



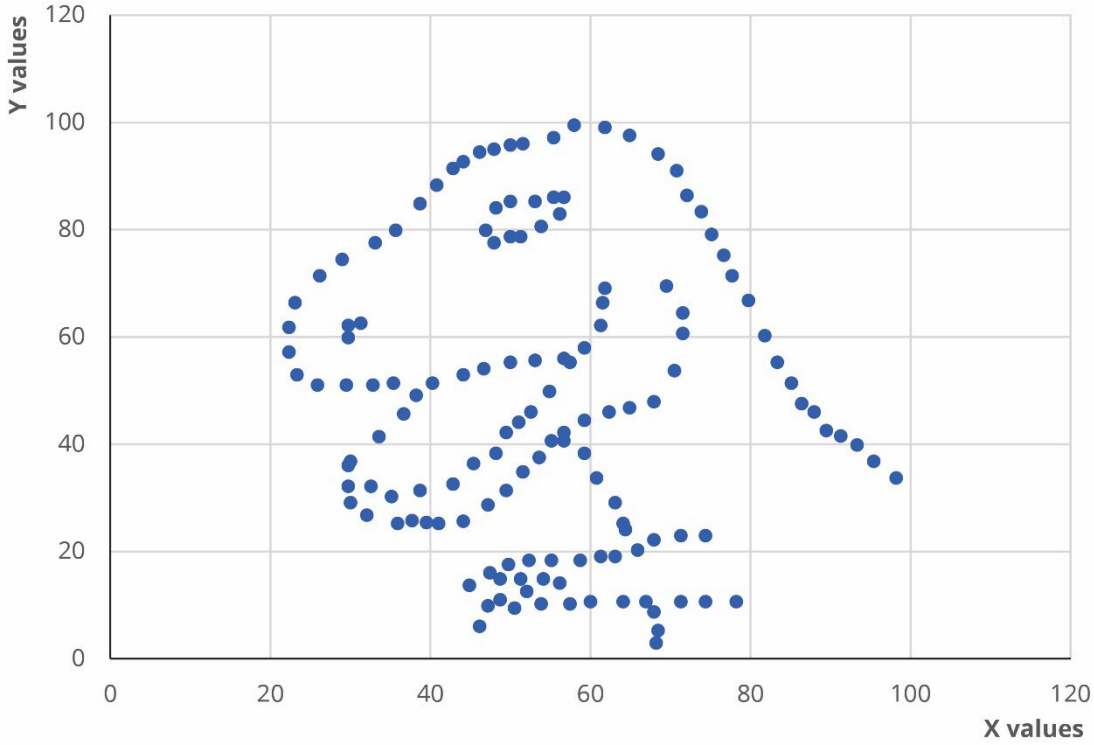
Powerful charts

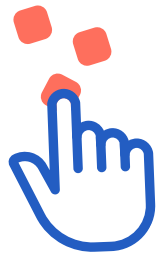
An introduction to data visualization

Koen Van den Eeckhout - Baryon

X	Y
55.3846	97.1795
51.5385	95.0256
46.1538	94.4872
42.8205	91.4103
40.7692	88.3333
38.7179	84.8718
35.6410	79.8718
33.0769	77.5641
28.9744	74.4872
26.1538	71.4103
23.0769	66.4103
22.3077	61.7949
22.3077	57.1795
23.3333	52.9487
25.8974	51.0256
29.4872	51.0256
32.8205	51.0256
35.3846	51.4103
40.2564	51.4103
44.1026	52.9487
46.6667	54.1026
...	...

X Mean: 54.26
Y Mean: 47.83
X SD : 16.76
Y SD : 26.93
Corr. : -0.06





All the slides and all the links:

baryon.be/dataviz-resources



Introductions

2004 - 09

Engineering physics (Ghent University)

2009 - 13

PhD in physics (Ghent University)

2013 - 18

Post-doctoral researcher (Ghent University)

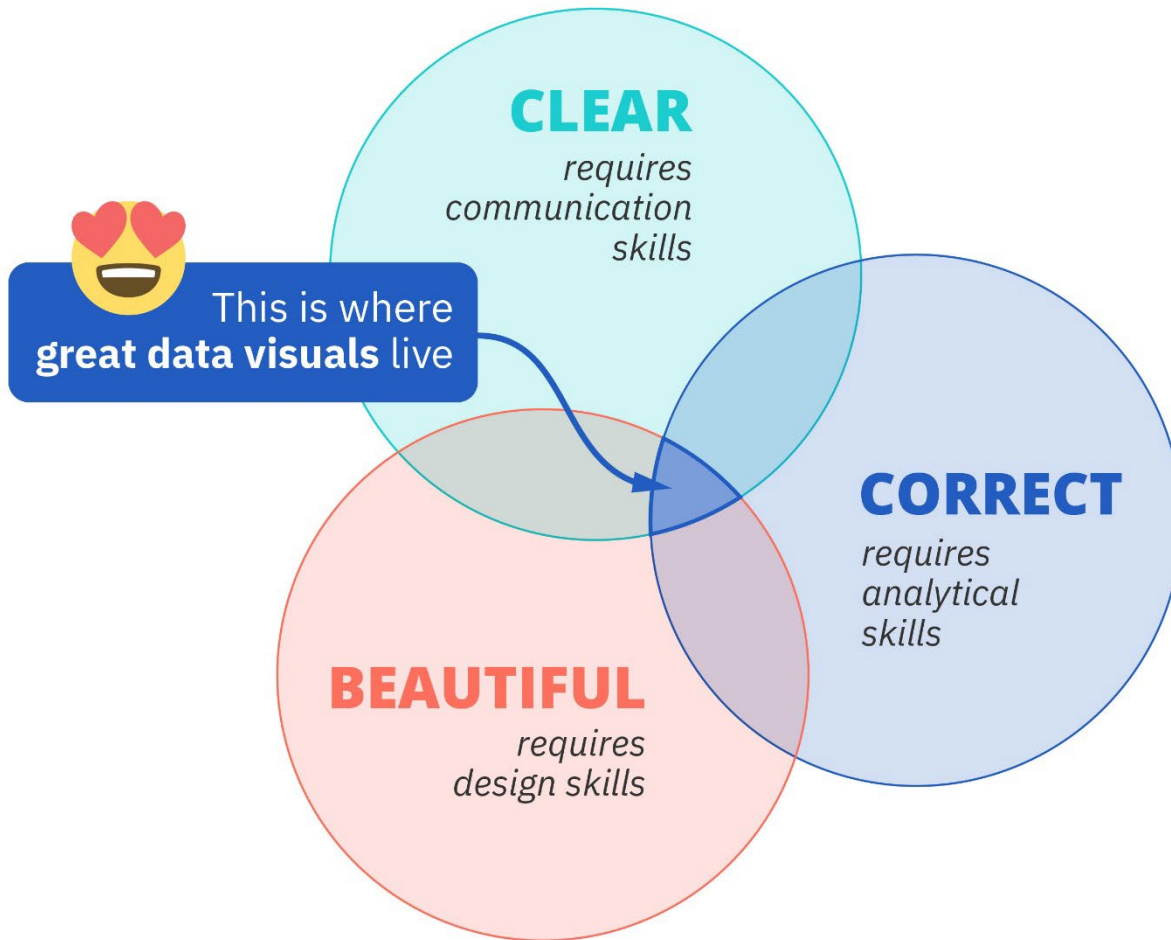
Grants & incentives consultant (EY)

Founded **Baryon**

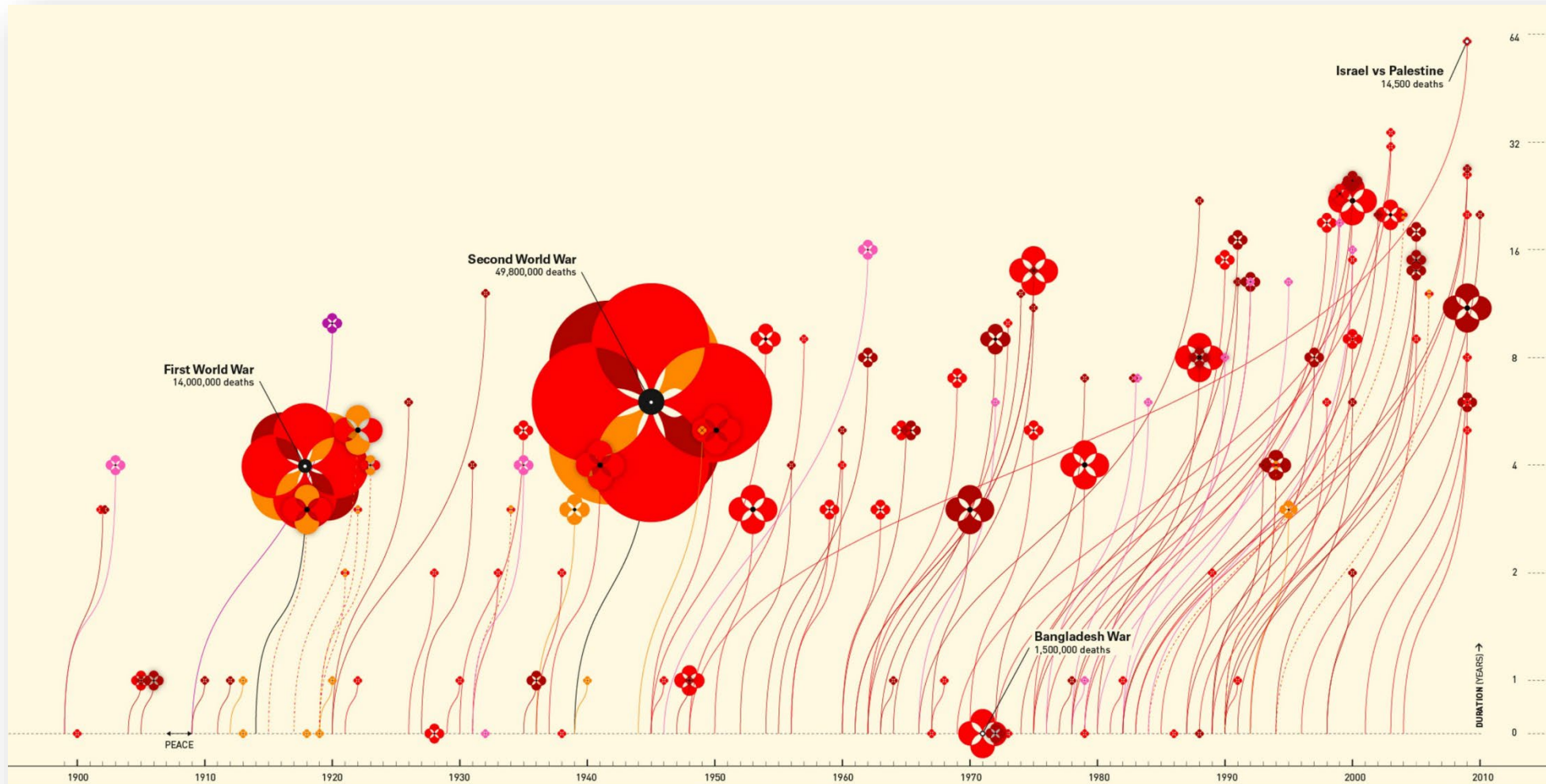
2019 - now

Expanding Baryon as an
information design agency

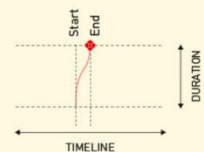
Koen Van den Eeckhout | koen@baryon.be



complicated
data art



POPPY DIAGRAM



The remembrance poppy commemorates soldiers who have died in war. Each poppy in the diagram depicts a war of the last century (with more than 10,000 deaths). The stem grows from the year when the war started. The poppy flowers in the year the war ended. Its size shows the number of deaths.

NUMBER OF DEATHS IN THOUSANDS (POPPY'S SIZE)



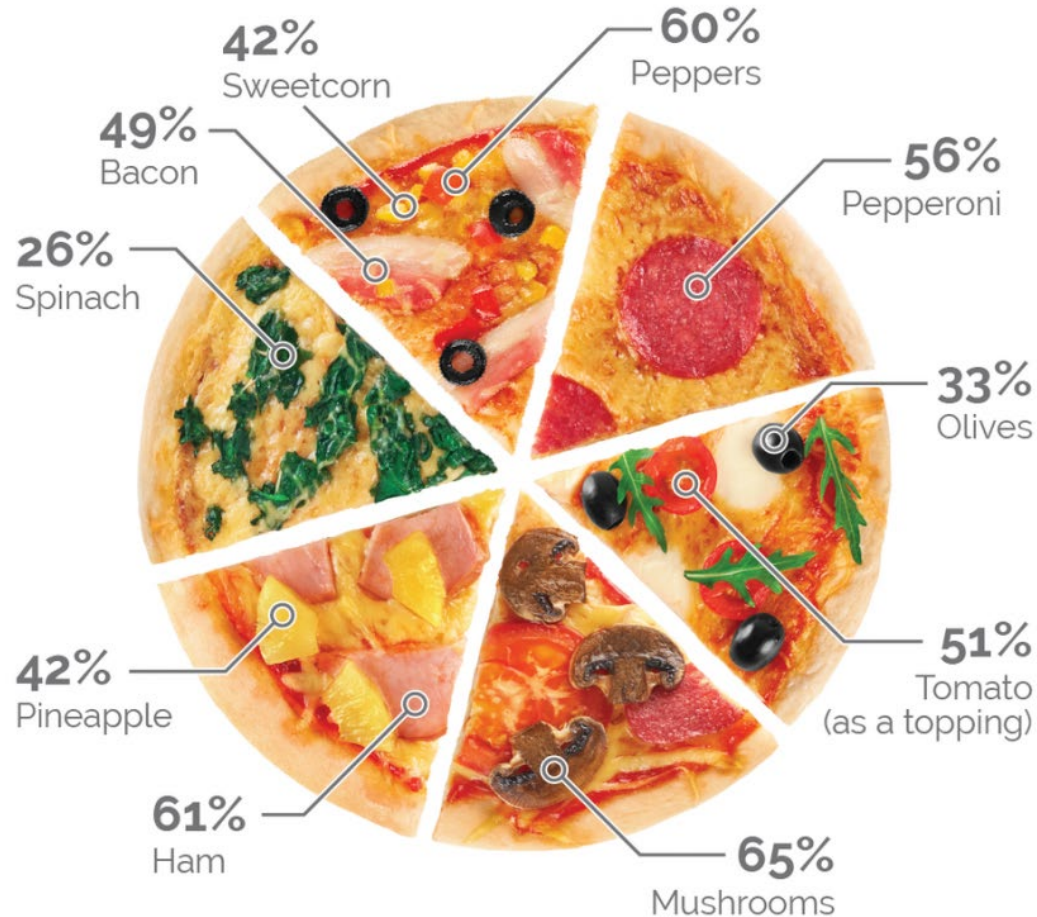
REGIONS INVOLVED IN WARS (POPPY'S COLOUR)



clear
correct
beautiful

Mushroom is the UK's most liked pizza topping

Generally speaking, which of the following toppings do you like on a pizza? Select as many as you like



Other items not depicted include: onions (62%), chicken (56%), beef (36%), chillies (31%), jalapeños (30%), pork (25%), tuna (22%), anchovies (18%). 2% of people say they only like Margherita pizzas

**misleading
charts**

clear

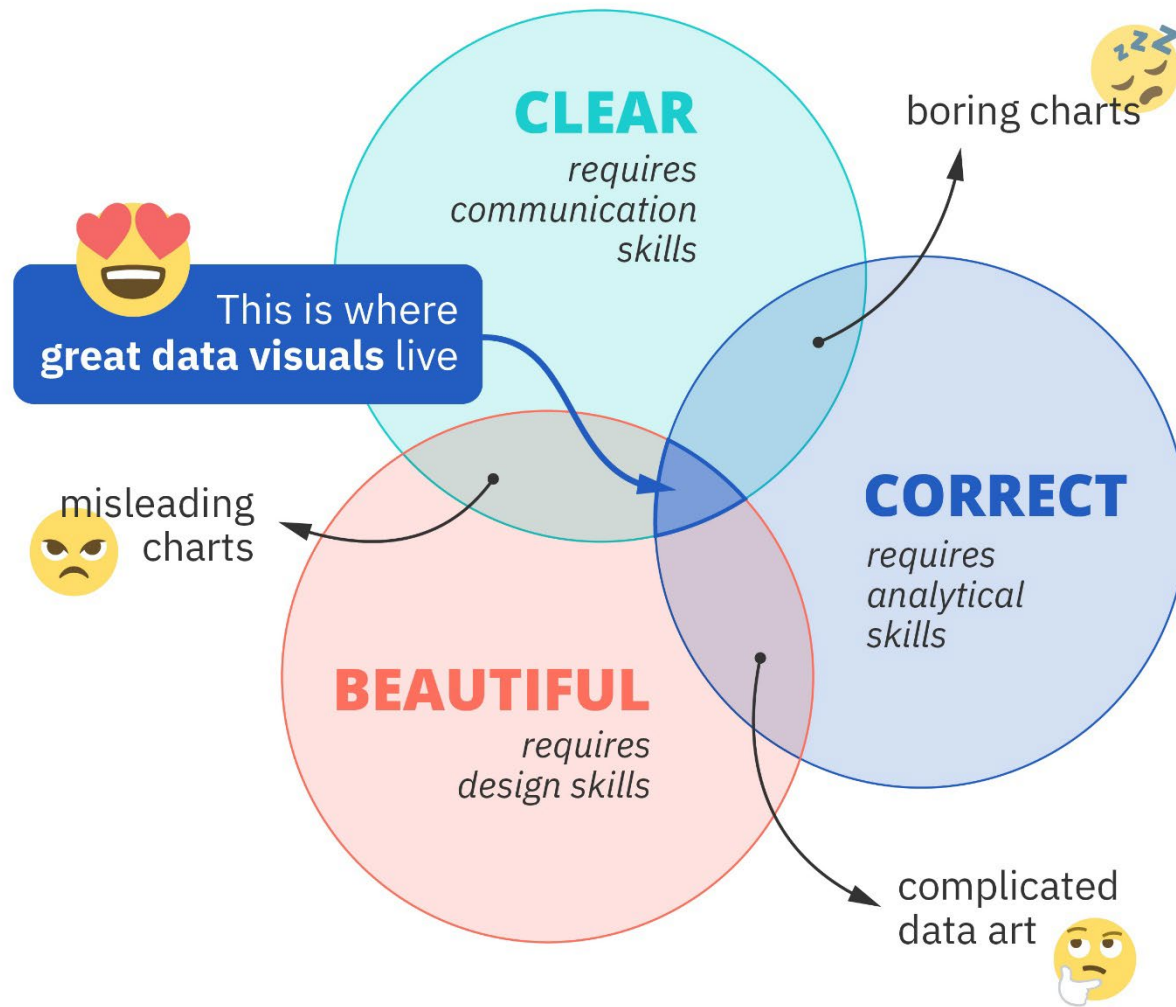
correct

beautiful



boring
charts

clear
correct
beautiful



What is a good data visualization?

Group exercise

Each group receives **a set of data visuals to discuss.**

As a group, choose your **most favorite** and **least favorite data visual** and explain why.





5 ways to tell a story

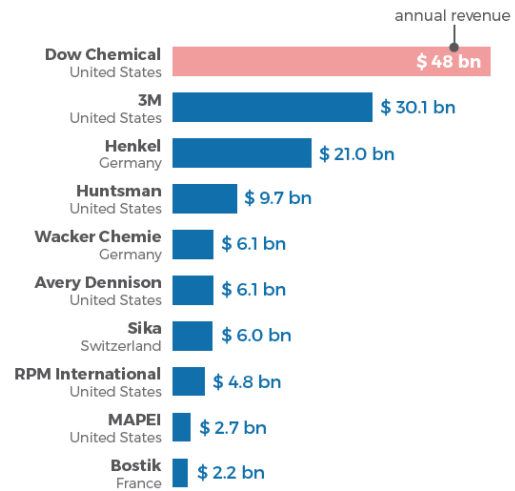
Choose the right chart

Less is more

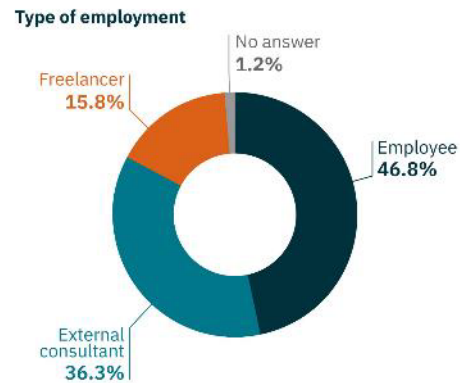
Use color in a clever way

Add helpful annotations

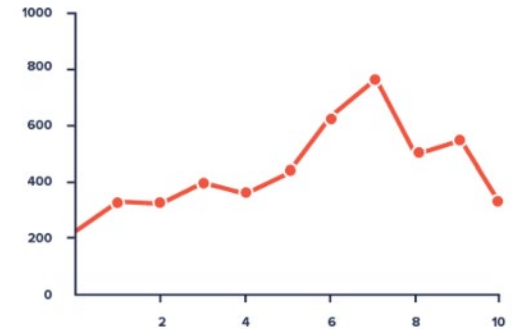
Break the rules



Bar charts
Comparisons



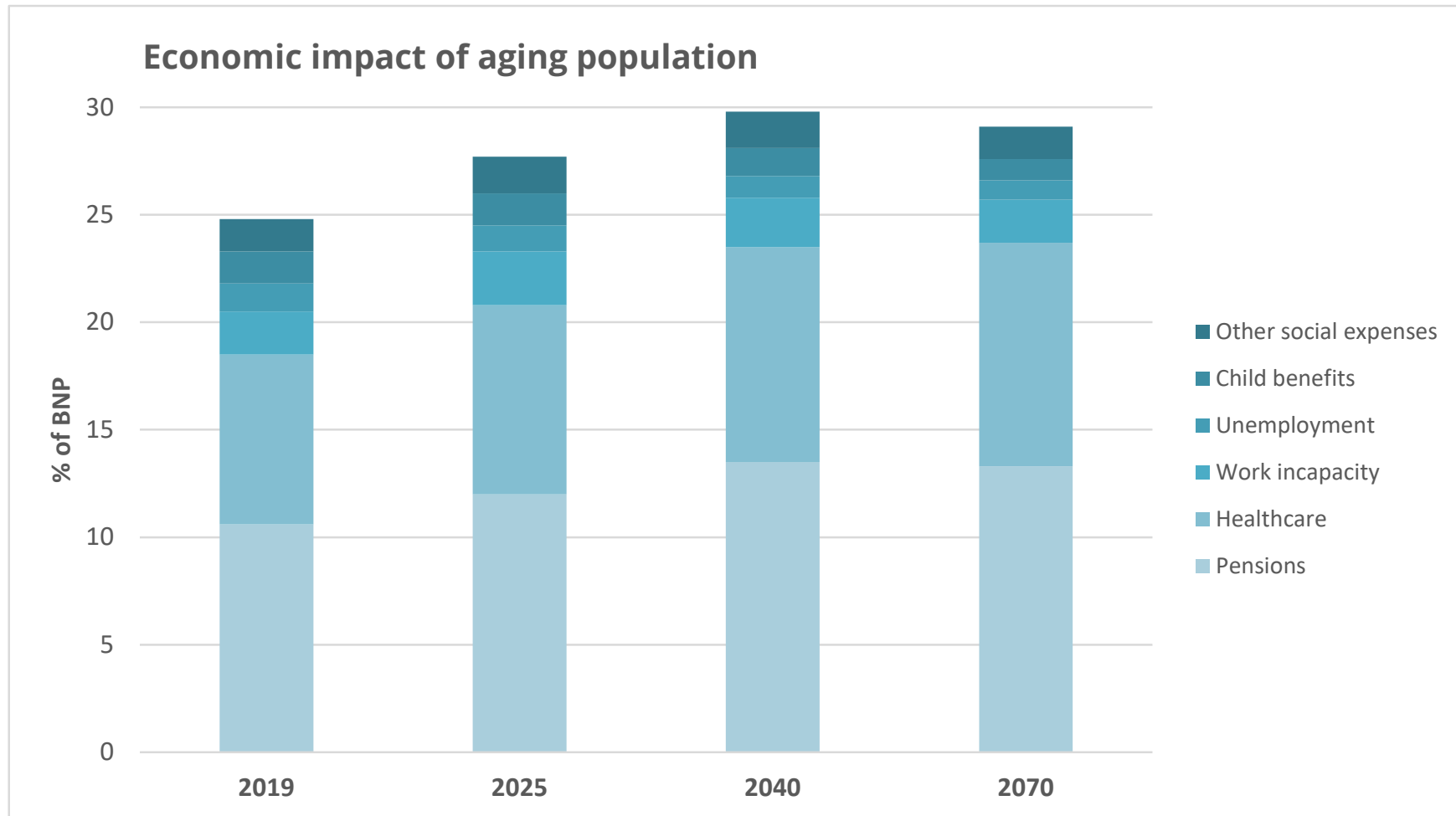
Pie charts
Part-to-whole
comparisons



Line charts
Evolutions

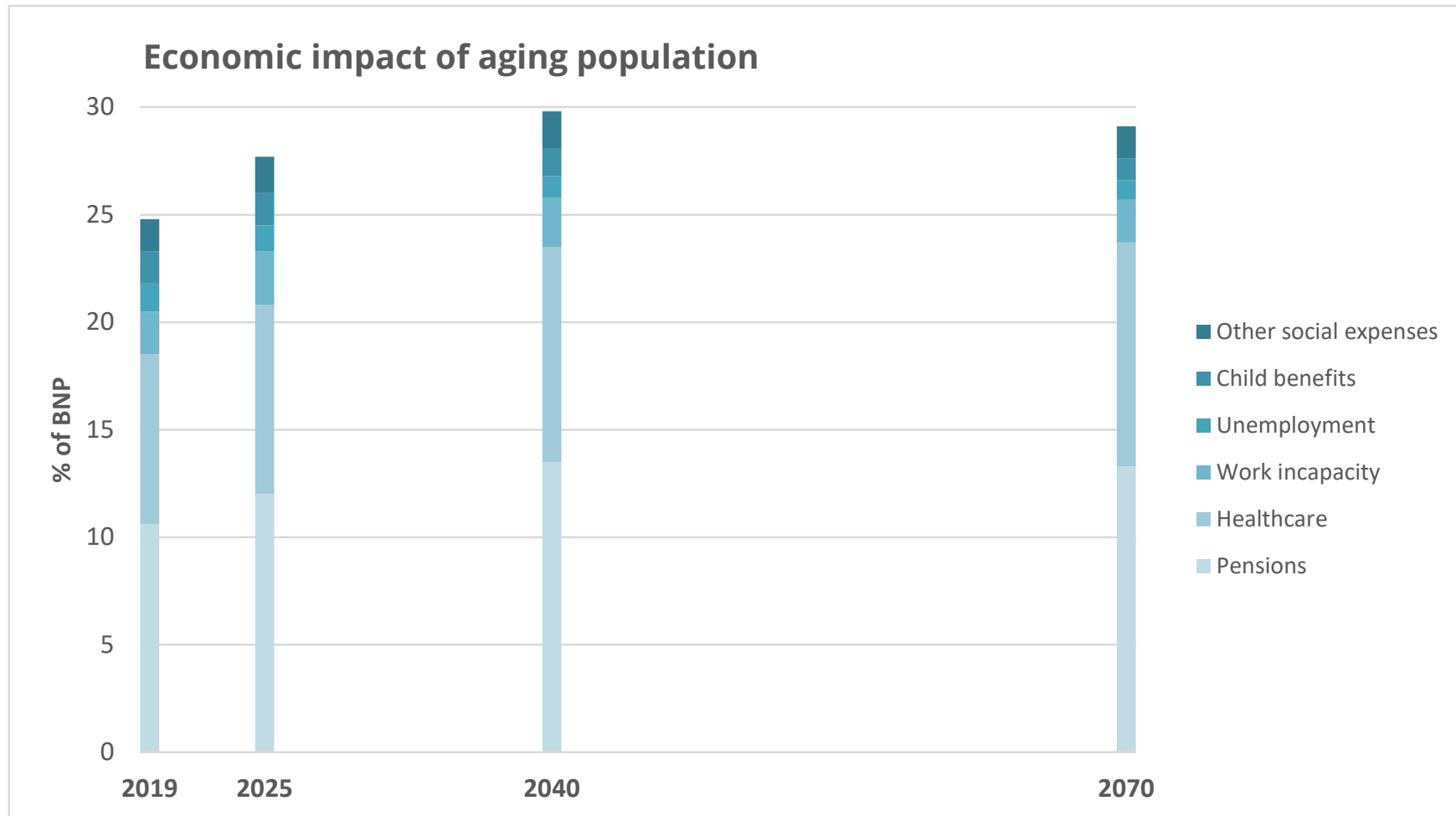
Pitfall

Equidistant labels for non-equidistant data



Pitfall

Equidistant labels for non-equidistant data

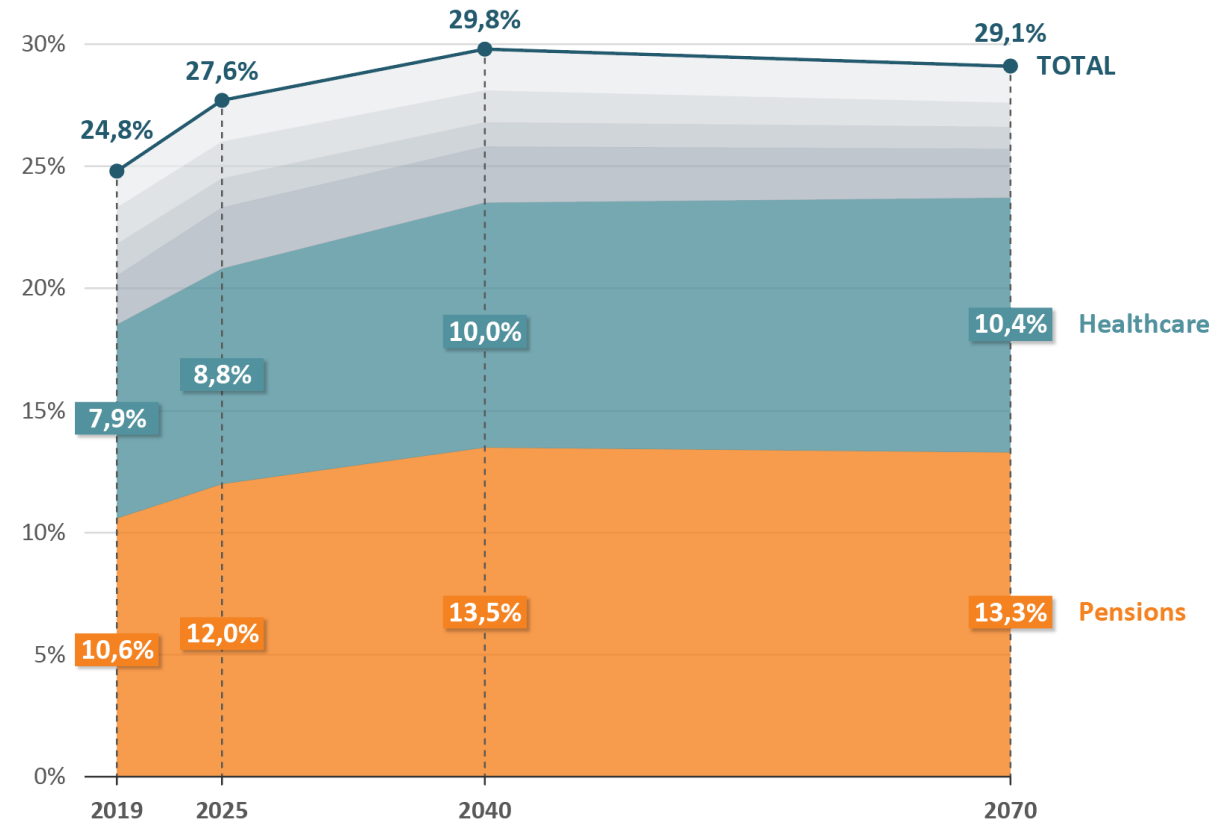


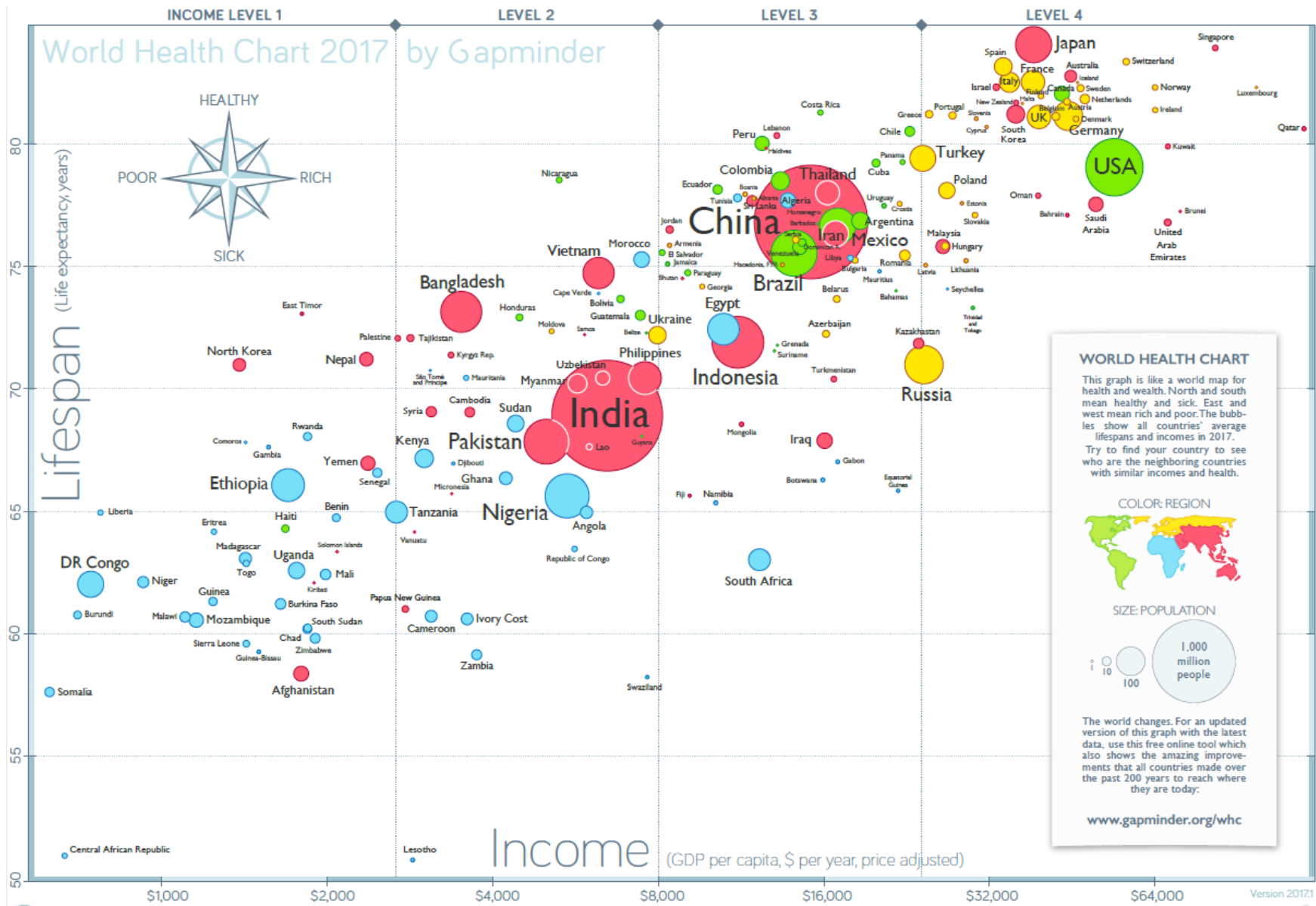
Alternative solution

Use a line or area chart

Economic impact of aging population in Belgium

SCvV reference scenario, July 2020
in % of bnp

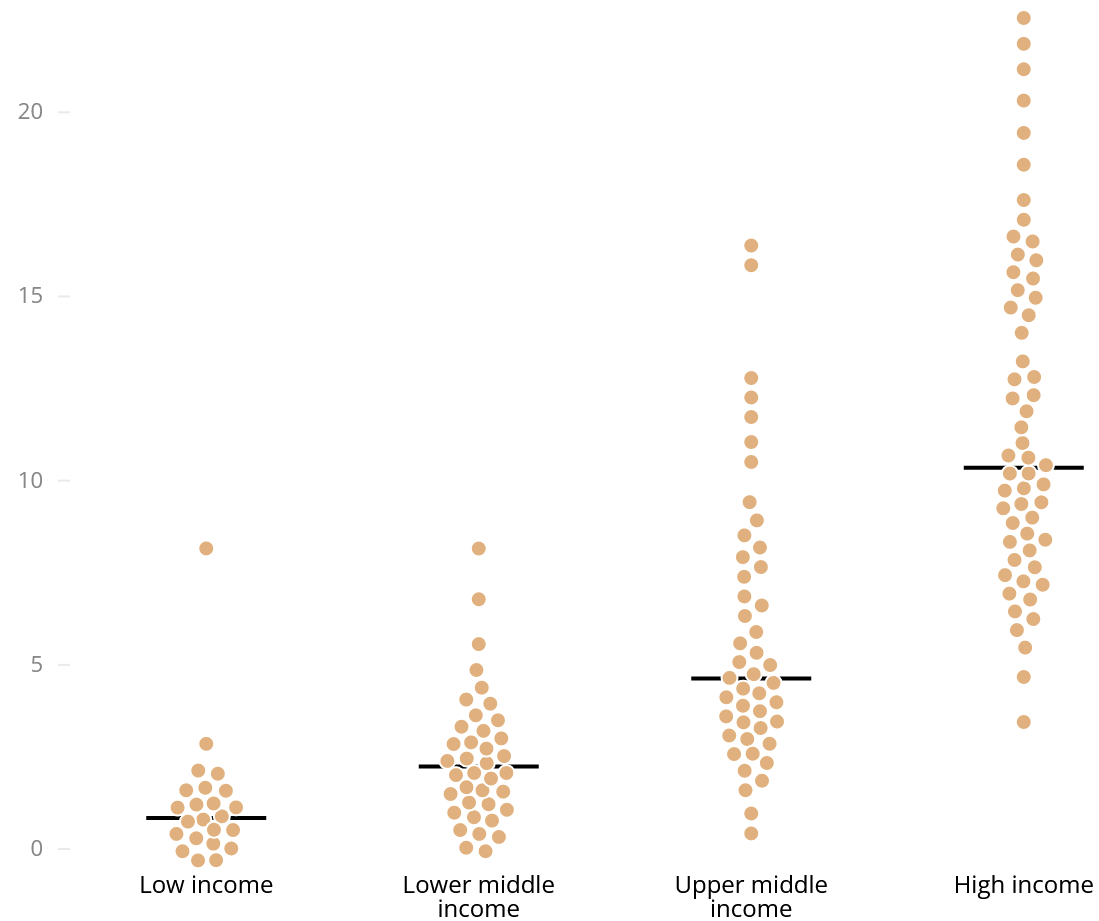




SOURCES—INCOME: World Bank's GDP per capita, PPP (2011 international \$) extended from 2016 with IMF's projections. Syria was estimated by Gapminder. X-axis uses log-scale to make a doubling income show same distance on all levels. — POPULATION: Data from UN World Population Prospects 2017. — LIFE EXPECTANCY: Based on IHME GBD-2017, extended one year by Gapminder. MORE INFO AT: www.gapminder.org/whc. LICENSE: Our charts are freely available under Creative Commons Attribution License. Please copy, share, modify, integrate and sell them as you like, as long as you mention: "Based on a free chart from www.gapminder.org".

**Bubble
chart**

Nurses and physicians per 1,000 people



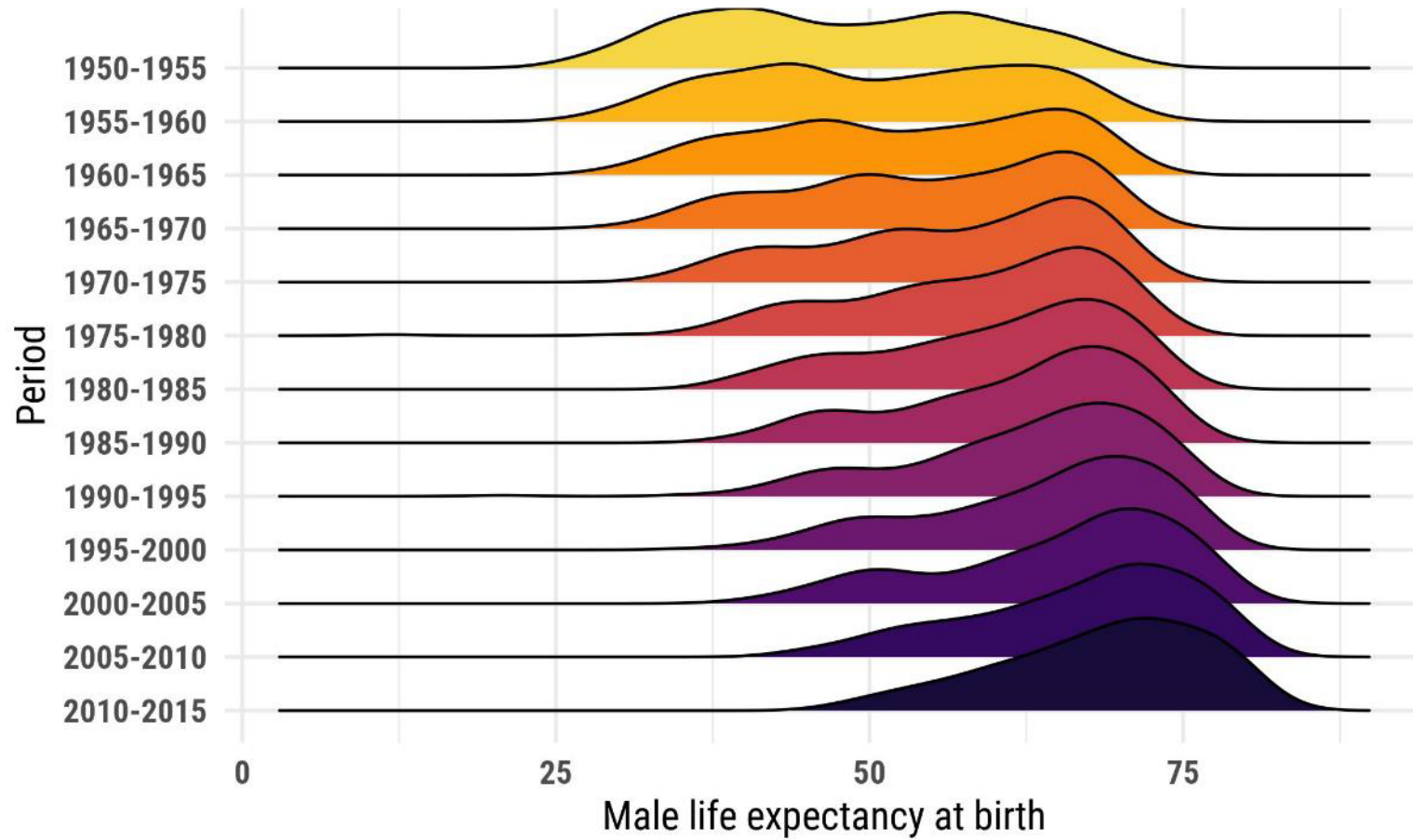
Note: Most recent value available; "Nurses" refers to nurses and midwives

Source: [World Development Indicators](#), [World Health Organization](#)

Beeswarm
plot

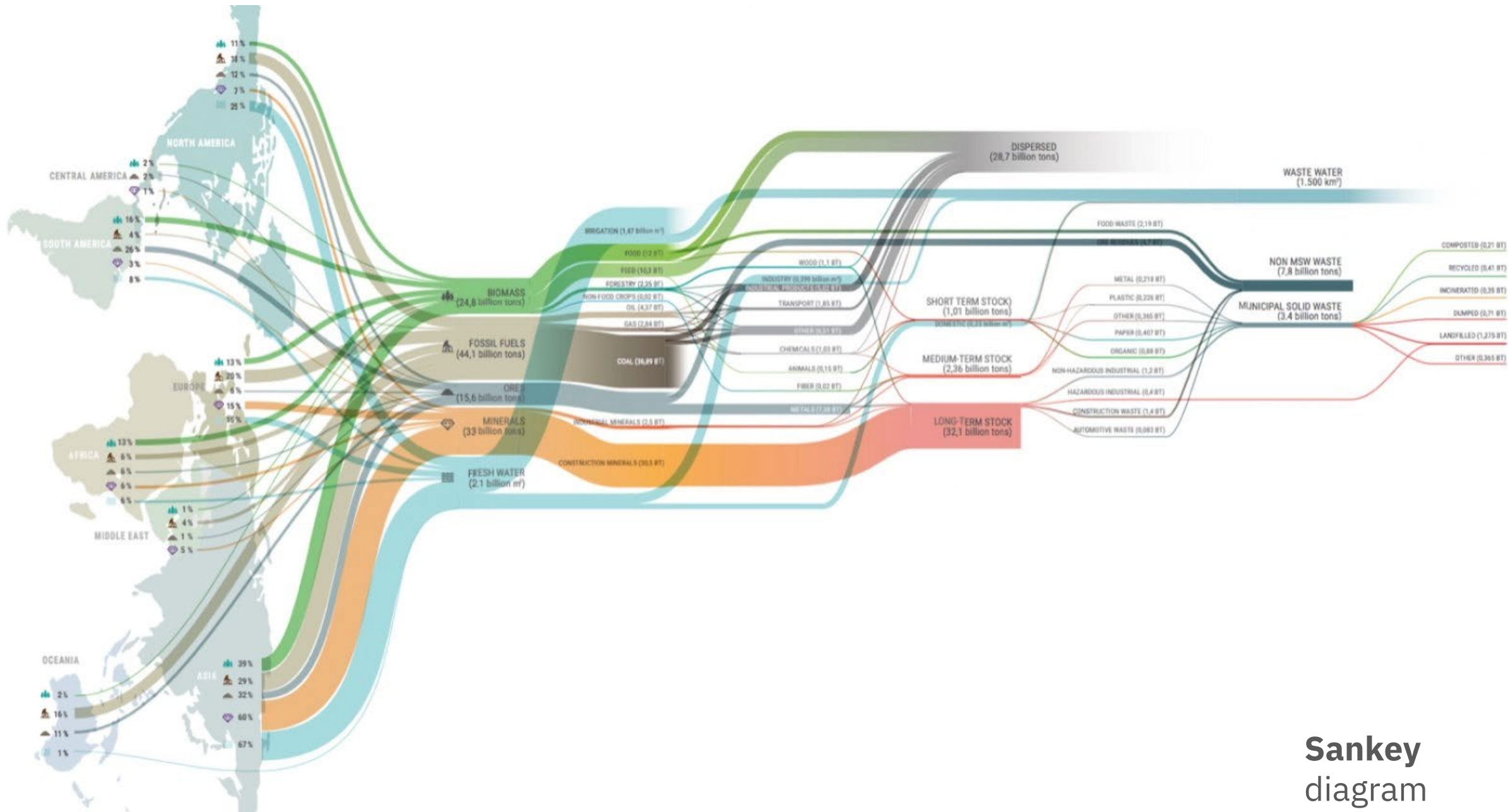
Global convergence in male life expectancy at birth since 1950

UNPD World Population Prospects 2015 Revision, via wpp2015



@ikashnitsky

Ridgeline
plot



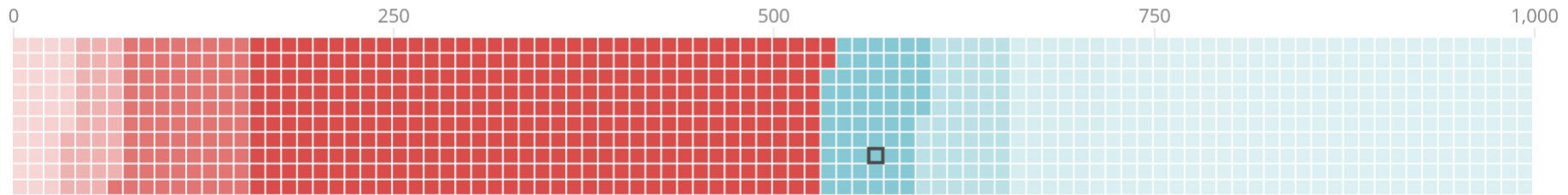
Sankey diagram

Guinea

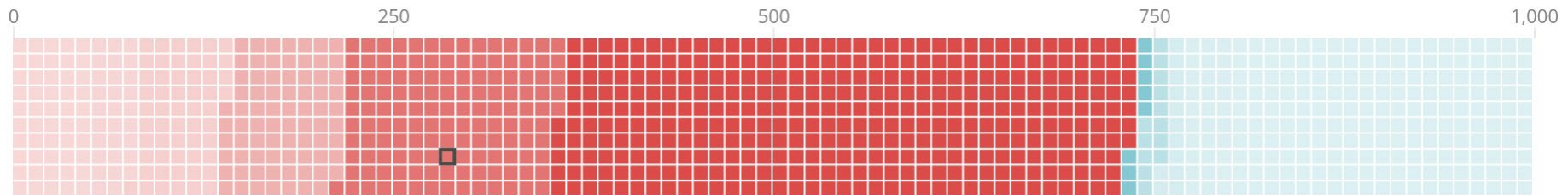
- Household answered "Yes"
- Household answered "No"

Probability of food insecurity
Low High

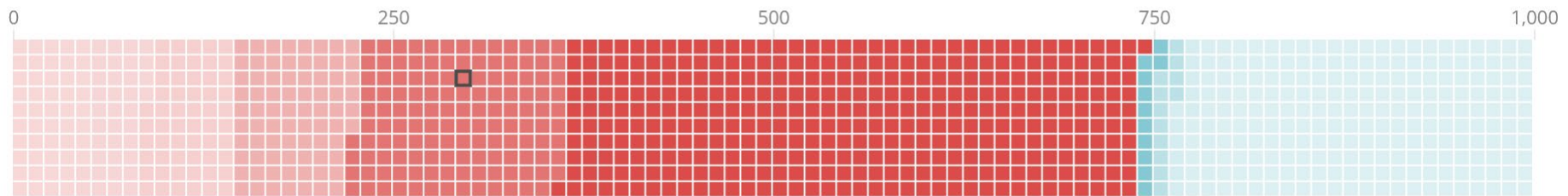
You went without eating for a whole day?



You ate less than you thought you should?



You were worried you would not have enough food to eat?

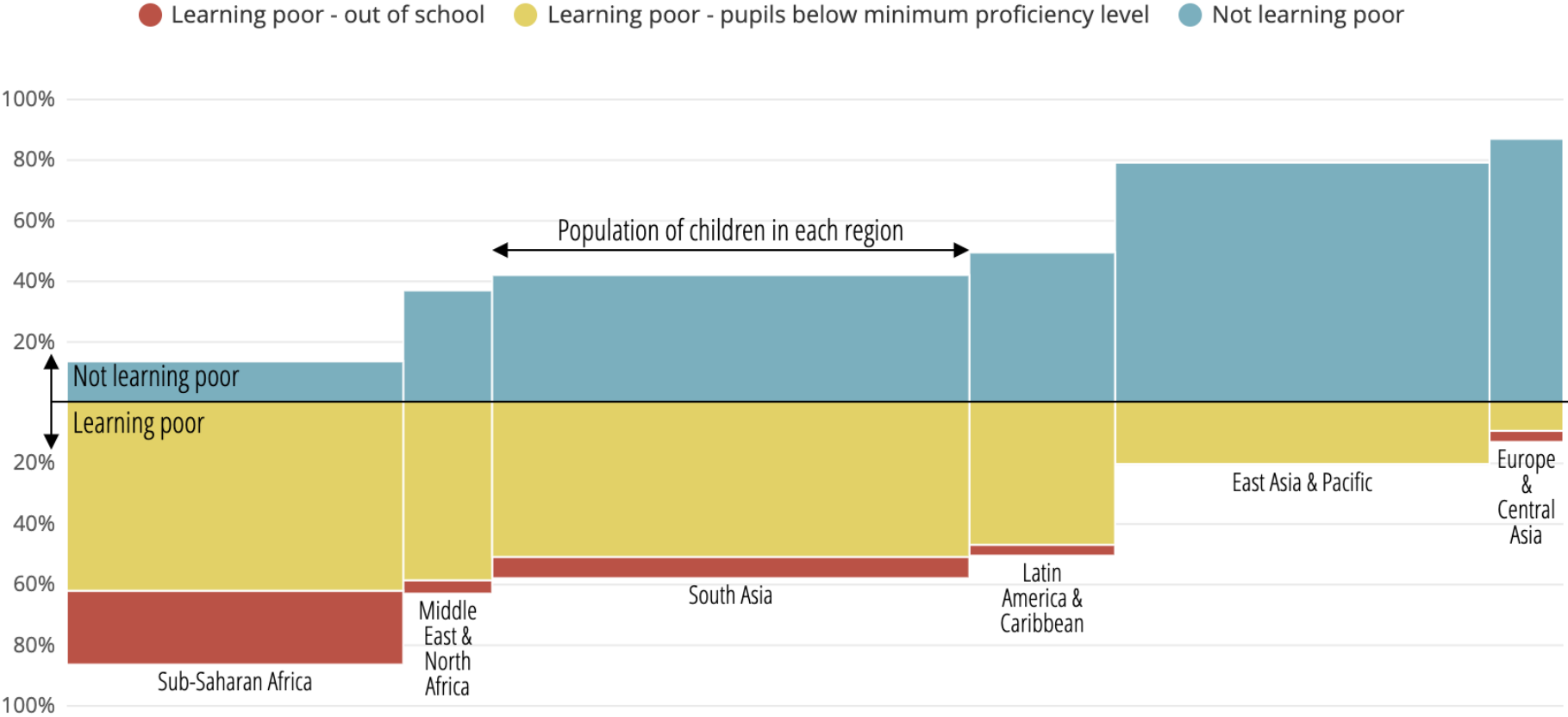


Note: The data is displayed for the most recent survey year (2017-2018).

Source: [Food Insecurity Experience Scale](#), Food and Agriculture Organization (FAO)

Waffle
chart

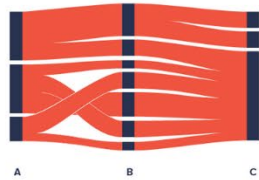
Learning poverty in low- and middle-income countries varies by region



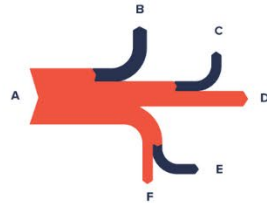
Source: World Bank. 2019. [Ending Learning Poverty : What Will It Take?](#) Washington, DC.

‘Shifted’
Marimekko
 chart

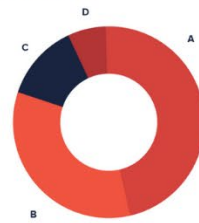
Alluvial Diagram



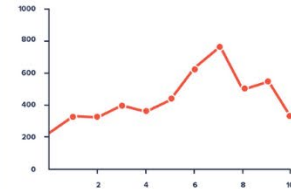
Sankey Diagram



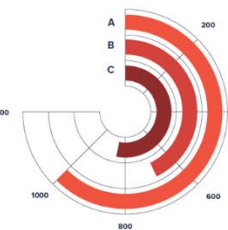
Donut Chart



Line Graph



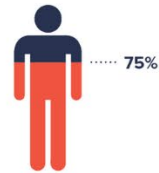
Radial Bar Chart



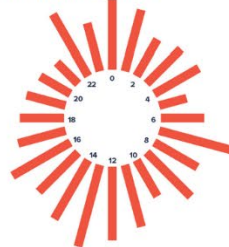
Polar Area Chart



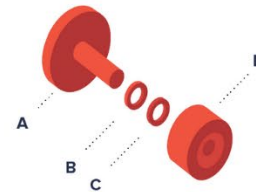
Pictorial Fraction Chart



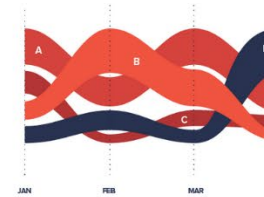
Radial Histogram



Exploded View Drawing



Sorted Stream Graph



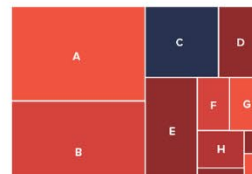
Flow Map



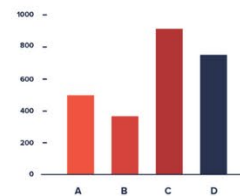
Sunburst Diagram



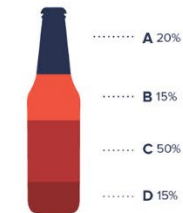
Treemap



Bar Chart (Vertical)



Pictorial Stacked Chart





5 ways to tell a story

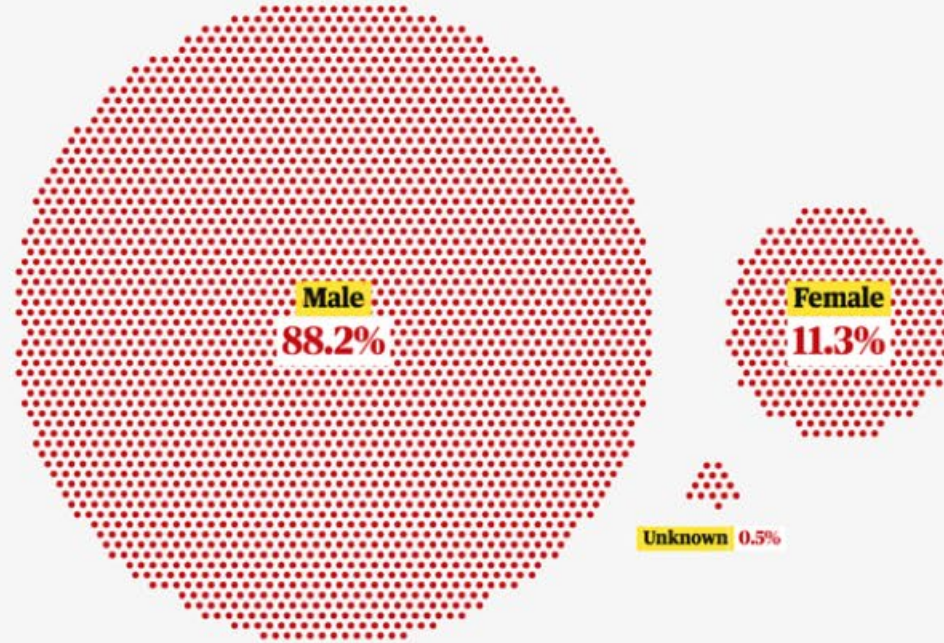
Choose the right chart

Less is more

Use color in a clever way

Add helpful annotations

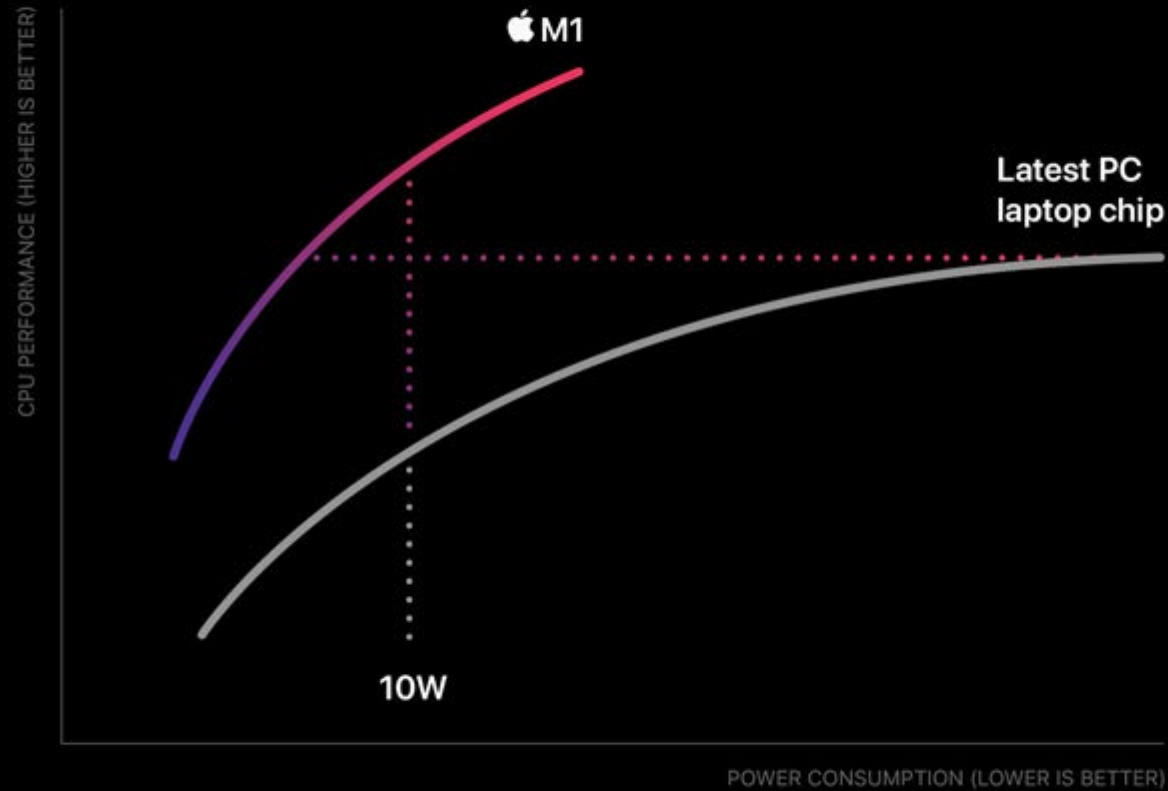
Break the rules



Far more men were arrested than women

Court documents do not record gender so we made educated guesses based on individuals' first names and the pronouns used in the documents.

CPU performance vs. power

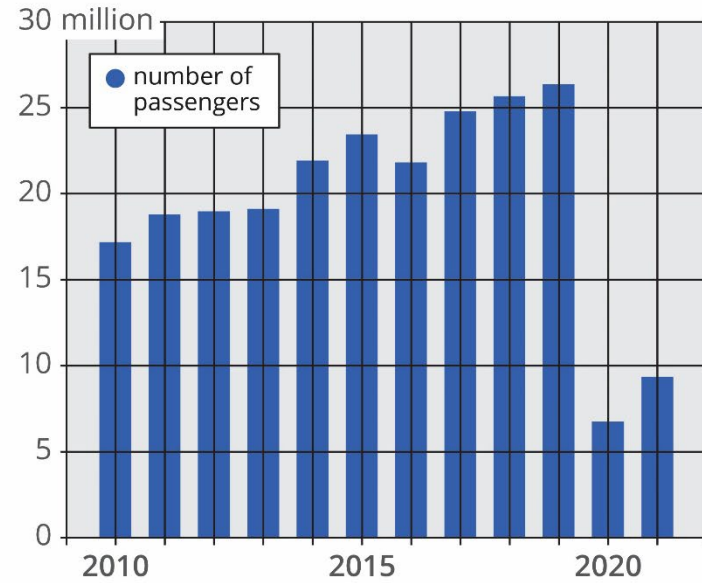


Up to
2x
faster CPU
performance¹

Matches peak PC
performance using
25%
of the power¹

Yearly passengers in Brussels Airport

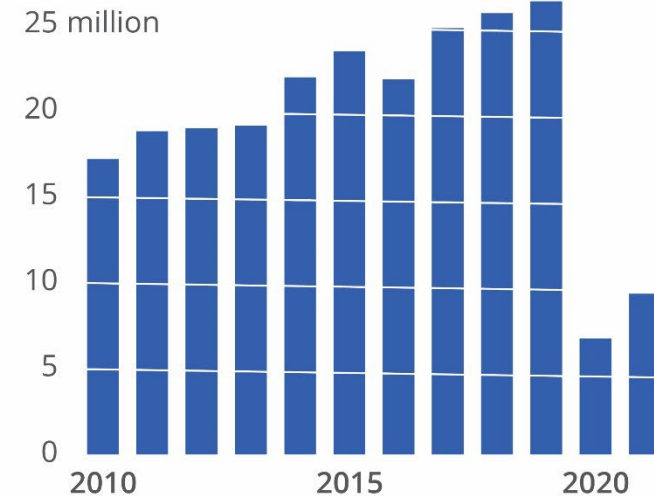
Data: Brussels Airport, Statistics Flanders



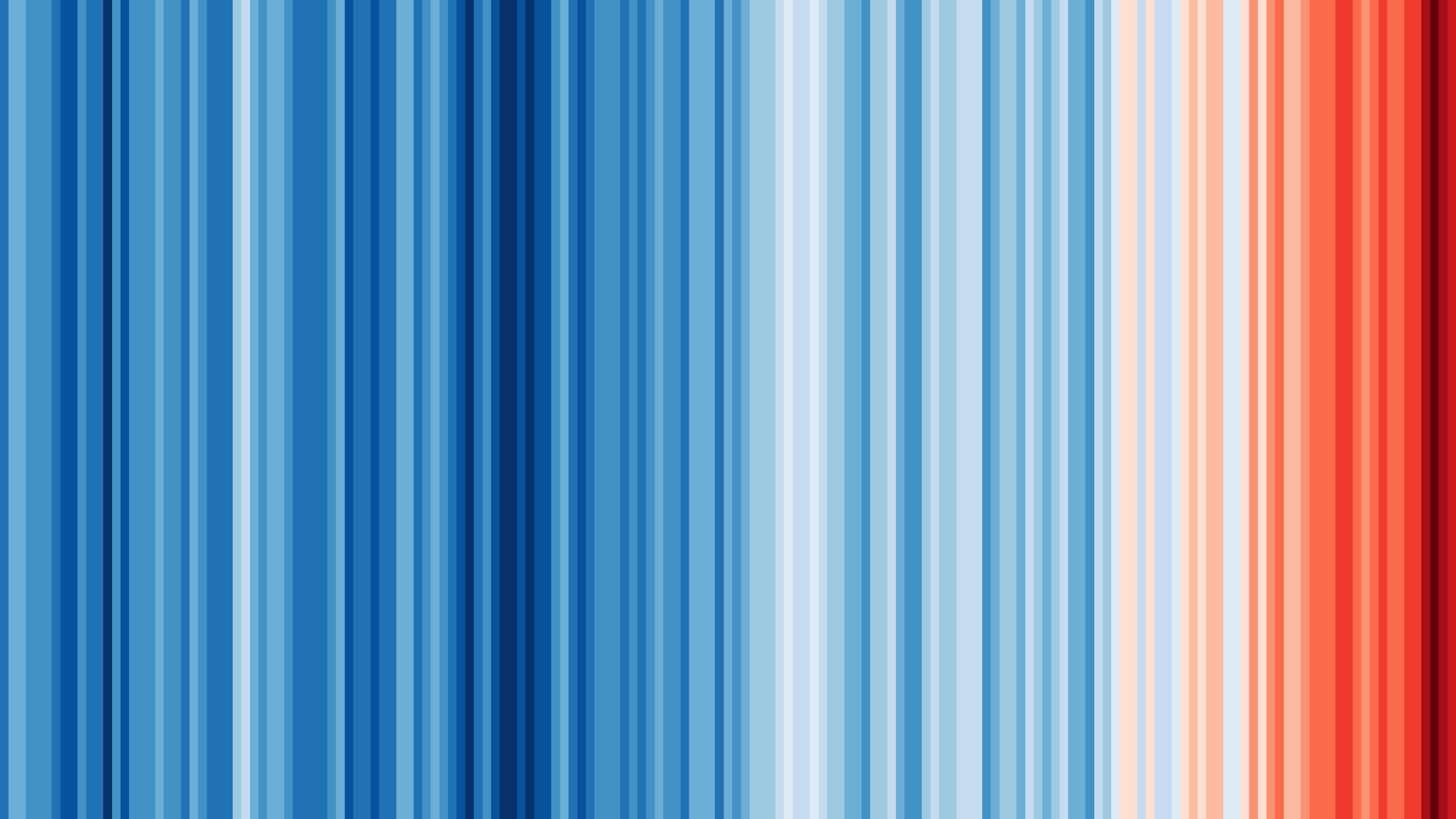
Low signal-to-noise ratio

Yearly passengers in Brussels Airport

Data: Brussels Airport, Statistics Flanders



High signal-to-noise ratio





5 ways to tell a story

Choose the right chart

Less is more

Use color in a clever way

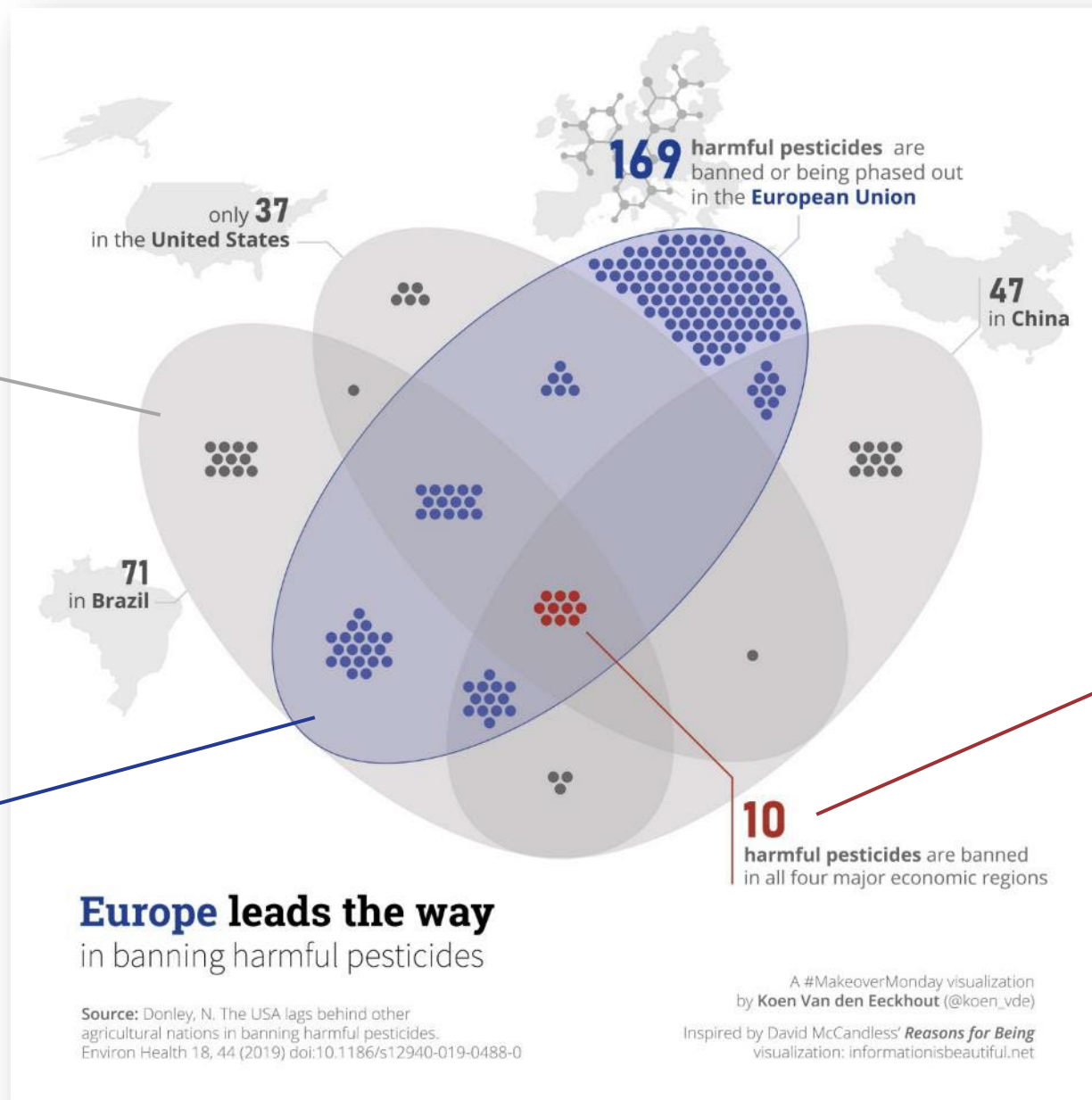
Add helpful annotations

Break the rules

background
color

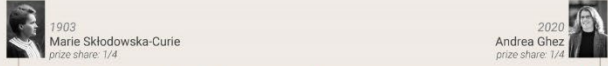
thematic
color

accent
color





Medicine
212 men, 12 women (5.4%)



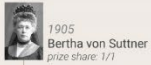
Physics
215 men, 4 women (1.8%)



Chemistry
181 men, 7 women (3.7%)



Literature
102 men, 16 women (13.6%)

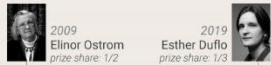


Peace
91 men, 28 organisations, 18 women (13.1%)

Women of the Nobel Prize

The Nobel Prize exists since 1901. In those 121 years, the Prize was awarded 888 times to a man, but only 59 times to a woman. 2009 was a record year, with 5 women winning a Prize.

In 2021, only 1 woman received the Prize: Maria Ressa won the Peace Prize, together with Dmitry Andreyevich Muratov, for her efforts to safeguard freedom of expression as a journalist. She is the first Nobel Prize laureate from the Philippines, and the first journalist since 1935 to receive the Nobel Peace Prize.



Economics
87 men, 2 women (2.2%)

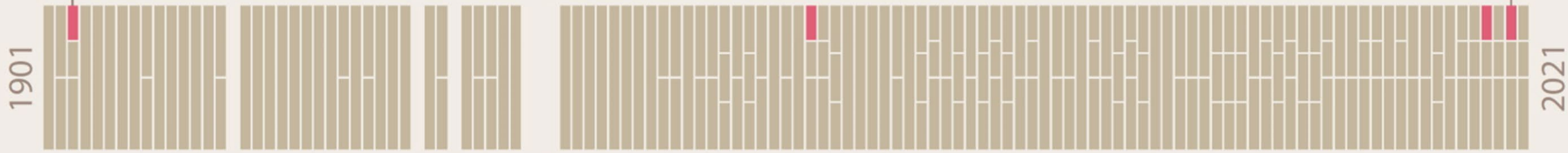
Source: nobelprize.org
Infographic design: Koen Van den Eeckhout
(@koen_vde | www.banyon.be)



1903
Marie Skłodowska-Curie
prize share: 1/4



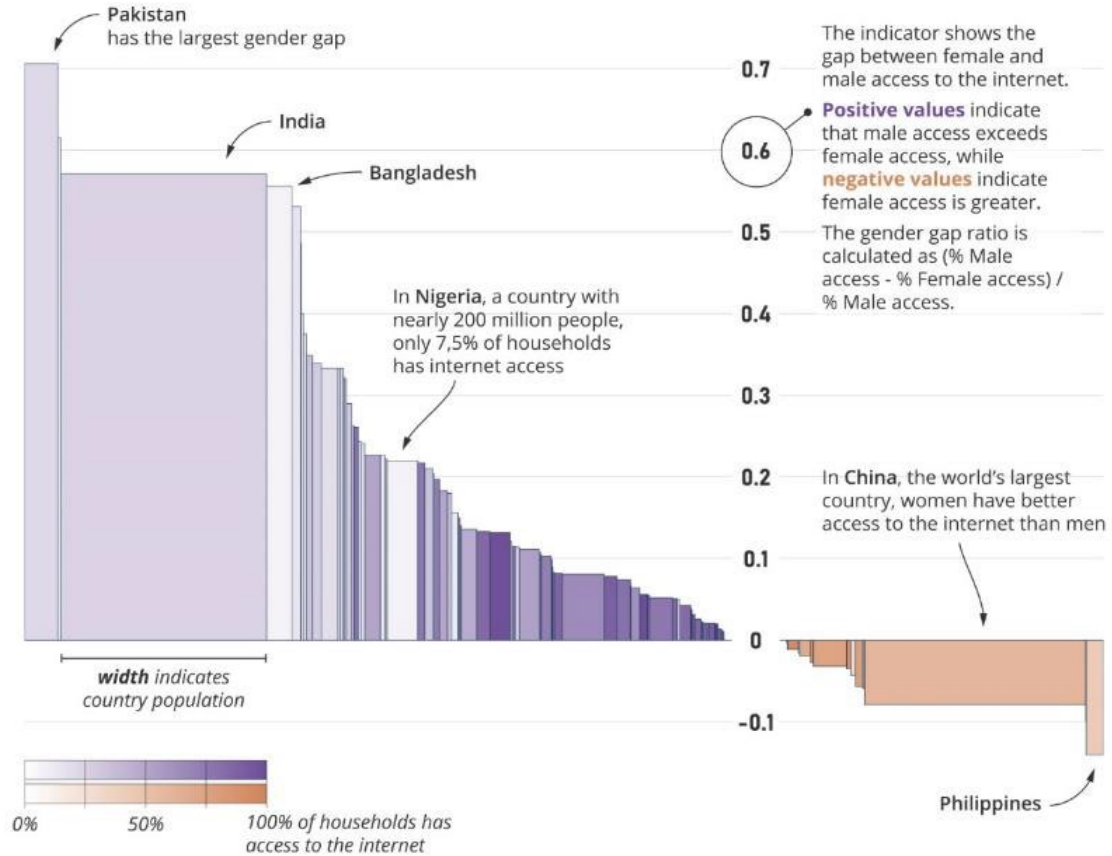
2020
Andrea Ghez
prize share: 1/4



Physics
215 men, 4 women (1.8%)

The digital divide

In most countries, **men** have better access to the internet than **women**



Source: The Economist Intelligence Unit Inclusive Internet Index 2020, International Telecommunication Union, Gallup World Poll

A #MakeoverMonday visualization by **Koen Van den Eeckhout** (@koen_vde)

Unemployment rate in selected countries

January-August 2020, sorted by the unemployment rate in January.

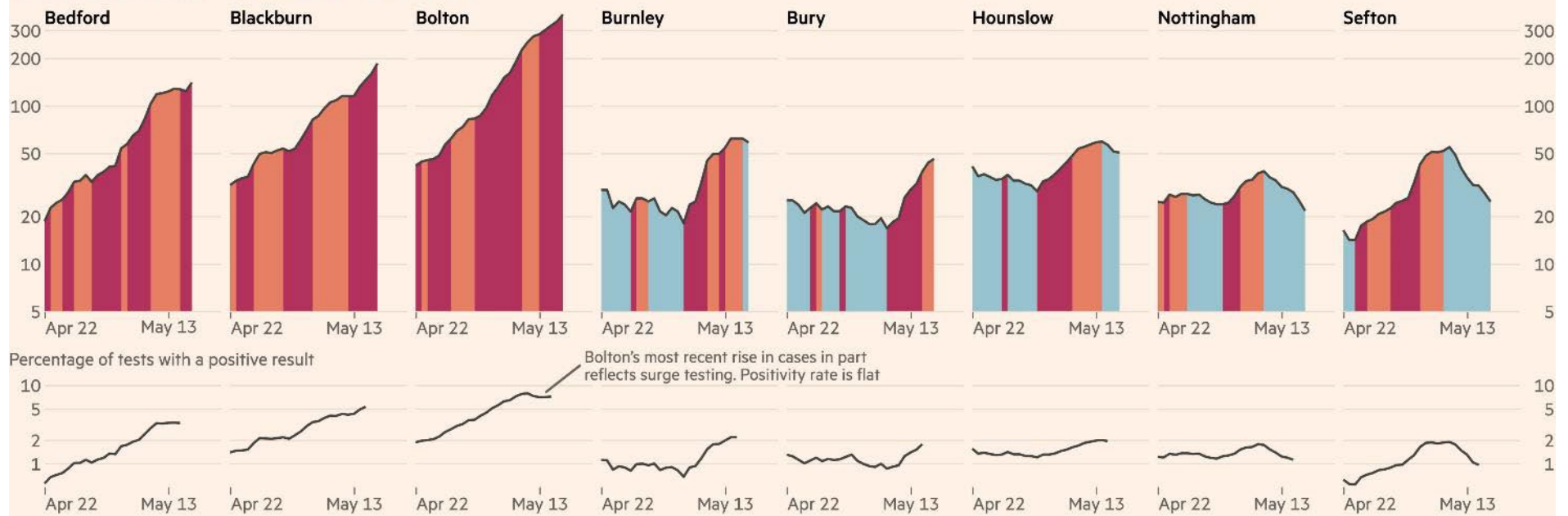
country	Jan ▲	Feb	Mar	Apr	May	Jun	Jul	Aug
Japan	2.4%	2.4%	2.5%	2.6%	2.9%	2.8%	2.9%	3.0%
Netherlands	3.0%	2.9%	2.9%	3.4%	3.6%	4.3%	4.5%	4.6%
Germany	3.4%	3.6%	3.8%	4.0%	4.2%	4.3%	4.4%	4.4%
Mexico	3.6%	3.6%	3.2%	4.8%	4.3%	5.4%	5.2%	5.0%
US	3.6%	3.5%	4.4%	14.7%	13.3%	11.1%	10.2%	8.4%
South Korea	4.0%	3.3%	3.8%	3.8%	4.5%	4.3%	4.2%	3.2%
Denmark	4.9%	4.9%	4.8%	4.9%	5.5%	6.0%	6.3%	6.1%
Belgium	5.1%	5.0%	5.0%	5.1%	5.0%	5.0%	5.0%	5.1%
Australia	5.3%	5.1%	5.2%	6.4%	7.1%	7.4%	7.5%	6.8%
Canada	5.5%	5.6%	7.8%	13.0%	13.7%	12.3%	10.9%	10.2%
Finland	6.8%	6.9%	7.0%	7.3%	7.5%	7.8%	8.0%	8.1%

Source: [OECD](#) • [Get the data](#) • Created with [Datawrapper](#)

Case rates continue to climb in several B.1.617.2 hotspots, though upticks have subsided in others

Weekly cases per 100k people (log scale) in areas where the variant is thought to be dominant, coloured by direction and pace of change

Outbreak accelerating ■ Decelerating ■ In remission ■



Source: FT analysis of UK government Covid-19 dashboard
© FT



5 ways to tell a story

Choose the right chart

Less is more

Use color in a clever way

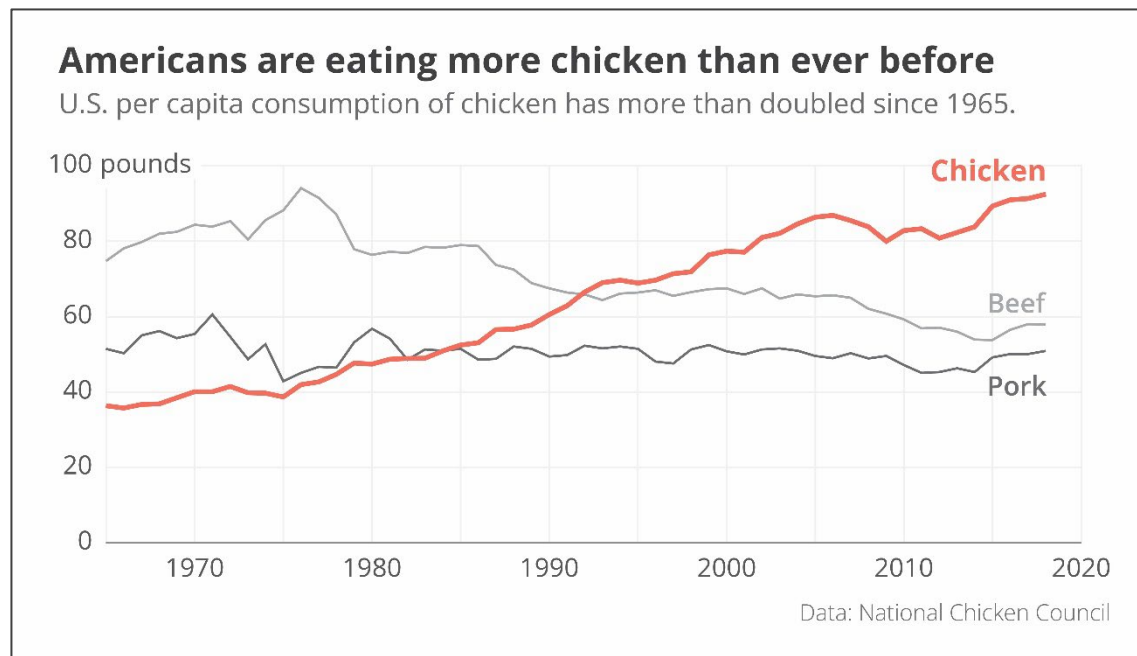
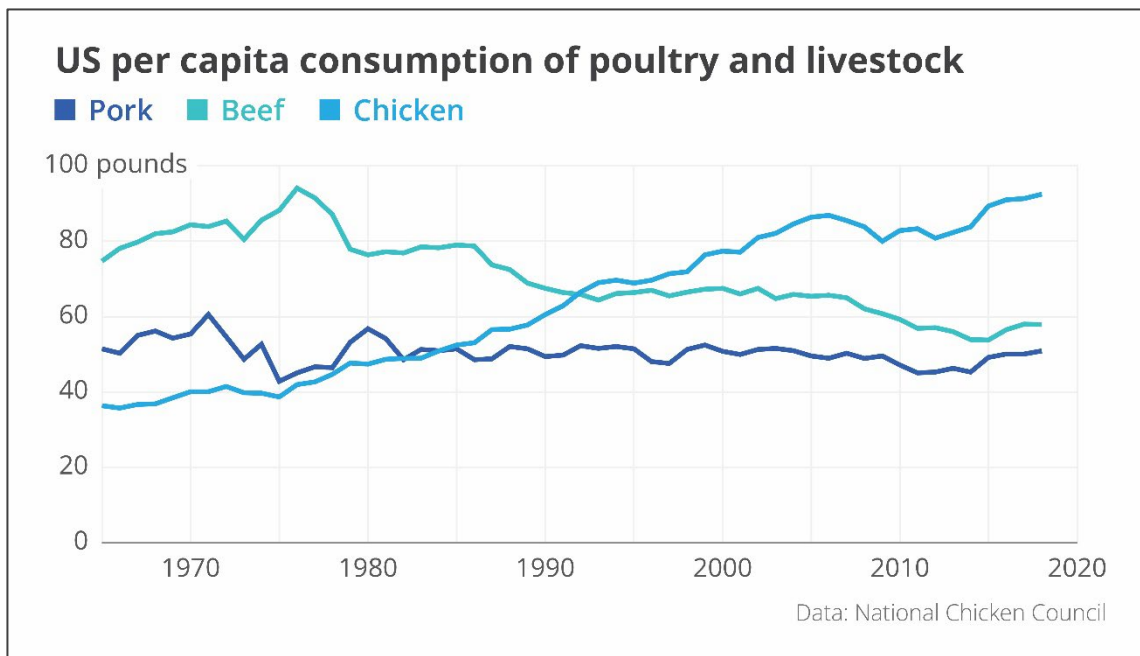
Add helpful annotations

Break the rules

~~data~~

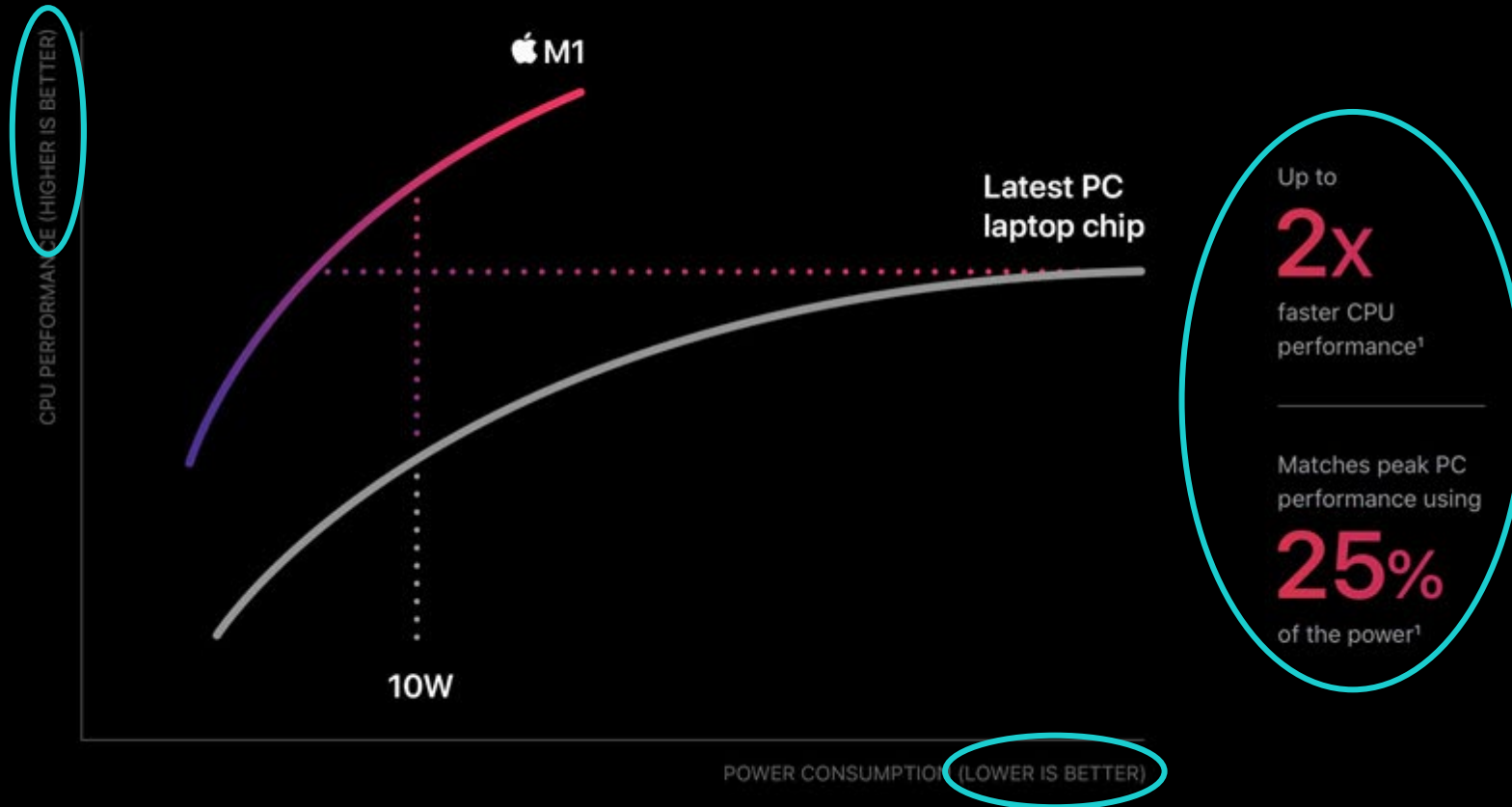


story

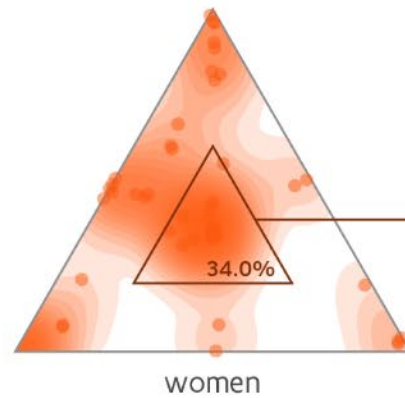
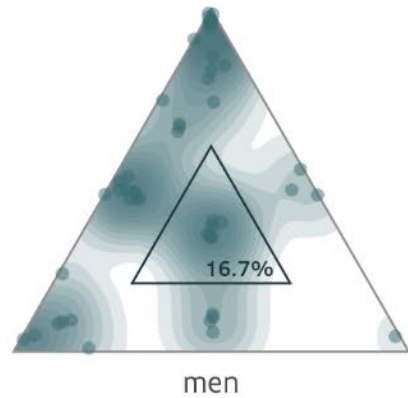
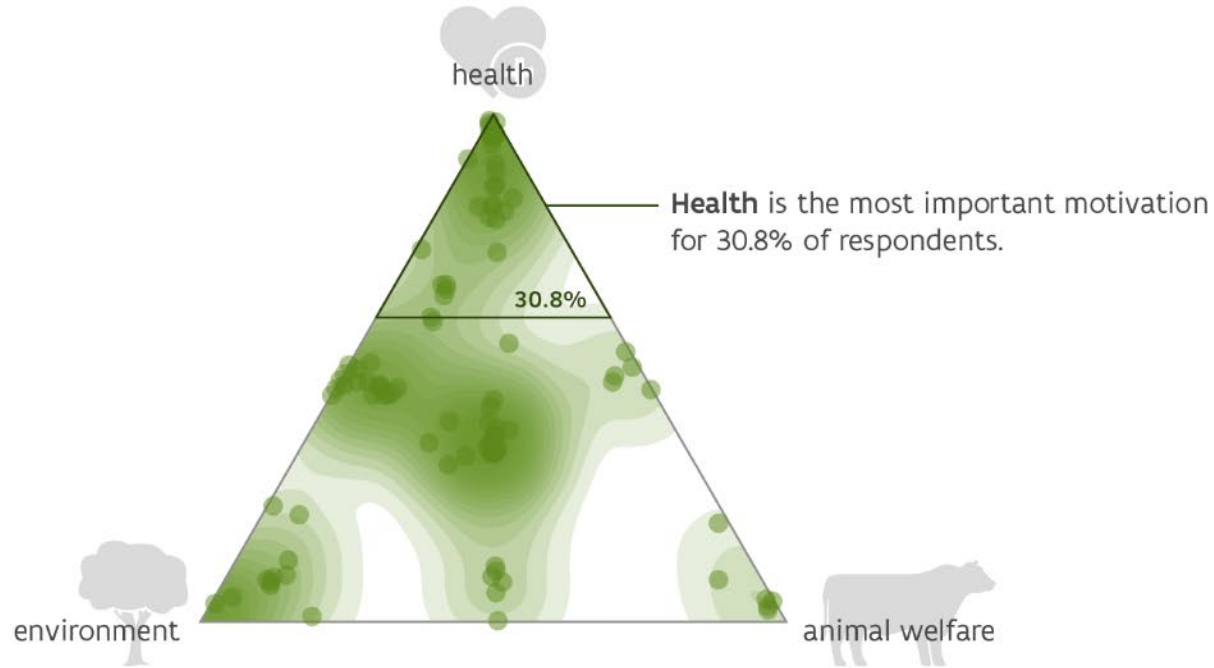


A good chart shows the data,
a great chart tells a story.

CPU performance vs. power



What motivated me to change my eating habits...



The motivations of female respondents are more balanced than those of male respondents. For 34%, **all three motivations** are equally important.

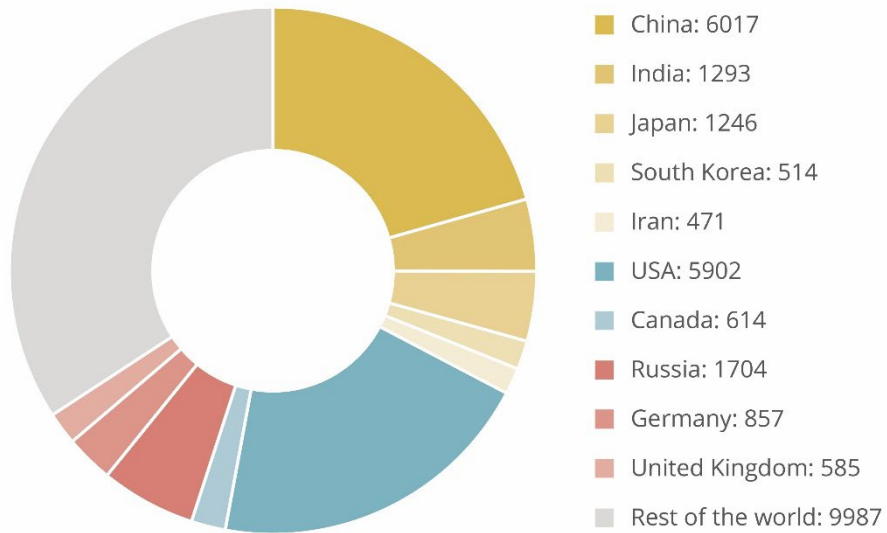


Quick tip

Direct labeling

World carbon dioxide emissions from the consumption and flaring of fossil fuels

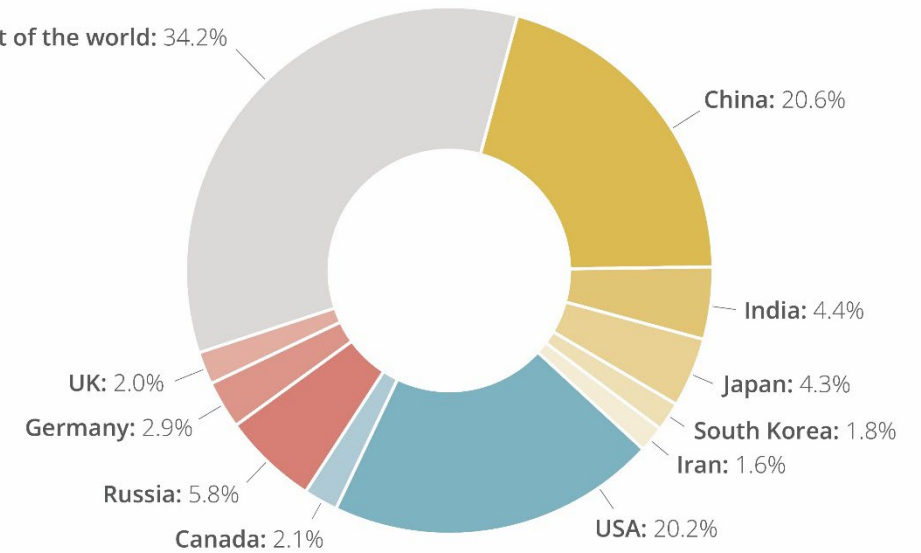
Million metric tons of carbon dioxide, in 2006



Source: Energy Emission Administration

Global share of CO₂ emissions (2006)

Carbon dioxide emissions are dominated by China and the USA



Source: Energy Emission Administration



5 ways to tell a story

Choose the right chart

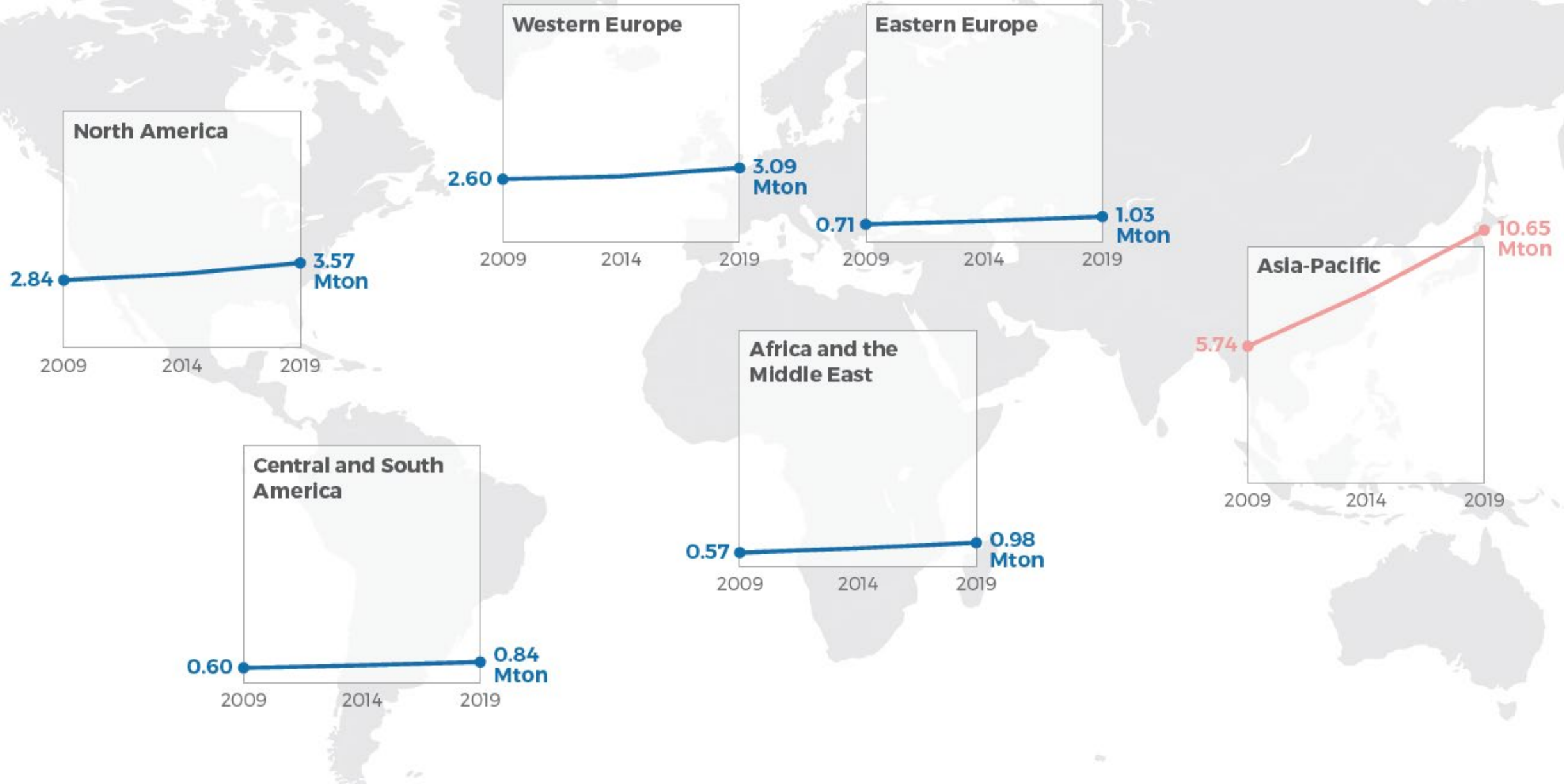
Less is more

Use color in a clever way

Add helpful annotations

Break the rules

Asia-Pacific will continue to be the biggest demand region





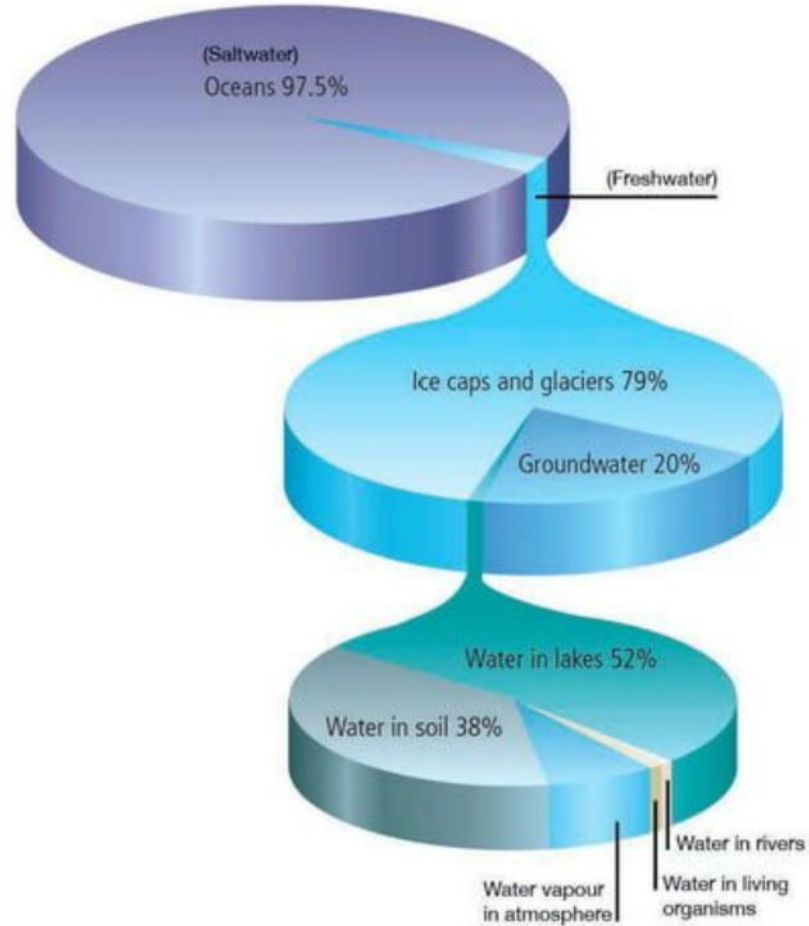
Koen Van den Eeckhout

Turning your complex data into powerful visual stories 📊 **Hiring**

1d • 🌐

📖 There's ALWAYS an exception... even for 3D pie charts!

🚫 No, 3D pie charts don't work. They're a bad idea. Because you can ...see more



👍👏👤 Mark Verbeke and 68 others

5 comments



Like



Comment



Share



Send

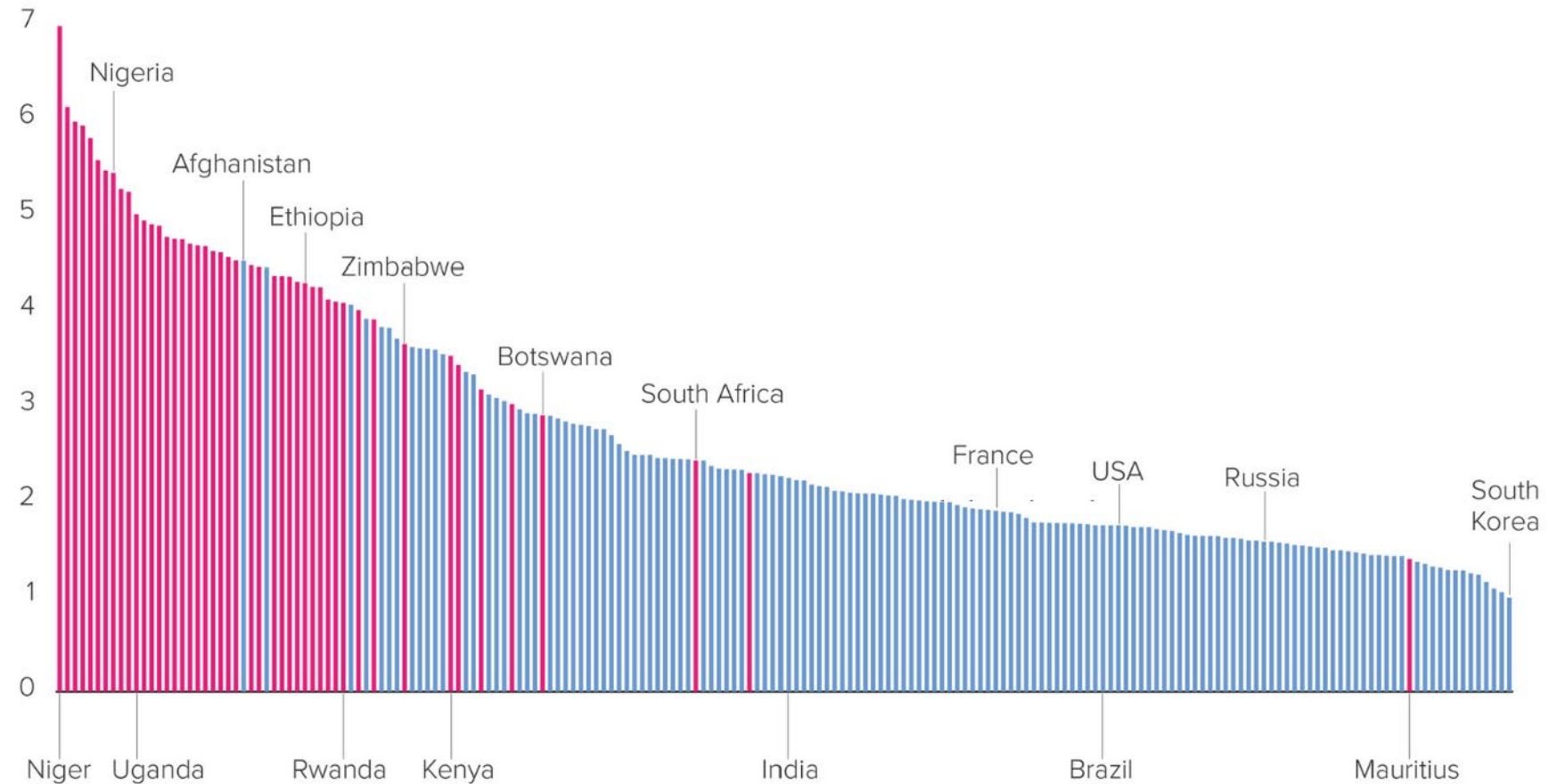


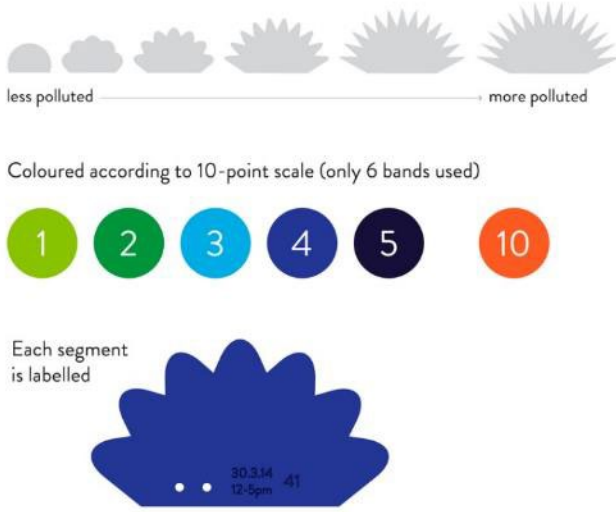
4,918 views of your post in the feed

The future is African

Sub-Saharan Africa has the highest fertility rates in the world, but declining infant mortality and increasing prosperity

Fertility rates (children per woman), 2018





stefanieposavec.com/airtransformed



5 ways to tell a story

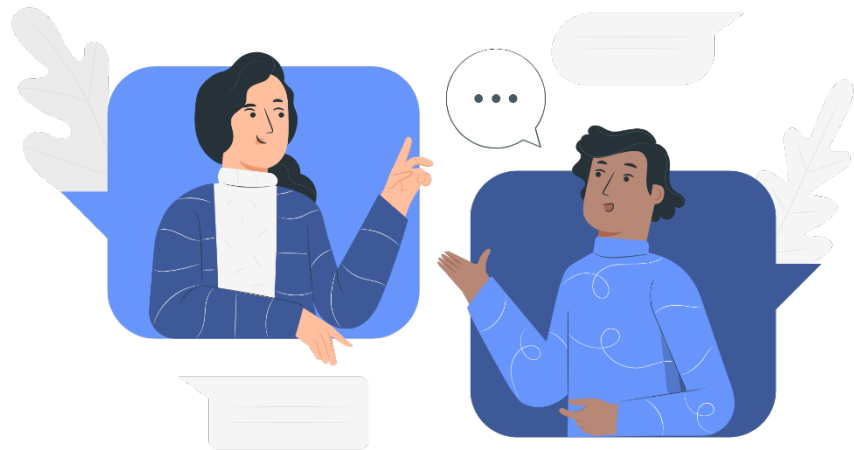
Choose the right chart

Less is more

Use color in a clever way

Add helpful annotations

Break the rules



Thank you!

All the slides and all the links:

baryon.be/dataviz-resources

Koen Van den Eeckhout – koen@baryon.be - @koen_vde