Smart Internz

Empowering India: Analysing the evolution of union budget allocations for sustainable growth

Team ID: LTVIP2026TMIDS24962

Team Size: 4

Team Leader: Maddi Ganesh

Member: Satwik Vemuri

Team Member: Sobha Vinay Babu Merugumala

Team Member: Polimetla Naveen Kumar

1. INTRODUCTION

1.1 Project Overview

This project explores the evolution of India's Union Budget allocations from the fiscal years 2021–2022 to 2023–2024 using MySQL and Tableau. It focuses on analyzing ministry-wise, category-wise, and scheme-wise budget allocations, along with revenue and capital expenditure trends.

The interactive dashboards and storyboards help stakeholders understand government spending priorities, identify growth sectors, and derive insights to support strategic decision-making for industries such as renewable energy, electric vehicles, and pharmaceuticals.

1.2 Purpose

The purpose of this project is to visualize Union Budget data to identify:

- Budget allocation trends across fiscal years
- Revenue vs Capital expenditure distribution
- Ministry-wise and scheme-wise investment patterns
- Growth sectors supporting sustainable development

Using Tableau's interactive dashboards and MySQL database integration, the project provides a structured analytical platform to explore and interpret government financial data efficiently.

2. IDEATION PHASE

2.1 Problem Statement

Organizations and businesses often lack clear visibility into government budget allocation trends across ministries and schemes. Without structured analysis, it becomes difficult to:

- Track investment growth patterns

- Understand revenue and capital expenditure distribution

- Make informed strategic business decisions

There is a need for a centralized, interactive dashboard that transforms raw budget data into meaningful insights.

2.2 Empathy Map Canvas

Who?
Policy analysts, business investors, renewable energy startups, EV manufacturers, pharmaceutical companies, and government policy observers who rely on structured financial insights for planning and decision-making.

Think & Feel?
They seek clarity in government spending patterns, want confidence in investment planning, and prefer simplified, visual interpretations of complex Union Budget data.

See?
Large volumes of raw financial data, lengthy budget reports, scattered information across documents, and limited tools for easy year-wise comparison.

Hear?
Growing emphasis on sustainable development, government initiatives supporting innovation and infrastructure, and the importance of data-driven strategic decisions.

Say & Do?
Explore interactive dashboards, apply filters to compare fiscal years, analyze ministry-wise and scheme-wise allocations, and use visual insights to guide business strategies.
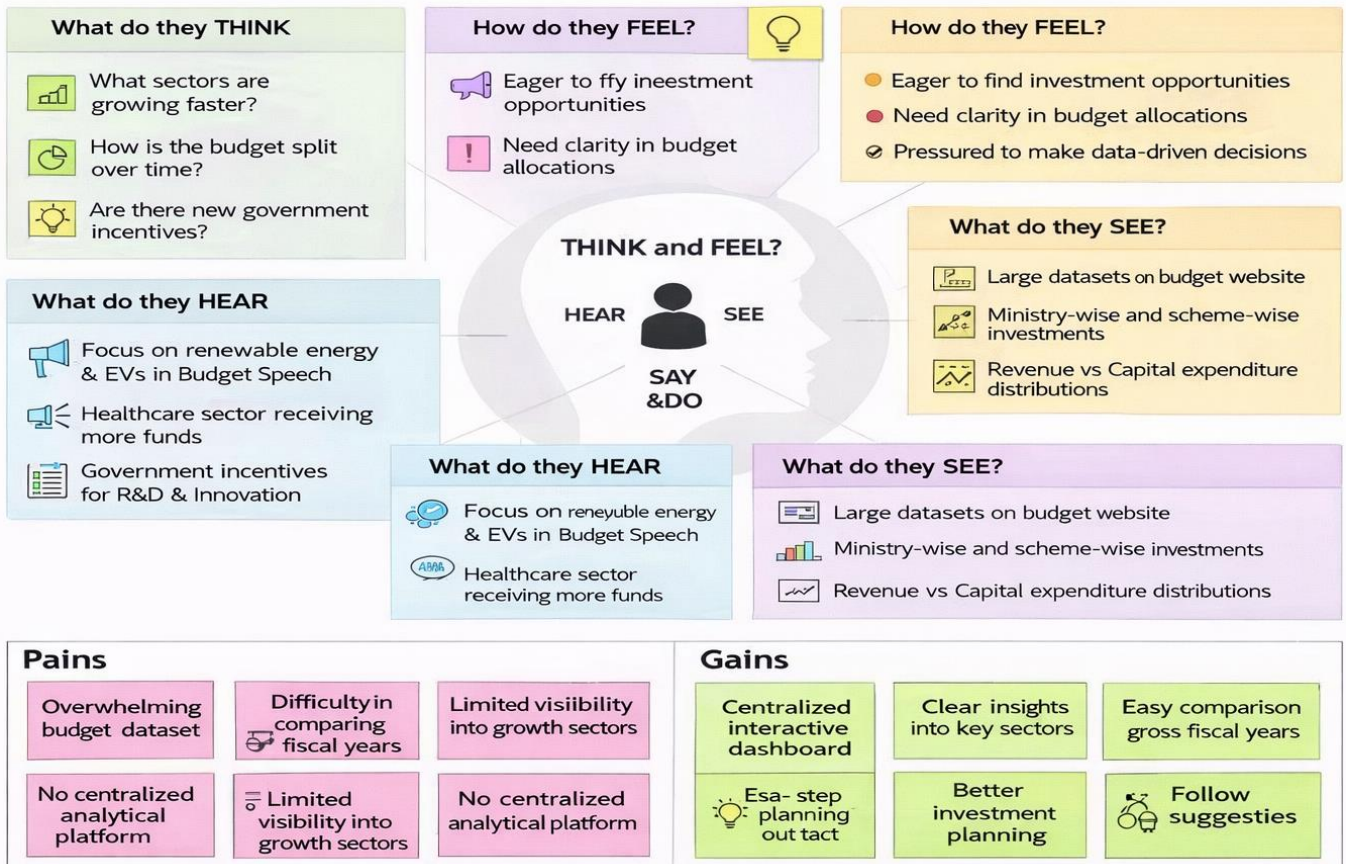
Pain?
Lack of a centralized analytical platform, difficulty comparing multiple fiscal years, challenges in understanding revenue vs capital expenditure distribution, and limited accessibility to simplified insights.

Gain?
A one-stop interactive dashboard, clear visualization of budget allocation trends, faster comparative analysis, improved investment decision support, and deeper understanding of India's economic priorities and growth sectors.

Empathy Map

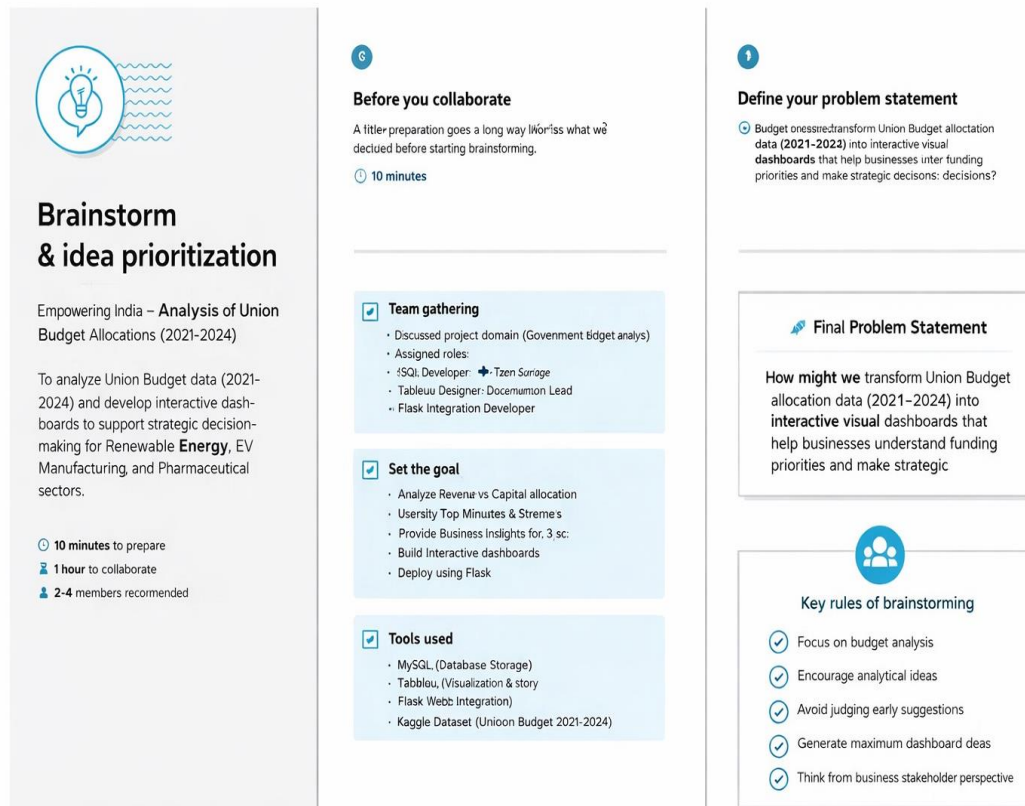**Project:** Empowering India — Union Budget Analysis (2021–2024)

What do they THINK

- What sectors are growing faster?
- How is the budget split over time?
- Are there new government incentives?

How do they FEEL?

- Eager to ffy ineestment opportunities
- Need clarity in budget allocations

How do they FEEL?

- Eager to find investment opportunities
- Need clarity in budget allocations
- Pressured to make data-driven decisions

What do they HEAR

- Focus on renewable energy & EVs in Budget Speech
- Healthcare sector receiving more funds
- Government incentives for R&D & Innovation

THINK and FEEL?

HEAR — SEE

SAY &DO

What do they SEE?

- Large datasets on budget website
- Ministry-wise and scheme-wise investments
- Revenue vs Capital expenditure distributions

What do they HEAR

- Focus on reneyuble energy & EVs in Budget Speech
- Healthcare sector receiving more funds

What do they SEE?

- Large datasets on budget website
- Ministry-wise and scheme-wise investments
- Revenue vs Capital expenditure distributions

Pains

Overwhelming budget dataset	Difficulty in comparing fiscal years	Limited visiibility into growth sectors
No centralized analytical platform	Limited visibility into growth sectors	No centralized analytical platform

Gains

Centralized interactive dashboard	Clear insights into key sectors	Easy comparison gross fiscal years
Esa- step planning out tact	Better investment planning	Follow suggesties

2.3 Brainstorming

Use Tableau to create interactive dashboards for Union Budget analysis
- Analyze year-wise budget growth (2021–2024)
- Compare Revenue vs Capital expenditure trends
- Identify top and low funded ministries
- Visualize category-wise and scheme-wise allocations
- Use bar charts, treemaps, and line charts for comparison
- Enable filters for Year, Ministry, and Category
- Embed dashboard into Flask web application

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

Brainstorm & idea prioritization

Empowering India – **Analysis of Union Budget Allocations (2021-2024)**

To analyze Union Budget data (2021-2024) and develop interactive dashboards to support strategic decision-making for Renewable **Energy**, EV Manufacturing, and Pharmaceutical sectors.

- 🕐 **10 minutes** to prepare
- ⏳ **1 hour** to collaborate
- 👤 **2-4 members** recommended

Before you collaborate

A little preparation goes a long way. Work iss what we decided before starting brainstorming.

🕐 10 minutes

✅ **Team gathering**
- Discussed project domain (Government budget analys)
- Assigned roles:
- ¡SQL Developer: ➕ Tzen Surrage
- Tableau Designer: Docemumon Lead
- Flask Integration Developer

✅ **Set the goal**
- Analyze Revenue vs Capital allocation
- Usersity Top Minutes & Stremes
- Provide Business Inslights for, 3 sc:
- Build Interactive dashboards
- Deploy using Flask

✅ **Tools used**
- MySQL, (Database Storage)
- Tabbleu, (Visualization & story
- Flask Webt: Integration)
- Kaggle Dataset (Unioon Budget 2021-2024)

Define your problem statement

ⓘ Budget onessredtransform Union Budget alloctation data **(2021-2022)** into interactive visual **dashboards** that help businesses inter funding priorities and make strategic decisons: decisions?

📎 **Final Problem Statement**

How might we transform Union Budget allocation data (2021–2024) into **interactive visual** dashboards that help businesses understand funding priorities and make strategic

Key rules of brainstorming

- ✅ Focus on budget analysis
- ✅ Encourage analytical ideas
- ✅ Avoid judging early suggestions
- ✅ Generate maximum dashboard deas
- ✅ Think from business stakeholder perspective

---

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

3.1 Customer Journey Map

Stage	Actions	Emotions	Emotions	Pain Points
Project Discovery	• Discover Tableau dashboard link • View project demo • Read project overview	Curious, Interested	Interested	Limited understanding of raw budget data
Data Access	• Load CSV dataset into MySQL • Connect MySQL with Tableau • Verify data structure	Focused, Analytical	Large dataset complexity Data cleaning challenges	Large dataset complexity Data cleaning challenges
Data Preparation	• Clean data • Create calculated fields • Validate revenue & capital columns	Engaged, Technical	Handling null values Formula errors	Handing null values Formula errors
Visualization	• Create bar charts, line charts, Treemaps • KPI cards	Confident, Creative	Layout alignment issues Dashboard formatting	Dashboard formatting challenges
Analysis & Insights	• Compare 2021—2024 budgets • Analyze ministry-wise growth • Identify top schemes	Informed, Insightful	Difficult multi-year comparison	Difficult multi-year comparison
Story Creation	• Build Tableau story scenes • Add filters & interactions	Structured, Organized	Limited storytelling experience	Embedding errors Responsiveness issues
Web Integration	• Embed dashboard into Flask web app	Satisfied, Accomplished	Embedding errors	Limited export customization options

3.2 Solution Requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Collection & Storage	• Import Union Budget dataset (2021–2024) • Store data in MySQL Database • Validate data integrity before storage
FR-2	Data Preprocessing	• Clean null values • Format revenue & capital columns • Create calculated fields (Total Budget, Growth %)
FR-3	Dashboard Visualization	• Category-wise budget visualization • Ministry-wise allocation analysis • Scheme-wise comparison charts
FR-4	Comparative Analysis	• Compare Actual vs Estimated vs Revised budgets • Year-wise trend analysis (2021–2024)
FR-5	Filtering & Interaction	• Filter by Financial Year • Filter by Ministry / Category • Drill-down into schemes
FR-6	Story & Insights	• Create Tableau Story with multiple scenes • Highlight top 5 ministries & schemes • Show budget growth trends
FR-7	Web Integration	• Embed Tableau Dashboard in Flask UI • Enable interactive dashboard view on web application
FR-8	Reporting & Export	• Allow users to download reports/screenshots • Provide summary insights for decision-making

3.3 Data Flow Diagram

Kaggle Union Budget CSV Dataset → MySQL Database → SQL Data Processing → Tableau Visualization → Interactive Dashboard → Flask Web Deployment → Insights & Decision Support

3.4 Technology Stack

- **Tool**: Tableau

- **Language**: Drag-and-drop interface (with SQL for data processing)
- **Data**: CSV – India Union Budget Dataset (2021-2024)
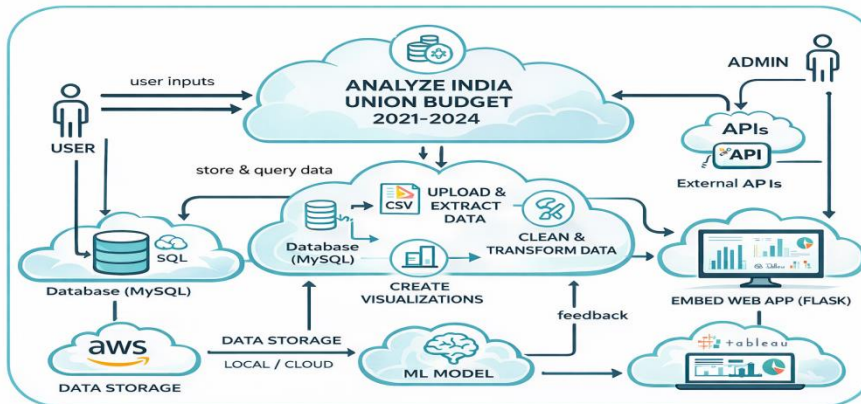
4. PROJECT DESIGN

4.1 Problem Solution Fit

The project focuses on transforming raw Union Budget data into meaningful visual insights using Tableau's interactive dashboards and analytical capabilities.


4.2 Proposed Solution

An interactive Tableau dashboard and storyboard to showcase Union Budget trends (2021–2024), ministry-wise and scheme-wise allocations, revenue vs capital expenditure comparison, and identification of top-funded sectors to support strategic decision-making.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Business stakeholders, renewable energy startups, EV manufacturers, and pharmaceutical companies lack clear and interactive insights into Union Budget allocations (2021–2024). The complexity of ministry-wise, category-wise, and scheme-wise budget data makes it difficult to analyze funding trends and make strategic investment decisions.
2.	Idea / Solution description	The project provides a SQL-based data management system integrated with Tableau dashboards to visualize Union Budget allocations. It presents ministry-wise, scheme-wise, category-wise, revenue vs capital comparisons, and year-wise trends through interactive dashboards and stories to support data-driven decision-making.
3.	Novelty / Uniqueness	Combines multi-year Union Budget data (2021–2024) with structured SQL processing and interactive Tableau visualization. Includes calculated fields, filters, Top-5 comparisons, revenue vs capital analysis, and integrated web deployment using Flask for enhanced accessibility.
4.	Social Impact / Customer Satisfaction	Improves transparency and understanding of government budget allocations. Helps startups and industries align their strategies with national priorities such as renewable energy, EV adoption, and healthcare development. Encourages informed, data-driven strategic planning.
5.	Business Model (Revenue Model)	Can be extended as a subscription-based analytics platform providing advanced sector-specific insights, premium forecasting features, downloadable reports, and API-based access for enterprises or research institutions.
6.	Scalability of the Solution	Easily scalable by incorporating additional fiscal years, integrating real-time government data sources, adding predictive analytics (ML models), sector-specific deep analysis, and expanding to state budget analysis for more granular insights.

4.3 Solution Architecture

- **Input**: India Union Budget Dataset (2021–2024) – CSV

- **Process**: Import into MySQL → Perform SQL Queries & Data Cleaning → Connect to Tableau → Create Visualizations → Build Interactive Dashboard & Story

- **Output**: Interactive Dashboards + Story Scenes + Web-Embedded Insights (Flask)
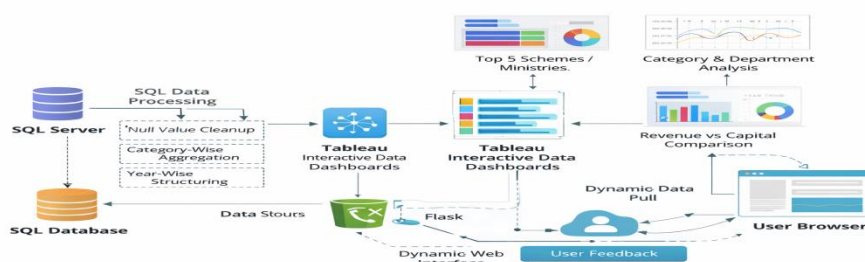
Architecture and data flow for the Union Budget Dashboard Project

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Phase	Timeline	Tools Used
Dataset Collection (Union Budget 2021–2024)	Day 1	Kaggle, CSV
Database Setup & Data Import	Days 2	MySQL Workbench
SQL Processing & Data Cleaning	Day 3	MySQL (SQL Queries)
Visualization Creation	Day 4-5	Tableau
Dashboard & Story Design	Day 6	Tableau
Web Integration & Deploymen	Day 7	Flask, HTML

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	10	3 days	01 Feb 2026	3 Feb 2026	10	03 Feb 2026
Sprint-2	11	3 days	04 Feb 2026	06 Feb 2026	11	06 Feb 2026
Sprint-3	10	3 days	07 Feb 2026	09 Feb 2026	10	09 Feb 2026
Sprint-4	08	3 days	10 Feb 2026	12 Feb 2026	08	12 Feb 2026

Sprint Burndown Chart - Union Budget Analysis Project
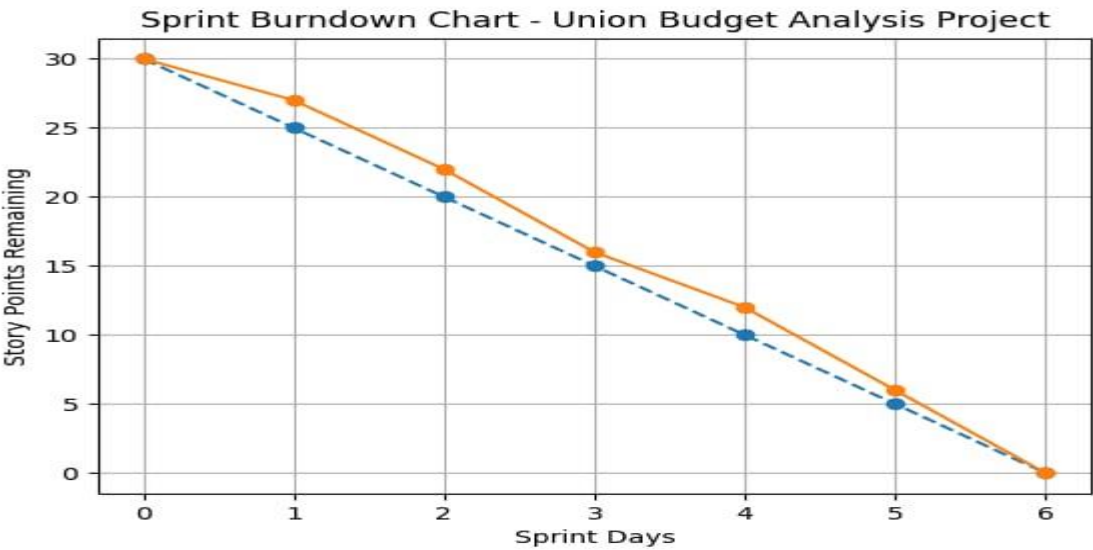
6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

- **Dashboard Loading Time**: Less than 2 seconds

| S.No	Parameter	Screenshot / Values
1.	**Data Rendered**	Category, Ministry, Scheme, Actual Revenue (2021–22), Actual Capital (2021–22), Total Budget (2021–22), Estimated Revenue (2022–23), Revised Estimates (2022–23), Budget Estimates (2023–24)
2.	**Data Preprocessing**	Removed null values, standardized column names, formatted currency values, verified data types (numeric/string), structured year-wise data
3	**Utilization of Filters**	Year Filter (2021–22, 2022–23, 2023–24), Category Filter, Ministry Filter, Scheme Filter
4	**Calculated Fields Used**	Total Investment (All Years), Revenue vs Capital Difference, Year-wise Growth %, Top 5 Ranking (Ministry/Scheme), Budget Share %
5	**Dashboard Design**	No. of Visualizations / Graphs – 7 (Top 5 Schemes, Top 5 Ministries, Category-wise Budget, Department-wise Budget, Scheme-wise Budget, Total Investment KPI, Revenue vs Capital Comparison)
6	**Story Design**	No. of Scenes – 5 (Introduction, Category Analysis, Ministry Analysis, Scheme Analysis, Conclusion & Business Insights)

7. RESULTS

7.1 Top 5 Schemes – 2021–2022

Treemap chart showing the highest funded schemes in FY 2021–22 based on total budget allocation, highlighting major government spending priorities and sector focus areas.
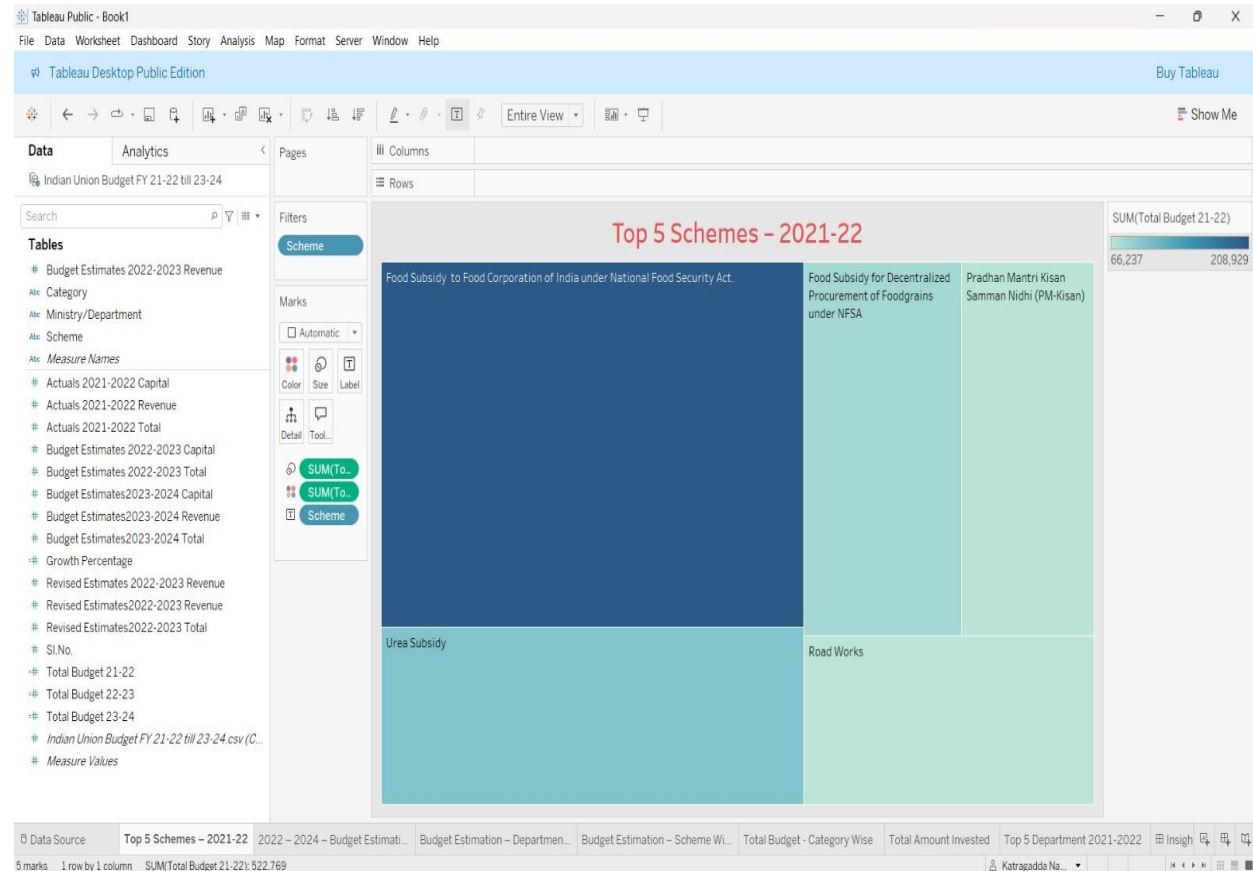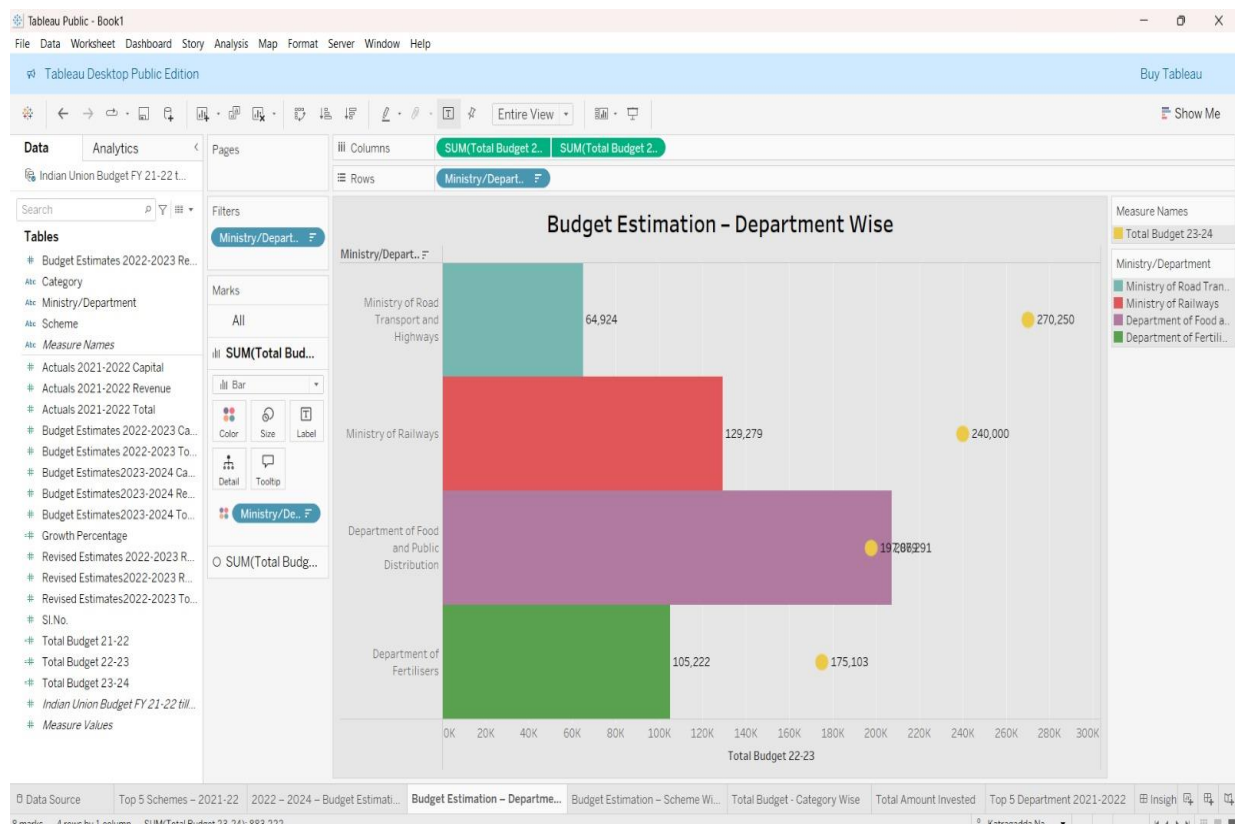
7.2 2022–2024 Budget Estimation – Category Wise

Heatmap chart comparing total budget allocations across different demand categories for FY 2022–23 and FY 2023–24, highlighting year-wise changes and identifying categories with increased or decreased funding.
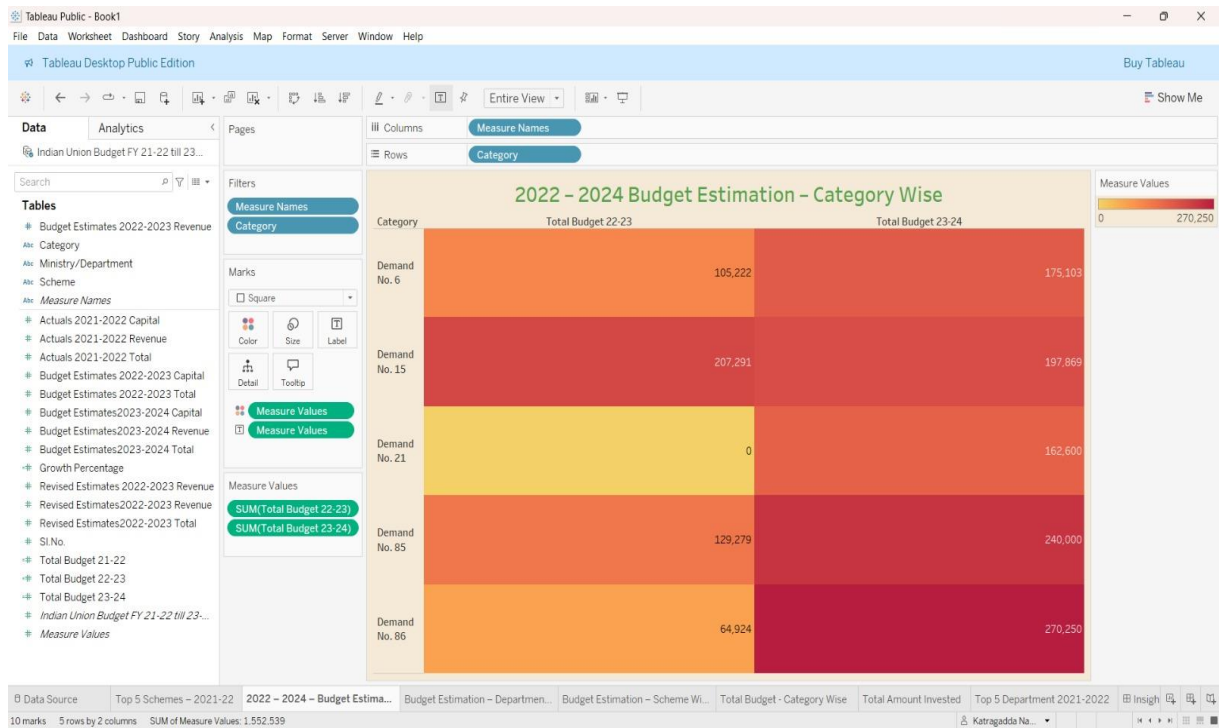

7.3 2022–2024 Budget Estimation – Department Wise

Bar chart comparing total budget allocations across major ministries/departments for FY 2022–23 and FY 2023–24, highlighting funding variations and identifying departments with increased or decreased allocations.

7.4 2022–2024 Budget Estimation – Scheme Wise

Bar chart comparing total budget allocations for major government schemes across FY 2022–23 and FY 2023–24, highlighting year-wise funding changes and identifying schemes with increased or decreased allocations
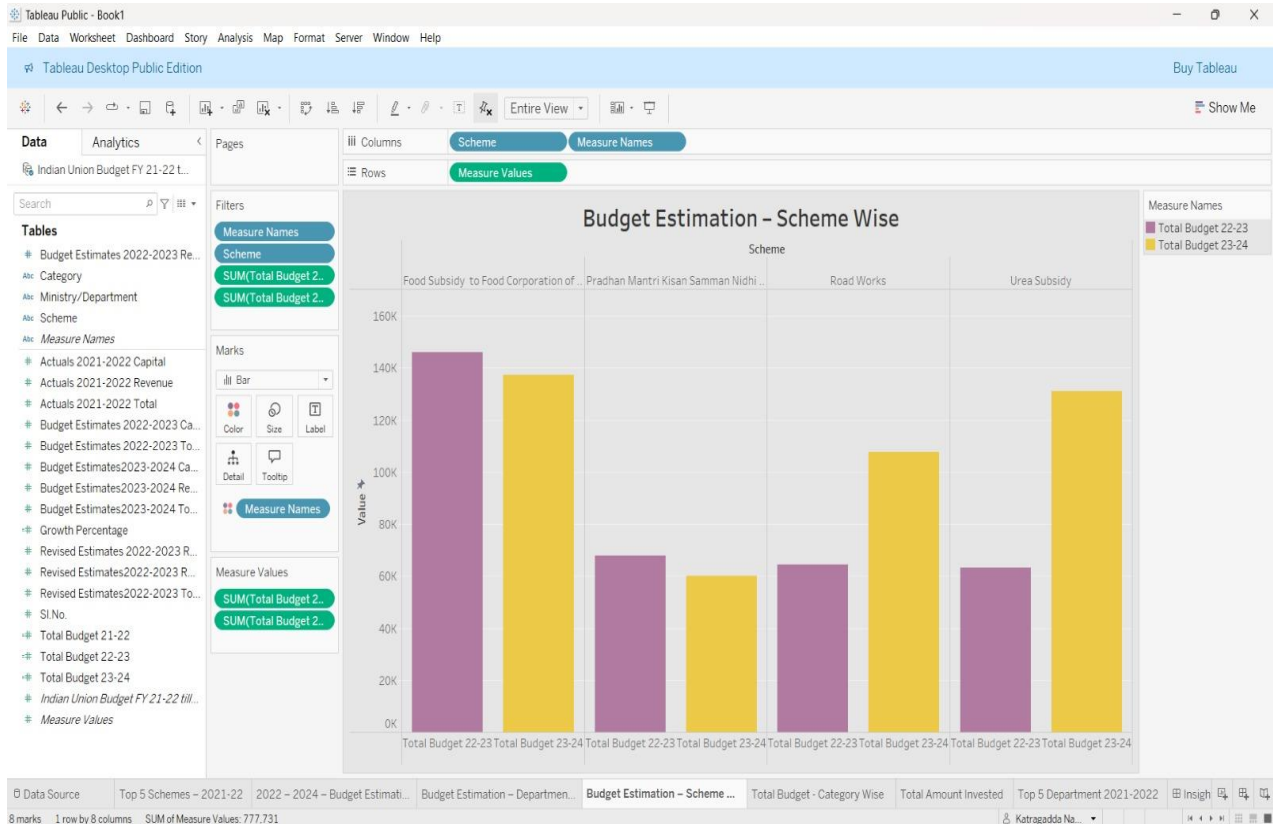

7.5 Top 5 Departments – 2021–2022

Bubble chart displaying the top five ministries/departments based on total budget allocation for FY 2021–22, highlighting the highest funded sectors and their relative spending proportions.
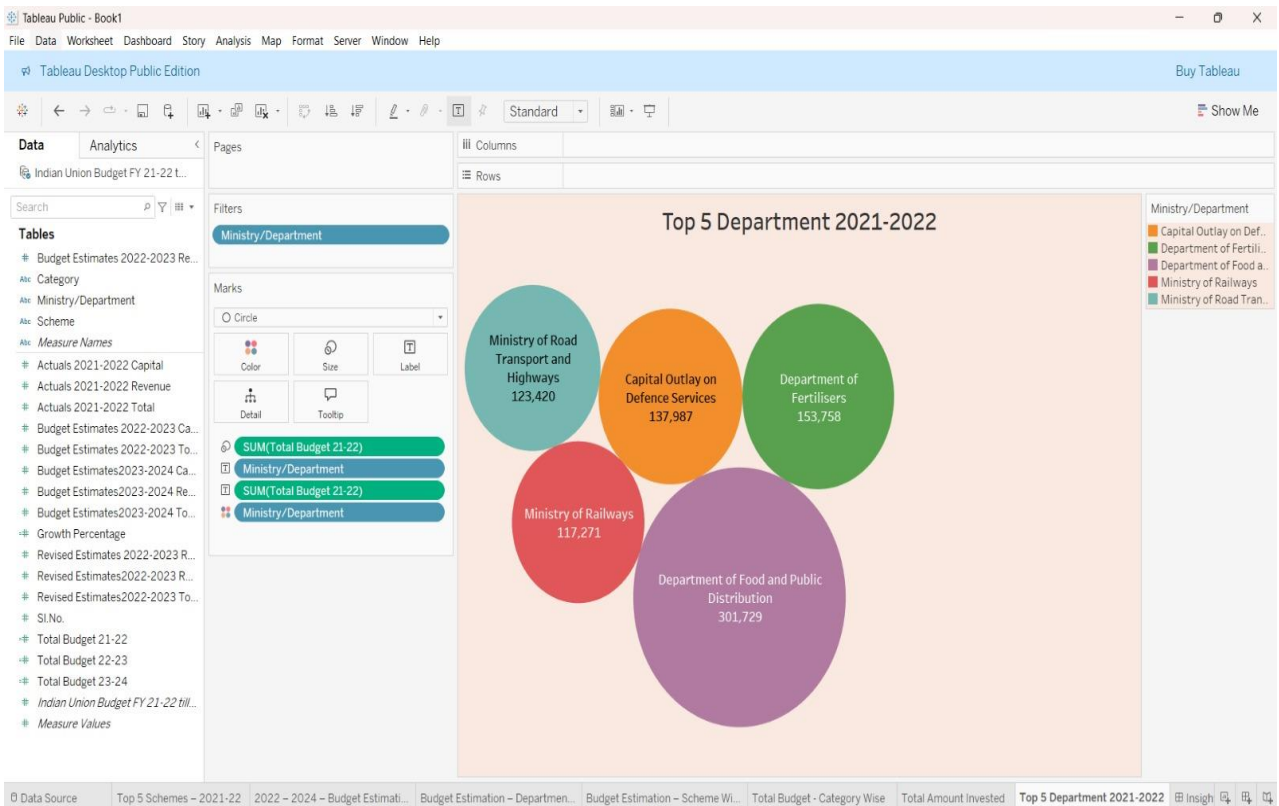
7.6 Total Amount Invested – 2021–2022

KPI text chart displaying total capital expenditure, revenue expenditure, and overall budget allocation for FY 2021–22, providing a consolidated view of government spending.
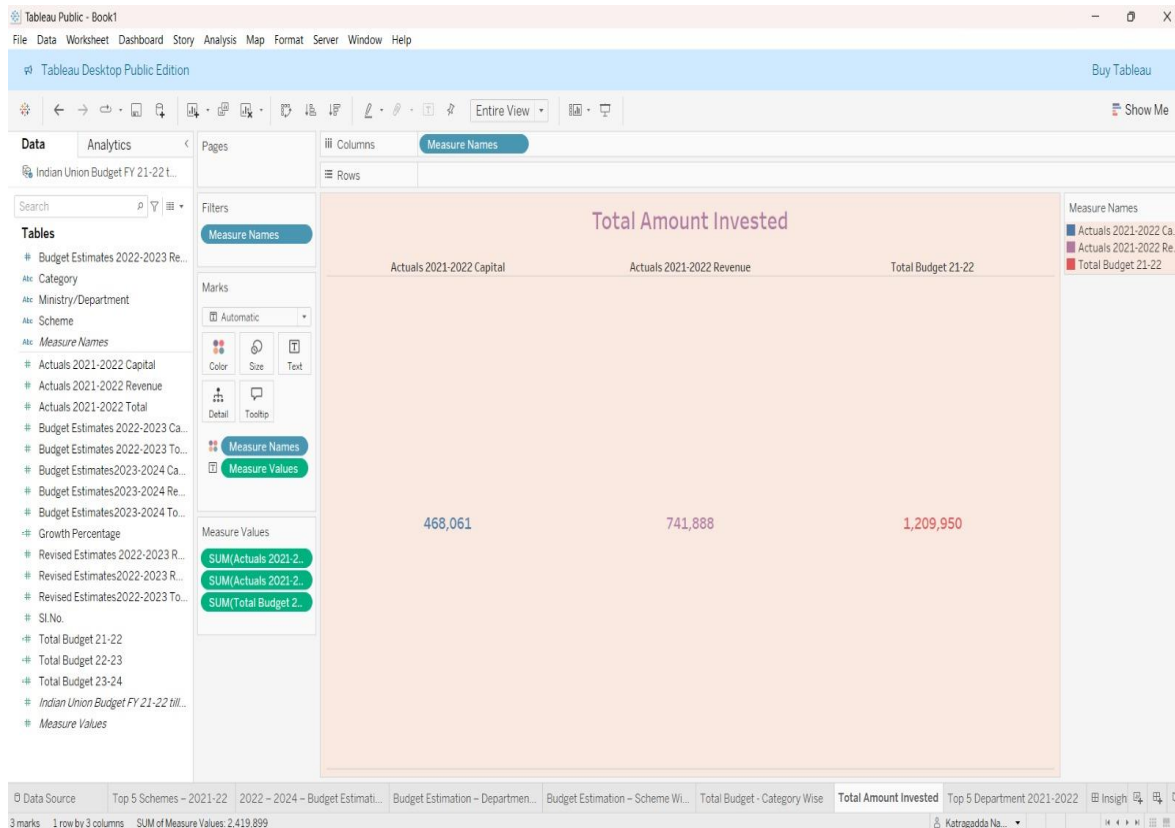
7.6 Total Budget – Category Wise (2023–2024)

Scatter (symbol) chart displaying total budget allocations across different demand categories for FY 2023-24,highlighting funding distribution and identifying categories with the highest and lowest allocations.
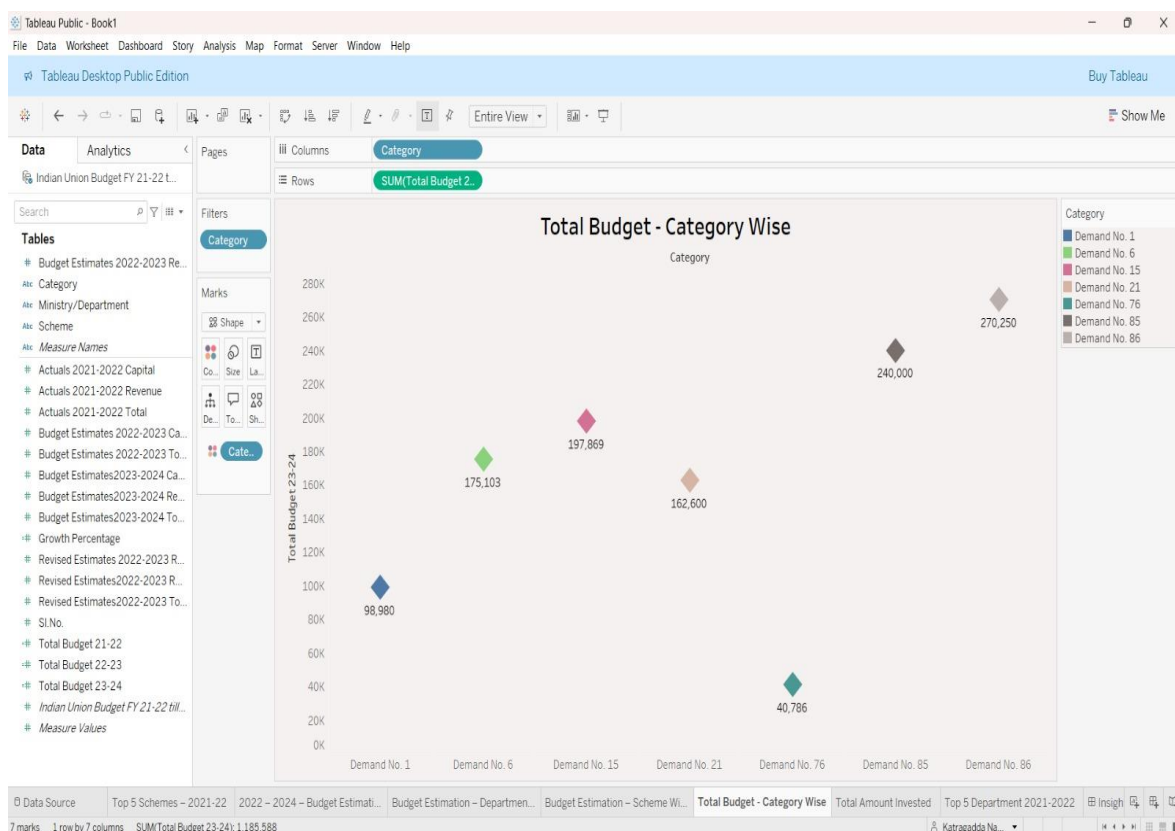
7.7 Dashboard View

Full Tableau Dashboard

7.8 Storyboard View

Story point with navigation tabs

7.8 Performance Testing

Amount of Data Loaded

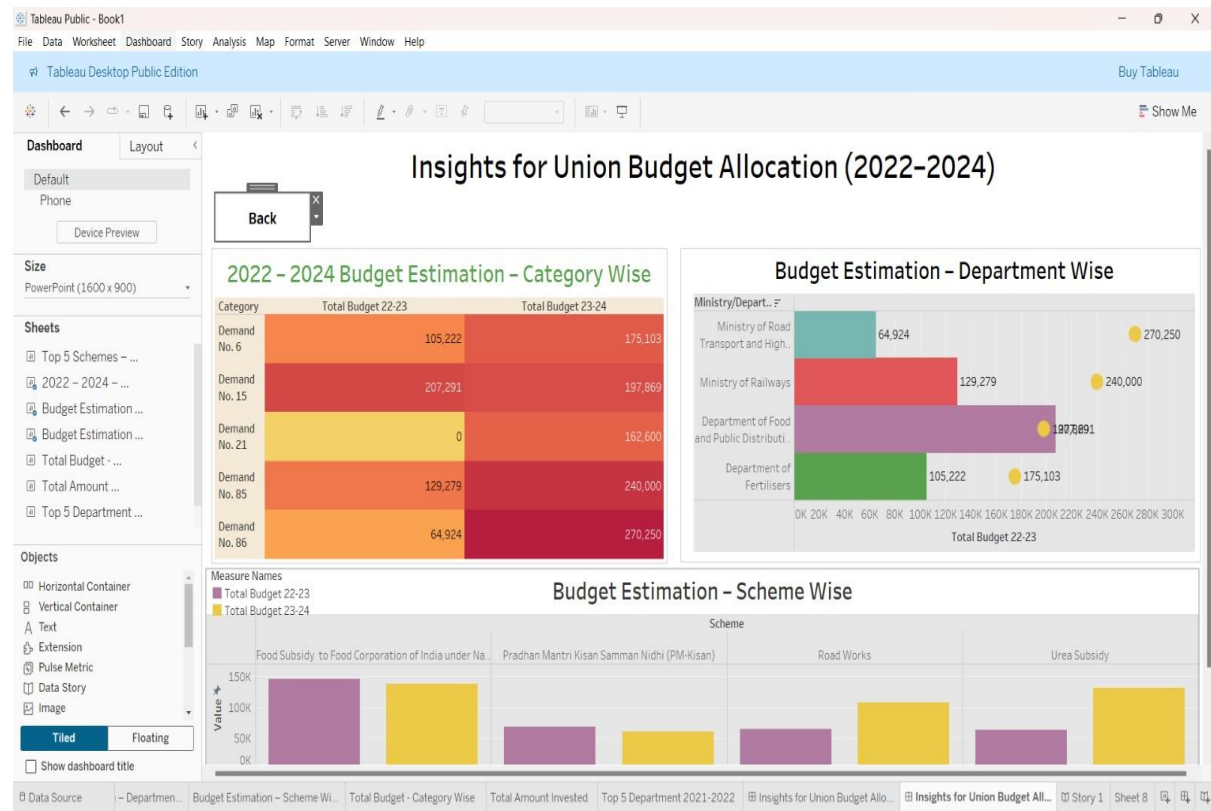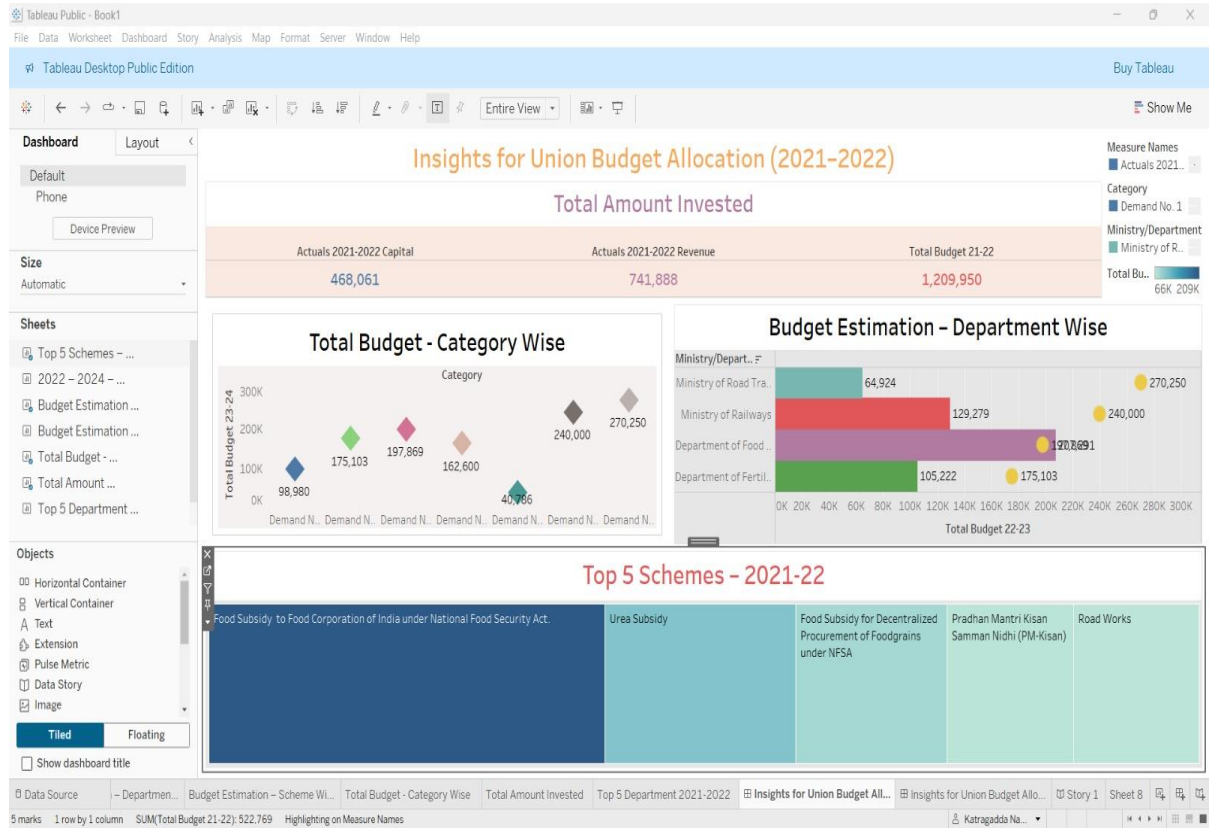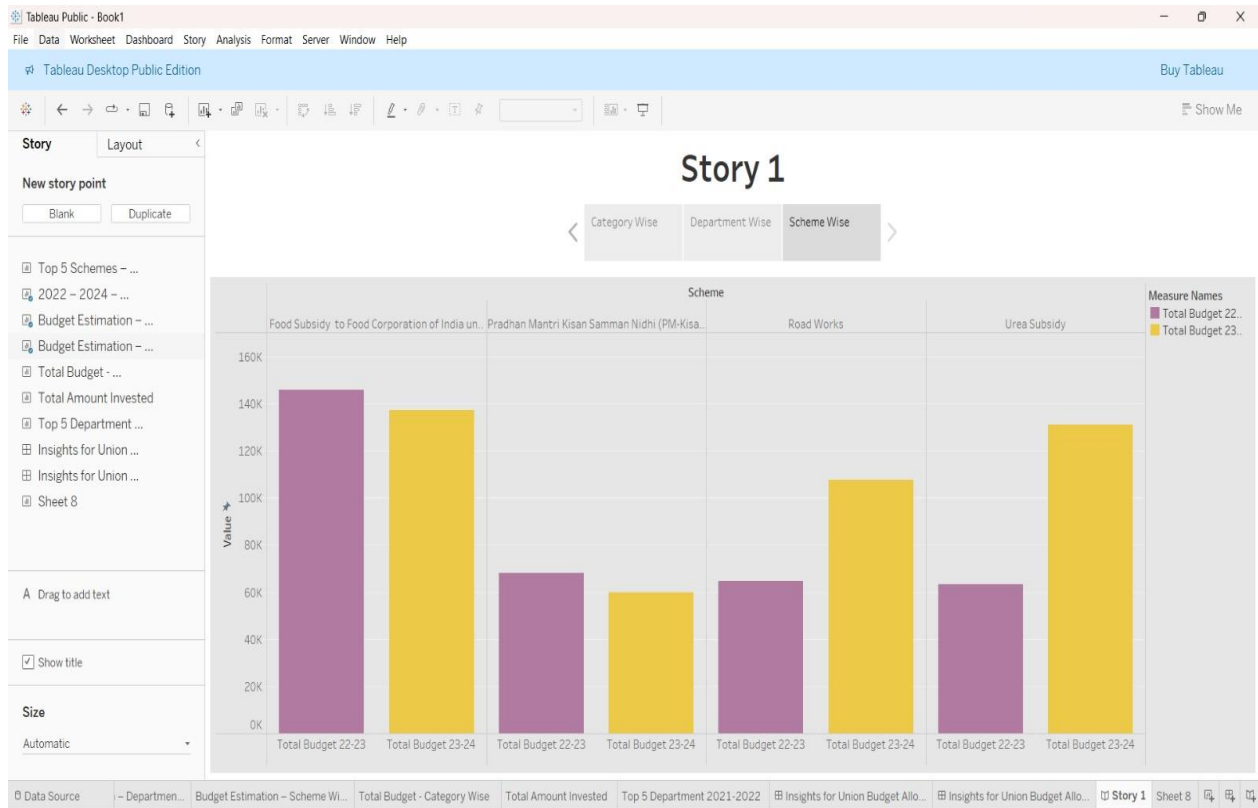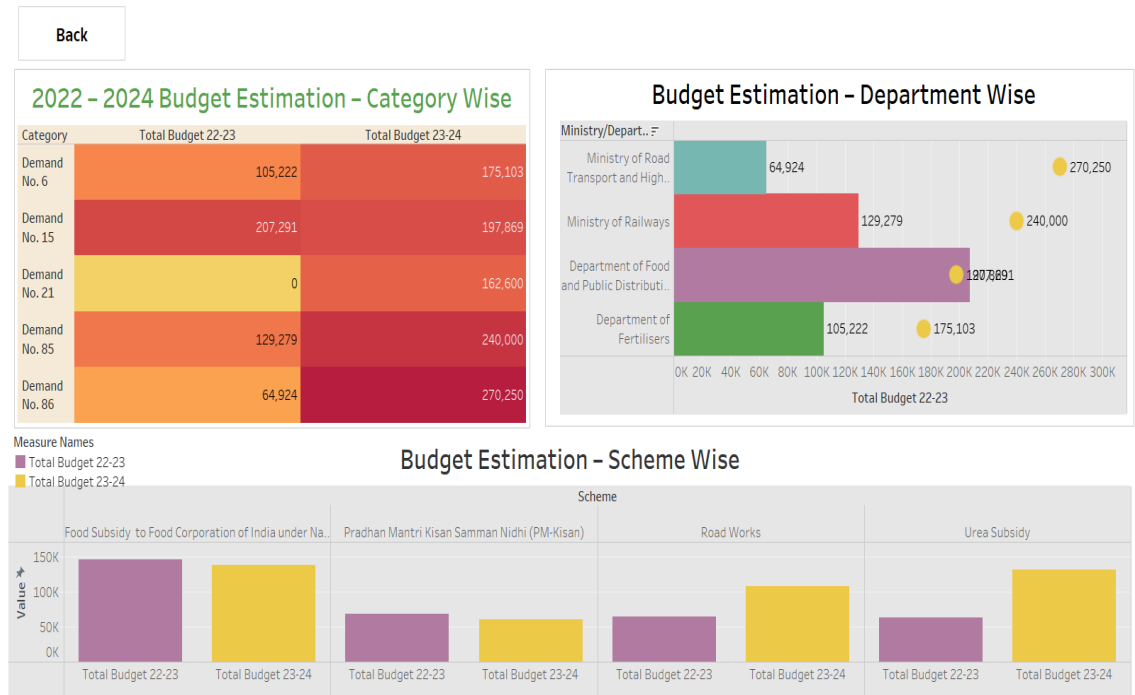**Utilization of Data Filters**

Insights for Union Budget Allocation (2022–2024)

Back

2022 – 2024 Budget Estimation – Category Wise

Category	Total Budget 22-23	Total Budget 23-24
Demand No. 6	105,222	175,103
Demand No. 15	207,291	197,869
Demand No. 21	0	162,600
Demand No. 85	129,279	240,000
Demand No. 86	64,924	270,250

Budget Estimation – Department Wise

Ministry/Depart..

Ministry/Department		
Ministry of Road Transport and High..	64,924	270,250
Ministry of Railways	129,279	240,000
Department of Food and Public Distributi..	207,891	197,869
Department of Fertilisers	105,222	175,103

0K 20K 40K 60K 80K 100K 120K 140K 160K 180K 200K 220K 240K 260K 280K 300K
Total Budget 22-23

Measure Names
■ Total Budget 22-23
■ Total Budget 23-24

Budget Estimation – Scheme Wise

Scheme

Food Subsidy to Food Corporation of India under Na..	Pradhan Mantri Kisan Samman Nidhi (PM-Kisan)	Road Works	Urea Subsidy
Total Budget 22-23 / Total Budget 23-24	Total Budget 22-23 / Total Budget 23-24	Total Budget 22-23 / Total Budget 23-24	Total Budget 22-23 / Total Budget 23-24

No of Calculation Fields

Growth Percentage   ✕

([Total Budget 23-24] – [Total Budget 22-23])
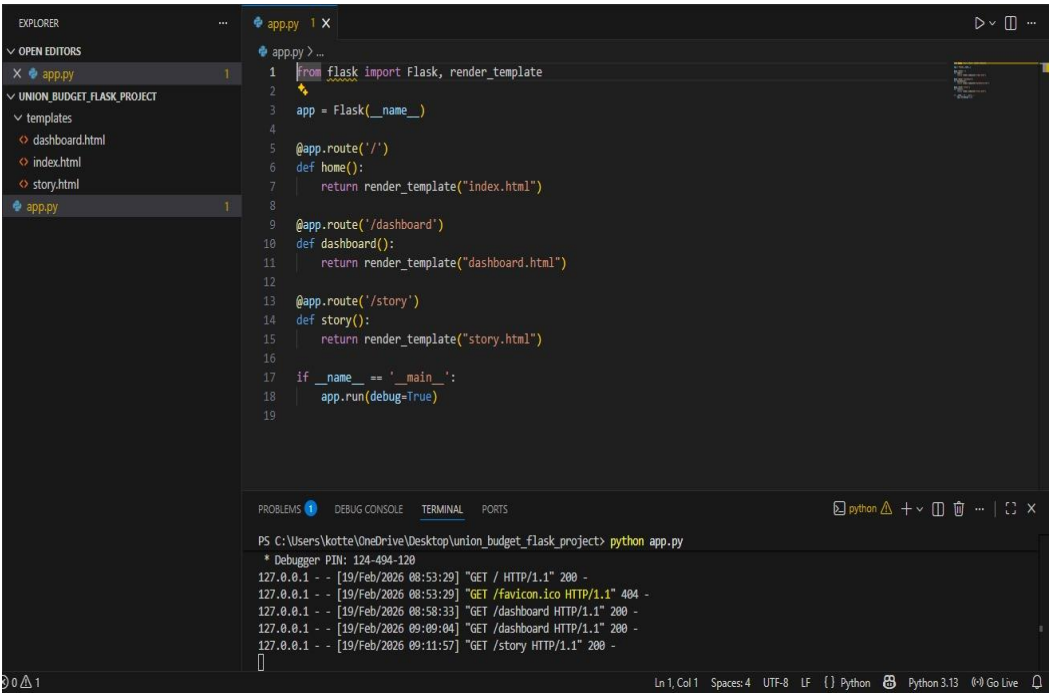/
[Total Budget 22-23]

The calculation is valid.   Apply   OK

No of Visualizations/ Graphs

- Total Amount Invested
- Total Budget- Category Wise
- Top 5 Department/Ministry Wise for 2021-2022
- Top 5 Schemes 2021-2022
- 2022 – 2024 – Budget Estimation – Category Wise
- 2022 – 2024 – Budget Estimation – Department Wise
- 2022 – 2024 – Budget Estimation – Scheme Wise

Web integration

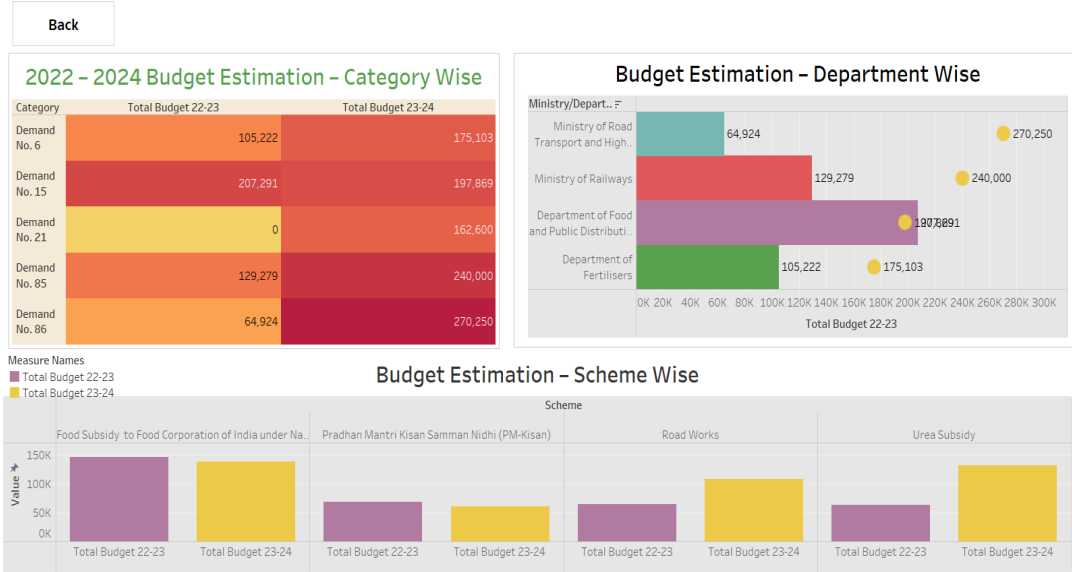**Dashboard and Story embed with UI With Flask**

```python
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def home():
    return render_template("index.html")

@app.route('/dashboard')
def dashboard():
    return render_template("dashboard.html")

@app.route('/story')
def story():
    return render_template("story.html")

if __name__ == '__main__':
    app.run(debug=True)
```

```
PS C:\Users\kotte\OneDrive\Desktop\union_budget_flask_project> python app.py
 * Debugger PIN: 124-494-120
127.0.0.1 - - [19/Feb/2026 08:53:29] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [19/Feb/2026 08:53:29] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [19/Feb/2026 08:58:33] "GET /dashboard HTTP/1.1" 200 -
127.0.0.1 - - [19/Feb/2026 09:09:04] "GET /dashboard HTTP/1.1" 200 -
127.0.0.1 - - [19/Feb/2026 09:11:57] "GET /story HTTP/1.1" 200 -
```

India Union Budget Analysis (2021–2024)

Open Dashboard

Open Story

Insights for Union Budget Allocation (2022–2024)

Back

2022 – 2024 Budget Estimation – Category Wise

Category	Total Budget 22-23	Total Budget 23-24
Demand No. 6	105,222	175,103
Demand No. 15	207,291	197,869
Demand No. 21	0	162,600
Demand No. 85	129,279	240,000
Demand No. 86	64,924	270,250

Measure Names
- Total Budget 22-23
- Total Budget 23-24

Budget Estimation – Department Wise

Ministry/Depart..	Total Budget 22-23	
Ministry of Road Transport and High..	64,924	270,250
Ministry of Railways	129,279	240,000
Department of Food and Public Distributi..	207,891 / 197,869	
Department of Fertilisers	105,222	175,103

Total Budget 22-23

Budget Estimation – Scheme Wise

Scheme

	Food Subsidy to Food Corporation of India under Na..	Pradhan Mantri Kisan Samman Nidhi (PM-Kisan)	Road Works	Urea Subsidy
Total Budget 22-23 / Total Budget 23-24				

Story 1

PROJECT DEMO VEDIO LINKS:

https://drive.google.com/file/d/1XDTJctPviG_vQaTBEEYeP8DDPqHtWwBX/view?usp=drivesdk
https://drive.google.com/file/d/173qDa5-Mi9MxwbhqodUfy7wetAp-yG-y/view?usp=drivesdk

8 ADVANTAGES & DISADVANTAGES

Advantages

- Interactive and dynamic dashboards for Union Budget analysis

- Easy comparison of fiscal years (2021–2024)

- Clear visualization of ministry-wise and scheme-wise allocations

- Revenue vs Capital expenditure analysis made simple

- Fast insights using Tableau without heavy programming

Disadvantages

- Limited customization outside Tableau environment

- Tableau Public has sharing and data privacy limitation

- No built-in advanced predictive analytics (requires additional ML integration)

- Performance may reduce with very large datasets

9 CONCLUSION

The Tableau-based Union Budget Analysis system successfully transforms complex government financial data (2021–2024) into clear, interactive visual insights, enabling better understanding of budget trends, ministry-wise allocations, and revenue vs capital expenditure patterns to support informed strategic and investment decisions.

10 FUTURE SCOPE

- Integration with live government open-data APIs

- Budget forecasting and predictive analytics using Python / Machine Learning

- Enhanced mobile-responsive dashboard design

- Advanced export functionality (PDF/Excel reports)

- Integration of additional fiscal years for long-term trend analysis

- Real-time policy impact comparison dashboards

---

11 APPENDIX

Source Code
Data processing performed using MySQL (SQL Queries) and visualization developed using Tableau's drag-and-drop interface. Web integration implemented using Flask and HTML

Dataset Link

Dataset: India Union Budget (FY 2021–2022 to FY 2023–2024) – Kaggle CSV Dataset

https://www.kaggle.com/datasets/prasenjitsharma/indian-union-budget-fy-21-22-till-23-24

TABLEAU PUBLIC DASHBOARD AND STORY LINKS:

DASHBOARD LINK:

https://public.tableau.com/views/Book1_17714001947740/InsightsforUnionBudgetAllocation20222024?:language=en-US&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

STORY LINK:

https://public.tableau.com/views/Book1_17714001947740/Story1?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link