GLOBAL SALES DATA ANALYTICS

USING DATA ANALYTICS

A Project report submitted in partial fulfilment of 7th semesterin degree of
BACHELOR OF ENGINEERING
IN

COMPUTER SCIENCE AND ENGINEERING

Submitted by

TEAM ID:PNT2022TMID44011

KEERTHANA.R	**723719104037**
KRISHNAPRIYA.M	**723719104040**
ANUSREE.S	**723719104009**
DIVYA.K	**723719104025**
DHIRUSHYA.P	**723719104021**
LARANI.K	**723719104042**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
VSB COLLEGE OF ENGINEERING TECHNICAL CAMPUS, COIMBATORE

ANNA UNIVERSITY: CHENNAI 600025

NOV-2022

VSB COLLEGEOF ENGINEERING TECHNICAL CAMPUS, COIMBATORE

(Affiliated Collegeof Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this project report "**GLOBAL SALES DATA ANALYTICS"** is the Bonafide record work done by **MS. KEERTHANA R**(723719104037), **MS. KRISHNAPRIYA M** (723719104040), **MS. DIVYA K**(723719104025)**, MS. ANUSREE S**(723719104009), **MS. DHIRUSHYA P**(723719104021), **MS. LARANI K**(723719104042) for **IBM- NALAIYATHIRAN** in **VII** semester of **B.E.,** degree course **in Computer Science and Engineering** branchduring the academic year of 2022 - 2023.

Staff-In charge
RADHA V

Evaluator
BHARATHI RAJA M

Head of the Department
Mr.DINESHKUMAR.P

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Finally, our acknowledgment does our parents, sisters, and friends those who had extended their excellent supportand ideas to make our Project a pledge one.

KEERTHANA R
KRISHNA PRIYA M
DIVYA K
ANUSREE S
DHIRUSHYA P
LARANI K

ABSTRACT

Data is being generated very rapidly due to increase in information in everyday life. Huge amount of data get accumulated from various organizations that is difficult to analyze and exploit. Data created by an expanding number of sensors in the environment such as traffic cameras and satellites, internet activities on social networking sites, healthcare database, government database, sales data etc., are example of huge data. Processing, analyzing and communicating this data are a challenge. Online shopping websites get flooded with voluminous amount of sales data every day. Analyzing and visualizing this data for information retrieval is a difficult task. Therefore a system is required which will effectively analyze and visualize data. This paper focuses on a system which will visualize sales data which will help users in applying intelligence in business, revenue generation, and decision making, managing business operation and tracking progress of tasks. The main Achievement of this **Global Sales Data Analytics** is to reduce the manufacturing cost of the raw material and improved the sales forecasting by identifying the key factors like the total sales revenue on a monthly and quarterly basis on the region and the sale amount. And the **decision support system** Data Warehousing Project is focused on analyzing the entire business process. In order to provide critical information like daily revenue, Weekly Revenue, Monthly Revenue, total sales, goals, information on employees and vision of the company developed Business Intelligence System.

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8.2 Test Cases

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GitHub & Project Demo Link

1. INTRODUCTION

1.1 PROJECT OVERVIEW

Category : Data Analytics
Team ID : PNT2022TMID44011

SKILLS REQUIRED:

IBM COGNOS, IBM CLOUD, IBM DB2, HTML, CSS, Data Cleaning.

PROJECT DESCRIPTION:

Data analysis is the process of cleaning, changing, and processing raw data and extracting actionable, relevant information that helps businesses make informed decisions. The main objective of this project is always **to simplify the information available** to the users. It should help you clearly understand your team's performance, sales trends and opportunities.In this project we have used the **IBM COGNOS, IBM DB2** services for loading the dataset, data preparation and vizualization of the data. The first step of the process is to download the dataset from the **kaggle.** The next step of data preparation IBM COGNOS provides the tool for data preparation. The third step of your data analytics project begins after obtained the data. By diving deep, we would determine what the data have and how might use it to attain their initial aim. After preparing the data, dashboard story and report are created through the IBM COGNOS and they were embedded into a web page using HTML and CSS.

1.2 PURPOSE

Shopping online is currently the need of the hour. Because of this COVID, it's not easy to walk in a store randomly and buy anything you want. So, try to understand a few things like, Customer Analysis and Product Analysis of this Global Super Store.

A data dashboard is an interactive analysis tool used by businesses to track and monitor the performance of their strategies with quality KPIs. Armed with real-time data, these tools enable companies to extract actionable insights and ensure continuous growth.The main objective of the project is Know fundamental concepts and can work on IBM Cognos Analytics.Gain a broad understanding of plotting different visualizations to provide a suitable solution.Able to create meaningful Visualizations and Dashboard.The overall purpose of a data analytics dashboard is to make it easier for data analysts, decision makers, and average users to understand their data, gain deeper insights, and make better data-driven decisions.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

The aim of sales analytics is to predict revenue more accurately and make the most of theopportunities in your reach. It provides a visual representation of your most recent performance metrics. It gives you a concise view of results-based data like sales-to-date, sales-by-region, lead conversionrate, sales growth, and so on. Dashboards are an essential tool for any business with plans to increase revenue and set ambitious growth goals. Without a sales dashboard, you're left to analyze dizzyingamounts of data on your own. Trying to compile all those sales analytics metrics manually is an impossibly exhausting task with a massive risk of critical human errors.IBM Cognos tools allows users to receive insights immediately with a simple setup, no training required, and dashboards for services like sales force,Google Analytics, and Microsoft Dynamics.

2.2 REFERENCES

S NO	PAPER TITLE	AUTHOR	MONTH / YEAR	LINK
1.	Impact of big data analytics on sales performance pharmaceutial organizations: The role of customer relationship management capabilities	MuhammadShahbaz, RimshaZahid	April/2021	https:/www.researchgate.net/publication/351153157_Imp
2.	Exploring the Impact of Sales Technology on Salesperson Performance	Eggert A,Serdaroglu	MAY/2006	https://doi.org/10.2753/MTP1069-6679190204
3.	Data-driven decision making via sales analytics	J.Ricky ferguson	July/2020	www.academia.edu/48422249/Data_driven_decisio

4.	A Conceptural View of the Dynamics of GlobalSales	Allison Smith, Ricky Fergurson and David Fleming	2020	**C:\Users\jbs\Downloads\sef-grant-executive-summary.pdf**
5.	Salesperson Ambidexterity and Customer Satisfaction: Examining the role of customer demandingness, adaptive selling, and role conflict	Raj Agnihotri	2014	**C:\Users\jbs\Downloads\Agnihotri-Executive-Summary-Salesperson-Ambidexterity-and-Customer-Satisfaction.pdf**

2.3 PROBLEM STATEMENT DEFINITION

PROBLEM STAEMENT:

Shopping online is currently the need of the hour. Because of this COVID, it's not easy to walk in a store randomly and buy anything you want. In this I am trying to understand few things like, Customer Analysis and Product Analysis of this Global Super Store.

Customers Analysis :

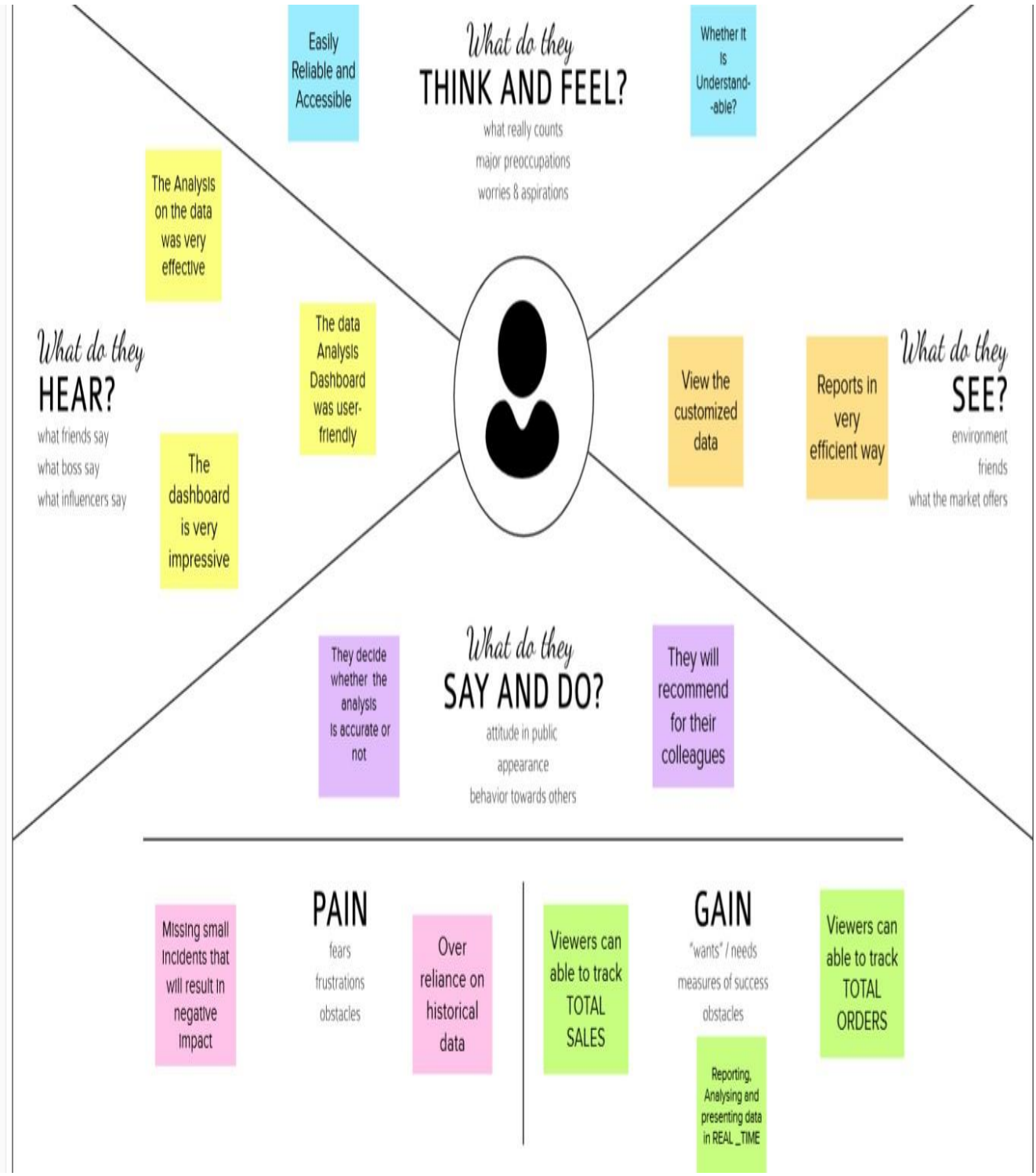
- Profile the customers based on their frequency of purchase - calculate frequency of purchase for each customer.
- Do the high frequent customers are contributing more revenue.
- Are they also profitable - what is the profit margin across the buckets.
- How the customer's are distributed across the countries?

Product Analysis :

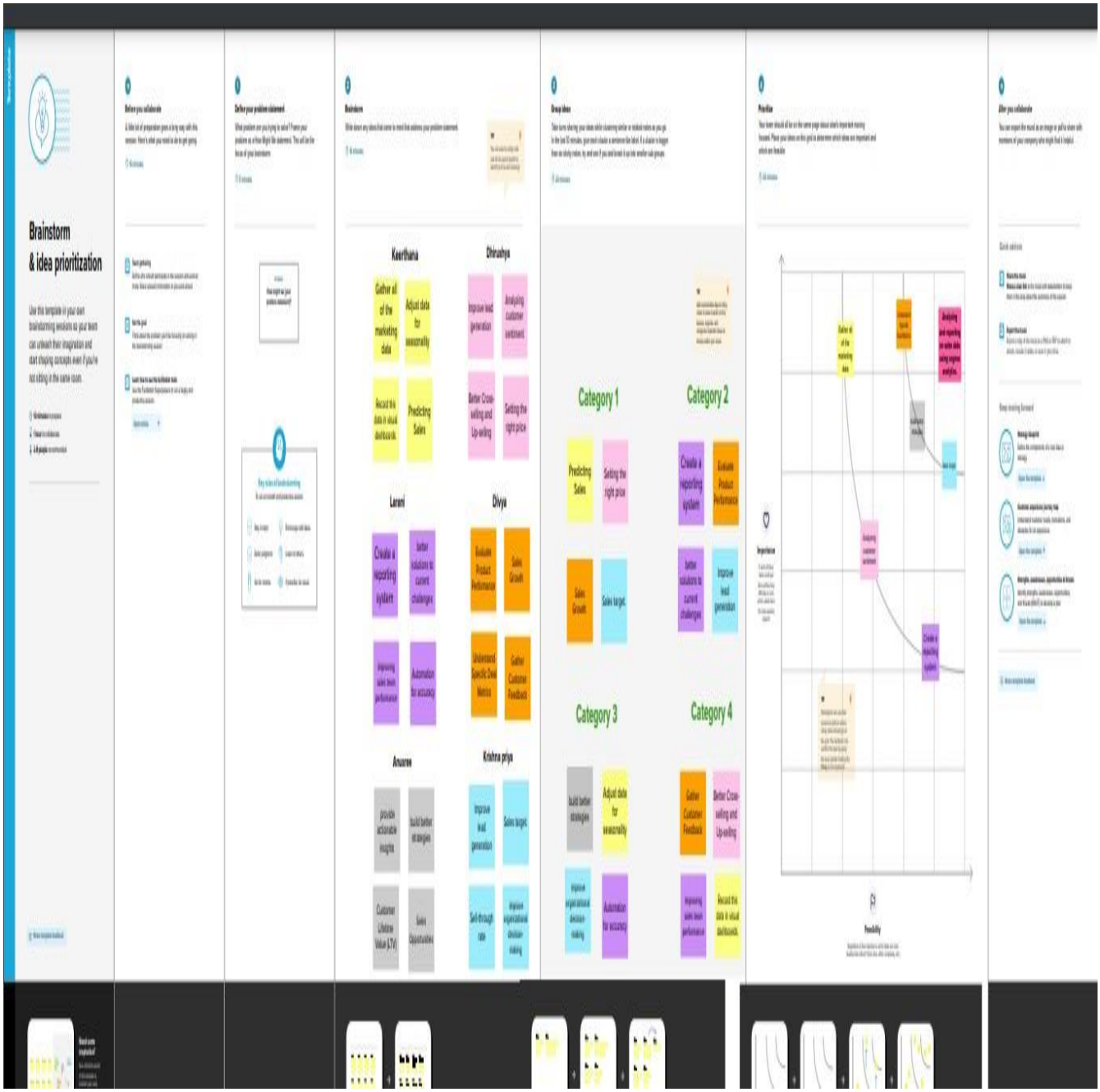
1. Root cause analysis
2. Quality of the product imported for further production.
3. Damage material Statement.
4. Collateral Damages (Including worker accidents while on work) .
5. Defect product generation 6. Plant maintenance standard.

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION AND BRAINSTROMING



3.3 PROPOSED SOLUTION

IDEA / SOLUTION DESCRIPTION:

A good sales dashboard is the solution. It organizes your most recent sales-specific data into easily understandable visual graphics saving your teams precious time and increasing understanding, motivation, and accuracy. With the right sales dashboards, you'll know exactly where you are, exactly how far away your current goals are, and where it may be necessary to tweak your sales strategy to achieve them.

UNIQUENESS / NOVALITY:

- Provides Real-Time Data.
- Can Help the Team Set Goals.
- Gives a Clear Overview of Sales Activity.
- Allows for the Identification of Sales Growth Opportunities.
- Identifies Opportunities for Improvement

SOCIAL IMPACT/CUSTOMER SATISFACTION:

- allow business decision-makers to review significant amounts valuable information at a glance.
- Mobile device accessible
- Customizable.
- Turn Data into Business Value.

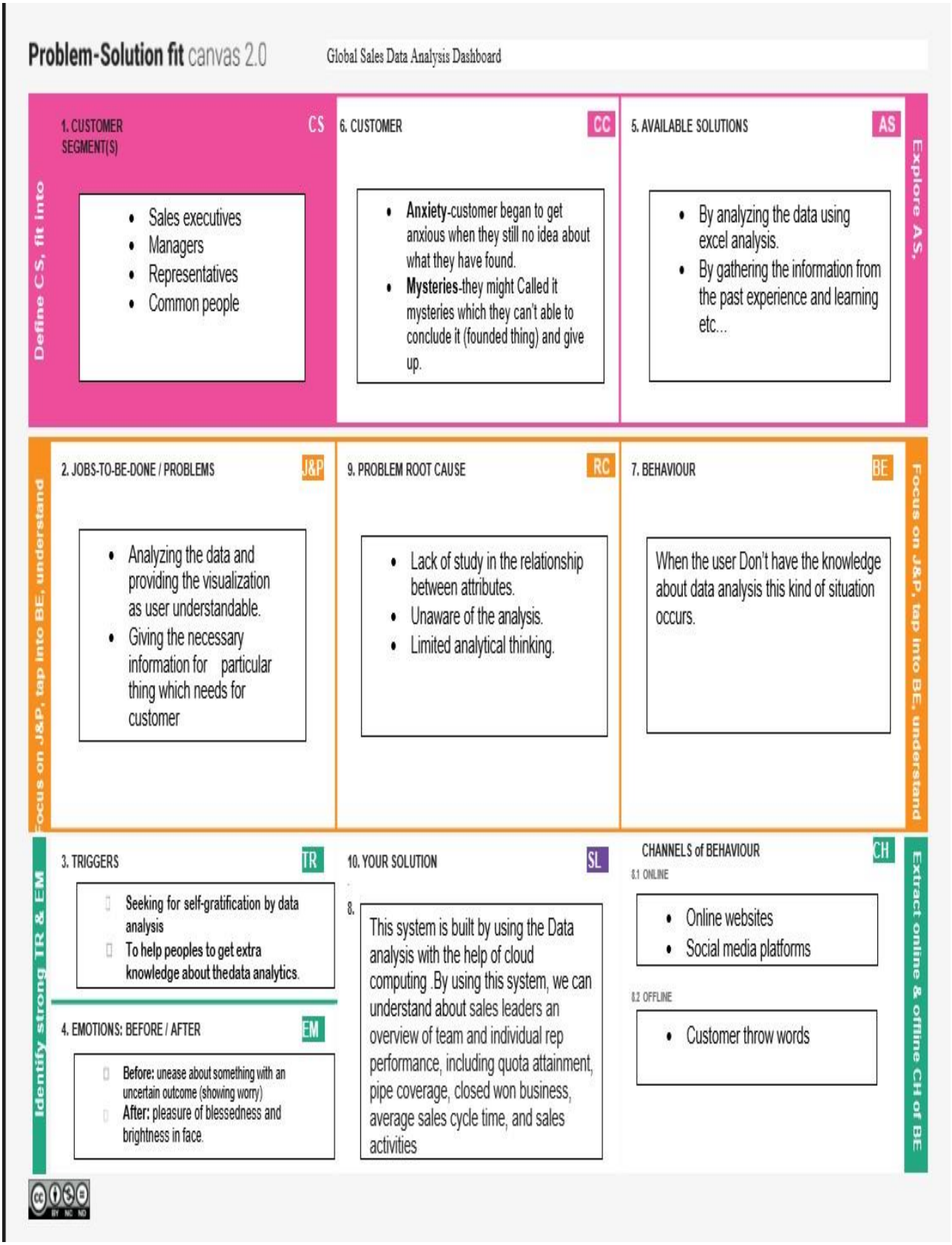
BUSINESS MODEL (FINANCIAL BENEFIT):

A Sales dashboard enables direct insight into your revenue driving force, allowing you to plan, implement and improve with data-based decisions.

SCALABILITY OF SOLUTION:

The great thing about Sales Analytics is that it gives you answers, and yosu need to ask the right questions. With accurate insight into current customers, a higher retention rate, as well as increasing revenue, can be achieved. Having real-time insight into increasing and decreasing customers will allow your Sales Team to focus on the right clients at the right time, ensuring marketing opportunities are realised, and efforts are driven towards suitable clients. A Sales Dashboard helps you visualize your Sales data, which is helpful for efficient decision-making and performance analysis.

3.4 PROBLEM SOLUTION FIT



4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

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 via Email and password
FR-4	User uploading data	To store the data set through the cloud for the further analysis
FR-5	End userbenefits	Getting higher state of efficiency and also to know entire data analysis

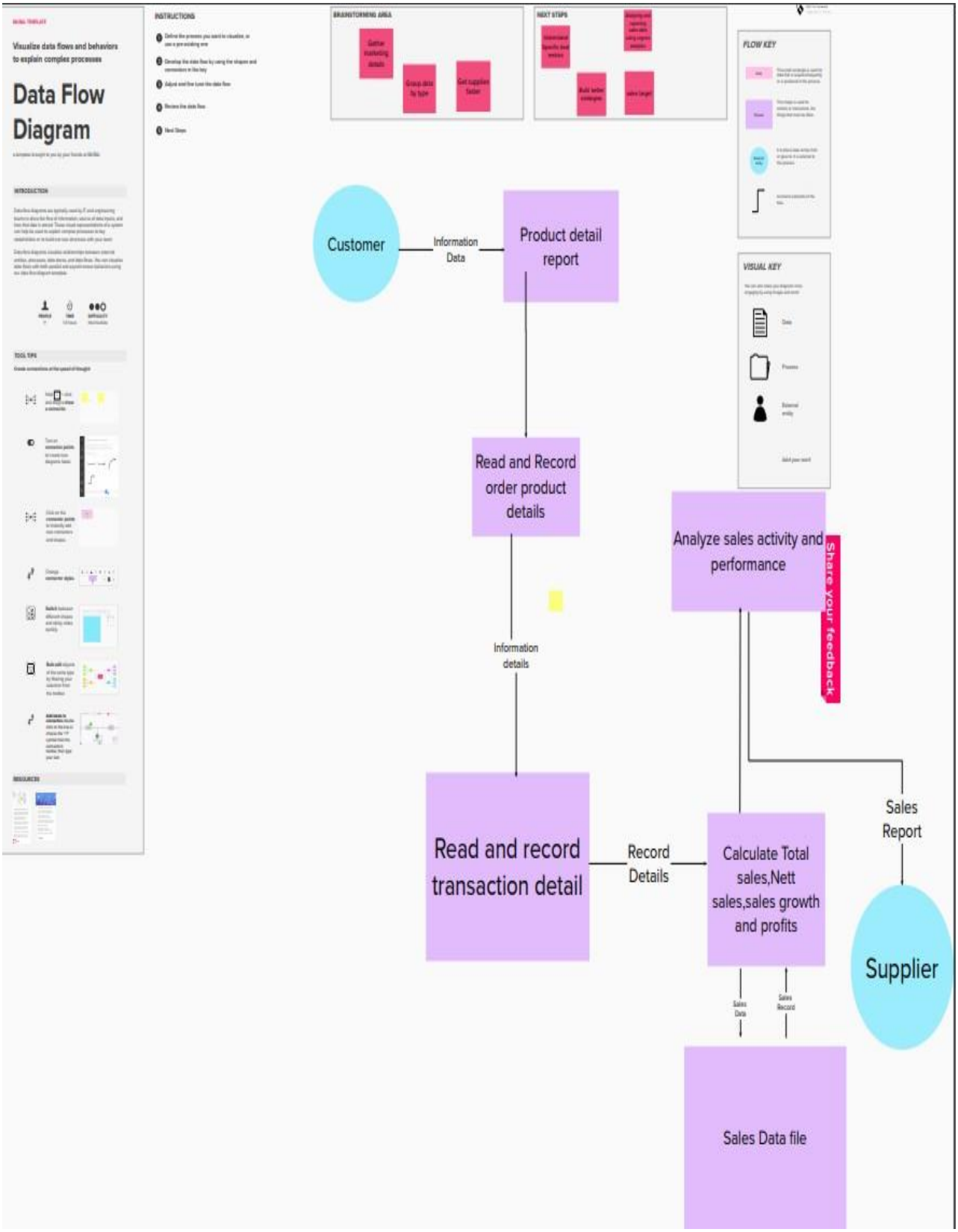
4.2 NON-FUNCTIONAL REQUIREMENTS

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Optimized resources and it can be used by everyperson who needsto analyze theirsales trend.
NFR-2	Security	The model is more securable because it hasend to end encryption and the data are kept secure with high levelauthentication and authorization.
NFR-3	Reliability	It has high reliability based on development and analysis techniques.
NFR-4	Performance	It has high state of performance and efficiency
NFR-5	Availability	The model is available on all platforms and websiteswithout the time constraint.
NFR-6	Scalability	The ability of a hardware and software parallel system to exploit increasing computing resources efficiency in the analysis of the (very)large datasets

5. PROJECT DESIGN

5.1 DATAFLOW DIAGRAM



5.2 SOLUTION AND TECHNICAL ARCHITECTURE

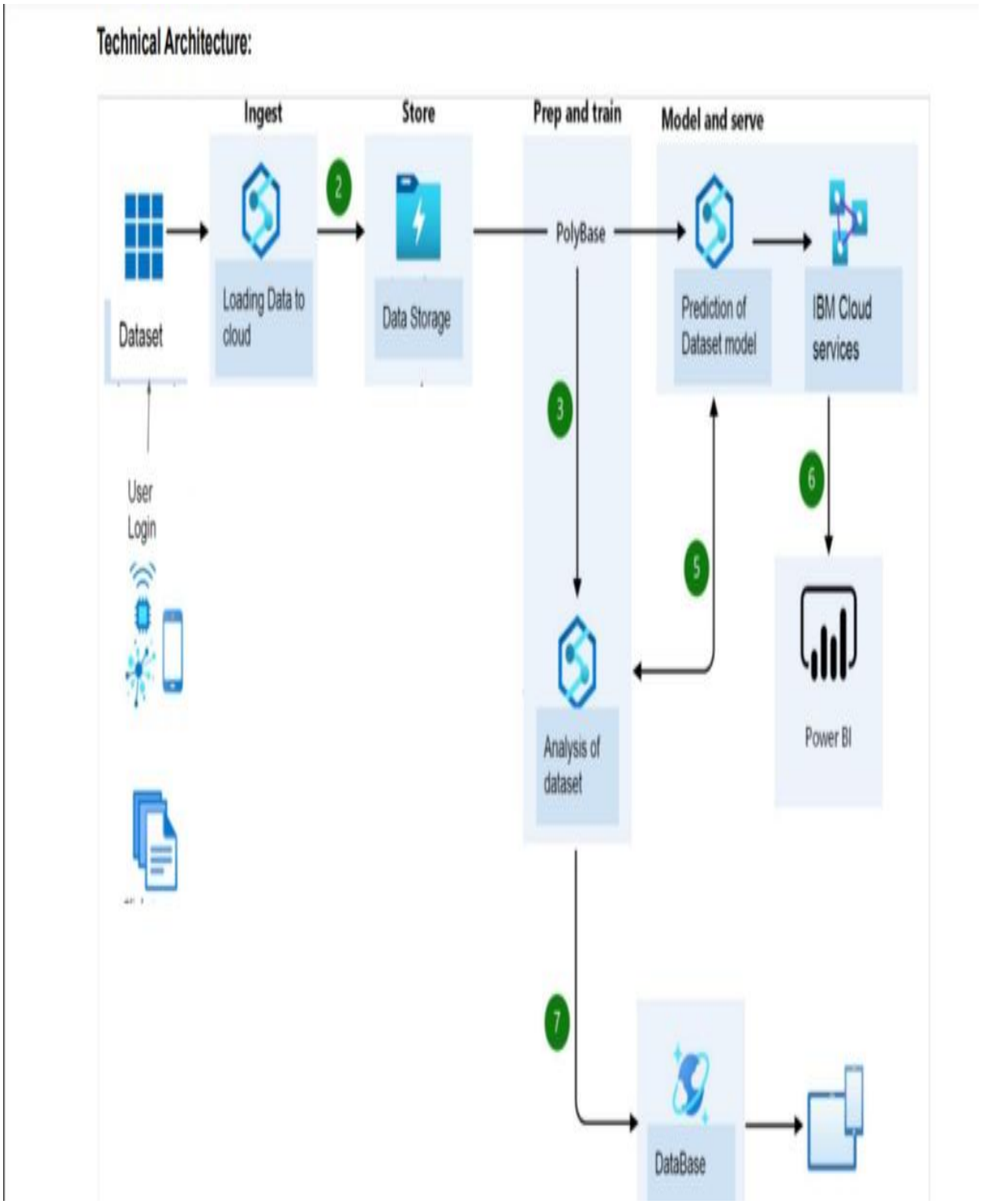


Table-1 : Components & Technologies:

S. No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g.Web UI, MobileApp, Chatbot etc.	HTML, CSS, JavaScript
2.	Cloud Storage	Sales data of the customer's are uploaded to the cloud	Java / Python
3.	Working with Dataset	Uploading, Cleaning and Processing dataset	IBM Cognos Watson
4.	Data Exploration	Uploaded datais explored to identify trends	IBM Cognos Watson
5.	Data Visualization	Multiple typesof graphs areshown according to customer data and requirements	IBM Cognos Dashboard andStory
6.	Cloud Database	Database Serviceon Cloud	IBM DB2, IBM Cloudant etc.
7.	Machine Learning Model	To do the predictive analysis on the input data	Predictive MachineLearning Model.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	IBM Cognos, IBM Cloud
2.	Security Implementations	To securethe user information and data	256-bit AES algorithm etc.
3.	Scalable Architecture	Provides scalability for the dataset	MS Excel Dataset, Kaggle, Google drive
4.	Availability	Provides various typeof analysis and provides full support irrespective of platform	IBM Cognos
5.	Performance	Withstand huge dataand process themwithout crashing .	IBM Cognos

5.3 USER STORIES

6. PROJECT PLANNING AND SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Collect thedataset	USN-1	Download the dataset fromKaggle API	3	High	Keerthana.R,Anusree.S, Divya.K ,Dhirushya.P, Krishnapriya.M, Larani.K
Sprint-1	Understa nd the dataset	USN-2	To understand the data in dataset	2	Medi um	Keerthana.R,Anusree.S, Divya.K,Dhirushya.P, Krishnapriya.M, Larani.K
Sprint-2	Loding the dataset	USN-3	Load the dataset in IBM cognosanalytics	5	High	Keerthana.R,Anusree.S, Divya.K,Dhirushya.P, Krishnapriya.M, Larani.K
Sprint-2	Preparation of data	USN-4	Prepare the datawith no nullvalues	2	Low	Keerthana.R,Anusree.S, Divya.K,Dhirushya.P, Krishnapriya.M, Larani.K
Sprint-2	Perfor mIng calcula tions	USN-5	Create new calculation for perfect visualization	3	Medi um	Keerthana.R,Anusree.S, Divya.K,Dhirushya.P ,Krishnapriya.M, Larani.K

Sprint-3	Creating Visualization	USN-6	Visualize thedata for the user to understande asily.	5	Medi um	Keerthana.R,Anusree.S, Divya.K,Dhirushya.P ,Krishnapriya.M, Larani.K

6.2 SPRINT DELIVERY SCHEDULE

Sprint	**Total Story Points**	**Durati on**	**Sprint Start Date**	**Sprint End Date (Plan ned)**	**Story Points Completed (as on PlannedE nd Date)**	**Sprint Release Date(Actua l)**
Sprin t-1	5	6 Days	24 Oct 2022	29 Oct 2022	5	29 Oct 2022
Sprin t-2	10	6 Days	31 Oct 2022	05 Nov 2022	10	05 Nov 2022
Sprin t-3	15	6 Days	07 Nov 2022	12 Nov 2022	15	12 Nov 2022
Sprin t-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

6.3 REPORTS FROM JIRA

7. CODING AND SOLUTIONING

7.1 FEATURE 1

iframe:

The iframes are essentially a section of your page that you "cut out." In the space that you have cut out of the page, you can then feed in an external webpage.

In essence, an iframe is another browser window set inside your web page. You see code iframes commonly used on websites that need to include external content like a Google map or a video from YouTube. Both of those popular websites use iframes in their embed code.The *iframe* element is supported by all modern desktop and mobile browsers. However, some browsers don't yet respond consistently to the three new HTML5 attributes for this element.

The *iframe* element, by itself, is not a security risk to you or your site visitors. Iframes have gotten a bad reputation because they can be used by malicious websites to include content that can infect a visitor's computer without them seeing it on the page, by incorporating links pointing to the invisible iframe, and those scripts set off malicious code.

Some computer viruses inject an invisible iframe into your web pages, effectively turning your website into a botnet.

Your site visitors are only as safe as the content of all the sites you link to. If you have reason to think a site is untrustworthy, don't link to it in any fashion.

This is a powerful capability in HTML — you can take any content from any website (with permission) and place it on your own site to enhance your content

This embedded page exists separately from the parent page in terms of its HTML, CSS, and JavaScript code.

The code snippet contains some extra attributes, width and height. These set the dimensions of the iframe region that displays the embedded file. width and height may be set as pixel values, or as percentages of the window, which scales the iframe proportionally to the size of the viewing window.

Like other HTML elements, iframes can be customized with other attributes.

7.2 SOURCE CODE

```
<!DOCTYPE html>
<html>
<head> <title>SALES DATA ANALYSIS</title> </head>
<body>
<style>
 body{
          height: 650px;
           background: linear-gradient(to bottom,  #66ccff 0%, #cc33ff 98%);
        }

 h4{
         padding-left:300px;
         font-size: 25px;
         font-family: cursive;
         color: black;
}

  h3{
          padding-left:800px;
          padding-right:10px;
          font-size: 20px;
         font-family: serif;
         color: #ffe6f2;
           }

  p{
padding-left:10px;
         padding-right:600px;
```

```
        font-size: 20px;
       font-family: serif;
       color: white;
         }

.wrapper {
    margin: 80px auto;
    text-align: center;
    width: 100%;
    position: relative;
  }

  .button {
    padding: 15px 100px;
    margin: 10px 4px;
    color: #eee;
    font-family: sans-serif;
    text-transform: uppercase;
    text-align: center;
    position: relative;
    text-decoration: none;
    display:  inline-block;
    border: 1px solid;
  }

  .button::before {
    content: "";
    position: absolute;
    top: 0;
    left: 0;
```

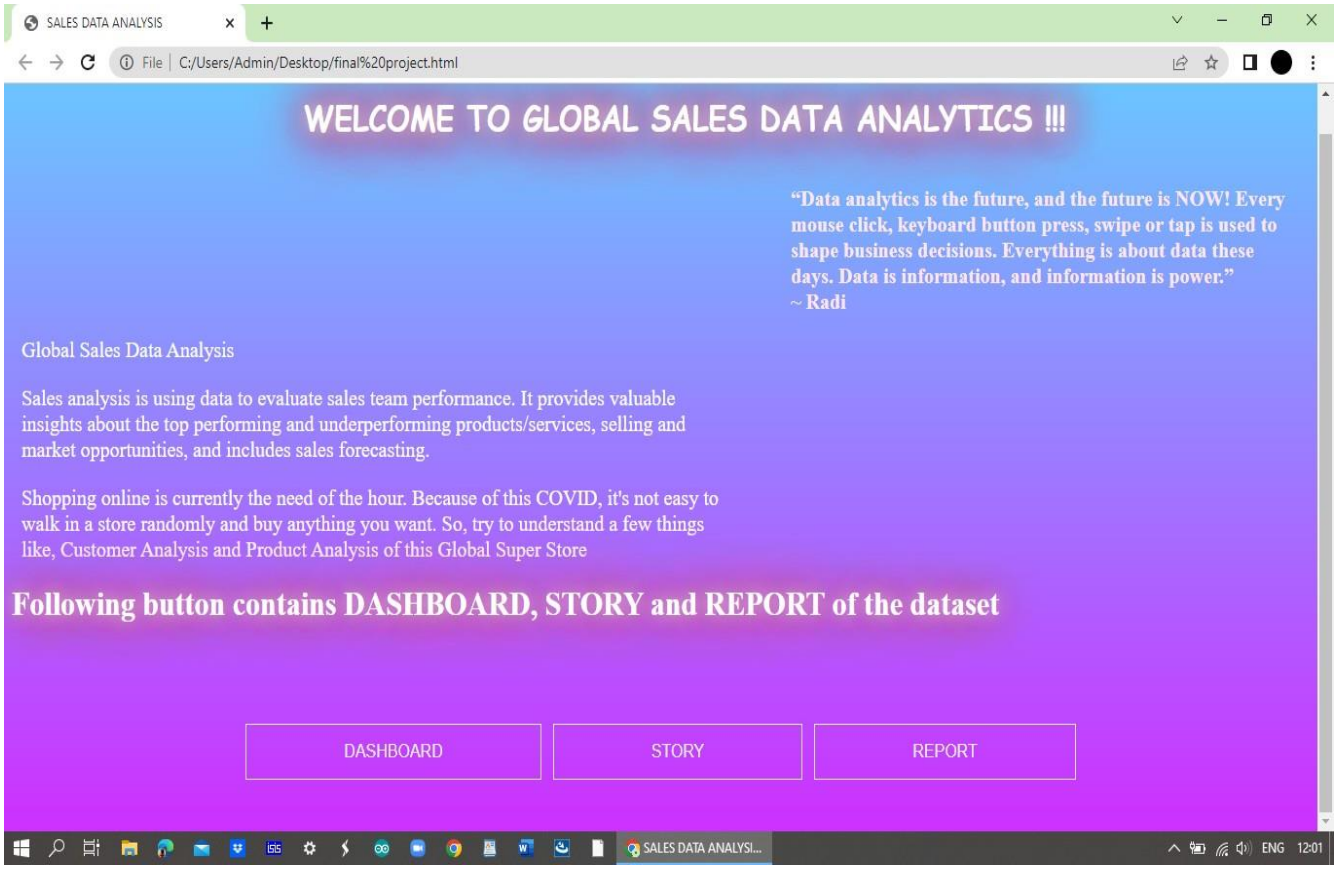
```
  display: block;
  width: 100%;
  height: 100%;
  z-index: -1;
  -webkit-transform: scaleY(.1);
  transform: scaleY(.1);
  transition: all .4s
}

.button:hover {
  color: #b414ba;
}

.button:hover::before {
  opacity: 1;
  background-color: skyblue;
  -webkit-transform: scaleY(1);
  transform: scaleY(1);
  transition: -webkit-transform .6s cubic-bezier(.08, .35, .13, 1.02), opacity .4s;
  transition: transform .6s cubic-bezier(.08, .35, .13, 1.02), opacity
}

.glow {
 font-size: 30px;
 color: #ffffff;
 -webkit-animation: glow 1s ease-in-out infinite alternate;
 -moz-animation: glow 1s ease-in-out infinite alternate;
  animation: glow 1s ease-in-out infinite alternate;
}
@-webkit-keyframes glow {
```

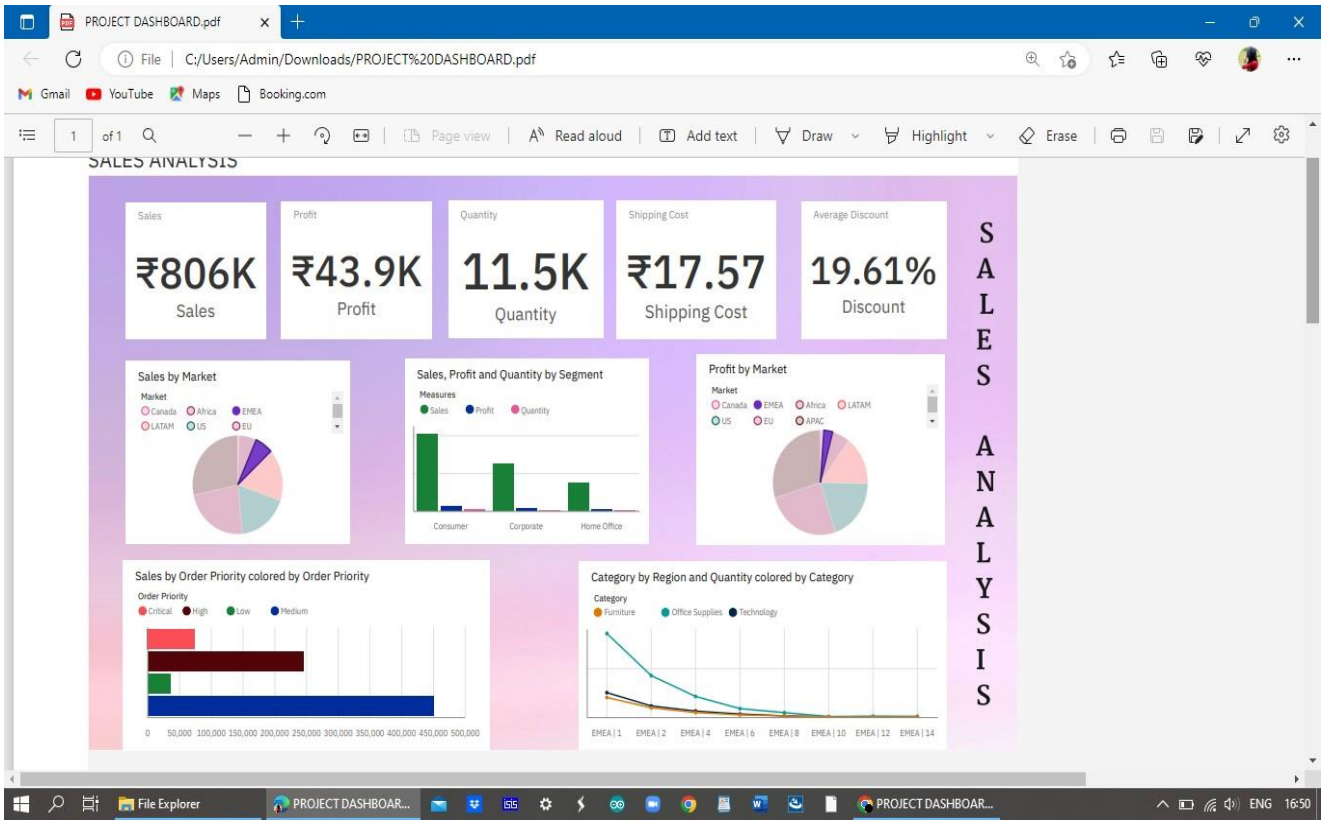
```
    from {
        text-shadow: 0 0 10px #eeeeee, 0 0 20px #000000, 0 0 30px #000000, 0 0 40px #000000,
                0 0 50px #9554b3, 0 0 60px #9554b3, 0 0 70px #9554b3;
    }
    to {
        text-shadow: 0 0 20px #eeeeee, 0 0 30px #ff4da6, 0 0 40px #ff4da6, 0 0 50px #ff4da6,
                0 0 60px #ff4da6, 0 0 70px #ff4da6, 0 0 80px #ff4da6;
    }
  }
 </style>
<h4 class="glow"> WELCOME TO GLOBAL SALES DATA ANALYTICS !!! </h4>
<h3> “Data analytics is the future, and the future is NOW! Every mouse click, keyboard button press, swipe  or tap is used to shape business decisions. Everything is about data these days. Data is information, and information is power.”</br>            ~ Radi</h3>

<p>Global Sales Data Analysis<p>

<p>Sales analysis is using data to evaluate sales team performance. It provides valuable insights about the top performing and underperforming products/services, selling and market opportunities, and includes sales forecasting.</p>

<p>Shopping online is currently the need of the hour. Because of this COVID, it's not easy to walk in a store randomly and buy anything you want. So, try to understand a few things like, Customer Analysis and Product Analysis of this Global Super Store</p>

<h1 class="glow">Following button contains DASHBOARD, STORY and REPORT of the dataset</h1>
<div class="wrapper">
```

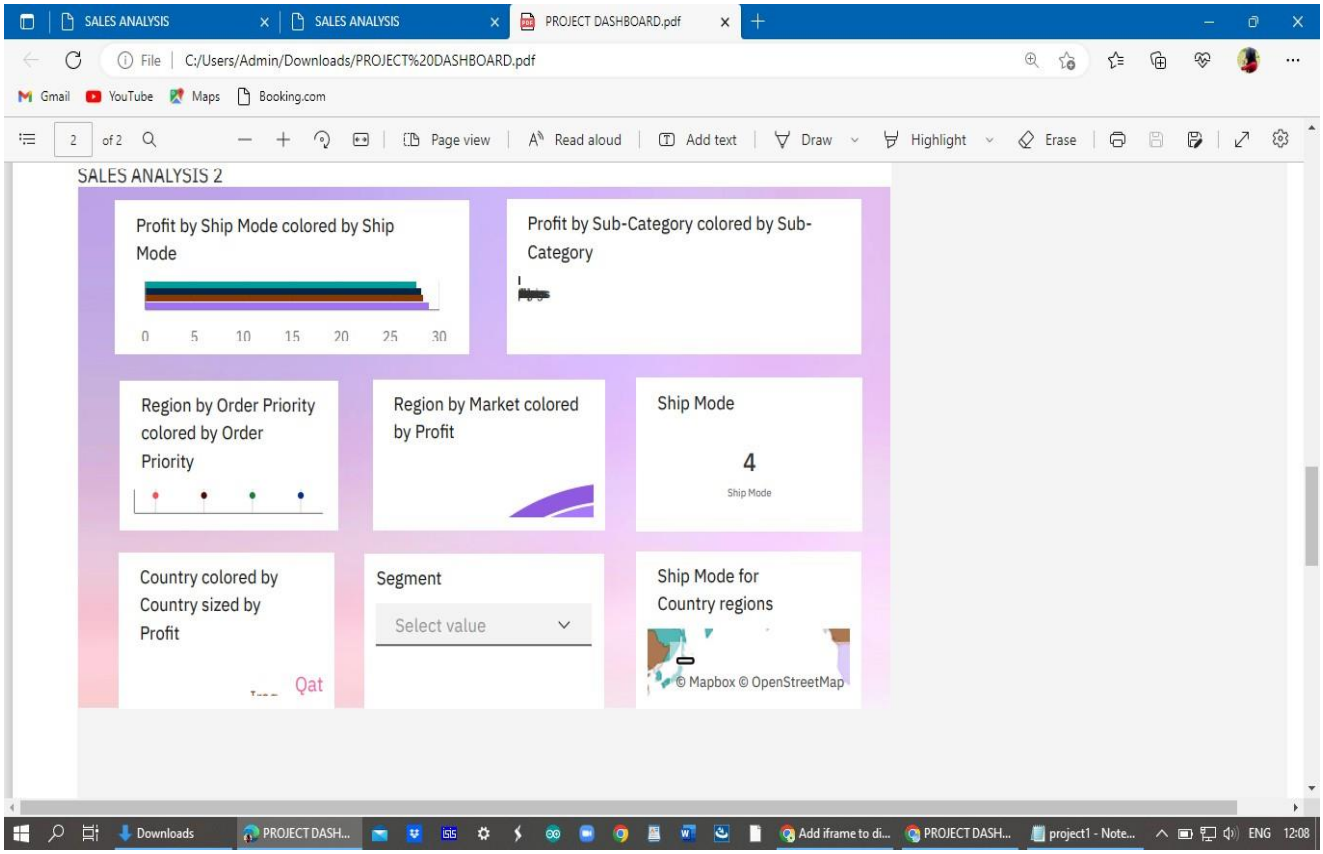
<span class="button" onclick="window.open('https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FProject%2FPROJECT%2BDASHBOARD&action=view&mode=dashboard&subView=model000001847a4bd3cf_00000000','_blank')">DASHBOARD
<span class="button" onclick="window.open('https://us3.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2FProject%2FANALYSIS%2BSTORY&action=view&sceneId=model000001847ab2d1f0_00000002&sceneTime=0','_blank')">STORY
REPORT

</body>
</html>

IMAGES OF THE WEBPAGE



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Maps
Booking.com
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Add text
Draw
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Profit by Sub-Category colored by Sub-Category
Region by Order Priority colored by Order Priority
Region by Market colored by Profit
Ship Mode
4
Ship Mode
Country colored by Country sized by Profit
Segment
Select value
Ship Mode for Country regions
© Mapbox © OpenStreetMap
Downloads
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Add iframe to di...
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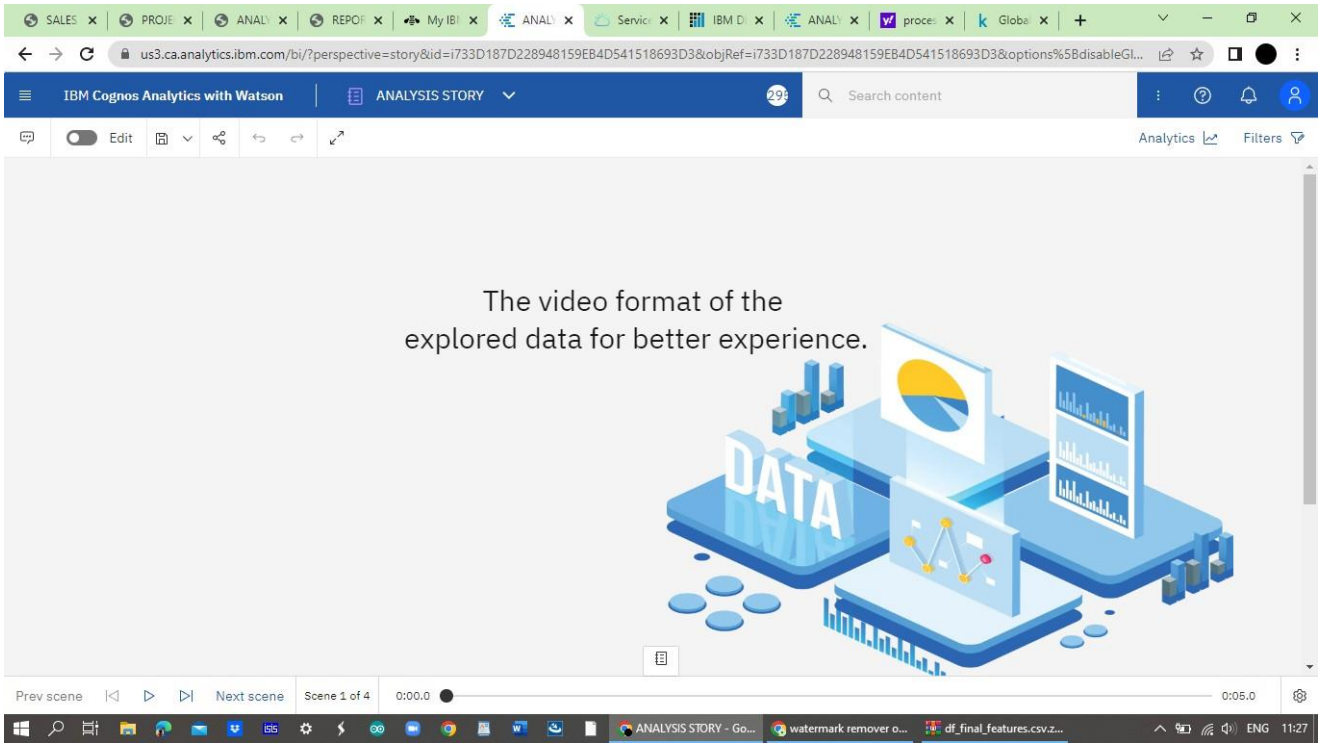
project1 - Note...
ENG
12:08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IBM Cognos Analytics with Watson
ANALYSIS STORY
Search content
Edit
Analytics
Filters
The video format of the explored data for better experience.
DATA
Prev scene
Next scene
Scene 1 of 4
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watermark remover o...
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ENG
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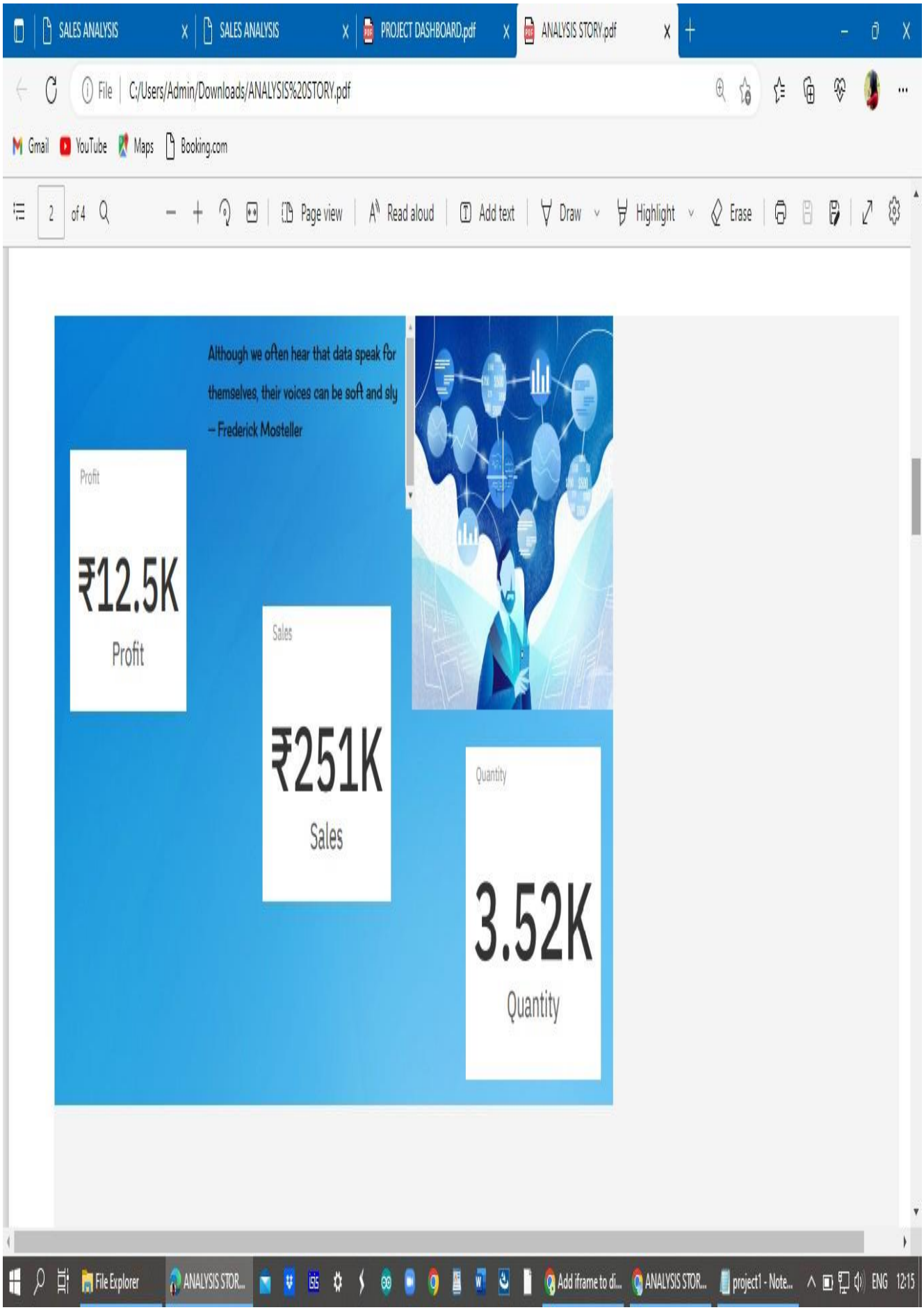
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Gmail YouTube Maps Booking.com
2 of 4
Page view Read aloud Add text Draw Highlight Erase
Although we often hear that data speak for themselves, their voices can be soft and sly
– Frederick Mosteller
Profit
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Sales
₹251K
Sales
Quantity
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Quantity
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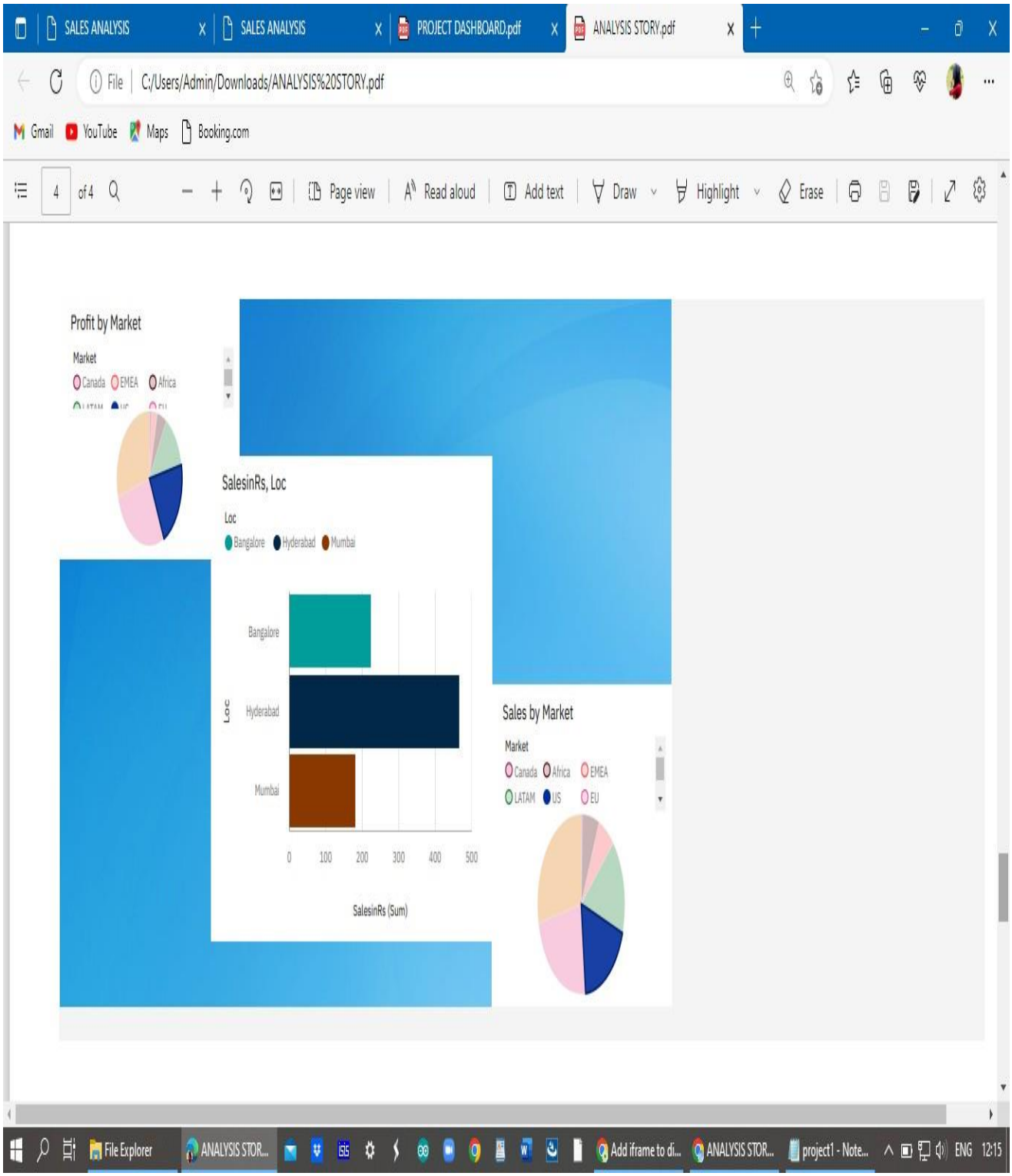
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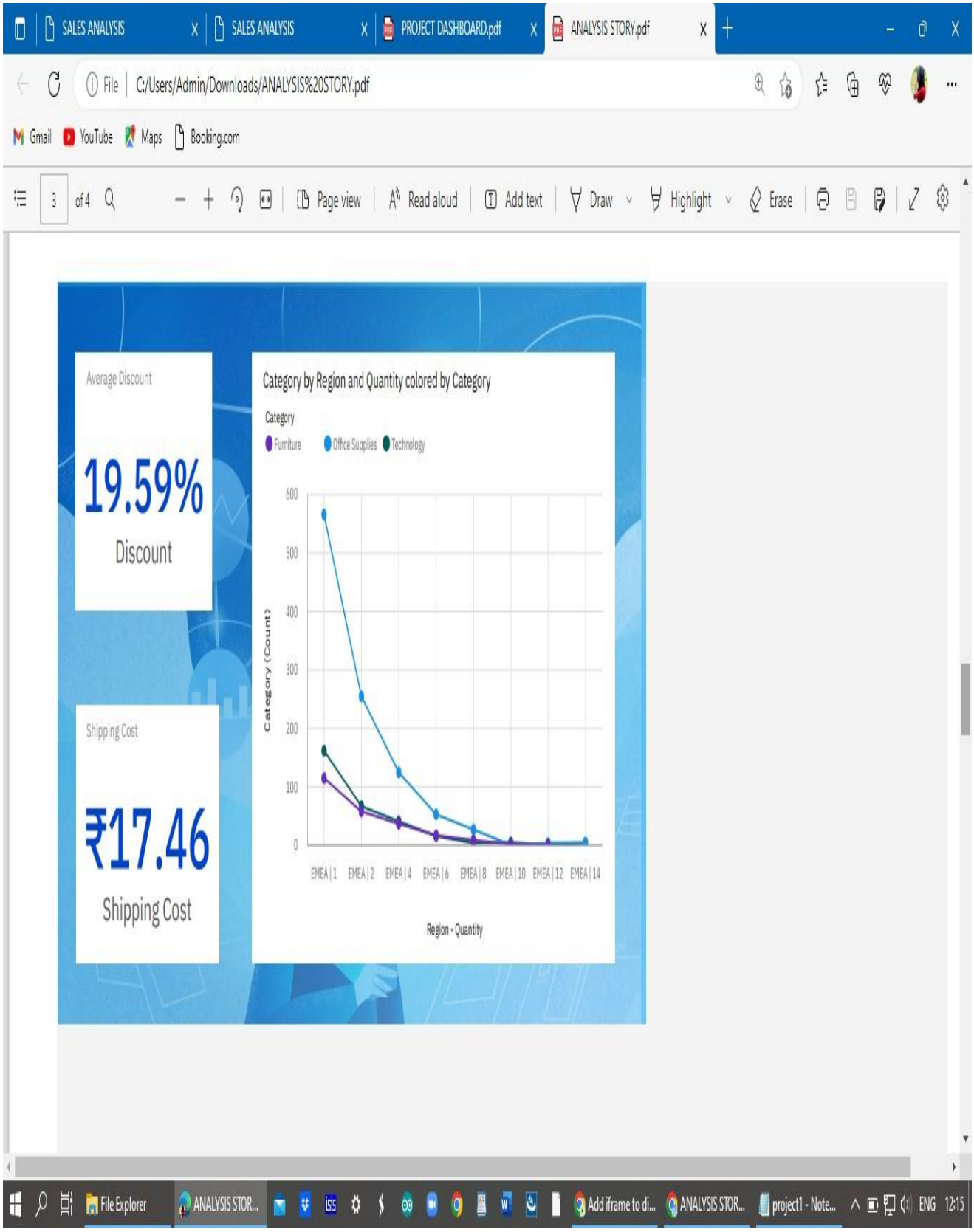
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3 of 4
Page view
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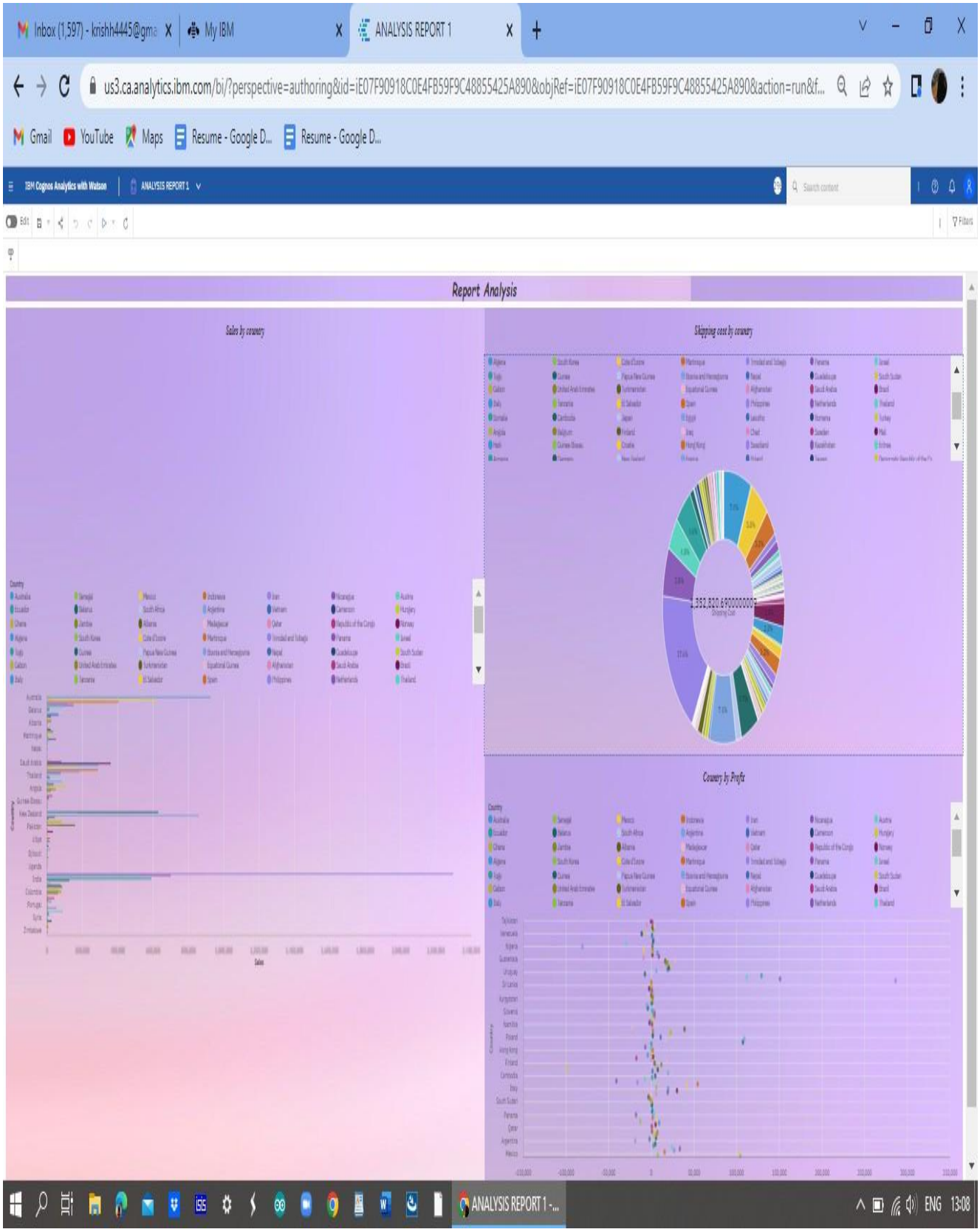
Inbox (1,597) - krishh4445@gma
My IBM
ANALYSIS REPORT 1
us3.ca.analytics.ibm.com/bi/?perspective=authoring&id=iE07F90918C0E4FB59F9C48855425A890&objRef=iE07F90918C0E4FB59F9C48855425A890&action=run&f...
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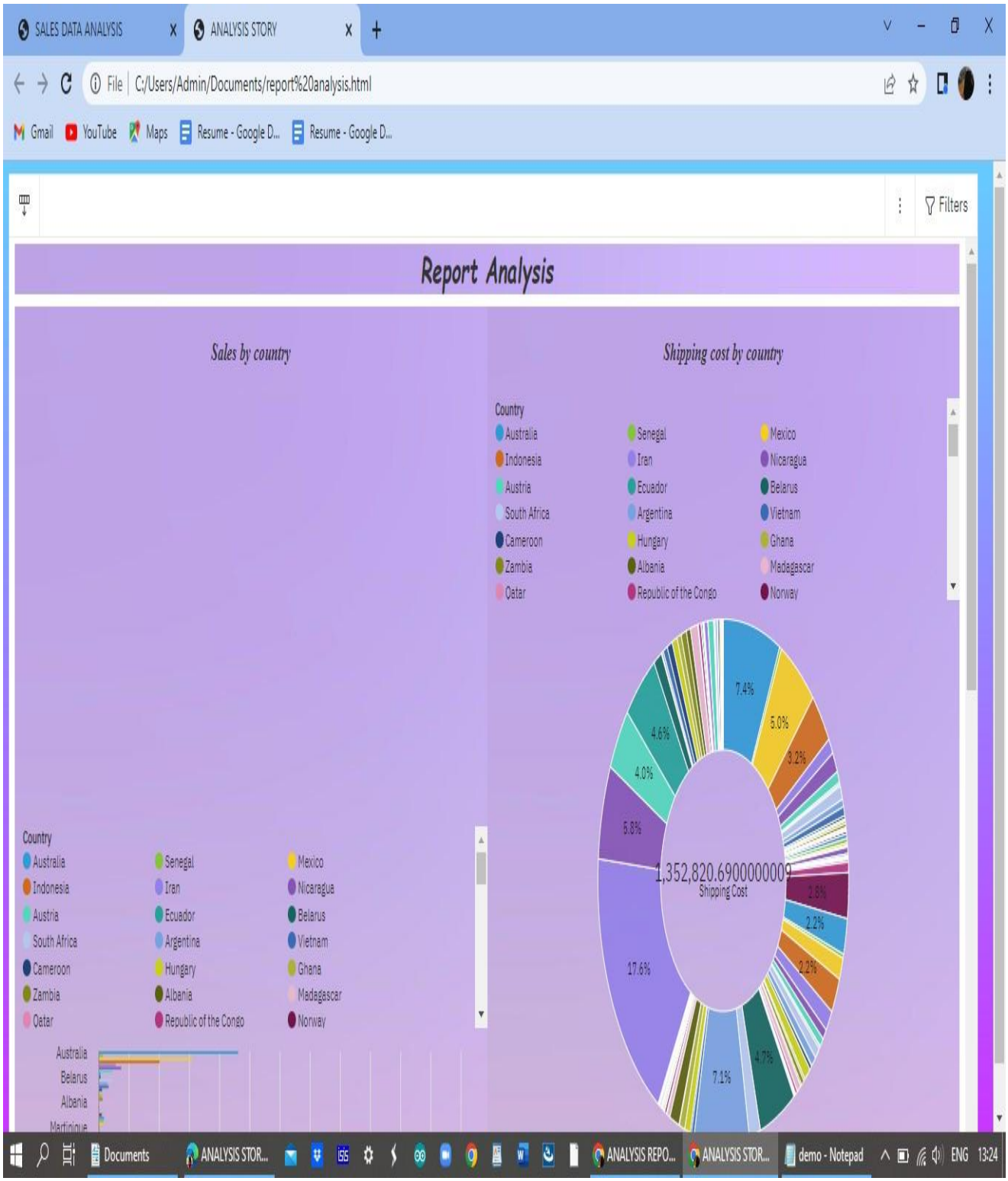
Resume - Google D...
Resume - Google D...
IBM Cognos Analytics with Watson
ANALYSIS REPORT 1
Report Analysis
Sales by country
Shipping cost by country
Country by Profit
ANALYSIS REPORT 1 -...
ENG
13:08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Sales by country
Shipping cost by country
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Australia
Senegal
Mexico
Indonesia
Iran
Nicaragua
Austria
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13:24

8. TESTING

8.1 USER ACCEPTANCE TESTING

This shows the number of resolved or closed bugs at each severity level, and how they were resolved.

Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
By Design	10	4	2	3	20
External	2	3	0	1	6
Fixed	11	2	4	20	37
Skipped	0	0	1	1	2
Won'tFix	0	0	0	1	1
Totals	23	9	7	26	66

8.2 TEST CASES

Section	Total Cases	Not Tested	Fail	Pass
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4

9. RESULTS

9.1 PERFOMANCE METRICES

Future sales prediction:

The prospect of future sales gives the companies that work with sales enormous relief. Those who sell have stock and must manage it intelligently. If there are too many items in stock, they risk having an insufficient room or having to sell at discounts for other items. Instead, when things are too little, the sales decline. Future sales can enable these issues to be avoided and better decisions to be taken.

Inventory Management:

The stock referred to the stocking of products and afterward used in crisis times. For enterprises to optimize resources and increase sales, inventory management is therefore vital. Retailers need to effectively manage inventories so that supply stays unimpacted, although sales suddenly rise. The supply networks and inventory chains are thoroughly analyzed to achieve this.

Merchandising:

The objective is to develop tactics to improve product sales and promotions. Customer decision-making using datasets will be influenced by merchandising. While appealing packaging and branding capture the attention of customers and increase their aesthetic look, rotary goods help to keep their products fresh and new.Data sets are gather to insights and create customer priority sets that take account of seasonality, relevance, and trends.

price prediction:

The objective is to predict&set pricing, for both seller and buyer should satisfactory.price prdiction should be done using analysis of previous dataset.Price optimization affects the satisfaction ratings of clients directly.

Churn prevention:

Now when sales players have the skills to anticipate when a client will make the next purchase, it is necessary to predict when a consumer will quit buying.Customer churn refers to the percentage of customers who have stopped buying and using the product for a specific period.data sets are used to identify trends and features in the behavior, communication, and ordering of customers who have ceased shopping through customer relationship management information.

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- Monitor the progress of sales.
- Contribute to decision-making.
- Personalization of products and services.
- Increase the efficiency of the work.

DISADVANTAGES:

- Lack of alignment within different teams and department.
- Lack of access to quality data.
- Increased time and cost when existing data is not avilable.
- Privacy concerns.

11. CONCLUSION:

From this project, we are able to predict and manage the daily basis sales and it can be access through our web application by both seller and buyer. While making this project, we gained a lot of experience of working as a team.We discovered various predicted and unpredicted problems and we enjoyed a lot solving them as a team.We adopted things like video tutorials, text tutorials, internet and learning materials to make our project complete.

12.FUTURE:

The project assists well to predict and manage the sales in general.
However, this project has some limitations:

- The application is unable to maintain the backup of data once it is uninstalled.
- This application does not provide higher decision capability.So,making the machine learning prediction model

To further enhance the capability of this application, we recommend the following features to be incorporated into the system:

- Mobile apps advantage.
- Provide backup and recovery of data.
- Provide better user interface for user.

13.APPENDIX:

Source Code Github Link :

IBM-EPBL/**IBM-Project-32971-1660213301**

https://github.com/IBM-EPBL/IBM-Project-32971-1660213301/tree/main/Final%20Deliverables

Project Demo Link :

https://drive.google.com/file/d/1LDQcrE0qajgFa-BMneUrwLJqq8AzDH9V/view?usp=share_link