

# PROJECT REPORT

Team ID: LTVIP2026TMIDS36154

## 1. INTRODUCTION

### 1.1 Project Overview

The project titled “**Heritage Treasures: An in Depth Analysis of UNESCO World Heritage Sites**” is a comprehensive data visualization initiative developed using Tableau.

This project focuses on analyzing UNESCO World Heritage Sites data to uncover meaningful patterns related to geographical distribution, inscription trends, heritage categories, and endangered status.

By transforming raw heritage data into interactive dashboards, the project provides a dynamic platform for exploration, comparative study, and data-driven storytelling.

### 1.2 Purpose

The purpose of this project is to design and develop an interactive analytical dashboard system that transforms UNESCO World Heritage data into an accessible, understandable, and visually engaging format. By replacing static spreadsheets with dynamic, filter-enabled dashboards, the project enables users to analyze heritage data efficiently and intuitively. The platform supports informed decision-making by allowing stakeholders such as students, researchers, and policymakers to explore patterns, trends, and comparative insights in a structured and interactive environment.

### 1. Executive Summary

The project presents a structured and interactive Tableau dashboard system designed to visualize UNESCO World Heritage Sites data in a clear, engaging, and analytical manner. The developed solution consists of multiple dashboards, including a Global Overview Dashboard, Regional Comparison Dashboard, Category Distribution Dashboard, and Year-wise Trend Analysis Dashboard. These dashboards collectively provide a comprehensive view of heritage site distribution, classification, and historical inscription trends. The system incorporates dynamic filters for region, country, category, and year, enabling users to explore the dataset interactively and derive meaningful insights. Through this approach, the project enhances understanding of global heritage representation and supports data-driven exploration.

## 2. Project Purpose

To design and develop an interactive analytical dashboard system that makes UNESCO World Heritage data:

- Accessible
- Understandable

- Visually engaging
- Insightful for decision-making

The project replaces static spreadsheets with dynamic, filter-enabled dashboards.

### **3. Project Objectives**

- Visualize global distribution of UNESCO sites using geospatial mapping
- Analyze inscription trends over years
- Compare heritage categories (Cultural, Natural, Mixed)
- Identify endangered heritage sites
- Enable region-wise and country-wise comparison
- Create interactive story points in Tableau
- Provide exportable and shareable insights

## **4. Methodology**

### **4.1 Data Collection**

Data was obtained from UNESCO World Heritage datasets in Excel format.

### **4.2 Data Cleaning & Preprocessing**

- Handled missing values
- Standardized column formats
- Categorized heritage types
- Created calculated fields for trend analysis

### **4.3 Dashboard Development**

- Designed in Tableau Desktop
- Created multiple visualizations
- Applied filters and parameters
- Designed interactive story flow

### **4.4 Testing & Validation**

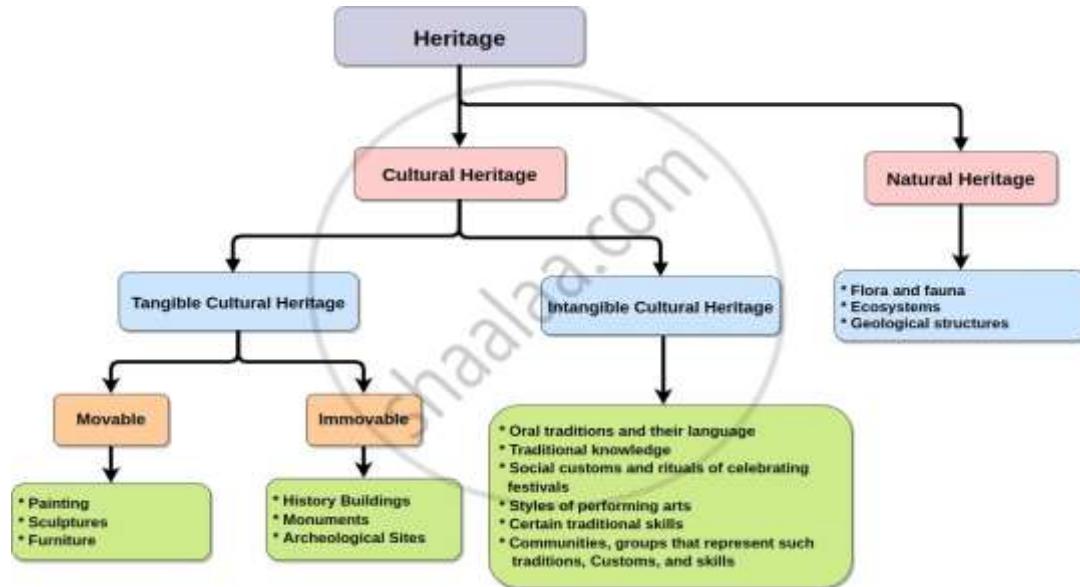
- Verified data accuracy
- Tested filter functionality
- Checked dashboard performance

## **5. Technologies Used**

- Tableau Desktop & Tableau Server
- Alteryx for ETL processes
- UNESCO World Heritage Sites Data (CSV/API)
- Microsoft Excel

- Tableau Story Feature
- Geospatial Mapping (Tableau Built-in Geo roles)

## 2.2 Empathy Map Canvas



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## Brainstorming

| S.No | Idea Description   | Category         |
|------|--|------------------|
| 1.   | Visualize average sale price by SalePriceBin                     | Pricing Insights |
| 2.   | Analyze impact of number of bedrooms on sale price               | Property         |
| 3.   | Explore relationship between Total Area and Price (scatter plot) | Based Pricing    |
| 4.   | Group insights by Zipcode Clusters                               | Geographical     |
| 5.   | Build a Story in Tableau for narrative                           | Storytelling     |

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## 3. REQUIREMENT ANALYSIS

### 3.1 Customer Journey map

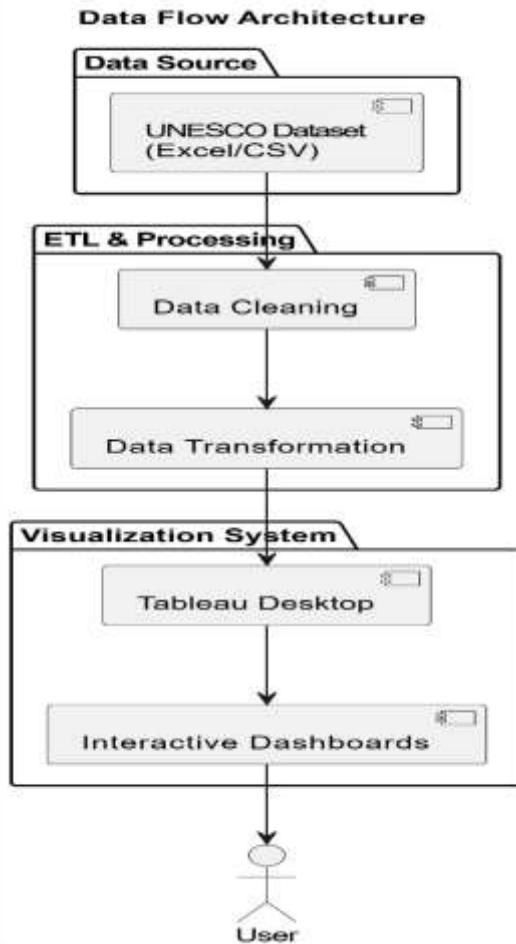
| Stage     | User Action   | Touchpoints  | User Goals  | Emotions            | Opportunities  |
|-----------|---|--|---|---------------------|--|
| Awareness | Learns about the dashboard via social media, academic circles, tourism websites, or a UNESCO newsletter | Blog post, LinkedIn, Email, campaign, Tableau Public | Discover a reliable tool for exploring global heritage data | Curious, interested | Use visuals and storytelling to create a compelling first impression |

| Stage         | User Action  | Touchpoints                                      | User Goals   | Emotions                    | Opportunities   |
|---------------|--|--|--|-----------------------------|---|
| Consideration | Visits Tableau Public or website to understand the purpose of the dashboard                    | Landing page, Dashboard preview, Description box | Determine usefulness and usability                                   | Hopeful, slightly skeptical | Add clear, concise descriptions of use cases (tourism, research, education) |
| Engagement    | Interacts with filters: region, country, heritage type, year of inscription, endangered status | Tableau dashboard, Filters, Tooltips             | Explore specific insights and historical trends                      | Intrigued, engaged          | Ensure filters are intuitive; provide contextual tooltips and charts        |
| Analysis      | Compares sites by region, analyzes cultural vs. natural sites, downloads visualizations        | Charts, Tables, Download buttons                 | Derive insights for research, travel planning, or policy suggestions | Empowered, satisfied        | Enable export options (PDF/image), allow deeper drill-downs                 |

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## 3.2 Data Flow Diagram



The Data Flow Architecture illustrates the structured movement of data from the UNESCO dataset (Excel/CSV) through the ETL and processing layer, where data cleaning and transformation are performed. The processed data is then integrated into Tableau Desktop to generate interactive dashboards. Finally, the visualized insights are delivered to end users for analysis and decision-making.

### **3.3 Technology Stack**

#### **1. Data Source Layer:**

| <b>Component</b> | <b>Technologies / Tools Used</b>  |
|------------------|---|
| Data Source      | <ul style="list-style-type: none"><li>- UNESCO World Heritage Sites dataset (Excel / CSV)</li><li>- Official UNESCO published records</li><li>- Supplementary country-level information (optional enrichment)</li></ul> |

#### **2. Data Visualization Layer**

| <b>Component</b> | <b>Technologies/Tools Used</b>  |
|------------------|---|
| Dashboard Tool   | <ul style="list-style-type: none"><li>- Tableau Desktop for dashboard design and development</li><li>- Tableau Public for publishing and sharing dashboards</li></ul>   |
| Features         | <ul style="list-style-type: none"><li>- Interactive filters (Region, Country, Category, Year of Inscription)</li><li>- Geospatial world map using Tableau Geo Roles</li><li>- Bar charts, Line charts, KPI indicators, Highlight tables</li><li>- Story feature for guided insights</li></ul> |

#### **3. Data Storage Layer**

| <b>Component</b> | <b>Technologies/Tools Used</b>  |
|------------------|---|
| Storage Format   | <ul style="list-style-type: none"><li>- Excel file storage (Primary dataset)</li><li>- Tableau Extract (.hyper) for optimized performance</li></ul> |
| Data Handling    | <ul style="list-style-type: none"><li>- Structured tabular format</li><li>- Categorized heritage types and regional groupings</li></ul>             |

#### **4. Security & Access Control (If Published**

##### **Online)**

**Authentication** - Tableau Public profile access control (if shared)

- Tableau Server user permissions (if deployed privately)

**Data Access control** - Role-based access (if hosted internally)

- Row-level security (if required for restricted datasets)

#### **5. Data Processing & ETL Layer**

| <b>Component</b>           | <b>Technologies/Tools Used</b>  |
|----------------------------|---|
| <b>ETL / Data Cleaning</b> | <ul style="list-style-type: none"><li>- Microsoft Excel (initial formatting and cleaning)</li><li>- Python (Pandas) for optional advanced preprocessing</li><li>- Tableau Calculated Fields for transformations</li></ul> |
| <b>Data Enrichment</b>     | <ul style="list-style-type: none"><li>- Country codes and regional classification</li><li>- External demographic or geographic indicators (if integrated)</li></ul>   |

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## PROJECT DESIGN

### 4.1 Problem Solution fit

## Problem-Solution Fit for Heritage Treasures:

An In-Depth Analysis of UNESCO World Heritage Sites in Tableau

### PROBLEM

- Lack of accessible visualizations
- Limited awareness of heritage sites
- Challenges in analyzing complex data

### SOLUTION

- Interactive and accessible dashboards
- Comprehensive insights into heritage sites
- Simplified data exploration and analysis

## 4.2 Proposed Solution

### 1. Objective:

To design and implement an interactive data visualization system using Tableau that transforms UNESCO World Heritage Sites data into meaningful, analytical, and user-friendly dashboards. The solution aims to improve global heritage awareness, enable comparative analysis, and support data-driven insights for research and academic exploration.

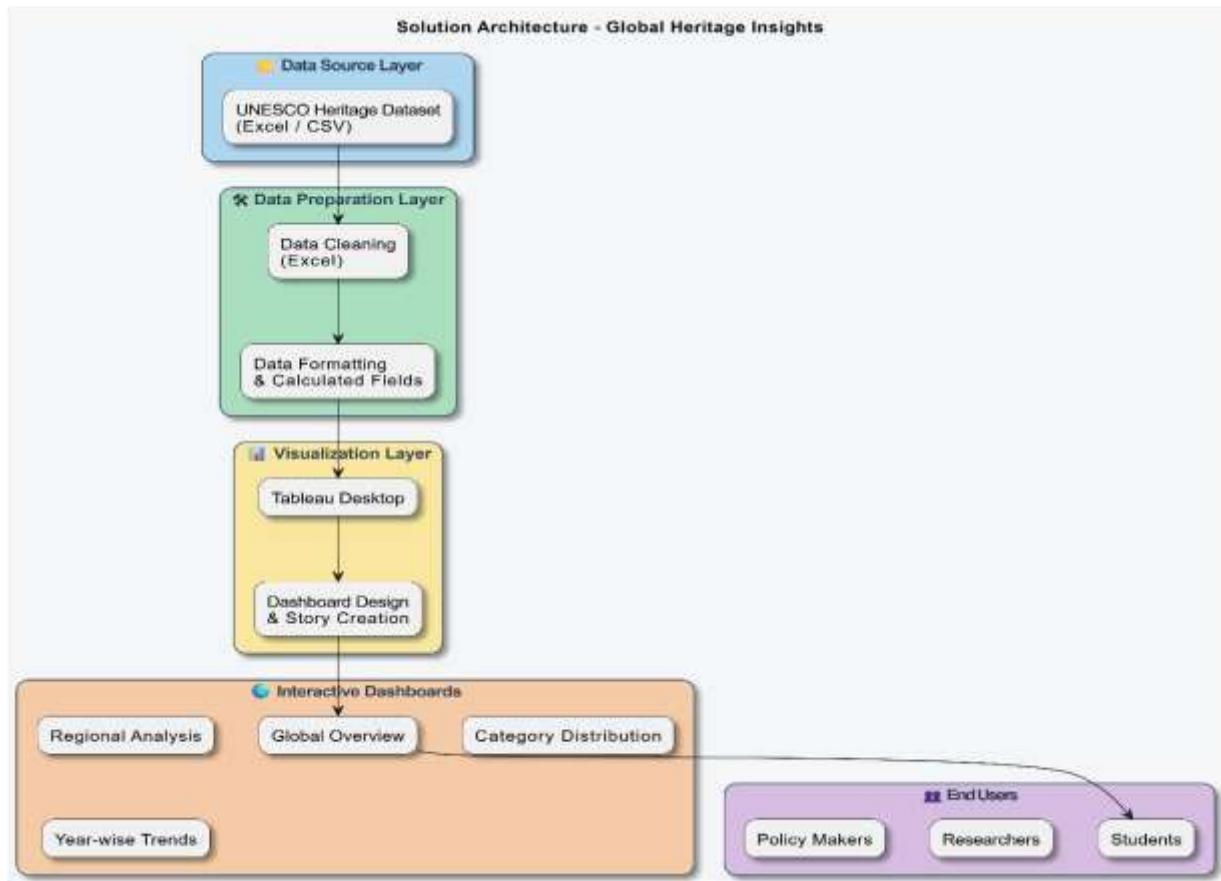
### 2. Key Features:

- **Global Distribution Mapping:** Interactive world map displaying heritage sites across countries & continents using Tableau geospatial features.
- **Year-wise Trend Analysis:** Dynamic timeline visualization to analyze the growth of heritage site inscriptions over different years.
- **Category-Based Classification:** Visual breakdown of Cultural, Natural, and Mixed heritage sites with comparative charts.
- **Endangered Site Identification:** Highlighting heritage sites marked as endangered for awareness and preservation focus.
- **Interactive Filtering System:** Custom filters enabling users to analyze data by region, country, category, and year of inscription.
- **Comparative KPI Dashboard:** Country-level and region-level performance indicators showing total sites, category distribution, and growth patterns

### 3. Tools & Technology:

- Tableau Desktop for dashboard creation, story development, and interactivity
- Microsoft Excel / CSV files for data cleaning, formatting, and preprocessing
- Tableau Calculated Fields for transformations and derived metrics

## 4.3 Solution Architecture



The Solution Architecture represents the structured flow of data from the UNESCO dataset (Excel/CSV) through data cleaning and preparation stages. The processed data is then visualized using Tableau dashboards and story features. Finally, the interactive insights are delivered to end users such as students, researchers, and policymakers for analysis and decision-making.

## 5 PROJECT PLANNING & SCHEDULING

### 5.1 Project Planning

The project was executed using an Agile-based iterative development approach. The entire 6-month duration was divided into structured sprints focusing on data preparation, dashboard development, testing, and documentation. Each sprint included defined deliverables and measurable progress tracking through story points.

### Project Tracker for "Heritage Treasures" (Agile Format):

| Spirit | Task description   | Status    | Role          | Story Points | Remarks                        |
|--------|--|-----------|---------------|--------------|--------------------------------|
| 1      | Collect UNESCO dataset (Excel/CSV)                               | Completed | Data Analyst  | 3            | CSV/API sources                |
| 2      | Clean and preprocess raw data using Python                       | Completed | Data Engineer | 5            | Standardized columns, nulls    |
| 3      | Design data model & storage structure (PostgreSQL or flat files) | Completed | Data Engineer | 3            | With geospatial support        |
| 4      | Enrich data with GIS/Geo JSON info                               | Completed | GIS Analyst   | 5            | Coordinates and mapping layers |

Velocity Chart (Sprints vs Story Points Completed):

| Sprint | Planned Story Points | Completed Story Points |
|--------|----------------------|------------------------|
| 1      | 8                    | 8                      |
| 2      | 8                    | 8                      |
| 3      | 10                   | 5                      |
| 4      | 8                    | 0                      |
| 5      | 3                    | 0                      |

Burndown Chart Data (Ideal vs Actual):

| Day (Sprint-wise) | Ideal Remaining Points | Actual Remaining Points |
|-------------------|------------------------|-------------------------|
| Day 0             | 37                     | 37                      |
| Day 1             | 29                     | 29                      |
| Day 2             | 21                     | 21                      |
| Day 3             | 13                     | 16                      |
| Day 4             | 5                      | 11                      |

## 6 FUNCTIONAL AND PERFORMANCE TESTING

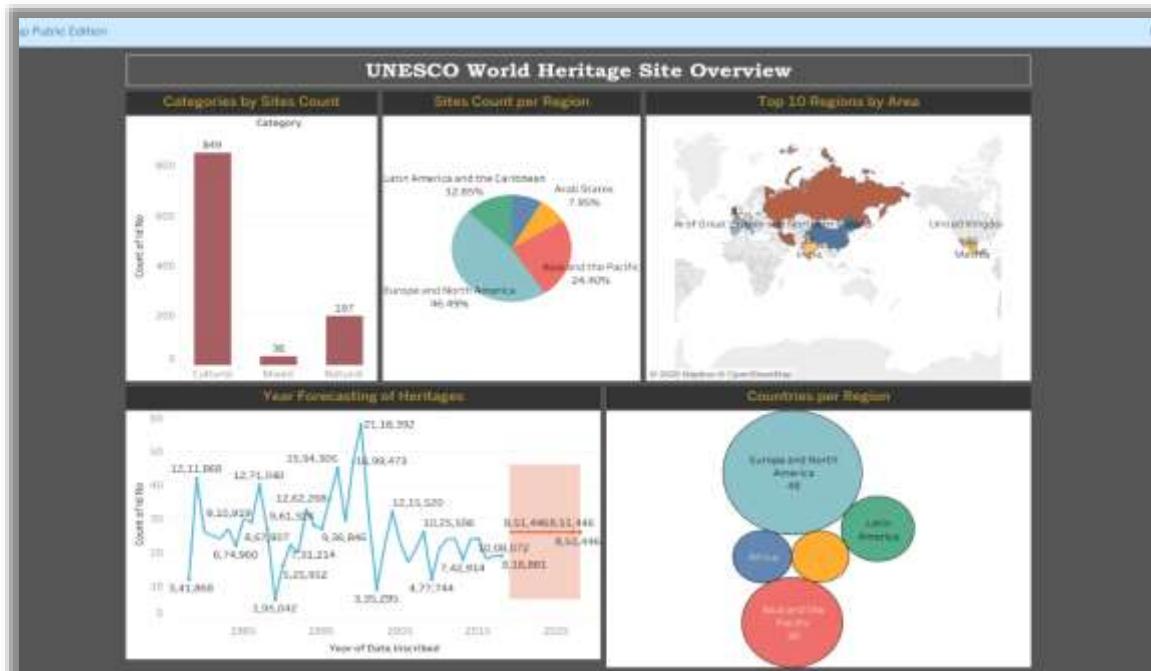
### 6.1 Performance Testing

| S.No. | Parameter          | Screenshot / Values  |
|-------|--------------------|--|
| 1.    | Data Rendered      | Data successfully loaded from cleaned Excel dataset containing UNESCO World Heritage Site details such as site name, country, region, category (Cultural/Natural/Mixed), year of inscription, & endangered status. More than 500+ records were visualized in Tableau dashboards. |
| 2.    | Data Preprocessing | Missing values were handled, column names standardized, and data types formatted correctly. Calculated fields were created for category grouping, regional classification, and year-wise trend analysis.   |

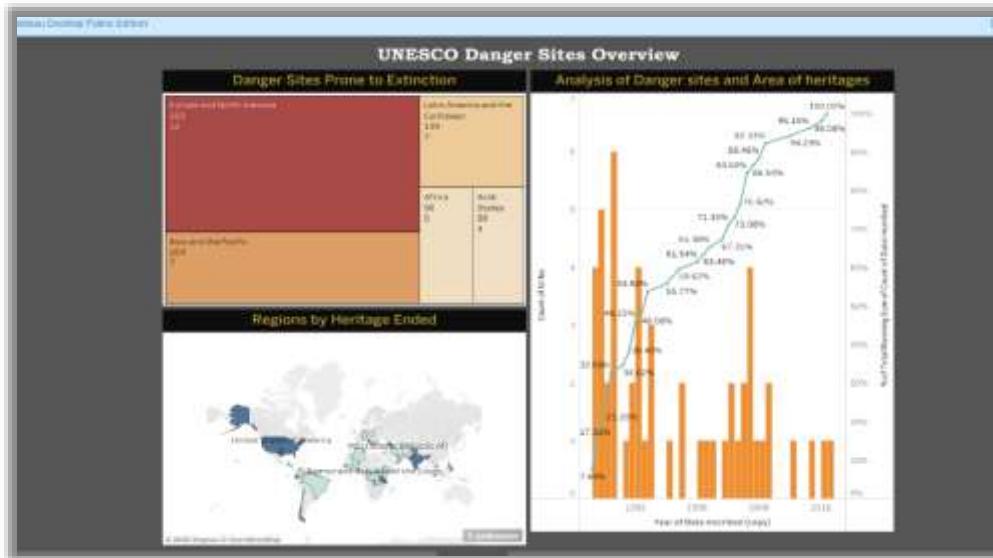
|    |                         |  |
|----|-------------------------|--|
| 3. | Utilization of Filters  | Interactive filters implemented for Region, Country, Heritage Category, and Inscription. Drop-down and multi-select filters enable dynamic dashboard exploration.  |
| 4. | Calculation fields Used | Calculated measures include total heritage sites per region, category-wise distribution, and yearly inscription trends to support comparative analysis.  |
| 5. | Dashboard design        | Developed <b>2 interactive dashboards</b> : (1) <i>UNESCO World Heritage Site Overview</i> – showing global distribution and category breakdown, and (2) <i>UNESCO Danger Sites Overview</i> – highlighting endangered heritage sites and their regional distribution. |
| 6. | Story Design            | Created <b>1 Tableau Story</b> integrating insights from both dashboards, presenting analysis of global heritage distribution and endangered site trends through story points.   |

## 7 RESULTS

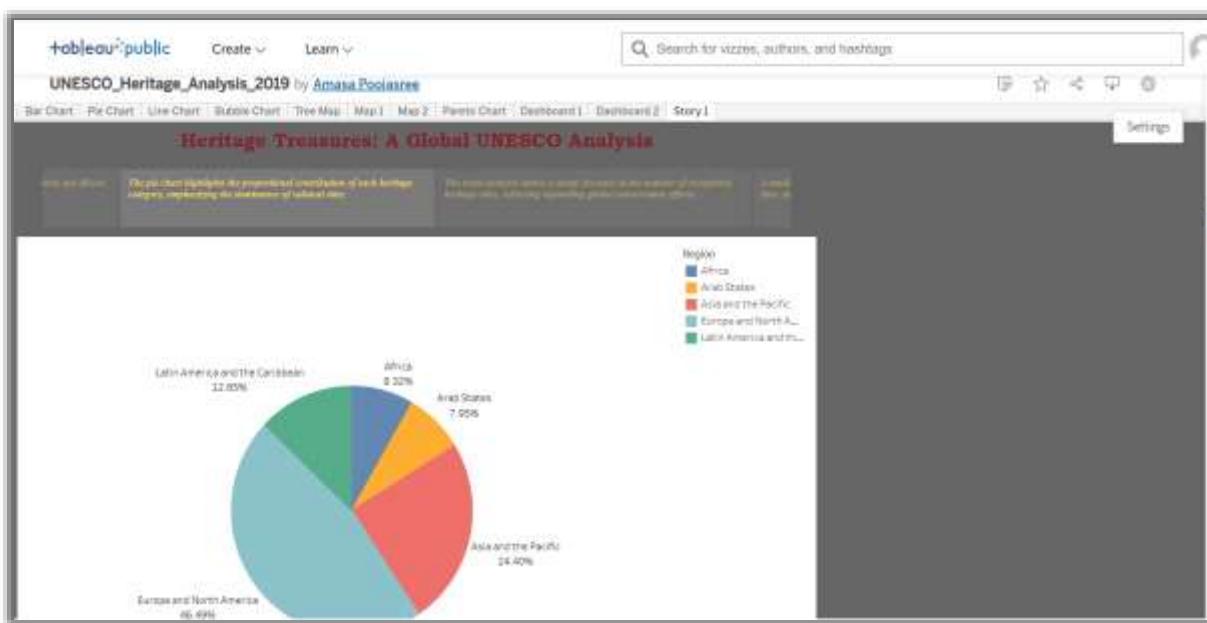
### 7.1 Output Screenshots



**Fig\_1: Dashboard -1**



**Fig\_2: Dashboard-2**



**Fig \_3: Story**

## **8 ADVANTAGES & DISADVANTAGES**

### **• ADVANTAGES:**

#### **1. Interactive Data Visualization:**

- Tableau offers dynamic dashboards that allow users to explore UNESCO World Heritage data interactively, improving user engagement and understanding.

#### **2. Enhanced Decision-Making:**

- Visual trends and patterns help historians, policymakers, and tourism boards make informed decisions regarding preservation, funding, and tourism development.

#### **3. Comprehensive Analysis:**

- Integration of multiple datasets (location, type, country, endangered status, etc.) provides a holistic view of the global heritage scenario.

### **• DISADVANTAGES:**

#### **1. Data Limitations:**

- The project relies heavily on the availability and accuracy of data from UNESCO and other sources. Incomplete or outdated data may skew results.

#### **2. Tableau Licensing Costs:**

- While Tableau Public is free, more advanced features (e.g., Tableau Server, Tableau Online) require paid licenses.

#### **3. Technical Constraints:**

- Some advanced analyses (e.g., machine learning or predictive modeling) are limited in Tableau and may require integration with Python/R.

## **9 CONCLUSION**

The project successfully demonstrates how data visualization techniques can transform raw UNESCO World Heritage data into a structured, interactive, and insightful analytical system. By leveraging Tableau's visualization capabilities, the study presents a clear understanding of global heritage distribution, inscription trends, category classifications, and regional comparisons. The developed dashboards not only simplify complex datasets but also enhance interpretability through geospatial mapping and interactive filtering mechanisms. This project highlights the importance of data-driven storytelling in heritage analysis and promotes informed exploration of cultural and natural assets worldwide. Overall, the system provides an efficient, scalable, and user-friendly platform that bridges the gap between raw data and meaningful insights.

## **10 FUTURE SCOPE**

### **1. Real-Time Data Integration**

- Enhance the dashboard by connecting it to live UNESCO data feeds or APIs to automatically update new heritage site inscriptions, status changes, and risk alerts without manual intervention.

### **2. Advanced Predictive Modeling**

- Integrate machine learning techniques using Python or R to analyze historical trends and predict potential endangered heritage sites, supporting early preservation planning and risk assessment.

### **3. Tourism & Socio-Economic Insights**

- Incorporate tourism statistics, visitor data, and regional economic indicators to evaluate the socio-economic impact of World Heritage Sites at both national and global levels.

### **4. Environmental & Risk Monitoring Analysis**

- Extend the analysis by integrating environmental datasets such as climate change indicators, natural disaster records, or urban expansion data to assess long-term threats to heritage conservation.

## **11 APPENDIX**

**Dataset Link:**

<https://www.kaggle.com/datasets/ujwalkandi/unesco-world-heritage-sites/data?select=whc-sites-2019.csv>

**GitHub Link:**

<https://github.com/AMASAPOOJASREE/Heritage-Treasures-An-In-Depth-Analysis-of-UNESCO-World-Heritage-Sites-in-Tableau>

**Project Demo Link:**

<https://drive.google.com/file/d/1WOOsMnM6XvDuYKuxVMNp2x0l8ipeE6td/view?usp=drivesdk>