General Sir John Kotelawala Defence University

Faculty of Management, Social Science and Humanities

Department of Languages

BSc in Applied Data Science Communication

Advanced SQL and Cloud Databases

Year 2: Semester 2

Task 03

Student Number	Name
D/ADC/24/0047	Muhammed Nasir
D/ADC/24/0007	Hussein Ziyard
D/ADC/24/0036	Rajintha Lakshani
D/ADC/24/0008	Chamali Abeysekara

A Data Analytics Approach to United Nations Sustainable Development Goals

Using SQL Server and Power BI

TABLE OF CONTENTS

Introduction

The United Nations Sustainable Development Goals (SDGs) offer a global benchmark of tracking the global development towards a sustainable society, economy, and environment. The 17 SDGs were adopted by all UN Member States in 2015 and cover a broad spectrum of priorities of the world, including poverty reduction, public health, quality education, gender equality, climate action, and sustainable urban development. To monitor the progress towards these goals, high-quality, standardised, and complete data is necessary, which can be compared across countries and time. These indicators are mostly hosted in the UN SDG Data Repository, which is the main global platform where analysts, researchers, and policymakers can view the trends and disparities in long-term development.

In the project, the UN SDG Data Repository provided real-world datasets which were retrieved and analysed to investigate the progress of countries in several SDG indicators since the year 2000. Selected datasets cover the topics of poverty, health, and climate, which gives a multidimensional concept of global development. The data sets were handled in SQL Server to ensure that proper data cleaning, standardisation, and relational structuring are done before the data sets are linked to Power BI to perform advanced visual analytics.

The project involved an entire end-to-end data analytics process - starting with the acquisition of raw SDG data, loading and cleaning the data into SQL Server and building a normalised data relational model. The data was then linked to Microsoft Power BI, where advanced data analysis techniques were used with DAX calculations, drill-down hierarchies, custom visuals, maps, and dynamic key performance indicators. The methodology is a realistic professional practice where massive and intricate global data sets need to be ready, transformed, and analysed to detect insightful information.

In this report, the data preparation, modelling, and visualisation are explained in detail, and the sophisticated Power BI features, including ranking metrics, cumulative measures of growth, and year-over-year comparisons, are used. It also decodes the trends that are shown in the dashboard and reflects how the insights can be used to make evidence-based decisions among governments, NGOs and development organisations working toward achieving the SDGs.

Methodology

This section outlines the complete methodological approach that will be used in this project, which is the data acquisition, data storage, data transformation, modelling, and data visualisation. The solution is based on a complete analytics life cycle, which incorporates SQL Server as a data handling solution and Microsoft Power BI as a modelling and dashboard creation tool. This was to make sure that the global SDG performance can be analysed with accuracy, reliability, and usability.

4.1 Data Collection

The data was obtained through the United Nations SDG Global Database, which is a well-known database that contains harmonised statistical indicators of global progress in the 17 Sustainable Development Goals. The chosen dataset contained the indicators concerning:

- Poverty and inequality
- Health and well-being
- Environmental and climatic impacts.

The data were downloaded in CSV and Excel files with dimensions of country name, indicator name, indicator code, year, units, sex, age, nature, value, and other metadata.

Raw files were kept as references while all the processing was done in SQL Server and Power BI.

4.2 Data storage and import (SQL Server)

The SQL Server database UN_SDG_DB contains a single main table, MainSDGData: Country_Name, Indicator_Name, Year, and Value. Data from CSV and Excel files was imported via SSMS, checked in staging tables, cleaned, and loaded into MainSDGData. The combination of Power BI and SQL server also simplified the workflow, allowing it to have organized storage, automatic updates, and less messy relational modelling. This simplified handling of large data sets and all dashboards were found on reliable data.

The full SQL scripts used are provided in Appendix A.

4.3 Data Cleaning and Transformation (SQL Server)

4.3.1 Cleaning Operations

Data cleaning included handling missing or invalid values, standardising field names (GeoAreaName → Country_Name, TimePeriod → Year), ensuring numeric consistency, and refining metadata fields for units, age, sex, and nature.

In the process, inconsistent country names, missing values, and matching SDG indicators on history occurred. These demanded further validation procedures and proper design of cleaning process.

4.3.2 Development of Analytical SQL View.

A cohesive SQL view (vw_AIISDGData) was created to combine all analysis-ready fields. This simplified Power BI modelling and ensured consistency, while also solving initial aggregation problems that appeared in the process of cleaning data. The perspective formed a solid basis of all the future dashboards.

4.4 Data Modelling (Power BI)

The modelling phase entailed development of a guided and effective analytical model that facilitates dynamic slicing and interactive dashboards.

4.4.1 Dimension Tables (Within Power BI) Creation.

As there was no SQL for creating dimension tables, it was created in power BI with the help of DAX: DimCountry (Country_Name), DimIndicator (Indicator_Name), and DimYear (Year with YearSort for chronological ordering) Creating these tables improved slicer functionality and usability. There were some difficulties such as the identification of the right chronological order of YearSort and the right mapping of indicators between countries.

4.4.2 Relationship Model

A star schema was created which included DimCountry, DimIndicator, and DimYear connecting to MainSDGData.

4.4.3 DAX Measure Development

Several DAX measures were developed to provide insights, including average values, YoY changes, cumulative values, progress percentages, and indicator rankings.

The entire DAX expressions are indicated in Appendix B.

4.5 Interactive Features and Visualisation (Power BI)

Four primary dashboard pages were created:

1. Global Overview
2. Country Insights
3. Indicator Deep Dive
4. Goal Summary

Each dashboard incorporates: KPI cards, Waterfall charts, Line charts, Scatter and bar charts, Summary tables, Drill-through navigation, Bookmarks and buttons to make it easy to use.

4.6 Additional Analytical Processing.

Additional modelling activities were:

- Tables of aggregated summaries that are calculated.
- Performance comparison ranking.
- Time intelligence using YearSort
- Efficiency of data type optimisation.

Results

This section outlines the analysis and key findings from the SDG datasets using Power BI. The results are organized by dashboards, which emphasize the main visualizations, KPIs, and observed trends. For clarity, each figure shows a specific visual element from the dashboards, and the complete dashboards can be found in Appendix C.

1. SDG Global Overview Dashboard

The SDG Global Overview dashboard is a high-level overview of SDGs progress in countries. Users are provided with the opportunity to interact with slicers to choose the desired countries or years and the visualisations are dynamically updated. To illustrate this, Germany has been chosen as a case example since it ranks the highest in the indicators in the dataset.

Key components of this dashboard include:
Year-over-Year (YoY) Change KPI: Figure 1 shows the annual change in the selected indicator for a country. For example, Germany has a YoY change of 298.71, indicating significant improvement over the previous year.

Cumulative Since 2015 KPI: Figure 2 shows the total value of the selected indicator since 2015. Germany's cumulative value is 593.92K, reflecting overall progress.

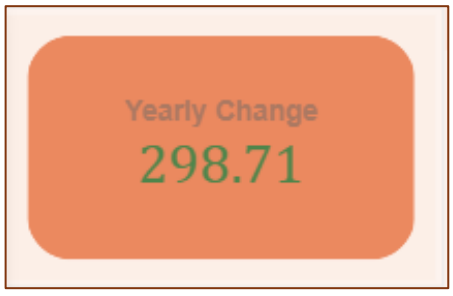


Figure 1: Year-over-Year (YoY) Change KPI - Germany, SDG Global Overview

Figure 2: Cumulative Since 2015 KPI - Germany, SDG Global Overview

Progress Percentage KPI: Figure 3 shows the percentage progress toward the SDG target. In Germany, the progress percentage is 1%, showing early-stage advancement relative to the target.

Average Value and Indicator Rank: The average value across all years is 298.71 in Figure 4, and Germany ranks first among the countries in this dataset. The indicator rank card in Figure 5 shows users to compare countries easily.

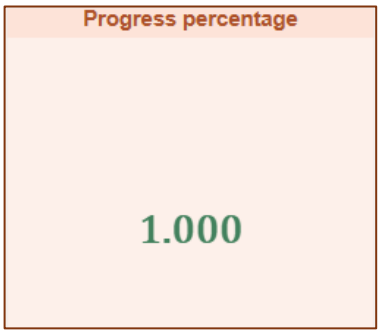


Figure 3: Progress Percentage KPI - Germany, SDG Global Overview

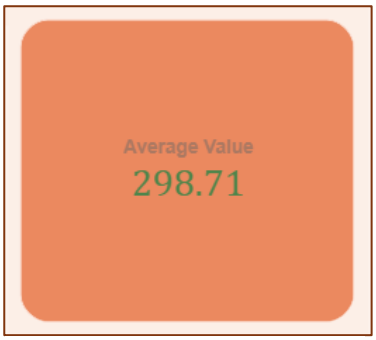


Figure 4: Average Value and Indicator Rank - Germany, SDG Global Overview

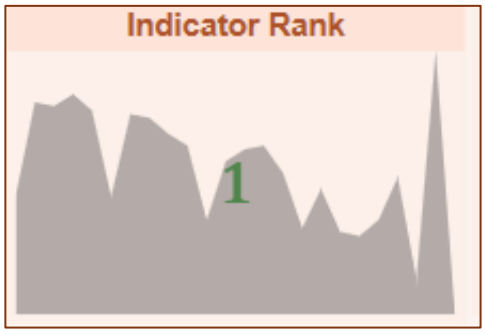


Figure 5: Average Value and Indicator Rank - Germany, SDG Global Overview

Change in Average Value Line Chart: Figure 6 shows trends over time. Germany has a steady trend from 2000 to 2021, with a decline in 2024 followed by a rapid rise from 2022 (123.50) to 2023 (1321.29).

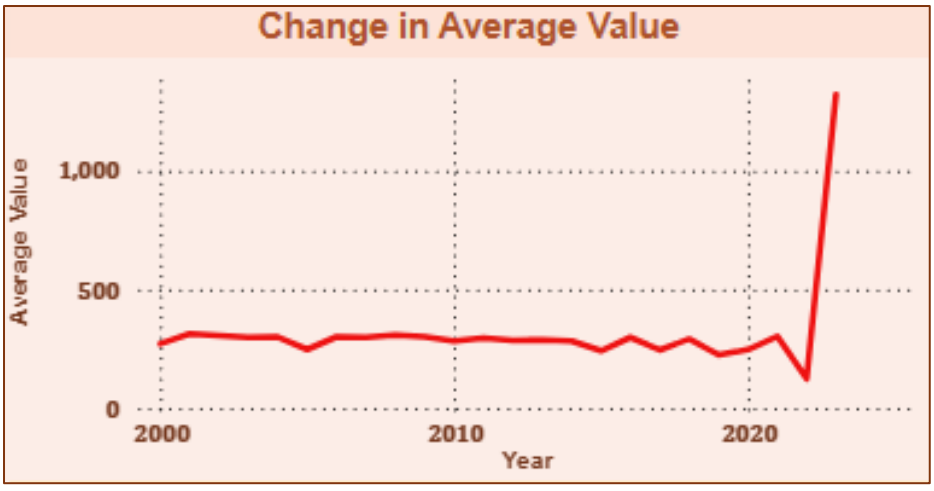


Figure 6: Change in Average Value Line Chart - Germany, SDG Global Overview

Total Value Table: Figure 7 shows the total values for all indicators and countries, summarizing progress in a tabular format.

Country_Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Albania	29.21	14.43	8.99	13.41	12.87	22.30	11.41	10.44	5.27	9.41	33.18	9.45	5.80	9.94	6.71	23.75	4.79	23.42	1.9
Algeria	89.31	113.39	102.07	101.01	90.71	73.97	84.47	83.49	83.32	82.63	74.44	40.36	81.08	80.60	80.47	76.74	78.69	75.67	75.4
Americas	11.70	11.70	11.20	10.90	10.10	9.40	8.00	7.30	6.70	6.40	5.80	5.30	5.10	4.60	4.50	4.20	4.30	4.30	4.1
Angola	235.78	628.61	602.37	538.02	498.91	242.95	437.17	401.30	197.15	348.08	176.22	300.59	277.80	266.79	261.73	142.69	235.69	130.15	58.4
Argentina	44.37	35.48	38.13	14.60	12.49	18.00	10.50	10.10	9.65	9.84	15.68	7.08	7.26	6.78	6.32	59.31	6.03	13.88	6.2
Armenia	41.78	30.92	27.97	24.83	22.00	29.80	17.77	16.98	15.75	15.91	30.25	15.17	14.54	14.46	14.47	31.65	13.55	31.78	13.2
Asia	116.42	150.06	142.46	134.84	126.86	94.03	110.42	103.27	96.60	90.67	75.48	79.48	74.03	68.55	64.15	62.46	58.01	58.92	54.1
Australia	353.64	305.44	412.99	323.36	328.57	351.12	467.14	488.08	375.80	505.87	356.45	568.63	555.41	540.67	369.98	433.11	380.09	411.54	394.0
Australia and New Zealand	29.45	3.82	3.71	3.72	3.42	29.52	3.28	3.37	3.26	3.33	30.16	3.47	3.40	3.40	3.36	31.25	3.35	31.15	3.1
Austria	38.30	39.39	37.43	11.16	10.66	16.47	10.83	11.24	11.40	11.60	19.32	10.74	10.11	10.11	9.26	16.34	11.34	17.21	11.6
Azerbaijan	44.09	28.24	4.71	4.81	4.44	7.77	33.47	33.15	30.29	29.27	39.66	27.50	28.10	23.87	11.40	27.83	11.18	28.72	10.3
Bangladesh	195.68	494.80	465.29	435.67	406.05	145.61	352.32	334.09	310.04	292.75	112.24	258.33	244.18	230.41	216.71	124.27	105.26	113.52	167.9
Barbados	49.83	45.84	43.19	44.65	42.72	57.86	44.62	41.90	41.50	41.77	58.35	41.18	39.53	39.66	38.55	58.51	6.56	58.29	36.7
Belarus	34.85	22.59	18.69	17.06	13.34	16.05	10.66	10.38	10.08	9.87	15.14	9.43	9.53	9.64	9.50	15.07	8.89	15.34	9.3
Belgium	58.79	70.31	67.02	17.89	18.48	23.26	18.07	17.97	19.37	19.26	27.34	17.83	16.21	17.04	15.55	21.19	16.39	21.76	16.6
Belize	62.56	76.22	68.21	66.77	62.76	59.04	55.36	51.58	47.79	44.53	52.44	39.27	40.26	41.36	43.66	58.08	51.40	61.92	7.6
Benin	275.23	532.46	534.39	301.39	530.59	268.09	509.45	500.85	563.38	597.96	319.86	340.89	617.88	607.17	605.18	235.74	604.18	312.82	97.2
Bhutan	179.36	285.59	256.56	126.18	207.18	111.73	166.67	80.48	132.65	121.23	75.28	95.77	44.79	79.20	73.38	60.68	63.31	39.00	55.2
Bolivia (Plurinational State of)	117.41	149.02	143.08	256.18	131.88	43.72	40.87	36.38	33.58	31.86	121.40	27.37	27.50	26.02	24.28	28.04	24.84	27.92	22.0
Bosnia and Herzegovina	27.75	5.68	10.16	9.88	4.98	35.14	8.84	1.11	8.25	7.83	34.77	1.00	6.82	6.77	6.75	37.33	6.53	38.29	6.8
Botswana	85.33	137.94	47.81	142.48	151.26	107.14	204.18	201.24	198.73	42.70	141.22	269.04	288.06	221.25	211.51	38.01	72.26	52.13	99.1
Brazil	68.32	41.97	41.08	42.07	42.44	52.73	41.79	41.65	40.25	38.76	70.98	34.48	13.20	12.29	11.91	19.46	13.65	20.65	13.9
Bulgaria	44.10	27.37	36.44	26.31	37.64	45.36	27.55	26.69	25.74	22.60	34.03	19.60	17.98	16.75	17.39	14.97	8.64	13.27	7.0
Burkina Faso	269.64	512.68	507.84	282.51	480.97	243.95	463.24	452.98	428.56	243.24	216.94	387.59	376.04	361.26	201.43	181.42	313.02	168.19	71.2
Burundi	439.61	798.86	743.50	704.80	686.61	354.54	375.99	654.54	834.57	612.38	323.68	597.05	575.09	315.58	533.38	282.62	500.51	260.87	463.5
Total	146.09	188.96	172.74	142.06	125.00	102.97	116.17	120.48	117.95	111.64	103.38	109.02	104.54	104.28	98.31	87.13	99.78	89.20	62.6

Figure 7: Total Value Table - SDG Global Overview

Note: Selecting any country updates all visuals on this dashboard automatically. The complete SDG Global Overview dashboard is included in Appendix C.1.

2. Country Insights Dashboard

The Country Insights dashboard enables one to look into the SDG performance at the country or regional level in detail. A user will be able to choose a particular country, and all KPIs and visualisations will dynamically update and give a comparative and time-based view.

Cumulative Since 2015 KPI: Figure 8 shows the cumulative value of the chosen indicator since 2015. As an illustration, the cumulative value is 593.92K irrespective of the fluctuations per year, and it reflects cumulative development.

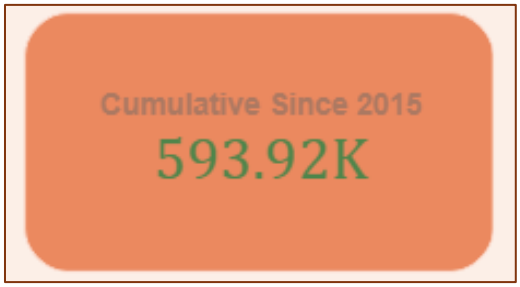


Figure 8: Cumulative Since 2015 KPI - Country Insights

Indicator Rank KPI: Figure 9 displays the performance of a country compared to others. As an example, when choosing China, the indicator rank is 135, which shows its location among other nations.

Average Value KPI: Generalises the performance of indicators in Figure 10. In China, the average value is 31.58.

Progress Percentage KPI: It is an indicator of incremental progress towards the SDG targets and China has made progress of 1 percent, this is shown in Figure 11.

Figure 9: Indicator Rank - China, Country Insights

Figure 10: Average Value - China, Country Insights

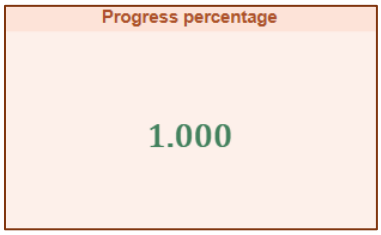


Figure 11: Progress Percentage - China, Country Insights

Change in Average Value Line Chart: Figure 12 shows the trends with time. In the case of China, the line is fluctuating with decreases between 2000-2008, increases in 2010, and decreases and increases between 2014- 2023.

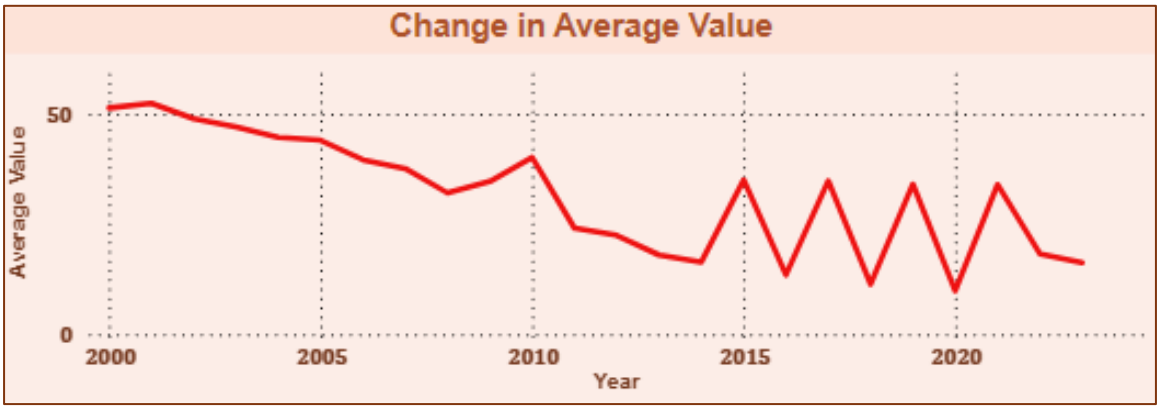


Figure 12: Change in Average Value Line Chart – China, Country Insights

Annual Change Waterfall Chart: Highlights the annual changes in Figure 13 and there is an overall trend of an increase in China over the past years.

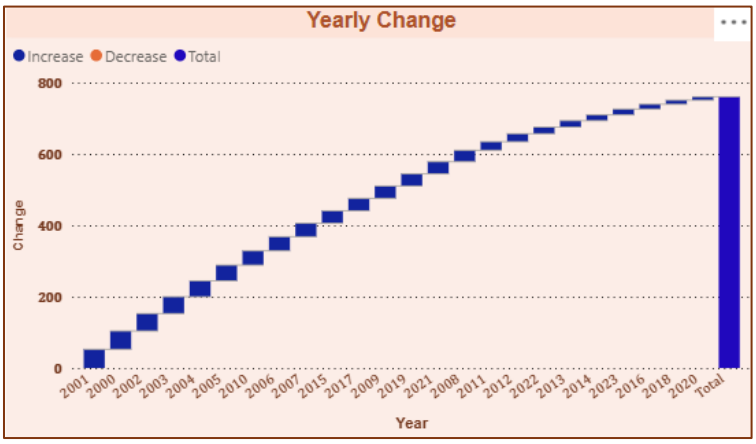


Figure 13: Yearly Change Waterfall Chart – China, Country Insights

Average Value Stacked Bar Chart: The average values of the indicators of the countries in one bar chart with the highest to the lowest values are held in Figure 14. The United States of America is the best example where the average value is the highest, then Central African Republic, Chad, South Sudan, Nigeria, etc. This graph will enable users to make a quick comparison between the performance of the countries.

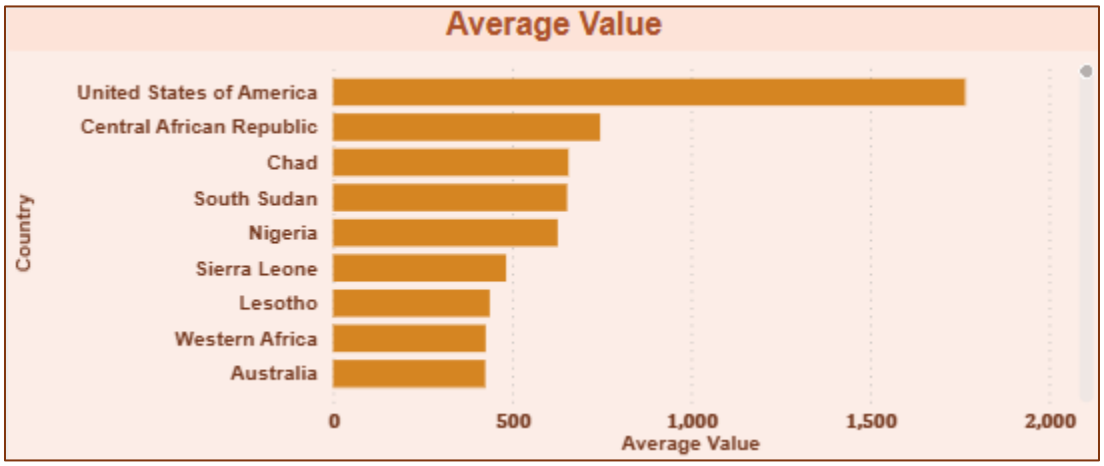


Figure 14: Average Value Stacked Bar Chart

Note: The ranking of the indicators, average, change in average and annual change and the scatter chart are all dynamic in that when a country is selected, the indicators' rank, average, change in average and annual changes, and the cumulative value are all fixed. The complete Country Insights dashboard is obtained in Appendix C.2.

3. Indicator Deep Dive Dashboard

The Indicator Deep Dive dashboard enables one to compare a particular SDG indicator between countries. A dropdown list allows one to choose an indicator, like 3:08:01 AM in Figure 15. According to this choice, the visuals and table are dynamically changing to indicate the performance of the selected indicator.

Figure 15: Indicator

Value by Target Scatter Chart: Figure 16 shows the actual value of countries against their target of a given indicator. As an illustration, 3:08:01 AM was chosen, we can see the countries evenly distributed based on their performance concerning the target.

Figure 16: Value by Target Scatter Chart - 3:08:01 AM, Indicator Deep Dive

Total Value Line Chart: Figure 17 shows the trend of the total values over the years of the selected indicator. In the case of 3:08:01 AM, the figure indicates that total value increases generally with the passage of time.

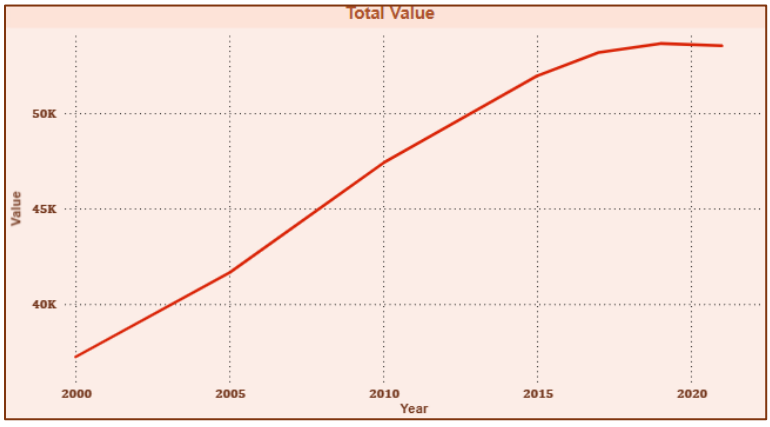


Figure 17: Total Value Line Chart - 3:08:01 AM, Indicator Deep Dive.

Country Table: The summary of the average value and rank of a chosen indicator per country shows in Figure 18. With 3:08:01 AM chosen, the names of countries, their average values, and position in the indicator are presented in a table which gives an easy reference to compare countries

Country_Name	Average Value	Indicator Rank
Albania	100.85	82
Algeria	100.85	82
Angola	100.85	82
Argentina	100.85	82
Armenia	100.85	82
Asia	100.85	82
Australia	100.85	82
Australia and New Zealand	100.85	82
Austria	100.85	82
Azerbaijan	100.85	82
Bangladesh	100.85	82
Barbados	100.85	82
Belarus	100.85	82
Belgium	100.85	82
Belize	100.85	82
Benin	100.85	82
Bhutan	100.85	82
Bolivia (Plurinational State of)	100.85	82
Bosnia and Herzegovina	100.85	82
Botswana	100.85	82
Brazil	100.85	82
Bulgaria	100.85	82
Burkina Faso	100.85	82
Burundi	100.85	82
Cabo Verde	100.85	82
Cameroon	100.85	82
Canada	100.85	82
Total	**100.85**	**82**

Figure 18: Country Table Indicator Deep Dive.

Note: When a different indicator is selected by the dropdown, the three visuals will be automatically updated, allowing the exploration of the dataset to be interactive. The full Indicator Deep Dive dashboard is in Appendix C.3.

4. SDG Goal Summary Dashboard

The SDG Goal Summary dashboard gives a summary of performance in a variety of SDG targets and goals. Hierarchical slicers allow users to choose a country, an indicator, and a goal, which is dynamically updated to a corresponding visual.

Figure 19 displays the **Sum of Targets KPI**; this indicates the number of targets in the country, indicator or region of choice; in this case, choosing Asia makes the value change to 210, indicating the number of targets in the region. **The Average Value KPI** as in Figure 20 is the average performance of the selected region or goal and is independent of selections. The same figure

indicates also the **Cumulative Since 2015 KPI** that is fixed to 593.92K, the total development amount since the base year 2015.

Figure 19: Sum of Targets KPI – Asia, SDG Goal Summary

Figure 20: Average Value KPI – Asia, SDG Goal Summary

Figure 20: Cumulative Since 2015 KPI – SDG Goal Summary

Column Chart of Yearly Average Values: Scattered column chart in Figure 21 used to show the historical trends of the region, indicator, and goal selected. As an example, the maximum yearly mean was 2001 (188.96) and the minimum in 2024 (4.69) and there was a fluctuation between the years 2000 and 2025.

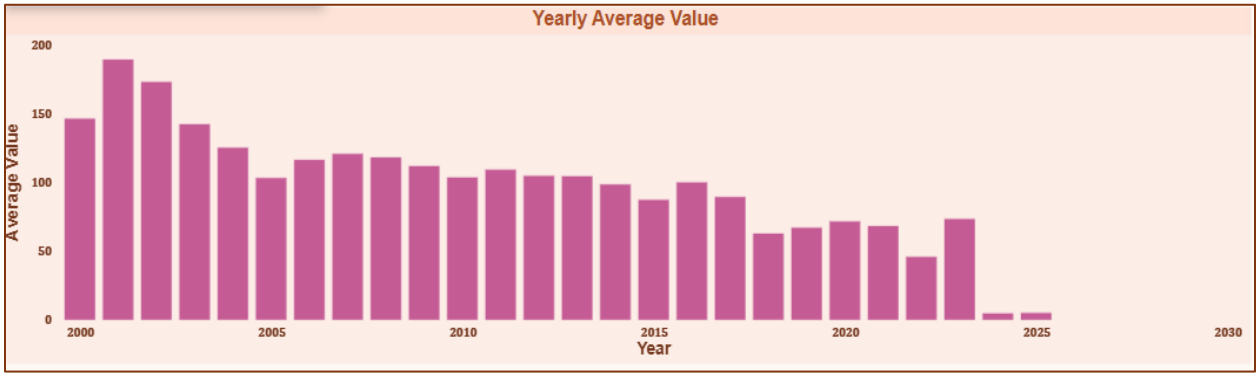


Figure 21: Yearly Average Value Line Chart – SDG Goal Summary

Note: The choice of other country, indicator or goal dynamically shows the total of targets, whereas the mean and the total since 2015 do not change. The entire SDG Goal Summary dashboard is attached in Appendix C.4.

5. Details Dashboard of Indicators.

The Indicator Details dashboard is a specific perspective of SDG indicators that enables the user to compare the performance of countries. The most important measures are the Yearly Change (e.g., 100.85), the average number of all countries of the chosen indicator (e.g., 64.56), and the Indicator Rank, which comprises the ranking of countries regarding the indicator performance. Furthermore, the dashboard provides an overview in terms of a table with the totals of goals, units, targets, and footnotes. All visuals and KPIs are dynamically updated when a particular indicator is chosen, allowing a close look into the progress on an indicator level. The complete Indicator Details dashboard is shown in Appendix C.5.

Summary

Across all dashboards, interactivity allows users to explore countries, indicators, and goals. The KPIs, line charts, tables, and scatter charts provide both high-level and detailed insights, revealing patterns of progress, stagnation, and decline in SDG indicators worldwide. All dashboards are designed to be interactive and responsive, serving as a useful tool for monitoring sustainable development outcomes.

Discussion

The dashboards provide a clear view of SDG performance by the countries, indicators and goals supporting real-time analysis. Global Overview highlights the best-performing countries, cumulative performance, and annual performance. The Country Insights dashboard also enables a deeper analysis of countries or regions, whereas the Indicator Deep Dive presents specific indicators in comparison with other countries. The SDG Goal Summary and Indicator Details dashboards are used to get aggregated and detailed metrics to make informed decisions.

Challenges such as handling missing values, country name inconsistencies, and variations in definitions of indicators. Creating correct DAX measures of cumulative values, percentages, progress and rankings requires testing and validation. Mapping indicators and development of chronological YearSort values were particularly demanding. These activities improved data cleaning, relational modelling, and advanced Power BI skills.

The dashboards demonstrate significant tendencies: there are countries with consistent improvement, while others stagnate or decline. Interactive features such as slicers, drop-downs and KPI cards that enable exploring of relationships between indicators, countries and goals. These policy implications would assist policy-makers and NGOs to prioritize the interventions, resource allocation, and program monitoring. SQL Server and power BI were used, which improved the working process, providing quality data storage and analysis.

Overall, the dashboards incorporate trends, comparisons, and interactivity to provide actionable information on the global SDG performance, and the importance of paying close attention to data preparation, modelling, and visualisation as evidence-based decision-making processes.

Conclusion

In this project, it is demonstrated that SQL Server and Power BI can be connected to create interactive dashboards that summarize the SDG performance at the global, country, and indicator levels. The dashboards are useful in terms of highlighting the trends, variations, and general progress and make the stakeholders explore data, areas where intervention is needed, and track the progress towards the Sustainable Development Goals.

The large size of datasets with advanced DAX metrics, relational modelling, and dynamic visualisations proves the utility of the data-driven analysis in decision-making. Interactive features like slicers, drill-throughs and KPI cards allow access and action on complex, multidimensional data.

In general, the project shows that data preparation is a crucial step, creating good modelling and designing a dashboard is essential to generate evidence-based insights. The strategy could be expanded in additional regions or contexts to help policymakers, NGOs and development organisations to meet the sustainable development goals with ease

Appendices

Appendix A - SQL Scripts

A.1 Table Creation Script (MainSDGData)

```sql
CREATE TABLE MainSDGData (
    Country_Name NVARCHAR(100),
    Indicator_Name NVARCHAR(200),
    Year INT,
    Value FLOAT
);
```

A.2 Data Cleaning

A.2.1 Handling and replacing missing values

```sql
-- Check missing values
SELECT * FROM SI_POV_DAY1 WHERE Value IS NULL;

-- Replace missing numeric values with 0
UPDATE SI_POV_DAY1
SET Value = 0
WHERE Value IS NULL;

-- Optional: Replace missing text with 'Unknown'
UPDATE SI_POV_DAY1
SET Country_Name = 'Unknown'
WHERE Country_Name IS NULL;

--done

-- Check missing values
SELECT * FROM SH_STA_MORT WHERE Value IS NULL;

-- Replace missing numeric values with 0
UPDATE SH_STA_MORT
SET Value = 0
WHERE Value IS NULL;

-- Optional: Replace missing text with 'Unknown'
UPDATE SH_STA_MORT
SET Country_Name = 'Unknown'
WHERE Country_Name IS NULL;

--done

-- Check missing values
SELECT * FROM SH_ACS_UNHC WHERE Value IS NULL;

-- Replace missing numeric values with 0
UPDATE SH_ACS_UNHC
SET Value = 0
WHERE Value IS NULL;
```

A.2.2 Standardize Country Names

```sql
-- Example: Standardize country names
UPDATE SI_POV_DAY1
SET Country_Name = 'United States'
WHERE Country_Name IN ('USA', 'US', 'U.S.');

-- Repeat for other common inconsistencies

-- Example: Standardize country names
UPDATE SH_STA_MORT
SET Country_Name = 'United States'
WHERE Country_Name IN ('USA', 'US', 'U.S.');

-- Repeat for other common inconsistencies

-- Example: Standardize country names
UPDATE SH_ACS_UNHC
SET Country_Name = 'United States'
WHERE Country_Name IN ('USA', 'US', 'U.S.');

-- Repeat for other common inconsistencies

-- Example: Standardize country names
UPDATE EN_ATM_GHGT_NAIP
SET Country_Name = 'United States'
WHERE Country_Name IN ('USA', 'US', 'U.S.');

-- Repeat for other common inconsistencies

-- Example: Standardize country names
UPDATE EN_ATM_GHGT_AIP
SET Country_Name = 'United States'
WHERE Country_Name IN ('USA', 'US', 'U.S.');
```

A.4 Column Renaming for Consistency

```sql
-- Example for Dataset1
EXEC sp_rename 'dbo.SI_POV_DAY1.GeoAreaName', 'Country_Name', 'COLUMN';
EXEC sp_rename 'dbo.SI_POV_DAY1.Indicator', 'Indicator_Name', 'COLUMN';
EXEC sp_rename 'dbo.SI_POV_DAY1.TimePeriod', 'Year', 'COLUMN';
EXEC sp_rename 'dbo.SI_POV_DAY1.Value', 'Value', 'COLUMN';

-- Repeat for Dataset2, Dataset3, etc.
EXEC sp_rename 'dbo.SH_STA_MORT.GeoAreaName', 'Country_Name', 'COLUMN';
EXEC sp_rename 'dbo.SH_STA_MORT.Indicator', 'Indicator_Name', 'COLUMN';
EXEC sp_rename 'dbo.SH_STA_MORT.TimePeriod', 'Year', 'COLUMN';
EXEC sp_rename 'dbo.SH_STA_MORT.Value', 'Value', 'COLUMN';

EXEC sp_rename 'dbo.SH_ACS_UNHC.GeoAreaName', 'Country_Name', 'COLUMN';
EXEC sp_rename 'dbo.SH_ACS_UNHC.Indicator', 'Indicator_Name', 'COLUMN';
EXEC sp_rename 'dbo.SH_ACS_UNHC.TimePeriod', 'Year', 'COLUMN';
EXEC sp_rename 'dbo.SH_ACS_UNHC.Value', 'Value', 'COLUMN';

--done

EXEC sp_rename 'dbo.EN_ATM_GHGT_NAIP.GeoAreaName', 'Country_Name', 'COLUMN';
EXEC sp_rename 'dbo.EN_ATM_GHGT_NAIP.Indicator', 'Indicator_Name', 'COLUMN';
EXEC sp_rename 'dbo.EN_ATM_GHGT_NAIP.TimePeriod', 'Year', 'COLUMN';
EXEC sp_rename 'dbo.EN_ATM_GHGT_NAIP.Value', 'Value', 'COLUMN';

EXEC sp_rename 'dbo.EN_ATM_GHGT_AIP.GeoAreaName', 'Country_Name', 'COLUMN';
EXEC sp_rename 'dbo.EN_ATM_GHGT_AIP.Indicator', 'Indicator_Name', 'COLUMN';
EXEC sp_rename 'dbo.EN_ATM_GHGT_AIP.TimePeriod', 'Year', 'COLUMN';
EXEC sp_rename 'dbo.EN_ATM_GHGT_AIP.Value', 'Value', 'COLUMN';

EXEC sp_rename 'dbo.DC_ODA_SIDS.GeoAreaName', 'Country_Name', 'COLUMN';
EXEC sp_rename 'dbo.DC_ODA_SIDS.Indicator', 'Indicator_Name', 'COLUMN';
EXEC sp_rename 'dbo.DC_ODA_SIDS.TimePeriod', 'Year', 'COLUMN';
EXEC sp_rename 'dbo.DC_ODA_SIDS.Value', 'Value', 'COLUMN';
```

A.5 Insert Cleaned Data into Main Table

```sql
-- Insert data from all datasets
INSERT INTO MainSDGData (Country_Name, Indicator_Name, Year, Value)
SELECT Country_Name, Indicator_Name, Year, Value FROM SI_POV_DAY1;

INSERT INTO MainSDGData (Country_Name, Indicator_Name, Year, Value)
SELECT Country_Name, Indicator_Name, Year, Value FROM SH_STA_MORT;

-- Repeat for other datasets
-- Insert data from all datasets
INSERT INTO MainSDGData (Country_Name, Indicator_Name, Year, Value)
SELECT Country_Name, Indicator_Name, Year, Value FROM SH_ACS_UNHC;

INSERT INTO MainSDGData (Country_Name, Indicator_Name, Year, Value)
SELECT Country_Name, Indicator_Name, Year, Value FROM EN_ATM_GHGT_NAIP;
-- Insert data from all datasets
INSERT INTO MainSDGData (Country_Name, Indicator_Name, Year, Value)
SELECT Country_Name, Indicator_Name, Year, Value FROM EN_ATM_GHGT_AIP;

INSERT INTO MainSDGData (Country_Name, Indicator_Name, Year, Value)
SELECT Country_Name, Indicator_Name, Year, Value FROM DC_ODA_SIDS;
```

Appendix B - DAX Measures

Average Value

```
Average Value = AVERAGE(MainSDGData[Value])
```

Year-over-Year (YoY) Change

```
YoY Change =
VAR CurrentYear = SELECTEDVALUE(DimYear[Year])
VAR CurrentValue = [Average Value]
VAR LastYearValue =
    CALCULATE(
        [Average Value],
        DimYear[Year] = CurrentYear - 1
    )
RETURN
CurrentValue - LastYearValue
```

Cumulative Value Since 2015

```
All Cumulative Since 2015 =
CALCULATE(
    SUM(MainSDGData[Value]),
    FILTER(
        ALL(MainSDGData),
        MainSDGData[Year] >= 2015
    )
)
```

Progress Percentage

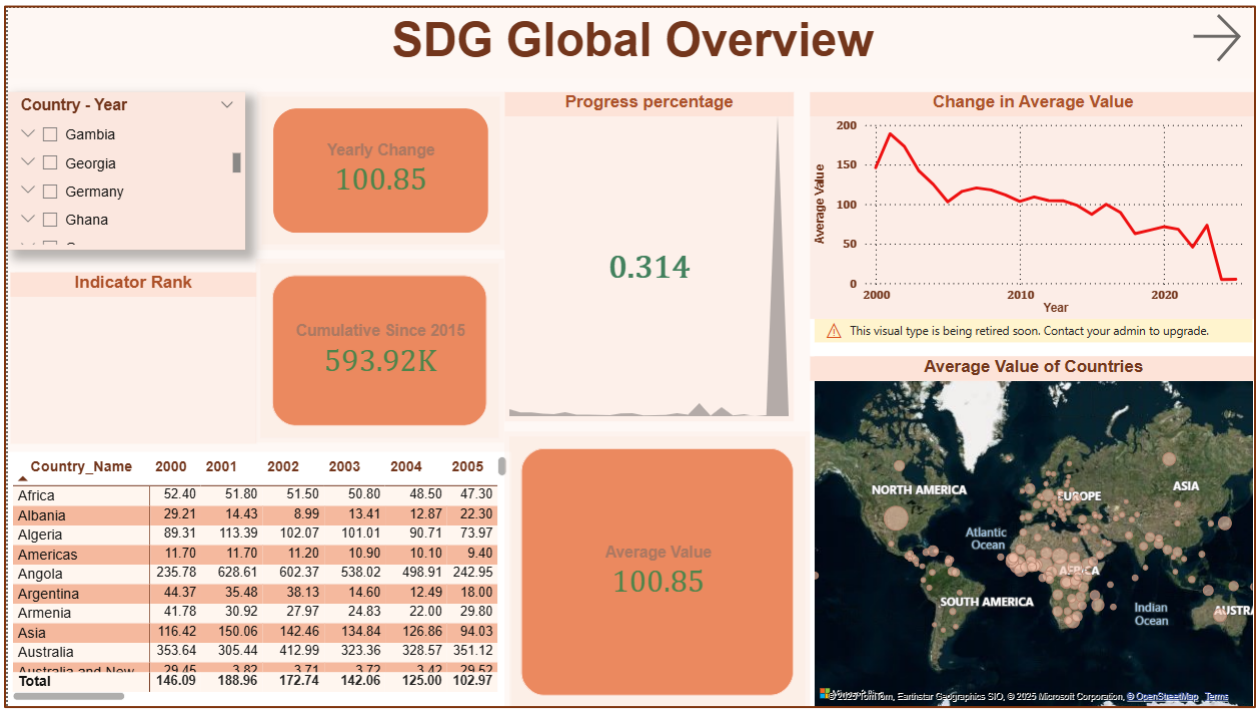
```
Progress % =
DIVIDE(
    AVERAGE(MainSDGData[Value]),
    CALCULATE( AVERAGE(MainSDGData[Value]), KEEPFILTERS( MainSDGData[Year] = MAX(MainSDGData[Year]) ), KEEPFILTERS( MainSDGData[Country_Name] = MAX
    (MainSDGData[Country_Name]) ) ),
    0
)
```

Indicator Rank

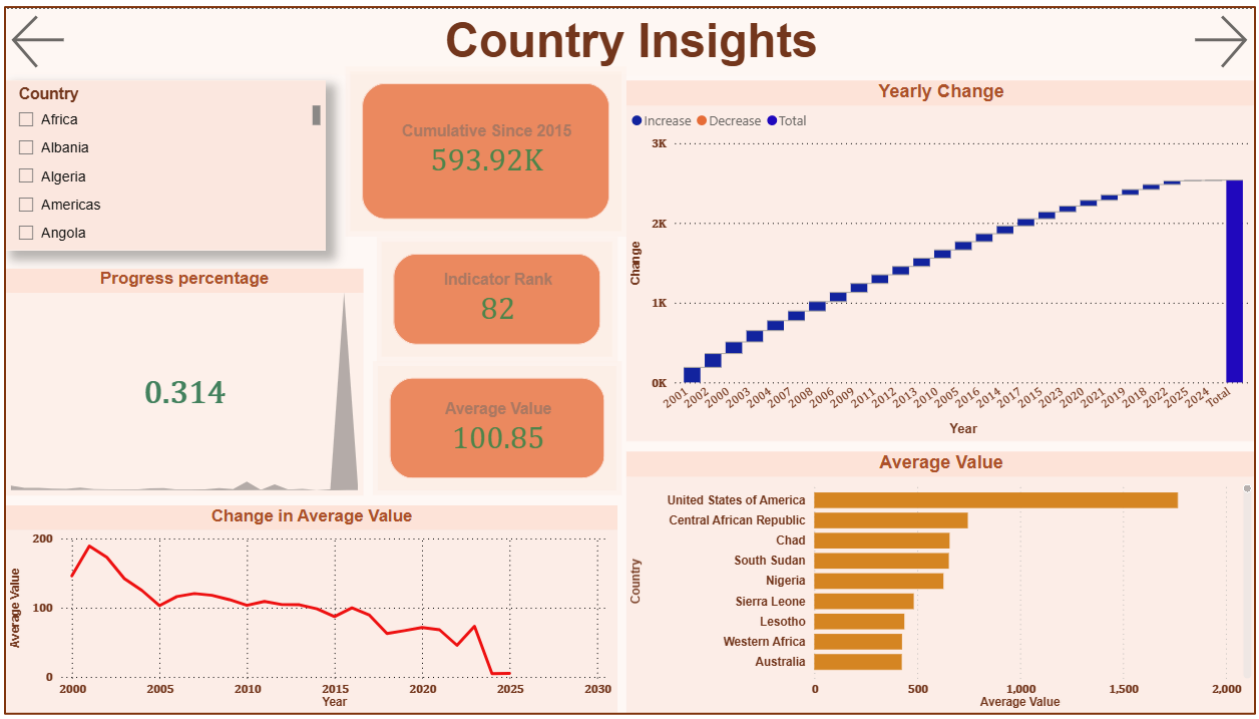
```
Indicator Rank =
RANKX(
    ALL(MainSDGData[Country_Name]),
    [Average Value],
    ,
    DESC
)
```

Appendix C - Full Dashboard Screenshots

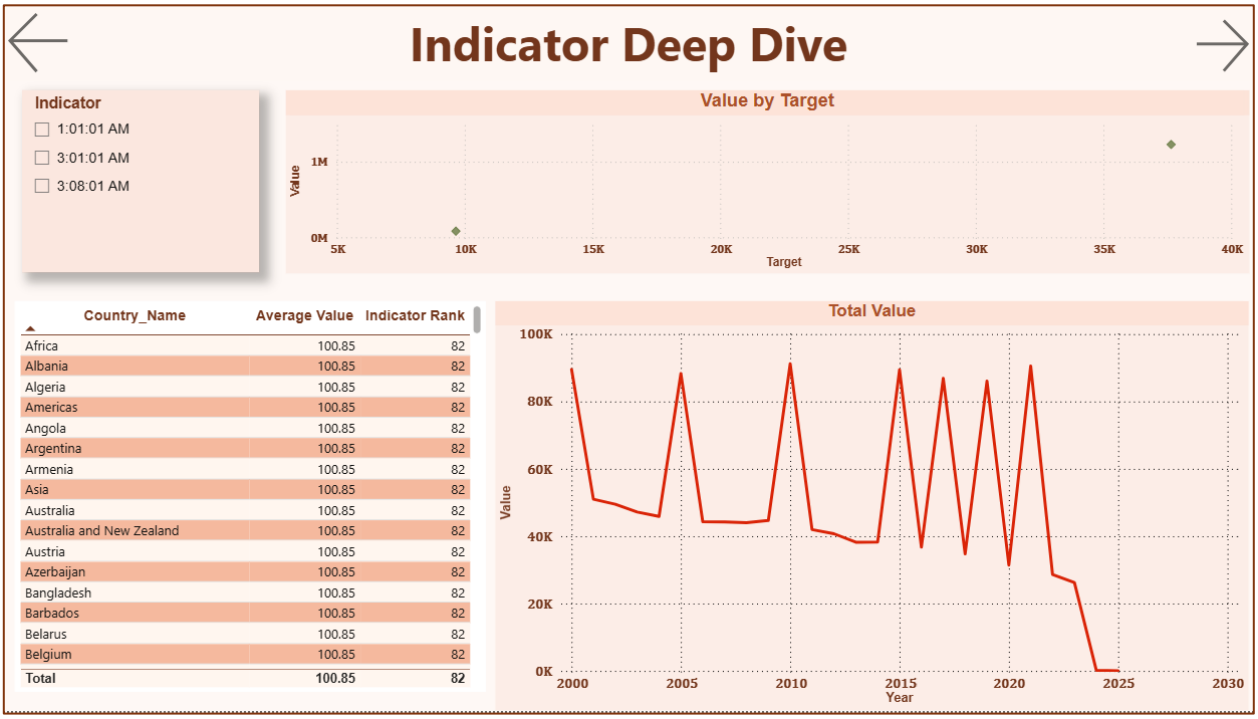
C.1 Global Overview Dashboard



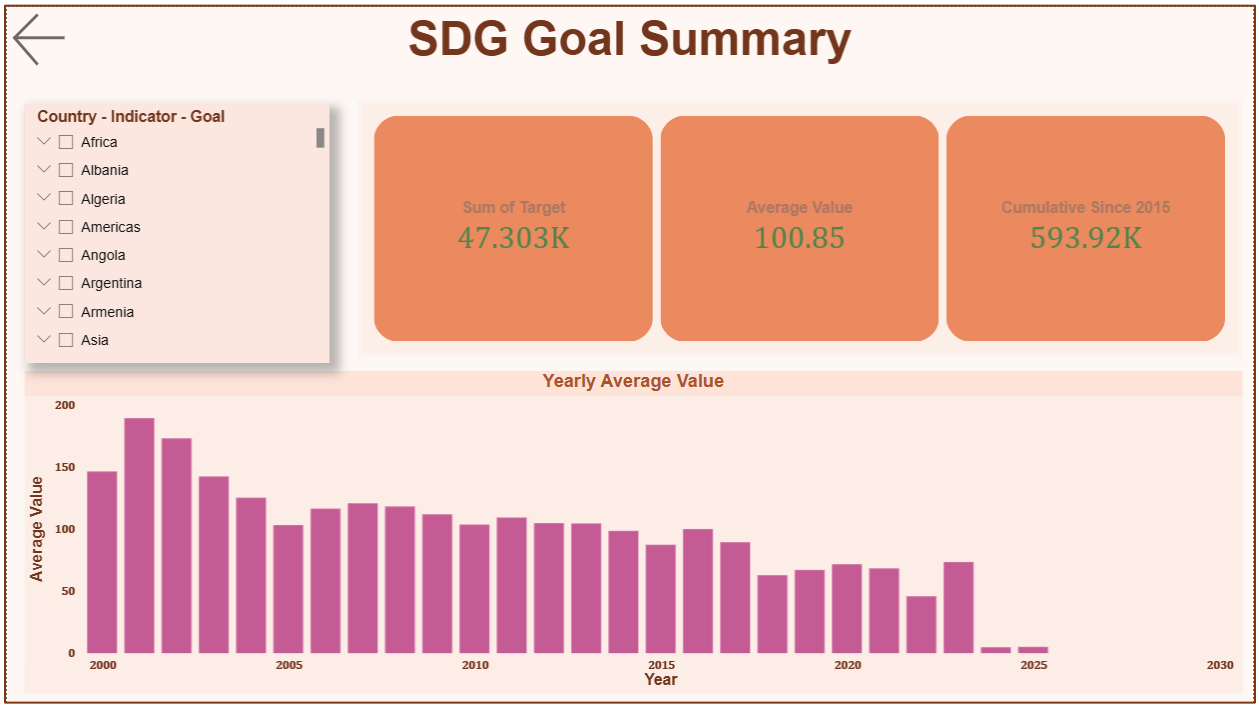
C.2 Country Insights Dashboard



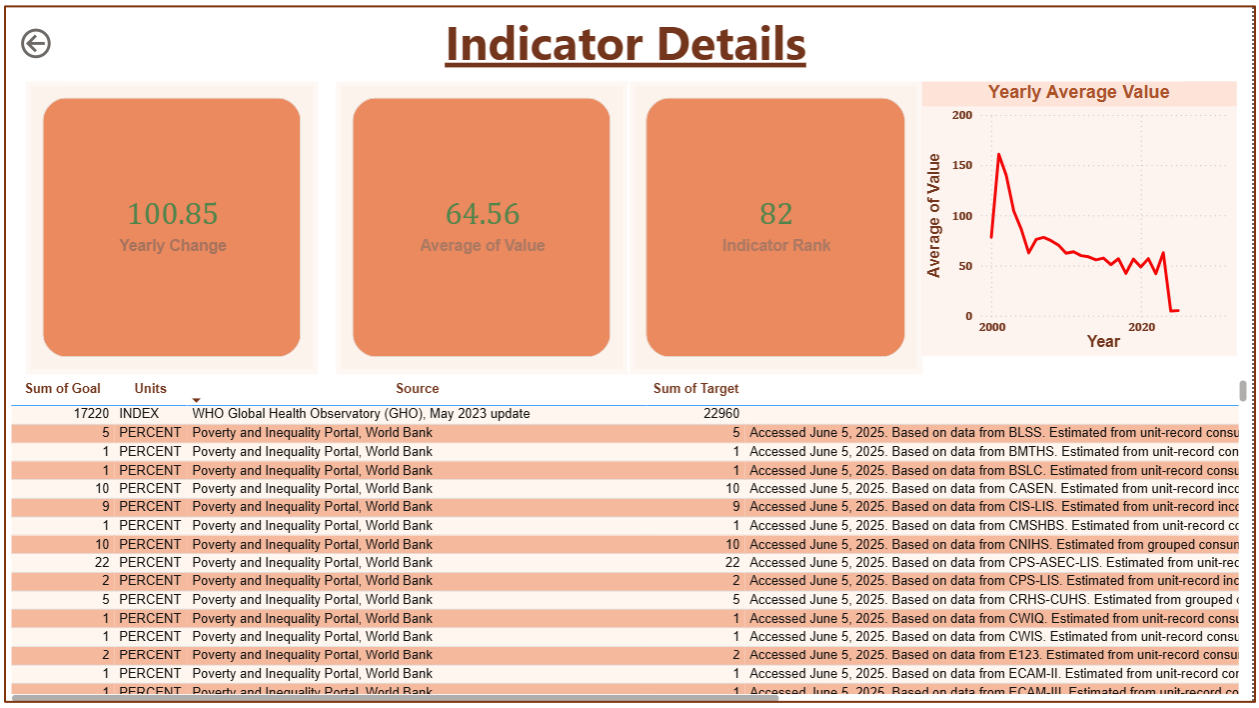
C.3 Indicator Deep Dive Dashboard



C.4 SDG Goal Summary Dashboard



C.5 Indicator Details Dashboard



Sum of Goal	Units	Source	Sum of Target	
17220	INDEX	WHO Global Health Observatory (GHO), May 2023 update	22960	
5	PERCENT	Poverty and Inequality Portal, World Bank	5	Accessed June 5, 2025. Based on data from BLSS. Estimated from unit-record consu
1	PERCENT	Poverty and Inequality Portal, World Bank	1	Accessed June 5, 2025. Based on data from BMTHS. Estimated from unit-record con
1	PERCENT	Poverty and Inequality Portal, World Bank	1	Accessed June 5, 2025. Based on data from BSLC. Estimated from unit-record consu
10	PERCENT	Poverty and Inequality Portal, World Bank	10	Accessed June 5, 2025. Based on data from CASEN. Estimated from unit-record inco
9	PERCENT	Poverty and Inequality Portal, World Bank	9	Accessed June 5, 2025. Based on data from CIS-LIS. Estimated from unit-record inco
1	PERCENT	Poverty and Inequality Portal, World Bank	1	Accessed June 5, 2025. Based on data from CMSHBS. Estimated from unit-record co
10	PERCENT	Poverty and Inequality Portal, World Bank	10	Accessed June 5, 2025. Based on data from CNIHS. Estimated from grouped consun
22	PERCENT	Poverty and Inequality Portal, World Bank	22	Accessed June 5, 2025. Based on data from CPS-ASEC-LIS. Estimated from unit-rec
2	PERCENT	Poverty and Inequality Portal, World Bank	2	Accessed June 5, 2025. Based on data from CPS-LIS. Estimated from unit-record inc
5	PERCENT	Poverty and Inequality Portal, World Bank	5	Accessed June 5, 2025. Based on data from CRHS-CUHS. Estimated from grouped d
1	PERCENT	Poverty and Inequality Portal, World Bank	1	Accessed June 5, 2025. Based on data from CWIQ. Estimated from unit-record consu
1	PERCENT	Poverty and Inequality Portal, World Bank	1	Accessed June 5, 2025. Based on data from CWIS. Estimated from unit-record consu
2	PERCENT	Poverty and Inequality Portal, World Bank	2	Accessed June 5, 2025. Based on data from E123. Estimated from unit-record consu
1	PERCENT	Poverty and Inequality Portal, World Bank	1	Accessed June 5, 2025. Based on data from ECAM-II. Estimated from unit-record cor
1	PERCENT	Poverty and Inequality Portal, World Bank	1	Accessed June 5, 2025. Based on data from ECAM-III. Estimated from unit-record co