PROJECT REPORT

1. INTRODUCTION

1.1 Project Overview:

Inflation plays a vital role in shaping economies, influencing purchasing power, market stability, and government policies. Over the years, inflation rates have fluctuated due to various factors such as policy changes, supply chain disruptions, global conflicts, and advancements in technology. This project utilizes Power BI to explore worldwide inflation patterns, offering valuable insights into economic shifts, regional disparities, and key contributing elements from a data-driven perspective.

1.2 Purpose:

1. Examine Inflation Trends – Analyze historical inflation data across different time periods and economic sectors to understand long-term patterns.

2. Identify Key Drivers – Investigate the major causes of inflation, including market demand, production costs, global trade, and financial policies.

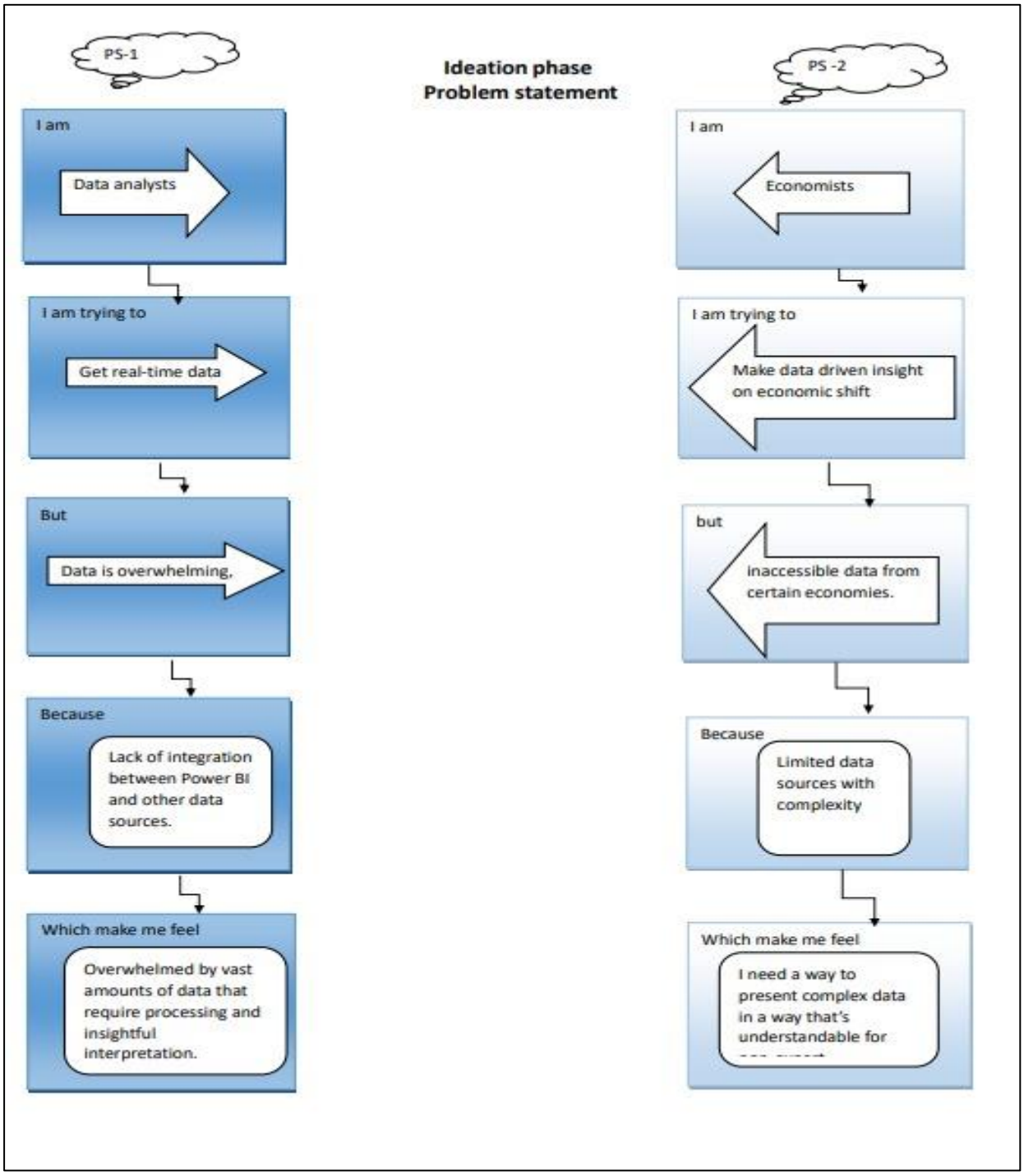
3. Compare Regional Variations – Study how inflation differs across various nations and economic zones, identifying significant trends and commonalities.

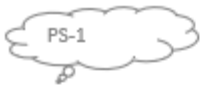
4. Assess Economic Impact – Evaluate how inflation affects employment, wages, cost of living, and overall economic growth.

5. Visualize Data with Power BI – Use Power BI to develop interactive dashboards, simplifying the interpretation of complex inflation data for better decision-making.

2. IDEATION PHASE

2.1 Problem Statement



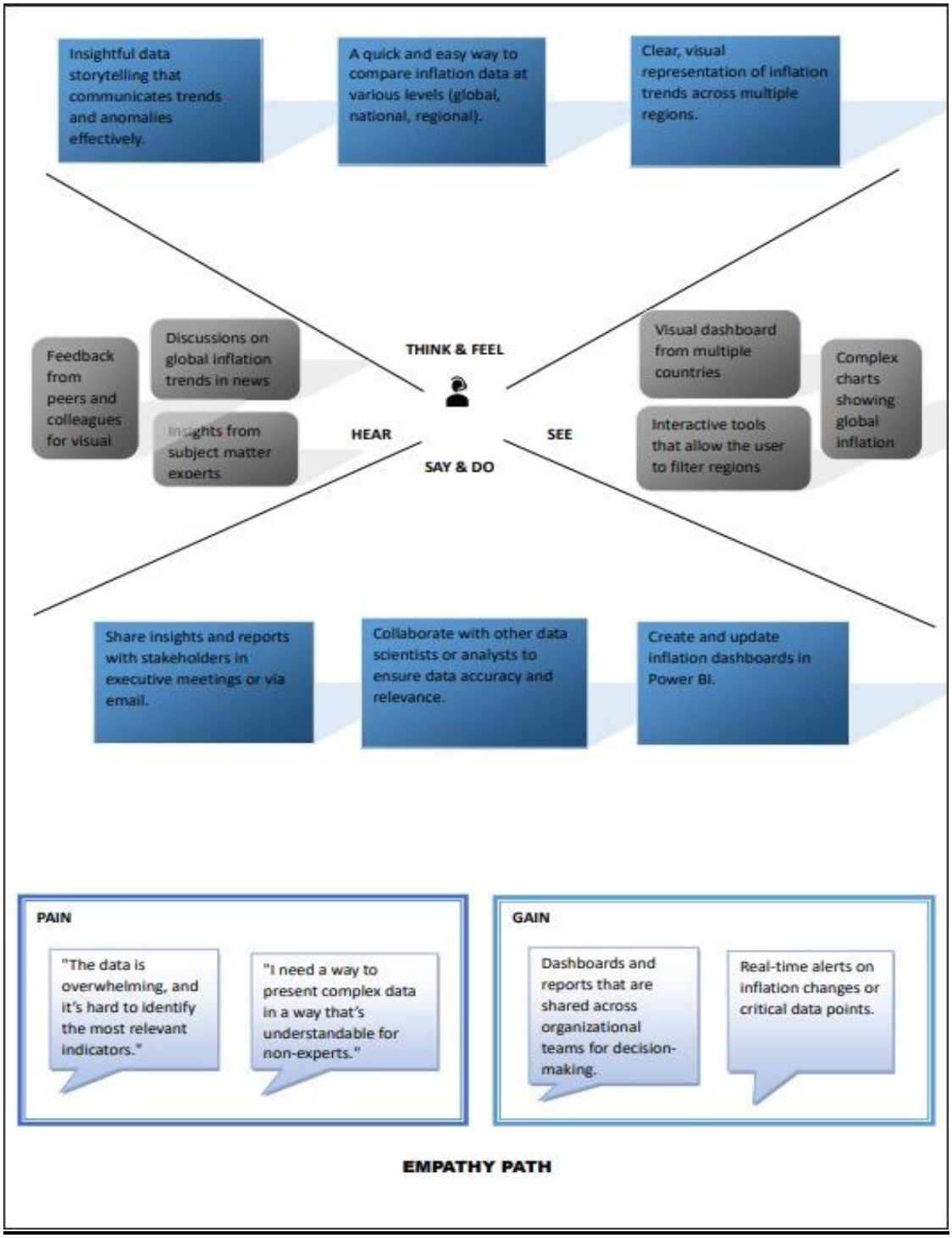


Ideation phase
Problem statement

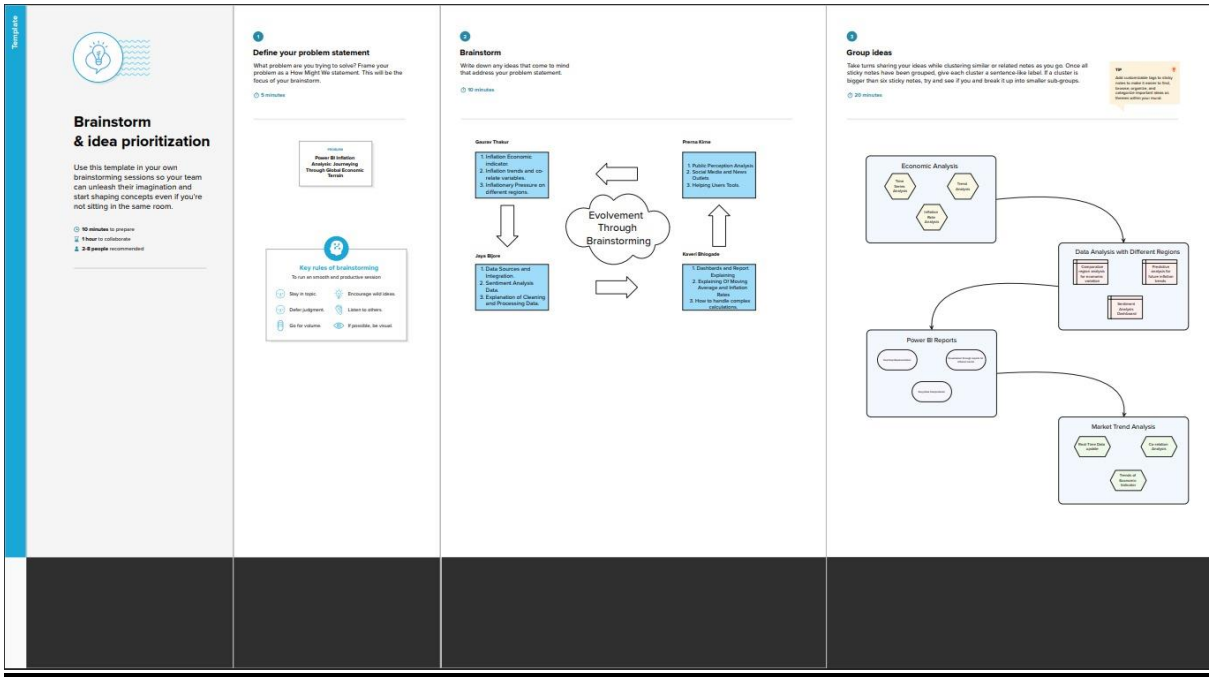
DATE	12 March 2025
TEAM ID	PNT2025TMID06643
PROJECT NAME	POWER BI INFLATION ANALYSIS ; JOURNEYING THROUGH ECONOMIC TERRAIN.
MAXIMUM MARKS	4

PS	I am	I am trying to	But	Because	Which make me feel
PS-1	Data analysts	Get real-time data	Data is overwhelming	Lack of integration between Power BI and other data sources.	Overwhelmed by vast amounts of data that require processing and insightful interpretation.
PS-2	Economists	Make data driven insight on economic shift	Inaccessible data from certain economies	Limited data sources with complexity	I need a way to present complex data in a way that's understandable for

2.2 Empathy Map Canvas:

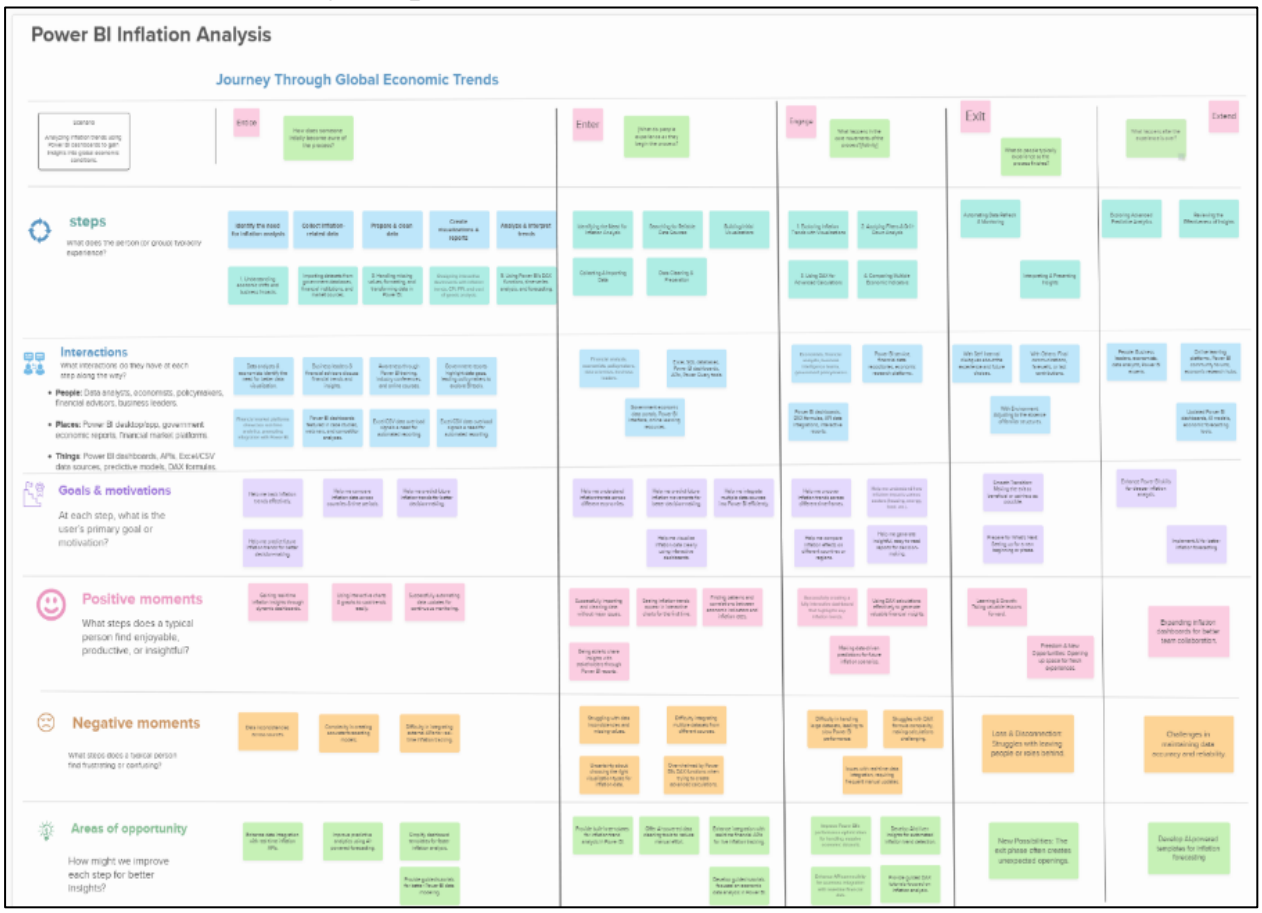


2.3 Brainstroming:



3. REQUIREMENT ANALYSIS

3.1Customer Journey Map:



3.2 Solution Requirement

Date	12 March 2025
Team ID	PNT2025TMID06643
Project Name	Power BI Inflation Analysis; Journey Through Global Economic Terrain.
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Global Inflation Trends Visualization	Power BI in inflation analysis is its ability to display global inflation trends through visually intuitive dashboards.
FR-2	Sectoral Impact	Power BI tracks inflation's effect on sectors like food, energy, housing, and healthcare, aiding businesses in pricing, supply chain, and investment decisions. It integrates external data sources to deepen sector-specific analysis.
FR-3	Country and Region Comparisons	By analyzing inflation across regions, Power BI highlights economic disparities, helping businesses and investors assess market opportunities and risks.
FR-4	Forecasting	Power BI's predictive analytics tools forecast inflation trends using historical data and economic indicators, helping businesses and governments plan for future economic conditions.

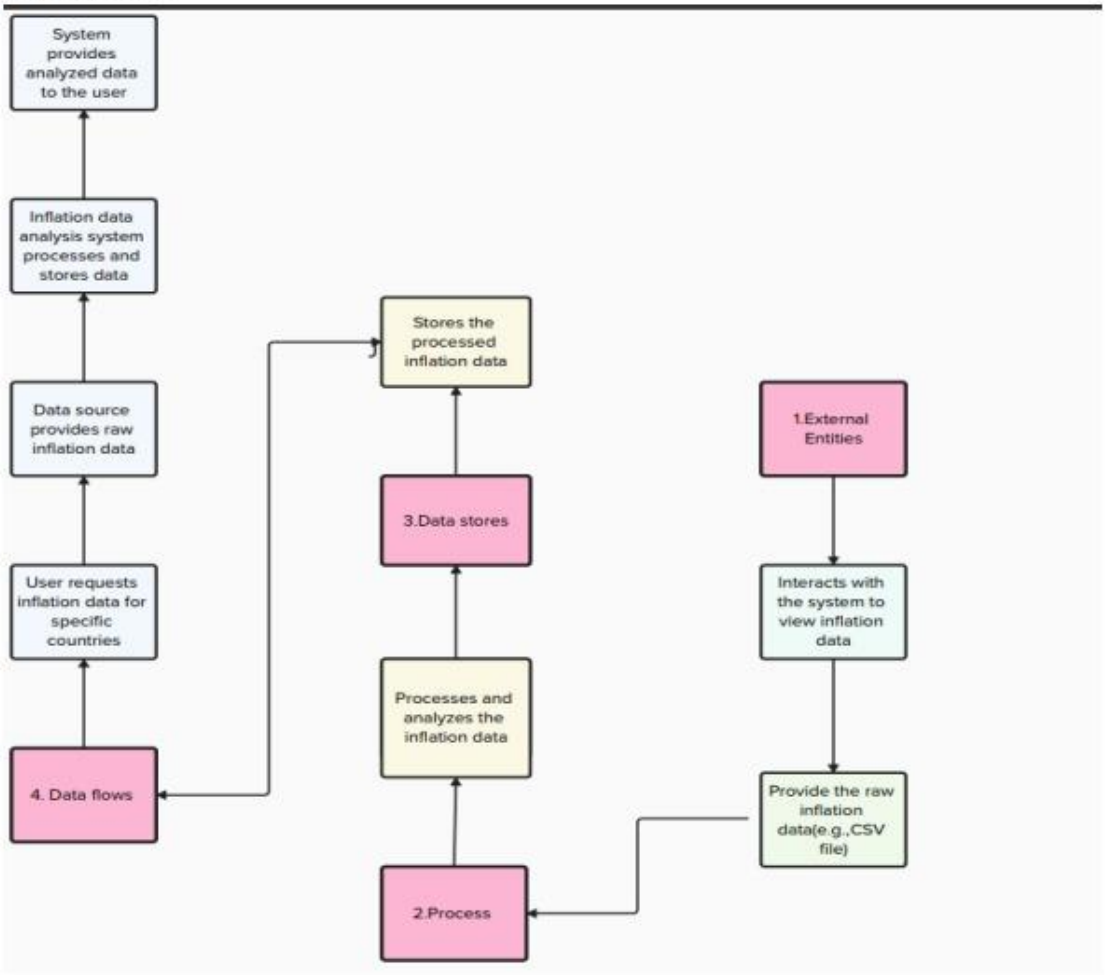
Non-functional Requirements:

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

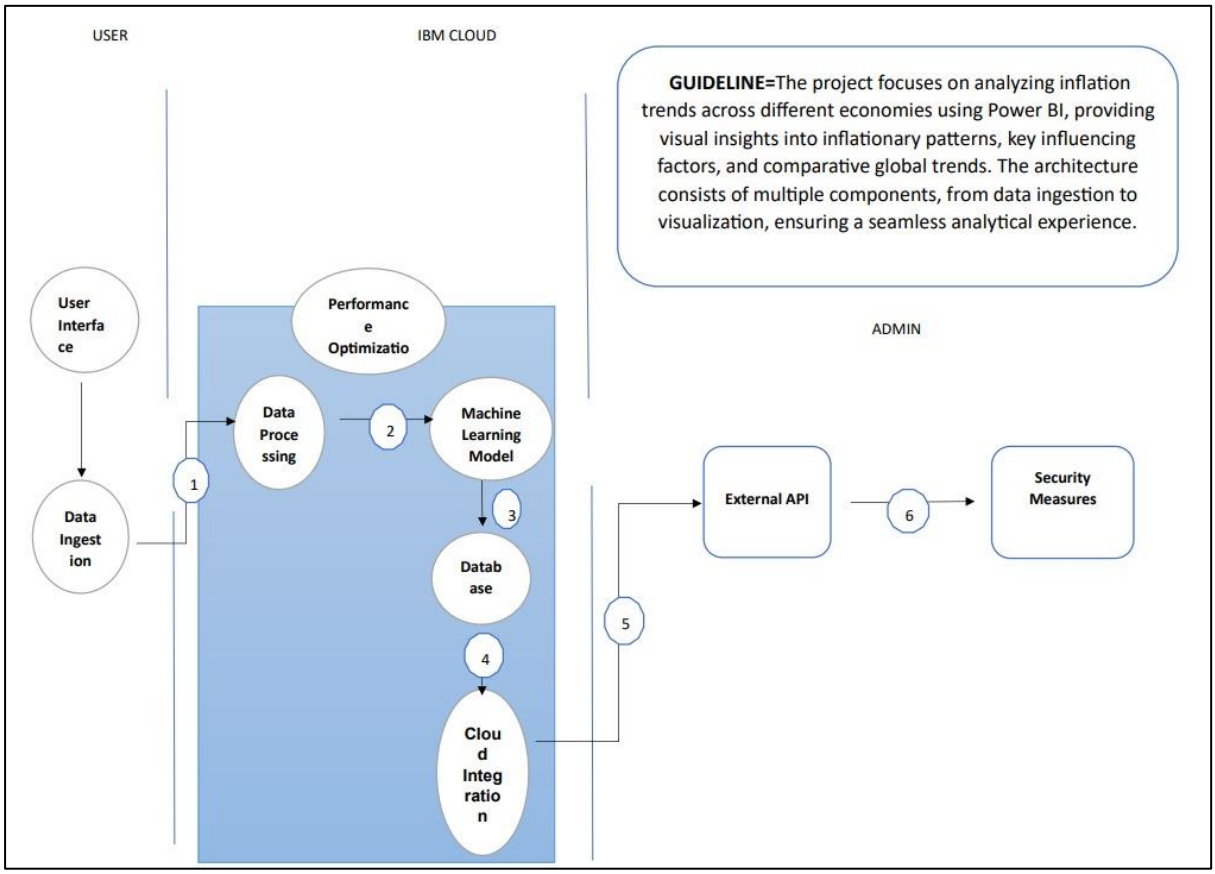
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Easy-to-use interface with customizable visualizations and drag-and-drop features, making it accessible for all users.
NFR-2	**Security**	End-to-end encryption and role-based access ensure the protection of sensitive data.
NFR-3	**Reliability**	Cloud-based with continuous updates, ensuring data availability and real-time analysis.
NFR-4	**Performance**	Handles large datasets and complex queries, ensuring high performance in inflation analysis.
NFR-5	**Availability**	Accessible on various devices, providing flexibility for decision-makers.
NFR-6	**Scalability**	Power BI grows with organizations, accommodating increasing data and complex analytics.

3.3 Data Flow Diagram And User Stories Documentation

❖ **DFD LEVEL 0**



3.4 Technology Stack:



Technical Architecture:

SR NO	Component	Description	Technology
1	**User Interface**	Interactive dashboards for inflation trend analysis	Power BI, DAX, Power Query
2	**Data Ingestion**	Extracting inflation data from various sources	Python (Pandas), SQL, API Integrations
3	**Data Processing**	Cleaning, transforming, and structuring data for analysis	Power Query, Python, SQL
4	**Machine Learning Model**	Predicting inflation trends based on historical data	Python (Scikit-learn), Power BI AI Insights

USER IBM CLOUD

5	**Database**	Storage of historical and real-time inflation data	SQL Server, Azure Data Lake
6	**Cloud Integration**	Hosting datasets and enabling scalable analytics	Azure, Google Cloud, AWS
7	**External API**	Fetching live inflation data from financial sources	World Bank API, IMF API
8	**Security Measures**	Ensuring data integrity and access control	Data Encryption, Role-Based Access Control (RBAC)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	**Security Implementations**	Protecting financial data from unauthorized access	Role-based authentication, Data Encryption
2.	**Scalable**	Handling large-scale inflation datasets across multiple economies	Cloud-based architecture (Azure, AWS)
3.	**Availability**	Ensuring continuous access to real-time insights	Load Balancing, Distributed Computing
4.	**Performance Optimization**	Optimizing queries and reports for fast processing	Caching, Indexing, Power BI Aggregations
5	**Open-Source Frameworks**	Use of open-source tools for analytics and visualization	Python, Pandas, Scikit-learn

4.PROJECT DESIGN

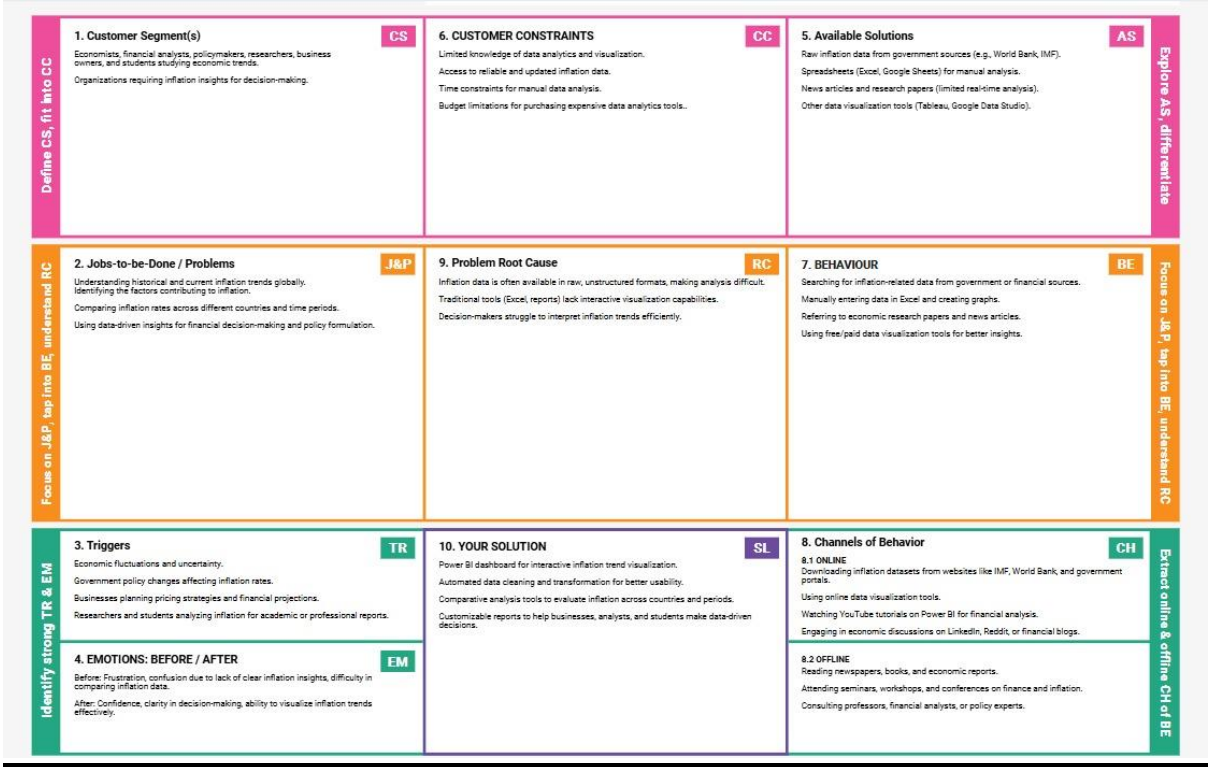
4.1 Problem Fit Template:

Problem- Solution Fit Template:

The Power BI Inflation Analysis project aims to provide a comprehensive view of global inflation trends using Power BI. By analyzing economic indicators, historical inflation rates, and country-specific data, this project enables users to make informed decisions. It helps economists, analysts, and policymakers understand inflation patterns, identify economic shifts, and predict future trends based on data-driven insights.

Purpose:

- Analyze global inflation trends and their impact on different economies.
- Provide interactive data visualizations to help stakeholders understand inflationary patterns.
- Enhance decision-making by identifying key factors influencing inflation rates.
- Compare inflation data across different countries and time periods to detect economic fluctuations.
- Improve financial planning and economic forecasting with accurate and real-time data analysis.



4.2 Proposed Solution:

S. No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Inflation impacts economies worldwide, affecting purchasing power, business growth, and policy decisions. Analysing inflation trends across regions is crucial for informed decision-making.
2.	Idea / Solution description	Using Power BI, we will create an interactive dashboard to visualize inflation trends, compare regional impacts, and identify key economic factors influencing inflation.
3.	Novelty / Uniqueness	Our approach integrates real-time data, advanced analytics, and predictive modelling to provide dynamic insights
4.	Social Impact / Customer Satisfaction	The dashboard will help businesses, policymakers, and researchers make data-driven decisions, improving economic stability and strategic planning.
5.	Business Model (Revenue Model)	The solution can be monetized through subscription-based access, consultancy services, or integration with financial platforms.
6.	Scalability of the Solution	It can be expanded by incorporating additional economic indicators, industry-specific insights, and global datasets for broader applicability.

4.3 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.

Architecture Overview: Power BI Inflation Analysis

The **Power BI Inflation Analysis** architecture is designed to process and visualize global economic inflation data efficiently. It follows a structured flow:

1. **Data Sources** – Collects data from **CSV files, APIs (World Bank, IMF), and databases**.
2. **Data Ingestion** – Uses **Power BI Dataflows** and API connectors for seamless integration.
3. **Processing & Transformation** – Utilizes **Power Query (ETL)** for data cleaning and **DAX calculations** for inflation trends.
4. **Data Storage** – Stores processed data in **Power BI Cloud, On-Premises Gateway, or Azure SQL**.
5. **Visualization & Reporting** – Generates **interactive dashboards, KPI metrics, and geographical heatmaps** for insights.
6. **End Users** – Serves **economists, analysts, policymakers, and businesses** for decision- making.

Example - Solution Architecture Diagram:

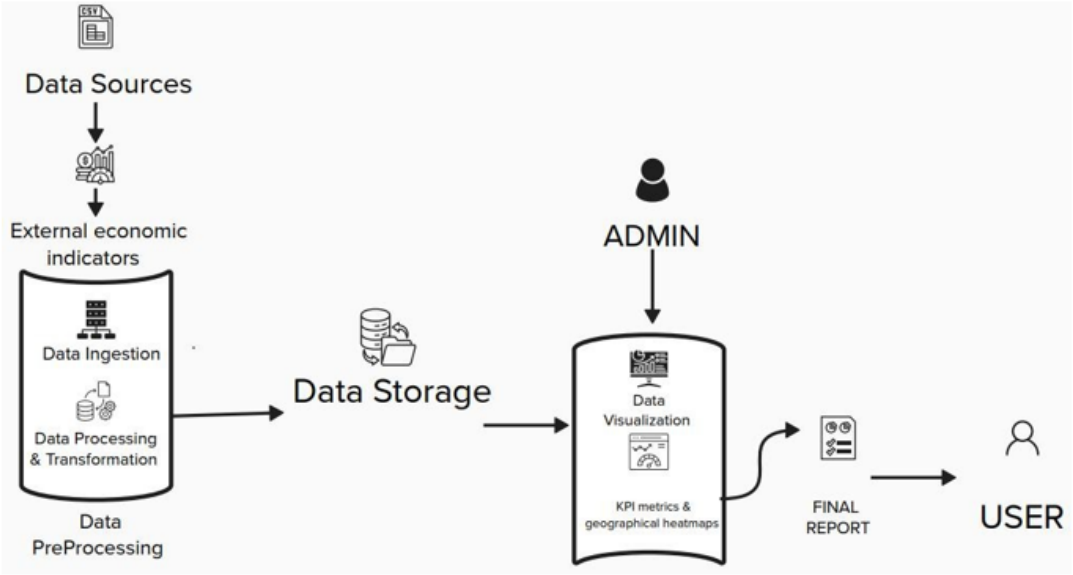


Figure 1: shows **Power BI Inflation Analysis**

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning:

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection	USN-1	Identify and gather data sources for global inflation.	5	High	Gaurav thakur
	Data Preparation	USN-2	Clean and preprocess collected data for analysis.	7	High	Jaya bijore
	Dashboard Design	USN-3	Create frames for Power BI dashboard layout.	4		Prerna kirne
		USN-4	Define key metrics and visualizations for the dashboard.	5	High	Kaveri bhiogade
Sprint-2	Data Modeling	USN-5	Build data models in Power BI to connect data sources.	8	High	Jaya Bijore, Kaveri bhiogade
	Visualization Development	USN-6	Create interactive visualizations for key metrics.	8	High	Gaurav thakur, Prerna kirne

	Testing	USN-7	Conduct testing of dashboard functionality and accuracy.	5	Medium	Kaveri bhiogade

	Feedback Collection	USN-8	Gather feedback from stakeholders on initial dashboard.	4	Medium	Gaurav thakur
Sprint-3	Training and Documentation	USN-9	Develop training materials for stakeholders.	5	High	Jaya bijore
		USN-10	Conduct training sessions for users on Power BI dashboard.	5	High	Prerna kirne
	Launch	USN-11	Officially launch the Power BI dashboard.	4	High	Gaurav thakur , jaya Bijore , kaveri bhiogade, Prerna kirne
	Evaluation	USN-12	Evaluate dashboard effectiveness and gather further feedback.	5	Medium	Gaurav thakur , jaya Bijore , kaveri bhiogade, Prerna kirne

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	21	10 Days	20 Feb 2025	01 March 2025	21	01 March 2025
Sprint-2	25	10 Days	2 March 2025	11 March 2025	25	11 March 2025
Sprint-3	19	2 Days	13 March 2025	14 March 2025	19	14 March 2025

Velocity:

Total Story Points Completed: 60

Total Number of Sprints = 3
Velocity = Total Story Points Completed / Number of Sprints
Velocity = 60 / 3 ≈ 20

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.

Sprint	Day	Total Story Points	Story Points completed	Remaining Story Points
1	1	60	0	60
	2	60	0	60
	3	60	0	60
	4	60	0	60
	5	60	0	60
	6	60	0	60
	7	60	0	60
	8	60	0	60
	9	60	0	60
	10	60	21	39
2	1	60	21	39
	2	60	21	39
	3	60	21	39

	4	60	21	39
	5	60	21	39
	6	60	21	39
	7	60	21	39
	8	60	21	39
	9	60	21	39

	10	60	19	41
3	1	60	19	41
	2	60	60	0

6.FUCTIONAL AND PERFORMANCE TESTING

6.1 Model Performance Testing:

Project team shall fill the following information in the model performance testing template.

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	Number Of Rows- 7952 Number Of Columns- 7
2.	Data Preprocessing	Data cleaning, added regions data, created new measures, Converted text columns into whole number columns.
3.	Utilization of Data Filters	Country Slicer
4.	DAX Queries Used	AdjustedInflationRate = global_inflation_data[Inflationrate]*.1 InflationrateCategory = IF('global_inflation_data'[Inflationrate] <2, "Low", IF('global_inflation_data'[Inflationrate] <5, "Moderate", "High")) InflationRateDifference = 'global_inflation_data'[Inflationrate] - 'global_inflation_data'[AdjustedInflationRate] InflationRateChange = VAR CurrentYear = MAX('global_inflation_data'[Year]) VAR CurrentInflationRate = CALCULATE(MAX('global_inflation_data'[InflationRate]), ALL('global_inflation_data'), 'global_inflation_data' [Year] = CurrentYear)

		VAR PreviousInflationRate = Calculate(MAX('global_inflation_data'[InflationRate]), ALL('global_inflation_data'), 'global_inflation_data'[Year] = CurrentYear - 1) RETURN IF(ISBLANK(PreviousInflationRate), BLANK(), (CurrentInflationRate - PreviousInflationRate) / PreviousInflationRate)
5.	Dashboard design	No of Visualizations - 1. Cards 2. Slicer 3. Pie Chart 4. Area Chart 5. Stacked Column Chart 6. Scatter Chart 7. Text Box
6	Report Design	No of Visualizations - 1. Filled Map 2. Text Box 3. Donut Chart 4. Clustered Column Chart

7.RESULTS

7.1 Dashboard

General Insights

Average and Maximum Inflation Rate

- The average inflation rate is 15.25, which suggests a moderately high inflationary environment.
- The maximum inflation rate recorded is 71.50, indicating extreme inflationary spikes at certain points.

Inflation Trends Over Time

- The sum of inflation rate by year shows fluctuations, with noticeable peaks in the late 1980s and 1990s.
- The trend appears to have stabilized post-2000, with relatively lower volatility.

Inflation Distribution

- A majority (97.44%) of the inflation rates fall into the low category, while only 2.56% are classified as high inflation.
- This suggests that inflation is mostly under control, with occasional spikes.

Country Selection:

- The dashboard seems to be analazing data for only one region at a time, currently set to Afghanistan.
- The option to switch between countries (Albania, Algeria) indicates a comparative study potential.

Recommendations

Expand the Dataset:

- If possible, include multiple countries simultaneously for a comparative inflation analysis.
- Introduce more economic indicators such as GDP growth, interest rates, and unemployment to correlate inflation trends.

Highlight Key Economic Events:

- Mark significant global and regional economic events (like financial crises or wars) on the timeline to explain spikes in inflation.

Improve Category Breakdown:

- Instead of just low, moderate, and high inflation, provide a more detailed breakdown, e.g., hyperinflation (>50%), stable (0-5%), and deflation (<0%).

Interactive Forecasting:

- Use Power BI forecasting models to predict future inflation trends based on historical data.

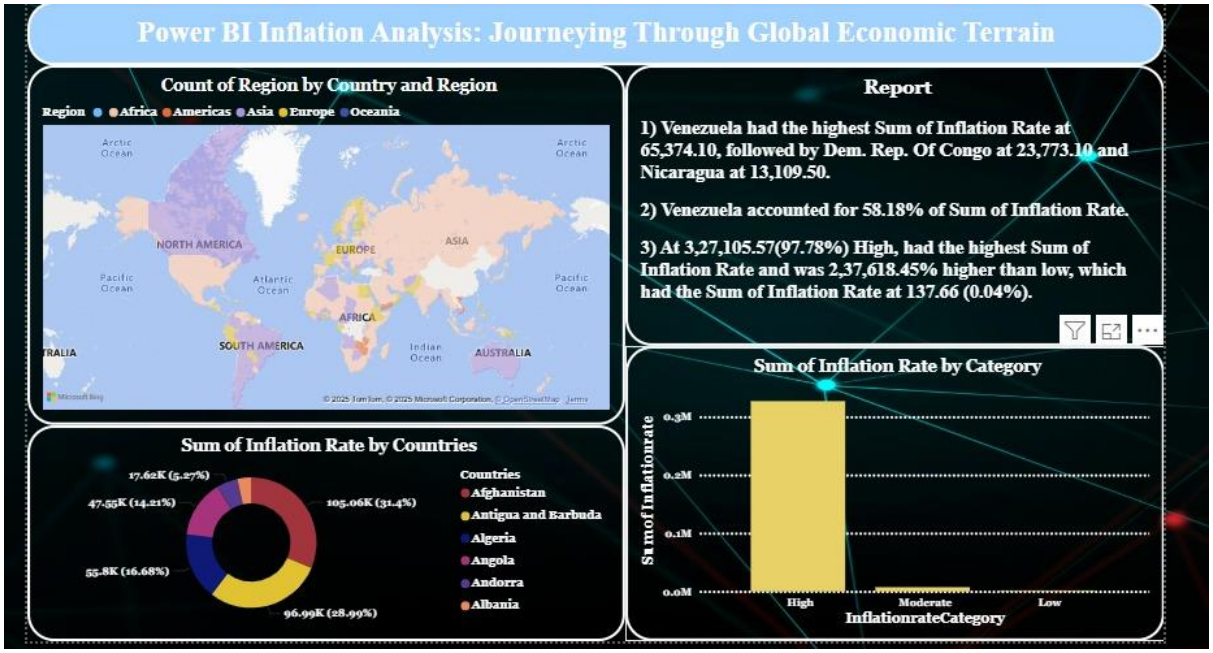
Trends & Patterns:

- Volatility in the 1980s and 1990s: A major spike, likely linked to economic or political turmoil.
- Relative Stability Post-2000: Inflation fluctuations have been much smoother after 2000.
- Most Inflation Data Falls in the Low Category: This suggests that, despite occasional spikes, inflation is generally manageable

Conclusion:

- The dashboard effectively presents inflation trends but could benefit from additional contextual insights and comparative analysis.
- Incorporating global economic events and predictive analytics could make the findings more actionable.
- If the goal is to compare multiple countries, adjusting filters to show side-by-side comparisons would enhance insights.

7.2 Report:



Observation from the Power BI Report: "Power BI inflation analysis through journey through global economic Terrain"

1. **General Overview**

- The dashboard is titled "Power BI Inflation Analysis: Journeying Through Global Economic Terrain."
- It presents key insights into inflation rates across different countries and regions.
- The visual design includes a world map, bar charts, and pie charts.

2. **Inflation by Country & Region:**

- A world map categorizes countries based on regions (Africa, Americas, Asia, Europe, Oceania).
- Venezuela recorded the highest inflation rate (65,374.10), followed by the Democratic Republic of Congo and Nicaragua.

3. **Sum of Inflation Rate by Countries:**

- A pie chart highlights the proportion of inflation rates across various nations.
- Venezuela appears to dominate with a significant share.

4. **Sum of Inflation Rate by Category:**

- A bar chart displays inflation distribution into High, Moderate, and Low categories.
- The "High" category overwhelmingly contributes to total inflation.

5. **Report Summary:**

- Venezuela alone contributed to 58.18% of the total inflation.
- The high inflation category (3,27,105.57) is significantly larger (by 2,37,618.45%) than the low category (137.66).

6. **Chart Analysis**

- The world map effectively visualizes geographic inflation trends.
- The pie chart provides a clear distribution of inflation by countries.
- The bar chart categorizes inflation levels efficiently.

8.ADVANTAGES & DISADVANTAGES

✓ **Advantages:**

1. Real-time Data Visualization: Power BI enables dynamic and interactive visualizations, allowing users to monitor inflation trends in real time.

2. Data Integration: It integrates various data sources (e.g., GDP, CPI, market trends) to provide comprehensive insights for better inflation analysis.

3. Advanced Analytics: Users can apply advanced analytics and forecasting tools to predict inflationary trends.

4. User-friendly Interface: The intuitive drag-and-drop interface helps non-technical users understand complex data without requiring advanced knowledge.

5. Customizable Dashboards: Power BI dashboards can be customized to focus on specific inflation metrics for different regions or sectors.

✖ Disadvantages:

1. Data Quality Dependency: The quality of analysis is reliant on the accuracy and timeliness of the input data.

2. Complexity for Advanced Features: While basic features are user-friendly, advanced analysis may require deeper expertise in Power BI.

3. Integration Challenges: Integrating complex or non-standard data formats can be difficult, especially for organizations with legacy systems.

4. Performance Issues with Large Datasets: As data grows, Power BI may face performance slowdowns, especially with large-scale data processing

9.Future Scope of Power BI in Inflation Analysis:

- AI & Machine Learning Integration: The future could see more integration of AI/ML algorithms to predict inflation trends and provide deeper insights.

- Cloud-Based Collaboration: With cloud-based solutions, real-time collaboration among global stakeholders could improve decision-making.

- Automation of Inflation Reports: Automating reports based on triggers (e.g., inflation hitting certain thresholds) will improve operational efficiency.

- Global Data Integration: Enhanced capabilities to integrate global datasets for comparative inflation analysis across different countries.

10. CONCLUSION:

Power BI serves as a powerful tool for inflation analysis, offering the advantages of real-time data visualization, integration, and predictive analytics. Despite its limitations in handling large datasets and requiring quality data, its ability to provide actionable insights into inflation trends makes it a valuable asset for businesses and policymakers. Looking forward, the integration of AI and cloud-based capabilities will significantly enhance its scope, driving more accurate predictions and better-informed economic decisions.

11. APPENDIX

Dataset Link:

https://www.kaggle.com/datasets/sazidthe1/global-inflation-data

GithHub Link:

https://github.com/Tsar-Alfredo/Power-BI-Inflation-Analysis-Journeying-Through-Global-Economic-Terrain

Project Demo Link:

https://drive.google.com/file/d/1OcHaroIOjMy626ejCeXyFWkJVbXzbVk6/view?usp=sharing