OPAL

open algorithms for better decisions

OPAL: algoritmos abertos para melhores decisões

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16 maio 2019
São Paulo, Brasil

A Decade of Data Revolution

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

SOCIAL SCIENCE

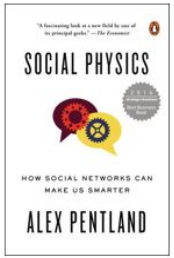
Computational Social Science

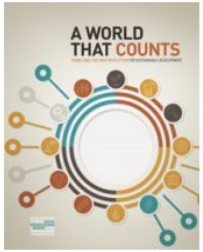
Big Data for Development: Challenges & Opportunities

May 2012

SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD





AFRIQUE CONTEMPORAINE

La révolution des données est-elle en marche ?

Implications pour la statistique publique et la démocratie

Thomas Roca et Emmanuel Letouzé

ITU Journal: *ICT Discoveries*, Special Issue No. 2, 6 Dec. 2018

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.*

Keywords – Artificial intelligence, big data, human development, open algorithms, fourth industrial revolution

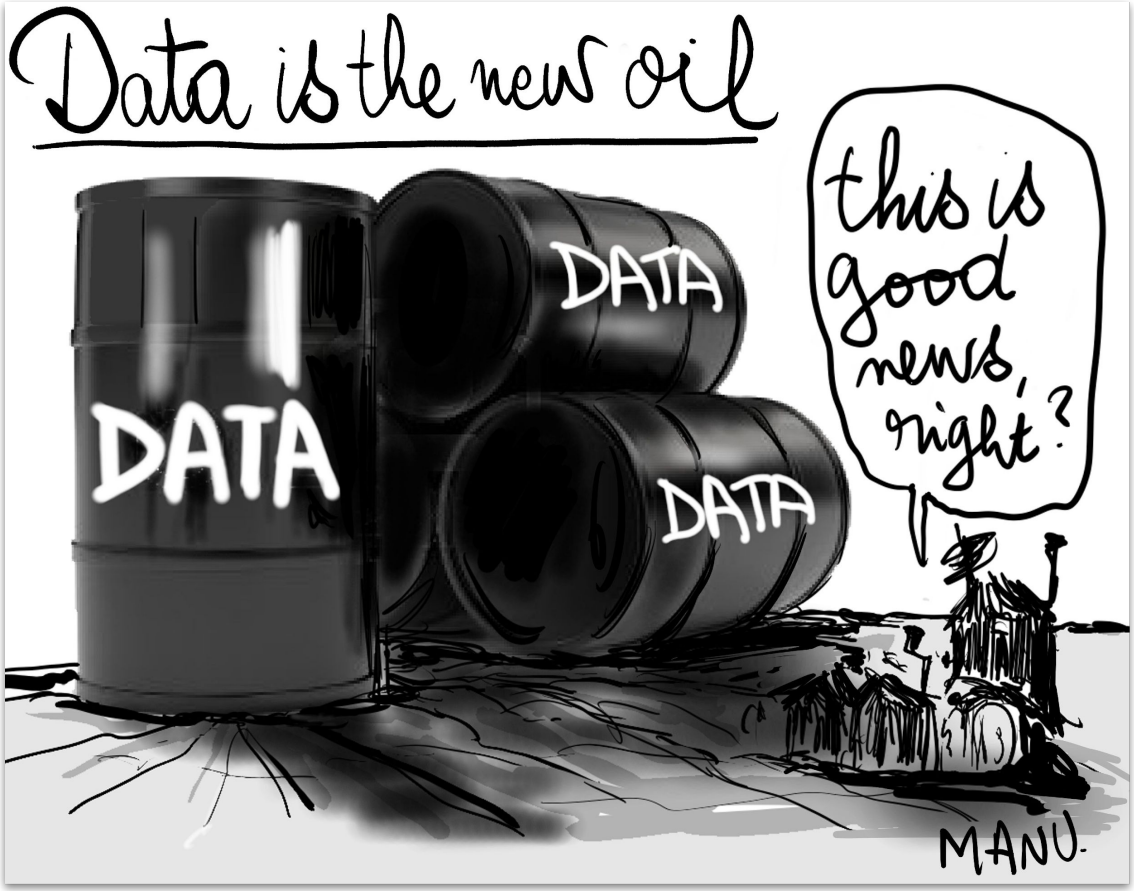
Data Revolution for 2030

A WORLD THAT COUNTS

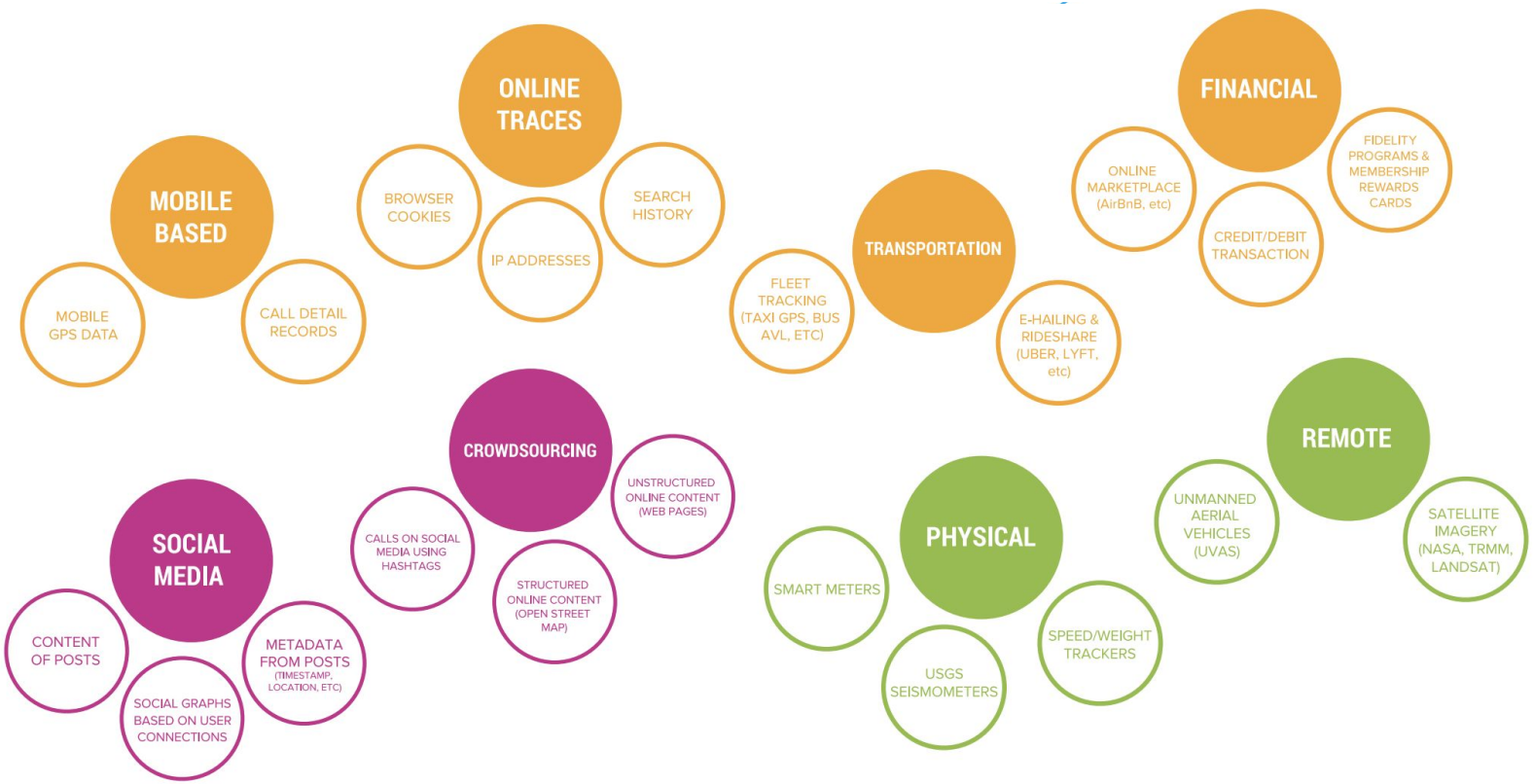
"A **data revolution** for all people and the whole planet"

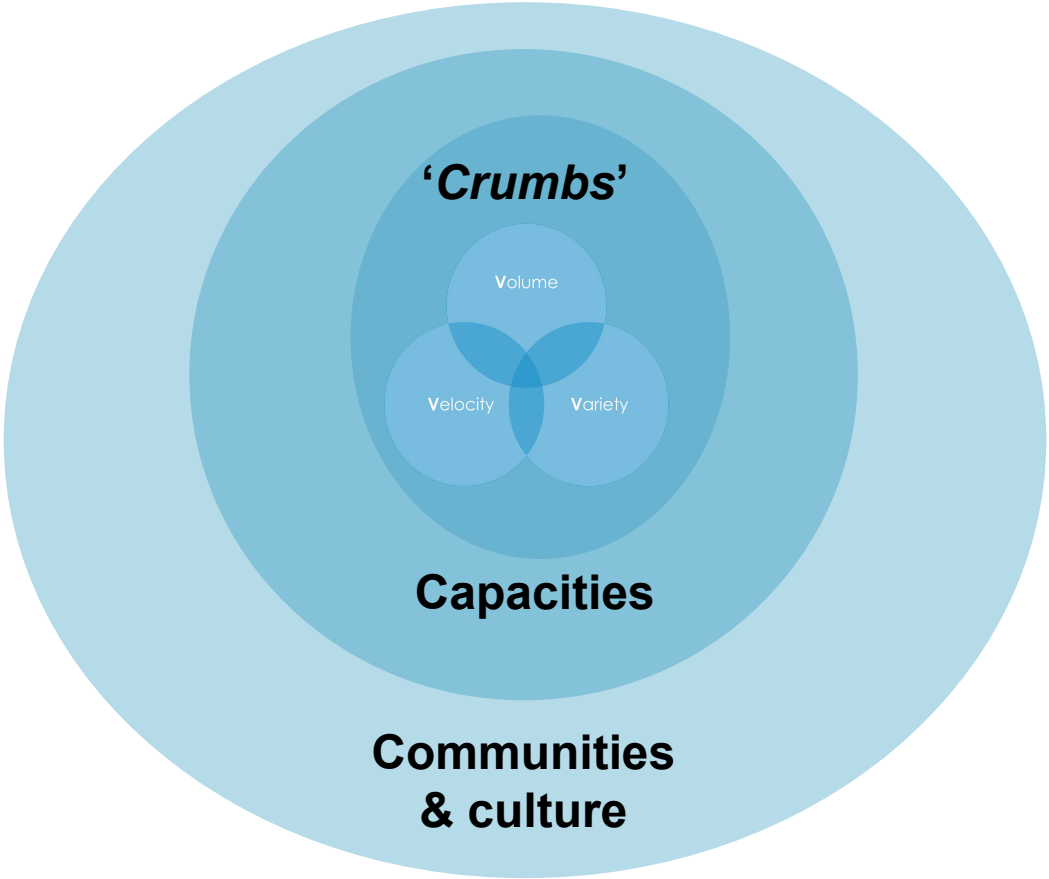
MDGs		SDGs
8 goals	vs	17 goals
21 objectives	vs	169 objectives
60 indicators	vs	232 indicators (without duplicates)

Os dados são o novo petróleo

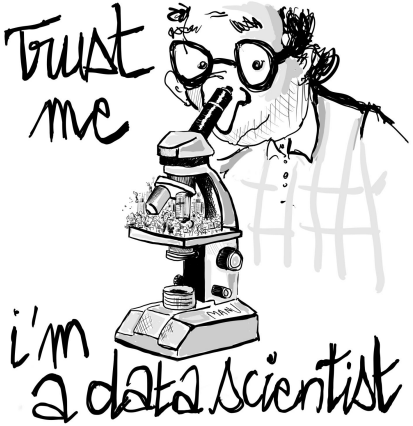


Esta é uma boa notícia, certo?


MOBILE BASED
MOBILE GPS DATA
CALL DETAIL RECORDS
ONLINE TRACES
BROWSER COOKIES
IP ADDRESSES
SEARCH HISTORY
TRANSPORTATION
FLEET TRACKING (TAXI GPS, BUS AVL, ETC)
E-HAILING & RIDESHARE (UBER, LYFT, etc)
FINANCIAL
ONLINE MARKETPLACE (AirBnB, etc)
CREDIT/DEBIT TRANSACTION
FIDELITY PROGRAMS & MEMBERSHIP REWARDS CARDS
SOCIAL MEDIA
CONTENT OF POSTS
METADATA FROM POSTS (TIMESTAMP, LOCATION, ETC)
SOCIAL GRAPHS BASED ON USER CONNECTIONS
CROWDSOURCING
CALLS ON SOCIAL MEDIA USING HASHTAGS
STRUCTURED ONLINE CONTENT (OPEN STREET MAP)
UNSTRUCTURED ONLINE CONTENT (WEB PAGES)
PHYSICAL
SMART METERS
USGS SEISMOMETERS
SPEED/WEIGHT TRACKERS
REMOTE
UNMANNED AERIAL VEHICLES (UVAS)
SATELLITE IMAGERY (NASA, TRMM, LANDSAT)


'Crumbs'
Volume
Velocity
Variety
Capacities
Communities
& culture

Data protection and privacy?



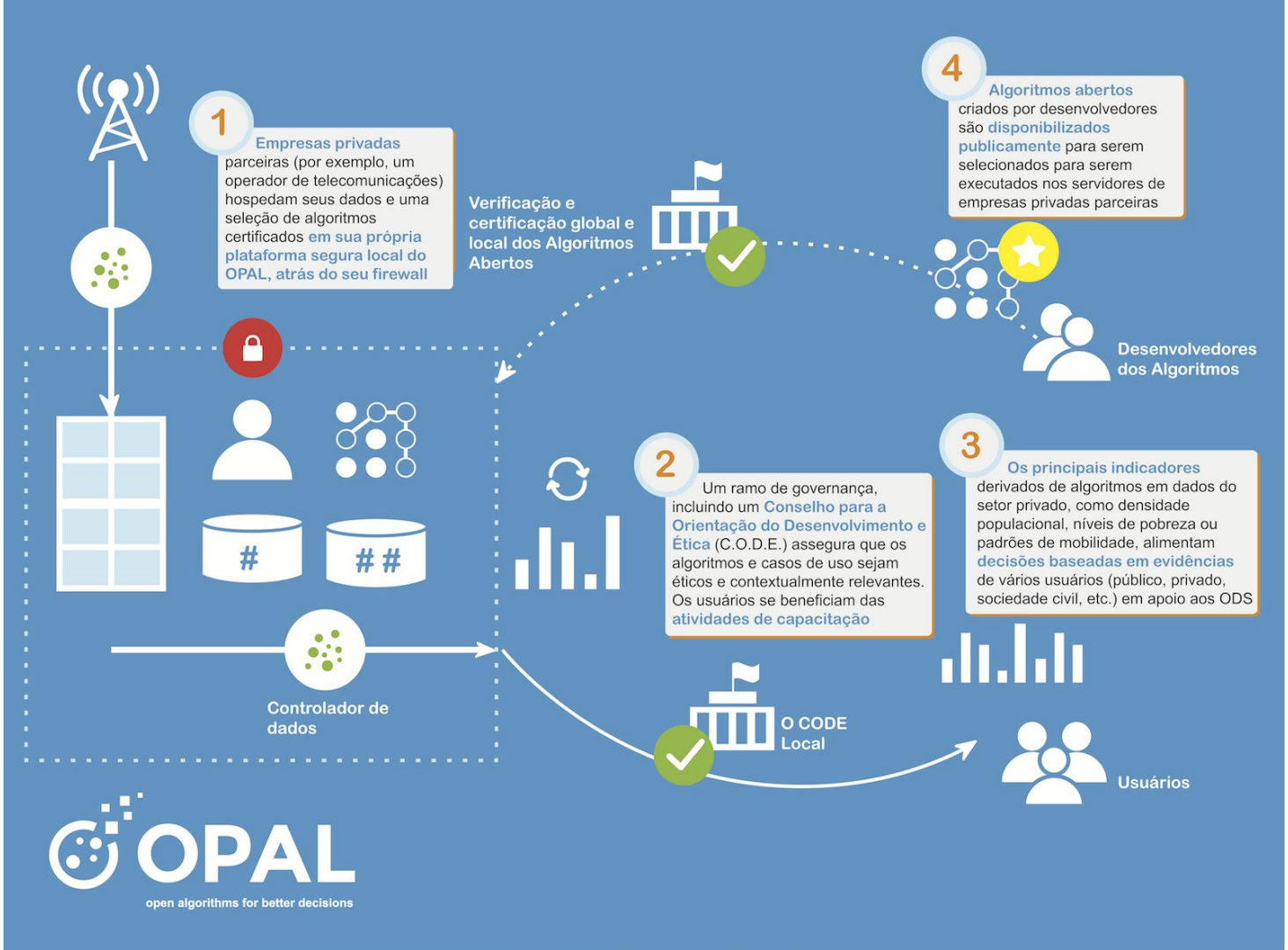
International standards?

Representativeness?

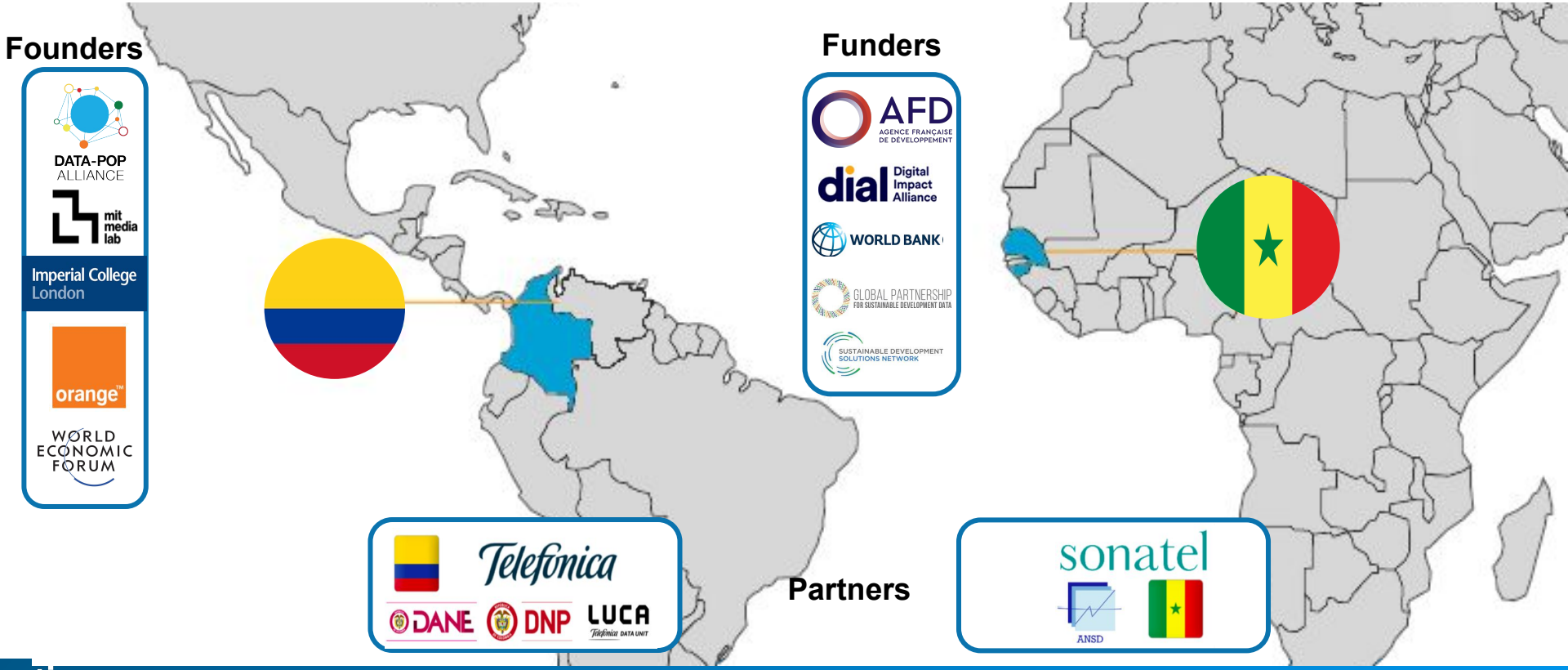
Data access?

Developing standards and norms to leverage private sector data for good, ethically, at scale

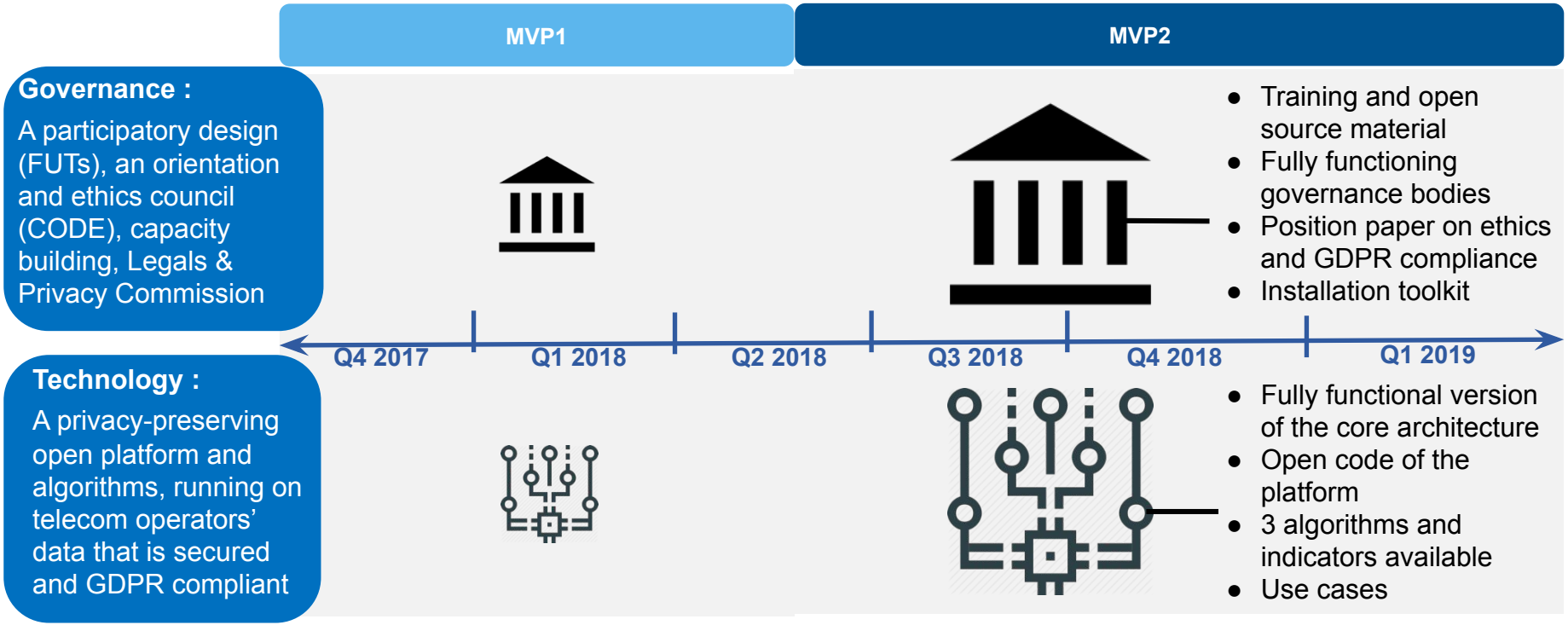
OPAL Consortium


1
Empresas privadas parceiras (por exemplo, um operador de telecomunicações) hospedam seus dados e uma seleção de algoritmos certificados em sua própria plataforma segura local do OPAL, atrás do seu firewall
Verificação e certificação global e local dos Algoritmos Abertos
4
Algoritmos abertos criados por desenvolvedores são disponibilizados publicamente para serem selecionados para serem executados nos servidores de empresas privadas parceiras
Desenvolvedores dos Algoritmos
2
Um ramo de governança, incluindo um Conselho para a Orientação do Desenvolvimento e Ética (C.O.D.E.) assegura que os algoritmos e casos de uso sejam éticos e contextualmente relevantes. Os usuários se beneficiam das atividades de capacitação
3
Os principais indicadores derivados de algoritmos em dados do setor privado, como densidade populacional, níveis de pobreza ou padrões de mobilidade, alimentam decisões baseadas em evidências de vários usuários (público, privado, sociedade civil, etc.) em apoio aos ODS
Controlador de dados
O CODE Local
Usuários
OPAL
open algorithms for better decisions

Pilots in Colombia and Senegal



The Colombia and Senegal pilots are MVPs for Stats Offices and “Friendly User Testers” (FUTs)



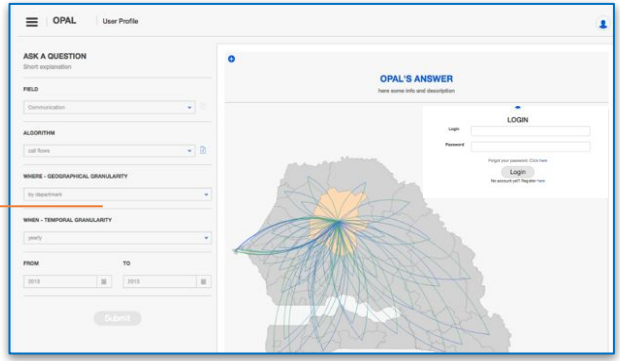
MVP1 platform for Friendly User Testing (FUT)

Isolated server installed **within the premises** of the telco partner

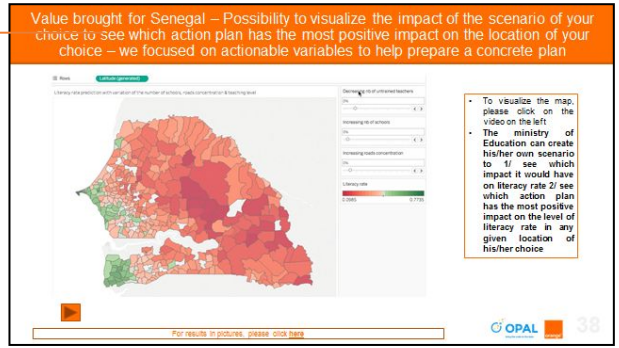
A simple **User Interface (UI)** developed by **Orange Labs & Precomputed results**

Visualize only **precalculated indicators** based on 2013 CDRs

- Population densities
- Call volume
- Migrations



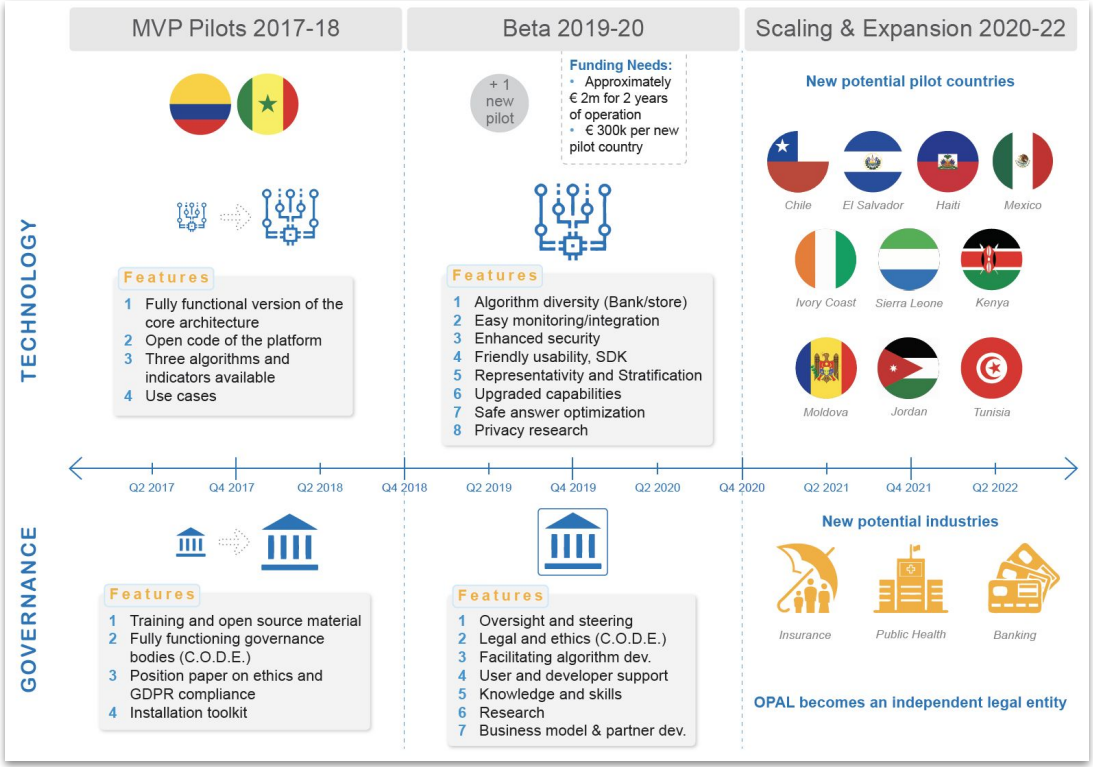
Orange developed User Interface for Algorithm discovery and documentation

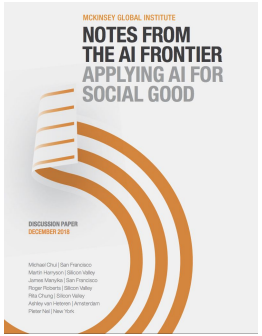


Orange, Essec Accenture, Tableau Software, pilot project for Chemonics.

Using Precomputed OPAL output to model drivers impacts on literacy rate

OPAL ambitions to radically change how data are used to improve the state of the world





"Other data sharing initiatives with private companies are also being worked on, including OPAL (…), to derive aggregated insights from a company's data without data leaving the company's server. If proven successful, this could be a powerful tool in unlocking private data for social causes."

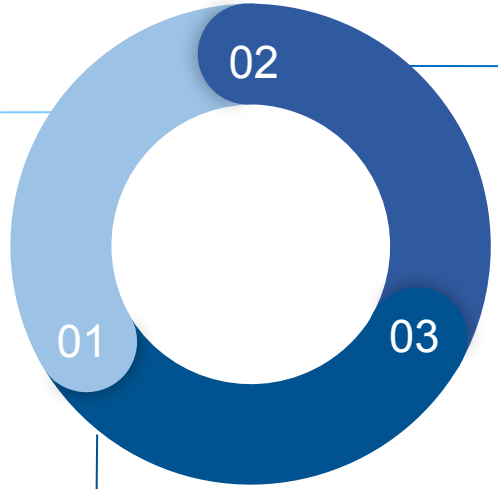
—McKinsey Global Institute *"Applying AI for Social Good"*, December 2018"

Inclusive open governance is at the core of OPAL

Participatory design and development

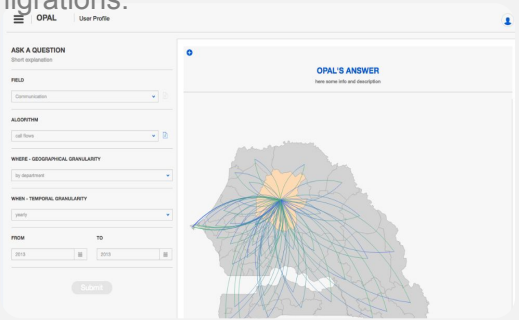
User Needs Assessment

Workshops and studies were conducted in Colombia and Senegal in 2017



MVP1 FUTs

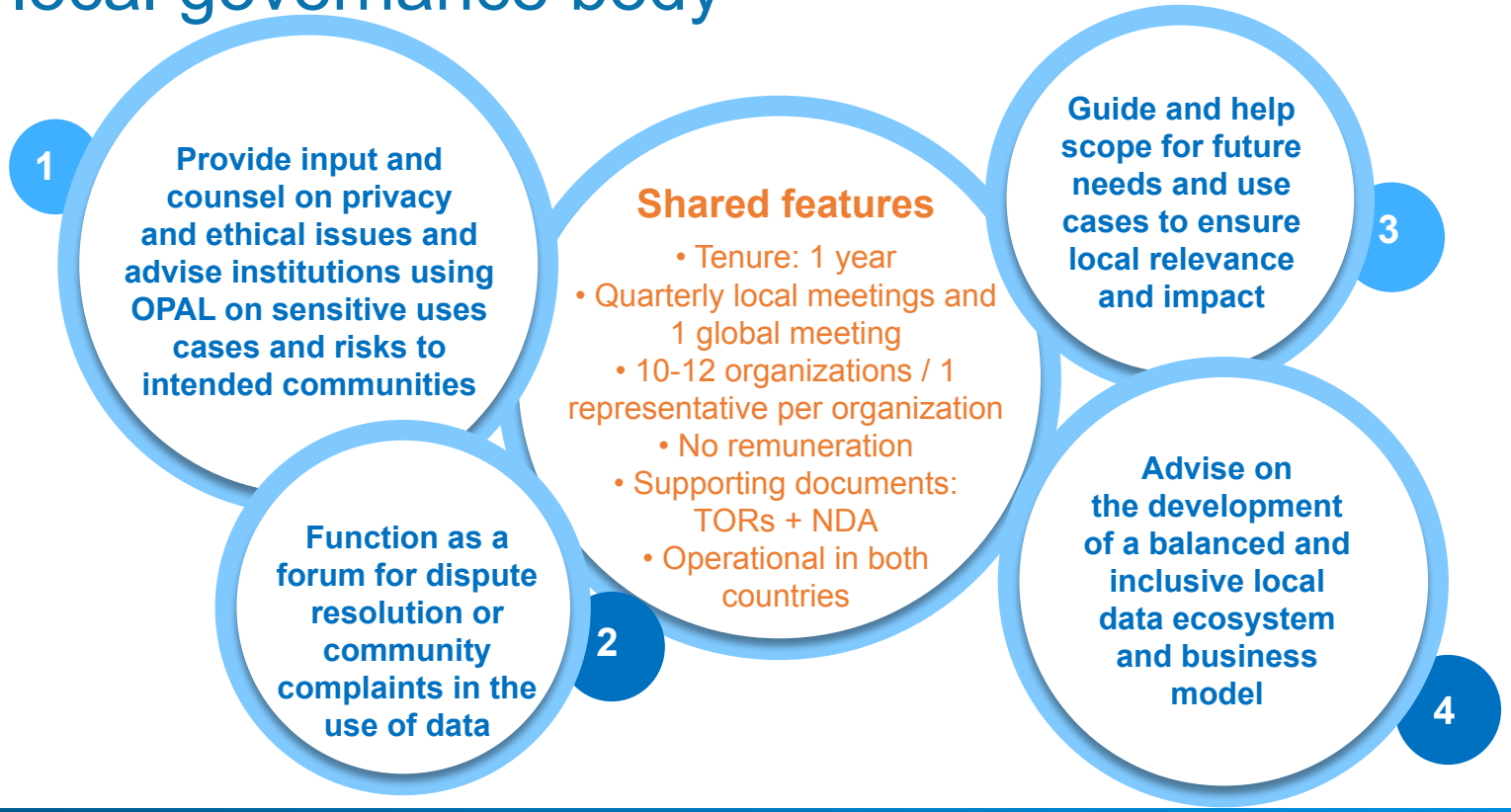
Interface of the MVP1 platform in Senegal with 3 families of algorithms on population densities, call flows, and migrations.



MVP2 FUTs

MVP2 FUTs in different sectors (public health, education, peacebuilding, transportation) use the platform to develop initial projects and provide feedback for the MVP2 and next versions

The CODE: features and functions of a unique local governance body



Key: building capacities and connections within and between local data ecosystems

Building Literacy for the Data Generation

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

MasterCard | MasterCard Center for Inclusive Growth

User Testers in Senegal

ANSD

Population Density
Calibration of the population density algorithm (with Till Koebe/Knuper)

Health
Granularity and explanatory factors of contagious diseases

POLITECNICO MILANO 1863

Institut Pasteur de Dakar

Institut Pasteur
Analysis of Dengue

Essec-Accenture

Poverty
Analysis of monetary poverty

UNDP

AFD AGENCE FRANÇAISE DE DÉVELOPPEMENT

Agriculture
Impact of road improvements on regional markets

Agriculture
Analysis of travel time and distance to regional markets

ipar Initiative Prospective Agricole et Rurale

wexity Digital City Management

Urbanism
Analysis of mobility flows

Economy
Event detection

sonatel

COLUMBIA SIPA School of International and Public Affairs

Migration and Stability
Migrations and tensions between communities

Agriculture
Data Visualization and simulation tool

Essec-Accenture

ipar Initiative Prospective Agricole et Rurale

User Testers in Colombia

Population Density

Study of Bogotá measuring the resident and non-resident populations; approximations of the economic burden of each one of these population groups in order to focus public policies to guarantee the sustainability of the Island and reduce pressure on ecosystems

Disaster Risk Management

Working towards SDG 11.5 (reducing deaths and persons affected by natural disasters) based on a characterization and understanding of the population density of 80 municipalities.

Peacebuilding & Security

Studying the impact of police activity in a former drug trafficking hotspot in Bogotá. FIP will analyze how and where miro-traffic has been reorganized in the city since that moment.

Migration

i) impact of climate shocks on migration patterns, ii) impact of social networks on migration patterns, and iii) migration patterns of venezuelan migrants in Colombian territory

Social Network

Understanding the relationship between individuals' behavioral patterns (both in terms of social network structures and mobility patterns) and their propensity to undergo changes in socioeconomic status