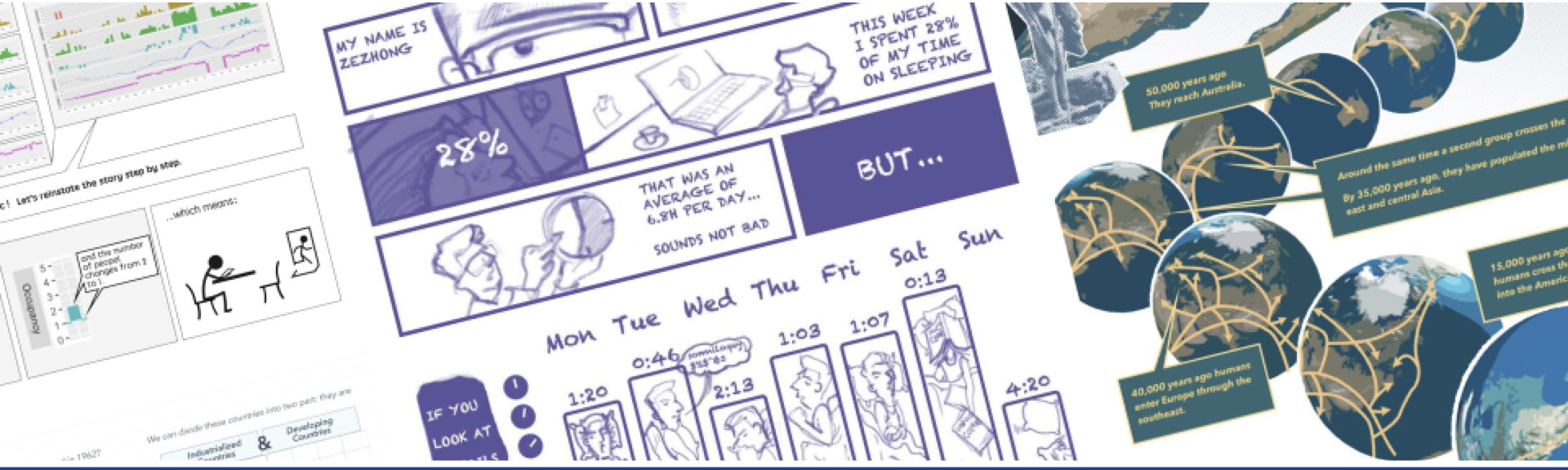
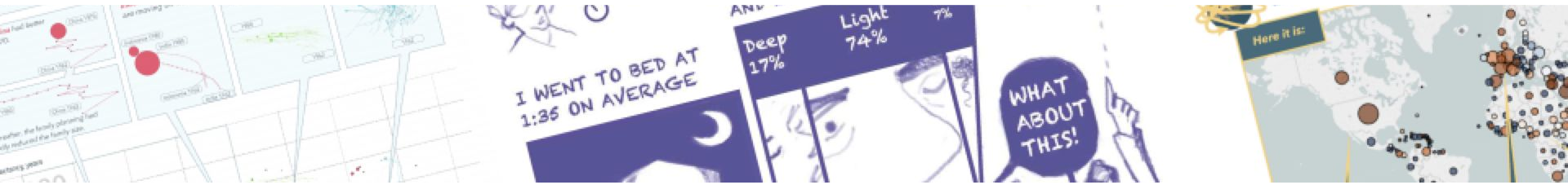


Data Comics for Data-Driven Storytelling

June 2022



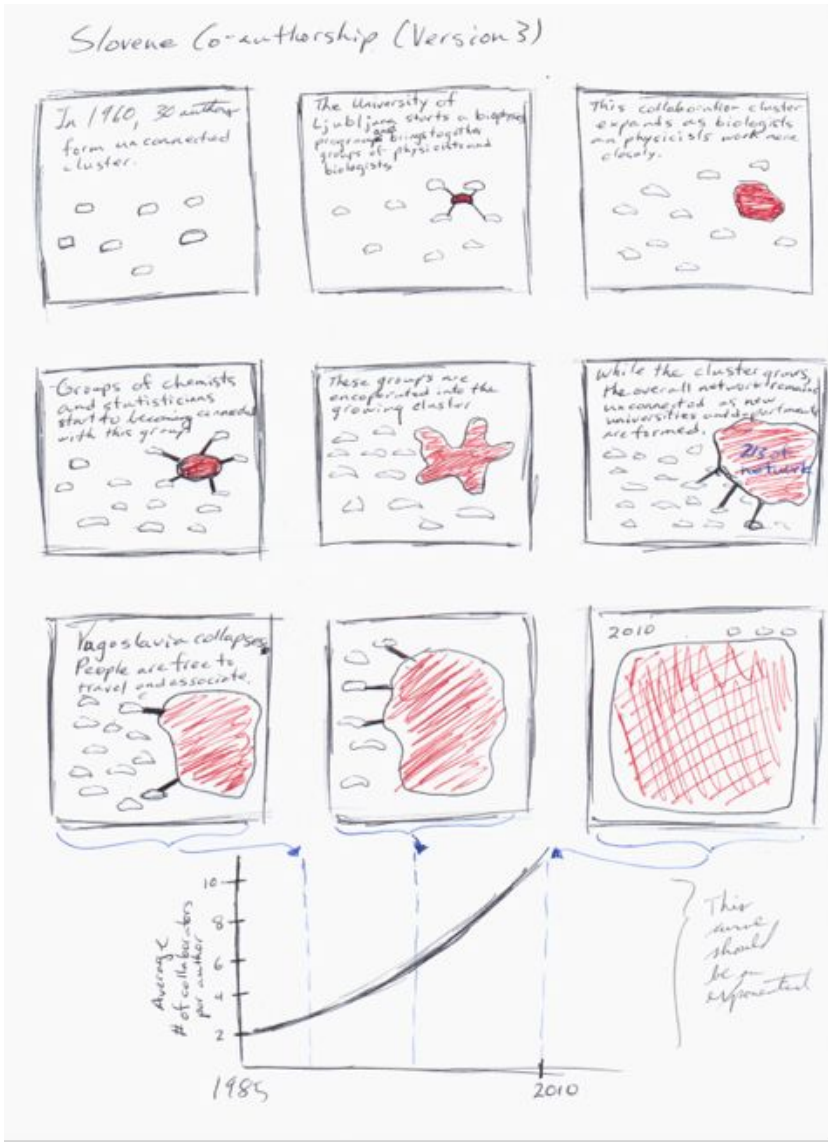
Workshop outline

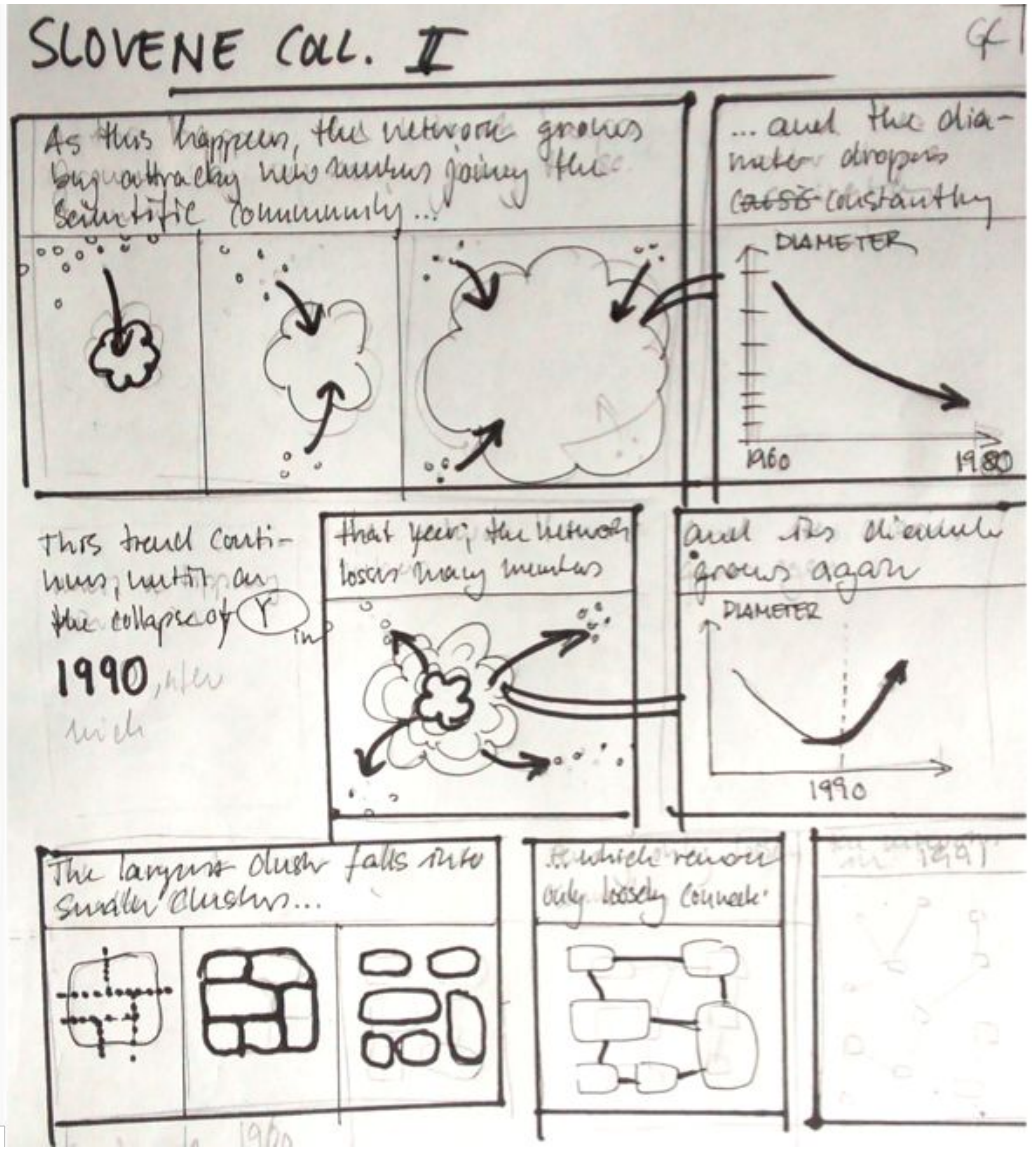
- Goal of the workshop
- Idea of data comics
- Create data comics!

But my final visualisation won't be a comic!

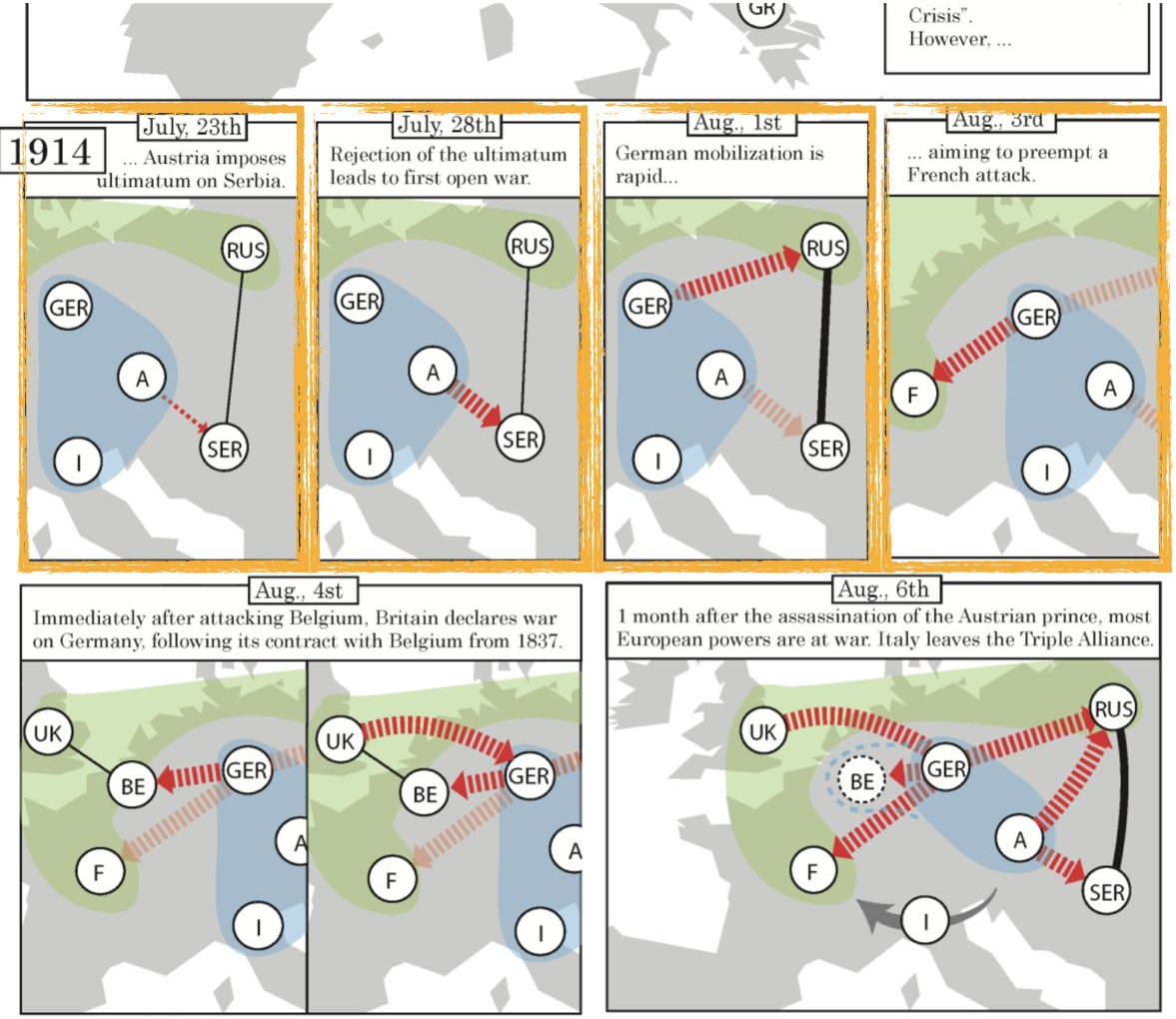
Goals:

- What **story** do you want to tell to your audience?
- What are the **messages** you want to tell them?
- What **visual content** do you need?
- What is your **sequence**?

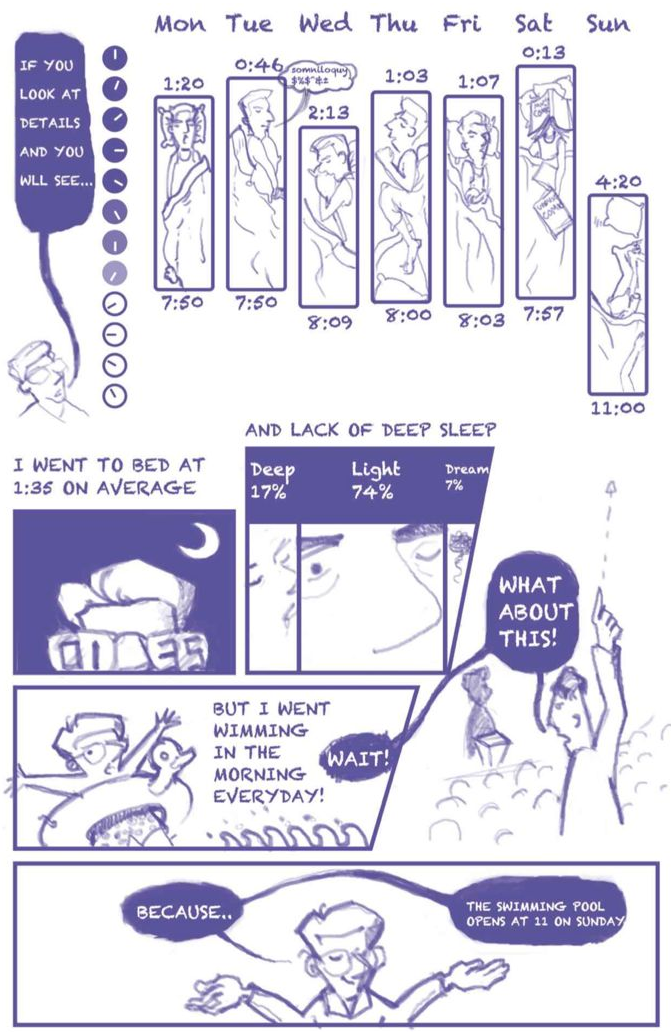

Slovene Co-authorship (Version 3)
In 1960, 30 authors form an connected cluster.
The University of Ljubljana starts a big new program bringing together groups of physicists and biologists
This collaboration cluster expands as biologists and physicists work more closely.
Groups of chemists and statisticians start to become connected with this group
These groups are encorporated into the growing cluster
While the cluster grows, the overall network remains unconnected as new universities and departments are formed.
Rest of network
Yugoslavia collapses. People are free to travel and associate.
2010
Average # of collaborators per author
10
8
6
4
2
1985
2010
This curve should be exponential


SLOVENE COLL. II
4
As this happens, the network grows by attracting new authors joining the scientific community...
...and the diameter drops constantly
DIAMETER
1960
1980
This trend continues, until an the collapse of Y in 1990, when
that year, the network losses many members
and its diameter grows again
DIAMETER
1990
The larger cluster falls into smaller clusters...
Individuals remain only loosely connected
1991

What are data comics?



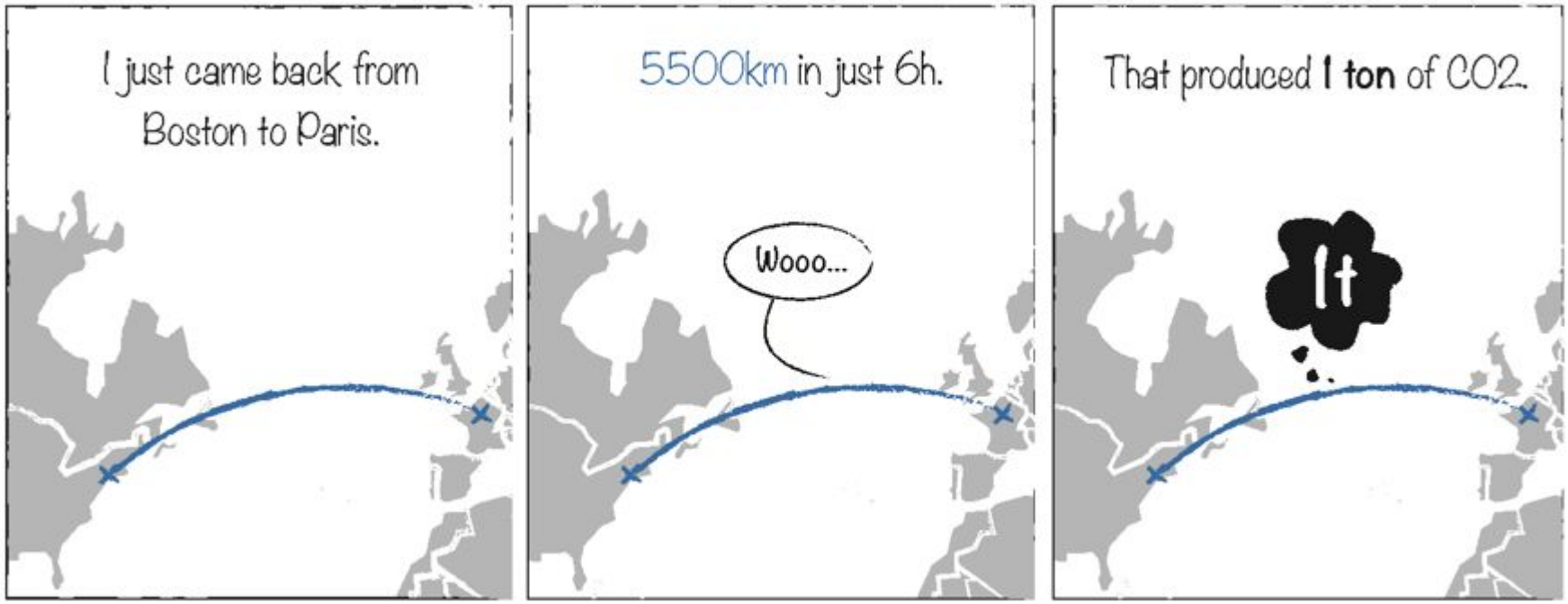
mputing Systems. ACM, 2016.



By Zezhong Wang (2017).

Panel (sequences)

Panel (sequences)



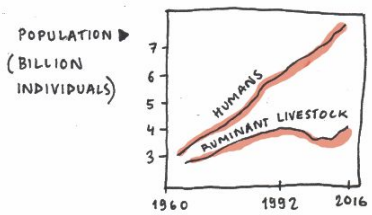
THAT'S RIGHT. THE HUMANS.

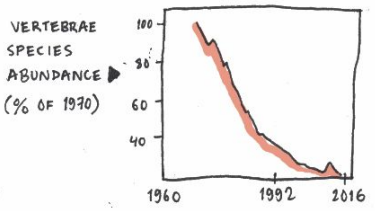
LET'S THROW IN SOME MORE GRAPHS. IF YOU WANT TO BE TAKEN SERIOUSLY, YOU HAVE TO HAVE GRAPHS.

THESE ARE FROM

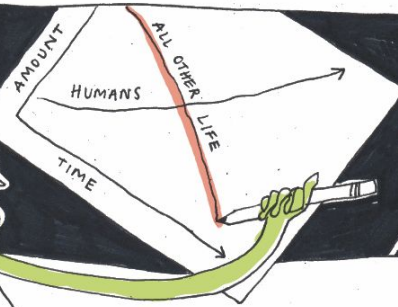
World Scientists' Warning to Humanity, A Second Notice, https://doi.org/10.1093/biosci/bix125

IT WAS PUBLISHED IN 2017. SO IT'S PRETTY RECENT DATA.



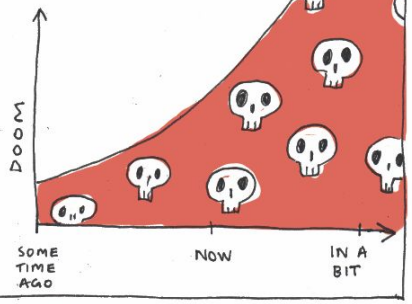


YOU SEE WHERE THIS IS GOING?

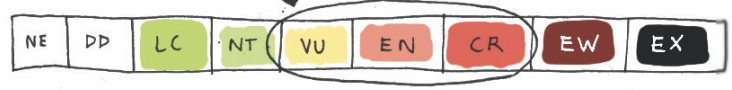


THE CURRENT EXTINCTION RATE IS ESTIMATED TO BE FROM 10 TO 1000 TIMES HIGHER THAN IT SHOULD BE (THAT REFERS TO THE BACKGROUND EXTINCTION RATE). MAKING ACCURATE ESTIMATES IS TRICKY...

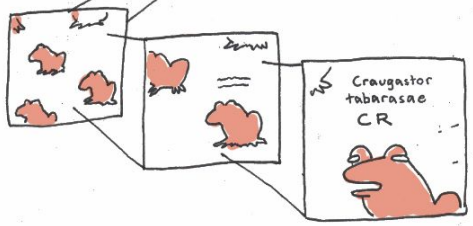
... BUT THIS IS THE GENERAL CONSENSUS.



IUCN (INTERNATIONAL UNION FOR CONSERVATION OF NATURE) HAS DATA ON SPECIES THAT ARE THREATENED WITH EXTINCTION RIGHT NOW.



SPECIES CLASSIFIED AS VULNERABLE, ENDANGERED OR CRITICALLY ENDANGERED.



SOURCES

The IUCN Red List of Threatened Species, https://www.iucnredlist.org/

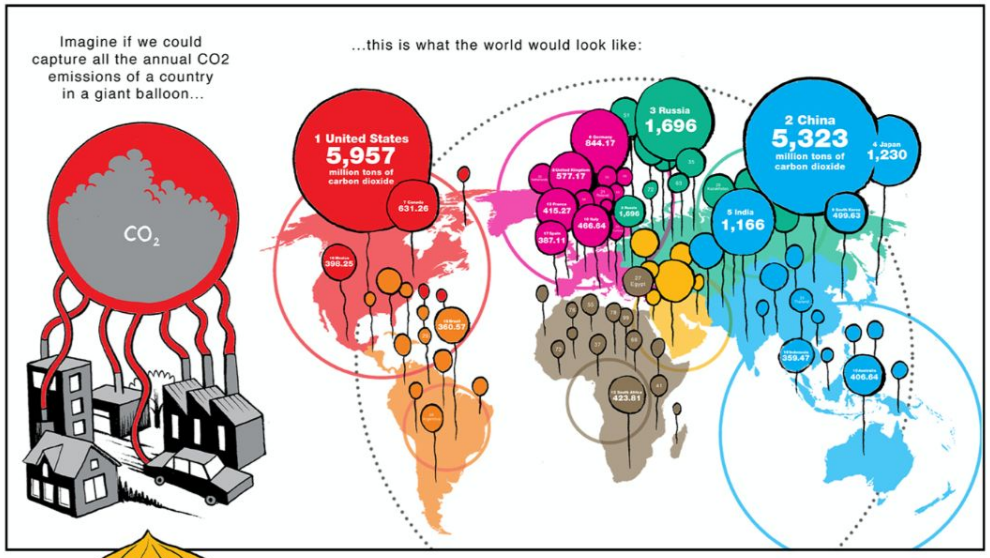
University of California Museum of Palcontology's Understanding Evolution, http://evolution.berkeley.edu

Viviane Richter: The Big Five Mass Extinctions, https://cosmosmagazine.com/palaeontology/big-five-extinctions

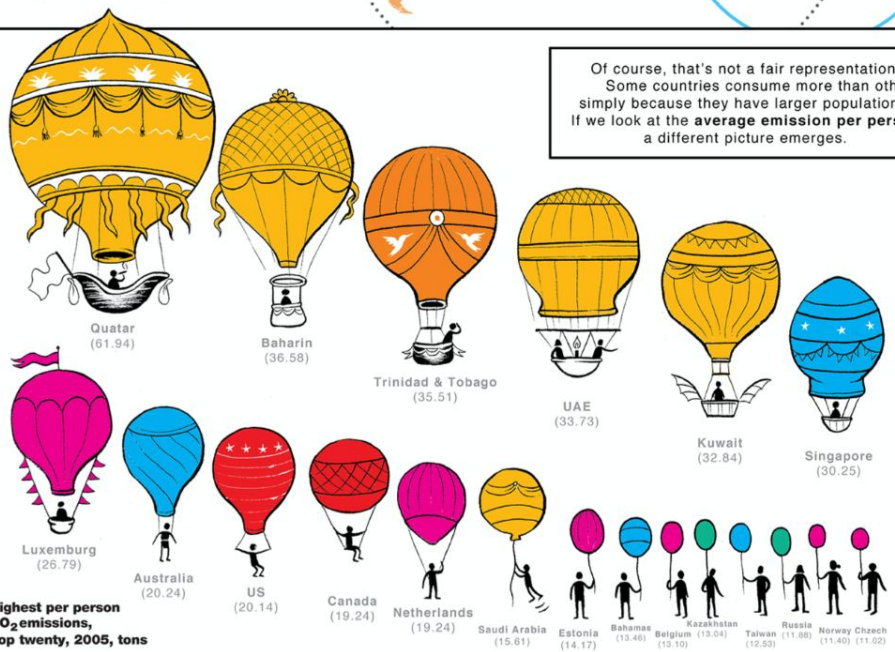
William J. Ripple, Christopher Wolf, Thomas M. Newsome, Mauro Galetti, Mohammed Alamgir, Eileen Crist, Mahmoud I. Mahmoud, William F. Laurance, 15,364 scientist signatories from 184 countries; World Scientists' Warning to Humanity: A Second Notice, BioScience, Volume 67, Issue 12, 1 December 2017, Pages 1026–1028, https://doi.org/10.1093/biosci/bix125

Adapted from Mark McCormick
Source: The Guardian, December 2007

Hot spots – the carbon atlas



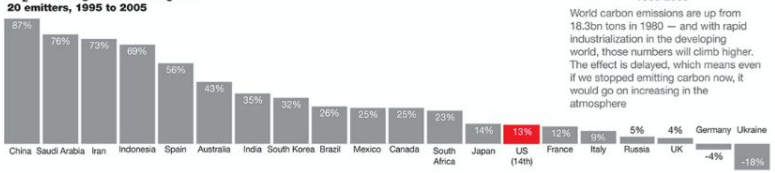
Of course, that's not a fair representation. Some countries consume more than others simply because they have larger populations. If we look at the **average emission per person** a different picture emerges.



Highest per person CO_2 emissions, Top twenty, 2005, tons

Moreover, some counties are taking active steps to curb their CO2 emissions, while others are raising rapidly:

CO_2 emission growth of the highest 20 emitters, 1995 to 2005



World total
28.19bn tons of CO_2

28% growth in carbon emissions, 1995-2005

World carbon emissions are up from 18.3bn tons in 1980 — and with rapid industrialization in the developing world, those numbers will climb higher. The effect is delayed, which means even if we stopped emitting carbon now, it would go on increasing in the atmosphere

North America
6.99bn tons of CO_2

14% growth in carbon emissions, 1995-2005

The US as a major producer of greenhouse gases has been reluctant to accept that man-made climate change even existed — and refused to accept the Kyoto protocol. But freak weather events and an avalanche of scientific evidence have forced it to rethink its position

Europe
4.67bn tons of CO_2

9% growth in carbon emissions, 1995-2005

For the first time, there is hard scientific evidence of climate change affecting Europe, said the Intergovernmental Panel on Climate Change recently. Freak weather events, such as the heatwaves of 2003, will become ever more common

Eurasia
2.58bn tons of CO_2

4% growth in carbon emissions, 1995-2005

Russia's carbon emissions dropped from 583 million metric tons of carbon in 1992 to 405 million metric tons in 1998, due to its then-deteriorating economic situation. Now, the energy giant may make clean up trading carbon credits

Asia & Oceania
10.36bn tons of CO_2

58% growth in carbon emissions, 1995-2005

Rapid industrialization combined with greater numbers of people moving to cities has provoked a huge rise in carbon emissions — with China rapidly moving to become the world's greatest carbon emitter in the next two years — some scientists say this has happened already

Central & South America
1.10bn tons of CO_2

29% growth in carbon emissions, 1995-2005

Increased freak weather events mean the IPCC is concerned South America will be hard-hit by climate change. Agriculture, water supplies and the unique natural habitat could be affected by a temperature increase of up to 4C by the end of the century

Africa
1.04bn tons of CO_2

28% growth in carbon emissions, 1995-2005

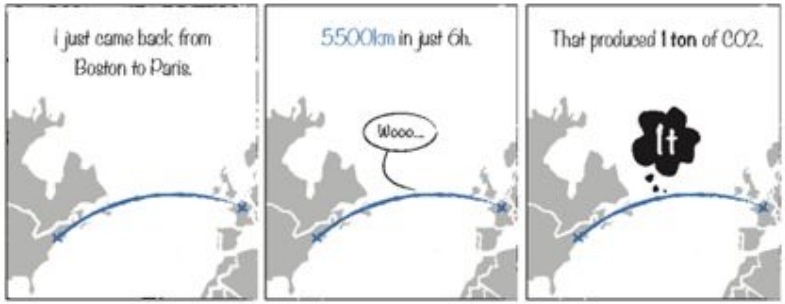
Its carbon emissions may be small but this is the continent most vulnerable to the effects of climate change, hitting food and water supplies, causing coastal flooding and an increase in tropical diseases such as malaria — as well as destroying parts of the ecosystem

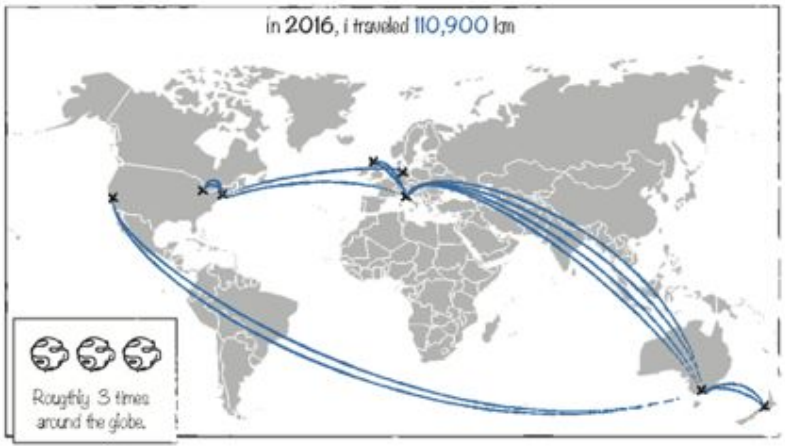
Middle East
1.45bn tons of CO_2

62% growth in carbon emission 1995-2005

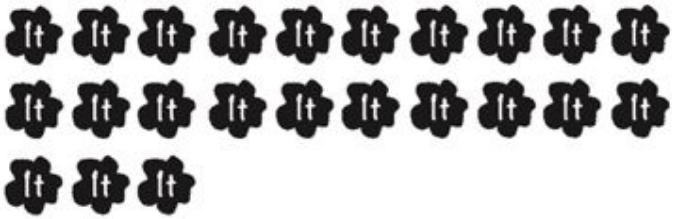
The region is a major contributor to global greenhouse gas emissions, through an oil and gas industry which produces over 30 percent of world oil supply and over 10 percent of its gas

CO Footprint

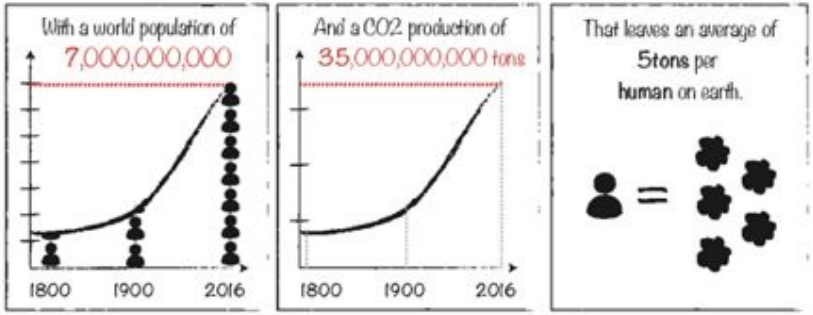


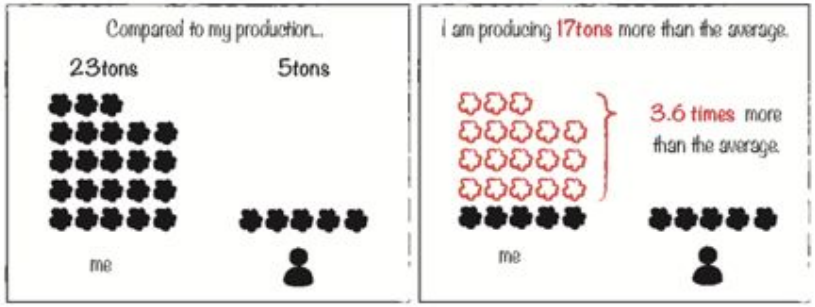


Which produced...

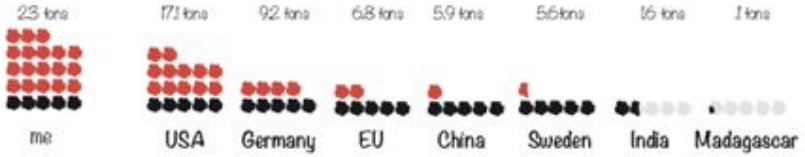


23 tons of CO2.





Thus, my travels in 2016 alone produced **more** CO2 than the average person in the most countries:



https://datacomics.github.io/

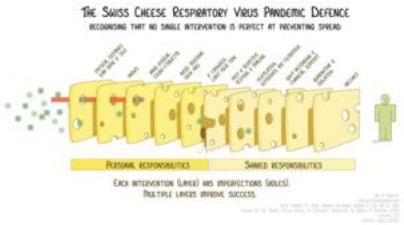
Data Comics
For visual storytelling

Data Comics

Data comics are a way of effectively communicating with data through data visualizations. They are inspired by the visual language of comics. This page lists examples we found online and those created during our research. We hope this website and our examples support a wider discussion and inspire journalists, artists, data scientists, and others to create their own data comics and help exploring and discovering this novel medium.

If you find or create your own data comics, get in touch with us. If you want to know more about research, see our publications.

Data Comics Gallery



The Swiss Cheese Respiratory Virus Pandemic Defense

Recognizing that no single intervention is perfect at prevengint disease

Ian M Mackay for Virologydownunder.com

Climate Change Strategies

Rosemay Moscow for BirdandMoon.com

Visual+ Interactive Data
design informatics
THE UNIVERSITY of EDINBURGH

Hosted on GitHub Pages — Theme by orderedlist

Warm-up Sketches (3-5min)!

4 panel sketch:

Explaining “the internet”

Discussion

Upload/share

- Challenges/Experience?
- What is your narrative?
- Why did you choose this layout?
- What is your message?
- Others - were they successful?

Story

Messages

Take-home Message(s) (1-3 bullet points)

- What do you want your audience to know?
- What do you want your audience to do with this knowledge?
- E.g.: "Inequality is multidimensional."

Messages

Take-home Message(s)

- What do you want your audience to know?
- What do you want your audience to do with this knowledge?
- E.g.: "Inequality is multidimensional."

Data Messages (as many bullet points as you need)

- How do you convince them with the data?
- What do they need to know about the data?
- E.g.: "General inequality is increasing." -> *think of the patterns in your data.*

Messages

Take-home Message(s)

- What do you want your audience to know?
- What do you want your audience to do with this knowledge?
- E.g.: "Inequality is multidimensional."

Data Messages

- How do you convince them with the data?
- What do they need to know about the data?
- E.g.: "General inequality is increasing."

Data-Literacy Messages

- What do they need to know to understand your visualizations and message?
- E.g.: "Gini-coefficient.", "Median income", "how to read a scatterplot"....

Discussion

Upload/share

- Experience?
- Messages?
- Challenges?

Story Structure

Introduction
Context
Problems
...

Curiosity

Events, facts,
Relations, surprise,
Findings, insight
...

Understanding

Conclusion,
Resolution,
Take-home
Call-to-action,
...

Action

Audience reaction

Create story (20min)

- Bullet points
- Narrative outline
- ...

Tell the story to others in your group/pairs

~ 3min storytelling

Discussion

Upload/share

- Experience?
- Challenges?

Panels & Flow

Website: https://datacomics.github.io/designpatterns.html

Data Comics
For visual storytelling

Visual+ Interactive Data

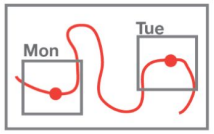
design informatics

THE UNIVERSITY of EDINBURGH

Time-Nesting

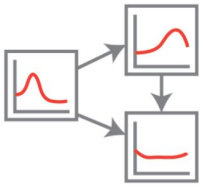
Temporal consists of panels depicting time spans of different length, e.g. one panel per year and individual panels for each important event in this year. In the temporal nesting panel, this hierarchy is visible in the panel layout: panels for the individual events are nested inside a larger panel showing the changes in the longer time span.

Time-Overlay



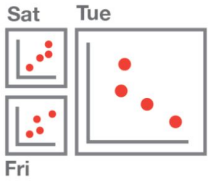
A time overlay overlays smaller panel onto a larger one with a large visualization. Each of the smaller panels shows a different temporal state of the data, for the location in the panel. E.g. the large visualization might be a map, or a time-changing network, or a scatterplot. The smaller panels act like time-lenses, showing the data shown in the panels at different timepoints (e.g. one panel shows the underlying data at t1, another at t2). The larger panel provides the context for the smaller panels to act within.

Time-States



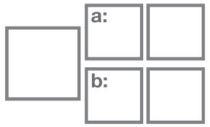
The state pattern is depicting a series of panels, connected in a network-fashion. Each panel is depicting the data set at a different time point, hence creating state-network. A state-network can show recurrent states as well as arbitrarily complex states in the data set. While the state-network is showing states within the data, panels provide the base for narration and explanation of each state. Linearity in the flow can be achieved through specific flow-marks (numbers, specific arrows) or a layout implying some linear reading order.

Moments

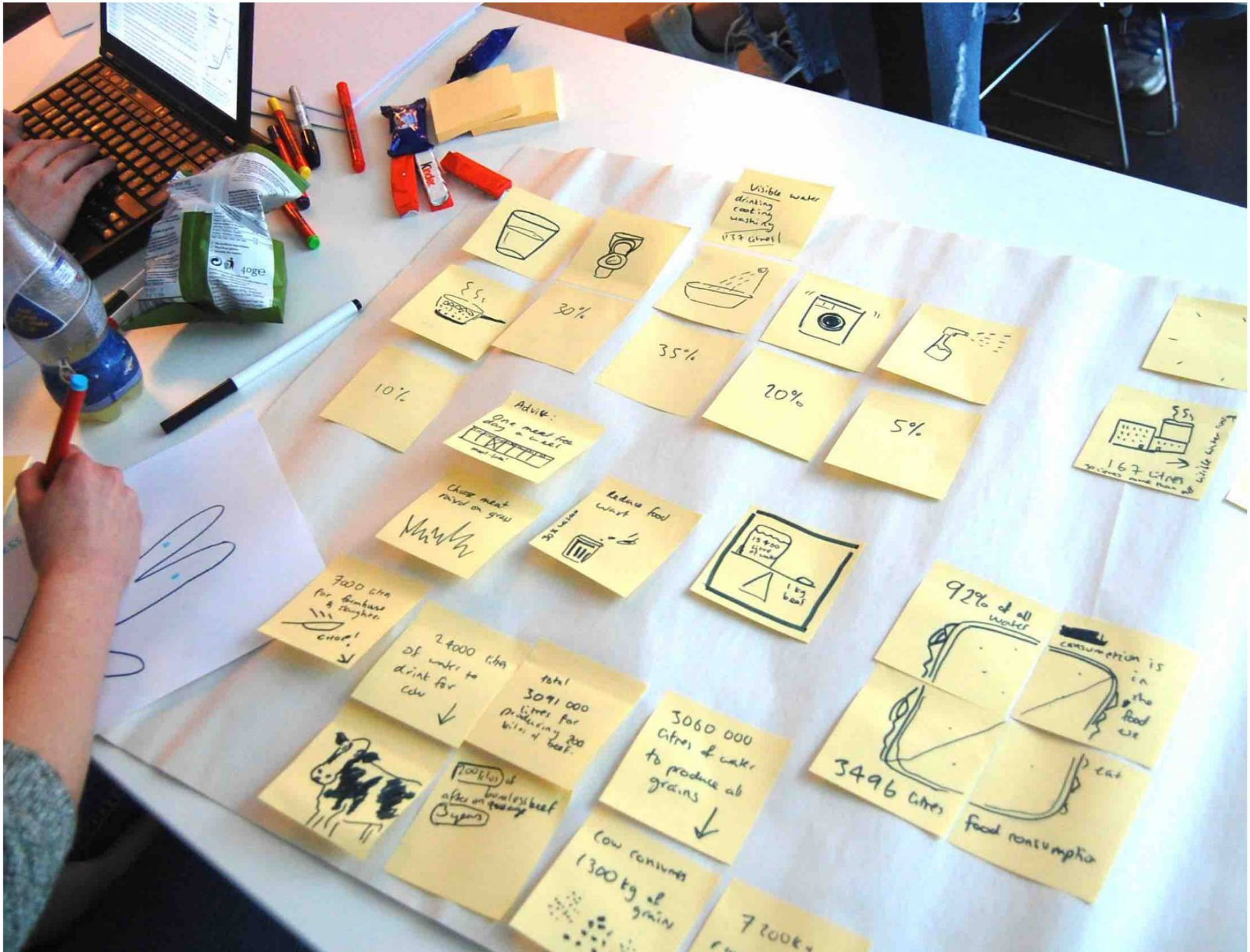


The moment pattern shows a set of panels, each showing the data at a different point in time. However, the tiled layout implies that the panels are not in temporal order. Moreover, any specific order can be applied, e.g. to group similar temporal states.

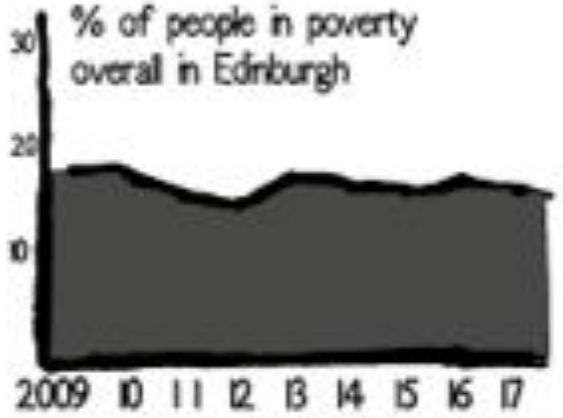
Alternative Tracks



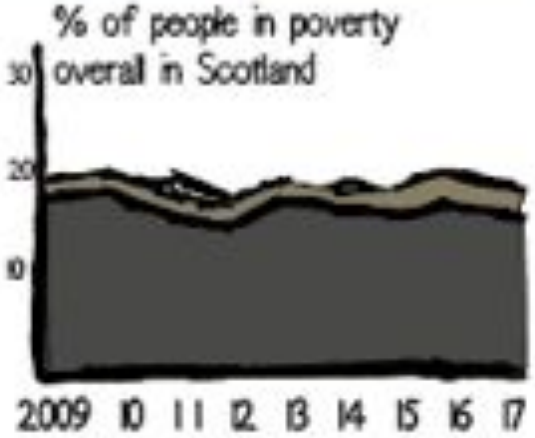
This pattern uses a branching to show alternative tracks in an otherwise linear layout. Each of the tracks can show a different time or facet of the data. Both tracks can run in parallel, implying alternatives or complementary visualization.


30%
35%
10%
20%
5%
Visible water
Advice:
92% of all water
3496 litres
3060 000 litres of water to produce ab grains
3091 000 litres for producing 200 kilos of beef
24000 litres of water to drink for cow
7200 litres for hamburger & sloughter
167 litres
Reduce food waste
Cheap meat raised on grass
Consumption is in the food use
Cow consumes 1300 kg of grain
7 200 kg

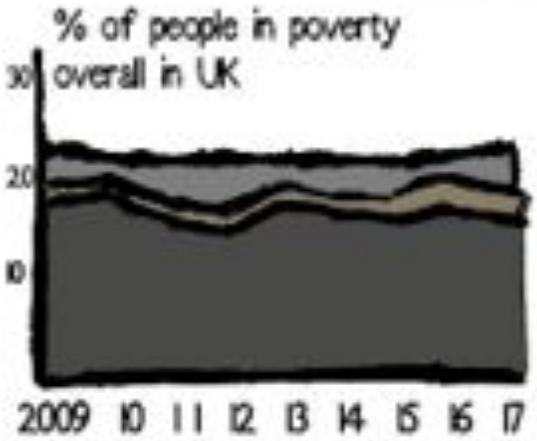
Build-up



For the last decade, this poverty rate has remained virtually unchanged, hovering around 16%.

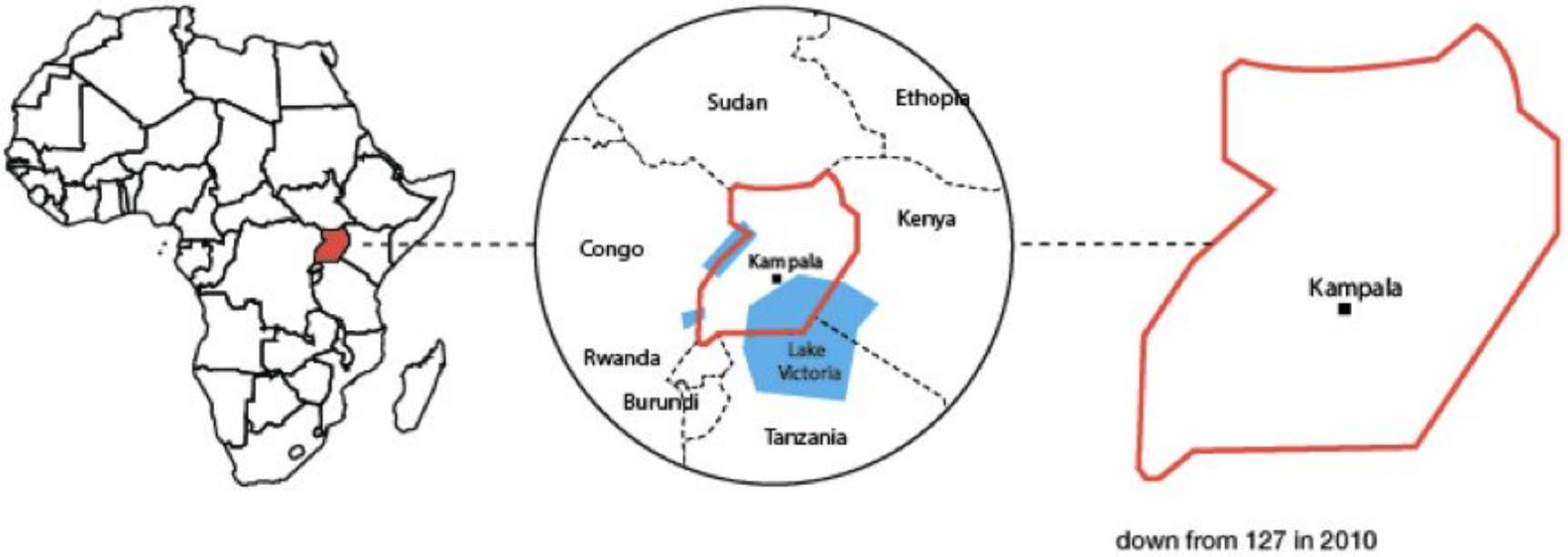


This is only slightly better than the poverty rate in Scotland overall, which in 2017 reached 19%.



.. which itself is lower than the overall UK rate at around 22%.

Zoom



down from 127 in 2010

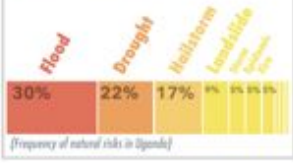
Exposé

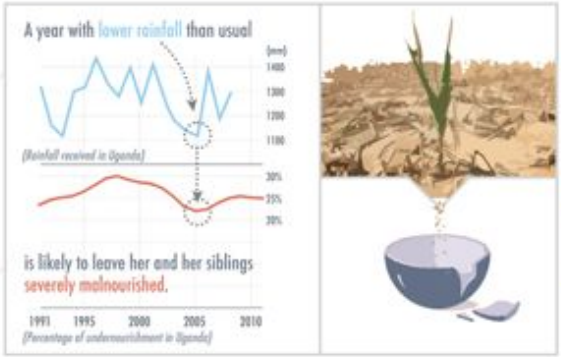
Let's consider a 14 years old girl in Uganda...

She lives in a rural area,

in a situation of poverty, largely dependent on subsistence agriculture

and extremely vulnerable to environmental shocks and stresses:

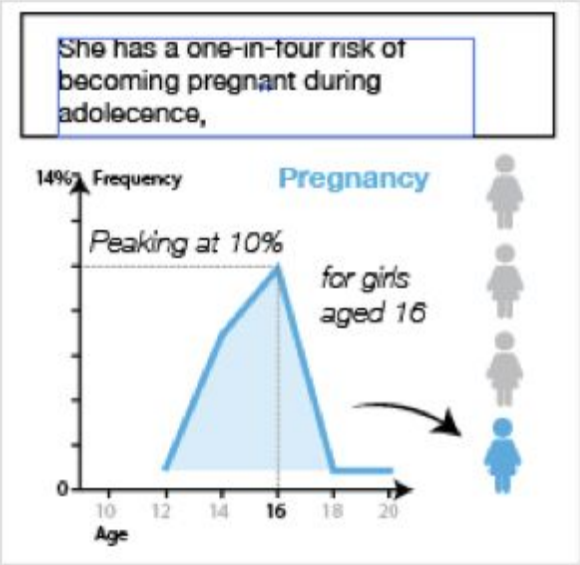


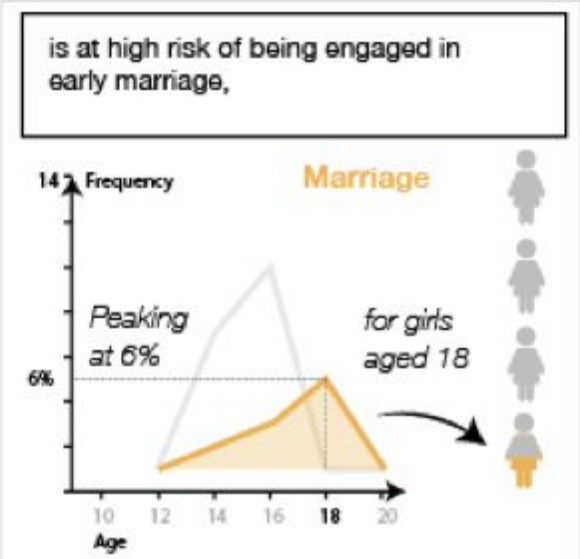


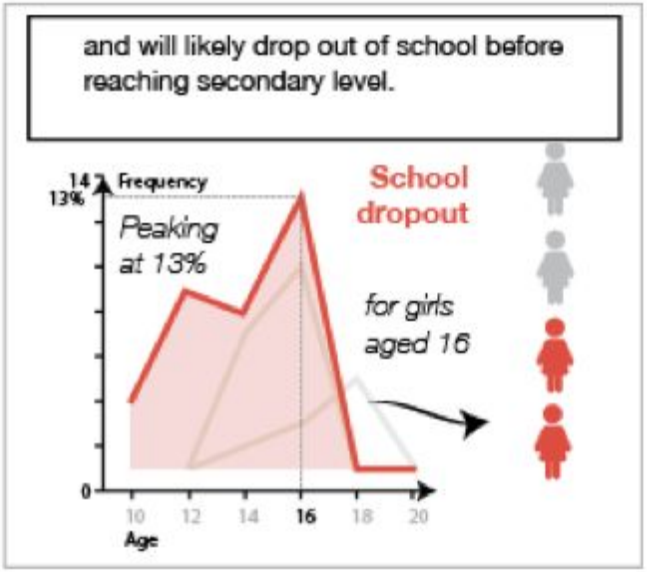
However, if her family is supported to diversify their assets by planting a wider variety of crops,

they are better able to spread their risks and therefore more resilient.

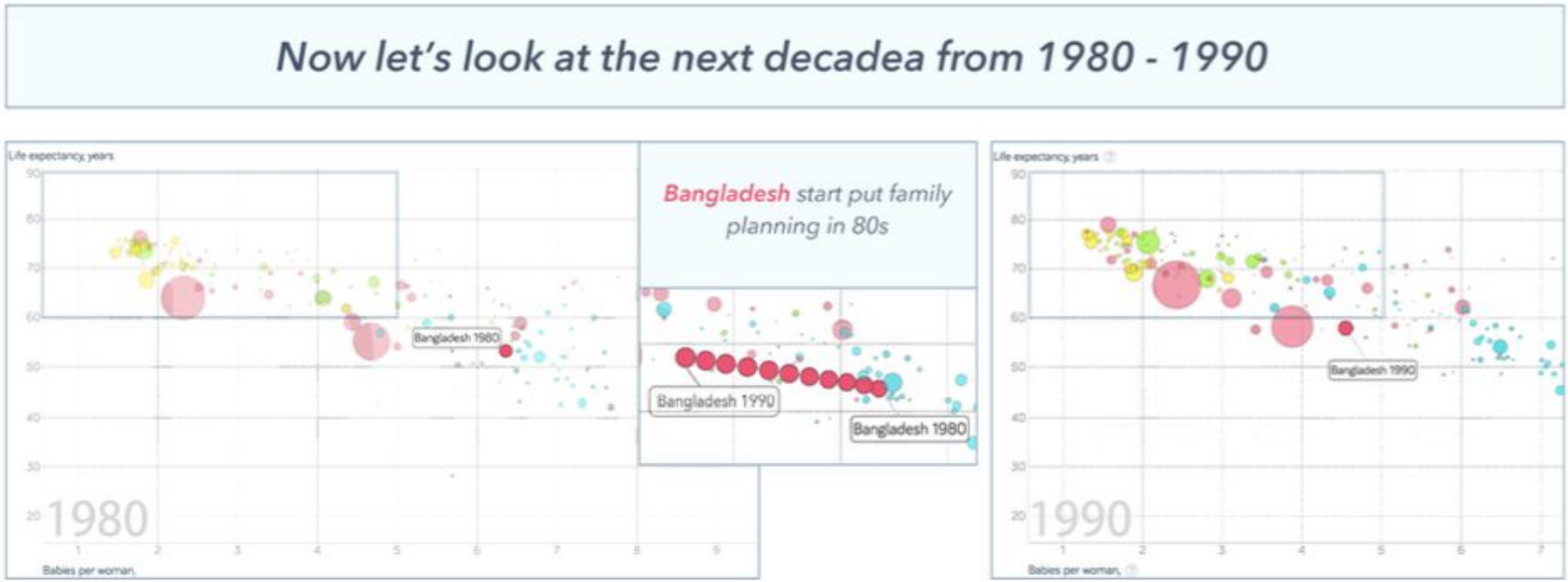
Multiple explanations



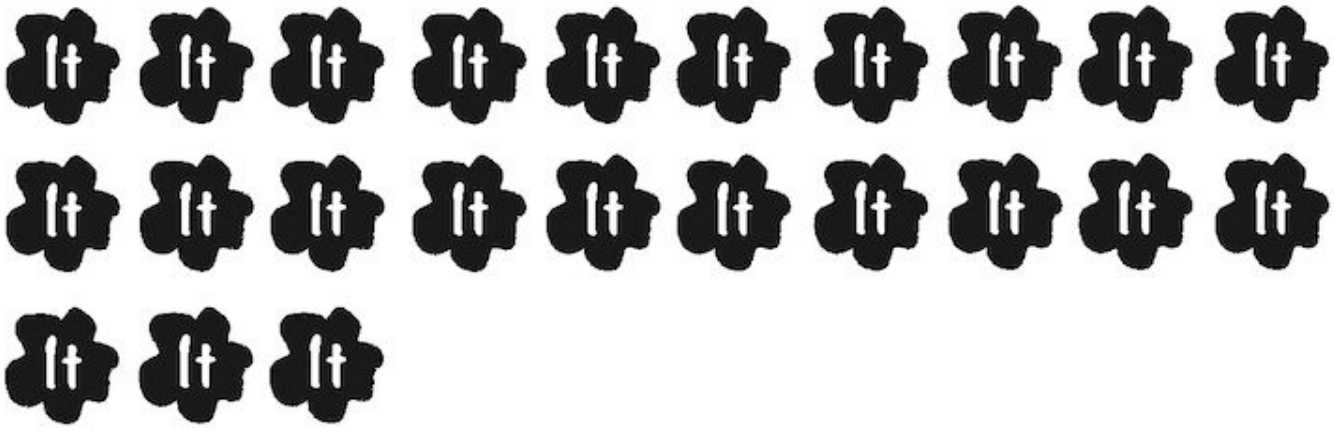




Transitions

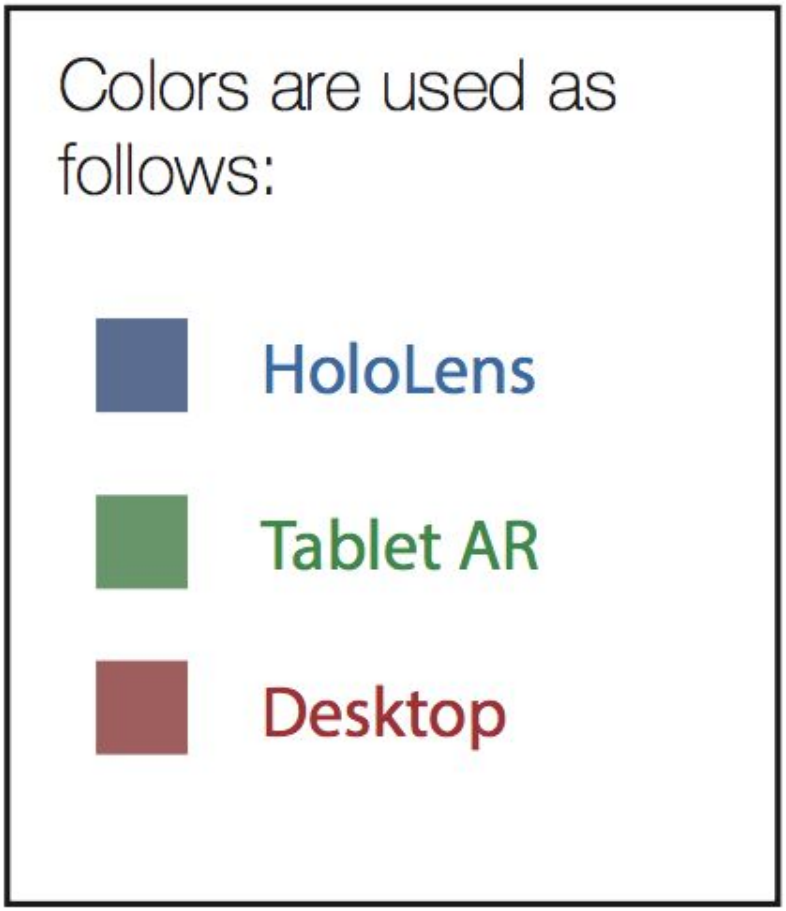


Concretization

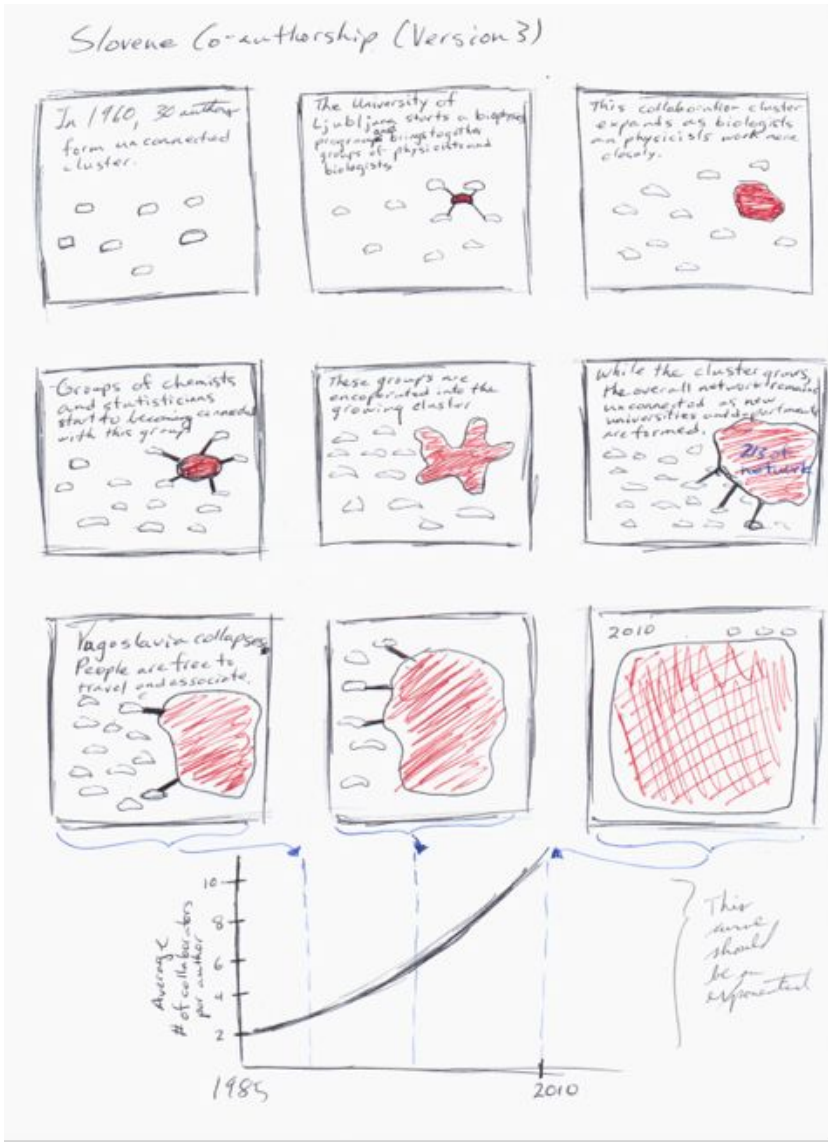


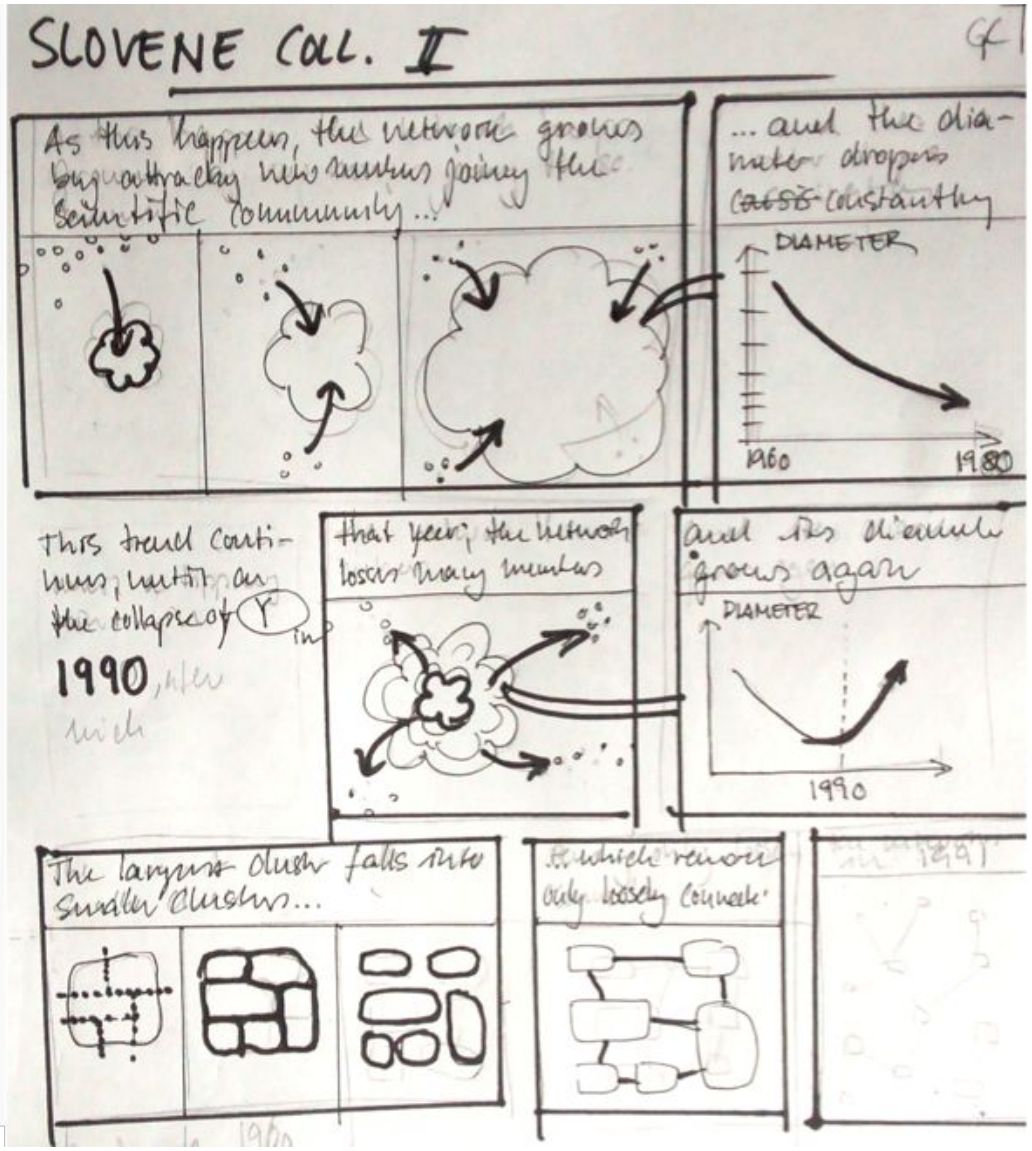
23 tons of CO2.

Legend



Create Data comic draft (30min)


Slovene Co-authorship (Version 3)
In 1960, 30 authors form an connected cluster.
The University of Ljubljana starts a big new program bringing together groups of physicists and biologists
This collaboration cluster expands as biologists and physicists work more closely.
Groups of chemists and statisticians start to become connected with this group
These groups are encorporated into the growing cluster
While the cluster grows, the overall network remains unconnected as new universities and departments are formed.
Rest of network
Yugoslavia collapses. People are free to travel and associate.
2010
Average # of collaborators per author
10
8
6
4
2
1985
2010
This curve should be exponential


SLOVENE COLL. II
4
As this happens, the network grows by attracting new authors joining the scientific community...
...and the diameter drops constantly
DIAMETER
1960
1980
This trend continues, until an the collapse of Y in 1990, when
that year, the network losses many members
and its diameter grows again
DIAMETER
1990
The larger cluster falls into smaller clusters...
Individuals remain only loosely connected
1991

Present in groups

- Put up comics
- Explain your story
- Which parts were hard
- Design decisions