
Task 3
REPORT
Measuring Global Progress: A Data-Driven Analysis of UN Sustainable Development Goals (SDG)
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1. Introduction

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In 2015, all United Nations Member States adopted the 2030 Agenda for Sustainable Development, offering a common roadmap of peace and prosperity now and in the future to people and the planet. At the core of this agenda are the 17 Sustainable Development Goals, a call to action to leverage the entire world for partnership to address the urgent global issues. This report is an in-depth review of a Business Intelligence project that will be built on open global data and will be monitoring the progress of three important objectives: SDG 1 (No Poverty), SDG 4 (Quality Education), and SDG 7 (Affordable and Clean Energy).This is not a data aggregation project; rather, it describes the stern process of data sourcing, cleaning, and modelling in SQL Server, with the next step being the application of advanced analytics and visualization in Microsoft Power BI. An interactive dashboard that can improve the basic data of varied dimensions of the UN into intelligence would be enabled for tracking global performance, viewing key trends, or learning about the relationship of struggles and successes of the SDGs realization . A profound reflection of technical issues faced, the use of most sophisticated features of Power

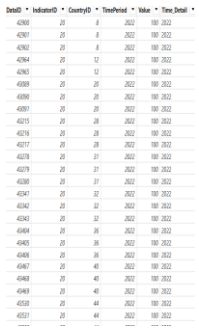
BI (DAX), and the insights gained could be used to develop sustainable development strategies.

2. Methodology: Data Preparation and SQL Integration

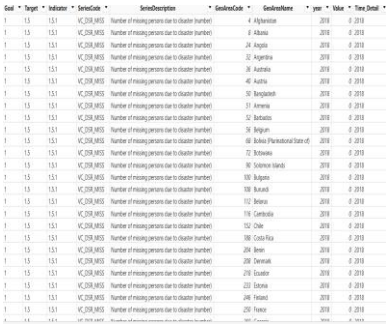
A consistent and well organized and scalable data source is the basis of a trusted business intelligence solution. Considering the size, diversity, and natural sloppiness of real-world global indicator data, it was important to have a relational database model in SQL Server. This solution provided the integrity, consistency, and the best performance of the Power BI consumption.

2.1 Data Sourcing and Initial Assessment

The sourced data from the UN SDG Data storage, focusing on three different but interconnected goals: Goal 1, Goal 4, and Goal 7. The Key indicators were included based on their relevance and data availability across time and geography. This data was downloaded as a csv files since it was downloaded as a CSV file there were multiple challenges because there was none standardized column names and multiple data files in the same file and there non numeric characters in the columns .



DataID	IndicatorID	CountryID	TimePeriod	Value	Time_Detail
42900	20	8	2022	100	2022
42907	20	8	2022	100	2022
42902	20	8	2022	100	2022
42964	20	12	2022	100	2022
42965	20	32	2022	100	2022
43089	20	20	2022	100	2022
43096	20	20	2022	100	2022
43097	20	20	2022	100	2022
43215	20	28	2022	100	2022
43216	20	28	2022	100	2022
43217	20	28	2022	100	2022
43278	20	31	2022	100	2022
43279	20	31	2022	100	2022
43280	20	31	2022	100	2022
43341	20	32	2022	100	2022
43342	20	32	2022	100	2022
43343	20	32	2022	100	2022
43404	20	36	2022	100	2022
43405	20	36	2022	100	2022
43406	20	36	2022	100	2022
43467	20	40	2022	100	2022
43468	20	40	2022	100	2022
43469	20	40	2022	100	2022
43530	20	44	2022	100	2022
43531	20	44	2022	100	2022



Goal	Target	Indicator	SeriesCode	SeriesDescription	GeoAreaCode	GeoAreaName	year	Value	Time_Detail
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	4	Afghanistan	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	8	Albania	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	24	Angola	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	32	Argentina	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	36	Australia	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	40	Austria	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	50	Bangladesh	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	51	Armenia	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	52	Barbados	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	56	Belgium	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	60	Bolivia (Plurinational State of)	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	72	Botswana	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	90	Solomon Islands	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	100	Bulgaria	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	108	Burundi	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	112	Belarus	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	116	Cambodia	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	152	Chile	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	188	Costa Rica	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	204	Benin	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	208	Denmark	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	218	Ecuador	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	233	Estonia	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	246	Finland	2010	0	2010
1	1.5	1.5.1	VC_DSR_MRS	Number of missing persons due to disaster (number)	250	France	2010	0	2010

Goal	Target	Indicator	SeriesCode	SeriesDescription	GeoAreaCode	GeoAreaName	TimePeriod	Value	Tim
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2003	8.86068	2003
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2004	12.26067	2004
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2005	13.76741	2005
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2006	33.61716	2006
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2008	42.40167	2008
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2009	80.52463	2009
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2010	82.8532	2010
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2011	77.75941	2011
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2021	62.7558	2021
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2022	66.09644	2022
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	12	Algeria	2023	66.39774	2023
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2014	86.17512	2014
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2015	87.21228	2015
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2016	96.73478	2016
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2017	92.44792	2017
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2018	89.20765	2018
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2019	94.003	2019
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2020	95.88415	2020
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2021	90.20468	2021
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2022	96.76946	2022
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	20	Andorra	2023	93.41693	2023
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	24	Angola	2009	63.94912	2009
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	24	Angola	2011	59.24679	2011
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	28	Antigua and Barbuda	2014	94.08262	2014
4	4.2	4.2.2	SE_PRE_PARTN	Participation rate in organized learning (one year before the official primary entry age), by sex (%)	32	Argentina	2003	98.32839	2003

2.2 Database Design and Normalization

The database, which is the SDG Analysis, was architected using a Schema, an industry best practice for analytical reporting to ensure clear separation between factual measurements and descriptive attributes. Dimension Tables (The 'Who' and 'What')

1. **dbo.SDG_Data**: This fact table is central to the model, and it contains the time-series measurements. A row can be understood as a single data point of a certain indicator in a certain country at a certain period of time. It contains foreign keys (IndicatorID and CountryID), TimePeriod (Year), the observed Value, Time_Detail and the important Units of measurement.

2. **dbo.Indicators:** All indicator metadata is looked up on this table. It maintains goal, Target, Indicatorcode and the entire SeriesDescription. Using the unique values populated in this table using all three source files, the dashboard will be able to filter and drill on the goals and indicators without any problem. INDICATORID is a primary key with a reliable primary key, which is auto-incremented with an IDENTITY(1,1) column.Fact Table (The 'When' and 'Value')

3. **dbo.SDG_Data**: This fact table is central to the model, and it contains the time-series measurements. A row can be understood as a single data point of a certain indicator in a certain country at a certain period of time. It contains foreign keys (IndicatorID and CountryID), TimePeriod (Year), the observed Value, Time_Detail and the important Units of measurement.

2.3 Data Cleaning and Transformation (SQL)

These SQL scripts provided a first and most important layer of cleaning and transformation, resolving issues that would have overly complicated Power BI's Power Query Editor.

- **Handling Missing and Inconsistent Values:** In practice, one big headache with data is that text representations of a number-like "N/A", ".", or text-based versions of a range like "less than 2.5"-may appear in what should be a number. The script came out successfully in attempting to mitigate this using TRY_CAST(g.Value AS FLOAT) AS Value function. This important action tries to convert source column into FLOAT data type; in case of failure- because of text or symbols-it gets the null value safely, so no data type error occurs, and the import may continue with all other existing valid numeric values.

```
- ========================================
-- 0. DROP TABLES IF THEY EXIST (in proper order)
-- ========================================
IF OBJECT_ID('dbo.SDG_Data', 'U') IS NOT NULL DROP TABLE dbo.SDG_Data;
GO
IF OBJECT_ID('dbo.Indicators', 'U') IS NOT NULL DROP TABLE dbo.Indicators;
GO
IF OBJECT_ID('dbo.Countries', 'U') IS NOT NULL DROP TABLE dbo.Countries;
GO


-- ========================================
-- 1. CREATE COUNTRIES TABLE
-- ========================================
CREATE TABLE dbo.Countries (
    CountryID INT PRIMARY KEY,
    CountryName VARCHAR(MAX)
);
GO

-- ========================================
-- 2. CREATE INDICATORS TABLE
-- ========================================
CREATE TABLE dbo.Indicators (
    IndicatorID INT IDENTITY(1,1) PRIMARY KEY,
    Goal INT,
    Target VARCHAR(MAX),
    IndicatorCode VARCHAR(MAX),
    SeriesCode VARCHAR(MAX),
    SeriesDescription VARCHAR(MAX)
);
GO
```

- **Data Consolidation and Loading**: There were specific INSERT statements made on Goals 1, 4 and 7 of the SDG_Data fact table. To correlate the raw data correctly with its descriptive data, the correspondence between each insert and the newly created Indicators dimension table is done immediately on the SeriesCode relevant and on the Indicator. This ensured the consistency of data and foreign key.

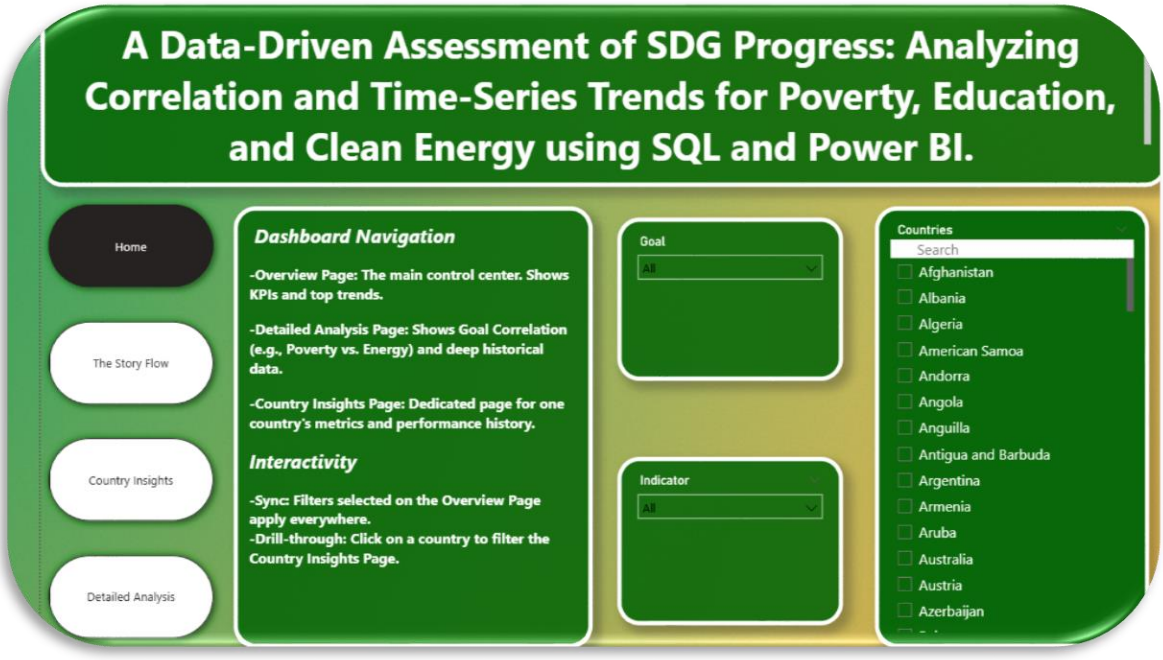
- Develop a general SQL Server plan to develop this robust normalized data model, which significantly simplified the further work with power BI with the focus on the final result and not on data cleaning.

3. Dashboard and Visualizations

The Power BI dashboard named Measuring Global Progress: A Power BI Dashboard on Sustainable Development Goals 1, 4 and 7 was prepared with the concept of being as interactive as possible. The graphical structure was prescribed by the data storytelling principle according to which the user was brought through the world perspective to the details of a state.

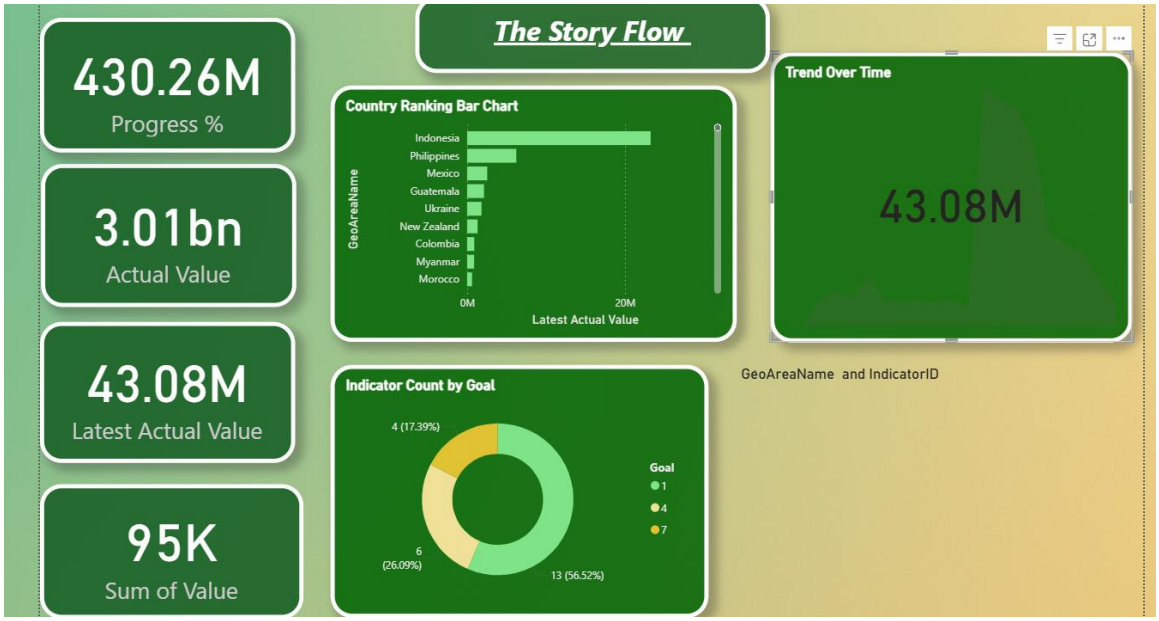
```
-- ========================================
-- 7. INSERT SDG_DATA (GOAL4)
-- ========================================
INSERT INTO dbo.SDG_Data (IndicatorID, CountryID, TimePeriod, Value, Time_Detail, Units)
SELECT
    i.IndicatorID,
    CAST(g.GeoAreaCode AS INT),
    g.TimePeriod,
    TRY_CAST(g.Value AS FLOAT) AS Value,
    g.Time_Detail,
    g.Units
FROM Goal4 g
JOIN dbo.Indicators i
    ON i.SeriesCode = g.SeriesCode
   AND i.IndicatorCode = g.Indicator;
GO

-- ========================================
-- 8. INSERT SDG_DATA (GOAL7)
-- ========================================
INSERT INTO dbo.SDG_Data (IndicatorID, CountryID, TimePeriod, Value, Time_Detail, Units)
SELECT
    i.IndicatorID,
    CAST(g.GeoAreaCode AS INT),
    g.TimePeriod,
    TRY_CAST(g.Value AS FLOAT) AS Value,
    g.Time_Detail,
    g.Units
FROM Goal7 g
JOIN dbo.Indicators i
    ON i.SeriesCode = g.SeriesCode
   AND i.IndicatorCode = g.Indicator;
GO
```



3.1 Visual Design and Storytelling

The dashboard follows a macro to micro flow of screen across various pages with a coordinated dark-green and yellow color scheme that indicates the themes of sustainability and warning.



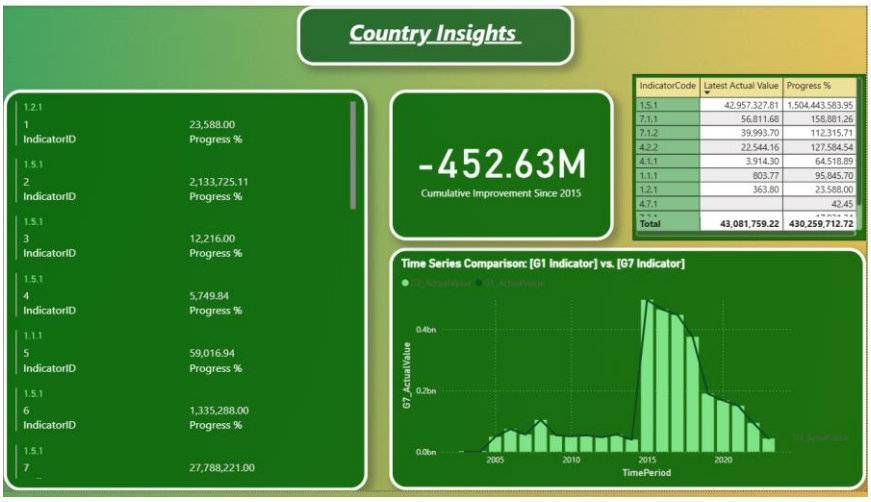
- Key Performance Indicators (KPIs): The large visual KPI cards, such as 430.26M Progress are placed on the left, and these assist in providing us with an immediate context. They are dynamic hence they are updated instantly based on the year, country or goal the user is interested in.

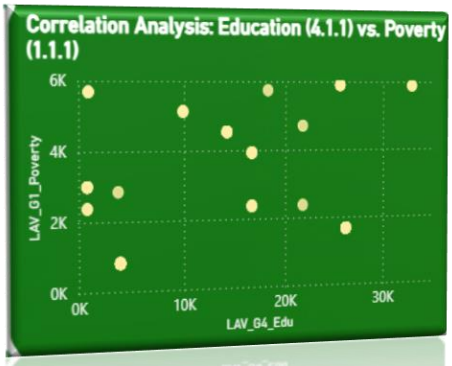
- Trend Analysis: The landing page focuses on the line chart of trend over time. It represents the performance of the choice of indicators as a whole or disaggregates and shows the times of quick improvement or growth stagnation.

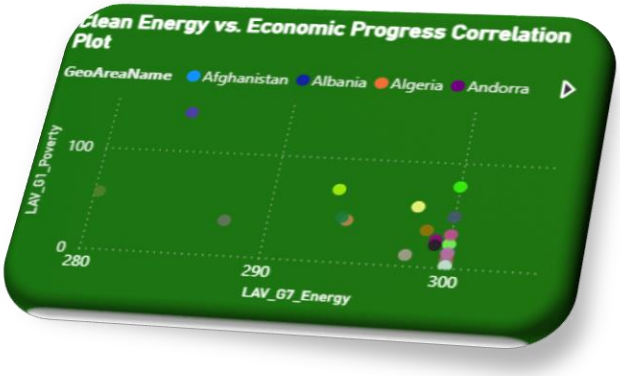
- Geospatial Analysis: With geographic distribution, a filled map visual has been employed, which is an easy manner of visualizing the performance in various countries. The intensity of the color of the map is dependent on the value of the selected indicator, which allows identifying the regional losers and winners in a short period.

Goal Overview: The use of a custom donor chart or a gauge would enable a visual representation of cumulative aggregated progress of the three selected goals (1, 4 and 7) and rapid display of the visual representation of which goal is more on track or off track.

- Correlation Analysis: Scatter plots were applied to identify the interdependencies among the goals: Two scatter plots, named Education vs. Poverty and Energy vs. Economic Progress, were created. These images are essential to the policymakers, since they measure the impact of an investment in a single area (e.g., Goal 4 Education) on the outcome of another (e.g., Goal 1 Poverty).


Country Insights
-452.63M
Cumulative Improvement Since 2015
Time Series Comparison: [G1 Indicator] vs. [G7 Indicator]
G7_ActualValue
TimePeriod
IndicatorCode
Latest Actual Value
Progress %
Total
43,081,759.22
430,259,712.72


Correlation Analysis: Education (4.1.1) vs. Poverty (1.1.1)
LAV_G1_Poverty
LAV_G4_Edu


Clean Energy vs. Economic Progress Correlation Plot
GeoAreaName
Afghanistan
Albania
Algeria
Andorra
LAV_G1_Poverty
LAV_G7_Energy


Detailed Analysis
Correlation Analysis: Education (4.1.1) vs. Poverty (1.1.1)
Historical Trend for [Selected Indicator]
Clean Energy vs. Economic Progress Correlation Plot
Actual Value by Time_Detail
Time_Detail

3.2 Advanced Power BI Features and Interactivity

The dashboard makes use of some of the most powerful features of Power BI like providing an interactive experience with a professional touch:

- **Drill-throughs and Navigation:**
    - Navigation: In this feature, a user can navigate data by clicking on a given column.
    - Drill-down: The user can drill down the Goal Overview visual (i.e. the bar chart) into the Target level, and down directly out of the aggregate Goal level (i.e. Goal 4).
    - Drill-through: The user has a special button or a context-menu selection whereby they may click on a particular country on the map and drill through to another page called Country Insights. On this second page, one can find all time-series data and indicator values in just that chosen country and keep the user focused.
- **Custom Visuals and Annotations:** It allows dense, multi-indicator comparisons that can be performed through Heatmaps with country Comparison . Annotations Dynamic annotations on tooltips were added, which showed the change over the year or percentage change between the SDG baseline (2015) when a point is hovered which did not contribute to the overall visual clutter.
- **Bookmarks and Navigation Buttons:** They created bookmarks so that they can save specific filter and visual preferences (e.g. Poverty Crisis View, Energy Progress Only). These bookmarks contained navigation buttons, which allowed the viewer to follow an analytical narrative, which is the primary element of data storytelling, which was pre-defined.
- **Slicers and Filters** Goal, Country, and Year were available as explorations, so the user can control fully the scope of the analysis.
-

4. Application of Advanced DAX

DAX Expressions were crucial in developing these dynamic measures that makes the analysis more than just a simple sum and count aggregations.

4.1 Time Intelligence Functions

Time intelligence is crucial for tracking progress towards a 2030 target.

- **Year-over-Year (YoY) Change:** The value of the measure YoY_Change_Value was calculated in CALCULATE([Actual Value], SAMEPERiODLASTYEAR(attributes) of the Calendar(Date). This is dynamically compared to the performance of the current period to the same period of the previous year and the velocity of change is obtained..

```
Cumulative Improvement Since 2015 =
VAR CurrentLatestValue = [Latest Actual Value] -- Assuming you have a measure that gets the latest value
VAR ValueIn2015 =
    CALCULATE(
        SUM('SDG_Data'[Value]), -- Replace 'SDG_Data'[Value] with the actual column you sum up
        FILTER(
            ALL('SDG_Data'), -- Clears all filters from the data table
            'SDG_Data'[TimePeriod] = 2015 -- Filters the table down to only the year 2015
        )
    )
RETURN
    IF(
        ISBLANK(ValueIn2015),
        BLANK(), -- Handle cases where 2015 data is missing
        CurrentLatestValue - ValueIn2015
    )
```

- **Cumulative Improvement Since 2015:** In the 2015 is the SDG baseline, a measure was created to trach the cumulative performance:

```
Cumulative Improvement Since 2015 =
VAR CurrentLatestValue = [Latest Actual Value] -- Assuming you have a measure that gets the latest value
VAR ValueIn2015 =
    CALCULATE(
        SUM('SDG_Data'[Value]), -- Replace 'SDG_Data'[Value] with the actual column you sum up
        FILTER(
            ALL('SDG_Data'), -- Clears all filters from the data table
            'SDG_Data'[TimePeriod] = 2015 -- Filters the table down to only the year 2015
        )
    )
RETURN
    IF(
        ISBLANK(ValueIn2015),
        BLANK(), -- Handle cases where 2015 data is missing
        CurrentLatestValue - ValueIn2015
    )
```

4.2 Ranking and Dynamic KPIs

- **Rank by Indicator Performance:** The RANKX function was used to create these measures :

This measure dynamically ranks countries based on the current indicator value. This ranking is then used for the Dynamic KPIs.

```
Country Rank = RANKX(ALL(Countries[GeoAreaName ]), [Actual Value], , DESC, Dense)
```

- **Dynamic KPIs:** Text or icon indicators were created by use of the SWITCH(TRUE,... pattern). An example used here is the Progress vs. Target (%) KPI, which becomes red (a warning signal) or green (a success signal) depending on the value of YoY Change depending on whether it is negative or positive, showcasing high-performing areas and areas that are not performing as good dynamically

.5. Reflective Analysis

The process of converting the UN SDG data available in raw files into a working analytical product drew attention to a number of technical issues and taught much about the importance of a process-oriented analytical approach**.**

5.1 Technical Data Import and Modeling difficulties.

The issues encountered in the project were common with the way real-world and externally-sourced data are handled:

- **Data Structure and Heterogeneity:** The most noticeable issue in the analysis was, however, the messiness of the UN data. Although the SQL normalized the data, since one Value column was the storage of data that was measured in vastly different units-such as percentage of population versus gigajoules of energy-only comparable indicators were compared against each other, and such comparison was only possible with the help of a cross reference between each data set and the Units field and the Series Description. In the absence of this, meaningless aggregation would arise.

- **Dealing with Sparsity and Granularity:** Virtue of Global indicators data is very sparse and most countries do not report data on all indicators annually. This sparsity resulted in time intelligence computation issues- such as YoY change- where a non-observed value should be counted as a break in the sequence instead of zero. The column Time_Detail, which sometimes stated the terms estimate or projection, created another level of complication, and had to be approached with

extreme care in Power Query in order to label the trustworthiness of the information.

- • DAX Context Transitions: To develop the Cumulative Progress measure, the author had to be well versed with the understanding of the DAX filter context. Specifically, the deletion of the filter on the TimePeriod of the baseline year calculation-ALL()-, but without deletion of all other filters, including Country and Indicator-, was not insignificant and required the exact use of CALCULATE.

5.2 Policy Implications and Data-Informed Decisions

The insights derived from the dashboard have significant implications for policymakers, NGOs, and governments:

- **Prioritization through Correlation:** The scatter plots resulting from the Correlation Analysis give empirical evidence that can justify policy resource allocation. For instance, if the "Education vs. Poverty" plot strongly indicated that an increase in school enrolment which is Goal 4 translates into a decrease in the rate of poverty, or Goal 1, then policymakers can strategize and allocate more funds to the educational infrastructure as a key lever for poverty reduction.
- **Addressing Data Gaps:** Perhaps the most important policy insight that can be derived from the dashboard regards the revelation of regional disparities in data availability. The gaps that appear in the geospatial analysis are not merely reporting errors; they are informational blind spots. Policymakers in these regions are operating with incomplete data and hence cannot plan effectively. The dashboard thus becomes an advocacy tool for investment in national statistical offices and data collection infrastructure.
- **Monitoring and Accountability:** The use of time intelligence and dynamic KPIs allows for real-time accountability. For example, using the YoY_Change_Value formula, NGOs can quickly determine if a program is having the desired effect and can adjust strategies mid-cycle rather than waiting for annual reports.

5.3 The Strategic Advantage of SQL Server Integration

The ability to connect Power BI to the SQL Server database gave an important and quantifiable advantage to the analytical process relative to flat files:

1. **Single-point Data Governance:** SQL database is a system of one truth. Any data cleaning and normalization occurs once in the database and, as such, any report constructed on the SDG_Data table would be consistent and reliable.

2. **Optimization of Performance**: The Power Query step of Power BI was greatly simplified and quicker by offloading the heavy data transformations (such as the UNION ALL of countries and the TRY_CAST of cleaning values) to the SQL Server engine. This is referred to as Query Folding, which has been used to push processing resources to the more efficient database server.

   Scalability and Refresh Efficiency: The database organization can be scaled to the future. All that is needed when the UN publishes new annual data in SQL is simple INSERT or UPDATE statements and in Power BI refreshes will be fast and painless. When using the flat files, the analyst would have to go through the process of manually updating/appending files, recreating Power Query steps, and potentially breaking the data model.

6. Conclusion

This project has managed to finish the entire data lifecycle, starting with the raw data capture up to the development of an advanced policy-relevant business intelligence tool. The combination of SQL Server to enhance data modelling and Power BI to provide advanced visualization with the use of more complex DAX to provide time intelligence and dynamic KPIs provided essential information about the progress and difficulties related to the UN Sustainable Development Goals 1, 4, and 7. The dashboard thus produced is not just a bunch of charts; it is an interactive system that allows dialogue based on facts, emphasizeing the relationship that is crucial between poverty, education and clean energy and can give a practical picture of where the global work should be concentrated so that the world can achieve the ambitious 2030 targets.