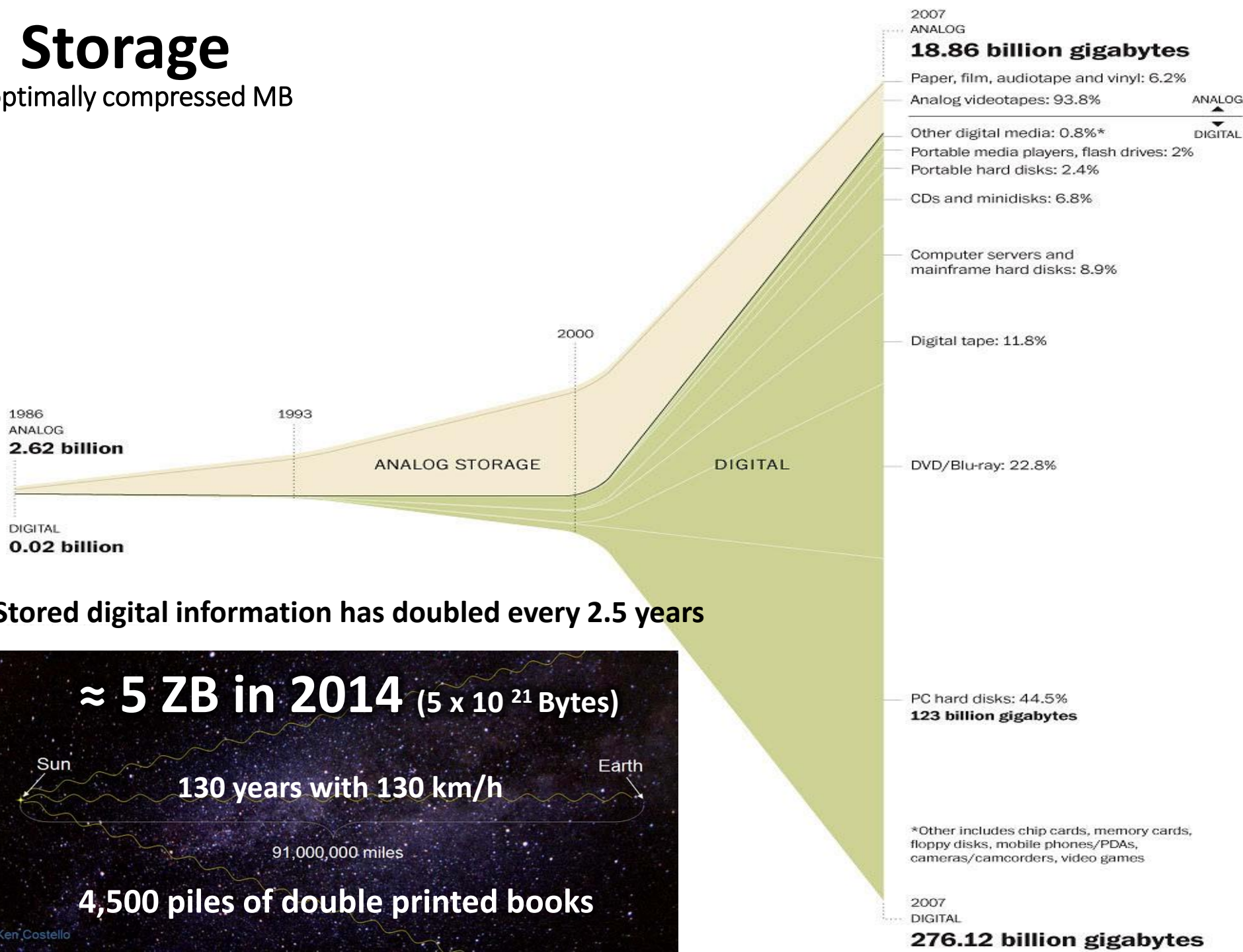


Foresight for Digital Development

Storage

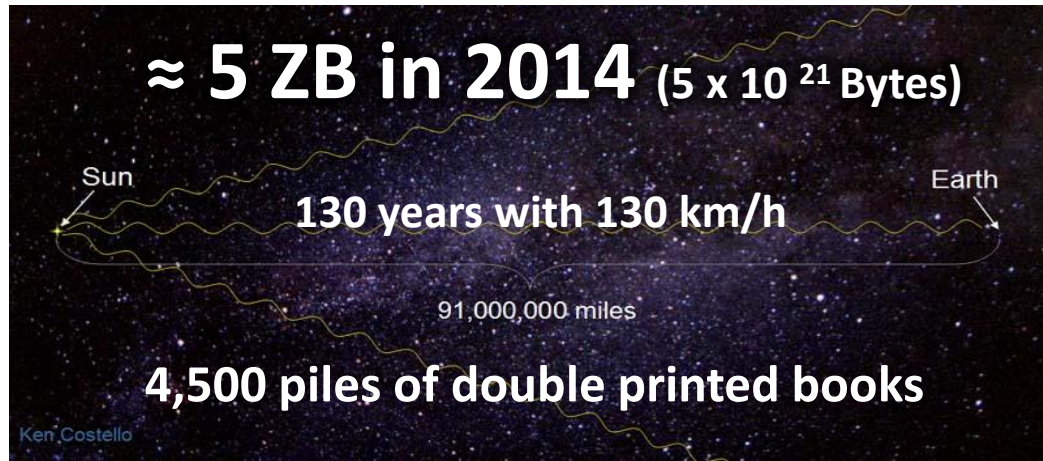
in optimally compressed MB



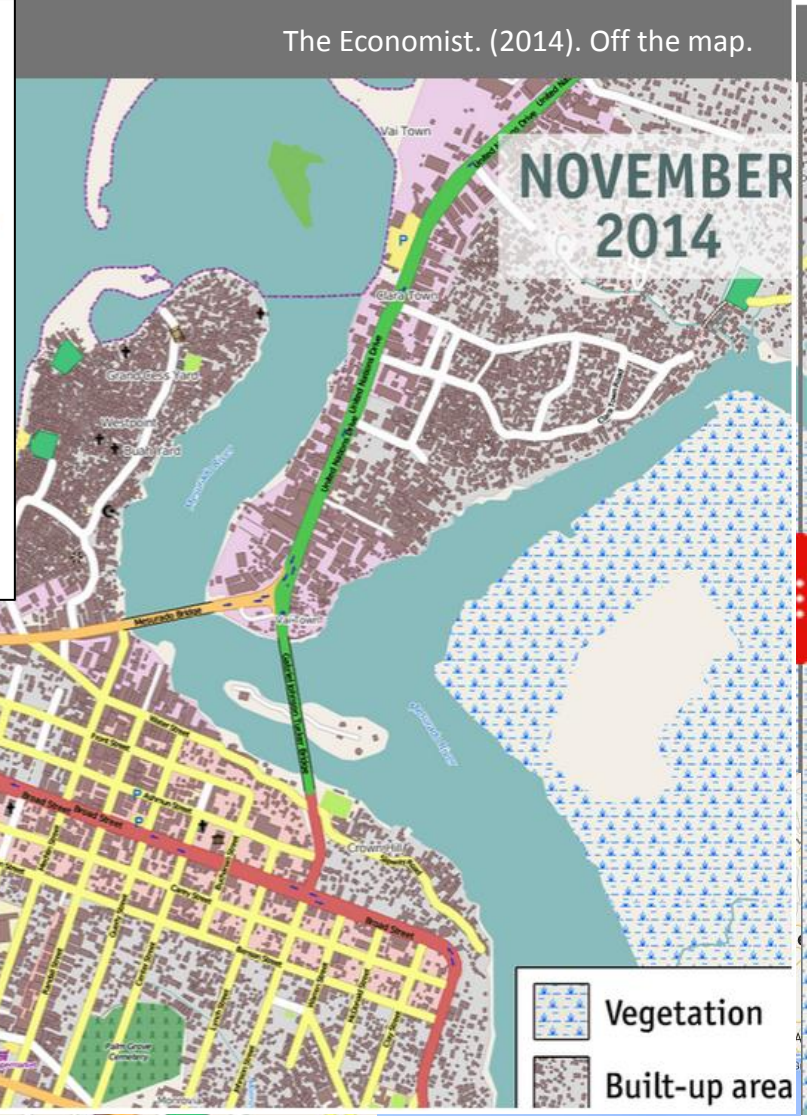
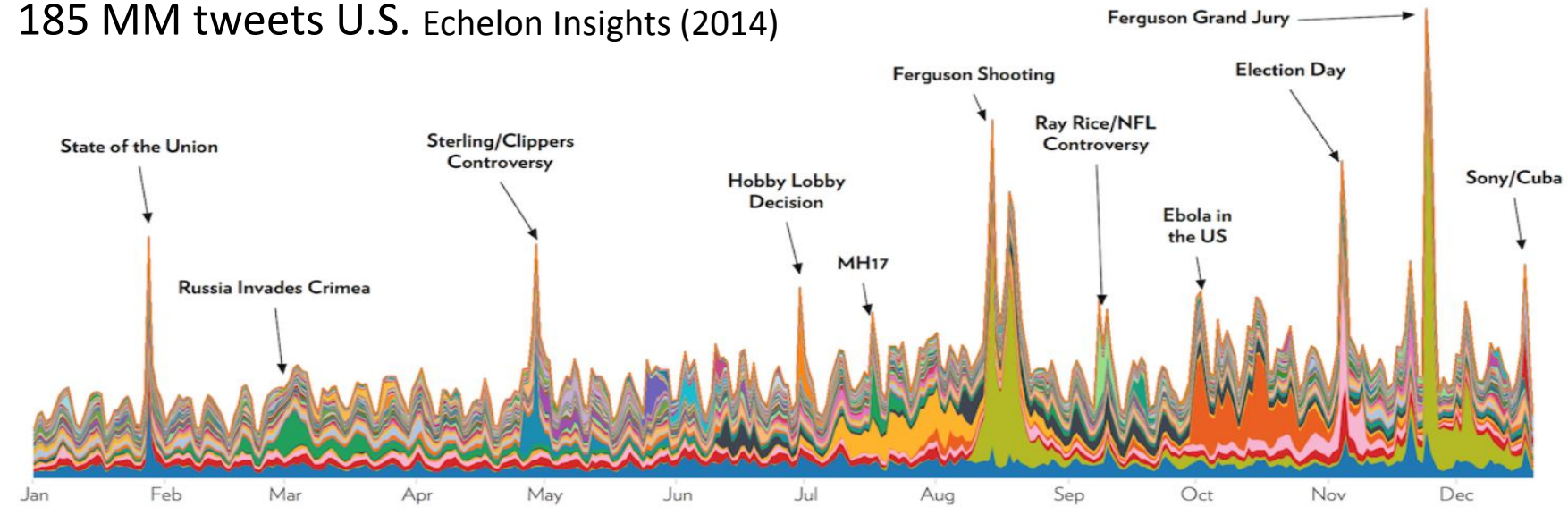
Hilbert & López (2011).
 The world's technological capacity to store, communicate and compute information.

Science, 332, 6025, 60-65
www.martinhilbert.net/WorldInfoCapacity.html

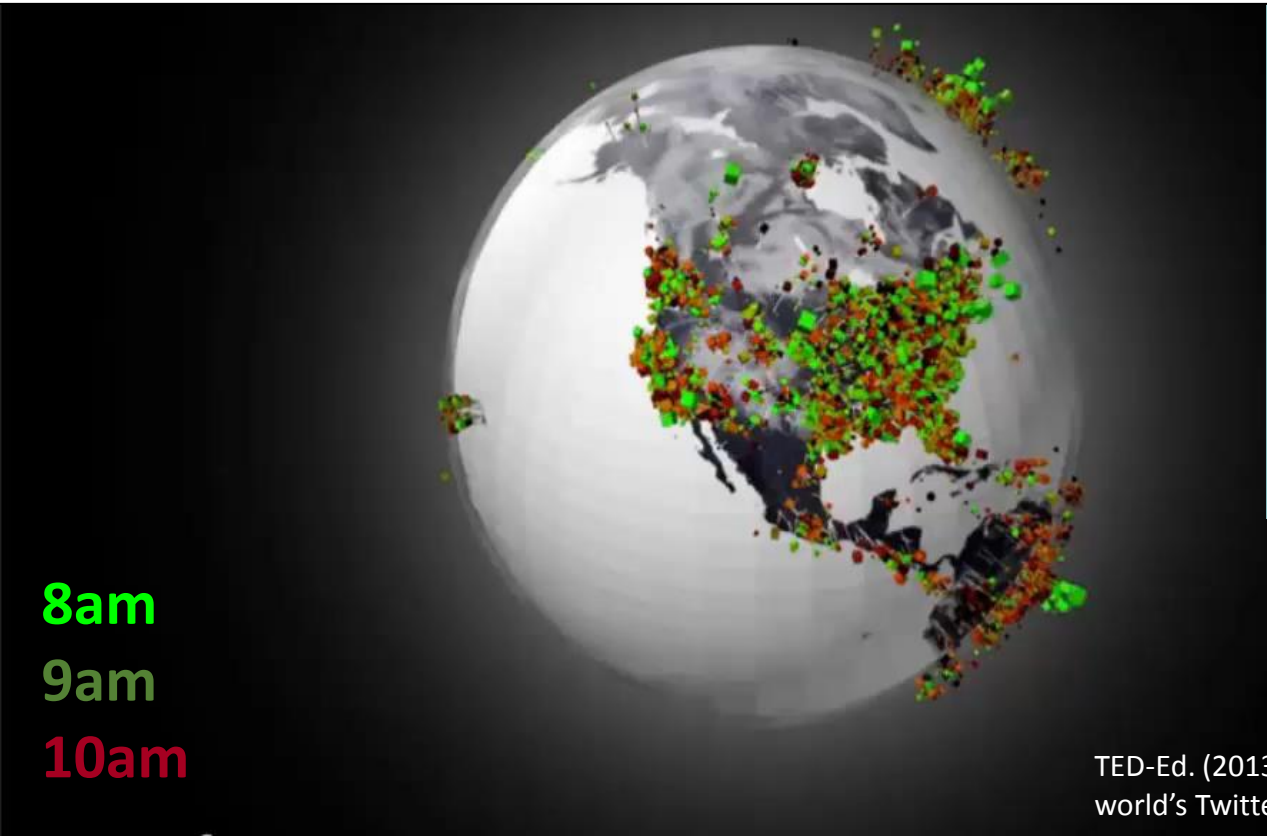
Stored digital information has doubled every 2.5 years



185 MM tweets U.S. Echelon Insights (2014)



The Economist. (2014). Off the map.



8am
9am
10am

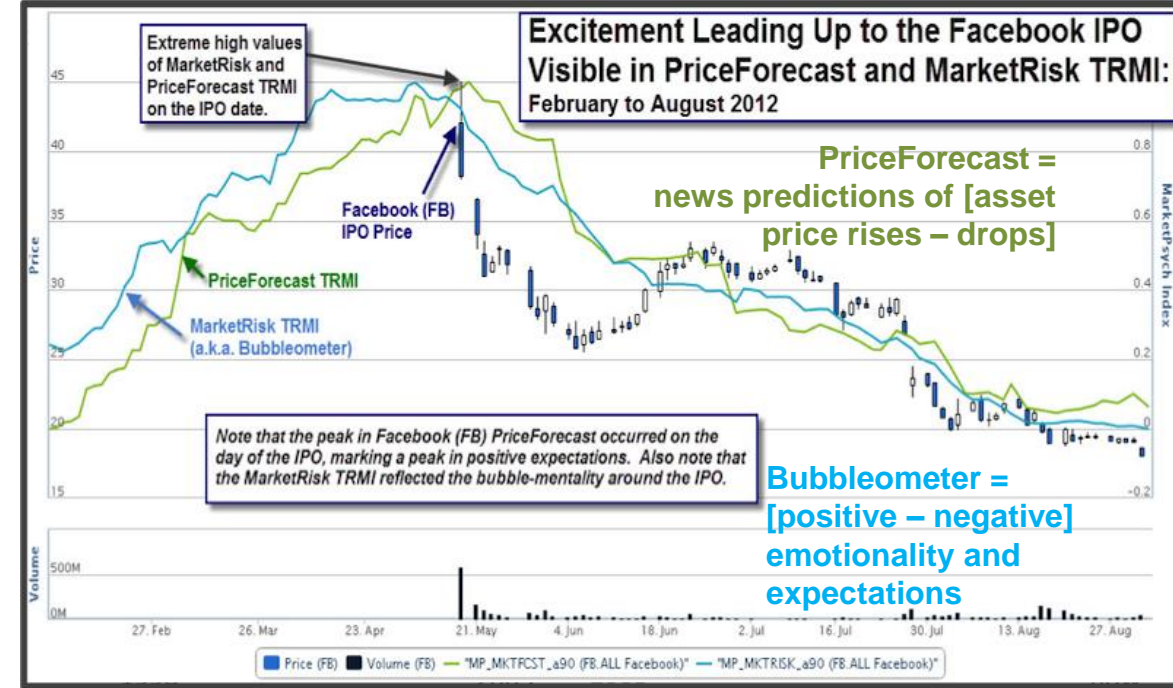
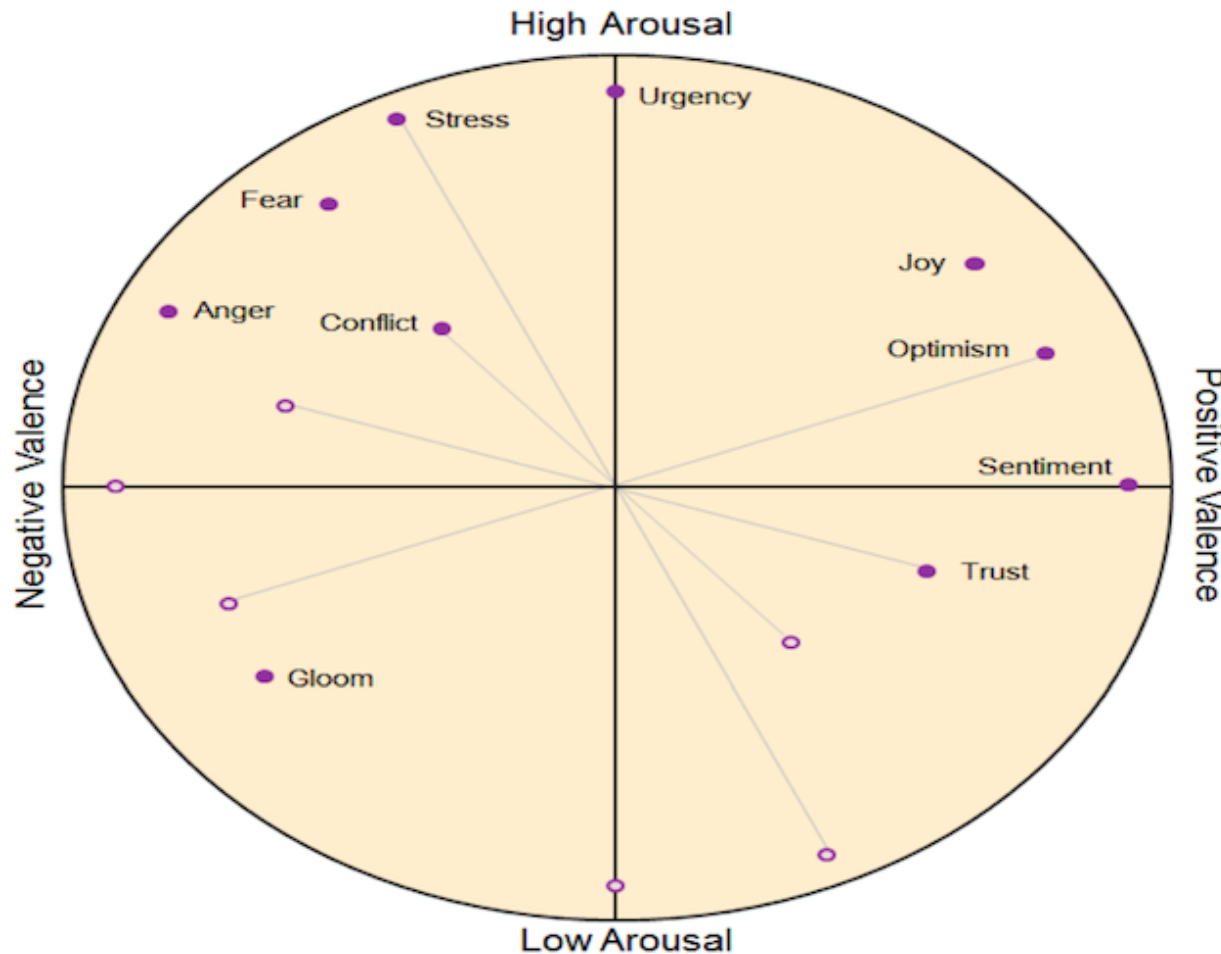
TED-Ed. (2013). Visualizing the world's Twitter data - Jer Thorp.

Digital footprints

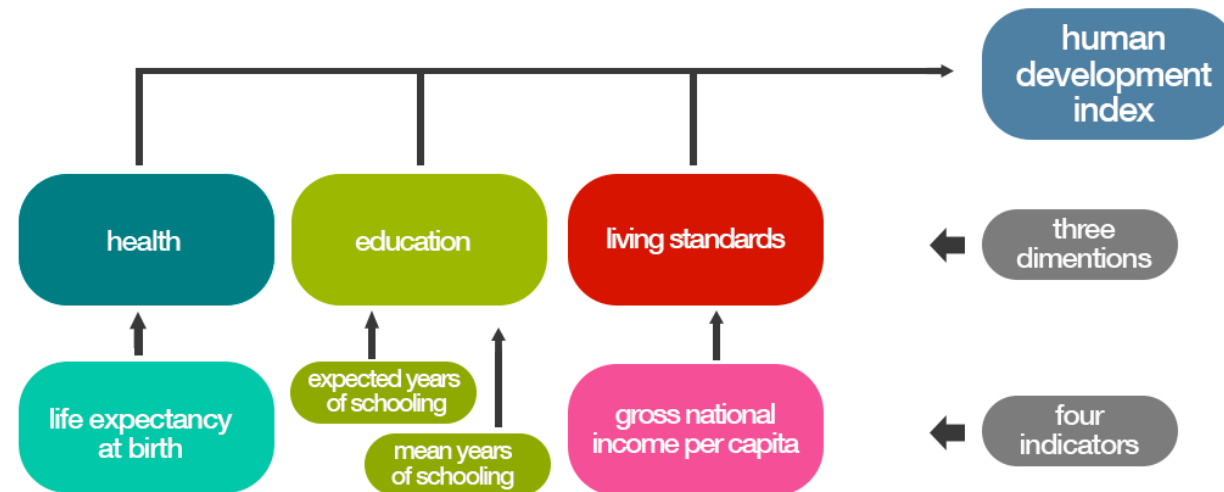
Big Data Development Indexes

Thomson Reuters MarketPsych Indices (TRMI)

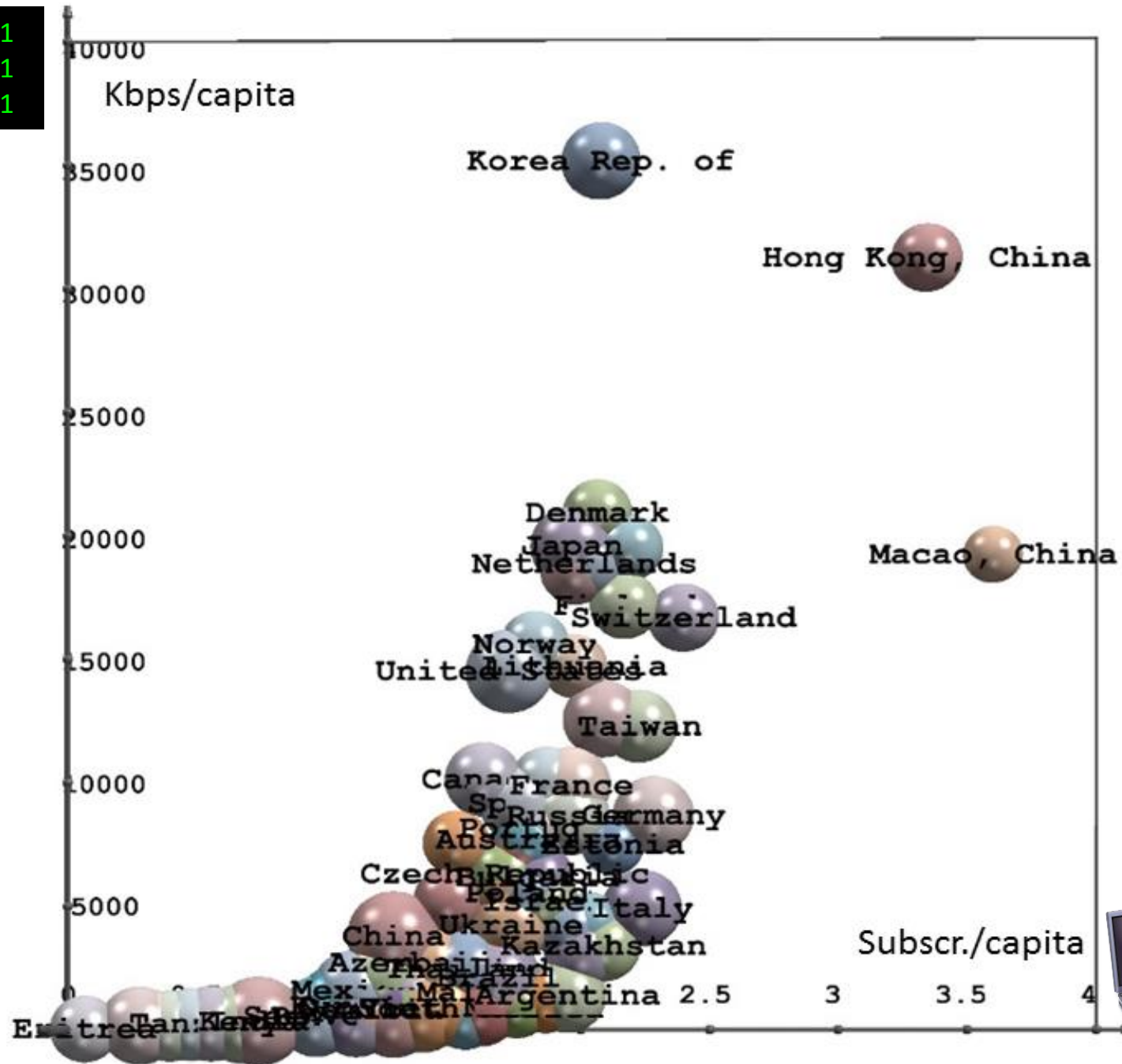
18,864 separate indices, across 119 countries, updated each minute (!)



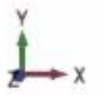
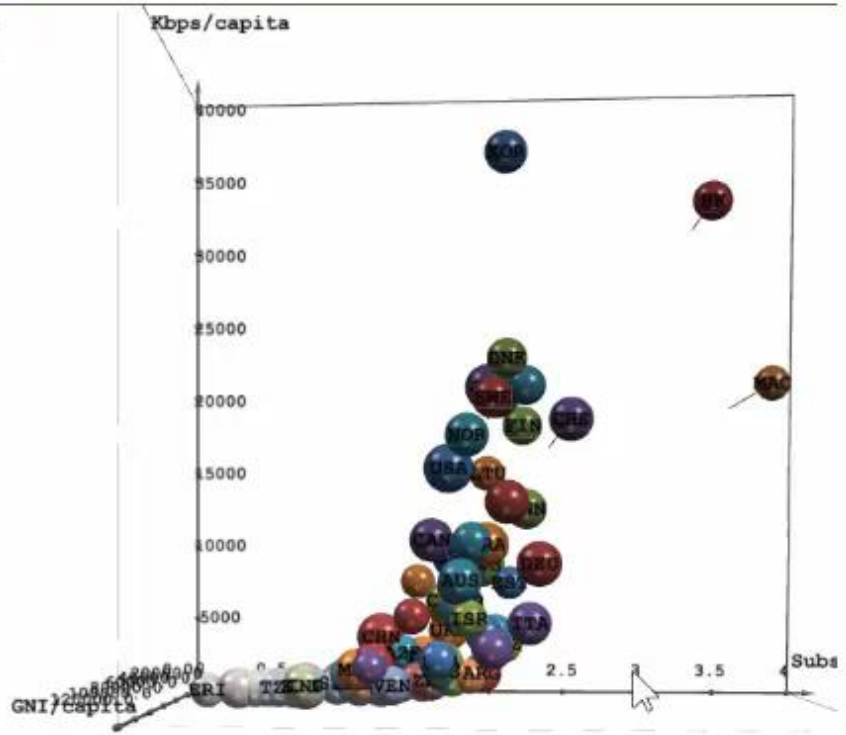
MarketPsych Data



100101
000101
100001



S- S+ Save Image Copy to Clipboard



Individual **human genomes**: 1×10^{19} bytes

Digital information: 5×10^{21} bytes

All DNA nucleotides: 5×10^{37} bytes

...digital growing at 30-40 % per year

=> doubling of info on Earth during next century!



Storage capacity **human brain**: 10^{12} = digital storage per capita $\left(\frac{5 \times 10^{21} \text{ Bytes}}{7.2 \times 10^9 \text{ people}} \right)$

Synaptic nerve impulses **human brain**: 1×10^{17} = world's general purpose computers in 2005!

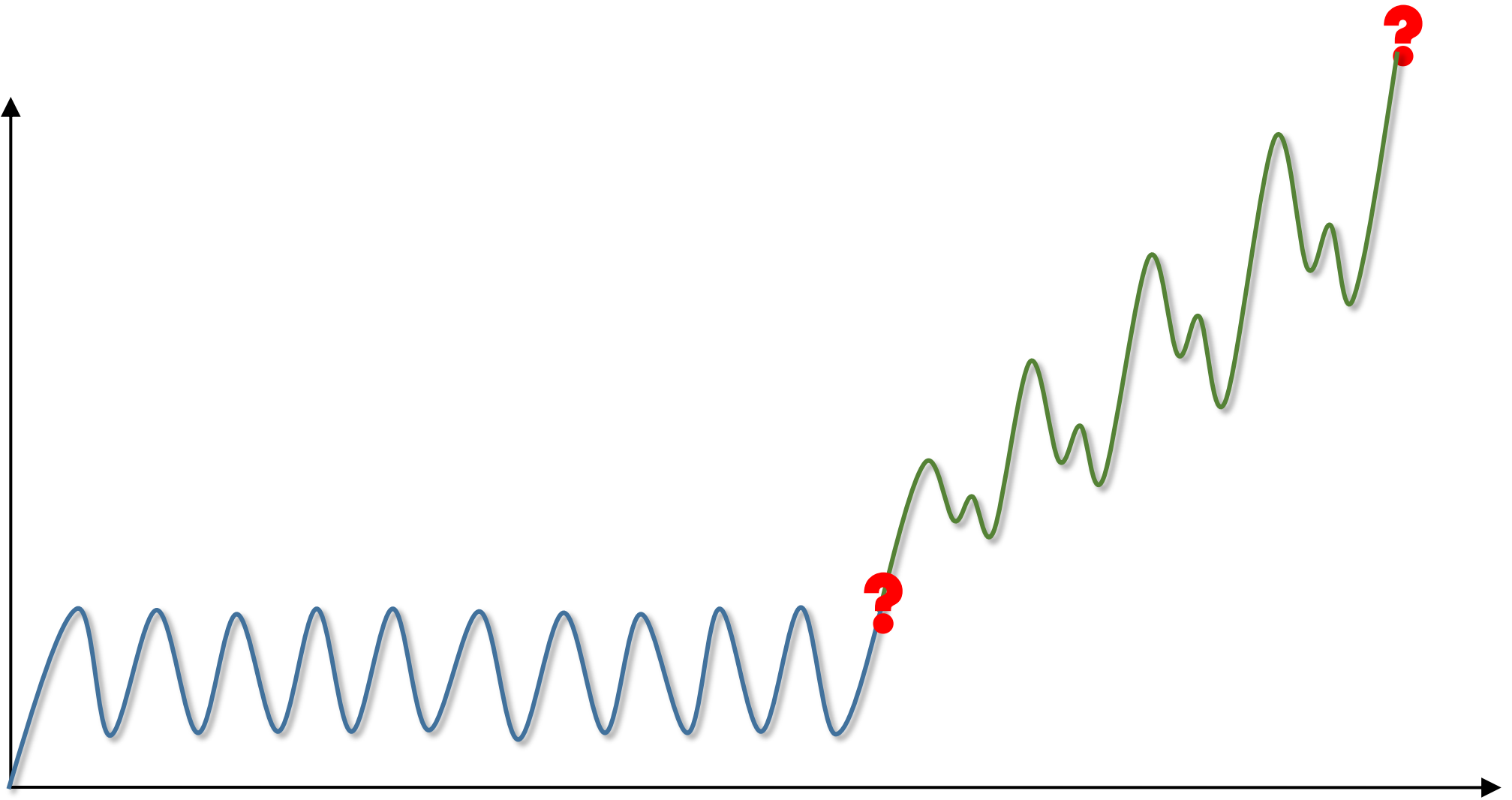


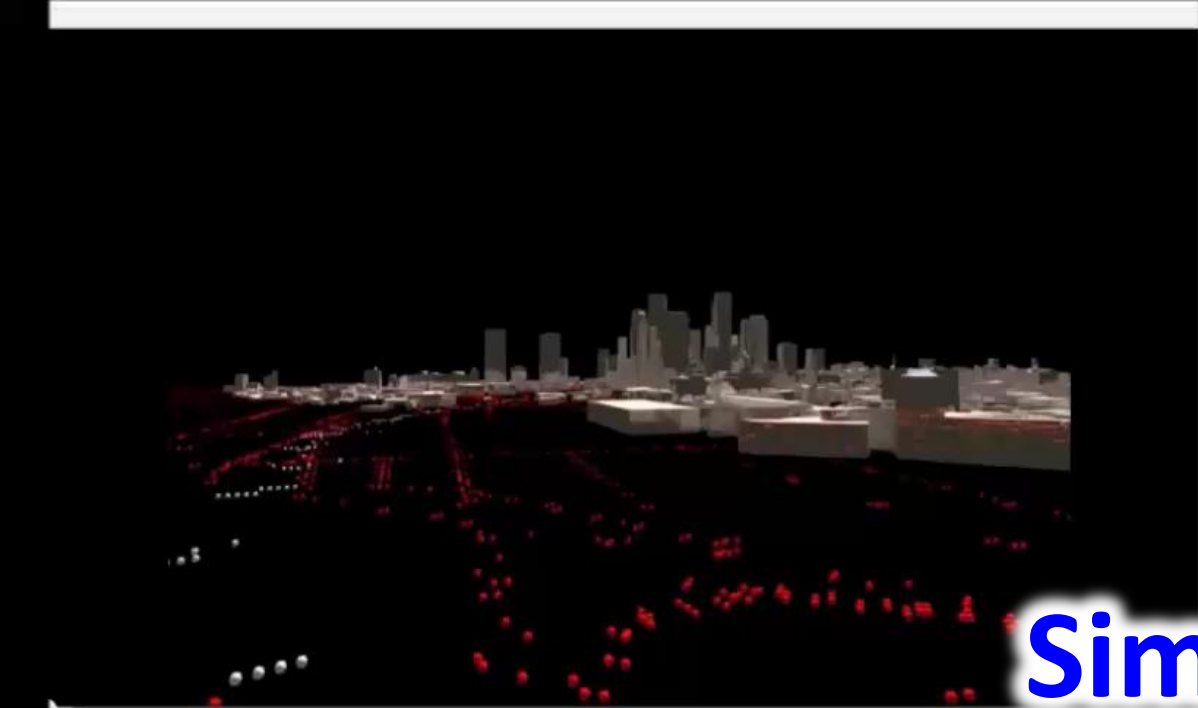
Information in the Biosphere: Biological and Digital Worlds

Michael R. Gillings  , Martin Hilbert, Darrell J. Kemp

Publication stage: In Press Corrected Proof

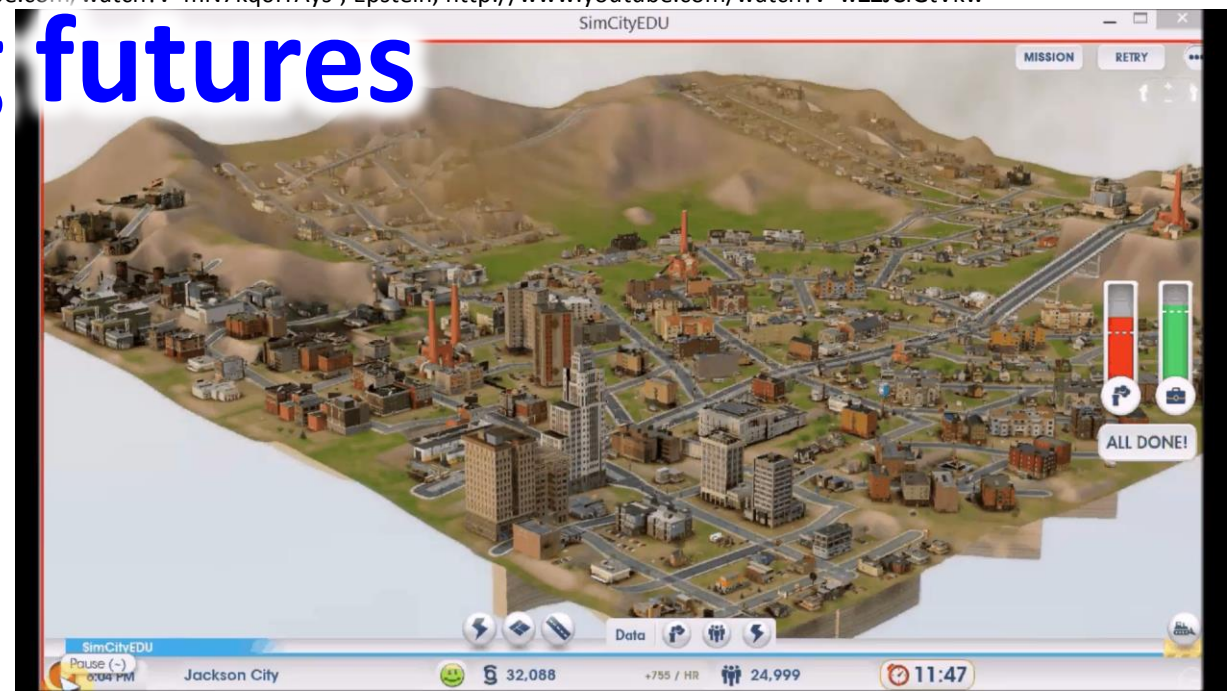
DOI: <http://dx.doi.org/10.1016/j.tree.2015.12.013>





Simulating changing futures

Sources: Bohemia Interactive Simulations, <http://youtu.be/G9P9bUTCdpA> ; SimCityEDU; TRANSIMS: <http://www.youtube.com/watch?v=mN7kq0ITAYS> ; Epstein, <http://www.youtube.com/watch?v=wZZJIGtVkw>



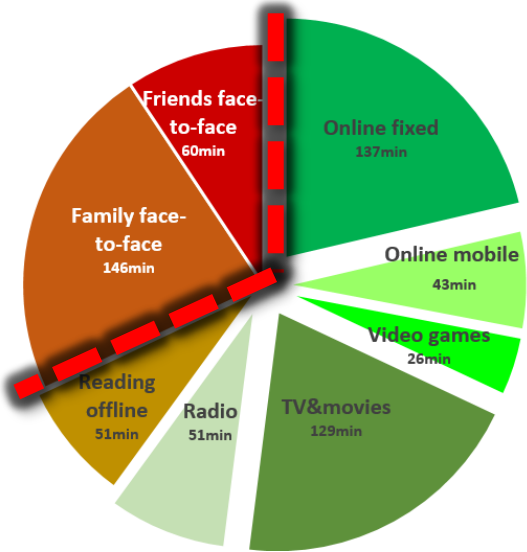
Google DeepMind's Deep Q-learning

The algorithm will play Atari breakout.

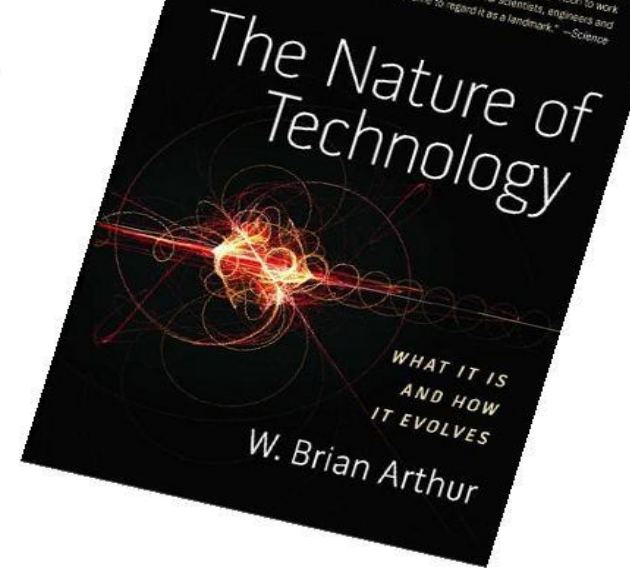
The most important thing to know is that all the agent is given is sensory input (what you see on the screen) and it was ordered to maximize the score on the screen.

No domain knowledge is involved! This means that the algorithm doesn't know the concept of a ball or what the controls exactly do.

Daily time budget 2013 (of 11h awake time)

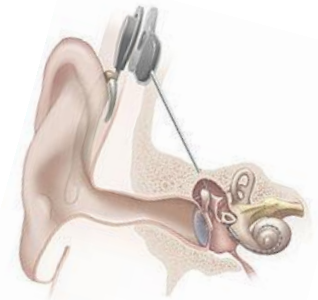
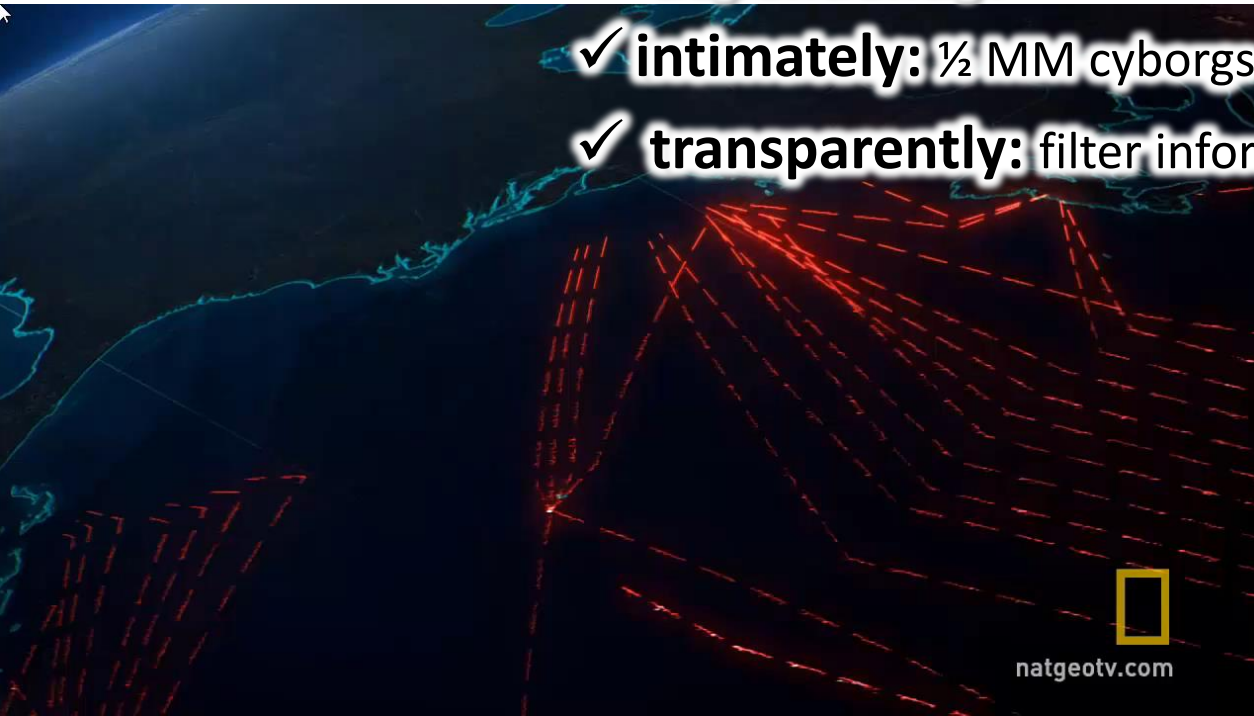


Collective of “*technology is indeed a living organism*”



...and we are merging with it:

- ✓ **pervasively:** $\frac{2}{3}$ of our awake time mediated
- ✓ **trustingly:** car anti-lock braking & plane autopilots
- ✓ **dependently:** resource allocation ($\frac{3}{4}$ US stock market) & energy supply (power grid)
- ✓ **intimately:** $\frac{1}{2}$ MM cyborgs w/ cochlear implants & $\frac{1}{3}$ marriages matched online
- ✓ **transparently:** filter information & detect personality



Center for Digital Future, 2014; Ochsner et al., 2015; Hendershott et al., 2011; Ramchurn et al., 2012; Cacioppo et al., 2013

Particularities of interventions for digital development

- **Uncertainty of trajectory** *short-term flexibility*
- **All-pervasiveness** *decentralized agenda*
- **Unpredictability of side-effects** *private-public alliance*
- **Internationality of digital networks** *international coordination*



Long term vision & short term actions



NACIONES UNIDAS

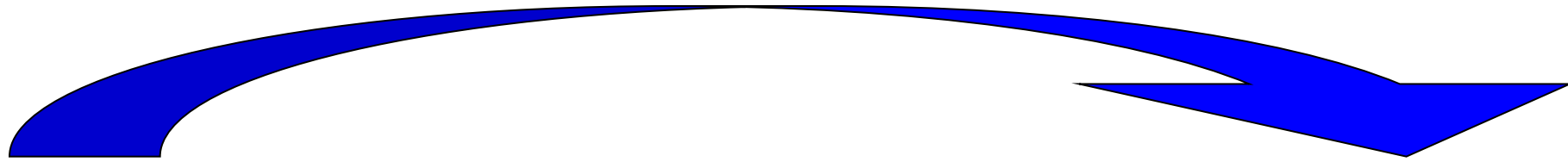


2005

2007

2010

2015



Guiding Principles World Summit

Long term goals World Summit

Short term Action Plan
Río de Janeiro 2005

Short term Action Plan
San Salvador 2008

Short term Action Plan
Lima 2010

Benchmarking
and evaluation
El Salvador
2007

Benchmarking
and evaluation
Peru 2010

Benchmarking
and evaluation
Mexico 2015

eLAC2007

eLAC2010

eLAC2015





NACIONES UNIDAS

Multi-stakeholder consultations

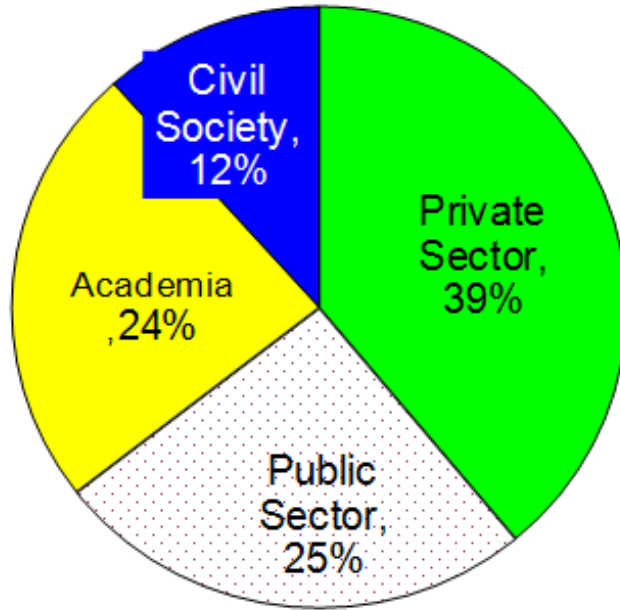
Confronting uncertainty through broad consultations

(diverse input + shared responsibility)

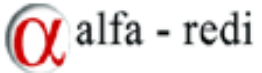
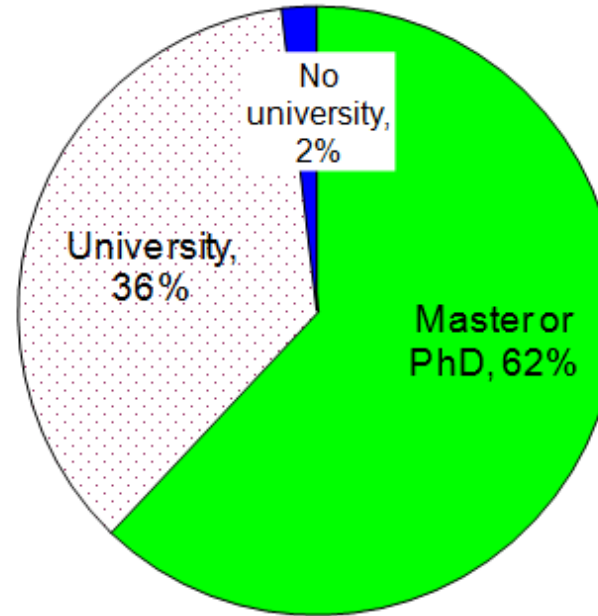


eLAC Policy Priority Delphi : 16 international institutions + 1,454 contributions

Professional affiliation



Educational level



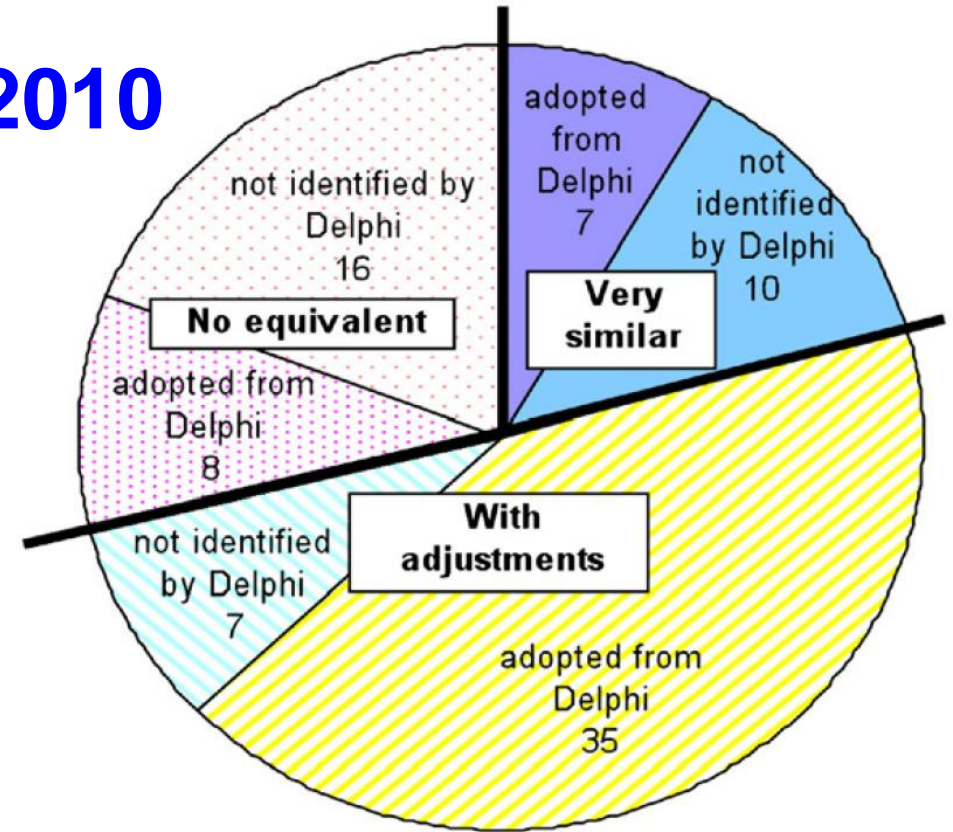
eLAC2007 → eLAC2010

lost importance:

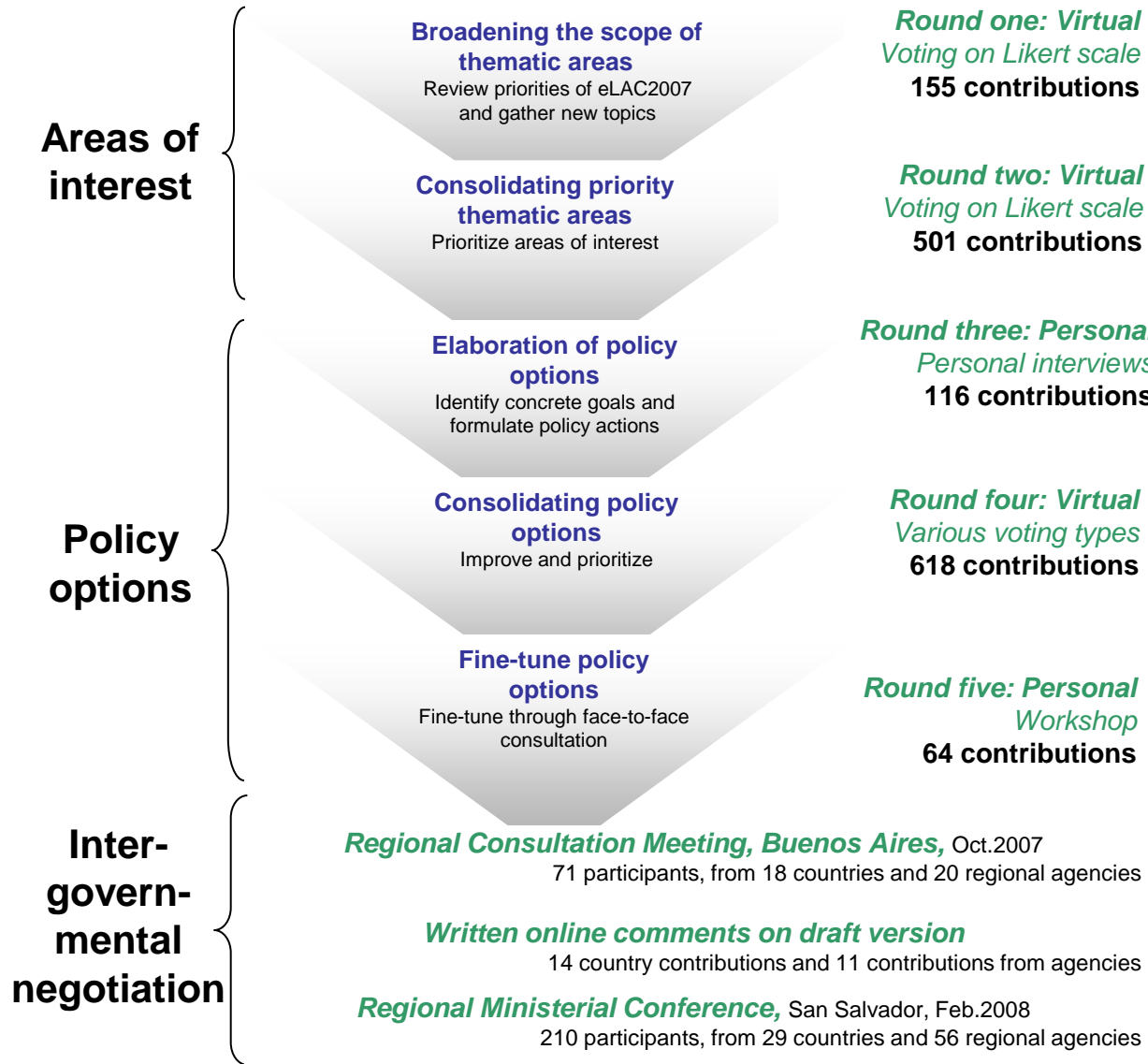
- ~~ICT for environment~~
- ~~Internet Governance~~
- ~~Local production of ICT goods and service~~
- ~~ICT for cultural heritage~~
- ~~Creative industries and content~~
- ~~Free and open source software~~
- ~~Alternative new technologies~~

+ new areas of interest:

- e-Democracy
- Civil participation
- e-Commerce
- Tele-medicine
- Gender perspective
- Intellectual Property
- Voice-over IP



eLAC2007 (Regional Action Plan 2005-2007)



eLAC2010 (Regional Action Plan 2008-2010)



“...the most extensive online participatory policy-making foresight exercise in the history of intergovernmental processes in the developing world...”

Hilbert, Miles, & Othmer, (2009). Foresight tools for participative policy-making in inter-governmental processes in developing countries: Lessons learned from the eLAC Policy Priorities Delphi. *Technological Forecasting and Social Change*, 76(7), 880–896.