Global Economic & Demographic Trend Analysis Using Power BI

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INTRODUCTION

In the modern era of data, analyzing global economic and population trends plays a key role in effective policy-making and strategic planning.
This project explores international data on population growth, economic performance (GDP), literacy levels, and infant mortality to reveal patterns over time and differences across regions.
By leveraging Power BI, diverse datasets are processed, modeled, and visualized to convert raw information into clear, actionable insights for better understanding and decision support.

PROJECT OVERVIEW

This project brings together worldwide data from SQL databases and Excel files to examine economic trends, population changes, and major health metrics across nations.

Using data preparation techniques, statistical methods, and DAX-based measures, a dynamic dashboard was designed to showcase patterns and developments observed between 1960 and 2017.

BUSINESS PROBLEM

Governments and organizations often face challenges in efficiently comparing global economic and demographic indicators.

Data scattered across multiple sources increases complexity and makes meaningful analysis difficult.

A unified analytical framework is needed to better understand the relationships between GDP, literacy rates, and key health indicators.

PROJECT OBJECTIVE

- To consolidate data from SQL and Excel into a unified Power BI data model
- To clean, transform, and structure the data for accurate analysis
- To conduct descriptive statistical analysis on key indicators
- To examine trends in population and GDP growth over time
- To explore relationships between economic and health-related factors
- To communicate findings through an interactive and insightful dashboard

DATA SOURCES

SQL Database – Countries World

This source provides structured country-level information, including:

- Population and population density
- GDP per capita
- Literacy rate
- Infant mortality rate
- Contribution of economic sectors (Agriculture, Industry, and Services

Excel Files

- Population per Country: Year-wise population statistics from 1960 to 2017
- GDP by Country: Historical GDP data from 1960 to 2016
- Metadata: Regional classification and income group information

DATA INTEGRATION PROCESS

Established a direct connection between the SQL database and Power BI

Imported Excel datasets using built-in Power BI connectors

Standardized Country Names and Country Codes to maintain consistency across sources

Integrated and merged the datasets into a unified analytical data model

DATA CLEANING & TRANSFORMATION

Data preparation was carried out using the Power Query Editor:

- Eliminated missing and duplicate records
- Standardized country names and country codes
- Converted text fields into appropriate numeric and percentage formats
- Unpivoted year-based columns to enable time-series analysis
- Ensured the dataset was clean, consistent, and well-structured for accurate insights

DATA MODELING

Established relationships using Country Code as the primary key

Designed a star-schema data model for structured analysis

Fact tables were used to store population and GDP metrics

Dimension tables contained region and country-related information

Optimized the data model to ensure efficient performance and faster query execution

DESCRIPTIVE STATISTICAL ANALYSIS

Population Analysis

Calculated mean, median, and standard deviation to understand population distribution

Identified regions with high population concentration, particularly in Asia

GDP Analysis

Computed average GDP per capita across regions

Highlighted economically strong and weaker regions

Infant Mortality Analysis

Examined distribution patterns and variability across different regions

Literacy Analysis

Determined average literacy rates at the regional level

DAX CALCULATIONS

DAX functions were utilized to:

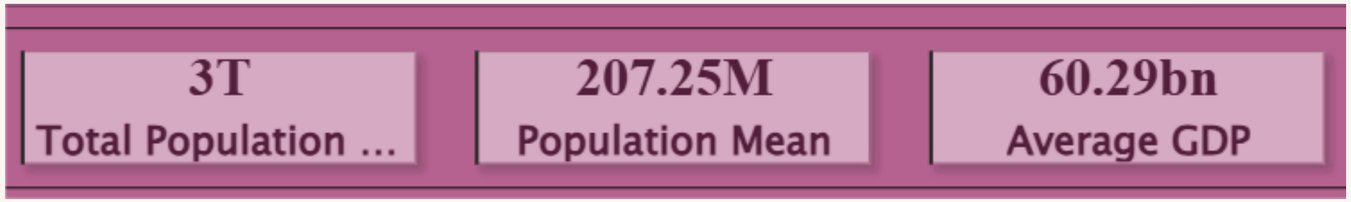
- Calculate total and average population
- Derive GDP per capita and growth rates
- Measure population growth over time
- Analyze trends in literacy rates and infant mortality
- Evaluate the relationship between GDP and literacy

These calculations support dynamic, interactive, and insight-driven analysis.

KPI OVERVIEW

The dashboard features KPI cards that display:

- Total global population
- Average population per country
- Average GDP
- Average literacy rate
- Average infant mortality rate

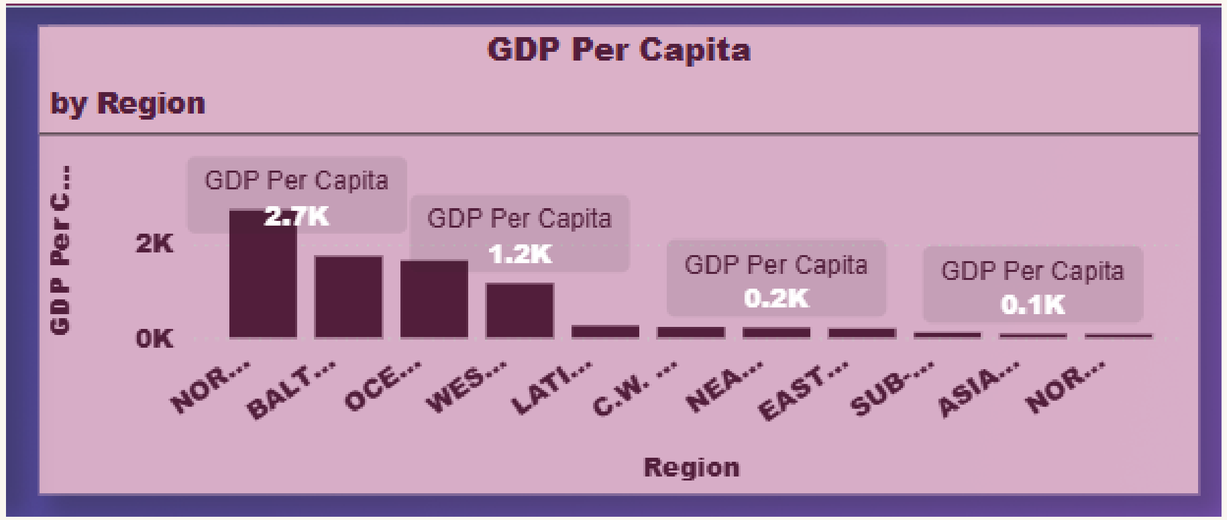


These key performance indicators offer a concise, high-level overview of global conditions and trends.

GDP PER CAPITA BY REGION

This visualization presents a comparison of GDP per capita across different regions:

- Developed regions such as Western Europe and North America exhibit higher GDP levels
- Developing regions demonstrate comparatively lower GDP per capita
- The chart clearly illustrates the extent of global economic disparit



GDP VS INFANT MORTALITY ANALYSIS

The scatter plot illustrates the relationship between GDP and infant mortality rates:

- Countries with higher GDP tend to have lower infant mortality rates
- Nations with lower GDP often experience greater health-related risks
- Bubble size represents population, indicating the scale of impact across countries

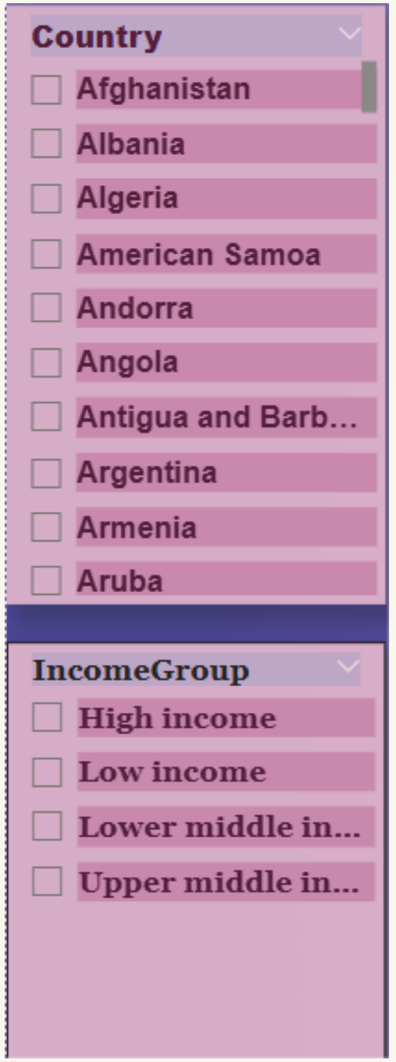
INTERACTIVITY & FILTERS

Year-wise analysis enabled through interactive slicers

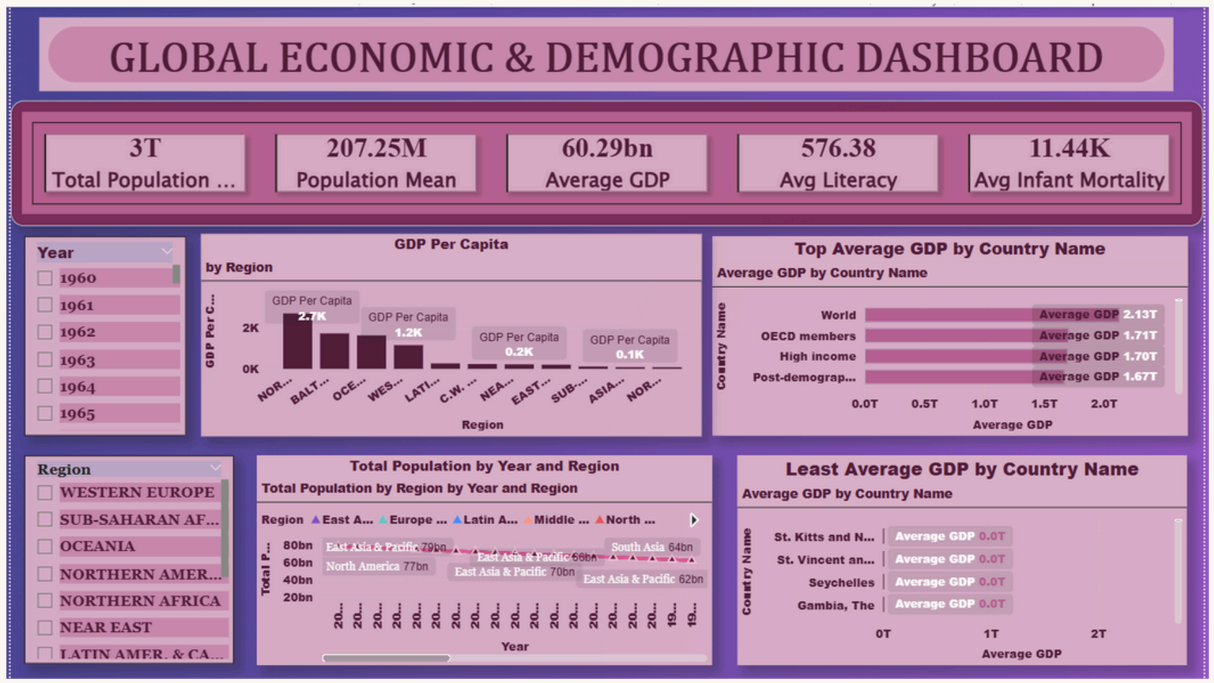
Drill-down functionality at both country and regional levels

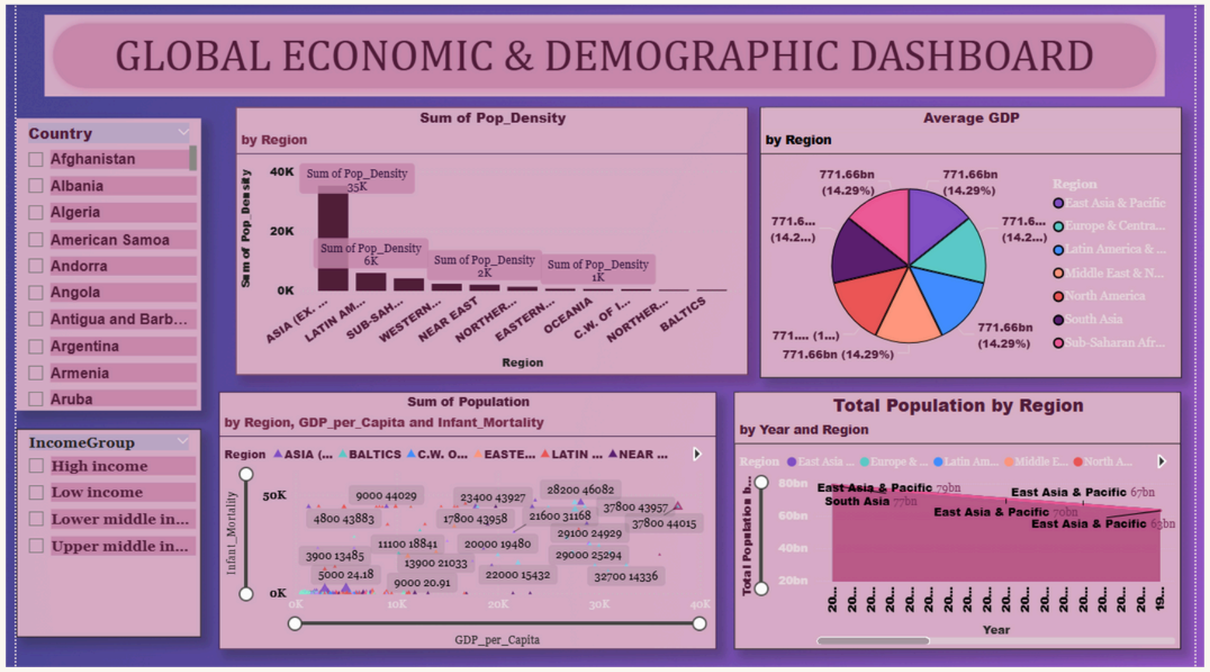
Filtering options based on income group classifications

Facilitates user-driven exploration and deeper data insights



DASHBOARD


GLOBAL ECONOMIC & DEMOGRAPHIC DASHBOARD
3T
Total Population ...
207.25M
Population Mean
60.29bn
Average GDP
576.38
Avg Literacy
11.44K
Avg Infant Mortality
Year
1960
1961
1962
1963
1964
1965
GDP Per Capita
by Region
GDP Per C...
2K
0K
GDP Per Capita 2.7K
GDP Per Capita 1.2K
GDP Per Capita 0.2K
GDP Per Capita 0.1K
NOR...
BALT...
OCE...
WES...
LATI...
C.W. ...
NEA...
EAST...
SUB-...
ASIA...
NOR...
Region
Top Average GDP by Country Name
Average GDP by Country Name
Country Name
World
OECD members
High income
Post-demograp...
Average GDP 2.13T
Average GDP 1.71T
Average GDP 1.70T
Average GDP 1.67T
0.0T
0.5T
1.0T
1.5T
2.0T
Average GDP
Region
WESTERN EUROPE
SUB-SAHARAN AF...
OCEANIA
NORTHERN AMER...
NORTHERN AFRICA
NEAR EAST
LATIN AMER. & CA...
Total Population by Year and Region
Total Population by Region by Year and Region
Region
East A...
Europe ...
Latin A...
Middle ...
North ...
Total P...
80bn
60bn
40bn
20bn
East Asia & Pacific 79bn
North America 77bn
East Asia & Pacific 66bn
East Asia & Pacific 70bn
South Asia 64bn
East Asia & Pacific 62bn
Year
Least Average GDP by Country Name
Average GDP by Country Name
Country Name
St. Kitts and N...
St. Vincent an...
Seychelles
Gambia, The
Average GDP 0.0T
0T
1T
2T
Average GDP


GLOBAL ECONOMIC & DEMOGRAPHIC DASHBOARD
Country
Afghanistan
Albania
Algeria
American Samoa
Andorra
Angola
Antigua and Barb...
Argentina
Armenia
Aruba
IncomeGroup
High income
Low income
Lower middle in...
Upper middle in...
Sum of Pop_Density
by Region
Sum of Pop_Density
40K
20K
0K
Sum of Pop_Density 35K
Sum of Pop_Density 6K
Sum of Pop_Density 2K
Sum of Pop_Density 1K
ASIA (EX. ...
LATIN AM...
SUB-SAH...
WESTERN...
NEAR EAST
NORTHER...
EASTERN...
OCEANIA
C.W. OF I...
NORTHER...
BALTICS
Region
Average GDP
by Region
771.66bn (14.29%)
771.66bn (14.29%)
771.6... (14.2...)
771.6... (14.2...)
771.... (1...)
771.66bn (14.29%)
771.66bn (14.29%)
Region
East Asia & Pacific
Europe & Centra...
Latin America & ...
Middle East & N...
North America
South Asia
Sub-Saharan Afr...
Sum of Population
by Region, GDP_per_Capita and Infant_Mortality
Region
ASIA (...
BALTICS
C.W. O...
EASTE...
LATIN ...
NEAR ...
Infant_Mortality
50K
0K
9000 44029
23400 43927
28200 46082
4800 43883
17800 43958
21600 31168
37800 43957
37800 44015
29100 24929
3900 13485
11100 18841
20000 19480
29000 25294
13900 21033
5000 24.18
9000 20.91
22000 15432
32700 14336
0K
10K
20K
30K
40K
GDP_per_Capita
Total Population by Region
by Year and Region
Region
East Asia ...
Europe & ...
Latin Am...
Middle E...
North A...
Total Population b...
80bn
60bn
40bn
20bn
East Asia & Pacific 79bn
South Asia 77bn
East Asia & Pacific 67bn
East Asia & Pacific 63bn
East Asia & Pacific 62bn
Year

KEY INSIGHTS

Asia exhibits the highest population growth among all regions

Higher literacy rates are positively associated with increased GDP

Infant mortality rates decline as economic conditions improve

Developed regions demonstrate greater economic stability

Developing regions require focused policy interventions for balanced growth

CONCLUSION

This project showcases the effective use of Power BI to consolidate multiple data sources and analyze global economic and demographic trends.

By performing data cleaning, applying DAX calculations, and creating interactive dashboards, actionable insights were generated to explore relationships between population, GDP, literacy rates, and key health indicators.

THANK YOU