esade

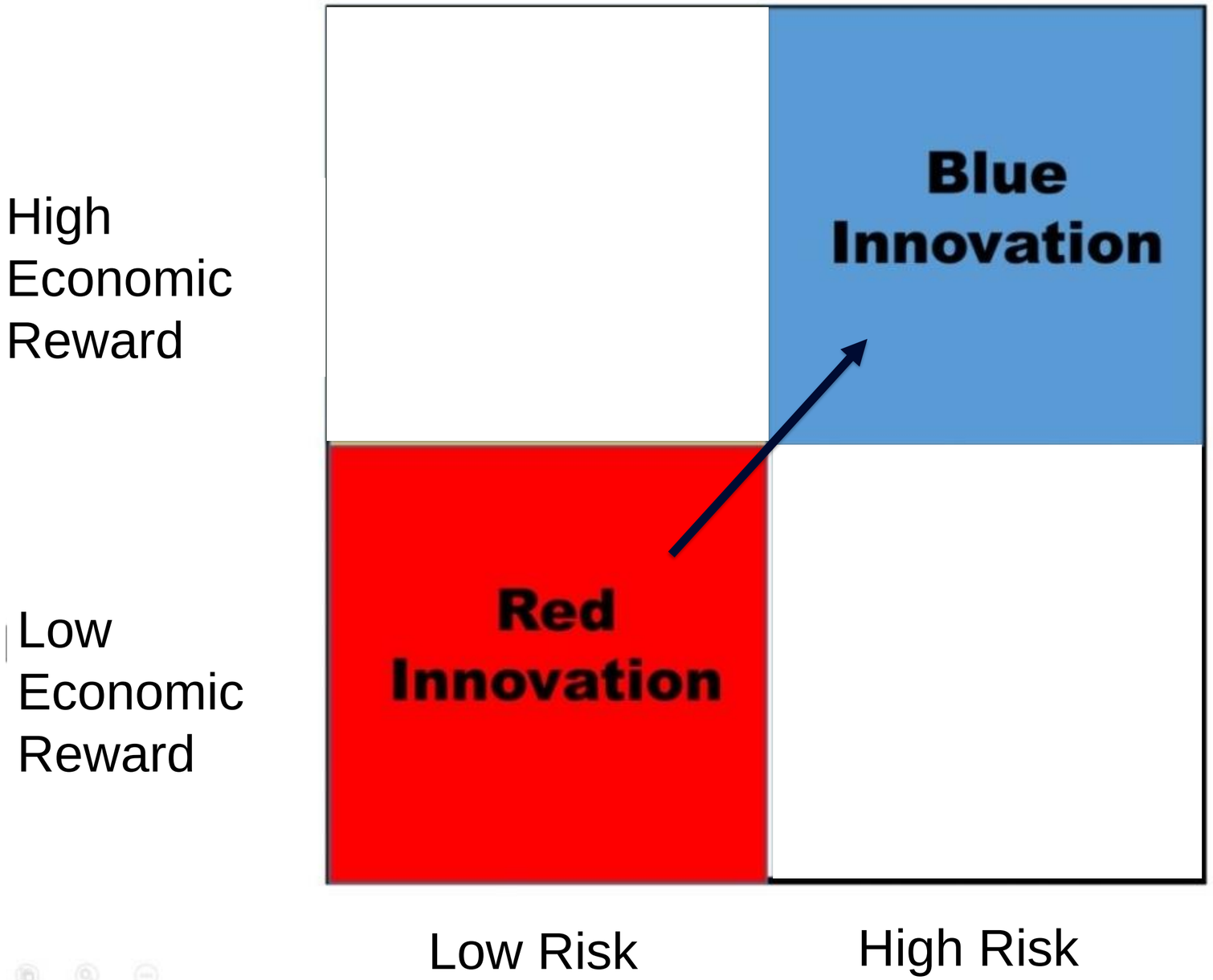
Liderazgos para la Innovación

Pimec, 04/03/21

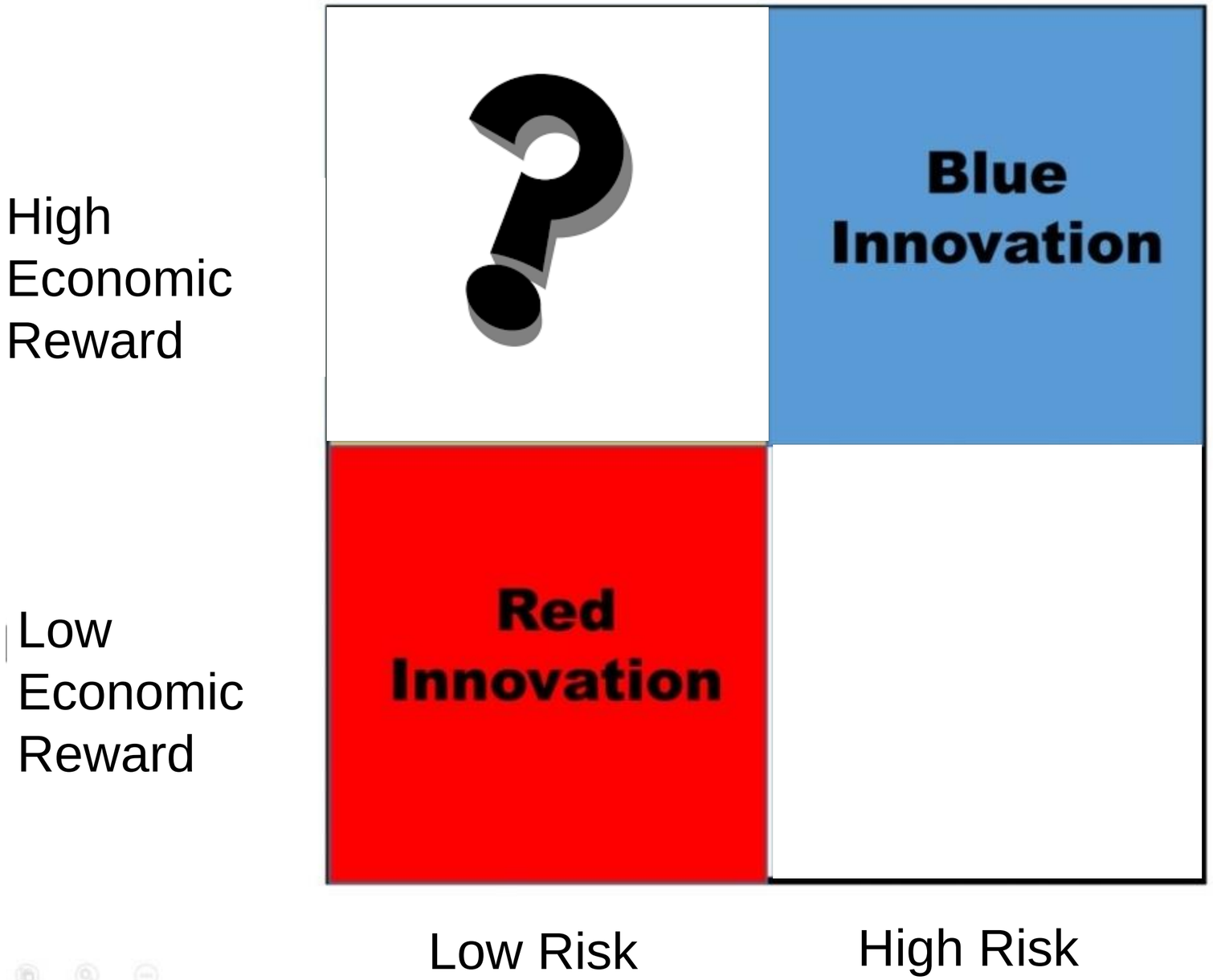
Do Good. Do Better.

¿Innovas o (solo) mejoras?

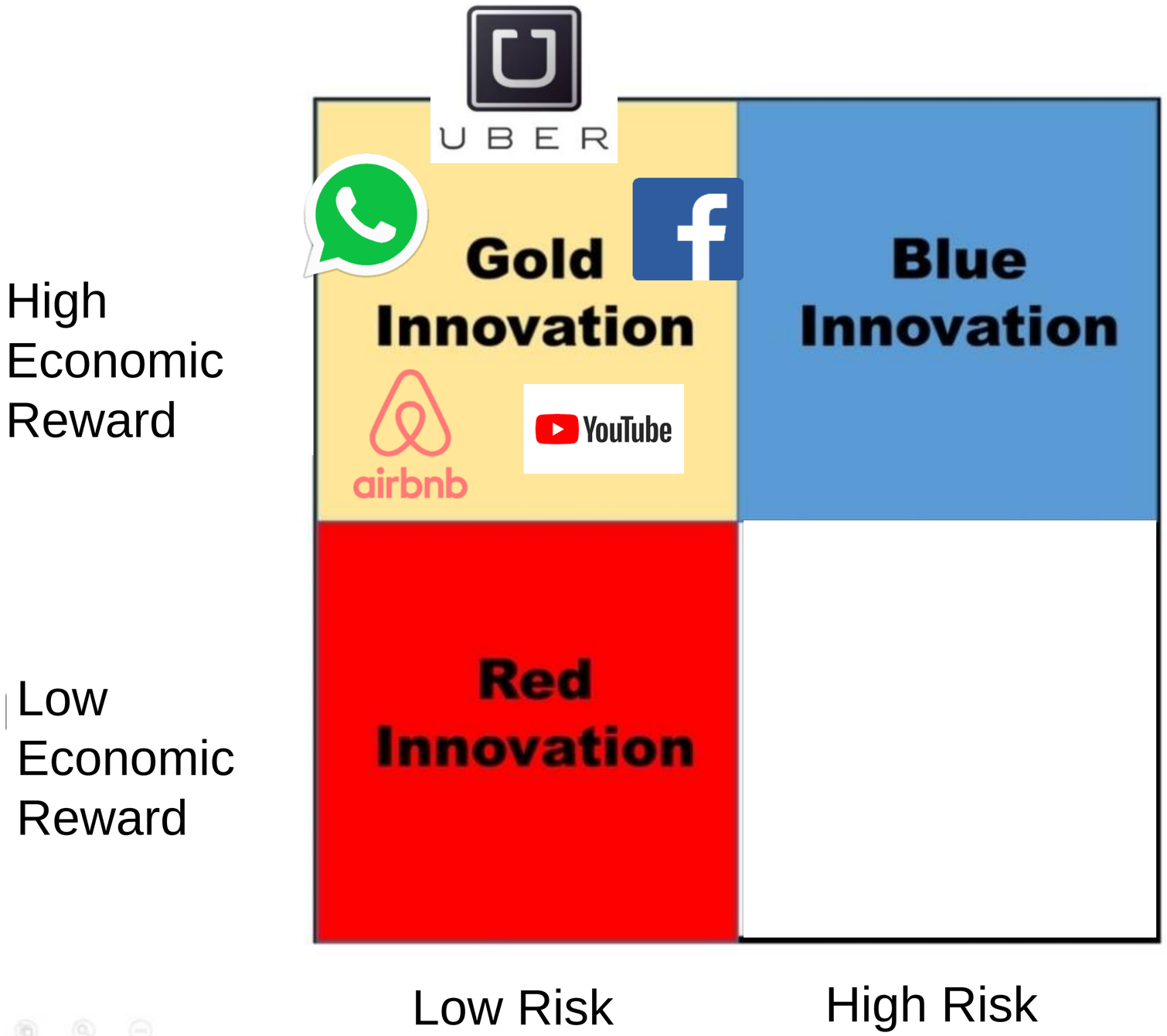
Innovación incremental o disruptiva



Innovación incremental o disruptiva



Innovación incremental o disruptiva



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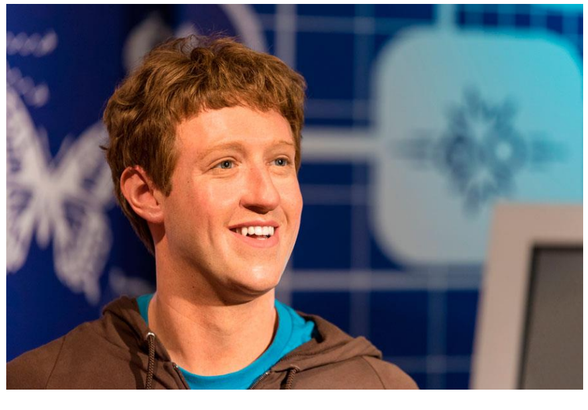
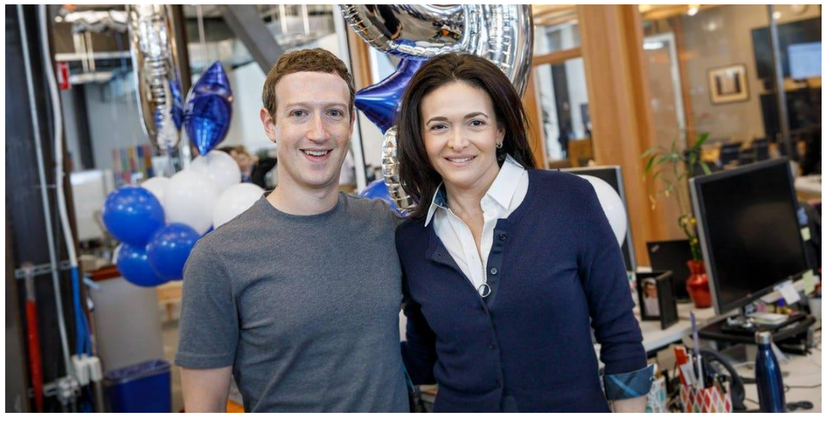
De emprendedores a empresarios

https://www.youtube.com/watch?v=18uDutylDa4





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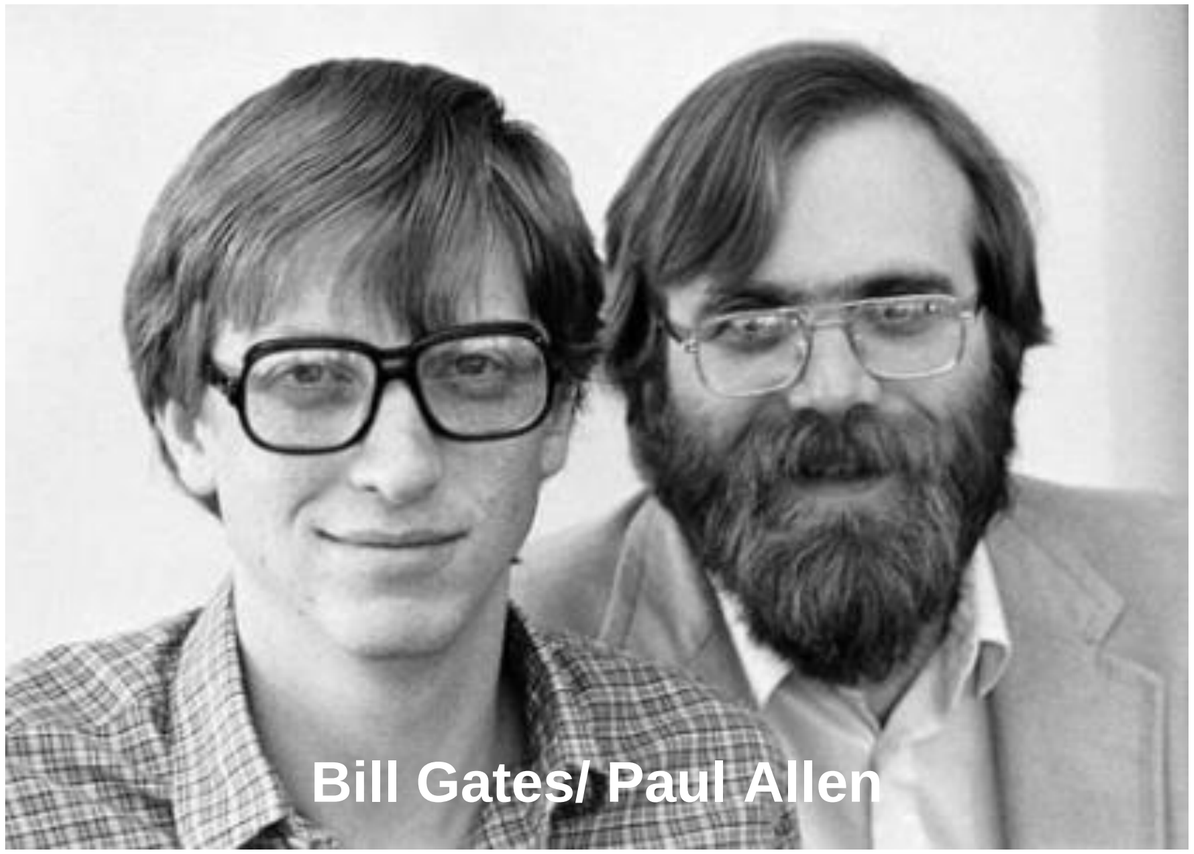
De emprendedores a empresarios

Page/ Brinn/ Eric Schmidt

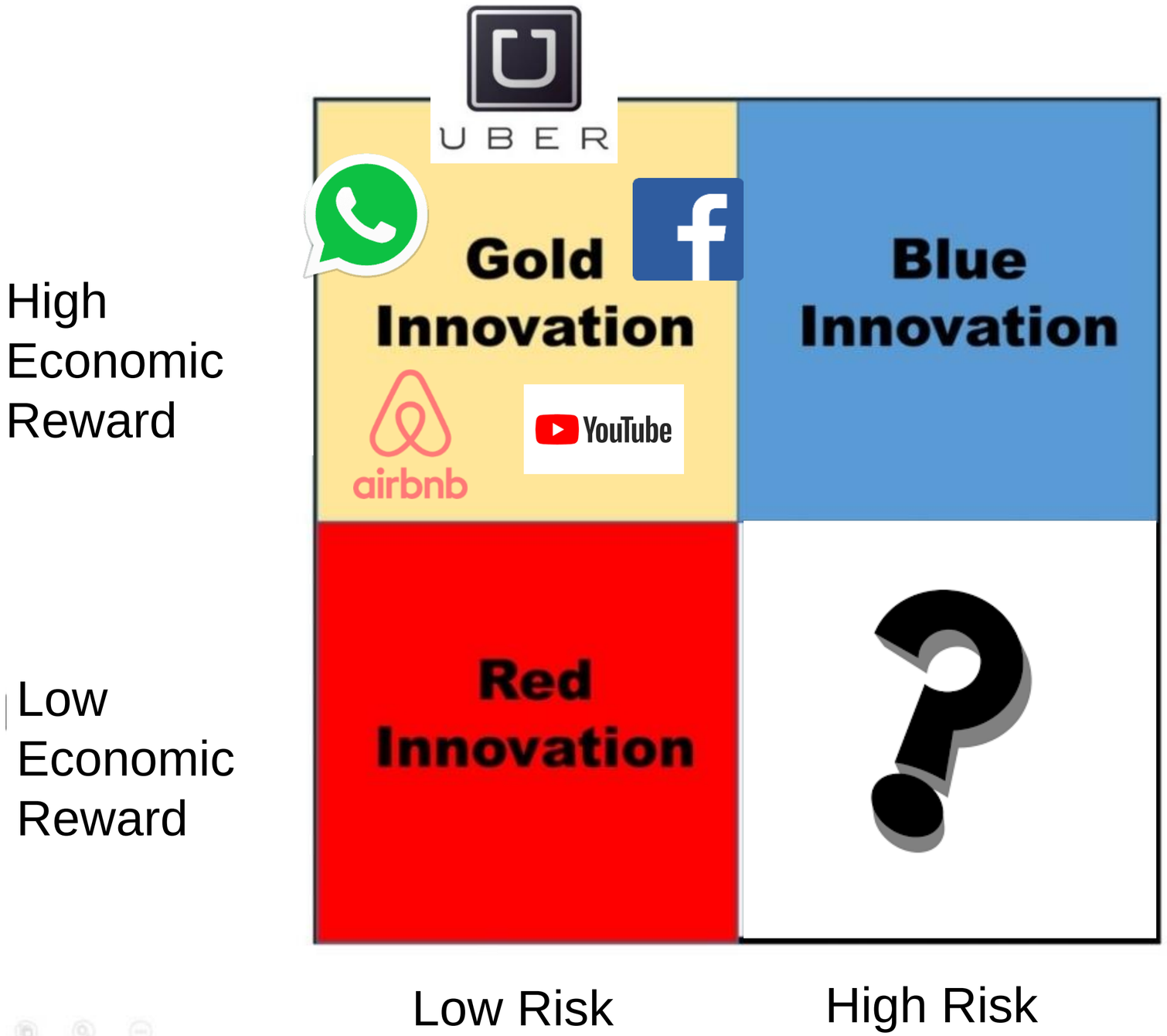


Bill Gates/ Paul Allen

Jobs/ Sculley

La CREATIVIDAD no es lo mismo que la INNOVACION. La IDEA no es siempre OPORTUNIDAD real. El EMPRENDEDOR no tiene por qué ser buen EJECUTOR

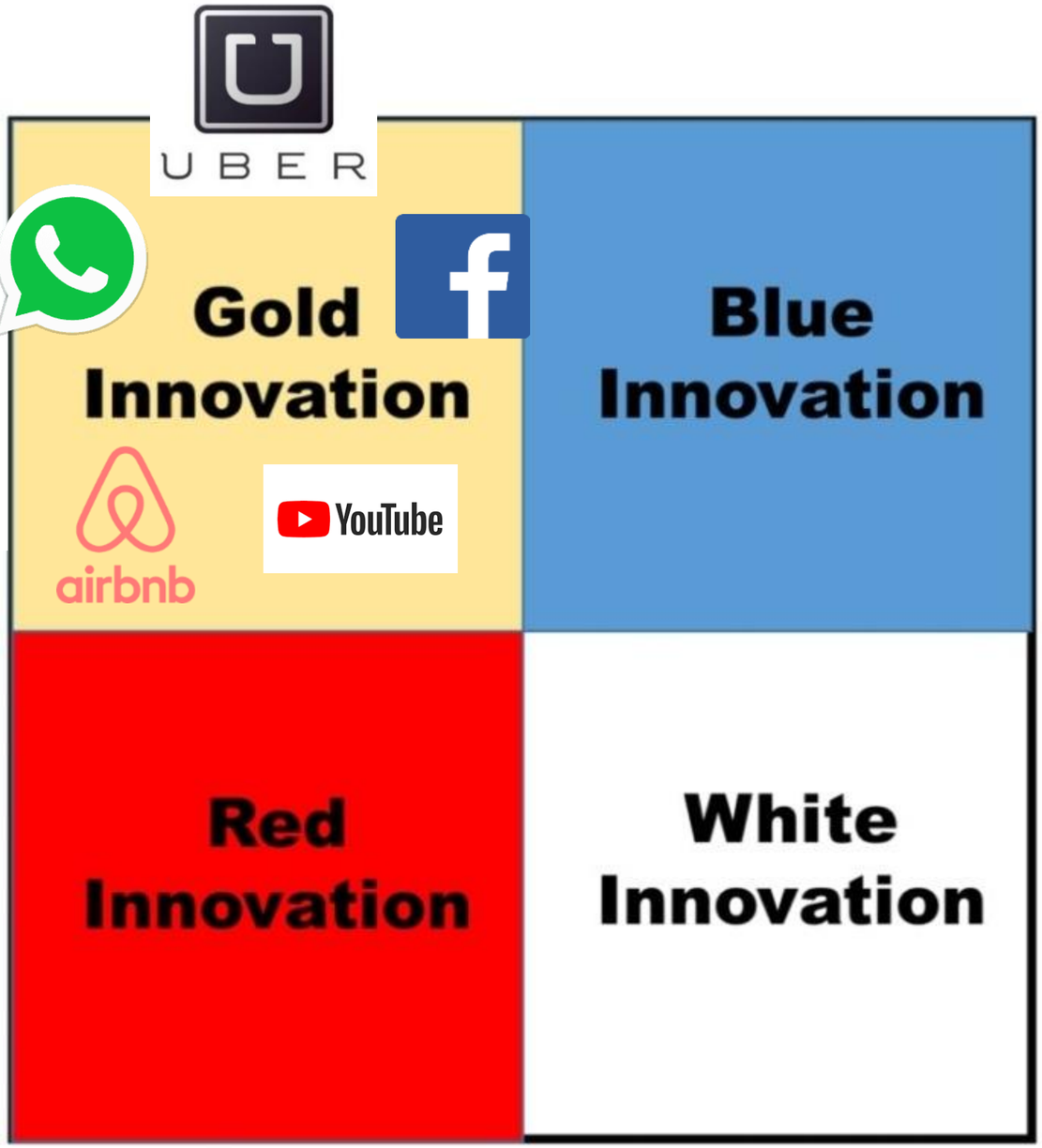
Innovación incremental o disruptiva



Innovación incremental o disruptiva

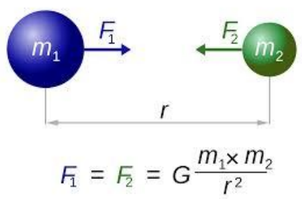
High Economic Reward

Low Economic Reward



Low Risk

High Risk

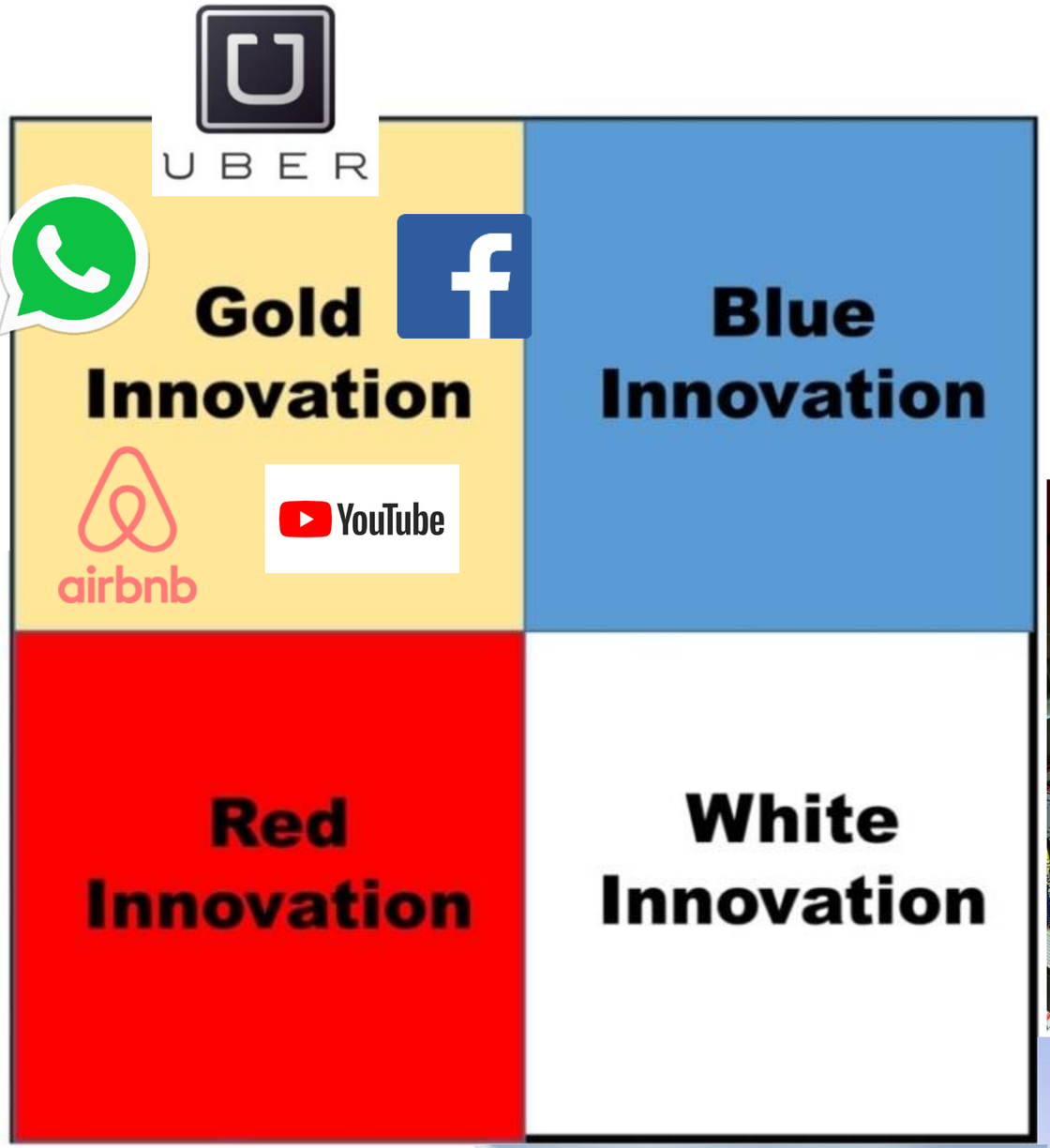


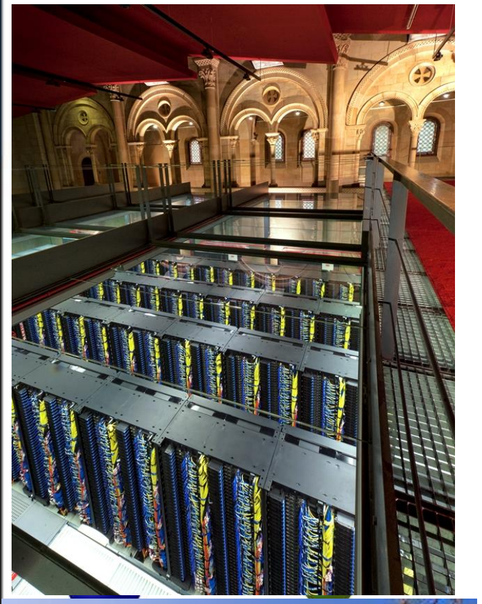
Innovación incremental o disruptiva

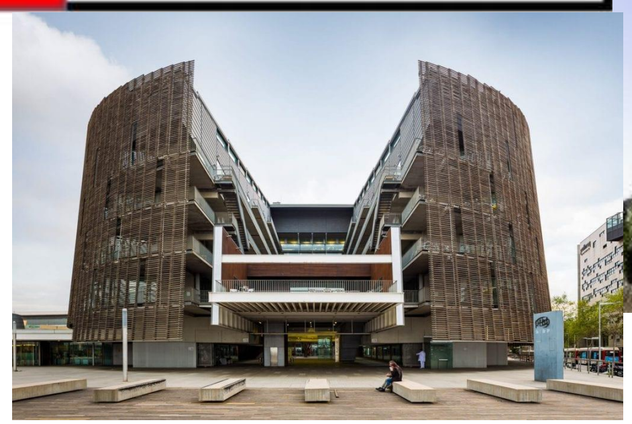
High Economic Reward

Low Economic Reward

Low Risk



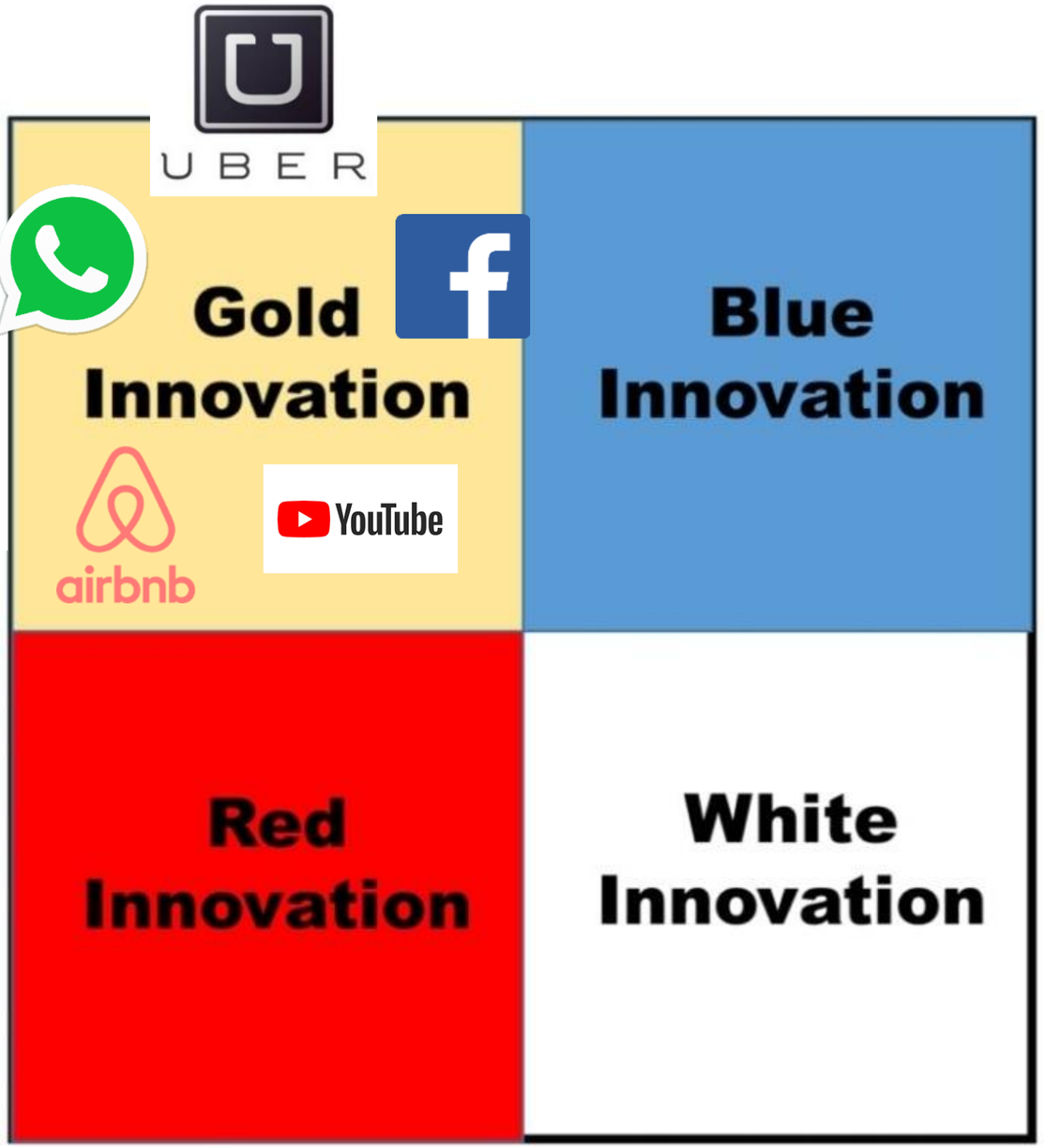




Innovación incremental o disruptiva

High Economic Reward

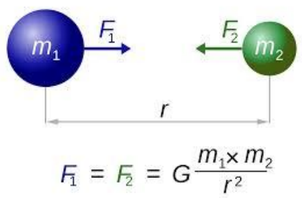
Low Economic Reward



Low Risk

High Risk

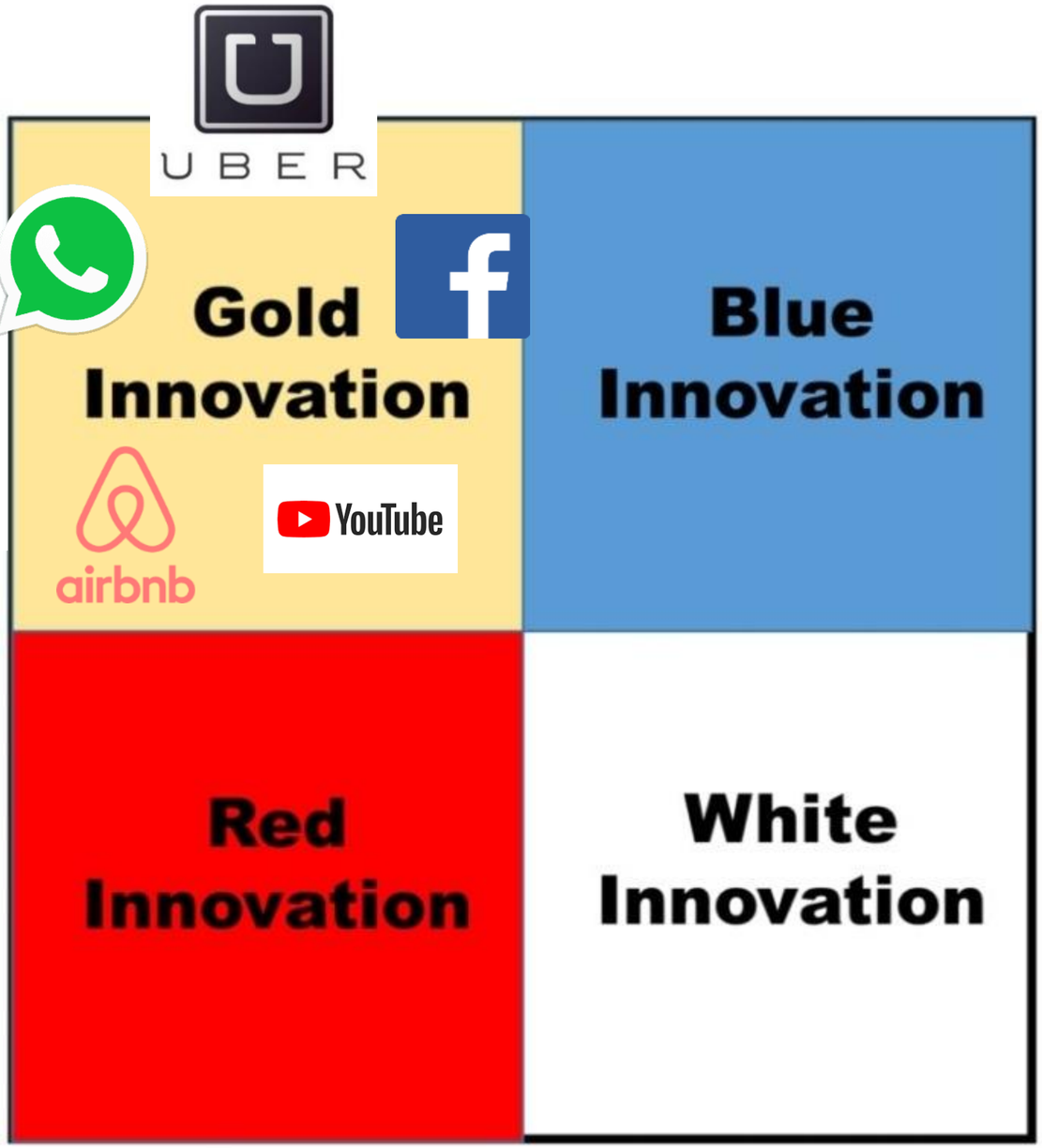
Automóvil (1890)
Avión (1901)
Rádar (1930)
Sónar (1950)
PC (1976)
Internet (1995)
Smartphone (2007)



Innovación incremental o disruptiva

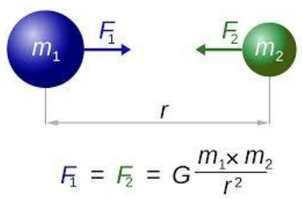
High Economic Reward

Low Economic Reward



KET'S: KEY ENABLING TECHNOLOGIES

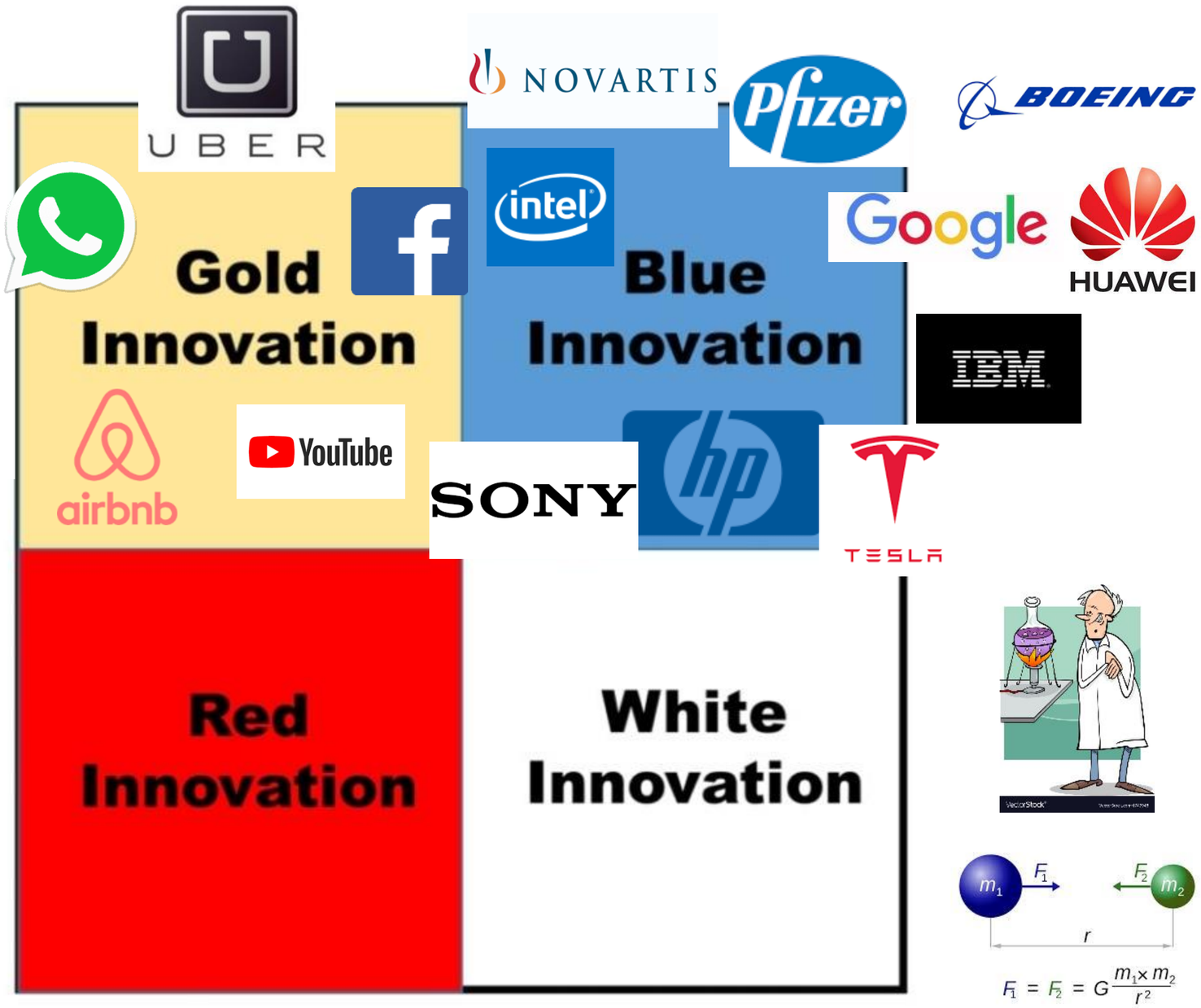
- **Inteligencia Artificial**
- **3D Printing**
- **Internet de las Cosas**
- **Biología Sintética**
- **Microelectrónica…**



Innovación incremental o disruptiva

High Economic Reward

Low Economic Reward



Low Risk High Risk

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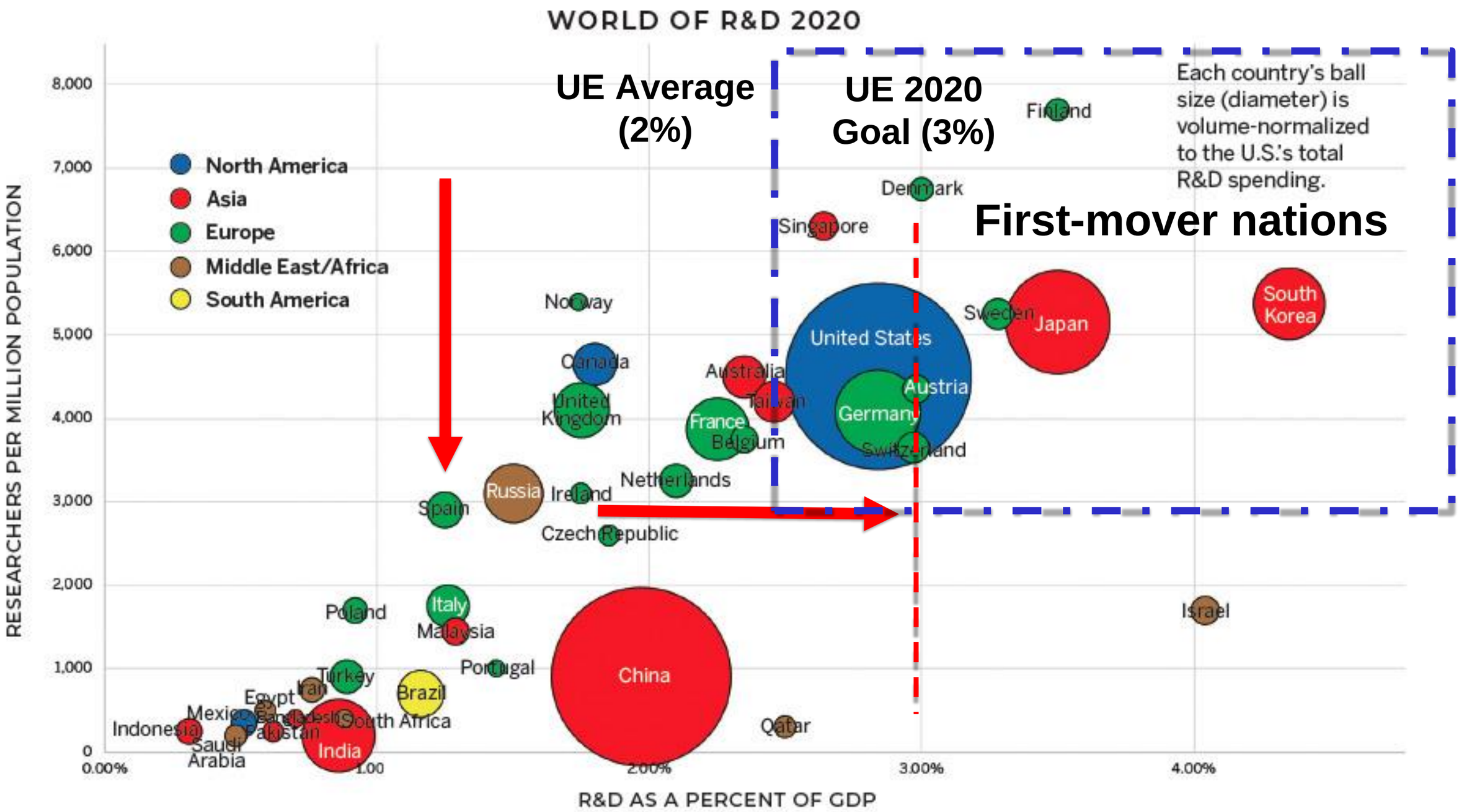
Países de Innovación Azul



SILICON VALLEY

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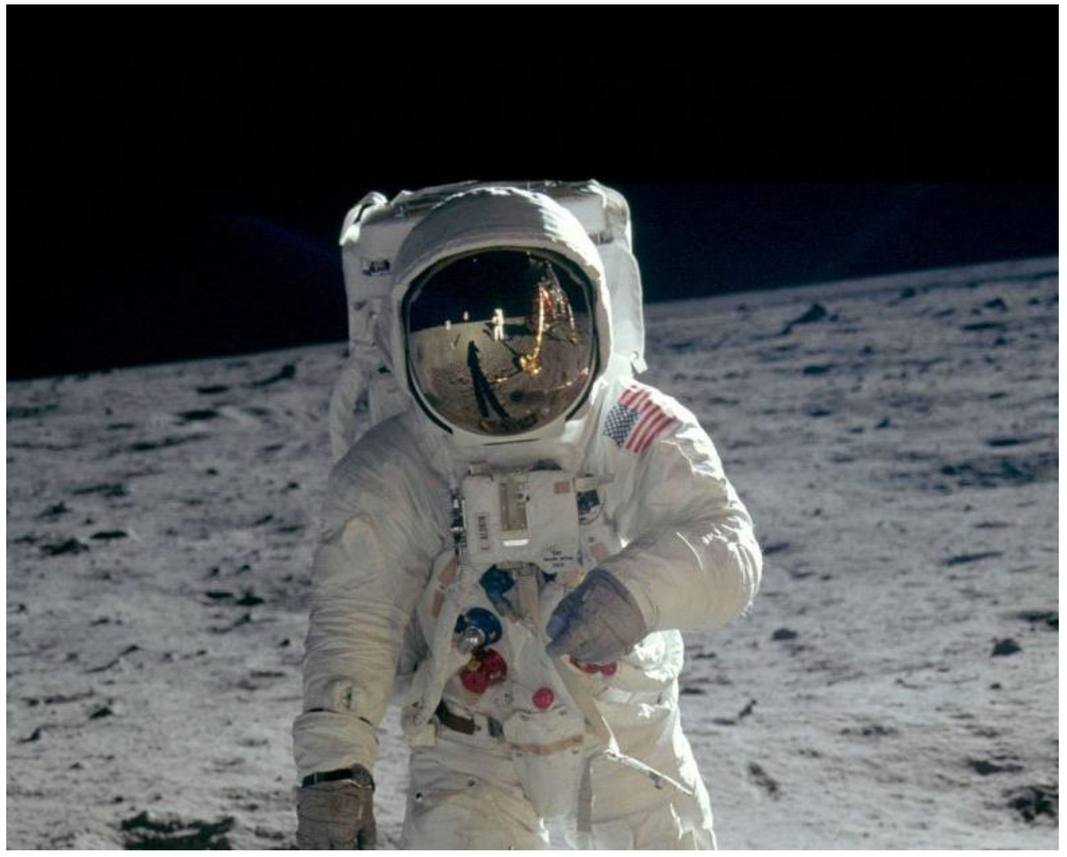
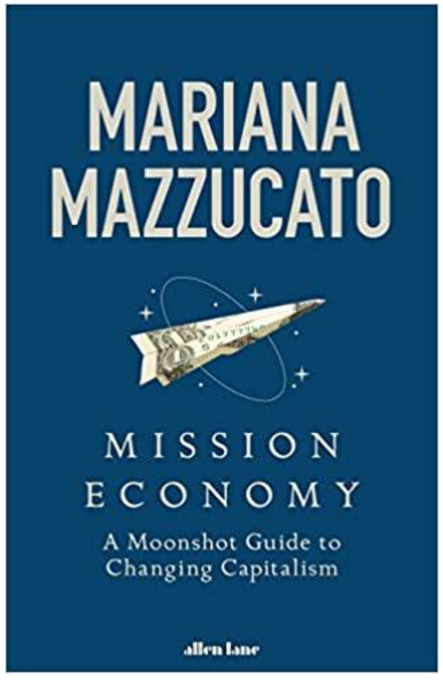
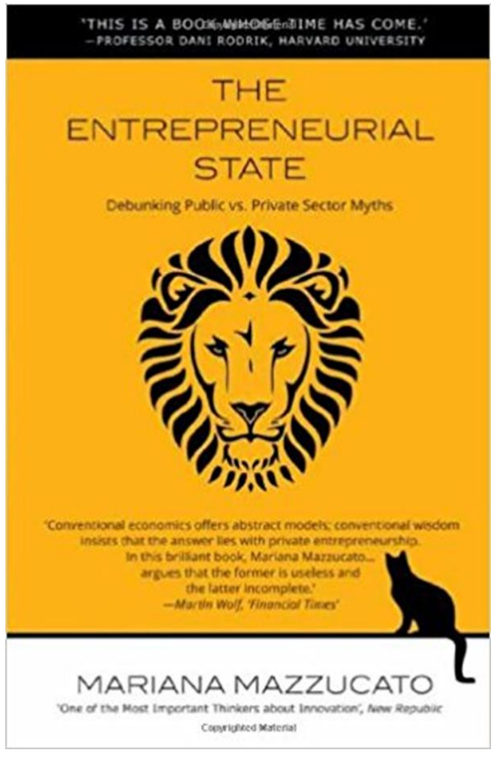
Liderazgos estratégicos nacionales







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Liderazgos Digitales

Symbol	Company	Cap Rank 10-6-20	Market Cap 10-6-20	1d Chg 10-6-20	1m Chg 10-6-20	12m Chg 10-6-20
AAPL	Apple	1	1,935.0	-2.9%	-6.4%	99.4%
MSFT	Microsoft	2	1,558.3	-2.1%	-3.9%	49.1%
AMZN	Amazon	3	1,552.7	-3.1%	-5.9%	78.2%
GOOGL	Alphabet	4	987.7	-2.1%	-8.2%	19.8%
FB	Facebook	5	736.9	-2.3%	-8.5%	43.3%
BRK.A	Berkshire Hathaway	6	502.1	-1.1%	-3.7%	0.9%
TSM	Taiwan Semiconductor	7	431.1	-1.7%	5.3%	75.3%
V	Visa	8	426.5	-1.5%	-2.1%	13.9%
WMT	Walmart	9	398.5	-0.8%	-1.5%	19.0%
TSLA	Tesla	10	385.8	-2.7%	-1.0%	794.4%
JNJ	Johnson & Johnson	11	385.1	-1.3%	-1.6%	9.4%
PG	Procter & Gamble	12	347.6	0.2%	1.2%	12.6%
NVDA	NVIDIA	13	339.0	0.7%	.8%	202.0%
MA	Mastercard	14	337.8	-1.7%	%	23.1%
UNH	UnitedHealth	15	298.8	-1.2%	0.8	43
JPM	JPMorgan Chase	16	298.7	-1.0%	-5.3%	5%
HD	Home Depot	17	297.6	-2.0%	2.5%	21.3%
VZ	Verizon	18	255.2	-0.3%	-1.7%	-0.7%
ADBE	Adobe	19	229.8	-1.5%	-2.6%	72.9%
CRM	Salesforce	20	227.6	-0.6%	-1.8%	69.0%
PYPL	PayPal	21	225.0	-2.6%	-0.1%	86.5%

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La Nueva Globalización

Hacia un Telón de Acero Digital

ELSEVIER

Materials Science and Engineering A253 (1998) 8–15

MATERIALS SCIENCE & ENGINEERING A

Ion implantation of semiconductors

J.S. Williams

Department of Electronic Materials Engineering, Research School of Physical Sciences and Engineering, Australian National University, Canberra 0200, Australia

Abstract

Ion implantation was first applied to semiconductors over 30 years ago as a means of introducing controllable concentrations of n- and p-type dopants at precise depths below the surface. It is now an indispensable process in the manufacture of integrated circuits. This review gives a brief and selected overview of ion beam modification of semiconductors, treating both fundamental and technological issues of current interest. Damage introduction during ion irradiation and its removal during a thermal annealing step are key issues which are highlighted. Some semiconductors are easily damaged and amorphised (e.g. silicon) whereas others (e.g. gallium nitride) are quite resistant to damage production due to efficient dynamic defect annihilation during implantation. The conditions needed to remove implantation damage also vary dramatically from one semiconductor to another: amorphous layers in silicon can be recrystallised to completely remove disorder at ~600°C, whereas extended defects in gallium nitride require temperatures of >1400°C to remove them. High dose implantation can result in the formation of supersaturated solid solutions, alloys and compounds, often with intriguing properties as a result of the non-equilibrium aspects of ion implantation. Formation of silicon dioxide layers directly during oxygen bombardment of silicon, even under cryogenic implantation conditions, is given as an example. From the standpoint of semiconductor technology, there are several current issues under intense study. Two of these are highlighted with respect to silicon technology: the problems of transient enhanced diffusion of dopants during low temperature annealing due to residual implantation-induced defects, and the need to remove extremely low concentrations of metals from active device regions. Finally, some recent novel applications of implantation in compound semiconductors are treated.

Keywords: Ion implantation; Semiconductors; Silicon processing; Radiation damage; Compound semiconductors

1. Introduction

The semiconductor industry has been the juggernaut that has driven implantation technology. There have now been >8000 implantation machines delivered to the semiconductor industry, more than 95% involved in the manufacture of advanced silicon chips alone [1]. Indeed, processing of 0.35 μm CMOS chips can involve more than 30 separate implantation steps [2]. Driven to a very large extent by requirements of the semiconductor industry, there has been an enormous research effort into a broad range of ion beam modification processes in semiconductors over the past 3 decades. For example, the production and removal of implantation damage [3–6], diffusion and electrical (optical) activation of implanted dopants during subsequent annealing [7–10], formation of insulating layers such as silicon dioxide [11] and conducting silicide layers [12] by direct implantation, controlled introduction of irradiation-induced defects to tailor specific electrical [13] and optical [14] properties, together with fundamental studies of defects [15–18] and diffusion [19–21] are all extremely active research areas.

This review briefly treats some of the above areas of research activity, concentrating on damage production and its removal in a range of semiconductors, silicon dioxide formation by oxygen implantation into silicon and a selection of recent technological applications of implantation in both silicon and compound semiconductors. Examples taken from the author's recent research will be given to illustrate each of these areas.

2. Damage accumulation and its removal

When an energetic ion enters a solid it loses energy by two processes: (i) by elastic or nuclear collisions with the matrix atoms causing direct atom displacements and disorder; and (ii) by inelastic or electronic processes in which the electrons of the solid are excited [3]. In

0921-5093/98/$ - see front matter
PII S0921-5093(98)00705-9

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Las tecnologías que cambian el mundo

McKinsey&Company

McKinsey Global Institute

12 Disruptive Technologies

Renewable energy

- 21,000 TWh annual global electricity consumption
- 85% lower price for solar photovoltaic cell per watt since 2000
- 13 billion tons in annual carbon dioxide emission from electricity generation
- $3.5 trillion value of global electricity consumption

Advanced oil & gas exploration & recovery

- 3x increase in efficiency of US gas wells between 2007 & 2011. 2x increase for oil wells over the same period
- 30 billion barrels of crude oil produced globally
- $3.4 trillion revenue from global sales of crude oil

Advanced materials

- $1000 vs $50: Price difference of 1 gram of nanotube over a decade
- 115x strength-to-weight ratio of carbon nanotubes vs steel
- $4 billion revenue from global carbon fibre sales

3D printing

- 90% decrease in price of home 3D printers compared to 2009
- $11 trillion worth in global manufacturing GDP
- 8 billion pieces of toys manufactured globally a year

Energy storage

- 40% price decline in Lithium-ion battery pack in an electric vehicle since 2009
- $100 billion estimated value of electricity for households currently without access
- 1.2 billion people without access to electricity

Next-generation genomics

- 10 months to double sequencing speed per dollar
- 100x increase in acreage of genetically modified crops between 1996 to 2012; 2.5 billion people employed in agriculture
- $6.5 trillion global health-care costs

Mobile Internet

- Fastest supercomputer in 1975 costs $5m, with equal performance as an iPhone 4, which costs $400
- 4.3 billion people yet to be connect to the Internet today
- $1.7 trillion worth of GDP related to the Internet
- 1.1 billion smartphone users, with potential to use automated digital assistance apps

Automation of knowledge work

- 100x increase in computing power from IBM's Deep Blue (1997) to Watson (2011)
- $9+ trillion global costs of employing knowledge workers, which is 27% of global employment costs

Internet of Things

- 300% increase in connected machine-to-machine devices since 2008
- 1 trillion things that could be connected to the Internet across different industries
- $36 trillion operating costs of key affected industries
  - mining
  - health-care
  - manufacturing

Cloud technology

- 18 months to double server performance per dollar
- 2.7 billion Internet users served by 50 million servers worldwide
- $3 trillion spending by enterprises on information technology

Advanced robotics

- 170% growth in sales of industrial robots between 2009 and 2011
- 320 million manufacturing workers may be potentially affected
- $6 trillion in global manufacturing employment costs, which is 19% of global workforce

Autonomous and near-autonomous vehicles

- 300,000+ miles driven by Google's autonomous cars with only 1 accident (which was human-caused)
- 1 billion cars & trucks, 450,000 civilian, military & general aviation aircrafts globally
- $4 trillion automobile industry revenues

Created by:
Daniel Tay
May 2013 Singapore
boingx5@gmail.com
www.tayxiongsheng.com
@tayxiongsheng

The source of information in this Mind Map comes from *http://www.mckinsey.com/insights/business_technology/disruptive_technologies*

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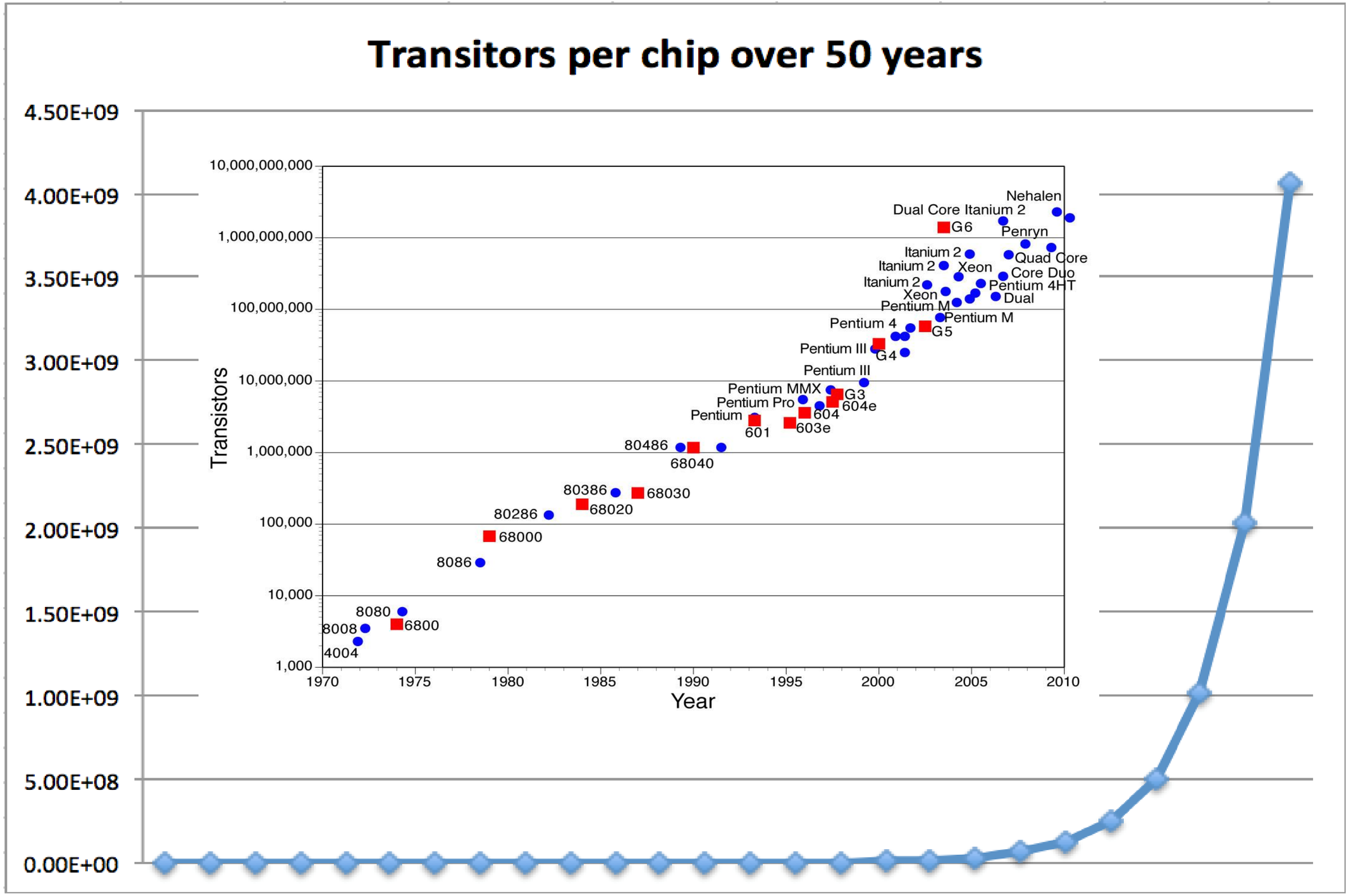
Digital laws: Moore's law



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https://www.bsc.es/

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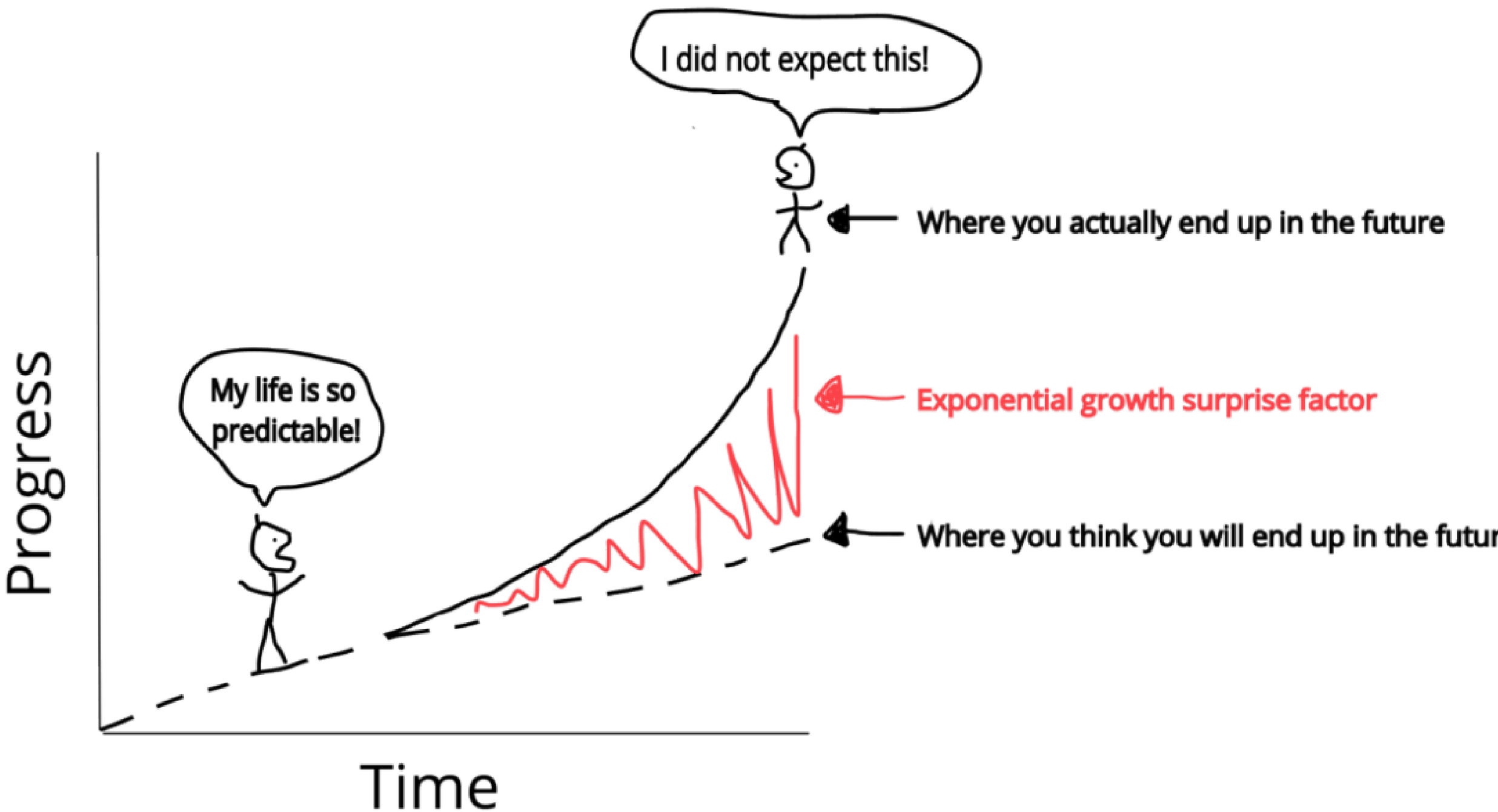
I did not expect this!
Where you actually end up in the future
Exponential growth surprise factor
Where you think you will end up in the future
My life is so predictable!
Progress
Time

esade

Liderazgos distribuídos

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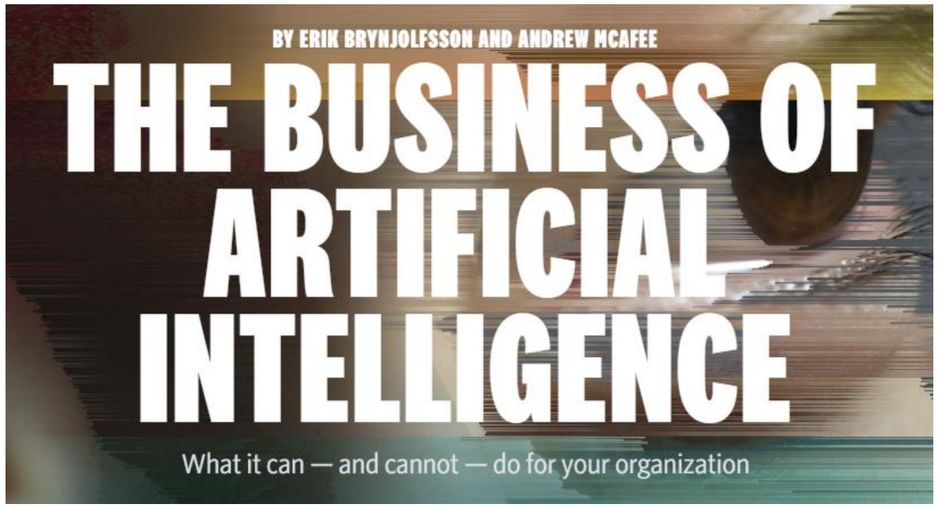
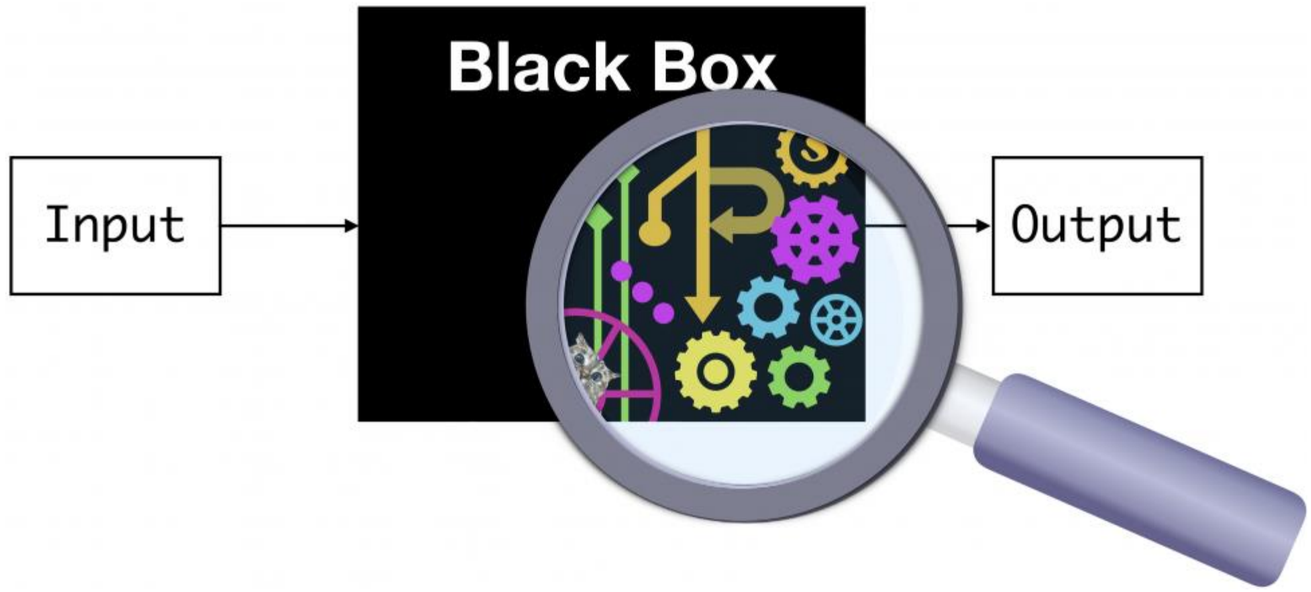
Artificial Intelligence: The Next Big Thing





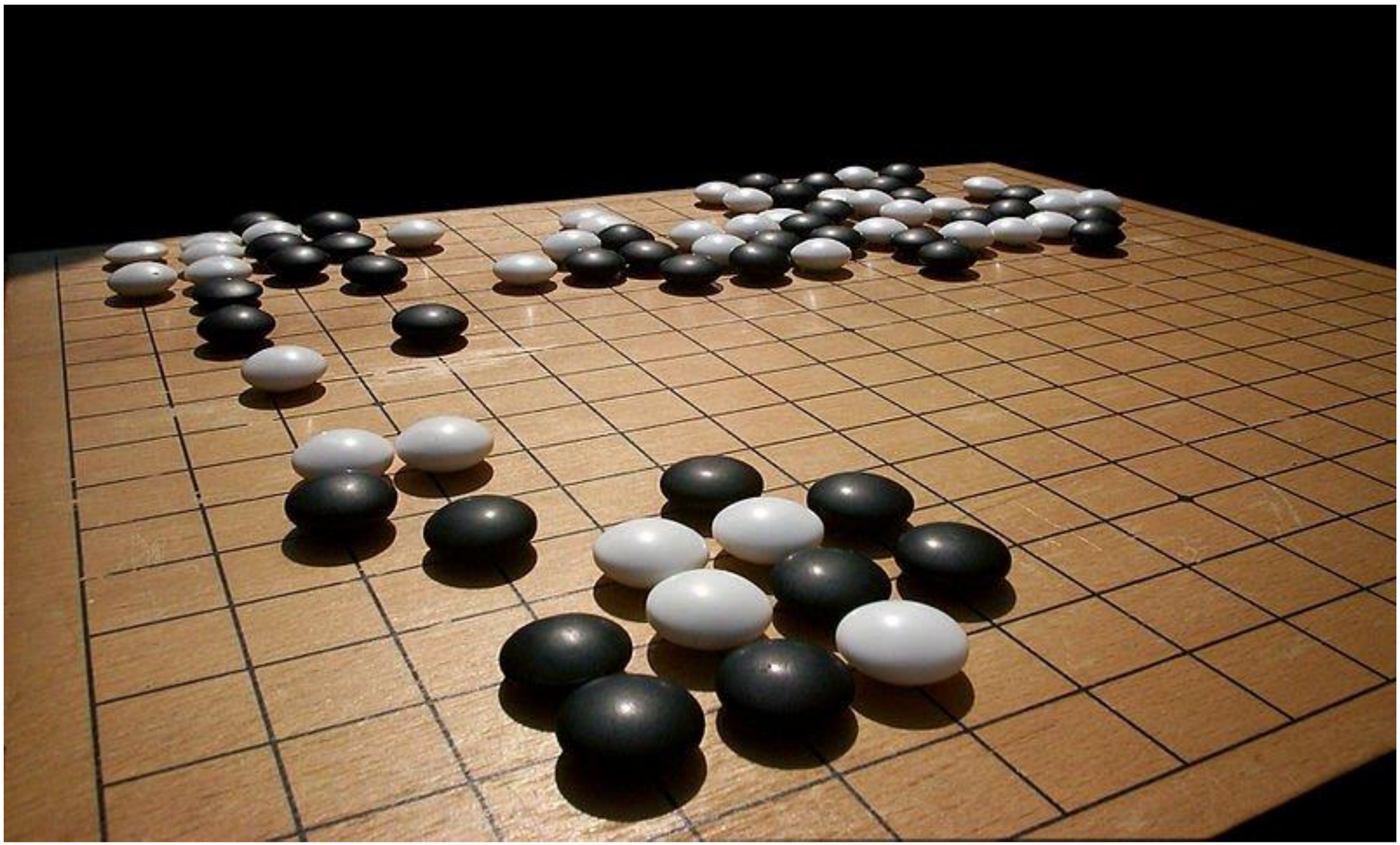
30 de julio del 2020

Personalizar el tratamiento de la COVID-19 con la ayuda de la inteligencia artificial reduce la mortalidad de los pacientes un 50%

Investigadores del Clínic-IDIBAPS han identificado unos patrones en las analíticas de los pacientes con COVID-19 que han permitido, con la ayuda de inteligencia artificial, aplicar tratamientos personalizados a más de 2.000 pacientes ingresados. Esto ha reducido en más de un 50% la mortalidad, incluso en la población de edad más avanzada y/o con enfermedades de riesgo. La solución de inteligencia artificial también ha permitido predecir mortalidad de los pacientes con un 90% de acierto.

Google AI beats Go world champion again to complete historic 4-1 series victory

Posted Mar 15, 2016 by Jon Russell (@jonrussell)



WIRED

CADE METZ BUSINESS 03.15.16 07:00 AM

IN TWO MOVES, ALPHAGO AND LEE SEDOL REDEFINED THE FUTURE

CADE METZ BUSINESS 03.11.16 07:00 AM

THE SADNESS AND BEAUTY OF WATCHING GOOGLE'S AI PLAY GO

George Zarkadakis, Contributor
AI engineer and writer

Move 37, or how AI can change the world

11/26/2016 09:35 am ET

In Game Two of AlphaGo versus Lee Sedol in March 2016, the machine made a move no human would ever think of doing. “Move 37” was unimaginable in the more than three thousand year history of the game. By taking position on the “fifth line” AlphaGo pushed the boundaries of human intuition. In Game Four Lee Sedol reciprocated with a human moment of transcendence, “Move 78”. These two moves have now entered the corpus that students of Go will study forevermore. But the moves did not just change the world of Go; they are pointers to how the world is about to change because of Artificial Intelligence, or to be more specific because of **General Artificial Intelligence**.

https://www.youtube.com/watch?v=WXuK6gekU1Y

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Artificial Intelligence: The Next Big Thing

Feature: MIT Technology Review

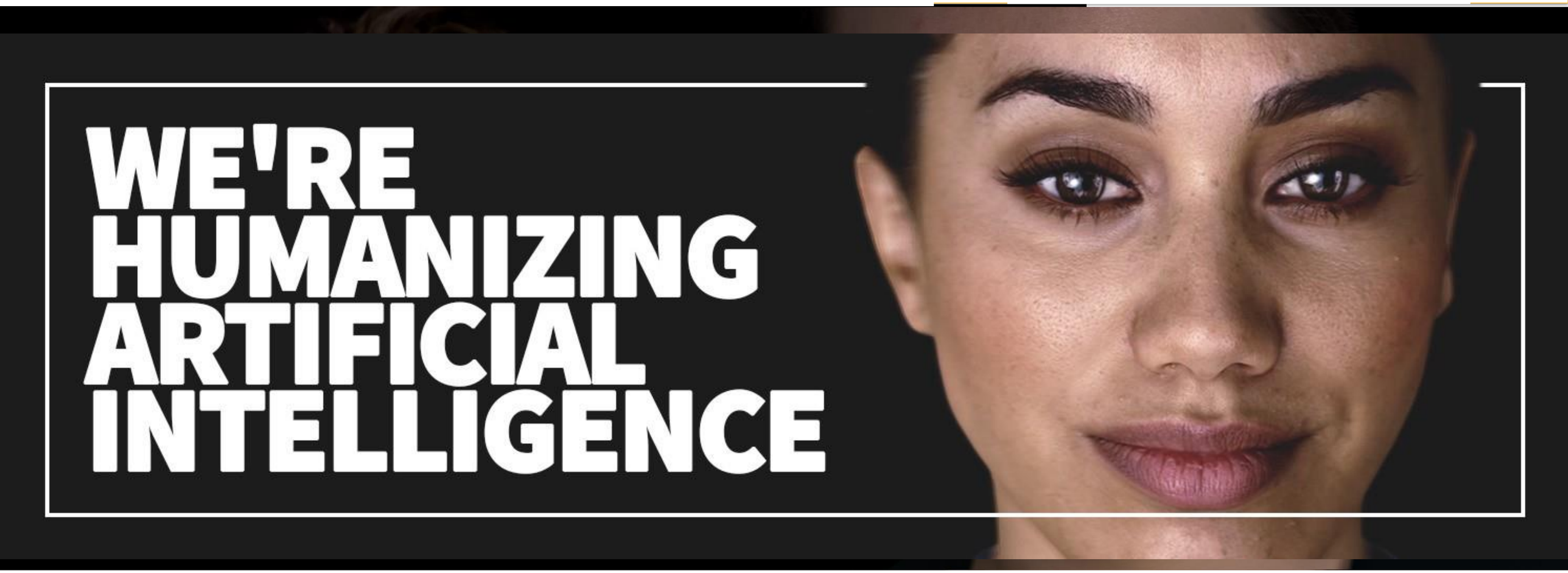
Emotional Intelligence

In the news today on MIT Technology Review:

"Customer Service Chatbots Are About to Become Frighteningly Realistic"

By: Tom Simonite // March 22, 2017

soul machines



https://www.youtube.com/watch?v=khr-eWGhTSI&t=173s

Artificial Intelligence: The Ethical Frontier

https://www.youtube.com/watch?v=NSb6FHzwGdY

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“AI will not replace managers. But those who do not use the AI will be replaced by those who do use it.”

ERIK BRYNJOLFSSON AND ANDREW MCAFEE (MIT)

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A World of Abundance?

In 100 years:

Average human lifespan x2
Average per capita incoming
x3
Chilhood mortality /10
Cost of food /10
Cost of electricity /100
Cost of communications /1000

Abundance of information/
education/ energy/
food/social relationships/
health/ transport…

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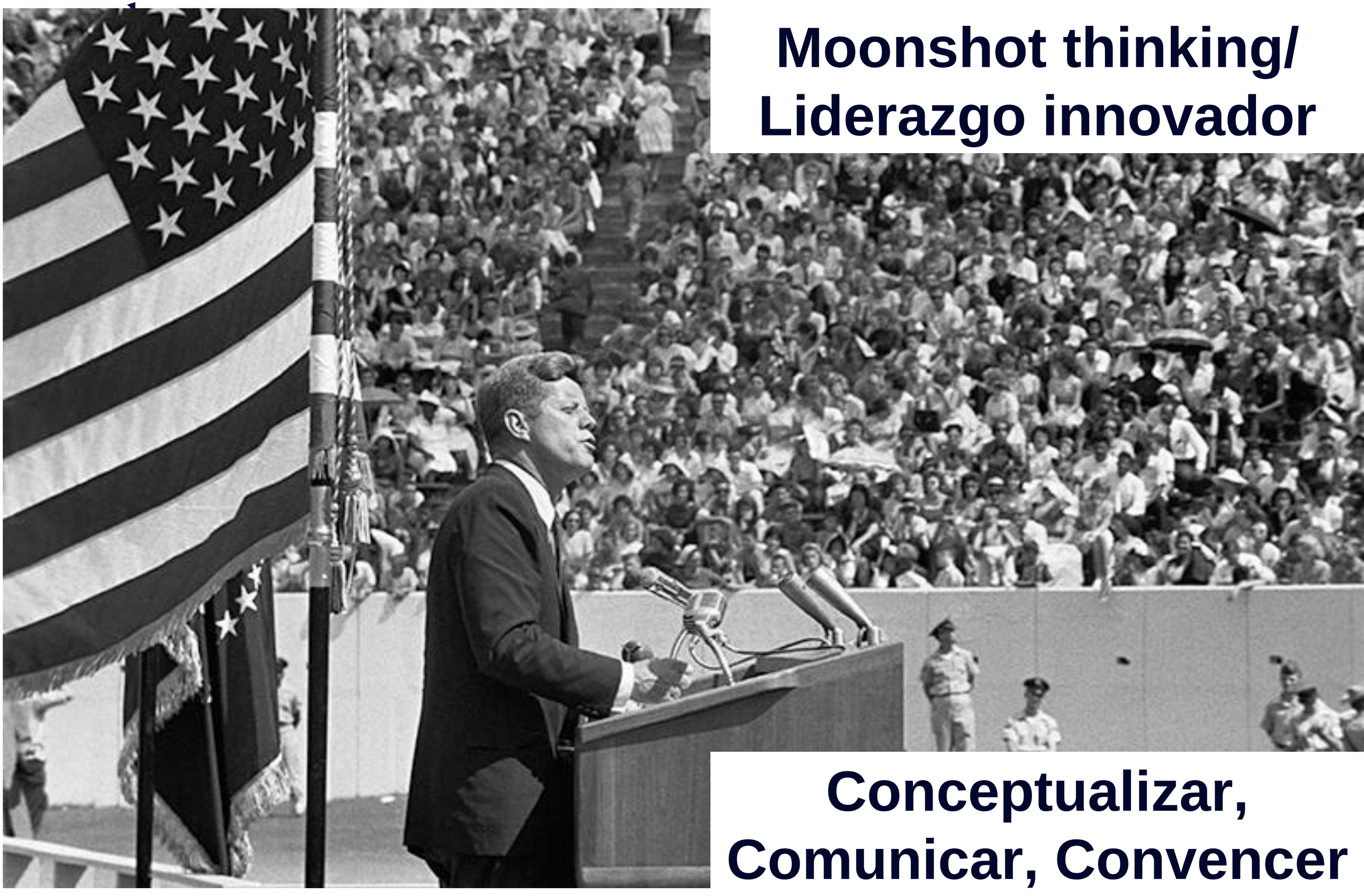
El directivo del Siglo XXI

CUADRO 1. COMPETENCIAS NECESARIAS PARA EL PROFESIONAL EN LA ERA DIGITAL

COMPETENCIAS COMPUTACIONALES • Solución de problemas complejos • Método científico • Visión sistémica	**COMPETENCIAS DIGITALES** • Pensamiento algorítmico • Estrategia de datos • Conocimiento tecnológico	**COMPETENCIAS LÓGICO-MATEMÁTICAS**
COMPETENCIAS HUMANÍSTICAS • Dirección por valores • Aprendizaje continuo • Creatividad • Pensamiento crítico	**COMPETENCIAS SOCIALES** • Inteligencia emocional • Comunicación • *Cross-cultural management* • Emprendimiento	**COMPETENCIAS HUMANÍSTICO-SOCIALES**
ORIENTACIÓN INTERNA	**ORIENTACIÓN EXTERNA**	

Xavier Ferràs, Harvard Deusto Business Review

Moonshot thinking/ Liderazgo innovador



Conceptualizar, Comunicar, Convencer

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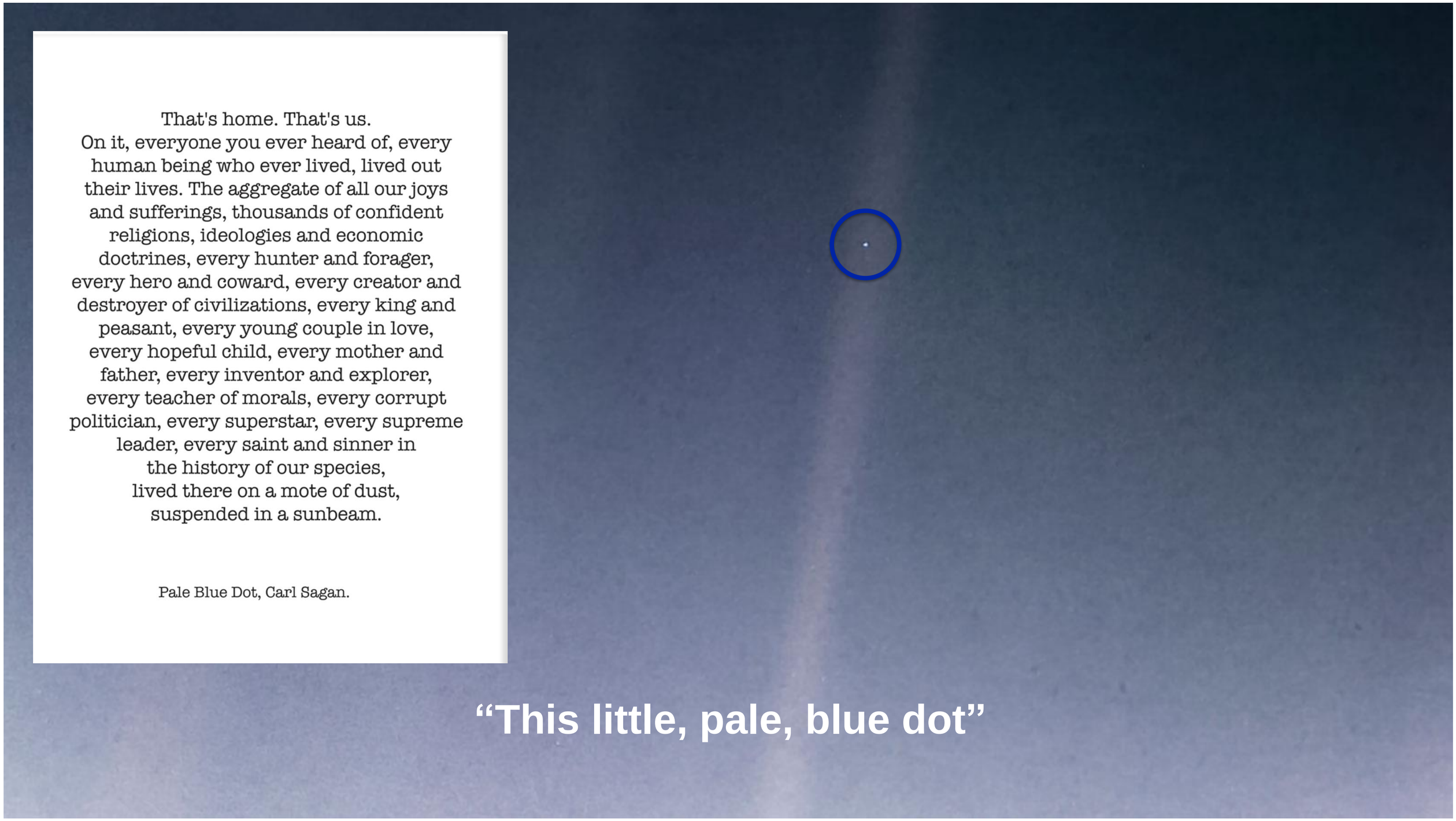
Años dorados para la innovación…

Y no olvidemos quiénes somos…



“This little, pale, blue dot”

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Thanks for your attention!

Xavier Ferràs
Xavier.ferras@esade.edu
@XavierFerras

LinkedIn me!