GLOBAL SALES DATA ANALYTICS

PROJECT REPORT
TEAM ID:PNT2022TMID15341

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

In the past few years, an explosion of interest in big data has occurred from both academia and the e-commerce industry. This explosion is driven by the fact that e-commerce firms that inject big data analytics (BDA) into their value chain experience 5–6% higher productivity than their competitors. A recent study by BSA Software Alliance in the United States (USA) indicates that BDA contributes to 10% or more of the growth for 56% of firms. Therefore, 91% of Fortune 1000 companies are investing in BDA projects, an 85% increase from the previous year. While the use of emerging internet-based technologies provides e-commerce firms with transformative benefits. Big data analytics (BDA) enables e-commerce firms to use data more efficiently, drive a higher conversion rate, improve decision making and empower customers. As such, the extant literature identifies BDA as the platform for "growth of employment, increased productivity, and increased consumer surplus". Due to the high impact in e-commerce, notably in generating business value, BDA has recently become the focus of academic and industry investigation.

The aims of this paper are:

• To identify definitional perspectives of big data analytics.

• To distinguish the characteristics of big data within e-commerce.

• To explore the types of big data within e-commerce.

• To illustrate the business value of big data in e-commerce.

• To provide guidelines for tackling the challenges of big data application within ecommerce.

1.2 PURPOSE

Companies today are forced to search for solutions that ensure both higher business returns and lower operating costs due to the evolving technological landscape and fresh business difficulties.

To increase sales productivity:

By highlighting areas for improvement, data analytics in sales help managers in shortening the sales cycle. Analytics aid salespeople in reducing leaks in the sales funnel in addition to a 20% average boost in sales productivity.

To find new sales opportunities:

A company expands, its products change, and new sales opportunities arise. Businesses can better understand how their products fit in various markets and industries by tracking sales statistics. Salespeople can identify their customer base and provide prospects for upselling and cross-selling by using previous data.

To set effective sales targets:

Sales data, such as finished deals, qualified opportunities, and sales cycle time, collected throughout a year or even a quarter, can dramatically enhance how companies plan to achieve their sales goals. Based on the performance of your sales force, predictive analysis helps forecast sales revenues and define individual goals.

To improve customer retention:

The use of sales analytics is to reduce the number of churned accounts by identifying potential drop-off stages and taking preventive action.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

While the use of big data tends to add value for business throughout the entire value chain, there are a few challenges that organizations should confront and resolve before pay-offs from big data will flow into their business. Indeed, any innovative way of performing jobs always brings challenges: big data is no exception to this reality. Many researchers have argued that, while big data have great potential to improve business performance/add value, decision makers need to address various business challenges in order to reap the benefits. The current study highlights some of these challenges with theoretical and practical implications, thus laying the ground for potential research on BDA in the e-commerce landscape. One of the biggest challenges in the big data environment is that it does not give clear direction on how to reach business targets by aligning with the existing organizational culture and capabilities. In this regard, it has been highlighted that the key challenge for managers is to make big data trustworthy and understandable to frontline employees, with the example that frontline employees are typically reluctant to use big data as they either did not trust a big data-based model or did not have the capabilities to understand how it worked. Therefore, in the process of gaining greater acceptance by employees and other end-users, managers should present big data in an understandable format such as through a dashboard, reports or a visualization system. Indeed, an innovative capability always leads toward sustained long-term advantages and superior firm performance through the characteristics of rarity, appropriability, non-reproducibility, and nonsubstitutability.

2.2 REFERENCES

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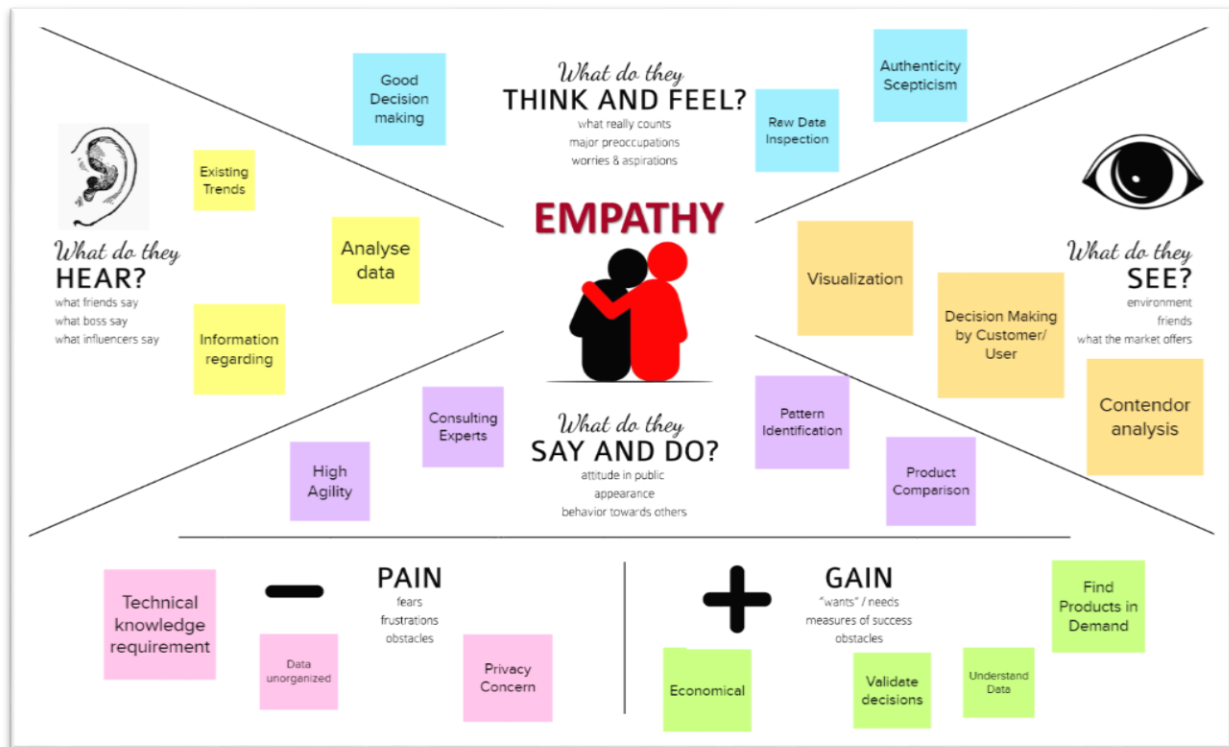
IBM, 2013. Analytics: The real-world use of big data: How innovative retail organizations extract value from uncertain data.
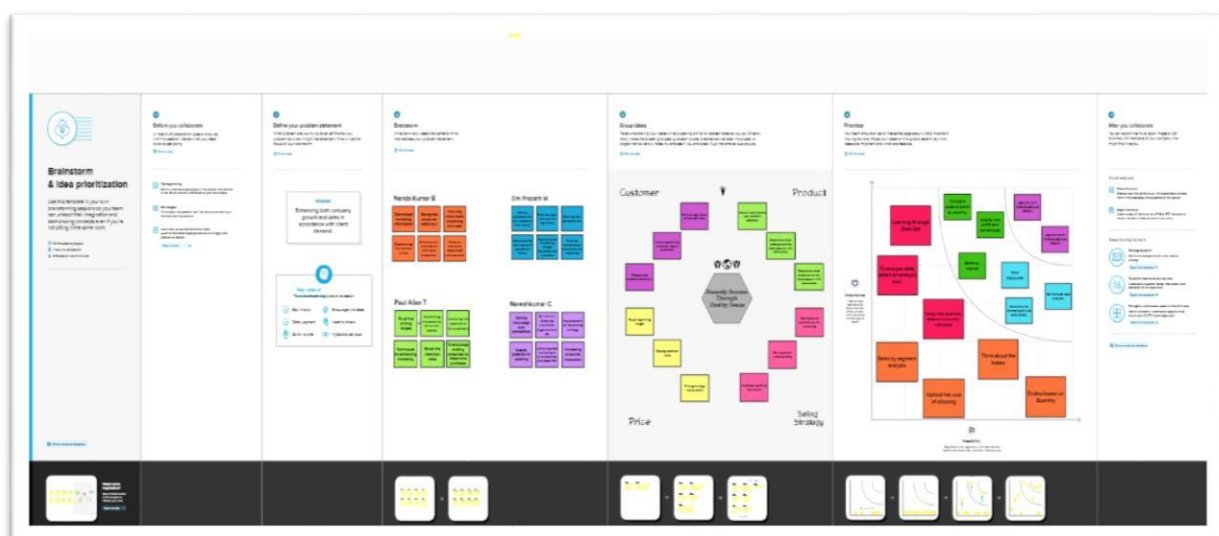
2.3 PROBLEM STATEMENT DEFINITION

Problem Statement	I am (Customer)	I'm trying to	But	Because	Which Makes Us
PS-1	Company or Corporation	To enhance sales by making smarter business judgments.	The data have been interpreted incorrectly in several cases.	There is a wealth of information available, but it is crucial to properly evaluate it. We shall be in a terrible position if we read information incorrectly and behave accordingly.	Impede
PS-2	Marketing Team	To develop a product marketing plan and strategy.	Time restrictions may apply.	Data must be carefully gathered and analyzed via a labor-intensive procedure called market research.	Obstruct
PS-3	Sales Team	To examine and process the data.	Lack of data transparency and integrity.	The data are not entirely reliable. Researchers found that 70% of marketers acknowledged having inconsistent and lowquality data.	Pique
PS-4	Product Lead	To improve corporate decision-making.	Lack of knowledge regarding the use of data.	A major problem in managing marketing analytics is a lack of knowledge of how to evaluate and apply data to boost business growth.	Uncertain
PS-5	Institution	Look for a more accurate analytical instrument.	Finding the best tool is challenging.	As a solution for analytics, there may be hundreds of useful tools. Consequently, it presents a new difficulty.	Distress

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

3.2 IDEATION & BRAINSTORMING

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To produce data-driven decisions by utilizing data analytics where business professionals can analyse customers, products, and new trends. A crucial component of operating a successful firm is sales analysis. We can choose which products to focus on, where to sell, and how to effectively reach customers using sales data.
2.	Idea / Solution description	Currently, analytic programmes are available, but they are not an ideal fix. To address this, we are developing a tailored analytics model that will assist companies of all sizes in increasing revenue, automating processes, making wiser decisions, and keeping you informed of changes in customer behavior.
3.	Novelty / Uniqueness	A successful data analytics program that gives you a clear image of where you are, where you have been, and where you should go will be made possible with the help of the tailored analytics model. in line with this model. As a result, this model will be unique.
4.	Social Impact / Customer Satisfaction	The use of this strategy will benefit a variety of enterprises by enhancing efficiency, boosting revenue, and reducing loss of income.
5.	Business Model (Revenue Model)	The methodology will be successful because it helps businesses better understand their clients, assess their advertising efforts, personalise content, and develop content strategies. Given its utility, it will undoubtedly attract clients.
6.	Scalability of the Solution	According to the dataset given, the tailored model will provide a crisp visual understanding with an attractive & engaging display and understanding. The data visualisation is used to spot trends, patterns, and other things which results in making data driven decisions.

3.4 PROBLEM SOLUTION FIT

9. PROBLEM ROOT CAUSE RC

Unpredictable sales

Market decline

Lots of data

5. AVAILABLE SOLUTIONS AS

Contenders run analytics and show dashboards with live insights.

The finished product offers the option to add manual or dynamic data to the dashboard.

1. CUSTOMER SEGMENT(S) CS

a company, online retailer, or seller who wants to learn more about sales on a worldwide scale.

7. BEHAVIOUR BE

Getting sales information

Use the information effectively.

2. JOBS-TO-BE-DONE / PROBLEMS J&P

Structure of the input file determination.

Which kind of analysis would be most helpful?

6. CUSTOMER

CONSTRAINTS

A file's structure should be checked before uploading.

Noneasy payment

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4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Signing up with Gmail Register or Log In
FR-2	User Confirmation	Email confirmation is delivered.
FR-3	Dataset	Dataset upload to Cognos Analytics Tool.
FR-4	Visualize/Analyse	Columns can be moved around to analyse the dataset.
FR-5	Create Dashboards	Create Charts , Graphs ,Tables etc.
FR-6	Log Out	After downloading the Dashboards, log out.

4.2 NON-FUNCTIONAL REQUIREMENT

FR No.	Non-Functional Requirement	Description

NFR-1	**Usability**	Until the Dashboard contains the appropriate Store Sales Dataset, the user can view it.
NFR-2	**Security**	The Dashboards/Templates are accessible to anyone with the proper Log In credentials.
NFR-3	**Reliability**	Templates are trustworthy since we upload and access them over the cloud.
NFR-4	**Performance**	The user can easily drag to any metrics they want to view, and it works as intended.
NFR-5	**Availability**	Anyone who is interested in learning more about Sales Data can access it for free.
NFR-6	**Scalability**	Dashboards and templates are quite flexible; users can change the metrics at any time.

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAM
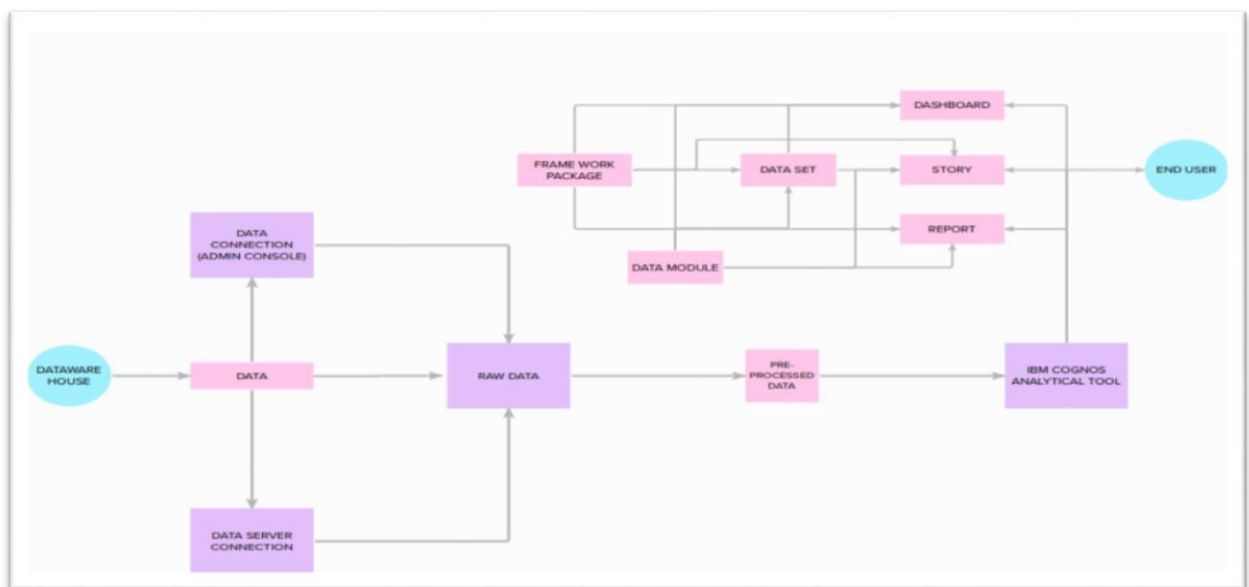
FLOW STRUCTURES:

1. User configures credentials and starts the app.

2. User selects data files to process and load.

3. Apache tikan extracts text from the data file.

4. Extracted text is passed to Watson NLU for enrichment.

5. Enriched data is visualized in the UI using D3.js library.

5.2 SOLUTION & TECHNICAL ARCHITECTURE

Solution Architecture:
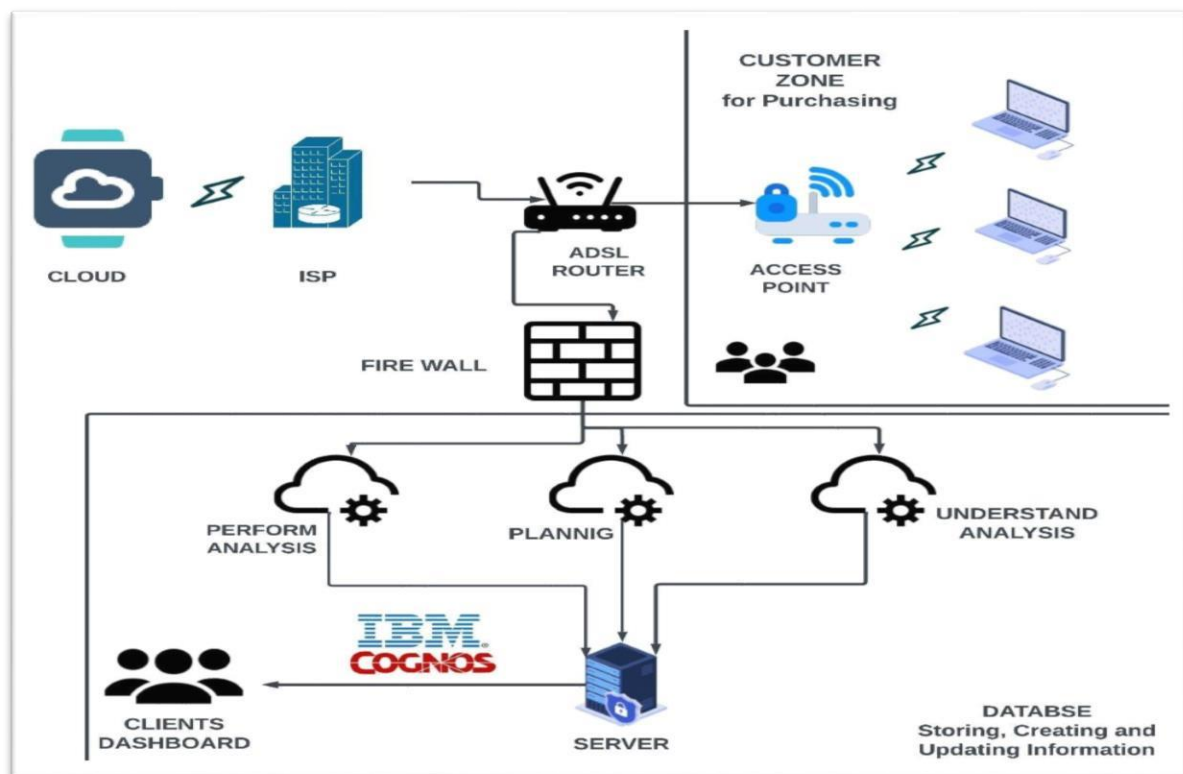
Technical Architecture:
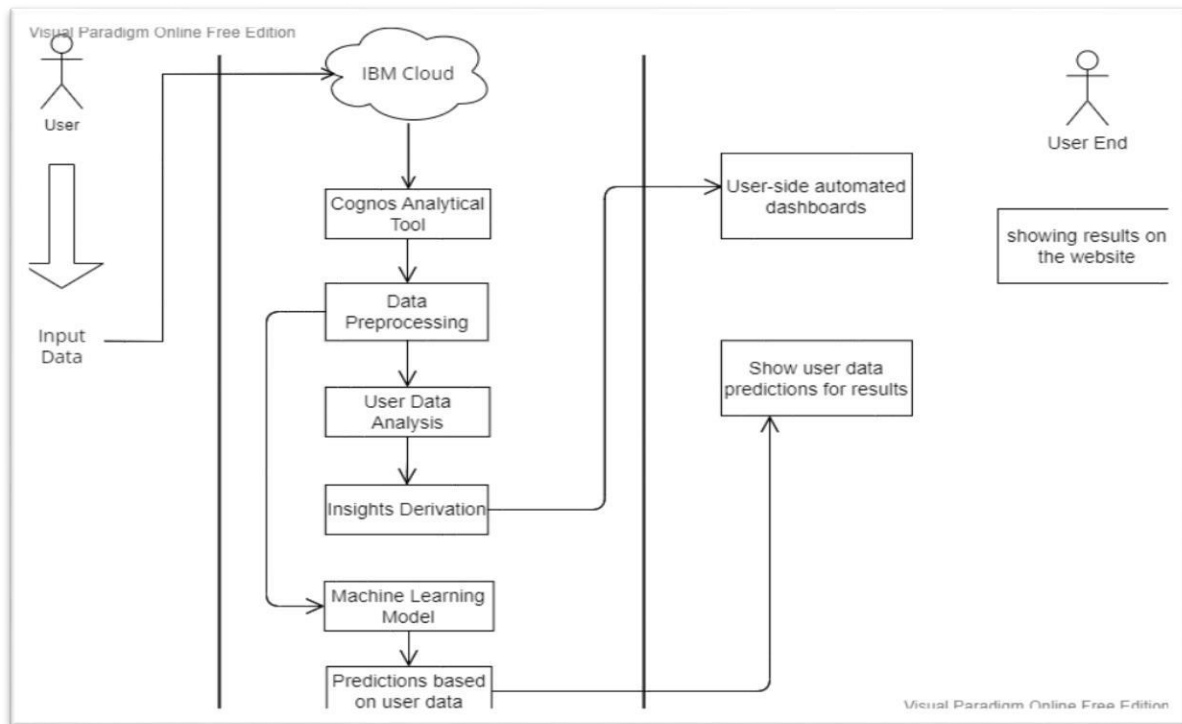
5.3 USER STORIES

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 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 the 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 and dashboard	High	Sprint-1
Customer Care Executive	Chat box	USN-1	It can be used by easily access and responsible	I can access by easily through application	High	Sprint-2
Administrator	Calling	USN-2	It can be used by easily access and responsible	I can access by easily through application	High	Sprint-2
	Mail	USN-3	It can be used by easily access and responsible	I can access by easily through application	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

6.1 USPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	Collect the dataset or Create the dataset .	2	High	Nanda, Paul, Om, Naresh
Sprint-2	Image Preprocessing	USN-2	Importing the required libraries and Loading Train data and Test data . Quantifying images with Label Encoding	1	High	Nanda, Paul, Om, Naresh

Sprint-3	Model Building	USN-3	Training the model,Testing the model ,Model Evaluation, Saving the model	2	Low	Nanda, Paul, Om, Naresh
Sprint-4	Application Building	USN-4	Create an HTML file and and Build Python Code	2	Medium	Nanda, Paul, Om, Naresh

6.2 SPRINT DELEIVERY SCHEDULE

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	10	
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	0	
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	0	
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	0	

6.3 REPORTS FROM JIRA
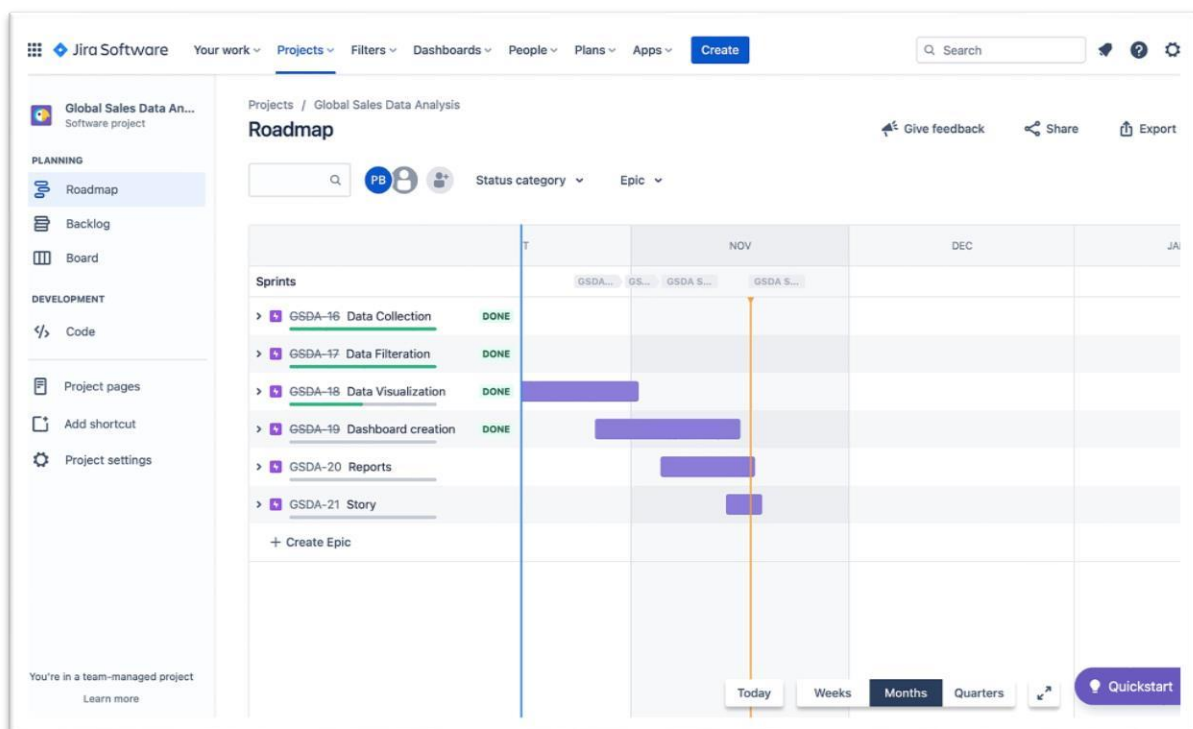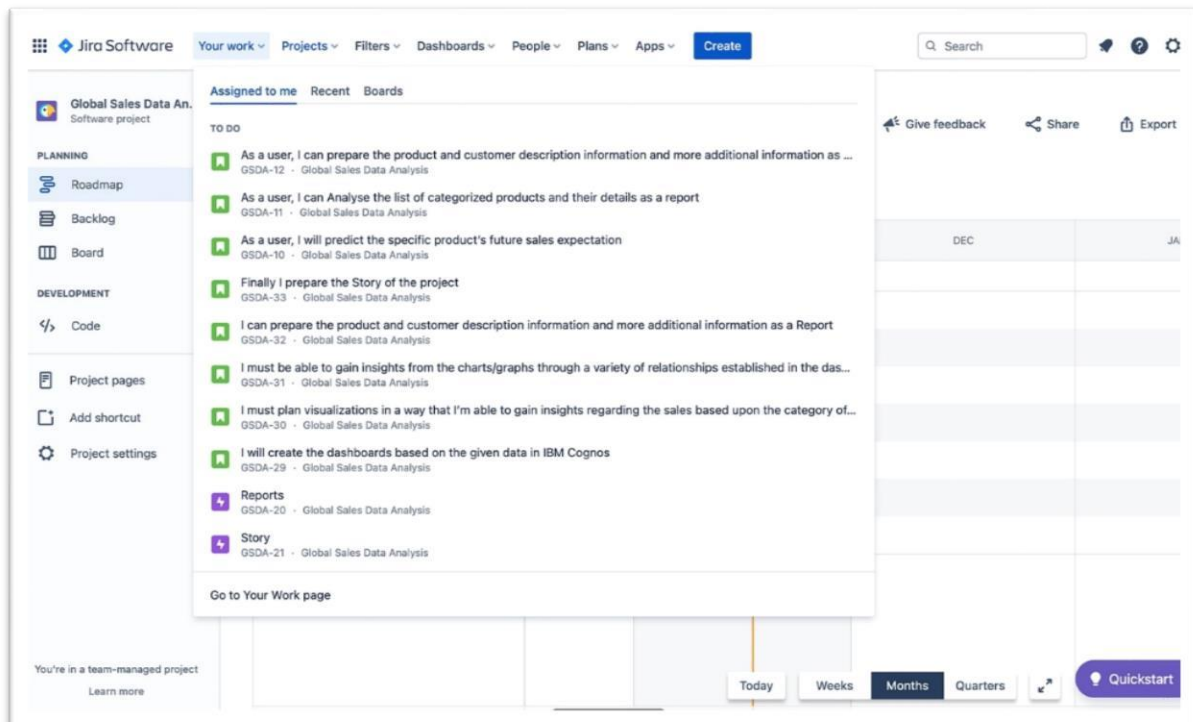
7. CODING & SOLUTIONING

Exploratory Data Analysis on "GLOBAL SALES DATASET

7.1 CODE

Exploratory Data Analysis on "GLOBAL SALES DATASET

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Demo Website</title>
</head>
<body style="border: 10px;margin: 20px;">
    <h1 style="text-align: center;color: white;background-color:rgb(0, 0, 0);border-radius: 5px;">GLOBAL SALES DATA ANALYTICS</h1>
    <h2 style="text-align: center;color: white;background-color:rgb(0, 34, 98);border-radius: 5px;">Dashboard</H2>
        <iframe src="https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FGlobal%2BSales%2BData%2BAnalytics%2BFinal%2BDashboard%2B2&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model000001847f0c75ed_00000000" width="1850" height="800" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

    <h2 style="text-align: center;color: white;background-color:rgb(51, 136, 153);border-radius: 5px;">Report</h2>
    <iframe src="https://us3.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FREPORT&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;shareMode=embedded&amp;action=run&amp;format=HTML&amp;prompt=false" width="1850" height="1500" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

    <iframe
```

src="https://us3.ca.analytics.ibm.com/bi/?pathRef=.my_folders%2FREPORT&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&shareMode=embedded&action=run&format=HTML&prompt=false" width="1850" height="800" frameborder="0" gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

   <h2 style="text-align: center;color: white;background-color:rgb(0, 34, 98);border-radius: 5px;">Story</h2>

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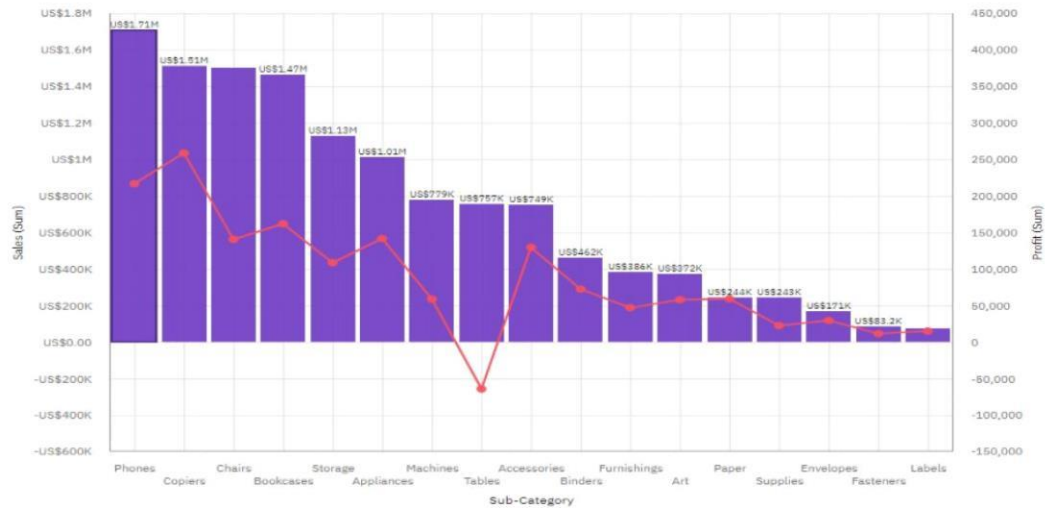
   </body>

</html>

7.2 DATA VISUALIZATION CHARTS

Top 10 Country Wise Sales Using Map Points

Sub Category Wise Sales And Profits, Using Line And Bar Chart

Sales Vs Profit By Countries (Top 10)

Sales by Sub-Category hierarchy

Phones	Storage	Appliances
Copiers	Machines	Tables	Accessories
Chairs		
Bookcases	Blenders	Art	Paper	Supplies
	Furnishings	Envelopes	Fasteners	Labels

Sales by Region

Region	Sales (Sum)	
Central		22.3%
South		12.7%
North		9.9%
Oceania		8.7%
Southeast Asia		7%
North Asia		6.7%
EMEA		6.4%
Africa		6.2%
Central Asia		6%
West		5.7%
East		5.6%
Caribbean		2.6%
Canada		0.5%

Sales (Sum)

Sales	Profit	Quantity	Discount
US$12.6M	**US$1.47M**	**178K**	**14%**
Sales	Profit	Quantity	Discount

Country Wise Sales Vs Profit Using Word Cloud

Australia, United Kingdom, United States, United States, France, United States, India, Brazil, Germany, China, Mexico, Indonesia, Spain, Italy, Iran, Turkey, Vietnam, Ukraine, Philippines, El Salvador, United States, Democratic Republic of the Congo, Nicaragua, Guatemala, New Zealand, Cuba, Thailand, Morocco, Canada, Zambia, Japan, Dominican Republic, Argentina, Egypt, Saudi Arabia, Honduras, Bangladesh, Pakistan, Russia, Colombia, Singapore, Cote d'Ivoire, Malaysia, South Africa, Netherlands, Poland, Nigeria, Belgium, Austria, Sweden

Sales By Segment Analysis (Ship Mode)

● Sales (Sum)　○ Min Sales Range (Sum)　○ Middle Sales Range (Sum)　○ Max Sales Range (Sum)　● Target Sales (Sum)

Regional Sales And Profit Forecast

--- Forecast

Region - Measures
● Canada | Sales　● Canada | Profit　● Caribbean | Sales　● Caribbean | Profit　● Central | Sales　● Central | Profit　● Southeast Asia | Sales　● Southeast Asia | Profit　● West | Sales
● West | Profit

Order Priority

Sales and Profit by Order_Month

--- Forecast　Measures　● Sales　● Profit

Regional Quantity And Sales Using Radar Chart (By Category)

Segment
● Consumer ● Corporate ● Home Office

Sales Vs Profit Scatter Plot With Sub Categories And Regions

Region
● Africa ● Canada ● Caribbean ● Central ● Central Asia ● EMEA ● East ● North ● North Asia ● Oceania ● South ● Southeast Asia ● West

Segment Wise Sales, Profit And Quantity

8. TEST CASES

TEST DATA MANAGEMENT

Testing Services
• Functional testing
• System integration
• Regression testing

Non-Functional
• Performance testing
• User acceptance
• Others

Development
• Unit testing

TDM Services
• Process
• Governance
• Technology
• Expertise
• Domain expertise

Plan Manage Build Execute
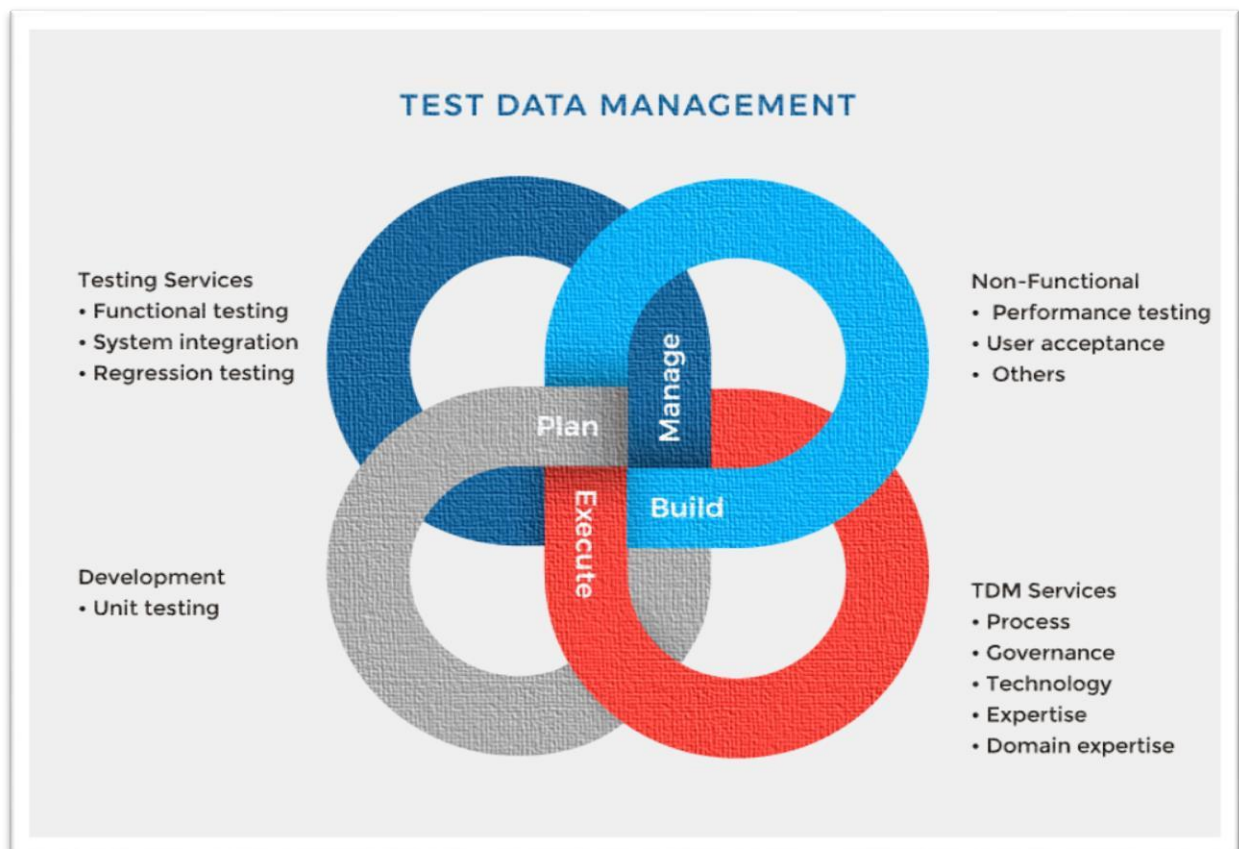
8.1 USER ACCEPTANCE TESTING

Purpose of the Document

The purpose of this document is to briefly explain the test coverage and open issues of the Global Sales Data Analytics project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis:

This report 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	9	5	3	2	19
Duplicate	1	0	2	1	4
External	2	2	1	1	6
Fixed	10	3	5	20	38
Not Reproduced	1	0	1	1	3
Skipped	0	1	0	1	2
Won'tFix	0	0	0	1	1
Totals	23	11	12	27	73

Test Case Analysis:

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7

Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	0	0	3	3
Exception Reporting	0	9	0	9
Final Report Output	4	0	0	4
Version Control	0	0	2	2

9. RESULTS

9.1 PERFORMANCE METRICS

Sales metrics are data points used to gauge sales performance, both on an individual and a team level. Sales leaders use relevant metrics to determine progress against predetermined goals and objectives.

RESULTANT DASHBOARD:

https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FGlobal%2BSales%2BData%2BAnalytics%2BFinal%2BDashboard%2B2&action=view&mode=dashboard

10. ADVANTAGEs & DISADVANTAGEs

BENEFITS

Data analytics supports better decision-making inside a business

Analytics may assist in converting the available data into useful information for executives to enable them to make better decisions. A company's weaknesses and potential areas for improvement become clear, and steps can be done to improve workplace efficiency overall and boost productivity.

Increase the efficiency of the work

Boost productivity Analytics may assist in swiftly analysing vast volumes of data and displaying it in a structured manner to assist in achieving certain organisational goals. By enabling the management to communicate with the staff the insights from the analytics results, it promotes an environment of efficiency and cooperation.

The analytics keeps you informed of any changes in the client's behaviour

Analytics can help you understand your target market's mentality and whether it has changed. Companies can have a clear advantage by being aware of changes in client behaviour so they can respond to market developments more quickly.

Customized goods and services

Customers want goods and services that can cater to their specific requirements. Analytics may assist businesses in tracking the type of service, item, or content that customers prefer and then presenting recommendations based on those

choices. Customers can receive customised services based on their unique needs thanks to data analytics.

Increasing the quality of goods and services

By identifying and fixing faults or preventing non-value-added tasks, data analytics can aid in improving the user experience. Self-learning systems can use data to analyse how users interact with tools and make the necessary adjustments to enhance the user experience. Data analytics can also aid in automatic data cleansing, enhance data quality, and ultimately benefit both customers and enterprises.

LIMITATIONS

Lack of alignment within team

Within an organisation, there is a lack of coordination between several teams or divisions. A small number of executives may be given access to the data analyses performed by a chosen group of team members.

Lack of commitment and patience

The implementation of analytics solutions is not difficult, but they are expensive and take time to pay for themselves. Setting up protocols and procedures to begin collecting the data may take some time, particularly if there is no previous data.

Low quality of data

Lack of access to high-quality data is one of the main constraints of data analytics. It's probable that businesses have access to a tonne of data already. It is necessary to take a top-down strategy, in which the business concerns that must be resolved must be identified first, and the data needed to resolve these issues can subsequently be identified.

Data gathering can occasionally violate a customer's privacy because the organisations whose services they use have access to information about their purchases, online transactions, and subscriptions. For mutual benefit, certain businesses might trade their datasets with other businesses. A person, a nation, or a community could potentially be attacked using certain obtained data.

Complexity & Bias

Some of the analytics tools developed by companies are more like a black box model. What is inside the black box is not clear or the logic the system uses to learn from data and create a model is not readily evident.

11. CONCLUSION

Our company can make future predictions using data from the past. When you have access to an abundance of information, goals shift from want-to-achieve to should-be-achieving. Business leaders may effectively manage their employees, distribute resources, reduce waste, and respond to market developments by taking lessons from the past. Data provides you the chance to spot a decline in sales, analyse it, and take action before it's too late. It may not be necessary to do a sales analysis at a specific moment, but it is crucial that business executives have access to current facts so they can make informed choices. A thriving company collaborates across divisions, floors, and even industries. Maintaining and using many business KPIs across various platforms is inefficient.

It's essential to have a unified, centralised dashboard that compiles all of the important reports. Sales data is really useful and may be obtained by keeping good track of your actions. Your sales process will be revolutionised when you fully employ it, which will improve lead generation, client engagement and retention, and ultimately result in more sales. You'll have a cycle that gives you refined data and reveals how you can save time and earn money when combined with the sales activities we've looked at.

You may assess your company's performance and identify the areas where your sales staff needs improvement after you have a firm grasp of the market conditions. Additionally, it pinpoints possible business prospects and provides a deeper comprehension of your consumers' needs, enhancing the effectiveness of your sales. But keep in mind that data analysis is a continuous activity, not a onetime occurrence. Since the sales sector is constantly changing, you'll want to ensure that your team has the finest chance possible to outperform the opposition.

12. FUTURE SCOPE

By gathering a large volume of data, expanding business models, igniting the creative processes, and fostering overall corporate growth and development, analytics can significantly alter the current business environment. There is a high demand for business analytics, which combines modern tools, analytics, programming, business administration, and IT. Business analytics enables us to enhance already-existing data, safeguard it, and make it accessible for usage in the future in a better and more efficient manner. Some of the industries that use business analytics are those in finance, media communications, outsourcing, and online businesses. In order to discover potential hazard sections and reduce risks, banks utilise data mining techniques to filter the populated data and segment the accessible data using a few devices.

Business analytics must be used to methodically separate the distributed and dispersed data and standardise organisational structure. Big Data is being used by many emerging firms in India to extract the crucial and practical data. Overall productivity and growth for the businesses and their employees have increased as a result. Big Data has been a significant factor in improving private businesses and open goods and enterprises. This incorporates consolidating skill and personal asset improvement and creating items and stages to compliment the rising demand. NASSCOM expects India's Big Data industry to form 32% of the

worldwide market to reach over a range of $16 billion by 2025 from the present level of $2 billion.

Consistent use of Big Data is necessary to enable the faster expansion of data analytics in India. Additionally, this will create fresh opportunities for development in every industry. You might begin as a data analyst, advance to data scientist status after gaining some expertise, and ultimately become a data evangelist.

13. APPENDIX

GitHub Link:

https://github.com/IBM-EPBL/IBM-Project-35283-1664792765