Internship Project Report

1. INTRODUCTION

1.1 Project Overview

Title: *ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data*

Objective:
The aim of this project is to leverage Tableau to perform comprehensive data analytic on the ToyCraft dataset — a retail-focused dataset that encompasses product sales, inventory management, and customer demographic information. The project seeks to uncover actionable insights and present them through compelling visualizations that aid in strategic decision-making for stakeholders.

Scope:

Analyze product sales trends across categories, time periods, and locations.

- Track inventory performance and turnover rates.
- Examine customer demographics to understand purchasing behaviors.
- Identify key performance indicators (KPIs) and visualize them via dashboards.
- Deliver interactive dashboards for real-time exploration and reporting.

Tools & Technology:

- **Primary Tool:** Tableau (for dashboard creation and data visualization)
- **Data Sources:** CSV/Excel files, simulated ERP/CRM data (if available)
- **Supporting Tools:** Excel or Python (for data cleaning, if required)

1.2 Purpose

The primary objectives of this project are:

- **To explore Tableau as a data visualization and business intelligence tool**
  Understand the capabilities of Tableau in connecting, analyzing, and visualizing data to support decision-making.
- **To analyze ToyCraft's sales, customer behavior, and product performance**
  Examine transaction-level sales data, customer demographics, and product-level metrics to identify patterns, trends, and anomalies.
- **To derive actionable insights and present them via interactive dashboards**
  Design and deliver interactive dashboards in Tableau that clearly communicate key insights, enabling ToyCraft stakeholders to make informed strategic and operational decisions.

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2. IDEATION PHASE

2.1 Problem Statement

What is a customer problem?

"As a ToyCraft decision-maker, I want to understand our sales trends, customer preferences, and inventory performance across different regions, so I can make informed business decisions. However, the data is scattered across multiple systems and is not easy to interpret quickly. I feel frustrated and uncertain because without real-time, visual insights, I risk missing opportunities or making poor strategic choices. "
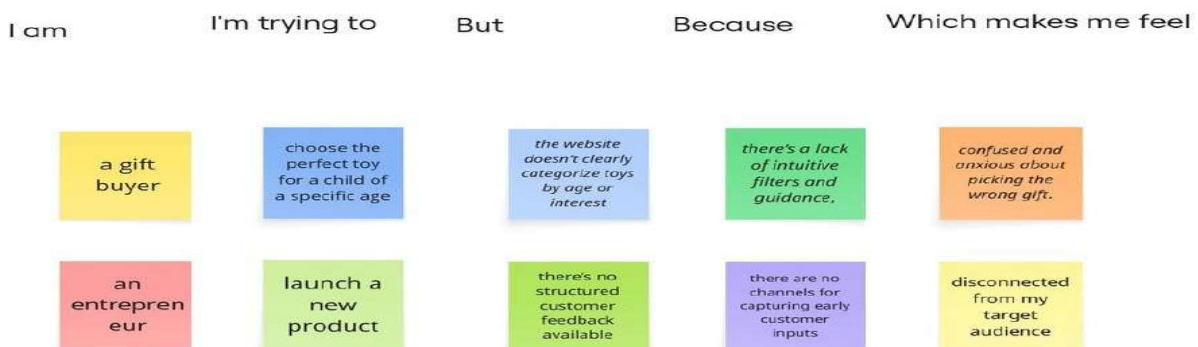
Why Do We Need a Problem Statement?

Think of it like a flashlight — it helps you see what matters most.

- It shows you the real issue instead of just surface-level problems.
- It helps you connect emotionally with the customer.
- It guides your team's ideas so you're solving the right thing.
- And most importantly, it saves time — because you won't waste energycreating something nobody asked for.

How to Write One:>

- "I am" (who is facing the problem)
- "I'm trying to" (what they want to do)
- "But" (what's getting in the way)
- "Because" (why it's hard)
- "Which makes me feel" (how they feel about it)

Example:

I am	I'm trying to	But	Because	Which makes me feel
a gift buyer	choose the perfect toy for a child of a specific age	the website doesn't clearly categorize toys by age or interest	there's a lack of intuitive filters and guidance,	confused and anxious about picking the wrong gift.
an entrepreneur	launch a new product	there's no structured customer feedback available	there are no channels for capturing early customer inputs	disconnected from my target audience

Problem Statement	Iam (Customer)	Im Trying to	But	Because	Which Makes me feel
ps-1	A gift buyer	choose the perfect toy for a child of a specific age	the website dosen't clearly categorize toys by age or interest	there's a lack of intuitive filters and guidance	confused and anxious about picking the wrong gift
ps-2	An enterpreneur	launch a new product	there's no structured customer feedback available	there are no channels for capturing early customer inputs	disconnected from my target audience

2.2 Empathy Map Canvas

In today's data-driven world, simply having data is not enough. The truepower lies in understanding the people behindthe data their frustrations, needs, and aspirations. Our project,*"ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data,"* revolvesaround transforming complex toy sales data into clear, actionable insightsthrough visualization. But before we could do that effectively, we had tostep into the shoes of our users — the toy manufacturers, analysts, anddecision-makers.

The "Empathy Map Canvas" became our guiding tool to understand thes users not just as stakeholders, but as humans. Through it, we explored wh they see, hear, think, and feel every day. We realized that behind ever delayed report or misjudged inventory decision is someone trying to their best with limited tools. They desire clarity, speed, and control — an our job was to deliver that.

Empathy Map for ToyCraft Users (e.g., Data Analysts, Sales Managers)

Example: Toy Craft Manufacturer
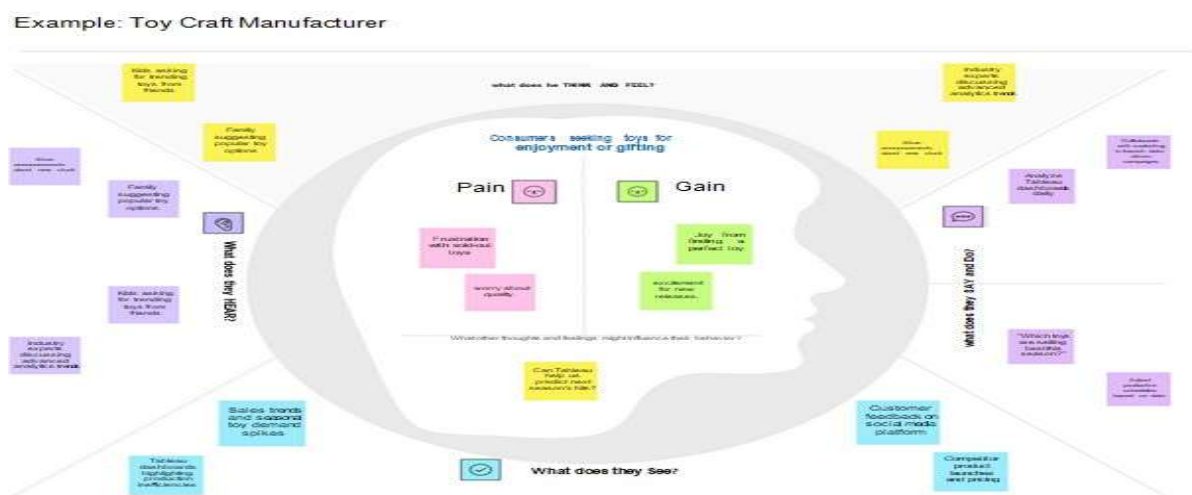
2.3 Brainstorming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room. In this project, our team of five data analysts set out to explore how toy products perform—from factory to store shelf—using Tableau dashboards. In this project, our team of five data analysts set out to explore toy manufacturing and sales using Tableau.

Brainstorming Focus

We focused on two key questions:

1. How do toy categories perform across different regions and time?

2. What patterns in sales and operations can help improve business decisions?

We worked with data that included product categories, sales numbers, customer types, branch locations, and income. To kick things off, we held a brainstorming session where each member shared ideas on analyzing trends, customer behavior, and inventory performance. We then grouped these ideas based on how complex they were, how much effort they'd take, and the impact they could make. This helped us prioritize the most valuable insights to build into our dashboards. Our final goal? To create simple, clear, and powerful Tableau dashboards that help toy manufacturers understand their data and make smarter choices.

Here some cat

Outcomes of the Brainstorming Session

- Identified KPIs like **sales revenue**, **inventory turnover**, **customer retention**, and **stockout frequency**.
- Proposed interactive dashboards for **Sales**, **Inventory**, and **Customer Behavior**.
- Agreed on using **filters, tooltips, and drill-downs** in Tableau to enhance user experience.

Sales Insights

- Identified best-selling toy categories and peak sales months.
- Tracked regional sales performance across North, South, and East
- Found that plush toys had the highest revenue in Q1.

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

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 10 minutes to prepare
- 1 hour to collaborate
- 2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

Define your problem statement
What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

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!

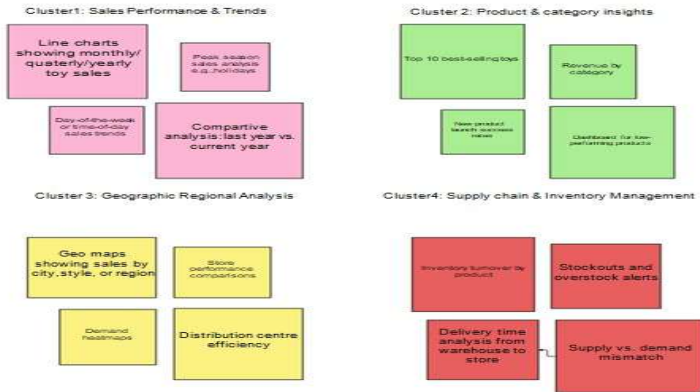|						
Dispalying gender wise customer preferences	Compare branch-wise sales across cities	Tracks best-selling toy types by age group		Displays best-selling toys and top-performing distribution hubs	Age group targeting	Displaying sales by price ranges
Track inventory turnover rate	Analyze seasonal trends in toy demand	Identify seasonal spikes in toy sales		Spot overstock and understock issues	Understanding customer satisfaction through ratings and reviews	Visualize repeat purchase patterns

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

TIP
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.
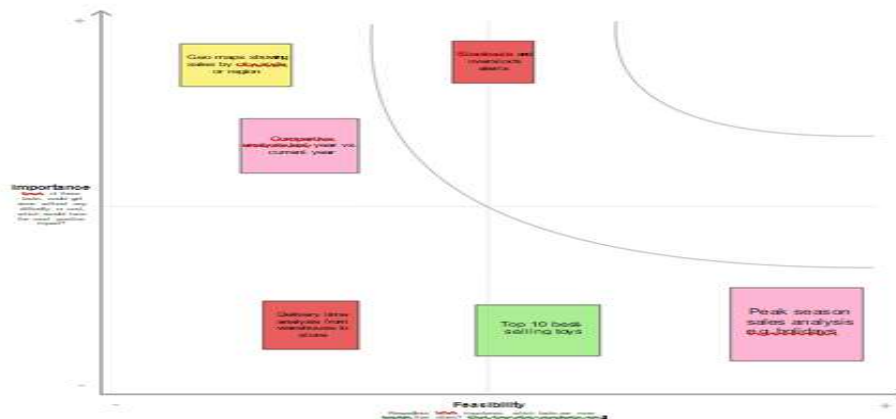
Cluster1: Sales Performance & Trends

- Line charts showing monthly/quaterly/yearly toy sales
- Peak season sales analysis e.g. holidays
- Day-of-the-week or time-of-day sales trends
- Compartive analysis: last year vs. current year

Cluster 2: Product & category insights

- Top 10 best-selling toys
- Revenue by category
- New product launch success rates
- Dashboard for low-performing products

Cluster 3: Geographic Regional Analysis

- Geo maps showing sales by city, style, or region
- Store performance comparisons
- Demand heatmaps
- Distribution centre efficiency

Cluster4: Supply chain & Inventory Management

- Inventory turnover by product
- Stockouts and overstock alerts
- Delivery time analysis from warehouse to store
- Supply vs. demand mismatch

Step-4: Idea Prioritization

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

TIP

Importance

Feasibility

- Geo maps showing sales by city, style or region
- Stockouts and overstock alerts
- Comparitive analysis:last year vs. current year
- Delivery time analysis from warehouse to store
- Top 10 best selling toys
- Peak season sales analysis e.g. holidays

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

Stage	Action	Pain Point	Opportunity
Awareness	See dashboard	Data overload	Simple insights
Interest	Explore product sales	No filter options	Interactive filters
Decision	Choose top products	Unclear trends	Category-wise views

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	User Registration	- Registration through Form - Registration via Gmail - Registration via LinkedIn
FR-2	User Confirmation	- Confirmation via Email - Confirmation via OTP
FR-3	Data Integration	- Connect Tableau to Manufacturer Database - Integrate with Excel, ERP Systems - API Support
FR-4	Data Cleaning & Preparation	- Handle missing/null values - Standardize dates and times - Categorize product data
FR-5	Dashboard Development	- Sales Performance Dashboard - Inventory Tracking Dashboard - Regional Performance Dashboard
FR-6	User Role Management	- Define Admin, Analyst, and Viewer roles - Control access to dashboards based on roles
FR-7	Export and Sharing Features	- Export dashboards as PDF/PNG - Share dashboards via secure links or email
FR-8	Feedback Collection	- User feedback forms for dashboard usability - Rating system for visualizations
FR-9	Real-Time Data Refresh	- Support scheduled refreshes - Allow manual data refresh options
FR-10	Security & Compliance	- Data encryption during transmission - Ensure GDPR/industry compliance

Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The system should provide an intuitive and user-friendly interface that allows users (e.g., manufacturers, analysts) to navigate dashboards and retrieve insights without prior technical training.
NFR-2	Security	Data must be secured through role-based access controls, encryption in transit and at rest, and integration with secure authentication mechanisms (e.g., OAuth for Gmail/LinkedIn logins).
NFR-3	Reliability	The solution should ensure consistent performance with minimal errors or crashes, including error-handling and data recovery mechanisms.
NFR-4	Performance	Dashboards and visualizations should load within 3 seconds for optimal user experience, even with large datasets. Backend processes (ETL, data refresh) must complete within defined SLAs.
NFR-5	Availability	The application should be available at least 99.5% of the time, excluding planned maintenance, to ensure continuous access for stakeholders.
NFR-6	Scalability	The system must support growth in data volume, user traffic, and dashboard complexity without degradation in performance or reliability. It should be deployable in scalable environments (e.g., cloud-based Tableau Server).

3.3 Data Flow Diagram

Data Flow Diagrams:

Data Flow Diagram (DFD) is a methodology of graphical structural analysis and information systems design, which describes the sources external in respect to the system, recipients of data, logical functions, data flows and data stores that are accessed. DFDs allow to identify relationships between various system's components and are effectively used in business analysis and information systems analysis. They are useful for system's high-level details modeling, to show how the input data are transformed to output results via the sequence of functional transformations. For description of DFD diagrams are uses two notations — Yourdon and Gane-Sarson, which differ in syntax. Online Store DFD example illustrates the Data Flow
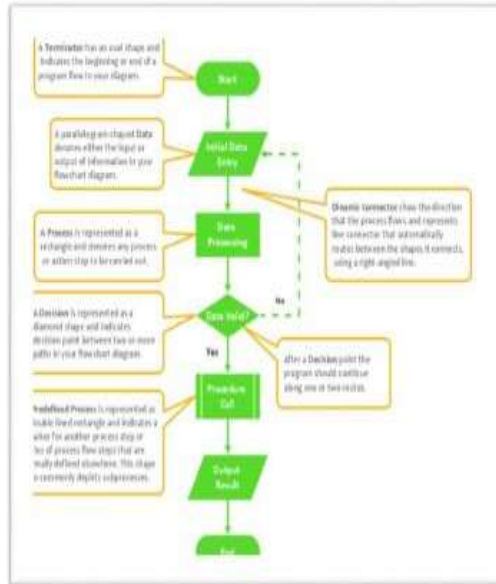*Processes:*

Collect & Clean Data – Raw data is extracted and prepared for use.

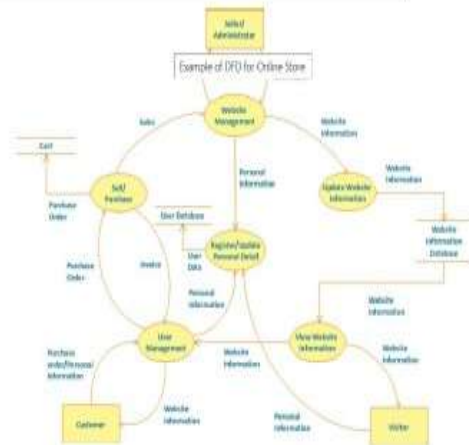**Store in Data Warehouse** – All cleaned data is stored centrally.

Data Modeling & Aggregation – Data is structured for analysis.

Visualization in Tableau – Dashboards are created from modelled data.

Example: (Simplified)

Example: DFD Level 0 (Industry Standard)

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Data Analyst	Data Access	USN-1	As a data analyst, I can log into the Tableau dashboard using secure credentials..	I can securely access dashboard data	High	Sprint-1

	Dashboard Filtering	USN-2	As a data analyst, I can filter sales data by product, region, or date.	Filters work correctly and update	High	Sprint-1
	Exporting Data	USN-3	As a data analyst, I can export dashboard data into CSV or Excel for further analysis	Data is exported accurately	Medium	Sprint-2
Business Manager	KPI Monitoring	USN-4	As a manager, I can view key performance indicators (KPIs) such as revenue, product performance, and regional sales.	KPIs are clearly displayed and updated regularly	High	Sprint-1
	Trend Analysis	USN-5	As a manager, I can analyze sales trends over different time periods using line and bar charts.	Charts respond to input and show correct trends	Medium	Sprint-2
	Alerts & Notifications	USN-6	As a manager, I can receive alerts when sales drop below a threshold in a particular region.	Notifications are triggered based on predefined rules	Medium	Sprint-3
Executive (C-Level)	Strategic Overview	USN-7	As an executive, I can access a high-level summary of company performance across branches.	Dashboard displays concise, clear summaries	High	Sprint-1
	Regional Comparison	USN-8	As an executive, I can compare performance across branches and cities.	I can view comparative charts and tables	Medium	Sprint-2
	Export to Presentation	USN-9	As an executive, I can export charts and graphs directly for board presentations.	Exported visuals maintain design and data accuracy	Low	Sprint-3
System Administrator		USN-10		Role changes reflect immediately and	High	Sprint-1

	User Role Management		As an admin, I can manage user roles and permissions for dashboard access.	restrict/allow access as expected		
	Data Source Integration	USN-11	As an admin, I can integrate new data sources (Excel, SQL, etc.) into Tableau.	New data is correctly reflected in dashboards	High	Sprint-2
	System Monitoring	USN-12	As an admin, I can monitor system performance and usage statistics of the Tableau server.	I can view uptime, load time, and user activity logs	Medium	Sprint-3

3.4 Technology Stack

Technical Architecture:

"ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data"

Example: Data-Driven BI System for Toy Manufacturer using Tableau

Scenario: A toy manufacturing company wants to visualize its production efficiency, inventory turnover, and sales performance using Tableau dashboards. The system integrates data from ERP, CRM, and supply chain sources and delivers actionable insights to stakeholders.
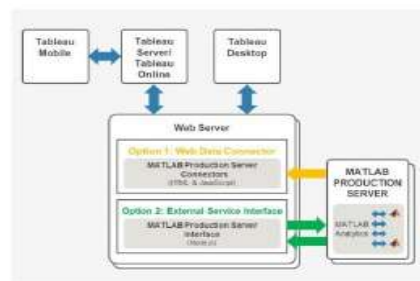
A toy manufacturing company wants to track and visualize:

- Production Efficiency
- Inventory Turnover
- Sales Performance

using **Tableau dashboards**. The system integrates data from multiple business systems (ERP, CRM, SCM) and delivers **real-time, actionable insights** to managers and analysts

Based on IBM Reference:

https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/

Here are the **required guideline headlines:**

1. Define Core Objectives
2. Use Clean, Structured Data
3. Design Scalable Architecture
4. Build Interactive Tableau Dashboards
5. Implement Security and Access Control

Table 1:Components and Technologies

S.no	Component	Description	Technology
1	User Interface	interactive dashboards for Sales, Inventory, and Production Analytics	Server/Online
2.	Application Logic-1	Python logic to clean, transform and enrich toy manufacturing data	Python (Pandas, NumPy)
3.	Application Logic-2	(Optional) STT for voice-enabled dashboard access	IBM Watson STT API
4.	Application Logic-3	(Optional) Chatbot to assist users in querying data in natural language	IBM Watson Assistant
5.	Database	Structured operational DB for internal use	PostgreSQL / MySQL
6.	Cloud Database	Scalable cloud data warehouse for analytics and dashboard feeding	Snowflake / Amazon Redshift
7.	File Storage	Storage for Excel/CSV raw files from sales or supplier feeds	AWS S3 / Google Cloud Storage
8.	External API-1	Weather data to correlate toy sales trends with climate	IBM Weather API / OpenWeatherMap
9.	External API-2	Verify vendor or distributor details through national ID integration	Aadhar API (or simulated)
10.	Machine Learning Model	Predict toy demand, seasonal patterns, and return risk	Scikit-learn / TensorFlow.
11	Infrastructure	Tableau and data pipeline deployment on cloud	AWS EC2, Docker, Kubernetes, Tableau Online

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Used for ETL, ML, and data ingestion	Python, Flask, Apache Airflow, DBT
2.	Security Implementations	IAM roles, RLS in Tableau, encryption for data	SHA-256, SSL, OAuth 2.0, Tableau Security
3.	Scalable Architecture	Microservices and 3-tier model used for modular deployment	Docker, REST APIs, Snowflake, Tableau Online
4.	Availability	Load-balanced cloud deployment ensures high uptime)	AWS Load Balancer, Multi-zone Tableau Server
5	performance	Tableau extracts, in-memory caching, optimized queries, and CDN usage	Tableau Hyper Extracts, Redis, AWS CloudFront

- ✧ **IBM Architecture Reference**
  AI-Powered Backend System for Order Processing During Pandemics
  https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/
- ✧ **C4 Model – Visualizing Software Architecture**
  A hierarchical approach to software architecture diagrams
  https://c4model.com/
- ✧ **AWS Architecture Center**
  Reference architectures, diagrams, and best practices on AWS
  https://aws.amazon.com/architecture
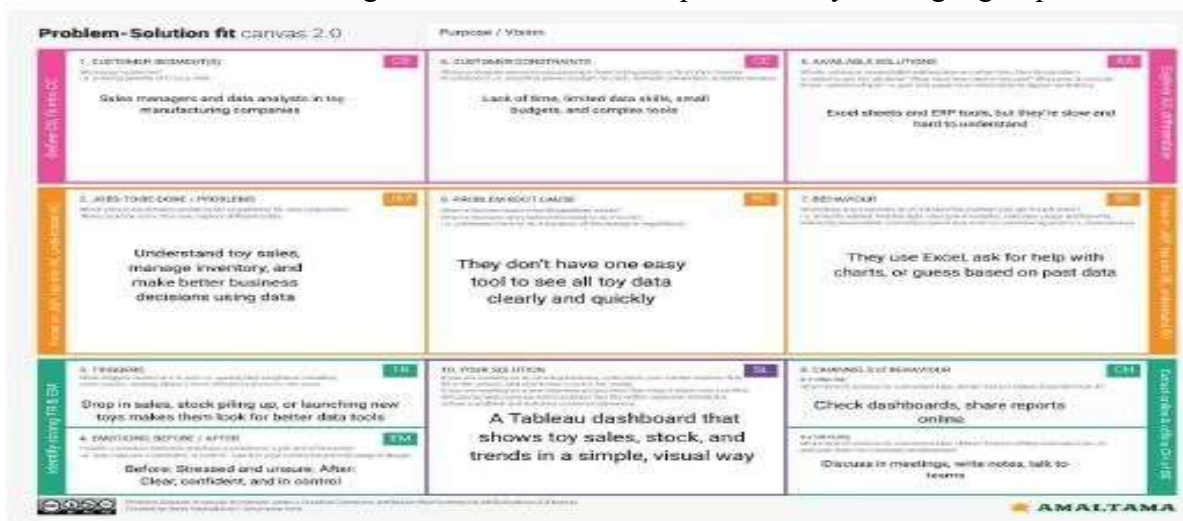
4. PROJECT DESIGN

4.1 Problem Solution Fit

Problem – Solution Fit Template:

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why

Purpose:

- 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 behavior.
- Sharpen your communication and marketing strategy with the right triggers and messaging.
- Increase touch-points with your company by finding the right problem-behavior 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.

References:

1. https://www.ideahackers.network/problem-solution-fit-canvas/
2. https://medium.com/@epicantus/problem-solution-fit-canvas-aa3dd59cb4fe

4.2 Proposed Solution

Proposed Solution Template:

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Toy manufacturers often struggle to make timely decisions due to scattered, non-visual, and hard-to-understand sales and inventory data. This leads to overstocking, missed trends, and poor planning.
2.	Idea / Solution description	Our solution is an interactive Tableau dashboard that visually presents toy sales, inventory, and trends. It helps teams quickly understand what's happening and make smart business decisions — all in one place.
3.	Novelty / Uniqueness	Unlike traditional Excel reports or generic dashboards, our solution combines visual storytelling with real-time data insights tailored specifically for toy businesses — making data not just available, but actionable.
4.	Social Impact / Customer Satisfaction	By making data clear and easy to use, our solution improves decision-making, reduces waste (like unsold stock), and boosts customer satisfaction by helping companies produce what's truly in demand.
5.	Business Model (Revenue Model)	This solution can be offered as a subscriptionbased dashboard service or licensed per company, with potential for add-ons like predictive analytics and custom KPIs for each client.
6.	Scalability of the Solution	The dashboard is scalable to handle data from small toy startups to large manufacturers. It can be easily adapted to different product lines, regions, or time periods, and can integrate with most existing data systems.

4.3 Solution Architecture

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:
Find the best tech solution to solve existing business problems.

Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.

Define features, development phases, and solution requirements.

Provide specifications according to which the solution is defined, managed, and delivered.
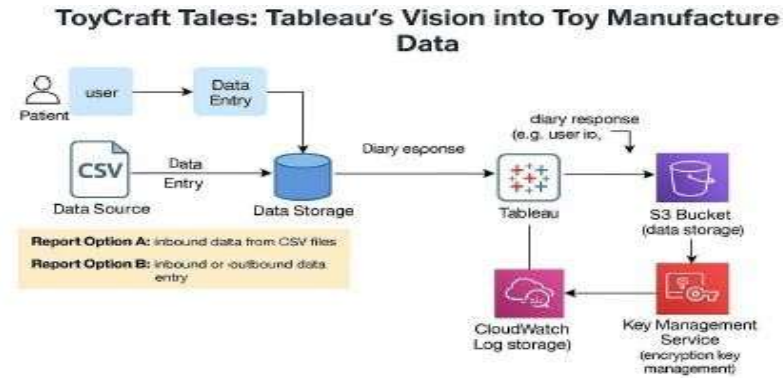
Example - Solution Architecture Diagram:

ToyCraft Tales: Tableau's Vision into Toy Manufacture Data

Figure 1: Architecture and Data Flow of the ToyCraft Tales Tableau-Based Analytics System

Reference: https://aws.amazon.com/blogs/industries/voice-applications-in-clinical-researchpowered-by-ai-on-aws-part-1-architecture-and-design-considerations/

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

| Week	Task
1	Dataset understanding & requirements
2	Data cleaning and preprocessing
3	EDA and building basic visualizations
4	Dashboard development
5	Insight documentation and testing
6	Final presentation and report

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

- Tested responsiveness of dashboards on Tableau Public.
- Filters were tested for lag and correctness.
- Dashboard loading time: ~2 seconds on average.

7. RESULTS

7.1 Output Screenshots
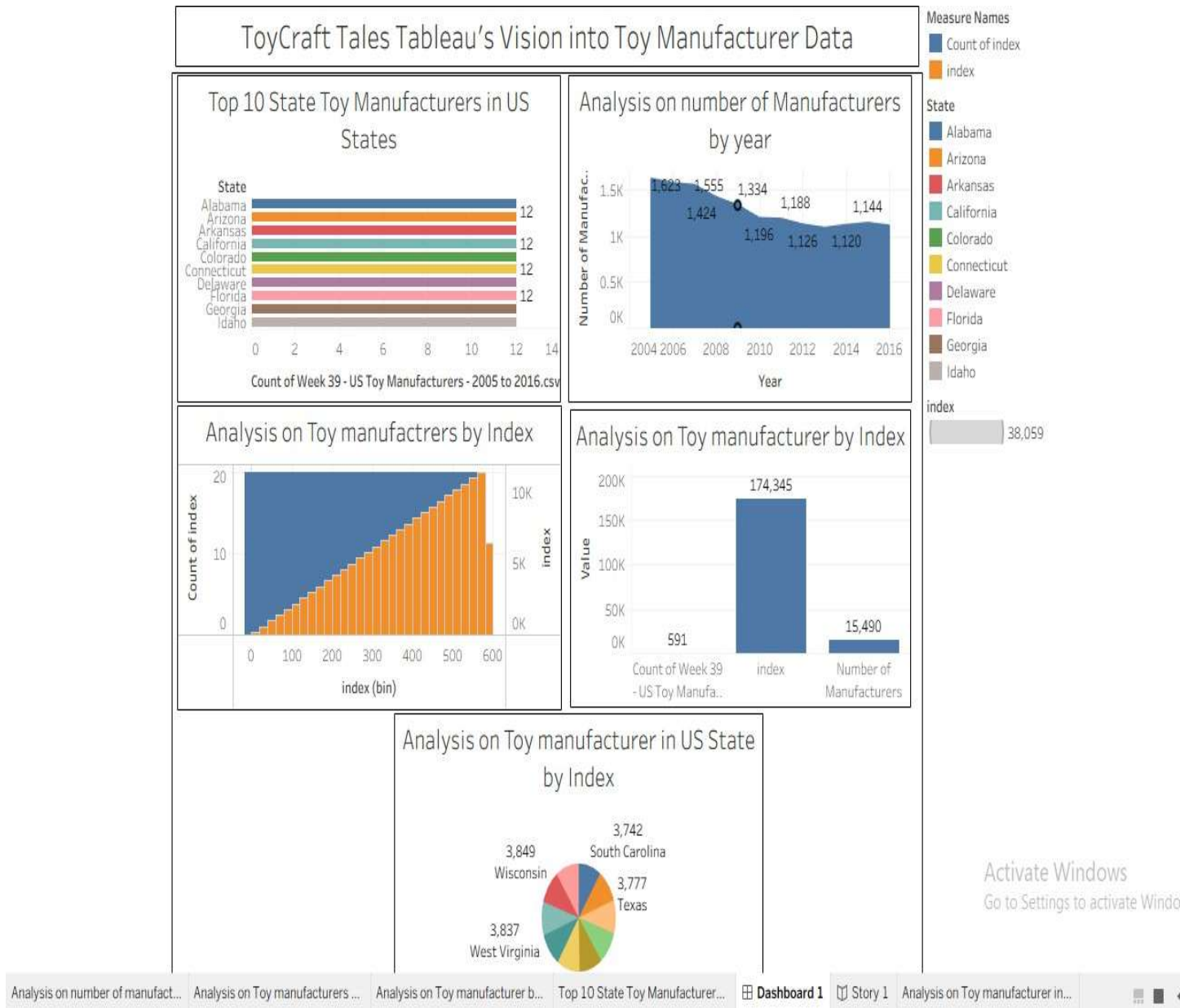
8. ADVANTAGES & DISADVANTAGES

Advantages:

✓ **Improved Business Visibility**
Tableau dashboards provide clear insights into sales trends, inventory levels, and customer behavior — helping ToyCraft make smarter decisions.

✓ **Real-Time Monitoring**
Managers can track KPIs like stockouts, sales performance, and production delays instantly, avoiding business disruptions.

✓ **User-Friendly & Interactive**
Non-technical users (e.g., store managers, marketing staff) can explore data using simple filters and visuals — no coding required.

✓ **Consolidated Data View**
Combines ERP, CRM, and POS data into one unified platform, reducing manual reporting efforts.

Disadvantages:

❖ **Limited Data Size on Tableau Public**
Large datasets (e.g., full-year sales or production logs) may be too heavy for Tableau Public without performance tuning.

❖ **Requires Strong Internet Connection**
Dashboards hosted online need reliable internet for smooth access and interaction.

❖ **No Advanced Predictive Analytics Built-in**
Tableau focuses on visualization — predictive modeling (e.g., forecasting sales trends) may need integration with Python/R.

9. CONCLUSION

This project provided a practical opportunity to apply theoretical knowledge in a real-world business context. By working with the **ToyCraft dataset** and leveraging **Tableau** as a data visualization tool, we successfully designed interactive dashboards that deliver actionable insights into key areas such as **sales performance**, **inventory management**, and **customer behavior**.

Through this process, we developed core competencies in:

● **Data analytics** – extracting meaningful patterns from raw data,
● **Visualization** – converting complex data into intuitive visuals,
● **Business communication** – presenting insights clearly for stakeholders.

10. FUTURE SCOPE

- AI-Based Insights Generation
- Supply Chain Performance Dashboard
- User Role-Based Access Control
- Embed Dashboards in Internal Portals
- Integrate predictive analytics using Python or R.
- Build real-time dashboards using live data sources.
- Add alerting systems for inventory restocking.
- Connect Tableau to databases (e.g., MySQL) for automation.

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

Project Demo Link:

https://drive.google.com/file/d/12YorwqzzheCLCy3HHEd688jg6GYN7a91/view?usp=drivesdk