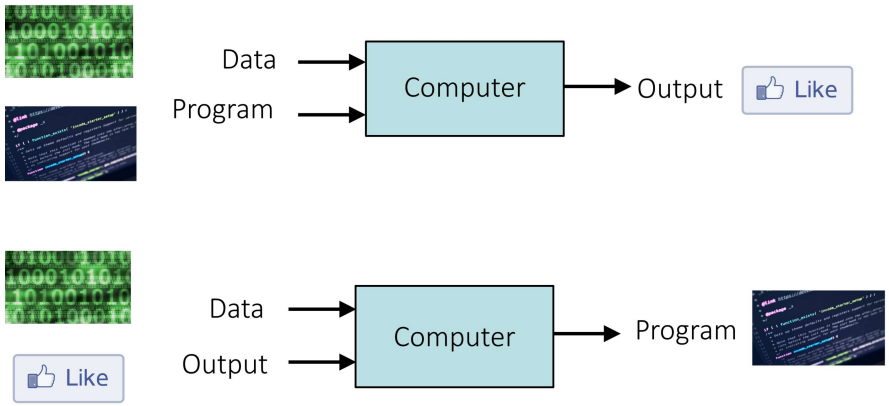
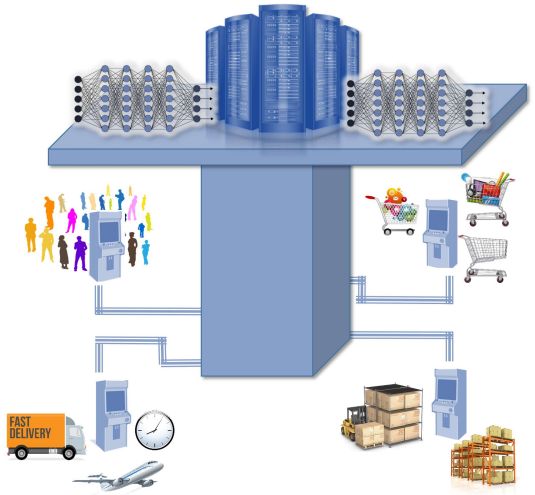




Computación social:

¿cómo conceptualizar la sociedad como un gigantesco sistema de procesamiento de información?

Martin Hilbert (Prof; Dr; PhD)
Chair DE Computational Social Science
Dpt. Communication; DataLab;
GG Computer Science
www.MartinHilbert.net | hilbert@UCDavis.edu

1) El Poder de lo **Artificial**

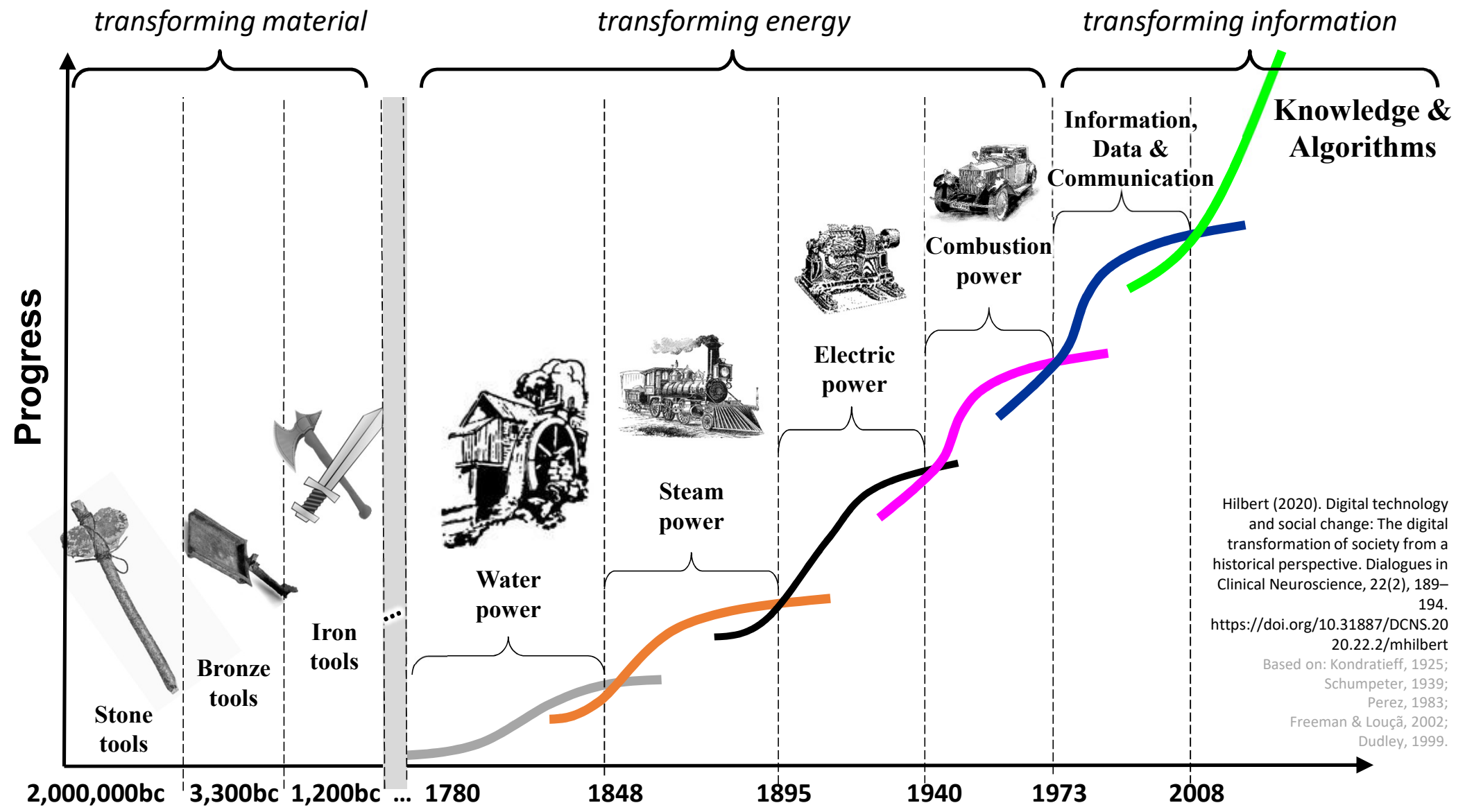
2) El Poder de lo **Humano con** lo **Artificial**

3) El Poder de lo **Artificial sobre** lo **Humano**

1) El Poder de lo **Artificial**

2) El Poder de lo **Humano** con lo **Artificial**

3) El Poder de lo **Artificial** sobre lo **Humano**



Hilbert (2020). Digital technology and social change: The digital transformation of society from a historical perspective. Dialogues in Clinical Neuroscience, 22(2), 189–194. https://doi.org/10.31887/DCNS.2020.22.2/mhilbert

Based on: Kondratieff, 1925; Schumpeter, 1939; Perez, 1983; Freeman & Louçã, 2002; Dudley, 1999.

Most valuable companies

2018

Rank	Brand
#1	Apple
#2	Google
#3	Microsoft
#4	Facebook
#5	Amazon

2019

Rank	Brand
#1	Apple
#2	Google
#3	Microsoft
#4	Amazon
#5	Facebook

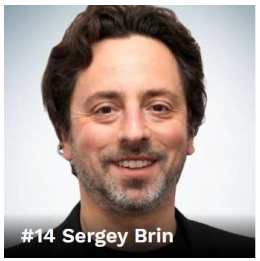
2020

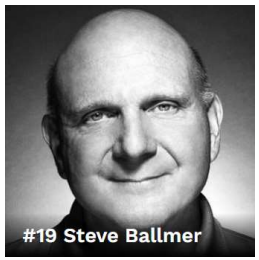
Rank	Brand
#1	Apple
#2	Google
#3	Microsoft
#4	Facebook
#5	Amazon

2021

Rank	Brand
#1	Apple
#2	Google
#3	Microsoft
#4	Amazon
#5	Facebook

https://www.forbes.com/the-worlds-most-valuable-brands





Top 10 digital individuals

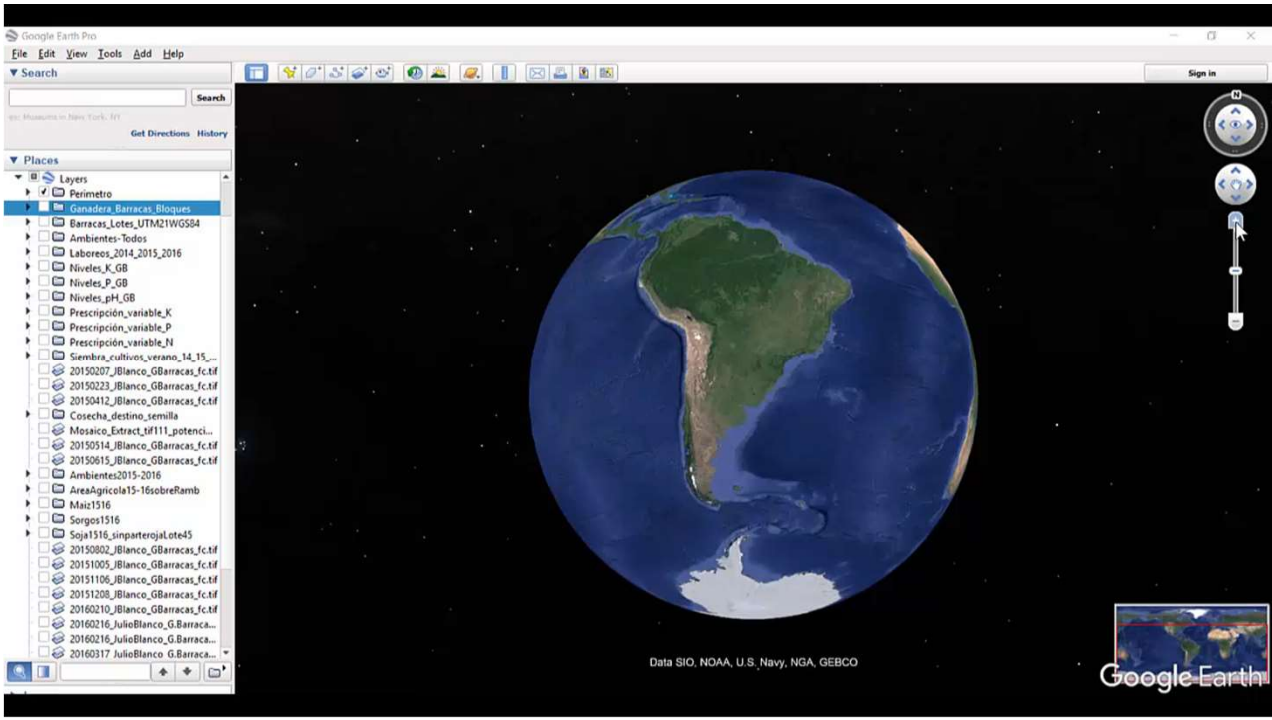
net worth 2019 =

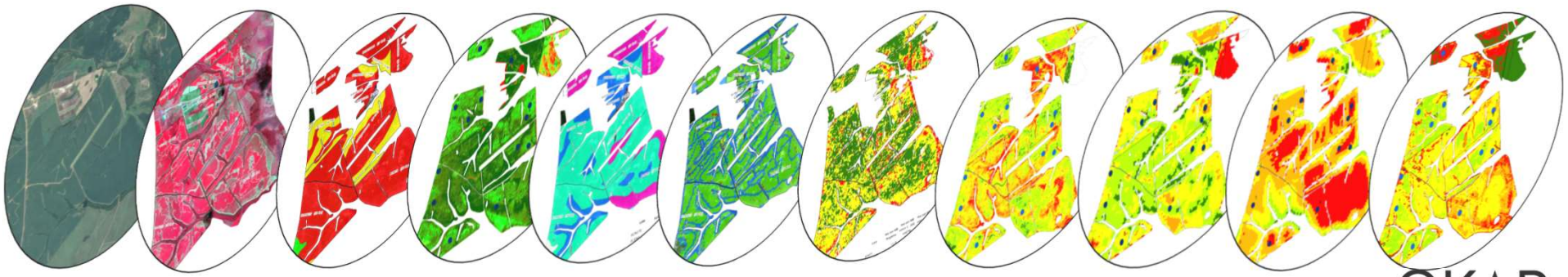
= $634 billion

> GDP of 40% of all countries together
(80 countries)

> GDP of 90% of each country
(171 countries)

Information & …





OKARATech®

… & Knowledge

Machine Learning

Like

Data

Program

Computer

Output

Like

(2 + 3) * 4 = ?

2 ? 3 ? 4 = 20

Data

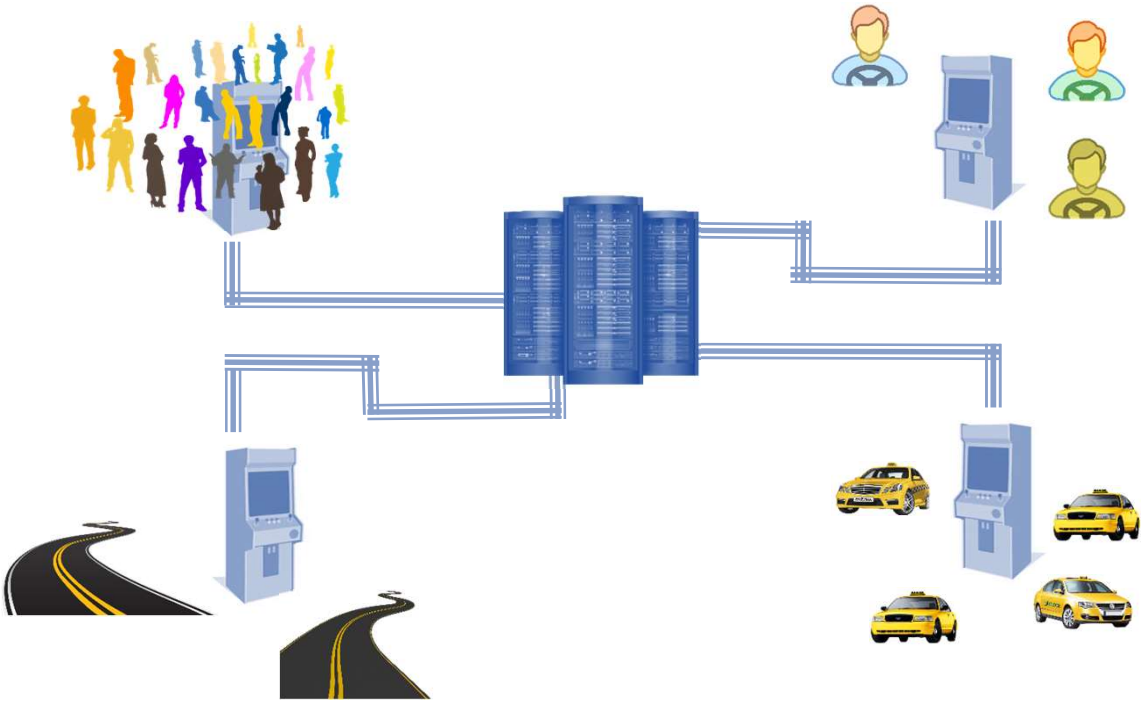
Output

Computer

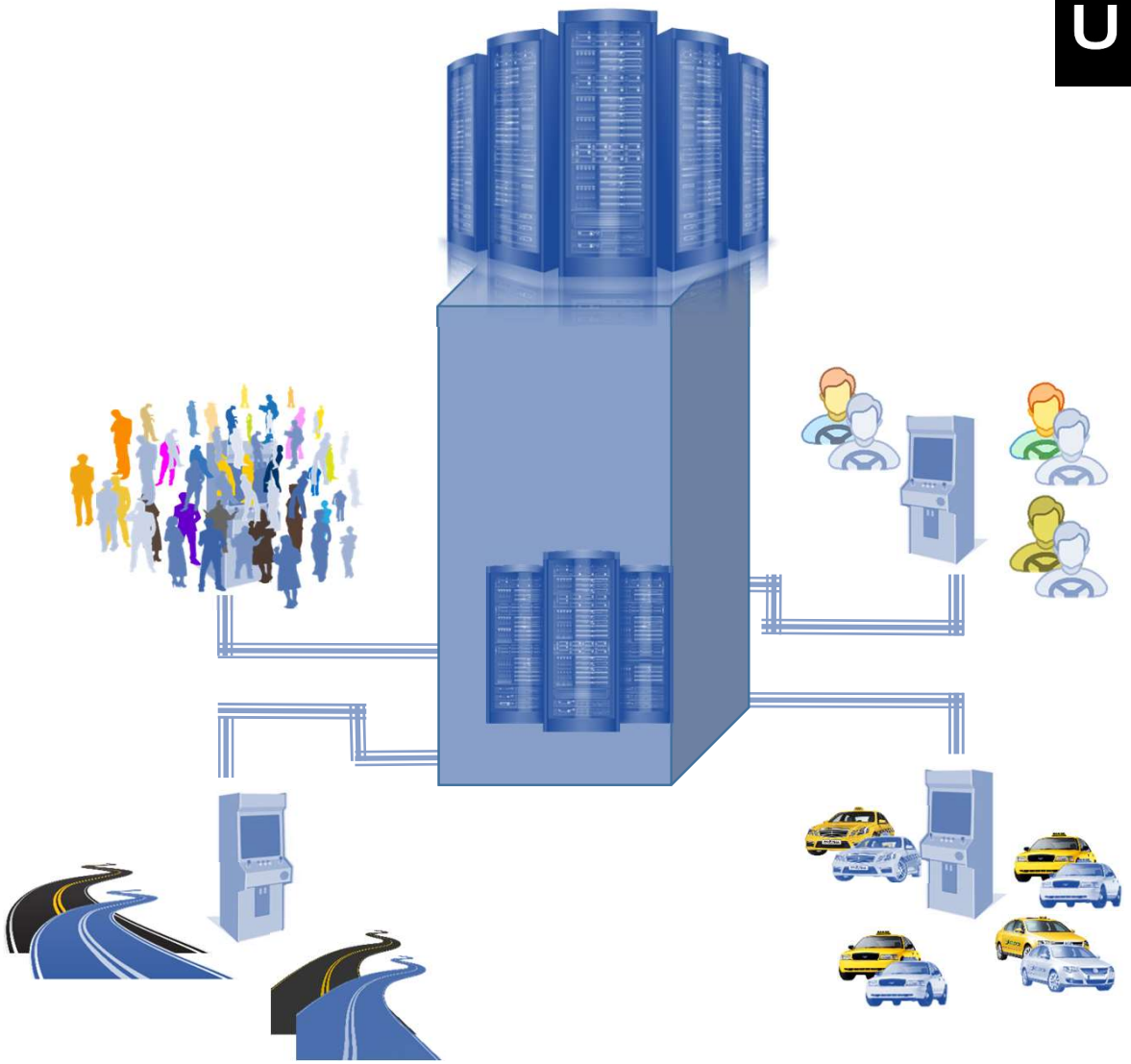
Program

Slide credit: P. Domingos

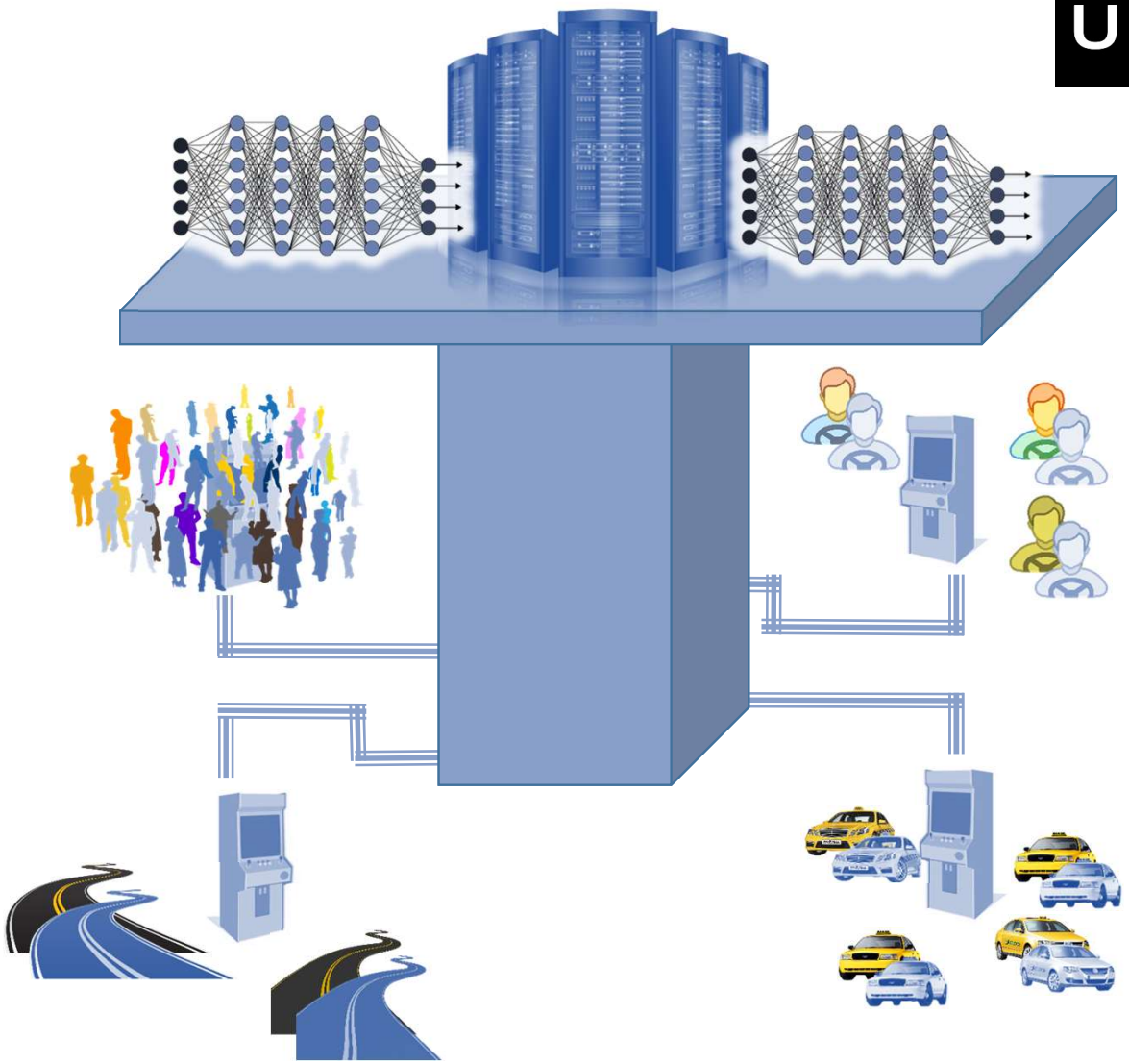
UBER

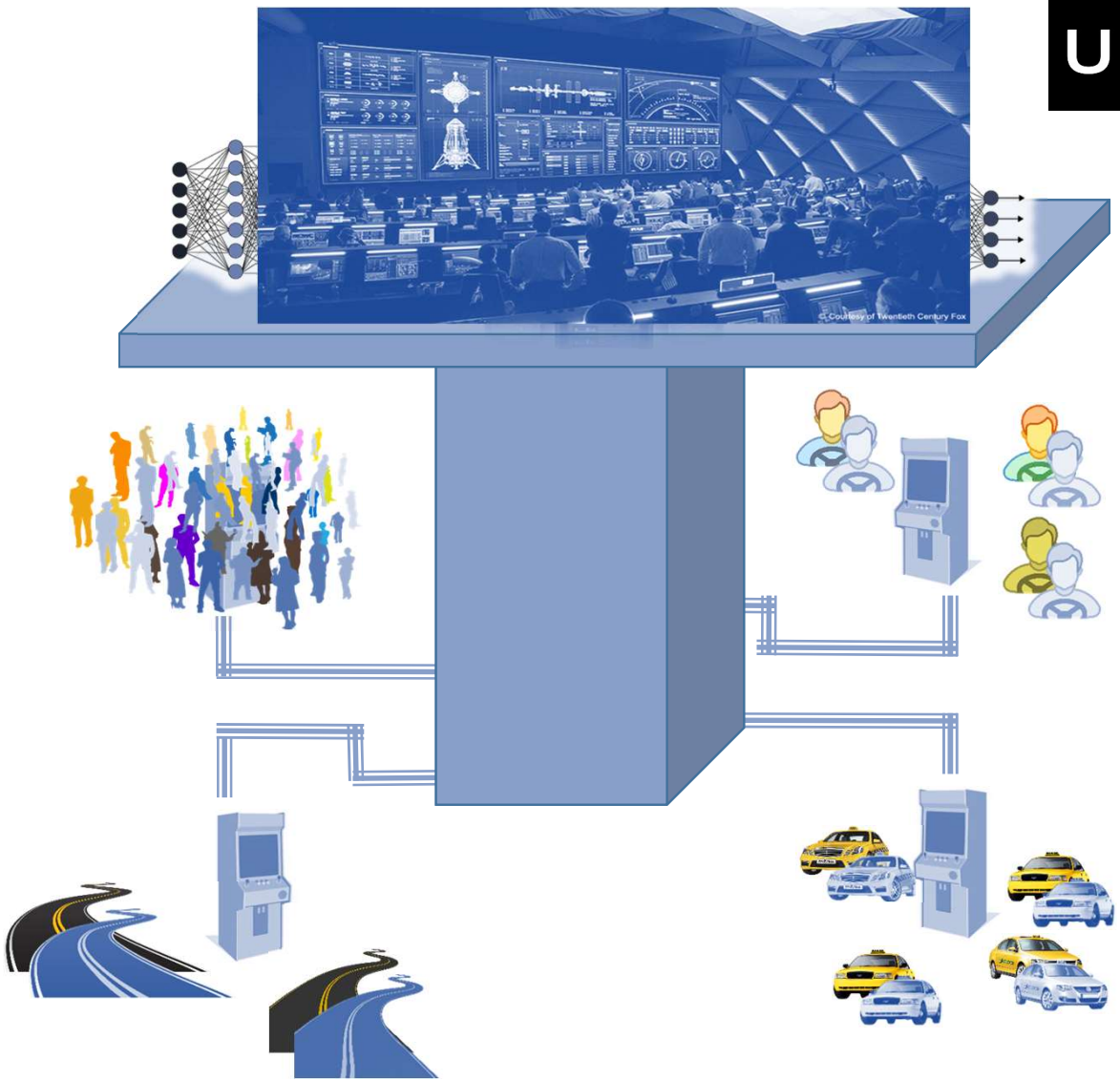


UBER



UBER

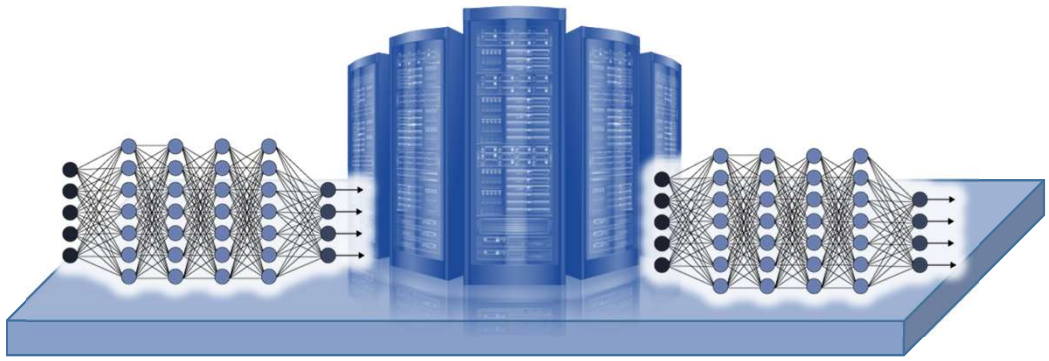




UBER

algoritmo maestro de control

El algoritmo maestro

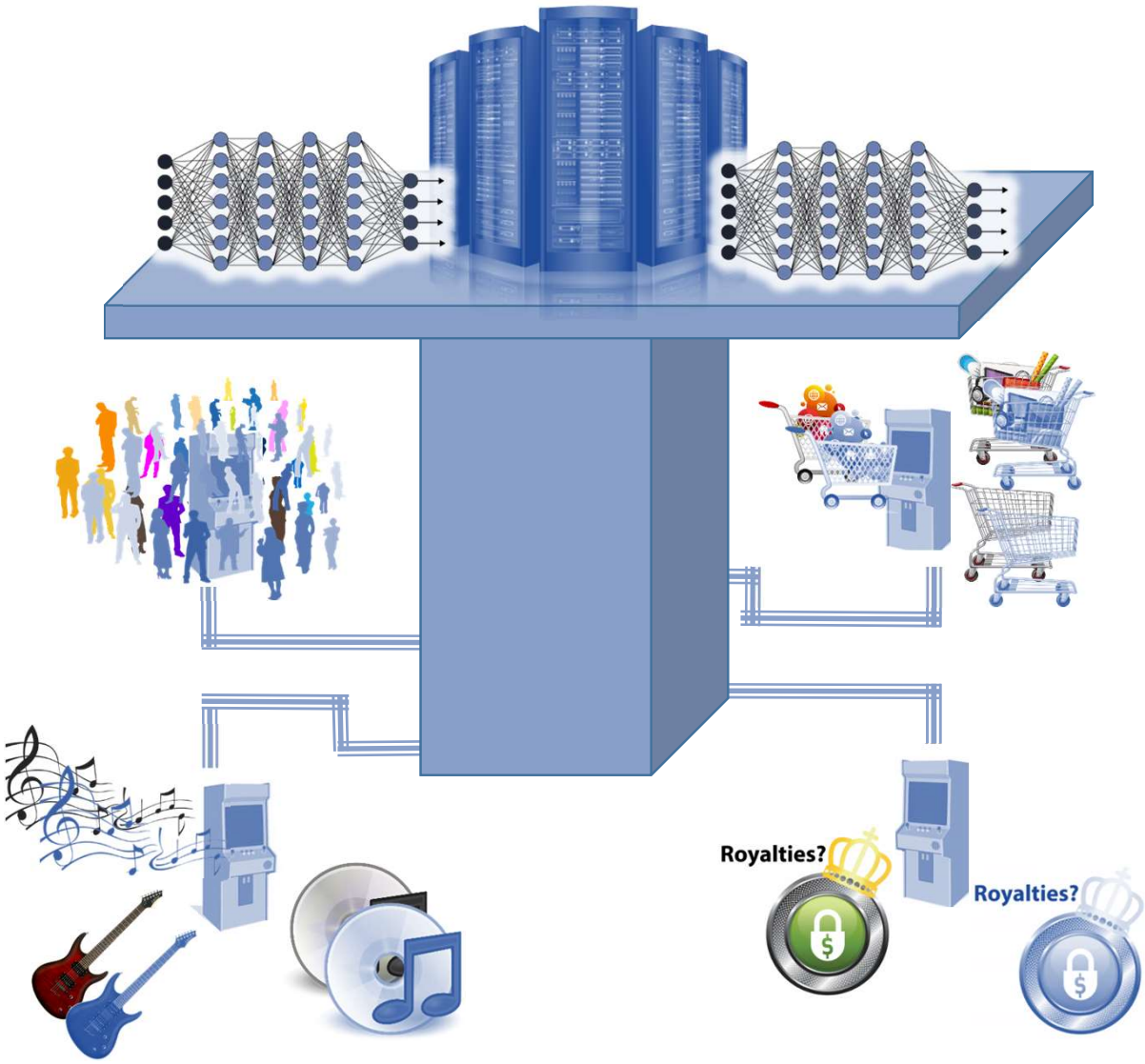


amazon

El algoritmo maestro

SONY MUSIC

El algoritmo maestro



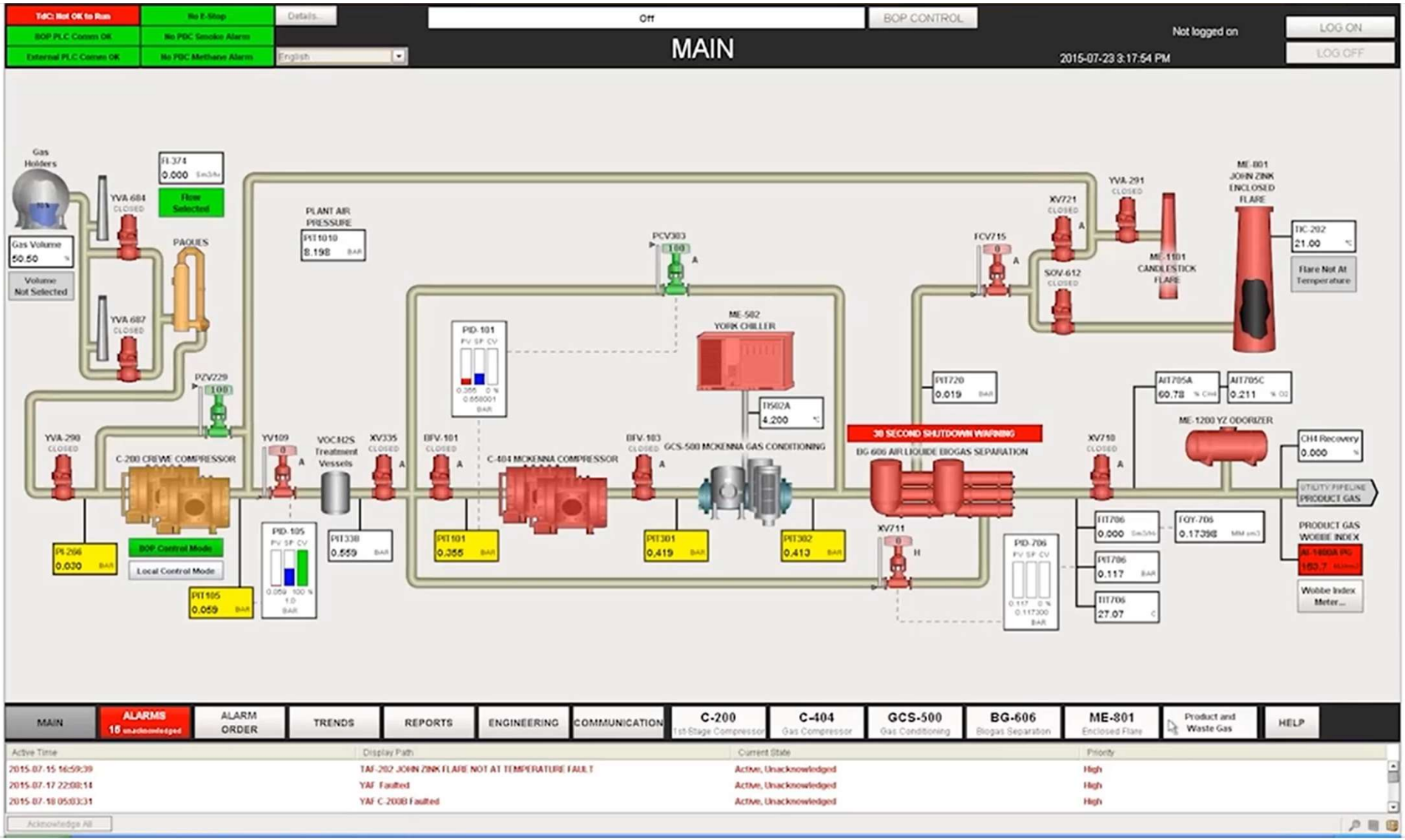
Spotify®

Revenue (2019): US$9 billion

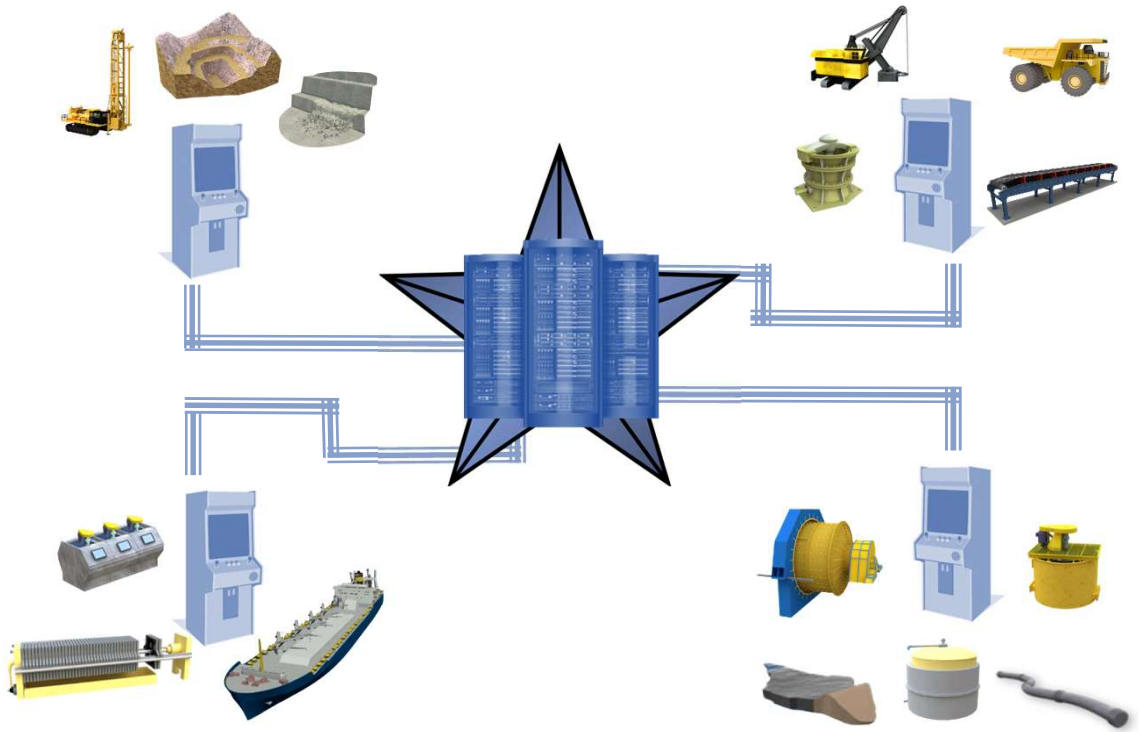
Revenue (2019): US$8 billion

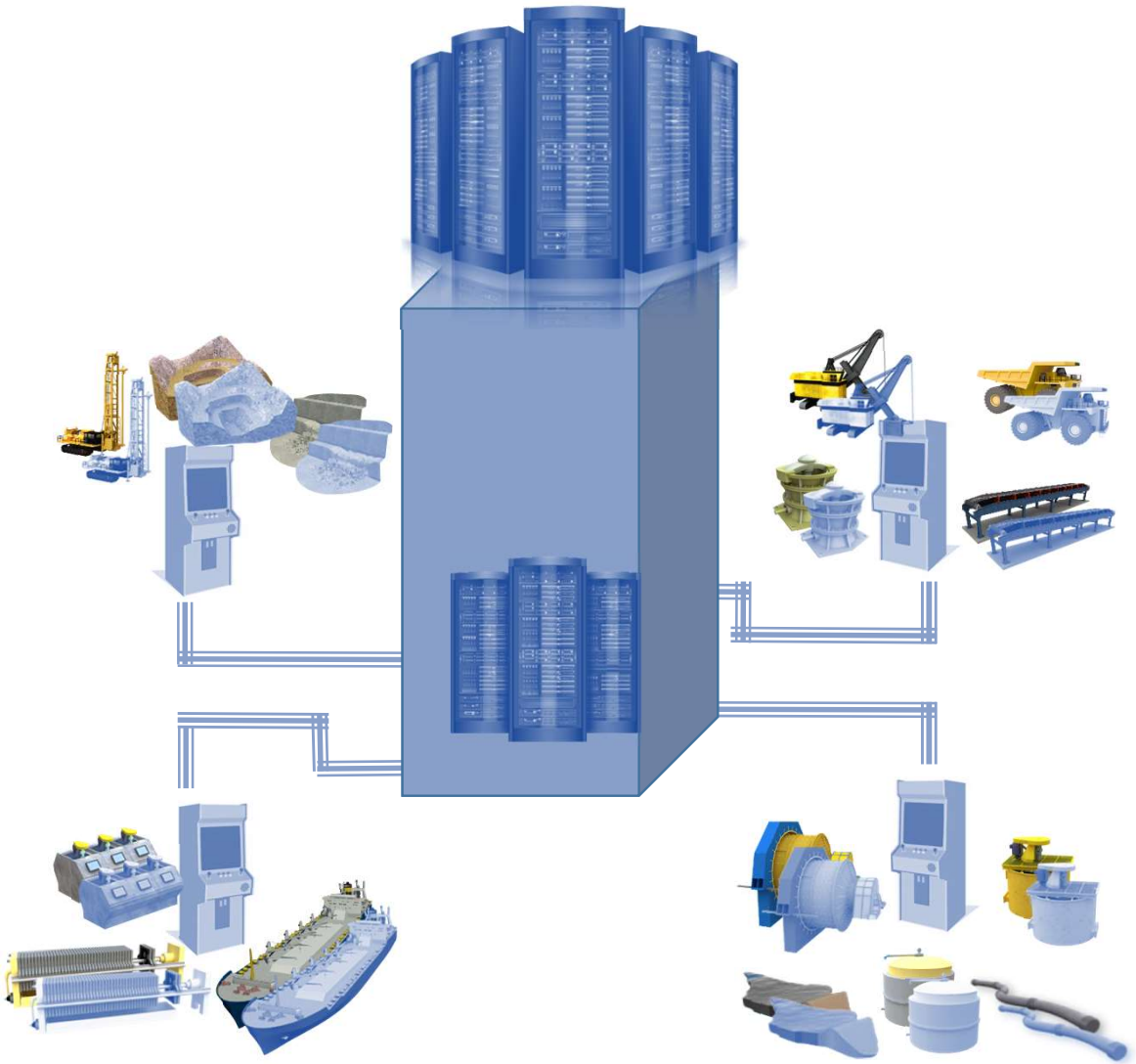
SONY MUSIC

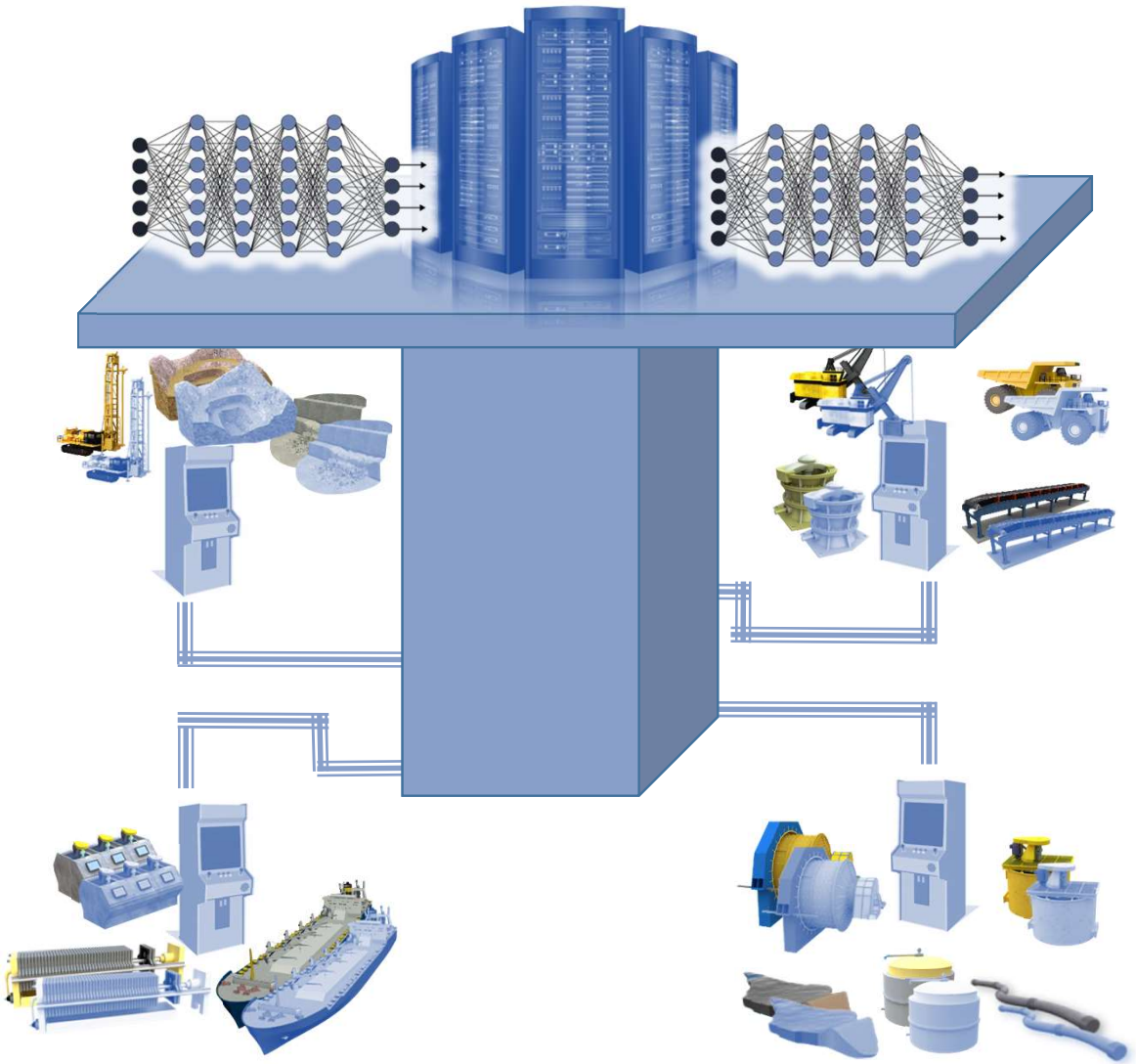
Owner of
"Happy Birthday to you"
Patty and Mildred J. Hill, 1893



https://inductiveautomation.com/resources/customerproject/rapid-development-for-natural-gas-utility







La Estrella de la Información…

3 requisitos:

1) escalable

2) abierto, flexible y non-discriminatoria

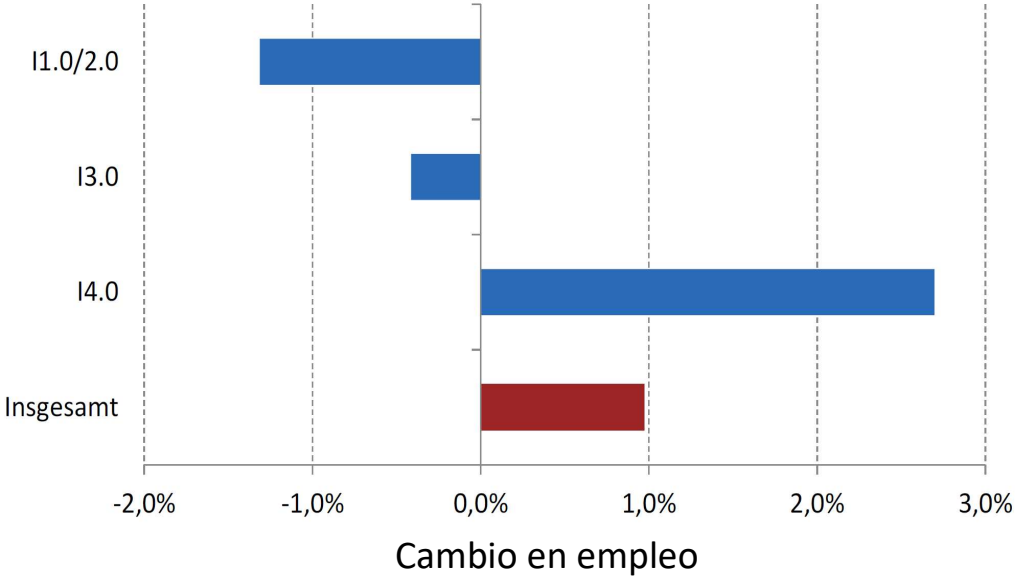
3) accionable

1) El Poder de lo Artificial

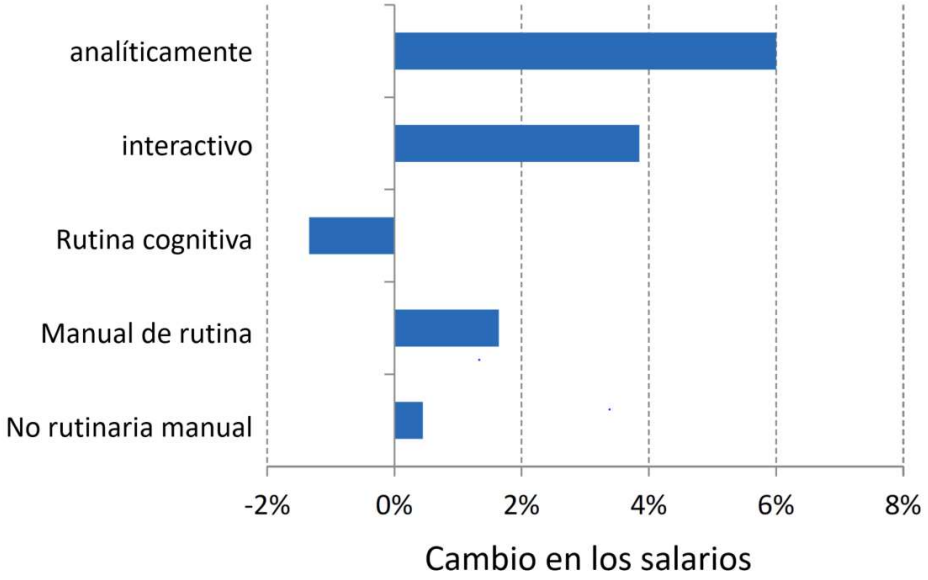
2) El Poder de lo Humano con lo Artificial

3) El Poder de lo Artificial sobre lo Humano

CANTIDAD: Efecto en el empleo por tecnología, 2011-2016



CALIDAD: Efectos salariales por ocupaciones, 2011-2016.



Tecnologías simples (Industria 1.0 / 2.0)

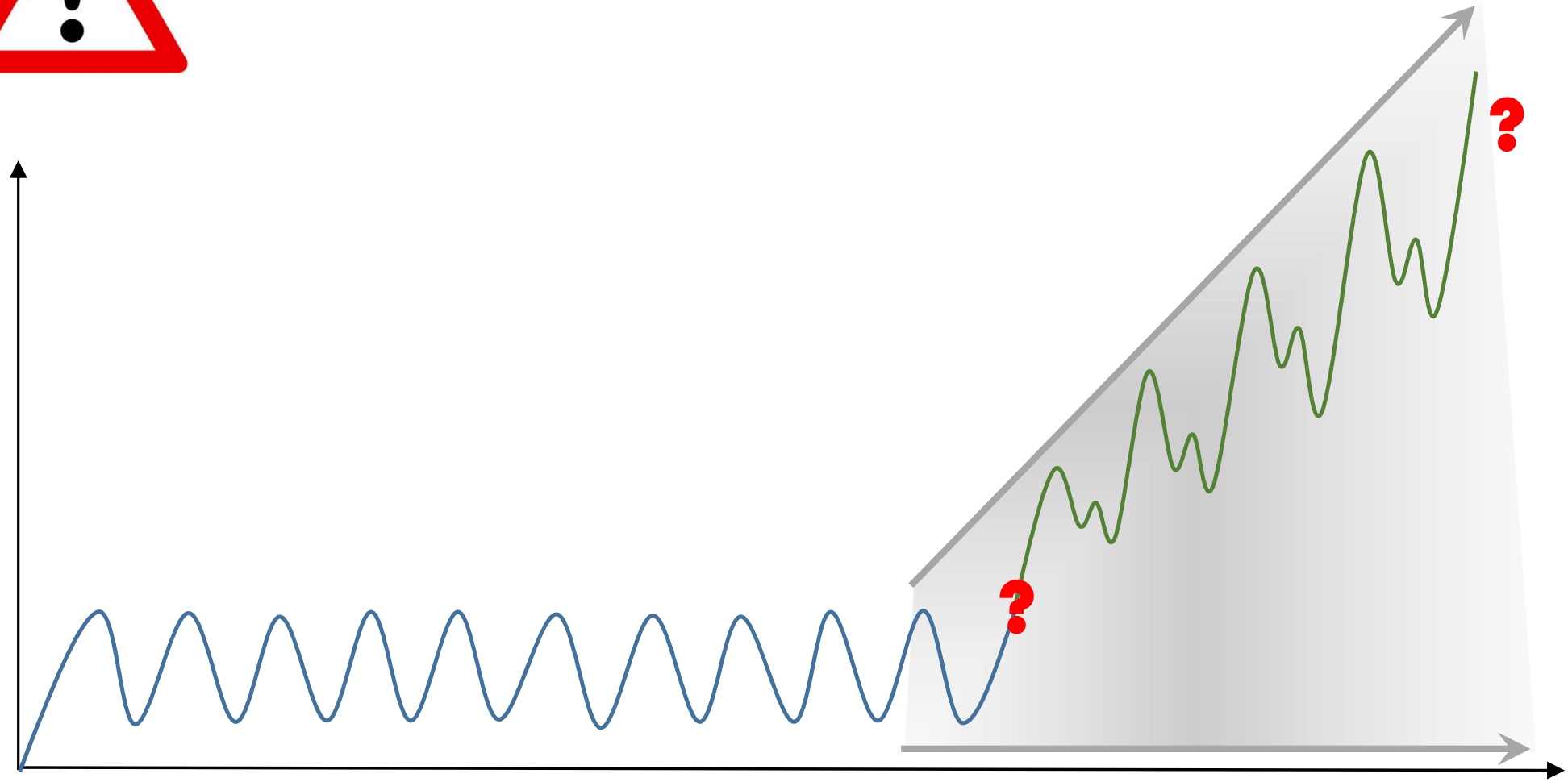
Tecnologías informatizadas/ soportado por computación (Industria 3.0)

Tecnologías de red digital (Industria 4.0)

ZEW
Zentrum für Europäische Wirtschaftsforschung GmbH

http://ftp.zew.de/pub/zew-docs/gutachten/DigitalisierungundZukunftderArbeit2018.pdf

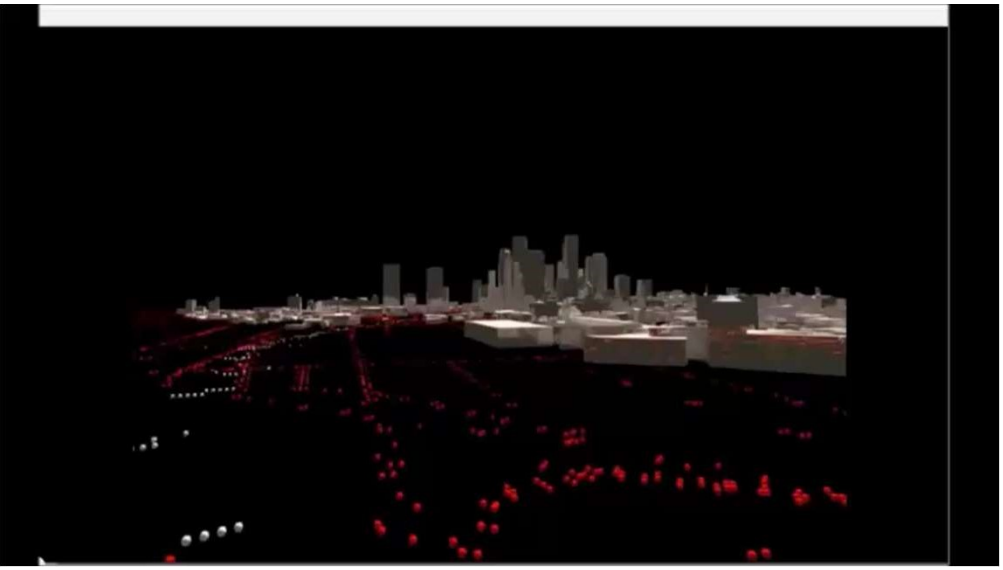
Past ≠ Future



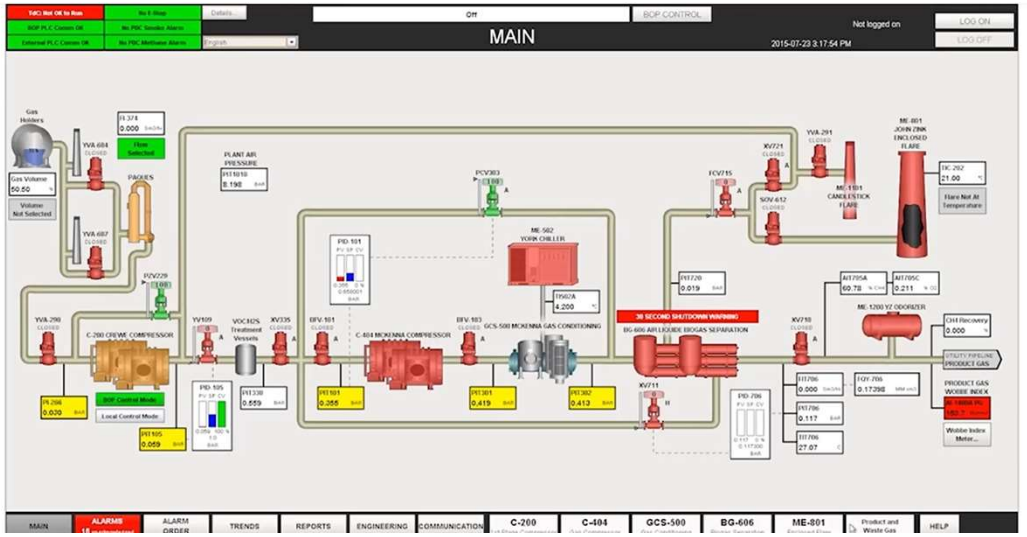
Past ≠ Future

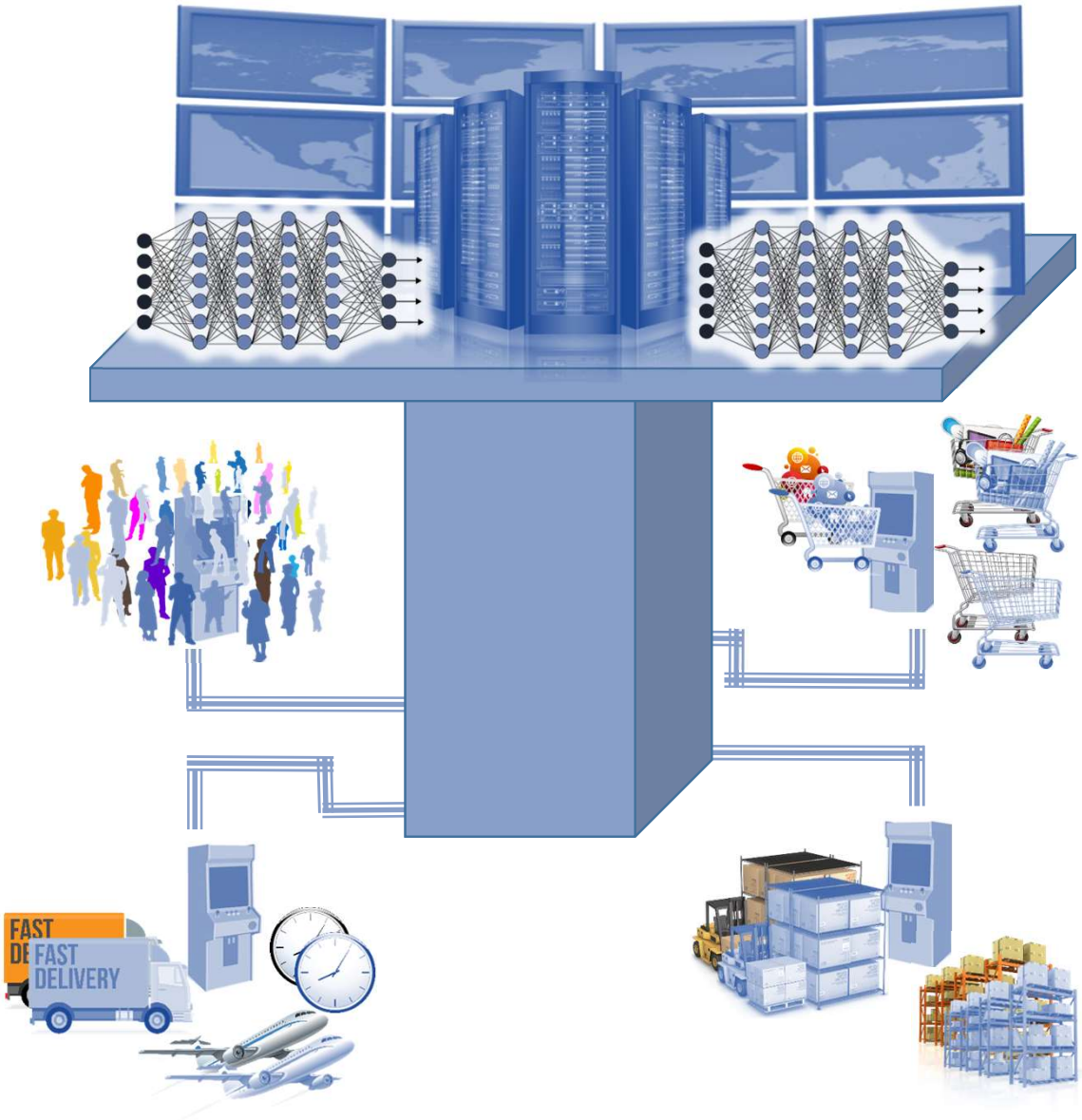
Wikipedia Commons

SIMCITY edu



Sources: Bohemia Interactive Simulations, http://youtu.be/G9P9bUTCdpA ; TRANSIMS: http://www.youtube.com/watch?v=mN7kq0ITAys ; Epstein, http://www.youtube.com/watch?v=wZZJCIGtVkw &
https://inductiveautomation.com/resources/customerproject/rapid-development-for-natural-gas-utility





amazon

1) El Poder de lo Artificial

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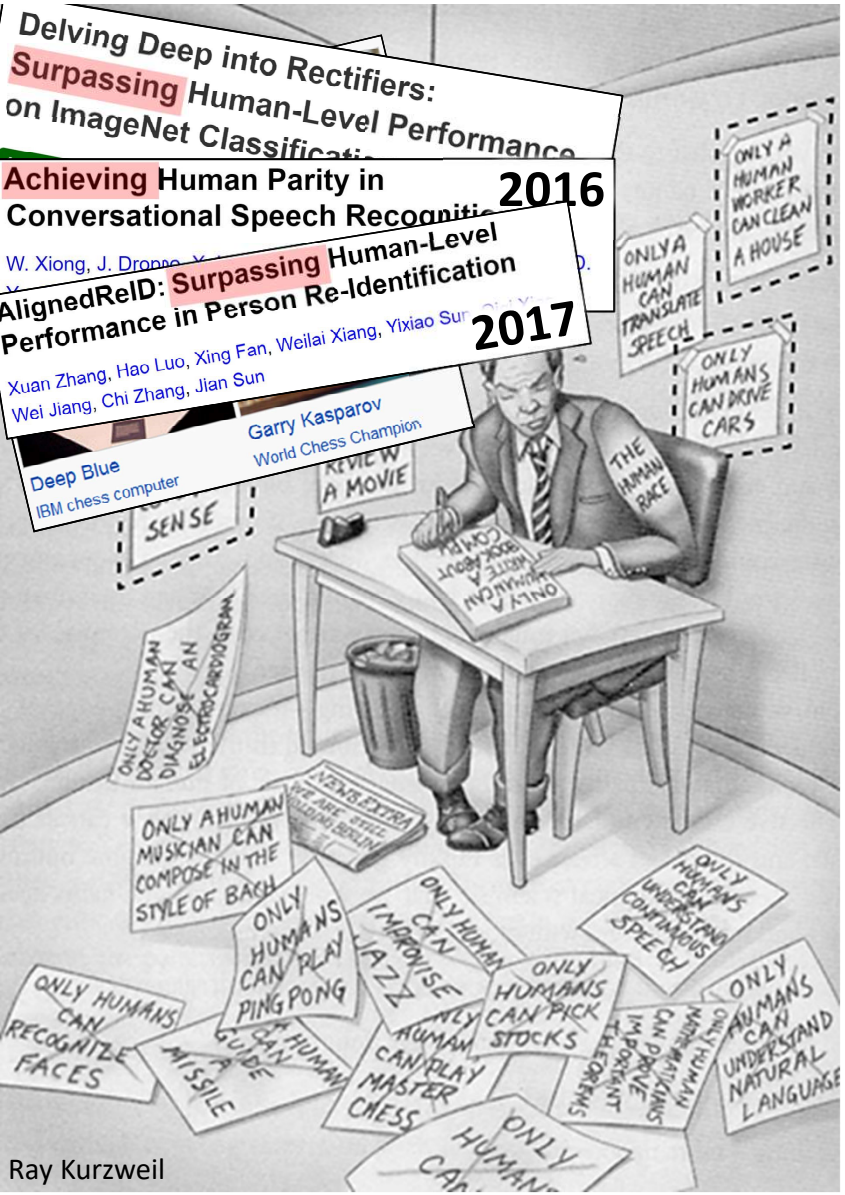
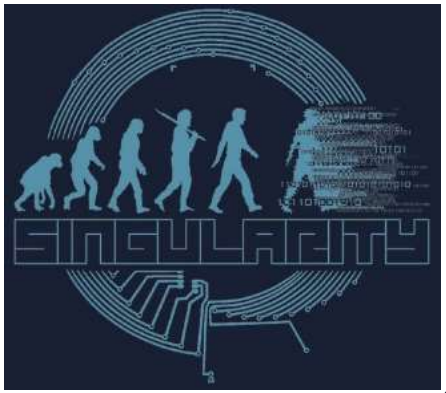
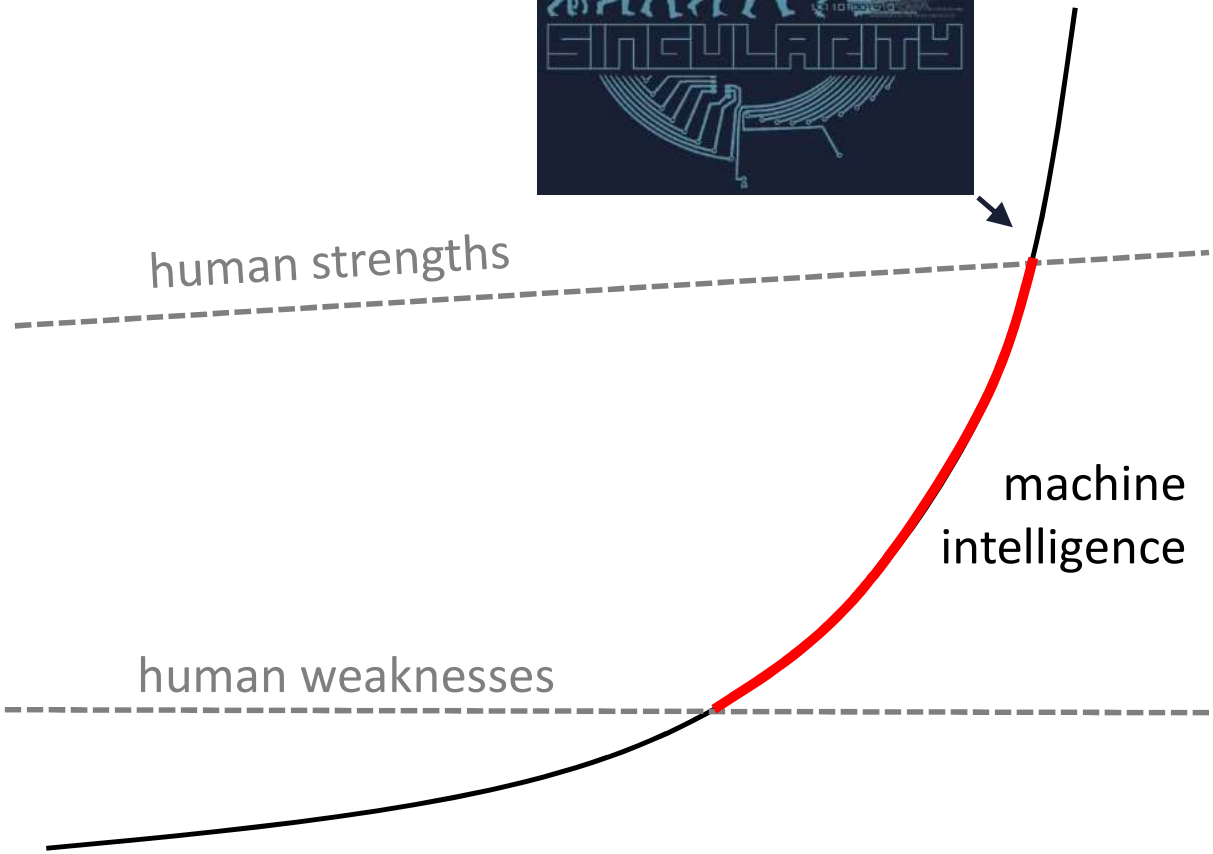
3) El Poder de lo Artificial sobre lo Humano

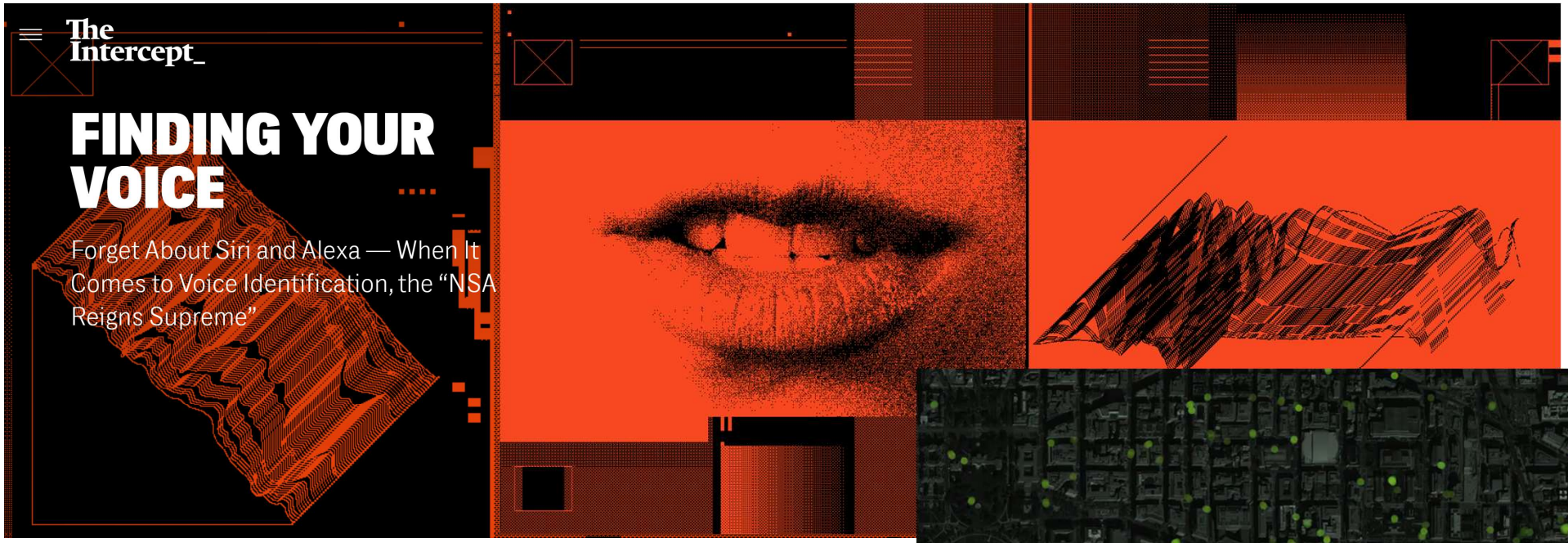


Ray Kurzweil





https://humanetech.com/problem



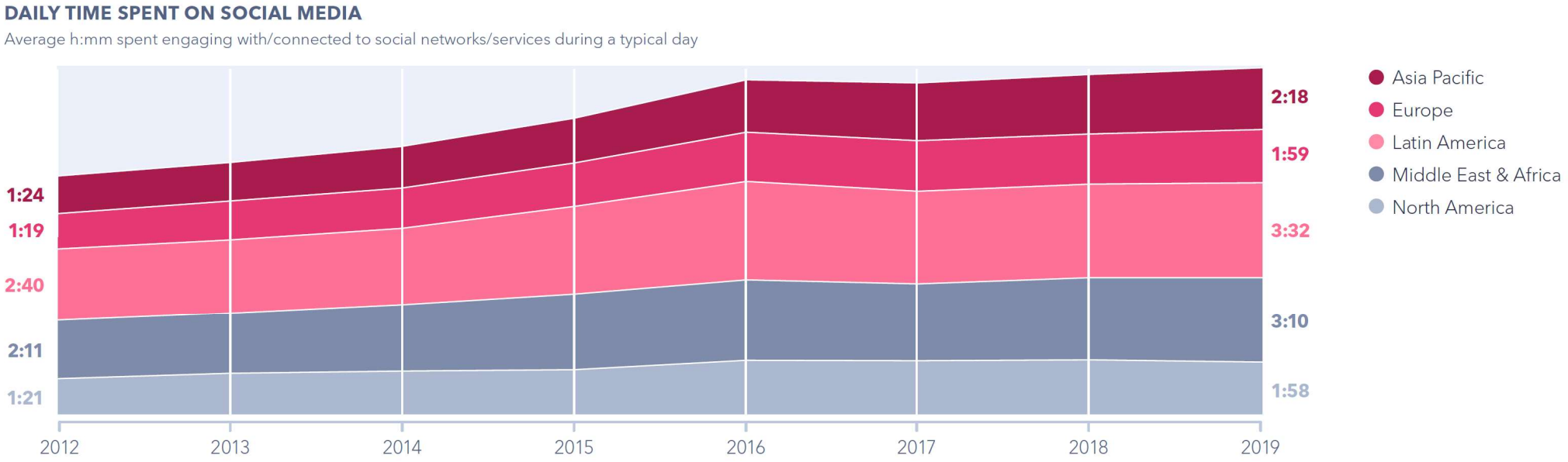
HUMAN RIGHTS WATCH

Available In 简体中文 English 日本語

China: Voice Biometric Collection Threatens Privacy

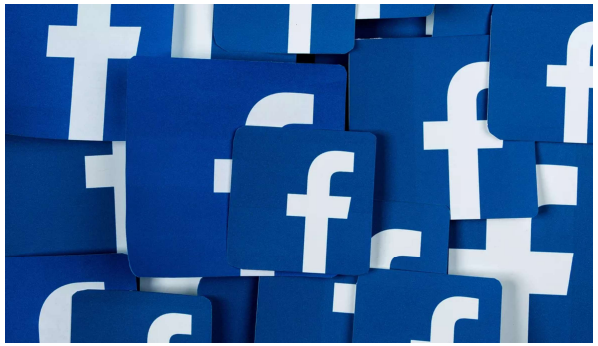
Police, AI Giant Collaboration in Legal Gray Area

https://theintercept.com/2018/01/19/voice-recognition-technology-nsa/ ; https://www.hrw.org/news/2017/10/22/china-voice-biometric-collection-threatens-privacy#
https://www.nytimes.com/interactive/2019/12/19/opinion/location-tracking-cell-phone.html ; https://www.nytimes.com/interactive/2019/12/19/opinion/location-tracking-cell-phone.html



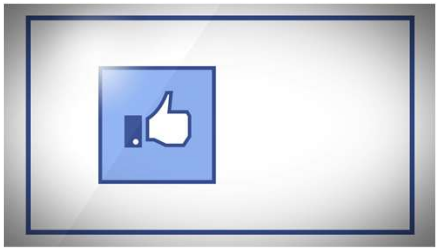
"*Cuando visita un sitio o una aplicación que utiliza nuestros servicios, recibimos información incluso si está desconectado o no tiene una cuenta de Facebook.*"

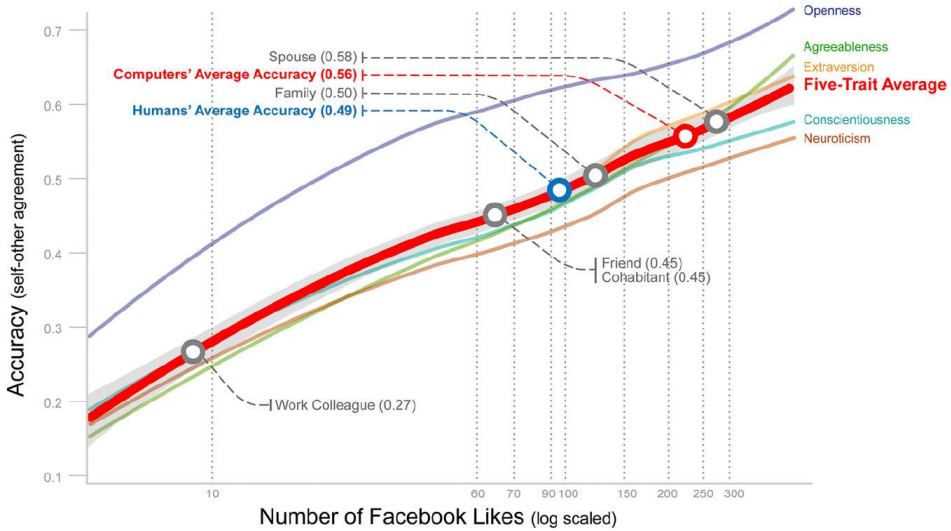
https://newsroom.fb.com/news/2018/04/data-off-facebook



Question: On an average day, how long do you spend on social media? **Source:** GlobalWebIndex 2012-2019 (averages of all waves conducted between Q2 2012 and Q3 2019) internet users aged 16-64

…know us better than we ourselves



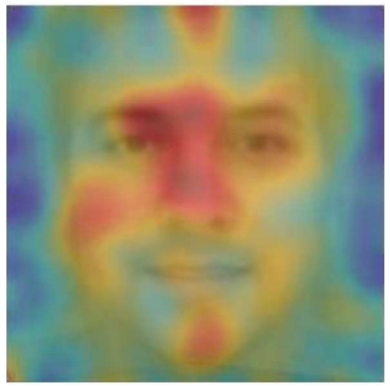


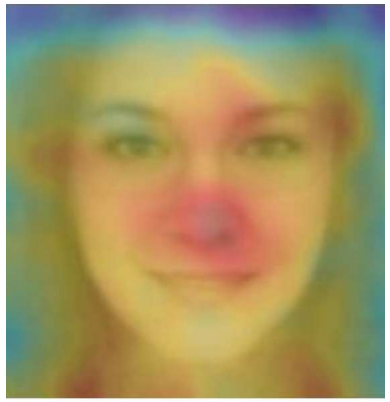
Personality Trait	Accuracy
Openness	.80
Conscientiousness	.65
Extroversion	.72
Agreeableness	.72
Neuroticism	.73

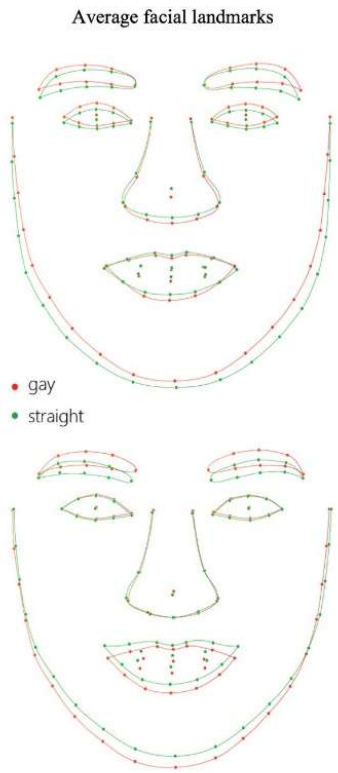
Youyou, Kosinski & Stillwell (2015). Computer-based personality judgments are more accurate than those made by humans. *PNAS*, 201418680. Kosinski, Stillwell, & Graepel (2013). Private traits and attributes are predictable from digital records of human behavior. *PNAS*, *110*(15), 5802–5805;
Grover, T., & Mark, G. (2017). Digital footprints: Predicting personality from temporal patterns of technology use. *Proc. 2017 ACM*, 41–44. Videoblocks.com

…know us better than we ourselves

	man	woman
Human:	61%	54%
AI (5 pics):	91%	83%







Wang & Kosinski (2018). Deep neural networks are more accurate than humans at detecting sexual orientation from facial images. *J. of Personality and Social Psychology*, *114*(2), 246–257.

…know us better than we ourselves

Crum, P. (2018). *Technology that knows what you're feeling*. https://www.ted.com/talks/poppy_crum_technology_that_knows_what_you_re_feeling

BBC NEWS | MUNDO

Noticias América Latina Internacional EE.UU. 2020 ¿Hablas español? Hay Festival

Economía Ciencia Salud Cultura Tecnología Video Centroamérica Cuenta BBC Extra

Martin Hilbert: "La verdadera fuente de poder de las redes ha sido llevarnos a nuestro narcisismo, enojo, ansiedad, envidia, credulidad y, por cierto, a nuestra lujuria"

Daniel Hopenhayn
Especial para BBC Mundo

20 octubre 2020

No sabemos cómo lidiar con el poder de los algoritmos, afirma Martin Hilbert

"El crecimiento de la digitalización siempre fue exponencial, pero la pandemia lo aceleró con esteroides", asegura Martin Hilbert, investigador alemán de la Universidad de California-Davis y autor del primer estudio que calculó cuánta información hay en el mundo.

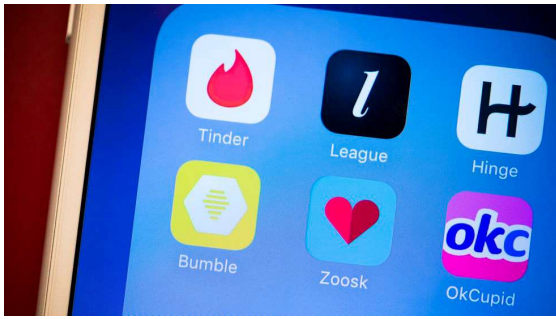
Reconocido por haber alertado sobre la intervención de Cambridge Analytica en la campaña de Donald Trump un año antes de que estallara el escándalo, Hilbert ha seguido de cerca los efectos digitales del coronavirus y sus conclusiones son poco optimistas: las personas no saben cómo lidiar con el poder de los algoritmos, los gobiernos no saben cómo usarlos en favor de la población y las empresas se resisten a adoptar pautas éticas efectivas.

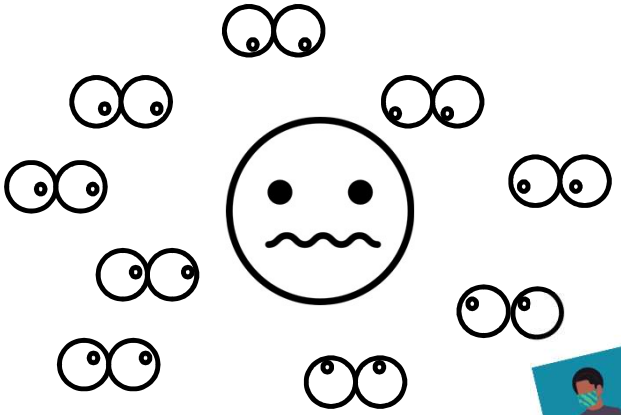
Esto debiera preocupar especialmente a América Latina, "porque son líderes mundiales en el uso de redes sociales", advierte Hilbert, que vivió una década en Chile como funcionario de la ONU y hoy vive a 40 minutos de Silicon Valley.

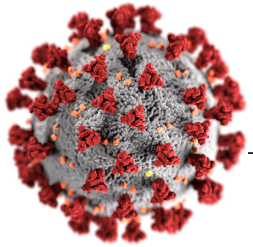
En conversación con BBC Mundo compartió su opinión de que las nuevas tecnologías plantean desafíos de alcances tales que podrían exigir una **evolución de la conciencia humana**.

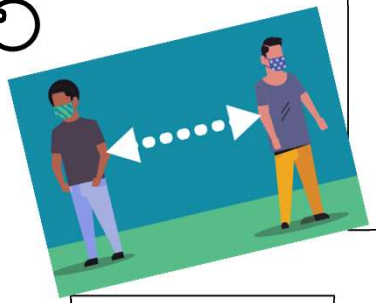
https://www.bbc.com/mundo/noticias-54484758

Vicious Circle









Loneliness

Social Anxiety

b = 0.40**

Prefer Online Interaction via dating apps.

b = 0.09*

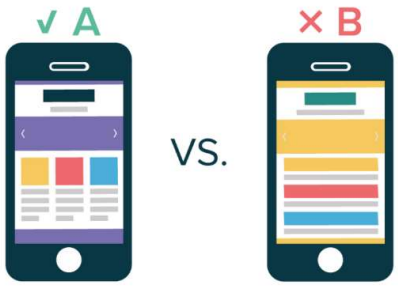
Compulsive use

b = 0.35***

Negative outcome academic/social/work

Coduto, K. D., Lee-Won, R. J., & Baek, Y. M. (2020). Swiping for trouble: Problematic dating application use among psychosocially distraught individuals and the paths to negative outcomes. *Journal of Social and Personal Relationships*, *37*(1), 212–232. https://doi.org/10.1177/0265407519861153

Attention Economy



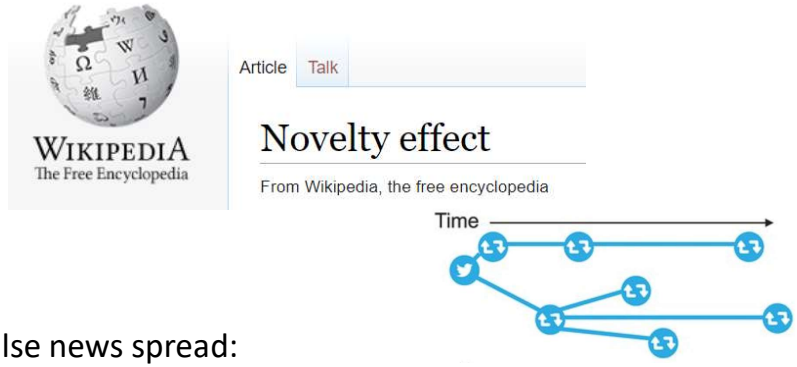
La investigación sobre "*juicio bajo incertidumbre*" generalmente se reduce a la recopilación de "*heurísticas y sesgos cognitivos*"

(Kahneman, Slovic and Tversky, 1982)

88% less likely to identify as fake

69% robust memory even when alerted of misinformation

Murphy, et al. (2019). False Memories for Fake News. *Psych. Sci.*, *30*(10).



False news spread:

- 6 x faster
- 20 x deeper (70% more likely to be retweeted)
- 2 x broader

Vosoughi, et al. (2018). The spread of true and false news online. *Science*, *359*(6380), 1146–1151.

YouTube

40 min/day * 70 % recommended = 30 min/day

* 0.05 conspiracy = **1.5 min/day**

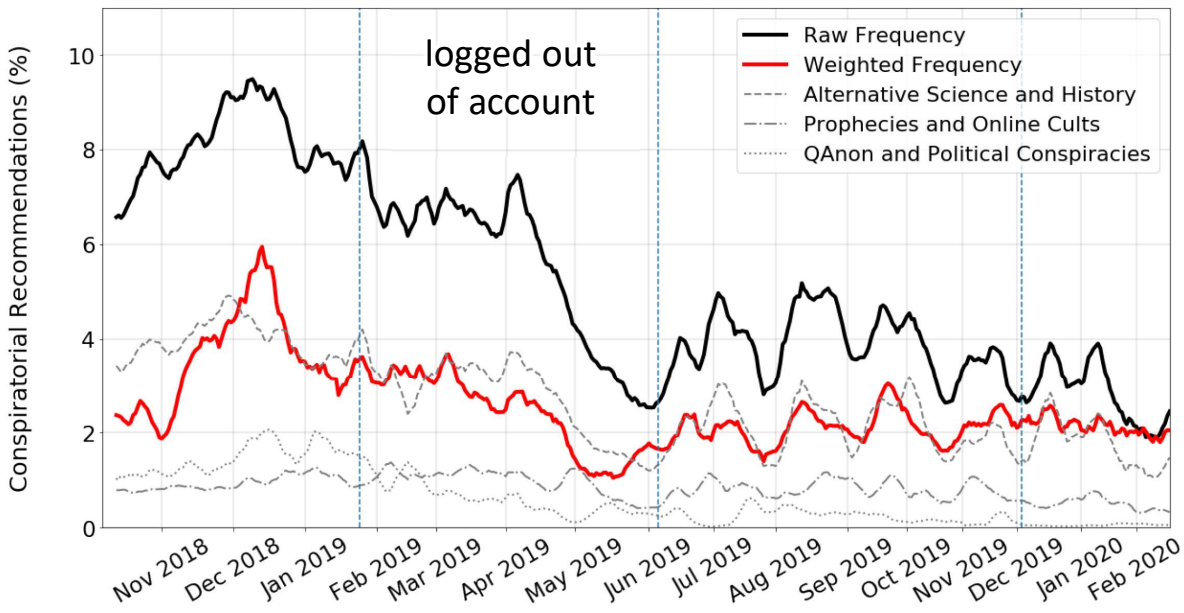
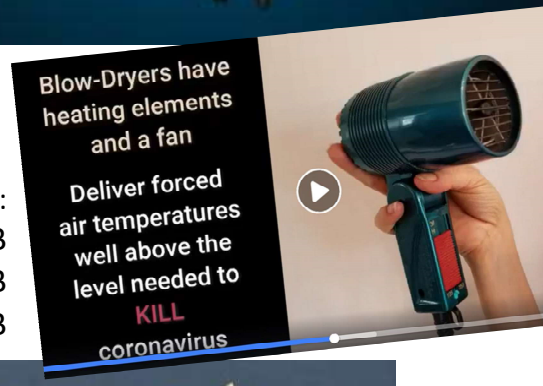
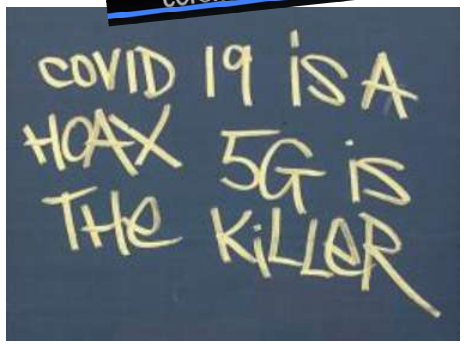


Fig. 2. Longitudinal trends of conspiratorial recommendations from informational channels on YouTube, in which each data point corresponds to a rolling seven day average. The **raw frequency** is an estimate of the percentage of conspiratorial recommendations obtained by weighting all recommendations classified as conspiratorial by their likelihood. This frequency represents the propensity of the YouTube algorithm to recommend conspiratorial content. The **weighted frequency** is an estimate of the percentage of conspiratorial weighted by the number of views of the source video. The **three dashed and dotted lines** correspond to the raw frequency for the top three topics: (1) Alternative Science and History, (2) Prophecies and Online Cults, and (3) QAnon, Deepstate, and New World Order (see Table 2). The **dotted vertical lines** represent the three YouTube announcements related to their efforts to fight conspiratorial content, on January 25th, June 5th and Dec 3rd of 2019.

25% of global population



Worldwide followers:
Muslims: 1.8 B
YouTube: 2.0 B
Christians: 2.2 B



Faddoul, Chaslot, Farid (2020). A longitudinal analysis of YouTube's promotion of conspiracy videos; farid.berkeley.edu/downloads/publications/arxiv20.pdf ; youtube.googleblog.com/2019/06/our-ongoing-work-to-tackle-hate.html

The New York Times

Opinion

TURNING POINTS

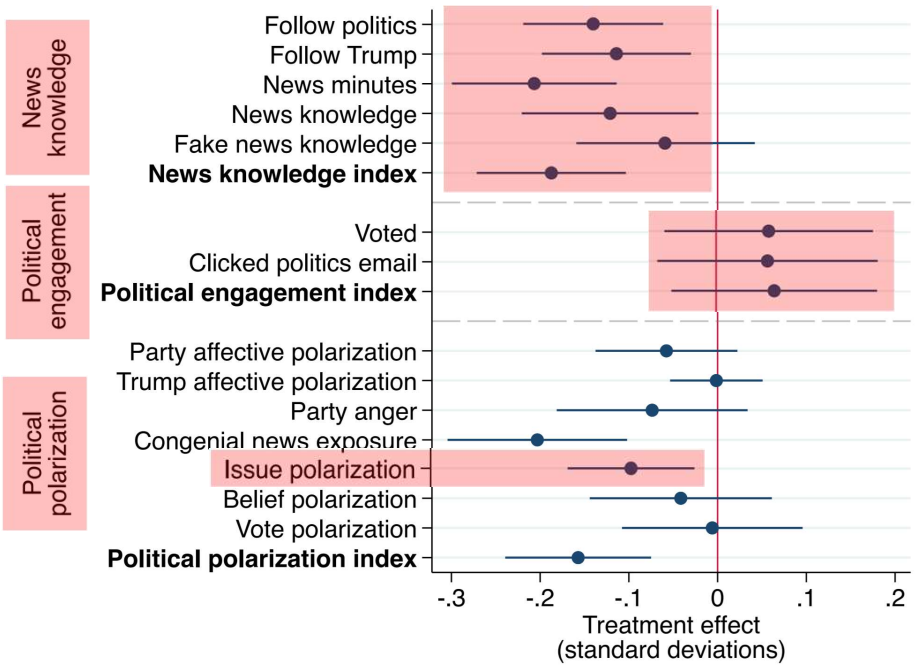
Our Brains Are No Match for Our Technology

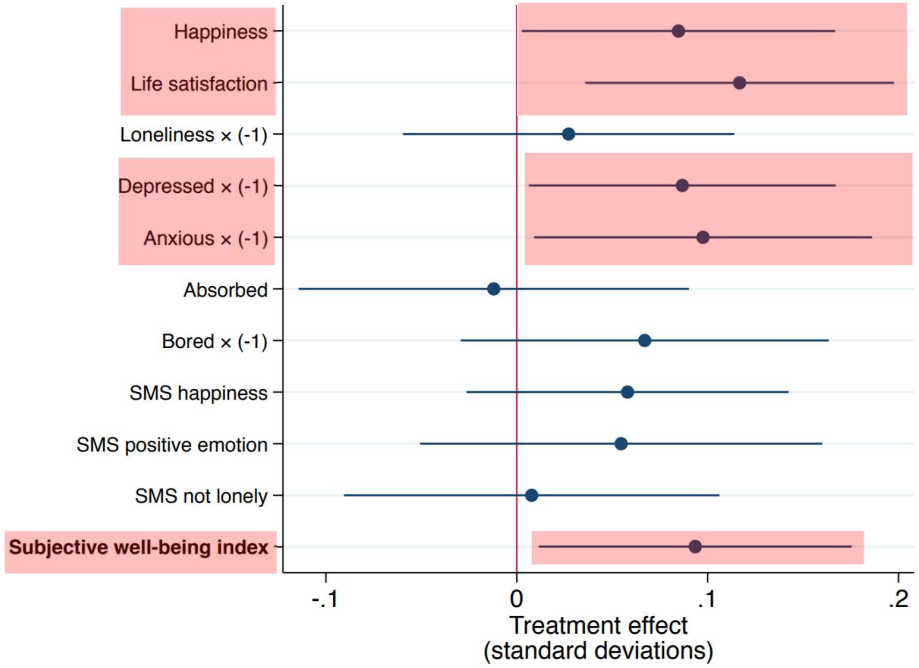
By Tristan Harris

Dec. 5, 2019

Deactivate Facebook for 4 weeks

before US Congress mid-term election (2,743 subjects)





→ about half of issue polarization increase btw 1996-2016

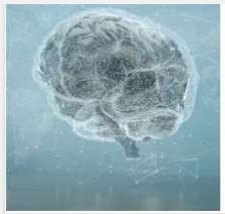
→ about 25-40 percent as much as standard psychological therapy

→ about $30,000 additional income (min $10,000, decreasing curve)

Allcott, H., Braghieri, L., Eichmeyer, S., & Gentzkow, M. (2020). The Welfare Effects of Social Media. *American Economic Review*, *110*(3), 629–676. https://doi.org/10.1257/aer.20190658

Course launched on Dec 9, 2019

Computational Social Science Methods



Course launched on Dec 9, 2019

Big Data, Artificial Intelligence, and Ethics

Course launched on Dec 10, 2019

Social Network Analysis

Course launched on Jan 7, 2020

Computer Simulations

Course launched on Feb 4, 2020

Computational Social Science Capstone Project

https://www.coursera.org/specializations/computational-social-science-ucdavis

coursera

< Data Science

Computational Social Science Specialization

4.7

Martin Hilbert

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