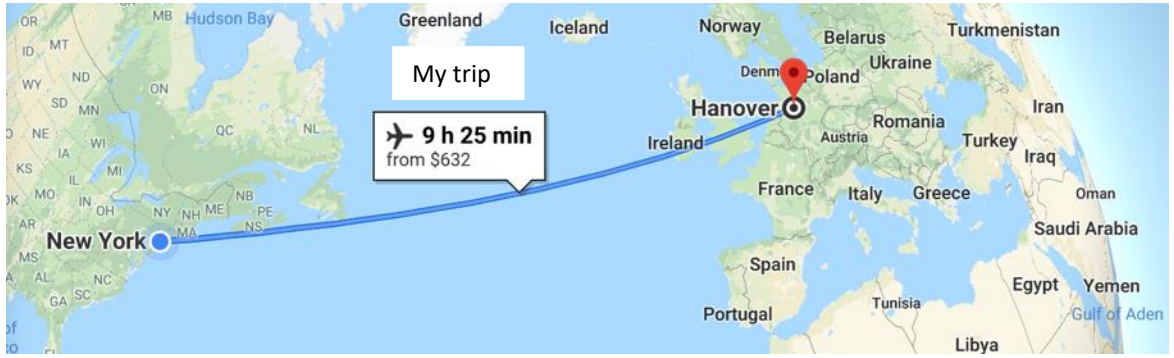
(Thoughts on)

Human Artificial Intelligence for Societal Resilience

Emmanuel Letouzé, PhD
Director and co-Founder, Data-Pop Alliance | Co-Founder and Executive Director, OPAL Project
Fellow, MIT Connection Science, Harvard Humanitarian Initiative and Overseas Development Institute

"Extreme Events - Building Climate Resilient Societies"
Herrenhausen Palace, Hanover, Germany, Oct 9-10-11 2019

VolkswagenStiftung



I contributed 2.2 tons of CO2 to come here. What will this and / or EUR53 achieve? Can we talk and tech our way out of this?

myclimate
shape our future

Calculate › Offset › Pay

Your flight:

From: New York Flushing Airport (US), FLU to: Hannover (DE), HAJ via: CDG, Paris [Charles de Gaulle], France, ER, Roundtrip
Economy Class, ca. 12,900 km, 1 traveller

EUR 53.00

projects in developing and newly industrialising countries.

ADD TO CART

myclimate carbon offset projects are reducing these emissions in developing and emerging countries. The projects meet the highest standards (Gold Standard, Plan Vivo) and contribute to the UN's sustainable development goals (SDGs). myclimate projects not only reduce greenhouse gas emissions but also contribute to the social, ecological and economic development in the region.

SUSTAINABLE DEVELOPMENT GOALS

A decade into the “Data Revolution”, with the rise of AI, many questions have energed about what is up and next

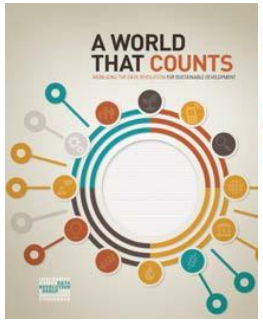
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 ?

*“We are at the beginning of what I call The **Industrial Revolution of Data.**”*
Joe Hellerstein , Nov. 2008

Source:courrierinternational

Fix Africa’s Statistics

By Marcelo Giugale



AFRIQUE CONTEMPORAINE

La révolution des données est-elle en marche ?
Implications pour la statistique publique et la démocratie
Thomas Roca et Emmanuel Letouzé

Source:Data Revolution Report

Data and development
Off the map

The Economist

Rich countries are deluged with data; developing ones are suffering from drought

Source: Digital Impact Alliance

TOWARDS A HUMAN ARTICIAL INTELLIGENCE FOR HUMAN DEVELOPMENT

Emmanuel Letouzé[1], Alex Pentland[2]
[1]Data-Pop Alliance, MIT Media Lab, and OPAL, [2]MIT and Data-Pop Alliance, and OPAL

Abstract *– This paper discusses the possibility of applying the key principles and tools of current artificial intelligence (AI) to design future human systems in ways that could make them more efficient, fair, responsive, and inclusive.*

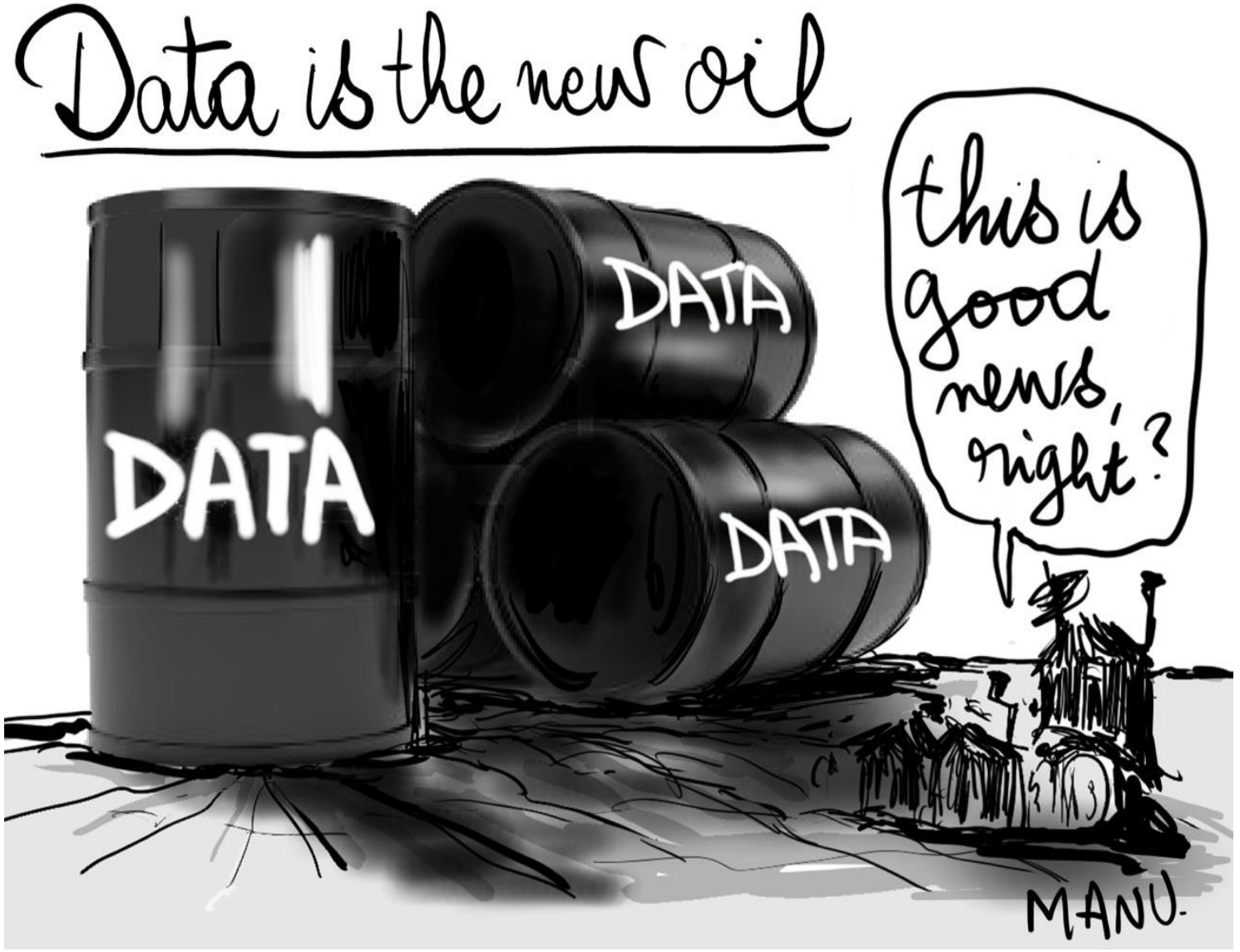
Fuel of the future

Data is giving rise to a new economy

How is it shaping up?

May 6th 2017

The world's most valuable resource is no longer oil, but data

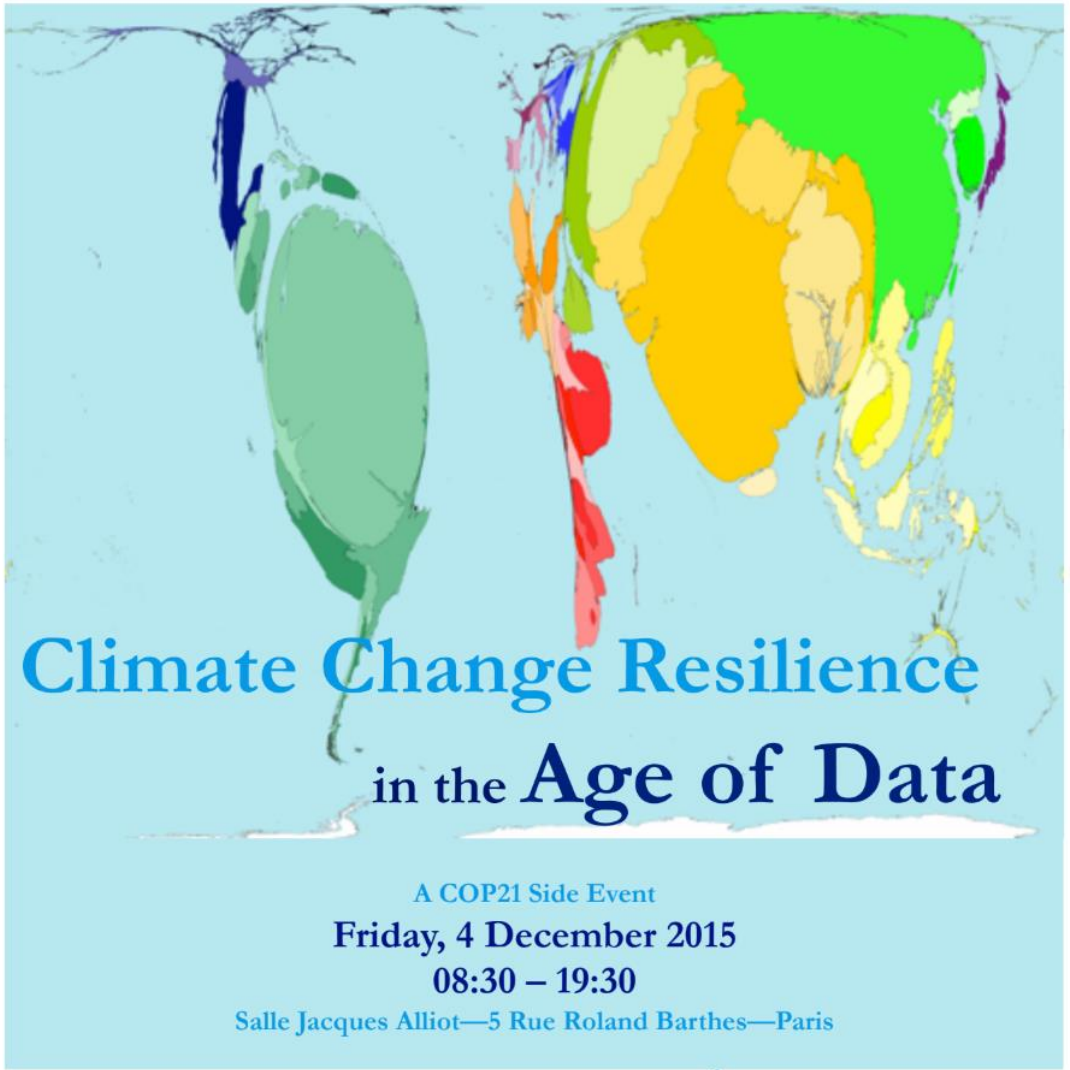


The interest in the Big Data – resilience nexus in not (very) new

DATA-POP ALLIANCE
SYNTHESIS REPORT

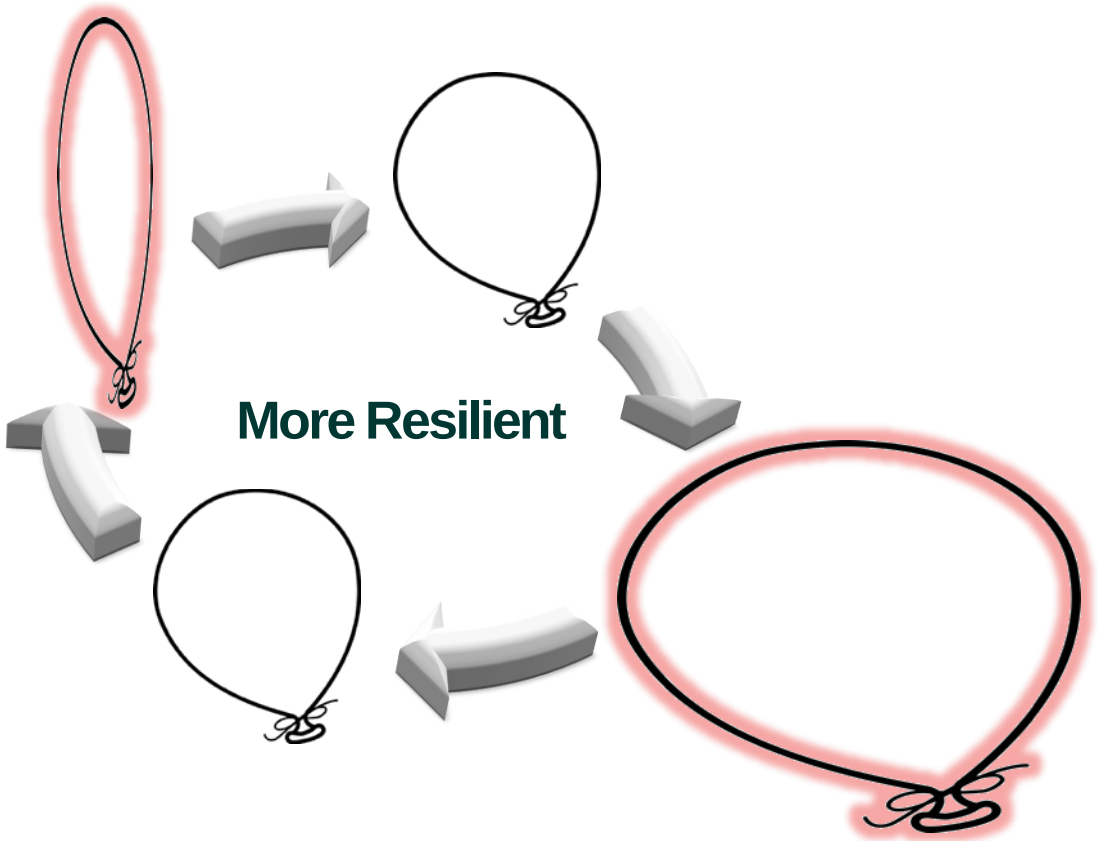
BIG DATA FOR CLIMATE CHANGE AND DISASTER RESILIENCE:
REALISING THE BENEFITS FOR DEVELOPING COUNTRIES

September 2015



“Big Data for climate change and disaster resilience”

(2015)

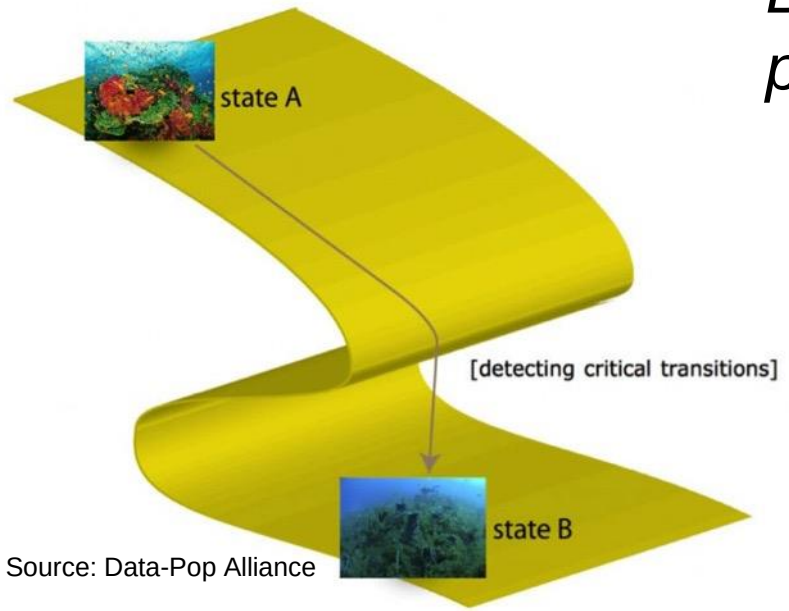


“The balloon is **more adaptive to stressors,** and thus overall, **more resilient.** It has the capacity to ‘bounce back’, and what characterizes this resilience – whether being resilient is desirable or not – is the fact that it **retained function while conditions changed”.**

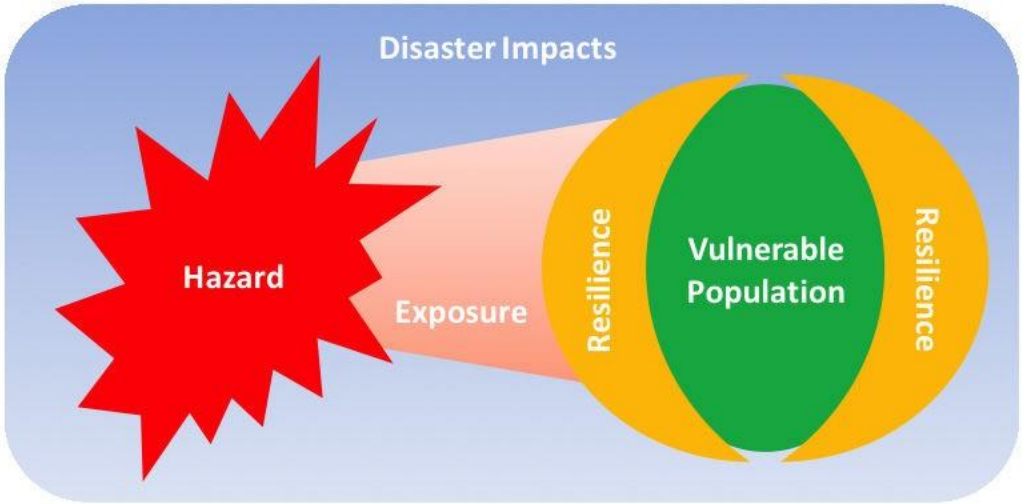
*“The glass bottle is **less adaptive and less resilient,** yet sturdier and more robust. It is less able to “absorb disturbance, reorganize and then retain essential functions, structures and feedbacks under changing circumstances”.*

“Big Data for climate change and disaster resilience”

(2015)



Source: Data-Pop Alliance



Big Data’s 4 functions (descriptive, predictive, prescriptive, discursive) can help through:

1. Monitoring hazards

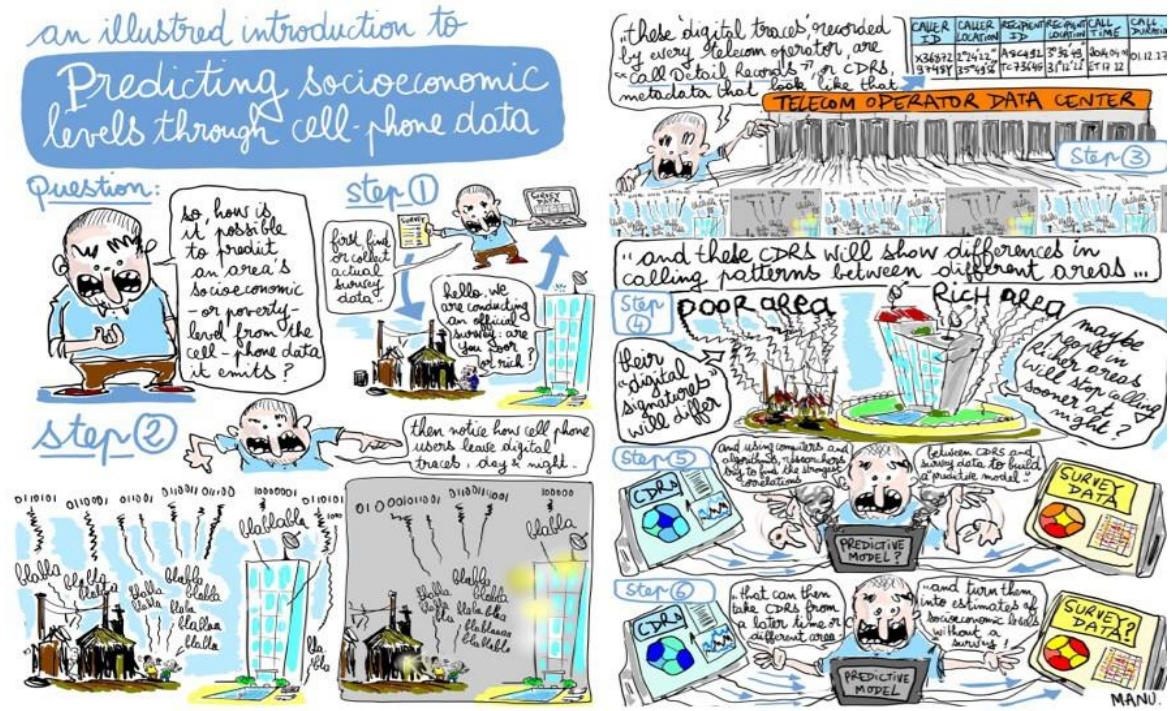
2. Assessing the resilience of natural systems

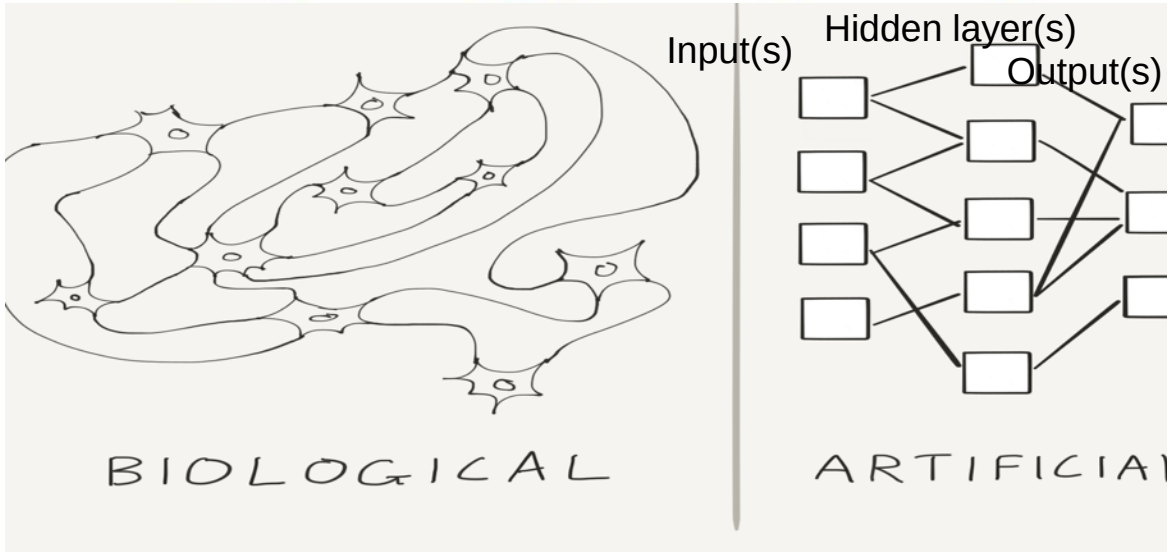
3. Guiding disaster response

4. Assessing exposure and vulnerability to hazards

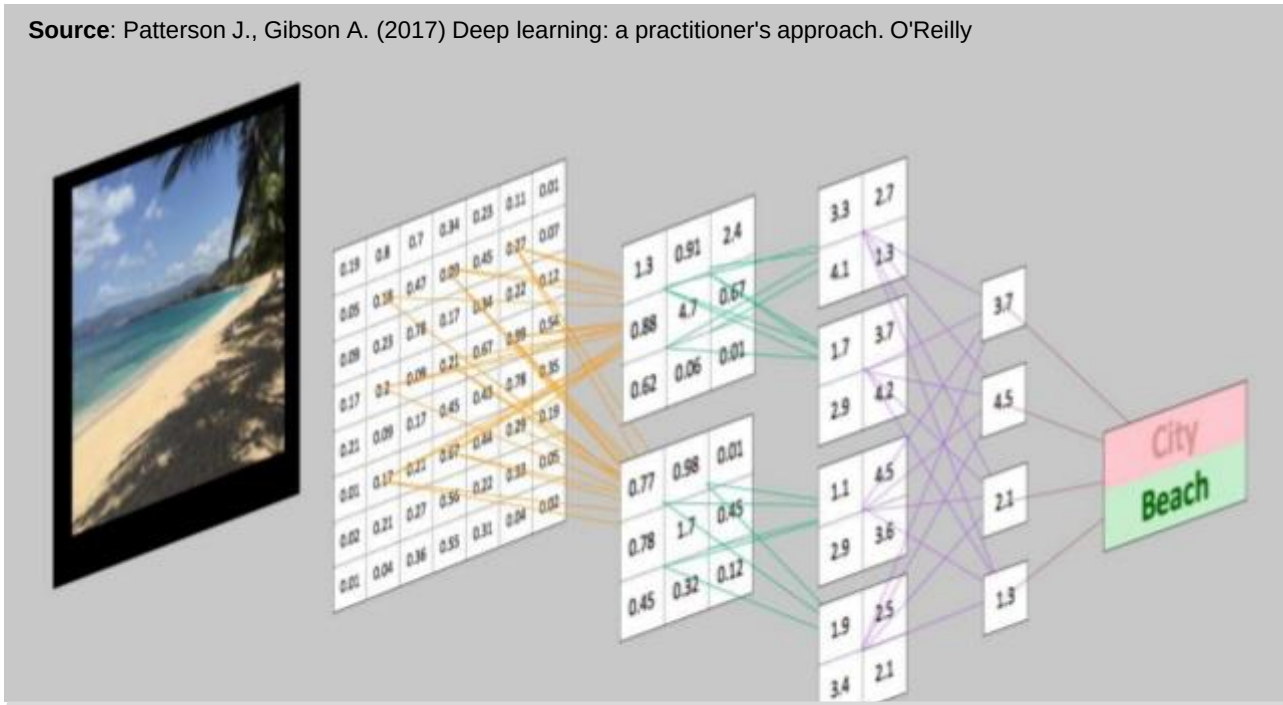
5. Engagement of communities

What are “new” AI, Machine Learning…changing?





Source: Patterson J., Gibson A. (2017) Deep learning: a practitioner's approach. O'Reilly



“Autonomous Driverless Car”

Image find under: https://dreamstime.com/stock-abbildung-autonomes-driverless-auto-image69816963

Could this be applied to human societies who (re)learn by copying and using data and algorithms towards a sort of 'Human AI' for fairer, more resilient societies?

TOWARDS A HUMAN ARTICIAL INTELLIGENCE FOR HUMAN DEVELOPMENT

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Abstract *– This paper discusses the possibility of applying the key principles and tools of current artificial intelligence (AI) to design future human systems in ways that could make them more efficient, fair, responsive, and inclusive.*

http://datapopalliance.org/wp-content/uploads/2019/02/HumanAIITU2018-15.pdf

What does “Human AI” mean and imply?

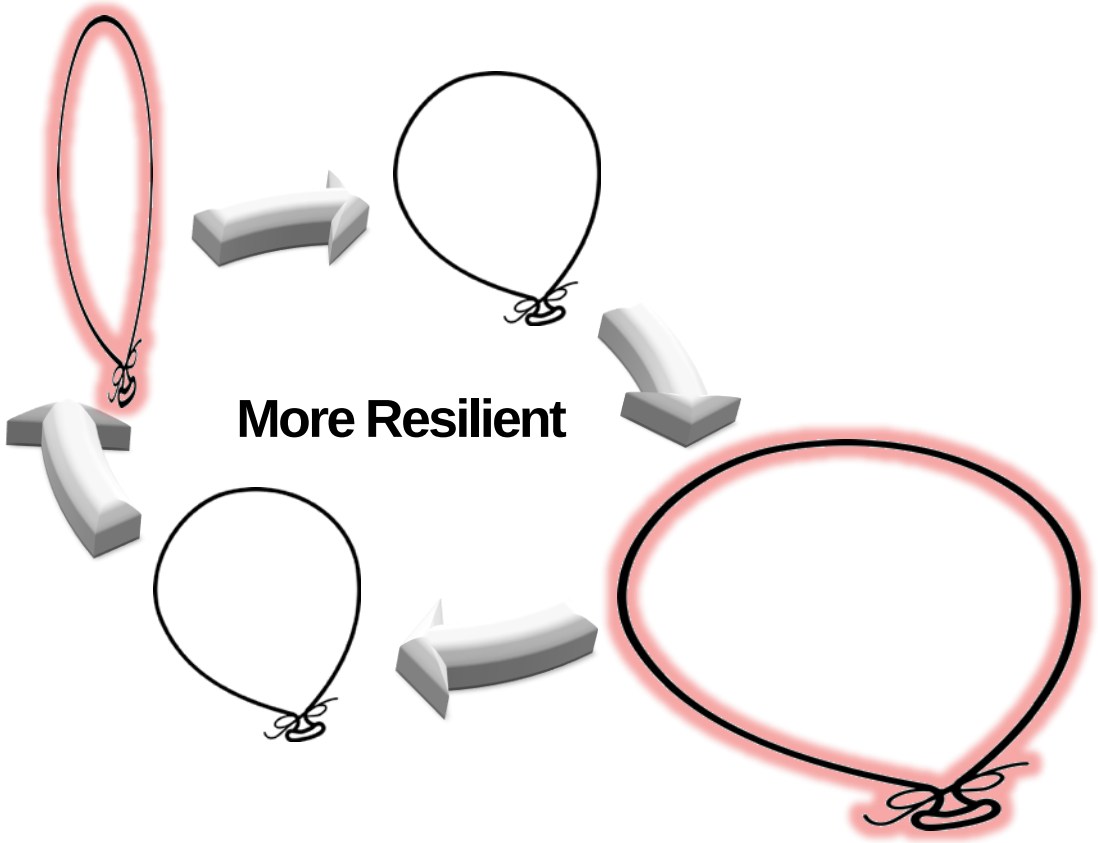

MIT Prof Alex ‘Sandy’ Pentland

“The big question that I'm asking myself these days is ***how can we make a human artificial intelligence?*** *(…) I don't want to think small—people talk about robots and stuff—I want this to be global. (…)*

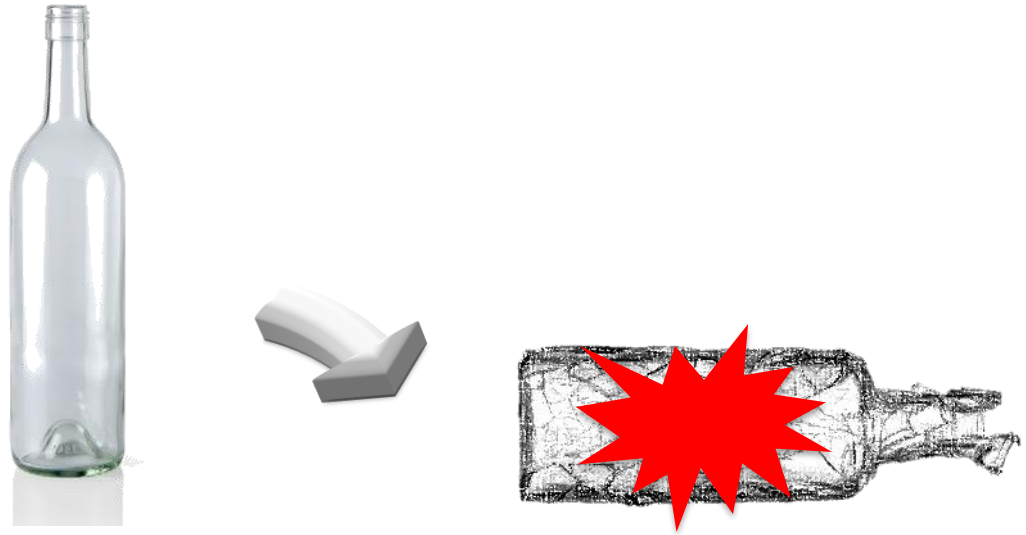
What would happen if you had ***a network of people where you could reinforce the ones that were helping*** *and maybe discourage the ones that weren't?* ***That begins to sound like a society****”.*

The Human Strategy *https://www.thehumanstrategy.mit.edu*

Recall….



Less Resilient



We need to be more like balloon + it would help if there was less changes in air pressure, wind…

Resilient societies are learning societies

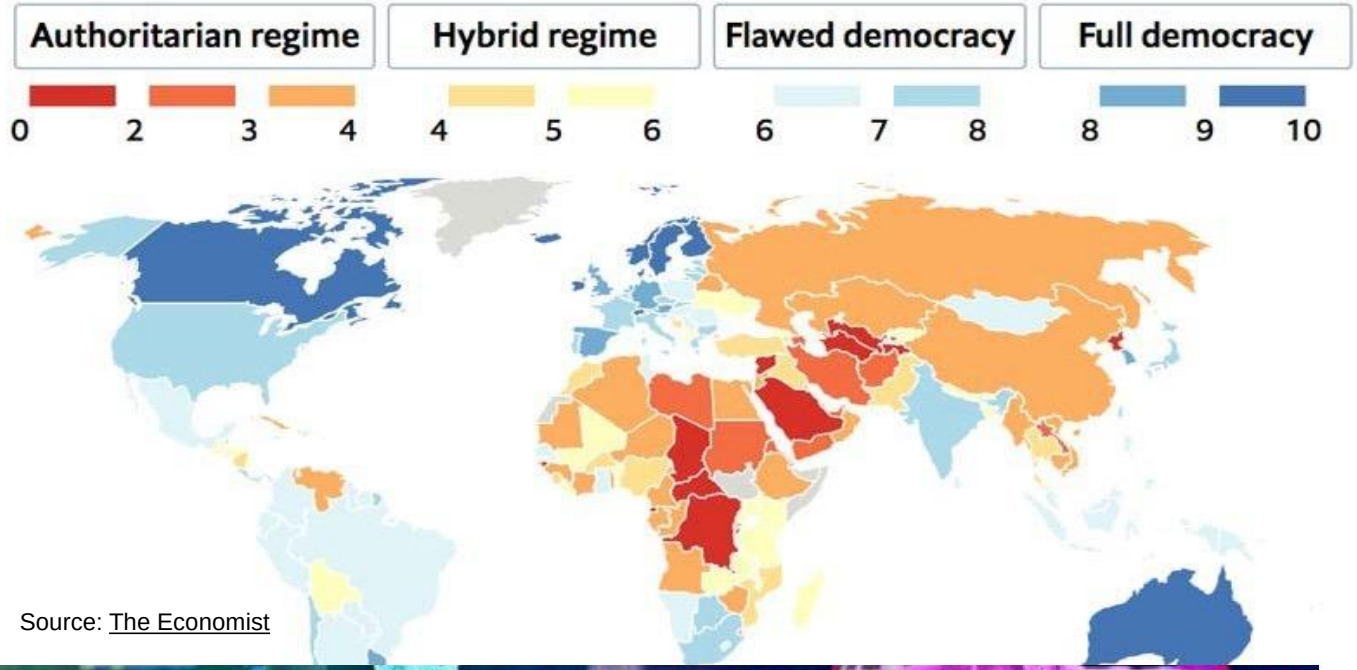
Source: dailymail.co.uk

Source: houstonchronicle.com

Source: Spyderskidoo / GettyImage

Why is it hard to do?

1. Lack of appropriate data access, connections, capacities, and culture
2. Bad/weak incentives from powerful agents (e.g. economic and political elites)
3. Distrust, disdain, echo chambers, alternative facts, fears, hampering innovation, cooperation, consensus, compromise
4. It is hard to change people's minds and habits
5. It can become "Orwellian", tech-and-elite centric, intrusive, all-too-prescriptive, self-perpetuating…

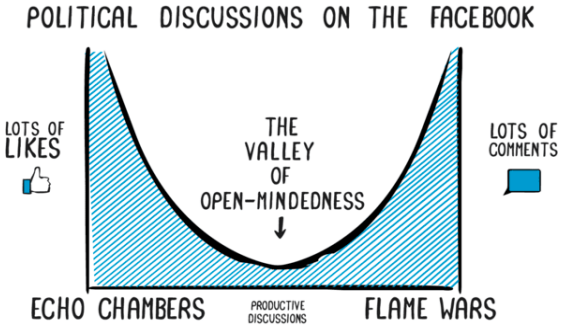


Source: The Economist

Source: The Atlantic.

Source: MIT Website

Source: New Yorker



Source: Nathan W. Pyle / Via buzzfeed.com

+ Data & tech and climate are not best friends …

How viral cat videos are warming the planet

Datacentre web servers, such as those used by Google and Facebook, to blame for 2% of greenhouse gas emissions – about the same as air travel

Data centers CO_2 emissions > entire airline industry

▲ Inside Google's data centre in Mayes County, Oklahoma. The firm's carbon footprint was equivalent to more than 1.7m tonnes of carbon dioxide in 2013. Photograph: Google/Rex

Source: Guardian

The Data Center Dilemma: Is Our Data Destroying the Environment?

The most important next step right now is simply education – and getting companies to realize that the importance and benefits of more eco-friendly data centers.

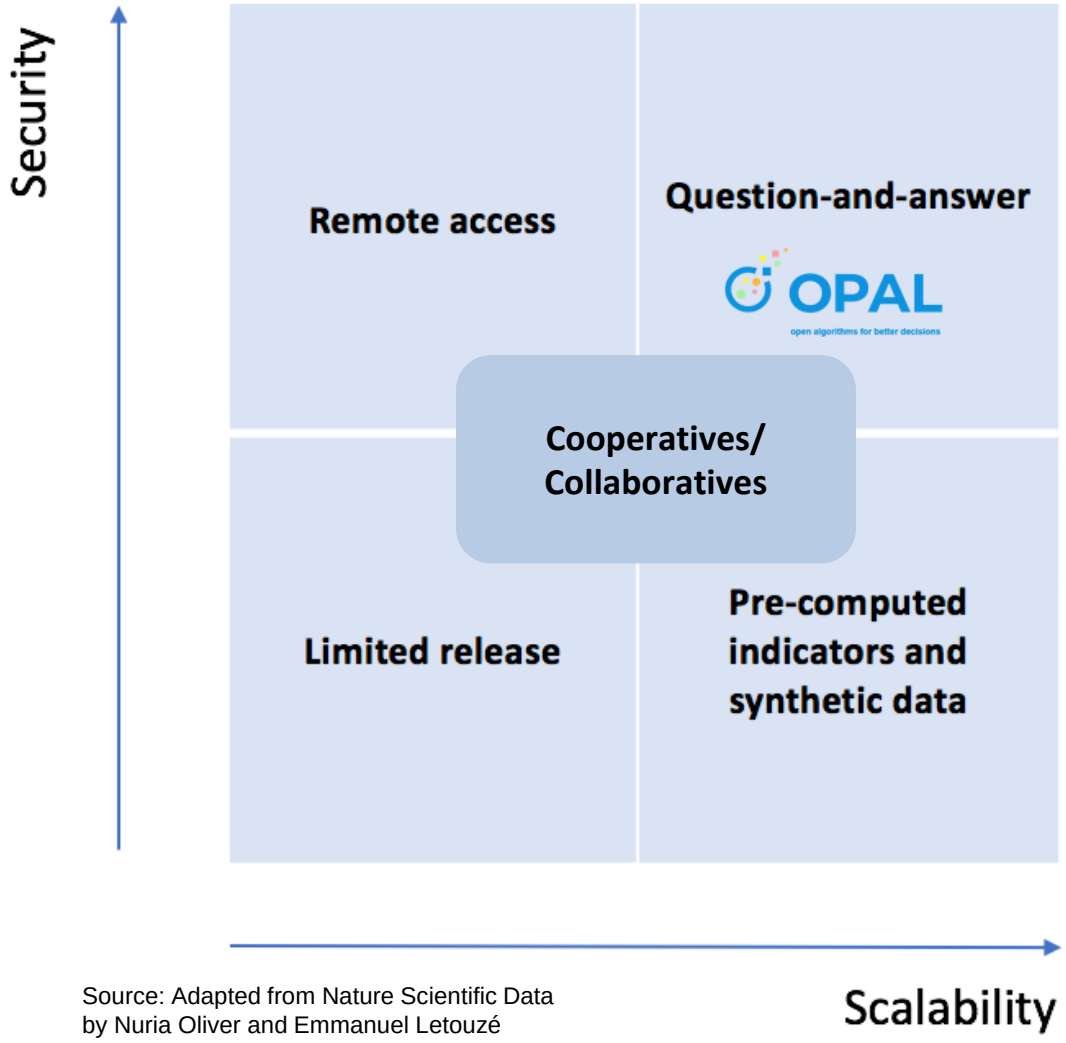
Apr 19, 2019

Source: mistbreaker.com

Trust me

i'm a data scientist

Towards Human AI: how to use data and algorithms safely, ethically, sustainably, systematically?



Source: Adapted from Nature Scientific Data
by Nuria Oliver and Emmanuel Letouzé

On the privacy-conscientious use of mobile phone data

Yves-Alexandre de Montjoye ✉, Sébastien Gambs, Vincent Blondel, Geoffrey Canright, Nicolas de Cordes, Sébastien Deletaille, Kenth Engø-Monsen, Manuel Garcia-Herranz, Jake Kendall, Cameron Kerry, Gautier Krings, Emmanuel Letouzé, Miguel Luengo-Oroz, Nuria Oliver, Luc Rocher, Alex Rutherford, Zbigniew Smoreda, Jessica Steele, Erik Wetter, Alex "Sandy" Pentland & Linus Bengtsson

Scientific Data **5**, Article number: 180286 (2018) | Download Citation ↓

Les Echos

DÉCRYPTAGE

Nos données peuvent-elles servir l'intérêt général ?

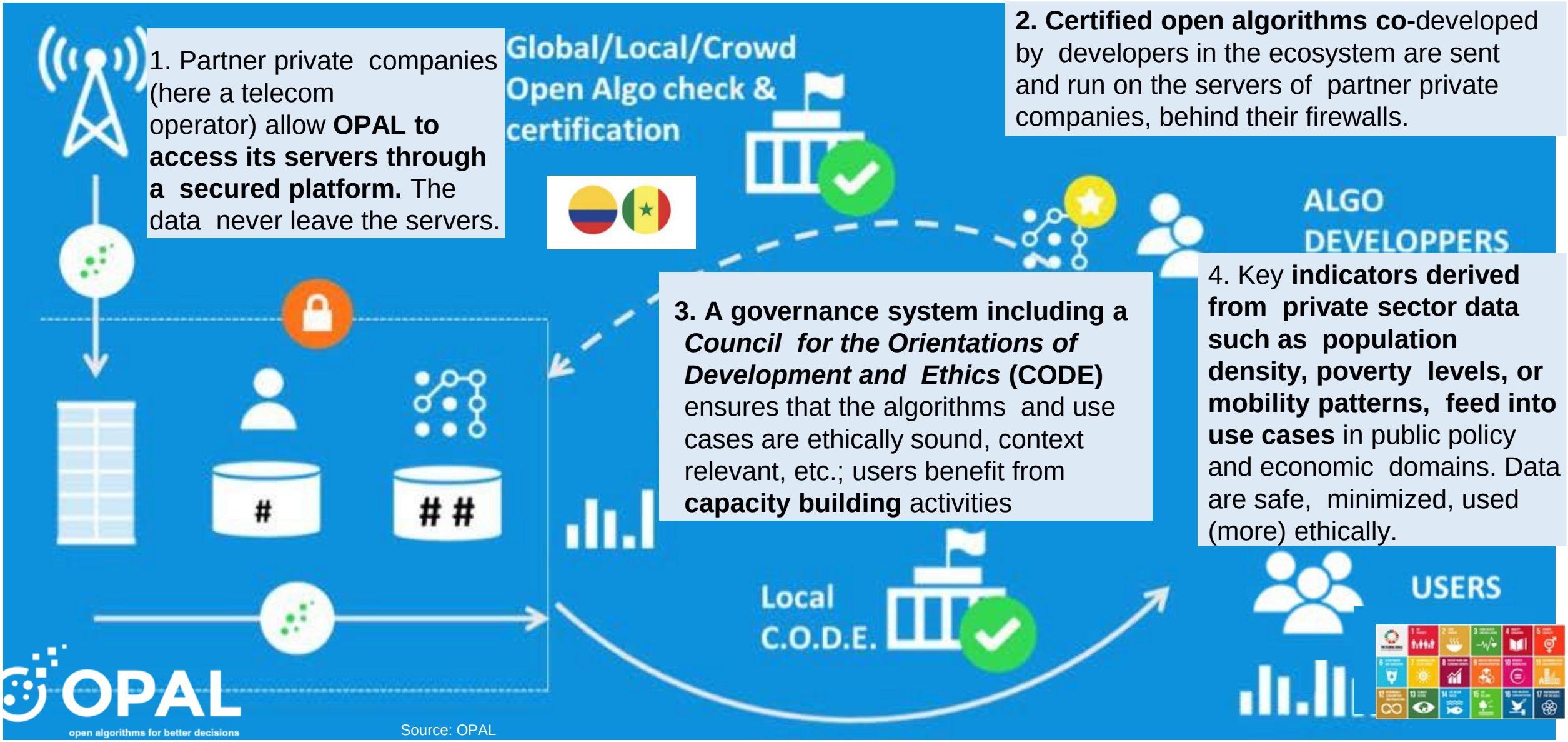
PROSPECTIVE - De plus en plus de voix s'élèvent pour demander que les données collectées par les entreprises privées soient mises au service de la collectivité.

Open algorithms: A new paradigm for using private data for social good

By Thomas Roca, Emmanuel Letouzé | 18 July 2016

Source: Devex

The Open Algorithms approach aims to set 21st century data systems and standards for Human AI

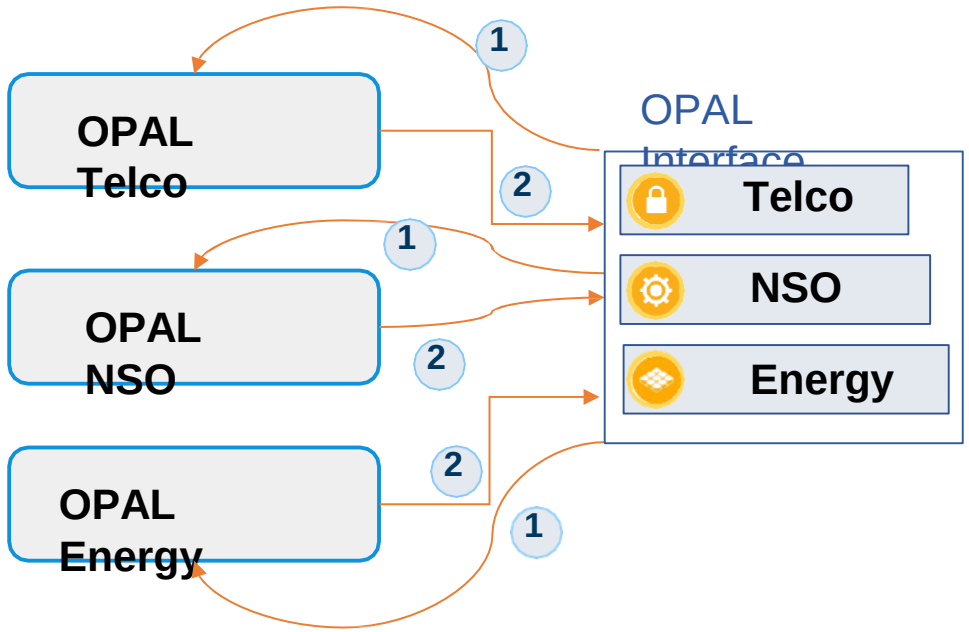


Source: OPAL

Next, OPAL will aim to query multiple data sources

First step

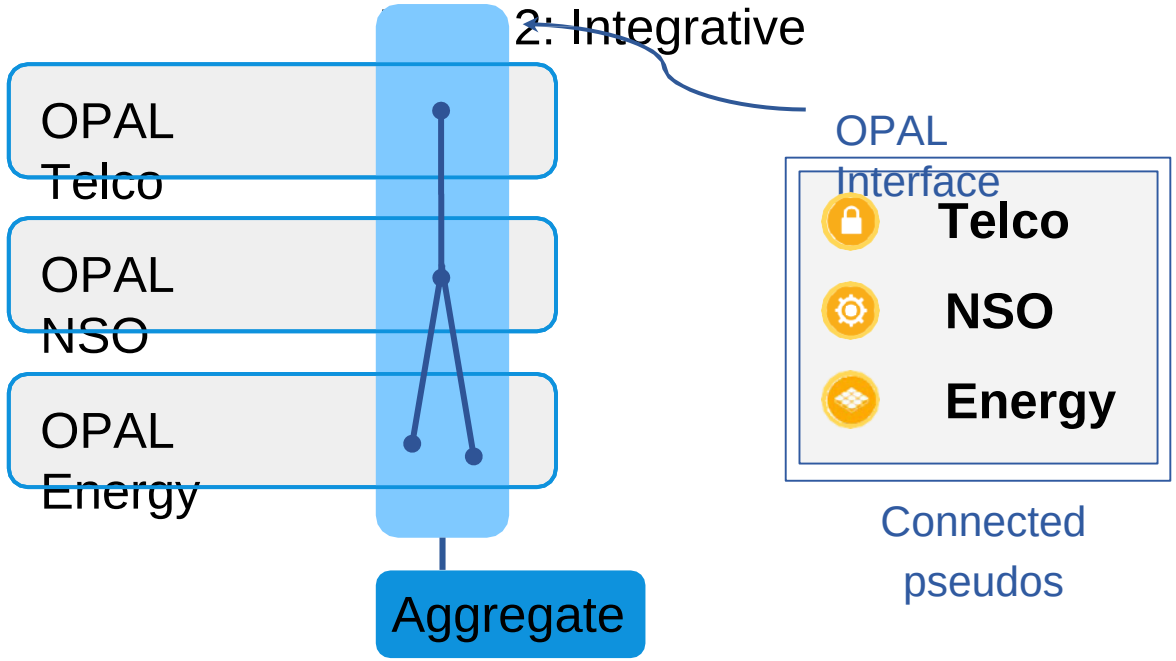
Level 1: Additive



1. Call algo on separate OPALs
2. Get individually aggregated results (current MIT OPAL demo)

OPAL's vision

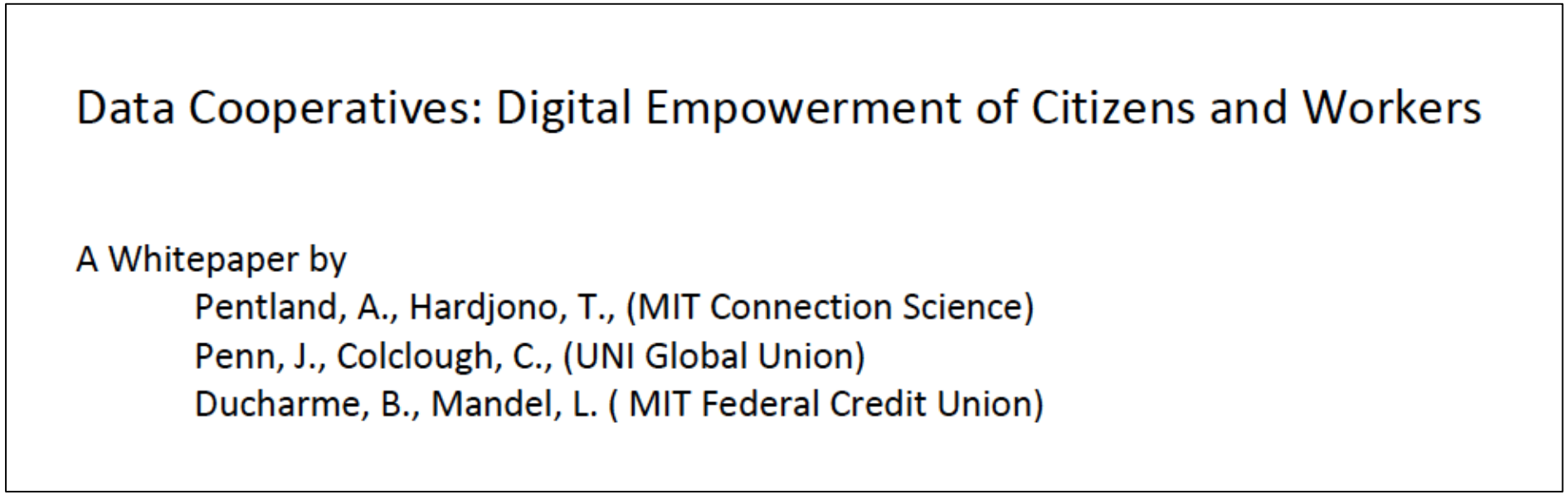
2: Integrative



1. Call level 2-algo that runs across OPALs
2. Aggregate combined results

Source: OPAL

Data + tech in support of data rights for better individual and collective actions


Data Cooperatives: Digital Empowerment of Citizens and Workers

A Whitepaper by

Pentland, A., Hardjono, T., (MIT Connection Science)

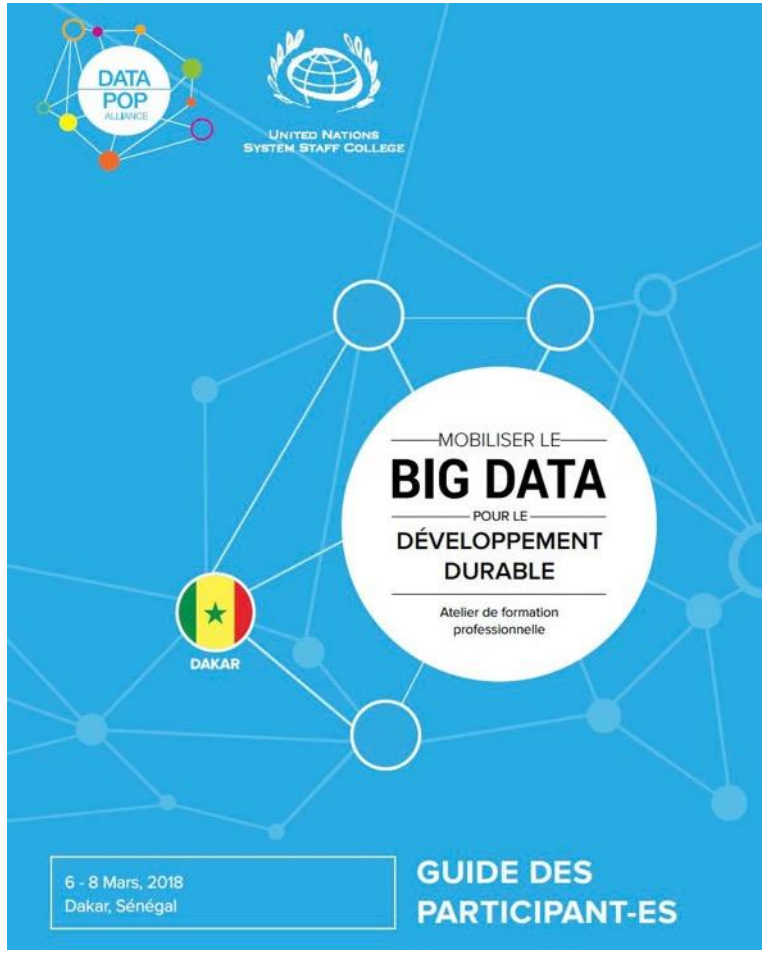
Penn, J., Colclough, C., (UNI Global Union)

Ducharme, B., Mandel, L. (MIT Federal Credit Union)

Source: MIT White Paper

"During the last decade, ***all segments of society have become increasingly alarmed by the amount of data, and resulting power, held by a small number of actors.*** *[…]. The same collective organization* [as the unions of the 19th Century] *is required to move from an individualized asset-based understanding of data control to a collective system based on rights and accountability, with legal standards upheld by a new class of representatives who act as fiduciaries for their members. […]. Who will lead this historic, and necessary transformation? The answer could well be trade unions. […] A critical first step will be to affirm worker's data rights into legislation and regulation. Such rights would protect against manipulation, discrimination, and unreasonable surveillance. "*

Not just tech, also talk: “data literacy", data strategies, connections, and “rational compassion”



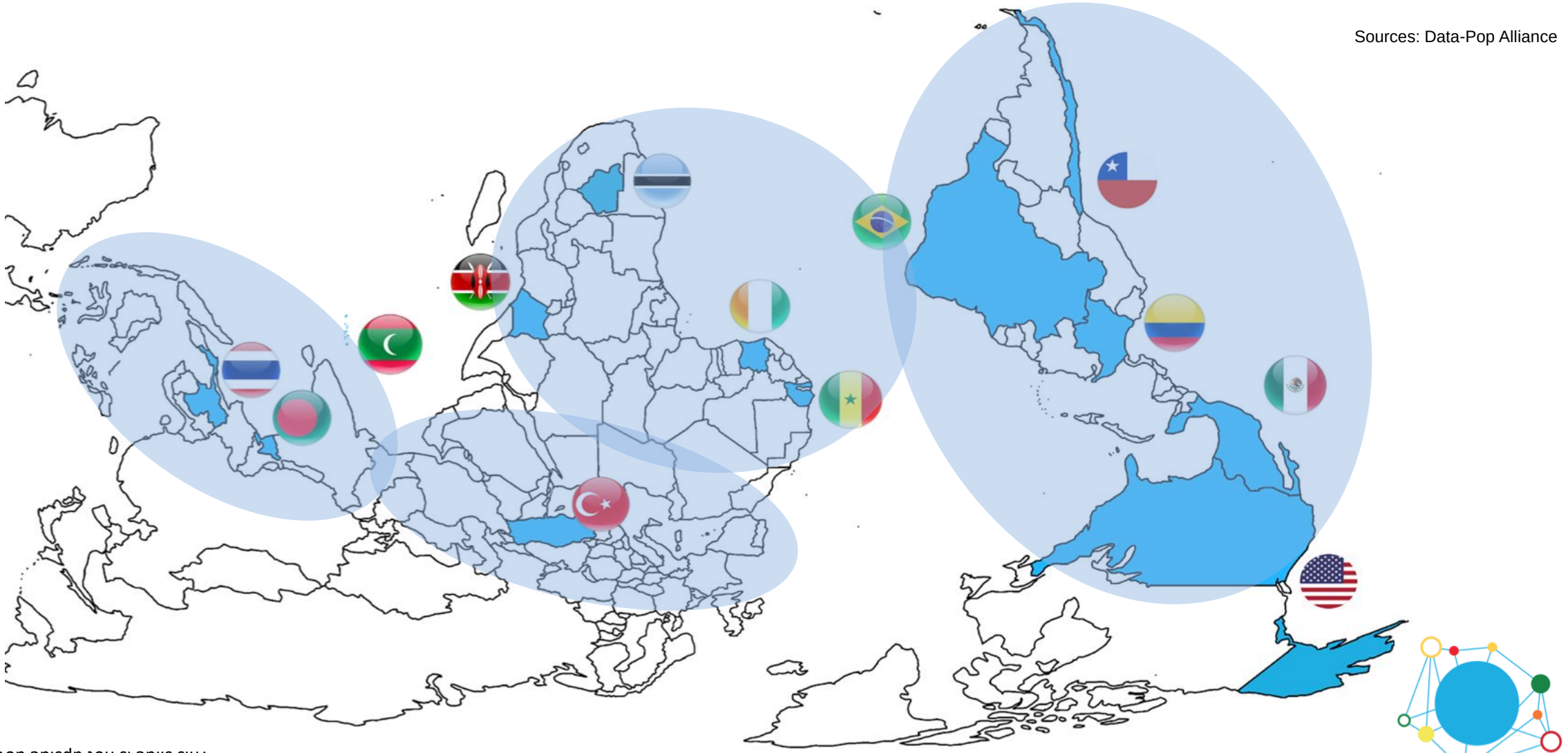
Building Literacy for the Data Generation

December 18, 2015

A unique opportunity exists to develop data literacy education for children born into a world shaped by big data.

Sources: Data-Pop Alliance

Data-Pop Alliance's approach: developing work across and between regional "Data Spaces"



Sources: Data-Pop Alliance

This slide is not upside down…

Some of our ongoing work on societal resilience

Research on ethical private data sharing

Support to Colombia's National 1st Big Data Strategy

Research on Big Data for the Sustainable Development Goals

Data Literacy Program to build next generation data skills for sustainable development

Research programme on criminality in Colombia and Mexico

Research program on global development challenges including climate resilience through Big Data

Research and advocacy work on Fintech and Carbon Saving Wallets

Sources: Data-Pop Alliance

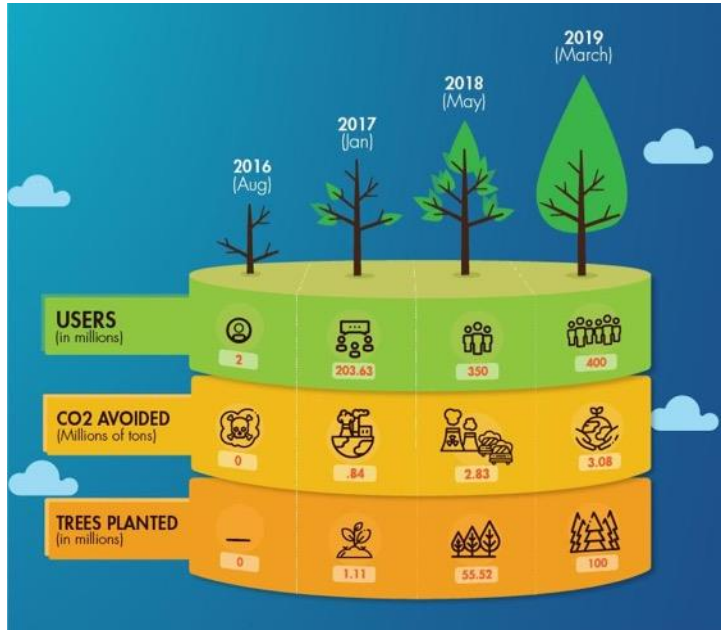
Example: Ant Forest: Changing climate change behaviors through data, IoT and “gamification”

Since 2016, Alipay’s Ant Forest has incentivized over **500 million individuals** to adopt greener, more sustainable behaviors, resulting in avoided emissions estimated at over 3 million tons of CO2.

Its success and easy replicability of its model is a call to establish more transparent and accurate carbon accounting methods and/or standards at the individual level.

Social media feature

IoT for real-time field monitoring



Source: Ant Forest and Data-Pop Alliance

Main message

fight against malaria." The company is also collaborating with researchers to conduct similar studies in Myanmar and Thailand.

But this type of promotion irks malaria researchers who aren't convinced that the information is helpful, especially given the lack of resources for proven methods to combat the disease — such as health workers, bed nets, insecticides and malaria drugs. "On an intellectual level, this [mobile-phone research] is attractive," says Myaing Nyunt, a malaria researcher at Duke University who is based in Myanmar. "But the thing in my head is that actual work is becoming harder to sustain in villages." Global funding for malaria has plateaued in the past few years, she points out — and with it, progress.

The same practical argument could be made against research on parasite genetics. But Nyunt says that call-record analyses trouble her more, because people haven't consented to take part.

DATA FOR DEVELOPMENT

In 2012, the mobile-phone company Orange, together with data scientists at the UN and several universities, held a 'Data for Development' challenge to encourage researchers to explore positive uses for call-detail records. Phone companies mostly analyse the records to boost their businesses, says Robert Kirkpatrick, director of UN Global Pulse, an initiative to harness big data. "We wanted to show how it could be used for the public good," he says.

Orange let scientists analyse anonymized call records from customers in Côte d'Ivoire. In one project, researchers found that brief calls surged before small violent events in Côte d'Ivoire, and suggested that future analyses could help officials to predict danger and thus intervene — but that idea hasn't been taken up.

in the studies. "Is there no way around understanding how isolated refugees are besides using an invasive technique to track people through mobile technology?" asks Alexandrine Pirlot de Corbion, a programme leader at Privacy International in London, a charity that advocates for the right to privacy. Another way to find out whether refugees are isolated would be to ask them questions, which allows them to decide what to share, she adds.

The Turkish computer engineer who helped to organize the refugee challenge, Albert Ali Salah, now at Utrecht University in the Netherlands, defends the project's worth. Anyone who might want to harm any of the 3.6 million Syrian refugees in Turkey already knows their neighbourhoods, he argues. But call-record intelligence might help policymakers by giving them quantitative information about refugee movements. And an ethics committee vetted the results: when research indicated refugees were working at a location illegally, for example, the committee told them not to publish the finding.

> "NOW IS THE TIME TO PUT IN PLACE STANDARDS TO DO THIS SAFELY, AT SCALE AND ETHICALLY."
>
> Emmanuel Letouzé

Responding to the charge that such data challenges have not helped people, Kirkpatrick says exploration was a necessary first step. The next phase in call-records research, he says, should be cost–benefit analyses that look at the investment needed to conduct a study, roll out an intervention and appraise the advantages for communities.

SECURITY AND CONSENT

In the meantime, exploratory studies continue.

risk off us," Rivers explains.

Letouzé, de Montjoye and their colleagues are piloting a system called Open Algorithms (OPAL) in Senegal and Colombia. As well as running analyses on phone-company servers, their model includes a committee that vets and shapes researchers' questions so that the data analysed are less specific. For instance, if aid workers want to know how many people leave Senegal's capital city Dakar each week, the committee can decide that records should be aggregated by day, rather than by hour. This reduces the number of extra, unapproved questions that the results can answer. "It's not a perfect system," de Montjoye says, "but we are trying to find a way to mitigate risks, while making sure data can be used for good."

Since last year, groups including Flowminder and phone companies that are headquartered in Europe must comply with the European Union's general data-protection regulation. Although anonymized and aggregated data seem to be exempt, Letouzé thinks that the law signals a trend towards privacy, and suggests that data scientists should consider how they might incorporate consent into their studies. OPAL is planning to send subscribers a text message asking if they want to opt out, which causes Letouzé some concern. "There are studies showing that when you give people an option, you lose about half," he says. He'd like to change that by convincing people of the worth of their studies, and by giving them assurances about data security.

UNINTENDED CONSEQUENCES

Advocates for data security and human rights say that, although technical changes are welcome, more careful risk assessments are required, because records don't need to be

Thank you

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@opalproject.org
@mit.edu

MANU cartoons are created by Emmanuel Letouzé