

Project Design Phase

Solution Architecture

Date	15 February 2025
Team ID	PNT2025TMID02642
Project Name	Power BI Inflation Analysis Journeying Through Global Economic Terrain
Maximum Marks	4 Marks

Solution Architecture:

This solution architecture provides a structured approach to analysing global inflation trends using Power BI. It ensures efficient data processing, insightful analytics, and secure deployment.

- **Data Sources Layer**

This layer gathers inflation-related data from multiple sources to ensure accuracy and depth of analysis.

- **Data Ingestion & Processing Layer**

This layer extracts, cleans, and transforms data before it is used in Power BI.

ETL (Extract, Transform, Load) with Power Query:

Data ingestion from APIs, CSVs, Excel files, and databases

Handling missing values, data inconsistencies, and unit conversions

Merging multiple sources to create a unified dataset

- **Data Transformation:**

Creating calculated columns (e.g., Inflation Rate %, CPI Change, Real GDP Growth)

Currency adjustments to ensure consistency

Aggregating and normalizing data for regional comparisons

- **Data Storage & Modelling Layer:**

This layer structures the data for efficient reporting and analysis.

Fact Tables: Inflation rates, CPI, Producer Price Index (PPI), GDP growth, interest rates

Dimension Tables: Countries, Regions, Economic Periods, Inflation Categories

Relationships: Optimized star schema to ensure efficient queries

Custom measures for year-over-year inflation trends

Forecasting models using moving averages and trend analysis

- **Analytics & Insights Layer**

This layer generates meaningful insights from the data using Power BI's analytical capabilities.

Key Analyses Performed:

Trend Analysis: Inflation changes over time for different regions

Comparative Analysis: Inflation rates by country, continent, or economic group (G7, G20, BRICS)

Economic Impact Analysis: Relationship between inflation and interest rates, GDP, unemployment

Predictive Analytics: Forecasting future inflation rates using Power BI's AI-driven analytics

- **Visualization & Reporting Layer**

Interactive Power BI dashboards present insights in an engaging format.

Dashboard Components:

Global Inflation Heatmap: Color-coded inflation trends by country

Time-Series Line Charts: Historical inflation changes

Comparative Bar Charts: Side-by-side inflation rates by region

KPI Cards: Displaying inflation rate, interest rate, GDP growth

Dynamic Filters & Drill-Throughs: Users can explore data at multiple levels

User Experience (UX) Considerations:

Interactive slicers for filtering data by country, period, and inflation type

Tooltips with contextual economic information

- **Deployment & Security Layer**

Ensures secure access, performance, and distribution of reports.

Power BI Deployment:

Power BI Service (Cloud): Secure web access for stakeholders

Power BI Report Server (On-Premises): For enterprise users with local data storage needs

Embedded Reports: Integration with business portals (SharePoint, Microsoft Teams)

Security Measures:

Row-Level Security (RLS): Restricts data access based on user roles

Example - Solution Architecture Diagram:

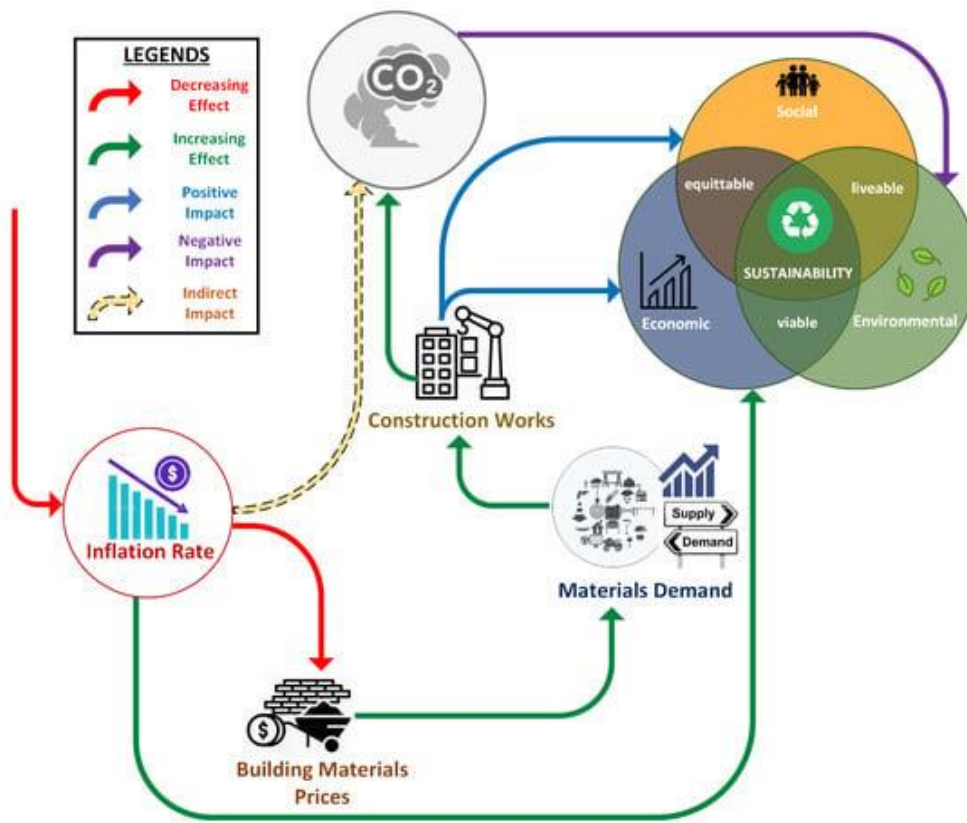


Figure 1: Architecture and data flow of the voice patient diary sample application

Reference:

<https://images.app.goo.gl/EAp3DgPbjbitKaDE8>

<https://www.mdpi.com/2071-1050/13/3/1562>