(Big) Data, Big Promise

Data for Peace & Justice

- Thomas Baar (Centre for Innovation, Leiden University)

Minor Responsible Innovation

13.00 - 16.00 - 14 September 2016

TPM, Delft

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CENTRE FOR INNOVATION
Leiden University

Universiteit Leiden

Peace Informatics Lab

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How can we leverage the potential of (Big) Data for furthering Peace and Justice?

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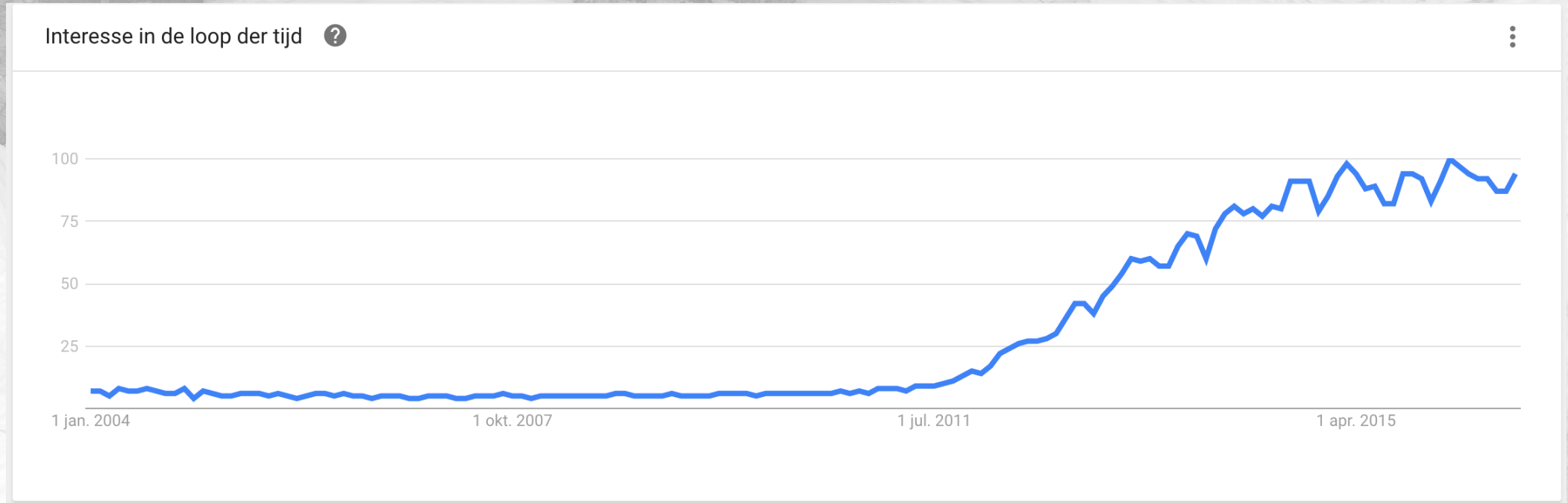
The Rise of Big Data

(Google Trends, 2016)



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With the emergence of Big Data new actors come into play with different roles, objectives and responsibilities (Letouzé, 2015)

The exponential increase in the volume and types of data available (United Nations, 2014)

The development of new tools, technologies and approaches in order to process, analyse and work with data (Tom White, 2012)

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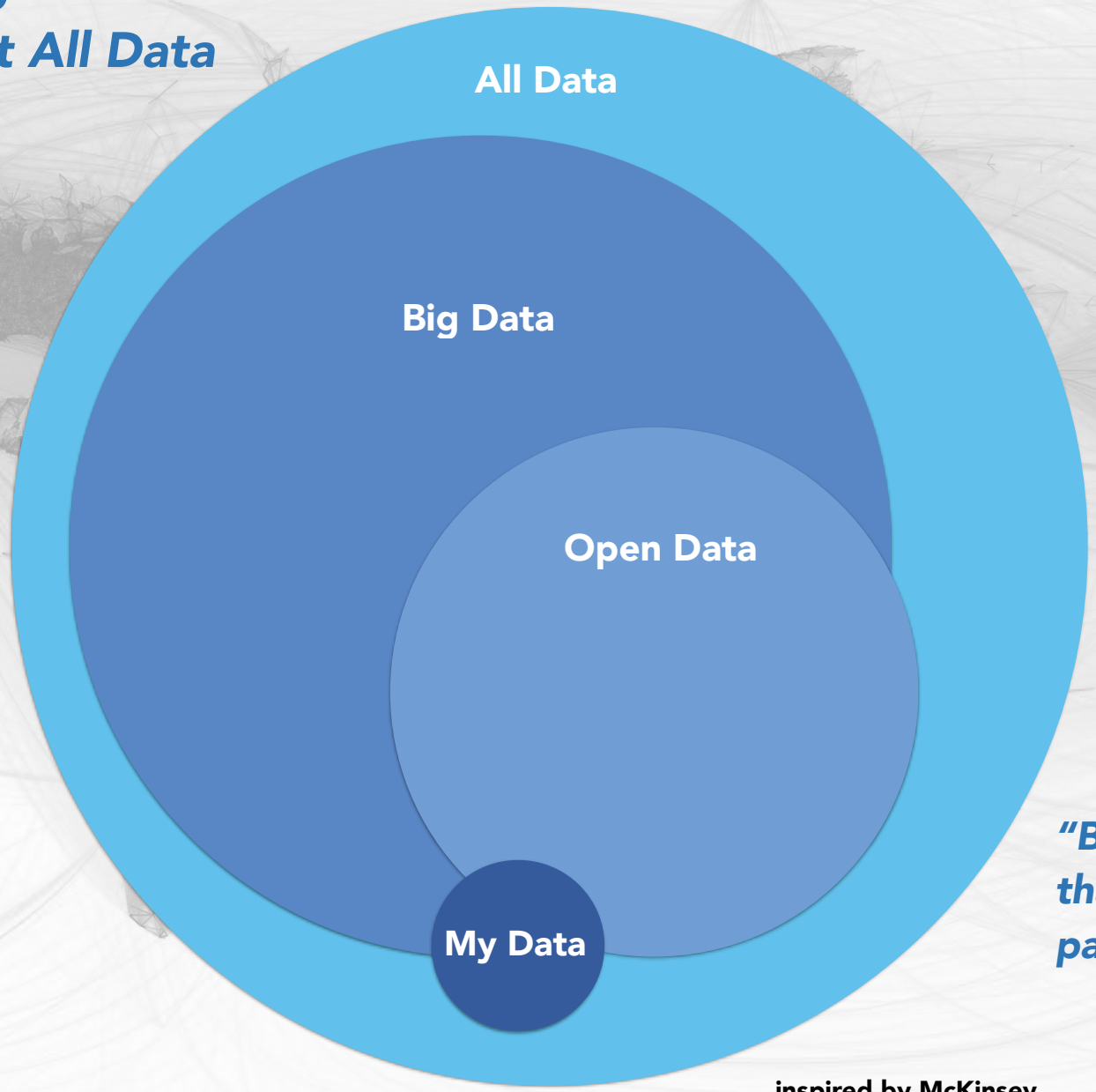
Big Data is not All Data



inspired by McKinsey

"Big Data is data that is larger than we have seen before in a particular context."

(Taylor, 2015)

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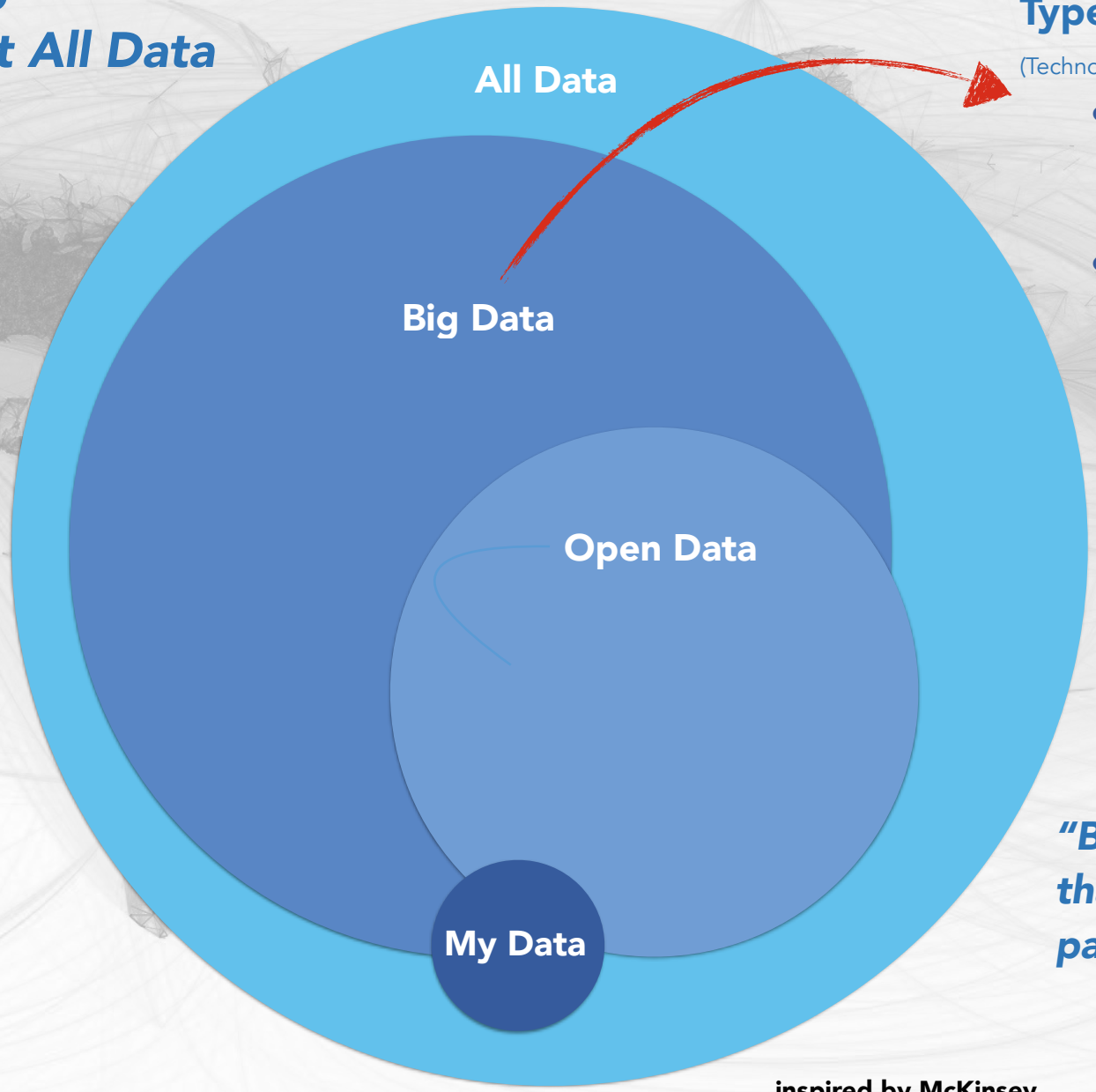

inspired by McKinsey

Types of Data Sources

(Technopolis, OII and CEPS, 2015; and OECD, 2016)

- **Public Datasets**

  (administrative (open) data an statistics about populations, economic indicators, education, etc.)

- **New Data Sources**
  - **Citizen Reporting** (e.g. crowdsourcing, mobile phone surveys)
  - **Open Web Data** (e.g. social media, blogs, websites, video content);
  - **Digital Breadcrumbs** (e.g. mobile phone data, financial transaction data);
  - **Remote Sensing Data** (e.g. satellite imagery).

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(Taylor, 2015)

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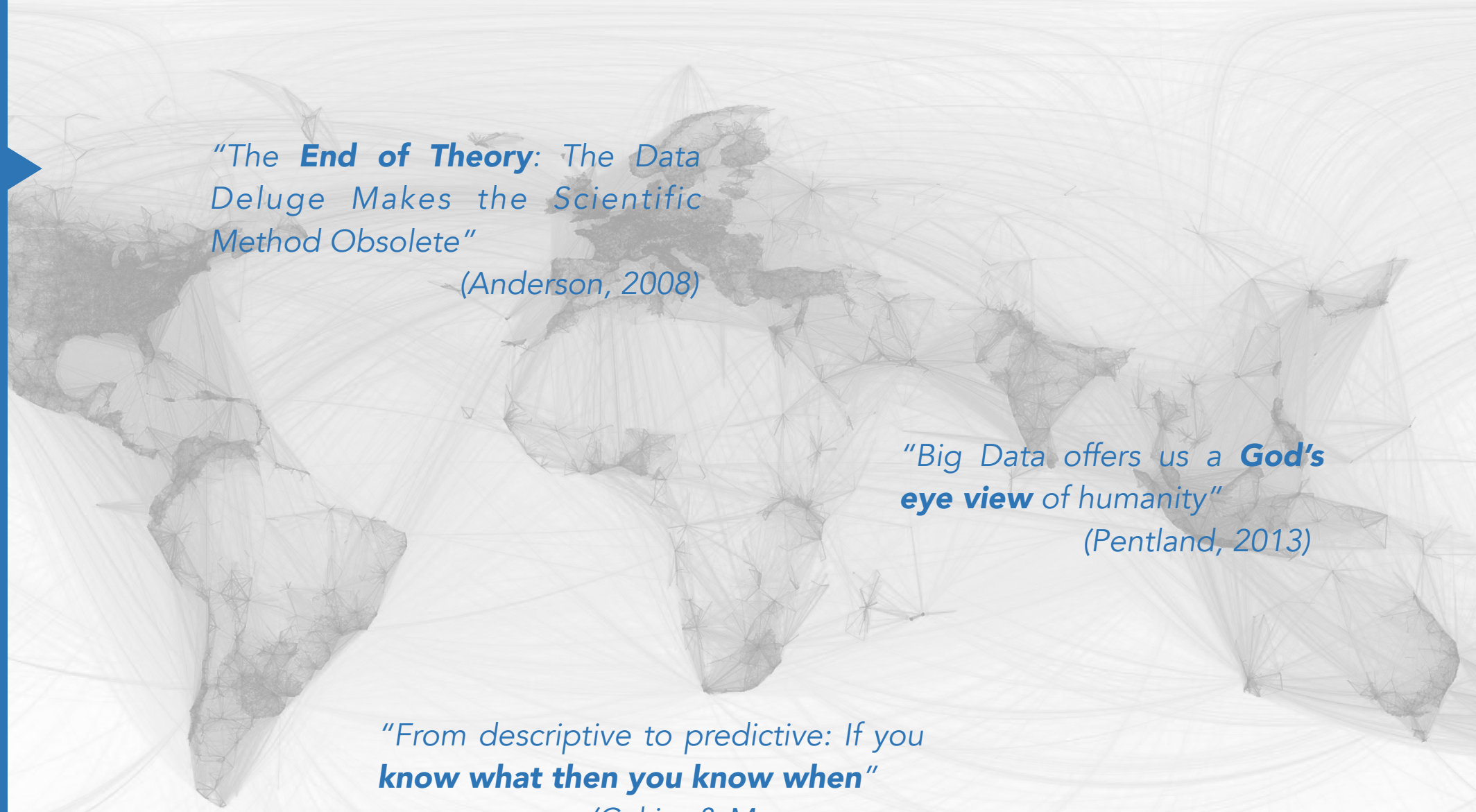

*"The **End of Theory**: The Data Deluge Makes the Scientific Method Obsolete"*
(Anderson, 2008)

*"Big Data offers us a **God's eye view** of humanity"*
(Pentland, 2013)

*"From descriptive to predictive: If you **know what then you know when**"*
(Cukier & Mayer-Schönberger, 2008)

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Data4Development Challenge 2013

- Ivory Coast: December 2011 - April 2012
- Orange: Mobile Phone Data (Call Detail Records)

D4D Challenge winner 'development' category

- Berlingerio et al. (2013) 'All Aboard: a system for exploring urban mobility and optimizing public transport using cellphone data'
- Abidjan, Ivory Coast
- Public Transportation

Challenge: local context

- Bias in the sample
- Ground truth

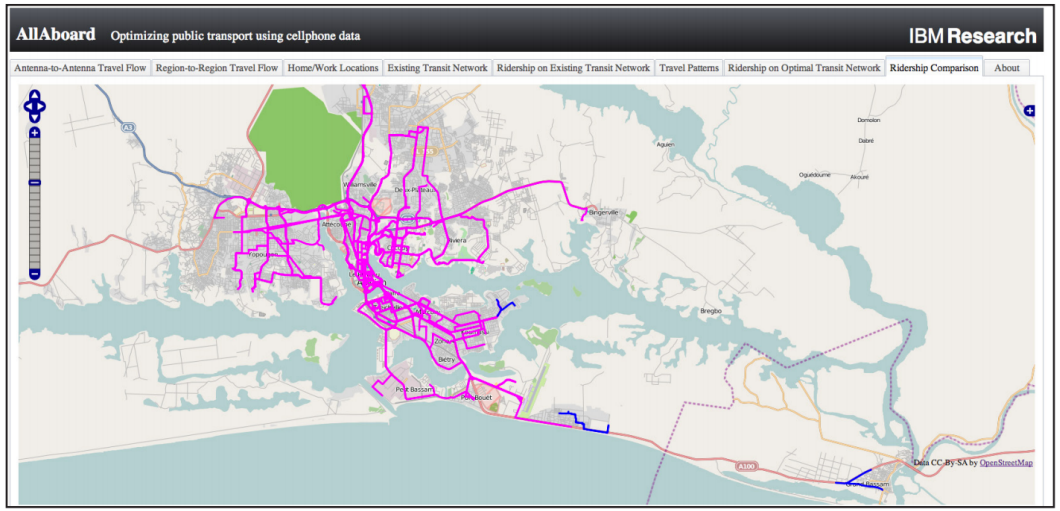

Figure 6: This image shows the existing public transport network (SOTRA) in Abidjan and additional routes suggested by the study. Source: Berlingerio et al., 2013.

By analyzing CDR data, scientists mapped new routes to decongest Abidjan's crowded roads, which would reduce travel time by 10%.

see Linnet Taylor (2014)

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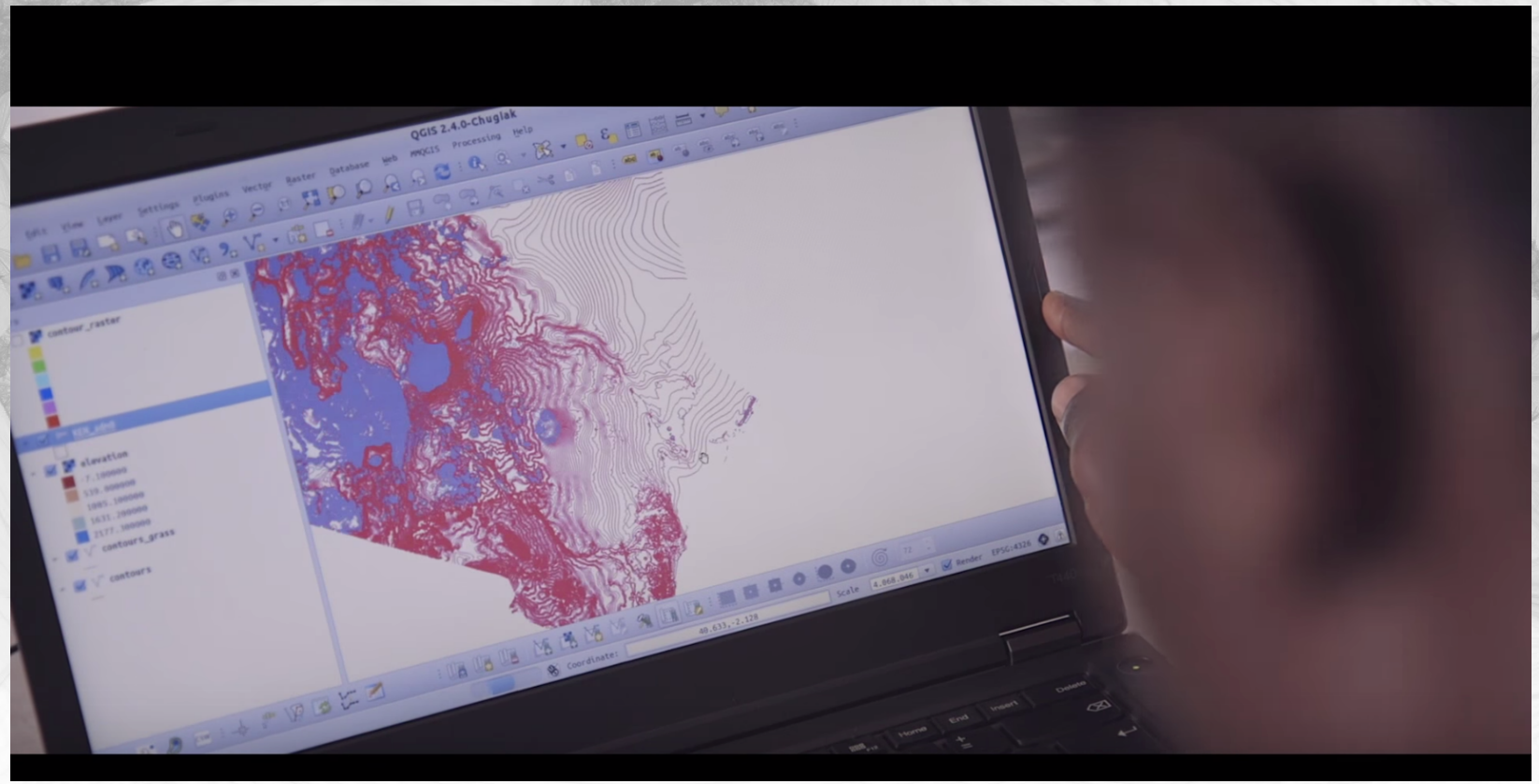
Making the Invisible Visible



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Big Data, Big Promise

'Data are the lifeblood of decision-making and the raw material for accountability.'

(UN Data Revolution, 2014)

'Big Data and other innovative data-driven approaches for policymaking create opportunities for evidence-informed policy and modernisation of public sectors.'

(Technopolis, OII and CEPS, 2015)

4 Value Levers

- Granular
- Real-Time
- Dynamic
- Data-Informed

3 Revolutions

- Measurement
- Management
- Learning & Accountability

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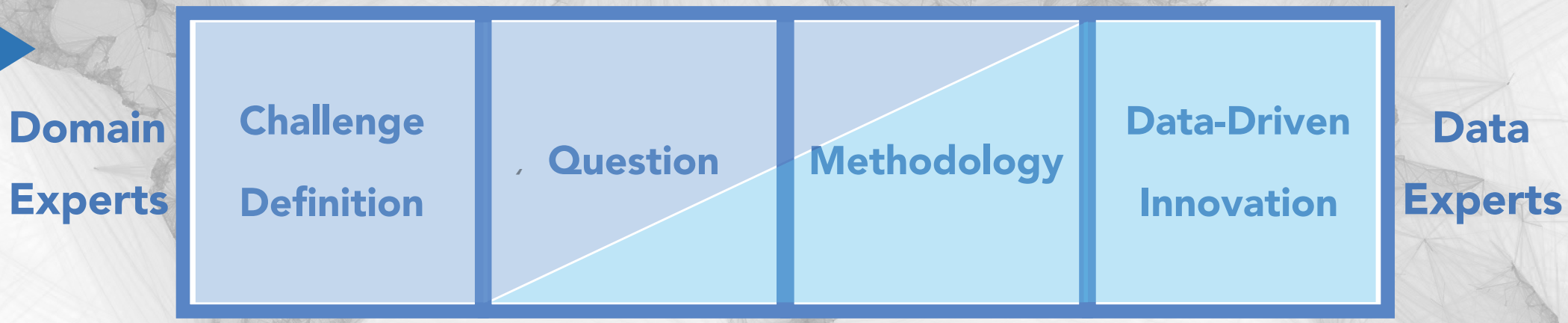
Operationalisation

Making Data-Driven Innovation Work



Source: 'Big Data for Peace Informatics'
(authors: U. Mans and T. Baar)

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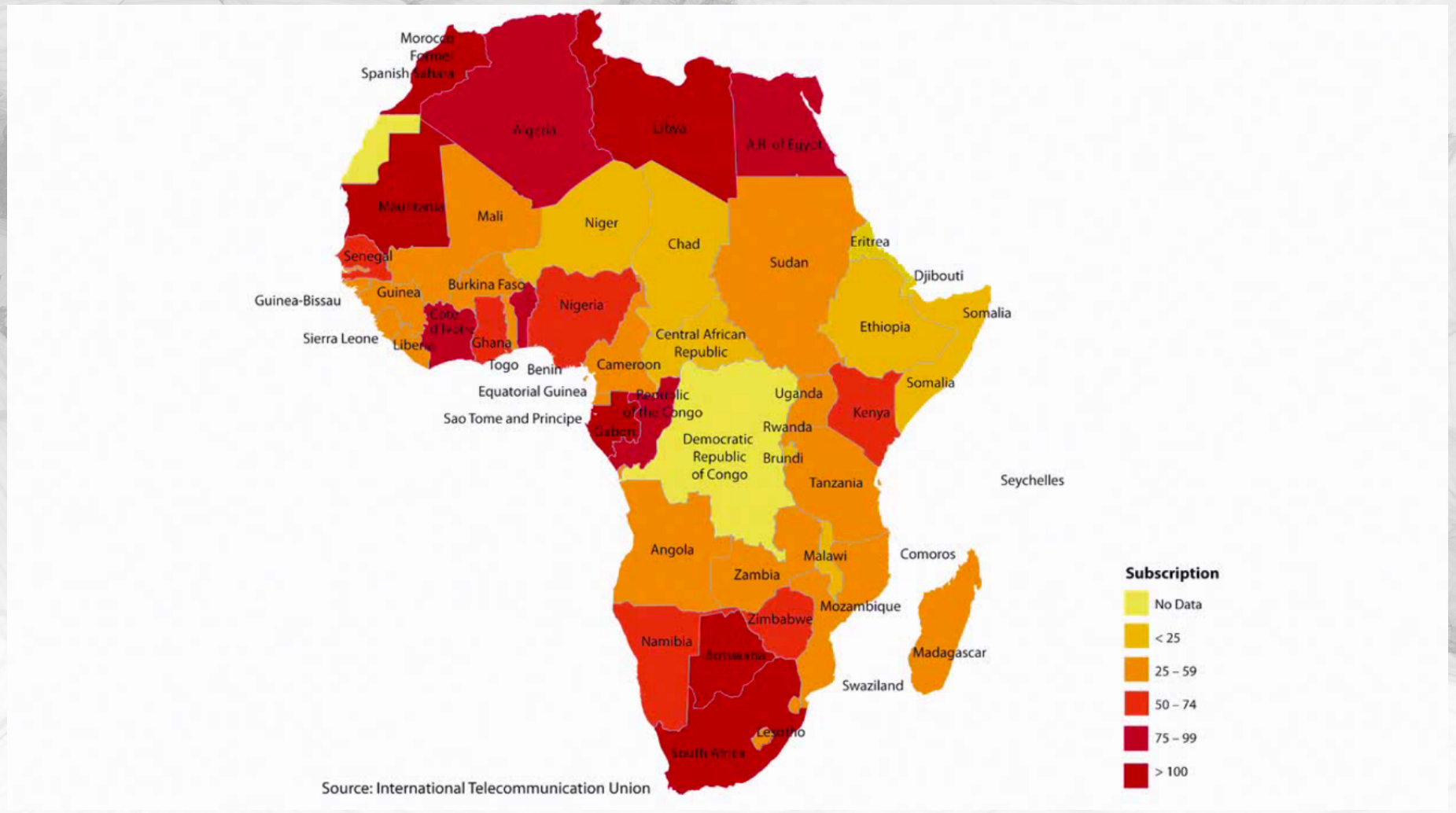
A Clearer View of Poverty

World Bank



New Data Stream

Citizen Reporting

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Predicting poverty and wealth from mobile phone metadata

Blumenstock, Cadamuro & On, 2015

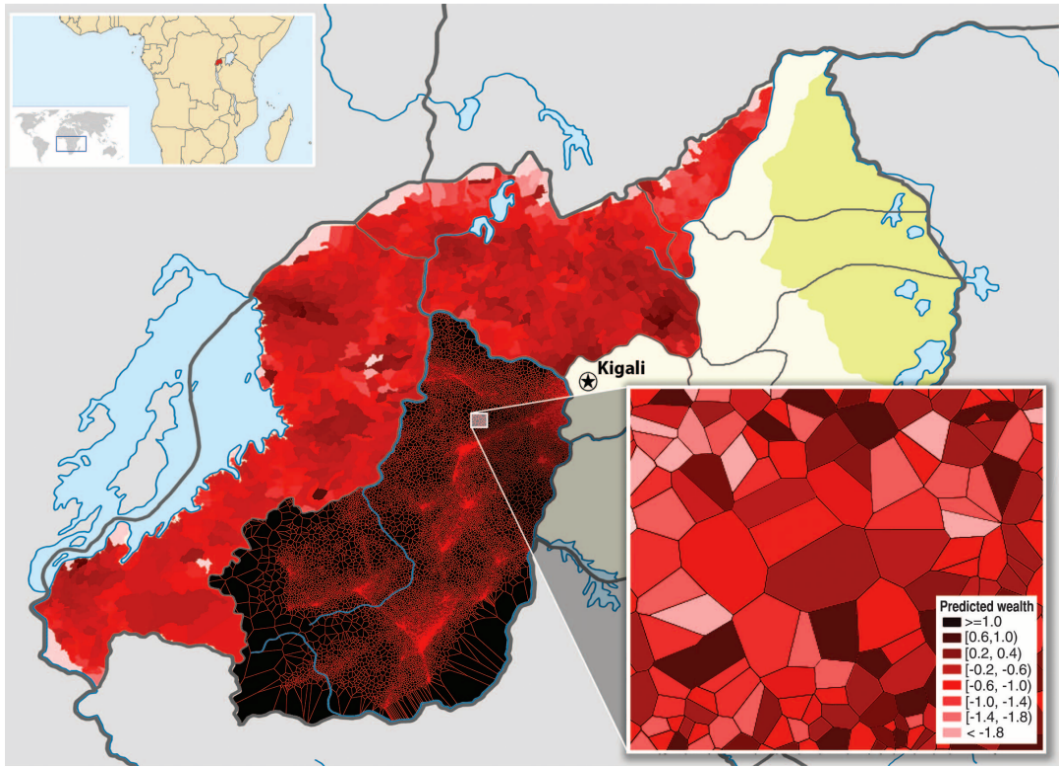

Fig. 2. Construction of high-resolution maps of poverty and wealth from call records. Information derived from the call records of 1.5 million subscribers is overlaid on a map of Rwanda. The northern and western provinces are divided into cells (the smallest administrative unit of the country), and the cell is shaded according to the average (predicted) wealth of all mobile subscribers in that cell. The southern province is overlaid with a Voronoi division that uses geographic identifiers in the call data to segment the region into several hundred thousand small partitions. (**Bottom right inset**) Enlargement of a 1-km^2 region near Kiyonza, with Voronoi cells shaded by the predicted wealth of small groups (5 to 15 subscribers) who live in each region.

New Data Stream

Digital Breadcrumbs

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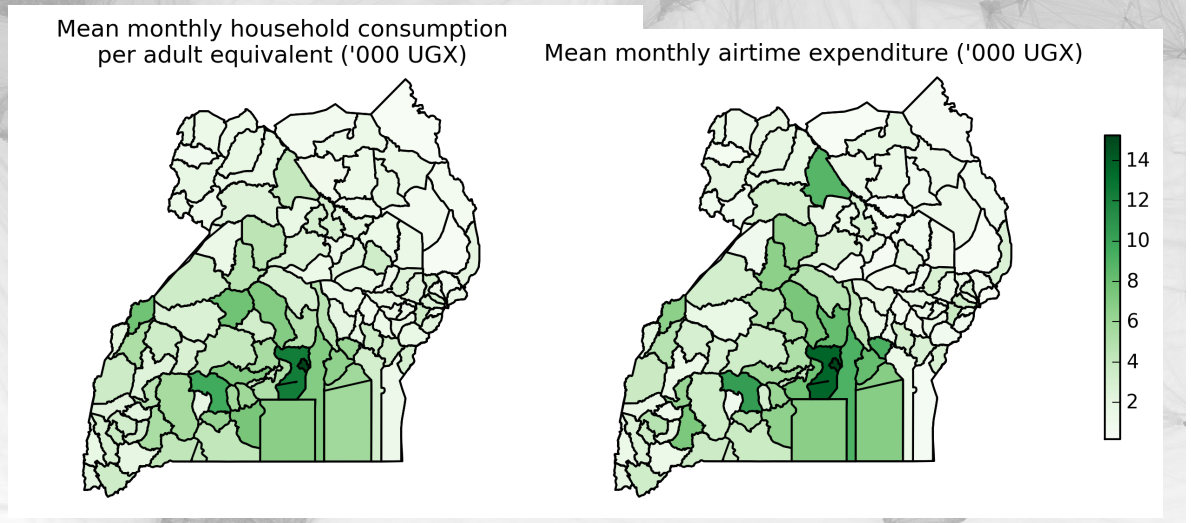
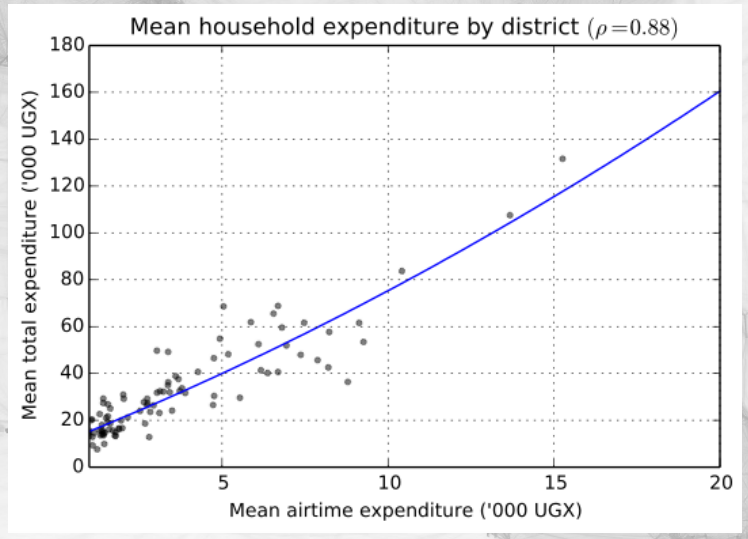
Poverty Mapping with Mobile Phone Data

UN Global Pulse & WFP, 2015



Household consumption based on surveys

Airtime expenditures



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Digital Breadcrumbs

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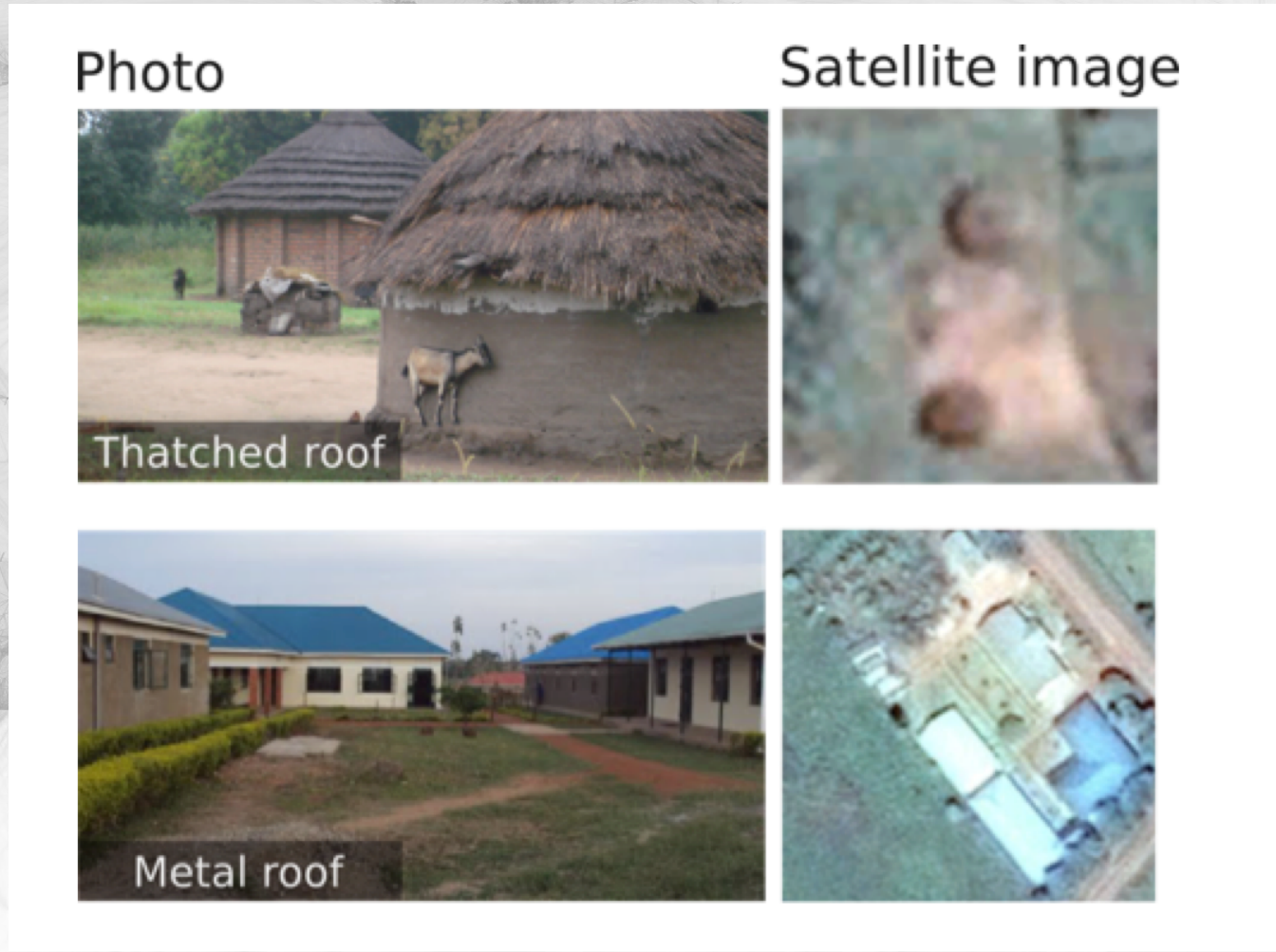
Measuring Poverty with Machine Roof Counting

UN Global Pulse & WFP, 2015



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Remote Sensing Data

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The Joy of Stats

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Data Access: More Data

Data Deficit: Availability ≠ Viability

Capacities: Process and Tools

Beyond Data

- … more than just patterns and correlation
- … contextual knowledge
- … provide interpretation
- … collaboration across disciplines
- … from data to policy