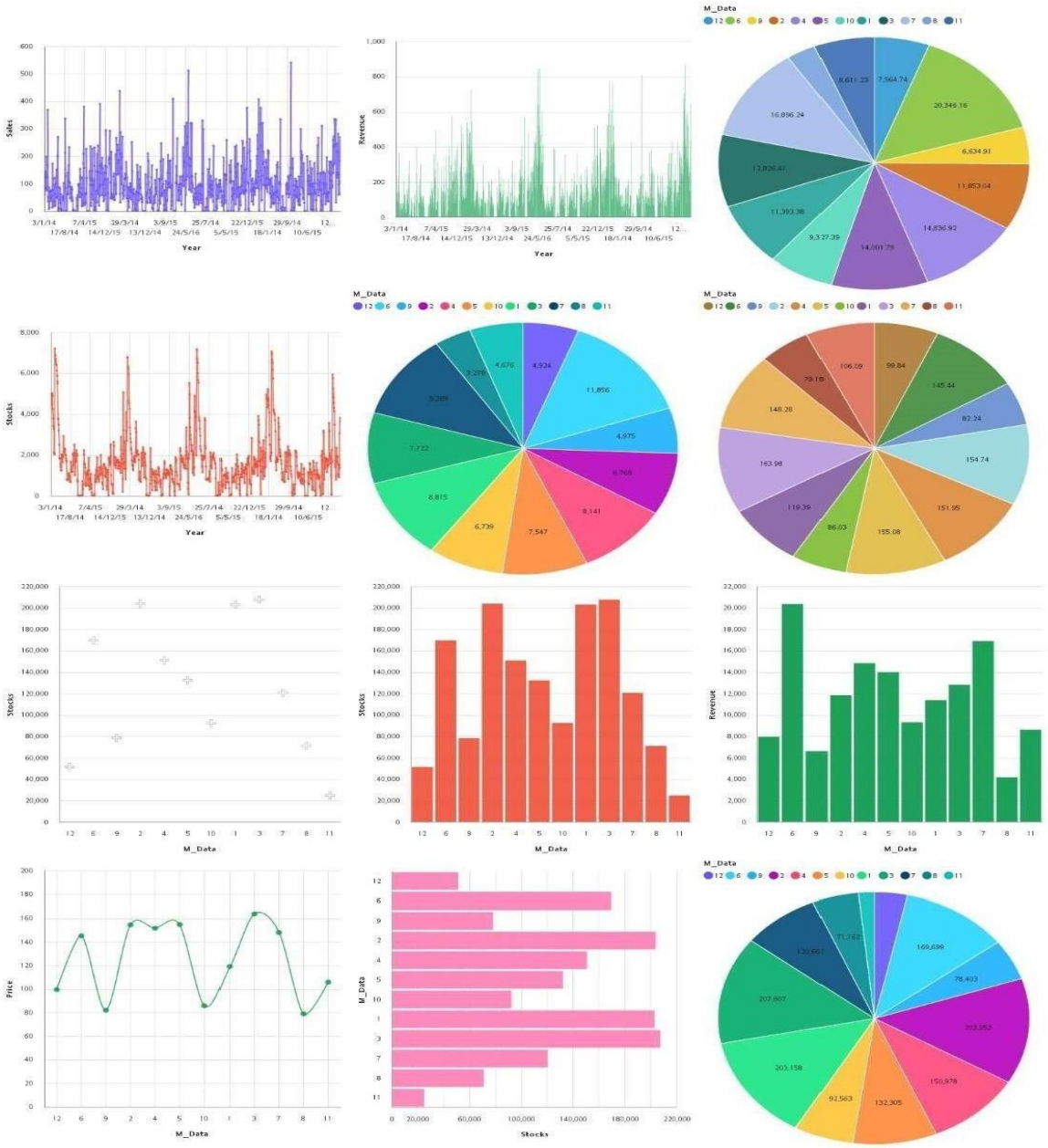


4)Revenue by year:



SPRINT 4

Retail store stock inventory analytics report

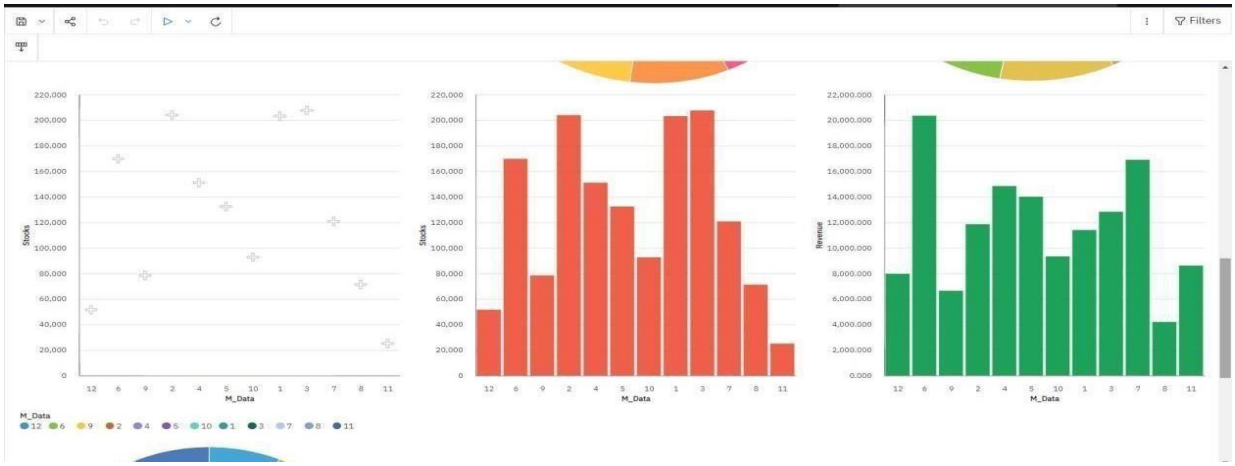


Report creation

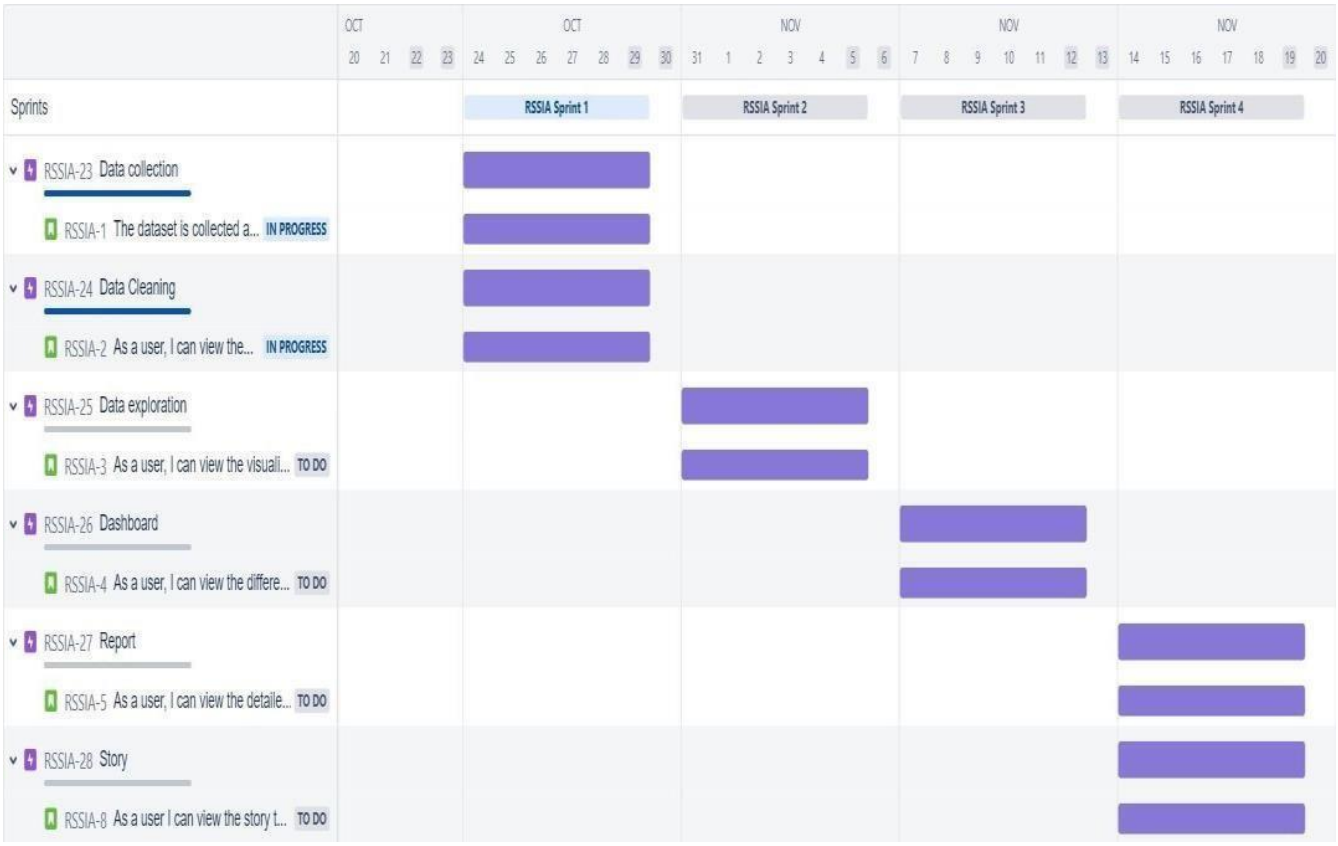
Sales By Year, Monthly Revenue, Revenue By Year

Monthly Stocks And Revenue

Monthly Sales



6.3 REPORT FROM JIRA



7.CODING & SOLUTIONING

7.1 FEATURE 1

Centralized inventory management

One of the most important functions of the inventory management system is that it tracks all of the information about the inventory. An inventory management system effectively keeps a good track of the stock levels, history of the product as well as many other product specifications. One of the greatest features of the inventory management system software is that it syncs with other modules of the inventory system. This assists in the operation of the inventory system accurately.

Tagging and Barcoding

Another great feature of the inventory management system is the elimination of standard human errors. Manual data functioning can cause errors, but scanning the barcode saves ample time for workers. The barcoding feature reduces employee training sessions and budget value. Traditionally, recording the data of the products requires so much effort. The inventory management system has made it easier by offering barcoding and tagging features. Now, the bulkiest work is completed in the least amount of time.Thus, inventory management system software lets you track the products efficiently with the help of tagging and barcoding.

Reporting of the business activities

One of the most advantageous tools of an inventory management system is the reporting of various business activities. Management of an inventory business demands people in charge to remain updated regarding various business activities such as the driver's location, the status of the product, information regarding the shipment of the order, etc. You can integrate many tools in the inventory management app for carrying out the reporting of tasks efficiently.

Forecasting of the inventory

It is a quite discomforting situation when company products go out of stock. An inventory management system allows you to check what products get out of stock, and what products are abundantly available in the stock of the company. This is a uniquely beneficial way of maintenance of a good user experience as well as spending resources wisely. Consequently, business owners purchase the business inventory smartly and intelligently.This feature of the inventory management system helps managers in meeting customer expectations and reduction of stock out risks.

7.2 FEATURE 2

Alerts regarding the inventory details

The manual work inventory supervision days are bygone. Now, managers do not have to spend a good amount of time and energy on the management of the stock data. A great inventory management system is one with a stock-out alert feature. In the alerts, the software describes various consequential issues that may occur due to reduced stock of a particular item.

Backup and security of the inventory

No matter the type of your business, proper backup, and security of the inventory is critical for the functioning of the inventory. Inventory management systems software has good security layers that make hacking impossible. In case inventory software gets hacked, the data has a backup that business operators can access and use. So, backup and security of the inventory prevent any hiccups.

Internet of Things (IoT) and Cloud data software

Inventory management system is cloud-based software, which can be accessed from all types of devices. Also, inventory management system software is IoT-driven, which makes it easier to record all the details of the inventory intelligently and smartly.

IoT keeps the inventory optimized and organized efficiently. All of the employees of the company can get real-time updates.

Integration of inventory management software with other systems

Nowadays, companies have installed an ERP system that has increased the productiveness of the companies to a greater extent. If inventory management systems software can be integrated with ERP, the company can benefit a lot from the integration. Data can be retrieved relentlessly from the system.

Optimized inventory

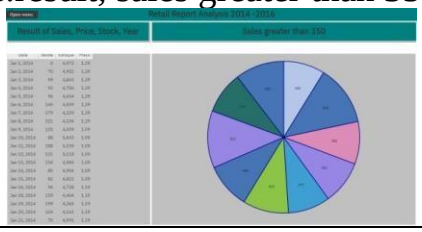
Another great feature of the inventory management software system is that it optimizes and organizes the inventory of companies. It becomes easier for the managers to function and meet deadlines with the optimized inventory.

8. TESTING

8.1 TEST CASES

Model Performance testing

S.No	Parameters		Screenshots/Values
1.	Dashboard Design		The dashboard is created with three category i.e. Overview, Sales, Price. 
2.	Data Responsiveness		The data is downloaded from an external API and uploaded in the IBM Cognos analytics with Watson and a data module is created
3.	Amount Data to Rendered		The dataset which is downloaded from the external API and uploaded is rendered from the DB2.

4.	Utilisation of Data Filters		The data filters are used for preprocessing the data i.e cleaning of data , removing the null value.The unwanted columns are removed from the dataset and the additional data which are required are added to the dataset.
5.	Effective User Story		The story is created with two scenes i.e. Introduction, sales by year & stock.  
6.	Descriptive Reports		The report is created with two visualisations i.e.result, sales greater than 350. 

8.2 USER ACCEPTANCE TESTING

Purpose of document

The purpose of the document is to give a clear view on what needs to be done i.e. the target and what is done and what are the things required to achieve the goal.The functional and User Application Interface is given under the feature type.The objective is given under the components column.The steps which need to be performed to achieve the goal is given under the Steps to execute column.The data which need to be tested is given under the test data column.The result or final objective which need to be achieved or attained are given under the expected result.The outcome which is actually attained is given under the actual result column.The status column contains whether the test is passed or fail.If in case the test failed the details of it has to be filled in the comments column.The automation of the test case has to be filled in the TC for automation which is denoted by “yes” or “no”.If in case the test failed the bug which occurred has to be given with its ID in the bug ID column.The person who performed the respective action is given under the executed by column

Test Case Analysis

Section	Test Cases	Not Tested	Fail	Pass
Dataset	5	0	0	5
Dashboard	8	0	0	8
Report	2	0	0	2
Story	5	0	0	5
Embed dashboard, report and story in simple .html file	15	0	0	15
Embed dashboard, report and Story in web app	25	0	0	25

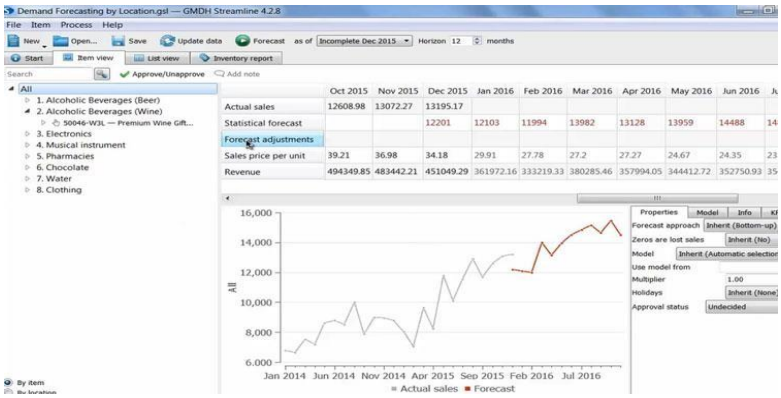
9. RESULTS

9.1 PERFORMANCE METRICS

The following are the five most effective inventory KPIs and metrics:

1. Demand Forecast Accuracy

An excellent inventory management metric for determining how strong collaboration is in a manufacturing operation, demand forecasting reflects the variation in real or actual demand and what is estimated at the factory level. Inventory metrics for manufacturing can make operations more effective by closing the gaps between forecasted demand and actual demand.



Use demand forecasting to plan inventory and forecast revenue.

This inventory metric also contributes directly to reducing inventory carrying costs, a key indicator of inventory management effectiveness. With demand forecasts on hand, you're less likely to order inventory beyond market demand. Further, demand forecasts can also clue you in on when to order more stock than normal, so you never miss a chance for growth.

2. Customer Satisfaction Levels

Often measured in net promoter scores (NPS), customer satisfaction levels need to be evaluated across all distribution and selling channels. Best-in-class manufacturers measure selling and distribution separately, determining an NPS for each channel. This is to index your customers' order-to-delivery times and check to see if they're consistent with what you originally expected.

3. Perfect Order Performance

Perfect order performance quantifies how effectively an organization delivers complete, accurate and damage-free orders to customers on time. The equation that defines the perfect order index (POI) or perfect order performance is: (percent of orders delivered on time) * (percent of orders complete) * (percent of orders damage free) * (percent of orders with accurate documentation) * 100.

DIFOT, or delivered in full and on time, is a critical KPI for purchase orders. But it can be a bit misleading if manufacturers assess it individually instead of using it in the POI formula above. The more configurable products are, the more difficult perfect order performance is to attain. However, the rapid growth of manufacturing intelligence is making perfect order performance more attainable than ever across the spectrum of production strategies.

4. Fill Rate Effectiveness as a Percentage of All Orders

Measuring supply chain collaboration needs to be a priority when selecting inventory metrics and KPIs to manage your operation. Tracking fill rate effectiveness as a percentage of all orders directly reflects how many orders or requests for material from production centers are fulfilled. Taking this metric a step further provides insights into how well production centers are managing inbound inventories to meet customer delivery dates.

5. Gross Contribution Margins by Product, Production Facility and Business Unit

Best-in-class inventory management solutions provide gross contribution margin (GCM) performance levels across several different dimensions of business. GCM is one of the most effective metrics a business can use to evaluate how well collaboration is happening across business units.f you know the GCM attributable to a given production center, you can track performance and effectiveness levels by location.

10.ADVANTAGES AND DISADVANTAGES

Advantages

- An advantage of the retail inventory method is that it does not require a physical inventory. The retail inventory method only requires an organization to record the retail prices of inventory items.
- If an organization has multiple locations in different cities and states, performing a physical inventory can become a costly and time-consuming undertaking. By using retail inventory, an organization can prepare an inventory for a centralized location.
- The retail inventory method also allows the organization to create an inventory value report for budgeting or the preparation of financial statements.

Disadvantages

- On the other hand, the retail inventory method is only accurate if all pricing across the board is the same and all pricing changes occur at the same rate. In most cases this is not realistic in retail because of the many variations that exist in merchandise pricing.
- For example, depreciation, markdowns, product damage and theft can affect the price of the retail inventory.
- For this reason, any calculations made using the retail inventory method should serve only as an estimate.

11. CONCLUSION

For the success of the program, the managers of the retail stores must formulate a modern way of managing the inventory by instituting electronic systems to take care of the resources of the company. This ensures that they can be accounted for and there are proper records available all the time for reference to be made when the need arises. Besides, the retail management system is necessary for ensuring that there is accountability in the way the company handles its stock. It helps in saving time.

Retail companies have acquired significant importance within several countries due to their high economic contribution. Therefore, the need to analyze their KPIs becomes highly significant, as well as their different systems, methodologies, and tools used within inventory management and optimization. From the aspects mentioned above, the main trends in inventory management within companies were define.

12. FUTURE SCOPES

New inventory management skills

As stock control advances, inventory managers need new skills to match them.
Besides organizational skills and general computational skills in math, data analytics, and forecasting, inventory managers in 2019 will need to learn bits and pieces of topics like:

- Coding and algorithms (you may need to insert a few lines of codes here and there.)
- Application programming interfaces (APIs).
- Enterprise resource planning (ERP).
- New reporting technologies (they keep improving; you want to keep up with them.)

As an inventory manager or store operator or owner, you may not need to know these skills too in-depth, but a basic knowledge of them is necessary.

Inventories that power experiential retail

- Experiential retail is a trend that's catching fire — especially in the past few months.
- In fact, they keep popping up in the news section of Google search results:
- The concept of consumers being in an exciting and relaxed place because a brand is becoming one
  of the strongest arms of retailing today. But as experiential retail grows in prominence and usefulness, the inventories that power them grow as well.
- For example, Nordstrom launched "Nordstrom Local" — a new line of smaller stores, with its first in West Hollywood, California. They didn't design the store to sell anything; it's simply an inventory that powers experiential retail for Nordstrom.
- According to CNBC, "Nordstrom Local will have eight dressing rooms where shoppers may try on clothes, but stores won't actually keep inventory for purchase in stock."
- The stores also have bars where shoppers can order drinks.
- "Shopping today may not always mean going to a store and looking at a vast amount of inventory," Shea Jensen, Nordstrom's senior vice president of customer experience, explains. "It can mean trusting an expert to pick out a selection of items."
- From brands like Amazon and Apple to backyard restaurants, every store is launching its own experiential retail initiatives in whatever way possible.

13. APPENDIX

SOURCE CODE

WEB APP ASSET

Some Glimpses of CSS Code:

```
/*_____________________________________________
# General
_____________________________________________*/
body {
font-family: "Open Sans", sans-serif;
color: #444444;
}

a {
color: #47b2e4;
text-decoration: none;
}

a:hover  {
color: #73c5eb;
text-decoration: none;
}

h1,
h2,
h3,
h4,
h5,
h6 {
font-family: "Jost", sans-serif;
}

/*_____________________________________________
```

```
# Preloader
_____*/
#preloader {
position: fixed;
top: 0;
left: 0;
right: 0;
bottom: 0;
z-index: 9999;
overflow: hidden;
background: #37517e;
}

#preloader:before {
content: "";
position: fixed;
top: calc(50% - 30px);
left: calc(50% - 30px);
border: 6px solid #37517e;
border-top-color: #fff;
border-bottom-color: #fff;
border-radius:  50%;
width: 60px;
height: 60px;
-webkit-animation: animate-preloader 1s linear infinite;
animation: animate-preloader 1s linear infinite;
}

@-webkit-keyframes animate-preloader {
0% {
transform: rotate(0deg);
}

100% {
transform: rotate(360deg);
}
```

```
}

@keyframes animate-preloader {
0% {
transform: rotate(0deg);
}

100% {
transform: rotate(360deg);
}
}

/*_____
# Back to top button
_____*/
.back-to-top {
position: fixed;
visibility: hidden;
opacity: 0;
right: 15px;
bottom: 15px;
z-index: 996;
background: #47b2e4;
width: 40px;
height: 40px;
border-radius: 50px;
transition: all 0.4s;
}

.back-to-top i {
font-size: 24px;
color: #fff;
line-height: 0;
}

.back-to-top:hover {
```

```
background: #6bc1e9;
color: #fff;
}

.back-to-top.active {
visibility: visible;
opacity: 1;
}

/*--------------------------------------------------------------
# Header
--------------------------------------------------------------*/
#header {
transition: all 0.5s;
z-index: 997;
padding: 15px 0;
}

#header.header-scrolled,
#header.header-inner-pages {
background: rgba(40, 58, 90, 0.9);
}

#header .logo {
font-size: 30px;
margin: 0;
padding: 0;
line-height: 1;
font-weight: 500;
letter-spacing: 2px;
text-transform: uppercase;
}

#header .logo a {
color: #fff;
}
```

```
.navbar .dropdown ul {
display: block;
position: absolute;
left: 14px;
top: calc(100% + 30px);
margin: 0;
padding: 10px 0;
z-index: 99;
opacity: 0;
visibility: hidden;
background: #fff;
box-shadow: 0px 0px 30px rgba(127, 137, 161, 0.25);
transition: 0.3s;
border-radius: 4px;
}

.navbar .dropdown ul li {
min-width: 200px;
}

.navbar .dropdown ul a {
padding: 10px 20px;
font-size: 14px;
text-transform: none;
font-weight: 500;
color: #0c3c53;
}

.navbar .dropdown ul a i {
font-size: 12px;
}

.navbar .dropdown ul a:hover,
.navbar .dropdown ul .active:hover,
.navbar .dropdown ul li:hover>a {
```

```
color: #47b2e4;
}

.navbar .dropdown:hover>ul {
opacity: 1;
top: 100%;
visibility: visible;
}

.navbar .dropdown .dropdown ul {
top: 0;
left: calc(100% - 30px);
visibility: hidden;
}

.navbar .dropdown .dropdown:hover>ul {
opacity: 1;
top: 0;
left: 100%;
visibility: visible;
}

@media (max-width: 1366px) {
.navbar .dropdown .dropdown ul {
left: -90%;
}

.navbar .dropdown .dropdown:hover>ul {
left: -100%;
}
}

/**
* Mobile Navigation
*/
.mobile-nav-toggle {
```

```
color: #fff;
font-size: 28px;

;
}


.portfolio-details .portfolio-info ul li+li {
margin-top: 10px;
}

.portfolio-details .portfolio-description {
padding-top: 30px;
}

.portfolio-details .portfolio-description h2 {
font-size: 26px;
font-weight: 700;
margin-bottom: 20px;
}

.portfolio-details .portfolio-description p {
padding: 0;
}

/*--------------------------------------------------------------
# Team
--------------------------------------------------------------*/
.team .member {
position: relative;
box-shadow: 0px 2px 15px rgba(0, 0, 0, 0.1);
padding: 30px;
border-radius: 5px;
background: #fff;
transition: 0.5s;
}
```

```
#footer .footer-top .footer-links {
margin-bottom: 30px;
}

#footer .footer-top .footer-links ul {
list-style: none;
padding: 0;
margin: 0;
}

#footer .footer-top .footer-links ul i {
padding-right: 2px;
color: #47b2e4;
font-size: 18px;
line-height: 1;
}

#footer .footer-top .footer-links ul li {
padding: 10px 0;
display: flex;
align-items: center;
}

#footer .footer-top .footer-links ul li:first-child {
padding-top: 0;
}

#footer .footer-top .footer-links ul a {
color: #777777;
transition: 0.3s;
display: inline-block;
line-height: 1;
}

#footer .footer-top .footer-links ul a:hover {
```

```
text-decoration: none;
color: #47b2e4;
}

#footer .footer-top .social-links a {
font-size: 18px;
display: inline-block;
background: #47b2e4;
color: #fff;
line-height: 1;
padding: 8px 0;
margin-right: 4px;
border-radius: 50%;
text-align: center;
width:  36px;
height: 36px;
transition: 0.3s;
}

#footer .footer-top .social-links a:hover {
background: #209dd8;
color: #fff;
text-decoration: none;
}

#footer .footer-bottom {
padding-top: 30px;
padding-bottom: 30px;
color: #fff;
}

#footer .copyright {
float: left;
}

#footer .credits {
```

```
float: right;
font-size: 13px;
}

#footer .credits a {
transition: 0.3s;
}

@media (max-width: 768px) {
#footer .footer-bottom {
padding-top: 20px;
padding-bottom: 20px;
}

#footer .copyright,
#footer .credits {
text-align: center;
float: none;
}

#footer .credits {
padding-top: 4px;
}
}
```

PHP:

```
<?php
  /**
  * Requires the "PHP Email Form" library
  * The "PHP Email Form" library is available only in the pro version of the template
  * The library should be uploaded to: vendor/php-email-form/php-email-form.php
  * For more info and help: https://bootstrapmade.com/php-email-form/
  */ if( file_exists($php_email_form = '../assets/vendor/php-email-form/php-email-form.php' )) {
    include( $php_email_form );
  } else {
    die( 'Unable to load the "PHP Email Form" Library!');
  } $contact = new PHP_Email_Form;
  $contact->ajax = true;
   $contact->to = $receiving_email_address;
  $contact->from_name = $_POST['name'];
  $contact->from_email = $_POST['email'];
  $contact->subject = $_POST['subject'];
  /*
  $contact->smtp = array(
    'host' => 'example.com',
    'username' => 'example',
    'password' => 'pass',
    'port' => '587'
  );
  */

  $contact->add_message( $_POST['name'], 'From');
  $contact->add_message( $_POST['email'], 'Email');
  $contact->add_message( $_POST['message'], 'Message', 10);

  echo $contact->send();
?>
```

GIT HUB LINK

https://github.com/IBM-EPBL/IBM-Project-27062-1660045095