جهـــاز التخطيـــط والإحصـــاء
Planning and Statistics Authority
State of Qatar • دولـــة قطـــر

Data Visualization Lab

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Planning and Statistics Authority (PSA)

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Agenda

01. Introduction

- What is Data Visualization Lab?
- Data Ecosystem & Lifecycle

02. What is Data Visualization?

- Why is data visualization important?
- Stages for producing data visualization

03. Data Visualization Framework

04. Call for Action

05. Closing

Introduction

What is Data Visualization Lab?

- Data Visualization Lab serves as a dedicated environment to influence the power of data visualization and unlock insights to effectively communicate complex information through visually engaging representations.

- These visualizations may be used in various domains such as business intelligence, scientific research, healthcare, finance, trade, and more.

Importance of Developing a Data Visualization Lab?

1. Continuous Learning and Improvement

Promotes continuous learning, and updates on advancements, and fosters experimentation, innovation, and knowledge sharing among members

2. Showcase and Dissemination

Encourage sharing, publishing, collaboration, and staying updated with the data visualization community.

3. Collaboration and Project Support

Encourage collaboration, support projects, facilitate knowledge sharing, networking, and feedback within lab.

4. Training and Workshops

Provide training, workshops, and hands-on exercises on data visualization techniques, tools, and best practices. Partner with experts for specialized training.

5. Create a Collaborative Space

Create collaborative space, offer tools, encourage interdisciplinary teamwork for data visualization projects.

6. Support Data Warehouse and Open Data Portal

Providing the central statistical data warehouse and the open data portal with multiple visual products

Today!

Workshop on Data Visualization for Better Decision-Making

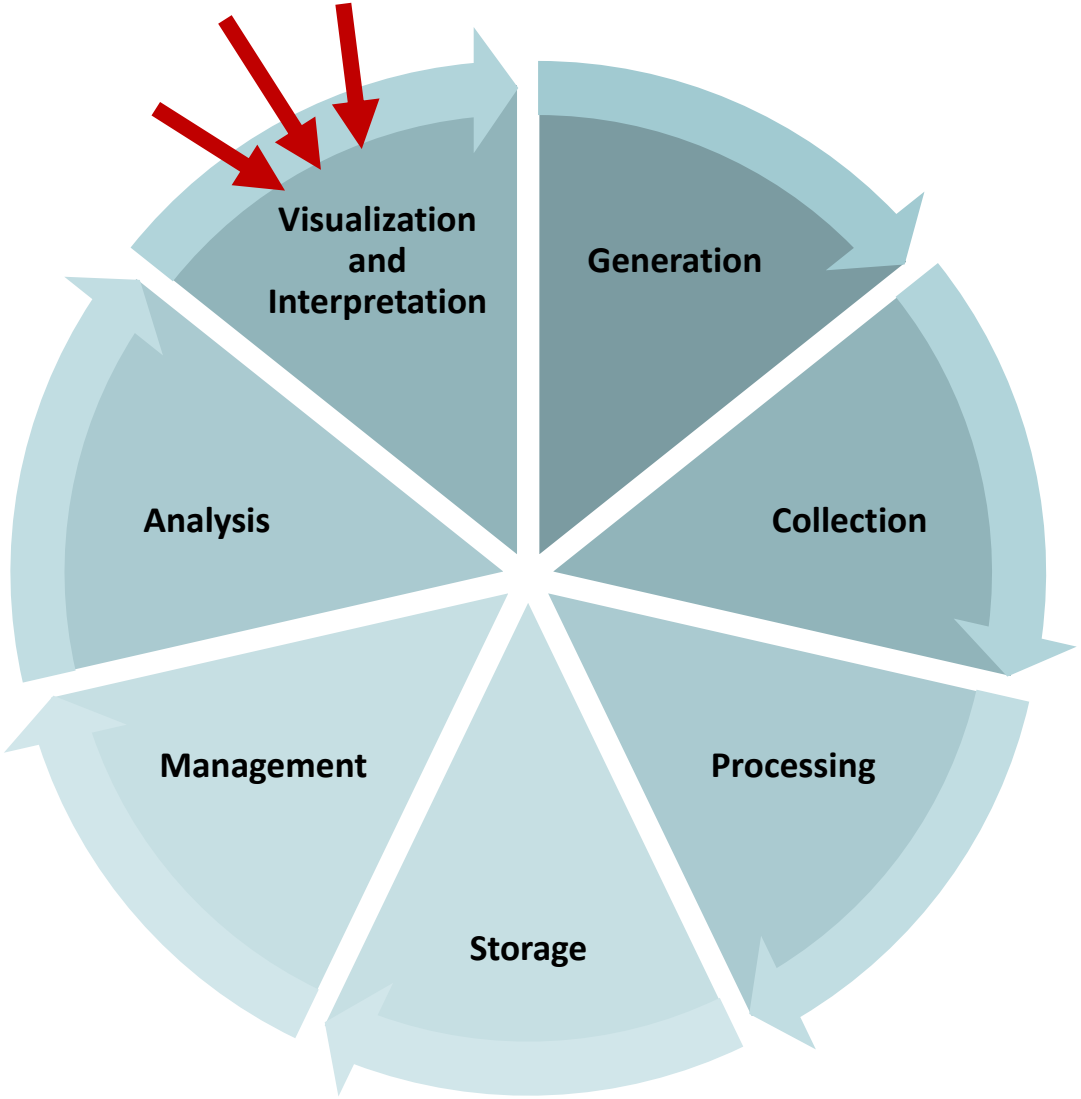
Expected Outcome:

- Understand the advantages of data visualization for decision-making.
- Know various types of visualization.
- Acquire some skills to produce various types of visualization.
- Know some commercial data visualization packages with functionality.

Data Ecosystem & Lifecycle

- The data ecosystem encompasses everything that handles, organizes, and processes data.
- It is the path data takes from generation to dissemination (actionable insights).
- This life cycle can be split into eight steps:

  Generation, Collection, Processing, Storage, Management, Analysis, Visualization, and Interpretation



What is Data Visualization?

- Data visualization uses graphical representations to illustrate information, uncover patterns, and aid decision-making. It combines science and design to communicate complex data effectively, empowering users to understand and present information in impactful ways.

- Data visualization utilizes graphs, charts, and other visual representations to convey information and insights from data effectively.

Importance of Data Visualization

Data comprehension

- Visualizing data allows us to **see complex information quickly and intuitively**.
- By presenting data in visual formats such as graphs, charts, and maps, patterns, trends, and outliers become more apparent, making it easier to derive insights and understand the underlying story within the data.

Decision-making

- Visualizing data enables better decision-making by **providing a clear and concise representation of information.**
- Supporting evidence-based decision-making and facilitating the communication of findings to stakeholders.

Importance of Data Visualization (continued)

Communication and storytelling

- Visual representations engage and captivate audiences, enabling effective communication of insights, recommendations, and narratives derived from data.

Exploration and discovery

- Interactive data visualizations allow users to explore and interact with data dynamically.
- When users can drill down, filter, and manipulate visualizations, uncovering deeper insights and discovering previously unnoticed patterns or trends.
- This exploratory aspect fosters a deeper understanding of data and promotes data-driven discovery.

Importance of Data Visualization (continued)

Data-driven insights

- Insights can drive informed decision-making, identify opportunities, detect anomalies, and improve overall performance.
- Empowers users to derive meaningful insights and make informed decisions based on data.

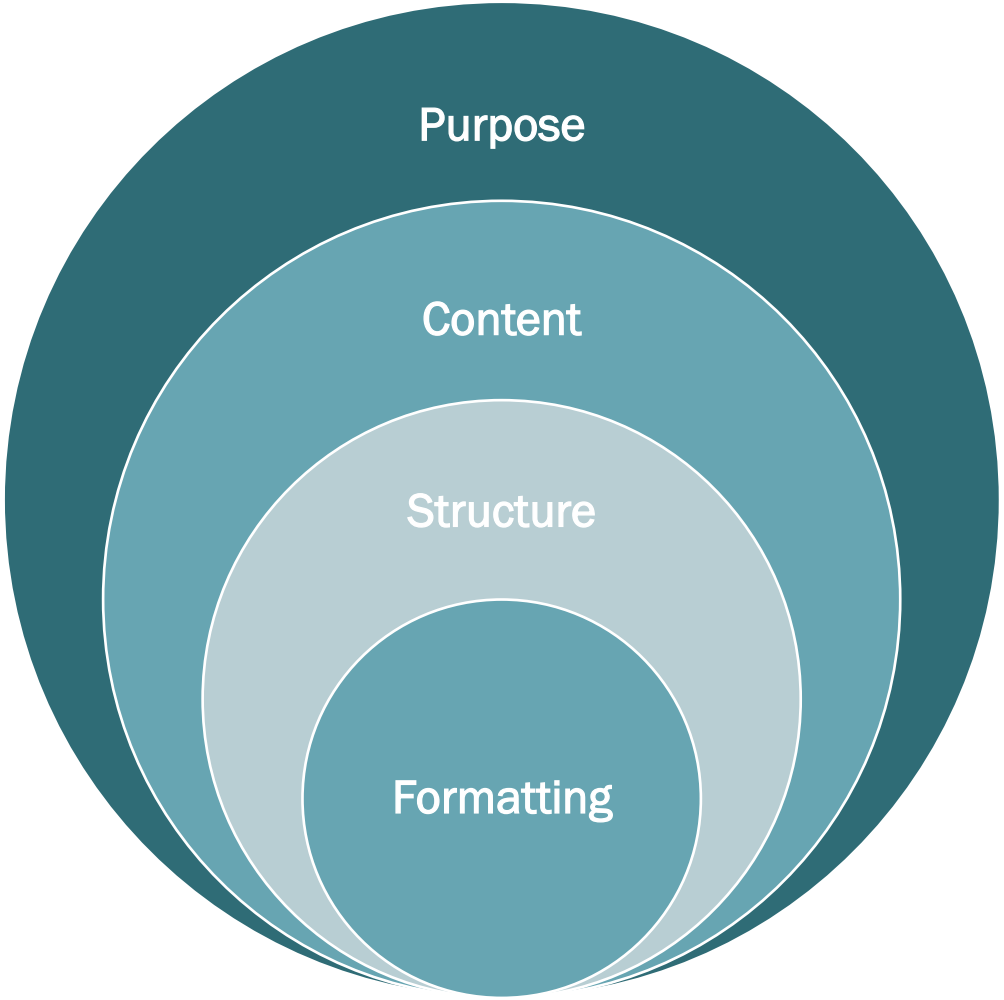
Audience engagement

- Visuals have a higher impact on audience engagement compared to raw data or textual information.
- Well-designed visualizations capture attention, evoke emotions, and enable better understanding and retention of information.
- **Harvard Business Review** demonstrate human beings are naturally wired to respond better to storytelling than most other forms of content sharing

  Why Your Brain Loves Good Storytelling (hbr.org)

Stages for Producing Effective Data Visualization Products

1. Purpose - determine the purpose of the visualization
2. Content - create or obtain the data that has the potential to aid the purpose
3. Structure – map your data and select geometrical shape that are most likely to reveal underlying patterns and insights.
4. Formatting - polish and format the best visual(s) from stage 3 for a more informative and/or persuasive for our intended audience.



A Proposed Data Visualization Framework

- [ ] Graphical Presentation
- [ ] Geographical Presentation
- [ ] Infographics
- [ ] Social Media
- [ ] Dashboard
- [ ] Podcast
- [ ] Interactive Publications
- [ ] Press Release
- [ ] Data Storytelling
- [ ] Data Journalism

(1)
Infographics

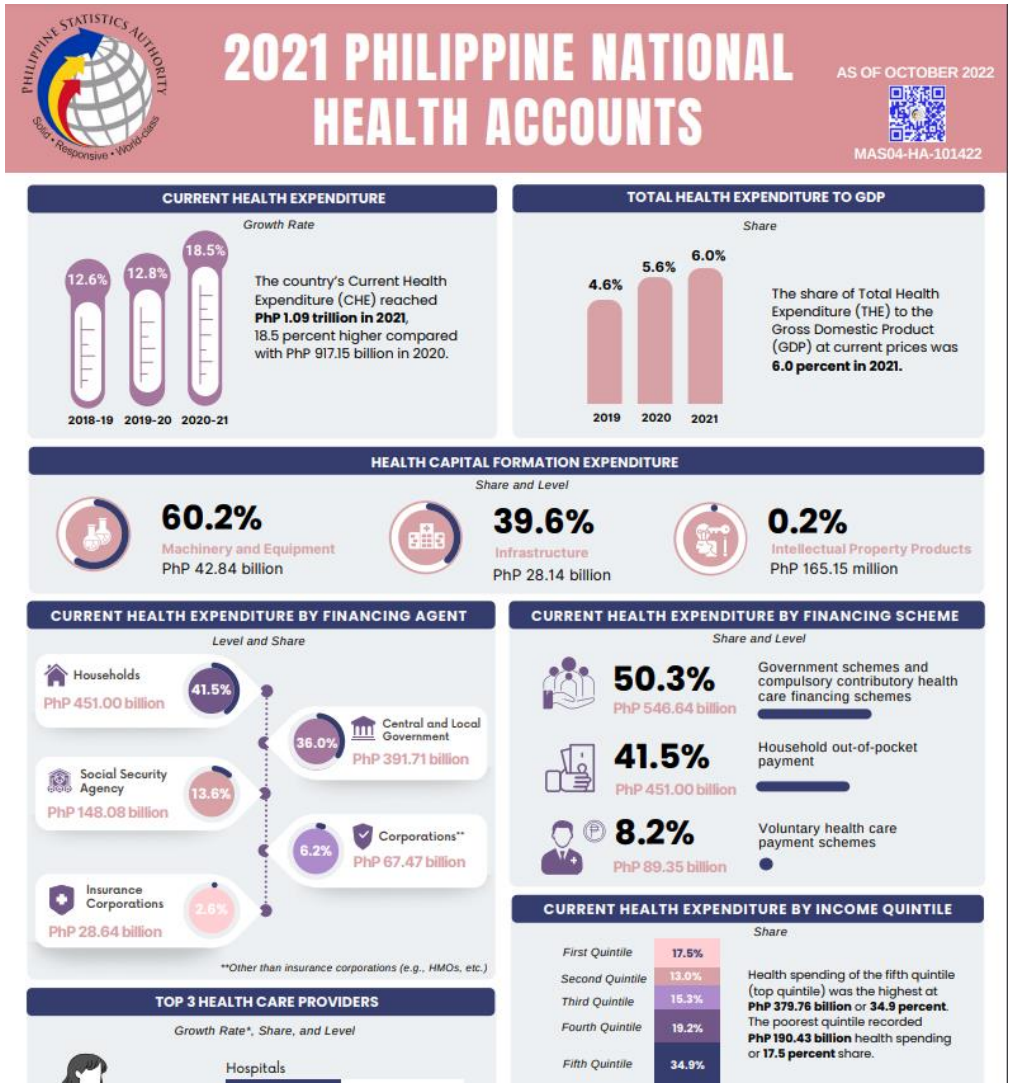
Infographics

What is Infographics?

- Infographics allow us to walk away with the information we can use to make better decisions without having to deep dive into the data.
- They help drill data down so audiences can get a view of the research problem – the big picture that we're all trying to see – as well as answer deeper questions about the results of that research .

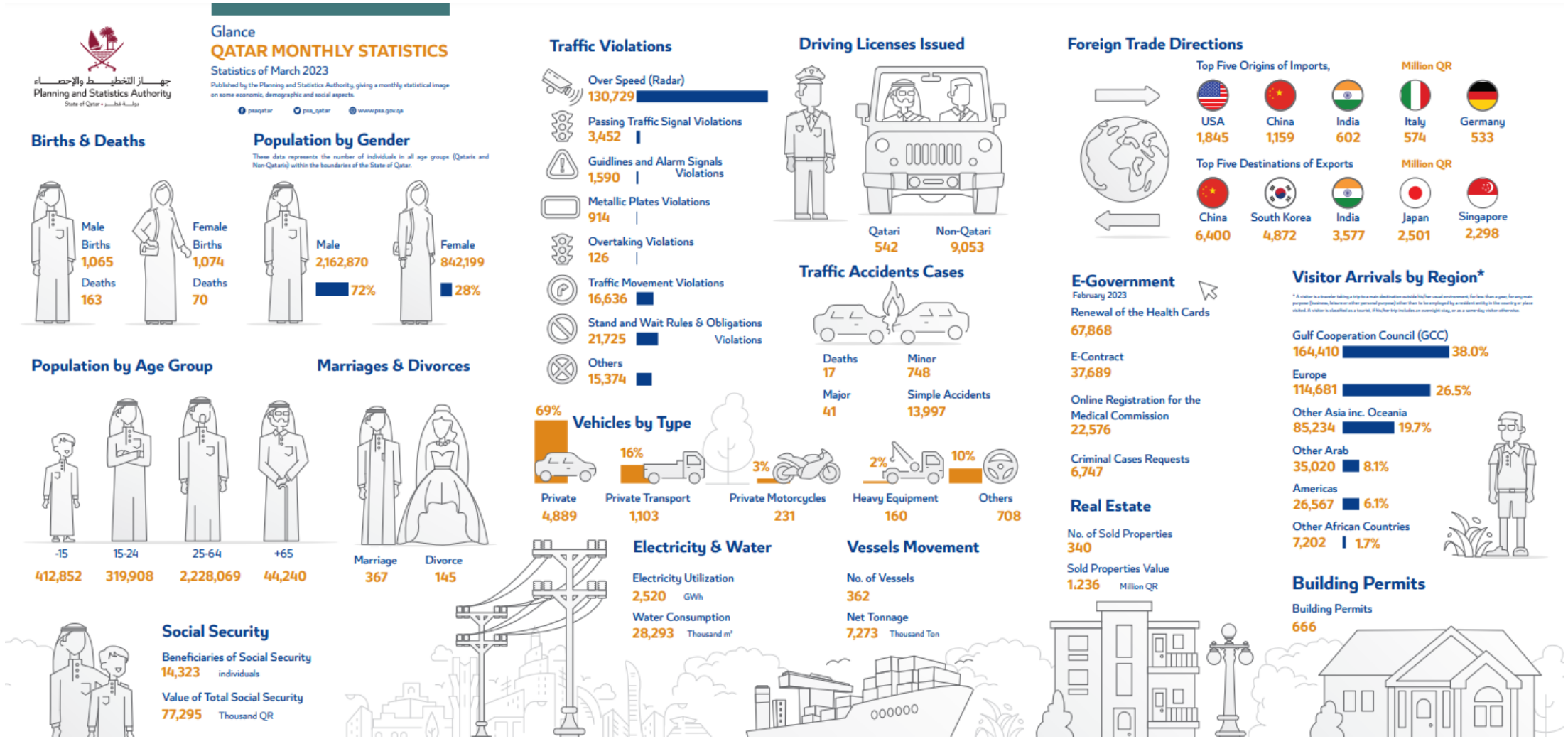
Example from Philippine Statistics Authority (PSA)

Philippine Statistics Authority | Republic of the Philippines (psa.gov.ph)



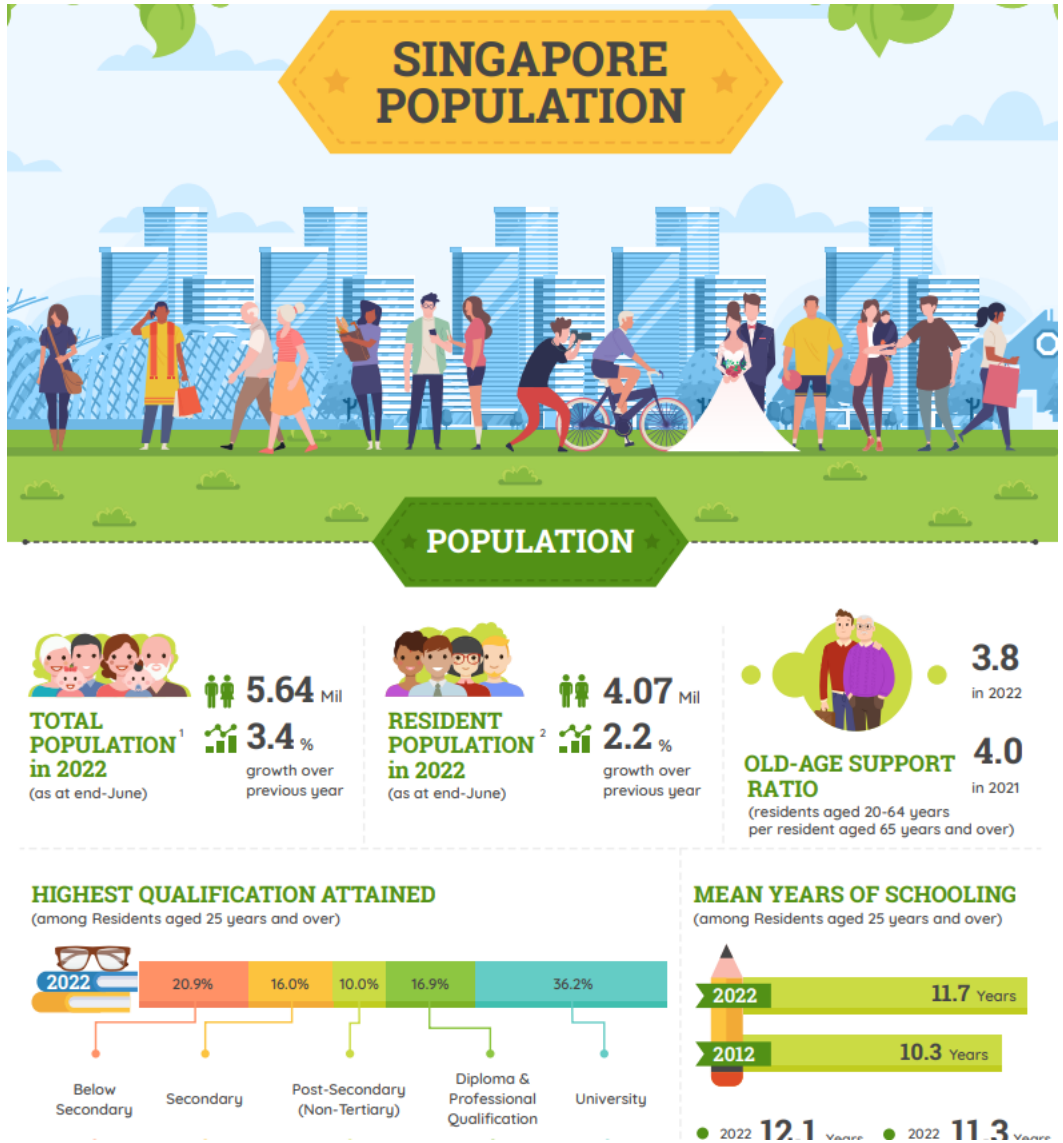
Example from Planning and Statistics Authority (Qatar Monthly Statistics)

[Planning and Statistics Authority Home Page (psa.gov.qa)]

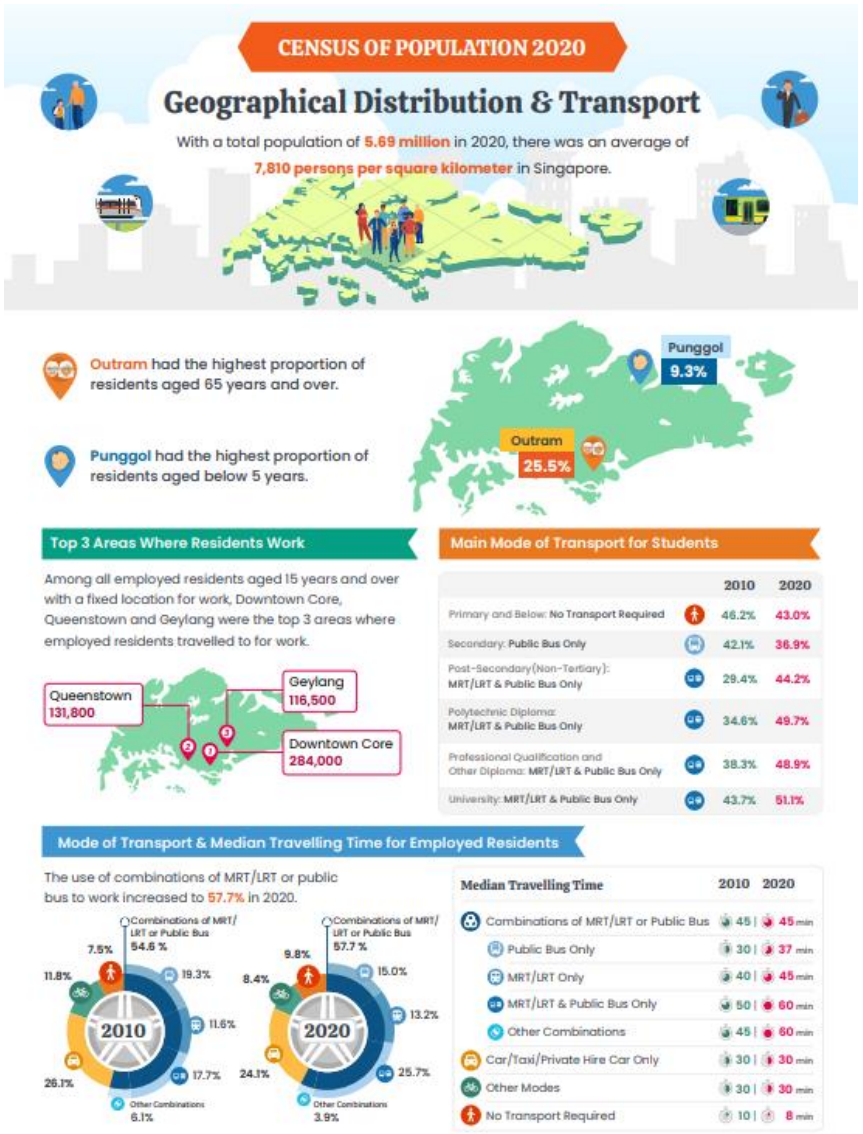


Example from Singapore Department of Statistics

DOS | SingStat Website - Singapore Population

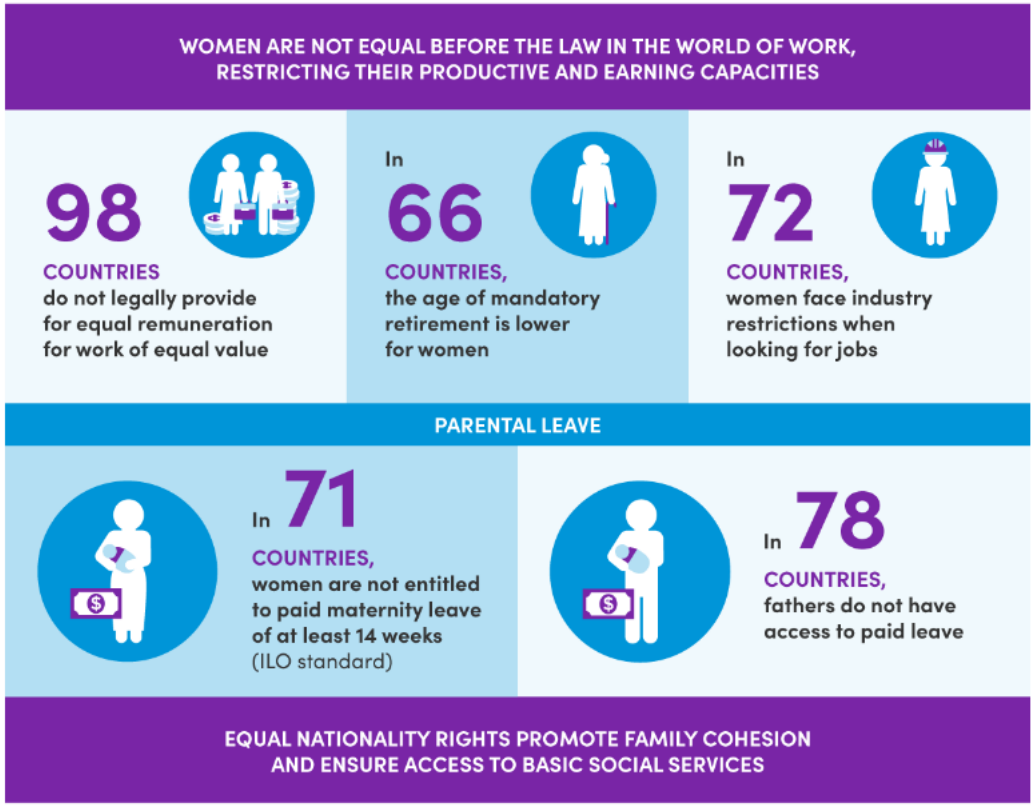


DOS | SingStat Website - Search by Theme



Example from UN Women

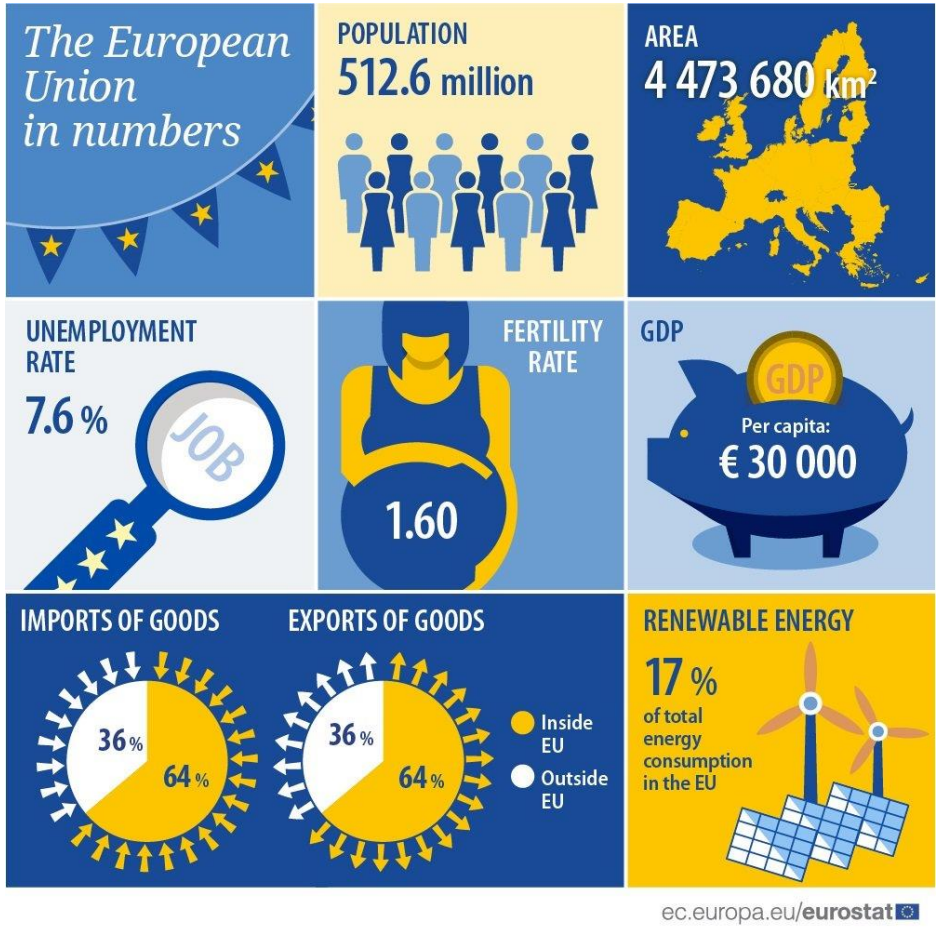
Infographic: Women's rights and the law | UN Women – Headquarters

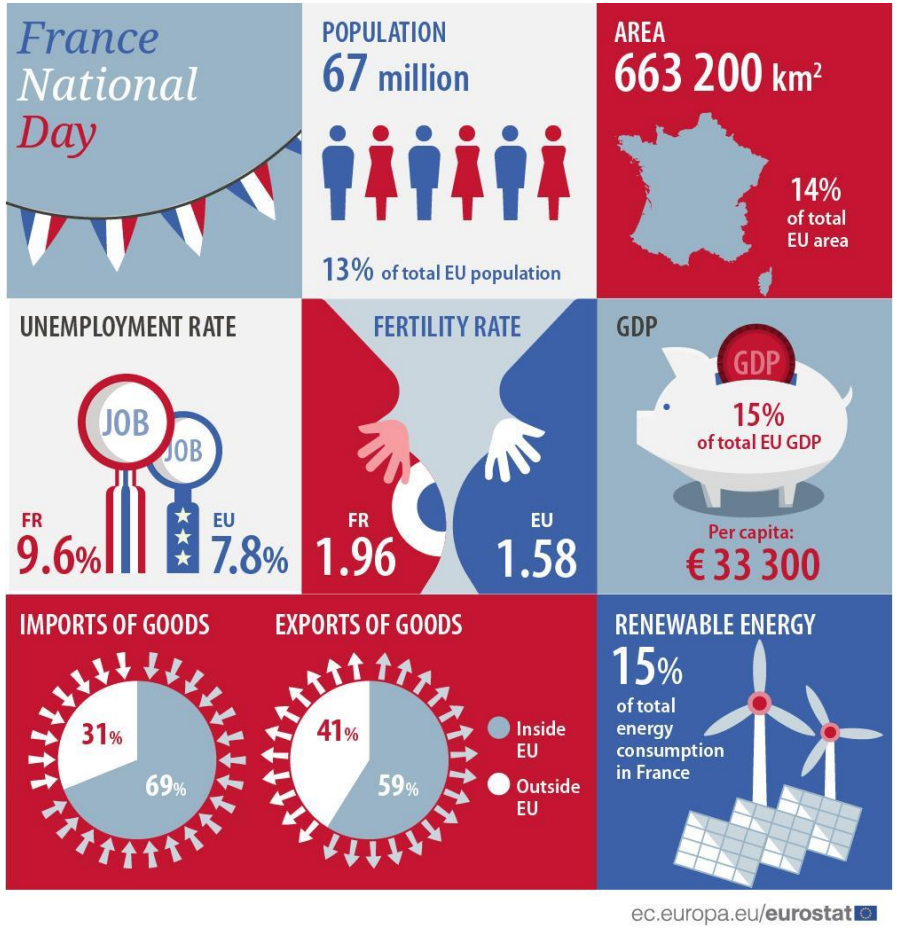


Infographic: Human Rights of Women | UN Women – Headquarters

Example from eurostat

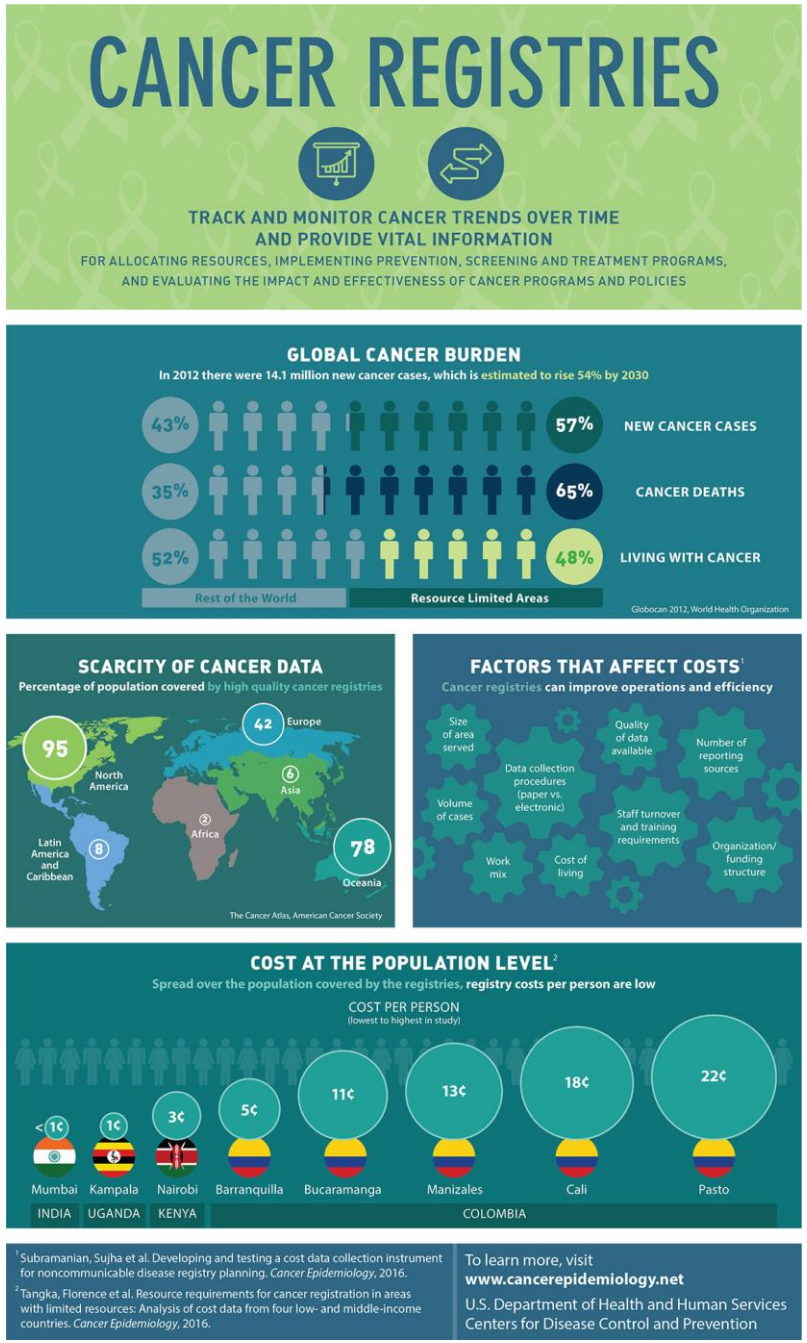
[eurostat infographic - Google Search]





Example from Center of Disease Control (CDC)

Global Health Infographics | CDC



(2)
Dashboard

Dashboard

What is Dashboards?

- A dashboard is a tool that visualizes data, enabling users to track, analyze, and understand key metrics for informed decision-making.
- It features charts, tables, and gauges to monitor performance against goals and benchmarks, engaging both technical and non-technical users in the analytics process.

Main Types of Dashboards

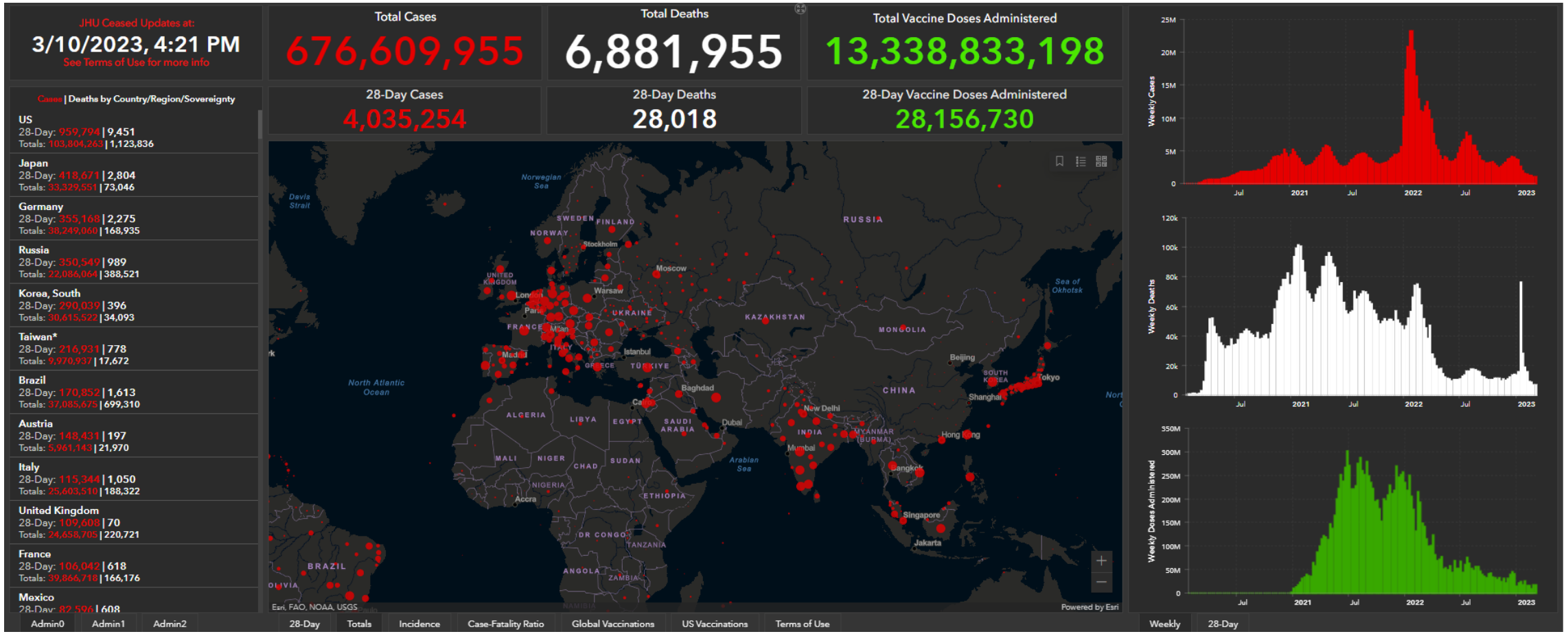
- **Real-time dashboards:** that provide up-to-the-minute data and insights, displaying information as it happens, while historical dashboards present past data and trends.
  - are useful for monitoring live events, tracking real-time metrics, and making immediate decisions,

- **Historical dashboards** help analyze trends, patterns, and historical performance over a specific period

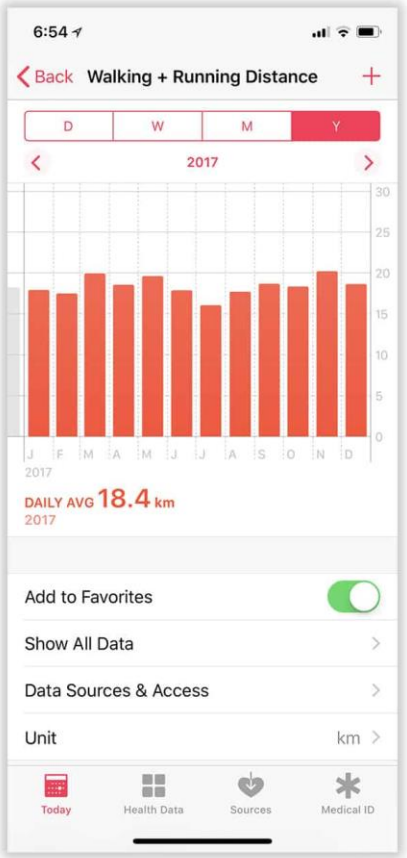
Real-time Dashboard

Example COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)

[COVID-19 Map - Johns Hopkins Coronavirus Resource Center (jhu.edu)]



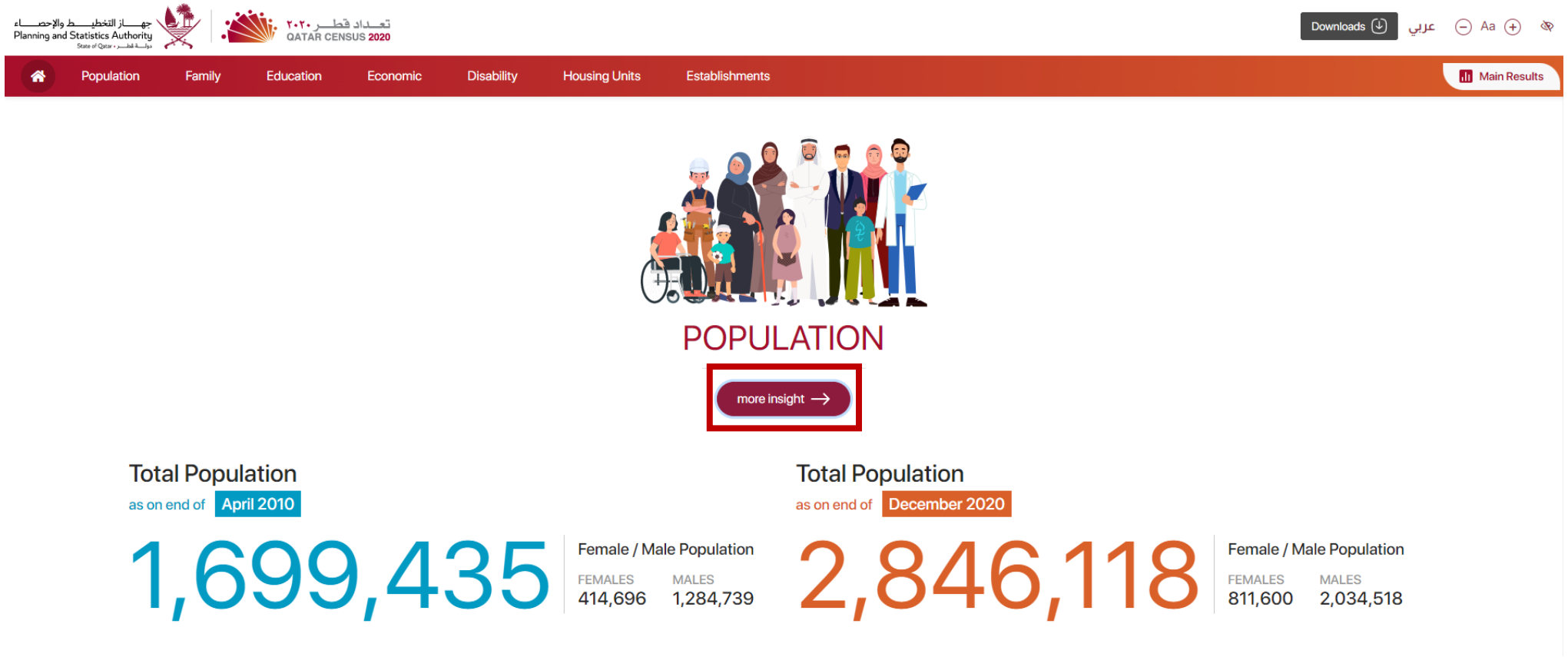
Real-time Dashboard



Historical Dashboard

Example PSA Qatar's Censes Dashboard (Total Population Example)

Qatar Census 2020 Detailed Results (psa.gov.qa)

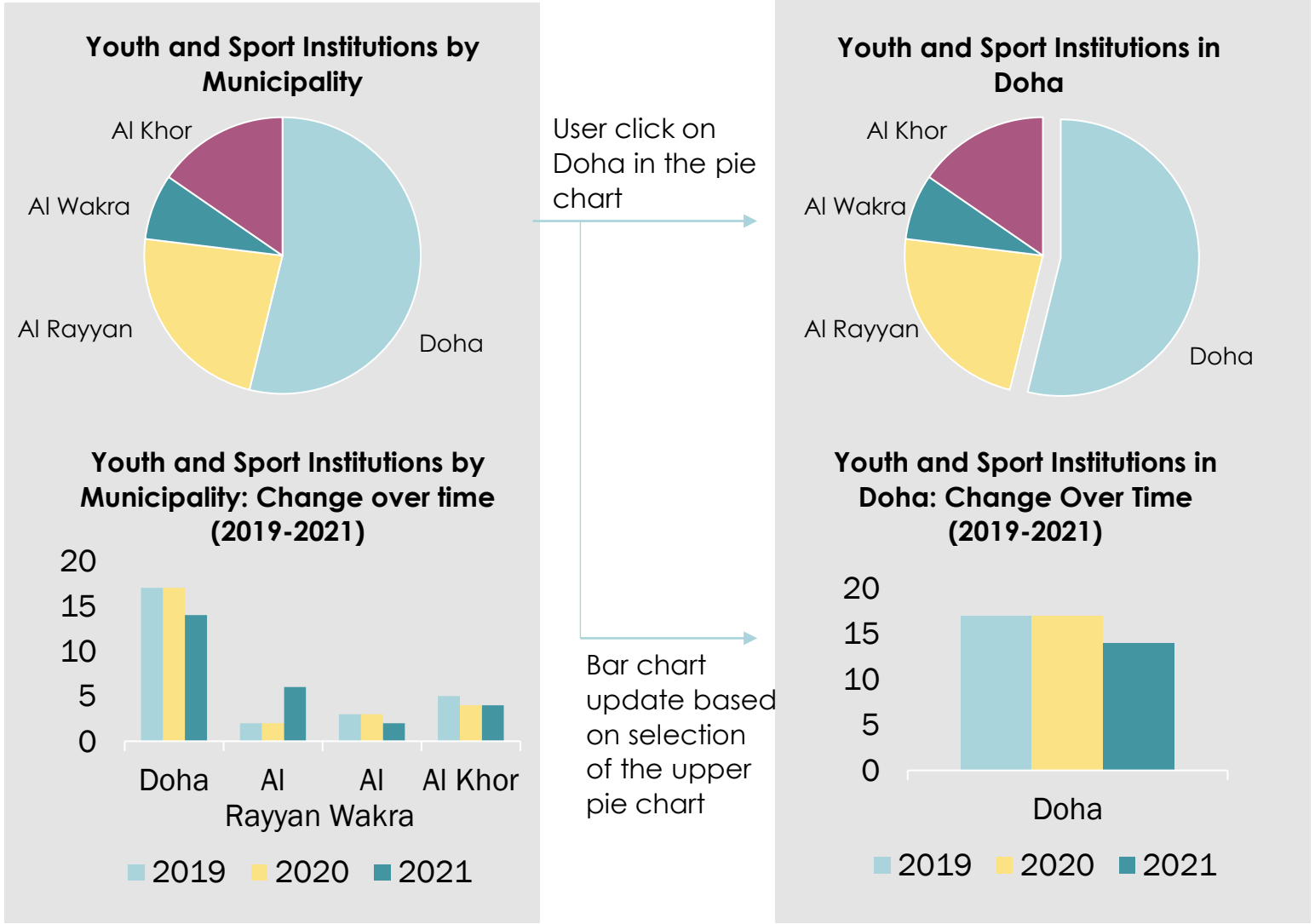


(3)
Interactive Publications

Interactive Publications

- Unlike PDFs, interactive publications are fully functioning web pages allowing data-users to choose which data they want to see and select graphs to visualize the numbers
  - It is type of dashboard known as interactive dashboard

Illustration:



Example Eurostat

Shedding light on energy - 2023 edition - Interactive publications - Eurostat (europa.eu)

eurostat

Shedding light on energy in the EU - 2023 interactive edition

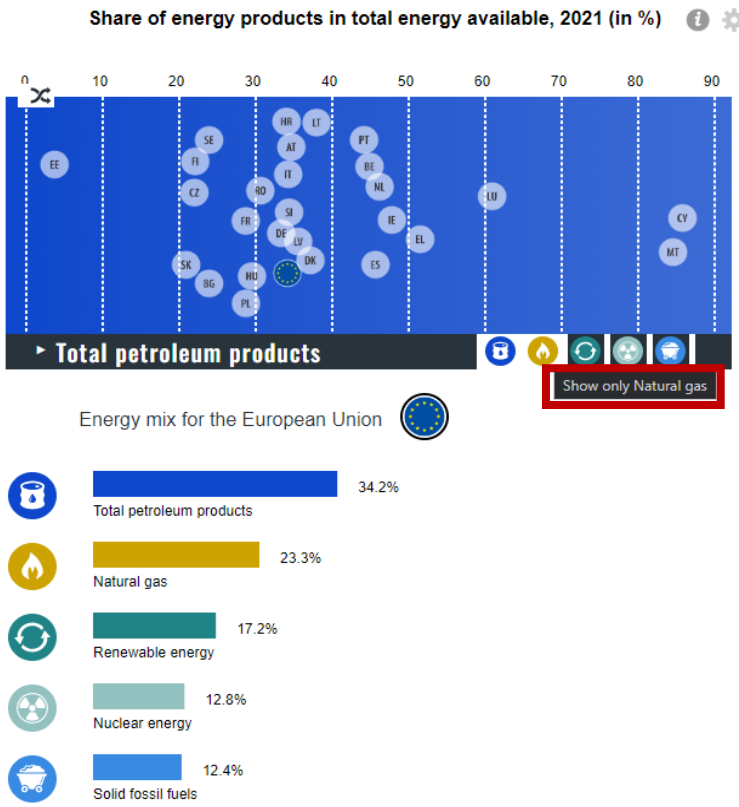
Energy is essential for our day-to-day life. Turning on our computers or starting our cars are actions that we take for granted, yet they represent the final stage of a complex process, from extraction to final consumption. Where does our energy come from? How dependent are we on energy imports? Which kind of energy do we consume in the EU and how much does it cost? Are we efficient in the consumption of energy? How much greenhouse gas do we emit in the EU?

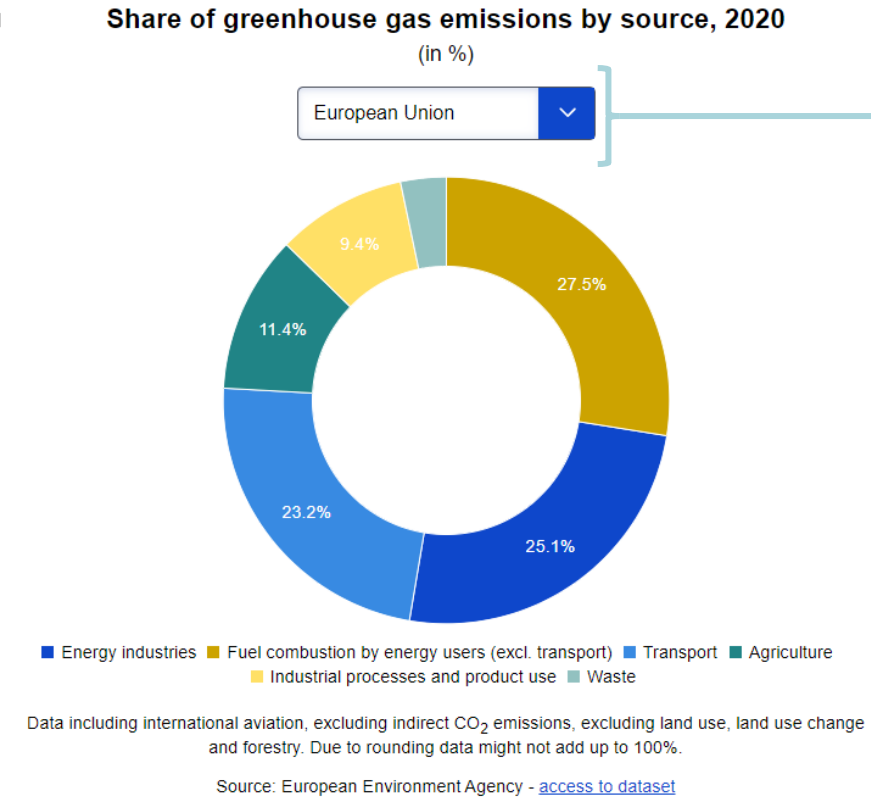
The 2023 edition of the interactive publication 'Shedding light on energy in the EU' provides answers to these questions and many more. The different visualisation tools allow you to explore selected indicators on energy and environment. The publication replies to the needs of those who are not familiar with the energy sector as well as more experienced users.

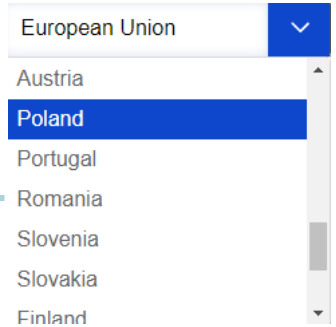
Open the publication

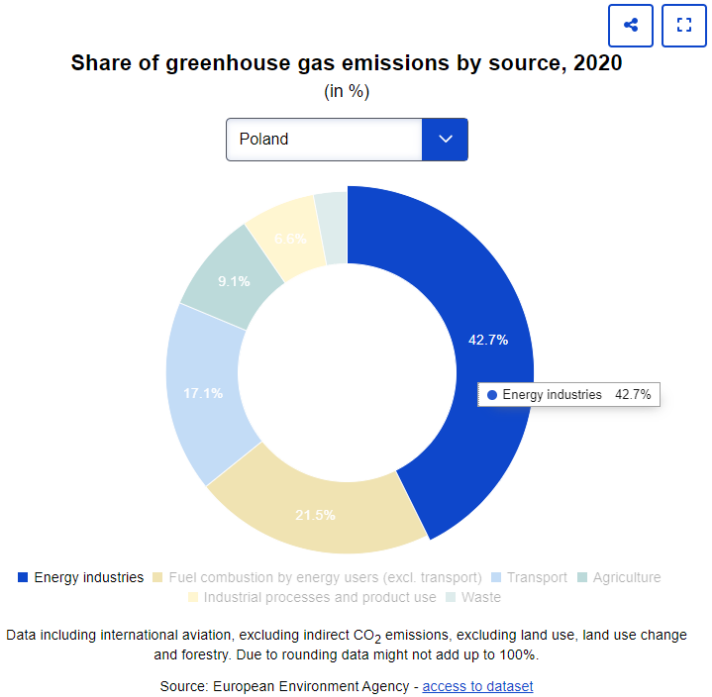
Example Eurostat

[Shedding light on energy - 2023 edition - Interactive publications - Eurostat (europa.eu)]









Example ONS (Office for National Statistics)

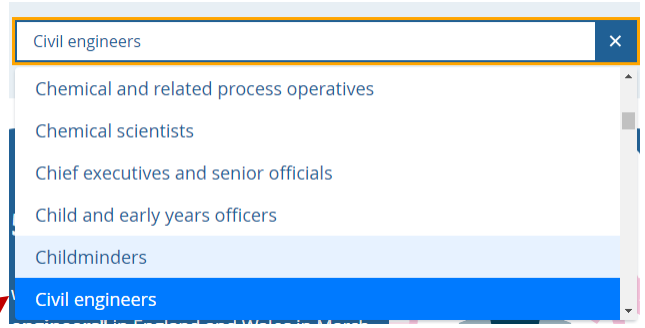
How many people do my job? - Office for National Statistics (ons.gov.uk)

Office for National Statistics

How many people do my job?

Select a job type

Select an occupation...



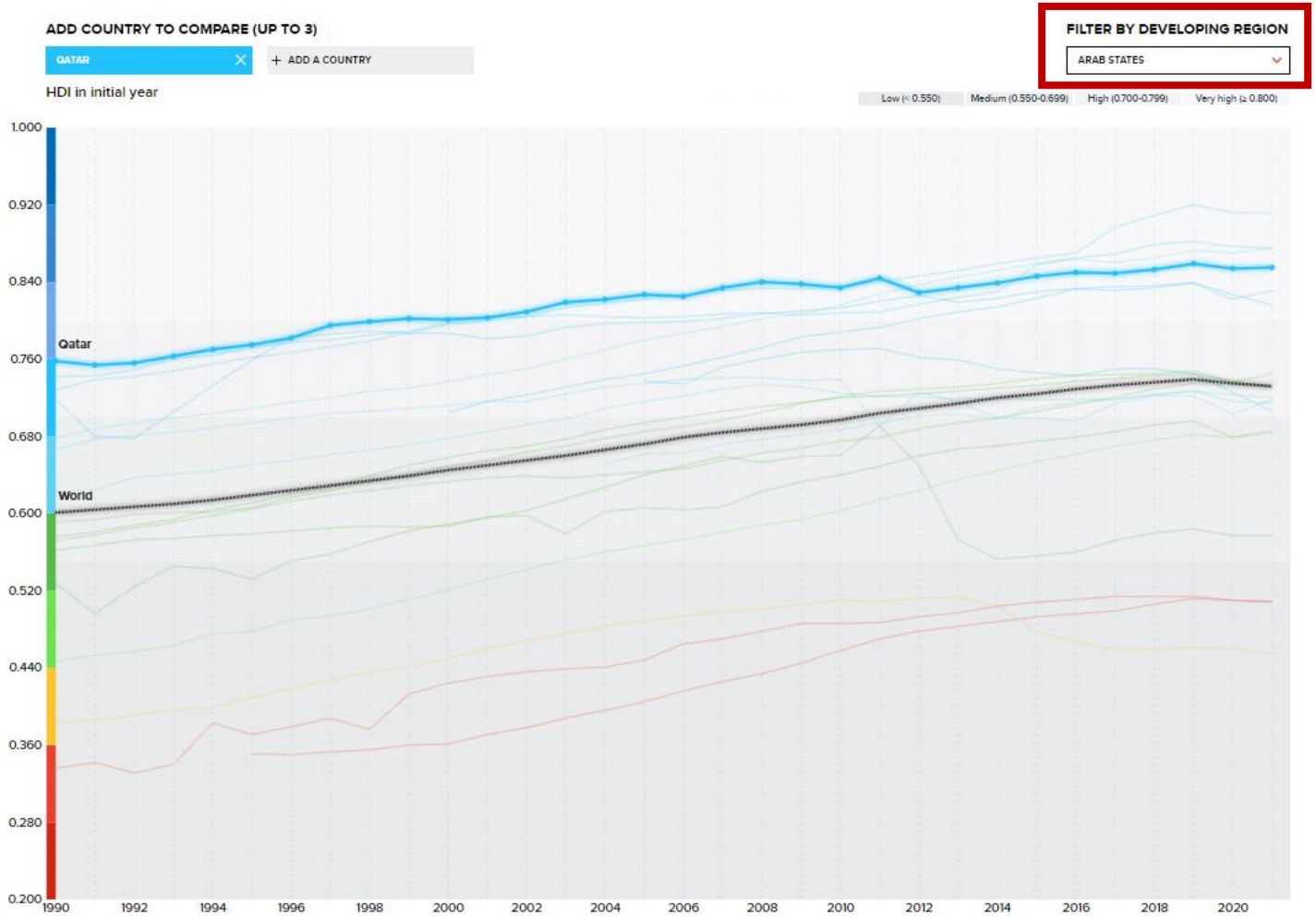
59,930 people

were counted on the census as **"civil engineers"** in England and Wales in March 2021.

Civil engineers undertake research and design, direct construction and manage the operation and maintenance of civil and mining engineering structures.

Example UNDP (Human Development Index)

[Human Development Index | Human Development Reports (undp.org)]



Example UNDP (Human Development Index)

Country Insights | Human Development Reports (undp.org)

Rank	Country	HDI Value	Change from 2020
26	United Arab Emirates	0.911	-0.001
35	Saudi Arabia	0.875	0.005
50	Kuwait	0.831	0.009
91	Algeria	0.745	0.009
97	Tunisia	0.731	-0.006
104	Libya	0.718	0.015
112	Lebanon	0.706	-0.020
123	Morocco	0.683	0.004
171	Djibouti	0.509	-0.001
183	Yemen	0.455	-0.005

Rank	Country	HDI Value	Change from 2020
35	Bahrain	0.875	-0.002
42	Qatar	0.855	0.001
54	Oman	0.816	-0.011
97	Egypt	0.731	-0.003
102	Jordan	0.720	-0.003
106	Palestine, State of	0.715	-0.001
121	Iraq	0.686	0.007
150	Syrian Arab Republic	0.577	0.000
172	Sudan	0.508	-0.002

Example UNDP (Human Development Index)

Human Development Report 2021-22 | Human Development Reports (undp.org)

Replacing the standard PDF report

(4)
Data
Storytelling

Data Storytelling

Data storytelling turns data into actionable insights, it is defined as the ability to effectively communicate insights from data using three important elements: **data, visuals, and narrative** to create engaging and easily understood actionable outcomes.

Example from SDG Today

Storytelling (sdgstoday.org)

ArcGIS StoryMaps

- Data-driven narratives about the SDGs and use StoryMaps to highlight data initiatives, research projects, and apps and technologies that utilize new data sources and innovative methods for sustainable development.

Example from SDG Today SDG 4: Quality Education (cont.)

Storytelling (sdgstoday.org)

SDGs TODAY

Collection

SDG 4: Quality Education

This collection of stories relating to Sustainable Development Goal #4 is featured as part of SDSN SDGs Today's data-driven storytelling initiative. Please visit www.sdgstoday.org for more stories and timely geospatial data on the SDGs.

1 MY SCHOOL TODAY!

2 Mapping Critical Race Theory, Book Bans, and Abortion...

3 Is Education a Necessity for Daerah Pantu Community?

4 An Education That Ends Poverty

5 Sexuality Education Legislation and Policy

6 Public Education in the United States of America

Example from SDG Today SDG 3: Good Health and Well-being (cont.)

Storytelling (sdgstoday.org)

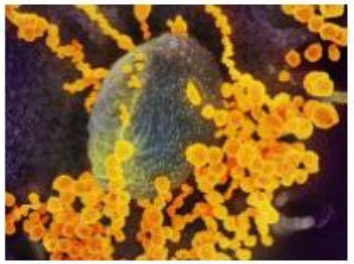
SDGs TODAY

Collection

SDG 3: Good Health and Well-being

This collection of stories relating to Sustainable Development Goal #3 is featured as part of SDSN SDGs Today's data-driven storytelling initiative. Please visit www.sdgstoday.org for more stories and timely geospatial data on the SDGs.

Get started



1 Mapping the spread of COVID-19

2 Sexuality Education Legislation and Policy

3 Working with a blindfold

4 Space, shelter and scarce resources - coping with...

5 Richmond Community Advocates: Heartbeat of Our...

6 Transforming lives: Ascend West and Central Africa

7 Call to Action: End environmental racism now

8 Women's Access to Health Services in Ghana

(5)
Geographical Presentation

Geographical Presentation

Map visualization

- Geographical presentation visualizes data on a map, showing spatial patterns and trends. It utilizes geographic references to convey information effectively, aiding analysis and decision-making based on location-specific data

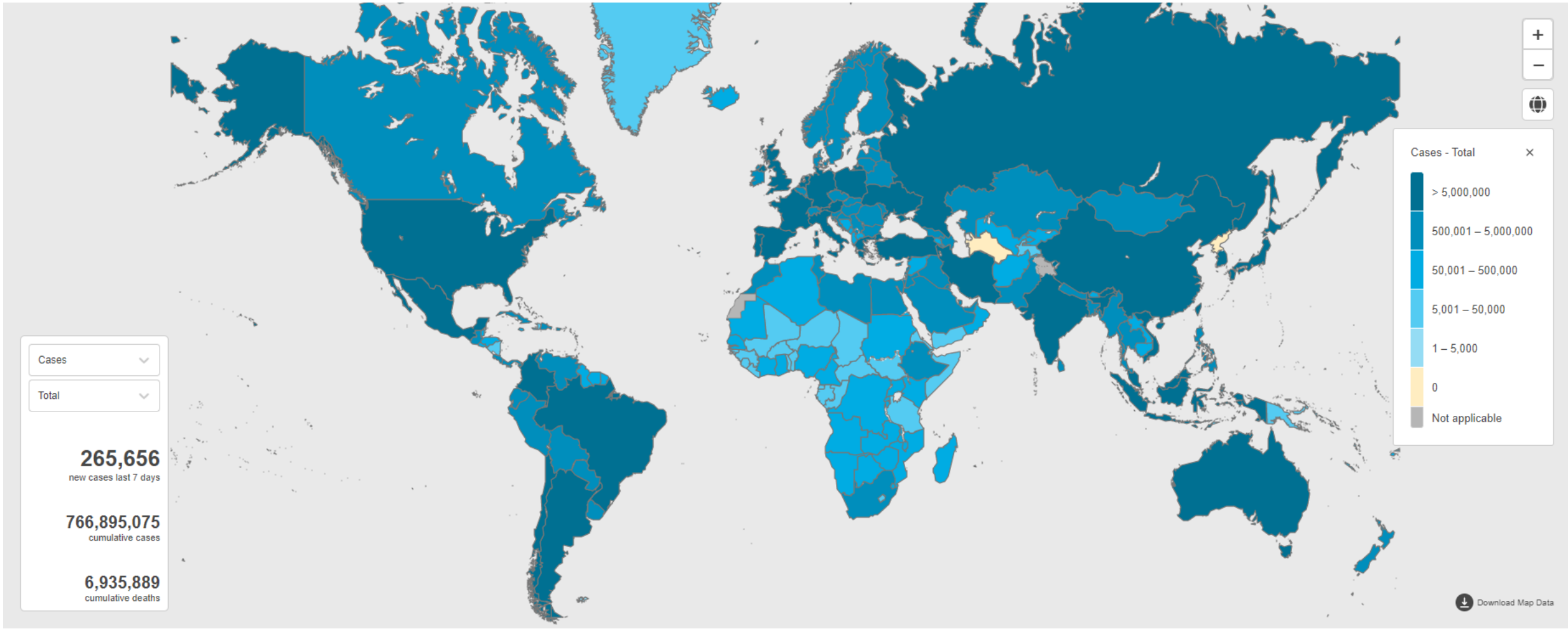
Guide on Geospatial Data Integration in Official Statistics

- PARIS21 publication provides a practical guide, based on five principles for national statistics offices to form stronger partnerships with national geospatial integration agencies

Geospatial_Data_Integration_in_Official_Statistics_0.pdf (paris21.org)

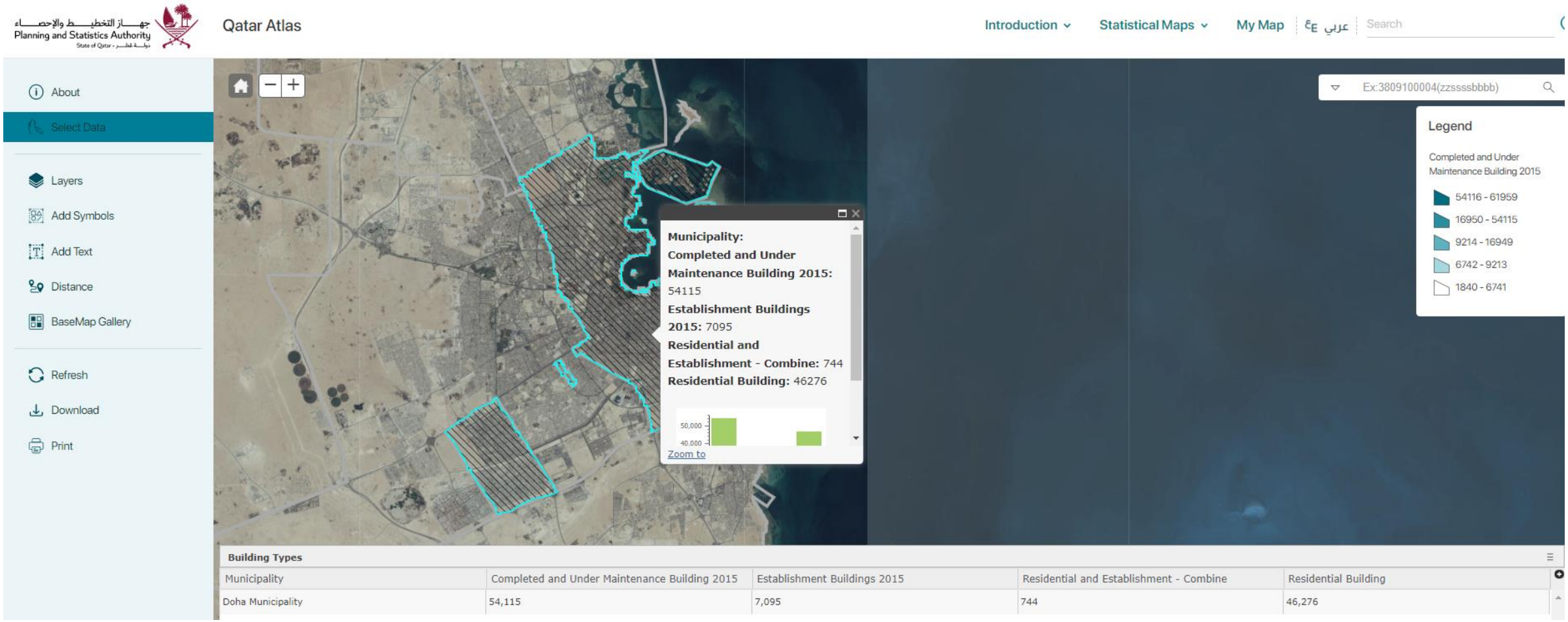
Example from World Health Organization (WHO)

WHO Coronavirus (COVID-19) Dashboard | WHO Coronavirus (COVID-19) Dashboard With Vaccination Data



Example from PSA (Qatar Atlas)

Qatar Atlas - Planning and Statistics Authority (psa.gov.qa)



(6)
Podcast

Podcast

- A podcast is a type of **digital media**, **usually audio**, that is available in a series of episodes or parts and is streamed or downloaded by the end user over the Internet.
- **Storytelling in podcasting** is an essential skill that allows us to capture attention and engage with listeners

ONS Podcast

ESCWA Podcast

Qatar University Podcast
(Research Wednesday Series)

جامعة قطر
QATAR UNIVERSITY

OFFICE OF VP FOR
RESEARCH & GRADUATE STUDIES

Al Jazeera Podcast

SDG & COVID-19 Data Visualization Toolkit

The SDG & COVID-19 Data Visualization Toolkit, developed as part of the UNSD-FCDO Project on SDG Monitoring, aims to support countries in data storytelling through infographics, reports, online platforms, presentations, promotion materials and social media.

SDG & COVID-19 DATA VISUALIZATION TOOLKIT (un.org)

SDG & COVID-19 Data Visualization Toolkit

COVID -19 ICONS

&

ICONS

SDG & COVID-19 DATA VISUALIZATION TOOLKIT (un.org)

Call for Action

Implementing data visualization in various domains of the above-mentioned framework will enable Planning and Statistics Authority (PSA) and various line ministries and concerned institutions to better:

- Decision-making
- Measurement
- Monitoring
- Reporting

Workshop Partners

Recourses

1. Jonathan Gray. Liliana Bounegru (2012) The Data Journalism Handbook2. Towards a Critical Data Practice. European Journalism Centre
2. Chun-houh Chen. Wolfgang Härdle. Antony Unwin (2008). Handbook of Data Visualization. Springer
3. Corentin Burnay1 · Fatima Dargam2 · Pascale Zarate3 (2019) Special issue: Data visualization for decision-making: an important issue© Springer-Verlag GmbH Germany, part of Springer Nature 2019.
4. Sarikaya, A., Correll, M., Bartram, L., Tory, M., & Fisher, D. (2018). What do we talk about when we talk about dashboards?. IEEE transactions on visualization and computer graphics, 25(1), 682-692.
5. UNECE (2011) Making Data Meaningful. Part 3. A guide to communicating with media.
6. European Union. Interact. Project Management Handbook. Chapter 3.
7. UN ECE (2005) Making Data Meaningful: a guide to writing stories about numbers
8. Statistical Commission of the United Nations (2022) SDGs Geospatial Road. 53 sessions. Background document
9. Paris21 (2021) Guide on Geospatial Data Integration in Official Statistics, https://paris21.org/geospatial
10. Eddy Borges-Rey (2016) Unravelling Data Journalism, Journalism Practice, 10:7, 833-843, DOI: 10.1080/17512786.2016.1159921
11. Borges-Rey, E. L. (2017). Data literacy and citizenship: understanding 'big Data'to boost teaching and learning in science and mathematics. In Handbook of research on driving STEM learning with educational technologies (pp. 65-79). IGI Global.

Thank you

We look forward to working together.

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