

Task 1: Calculate the average public expenditure for the year 2005 across all countries.

The screenshot displays the Microsoft Power BI Desktop interface. The top ribbon includes tabs for File, Home, Insert, Modeling, View, Optimize, Help, Format, Data / Drill, Table tools, and Measure tools. The 'Measure tools' tab is active, showing the 'Name' field set to 'Average2005', the 'Format' dropdown set to 'General', and the 'Data category' dropdown set to 'Uncategorized'. The 'Home table' is set to 'Measure'. The 'Structure' pane on the left shows a single measure named 'Average2005' with the DAX formula: `1 Average2005 = CALCULATE(AVERAGE(expenditure[2005]),expenditure[direct_expenditure_type]="Public")`. The 'Build' pane on the right shows the 'Fields' list with 'Average2005' selected. The 'Data' pane on the right shows the 'expenditure' table with various fields listed. The main canvas displays a card visual with the value '3.01' and the label 'Average2005'. The bottom status bar shows 'Page 1 of 1' and '70%' zoom.

To Perform this task:

- First we created a measure named **Average2005**
- DAX formula
Average2005 =
CALCULATE(AVERAGE(expenditure[2005]),expenditure[direct_expenditure_type]="Public")
- Then selected a card visual to show the output.

Task 2: Calculate the total publications for institutions in the UK.

The screenshot shows the Microsoft Power BI Desktop interface. The top ribbon includes tabs for File, Home, Insert, Modeling, View, Optimize, Help, Format, Data / Drill, Table tools, and Measure tools. The 'Measure tools' tab is active, showing the 'Name' field set to 'total Publication', the 'Format' dropdown set to 'Whole number', and the 'Data category' dropdown set to 'Uncategorized'. The 'Home table' dropdown is set to 'Measure'. The 'Structure' pane on the left shows a single measure named '1 total Publication' with the DAX formula: `1 total Publication = CALCULATE(SUM(data[publications]),data[country]="United Kingdom")`. The main canvas displays a card visual with the value '57017' in red and the label 'total Publication' in blue. The 'Build' pane on the right shows the 'Data' pane with a search bar and a list of fields, including 'total Publication' which is selected. The 'Fields' pane shows the 'total Publication' field in a box. The bottom status bar indicates 'Page 2 of 2', 'Page 2', and '70%' zoom.

To perform this task:

- Create a new measure named **total Publication**
- DAX Formula
total Publications = CALCULATE(SUM(data[publications]),data[country]="United Kingdom")
- Then select a card visual to show the output.

Task 3: Filter the dataset to show only institutions with a world rank below 100.

Untitled - Power BI Desktop

Search

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File Home Help **Table tools**

Name Table

Manage relationships

New measure Quick measure New column New table

Mark as date table

Structure Relationships Calculations Calendars

1 Table = **`FILTER(data,data[world_rank]<100)`**

world_rank	institution	country	national_rank	quality_of_education	alumni_employment	quality_of_faculty	publications
97	University of Melbourne	Australia	2	136	101	210	
31	University College London	United Kingdom	4	35	101	45	
32	Osaka University	Japan	3	77	101	44	
56	Tel Aviv University	Israel	4	97	101	51	
63	Pierre-and-Marie-Curie University	France	4	54	101	84	
65	University of Geneva	Switzerland	2	46	101	29	
67	University of British Columbia	Canada	3	101	101	93	
74	Nagoya University	Japan	4	56	101	69	
76	University of Manchester	United Kingdom	5	101	101	75	
79	Tohoku University	Japan	5	53	101	101	
83	Ludwig Maximilian University of Munich	Germany	2	90	101	90	
88	University of Zurich	Switzerland	4	101	101	80	
90	Technical University of Munich	Germany	3	52	101	101	
94	University of Sydney	Australia	2	101	101	101	
97	University of Nottingham	United Kingdom	6	101	101	87	
98	University of Bristol	United Kingdom	7	101	101	78	
99	Utrecht University	Netherlands	2	100	101	101	
30	University College London	United Kingdom	4	24	101	49	
33	Weizmann Institute of Science	Israel	2	18	101	23	
45	University of Edinburgh	United Kingdom	5	47	101	45	
48	Pierre-and-Marie-Curie University	France	2	19	101	84	
56	University of Geneva	Switzerland	2	52	101	30	
57	Tel Aviv University	Israel	3	84	101	54	

Table: Table (396 rows)

Update available (click to download)

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ENG 17:55 07-06-2025

To Perform this task:

- Go to table view > Select the data table > Table tools > New table
- Then DAX Formula **Table = `FILTER(data,data[world_rank]<100)`**.
- Then click enter and table with filtered data will be created.

Task 4: Calculate the total expenditure for all years for each country

Assignment 3 BI • Last saved: Today at 5:56 PM

Search

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File Home Insert Modeling View Optimize Help Format Data / Drill Table tools Measure tools

Name: Total expenditure Format: General Data category: Uncategorized

Home table: Measure

Structure Formatting Properties Calculations

1 Total expenditure = SUMX(expenditure,expenditure[1995] + expenditure[2000] + expenditure[2005] + expenditure[2009] + expenditure[2010] + expenditure[2011])

Back to

country	Total expenditure
Australia	70.40
Austria	76.30
Belgium	81.90
Brazil	45.30
Canada	55.20
Chile	57.70
Czech Republic	61.50
Denmark	96.30
Estonia	55.90
Finland	87.20
France	80.00
Germany	55.40
Greece	27.00
Hungary	55.00
Iceland	90.00
Ireland	77.20
Israel	74.80
Italy	62.10
Japan	55.90
Mexico	72.10
Netherlands	73.50
New Zealand	86.50
Total	2,466.80

Build

Suggestions

Columns

country X | >

Total expendit... X | >

+Add data

Data

Search

Measure

Average2005

Total expendit...

total Publicati...

data

Σ alumni_emplo...

Σ broad_impact

Σ citations

country

Σ influence

institution

Σ national_rank

Σ patents

Σ publications

Σ quality_of_ed...

Σ quality_of_fac...

Σ score

Σ world_rank

Σ year

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18:03 07-06-2025

To Perform this task:

- Create a new measure named Total expenditure.
- Use DAX Formula
Total expenditure = SUMX(expenditure, expenditure[1995]+ expenditure[2000]+ expenditure[2005]+ expenditure[2009]+ expenditure[2010]+ expenditure[2011])
- Create table visual add country and Total expenditure.

Task 5: Write a DAX formula to ignore any filters on the year column and calculate the total score across all years

❖ **DAX Formula -> Total Score = CALCULATE(SUM(data[score]),ALL(data[year]))**

“ALL” function will remove all the filters if any to year column in data table.

Task 6: Calculate the growth in expenditure for Austria from 1995 to 2000.

The screenshot displays the Microsoft Power BI Desktop interface. The top ribbon shows the 'Measure tools' tab. The 'Name' field is set to 'Growth in expendit...', and the 'Home table' is 'Measure'. The 'Format' dropdown is set to 'General', and the 'Data category' is 'Uncategorized'. The 'Calculations' section shows 'New measure' and 'Quick measure' buttons. The main area shows a DAX formula bar with the following formula:

```
1 Growth in expenditure from 1995 to 2000 = CALCULATE(SUM(expenditure[2000]),expenditure[country]="Austria")-CALCULATE(SUM(expenditure[1995]),expenditure[country]="Austria")
```

Below the formula bar, a single card visual is displayed with the value '0.30' and the text 'Growth in expenditure from 1995 to 2000'. The right-hand pane shows the 'Build' and 'Data' sections. The 'Build' section has a 'Suggestions' list with various visual options. The 'Data' section shows a list of measures, including 'Growth in expenditure from 1995 to 2000', which is currently selected. The bottom status bar indicates 'Page 8 of 8' and '70%' zoom.

To Perform this task:

- Create a new measure named Growth in expenditure
- Use DAX Formula
Growth in expenditure from 1995 to 2000 =
CALCULATE(SUM(expenditure[2000]),expenditure[country]="Austria") –
CALCULATE(SUM(expenditure[1995]),expenditure[country]="Austria")
- Use single card visual to see the output.

Task 7: Format the expenditure values to include a currency symbol and zero decimal places.

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File Home Help **Table tools** **Column tools** Share

Name: 2011

Data type: Decimal number

Format: Currency

Summarization: Sum

Data category: Uncategorized

Sort by column

Data groups

Manage relationships

New column

Structure

Formatting

Properties

Sort

Groups

Relationships

Calculations

	institute_type	direct_expenditure_type	1995	2000	2005	2009	2010	2011
United States	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
United Kingdom	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Switzerland	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Sweden	Higher Education Institutions	Public	\$2	\$2	\$2	\$2	\$2	\$2
Spain	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Portugal	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Poland	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Norway	Higher Education Institutions	Public	\$2	\$1	\$1	\$1	\$2	\$2
New Zealand	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Netherlands	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Mexico	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Korea, Republic of	Higher Education Institutions	Public	\$0	\$1	\$1	\$1	\$1	\$1
Japan	Higher Education Institutions	Public	\$0	\$1	\$1	\$1	\$1	\$1
Italy	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Ireland	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Iceland	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Hungary	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
France	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Finland	Higher Education Institutions	Public	\$2	\$2	\$2	\$2	\$2	\$2
Denmark	Higher Education Institutions	Public	\$1	\$2	\$2	\$2	\$2	\$2
Czech Republic	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Belgium	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1
Austria	Higher Education Institutions	Public	\$1	\$1	\$1	\$1	\$1	\$1

Table: expenditure (333 rows, 80 filtered rows) Column: 2011 (70 distinct values, 45 filtered distinct values)

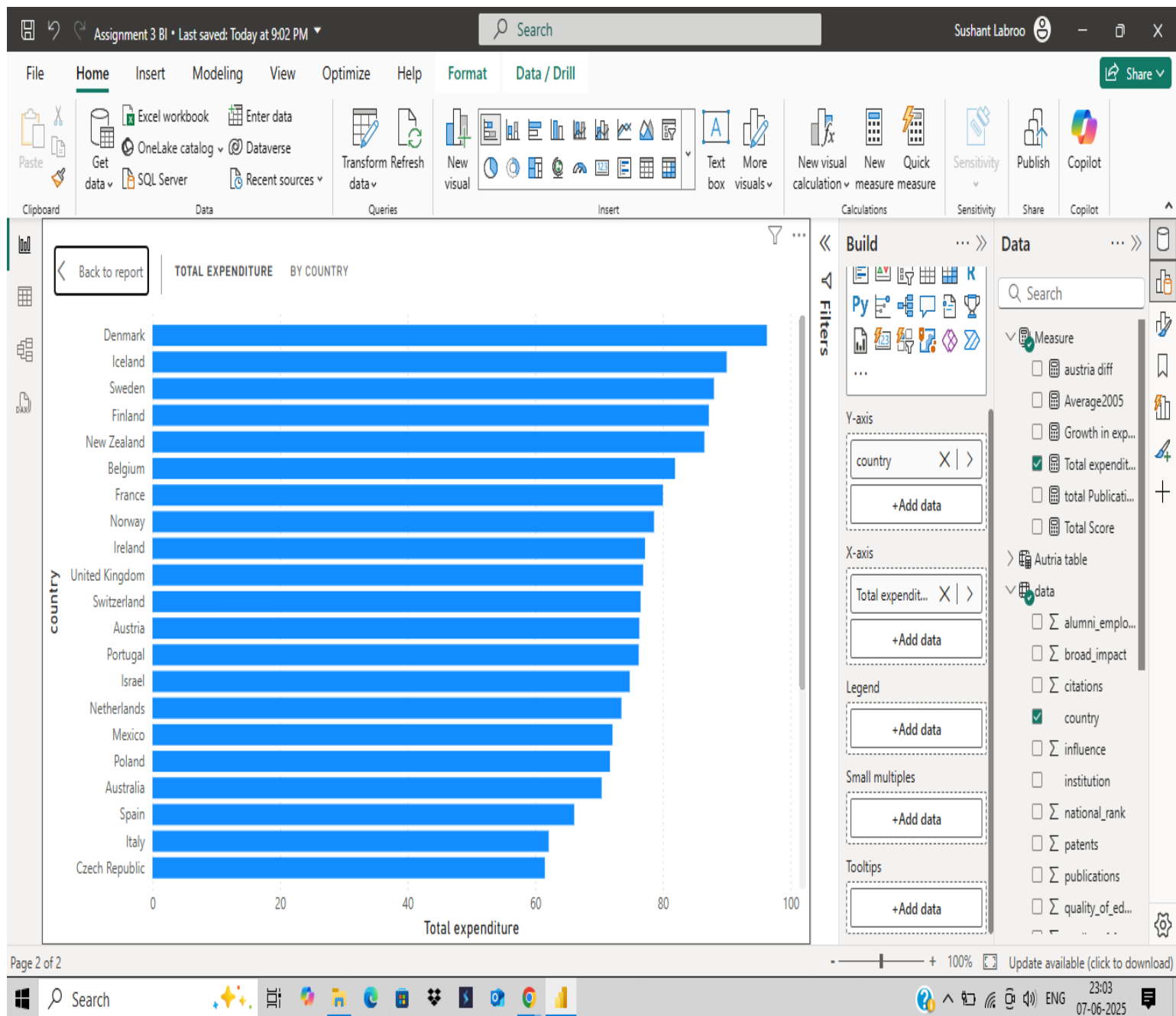
Update available (click to download)

21:02 07-06-2025

To Perform this task:

- Go to table view > Select the column > Column tools
- Under that there is format drop down menu select currency and change to \$ sign.
- Next to that is the decimal places box write 0 and it will remove all decimal places.

Task 8: Calculate the total expenditure for each country.

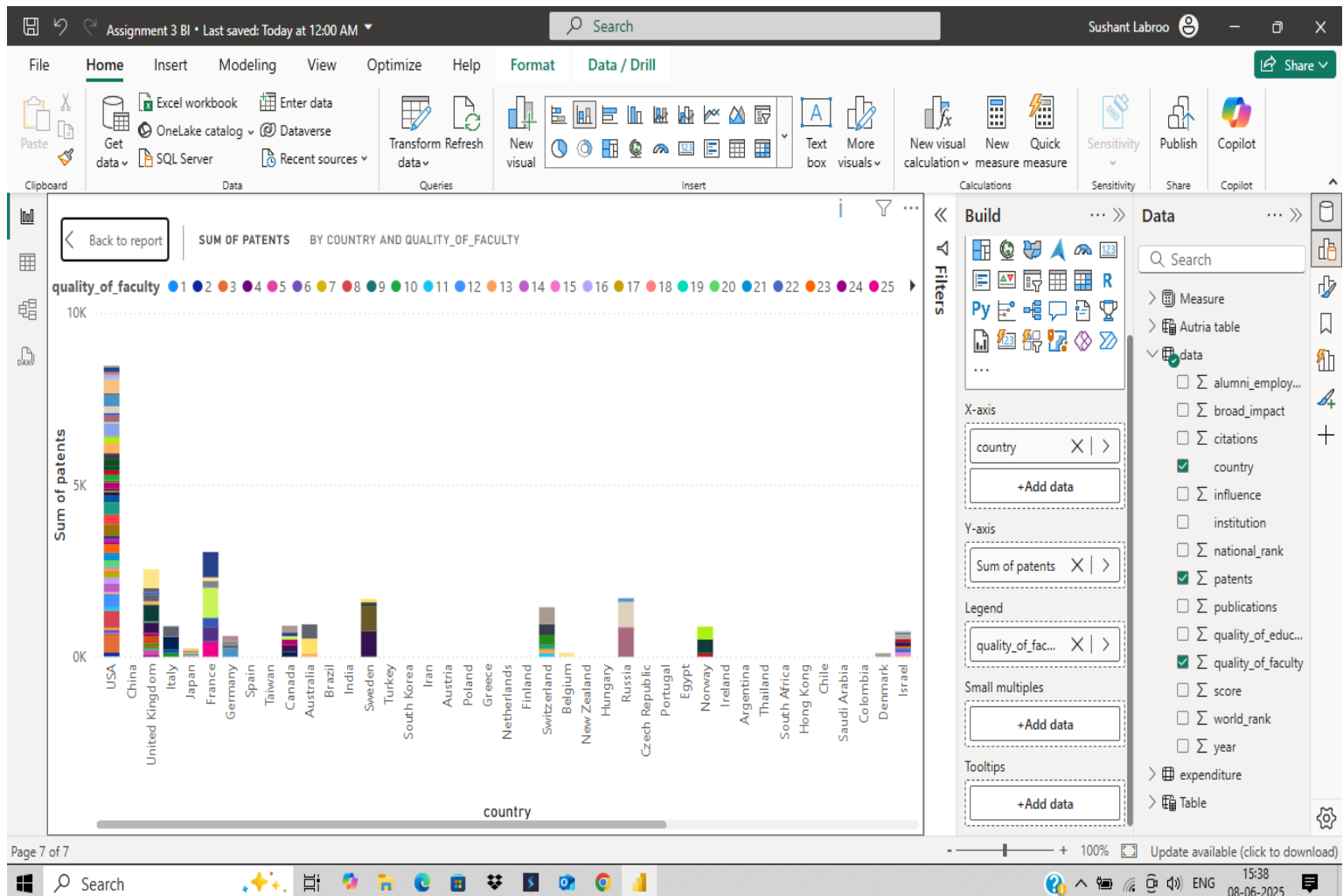


To Perform this task:

- Create a new measure named Total expenditure.
- Use DAX Formula
Total expenditure = SUMX(expenditure, expenditure[1995]+ expenditure[2000]+ expenditure[2005]+ expenditure[2009]+ expenditure[2010]+ expenditure[2011])
- Create bar chart visual add country and Total expenditure.

Task 9: Create a report showing each visual in different sheets:

- (a) Break down the total patents of institutions by country and then by quality of faculty. Analyze which factors contribute most to the number of patents across different countries.



To Perform this task:

- Select a column chart visual
- Add country in x-axis, sum of patents in y-axis, and quality_of_faculty in Legend.

- (b) Use the Q&A feature in Power BI to answer the question: "What is the total publications and citations for institutions in the USA?" and display the results in a table and bar chart format.

Assignment 3 BI • Last saved: Today at 9:02 PM

Search

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File Home Insert Modeling View Optimize Help Format Data / Drill

Clipboard Data Queries Insert Calculations Sensitivity Share Copilot

Excel workbook Enter data OneLake catalog Dataserver SQL Server Recent sources Transform Refresh data New visual Text box More visuals New visual calculation New Quick Sensitivity Publish Copilot

Help Q&A understand people better by adding synonyms. Add synonyms now

What is the total publications and citations for institutions in the country USA in table form

Showing results for Total publication, table citation, and table institution with table country that tables are in USA as table

citations	institution	total Publication
1	Harvard University	57017
2	Massachusetts Institute of Technology	57017
2	Stanford University	57017
3	Massachusetts Institute of Technology	57017
3	Stanford University	57017
3	University of California, Berkeley	57017
4	Massachusetts Institute of Technology	57017
4	University of California, Berkeley	57017
5	Johns Hopkins University	57017
5	University of Michigan, Ann Arbor	57017
5	University of Washington - Seattle	57017
6	Johns Hopkins University	57017
6	University of California, Los Angeles	57017
6	University of Michigan, Ann Arbor	57017
7	Johns Hopkins University	57017
7	University of California, Los Angeles	57017
7	University of Michigan, Ann Arbor	57017
8	University of California, Los Angeles	57017
8	University of Michigan, Ann Arbor	57017
8	University of Pennsylvania	57017
8	University of Washington - Seattle	57017
9	Columbia University	57017
9	Johns Hopkins University	57017
9	University of Pennsylvania	57017
Total		57017

Build Data

Suggestions

Autria table

data

- ☐ alumni_emplo...
- ☐ broad_impact
- ☐ citations
- ☐ country
- ☐ influence
- ☐ institution
- ☐ national_rank
- ☐ patents
- ☐ publications
- ☐ quality_of_ed...
- ☐ quality_of_fac...
- ☐ score
- ☐ world_rank
- ☐ year

expenditure

- ☐ 1995
- ☐ 2000
- ☐ 2005

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23:19 07-06-2025

To Perform this task:

- Select the Q/A visual from the build pane.
- Write in the box What is the total publications and citations for institutions in USA in table form.
- It will show output in the table form.

(c) Display key metrics for the top 5 institutions by world rank, including fields such as institution, country, score, and national rank.

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File Home Insert Modeling View Optimize Help Format Data / Drill

Paste Get data OneLake catalog Enter data Dataserver SQL Server Recent sources Transform Refresh data New visual Text box More visuals New visual calculation New Quick measure measure Sensitivity Publish Copilot

Clipboard Data Queries Insert Calculations Sensitivity Share Copilot

Back to report

world_rank	institution	country	score	national_rank
5	California Institute of Technology	USA	85.21	4
1	Harvard University	USA	100.00	1
4	Massachusetts Institute of Technology	USA	91.45	3
2	Massachusetts Institute of Technology	USA	91.67	2
3	Massachusetts Institute of Technology	USA	97.54	3
3	Massachusetts Institute of Technology	USA	98.69	3
3	Stanford University	USA	89.50	3
2	Stanford University	USA	93.94	2
2	Stanford University	USA	98.66	2
2	Stanford University	USA	99.09	2
4	University of Cambridge	United Kingdom	86.17	1
5	University of Cambridge	United Kingdom	90.24	2
4	University of Cambridge	United Kingdom	96.81	1
4	University of Cambridge	United Kingdom	97.64	1
3	University of Oxford	United Kingdom	92.54	1
5	University of Oxford	United Kingdom	96.46	2
5	University of Oxford	United Kingdom	97.51	2

Filters

Search

institution is (All)

national_rank is (All)

score is (All)

world_rank is less than or equal to...

Filter type: Advanced filtering

Show items when the value is less than or equal to 5

And Or

Apply filter

Build

Suggestions

Columns

world_rank X | >

institution X | >

country X | >

score X | >

national_rank X | >

+Add data

Data

Search

Autria table

data

Σ alumni_emplo...

Σ broad_impact

Σ citations

country

Σ influence

institution

Σ national_rank

patents

Σ publications

Σ quality_of_ed...

Σ quality_of_fac...

score

Σ world_rank

Σ year

expenditure

Σ 1995

Σ 2000

Σ 2001

Page 5 of 5

Search

23:26 07-06-2025

To Perform this task:

- Select a table visual
- Add world_rank, institution, country, score, national_rank.
- Then go to Filters pane
- Select the world_rank box
- Change filter type to Advanced filtering.
- Under Show items when value > is less than or equal to > 5.
- Apply filter.

(d) Represent the distribution of direct_expenditure_type (e.g., public vs. private) for the year 2011 across all countries. Highlight the OECD Average as a separate segment.

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File Home Insert Modeling View Optimize Help Format Data / Drill

Clipboard Get data Excel workbook OneLake catalog SQL Server Enter data Datasource Recent sources Transform Refresh data

New visual

Text box More visuals

New visual calculation New measure Quick measure

Sensitivity Publish Copilot

Share

Back to report

direct_expenditure_type	country	Sum of 2011
Public	Norway	\$14
Public	Denmark	\$14
Public	Iceland	\$13
Public	Finland	\$12
Public	New Zealand	\$12
Public	Belgium	\$12
Public	Sweden	\$12
Public	Ireland	\$11
Public	Brazil	\$11
Public	United Kingdom	\$11
Public	France	\$11
Public	Austria	\$10
Public	Israel	\$10
Public	Netherlands	\$10
Public	Switzerland	\$10
Public	OECD Average	\$10
Public	Estonia	\$10
Public	Slovenia	\$10
Public	Portugal	\$10
Public	Mexico	\$9
Public	Korea, Republic of	\$9
Public	Poland	\$9
Total		\$383

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To Perform this task:

- Select a table visual > Add direct_expenditure_type , country, Sum of 2011.
- Then Go to Filters pane > direct_expenditure_type > filter only private and public.
- Then go to format pane > **cell elements** and Highlight data where country is OECD Average.

Task 10: Create a workspace "Institution Analysis" and set up a schedule to refresh the datasets every day at 6 AM.

app.powerbi.com/home?experience=power-bi&clientSideAuth=0&refreshAccessToken=true

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Name Type Opened

Internshala Workspace a day ago

Create a workspace

Name *

"Institution Analysis"

This name is available

Description

Describe this workspace

Domain

Assign to a domain (optional)

Learn more about workspace settings

Workspace image

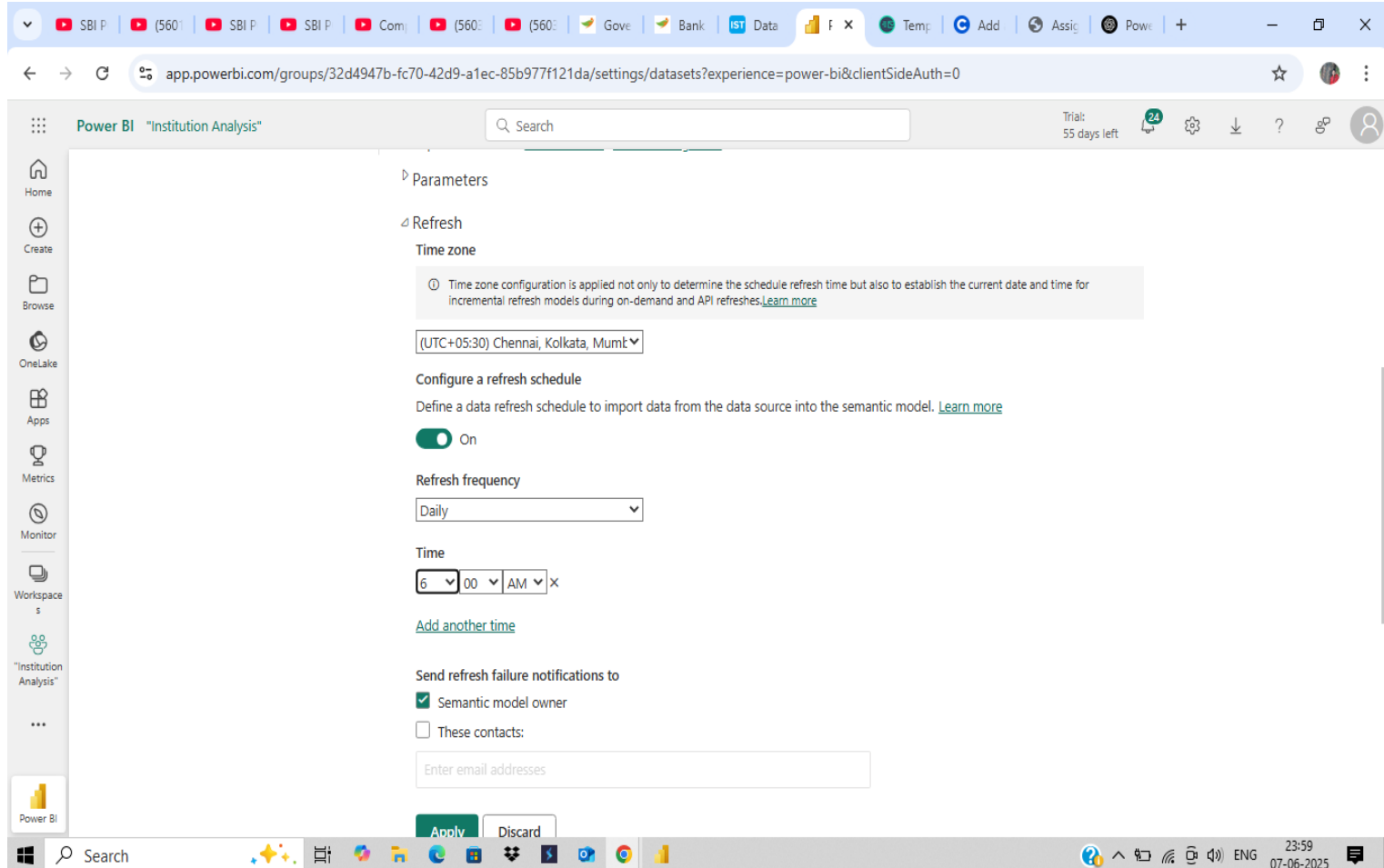
Upload

Reset

Advanced

Apply Cancel

23:56 07-06-2025



To Perform this task:

- Go to Power BI Service > Workspaces > New Workspaces > Name it as **“Institution Analysis”**.
- You can also write description, upload image then click apply.
- New workspace will be created.

Schedule a Refresh:

- First publish report to Power BI Service
- Go to workspace > settings > Power BI settings > semantic models > Refresh.
- Set the time zone first
- Refresh frequency to Daily.
- Set the time to 6 A.M.