

## **1. Scenario Summary**

The scenario involves working as a Data Analyst within a global economic development think-tank that aims to support policymakers and the public in understanding international economic performance. I was provided with IMF Global Economic Outlook data containing a wide range of indicators for multiple countries from 2001 to 2020. The think-tank's objective is to transform this extensive dataset into clear insights that can inform decisions, highlight economic trends, and allow comparisons across countries or country groups. As part of this task, I was expected to explore the data, identify the indicators most relevant to assessing economic development, and define a focused analytical direction, either by examining long-term economic trends or presenting annual economic snapshots, based on my understanding of the dataset and its potential value to decision-makers.

## **2. Data Exploration**

The data exploration began with a broad view of the IMF Global Economic Outlook dataset, which contained 44 macroeconomic indicators across the years 2001–2020 for multiple countries. The first step was to understand which indicators were most relevant for assessing overall economic performance from both a development and policy perspective. During this exploration, particular attention was given to indicators that:

- capture economic productivity (e.g., GDP per capita),
- reflect labour market conditions (such as unemployment rate),
- track macroeconomic stability (e.g., inflation), and
- provide insight into demographic and fiscal structures (population, revenue, expenditure, and net debt).

Trend patterns were examined across countries to identify indicators with good continuity over time, limited missing data, and meaningful year-to-year variation. Visual checks and summary statistics helped determine which variables would offer the clearest and most interpretable insights for policymakers. This process highlighted four key trend-based indicators, GDP per capita, unemployment rate, inflation, and population, as they collectively represent the core dimensions of economic growth, labour conditions, price stability, and demographic change. Fiscal indicators such as revenue, expenditure, and net debt were also identified as essential for understanding a country's financial position, particularly when focusing on the latest available year.

## **2.1. Specific Objectives**

Based on this exploration, the following specific objectives were defined:

1. To examine long-term economic performance trends by analysing how GDP per capita, unemployment rate, inflation, and population have evolved from 2001–2020 across different countries.
2. To allow cross-country comparisons by enabling users to select a country of interest and observe how its economic trajectory compares to global patterns.
3. To provide policymakers with a current-year(2020) fiscal and demographic snapshot, focusing on the latest values of population, government revenue, government expenditure, and net debt.
4. To support economic interpretation and decision-making by presenting indicators that together illustrate productivity, labour market health, price stability, demographic growth, and fiscal sustainability.

5. To simplify complex macroeconomic data into clear, high-level insights that can be understood by both technical and non-technical audiences.

### **3. Data Visualisation**

The selection of visualisation techniques for this dashboard was guided by both data visualisation theory and the analytical objectives established for exploring global economic performance over time. Given that the primary goal was to help policymakers observe long-term trends and compare economic indicators across countries, visual forms that maximise clarity, accuracy, and comparability were prioritised.

#### **3.1. Line Charts for Time-Series Indicators:**

Line charts were used to display trends in GDP per capita, unemployment rate, inflation, and population. According to Cleveland and McGill's hierarchy of graphical perception, position along a common scale is one of the most accurate ways for viewers to interpret quantitative information. Line charts leverage this by clearly showing how values change across a continuous time axis, making them particularly suitable for time-series analysis. This choice supports the dashboard's objective of showing economic performance trends from 2001 to 2020, enabling users to easily identify peaks, declines, and long-run patterns. Further, Tufte's principles of data-ink ratio emphasise simplicity and the removal of unnecessary visual elements. The line charts used adhere to this by presenting minimally cluttered visuals that focus attention on the underlying trends rather than graphical decoration.

#### **3.2. Summary Cards for Latest-Year Indicators**

Summary cards were used to present the most recent values for population, government revenue, government expenditure, and net debt. These cards act as high-impact visual cues

that support rapid interpretation. Research in dashboard design theory (Few, 2006) highlights that key performance indicators should be shown in a highly prominent format that facilitates immediate recognition. Summary cards achieve this by isolating essential values and displaying them with large fonts and clear labelling. This design choice aligns with the second objective of the dashboard: to provide users with an accessible current-year snapshot of fiscal and demographic conditions. The cards eliminate complexity and make the most important annual figures instantly visible without requiring further interaction.

### **3.3. Use of a Country Selection Filter:**

Although not a chart, the slicer (country filter) is a deliberate visual control grounded in the principle of *analytical flexibility*. It enables comparative analysis—a core requirement of the scenario—allowing users to quickly switch between countries and observe how trends differ. This reinforces the dashboard’s purpose of supporting informed policy analysis and international comparison.

### **3.4. Consistent Use of Colour and Scale:**

A consistent colour scheme was applied across charts to minimise cognitive load and ensure visual coherence. Following best practices from Few and Ware, reducing colour variation helps users focus on the data’s shape and direction rather than being distracted by aesthetic elements. Uniform scales and clearly labelled axes further enhance interpretability and comparability across indicators.

## **4. Dashboard Layout, Formatting, and Composition**

The overall layout and composition of the dashboard were designed to maximise clarity, minimise cognitive load, and support rapid interpretation, key principles emphasised throughout data visualisation and human-computer interaction (HCI) literature. The structure follows a logical,

top-to-bottom flow that aligns with established user-reading patterns (Nielsen, 2006), starting with high-level metrics and moving toward detailed trend analysis.

#### **4.1.Prioritisation of Information Using a Top-Down Structure**

The placement of summary cards at the top of the dashboard reflects Stephen Few's guidance that dashboards should begin with high-level key performance indicators (KPIs) that provide immediate situational awareness. According to Few (2006), users should be able to understand the most important information within a few seconds of viewing a dashboard. By positioning the latest-year population, revenue, expenditure, and net debt at the top, the design ensures that decision-makers can quickly grasp the country's recent fiscal and demographic position before exploring historical trends.

#### **4.2.Grouping and Proximity to Support Interpretability:**

The dashboard uses aligned visuals arranged in a grid-like structure, following Gestalt principles, specifically similarity and proximity. Related charts (e.g., all time-series analyses) are placed together in consistent positions, allowing viewers to intuitively compare patterns across indicators. This approach mirrors Ware's (2013) emphasis on organising visual elements in ways that align with natural perceptual processes, thereby reducing unnecessary mental effort.

#### **4.3.Consistency in Formatting, Colour, and Scale:**

Consistent formatting across charts, including matching colours, identical font styles, aligned axes, and uniform spacing, enhances the visual coherence of the dashboard.

According to Tufte (2001), visual clutter interferes with the viewer's ability to detect meaningful patterns. Maintaining a consistent design reduces cognitive friction and allows users to focus on the content rather than adjusting to multiple visual styles. The restrained use of colour, primarily a single highlight colour for trend lines, adheres to Few's recommendation to limit colour usage to functional purposes rather than decoration.

#### **4.4.Balanced Use of Space and Minimalism**

The dashboard employs a clean, minimalist design with adequate white space to prevent overcrowding. This follows Tufte's data–ink ratio principle, which promotes eliminating non-essential elements so that the maximum proportion of visual representation is dedicated to the data itself. The clarity created by sufficient spacing ensures that each chart is distinct, legible, and digestible without overwhelming the viewer.

#### **4.5.Interactivity Positioned for Usability**

The country filter is placed unobtrusively in the upper right corner, easy to find, yet not visually dominant. This placement follows general usability heuristics (Nielsen, 2006), which suggest that interactive controls should be available without obstructing the main analytical content. By making country selection intuitive, the dashboard facilitates quick comparison across nations, supporting the broader objective of enabling policymakers to explore economic differences efficiently.

### **5. Step by step Overview of Building the Dashboard**

#### **5.1. Import data**

- Power BI Desktop - Get data - choose Excel
- In Power Query Editor:
  - Promoted header
  - Ensured the data was clean and ready for exploration
  - Created a custom population column that expressed the population of the countries in millions
  - Click Close & Apply.

## 5.2.DAX measures (calculated measures used in cards & visuals) – I created the following measures

- Latest Year Population
- Latest Year Revenue
- Latest Year Expenditure
- Latest Year Net Debt

```

1 Latest Year Value Expenditure =
2 VAR _LatestYear =
3   CALCULATE ( MAX ( 'Sheet1'[Year] ), ALL ( 'Sheet1' ) )
4 RETURN
5   CALCULATE [
6     SUM ( Sheet1[General government total expenditure,National currency] ) * 1000000000,
7     'Sheet1'[Year] = _LatestYear
8   ]

```

WEO Country Code	ISO	Country	Year	Gross domestic product, constant prices,National currency	Gross domestic product, constant prices,Percent change	Gross domestic product, current prices,Nat
171 AND	Andorra	2001		2.153	8.119	
171 AND	Andorra	2002		2.251	4.546	
171 AND	Andorra	2003		2.447	8.694	
171 AND	Andorra	2004		2.646	8.136	
171 AND	Andorra	2005		2.789	5.398	
171 AND	Andorra	2006		2.923	4.809	
171 AND	Andorra	2007		2.968	1.553	
171 AND	Andorra	2008		2.803	-5.559	
171 AND	Andorra	2009		2.655	-5.303	
299 VEN	Venezuela	2019			-27.67	
299 VEN	Venezuela	2020			-29.995	
311 ATG	Antigua and Barbuda	2001		2.298	-4.548	
311 ATG	Antigua and Barbuda	2002		2.322	1.028	
311 ATG	Antigua and Barbuda	2003		2.463	6.076	
311 ATG	Antigua and Barbuda	2004		2.605	5.767	
311 ATG	Antigua and Barbuda	2005		2.773	6.475	
311 ATG	Antigua and Barbuda	2006		3.126	12.707	
311 ATG	Antigua and Barbuda	2007		3.417	9.316	
311 ATG	Antigua and Barbuda	2008		3.416	-0.014	
311 ATG	Antigua and Barbuda	2009		3.008	-11.963	
311 ATG	Antigua and Barbuda	2010		2.772	-7.841	
311 ATG	Antigua and Barbuda	2011		2.718	-1.959	
311 ATG	Antigua and Barbuda	2012		2.809	3.372	

### **5.3. Building the report visuals**

**5.3.1.** Textbox title: Added a header text box “Global Economic Performance Trend Overtime”

**5.3.2.** Top row KPI Cards:

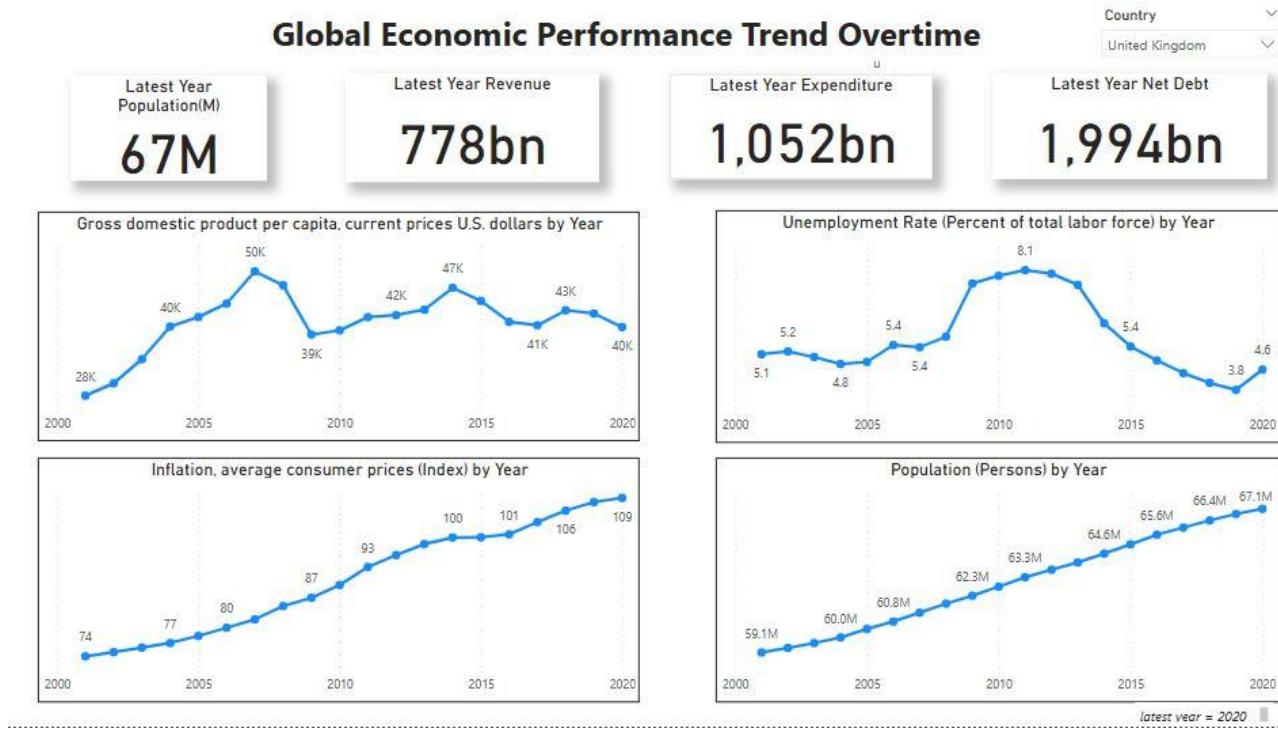
- Latest Year Population
- Latest Year Revenue
- Latest Year Expenditure
- Latest Year Net Debt

Formatted cards with large font, subtle shadow, and short descriptive title.

**5.3.3.** Main grid Four line charts:

- GDP per capita
- Unemployment rate
- Inflation index
- Population
- Used the Years field for the X axis
- Enabled data labels and markers
- Remove horizontal grid lines
- Turned off axis labels

**5.3.4.** Slicer: Added a *Country* slicer (dropdown) in the top-right. Enabled single-select.



## Critical Evaluation of the Dashboard Solution

The dashboard successfully provides a clear, accessible, and intuitive overview of economic performance across countries over time. By focusing on key indicators such as GDP per capita, unemployment rate, inflation, and population, it offers policymakers and general users a coherent understanding of long-term macroeconomic trends. The inclusion of current-year summary cards for population, revenue, expenditure, and net debt adds immediate contextual insight, supporting quick, high-level interpretation, an essential aspect of effective dashboard design. The use of a country slicer enhances interactivity, allowing users to tailor the view to specific national contexts and enabling meaningful comparisons across countries. The layout is logically structured, the visuals are consistent, and the charts chosen align well with theoretical best practices for trend analysis.

However, the dashboard also has some limitations. First, the reliance on a single-screen layout restricts the depth of analysis that can be accommodated. While this makes the view simple and uncluttered, it limits the number of indicators that can be displayed without overwhelming the user. Additionally, the dashboard presents only a subset of the 44 available indicators, which, while necessary for clarity, means some economic dimensions, such as trade balance, investment flows, or government balance, remain unexplored. The dashboard also primarily supports descriptive analysis; more advanced capabilities such as forecasting, anomaly detection, or correlation exploration are absent, which could have strengthened the decision-making value. Similarly, users cannot drill down into sub-national or sector-specific data because the dataset does not provide such granularity.

Data limitations also influence the dashboard's effectiveness. Missing values in certain years or indicators may affect trend accuracy, and the aggregation choices (summing) may introduce assumptions that need careful interpretation. Additionally, because the dashboard depends entirely on the IMF dataset, any structural biases or definitional differences across countries inevitably influence the displayed results.

Overall, the dashboard meets its primary objective of offering a concise, interactive view of global economic trends and current-year fiscal indicators. While it is effective for high-level pattern recognition and comparison, its analytical depth is constrained by both design choices and data limitations. Further enhancements could include more granular exploration, predictive analytics, or additional economic dimensions to strengthen its value for policy analysis.

## Conclusion

In summary, the dashboard effectively transforms complex IMF economic data into a clear, interactive tool that supports policymakers and the public in understanding global economic performance. By focusing on essential indicators and presenting both current-year insights and long-term trends, it offers a balanced view of economic conditions across countries. The use of intuitive visuals, consistent formatting, and user-driven filtering enhances accessibility and interpretability. While the dashboard is limited by its single-screen format, the selected indicators, and gaps within the dataset, it nevertheless provides a strong foundation for informed analysis and can be further expanded to deepen insight and analytical capability.

## References

- Cleveland, W.S. and McGill, R. (1984) ‘Graphical perception: Theory, experimentation, and application to the development of graphical methods’, *Journal of the American Statistical Association*, 79(387), pp. 531–554.
- Few, S. (2006) *Information Dashboard Design: The Effective Visual Communication of Data*. Sebastopol, CA: O’Reilly Media.
- Nielsen, J. (2006)** *Ten usability heuristics*. Nielsen Norman Group. Available at: <https://www.nngroup.com/articles/ten-usability-heuristics/>
- Tufte, E.R. (2001) *The Visual Display of Quantitative Information*. 2nd edn. Cheshire, CT: Graphics Press.
- Ware, C. (2013) *Information Visualization: Perception for Design*. 3rd edn. Waltham, MA: Morgan Kaufmann.