



# VIZBUILDER

## USER GUIDE

March 2024

## PARAMETERS

Language

English

Topic

Economic Indicators

Social Indicators

Subtopic

Monetary

Table

Bank Deposits by Year

Source: Saudi Central Bank (SAMA)

Metrics (0)

Million SAR

Columns (0)

Filters (0)

Query options

Execute query

## Welcome to the DataSaudi Vizbuilder

This tool allows full access to the DataSaudi database. Once you have made your data selections using the side panel, you are able to view the custom query as a table, visualization, API query, or download the a file directly.

To begin, select one of the following examples or start a guided tour by clicking the button in the bottom corner.

Yearly GDP by  
Economic ActivityQuarterly Trade  
BalanceMonthly  
Purchasing  
Manager Index  
(PMI)Take a tour  
User Guidance

The Vizbuilder is an advanced data exploration tool that allows users to query and visualize all of the available datasets ingested into the DataSaudi database. While the DataSaudi narrative reports function as an introductory guide to selected indicators across various tables, the Vizbuilder enables a transparent view into all of the underlying tables in the database. This allows data savvy users to create custom filters and aggregations of data that may not be currently featured across the various reports.



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# Building a Query

- The Vizbuilder interface is divided into 2 primary sections:
  - **Parameters:** The available parameters for building a data query.
  - **Results:** The resulting data from executing the selected parameters (initially displays a welcome screen when no data is selected).

The screenshot displays the Vizbuilder interface for the Kingdom of Saudi Arabia. The left panel, titled 'PARAMETERS', shows the following settings:

- Language: English
- Topic: Economic Indicators (selected), Social Indicators
- Subtopic: External Sector & International Trade
- Table: Trade Balance
- Source: General Authority for Statistics (GASTAT)
- Metrics (1): Trade Balance (checked)
- Columns (1): Trade Balance
- Filters (0)
- Query options

The right panel, titled 'Data Table', shows the resulting data with 28 rows. The table has the following columns: #, Quarter ID, Quarter, and Trade Balance.

#	Quarter ID	Quarter	Trade Balance
1	20171	2017-Q1	SAR 81,653.29
2	20172	2017-Q2	SAR 63,017.98
3	20173	2017-Q3	SAR 72,434.97
4	20174	2017-Q4	SAR 110,328.43
5	20181	2018-Q1	SAR 118,179.36
6	20182	2018-Q2	SAR 148,074.25
7	20183	2018-Q3	SAR 160,410.28
8	20184	2018-Q4	SAR 163,243.92
9	20191	2019-Q1	SAR 116,895.43
10	20192	2019-Q2	SAR 100,798.40
11	20193	2019-Q3	SAR 90,422.24
12	20194	2019-Q4	SAR 98,534.84
13	20201	2020-Q1	SAR 59,292.41
14	20202	2020-Q2	-SAR 5,192.86
15	20203	2020-Q3	SAR 37,546.62
16	20204	2020-Q4	SAR 42,815.20
17	20211	2021-Q1	SAR 68,639.51
18	20212	2021-Q2	

A query showing user selected Parameters (left) and the resulting Data Table (right).

Each query has many required and non-required parameters available, and the following section outlines each option in detail.



# Data Output Language

DataSaudi makes every dataset available in both Arabic and English. This allows users viewing the site in one language to query the data in the other language. For example, a user exploring the site and interface in Arabic is able to load data with English names by selecting “English” from this dropdown.

The screenshot shows the DataSaudi interface with a sidebar on the left containing a 'PARAMETERS' section. The 'Language' dropdown is highlighted with a red box and set to 'القرنية' (Arabic). Below it, the 'Topic' is 'مؤشرات اقتصادية' (Economic Indicators) and the 'Subtopic' is 'القطاع الخارجي والتجارة الدولية' (External Sector and International Trade). The 'Table' is 'قيمة الواردات حسب التصنيف الصناعي الدولي الموحد (ISIC)' (Value of Imports by International Standard Industrial Classification (ISIC)). The main area displays a 'Data Table' with 10 rows of data in Arabic. A 'Take a tour' button is visible in the bottom right corner.

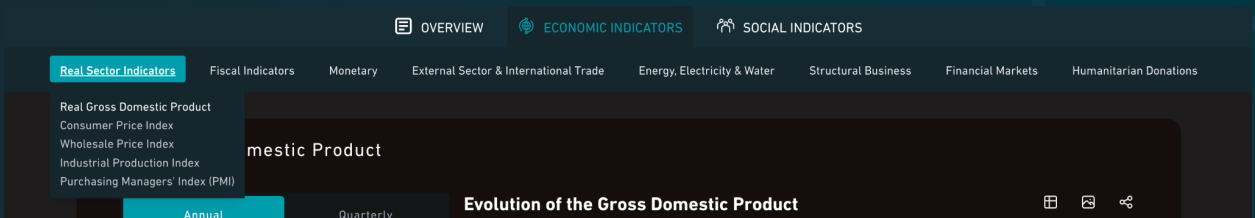
#	ID القطاع الاقتصادية	القطاعات الاقتصادية	قيمة الواردات
1	A	الزراعة والغابات وصيد الأسماك	274008.53
2	B	التعدين واستغلال المحاجر	31254.226
3	C	التصنيع	4858947.839
4	D	توريد الكهرباء والغاز والبخار وتكييف الهواء	2.076
5	E	ت المياه والصرف الصحي وإدارة النفايات وأنشطة المعالجة	48.905
6	H	النقل والتخزين	48.591
7	J	المعلومات والاتصالات	8687.04
8	M	الأنشطة المهنية والعلمية والتقنية	96.985
9	R	الفنون والترفيه والاستجمام	5923.006
10	S	أنشطة الخدمات الأخرى	61019.534

A query showing Arabic data being explored in the English side of DataSaudi.

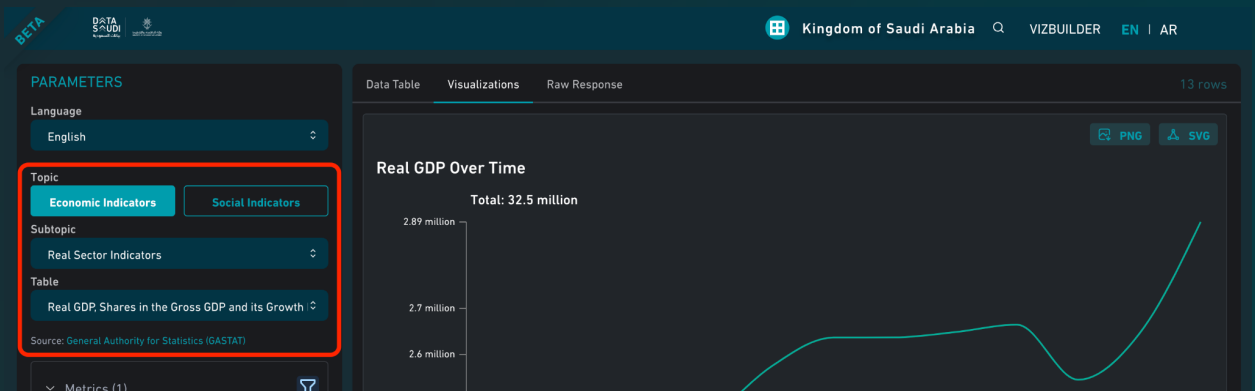


# Selecting a Dataset

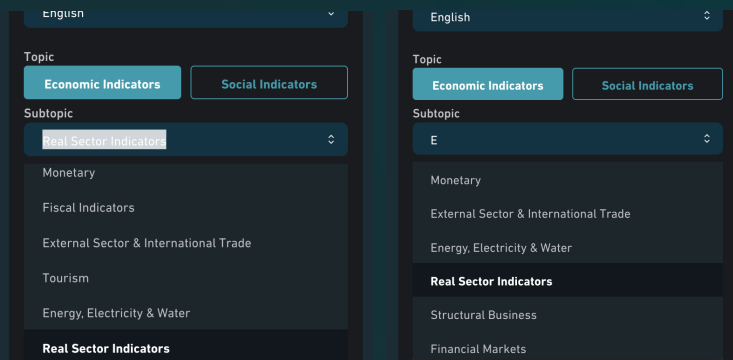
Datasets are organized by the same groupings and labels used in the report navigation. As an example, the Gross Domestic Product dataset is located under the “Economic Indicators” topic within the “Real Sector Indicators” subtopic (seen below):



Gross Domestic Product as found within the Kingdom of Saudi Arabia report.



Gross Domestic Product as found within the Vizbuilder, using the same groupings.



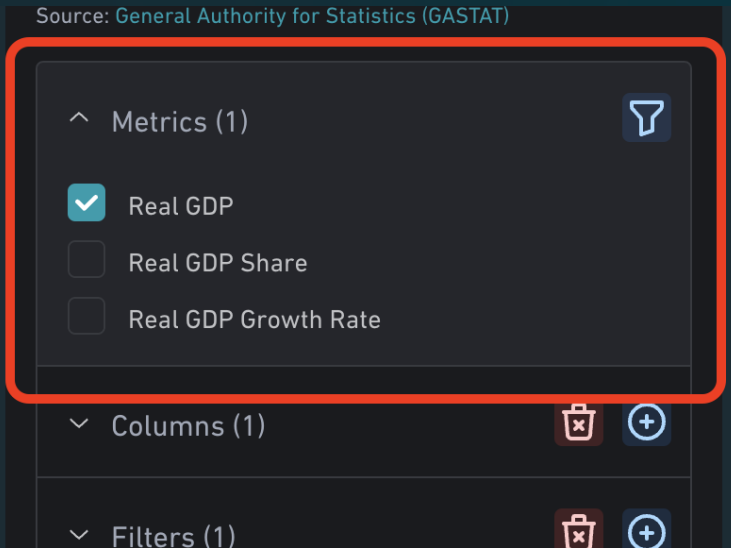
Using search inside of the Subtopic dropdown.



## Choosing Metrics

*Note: Users must select at least one Metric to make a query.*

Once a specific data table has been selected, users are presented with all of the available numerical measures in the “Metrics” panel. Metrics selected here will be presented as columns in the resulting data table.



Selecting the first of 3 available Metrics.

The DataSaudi database was constructed using a Relational OLAP (ROLAP) architecture, which allows storing data at its more granular level and allowing the query interface to perform data aggregations on demand. This enables users to create custom queries that may not be available in the source data by aggregating metric values based on the user’s selected Columns (see the “Choosing Columns” of this document).



# Choosing Columns

Note: Users must select at least one Column to make a query.

Each data table in DataSaudi can have many different non-numeric Columns used to organize and filter the resulting data table. The more columns that a user selects, the deeper and more granular the resulting data will be.

Additionally, each Column has the potential to have multiple different levels within itself, like “Year” and “Quarter” inside of a “Time” dimension or a “Geography” dimension that contains both “Continent” and “Country”. Only 1 level of a specific dimension can be selected for a query, and the depth of the level determines how the data will be aggregated (for example, selecting a “Continent” level will aggregate the numeric values for all Countries within each Continent).

The screenshot shows the DataSaudi interface for the Kingdom of Saudi Arabia. The 'PARAMETERS' sidebar on the left includes settings for Language (English), Topic (Economic Indicators), Subtopic (External Sector & International Trade), and Table (Imports value by international standard industrial). The 'Columns' section is highlighted with a red box, showing two selected columns: 'Countries/Continent' and 'Date Month/Period/Year'. The main data table displays 18 rows of data, with columns for '#', 'Continent ID', 'Continent', 'Year', and 'Imports value'. The data shows that for the 'Imports value' metric, the values are aggregated by continent (Africa and Antarctica) and year (2015-2023).

#	Continent ID	Continent	Year	Imports value
1	af	Africa	2015	22829.772
2	af	Africa	2016	18946.134
3	af	Africa	2017	19070.122
4	af	Africa	2018	15359.828
5	af	Africa	2019	20576.312
6	af	Africa	2020	19076.152
7	af	Africa	2021	25462.458
8	af	Africa	2022	39583.827
9	af	Africa	2023	28552.444
10	an	Antarctica	2015	2.111
11	an	Antarctica	2016	0.021
12	an	Antarctica	2017	0.083
13	an	Antarctica	2018	2.955
14	an	Antarctica	2019	1.993
15	an	Antarctica	2020	7.337
16	an	Antarctica	2021	0.128
17	an	Antarctica	2022	0.284
18	an	Antarctica	2023	0.284

Continent values being aggregated for the Imports value metric.





# Column Filters

The “Filters” panel allows users to only display the members of a Column that they are interested in. For example, a user could filter a “Year” column by only the most recent year, or a “Sector” column by only the pertinent sector(s) for their research.

Once a filter has been added for a specific column, clicking on the name of the column inside of the Filter interface will present the user with a pop-up modal window showing all of the available members of that column. If users want to see data for all of the available members of a column, there is no need to apply a filter to that column.

The screenshot shows a data visualization tool interface. On the left, the 'PARAMETERS' panel is visible, with 'Filters (1)' expanded to show a filter for 'Date Month/Period/Year (2...)' which is currently active. A 'Members' modal window is open, displaying a list of years from 1993 to 2023. The years 2022 and 2023 are selected, while the others are unselected. The modal also includes a search bar, 'Select all' and 'Unselect all' buttons, and a search icon with 'ids' next to it. The main data table shows columns for '#', 'Continent ID', 'Continent', 'Year', and 'Imports value'. The table is filtered to show only the years 2022 and 2023. The interface also includes a 'Download dataset' section at the bottom left and a 'Take a tour' button at the bottom right.

#	Continent ID	Continent	Year	Imports value
1	af	Africa	2022	39583.827
2	af	Africa	2023	28552.444
3	an	Antarctica	2022	0.284
4	an	Antarctica	2023	1.433
5	as	Asia	2022	383766.786
6	as	Asia	2023	363350.106
			2022	181889.289
			2023	179486.143
			2022	75024.834
			2023	71579.382
			2022	9852.748
			2023	6159.781
			2022	21775.421
			2023	14683.442
			2022	23.088
			2023	8.904

A “Year” column being filtered to show only 2022 and 2023.



## Executing the Query

Once the desired data table, metrics, columns, and filters have been selected, users need to press the “Execute query” button to request the data from the database. Once the server responds with the custom data query, its contents are displayed in the tabbed interface next to the query Parameters, replacing the welcome text (or any previously queried data).

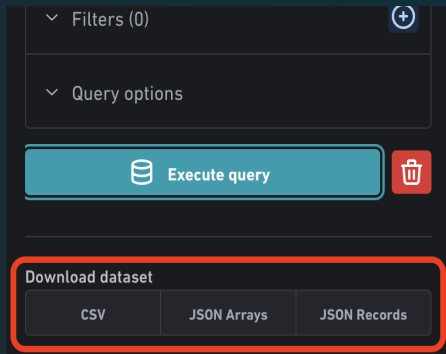
The screenshot displays the DataSaudi Vizbuilder interface. On the left, the 'PARAMETERS' panel is visible, showing settings for Language (English), Topic (Economic Indicators), Subtopic (Monetary), and Table (Bank Deposits by Year). Below these, there are sections for Metrics (1), Columns (1) with 'Year' selected, Filters (0), and Query options. At the bottom of the parameters panel, the 'Execute query' button is highlighted with a red box, and a red arrow points to it. The main content area on the right shows a 'Welcome to the DataSaudi Vizbuilder' message, explaining that the tool allows full access to the DataSaudi database and provides instructions on how to use the tool. Three example buttons are visible: 'Yearly GDP by Economic Activity', 'Quarterly Trade Balance', and 'Monthly Purchasing Manager Index (PMI)'. A 'Take a tour' button is located in the bottom right corner.

The “Execute query” button ready to be clicked after making parameter selections.



## Downloading the Data

At any point after a query has been executed, users can immediately download the data in both CSV and JSON formats. These buttons are located just below the Execute query button at the bottom of the Parameters panel.

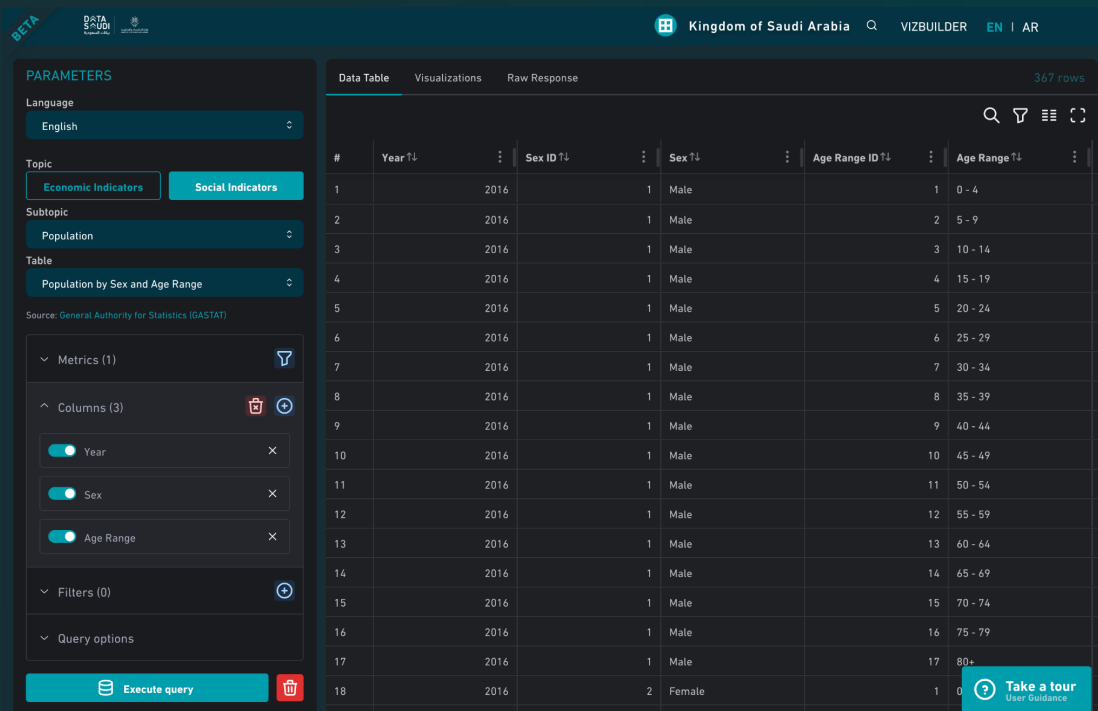


Download dataset buttons placement.

## Viewing Results

### Data Table

After executing a query, the results are initially displayed as a large data table.

A screenshot of the data visualization tool's interface. The left sidebar shows the 'PARAMETERS' panel with settings for Language (English), Topic (Social Indicators), Subtopic (Population), and Table (Population by Sex and Age Range). The main area displays a 'Data Table' with 367 rows. The table has columns for #, Year, Sex ID, Sex, Age Range ID, and Age Range. The data shows population counts for males in various age groups from 2016. A 'Take a tour' button is visible in the bottom right corner of the table area.

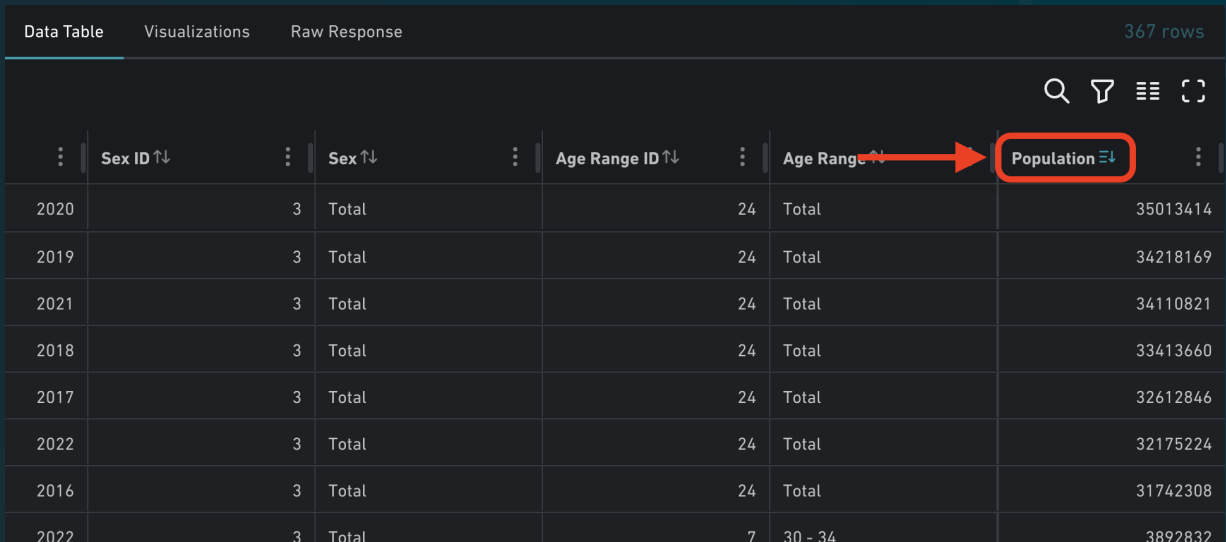
#	Year	Sex ID	Sex	Age Range ID	Age Range
1	2016	1	Male	1	0 - 4
2	2016	1	Male	2	5 - 9
3	2016	1	Male	3	10 - 14
4	2016	1	Male	4	15 - 19
5	2016	1	Male	5	20 - 24
6	2016	1	Male	6	25 - 29
7	2016	1	Male	7	30 - 34
8	2016	1	Male	8	35 - 39
9	2016	1	Male	9	40 - 44
10	2016	1	Male	10	45 - 49
11	2016	1	Male	11	50 - 54
12	2016	1	Male	12	55 - 59
13	2016	1	Male	13	60 - 64
14	2016	1	Male	14	65 - 69
15	2016	1	Male	15	70 - 74
16	2016	1	Male	16	75 - 79
17	2016	1	Male	17	80+
18	2016	2	Female	1	0 - 4

A data table result after pressing the "Execute query" button.



## Sorting Data

Clicking on a column header allows users to sort the data in both ascending and descending order, as seen in this screenshot:



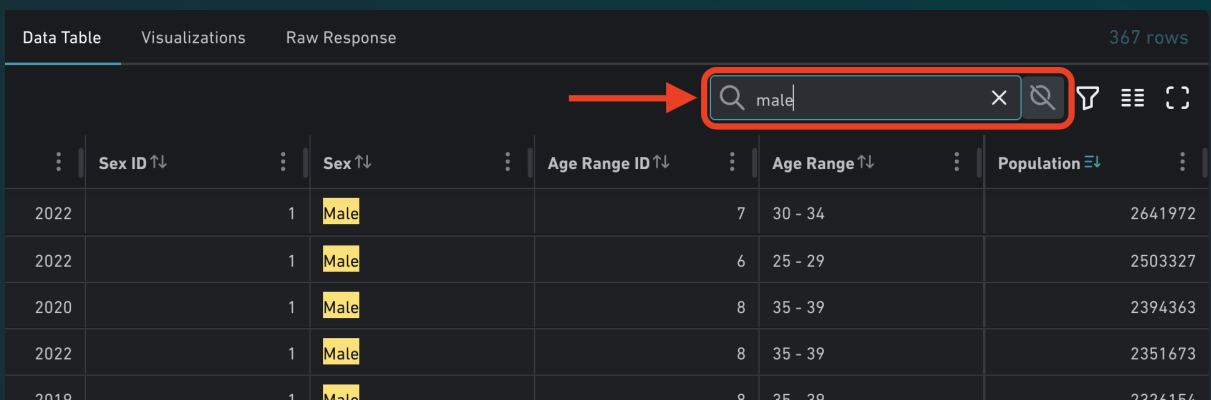
The screenshot shows a data table interface with tabs for 'Data Table', 'Visualizations', and 'Raw Response'. The table has 367 rows. The columns are 'Sex ID', 'Sex', 'Age Range ID', 'Age Range', and 'Population'. The 'Population' column header is highlighted with a red box, and a red arrow points to it from the 'Age Range' column header. The table data is as follows:

	Sex ID	Sex	Age Range ID	Age Range	Population
2020	3	Total	24	Total	35013414
2019	3	Total	24	Total	34218169
2021	3	Total	24	Total	34110821
2018	3	Total	24	Total	33413660
2017	3	Total	24	Total	32612846
2022	3	Total	24	Total	32175224
2016	3	Total	24	Total	31742308
2022	3	Total	7	30 - 34	3892832

Sorting the Data Table by descending "Population".

## Searching Data

Clicking the search icon, the first icon in the top corner of the Data Table, allows users to search the returned data for a specific query, filtering the results live as the user types.



The screenshot shows the same data table interface, but with a search filter applied. The search icon in the top right corner is highlighted with a red box, and a red arrow points to it. The search input field contains the text 'male'. The table data is filtered to show only rows where the 'Sex' column is 'Male':

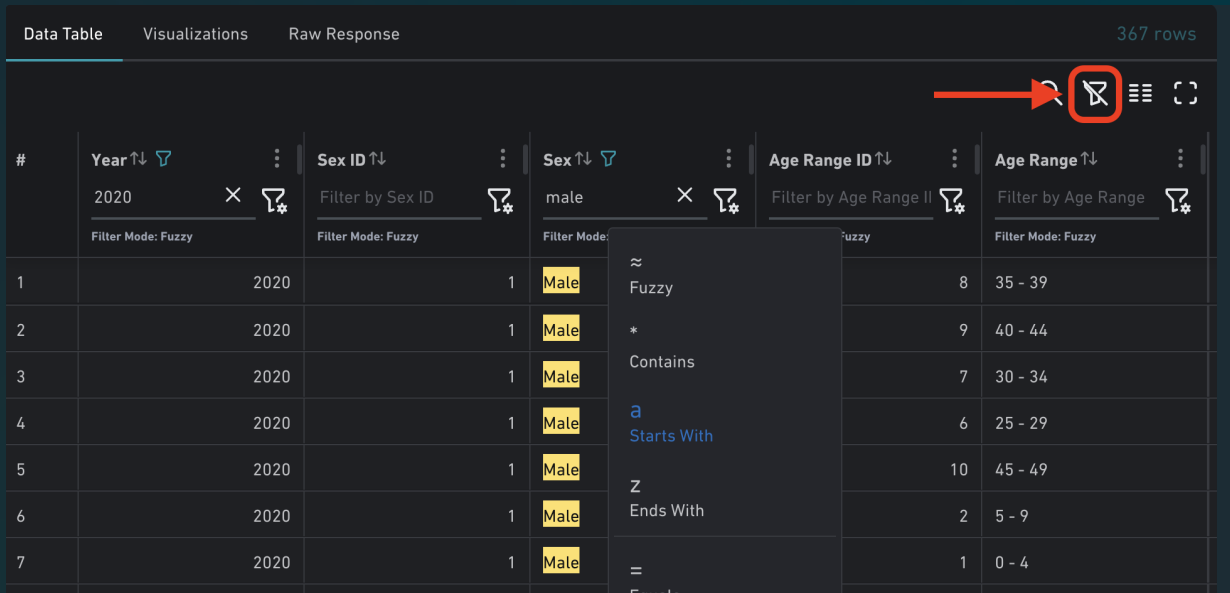
	Sex ID	Sex	Age Range ID	Age Range	Population
2022	1	Male	7	30 - 34	2641972
2022	1	Male	6	25 - 29	2503327
2020	1	Male	8	35 - 39	2394363
2022	1	Male	8	35 - 39	2351673
2019	1	Male	8	35 - 39	2324154

Searching the Data Table for a specific string ("male").



# Filtering Columns

Clicking the filter icon, the second icon in the top corner of the Data Table, toggles a filter interface for each column that appears underneath each individual column header. This interface allows for multiple types of String and Number filtering, such as “starts with” and “great than/less than”, which are applied to the data as the user types.



The screenshot shows a data table with columns: #, Year, Sex ID, Sex, Age Range ID, and Age Range. The 'Year' column is filtered with '2020' and 'Filter Mode: Fuzzy'. The 'Sex' column is filtered with 'male' and 'Filter Mode: Fuzzy'. A filter dropdown menu is open for the 'Sex' column, showing options: ≈ Fuzzy, \*, Contains, a Starts With, Z Ends With, and =. A red arrow points to the filter icon in the top right corner of the table header.

#	Year	Sex ID	Sex	Age Range ID	Age Range
1	2020	1	Male	8	35 - 39
2	2020	1	Male	9	40 - 44
3	2020	1	Male	7	30 - 34
4	2020	1	Male	6	25 - 29
5	2020	1	Male	10	45 - 49
6	2020	1	Male	2	5 - 9
7	2020	1	Male	1	0 - 4

Data Table results being filtered by “Fuzzy” matching and “Starts With” on two separate columns.



## Showing/Hiding Columns

The third icon in the top corner of the Data Table allows the user to edit which specific columns are returned with the data. This is commonly used to hide ID columns which may not be pertinent to a user's specific need.

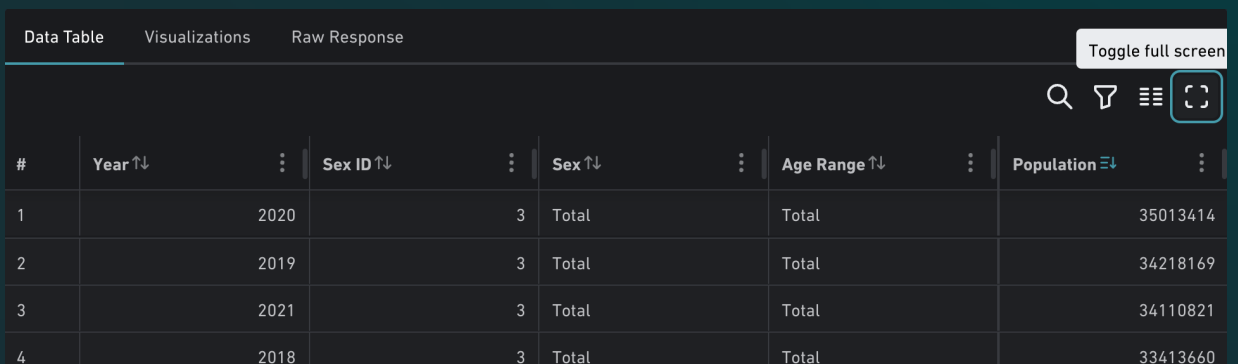


#	Year ↑↓	Sex ID ↑↓	Sex ↑↓	Age Range ↑↓	
1	2020	3	Total	Total	
2	2019	3	Total	Total	
3	2021	3	Total	Total	
4	2018	3	Total	Total	
5	2017	3	Total	Total	
6	2022	3	Total	Total	
7	2016	3	Total	Total	31742308
8	2022	3	Total	30 - 34	3892832
9	2020	3	Total	25 - 29	3892832

Hiding the "Age Range ID" column using the Show/Hide interface.

## Fullscreen Table

The final and fourth icon in the top corner of the Data Table will enable fullscreen mode for the table, allowing users to explore large datasets with as much screen real estate as possible.



#	Year ↑↓	Sex ID ↑↓	Sex ↑↓	Age Range ↑↓	Population
1	2020	3	Total	Total	35013414
2	2019	3	Total	Total	34218169
3	2021	3	Total	Total	34110821
4	2018	3	Total	Total	33413660

The full screen toggle button about to be clicked.



# Visualizations

The second tab in the results interface will take the currently selected data query and produce as many visualizations as possible. For complex/large queries, this often involves looking at each individual Metric across each individual Column, transforming the data into various slices which make the most sense for comprehensible visualizations.

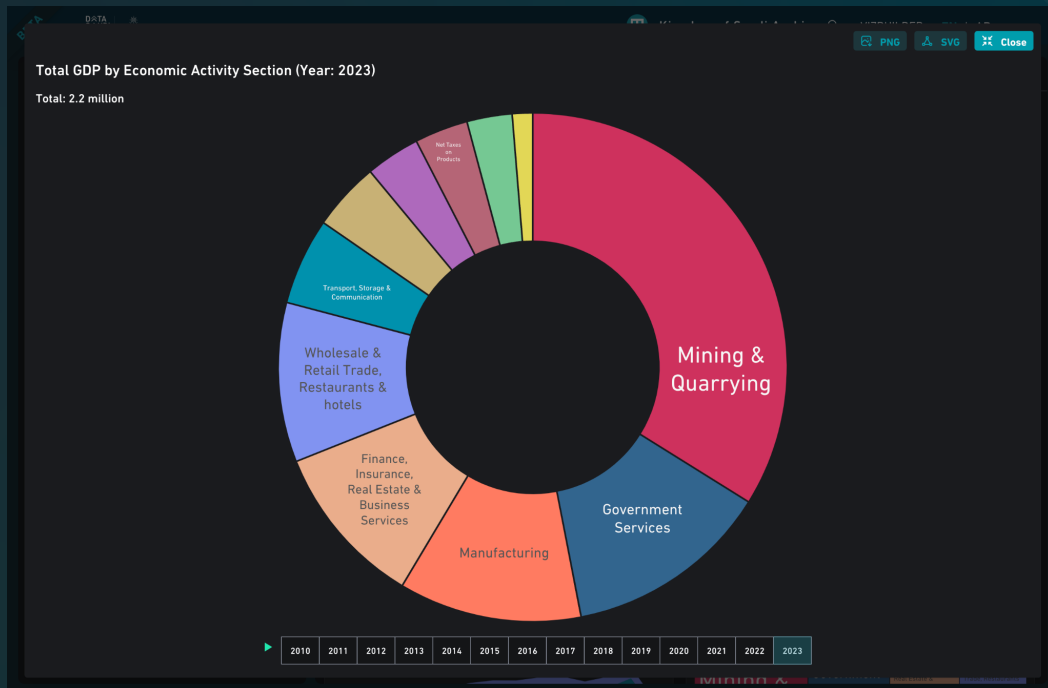
The screenshot displays the VIZBUILDER interface for the Kingdom of Saudi Arabia. The left sidebar contains the 'PARAMETERS' section with the following settings: Language: English; Topic: Economic Indicators; Subtopic: Real Sector Indicators; Table: GDP by economic activity; Source: General Authority for Statistics (GASTAT). The main area shows a grid of six visualizations under the 'Visualizations' tab, all for the query 'Total GDP by Economic Activity Section (Year: 2023)'. The visualizations include: 1. A horizontal bar chart showing GDP by economic activity section. 2. A stacked bar chart showing GDP by economic activity section over time. 3. A donut chart showing the distribution of GDP by economic activity section. 4. A line chart showing GDP by economic activity section over time. 5. A line chart showing GDP by economic activity section over time. 6. A line chart showing GDP by economic activity section over time. A 'Take a tour' button is visible in the bottom right corner.

The Visualizations tab showing small multiple visualizations based on a user query.



## Enlarging a Visualization

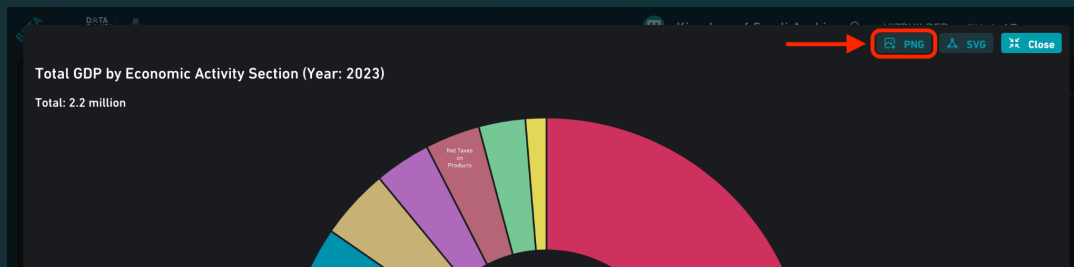
By default, the Visualizations appear as small tiles, showing the full breadth of possibilities and combinations. When finding a visualization of interest, users can click the “Enlarge” button in the top corner of that visualization to zoom in on that single visualization, often showing more detail, labeling, and a timeline.



An enlarged Pie Chart appearing in a pop-up modal above the interface.

## Downloading a Visualization

When viewing an enlarged visualization, users have the option to download the current visualization as either a PNG or SVG image by using the buttons in the top corner.



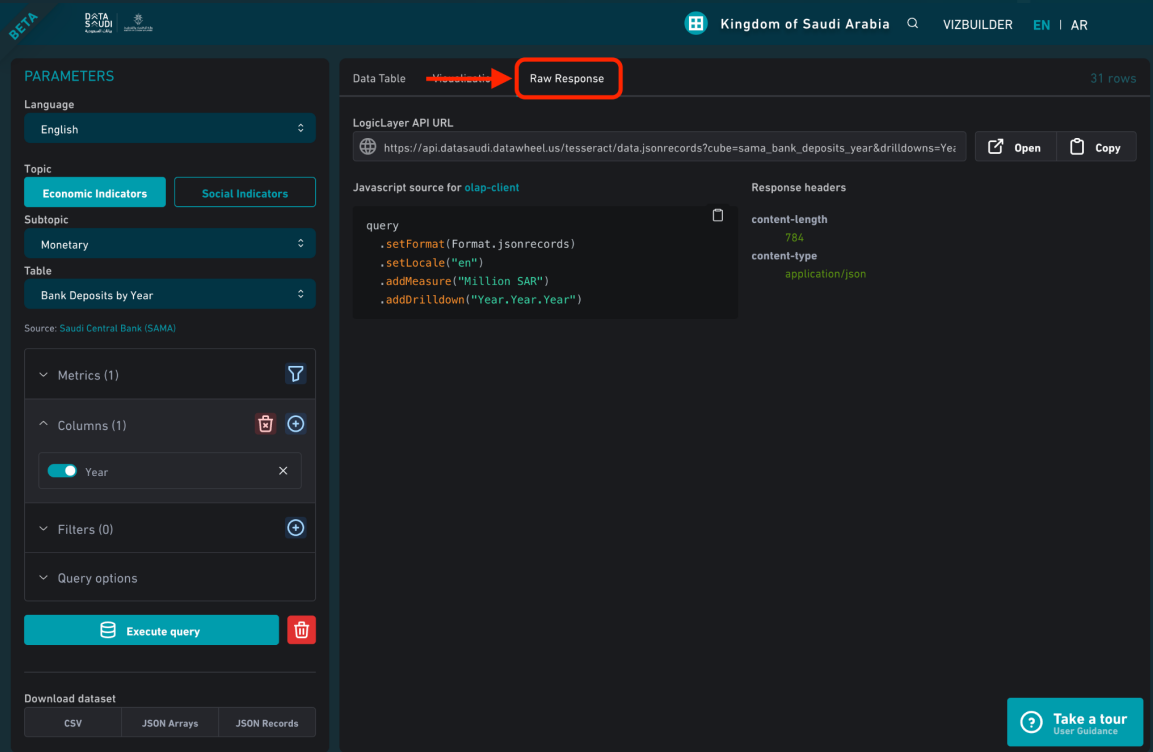
The location of the “Download as a PNG” button.





# Raw Response

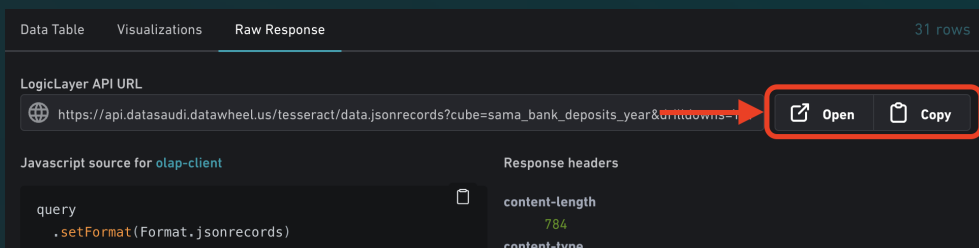
The final tab in the results panel is the API tab, which shows a few different ways to interact with the data in external/developer applications.



The Raw Response tab for an example query.

## LogicLayer API URL

Every data query is made using a URL containing all of the query parameters. This URL can be queried from any application to retrieve data as JSON results. The buttons to the side of the URL can be used to Open the URL in a new browser window, or Copy the URL to the user's clipboard.

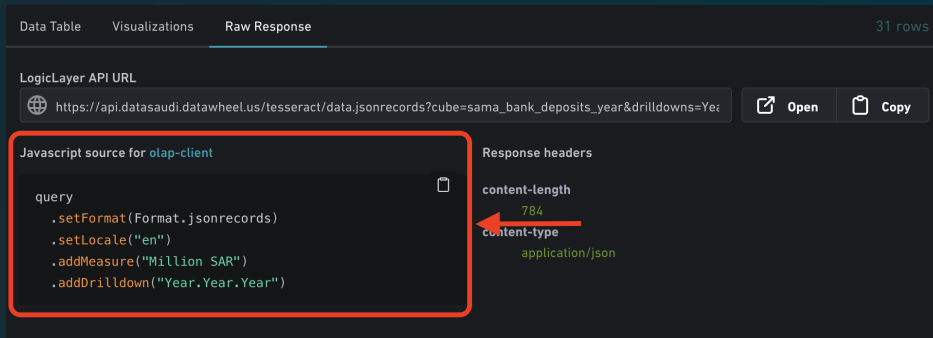


The "Open" and "Copy" buttons for the LogicLayer API URL.



# Javascript Source

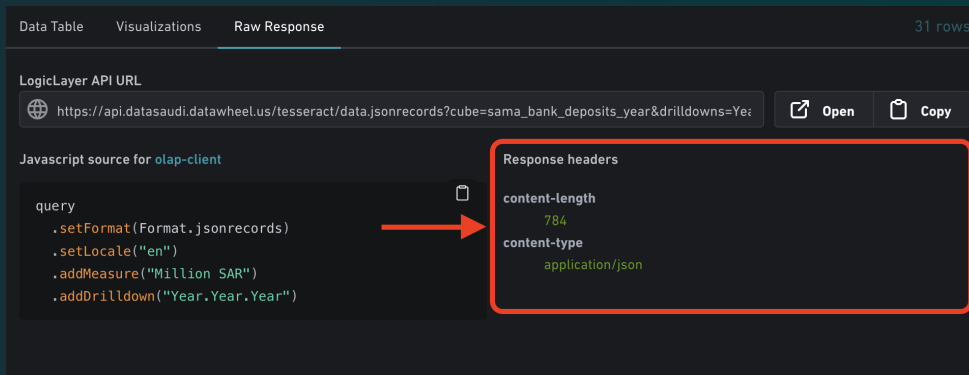
Additionally, the OLAP database can be queried directly from a Node/JavaScript environment using the @datawheel/olap-client open source library. The Raw Response tab shows the appropriate code needed to use this programmatic interface.



The Javascript Source for an example query.

# Response Headers

And finally, the last part of the Raw Response tab shows the headers received from the API response, which can be helpful when debugging and integrating data into external platforms.

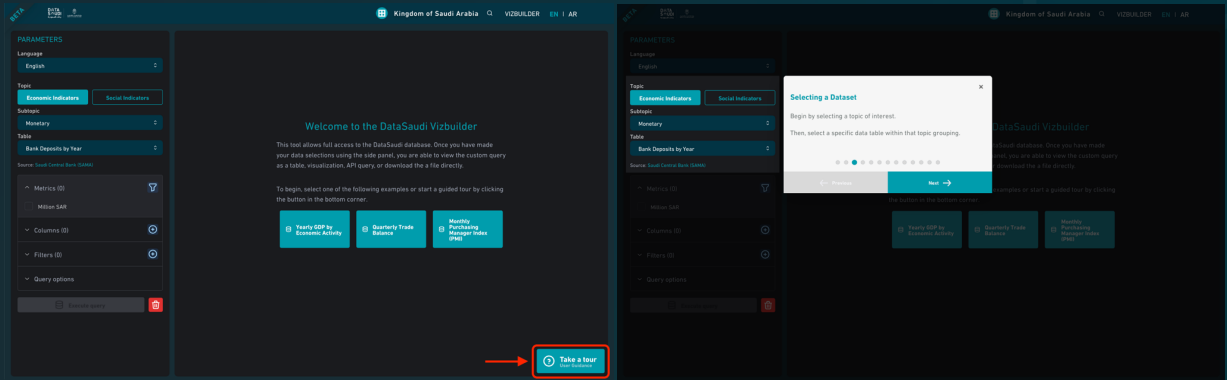


The Response Headers for an example query.



# Interactive User Guide

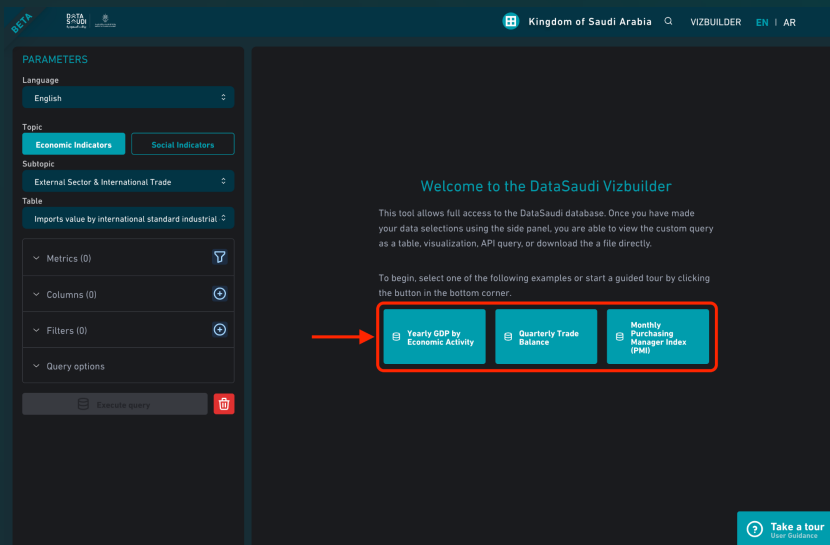
Many of the interface descriptions outlined in this document are also available on the live site by clicking the “Take a Tour” button in the bottom right corner of the window. This will launch a guided tour highlighting the different elements of the interface using an example starting query.



Button location to begin tour and example tour step.

## Starting Examples

In addition to the interactive tour, the starting screen also displays example queries to help the user get started. Clicking any of these buttons will populate the interface with the selected dataset, allowing users to jump right into using the interface without having to manually choose a dataset and options.



Button location of example queries.

