Toycraft Tales: Tableau's Vision Into Toy Manufacturer Data

1. INTRODUCTION

1.1 Project Overview

ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data Employ Tableau to delve into Toy Manufacturers' data, uncovering market trends, production patterns, and consumer preferences. Craft interactive visualizations to guide strategic decisions and enhance market competitiveness The Toy Manufacturers' Data Exploration and Visualization Project aims to leverage the power of Tableau to provide a comprehensive analysis of the toy manufacturing industry. By delving into the vast dataset encompassing various facets of the industry, the project seeks to uncover valuable insights related to market trends, production patterns, and consumer preferences. Utilize Tableau to dissect market trends within the toy manufacturing sector. Explore historical sales data, identify emerging market demands, and highlight patterns that can inform strategic decisions. By visualizing market dynamics over time, the project aims to offer a deep understanding of the industry's evolution. Analyze consumer behaviour and preferences by examining data related to popular toy categories, demographic trends, and purchasing patterns. Develop interactive visualizations that highlight consumer preferences, enabling manufacturers to align their product offerings with market demands. This insight is crucial for tailoring product development strategies to meet customer expectations. Scenario 1: Market Trend Analysis for Seasonal Products: The project could delve into historical sales data for different types of toys across various seasons and holidays. By visualizing the sales trends over the years, manufacturers can identify patterns in consumer preferences during specific times of the year. For instance, they might find that certain types of toys sell better during the holiday season, while others have higher demand during summer months. Armed with this insight, toy manufacturers can adjust their production schedules and marketing strategies accordingly to maximize sales and meet seasonal demands effectively. Scenario 2: Consumer Preference Analysis Across Demographics: Using demographic data such as age, gender, and location, the project could analyze consumer preferences for different types of toys. Interactive visualizations can be created to show

how preferences vary among different demographic groups. For example, it might reveal that teenagers in urban areas have a higher preference for electronic toys, while younger children in rural areas prefer traditional toys such as dolls and action figures. This information can help manufacturers tailor their product offerings and marketing campaigns to target specific demographic segments more effectively. Scenario 3: Product Performance Comparison Across Regions: By analyzing sales data across different regions or countries, the project could identify which toy categories perform better in certain geographic areas. For instance, it might find that educational toys are more popular in regions with a strong emphasis on education, while outdoor toys sell better in areas with favourable weather conditions. Visualizations could illustrate these regional differences in demand, allowing manufacturers to optimize their distribution channels and inventory management strategies to better serve each market.

1.2 Purpose

The purpose of this project is to analyze and visualize historical toy manufacturing data (2005–2016) to uncover meaningful insights about market trends, seasonal sales patterns, product category performance, and regional consumer preferences. By leveraging Tableau, the project aims to transform raw sales data into interactive dashboards that can support strategic planning, product development, and marketing decisions within the toy manufacturing industry. This solution is designed to: • Help decision-makers identify top-performing toy categories and high demand periods (e.g., holiday seasons) • Provide regional and demographic insights to align with consumer behaviour • Enable accurate forecasting of future demand using historical trends • Deliver a user-friendly visual interface for stakeholders to explore insights in real time

2. IDEATION PHASE

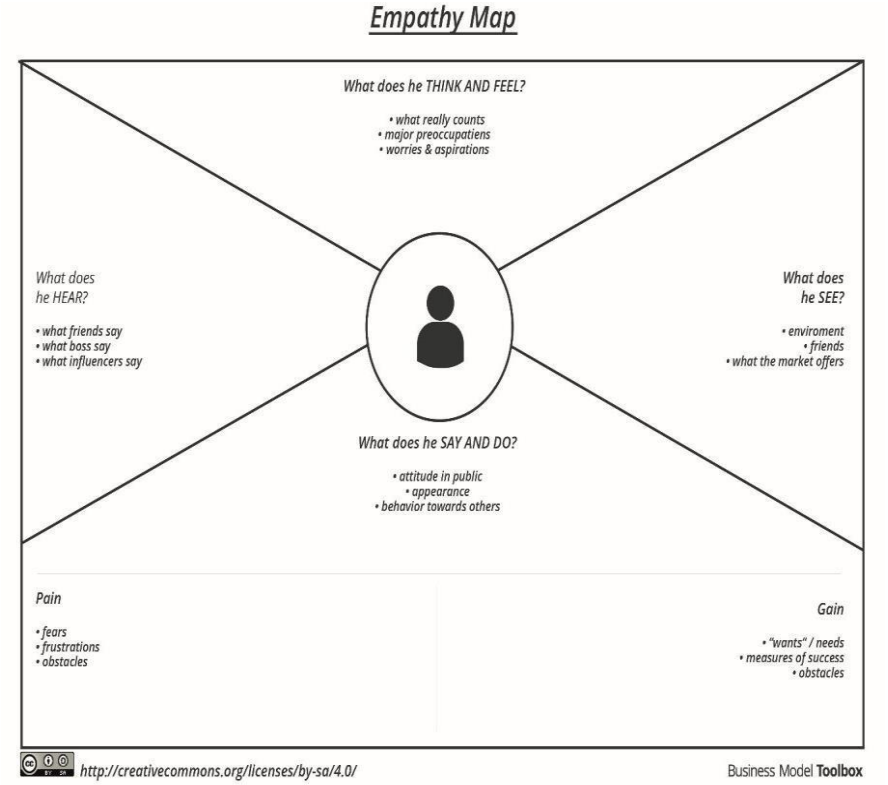
2.1 Problem Statement

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	parent looking to buy toys for my child	find toys that are fun, safe, and age-appropriate	I'm not sure which ones are good quality	I don't have clear information or reviews to compare	confused and worried
PS-2	customer shopping for a birthday gift	find a popular toy that kids will love	I don't know what's trending right now	stores don't show which toys are the most popular	unsure and stressed

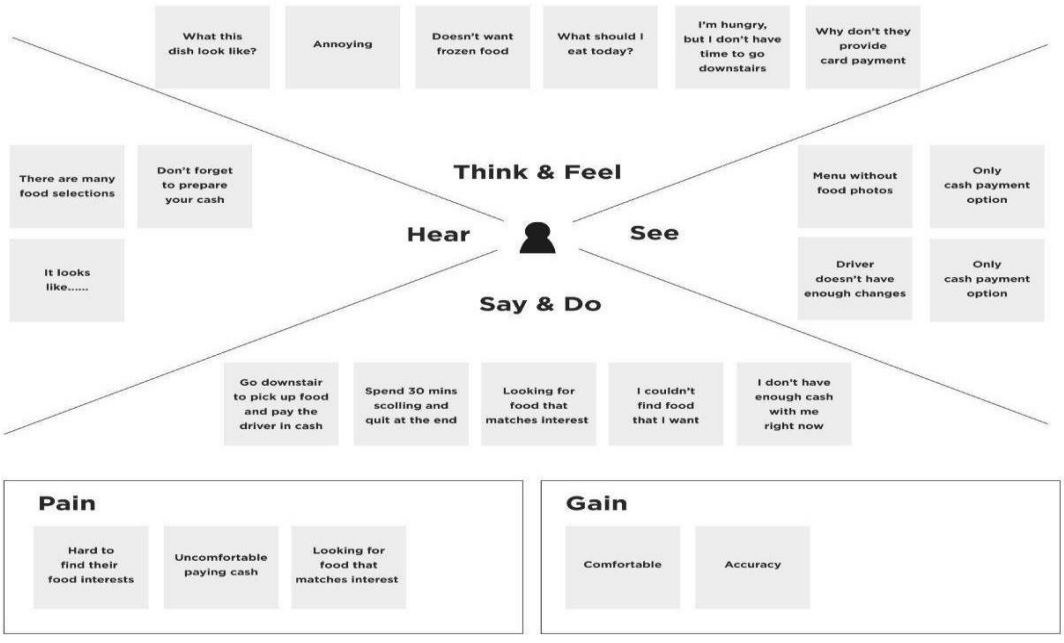
2.2 Empathy Map Canvas

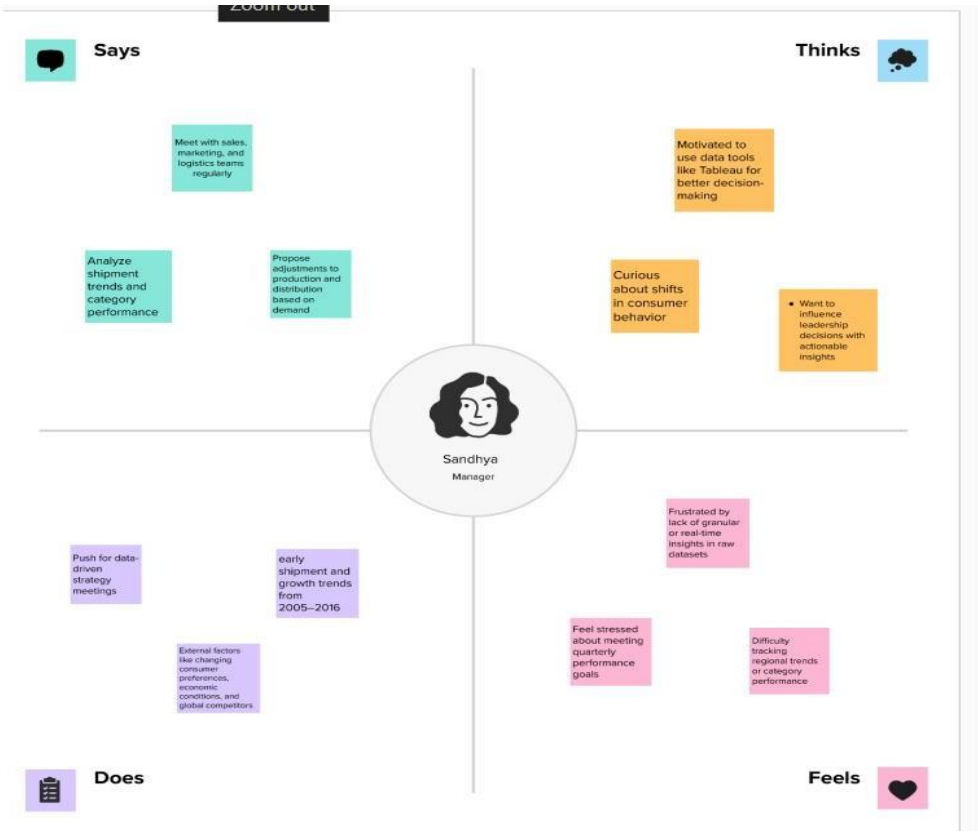
- An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.
- It is a useful tool to helps teams better understand their users.
- Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

- **Example:**



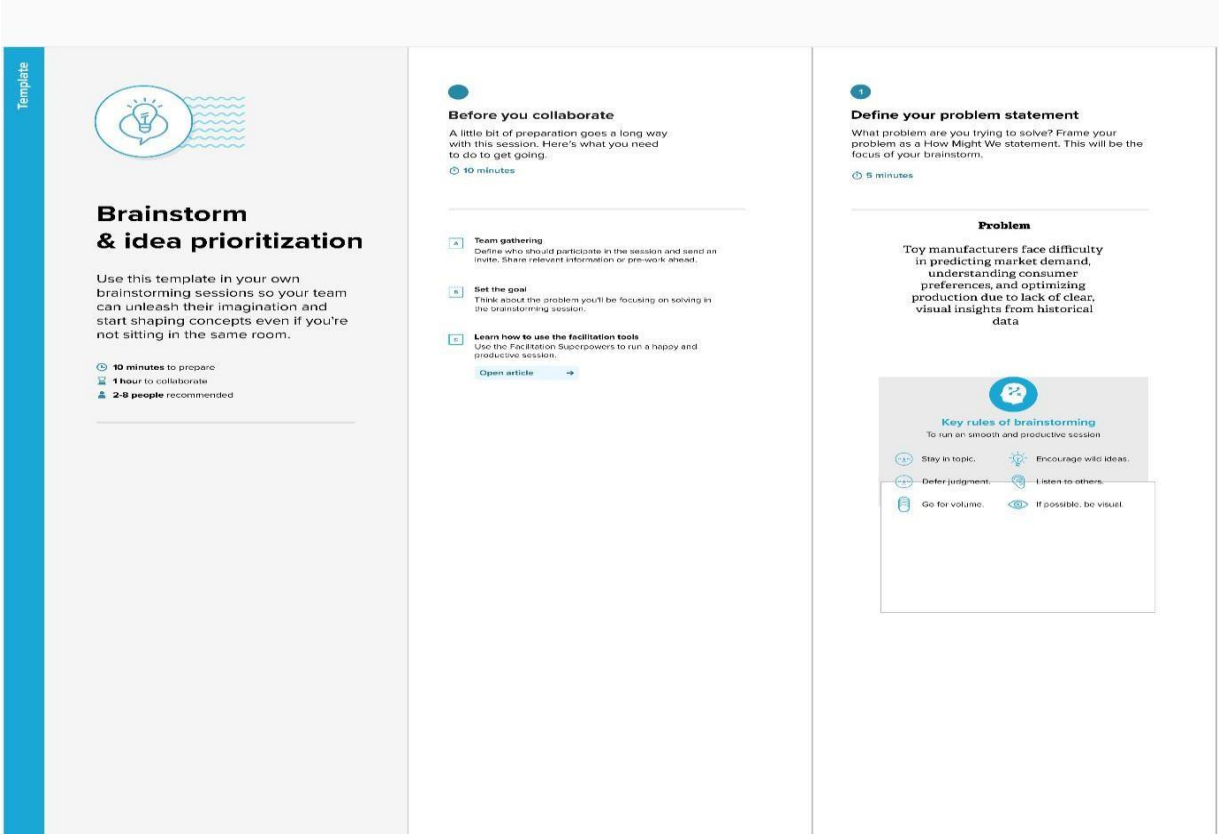
Example: Food Ordering & Delivery Application



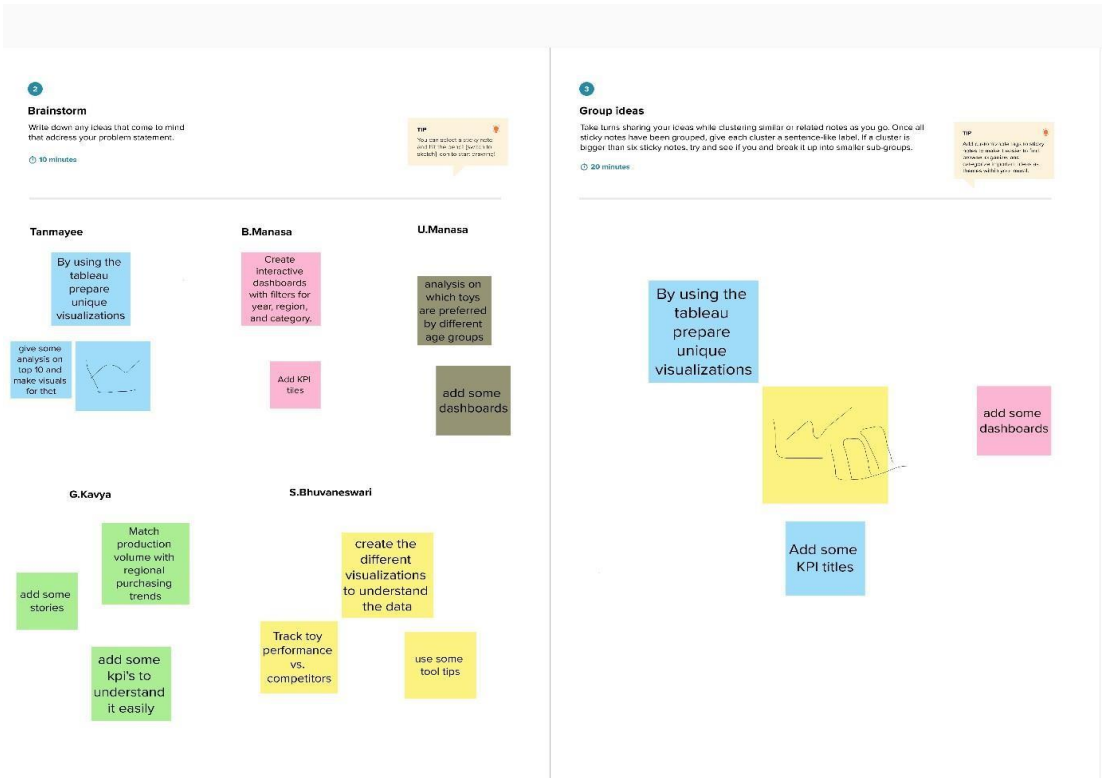


2.3 Brainstorming

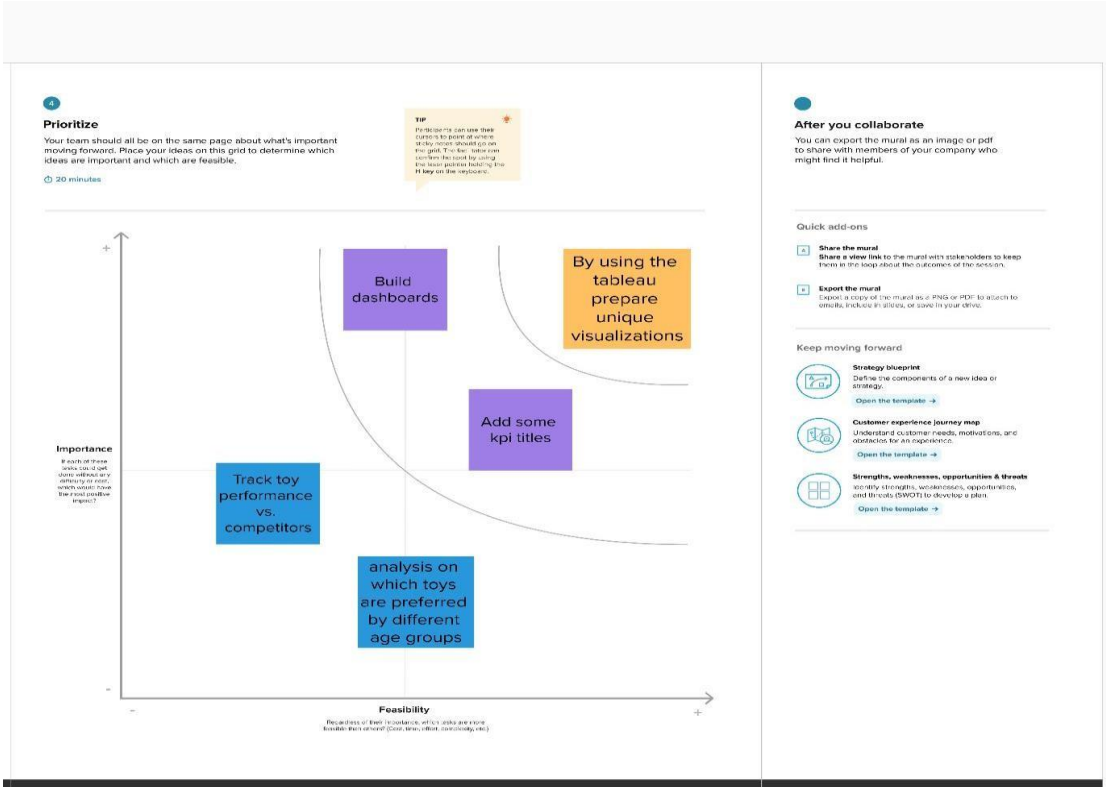
Step-1: Team Gathering, collaboration and select the problem statement



Step-2: Brainstorm, Idea Listing and Grouping

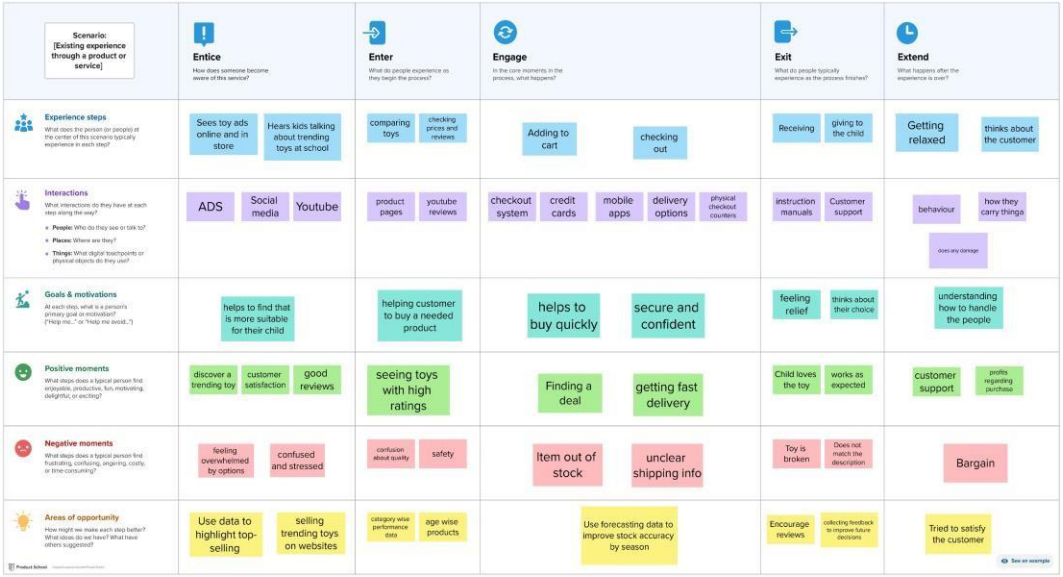


Step-3: Idea prioritization



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map



3.2 Solution Requirement

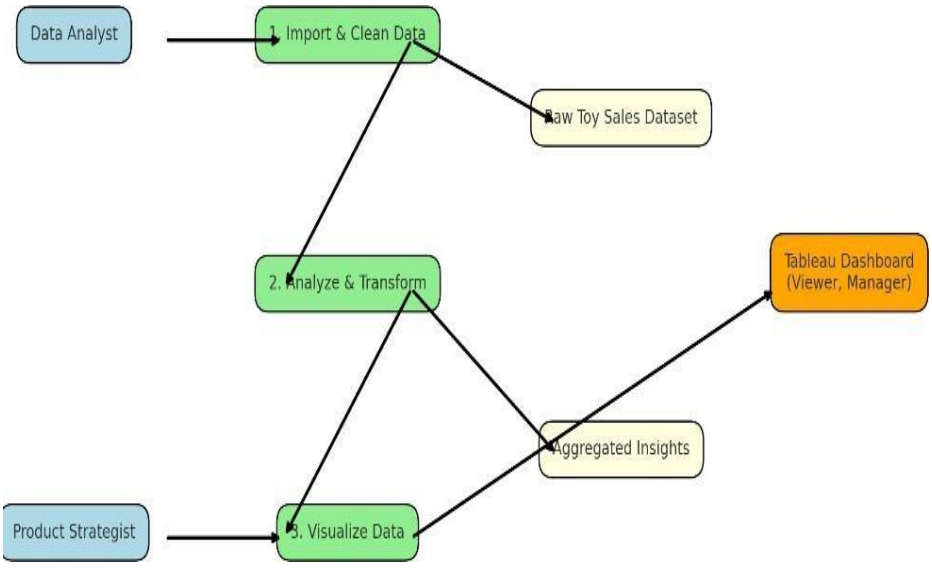
Functional Requirements

FR N0.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Upload & Integration	Import toy industry CSV data into Tableau
		Clean and format data for consistency and structure
FR-2	Market Trend Analysis	Analyze annual shipment growth and total market size
		Highlight seasonal spikes
FR-3	Category Performance Dashboard	Visualize toy categories across years
		Identify top-selling categories over time
FR-4	Regional & Demographic Filtering	Add filters by region, age group, and consumer type
		Enable dynamic charts that respond to selections
FR-5	Unified Dashboard	Combine all insights into a single dashboard
		Allow stakeholders to export reports or snapshots

Non-Functional Requirements

NFR NO.	Non-Functional Requirements	Description
NFR-1	Usability	Dashboard should be intuitive, with tooltips and clear legends
NFR-2	Security	Only authorized users can upload/edit data in Tableau
NFR-2	Reliability	Dashboard should load consistently across devices and users
NFR-4	Performance	Visuals must load in under 2 seconds even with full dataset
NFR-5	Availability	Dashboard should be accessible 24/7 via Tableau Public or Server
NFR-6	Scalability	Should handle additional years/categories without redesign

3.3 Data Flow Diagram



User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Data Analyst	Data Upload	USN-1	As a data analyst, I want to import and clean toy sales data for analysis	Data is cleaned and imported into Tableau correctly	High	Sprint-1
Data Analyst	Data Transformation	USN-2	As an analyst, I want to aggregate data by category, region, and year	Aggregated dataset is ready for chart building	High	Sprint-1
Product Strategist	Trend visualizations	USN-3	As a strategist, I want to see annual shipment and growth trends	Trendline appears with historical context	High	Sprint-1
Marketing manager	Consumer Behaviour Insights	USN-4	As a marketer, I want to filter toy preferences by region and demographics	Filtered visuals update dynamically	Medium	Sprint-2
Product Manager	Category comparision	USN-5	As a product manager, I want to compare toy	Bar/line charts for categories are generated	Medium	Sprint-2

3.4 Technology Stack

Technical Architecture

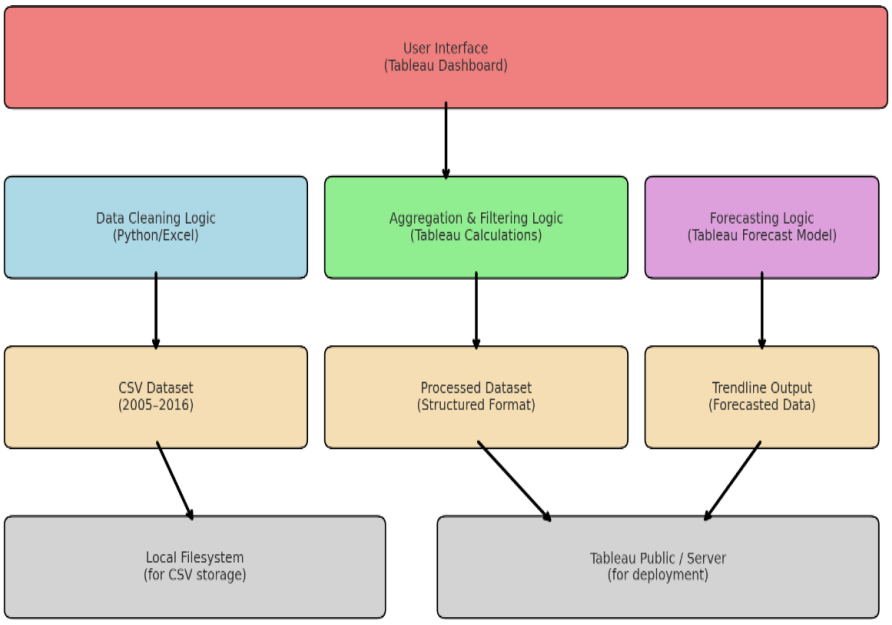


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Dashboard interface for users to interact with data	Tableau Public
2.	Application Logic-1	Data cleaning and transformation	Excel(pre-Tableau)
3.	Application Logic-2	Data aggregation by year, category, region	Tableau calculated fields
4.	Application Logic-3	Forecasting based on historical trends	Tableau Forecasting
5.	Database	CSV dataset with shipment and category info	Excel sheet
6.	Cloud Database	Not applicable	Tableau cloud
7.	File Storage	Upload and store toy dataset	Local drives or google drive
8.	External API-1	Weather data to correlate seasonality	Open WeatherAPI
9.	External API-2	Social media trend integration	Google Trends
10.	Machine Learning Model	Predictive modeling	Tableau's built-in forecast model
11.	Infrastructure (Server / Cloud)	Cloud-hosted dashboard viewable by users	Tableau Server/Tableau public

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Python (data cleaning)	Python
2.	Security Implementations	Restricted access via Tableau login	IAM (Tableau server)
3.	Scalable Architecture	Tableau scales to multiple dashboards/users without code changes	Tableau cloud Architecture
4.	Availability	Dashboard hosted on Tableau Public with 24/7 access	Tableau server/Tableau public
5.	Performance	Optimized visual queries, aggregated filters, and trendline calculations	Tableau filtering

4. PROJECT DESIGN

4.1 Problem Solution Fit

The diagram outlines a value proposition for small-to-medium U.S. toy manufacturers who struggle with analyzing historical sales data and making data-driven decisions due to limited tools and expertise. It presents a domain-specific analytics solution that simplifies data processing, trend visualization, and insight generation to improve decision-making and business performance.


Define CS, fit into CL
1. CUSTOMER SEGMENT(S) CS
Small-to-medium U.S. toy manufacturing companies operating from 2005 to 2016
6. CUSTOMER LIMITATIONS CL
• Budget constraints for sophisticated tools.
• Lack of in-house technical expertise.
• Dependency on legacy systems.
5. AVAILABLE SOLUTIONS PLUSES & MINUSES AS
• Manual Excel analysis (time-consuming, error-prone).
• General-purpose BI tools (complex setup, non-domain-specific).
• Consultant-driven reports (expensive, not scalable)
Focus on PR, tap into BE, understand RC
2. PROBLEMS / PAINS + ITS FREQUENCY PR
• Lack of tools to analyze historical manufacturing and sales data.
• Difficulty identifying trends and seasonal shifts.
• Inability to make data-backed decisions.
• Fragmented or inaccessible archival data.
9. PROBLEM ROOT / CAUSE RC
Root Cause: Lack of easy-to-use, tailored analytics solutions for the toy manufacturing domain.
Frequency: Occurs every fiscal quarter and peak business periods
7. BEHAVIOR + ITS INTENSITY BE
• Maintain Excel-based records.
• Intermittently review past data during key decisions.
• Attend trade shows and research online for tools.
• Outsource occasional analytics.
Identify strong TR & EM
3. TRIGGERS TO ACT TR
Annual business reviews and planning cycles.
Increase in market competition.
Demand for modern, analytics-driven reporting from management.
4. EMOTIONS EM
• Before: Frustration, confusion, indecision, fear of missed opportunities.
• After: Confidence, clarity, empowerment, improved decision-making.
10. YOUR SOLUTION SL
A cloud-based, domain-specific analytics platform allowing toy manufacturers to upload historical data (e.g., spreadsheets), process and visualize trends, and receive actionable business insights. Features include dashboard generation, trend reports, and integration options for legacy system
8. CHANNELS of BEHAVIOR CH
• Online: Manufacturer forums, LinkedIn groups, trade websites.
• Offline: Industry expos, consultant meetings, internal planning workshops.

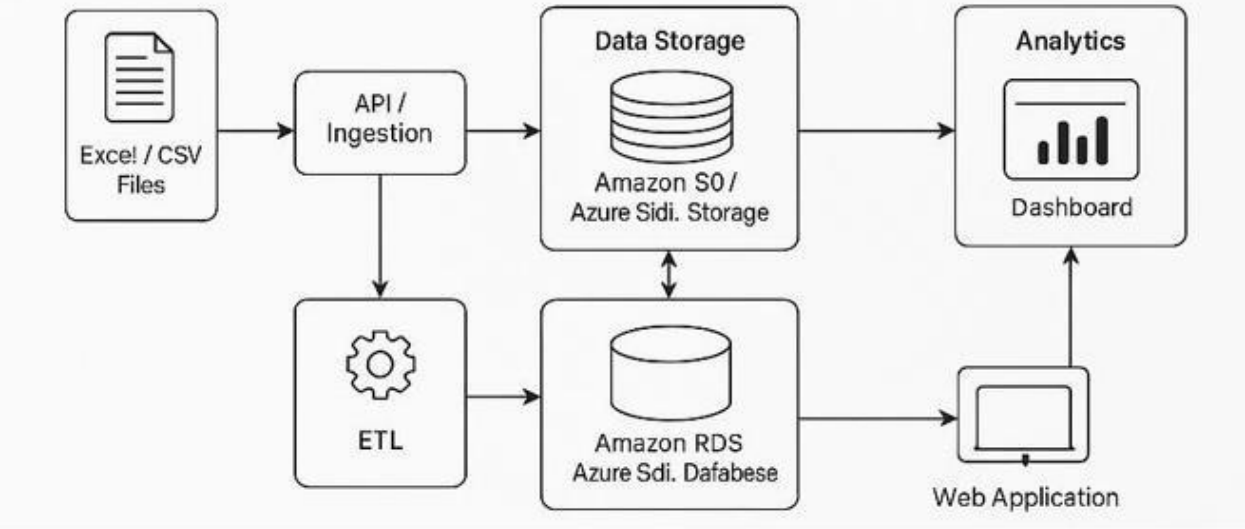
4.2 Proposed Solution

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Toy manufacturers and decision-makers lack a clear understanding of historical market trends, seasonal demand, and category-wise performance due to raw, unstructured spreadsheet data
2.	Idea / Solution description	The proposed solution is a Tableau-based interactive dashboard that transforms 12 years of toy sales data into meaningful visual insights
3.	Novelty / Uniqueness	The solution bridges the gap between raw data and strategic decision-making using a no-code, real-time analytics platform
4.	Social Impact / Customer Satisfaction	helps deliver toys customers actually want—leading to higher customer satisfaction and reduced waste
5.	Business Model (Revenue Model)	The dashboard can be offered as a SaaS solution or internal tool for toy manufacturers to optimize marketing, inventory, and sales operations
6.	Scalability of the Solution	The solution is scalable—more data (new years, product lines, or regions) can be integrated without modifying the core dashboard. Tableau supports enterprise-level deployment via Tableau Server or Tableau Cloud.

4.3 Solution Architecture

The diagram illustrates the architecture and data flow for toy sales analysis. Sales data is first collected from Excel or CSV files and sent through an API for ingestion. The data is then processed using ETL operations and stored in cloud storage services such as Amazon S3 or Azure Storage, as well as in databases like Amazon RDS or Azure SQL Database. Finally, the stored data is accessed by a web application and displayed on an analytics dashboard to provide insights and visual reports.

Figure 1: Architecture and data flow for toy sales analysis



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 Preparation & Import	USN-1	As a data analyst, I want to clean and import the toy sales dataset into Tableau	3	High	P.Afrin Khatun R.Deepthi
Sprint-1	Initial Market Trends View	USN-2	As a strategist, I want to create a basic trends dashboard showing shipment and growth over time	2	High	B Prasanna Lakshmi R.Deepthi

Sprint-2	Category & Seasonal Insights	USN-3	As a product manager, I want to compare toy category	3	Medium	P.Afrin Khatun B Prasanna Lakshmi

Sprint	Functional Requirement (Epic)	User story Number	User Story /Task	Story Points	Priority	Team Members
			performance and seasonal spike			
Sprint-2	Consumer Demographics Filter	USN-4	As a marketer, I want to filter data by region and age group to identify preferences	3	Medium	B Prasanna Lakshmi R.Deepthi
Sprint-3	Dashboard and story	USN-5	As a stakeholder, I want an integrated dashboard with trendlines and filters for strategic use	4	High	P.Afrin Khatun

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	3 Days	30 JANUARY 2026	01 JANUARY 2026	5	01 JANUARY 2026
Sprint-2	6	3 Days	02 JANUARY 2026	07 JANUARY 2026	6	07 JANUARY 2026
Sprint-3	4	2 Days	08 JANUARY 2026	11 JANUARY 2026	4	11 JANUARY 2026

Velocity:

Total story points completed: 15

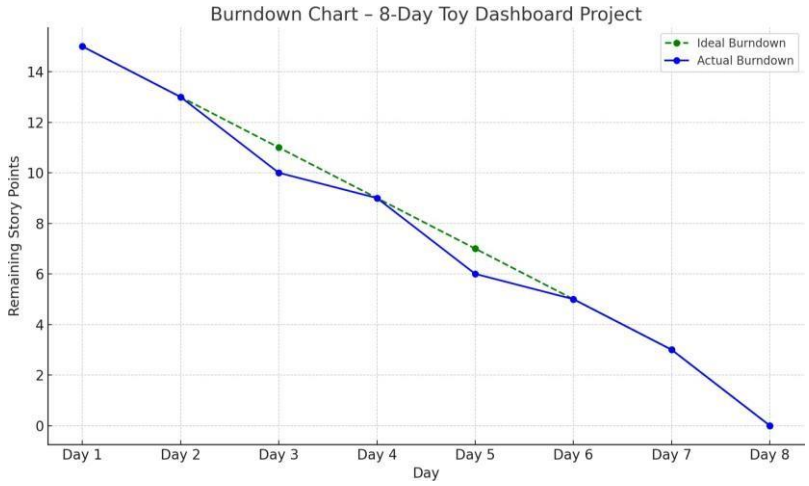
Total project duration**:** 8 working days

Average team velocity:

$$15 \div 8 = \sim 1.88 \text{ story points per day}$$

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 Serum. However, burn down charts can be applied to any project containing measurable progress over time.

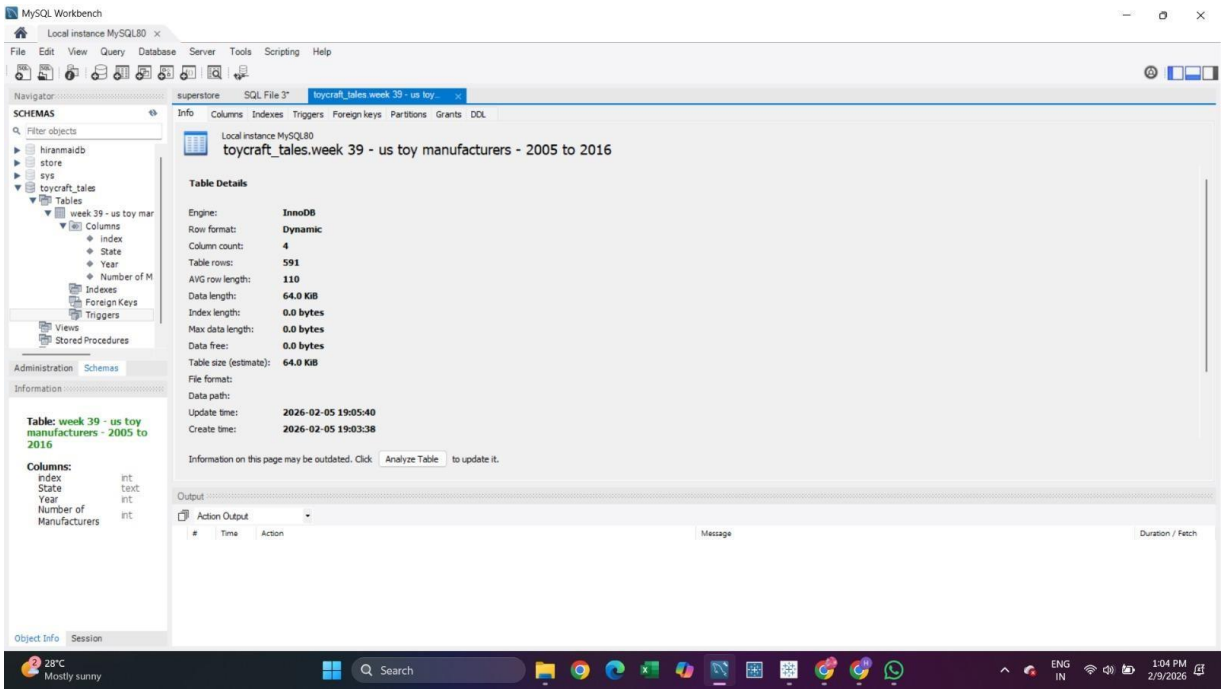


6. FUNCTIONAL AND PERFORMANCE TESTING

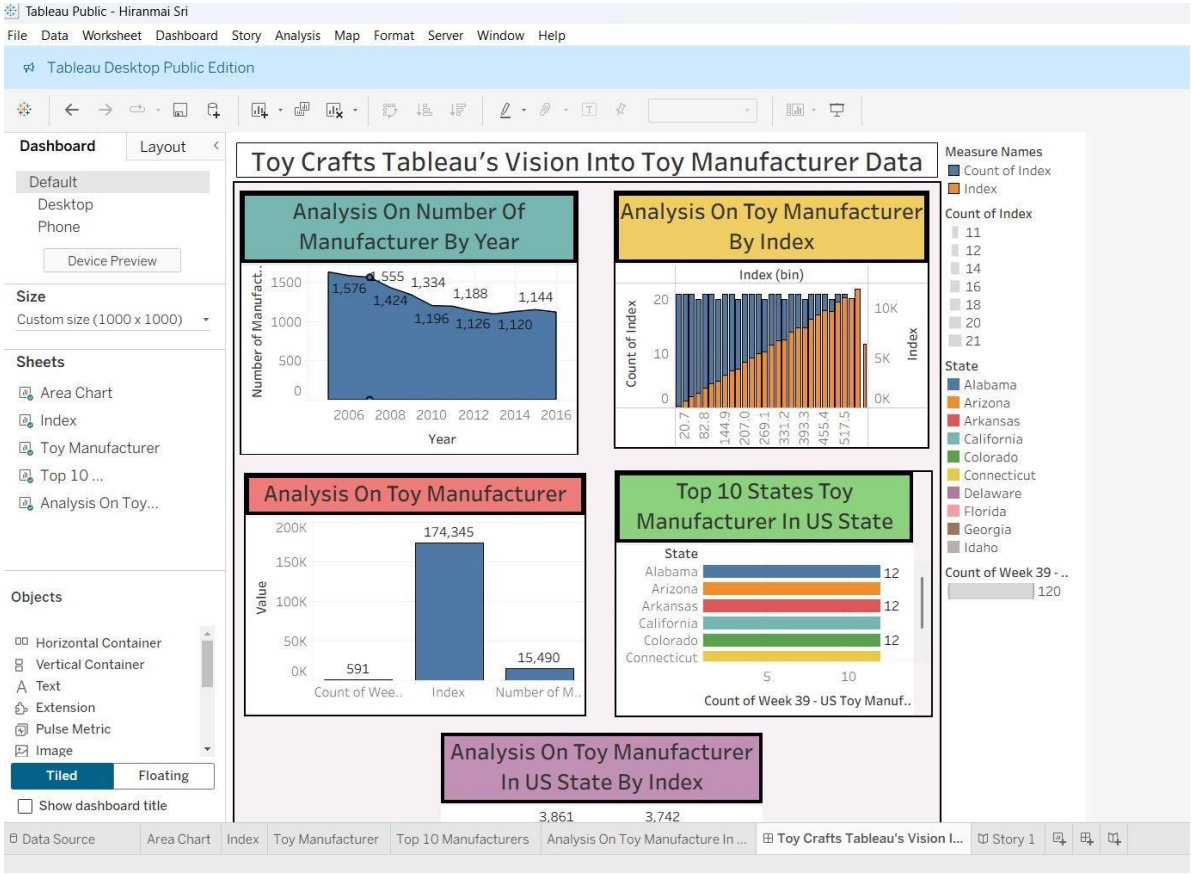
6.1 Performance Testing

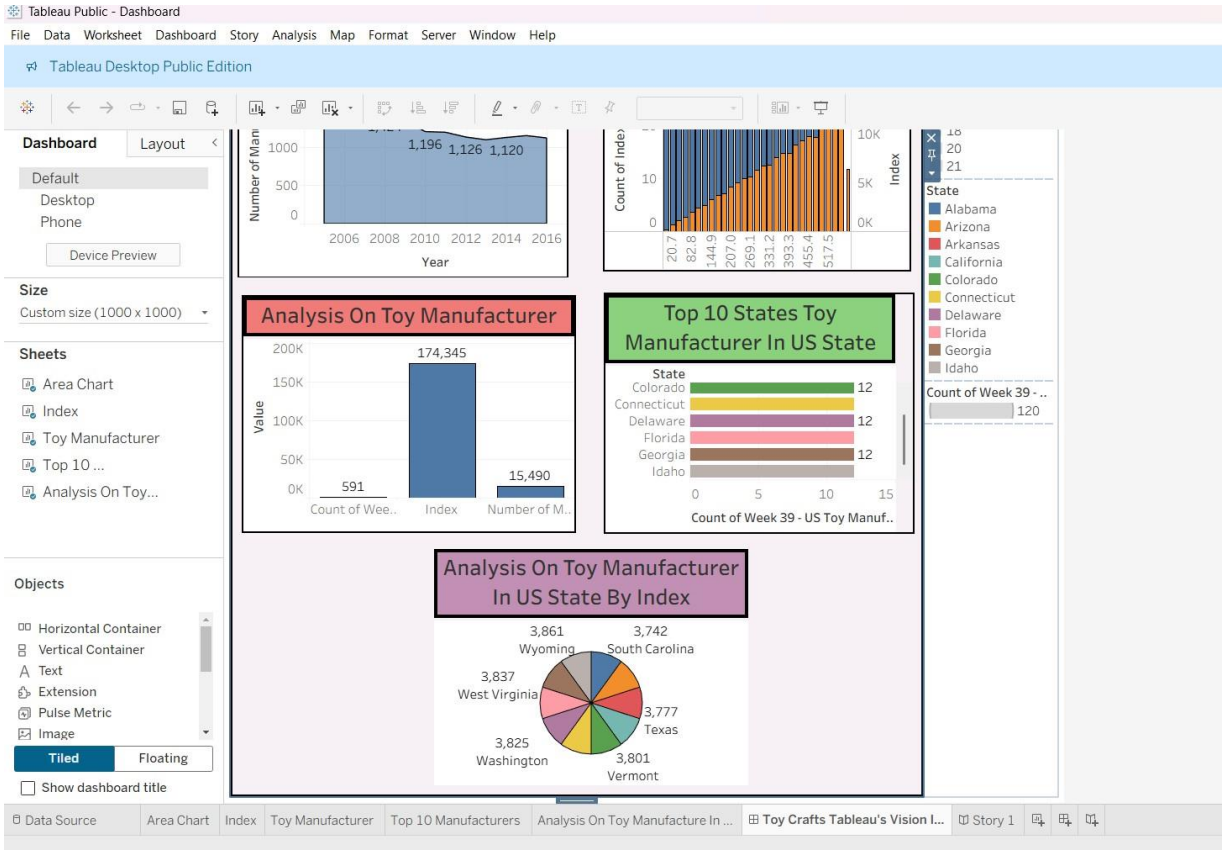
S.NO	Parameter	Screenshot/values
1.	Data Rendered	Shown below
2.	Data Preprocessing	Shown below
3.	Utilization of Filters	Shown below
4.	Calculation fields Used	Shown below
5.	Dashboard design	No of Visualizations / Graphs-5
6.	Story Design	No of Visualizations / Graphs-5

Data Rendered

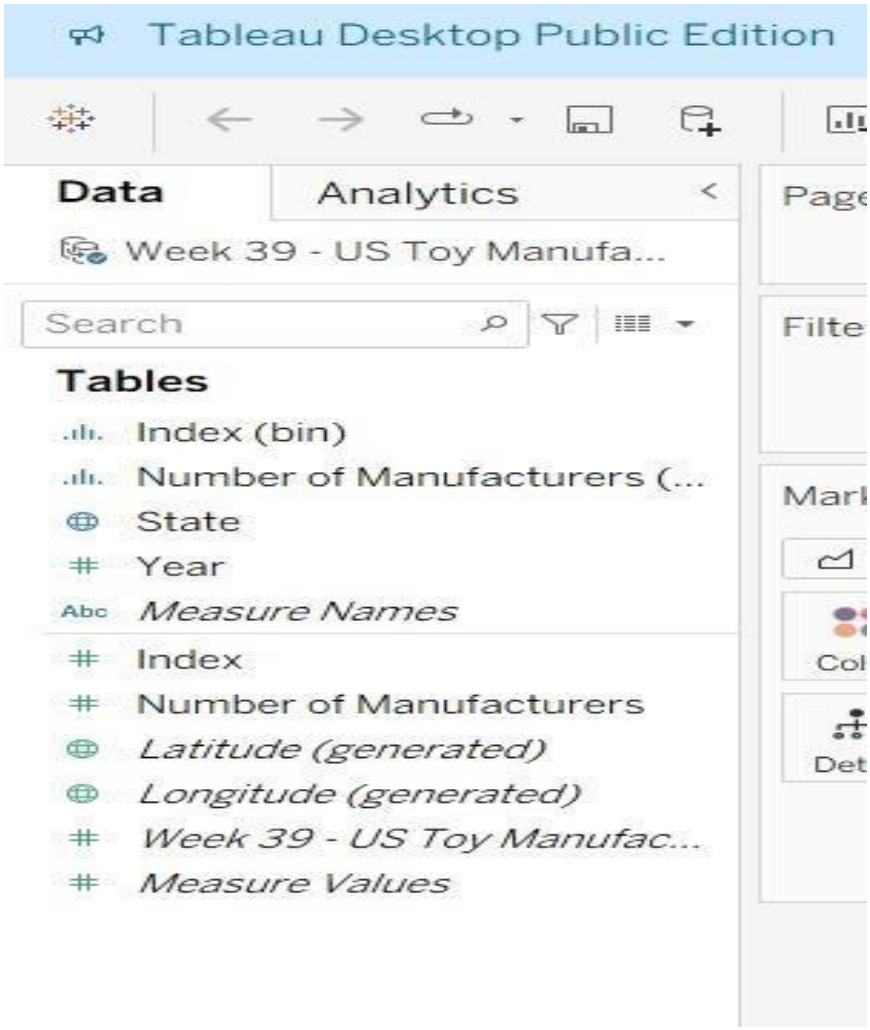


Utilization of filters

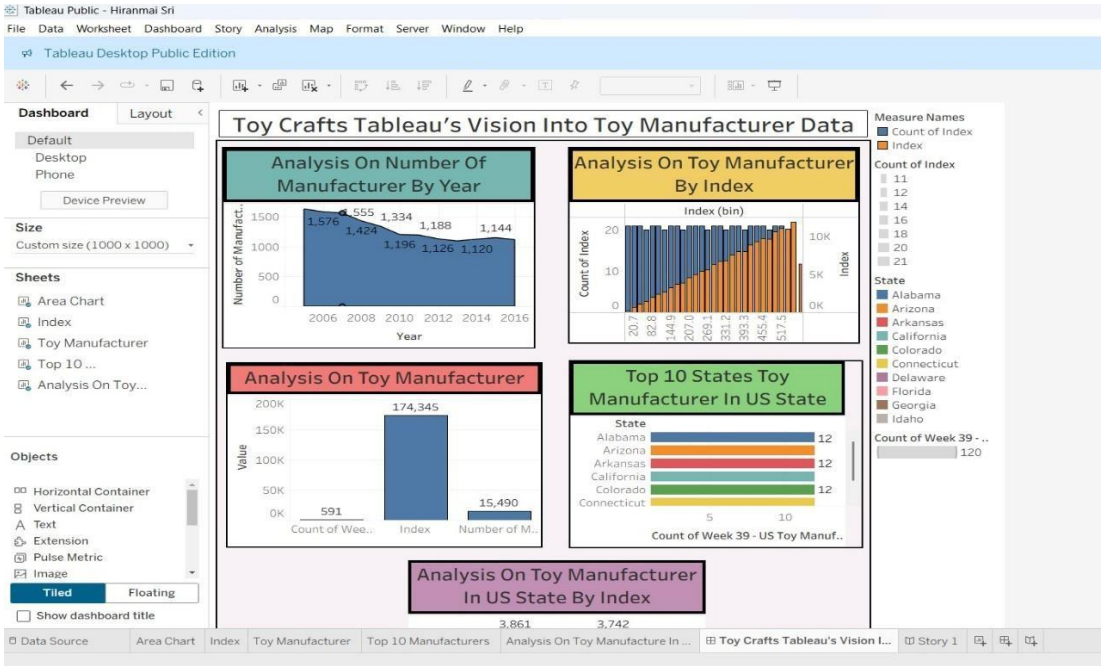


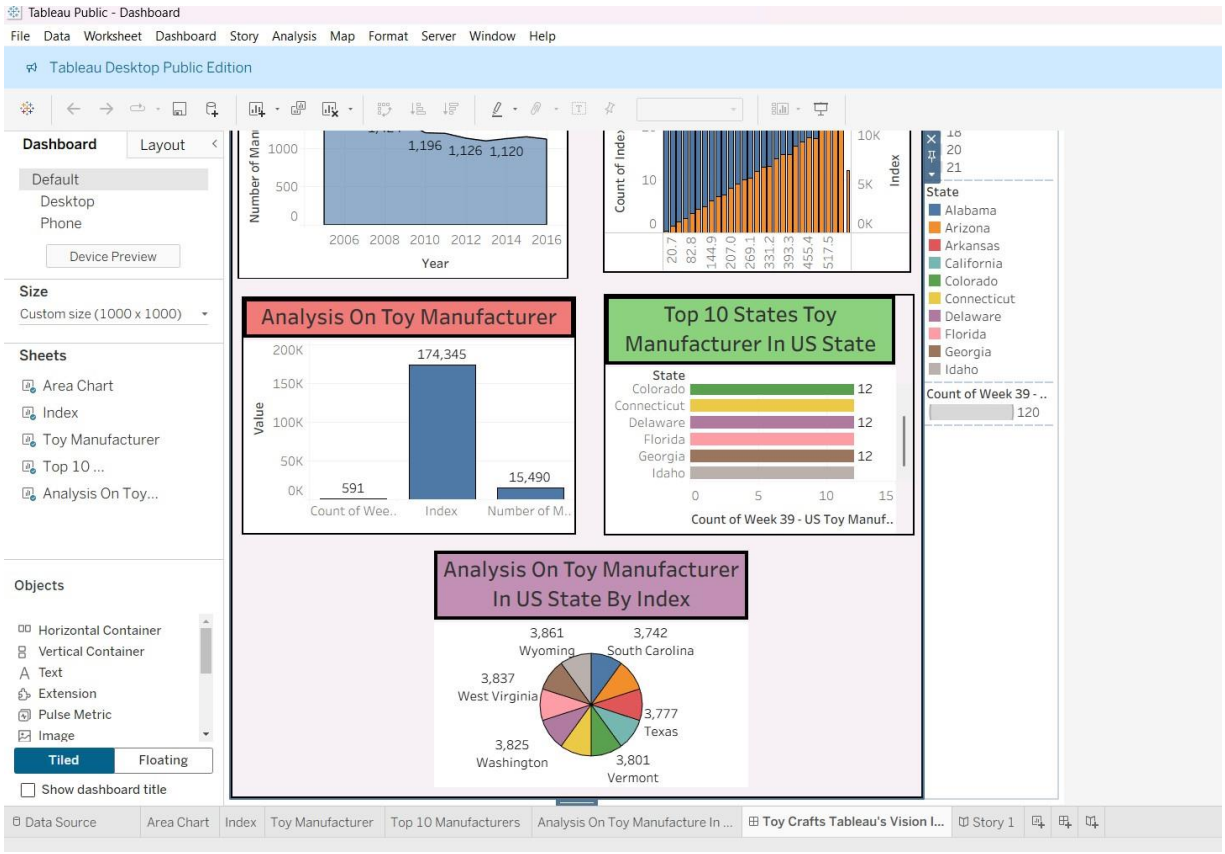


Calculation fields Used



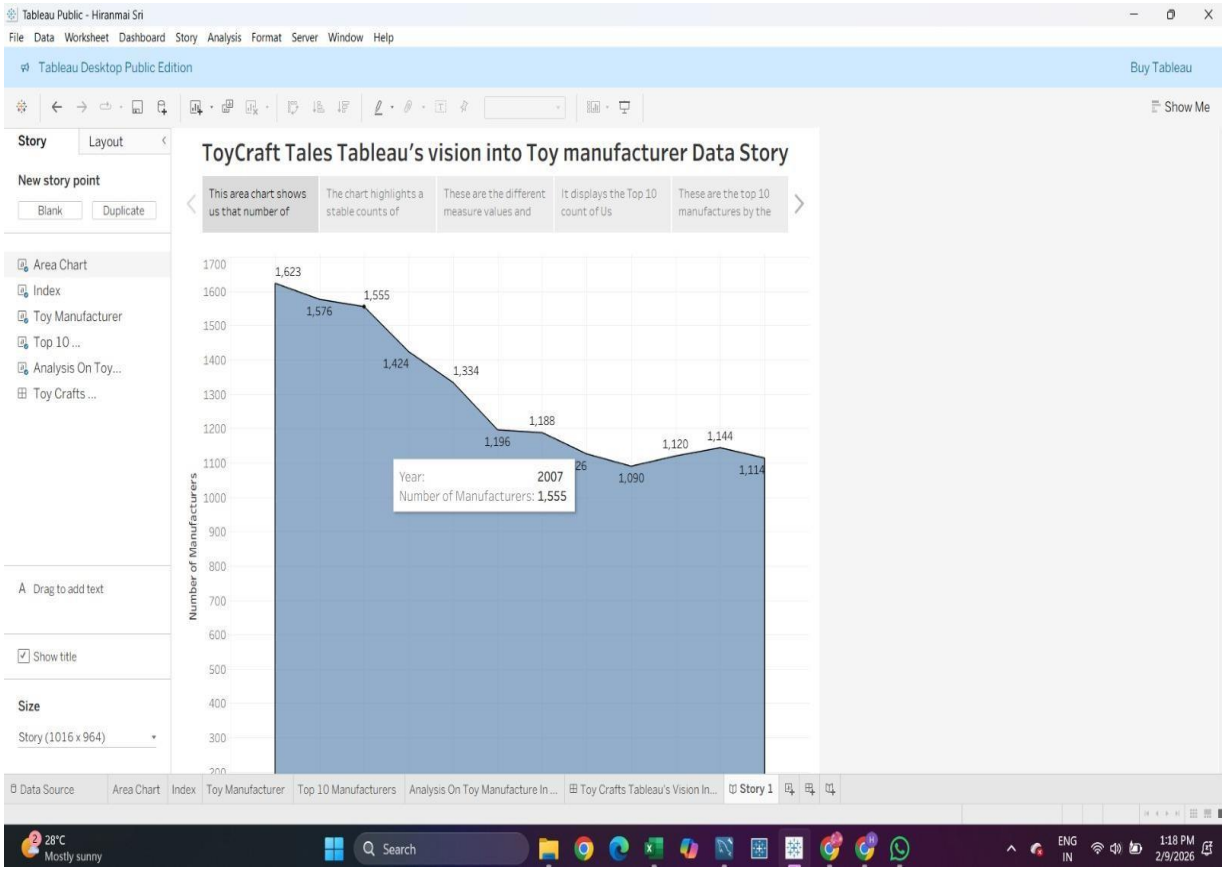
Dashboard design





1. Analysis of the number of Manufacturers by Year
2. Analysis of Toy Manufacturer by Index
3. Analysis of toy Manufacturers in US state By Index
4. Analysis of Toy Manufacturers
5. Top 10 states toy manufacturer in US state

Story design

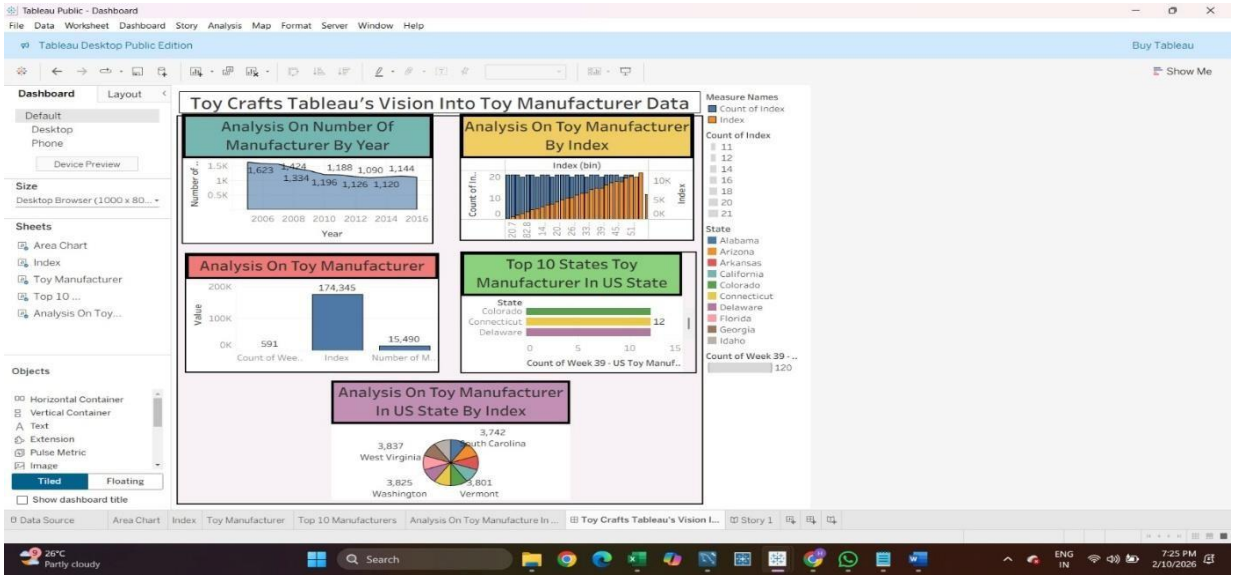


The story design in Tableau presents the analysis through a structured sequence of visualizations, enabling users to understand insights step by step. Each story point highlights a specific aspect of toy manufacturer data, such as yearly trends, manufacturer index analysis, regional distribution, and top-performing manufacturers. The use of an area chart helps visualize changes in the number of manufacturers over time, making trend identification easier. Interactive navigation allows users to move between different analytical views, improving clarity, engagement, and data-driven decision-making**.**

7. RESULTS

7.1 Output Screenshots

- The Tableau dashboards provided:
- Clear visualization of market trends.
- Identification of top-performing manufacturers.
- Regional analysis.
- Data-driven strategic insights.



8. ADVANTAGES & DISADVANTAGES

Advantages

- Easy visual interpretation.
- Interactive filters.
- Scalable design.
- Improved decision-making.

Disadvantages

- Depends on data quality
- May require significant development time

9. CONCLUSION

This project successfully transformed raw toy manufacturer data into interactive visual dashboards using Tableau. The developed system enables stakeholders to analyze market trends efficiently, understand manufacturer performance, and identify regional and category-wise insights through clear visualizations. By converting complex datasets into meaningful graphical representations, the project improves data interpretation and supports informed strategic decision-making.

The interactive features such as filters, calculated fields, and story-based dashboards enhance user experience and allow dynamic exploration of data. The project demonstrates how data visualization tools can bridge the gap between raw information and actionable insights, helping businesses optimize planning, marketing strategies, and operational efficiency.

Overall, ToyCraft Tales showcases the practical application of data analytics and visualization in solving real-world business challenges. It highlights the importance of structured data analysis and provides a scalable solution that can be expanded with additional datasets or advanced analytical features in the future.

10. FUTURE SCOPE

- Real-time data integration for live market analysis.
- AI-based predictive analytics for forecasting trends and demand.
- Mobile-friendly dashboard version for easy access.
- Expansion of dataset coverage to include global markets.
- Integration with cloud platforms for collaborative analytics.
- Advanced filtering and personalization features for users.
- Automated report generation for faster business insights.
- Implementation of machine learning models for deeper pattern analysis.

11. APPENDIX & LINKS

DATASET LINK

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

DASHBOARD LINK

https://public.tableau.com/app/profile/afrin.khatun.pathan/viz/AnalysisonnumberofManufacturerbyYear/Dashboard1#1

STORY LINK

https://public.tableau.com/app/profile/afrin.khatun.pathan/viz/AnalysisonnumberofManufacturerbyYear/Story1

PROFILE LINK

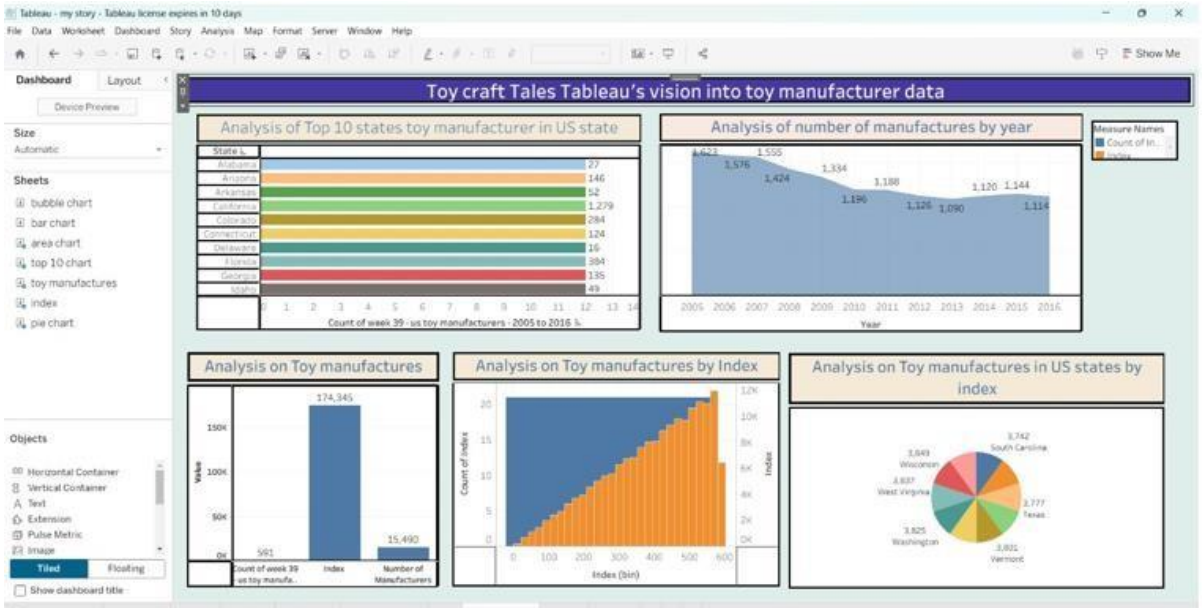
https://public.tableau.com/app/profile/afrin.khatun.pathan

DEMO LINK

https://drive.google.com/file/d/1AEvjLmksCSNd1jfBajkANj4MMNyTpm3o/view?usp=sharing

SCREENSHOTS OF DASHBOARD AND STORY

DASHBOARD



STORY