

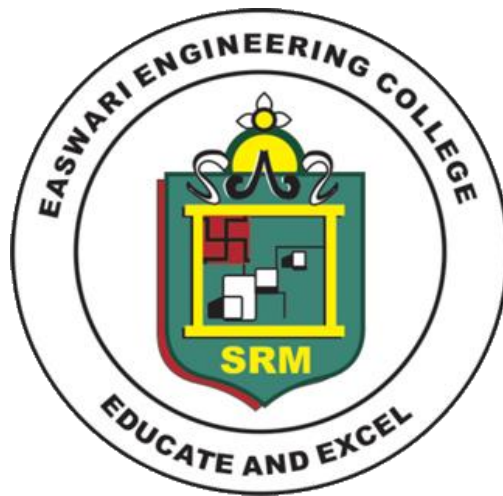
**IBM NALAIYA THIRAN**

**EASWARI ENGINEERING COLLEGE**

**(AN AUTONOMOUS INSTITUTION)**

**GLOBAL SALES DATA ANALYTICS**

**TEAM ID: PNT2022TMID54330**



**TEAM MEMBERS**

**EVANS EZHILARASAN J**

**ANISHA RAMESH**

**JIVITHA K.R**

**FARREL DEVA ASIR J**

# **PROJECT REPORT FORMAT**

## **1. INTRODUCTION**

1.1 Project Overview

1.2 Purpose

## **2. LITERATURE SURVEY**

2.1 Existing problem

2.2 References

2.3 Problem Statement Definition

## **3. IDEATION & PROPOSED SOLUTION**

3.1 Empathy Map Canvas

3.2 Ideation & Brainstorming

3.3 Proposed Solution

3.4 Problem Solution fit

## **4. REQUIREMENT ANALYSIS**

4.1 Functional requirements

4.2 Non-Functional requirements

## **5. PROJECT DESIGN**

5.1 Data Flow Diagrams

5.2 Solution & Technical Architecture

5.3 User Stories

## **6. PROJECT PLANNING & SCHEDULING**

6.1 Sprint Planning & Estimation

6.2 Sprint Delivery Schedule

6.3 Reports from JIRA

## **7. CODING & SOLUTIONS**

## **8. TESTING**

8.1 Test Cases

8.2 User Acceptance Testing

## **9. RESULTS**

9.1 Performance Metrics

## **10. ADVANTAGES & DISADVANTAGES**

## **11. CONCLUSION**

## **12. FUTURE SCOPE**

## **13. APPENDIX**

13.1 GitHub & Project Demo Link

**1.1 PROJECT OVERVIEW**

Information technology in this 22st century is reaching the skies with large-scale of data to be processed and studied to make sense of data where the traditional approach is no more effective. Now, retailers need a 360-degree view of their consumers, without which, they can miss competitive edge of the market. We all are constantly thinking about the future and what is expected to happen in the coming weeks, months and even years, and to be able to do so, a look at the past is mandatory. Business needs to be able to see their progress and the factors affecting their sales . In this technological era of large scale data, businesses need to rethink on the modern approaches to better understand the customers to gain a competitive edge in the market. Data is worthless if it cannot be analysed , interpreted and applied in context . In this work, we have used the Global sales data to create business value by understanding customer intent (sentiment analysis)and business analytics. A picture speaks a thousand word sand business analytics would help paint a picture through visualization of data to give the retailers insights on their business. With these insights the businesses can make relevant changes to their strategy for the future to maximize profits and success. Most of the raw data, particularly large scale datasets do not offer value in its unprocessed state. By applying the right set of tools , we can pull powerful insights from this stockpile of bits. Moreover, the big data application enables retailers to use historical dataset to better observe the supply chain, then a clear picture can be obtained about a particular store whether they are making profit or are under loss. When data is properly analysed, we will start to see the patterns, insights and the big picture of the company. Then the required suitable actions can be applied accordingly. This will help optimize operations and maximize sales and profit. Apache data science platforms, libraries, and tools are used in this work by testing and implementing the software development tools and environments dealing with Big Data technology. Tools like Shadoof Distributed File Systems (HDFS), Shadoof MapReduce framework and Apache Spark along with Scala, Java and Python high-level programming environments are used to analyse and visualize the data.

## 1.2 PURPOSE

Regular data analysis provides an understanding of the products that your customers are buying and helps you dissect why they are behaving in a certain way. You can also find patterns in your lead conversions and drop offs. All of these aspects enable you to optimize your sales process. With an intelligent sales CRM like Close, you get actionable reports to keep a close eye on essential sales KPIs. Such a continuous sales analysis helps in iterating your sales strategy so that you can continue growing your business sustainably. Data Trend Analysis is the type of sales analysis is about finding patterns in sales data (whether they are going up or down) over a specific timeframe. A micro trend might last for a week for a specific product, while a macro trend might last for a quarter over a range of products. Sales Performance Analysis is gauge the effectiveness of your sales strategy and how your sales team is performing, a sales performance analysis can come in handy. It can involve conducting a strictly financial analysis based on the sales revenue generated and how it's meeting your sales targets. Product Sales Analysis is the company offers many products, then you need to conduct regular product sales analysis to find out the items that are overcrowding your product lining. You can use KPIs and revenue bar charts to look at the product sales overall or in a specific time frame. Sales growth shows how much your revenue increases (or decreases) over a specific period. This metric provides a bird's-eye view of sales and how your team is performing. To determine sales growth, take the sales total for the current period and subtract the sales total from the previous period. Divide that result by sales from the previous period, then multiply by 100 to get your growth percentage. Sales management reports are important to monitor the effectiveness of your sales reps and help them identify selling opportunities in customer interactions. Essentially these reports are about crunching meaningful patterns in your data and actionable insights to improve the sales performance of your team. With sales management software like Close, you can trust that your sales reps will stay organized and efficient, and spend time on deals that positively affect your bottom line. Our dashboards will let you identify the traits of your top performers so that you can shape your sales training. You can even share feedback with your reps for filling the gaps in sales skills and improve their effectiveness.

## 2.

## LITERATURE SURVEY

### 2.1 EXISTING PROBLEM

In the last few instalment in our data analytics series, we focused primarily on the game-changing, transformative, disruptive power of Data analytics. The flip side to the massive potential of Data analytics is that many challenges come into the mix. A recent report from Dun & Bradstreet revealed that businesses have the most trouble with the following three areas: protecting data privacy (34%), ensuring data accuracy (26%), and processing & analysing data (24%). Of course, these are far from the only Data challenges companies face. In another report, this time from the Journal of Data, researchers reported on a whole range of issues related to Data's inherent uncertainty alone. Additionally, Data and the analytic platforms, security solutions, and tools dedicated to managing this ecosystem present security risks, integration issues, and perhaps most importantly, the massive challenge of developing the culture that makes all of this stuff work. In these next few sections, we'll discuss some of the biggest hurdles organizations face in developing a Data strategy that delivers the results promised in the most optimistic industry reports. As with any complex business strategy, it's hard to know what tools to buy or where to focus your efforts without a strategy that includes a very specific set of milestones, goals, and problems to be solved. According to IDC, an estimated 35% of organizations have fully-deployed analytic systems in place, making it difficult for employees to put insights into action. So before you do anything, what do you hope to accomplish with this initiative? Make sure internal stakeholders and potential vendors understand the broader business goals you hope to achieve. Data scientists and IT teams must work with their C-suite, sales, and marketing colleagues to develop a systematic process for finding, integrating, and interpreting insights.

## 2.2 REFERENCES

1. [https://www.researchgate.net/publication/328246040\\_Walmart's\\_Sales\\_Data\\_Analysis\\_-\\_A\\_Big\\_Data\\_Analytics\\_Perspective](https://www.researchgate.net/publication/328246040_Walmart's_Sales_Data_Analysis_-_A_Big_Data_Analytics_Perspective)
2. <https://blog.close.com/sales-analysis/#:~:text=Sales%20analysis%20is%20using%20data,opportunities%2C%20and%20includes%20sales%20forecasting.>
3. <https://www.3pillarglobal.com/insights/current-issues-and-challenges-in-big-data-analytics>
4. <https://www.pipedrive.com/en/blog/sales-data>
5. <https://www.mural.co/templates/empathy-map-canvas>
6. <https://corporatefinanceinstitute.com/resources/management/ideation>
7. <https://courses.lumenlearning.com/suny-esc-communicationforprofessionals/chapter/possible-proposed-solutions/>
8. <https://www.altexsoft.com/blog/business/functional-and-non-functional-requirements-specification-and-types/>
9. <https://www.lucidchart.com/pages/data-flow-diagram>
10. <https://subscription.packtpub.com/book/web-development/9781838645649/1/ch01lv11sec04/why-is-solution-architecture-important>
11. <https://www.visual-paradigm.com/guide/agile-software-development/what-is-user-story/>
12. <https://www.geeksforgeeks.org/agile-planning-and-estimation>
13. <https://www.atlassian.com/agile/tutorials/burndown-charts>
14. <https://www.sigmamagic.com/blogs/analytics-advantages-and-limitations/>
15. <https://www.techtarget.com/searchsoftwarequality/definition/test-case>

## 2.3 PROBLEM STATEMENT DEFINITION

A spreadsheet can help you collate your data, sales-related or otherwise, but a CRM platform with strong insights features is the best option. With the sheer amount of information on leads, deals and communications to keep track of, you'll need a streamlined piece of software with clear access to your data. Make sure your team is also familiar with the tool and how you use it, and are inputting the data you need after every interaction they have. Without a fundamental idea of what needs to be in a sales pipeline, you'll struggle to find useful data and you'll be putting yourself at a significant disadvantage versus your competition. Here are some sales pipeline templates to get you started. Sales pipeline and reporting templates to get you organized. Before spending a cent on CRM tools, try out this 100% free and effective sales pipeline and reporting template. There's several benefits to using spreadsheets to gather data: they're free (Google Sheets and Open Office), they provide a helpful real-time overview of your current sales operation and they can be programmed to automatically perform calculations on figures you input. The downside? All data needs to be input manually. If you'd rather your team spent less time on data entry and more time prioritizing their best leads, then consider moving to a CRM with automated data collating. If you're only dealing with a small number of leads this shouldn't be too much of an issue, but you need to be making sure that all interactions between your reps and your leads are being recorded in the spreadsheet—every email sent, every cold call made, every sales presentation, every follow-up call that wasn't answered, etc). Customer Relationship Management (CRM) software presents a substantial step up over spreadsheet software in many ways. CRM software automatically records interactions with leads in your pipeline, saving your team time otherwise wasted on data entry and helping you make sure you never lose track of communications with your leads. Plus, with mobile app features and third-party integrations, CRMs expand the scope of what you can measure. Were your automated email campaigns successful? How long was the average length of a successful cold call versus an unsuccessful one? Where are your most successful leads being generated? Your CRM gives you reports on your winning sales patterns so you can reproduce and improve them. On top of everything a spreadsheet can do, CRMs give you even more control of your data.



### 3. IDEATION & PROPOSED SOLUTION

#### 3.1 EMPATHY MAP CANVAS

An empathy map canvas is a more in-depth version of the original empathy map, which helps identify and describe the user's needs and pain points. And this is valuable information for improving the user experience. Teams rely on user insights to map out what is important to their target audience, what influences them, and how they present themselves. This information is then used to create personas that help teams visualize users and empathize with them as individuals, rather than just as a vague marketing demographic or account number. Agile teams in a variety of departments use empathy map canvases to better understand how to meet their customers' needs. Design teams use them to help understand the various reasons why a user might interact with the product so they can design a user-friendly experience.

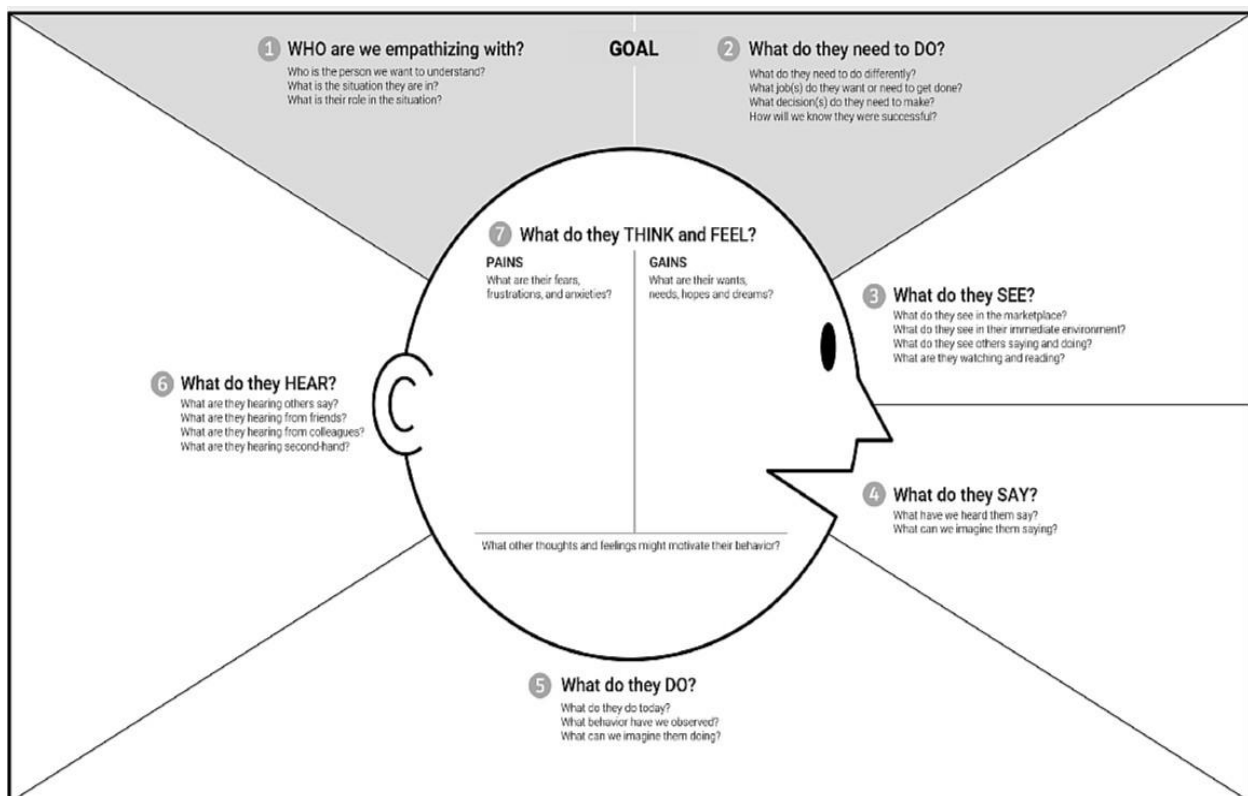


FIG 3.1 EMPATHY MAP

Sales teams use them to learn who customers are at an individual level so they can help them invest in a product that suits their needs, rather than leading with a sales pitch that might be off-putting or not appropriately tailored to customers. An empathy map canvas helps brands provide a better experience for users by helping teams understand the perspectives and mind set of their customers. Using a template to create an empathy map canvas reduces the preparation time and standardizes the process so you create empathy map canvases of similar quality. Good canvases rely on insights from actual users, which help provide an accurate picture of how they feel about their experience with the product. This provides insight into which features are accessed the most often and how they are used. And this knowledge empowers teams to make the improvements that most benefit the user and increase the product's value.



FIG 3.2 GLOBAL SALES DATA ANALYTICS EMPATHY MAP

## **3.2 IDEATION & BRAINSTORMING**

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A principal difference between ideation and brainstorming is that ideation is commonly more thought of as being an individual pursuit, while brainstorming is almost always a group activity. Brainstorming is usually conducted by getting a group of people together to come up with either general new ideas or ideas for solving a specific problem or dealing with a specific situation. For example, a major corporation that recently learned it is the object of a major lawsuit may want to gather together top executives for a brainstorming session on how to publicly respond to the lawsuit being filed. Participants in a brainstorming session are encouraged to freely toss out whatever ideas may occur to them. The thinking is that by generating a large number of ideas, the brainstorming group is likely to come up with a suitable solution for whatever issue they are addressing. The lines between ideation and brainstorming have become a bit more blurred with the development of several brainstorming software programs, such as Brightidea and Idea wake.

These software programs are designed to encourage employees of companies to generate new ideas for improving the companies' operations and, ultimately, bottom-line profitability. The programs often combine the processes of ideation and brainstorming in that individual employees can use them, but companies may simulate brainstorming sessions by having several employees all utilize the software to generate new ideas intended to address a specific purpose. In the business world, ideation is associated with things such as inventing and/or developing new products or services or creating new means or methods of production or delivery of products or services. Amazon's "Prime" two-day delivery service is an example of ideation being used to address the question of how to serve consumers more efficiently. Ideation is frequently part of what is known as the "design process," which is the process of developing a plan for producing a new product or creating a new operating system. It may also include detailing or mapping out precisely how a new system or process will be implemented.

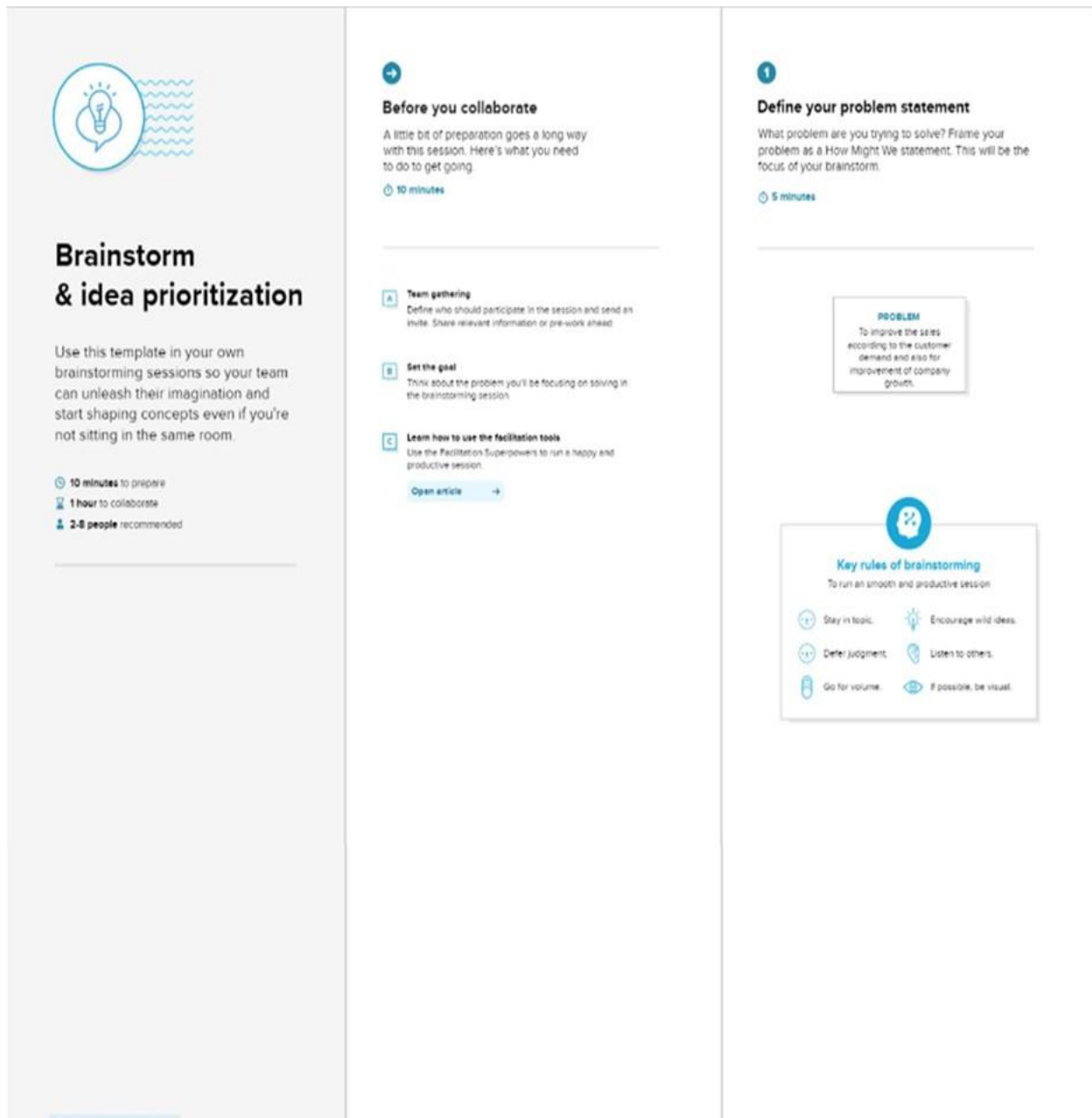


FIG 3.3 IDEATION & BRAINSTORMING

2

## Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

### TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

### ARUN KUMAR



### HARI LINGA



### GOWTHAM



### HARI VIGNESH

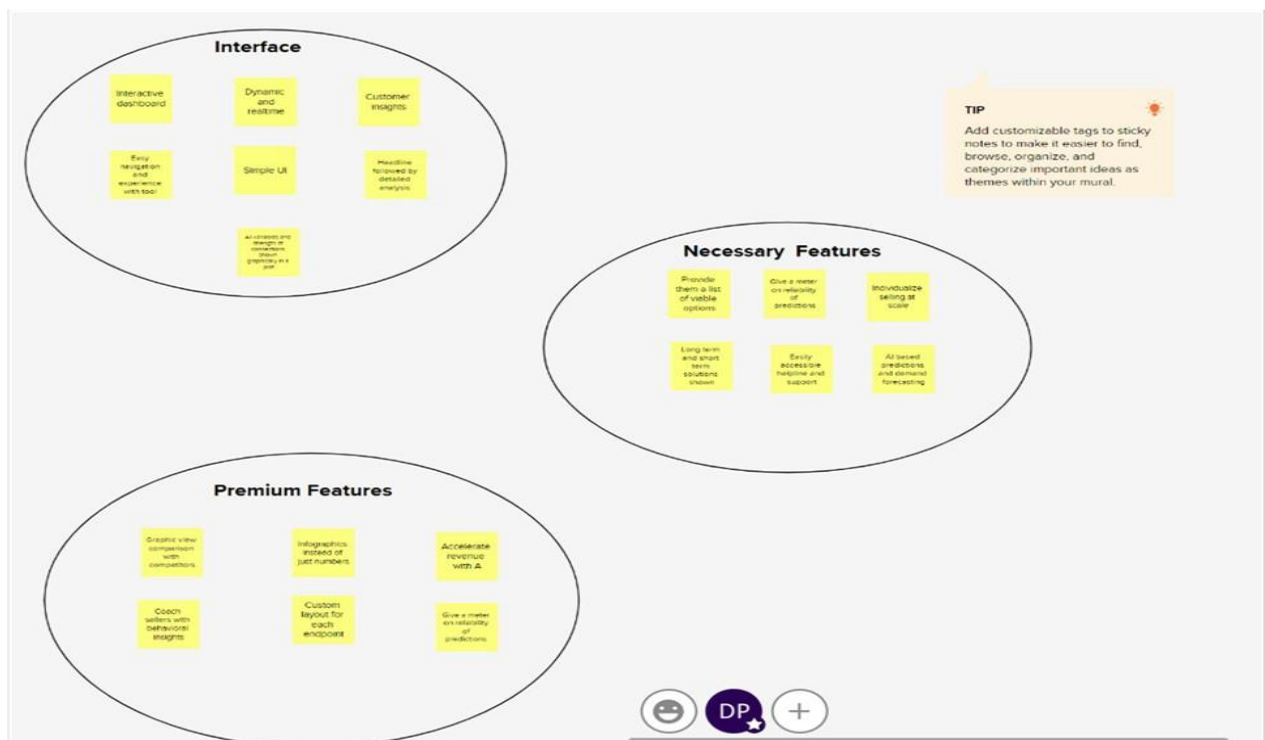
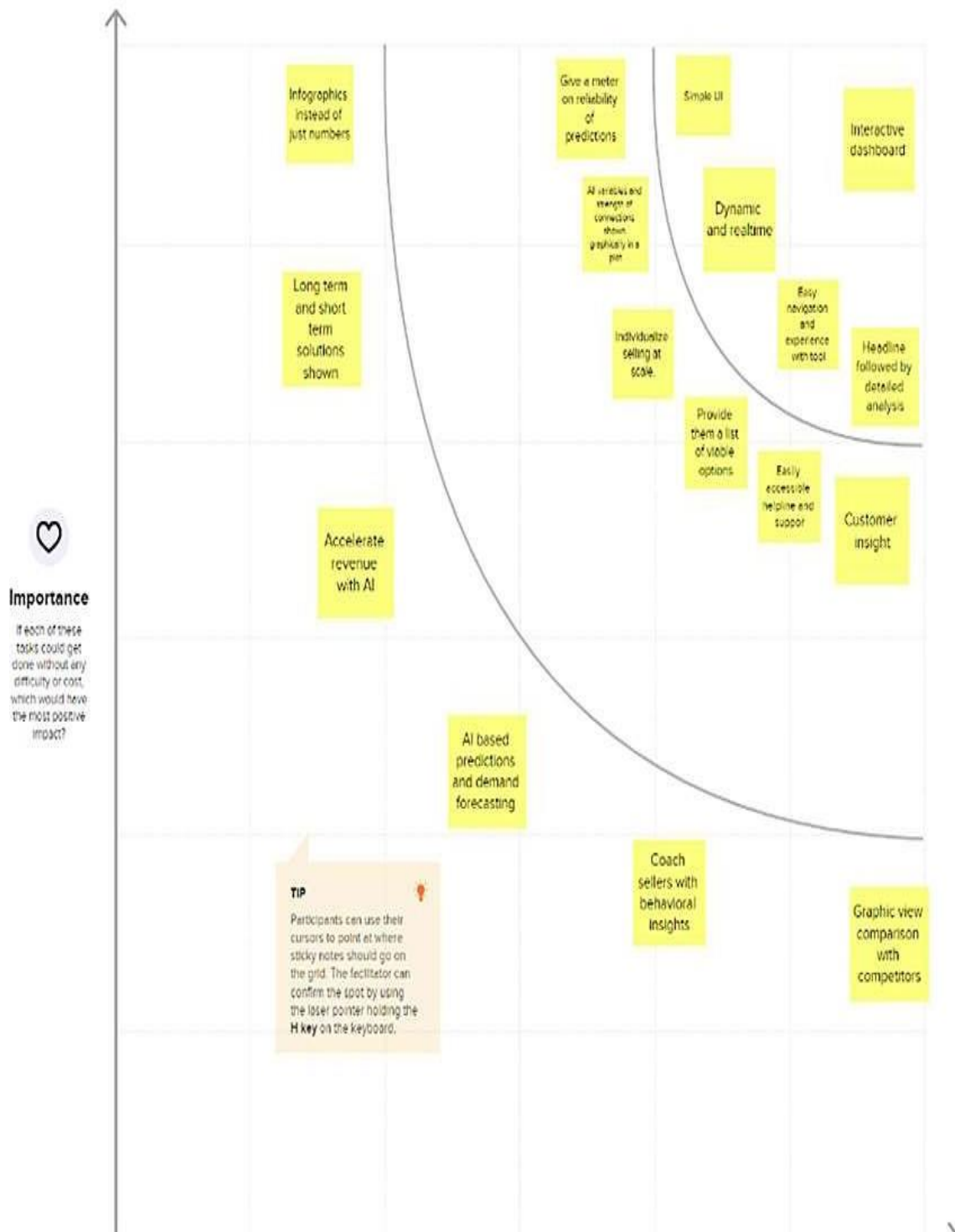


FIG 3.4 BRAINSTORM, IDEA LISTING AND GROUPING



**FIG 3.5 IDEA PRIORITIZATION**

### **3.3 PROPOSED SOLUTION**

Identifying possible solutions is part of logical problem-solving\* and, as such, is an important strategy in proposal writing. Remember that the one solution you're proposing may not seem obvious or feasible to the decision-makers to whom the proposal is addressed, so it's good strategy on your part to show that you've considered many possibilities before choosing one. Your proposed solution section should offer your solution specifically, with enough detail so that your reader understands exactly what you're proposing. Indicate how your proposed solution will solve the problem and provide tangible benefits. Specifically, explain how it will meet the objectives and abide by the constraints outlined in the problem definition. Give concrete examples. Show the specific differences between "how things are now" and "how they could be." Be as logical as possible. Emphasize the results, benefits, and feasibility of your proposed idea. Also use your criteria, developed as you considered possible solutions, to analyze your proposed solution against the other possible solutions.

This is where your pros and cons come in – you can use your brainstorming and idea development to create the evidence to back up your particular solution and prove that it's better than the others. Show that your proposed solution is more cost effective, easier to implement, etc. than other proposed solutions. Make sure, in the proposed solution section, to focus on "what" your solution is and "why" it is the best. The other sections of the proposal that follow the proposed solution will expand on the "how," "who," "when," and "where."

S.No.	Parameter	Description
1.	Problem Statement(Problem to be solved)	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.
2.	Idea / Solution description	The described solution is by using IBM cognos we can display all the records and previous year global sales of product names, category and sub category as a graphical representation.
3.	Novelty / Uniqueness	we are going to provide discounts to the customers to increase the sales by providing free doorstep delivery of products to customers.
4.	Social Impact / Customer Satisfaction	Customers should know the available products and nearest location of the shops which gives the idea to customer for purchase.
5.	Business Model (Revenue Model)	This method focuses on the actual sales numbers from the customers. This helps to determine which products are top performers and multiplying the shop and increasing the product quantity.
6.	Scalability of the Solution	Using this approach, the price of products across the world are kept same so the customers will be reliable.



### 3.4 PROBLEM SOLUTION FIT

The Problem-Solution Fit canvas is based on the principles of Lean Startup, LUM (Lazy User Model) and User Experience design. It helps entrepreneurs, marketers and corporate innovators identify behavioural patterns and recognize what would work and why. It is a template to help identify solutions with higher chances of solution adoption, reduce time spent on testing and get a better overview of the current situation.

My goal was to create a tool that translates a problem into a solution, taking into account customer behaviour and the context around it. None of the existing canvases or frameworks were giving me an overview and insight into the real customer situation during his/her decision-making process. With this template you will be able to take important information into consideration at an earlier stage and look at problem solving in depth. It increases your chances of finding problem-solution and product-market fit.

It helps you to:

- Solve complex problems in a way that fits the state of your customers.
- Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behaviour.
- Sharpen your communication and marketing strategy with the right triggers and messaging.
- Increase touch-points with your company by finding the right problem-behaviour fit and building trust by solving frequent annoyances, or urgent or costly problems.
- Understand the existing situation in order to improve it for your target group.

Problem-Solution Fit canvas

Purpose / Vision

Version:

Define CS, fit into CL	<div>1. CUSTOMER SEGMENT(S)</div> <div>CS</div>	<div>6. CUSTOMER LIMITATIONS</div> <div>EG. BUDGET, DEVICES</div> <div>CL</div>	<div>5. AVAILABLE SOLUTIONS</div> <div>PROS &amp; CONS</div> <div>AS</div>	Explore AS, differentiate
	<div>2. PROBLEMS / PAINS</div> <div>+ ITS FREQUENCY</div> <div>PR</div>	<div>9. PROBLEM ROOT / CAUSE</div> <div>RC</div>	<div>7. BEHAVIOR</div> <div>+ ITS INTENSITY</div> <div>BE</div>	
Focus on PR, tap into BE, understand RC				Focus on PR, tap into BE, understand RC
Identify strong TR & EM	<div>3. TRIGGERS TO ACT</div> <div>TR</div>	<div>10. YOUR SOLUTION</div> <div>SL</div>	<div>8. CHANNELS of BEHAVIOR</div> <div>CH</div> <div>ONLINE</div>	Extract online & offline CH of BE
	<div>4. EMOTIONS</div> <div>BEFORE / AFTER</div> <div>EM</div>		<div>OFFLINE</div>	

Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Designed by Daria Nepriakhina / [ideaHackers.nl](https://ideaHackers.nl) - we tailor ideas to customer behaviour and increase solution adoption probability.

**FIG 3.6 PROBLEM SOLUTION FIT**

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> A Bussiness owner who would like to understand more about his bussiness performance in global scale.	<b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span> 1) No online payments available. Buy directly from us. 2) Need to check input file structure before Uploading.	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> 1) The competition perform analytics and display Dashboard with autogenerated insights. 2) Our product provides facility to add manual insights to the analytics performed.	Explore AS, differentiate
Focus on J&P, tap into BE, understand RC	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <span>J&amp;P</span> 1) Determine input file structure. 2) What analysis to perform to be useful and how to perform them?	<b>9. PROBLEM ROOT CAUSE</b> <span>RC</span> 1) IBM. 2) Anna university. 3) Bussiness model. 4) Society	<b>7. BEHAVIOUR</b> <span>BE</span> 1) Collecting sales data and using office software to analyze it. 2) Un-intuitive way of analyzing data and lot of manual labor.	Focus on J&P, tap into BE, understand RC
Identify strong TR & EM	<b>3. TRIGGERS</b> <span>TR</span> 1) Have you ever felt that you are unaware of how your bussiness is performing? 2) Have you ever had a decision fatigue? Not knowing what to do next in order to progress? Our product can help you to find that spark to take the next step.	<b>10. YOUR SOLUTION</b> <span>SL</span> 1) Creating an Interactive Dashboard. 2) Responsive Design for every screen sizes. 3) Manual insights for each interaction. 4) One time payment.	<b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span> <b>8.1 ONLINE</b> Using third party services with automated insights and subscription based services to analyze data.	Extract online & offline CH of BE
	<b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span> Before: Anxiety, Decision fatigue, Laziness. After : Clear mind, Peacefulness.		<b>8.2 OFFLINE</b> Using office software to analyze complex data in un-intuitive way.	

**FIG 3.7 PROBLEM FIT FOR GLOBAL SALES DATA ANALYTICS**

## 4. REQUIREMENT ANALYSIS

### 4.1 FUNCTIONAL REQUIREMENTS

Functional requirements are product features or functions that developers must implement to enable users to accomplish their tasks. So, it's important to make them clear both for the development team and the stakeholders. Generally, functional requirements describe system behaviour under specific conditions.

For example: The system sends an approval request after the user enters personal information. A search feature allows a user to hunt among various invoices if they want to credit an issued invoice. The system sends a confirmation email when a new user account is created.

FUNCTIONAL vs NONFUNCTIONAL REQUIREMENTS		
	Functional requirements	Nonfunctional requirements
Objective	Describe what the product does	Describe how the product works
End result	Define product features	Define product properties
Focus	Focus on user requirements	Focus on user expectations
Documentation	Captured in use case	Captured as a quality attribute
Essentiality	They are mandatory	They are not mandatory, but desirable
Origin type	Usually defined by user	Usually defined by developers or other tech experts
Testing	Component, API, UI testing, etc. Tested before nonfunctional testing	Performance, usability, security testing, etc. Tested after functional testing
Types	External interface, authentication, authorization levels, business rules, etc.	Usability, reliability, scalability, performance, etc.

**FIG 4.1 FUNCTIONAL vs NON-FUNCTIONAL**

## 4.2 NON-FUNCTIONAL REQUIRMENTS

Non-functional requirements, not related to the system functionality, rather define how the system should perform. Some examples are: The website pages should load in 3 seconds with the total number of simultaneous users <5 thousand. The system should be able to handle 20 million users without performance deterioration. Here's a brief comparison and then we'll proceed to a more in-depth explanation of each group.

<b>FR No.</b>	<b>Functional Requirement (Epic)</b>	<b>Sub Requirement (Story/Sub-Task)</b>
<b>FR-1</b>	User Registration	Registration through Form Registration through Gmail
<b>FR-2</b>	User Confirmation	Confirmation via Email Confirmation via OTP
<b>FR-3</b>	User Login	Login via Email and password
<b>FR-4</b>	User uploading data(administrative)	To store the dataset through the cloud
<b>FR-5</b>	End user benefits	Getting higher state of efficiency and also to know entire data analysis

**FIG 4.2 FUNCTIONAL REQUIREMENT**

<b>FR NO.</b>	<b>NON FUNCTIONAL REQUIREMENT</b>	<b>Description</b>
<b>NFR-1</b>	Usability	Optimized resources and it can be used by everyone
<b>NFR-2</b>	Security	It has securable because it has end to end encryption
<b>NFR-3</b>	Reliability	It has high reliability based on development.
<b>NFR-4</b>	Performance	It has high state of performance and efficiency.
<b>NFR-5</b>	Availability	It has available in all platforms and websites.
<b>NFR-6</b>	Scalability	The ability of a hardware and software parallel System to exploit increasing computing resources efficiency in the analysis of the (very)large datasets

**FIG 4.3 NON- FUNCTIONAL REQUIREMENT**

## 5. PROJECT DESIGN

### 5.1 DATA FLOW DIAGRAM

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination. Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. They can be used to analyse an existing system or model a new one. Like all the best diagrams and charts, a DFD can often visually “say” things that would be hard to explain in words, and they work for both technical and non- technical audiences, from developer to CEO. That’s why DFDs remain so popular after all these years. While they work well for data flow software and systems, they are less applicable nowadays to visualizing interactive, real-time or database-oriented software or systems.

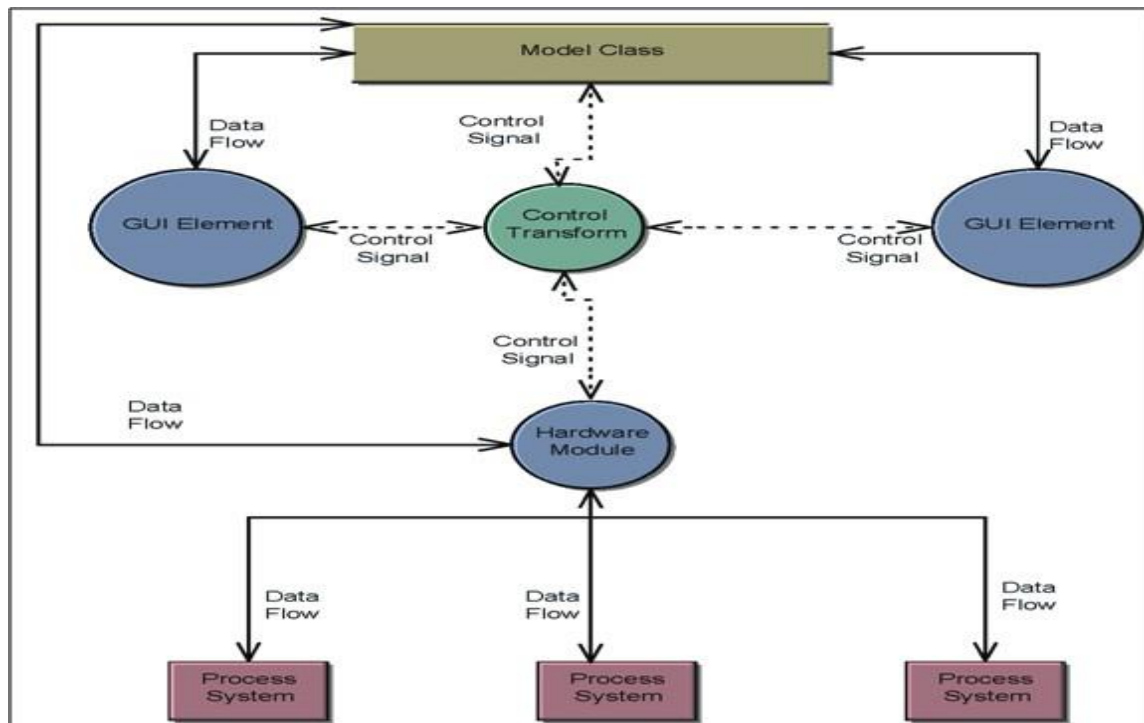
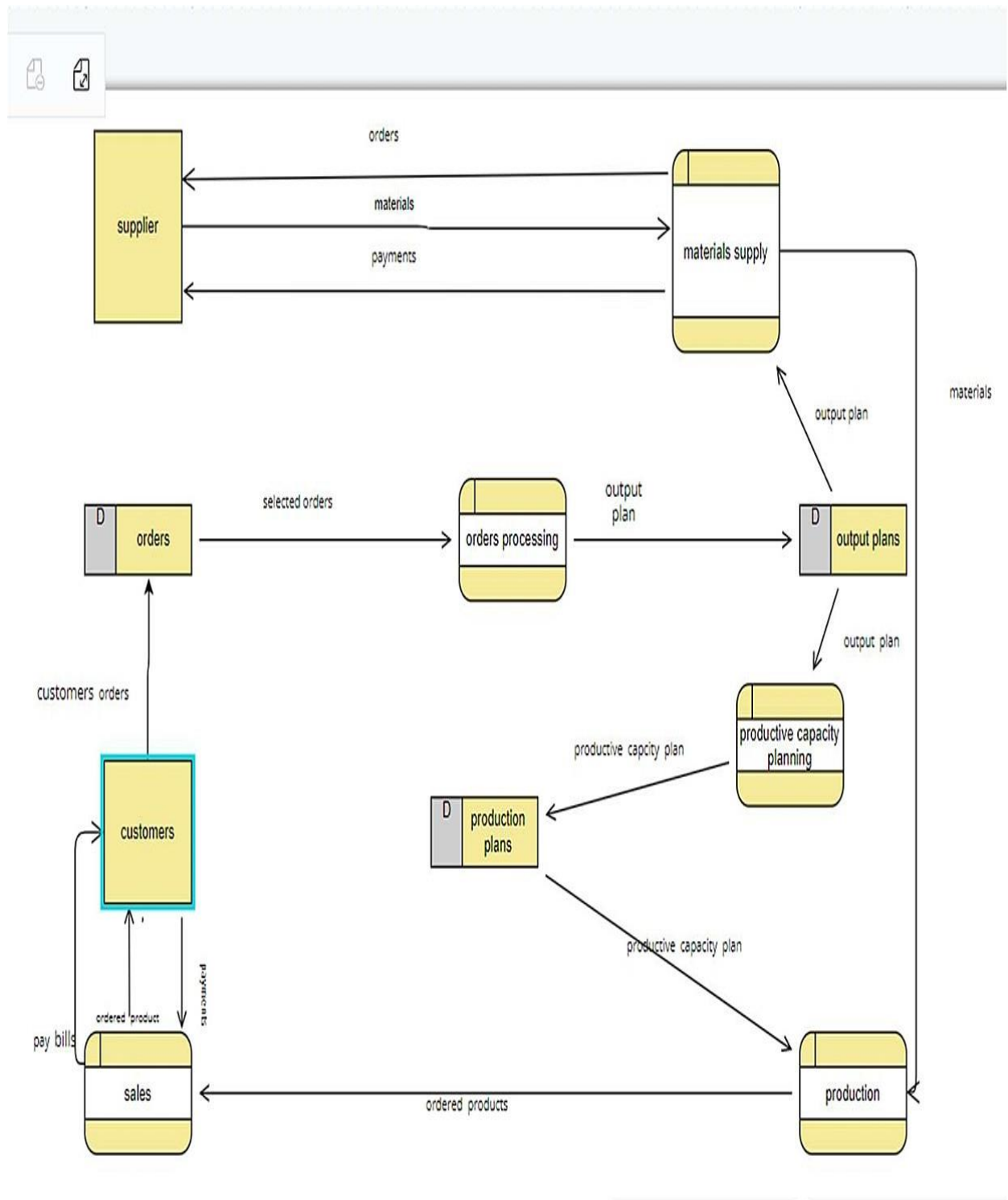
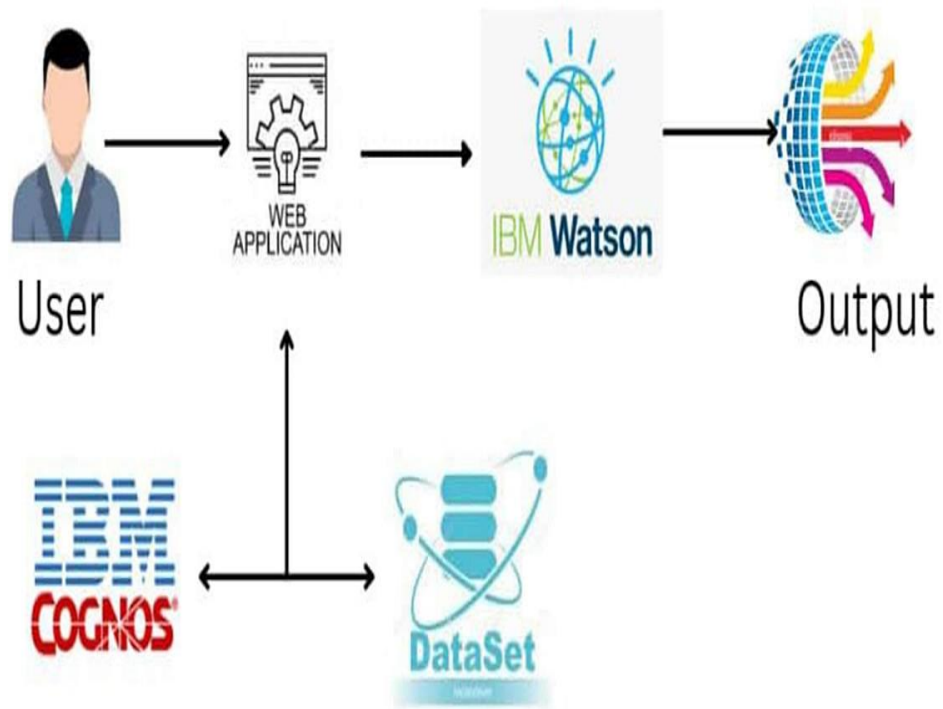


FIG 5.1 DATA FLOW DIAGRAM



**FIG 5.2 STRUCTURAL FLOW DIAGRAM**



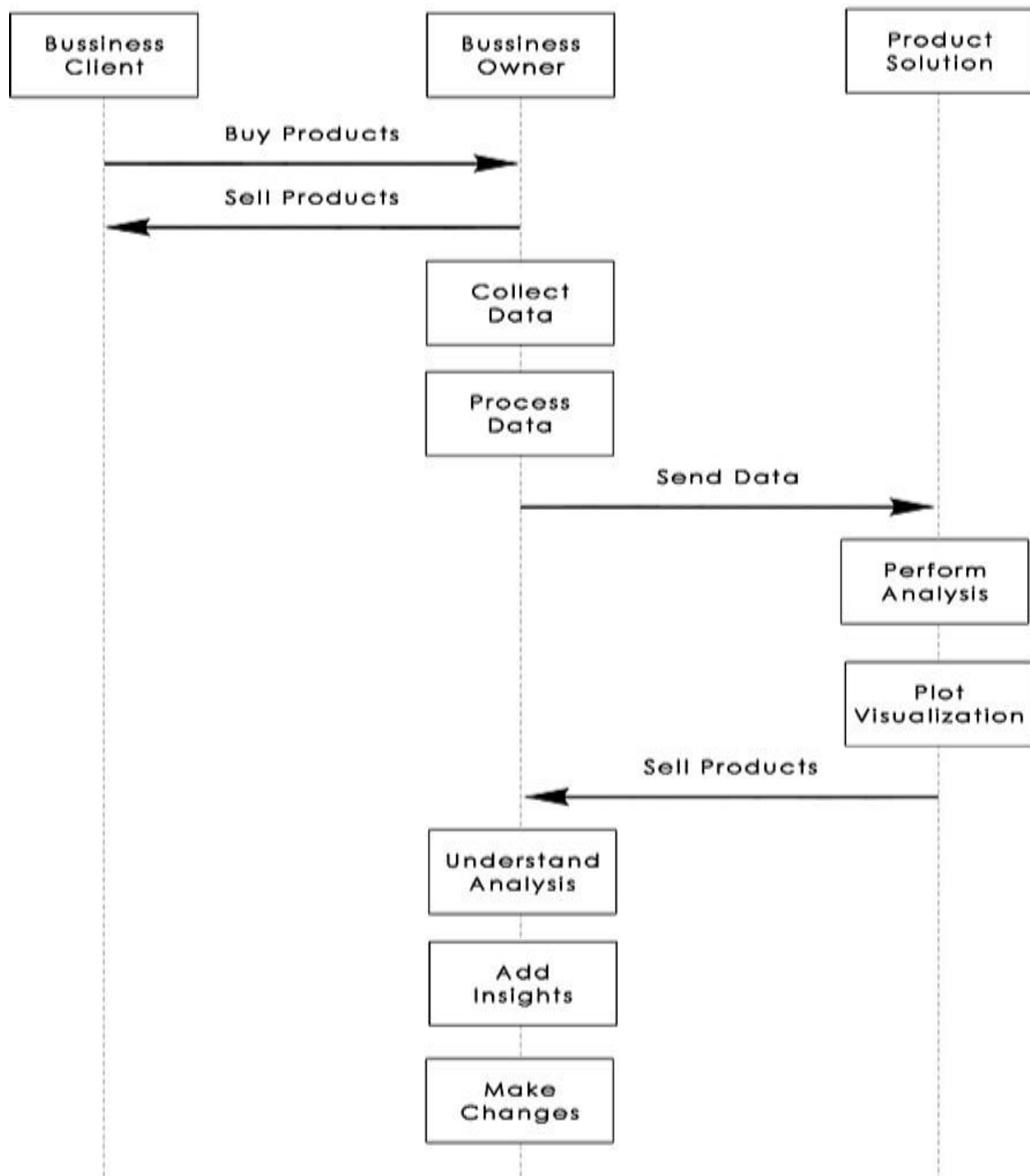


**FIG 5.3 DATA FLOW DIAGRAM FOR GLOBAL SALES DATA ANALYTICS**

## 5.2 SOLUTION AND TECHNICAL ARCHITECTURE

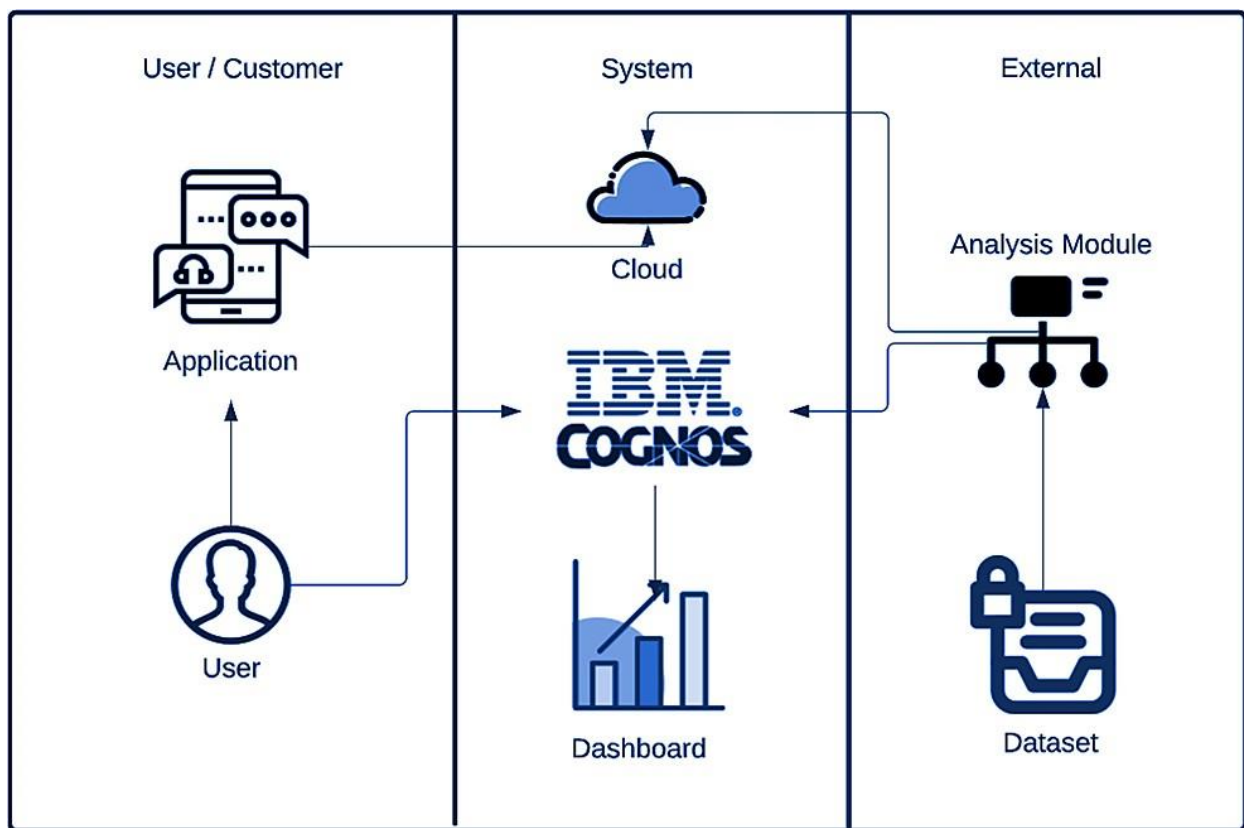
**Solution architecture** is the building block for an overall enterprise software solution that addresses specific problems and requirements. As the project size increases, the team becomes distributed globally. It is required to have a solution architecture in place for long-term sustainability and a solid foundation. Solution architecture addresses various solution needs, keeping the business context intact. It specifies and documents technology platforms, application components, data requirements, resource requirements, and many important non-functional requirements such as scalability, reliability, performance, throughput, availability, security, and maintainability. Solution architecture is vital for any industry and its solution. In the absence of solution architecture, there is a chance that software development could fail; projects can get delayed, get over budget, and not deliver enough functionalities.





**FIG 5.4 SOLUTION ARCHITECTURE**

**Technical Architecture** is the name of the total concept that is applied to the IT Infrastructure of an organization. IT Infrastructure is a coherent set of interconnected hardware and software, like networks, clouds, servers, clients, printers, tablet PC, smartphones. The IT Infrastructure of an organization can be small, one computer, but also immense, like a data Center of a banking company. Big IT Infrastructures also cost millions of dollars to keep operational (available) for their users. Whether your IT Infrastructure is big or small, the whole company depends on it. So the business owner demands four things: the IT Infrastructure must be strong (constructive) to withstand calamities, it must be flexible so it can be changed if new demands of technologies arise (adaptive), it must be fit to service employees and clients for the job to be done (operative) and it must be appealing and inviting to use it (decorative). These top-level requirements are the basis for the architect to design a total concept with technology concepts or IT Infrastructure concepts. There are thousands of technology concepts that can be made part of a technology architecture.



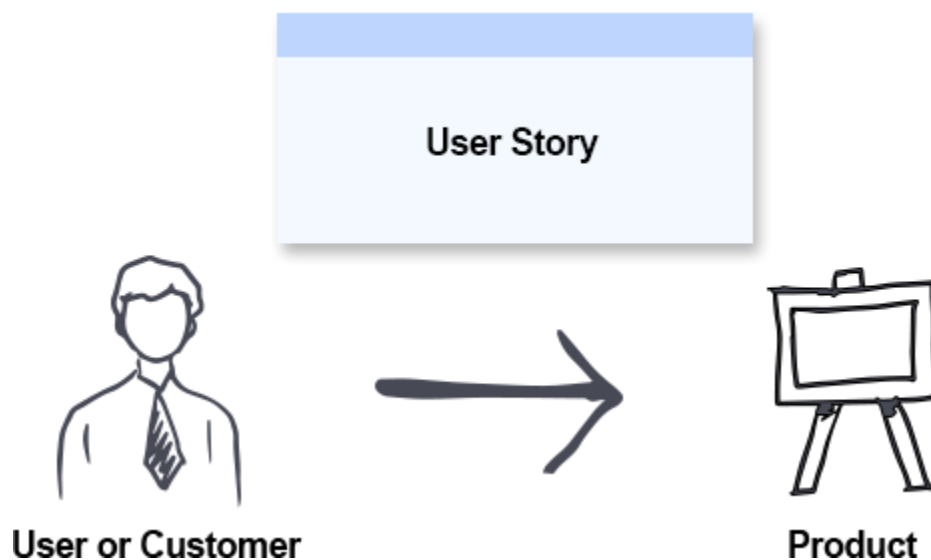
**FIG 5.5 TECHNICAL ARCHITECTURE**

## 5.3 USER STORIES

A user story is a tool used in Agile software development to capture a description of a software feature from an end-user perspective. A user story describes the type of user, what they want and why. A user story helps to create a simplified description of a requirement.

User stories are often recorded on index cards, on Post-it notes, or in project management software.

Depending on the project, user stories may be written by various stakeholders such as clients, users, managers or development team members. Requirements always change as teams and customers learn more about the system as the project progresses. It's not exactly realistic to expect project teams to work off a static requirements list and then deliver functional software months later. With user story approach, we replace big upfront design with a "just enough" approach. User stories reduce the time spent on writing exhaustive documentation by emphasizing customer-centric conversations. Consequently, user stories allow teams to deliver quality software more quickly, which is what customers prefer.



**FIG 5.6 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 applicationby entering my email ,password and confirming my password	I can access my accountand dashboard	High	Sprint-1
---------------------------	-------	-------	--	---	------	----------

User Type	Functional Requireme nt(Epic)	User Story Numb er	User Story / Task	Acceptance criteria	Priori ty	Relea se
Customer Care Executive	Chat box	USN-1	It can be used by easily access and responsible .	I can access by easily through applicati on	High	Sprint-2
Administrat or	Calling	USN-2	It can be used by easily access and responsible.	I can access by easily through applicati on	High	Sprint-2
	Mail	USN-3	It can be used by easily access and responsible	I can access by easily through applicati on	High	Sprint-1

## **6. PROJECT PLANNING & SCHEDULING**

### **6.1 SPRINT PLANNING & ESTIMATION**

Sprint planning is an event in scrum that kicks off the sprint. The purpose of sprint planning is to define what can be delivered in the sprint and how that work will be achieved. Sprint planning is done in collaboration with the whole scrum team.

In scrum, the sprint is a set period of time where all the work is done. However, before you can leap into action you have to set up the sprint. You need to decide on how long the time box is going to be, the sprint goal, and where you're going to start. The sprint planning session kicks off the sprint by setting the agenda and focus. If done correctly, it also creates an environment where the team is motivated, challenged, and can be successful. Bad sprint plans can derail the team by setting unrealistic expectations.

During sprint planning it is easy to get 'bogged down' in the work focusing on which task should come first, who should do it, and how long will it take. For complex work, the level of information you know at the start can be low, and much of it is based on assumptions. Scrum is an empirical process, meaning that you can't plan upfront, but rather learn by doing, and then feed that information back into the process.



<b>Sprint</b>	<b>Functional Requirement (Epic)</b>	<b>User Story Number</b>	<b>User Story/ Task</b>	<b>Story Points</b>	<b>Priority</b>	<b>Team Members</b>
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Arun Kumar D, Hari Vignesh M, Hari Linga Pradeep M, Gowtham E
Sprint-1	Login	USN-2	As a user, I need valid credentials to login to my application.	1	High	Arun Kumar D, Hari Vignesh M, Hari Linga Pradeep M, Gowtham E
Sprint-1	Data Collection	USN-3	As a user, I need to gather the data in the form of CSV/XLS and clean the data	2	High	Arun Kumar D, Hari Linga Pradeep M
Sprint-2	Upload dataset	USN-4	As a user, I can view the data of the products	1	Low	Hari Vignesh M, Gowtham E
Sprint-2	Data Preparation	USN-5	As a user, I need to filter it for Data visualization.	3	High	Arun Kumar D, Hari Vignesh M
Sprint-2	Data visualization	USN-6	As a user, I can easily visualize the data in the form of charts.	4	Medium	Gowtham E, Hari Linga Pradeep M

Sprint-3	Dashboard	USN-7	As a user,I can view the summary of theproduct sales by the help dashboard.	2	Medi um	Arun KumarD, Hari Linga Pradeep
----------	-----------	-------	---	---	---------	---------------------------------

						M
Sprint-3	Dashboard	USN-8	As a user, I must plan visualizations in a way that I'm able to gain insights regarding the sales based upon the category of sales and the respective region	4	High	Hari Vignesh M, Gowtham E

Sprint	Function al Requirement (Epic)	User Story Number	User Story/ Task	Sto ry Poi nts	Priori ty	Team Membe rs
Sprint-3	Dashboard	USN-9	As a user, I must be able to gain insights fromthe charts/graphs through a variety of relationships established in the dashboard.	4	Medi um	Arun KumarD, Hari Vignesh M
Sprint- 4	Prediction	USN-10	As a user, I see the prediction of the specificproduct's future sales expectation.	4	Medi um	Gowtham E,Hari Linga Pradeep M

Sprint- 4	Report	USN-11	As a user, I can view the list of categorized products and their details as a report.	5	High	Arun Kumar D, Hari Linga Pradeep M
Sprint-4	Story	USN-12	As a user, I can view the product and customer description and more additional information as a story.	5	High	Hari Vignesh M, GowthamE

## ESTIMATION

Estimation is a process to forecast these variables to develop or maintain software based on the information specified by the client. There are three main challenges faced during estimation i.e., Uncertainty, Self-knowledge, and Consistency of Method used for Estimation. Usage of standardized and scientific estimation methods for estimating size, effort, and schedule, helps towards maintaining minimal variance between the planned estimates and actual values thereby achieving maximum estimation accuracy. This provides a better client experience. All estimation needs for a project cannot be determined by a single method. It is important to have different methods of estimation for different stages.

Planning and Estimation in Agile projects bring a lot of focus on preparation and forecasting. Both these activities are done keeping business context in mind and measurable value delivery is committed to the client. Therefore, it is recommended to have required planning and estimation in Agile from the start of the project, in order to ensure better risk coverage and higher predictability.

## 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) per iteration unit (story points per day)

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

SPRINT	TOTAL STORY POINTS	DURATION	AVERAGE VELOCITY
SPRINT-1	5	6 Days	5/6 = 0.833
SPRINT-2	8	6 Days	8/6 = 1.33
SPRINT-3	10	6 Days	10/6 = 1.66
SPRINT-4	14	6 Days	14/6 = 2.33

## 6.2 SPRINT DELIVERY SCHEDULE

Sprints	Total Story Points	Duration	Sprint StartDate	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	5	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	8	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	14	19 Nov 2022

### SPRINT 1

Projects / Global Sales Data Analytics

#### Backlog

Search:  HM AD GE H Epic Insights

▼ GSDA Sprint 1 24 Oct – 29 Oct (3 issues) 0 0 5 Complete sprint

- GSDA-1 As a user, I can register for the application by entering my email, password, and confirming my password. REGISTRATION 2 DONE AD
- GSDA-2 As a user, I need valid credentials to log in to my application. REGISTRATION 1 DONE HM
- GSDA-3 As a user, I need to gather the data in the form of CSV/XLS and clean the data REGISTRATION 2 DONE GE

+ Create issue

▼ GSDA Sprint 2 31 Oct – 5 Nov (3 issues) 0 0 9 Complete sprint

FIG 6.1 SPRINT 1 DELIVERY PLAN

## SPRINT 2

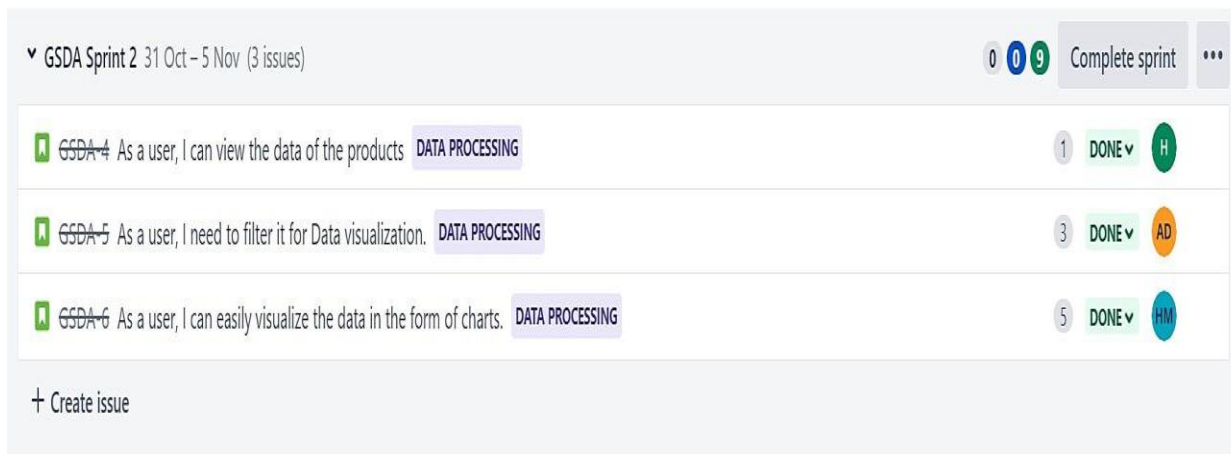


FIG 6.2 SPRINT 2 DELIVERY PLAN

## SPRINT 3

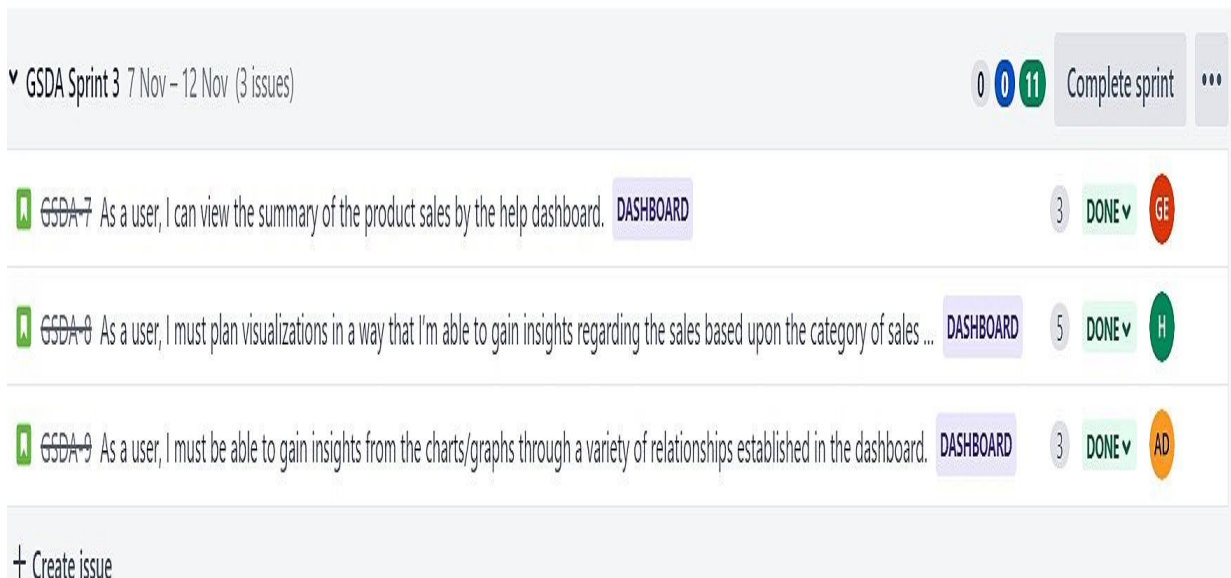


FIG 6.3 SPRINT 3 DELIVERY PLAN

## SPRINT 4

▼ GSDA Sprint 4

14 Nov – 19 Nov (3 issues)

0

0

13

Complete sprint

...

GSDA-10

As a user, I see the prediction of the specific product's future sales expectation.

FINAL

3

DONE▼

HM

GSDA-11

As a user, I can view the list of categorized products and their details as a report.

FINAL

5

DONE▼

GE

GSDA-12

As a user, I can view the product and customer description and more additional information as a story.

FINAL

5

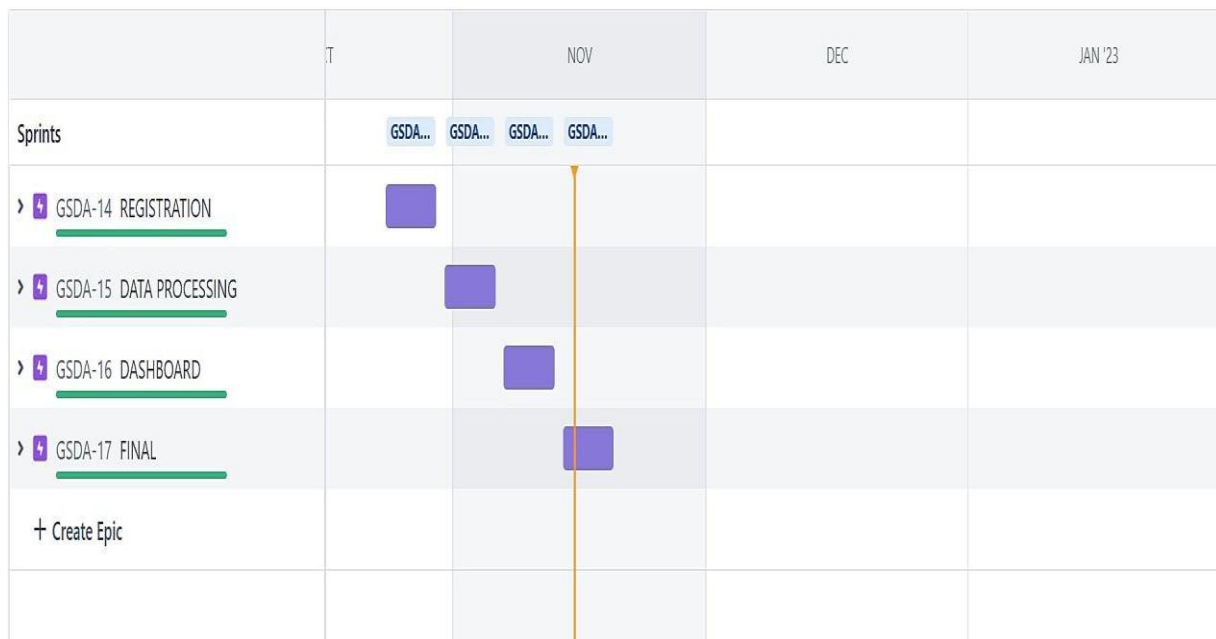
DONE▼

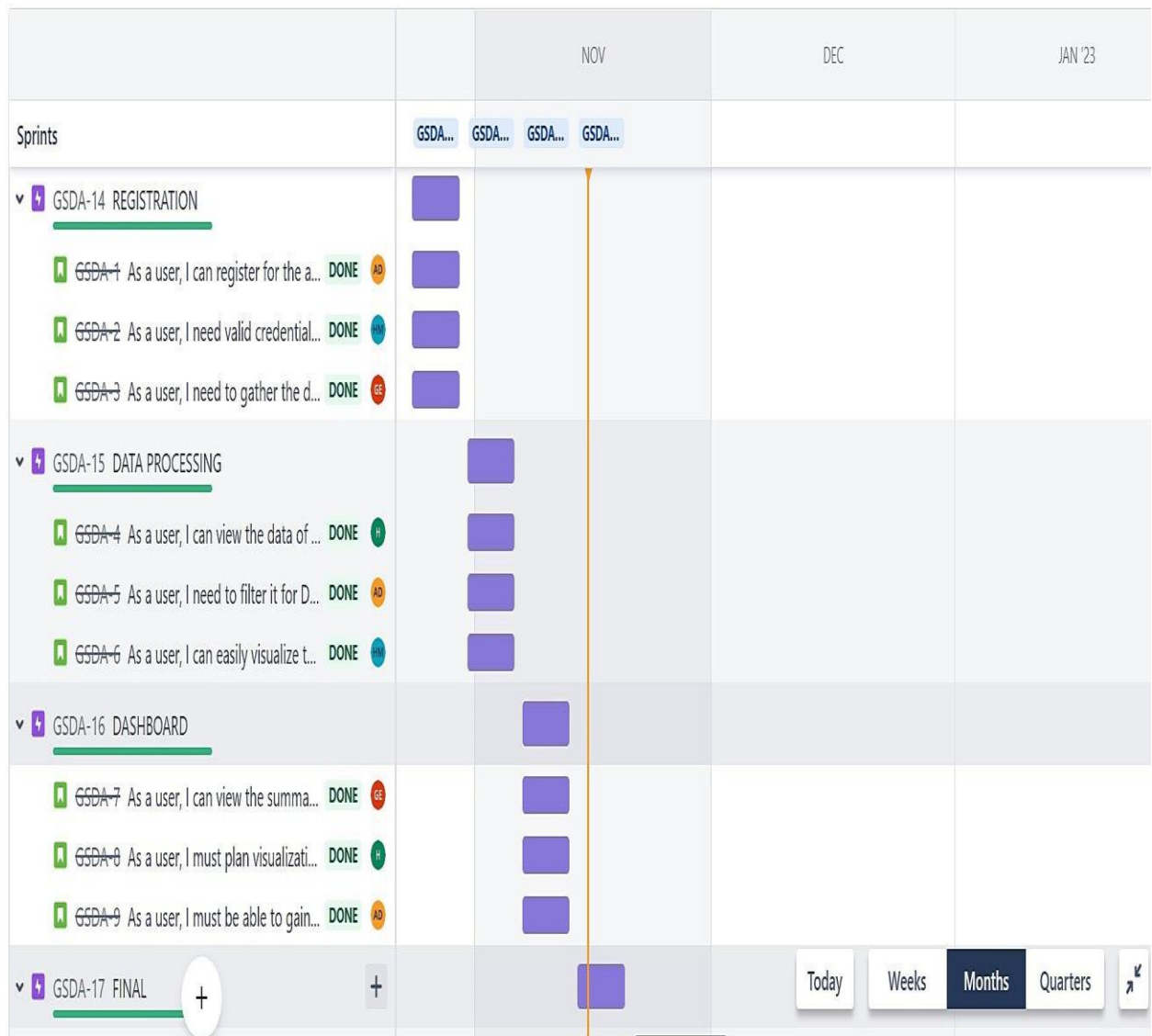
H

+ Create issue

**FIG 6.4 SPRINT 4 DELIVERY PLAN**

## ROADMAP





**FIG 6.5 ROADMAP FOR DELIVERY PLAN**



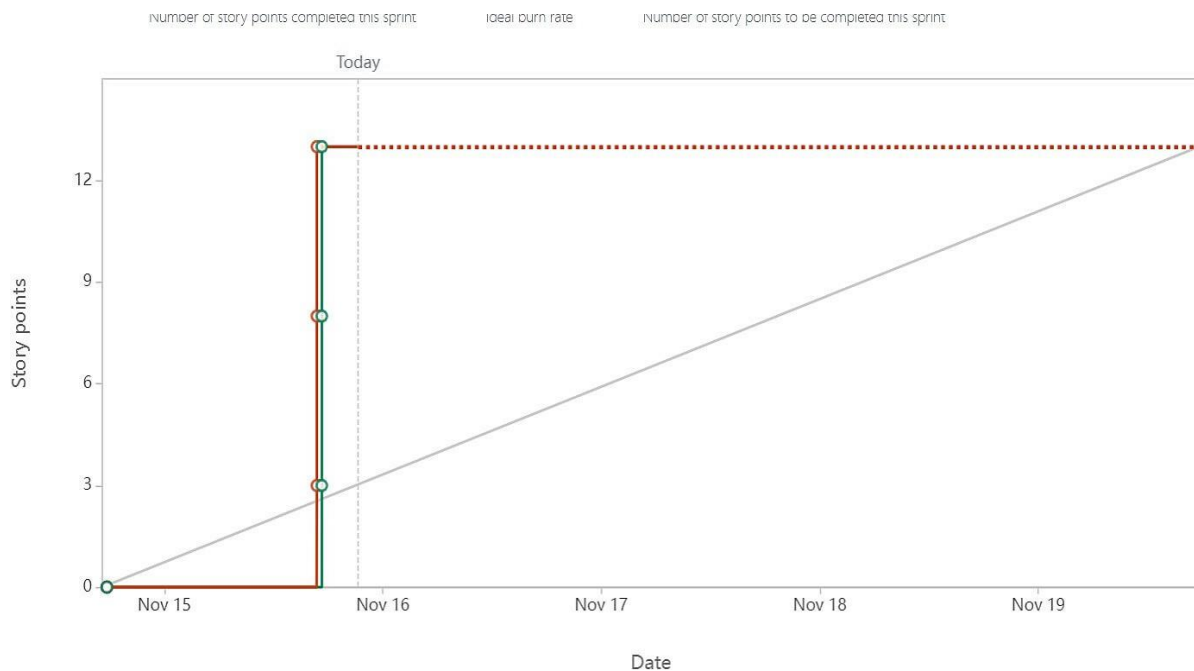
## 6.3 REPORT FROM JIRA

### JIRA

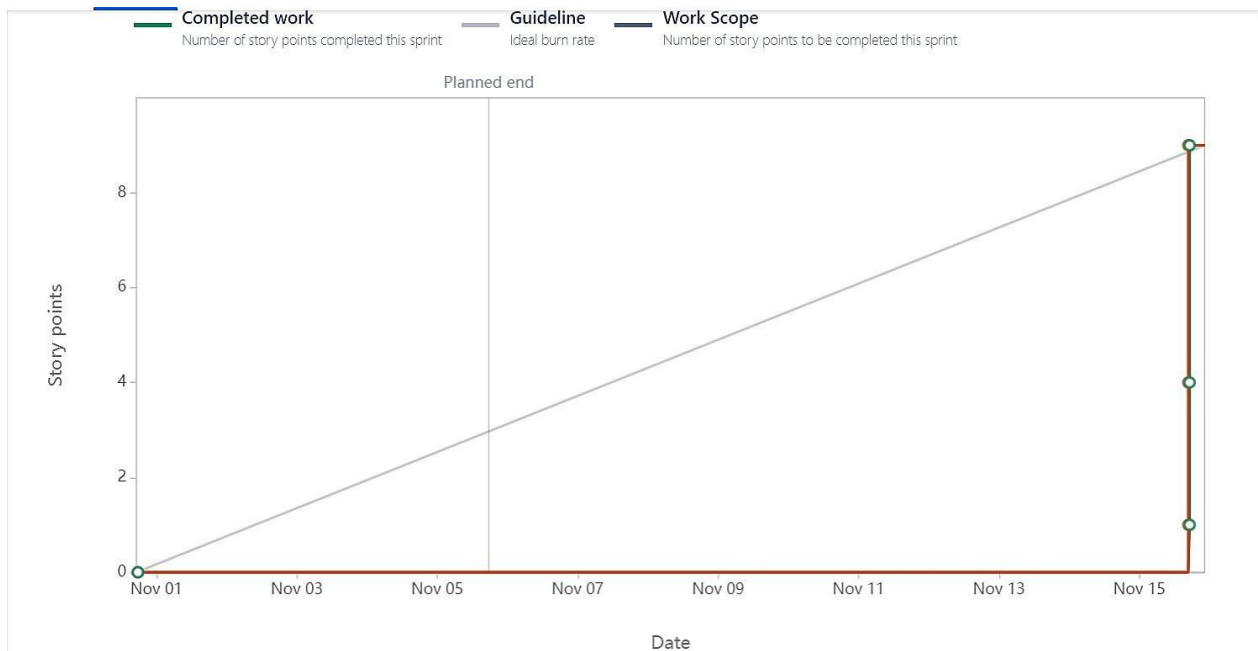
Jira Software is part of a family of products designed to help teams of all types manage work. Originally, Jira was designed as a bug and issue tracker. But today, Jira has evolved into a powerful work management tool for all kinds of use cases, from requirements and test case management to agile software development.

### BURNUP CHART

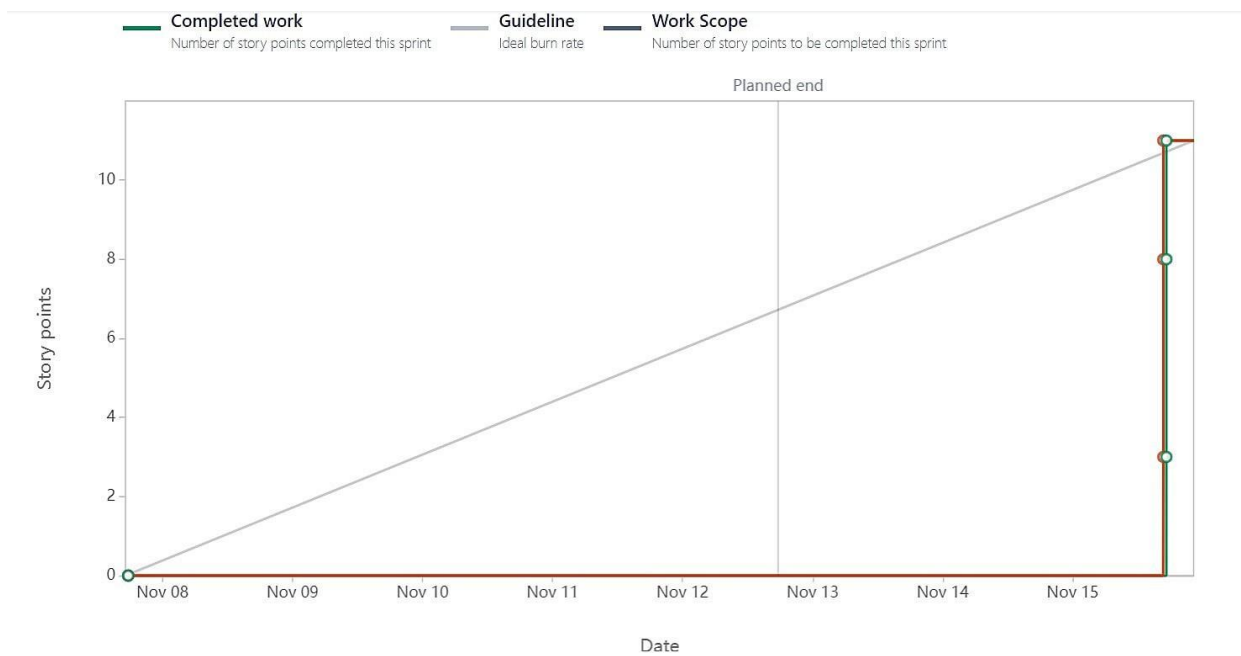
A burn up chart is a graph that shows project progress over time. There are two main lines shown on the chart: one for the total project work planned, and the other for tracking the work completed to date. By comparing the work your team has accomplished so far with the total amount of work planned, you can understand how efficiently they're working and better estimate how long it will take to complete the work remaining.



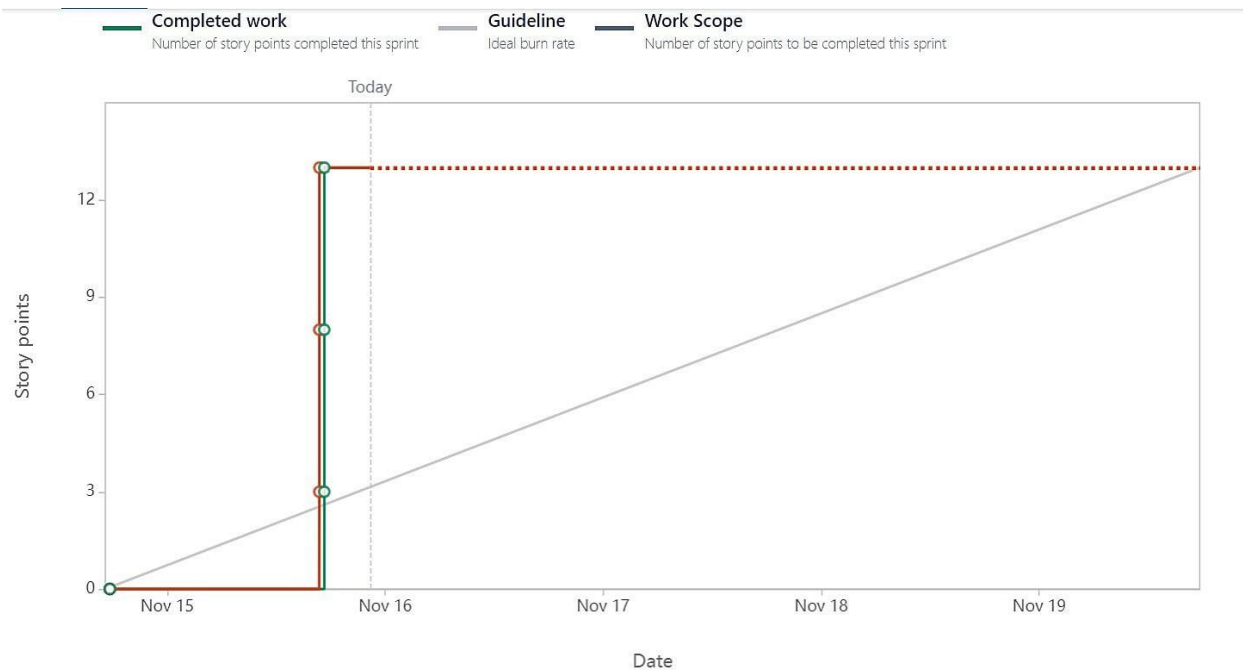
**FIG 6.6 BURNUP CHART FOR SPRINT 1**



**FIG 6.7 BURNUP CHART FOR SPRINT 2**



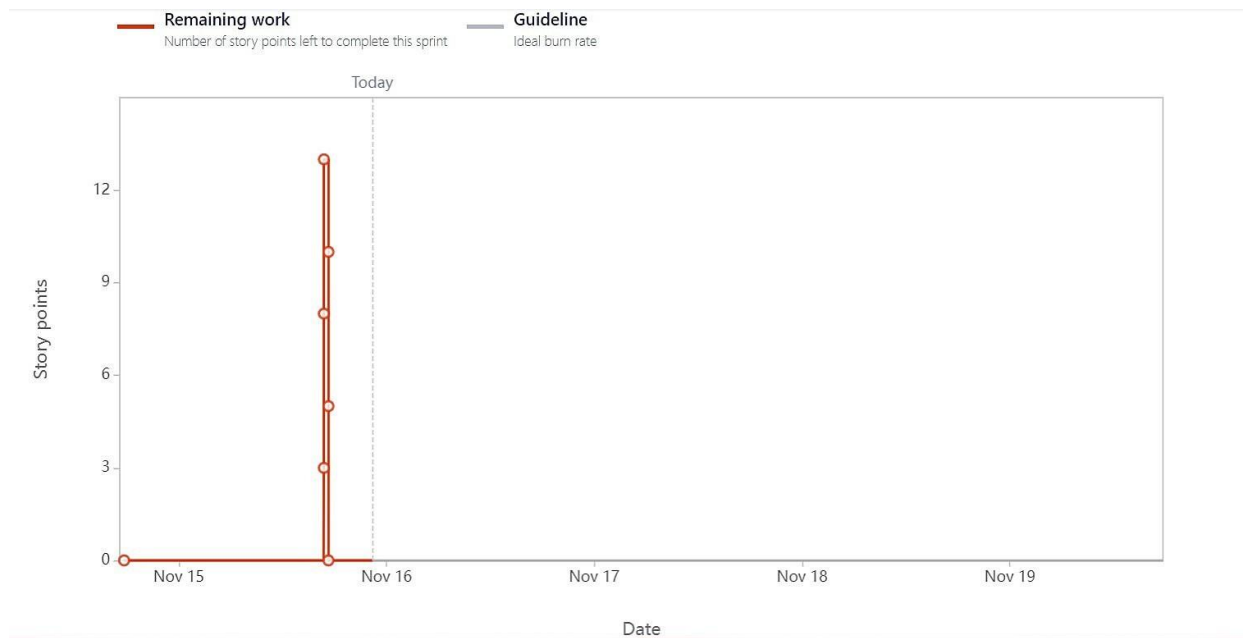
**FIG 6.8 BURNUP CHART FOR SPRINT 3**



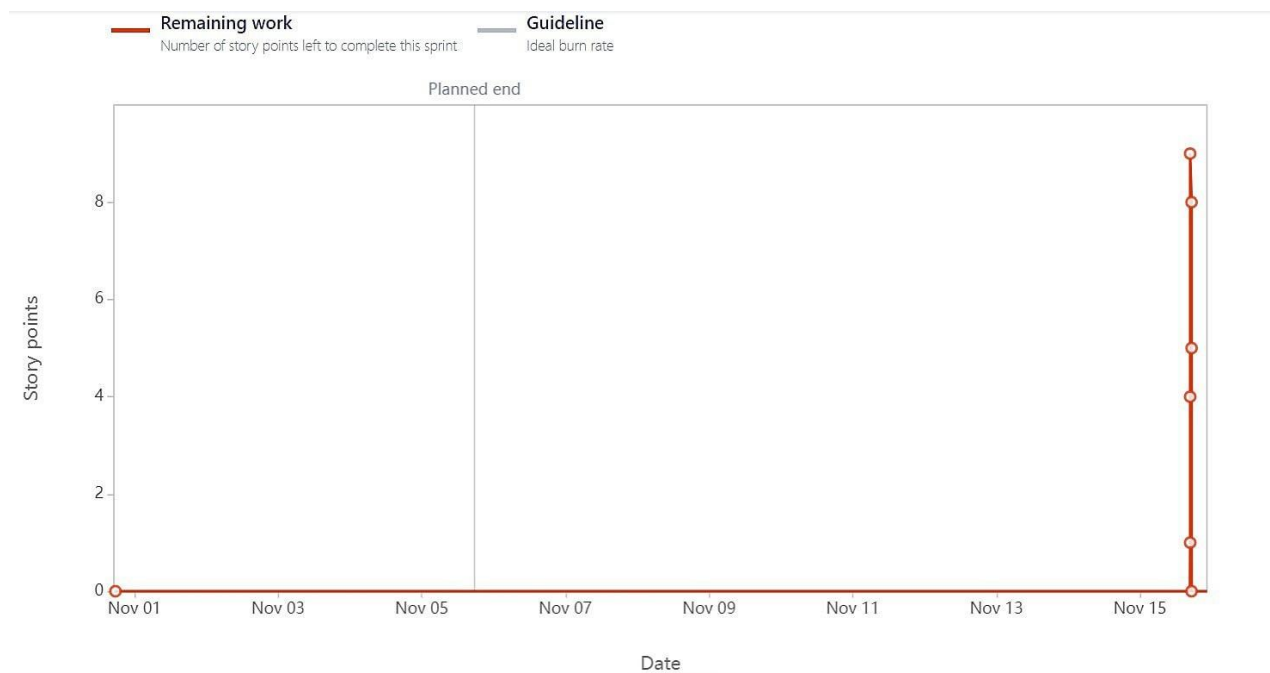
**FIG 6.9 BURNUP CHART FOR SPRINT 4**

## BURNDOWN CHART

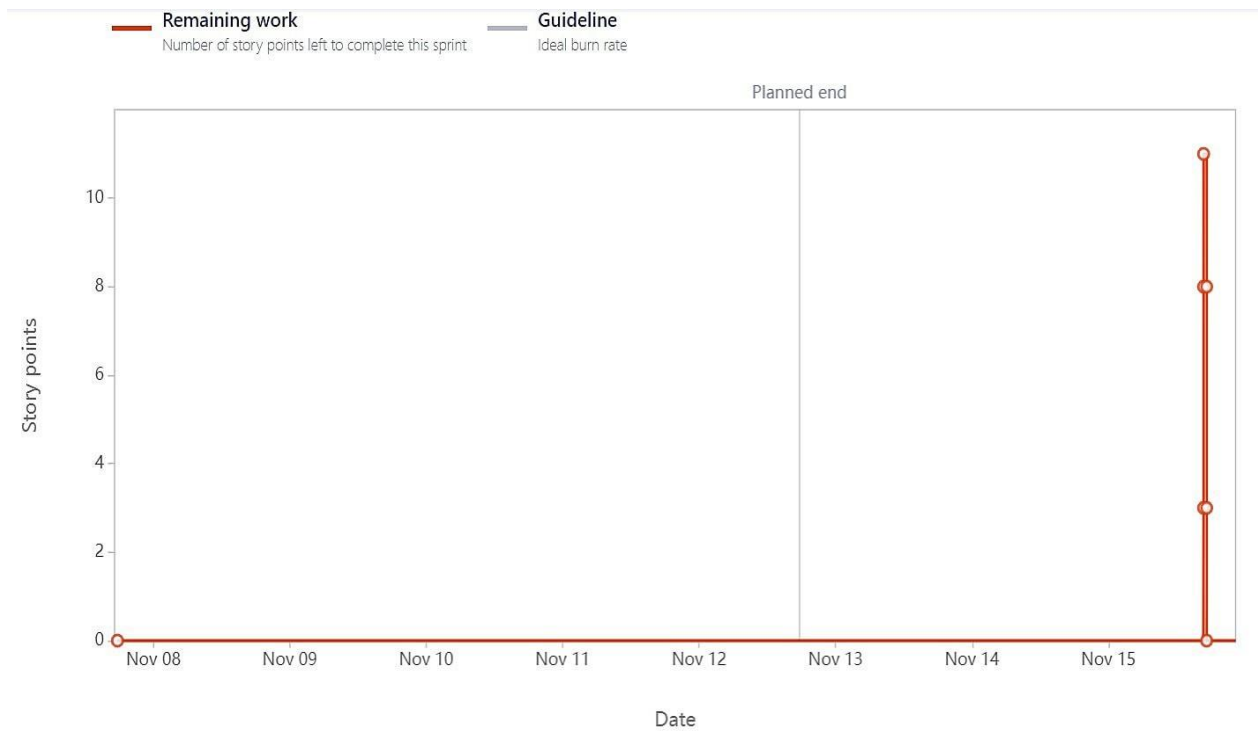
A burndown chart shows the amount of work that has been completed in an epic or sprint, and the total work remaining. Burndown charts are used to predict your team's likelihood of completing their work in the time available. They're also great for keeping the team aware of any scope creep that occurs. This report shows the amount of work to be done in a sprint. It can be used to track the total work remaining in the sprint, and to project the likelihood of achieving the sprint goal. By tracking the remaining work throughout the sprint, a team can manage its progress, and respond to trends accordingly. For example, if the burndown chart shows that the team may not reach the sprint goal, then they can take the necessary actions to stay on track.



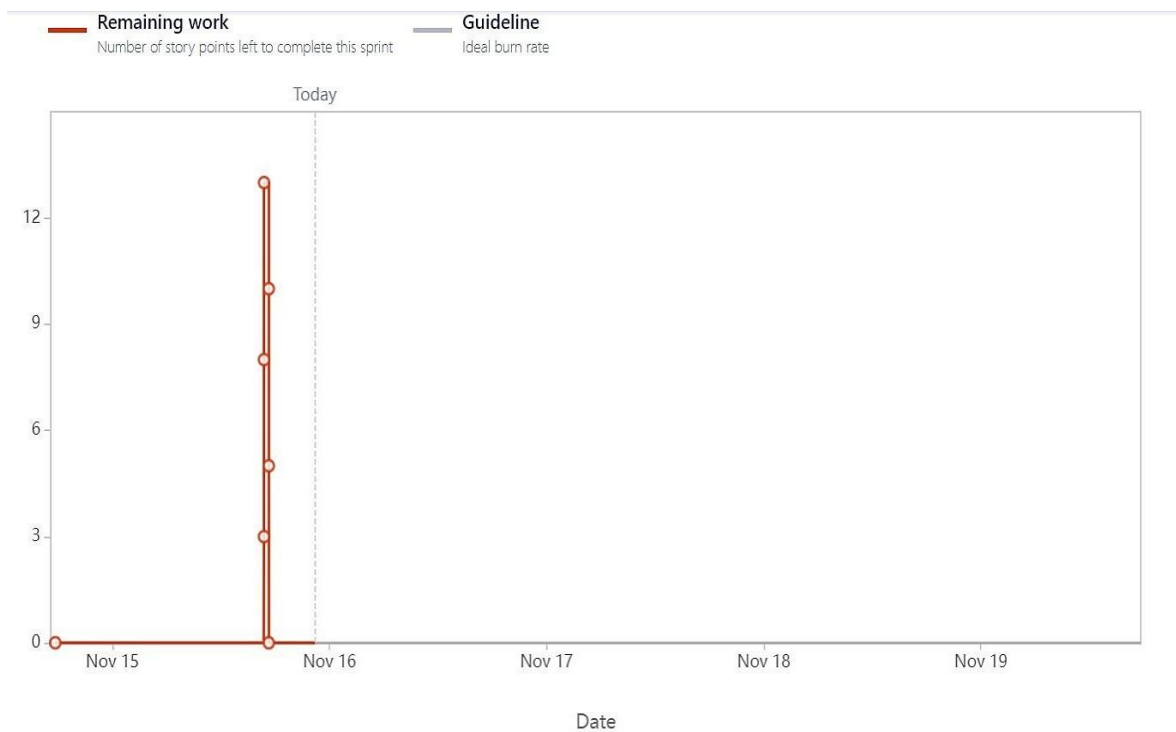
**FIG 6.10 BURNDOWN CHART FOR SPRINT 1**



**FIG 6.11 BURNDOWN CHART FOR SPRINT 2**



**FIG 6.12 BURNDOWN CHART FOR SPRINT 3**



**FIG 6.13 BURNDOWN CHART FOR SPRINT 4**

## 7. CODING & SOLUTIONS

### dashboard.html

```
<!DOCTYPE html>

<html lang="en">

<head>

<link rel="stylesheet" href="index.css">

</head>

<body>

<div class="whole-page">

<div class="navbar">

<div class="one">

<p>Global Sales Data Analytics</p>

</div>

<div class="two">

</div>

<div class="three">

<a href="dashboard.html">Dashboard</a>

<a href="report1.html">Report</a>
```

```
    <a href="story.html">Story</a>

</div>

</div>

<div class="pic">

    <div>

    </div>

</div>

</div>

</body>

</html>
```

## **report.html**

```
<!DOCTYPE html>

<html lang="en">

<head>

    <link rel="stylesheet" href="index.css">

</head>
```

```
<body>
```

```
<div class="whole-page">
```

```
<div class="navbar">
```

```
<div class="one">
```

```
<p>Global Sales Data Analytics</p>
```

```
</div>
```

```
<div class="two">
```

```
</div>
```

```
<div class="three">
```

```
<a href="dashboard.html">Dashboard</a>
```

```
<a href="report.html">Report</a>
```

```
<a href="story.html">Story</a>
```

```
</div>
```

```
</div>
```

```
<div class="pic">
```

```
<div>
```

```

```

```
</div>
```



```
<div>
```

```
  
```

```
</div>
```

```
<div>
```

```
  
```

```
</div>
```

```
</div>
```

```
</div>
```

```
</body>
```

```
</html>
```

## **story.html**

```
<!DOCTYPE html>
```

```
<html lang="en">
```

```
<head>
```

```
  <link rel="stylesheet" href="index.css">
```

```
</head>
```

```
<body>
```

```
<div class="whole-page">
```

```
<div class="navbar">
```

```
<div class="one">
```

```
<p>Global Sales Data Analytics</p>
```

```
</div>
```

```
<div class="two">
```

```
</div>
```

```
<div class="three">
```

```
<a href="dashboard.html">Dashboard</a>
```

```
<a href="report1.html">Report</a>
```

```
<a href="story.html">Story</a>
```

```
</div>
```

```
</div>
```

```
<div class="pic">
```

```
<div>
```

```

```

```
</div>
```

```
</div>
```

```
</div>
```

```
</body>
```

```
</html>
```

## **index.css**

```
.whole-page{
```

```
    height:2200px;
```

```
    display:grid;
```

```
    grid-template-rows: 1fr 10fr;
```

```
}
```

```
.navbar{
```

```
    background-color: rgb(255, 255, 255);
```

```
    display: grid;
```

```
    grid-template-columns: 4fr 5fr 5fr;
```

```
}
```

```
.pic{
```

```
    background-color: rgb(255, 255, 255);
```

```
    display: grid;
```

```
    grid-template-rows:1fr 1fr 1fr ;

}

img{

    width:100%;

}

.one{

    background-color: rgb(255, 255, 255);

    text-align: center;

    margin-top: 30px;

}

.two{

    background-color: rgb(255, 255, 255);

}

.three{

    background-color: rgb(255, 255, 255);

    display:grid;

    grid-template-columns: 1fr 1fr 1fr;

    text-align: center;
```

```
margin-top: 30px;

}

p{

font-family:sans-serif;

font-size: 25px;

}

a{

font-family:sans-serif;

font-size: 25px;

text-decoration: none;

color:black;

}

a:hover{

color:blue;

}
```

## **8. TESTING**

Testing is the process of verifying the accuracy and completeness of project deliverables before they are released to the customer. It is an essential part of quality assurance and helps to ensure that the final product meets the customer's expectations. There are generally four phases of testing in a project: unit testing, integration testing, system testing, and acceptance testing. Each of these phases has its own purpose and focuses on different aspects of the project.

Testing is a critical component of quality management. It is the process of verifying that a project meets its requirements and that it performs as expected. Testing helps ensure that the project is fit for purpose and that it will meet the needs of the customer or client.

### **8.1 TEST CASES**

A test case is a set of actions performed on a system to determine if it satisfies software requirements and functions correctly. The purpose of a test case is to determine if different features within a system are performing as expected and to confirm that the system satisfies all related standards, guidelines and customer requirements. The process of writing a test case can also help reveal errors or defects within the system.

Test cases are typically written by members of the quality assurance (QA) team or the testing team and can be used as step-by-step instructions for each system test. Testing begins once the development team has finished a system feature or set of features. A sequence or collection of test cases is called a test suite. A test case document includes test steps, test data, preconditions and the postconditions that verify requirements.

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments
LoginPage_TC_001	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button	Nil	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup displayed or not	<a href="#">192.646.234</a>	Login/Signup popup should display	Working as expected	Pass	
LoginPage_TC_002	UI	Home Page	Verify the UI elements in Login/Signup popup	Nil	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Last password? Recovery password link	<a href="#">192.646.234</a>	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link	Working as expected	Fail	Steps are not clear to follow
LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials	Nil	1.Enter URL( <a href="https://shopnizer.com/">https://shopnizer.com/</a> ) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in Email text box 4.Enter valid password in password text box	Username: chalam@gmail.com password: Testing123	User should navigate to user account homepage			

LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials	Nil	1.Enter URL( <a href="https://shopnizer.com/">https://shopnizer.com/</a> ) and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing123	Application should show 'Incorrect email or password' validation message.			
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials	Nil	1.Enter URL( <a href="https://shopnizer.com/">https://shopnizer.com/</a> ) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in Email text box 4.Enter Invalid password in password text box 5.Click on login button	Username: chalam@gmail.com password: Testing123678686786878676	Application should show 'Incorrect email or password' validation message.			
			Verify user is able to log into		1.Enter URL( <a href="https://shopnizer.com/">https://shopnizer.com/</a> ) and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in	Username: chalam@gmail.com password: Testing123678686786878676	Application should show 'Incorrect email or password' validation message.			

**FIG 8.1 TEST CASES FOR REGISTRATION**

## 8.2 USER ACCEPTANCE TESTING

User acceptance testing is the final testing stage in software development before production. It's used to get feedback from users who test the software and its user interface (UI). UAT is usually done manually, with users creating real-world situations and testing how the software reacts and performs. Test-case scenarios can also be automated, simulating a user experience. Due to the costliness of UAT and the complexity of combining manual and automated testing in this phase, it's important to prepare ahead and develop a plan. As a testing plan is created and a timeline is established, it's good to keep in mind some of the challenges that may occur during the process.

### 1. Purpose of 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).

### 2. 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	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	0	0	1	1



Totals	24	9	11	26	71
--------	----	---	----	----	----

### 3. Test Case Analysis

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

Section	TotalCases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
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
Version Control	2	0	0	2

## 9. RESULTS

### 9.1 PERFORMANCE METRICS

Performance testing is a testing technique that determines the speed, scalability, and stability of an application under a given workload. It helps to ensure the quality of the software and makes the application ready to be released into the market.

- Speed - The speed at which the application responds.
- Scalability - The maximum user load that the application can handle.
- Stability - The condition of the application under varying loads.

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	No of Visualizations / Graphs - 7-8 visualization/6-7 graphs
2.	Data Responsiveness	Users and Analyst or Developers
3.	Amount Data to Rendered (DB2Metrics)	5 countries
4.	Utilization of Data Filters	Sales ,profit, products, market rate and order id filtration
5.	Effective User Story	No of Scene Added - 30 user stories
6.	Descriptive Reports	No of Visualizations / Graphs - 4 visualizations/6 graph

## 10. ADVANTAGES & DISADVANTAGES

### ADVANTAGES

- **Data analytics helps an organization make better decisions**

Lot of times decisions within organizations are made more on gut feel rather than facts and data. One of the reasons for this could be lack of access to quality data that can help with better decision making. Analytics can help with transforming the data that is available into valuable information for executives so that better decisions can be made. This can be a source of competitive advantage if fewer poor decisions are made since poor decisions can have a negative impact on a number of areas including company growth and profitability.

- **Increase the efficiency of the work**

Analytics can help analyse large amounts of data quickly and display it in a formulated manner to help achieve specific organizational goals. It encourages a culture of efficiency and teamwork by allowing the managers to share the insights from the analytics results to the employees. The gaps and improvement areas within a company become evident and actions can be taken to increase the overall efficiency of the workplace thereby increasing productivity.

- **The analytics keeps you updated of your customer behavioural changes**

In today's world, customers have a lot of choices. If organizations are not tuned to customer desires and expectations, they can soon find themselves in a downward spiral. Customers tend to change their minds as they are continuously exposed to new information in this era of digitization. With vast amount of customer data, it is practically impossible for organizations to make senses of all the changes in customer perception data without using the power of analytics. Analytics gives you insights into how your target market thinks and if there is any change. Hence, being aware of shift in customer behaviour can provide a decisive advantage to companies.

- **Personalization of products and services**

Gone are the days where a company could sell a standard set of products and services to customers. Customers crave products and services that can meet their individual needs. Analytics can help companies keep track of what kind of service, product, or content is preferred by the customer and then show the recommendations based on their preferences. For example, in social media, we usually see what we like to see, all of this is made possible due to the data collection and analytics that companies do. Data analytics can help provide targeted services to customers based on their individual requirements.

- **Improving quality of products and services**

Data analytics can help with enhancing the user experience by detecting and correcting errors or avoiding non-value-added tasks. For example, self-learning systems can use data to understand the way customers are interacting with the tools and make appropriate changes to improve user experience. In addition, data analytics can help with automated data cleansing and improving the quality of data and consecutively benefiting both customers and organizations.

## **DISADVANTAGES**

- **Lack of alignment within teams**

There is a lack of alignment between different teams or departments within an organization. However, the insights generated by these teams are either of not much value or are having limited impact on organizational metrics. This could be due to a “silos” way of working with each team only using their existing processes disconnected from other departments. The analytics team should be focussed on answering the right questions for the business and the results generated by data analytics teams needs to be properly communicated to the right employees to drive the right set of actions and behaviours so that it can have an positive impact on the organization.

- **Lack of commitment and patience**

Analytics solutions are not difficult to implement, however, they are costly, and the ROI is not immediate. Especially, if existing data is not available, it may take time to put processes and procedures in place to start collecting the data. By nature, the analytics models improve accuracy over time and require dedication to implement the solution. Since the business users do not see results immediately, they sometimes lose interest which results in loss of trust and the models fail.

When an organization decides to implement data analytics methods, there needs to be a feedback loop and mechanism in place to understand what is working and what is not, and corrective actions are required to fix things that are broken. Without this closed loop system, senior management may decide that analytics is not working or much valuable and may abandon the entire exercise.

- **Low quality of data**

One of the biggest limitations of data analytics is lack of access to quality data. It is possible that companies already have access to a lot of data, but the question is do they have the right data that they need? A top down approach is required where the business questions that need to be answered need to be known first and what data is required to answer these questions can then be determined.

In some cases, data may have been collected for historical reasons may not be suitable to answer the questions that we ask today. At other times, even though we have the right metrics that we are collecting data on, the quality of the data collection may be poor. There can be instances where adequate data is not available or is missing for proper analytics to be done. As they say, garbage-in garbage-out. If the data quality is poor, the decision made by using this data is also going to be poor. Hence, actions must be taken to fix the quality of the data before it can be effectively used within organizations.

- **Privacy concerns**

Sometimes, data collection might breach the privacy of the customers as their information such as purchases, online transactions, and subscriptions are available to companies whose services they are using. Some companies might exchange those datasets with other companies for mutual benefit. Certain data collected can also be used against a person, country, or community. Organizations need to be cautious of what sort of data they are collecting from customers and ensure the security.

- **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. For example, a neural network model that learns from various scenarios to decide who should be given a loan and who should be rejected.

## **11. CONCLUSION**

The availability of Data, low-cost commodity hardware, and new information management and analytic software have produced a unique moment in the history of data analysis. The convergence of these trends means that we have the capabilities required to analyse astonishing data sets quickly and cost-effectively for the first time in history. These capabilities are neither theoretical nor trivial. They represent a genuine leap forward and a clear opportunity to realize enormous gains in terms of efficiency, productivity, revenue, and profitability.

Sales analytics is an indispensable tool for businesses all over the globe. It keeps our business updated. This is the must-have element,our business won't last long in a highly competitive industry. Provides better insights via Data Visualization. Depending on the company we are managing,finding the right sales analytics software is crucial. With the benefits that sales analytics provides,making the most out of the tool will keep our business running efficiently and maintain superior productivity for years to come.

The Age of Global Sales Data is here, and these are truly revolutionary times if both business and technology professionals continue to work together and deliver on the promise.

## **12. FUTURE SCOPE**

Global Sales Data Analytics eliminates guesswork and manual tasks. Be it choosing the right content, planning marketing campaigns, or developing products. Organizations can use the insights they gain from data analytics to make informed decisions. Thus, leading to better outcomes and customer satisfaction. By visualizing the data by bar chart, pie chart etc., we can easily identify the profit and loss for the company.

In Future we can identify when a customer purchases the next product and understand how long it took to deliver the product. we get a better insight into the kind of items a customer looks for, product returns, etc and will be able to predict the sales and profit for the next quarter.



## **13. APPENDIX**

### **13.1 GITHUB AND PROJECT VIDEO LINK**

Github Link - <https://github.com/IBM-EPBL/IBM-Project-42139-1660651196>