GLOBAL SALES DATA ANALYTICS

IBM PROJECT REPORT 2022

Submitted by

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Project Report

Date 18 November 2022	
Team ID PNT2022TMID31896	
Project Name	Global Sales Data Analytics

1. INTRODUCTION

1.1 Project Overview

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. It has 51291 Rows and 24 Columns.

1.2 Purpose

To create data visualization charts like those mentioned below:

- 1. Column Graph Showing Sales, Quantity and Profit By Segment.
- 2. Pie Chart Showing Sales By Order Priority and Sales.
- **3.** TreeMap showing Sales for Sub-Category Hierarchy and Bar Graph showing Sales By Region.
- **4.** Geographical Map showing Top-10 Country-Wise Sales coloured by Region.
- **5.** Line Graph Showing Profit and Sales By Sub-Category.
- **6.** Bullet Chart Showing Sales Analytical Values Across Different Sub- Categories
- 7. Scatter Plot showing Sales by Profit with points for Sub-Category.
- **8.** Line Graph showing Regional Sales Forecast.
- **9.** Line Graph showing Sales and Profit for Month_Order
- **10.** Box Plot showing Sales Sub Category with Segment Key.
- 11. Sales Bullet Chart By Ship Mode
- **12.** Geographical Map for Showing Top-10 Countries By Sale
- **13.** Radar Graph for showing Regional Sales By Segment

- 14. To Create Word Cloud for Country-Wise Sales a Bar Graph for Sales By Region.
- **15.** Summary Graph for Sales, Profit, Quantity and Discount and a Bar Graph for Sales By Sub-Category.

2 LITERATURE SURVEY

2.1 EXISTING PROBLEM

- If we are finding unusual patterns within our data analysis or our statistical significance is not strong enough, we might not have enough data to make valid conclusions
- Data is meaningless without context and without context, we cannot turn data into information
- Without doing data analysis, we won't get the opportunity to evaluate the data before making actionable plans
- Information is useless without being able to apply to something

2.2 REFERENCES

REFERENCES	AUTHORS
Predictive Sales Analytics	1. Johannes Habel Associate Professor of
	Marketing University of Houston
	2. Sascha Alavi, Professor of Sales
	Management and Chair of the Sales
	Marketing Department University of
	Bochum
	3. Nicolas Heinitz Research Associate
	University of Bochum
Data Analytics	1. Nada Elgendy , University of Oulu.
	2. Ahmed Elragal, Research Associate

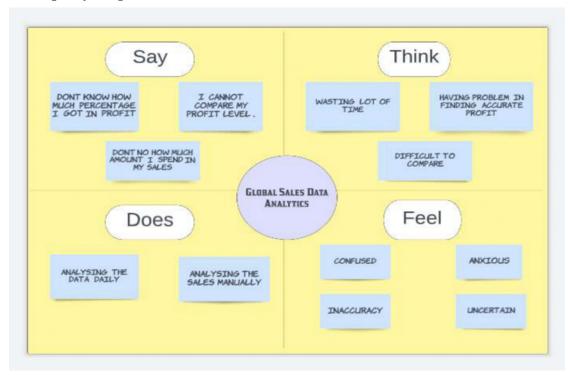
Top-down Data Analysis with Tree maps	1. M. Tennekes, Research Associate
	Research Associate
	2. E. de Jonge, Associate Professor of
	University of Houston
	3. Jian Pei Research Associate University
	of Bochum
Parallel Arc Diagrams: Visualizing Temporal	1. P. Hoek, Journal of Social Structure
Interactions	
Data Mining Concepts and Techniques	1. Han Jiawei, University of Oulu
	2. Micheline Kamber, University of
	Houston
	3. Jian Pei, Sales, Marketing Department
	University of Bochum
Social media big data analytics for demand	1. Iftikhar, Associate Professor
forecasting: development and case	ofUniversity of Bochum
implementation of an innovative framework	2. Mohammad Saud, Professor of Sales
	Marketing Department University of
	Bochum

2.3 PROBLEM STATEMENT

Data that includes a large array of metrics is known as sales data, but broadly speaking, if you can measure something that relate to the sales process. Software such as IBM cognos, which help to collect the data and helps to analyse the performance. It is important to know to learn to read that data to understand that what means for business and where to improve. With right sales analysis tools and wealth of information, we can able to spot the current trends that will empower the organization to provide better sales forecasts and goals for the rest of the organization.

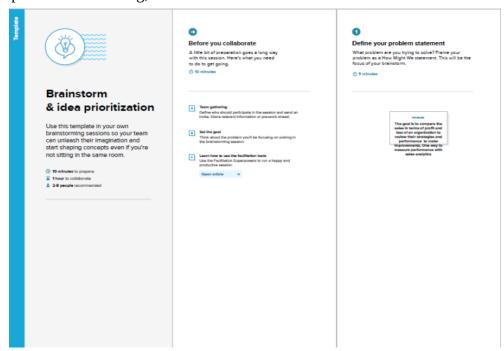
3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

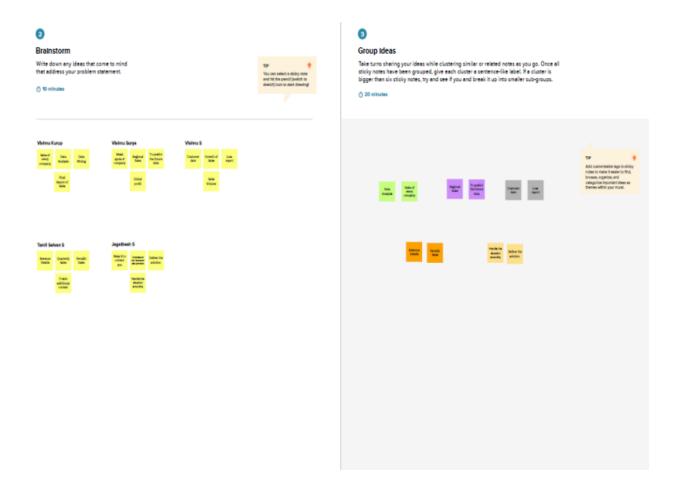


3.2 Ideation & Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping



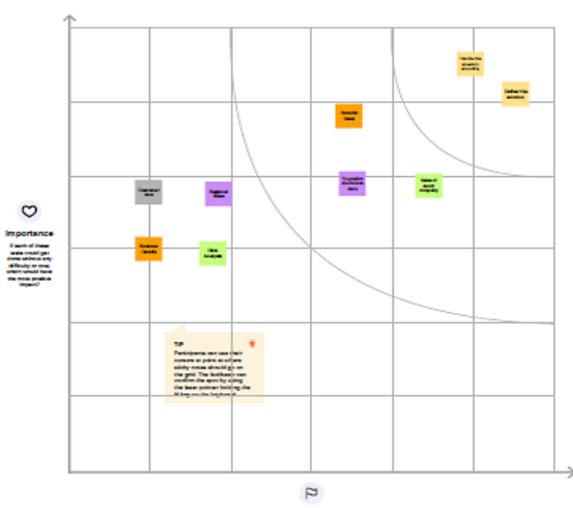
Step-3: Idea Prioritization



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 fessible.

☼ 20 minutes



Fessibility

Reporting of the Improvers, which had not more

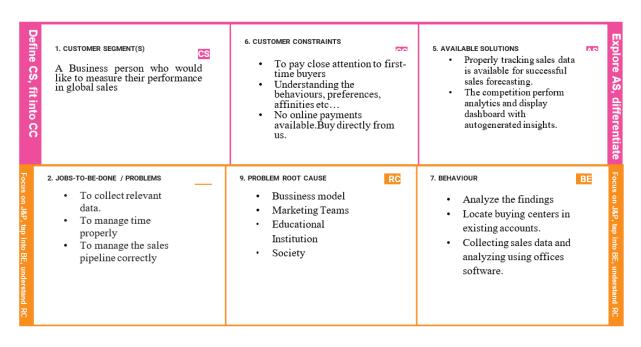
3.3 Proposed Solution

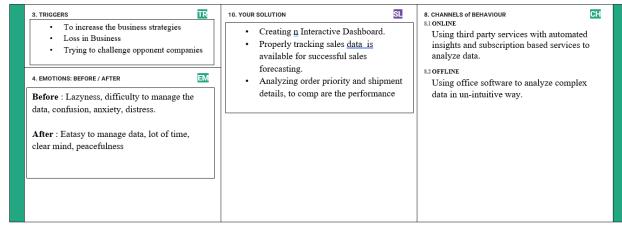
Project team shall fill the following information in proposed solution template

S.No.	Parameter	Description
1.	Problem Statement (Problem to be	Shopping online is currently the need of
	solved)	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.
2.	Idea / Solution description	Using IBM Cognos , we can analyze the
		previous year sales data analysis and we
		could predict the sales pattern for the
		future good extend.
3.	Novelty / Uniqueness	Focusing on the data will provide most
		valuable and important information that
		will be useful to predict the future sales
		pattern. Once you've incorporated sales
		data analysis into your pipeline, you can
		begin moving on to metrics that suit the
		more bespoke challenges you face.
4.	Social Impact / Customer	A MNC companies and huge organization
	Satisfaction	can predict the sales pattern to determine
		their performance in terms of profit and
		loss in the future.

5.	Business Model (Revenue Model)	This could cost with less expensive . Data				
		science and a gadget is needed to develop				
		this. If developing an app with some extra				
		facilities may cost some charges.				
6.	Scalability of the Solution	Investors, Financers and Business				
		Organizations.				

3.4 Problem Solution Fit





4 REQUIREMENT ANALYSIS

4.1 Functional Requirement

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 email			
		SignUp/SignIn			
FR-2	User Confirmation	Confirmation via registered email.			
FR-3	User Login	Login via email and password .			
FR-4	Uploading Dataset	Upload dataset in Cognos analytics tool			
FR-5	Visualize and analysing data	Creating different visualization such as line			
		chart, pie chart etc to analyse the dataset			
FR-6	Creating Dashboard	Create graphs, tables, charts etc			
FR-7	Log out	Logout after downloading the Dashboard			

4.2 Non-Functional Requirements

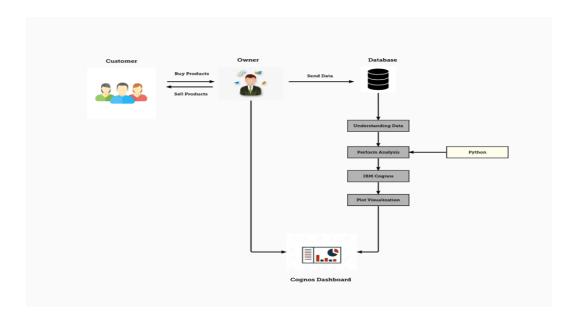
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description					
NFR-1	Usability	Optimized resources and the user can access the dashboard till it has the right store sale dataset.					
NFR-2	Security	It is securable. Anyone with correct login credentials only can view the dashboards.					
NFR-3	Reliability	Based on development, it is highly reliability.					
NFR-4	Performance	Performance and efficiency levels are high. User can easily drag to any functions which they want to visualize.					

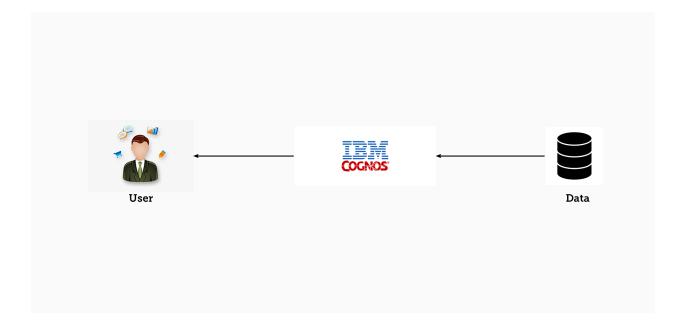
NFR-5	Availability	Available to all users who wants to know		
		about the sales data in all websites. It is free		
		of cost.		
NFR-6	Scalability	Dashboards are very scalable and user can		
		modify the metrics of the dashboard		
		whenever they want.		

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS



5.2 Solution & Technology Architecture



5.3 User Stories

Use the below template to list all the user stories for the product.

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 application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-6	As a user, I can create a visualization by using the dashboard in the application.		High	Sprint-3
Customer (Web user)	Login	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account dashboard	High	Sprint-1
Customer Care Executive	Chat box	USN-2	It can be used by easily access and responsible	I can access by easily through application	High	Sprint-2
Administrator	Calling	USN-3	It can be used by easily access and responsible	I can access by easily through application	High	Sprint-2

6 PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members	
Sprint-1	Registration	USN-1	user can register for the application by entering my email and password	3	High	VISHNU KURUP	
Sprint-1		USN-2	User will receive email if the registration is successful. That the registration has conformed	successful. That the registration has 3 High		VISHNU SURYA P	
Sprint-1		USN-3	As a user, I can register by any browser.	5	Low	TAMILSELVAN S	
Sprint-1		USN-4	As a user, I can extract data	3	Medium	JAGATHESH S	
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	6	High	VISHNU S	
Sprint-2	Dashboard	USN-6	I can access the dashboard of mine.	3	Medium	JAGATHESH S	
Sprint-2		USN-7	I can register for the application throughany web browser.	5 Low		VISHNU SURYA P	
Sprint-2		USN-8	I can use my credentials. For accessing my resources.	For accessing my 2 High		VISHNU S	
Sprint-2		USN-9	As, a user I can schedule events and set events.	set 7 High		VISHNU KURUP	
Sprint-3	Support	USN-10	I can perform analysis by tools (IBM Cognos)	10 Medium		TAMILSELVAN S	
Sprint-3		USN-11	Responds to user queries via telephone, emailetc.	3	Medium	VISHNU SURYA P	
Sprint-3		USN-12	The team must respond immediately to the queries based on the priority	5	High	TAMILSELVAN S	
Sprint-4	System Requirements	USN-13	Hardware Requirement 1. Laptop or PC • i5 processor system or higher • 4 GB RAM or higher • 128 GB ROM or higher 2. Mobile (12.0 and above)	5	Low	VISHNU KURUP	
Sprint-4		USN-14	Software Requirement 1. Laptop or PC • Windows 10 or higher Android Studio	8	Medium	VISHNU SURYA P	

6.2 Sprint Delivery & Schedule

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	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	17	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	18	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	13	19 Nov 2022

Velocity:
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) periteration unit (story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

7. CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1 Feature 1

Global superstore dataset is required data set for our data analytics. Using analytical visualizations in IBM Cognos Analytics tool required dashboard, report and story has been created. Kaggel API has been . Purpose of external API has been used in the application. IBMDB2 database is used for uploading the dataset to the cloud database for performing basic sql operations and then connected to IBM cognos analytics platform. Open source frameworks has been used for embedding the dashboard, report and story using HTML and Bootstraps.

7.2 Feature 2

```
Code:
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="utf-8">
 <meta content="width=device-width, initial-scale=1.0" name="viewport">
<title>Global Sales Data Analytics</title>
 <meta content="" name="description">
 <meta content="" name="keywords"
<!-- Favicons -->
 <link href="assets/img/favicon.png" rel="icon">
 k href="assets/img/apple-touch-icon.png" rel="apple-touch-icon">
 <!-- Google Fonts -->
 link
href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|
Raleway:300,300i,400,400i,500,500i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i,600
,600i,700,700i" rel="stylesheet">
 <!-- Vendor CSS Files -->
```

```
link href="assets/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
 k href="assets/vendor/bootstrap-icons/bootstrap-icons.css" rel="stylesheet">
 <link href="assets/vendor/boxicons/css/boxicons.min.css" rel="stylesheet">
 link href="assets/vendor/glightbox/css/glightbox.min.css" rel="stylesheet">
 link href="assets/vendor/remixicon/remixicon.css" rel="stylesheet">
 k href="assets/vendor/swiper/swiper-bundle.min.css" rel="stylesheet">
 <!-- Template Main CSS File -->
 <link href="assets/css/style.css" rel="stylesheet">
 * Template Name: KnightOne - v4.9.1
 * Template URL: https://bootstrapmade.com/knight-simple-one-page-bootstrap-template/
 * Author: BootstrapMade.com
 * License: https://bootstrapmade.com/license/
 </head>
<body>
 <!-- ===== Header ====== -->
 <header id="header" class="fixed-top">
  <div class="container-fluid">
    <div class="row justify-content-center">
    <div class="col-xl-9 d-flex align-items-center justify-content-lg-between">
     <h1 class="logo me-auto me-lg-0"><a href="index.html">Data Analytics</a></h1>
     <!-- Uncomment below if you prefer to use an image logo -->
     <!-- <a href="index.html" class="logo me-auto me-lg-0"><img src="assets/img/logo.png"
alt="" class="img-fluid"></a>-->
     <nav id="navbar" class="navbar order-last order-lg-0">
```

```
<a class="nav-link scrollto active" href="#hero">Home</a>
       <a class="nav-link scrollto" href="#about">About</a>
       <a class="nav-link scrollto" href="#services">Dashboard</a>
       <a class="nav-link scrollto" href="#portfolio">Report</a>
       <a class="nav-link scrollto" href="#pricing">Story</a>
      <i class="bi bi-list mobile-nav-toggle"></i>
     </nav><!-- .navbar -->
<a href="#about" class="get-started-btn scrollto">Get Started</a>
   </div>
  </div>
</div>
</header><!-- End Header -->
<!-- ===== Hero Section ====== -->
<section id="hero" class="d-flex flex-column justify-content-center">
 <div class="container">
  <div class="row justify-content-center">
   <div class="col-xl-8">
     <h1>Global Sales Data Analytics</h1>
     <h2>What Gets Measured, Gets Managed</h2>
     <a href="https://youtu.be/tikHooKBxjY" class="glightbox play-btn mb-4"></a>
   </div>
  </div>
 </div>
</section><!-- End Hero -->
<main id="main">
 <!-- ===== About Us Section ====== -->
 <section id="about" class="about">
  <div class="container">
```

```
<div class="section-title">
    <h2>About Us</h2>
    <h3>One way to measure performance is with sales analytics</h3>
```

Global Sales covers all activities involved in selling a product or service to a consumer or business. It is important for sales and marketing teams to review their strategies and performance in order to make improvements. Sales data analytics refers to the use of technology to collect and use sales data to identify actionable insights. It is used to identify, optimize, and increase sales. An efficient sales model that generates higher revenue for the business.

```
An efficient sales model that generates higher revenue for the business.
     </div>
<div class="row content">
     <div class="col-lg-6">
     </div>
    </div>
 </div>
  </section><!-- End About Us Section -->
  <!-- ===== Services Section ====== -->
  <section id="services" class="services">
   <div class="container">
      <div class="section-title">
     <h2>Dashboard</h2>
    A tool used to do multi-task, organize, visualize, analyze, and track data. View
automatically updated data with interactive charts, graphs and tables.
    </div>
    <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2
FData%2BModule%2FDashboardDB2&closeWindowOnLastView=true&ui_appbar=f
alse&ui naybar=false&shareMode=embedded&action=view&mode=dashbo
ard&subView=model000001847a849dc0_00000000" width="1500" height="1000"
frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>
```

```
</div>
      </section><!-- End Cta Section -->
      <!-- ===== Portfolio Section ====== -->
      <section id="portfolio" class="portfolio">
         <div class="container">
              <div class="section-title">
              <h2>Report</h2>
              Sorting and organization of data, while analytics derive insights from that data and
often influence business decisions.
           </div>
     <iframe
src="https://us1.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FData%2BModule%2FSales
%2Breport&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false
&shareMode=embedded&action=run&prompt=false" width="1500"
height="1000" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>
  </div>
      </section><!-- End Portfolio Section -->
     <!-- ===== Pricing Section ====== -->
     <section id="pricing" class="pricing">
        <div class="container">
               <div class="section-title">
              <h2>Story</h2>
              A methodology for communicating information, tailored to a specific audience, with a
compelling narrative.
           </div>
           <iframe
src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&pathRef=.my_folders%2FStor
y&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shar
eMode = embedded \& amp; action = view \& amp; scene Id = model 00000184816b7035\_00000002 \& amp; action = view \& amp; scene Id = model 00000184816b7035\_000000002 \& amp; action = view \& amp; action =
p;sceneTime=0" width="1500" height="1000" frameborder="0" gesture="media"
```

```
allow="encrypted-media" allowfullscreen=""></iframe>
   </div>
  </section><!-- End Pricing Section -->
  <!-- ===== Contact Section ====== -->
  <section id="contact" class="contact">
   <div class="container">
    <div class="section-title">
     <h2>Contact</h2>
     </div>
   </div>
   <div class="container">
    <div class="row mt-5">
      <div class="col-lg-4">
       <div class="info">
        <div class="address">
         <div class="social-links mt-3">
          <a href="https://github.com/IBM-EPBL/IBM-Project-39960-1660572586"
class="github"><i class="bi bi-github"></i> GitHub</a>
         </div>
        </div>
        <div class="email">
         <i class="ri-mail-line"></i>
         <a href="721219106060@smartinternz.com"> Smart Internz Mail</a>
        </div>
       </div>
     </div>
    </div>
   </div>
  </section><!-- End Contact Section -->
```

```
</main><!-- End #main -->
 <!-- ===== Footer ====== -->
 <footer id="footer">
  <div class="container">
   <h3>Team ID : PNT2022TMID31896</h3>
   <div class="social-links">
    <a href="#" class="twitter"><i class="bx bxl-twitter"></i></a>
    <a href="#" class="facebook"><i class="bx bxl-facebook"></i></a>
    <a href="#" class="instagram"><i class="bx bxl-instagram"></i>
    <a href="#" class="google-plus"><i class="bx bxl-skype"></i></a>
    <a href="#" class="linkedin"><i class="bx bxl-linkedin"></i></a>
   </div>
</div>
 </footer><!-- End Footer -->
<div id="preloader"></div>
 <a href="#" class="back-to-top d-flex align-items-center justify-content-center"><i class="bi
bi-arrow-up-short"></i>
<!-- Vendor JS Files -->
 <script src="assets/vendor/purecounter_vanilla.js"></script>
 <script src="assets/vendor/bootstrap/js/bootstrap.bundle.min.js"></script>
 <script src="assets/vendor/glightbox/js/glightbox.min.js"></script>
 <script src="assets/vendor/isotope-layout/isotope.pkgd.min.js"></script>
 <script src="assets/vendor/swiper/swiper-bundle.min.js"></script>
 <script src="assets/vendor/php-email-form/validate.js"></script>
<!-- Template Main JS File -->
 <script src="assets/js/main.js"></script>
</body>
</html>
```

8. RESULTS

8.1 Performance Metrics

- Greater visibility
- Measurable
- Easy to understand and predict
- Timesaving Efficiency
- Better for decision making
- Better for forecasting

9. ADVANTAGES & DISADVANTAGES

Advantages:

- Enhanced Visibility: Dashboards provide greater visibility with information available whenever it is required to ensure businesses are better placed to respond to changing market conditions.
- Timesaving Efficiency: With dashboards, we are no longer wasting valuable time generating reports from multiple systems. Instead, data is drawn from a source and displayed as an easy to interpret visual overview.
- Better Forecasting: With greater insight into the data, future demand can be more accurately predicted using historic information. Businesses can be more effectively planned for demand fluctuations, setting measurable goals and deliverables for greater success.
- Better Decision Making: Whether you're providing reporting and analysis for the entire
 organisation or functional areas of the business, a dashboard allows companies to analyse
 key data quickly and meticulously. Visualised interactivity serves to deliver
 overwhelming amounts of data in a way that is easy to understand. With the ability to
 easily identify what the data really means; better decisions can be made relevant to the
 business.

Disadvantages:

- Flashy or cluttered design, with users attempting to incorporate too much information
 without understanding constraints or considering their specific needs from the range of
 different measurables detailed data analysis provides.
- The technology used in the development of dashboards differs from other software solutions already employed in organisations and can be initially difficult to understand.
- The business has no predetermined rules and hierarchies for how dashboard metrics are
 used. This means each employee can use the metrics in different ways, resulting in a
 diverse set of data being reported.

10. CONCLUSION

From this project, we have successfully,

- Created multiple analysis charts / graphs .
- Used the analysed chart for creation of dashboard .
- Used the analyseed chart for creation of report and story.
- Saved and visualized the dashboard, report and story in web application using HTML and bootstrap.

11. FUTURE SCOPE

Sellers make websites where they display images of their products with price and description. Shoppers who buy the products have multiple payment options like COD, e-wallet, net banking, credit card, and so on. Online sellers have the responsibility of shipping the product to the buyer and ensuring safe and timely delivery. Various charts can be prepared like regarding Year_Order and Day_Order Columns, Market and Shipping Costs Columns, country and state wise sales column, segment wise price column, order priority wise shipping mode and shipping cost, city wise profit and sales columns etc...can be visualized. Interactive dashboards can be created with more number of visualization. User friendly and interactive web application can be created with latest technology for different type of datasets.

GitHub Link:

https://github.com/IBM-EPBL/IBM-Project-39960-1660572586

Project Demo Link:

 $\underline{https://drive.google.com/file/d/1BY1I8kFxntfpvU21R25UmFLFpqCJUcls/view?usp=sharing}$