Culminating Project Week 2

Data Source:

* World Bank, World Development Indicators (WDI) Database
* International Debt Statistics
* Global Financial Development Database

Access Link: <https://databank.worldbank.org/source/world-development-indicators>

Three Selected Indicators with Descriptions

|  |  |  |
| --- | --- | --- |
| GDP per capita (current US$) |  | Measures a country’s economic output per person, calculated as total Gross Domestic Product (GDP) divided by the population. This is a key indicator of economic prosperity. |
| Unemployment, total (% of total labor force) |  | Represents the percentage of the labor force that is unemployed but actively seeking employment. It is a critical measure of labor market conditions. |
| CO₂ emissions (metric tons per capita) |  | Measures the average carbon dioxide (CO₂) emissions per person in a country, which is crucial for analyzing environmental impact and sustainability. |

Entity-Relationship (ER) Model for Selected Indicators

ER Model for storing World Development Indicators (WDI) data.

Entities & Attributes

1. Country *(Stores country-specific data)*
   * Country\_ID *(Primary Key)*
   * Country\_Name
   * Region
   * Income\_Level
2. Indicator *(Stores different indicators)*
   * Indicator\_ID *(Primary Key)*
   * Indicator\_Name
   * Indicator\_Description
   * Indicator\_Code
3. Data\_Record *(Stores indicator values for each country and year)*
   * Record\_ID *(Primary Key)*
   * Country\_ID *(Foreign Key → Country)*
   * Indicator\_ID *(Foreign Key → Indicator)*
   * Year
   * Value *(Indicator measurement for that year & country)*

Relationships

* One country can have many indicator records (1:M between Country → Data\_Record).
* One indicator applies to many countries (1:M between Indicator → Data\_Record).

ER Diagram Representation

The ER Model consists of:

* Entities: Country, Indicator, Data\_Record
* Relationships: One-to-Many (1:M) between entities

20 World Bank datasets, each containing at least 30 indicators

1. World Development Indicators (WDI)
   * Description: The WDI is the World Bank's premier compilation of cross-country comparable data on development. It includes over 1,400 time-series indicators for 217 economies, covering various aspects of global development.
   * A. cite B. turn C. search
2. Global Financial Development Database (GFDD)
   * Description: The GFDD provides data on financial system characteristics for over 200 economies. It includes indicators on financial depth, access, efficiency, and stability.
3. International Debt Statistics (IDS)
   * Description: DS offers comprehensive data on the external debt of developing countries, including over 200 time-series indicators from 1970 onwards.
4. Enterprise Surveys
   * Description: these surveys provide firm-level data on various aspects of the business environment across countries, covering topics like finance, infrastructure, trade, and corruption.
5. Worldwide Governance Indicators (WGI)
   * Description: The WGI project reports aggregate and individual governance indicators for over 200 countries, covering six dimensions of governance
6. Global Economic Monitor (GEM)
   * Description: EM provides high-frequency data on global economic developments, including indicators on commodity prices, exchange rates, and equity markets.
7. Poverty and Equity Database
   * Description: his database offers indicators related to poverty, inequality, and shared prosperity for various countries.
8. Health Nutrition and Population Statistics
   * Description: his dataset includes indicators on health, nutrition, and population dynamics, covering topics like mortality rates, disease prevalence, and health expenditures.
9. Education Statistics (EdStats)
   * Description: EdStats compiles data on education from national and international sources, including indicators on enrollment, completion, and literacy rates.
10. Gender Statistics
    * Description: his dataset provides indicators on gender equality, covering areas like education, labor force participation, and political representation.
11. Climate Change Knowledge Portal
    * Description: his portal offers climate-related data, including indicators on greenhouse gas emissions, climate finance, and vulnerability indices.
12. Logistics Performance Index (LPI)
    * Description: The LPI measures the logistics performance of countries, including indicators on customs efficiency, infrastructure quality, and shipment reliability.
13. Doing Business
    * Description: his dataset provides indicators on business regulations and their enforcement across economies, covering areas like starting a business, obtaining credit, and enforcing contracts.
14. Global Consumption Database
    * Description: his database offers data on household consumption patterns in developing countries, including indicators on spending habits across various sectors.
15. Africa Development Indicators
    * Description: his compilation includes over 1,400 indicators of development in Sub-Saharan Africa, covering topics like national accounts, trade, and social indicators.
16. Global Financial Inclusion (Global Findex) Database
    * Description: The Global Findex provides indicators on how adults in various countries save, borrow, make payments, and manage risk.
17. Remittance Prices Worldwide
    * Description: his dataset offers indicators on the cost of sending and receiving remittances across different country corridors.
18. Subnational Malnutrition Database
    * Description: his database provides indicators on malnutrition at the subnational level, including data on stunting, wasting, and underweight prevalence.
19. Wealth Accounting and the Valuation of Ecosystem Services (WAVES)
    * Description: AVES provides indicators on natural capital accounting, including data on ecosystem services and wealth estimates.
20. Global Partnership for Education (GPE) Results Framework
    * Description: his dataset includes indicators used to monitor progress in education in GPE partner countries, covering areas like learning outcomes and equity. Incorporating these datasets will provide a comprehensive foundation for structuring queries and conducting in-depth analyses, thereby enhancing the scope and depth of your research.

Refined ER Model

Entities & Attributes

1. Country *(Stores country-specific data)*
   * Country\_ID *(Primary Key)*
   * Country\_Name
   * Region
   * Income\_Level
2. Dataset *(Stores dataset-specific information)*
   * Dataset\_ID *(Primary Key)*
   * Dataset\_Name
   * Dataset\_Source
   * Category (e.g., Economy, Education, Health, Climate)
3. Indicator *(Stores details on each indicator across datasets)*
   * Indicator\_ID *(Primary Key)*
   * Indicator\_Name
   * Indicator\_Description
   * Indicator\_Code
   * Dataset\_ID *(Foreign Key → Dataset)*
4. Data\_Record *(Stores actual indicator values over time for each country)*
   * Record\_ID *(Primary Key)*
   * Country\_ID *(Foreign Key → Country)*
   * Indicator\_ID *(Foreign Key → Indicator)*
   * Year
   * Value *(The actual data for that country and indicator in a specific year)*

Research Questions the Database Can Answer

1. Economic & Financial Analysis  
    *How does GDP per capita correlate with financial inclusion and access to credit across developing countries?*
   * Indicators Used: GDP per capita, Financial Inclusion Index, Domestic Credit to Private Sector (% of GDP)
2. Climate & Sustainability  
    *What is the relationship between CO₂ emissions, renewable energy consumption, and economic growth?*
   * Indicators Used: CO₂ emissions per capita, Renewable energy consumption, GDP growth rate
3. Education & Workforce Development  
   *How do literacy rates and tertiary education enrollment impact unemployment rates across regions?*
   * Indicators Used: Literacy Rate (% of Population), Tertiary Education Enrollment (%), Unemployment Rate

60 research questions based on the selected datasets and indicators from the World Bank. These questions are categorized based on themes such as economy, finance, education, health, climate, governance, and infrastructure.

Economic Development & Growth

1. How does GDP per capita correlate with education expenditure across different countries?
2. What is the impact of foreign direct investment (FDI) on economic growth in developing economies?
3. How do inflation rates affect employment levels in emerging markets?
4. What is the relationship between government debt (% of GDP) and economic growth?
5. How do exports and imports influence GDP growth in high-income vs. low-income countries?
6. How has remittance inflow influenced poverty reduction across regions?
7. What is the impact of public sector wages on economic productivity?
8. How do interest rate changes impact business growth and investment?
9. Does higher tax revenue lead to better public services in different regions?
10. What role does internet penetration play in economic development?

Financial Inclusion & Debt

1. How does access to credit impact entrepreneurial success in low-income countries?
2. What is the correlation between mobile banking adoption and financial inclusion?
3. How do non-performing loans (% of total loans) affect financial stability?
4. How do interest rates impact household savings across income groups?
5. Does domestic credit to the private sector improve economic productivity?
6. What is the impact of sovereign debt levels on foreign investment?
7. How does external debt service impact government spending on social programs?
8. What is the relationship between stock market development and GDP per capita?
9. How do capital flows impact currency stability in emerging markets?
10. Does bank ownership structure (private vs. state-owned) influence financial efficiency?

Education & Workforce

1. How does tertiary education enrollment impact youth unemployment rates?
2. What is the effect of government expenditure on education on literacy rates?
3. How does student-to-teacher ratio impact learning outcomes in primary education?
4. What is the correlation between higher education levels and income inequality?
5. How does vocational training impact job placement rates in developing countries?
6. What is the impact of early childhood education investment on long-term economic growth?
7. How does digital literacy correlate with employment rates?
8. What is the effect of STEM education investment on economic innovation?
9. How do female literacy rates impact women’s labor force participation?
10. Does public vs. private education funding affect educational outcomes?

Health & Well-being

1. How does life expectancy correlate with healthcare expenditure (% of GDP)?
2. What is the impact of malnutrition rates on economic productivity?
3. How does government investment in healthcare affect infant mortality rates?
4. What is the relationship between urbanization rates and non-communicable diseases?
5. How does access to clean water impact child mortality rates?
6. How do vaccination rates affect disease outbreak trends?
7. What is the effect of air pollution levels on respiratory diseases?
8. How do mental health services impact the workforce’s productivity?
9. What is the impact of health insurance coverage on out-of-pocket medical expenses?
10. Does an aging population increase healthcare costs in developed countries?

Climate Change & Sustainability

1. How does CO₂ emissions correlate with renewable energy consumption?
2. What is the impact of climate change policies on carbon footprint reduction?
3. How does deforestation affect biodiversity loss in tropical regions?
4. What is the relationship between climate disasters and GDP losses?
5. How do air pollution levels correlate with urban population growth?
6. Does investment in green infrastructure improve climate resilience?
7. What is the effect of water conservation policies on agriculture productivity?
8. How does energy efficiency impact sustainable economic growth?
9. What is the correlation between temperature rise and agricultural yields?
10. How do carbon tax policies affect energy consumption patterns?

Governance & Institutions

1. What is the effect of government transparency on foreign direct investment (FDI)?
2. How does corruption perception impact business competitiveness?
3. What is the relationship between political stability and economic growth?
4. Does higher democracy correlate with better economic development?
5. How do strong legal institutions affect entrepreneurial success?
6. What is the impact of public sector corruption on infrastructure quality?
7. How does press freedom correlate with government accountability?
8. What is the effect of human rights policies on international trade partnerships?
9. Does judicial independence improve contract enforcement and business climate?
10. How does digital governance (e-government) impact service delivery efficiency?