

A

**Project Report**

On

**Power BI Inflation Analysis: Journeying  
Through the Global Economic Terrain**

**Submitted for fulfilment of  
Experiential Project Based Learning  
(EPBL)**

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# CHAPTER : 01

## INTRODUCTION

Inflation is one of the most crucial economic indicators, influencing everything from consumer purchasing power to national fiscal policies. As economies evolve, the ability to track and analyse inflation trends becomes essential for businesses, policymakers, and individuals alike.

This report leverages **Power BI** to provide an interactive and data-driven exploration of global inflation trends. By integrating real-time data, historical comparisons, and predictive analytics, we uncover the key drivers of inflation, regional disparities, and the impact on various economic sectors.

Join us as we navigate the complex global economic landscape, transforming raw data into actionable insights through the power of **business intelligence and visualization**. This journey will equip stakeholders with the knowledge to make informed decisions in an ever-changing financial world.

## 1.1 Project Overview

This project leverages **Power BI** to analyse global inflation trends, exploring inflation rates across countries, key economic indicators like GDP and interest rates, and sectoral impacts on industries such as energy and food. By integrating data from sources like the **IMF and World Bank**, the project identifies major inflation drivers, including supply chain disruptions and policy changes. Using historical data and predictive models, it forecasts future inflation trends, providing **interactive dashboards** for real-time insights. The findings support **policymakers, businesses, and investors** in making informed decisions and include **strategic recommendations** for navigating inflationary challenges.

## 1.2 Purpose

The purpose of this project is to provide a **comprehensive and data-driven analysis** of global inflation trends using **Power BI**. By visualizing inflation rates, key economic indicators, and sectoral impacts, the project aims to help **policymakers, businesses, and investors** make informed decisions. It also seeks to identify the **root causes** of inflation, predict future trends using forecasting models, and offer **strategic insights** to mitigate economic risks. Ultimately, this project serves as a **decision-support tool**, enabling stakeholders to better understand and respond to inflationary pressures in an evolving global economy.

## **CHAPTER : 02**

### **IDEATION PHASE**

The **ideation phase** of this Power BI Inflation Analysis project focuses on defining objectives, identifying key stakeholders, and structuring the analytical approach. It begins with recognizing inflation's impact on economies and determining the need for **data-driven insights** to support policymakers, businesses, and investors. Reliable data sources such as the **IMF, World Bank, and central banks** are selected, along with key economic indicators like **CPI, GDP, and interest rates**. Power BI is chosen for its robust visualization and analytical capabilities, ensuring the creation of **interactive dashboards** for trend analysis and forecasting. Potential challenges, such as data accuracy and real-time processing, are considered, while expert collaboration helps refine the project scope. Ultimately, this phase sets the groundwork for developing a **comprehensive, user-friendly, and insightful** inflation monitoring tool.

## 2.1 Problem Statement

Inflation significantly impacts economies, affecting consumer purchasing power, business operations, and government policies. However, analysing inflation trends is challenging due to **complex data, lack of real-time insights, and difficulties in identifying key drivers**. Policymakers, businesses, and investors require an effective tool to track inflation, compare economic indicators, and predict future trends. This project utilizes **Power BI** to develop an **interactive inflation analysis platform**, providing accurate, visualized insights for informed decision-making.

## 2.2 Empathy Map Canvas

An **Empathy Map Canvas** helps understand the needs, thoughts, and challenges of the target audience, ensuring that the Power BI inflation analysis is user-centric and impactful.

## 2.3 Brainstorming

The **Power BI Inflation Analysis** project aims to track and visualize **global inflation trends** by integrating key economic indicators like **CPI, GDP, and interest rates**. Key features include **real-time data updates, interactive dashboards, forecasting models, and sectoral impact analysis**. Challenges such as **data inconsistencies and complex economic relationships** can be addressed through **reliable data sources, AI-driven insights, and user-friendly visualizations**. The goal is to create a **decision-support tool** that helps **policymakers, businesses, and investors** make informed economic decisions.

# **CHAPTER : 03**

## **REQUIREMENT ANALYSIS**

### **1. Business Requirements**

- Develop an interactive Power BI dashboard for inflation analysis.
- Provide real-time insights on inflation trends across regions and industries.
- Enable comparative analysis of economic indicators (CPI, GDP, interest rates).
- Offer predictive analytics for future inflation trends.
- Ensure the dashboard is user-friendly, visually engaging, and accessible.

### **2. Functional Requirements**

- Data Integration: Connect to IMF, World Bank, central banks, and other financial databases.
- Visualization Features: Implement heatmaps, trend lines, bar charts, and filters.
- Comparative Analysis: Allow users to compare inflation rates across time, countries, and industries.
- Forecasting Models: Use historical data to generate future inflation predictions.
- Automated Reports & Alerts: Set up email notifications and dynamic reports for significant inflation changes.

### **3. Technical Requirements**

- Platform: Power BI for visualization and reporting.
- Data Storage: Cloud-based or on-premise database integration.
- APIs & Data Sources: Integration with live data APIs for real-time updates.
- Security & Access Control: Role-based access for different user groups.

## 4. Non-Functional Requirements

- Performance: Ensure fast data processing and smooth dashboard interaction.
- Scalability: Ability to handle increasing data volume over time.
- Usability: Intuitive design for economists, policymakers, and business analysts.

### 3.1 Customer Journey Map

| Stage           | User Actions  | Pain Points  | Opportunities   |
|-----------------|---|--|---|
| Awareness       | Recognizing the need for inflation tracking and economic insights.            | Lack of real-time, reliable inflation data.                      | Provide educational content on the importance of inflation analysis.              |
| Consideration   | Researching tools like Power BI for data visualization.                       | Overwhelming amount of economic data with complex relationships. | Highlight Power BI's interactive dashboards and ease of use.                      |
| Onboarding      | Accessing and exploring the Power BI inflation dashboard.                     | Initial learning curve in using Power BI effectively.            | Offer tutorials, user guides, and training sessions.                              |
| Usage           | Filtering data, analyzing trends, and comparing inflation rates.              | Data overload and difficulty in drawing meaningful insights.     | Provide AI-driven insights, predictive analytics, and easy-to-understand visuals. |
| Decision-Making | Using insights for financial planning, policy-making, or business strategies. | Uncertainty in interpreting forecasts and economic trends.       | Offer expert recommendations and scenario-based analysis.                         |

## 3.2 Solution Requirement

### 1. Business Solution Requirements

- Develop an **interactive Power BI dashboard** to track and analyze global inflation.
- Provide **real-time and historical data visualization** for accurate insights.
- Enable **comparative analysis** of inflation rates across countries, regions, and industries.
- Offer **predictive analytics** to forecast future inflation trends.
- Ensure the solution is **user-friendly, scalable, and accessible** for policymakers, businesses, and investors.

### 2. Functional Solution Requirements

- **Data Integration:** Connect with sources like **IMF, World Bank, central banks, and financial APIs**.
- **Visual Analytics:** Include **heatmaps, trend charts, and dynamic filters** for data exploration.
- **Comparative & Sectoral Analysis:** Allow users to compare inflation across **time periods, countries, and industries**.
- **Predictive Modeling:** Implement **forecasting algorithms** based on historical trends.
- **Custom Reports & Alerts:** Generate **automated reports** and set up **notifications for inflation changes**.

### 3. Technical Solution Requirements

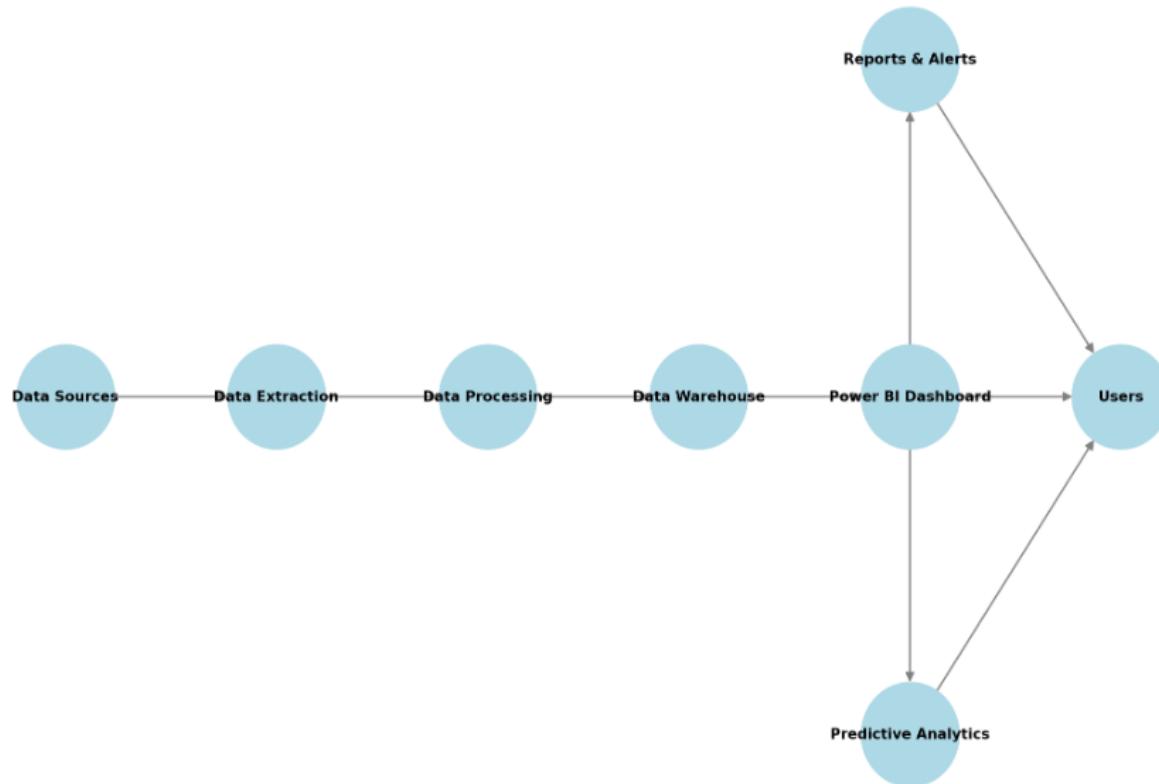
- **Platform:** Power BI for data visualization and report generation.
- **Database:** Use **cloud-based storage** (e.g., Azure, AWS) or integrate with on-premise databases.
- **Data Sources:** Real-time API integration for **up-to-date inflation data**.
- **Security & Access Control:** Role-based authentication for different user groups.

- **Performance & Scalability:** Optimize **data processing speed** for seamless dashboard interaction.

#### 4. Non-Functional Solution Requirements

- **Usability:** Ensure an **intuitive interface** for economists, policymakers, and analysts.
- **Reliability:** Maintain **data accuracy and consistency** across all reports.
- **Scalability:** Support increasing data volume and new economic indicators over time.
- **Compliance:** Adhere to **financial data regulations and privacy policies**.

#### 3.3 Data Flow Diagram



## 3.4 Technology Stack

The technology stack includes tools, platforms, and frameworks for **data collection, processing, visualization, and reporting**.

### 1. Data Sources & Integration

- **APIs & Databases:** IMF, World Bank, Central Banks, Trading Economics API
- **Cloud Data Sources:** Google Big Query, AWS RDS, Azure SQL Database
- **File-Based Data:** CSV, Excel, JSON, XML

### 2. Data Processing & Storage

- **ETL (Extract, Transform, Load):** Microsoft Power Query, SQL Server Integration Services (SSIS)
- **Data Storage:** SQL Server, PostgreSQL, Azure Data Lake, Snowflake
- **Data Cleaning & Transformation:** Python (Pandas, NumPy), SQL

### 3. Data Visualization & Analysis

- **Visualization Tool:** Power BI (Dashboards, Reports, Data Models)
- **Analytics & Forecasting:** Power BI AI Insights, Python (Stats models, Scikit-learn)
- **Custom Visualizations:** DAX (Data Analysis Expressions), R for advanced statistics

### 4. Deployment & Security

- **Cloud Platforms:** Azure Power BI Service, AWS Quick Sight, Google Cloud
- **Access Control:** Role-Based Authentication (Azure AD, OAuth)
- **Data Governance:** GDPR, ISO 27001 Compliance, Data Encryption

### 5. Automation & Reporting

- **Scheduled Reports:** Power BI Service (Data Refresh & Alerts)
- **Notifications & Alerts:** Power Automate, Email Triggers

- **Collaboration:** Power BI Embedded, Microsoft Teams, SharePoint

# CHAPTER :04

## PROJECT DESIGN

The **Project Design** defines the architecture, workflows, and user experience of the **Power BI Inflation Analysis** system. It ensures seamless **data collection, processing, visualization, and decision-making** for stakeholders like **policymakers, investors, and business analysts**.

### 1. System Architecture

A **3-tier architecture** is used to ensure scalability and efficiency:

#### a) Data Layer (Collection & Storage)

**Sources:** IMF, World Bank, Central Banks, Trading Economics API

**Storage:** SQL Server, Azure Data Lake, Google Big Query

**ETL Processing:** Power Query, Python (Pandas, NumPy), SSIS

#### b) Processing Layer (Data Transformation & Analysis)

**Data Cleaning:** Power Query, SQL, Python (Data Preprocessing)

**Forecasting Models:** Power BI AI Insights, Python (Stats models, Scikit-learn)

**Data Aggregation:** DAX, SQL Queries

#### c) Presentation Layer (Visualization & Reporting)

**Power BI Dashboard:** Interactive charts, heatmaps, trend lines

**Custom Reports:** Dynamic reports, scheduled email alerts

**User Interaction:** Filters, drill-down analysis, comparative views

### 2. Workflow Design

1  **Data Collection** → Extract data from APIs, databases, and files

2  **Data Transformation** → Clean, validate, and preprocess data

3  **Data Storage** → Store structured data in a database

4 **Dashboard Creation** → Design Power BI dashboards & reports

5 **User Interaction** → Users explore insights, set alerts, and export reports

### 3. UI/UX Design (Dashboard Features)

**Real-Time Data Updates** – Automatically refresh inflation data

**Interactive Filters & Comparisons** – Drill-down by region, industry, time period

**Predictive Insights** – AI-driven inflation forecasting models

**Custom Reports & Alerts** – Export insights and receive alerts on inflation spikes

### 4. Security & Access Control

**Authentication:** Azure AD, OAuth for secure login

**Role-Based Access:** Different access levels for policymakers, analysts, and executives

**Data Encryption:** Secure storage and transmission of financial data

#### 4.1 Problem Solution Fit

The **Problem-Solution Fit** ensures that the Power BI Inflation Analysis project effectively addresses the key challenges of inflation tracking and decision-making for stakeholders like policymakers, businesses, and investors.

##### 1. Identifying the Problem

###### **Problem:**

- Inflation trends are **complex and difficult to analyse** in real-time.
- Lack of **centralized and interactive visualization tools** for global inflation data.
- Decision-makers struggle with **forecasting future inflation trends**.
- Traditional reports are **static, slow, and lack actionable insights**.

## 2. Validation & Fit

**User Needs Alignment:** The dashboard provides **real-time, predictive, and comparative** inflation insights.

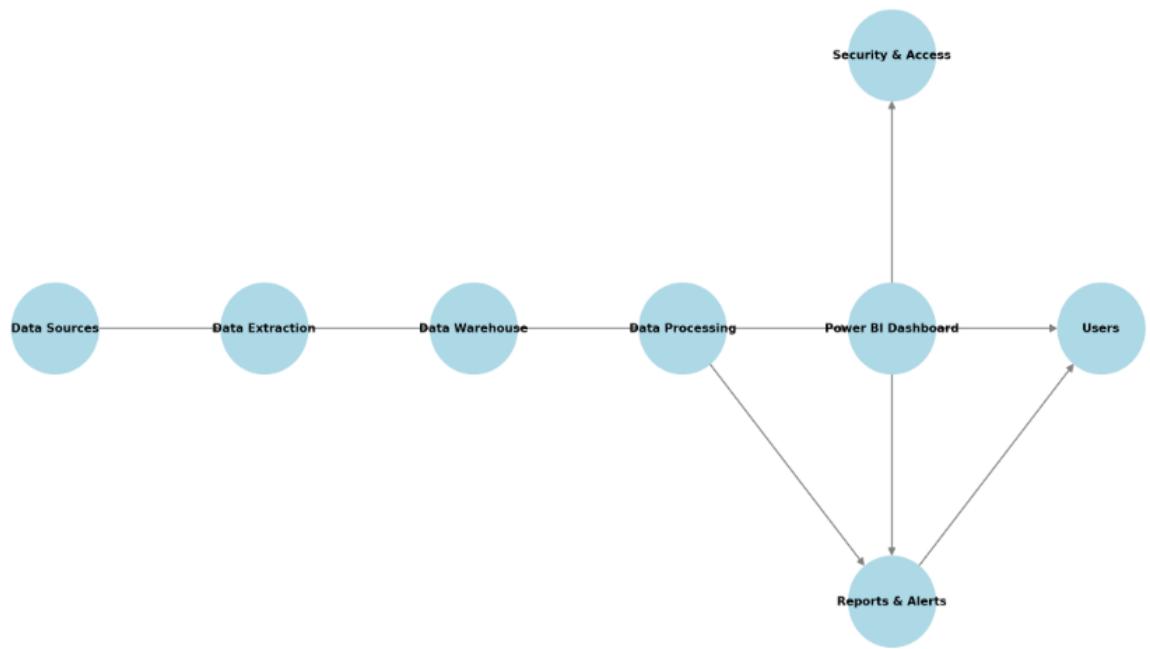
**Ease of Use:** Interactive Power BI features ensure **intuitive exploration** of inflation trends.

**Actionable Insights:** Helps **policymakers, businesses, and investors** make **informed economic decisions**.

### 4.2 Proposed Solution

| Problem                                    | Solution (Power BI Features)  |
|--|---|
| No centralized inflation tracking          | Integrated Power BI dashboard with global inflation data.                 |
| Complex and scattered economic data        | Data aggregation from IMF, World Bank, and central banks for accuracy.    |
| Difficulty in forecasting inflation trends | AI-driven predictive analytics to project future inflation.               |
| Slow and static reports                    | Dynamic, interactive dashboards with real-time updates and insights.      |
| No industry-specific impact analysis       | Sector-wise inflation impact visualization (e.g., energy, food, housing). |
| Lack of timely alerts for inflation risks  | Automated alerts and reports for significant changes in inflation.        |

#### 4.3 Solution Architecture



# CHAPTER: 05

## PROJECT PLANNING AND SCHEDULING

### 5.1 Project Planning

A well-structured project plan ensures that the **Power BI Inflation Analysis** project is executed efficiently, meeting deadlines and stakeholder expectations.

#### 1. Project Timeline & Phases

| Phase                         | Tasks                                      | Duration |
|-------------------------------|--|----------|
| 1. Ideation & Research        | Define problem, scope, and objectives      | 1 Week   |
| 2. Data Collection & ETL      | Identify sources, extract and clean data   | 2 Weeks  |
| 3. Data Storage & Processing  | Store and transform data in Data Warehouse | 2 Weeks  |
| 4. Dashboard Development      | Build Power BI reports and visualizations  | 3 Weeks  |
| 5. AI Forecasting & Analytics | Implement predictive models                | 2 Weeks  |
| 6. Testing & Validation       | Validate data accuracy, fix errors         | 1 Week   |
| 7. Deployment & Training      | Deploy solution, train end-users           | 1 Week   |
| 8. Monitoring & Optimization  | Collect feedback, optimize performance     | Ongoing  |

#### 2. Key Milestones & Deliverables

**Week 2:** Data Collection Completed

**Week 4:** Data Processing & Storage Completed

**Week 7:** Power BI Dashboard & Forecasting Ready

**Week 9:** Deployment & Training Completed

# CHAPTER: 06

## FUNCTIONAL AND PERFORMANCE TESTING

### 6.1 Performance Testing

#### 1. Functional Testing

Functional testing ensures that all features **work as expected** and meet user requirements.

| Test Scenario                     | Expected Outcome   |
|-----------------------------------|--|
| Data Import & Integration         | Data is successfully extracted from IMF, World Bank, and APIs without errors.    |
| Data Transformation & Cleaning    | Data is correctly formatted, aggregated, and cleansed before visualization.      |
| Dashboard Interactivity           | Filters, drill-downs, and interactive elements work correctly.                   |
| Data Accuracy Validation          | Displayed inflation data matches source data (IMF, World Bank).                  |
| AI Forecasting Accuracy           | Predictive models generate reasonable and accurate inflation trends.             |
| User Authentication & Role Access | Only authorized users can access sensitive reports.                              |
| Scheduled Reports & Alerts        | Reports generate automatically and alerts are triggered for significant changes. |

#### 2. Performance Testing

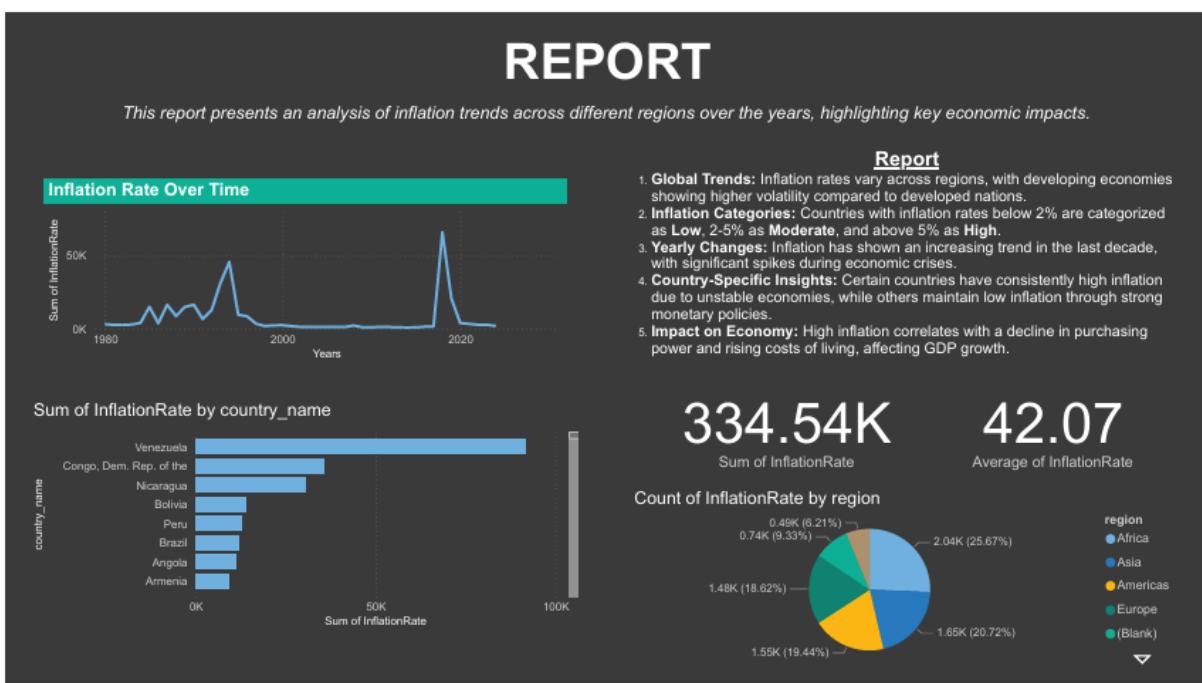
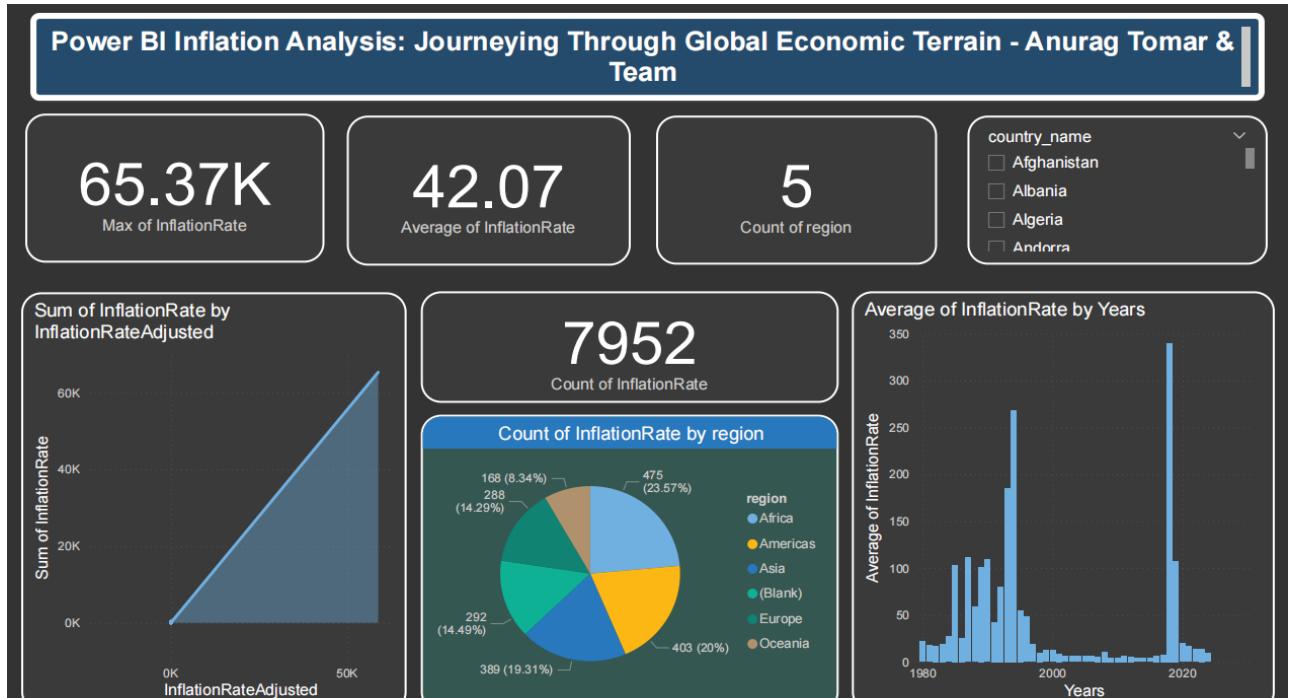
Performance testing ensures that the **dashboard runs smoothly** under different conditions.

| Test Scenario               | Metric                         | Expected Outcome                          |
|-----------------------------|--------------------------------|---|
| Dashboard Load Time         | Time to open reports           | <3 seconds                                |
| Data Refresh Speed          | Time for real-time data update | <5 seconds                                |
| User Load Testing           | Number of concurrent users     | Supports 100+ users                       |
| Report Generation Speed     | Time to generate a full report | <10 seconds                               |
| Data Processing Performance | Query execution time           | Optimized queries run under 2 sec         |
| Scalability Testing         | Increase in data volume        | System handles large datasets efficiently |

# CHAPTER : 07

## RESULTS

### 7.1 Output Screenshots



# **CHAPTER : 08**

## **ADVANTAGES AND DISADVANTAGES**

### **Advantages of Power BI Inflation Analysis**

The **Power BI Inflation Analysis** solution offers several key advantages for **policymakers, investors, businesses, and analysts** by providing real-time insights, forecasting capabilities, and interactive data visualization.

#### **1. Data Accuracy & Reliability**

**Centralized Inflation Data** : Aggregates data from trusted sources (IMF, World Bank, Central Banks).

**Automated Data Updates** : Reduces manual errors and ensures real-time accuracy.

**Data Validation & Cleaning** : Ensures consistency before analysis.

#### **2. Advanced Analytics & AI Forecasting**

**Predictive Analytics** : Uses AI/ML models to forecast future inflation trends.

**Comparative Analysis** : Analyzes inflation trends across countries, industries, and time periods.

**Customizable Metrics** : Users can adjust parameters for inflation impact analysis.

#### **3. Interactive & User-Friendly Dashboards**

**Drill-Down & Filters** : Users can explore inflation data by country, sector, and timeframe.

**Dynamic Visualizations** : Charts, heatmaps, and trend lines make data easy to interpret.

**Custom Reports & Alerts** : Automated alerts for inflation spikes or policy changes.

## **4. Performance & Scalability**

**Fast Query Execution :** Optimized data retrieval for quick insights.

**Handles Large Datasets :** Supports global economic data without lag.

**Cloud Scalability :** Works with Azure, AWS, or Google Cloud for high performance.

## **5. Security & Compliance**

**Role-Based Access Control:** Ensures data security for different user levels.

**Data Encryption:** Protects sensitive financial data.

**Compliance with Regulations :** GDPR, ISO 27001, and financial data standards.

## **Disadvantages of Power BI Inflation Analysis**

While **Power BI Inflation Analysis** provides powerful insights, it also has some limitations that may affect usability, scalability, and data handling.

### **1. Data Limitations**

**Real-Time Data Constraints:** Power BI refresh rates depend on the data source (e.g., direct query, import mode).

**Limited Large-Scale Data Handling :** Performance may degrade with very large datasets unless optimized with Big Query or Azure Data Lake.

**External API Dependencies :** Accuracy relies on sources like IMF, World Bank, and Trading Economics, which may have data update lags.

### **2. Performance Issues**

**Slow Performance with Complex Queries:** High-volume **DAX calculations** or too many visuals in a single dashboard can slow down performance.

**Limited AI/ML Capabilities:** While Power BI supports basic AI insights, advanced ML models need integration with **Python or Azure ML**.

**High Memory Consumption:** Large dashboards can consume significant RAM, affecting performance on lower-end devices.

## **CHAPTER: 09**

### **CONCLUSION**

The Power BI Inflation Analysis project provides a comprehensive, data-driven approach to monitoring and predicting inflation trends globally. By leveraging real-time data integration, interactive dashboards, and AI-powered forecasting, this solution empowers policymakers, investors, and businesses to make informed economic decisions.

While accuracy, visualization, and automation are key advantages, challenges such as performance optimization, data refresh limitations, and licensing costs need to be managed effectively. With proper data governance, scalable infrastructure, and training, these limitations can be mitigated to ensure a highly efficient and impactful solution.

In summary, Power BI Inflation Analysis enhances economic planning, risk management, and policy-making, making it an essential tool for understanding global inflation dynamics in a rapidly changing financial landscape.

# **CHAPTER: 10**

## **FUTURE SCOPE**

The Power BI Inflation Analysis solution has the potential to evolve into a more advanced and comprehensive financial analytics tool. One of the key areas of enhancement is AI-powered forecasting, where deep learning models and time-series analysis can provide more accurate inflation predictions. Additionally, natural language processing (NLP) can be integrated to analyse economic news, policy changes, and social sentiment, helping users understand inflation trends beyond just numerical data.

Another significant improvement would be real-time data processing, ensuring that the dashboard updates automatically with the latest inflation data from global sources like the IMF, World Bank, and central banks. By integrating cloud-based data warehouses such as Google BigQuery, AWS Redshift, or Snowflake, the system can handle large-scale economic datasets efficiently. Moreover, automated anomaly detection can alert users about unexpected inflation spikes or trends, allowing for proactive decision-making.

Expanding the dashboard's analytical scope is another key future direction. The solution can include macroeconomic indicators like GDP growth, employment rates, and interest rates, providing a holistic view of economic conditions. Additionally, industry-specific inflation tracking can be introduced to assess how inflation affects different sectors, such as healthcare, energy, and technology. Cross-country comparisons can also be enhanced to provide insights into global inflation trends.

From a user experience perspective, making the dashboard more interactive and accessible is essential. Future improvements may include mobile-friendly dashboards, voice assistant integration, and AI-powered chatbots that allow users to query economic data conversationally. Customizable alerts and automated report generation will further streamline decision-making processes for policymakers, investors, and business leaders.

# **CHAPTER: 11**

## **APPENDIX**

### **1. Power BI Documentation**

Dataset Link: <https://www.kaggle.com/datasets/sazidthe1/global-inflation-data>

GithHub Link: <https://github.com/Theanuragtomar/EPBLProject.git>