DATA ANALYTICS WITH TABLEAU

INTERNSHIP REPORT

ON

PROJECT NAME : ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data

TEAM ID : LTVIP2025TMID51129

COLLEGE : Anil Neerukonda Institute Of Technological Sciences (Anits)

1. INTRODUCTION

1.1 Project Overview

The toy manufacturing industry plays a pivotal role in shaping childhood experiences and driving a significant segment of the consumer market. With an ever-growing variety of toys and a constantly evolving demand pattern, analyzing the industry's performance across regions and years is essential for making informed business decisions.

ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data is a data analytics and visualization project that aims to uncover deep insights into toy manufacturing trends in the United States. Leveraging Tableau for interactive visualizations and integrating structured datasets through a backend powered by Python (Flask) and MySQL, the project provides comprehensive, visual-driven insights. These insights span across dimensions like annual trends, regional distributions, and participation levels of states over time.

Through this project, stakeholders can identify peak manufacturing years, region-wise dominance, consumer-driven shifts, and strategic patterns that influence production planning and marketing strategies.

1.2 Purpose

The primary purpose of the project is to harness the power of data visualization tools to better understand the trends and dynamics of the toy manufacturing industry. Using Tableau as the core visualization engine, this project:

- Helps identify historical and seasonal trends in toy manufacturing.
- Reveals region-wise participation and performance using index-based comparisons.
- Aids in comparing performance across states, years, and index metrics.
- Supports data-backed decision-making for manufacturers, analysts, and policymakers.

Additionally, this project aims to provide an end-to-end data solution—starting from data collection and database design to dashboard creation, story building, and deployment on the web through Flask. The solution is designed to be scalable, visually intuitive, and capable of driving strategic insights in the manufacturing domain.

2. IDEATION PHASE

2.1 Problem Statement

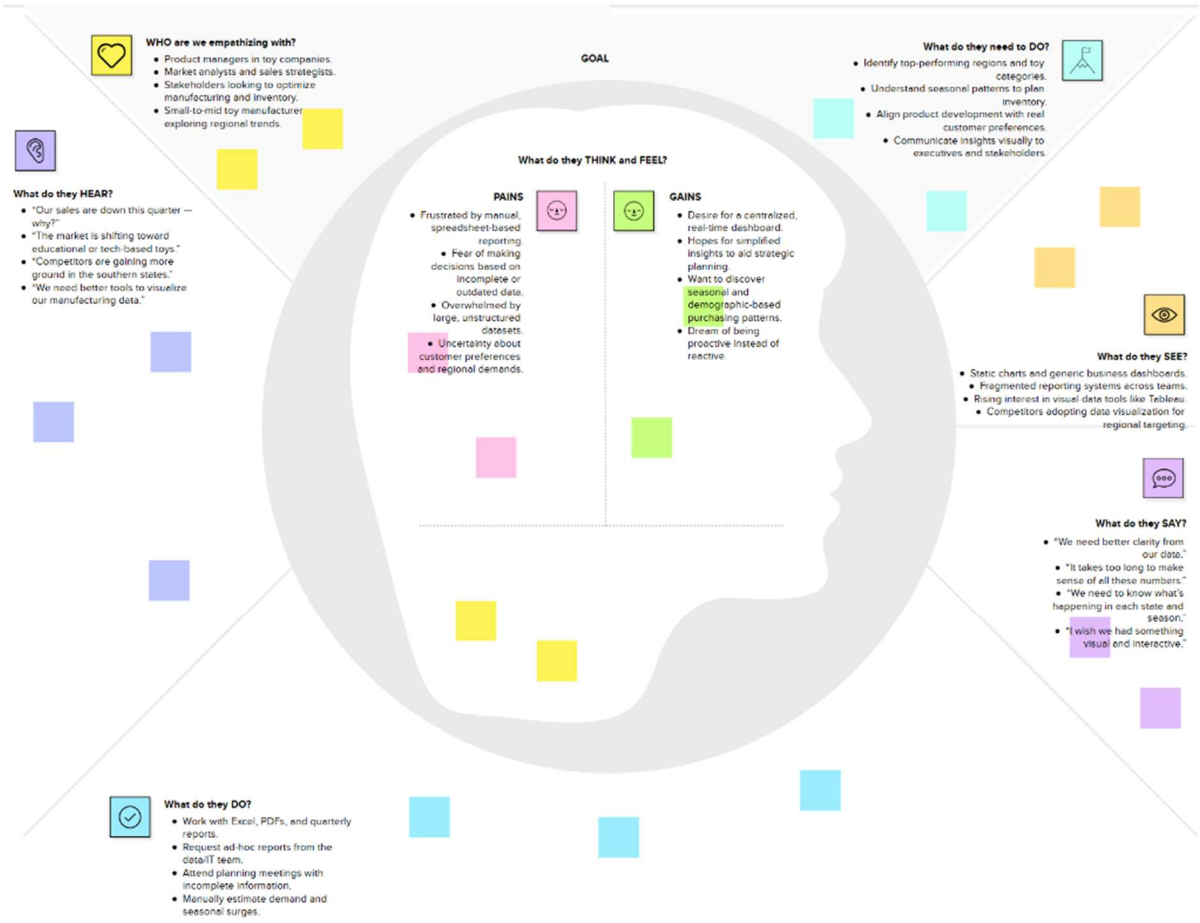
PS1:

PS2:

Problem Statement (PS)	**I am (Customer)**	**I'm trying to**	**But**	**Because**	**Which makes me feel**
PS-1	I am a product manager at a toy manufacturing company	I am trying to understand production trends, seasonal demands, and regional performance through data	But I find it difficult to interpret raw reports and spreadsheets effectively	Because the data is scattered, non-visual, and lacks real-time insights	Which makes me feel frustrated, uncertain, and less confident in making strategic decisions

PS-2	I am a market analyst working in the toy industry	I am trying to identify emerging trends and consumer preferences across different demographics and seasons	But I struggle to get actionable insights from traditional tools and disconnected data sources	Because there is no interactive or consolidated visualization platform tailored to our domain	Which makes me feel overwhelmed, reactive instead of proactive, and unsure if I'm making the right recommendations

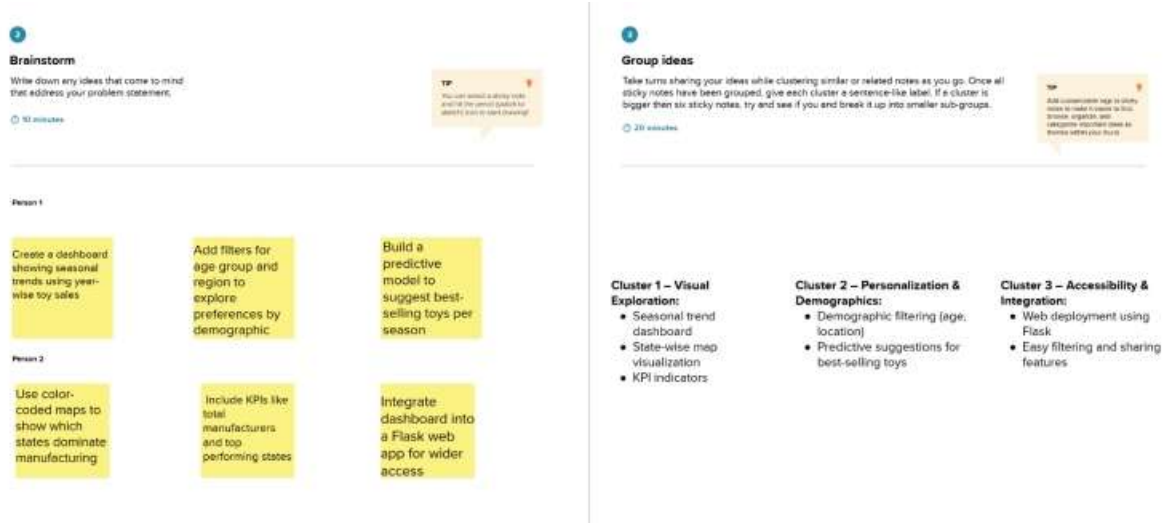
2.2 Empathy Map Canvas



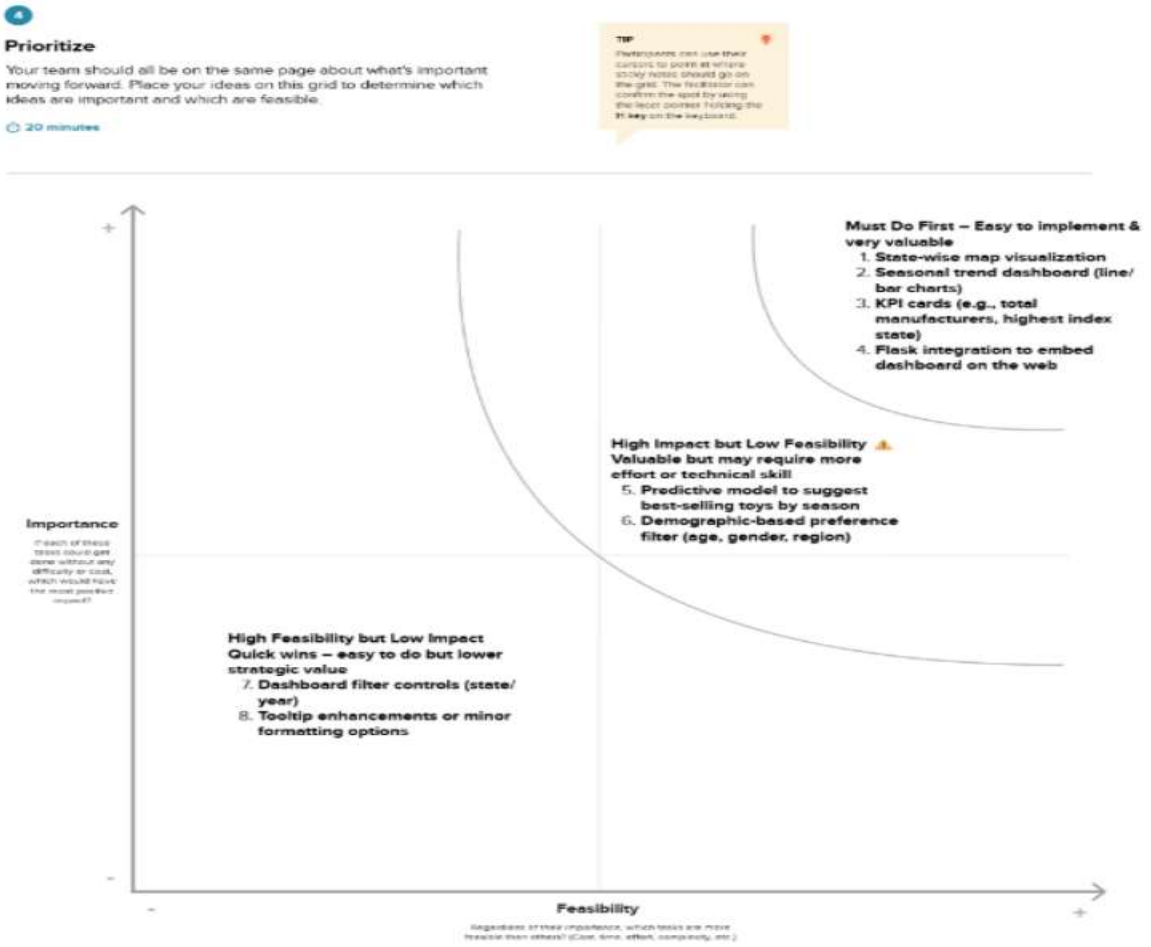
2.3 Brainstorming

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

Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map

CUSTOMER JOURNEY MAP TABLE

SCENARIO: Browsing, booking, attending, and rating a local city tour	Entice How does someone initially become aware of this process?	Enter What do people experience as they begin the process?	Engage In the core moments in the process, what happens?	Exit What do people typically experience as the process finishes?	Extend What happens after the experience is over?
Steps What does the person (or group) typically experience?	Users become aware of Tableau dashboard while planning strategic review	User opens the dashboard via Flask or Tableau Public	Users apply filters, explore charts, maps, KPIs	User exports/downloads insights or takes notes	Users apply insights in decision-making; recommend the tool to others
Interactions What interactions do they have at each step along the way? **People:** Who do they see or talk to? **Places:** Where are they? **Things:** What digital touchpoints or physical objects would they use?	Browsing internal portal, shared links, or email alerts; May ask colleagues for tools	Interacts with Tableau interface; sits at work desk or home setup	Engages with pie charts, maps, line charts; clicks filters for state/year	Discusses findings with colleagues or managers; prepares reports	Management uses insights for planning; may request updated versions
Goals & motivations At each step, what is a person's primary goal or motivation? ("Help me..." or "Help me avoid...")	Help me find a better way to analyze toy data visually	Help me easily explore the toy manufacturing data by year/state	Help me discover trends, patterns, and outliers quickly	Help me wrap up analysis with clear insights	Help me use the insights for better decisions and planning next steps
Positive moments What steps does a typical person find enjoyable, productive, fun, motivating, delightful, or exciting?	Seeing a beautiful dashboard preview; realizing it's interactive	Fast loading and clear layout of dashboard	Discovering state with highest index; seeing seasonal trends visually	KPI cards summarizing info; exporting insights easily	Reusing dashboard; applying insights into marketing or supply chain
Negative moments What steps does a typical person find frustrating, confusing, angering, costly, or time-consuming?	May ignore tool due to dashboard fatigue; not knowing its value	Initial confusion about filters or data meaning	Overwhelmed by too many visuals if untrained	Not knowing where export/download is	Data may become outdated if not maintained regularly
Areas of opportunity How might we make each step better? What ideas do we have? What have others suggested?	Promote dashboard via internal newsletter or training session	Add tooltips, filter descriptions, and basic onboarding	Simplify layout; allow user to choose "basic" or "advanced" view	Add download/export icon and summary panel	Automate data refresh; email monthly insights; collect user feedback

3.2 Solution Requirement

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Integration	Extract, clean, and store toy manufacturing data in a database
FR-2	SQL Backend	Perform SQL operations for filtering and querying data
FR-3	Interactive Dashboard	Create visualizations using Tableau (bar, pie, map, line, histogram)

FR-4	Story Creation	Develop multi-scene Tableau story for business insights
FR-5	Web Deployment	Integrate Tableau dashboard into a Flask web application
FR-6	Export Options	Allow users to download or capture visual insights

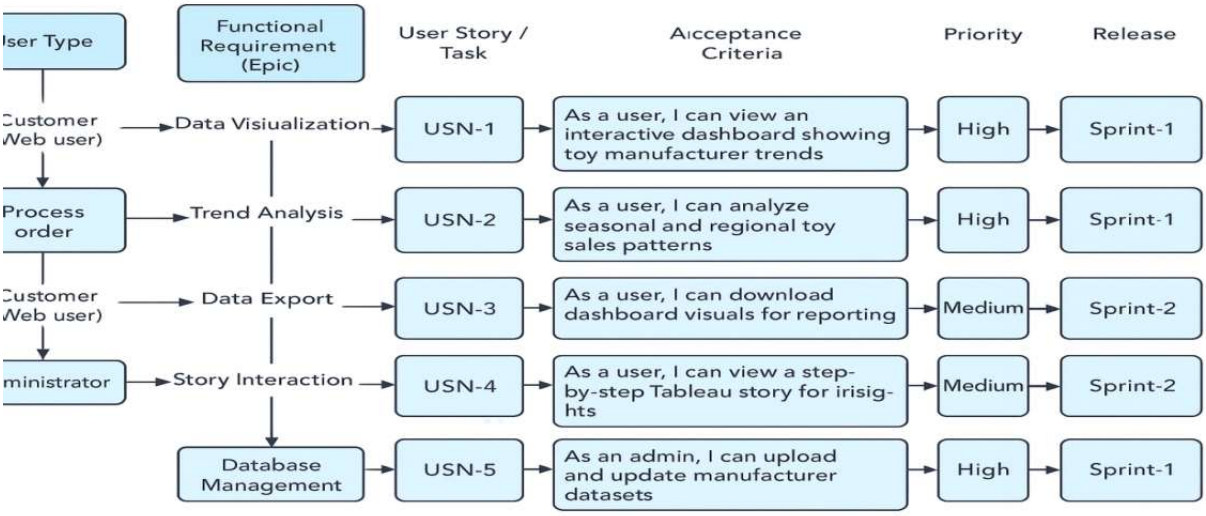
Non-functional Requirements:

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

FR No.	**Non-Functional Requirement**	**Description**
NFR-1	Usability	The dashboard interface is user-friendly and intuitive for non-technical users.
NFR-2	Security	User and data access is secure via role-based access and database controls.
NFR-3	Reliability	The solution consistently loads data and charts without crashes or errors.
NFR-4	Performance	Dashboard loads and visualizations respond quickly even with larger datasets.
NFR-5	Availability	Available 24/7 through web deployment for anytime access to insights.
NFR-6	Scalability	System can scale to include more data (e.g., global toy markets or new KPIs).

3.3 Data Flow Diagram

Data Flow Diagrams:



3.4 Technology Stack

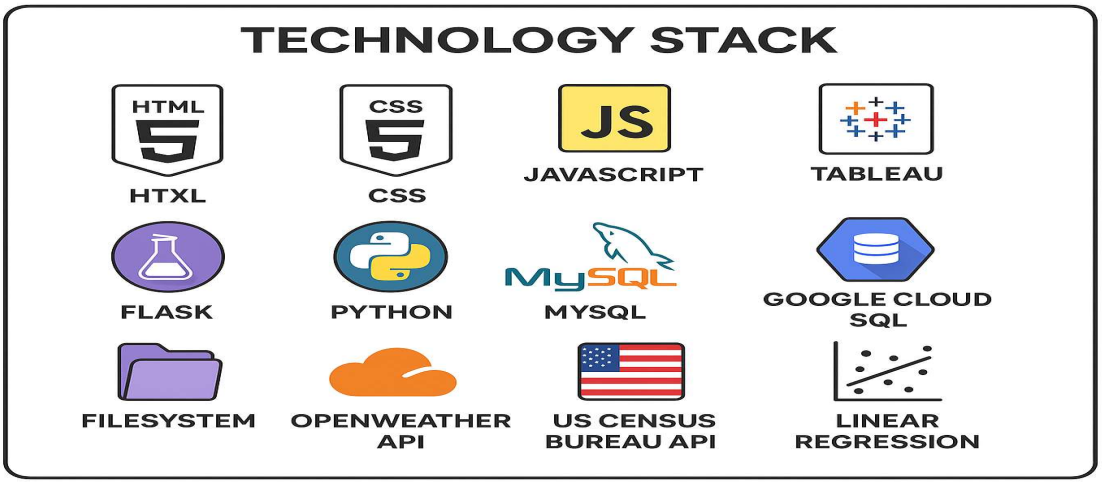


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Web UI to interact with dashboard and filters	HTML, CSS, JavaScript, Tableau Web View
2	Application Logic-1	Backend to fetch and process data	Python (Flask Framework)
3	Application Logic-2	Dashboard & story logic hosted in Tableau	Tableau
4	Application Logic-3	Web server handling routing and rendering	Flask
5	Database	Structured data storage for manufacturers & index	MySQL
6	Cloud Database	Optional for remote hosting of data	Google Cloud SQL (MySQL)
7	File Storage	Storage of dashboard exports, CSVs	Local Filesystem / Google Drive
8	External API-1	Future integration for forecasting or weather-based insights	OpenWeather API (Optional)
9	External API-2	For demographic insights or census data	US Census Bureau API (Optional)
10	Machine Learning Model	Optional for trend prediction	Linear Regression / Time Series (planned extension)

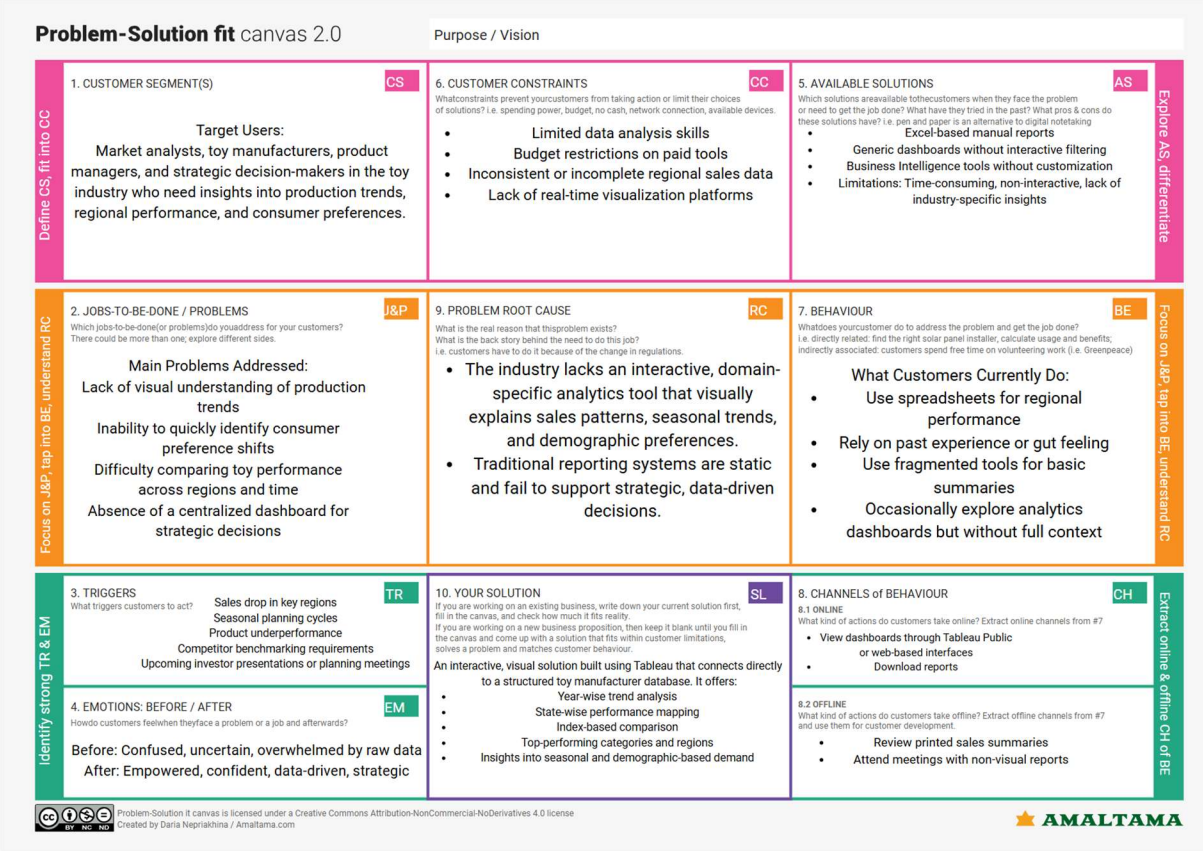
11	Infrastructure (Server / Cloud)	Deployment via local server and optional cloud hosting	Flask on Localhost / Google Cloud App Engine

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Flask, MySQL, Python, Tableau Public	Python, Flask, MySQL, Tableau
2	Security Implementations	Password protection for database, Flask route controls	SHA-256, Access Controls, MySQL User Privileges
3	Scalable Architecture	Separation of dashboard, backend, and DB makes it scalable	3-tier architecture
4	Availability	Can be deployed on cloud for 24/7 access	Google Cloud / Web Host with Auto Restart
5	Performance	Optimized queries, cached results, efficient dashboard rendering	SQL Indexing, Tableau extract, Flask optimization

4. PROJECT DESIGN

4.1 Problem Solution Fit



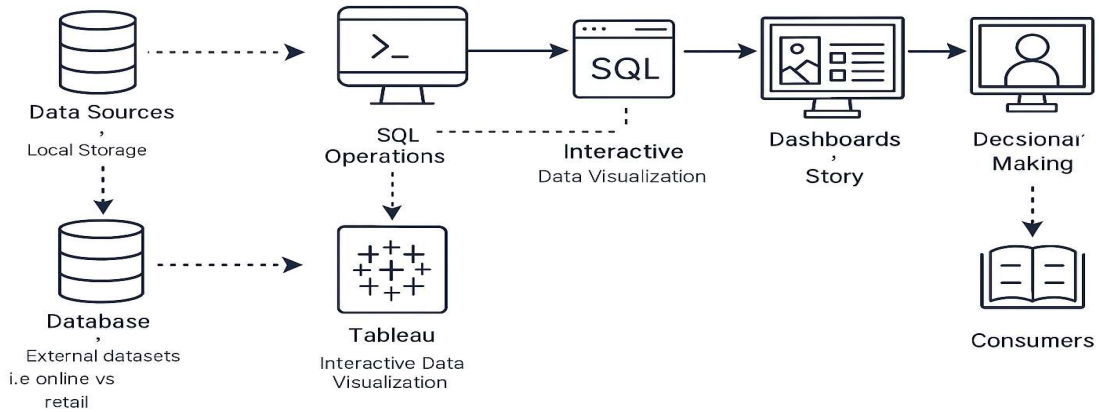
4.2 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Toy manufacturers and stakeholders lack interactive tools to analyze market trends, seasonal patterns, regional performance, and consumer preferences, making strategic planning and decision-making inefficient and reactive.
2.	Idea / Solution description	The project proposes a Tableau-based interactive analytics dashboard

		connected to a backend SQL database. It visualizes toy manufacturer data through line charts, maps, pie charts, histograms, and KPIs. Insights include trends by year, regional performance, top states, and index-based evaluations. It is embedded into a Flask-based web interface and supported with full documentation and demo video.
3.	Novelty / Uniqueness	Unlike traditional static reports, this solution integrates live SQL-based data with dynamic Tableau visualizations and supports scenario-based decision-making. It provides a centralized, visual storytelling platform tailored for the toy manufacturing domain, with scenes covering seasonality, demographics, and regional comparison.
4.	Social Impact / Customer Satisfaction	Helps manufacturers better meet consumer demand by aligning products with preferences and seasons, leading to reduced waste, optimized supply chain, and increased customer satisfaction. Decision-makers gain confidence through data-driven insights and clear visual narratives.

5.	Business Model (Revenue Model)	The solution can be licensed as a data analytics service to manufacturers or industry associations. Alternatively, a freemium model could be adopted, offering basic insights for free and charging for advanced features like prediction, scenario simulation, or API access.
6.	Scalability of the Solution	The dashboard is scalable to accommodate additional datasets (e.g., global markets, online vs retail data), new features (forecasting, ML-powered trends), and integration with business ERP systems. It can serve multiple industries beyond toys by modifying schema and visual layers.

4.3 Solution Architecture



ToyCraft Ta les Tableu's Vision into Toy Manufacturer Data

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection & Preprocessing	USN-1	As a user, I can collect and load toy manufacturing data into the database	2	High	G. Lokesh Naidu
Sprint-1	Data Preprocessing	USN-2	As a user, I can clean, handle missing values, and structure the data	3	High	G. Lokesh Naidu
Sprint-2	SQL & Tableau Integration	USN-3	As a user, I can perform SQL operations and connect the database to Tableau	3	High	G. Lokesh Naidu
Sprint-2	Data Visualization	USN-4	As a user, I can create visualizations like bar charts, pie charts, maps, etc.	5	High	G. Lokesh Naidu
Sprint-2	Dashboard	USN-5	As a user, I can create an interactive dashboard and build a story in Tableau	4	High	G. Lokesh Naidu
Sprint-2	Story	USN-6	As a user, I can integrate the dashboard with a Flask web interface	4	Medium	G. Lokesh Naidu
Sprint-2	Documentation & Video	USN-7	As a user, I can prepare a demo video and full documentation of the project	3	Medium	G. Lokesh Naidu

Project Tracker, Velocity & Burndown Chart:

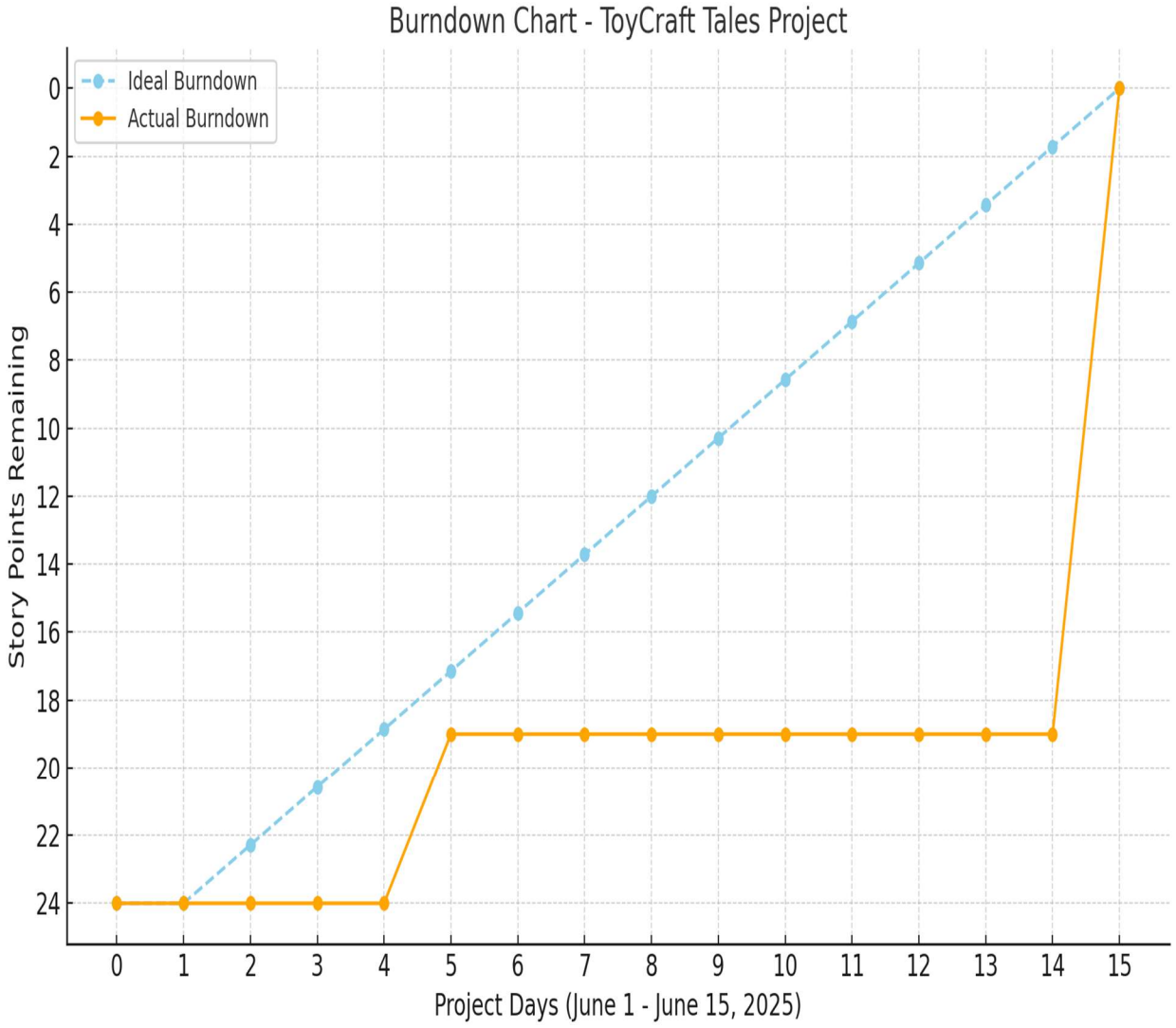
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	5 Days	01 June 2025	05 June 2025	5	05 June 2025
Sprint-2	19	10 Days	06 June 2025	15 June 2025	19	15 June 2025

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)

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

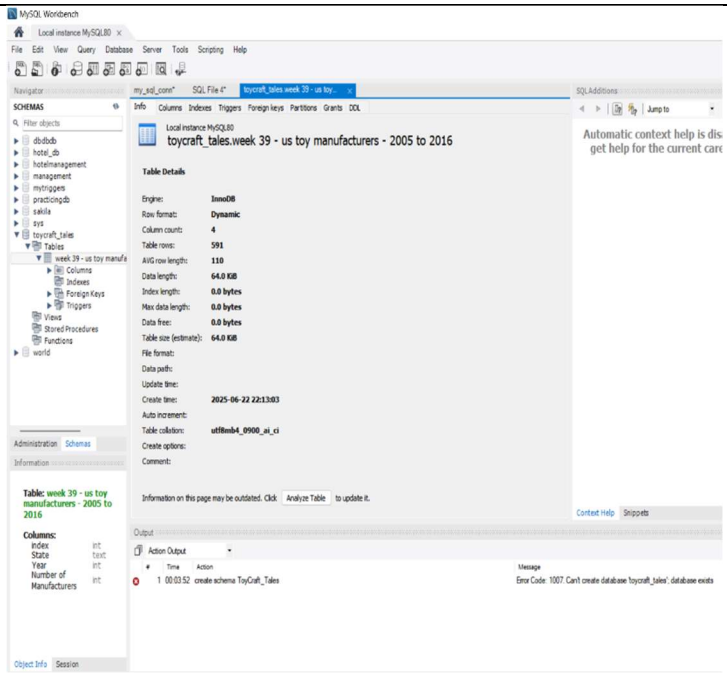
Burndown Chart:

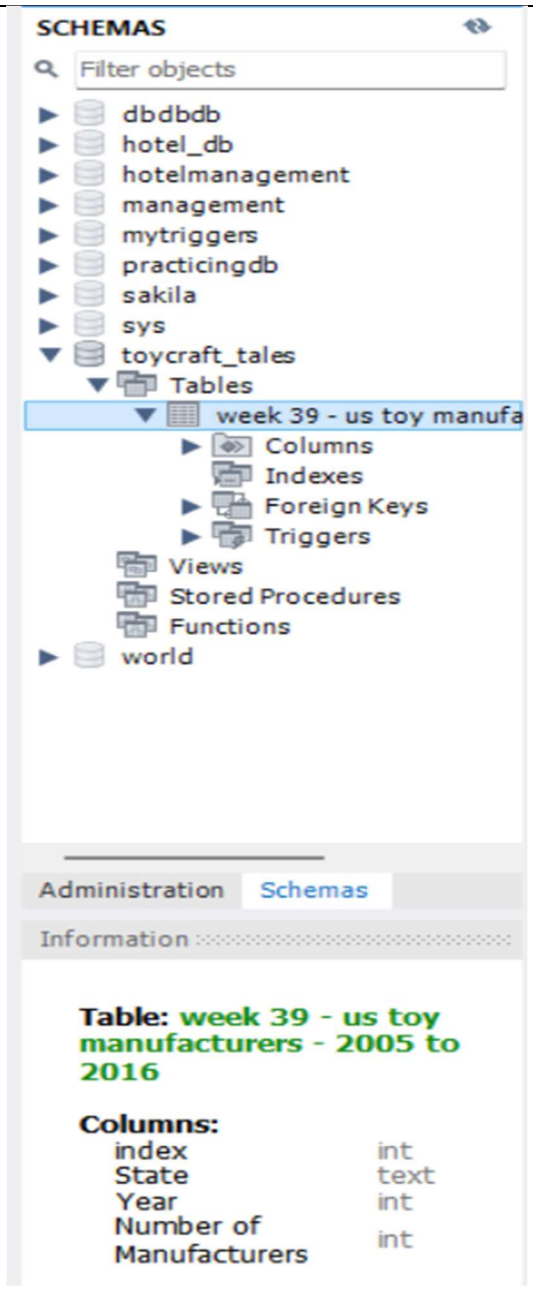
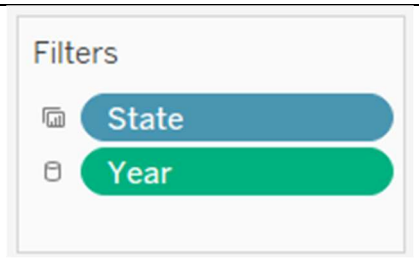
A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

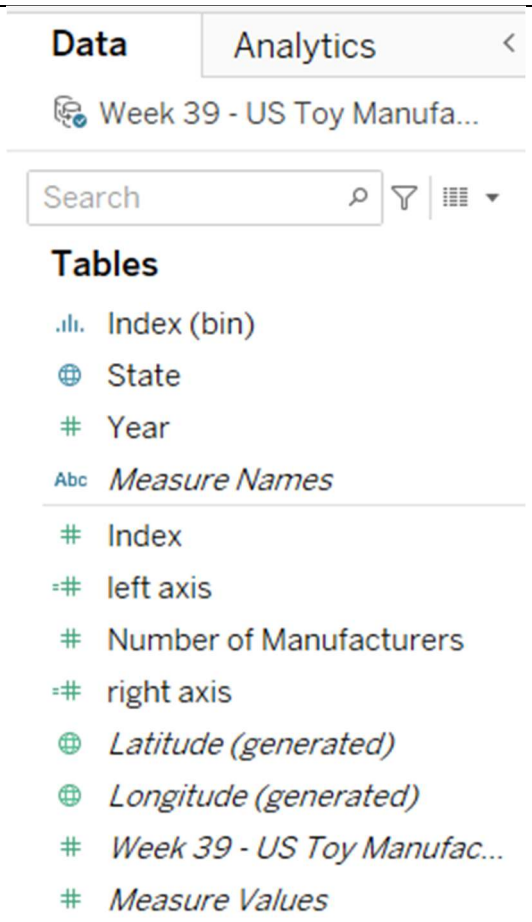


6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	

		
2.	Data Preprocessing	Already cleaned data is given
3.	Utilization of Filters	

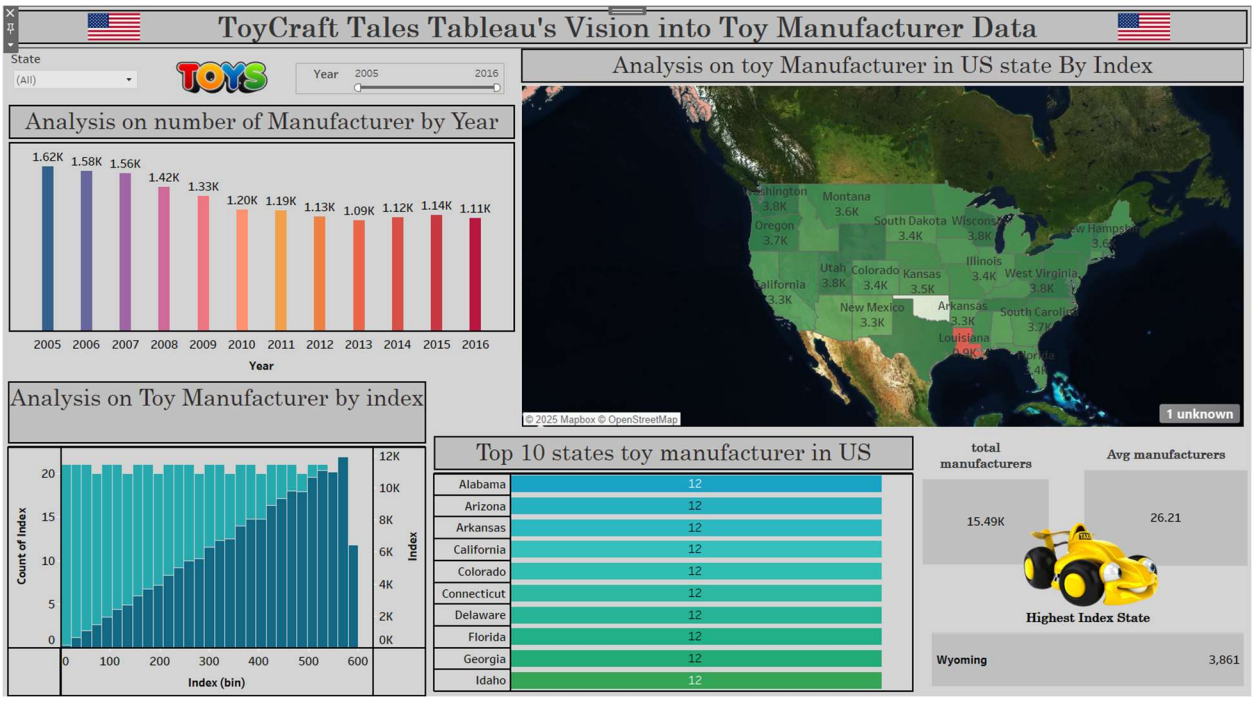
4.	Calculation fields Used	
5.	Dashboard design	No of Visualizations / Graphs – 10 Bar Chart: Number of Manufacturers by Year Map Chart: State-wise Index Analysis Histogram: Toy Manufacturer Index Distribution Horizontal Bar Chart: Top 10 States by Manufacturer Count KPI Cards: Total Manufacturers, Average Manufacturers, Highest Index State Interactive Filters: Year and State selector Butterfly chart: Annual State Participation and Manufacturing Volume

		Donut chart: State wise Distribution of Manufacturers in the U.S. Line chart: Yearly Trend of Toy Manufacturing Index
6	Story Design	No of Visualizations / Graphs -7 Scene 1: Manufacturer Trend Over Time (Bar Chart) Scene 2: Geographic Analysis of Index (Map Chart) Scene 3: Index Distribution Analysis (Histogram) Scene 4: Top State Performers & Summary KPIs (Bar + KPIs) Scene 5: Annual State Participation and Manufacturing Volume Scene 6: State wise Distribution of Manufacturers in the U.S. Scene 7: Yearly Trend of Toy Manufacturing Index

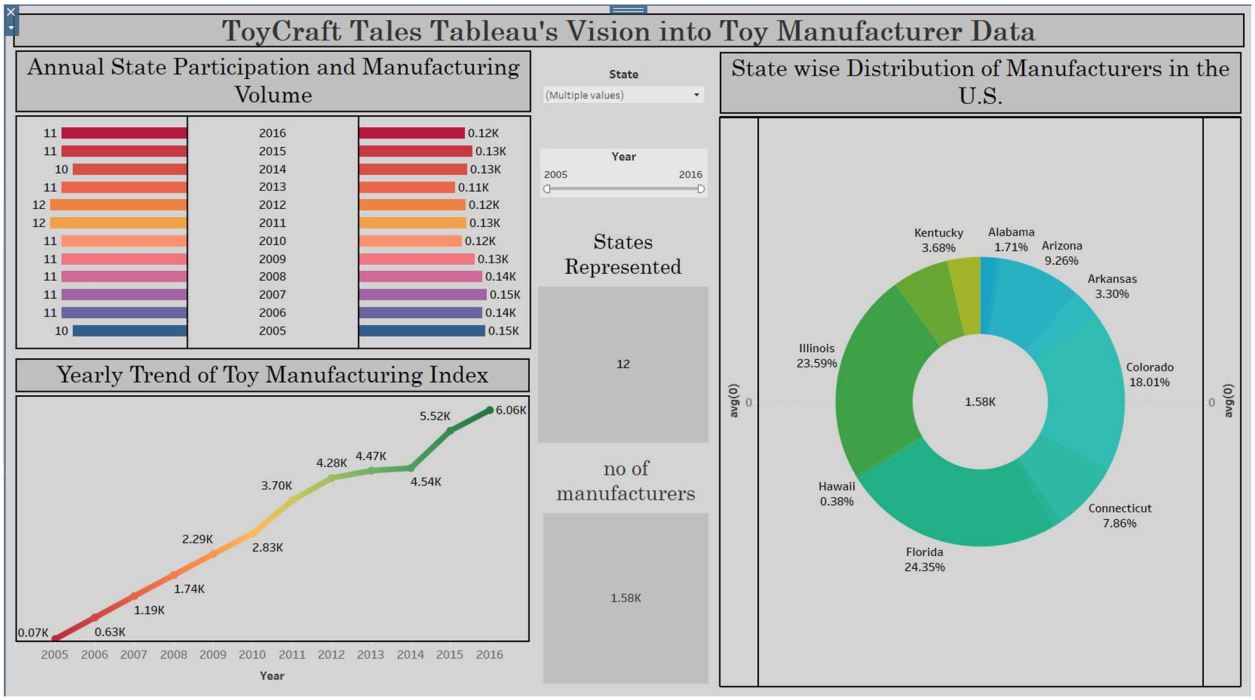
7. RESULTS

7.1 Output Screenshots

Dashboard 1:



Dashboard 2:



8. ADVANTAGES & DISADVANTAGES

Advantages:

- **Interactive Insights:** Tableau dashboards provide dynamic filtering, making it easy to explore toy manufacturing trends over time and across regions.
- **Better Decision-Making:** Visual patterns help manufacturers, marketers, and analysts understand performance and optimize resource allocation.
- **Integrated Workflow:** From data collection and SQL preprocessing to dashboard deployment via Flask, the end-to-end pipeline is streamlined and automated.
- **Real-Time Filtering & Drill-downs:** Users can interact with visualizations by year, state, or index, enabling granular analysis.
- **Ease of Use:** Tableau offers a drag-and-drop interface with no advanced coding required for rich visuals.
- **Web Deployable:** Final output can be embedded in a website using Flask for easy sharing with stakeholders.

Disadvantages:

- **Static Dataset:** The project uses historical data, and does not include real-time updates unless manually integrated.
- **Tool Dependency:** Tableau Public has some feature limitations compared to Tableau Desktop or Server.
- **Scalability Limits:** With large datasets or live data, Tableau Public may face performance issues.
- **Requires Manual Preprocessing:** Data cleaning and transformation were handled manually or using SQL before being fed to Tableau.

9. CONCLUSION

The project **“ToyCraft Tales”** successfully demonstrates the power of data analytics and visualization in uncovering valuable insights in the toy manufacturing industry. By using Tableau’s intuitive interface and powerful visualization capabilities, we analyzed historical data to detect patterns across years, states, and manufacturing indices.

The project’s integration of SQL, Tableau, and Python (Flask) ensures an automated and robust pipeline — from data ingestion to insightful dashboards and web delivery. This solution can serve as a decision-support tool for stakeholders in the toy industry, driving data-backed strategies for regional performance optimization, trend analysis, and market planning.

10. FUTURE SCOPE

Live Data Integration: The current project can be extended by integrating APIs or real-time databases for live updates.

Predictive Analytics: Machine learning models can be added to forecast toy manufacturing trends and detect anomalies.

User Role Access: Build role-based dashboards for manufacturers, analysts, and managers with restricted views and insights.

Enhanced Web UI: Integrate React.js or Vue.js with Flask for a richer frontend experience.

Mobile Responsiveness: Make the dashboard adaptive to mobile and tablet views for broader accessibility.

Storytelling Automation: Use Tableau's Story feature to dynamically adapt stories based on selected filters or time periods.

11. APPENDIX

Dataset Link :

https://www.kaggle.com/datasets/thedevastator/toy-manufacturers-in-us-states?select=Week+39+-+US+Toy+Manufacturers+-+2005+to+2016.hyper

GitHub & Project Demo Link :

https://github.com/lokeshnaidu31/ToyCraft-Tales-Tableau-s-Vision-into-Toy-Manufacturer-Data

project demo link :

https://drive.google.com/file/d/10KEg7ApVTC2s-oiTis_RdYvGuTj7Xmlh/view?usp=sharing