

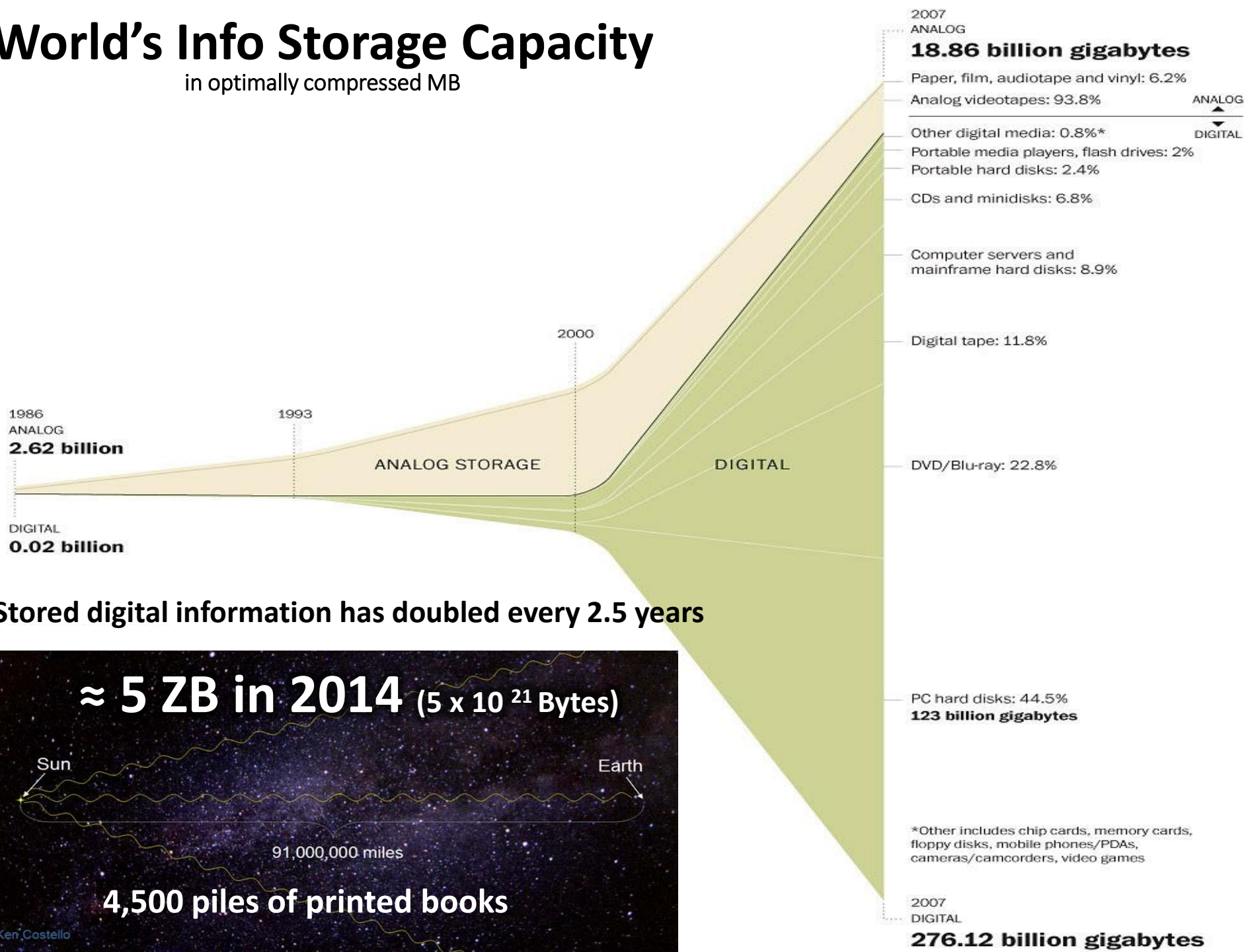
# Foresight for Digital Development

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# World's Info Storage Capacity

in optimally compressed MB

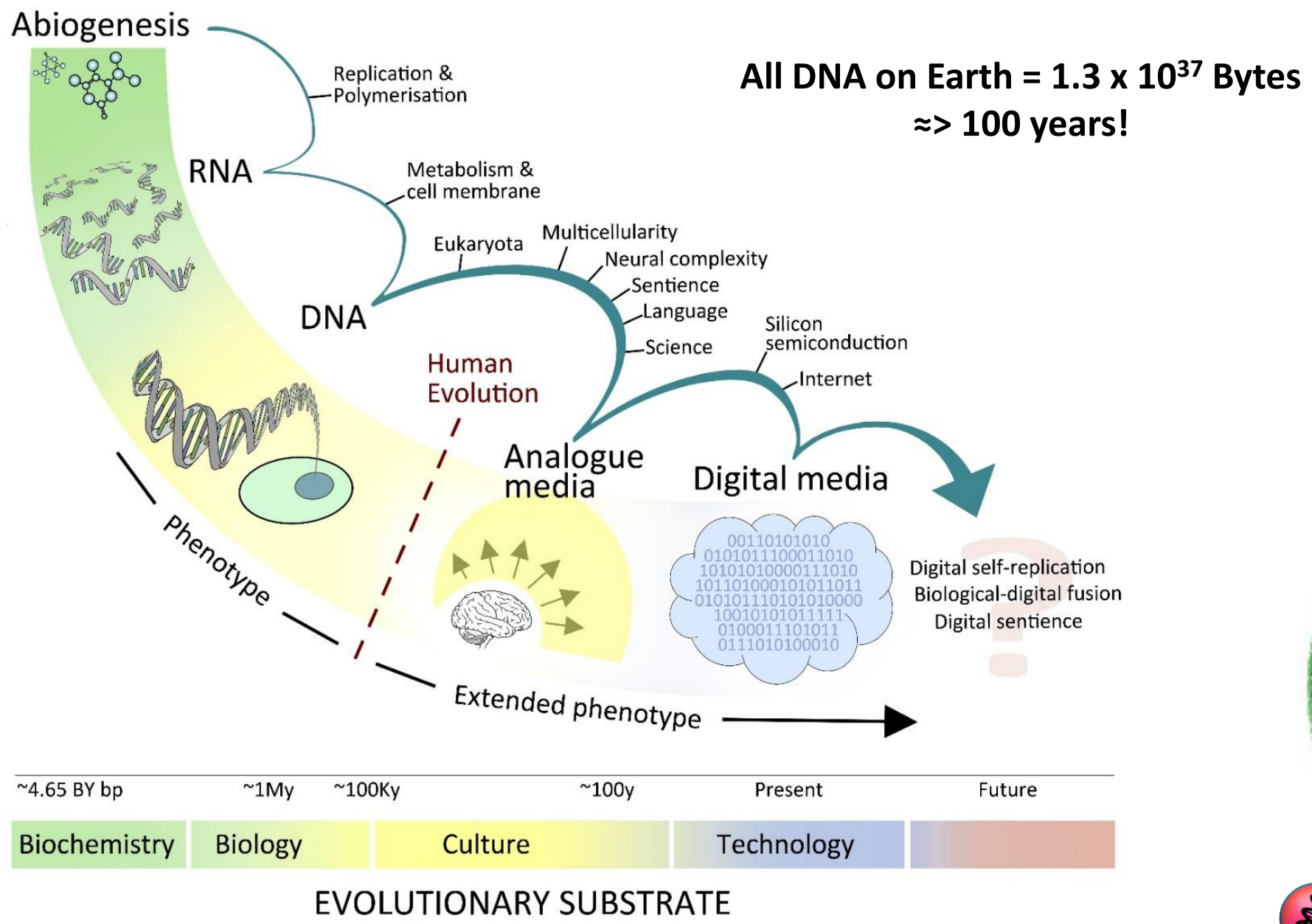


Hilbert & López (2011).  
The world's technological capacity to store, communicate and compute information.

*Science*, 332, 6025, 60-65  
[www.martinhilbert.net/WorldInfoCapacity.html](http://www.martinhilbert.net/WorldInfoCapacity.html)

Stored digital information has doubled every 2.5 years

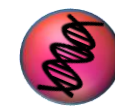




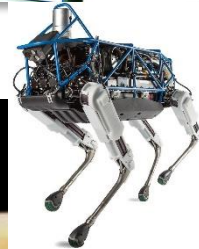
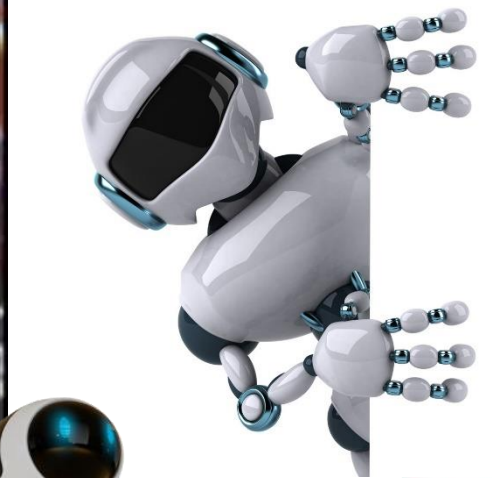
**All DNA on Earth =  $1.3 \times 10^{37}$  Bytes**  
 $\approx 100$  years!

Gillings, Hilbert & Kemp (2016)  
 Information in the Biosphere:  
 Biological and Digital Worlds.  
*Trends in Ecology & Evolution*,  
 31(3), 180–189

[www.martinhilbert.net/information-in-the-biosphere/](http://www.martinhilbert.net/information-in-the-biosphere/)



**7.2 bn humans \* 6.2 bn nucleotides =  $1 \times 10^{19}$  Bytes vs.  $5 \times 10^{21}$  Bytes**



news.com/60-minutes

Robot Baxter: US\$20,000 for 3 years

⇒ \$ 6,666/year = \$ 3.5/h

min. wage:

⇒ Argentina: \$ 6600

⇒ Brazil: \$ 4700

⇒ China Foxconn: \$ 4800

+ 40 h/week vs. 168 h/week

## **Google DeepMind's Deep Q-learning**

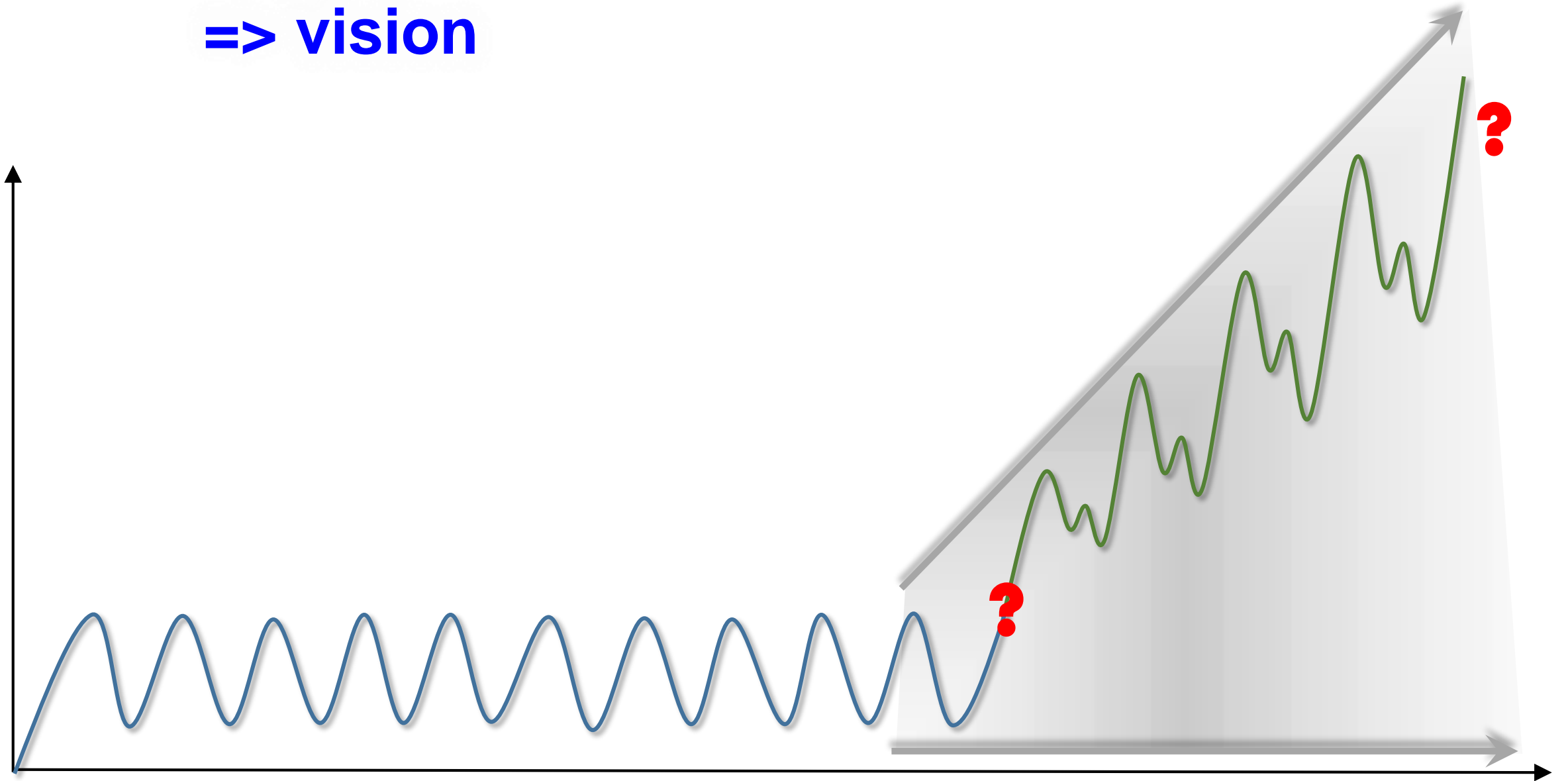
**The algorithm will play Atari breakout.**

**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.**

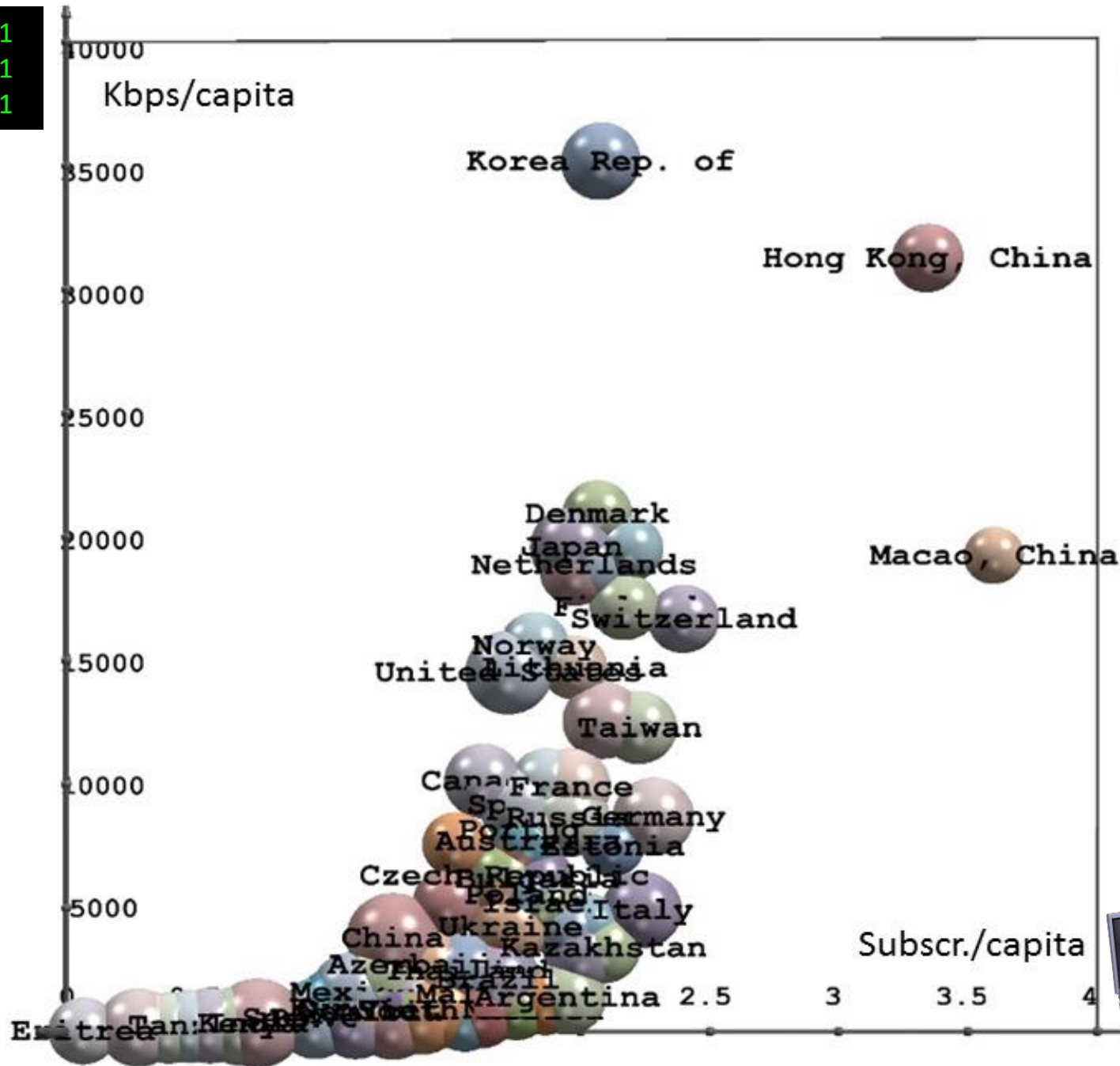
**No domain knowledge is involved! This means that the algorithm doesn't know the concept of a ball or what the controls exactly do.**

# Challenge 1

=> vision



100101  
000101  
100001



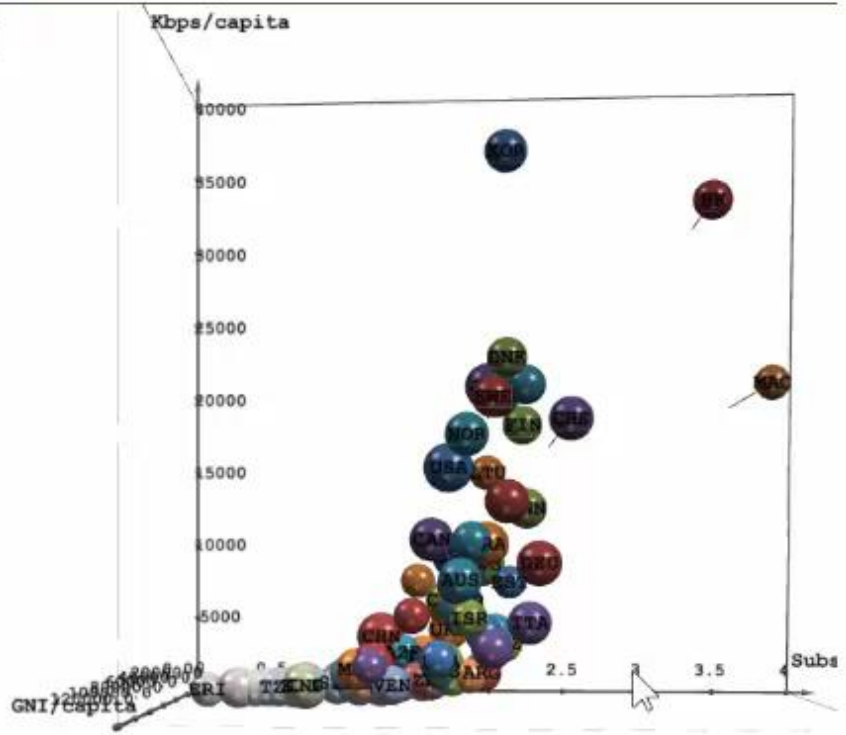
# Challenge 2

=> inequality

Hilbert (2016). The bad news is that the digital access divide is here to stay: Domestically installed bandwidths among 172 countries for 1986–2014. *Telecommunications Policy*.

[www.martinhilbert.net/the-bad-news-is-that-the-digital-access-divide-is-here-to-stay](http://www.martinhilbert.net/the-bad-news-is-that-the-digital-access-divide-is-here-to-stay)





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# So what?

## Foresight 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*

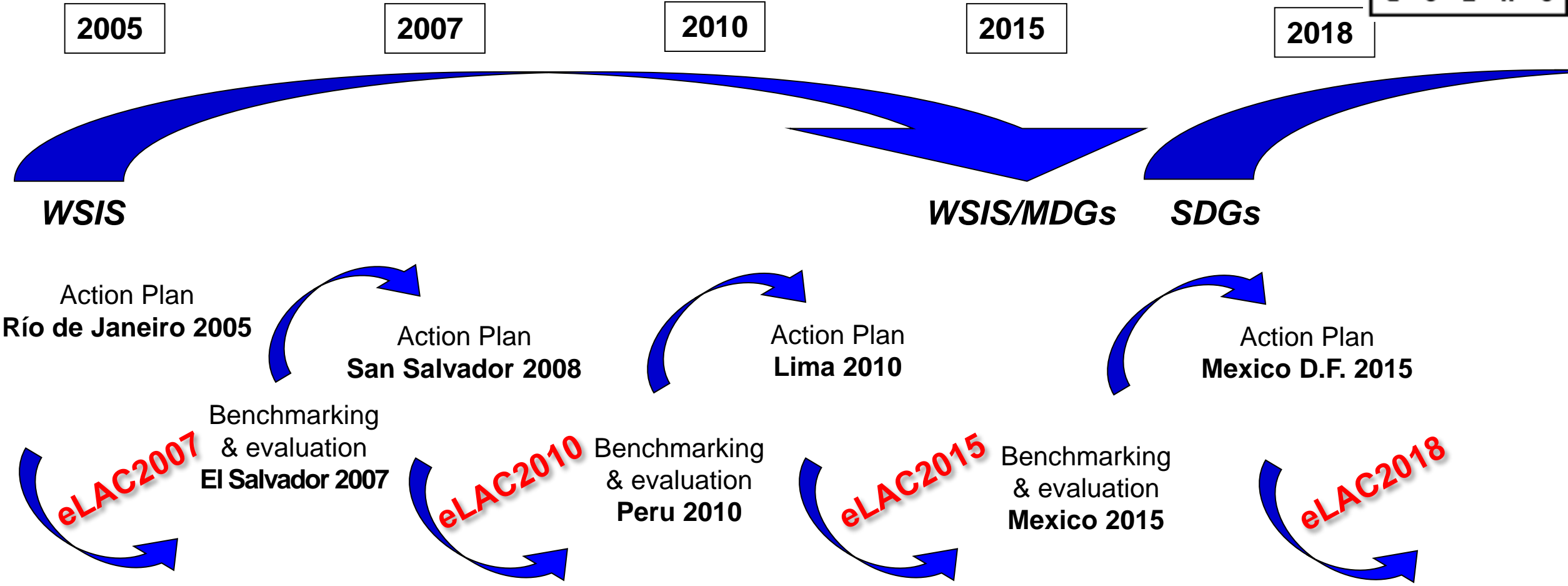
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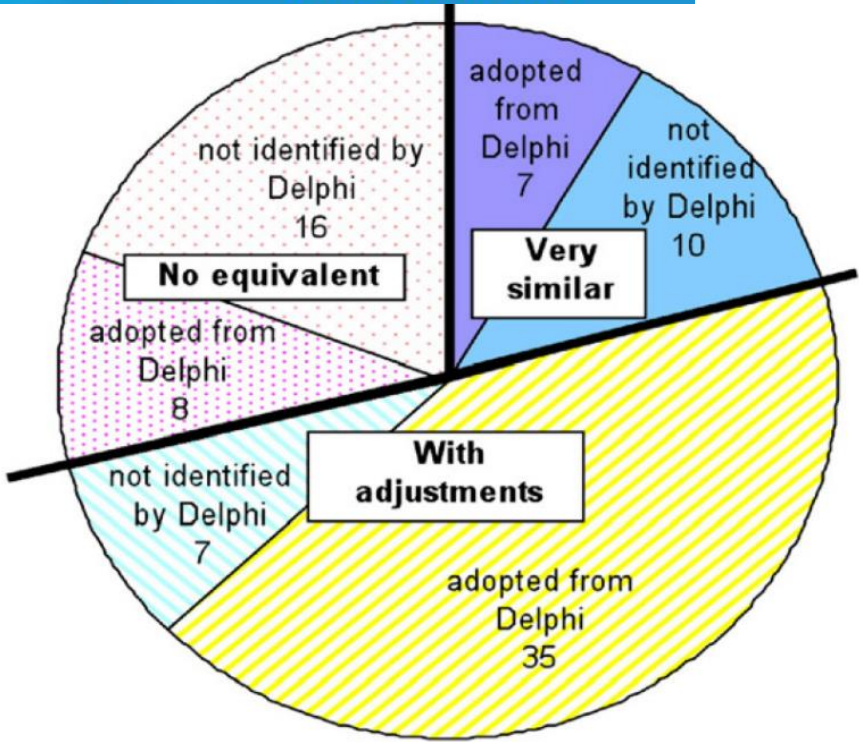
# Long term vision & short term actions



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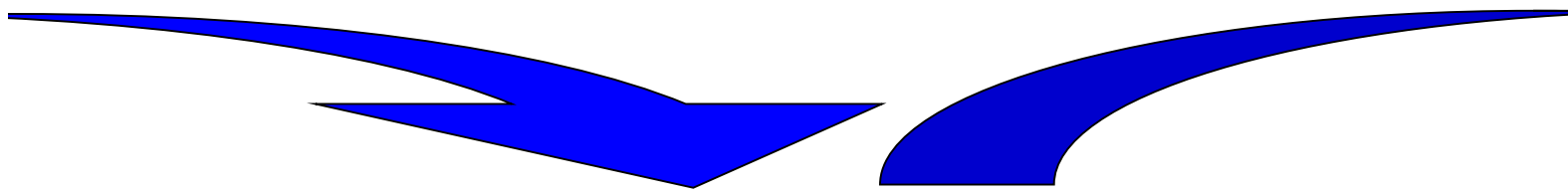
NACIONES UNIDAS



2010

2015

2018



*WSIS/MDGs*

*SDGs*

Action Plan Lima 2010

Action Plan Mexico D.F. 2015

Benchmarking & evaluation El Salvador 2007

Benchmarking & evaluation Peru 2010

Benchmarking & evaluation Mexico 2015

Benchmarking & evaluation 2018



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**eLAC2007** (Regional Action Plan 2005-2007)

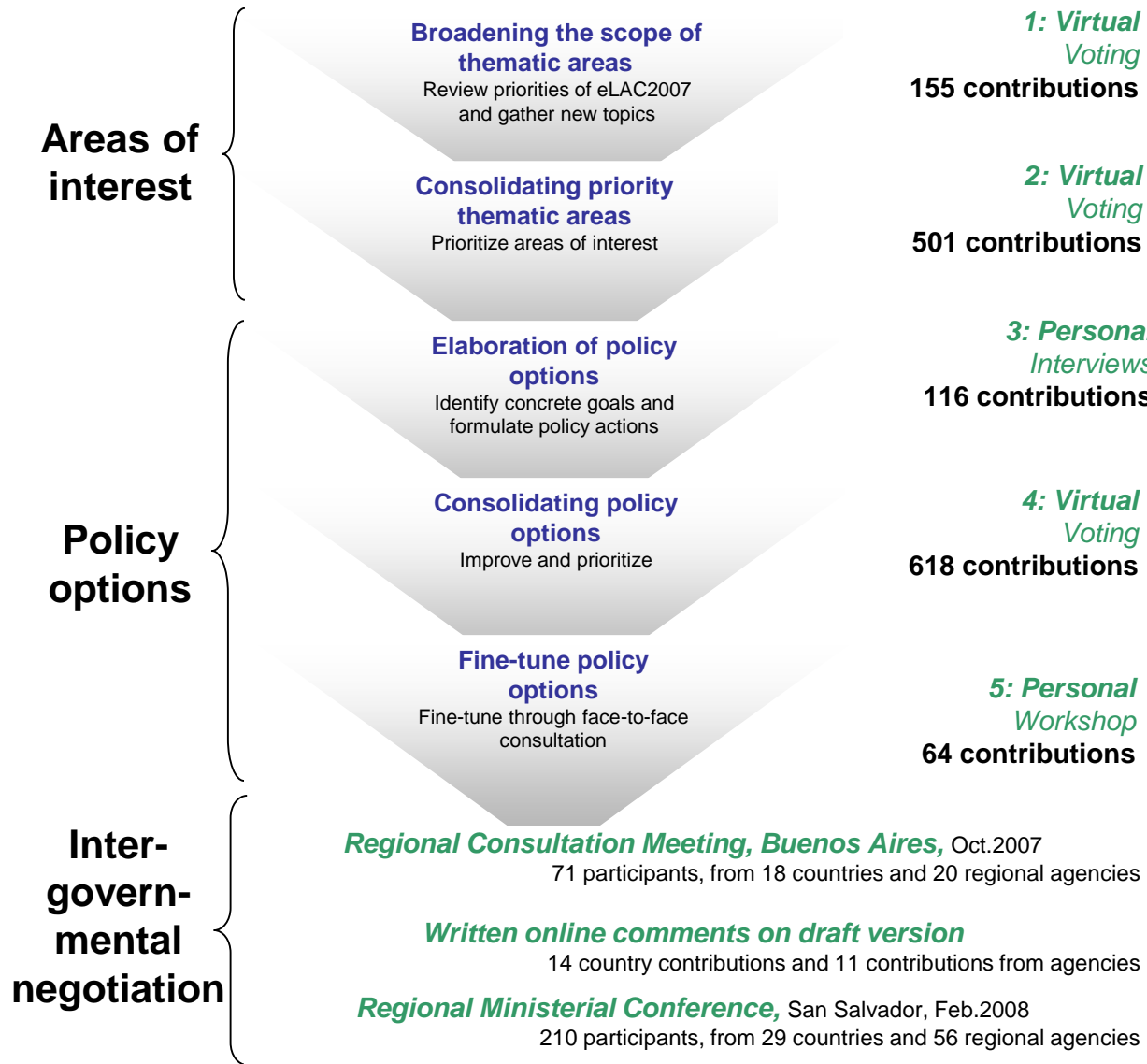


*decentralized agenda?*

*private-public alliance?*

*international coordination?*

### eLAC2007 (Regional Action Plan 2005-2007)



### eLAC2010 (Regional Action Plan 2008-2010)



16 international institutions + 1,500 contributions

*“...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.

[www.martinhilbert.net/foresight-tools-for-participative-policy-making-in-inter-governmental-processes-in-developing-countries/](http://www.martinhilbert.net/foresight-tools-for-participative-policy-making-in-inter-governmental-processes-in-developing-countries/)

## Main References:

- > Gillings, Hilbert & Kemp (2016). Information in the Biosphere: Biological and Digital Worlds. *Trends in Ecology & Evolution*, 31(3), 180–189. [www.martinhilbert.net/information-in-the-biosphere/](http://www.martinhilbert.net/information-in-the-biosphere/)
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