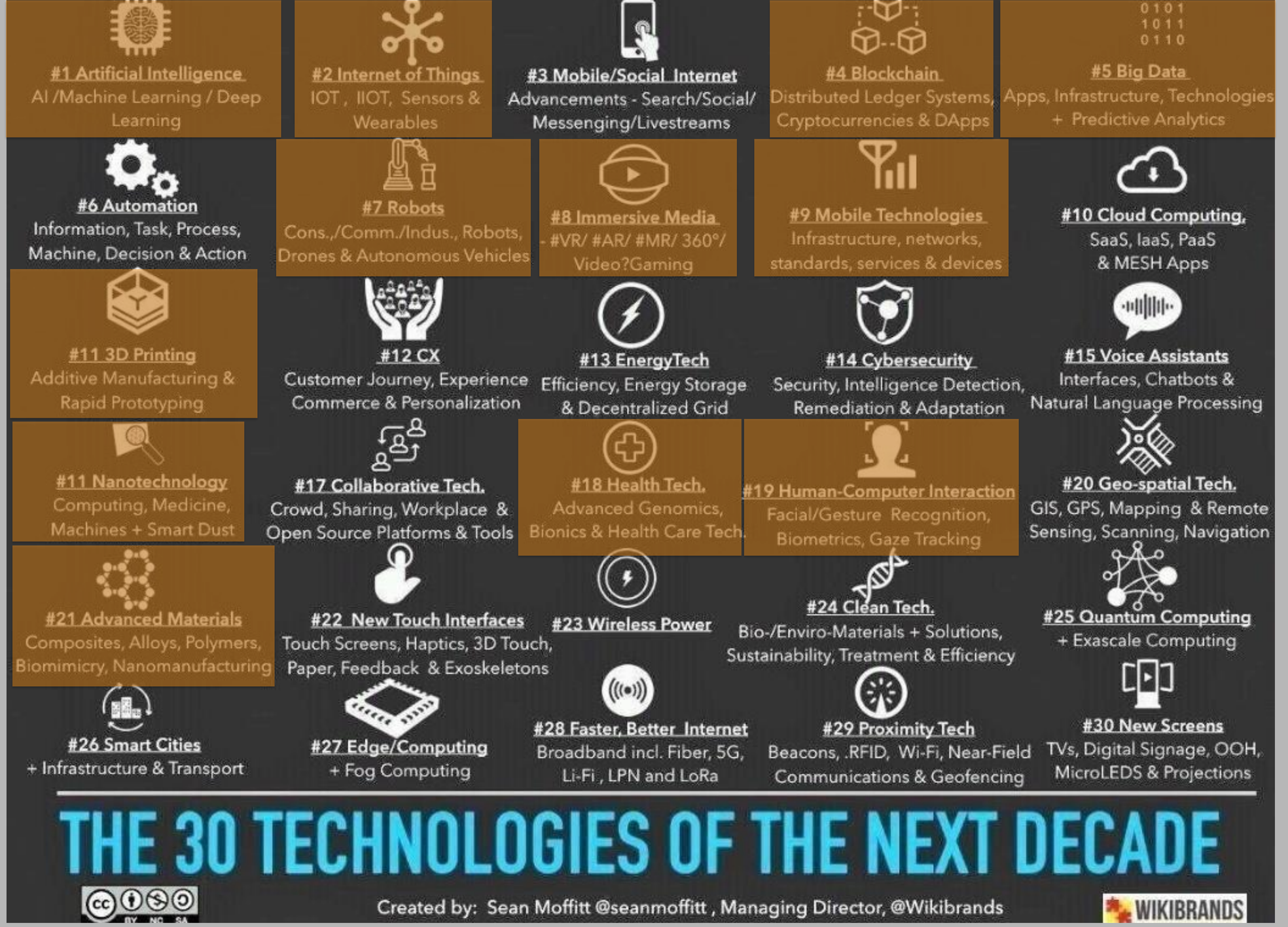
Exponential Technologies – Impact, Changes, and Challenges for the future Entrepreneur“

New Technologies!

2060. Former patient Ambrose Turner begins to understand how he has been given a second chance at life as cardiologist Sheila Shelby downloads his “file” and explains the chain of events that allowed him to survive 40 years in an induced coma while the world’s population was decimated.

https://www.siemens.com/innovation/en/home/pictures-of-the-future/health-and-well-being/medical-imaging-trends.html



30 TECHNOLOGIES OF THE NEXT DECADE

WORK ON BIG PROBLEMS

+ HEALTH

GLOBAL WARMING
Sea Level Rise 2m by 2100

POPULATION
9BN People by 2050

POVERTY
3BN People on <$2.50/Day

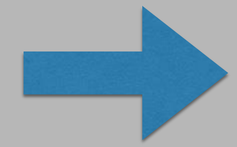
SANITATION
2.5BN People Affected

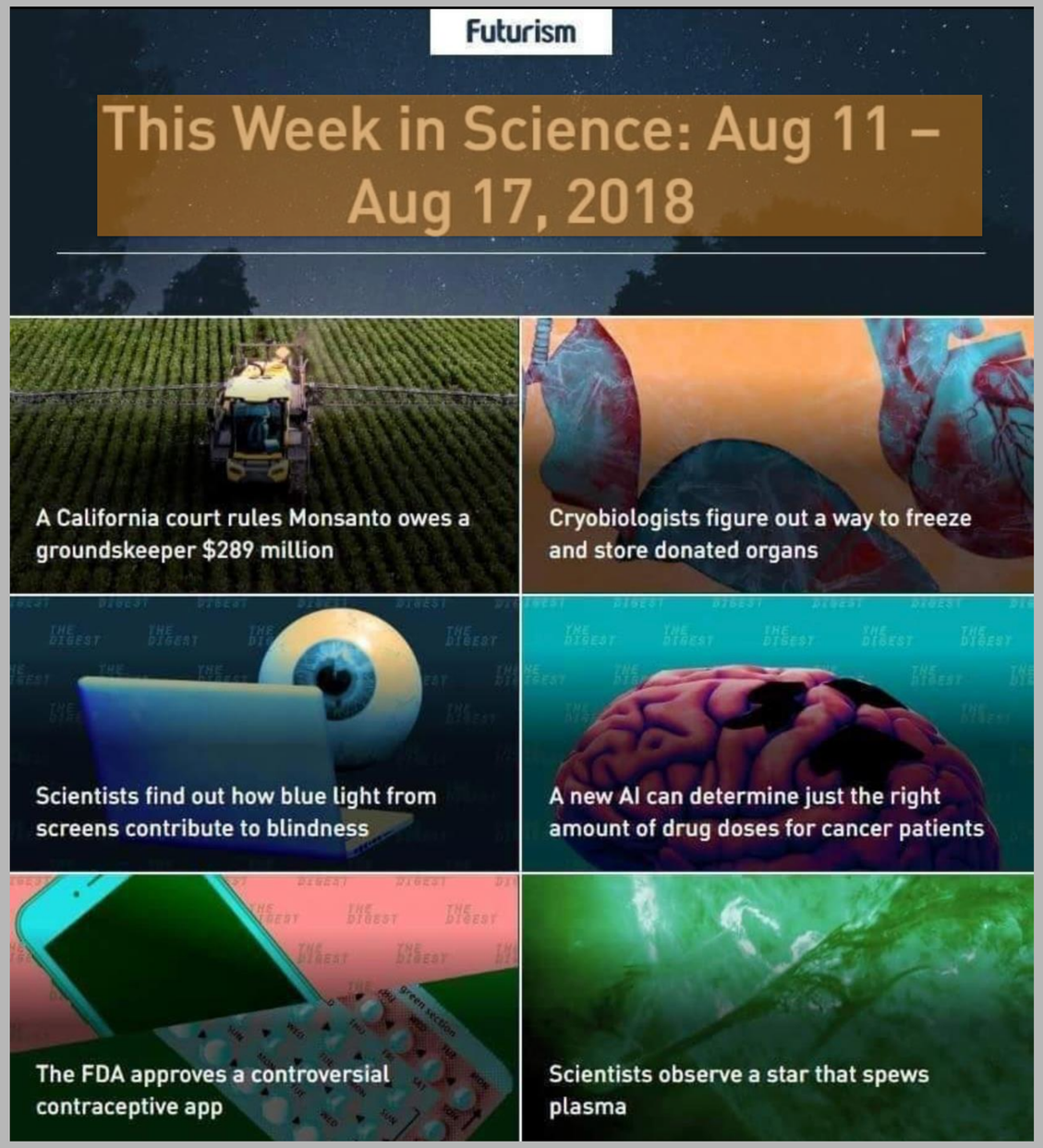
WATER
800M People

ILLITERACY
757M People Can't Read

MALNUTRITION
One Child Dies Every 8 Sec

TOPIC RELEVANCE

- **Technology changes incredibly fast**
- **Healthcare is one of the top challenges**
- ***Ageing, Unequal Healthcare Delivery, Cost, Lack of Rural Service*, …  *are we, are YOU working on these?***
- **Academic Research is very often not focussing on solving these problems and issues**


Futurism
This Week in Science: Aug 11 – Aug 17, 2018
A California court rules Monsanto owes a groundskeeper $289 million
Cryobiologists figure out a way to freeze and store donated organs
Scientists find out how blue light from screens contribute to blindness
A new AI can determine just the right amount of drug doses for cancer patients
The FDA approves a controversial contraceptive app
Scientists observe a star that spews plasma


Science alert
Senescent cells (Lorna Harries/Matt Whiteman)
Scientists Just Successfully Reversed Ageing in Lab Grown Human Cells
Whoa.
LORNA HARRIES & MATT WHITEMAN, THE CONVERSATION
13 AUG 2018

Yesterday, innovation meant technological innovation. But today, it means institutional and organizational innovation—ways to motivate, inspire, and coordinate human effort, ideas, and imagination that have greater, deeper, and truer human benefits.

(Why) Tomorrow's Breakthroughs Won't Be L..
umair haque

Michael Friebe, PhD

- Dipl.-Ing. Nachrichtentechnik, Stuttgart; MSc. - Management, San Francisco; Dr. rer. medic. (PhD) Medizinphysik, Witten; MSc. Brewing&Distilling Heriot-Watt University, Edinburgh
- 5 years in San Francisco (UCSF / UC RIL / TOSHIBA MRI) as MRI R&D and Project Engineer / Product Manager
- CEO and Entrepreneur since 1993 (15 companies founded or co-founded)
- Germany's Business Angel of the year 2011 — currently invested in 14 MedTec Start-Up companies
- since Oct 2012 Rudolf-Diesel-Industry-Fellow of the Institute for advanced Studies TU München / since 2014 Honoray Professor Biomedical Engineering MISR University, Egypt / since Oct 2018 Adjunct Professor QUT, Brisbane
- since December 2014, Professor (Chair of Catheter Technologies and Image Guided Surgeries), Otto-von-Guericke University, Magdeburg, Germany — http://www.ovgu.de/friebe
- >80 national and international patent applications as lead inventor
- Passionate Outdoor Person (Hiking, Climbing, Skiing, Hunting, Dog Lover)

CATHETER TECHNOLOGIES + IMAGE GUIDED THERAPIES

RESEARCH TOPICS

Intelligent tools and systems for image guided procedures (e.g. robotics, catheters, implants)

Minimally invasive imaging and therapy concepts including hybrid modalities

Translational concepts + Innovation generation – from medical need recognition to solution generation

German Public Research University — 18.000 Students, 2.000 Staff, 250 Professors, own medical school and university hospital

INKA MEDICAL DEVICES

CATHETER TECHNOLOGIES + IMAGE GUIDED THERAPIES

Diagnostic imaging (Ultrasound, 2D+3D X-Ray, MRI, Molecular Imaging, Video and others) is commonly used for accurate assessment of clinical conditions. Our research focuses on utilizing them as guiding tools for minimally invasive and intra-operative therapy procedures by creating appropriate tools and accessories.

Our interdisciplinary approach includes innovation generation with the clinicians and subsequent close collaboration and transfer of the technologies to industrial partners.

www.inka-md.de

INKA
INTELLIGENTE KATHETER

INNOPROFILE
UNTERNEHMEN REGION
Die BMBF-Innovationsinitiative Neue Länder

IGT INNOLAB
ego.-INKUBATOR

SACHSEN-ANHALT

EUROPÄISCHE UNION
EFRE
Europäischer Fonds für regionale Entwicklung

OTTO VON GUERICKE
UNIVERSITÄT
MAGDEBURG

www.inka-md.de

2018 — 24 Invention Disclosures, 14 Patent Applications, 65 Publications

INKA — currently 19 PhD Students and 2 Post-Docs in

- ***Software Solutions** (Post Doc Alfredo Illanes with 6 PhD — Image Segmentation, Machine Learning, Signal Analysis, Navigation and Tracking SW)*
- ***Tools and Devices** (Post-Doc Axel Boese with 7 PhD — Catheters, Needles, Surgical Robotics and Manipulation)*
- ***Electronic Solutions** (Navigation and Tracking HW, interventional MRI, Sensors)*

We are also operating an INNOVATION Lab at the University Hospital (IGT:INNOLAB), a separate Graduate School (I2T2) for our PhD students, plus imaging/hardware/software/3D printing labs at the technical university. From 2018 on we will also be in charge of the novel and unique HEALTHCARE INNOVATION MANAGEMENT MBA.

Why Change? Why Future Look? …

Nobody has a f%$king clue about what is going to happen.

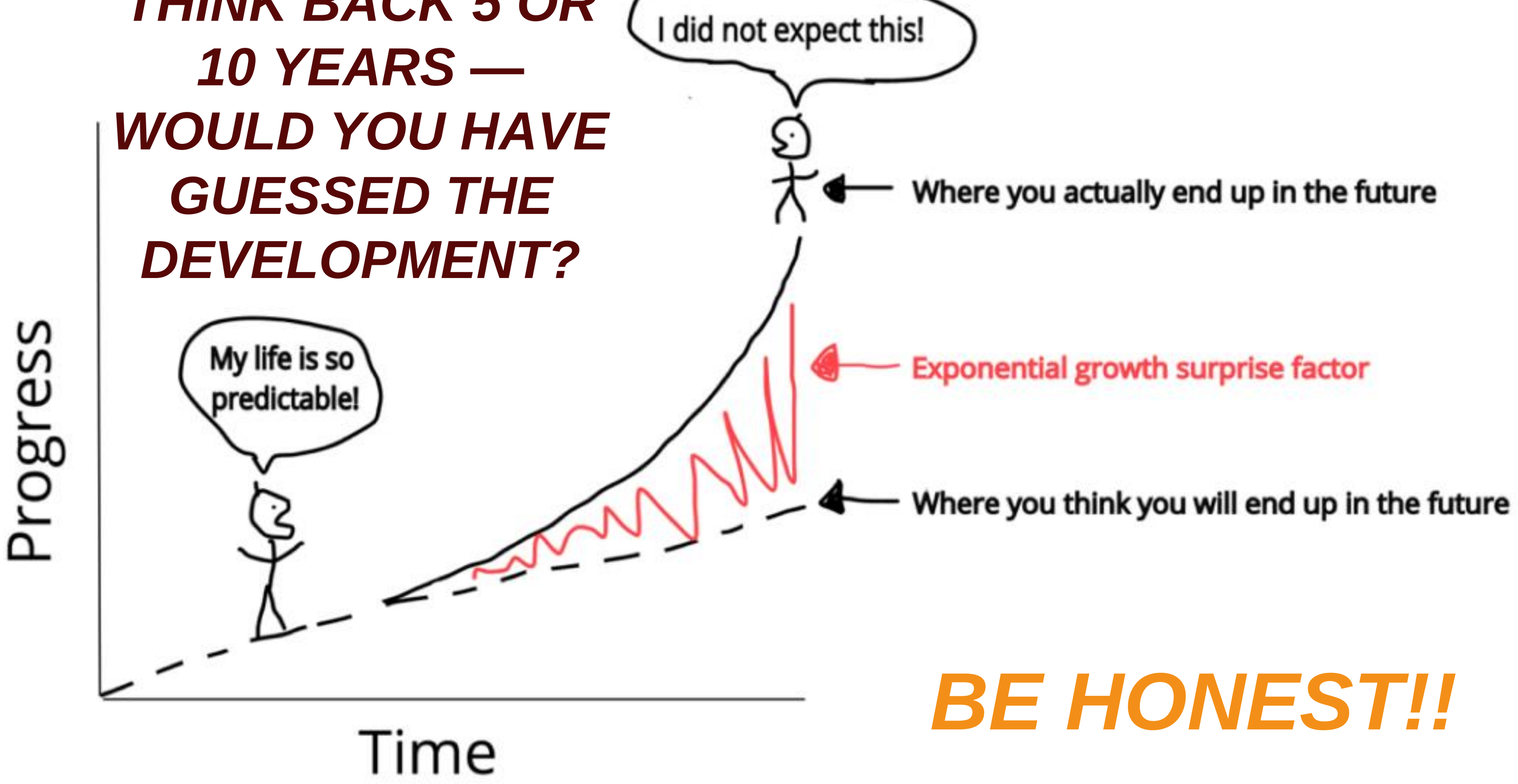
Me neither.

Leaders anticipate. Followers react.

Exponentials

Proof that we are living in an exponential world!

THINK BACK 5 OR 10 YEARS — WOULD YOU HAVE GUESSED THE DEVELOPMENT?



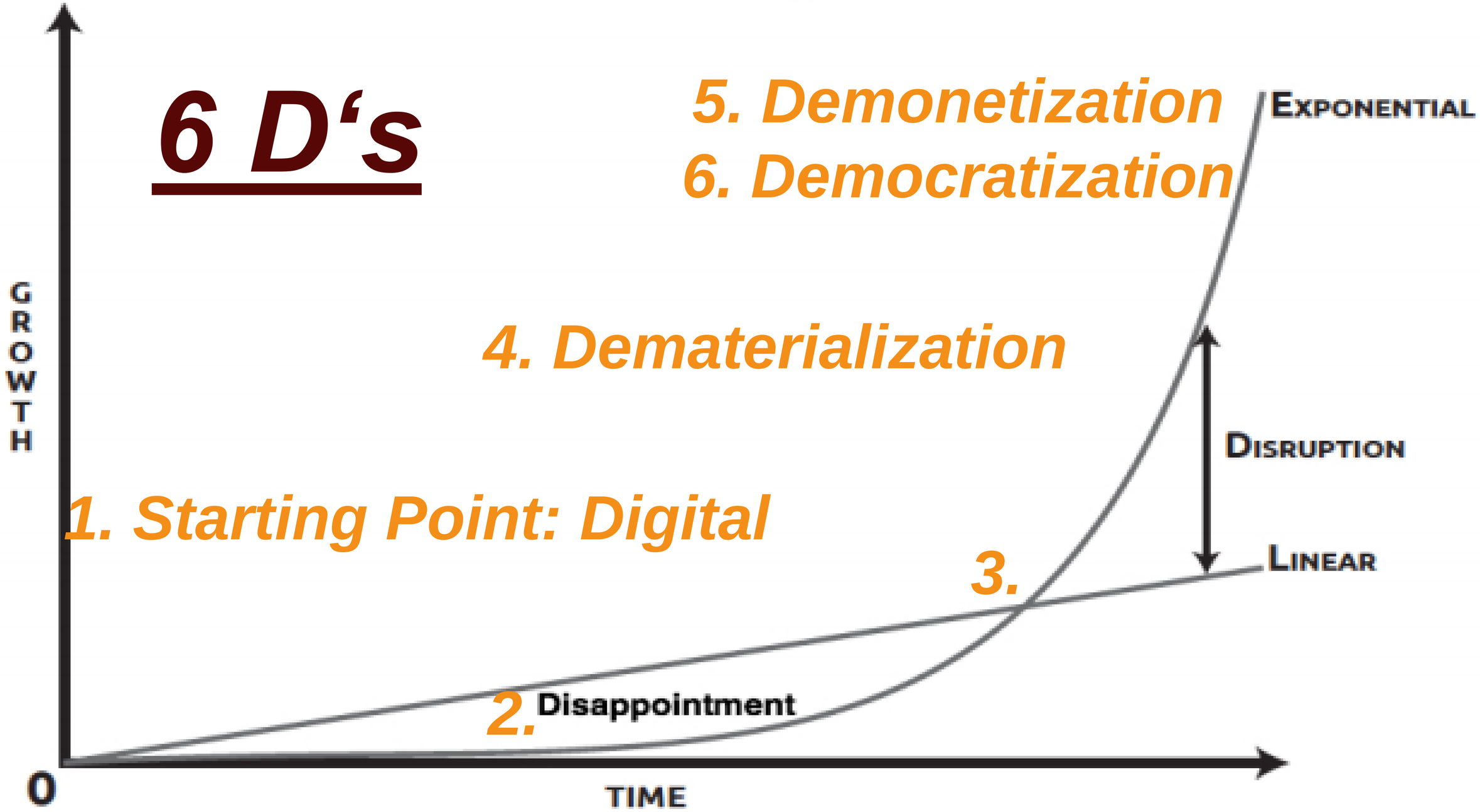
BE HONEST!!

Linear vs. Exponential

6 D‘s

5. Demonetization

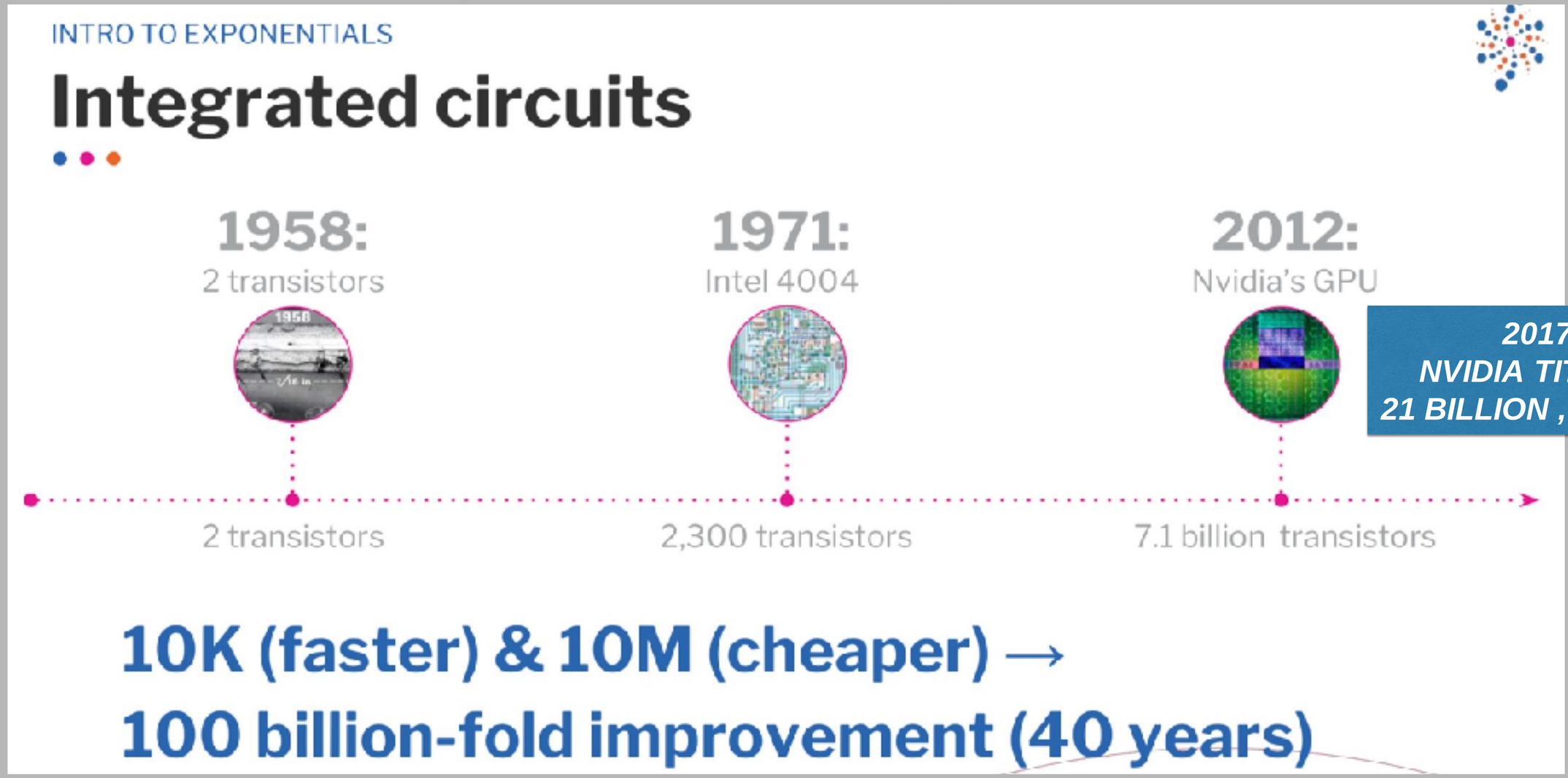
6. Democratization



New Demands / New Technologies — complete Change!

Limit at the moment — Calculation Power — Really??

Sure you know all that — quick review!



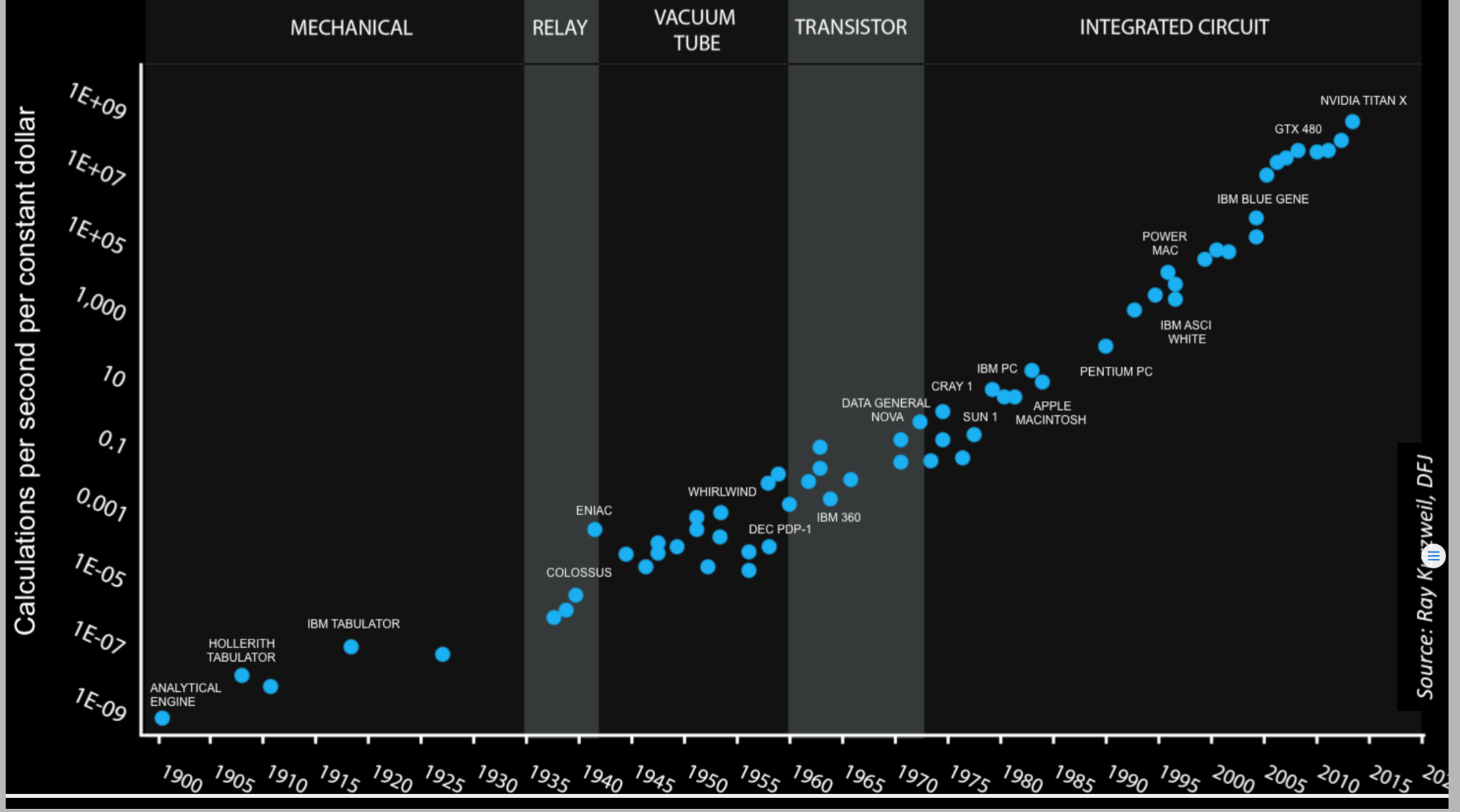
2017
NVIDIA TITAN V
21 BILLION , 110 TFL

What is driving this?

Moore's Law:

Price performance of computers doubles every 18 – 24 months

– *Gordon Moore*


MECHANICAL
RELAY
VACUUM TUBE
TRANSISTOR
INTEGRATED CIRCUIT
Calculations per second per constant dollar
1E+09
1E+07
1E+05
1,000
10
0.1
0.001
1E-05
1E-07
1E-09
NVIDIA TITAN X
GTX 480
IBM BLUE GENE
POWER MAC
IBM ASCI WHITE
PENTIUM PC
IBM PC
CRAY 1
DATA GENERAL NOVA
SUN 1
APPLE MACINTOSH
WHIRLWIND
ENIAC
IBM 360
DEC PDP-1
COLOSSUS
IBM TABULATOR
HOLLERITH TABULATOR
ANALYTICAL ENGINE
1900
1905
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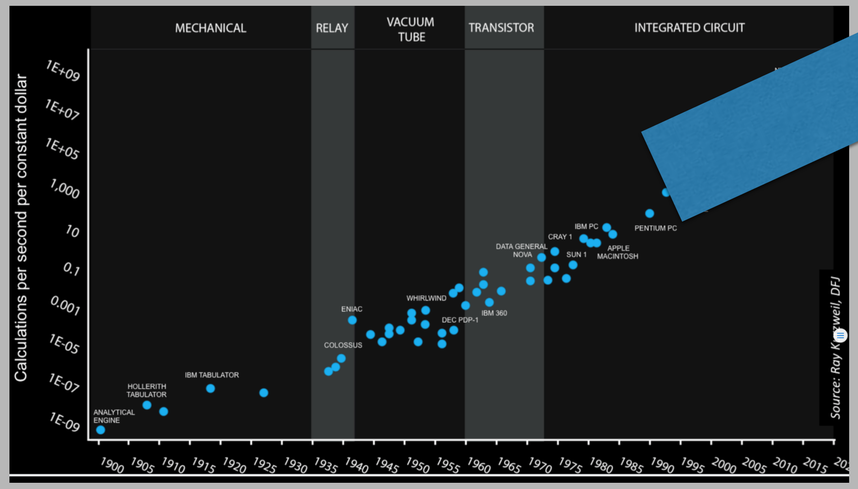
2015
Source: Ray Kurzweil, DFJ

Calculation Power — Limit in the Future — Really??



“The thing driving the hype is the realization that quantum computing is actually real. It is no longer a physicist’s dream—it is an engineer’s nightmare.”

Intelligent Machines

Serious quantum computers are finally here. What are we going to do with them?

Hello, quantum world.

by Will Knight February 21, 2018

NEWS IN BRIEF QUANTUM PHYSICS

Google moves toward quantum supremacy with 72-qubit computer

IBM and Intel recently debuted similarly sized chips

BY **EMILY CONOVER** 5:17PM, MARCH 5, 2018

QUANTUM UPGRADE Google’s 72-qubit quantum chip (shown) could become the first to perform a calculation impossible for traditional computers.

Data!!! (1 EB = 1 Mio TB = 10E18)

SINCE THE DAWN OF TIME...

UP UNTIL 2005...

HUMANS HAD CREATED...

130 EXABYTES OF DATA

Data!!! (1 EB = 1 Mio TB = 10E18)

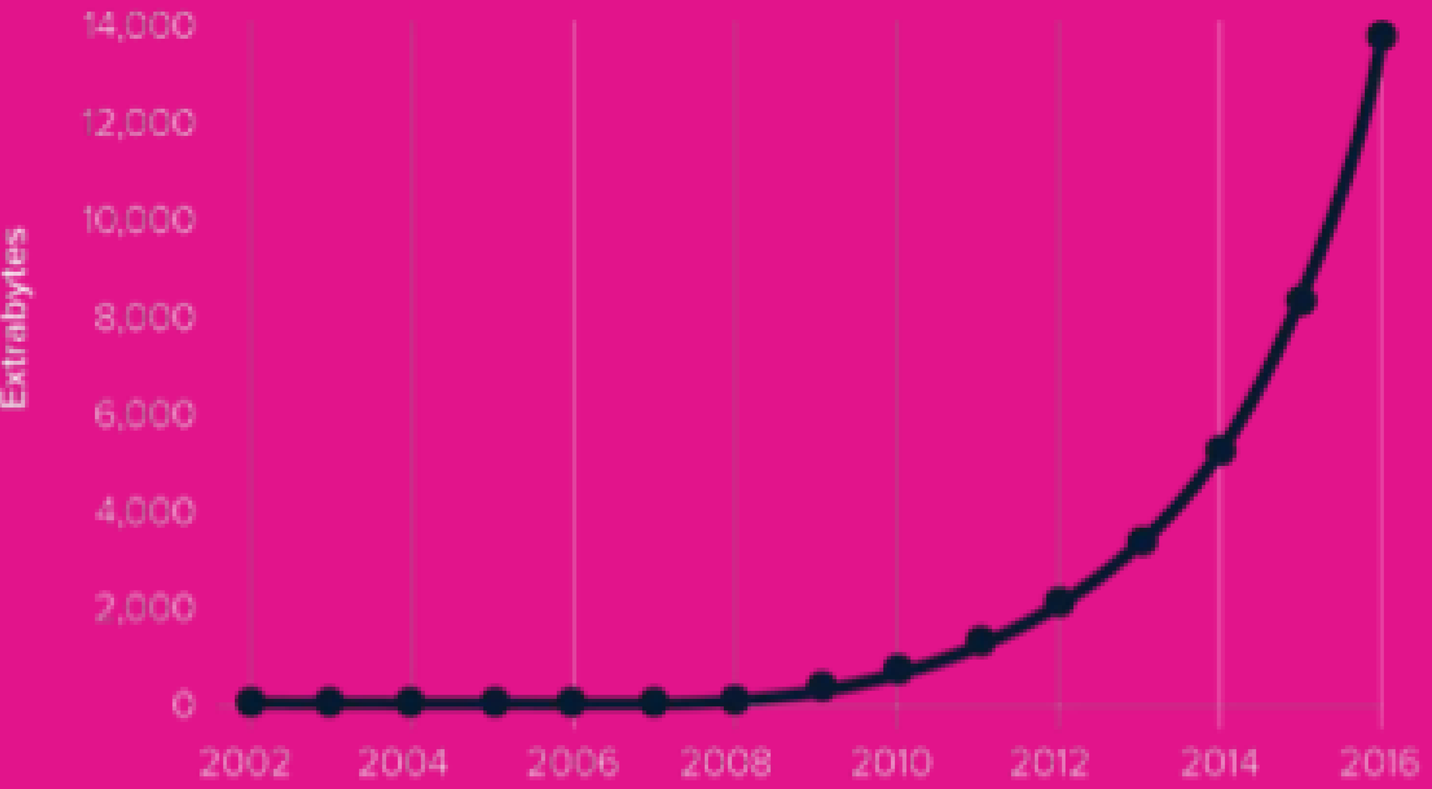
2005 – 130 EXABYTES

2010 – 1,200 EXABYTES

2015 – 7,900 EXABYTES

2020 – 40,900 EXABYTES

The exponential growth of data



5 billion gigabytes

In 2010... ~2 days

In 2013... ~10 minutes

In 2018 ... around 2 minutes

>100 hours of video content is added to YouTube every minute

A commercial airliner generates >1 Terabyte of data per day.

Internet of Things (IoT) / Sensors

EVERYONE WILL BE CONNECTED EVERYWHERE AND ALWAYS BY 2025

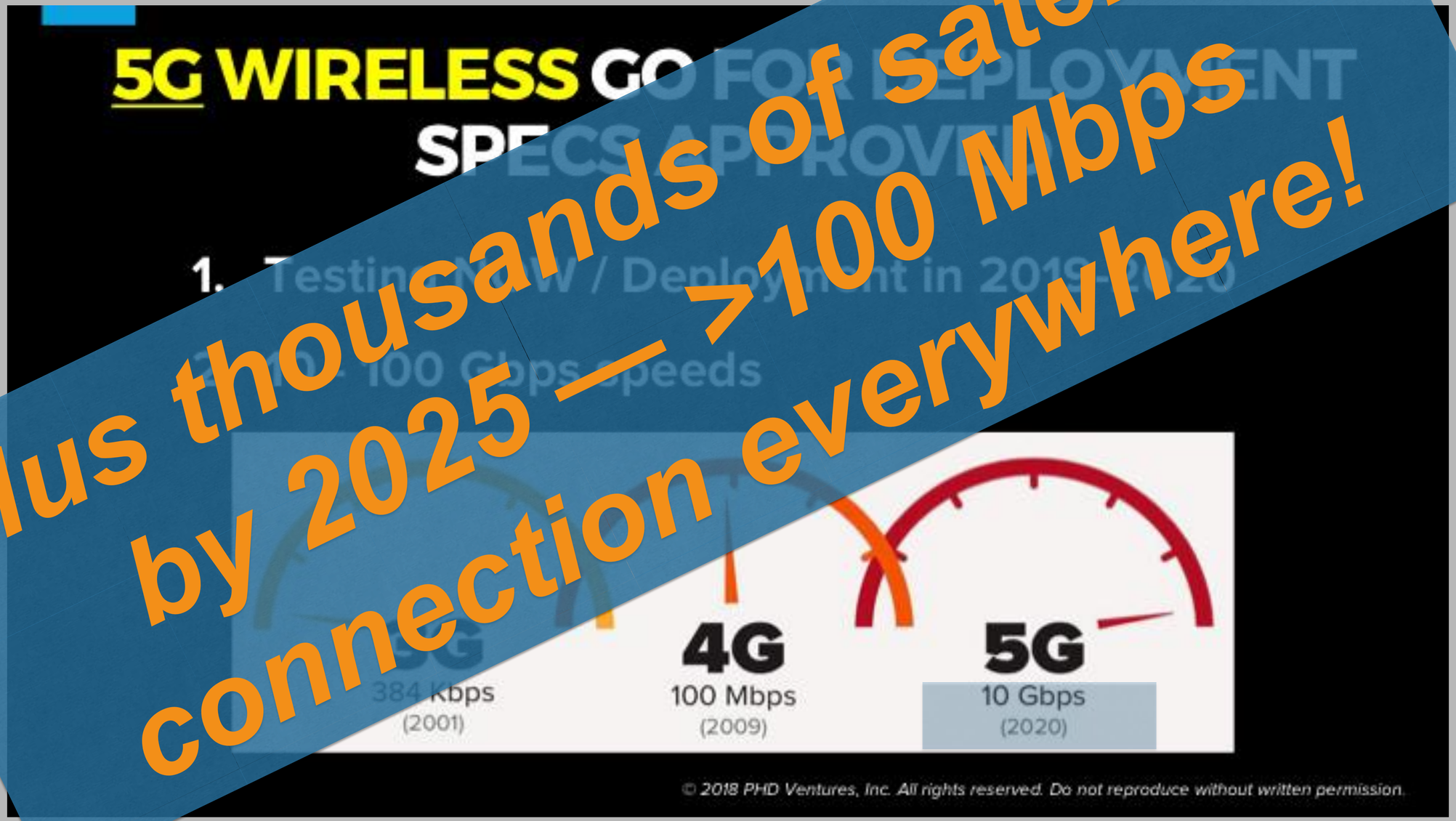
It's Not Just People Being Connected...

Global Connectivity will connect everything, everywhere, always → The Internet of Everything.

- 2015: 15 Billion (adding: 7 mil /day or 2.5 Billion/year)
- 2020: > 50 Billion devices & 1 Trillion Sensors
- 2030: > 500 Billion devices & 100 Trillion Sensors

Limit at the moment — Calculation Power — Really??

Probably no longer … Network?

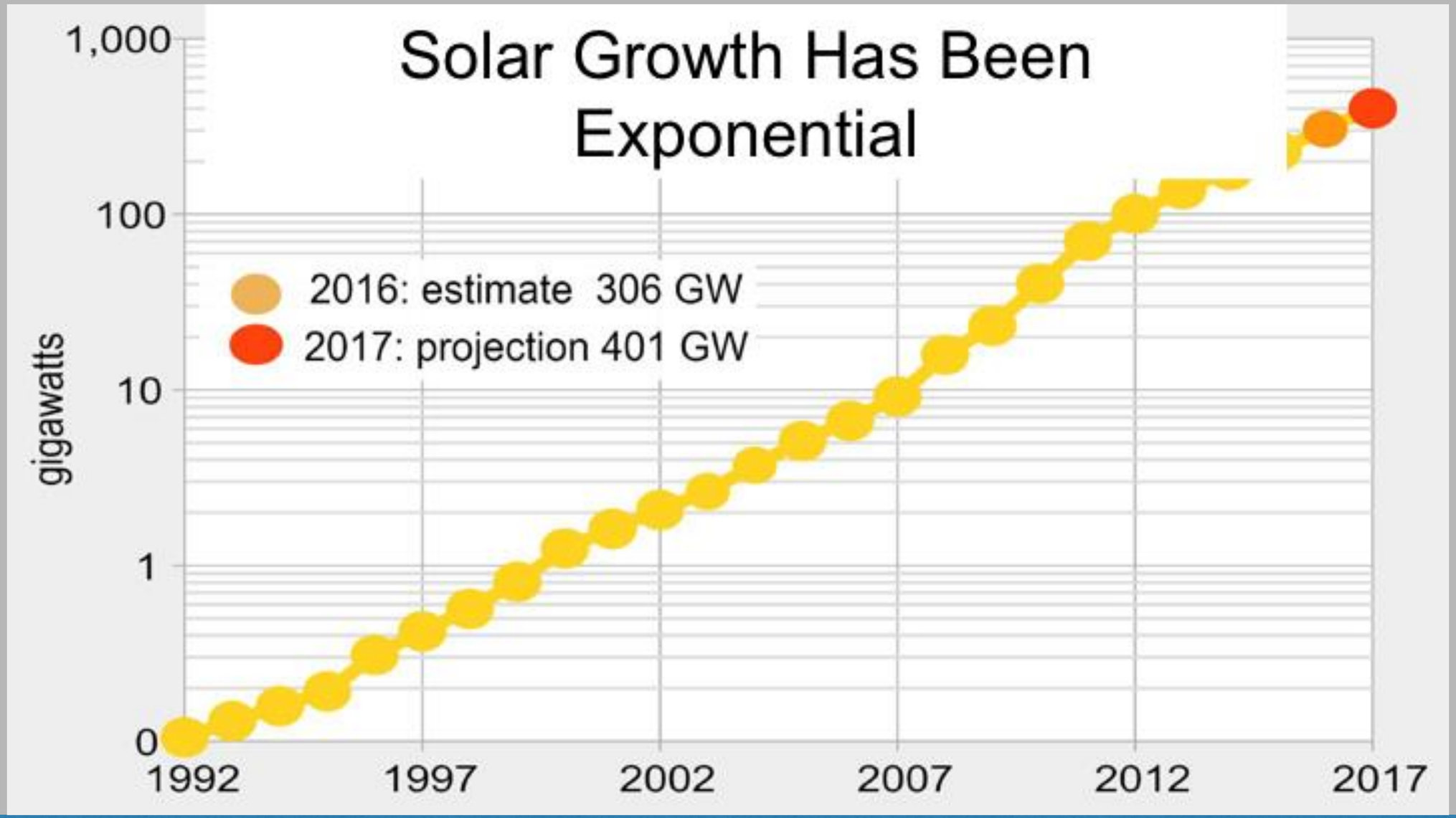


Plus thousands of satellites by 2025 — >100 Mbps connection everywhere!

Limit at the moment — Cost of ENERGY??

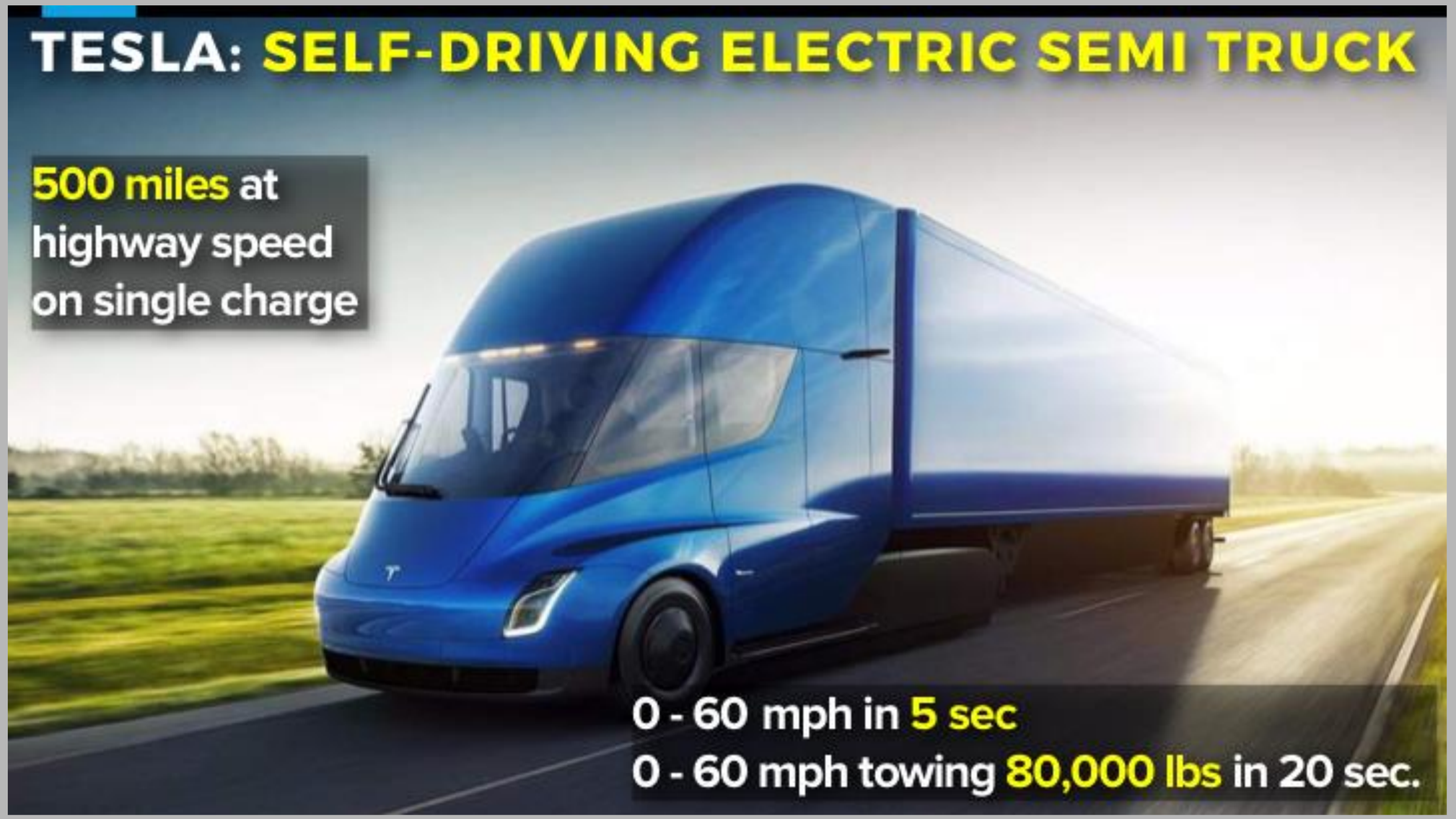
ENERGY AVAILABLE IN ABDUNDANCE BY 2030?

Limit at the moment — Cost of ENERGY??



ENERGY AVAILABLE IN ABDUNDANCE BY 2030?

TRANSPORTATION



SELF DRIVING AND SELF TRANSPORTING

TRANSPORTATION

SELF DRIVING AND SELF TRANSPORTING

TRANSPORTATION

SELF DRIVING AND SELF TRANSPORTING

TRANSPORTATION

Zunum Aero's Hybrid-Electric Aircraft

Max range: 700+ miles

Max speed: 340 mph

Ops cost: 8¢/seat mile

SELF DRIVING AND SELF TRANSPORTING

TRANSPORTATION

SELF DRIVING AND SELF TRANSPORTING

TRANSPORTATION

SELF DRIVING AND SELF TRANSPORTING

TRANSPORTATION / TRAVEL TO SPACE

Reached space (>50 meiles) on Tuesday — commercial now!

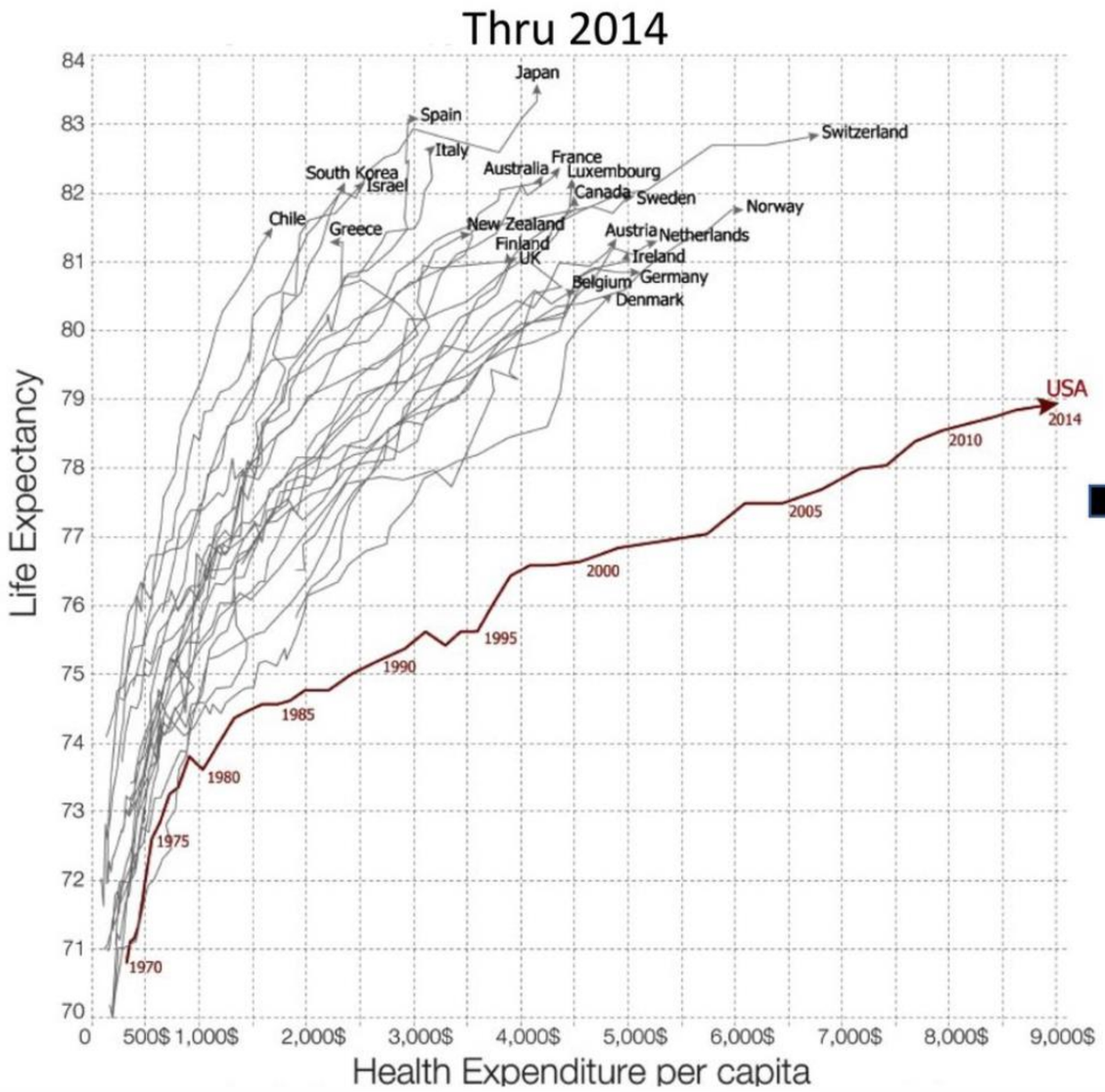
BY 2020 TOURIST TRIPS TO SPACE AND BEYOND

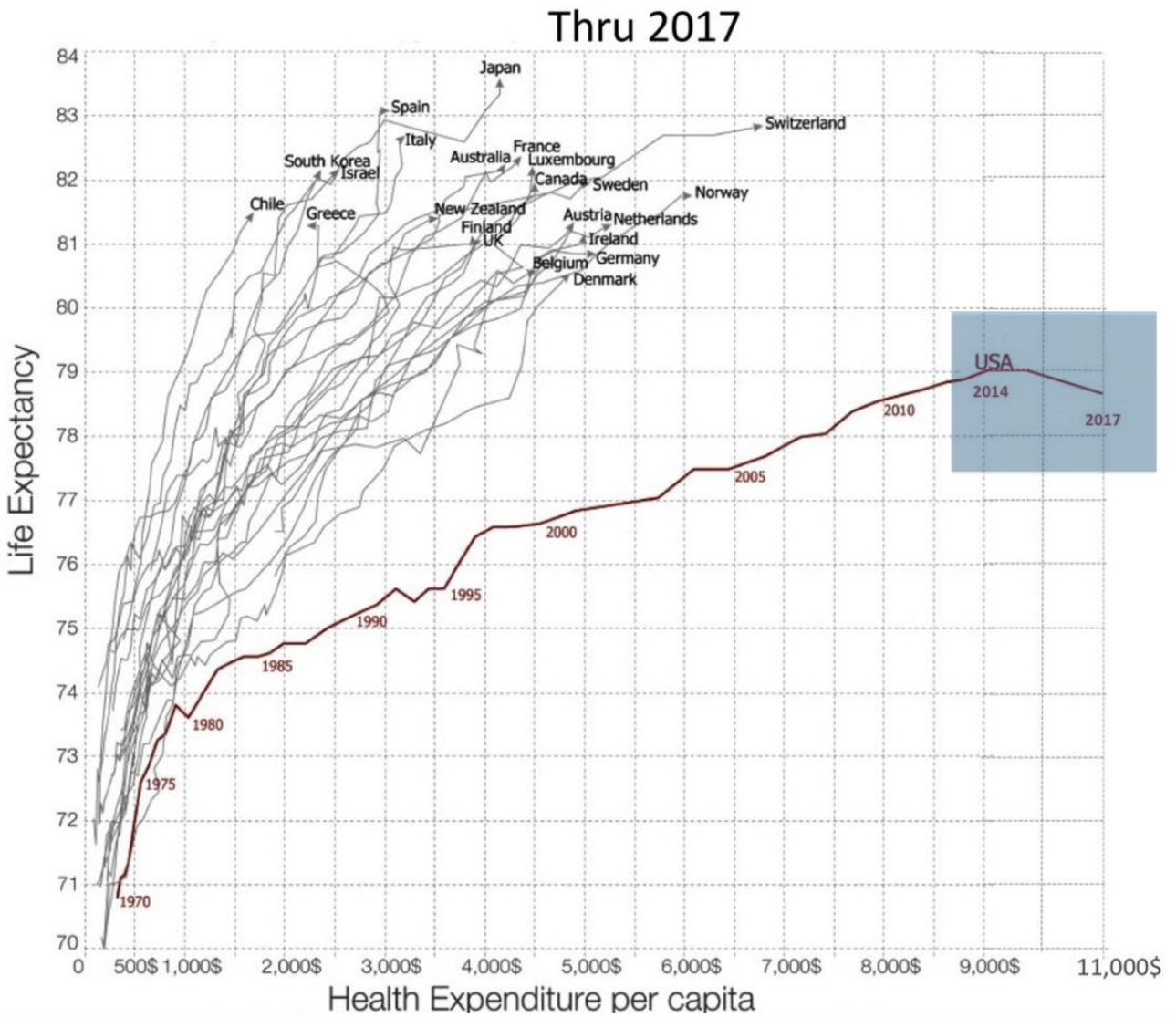
Why should that NOT affect Healthcare?

What has happened to US Healthcare in 40 yrs?

Metric	1975	Now
N of healthcare jobs	4 million	> 16 million (#1 US economy)
Healthcare spend per person	$550/yr	> $11,000/yr
Most expensive drug	$1200/yr	> $700,000/yr
Time allotted for office visits	60 min new, 30 min return	12 min new, 7 min return
% GDP healthcare	<8	18
Hospital daily room charge (avg)	~ $100	$4,600
Miscellaneous	None of these	Relative value units, EHRs, PBMs, "health systems"

Life Expectancy Vs. Health Expenditure Per Capita





DISRUPTIVE MEDTEC IN USE

Dante Labs

Order #EU2938W

Thank you Michael!

Your shipment is confirmed

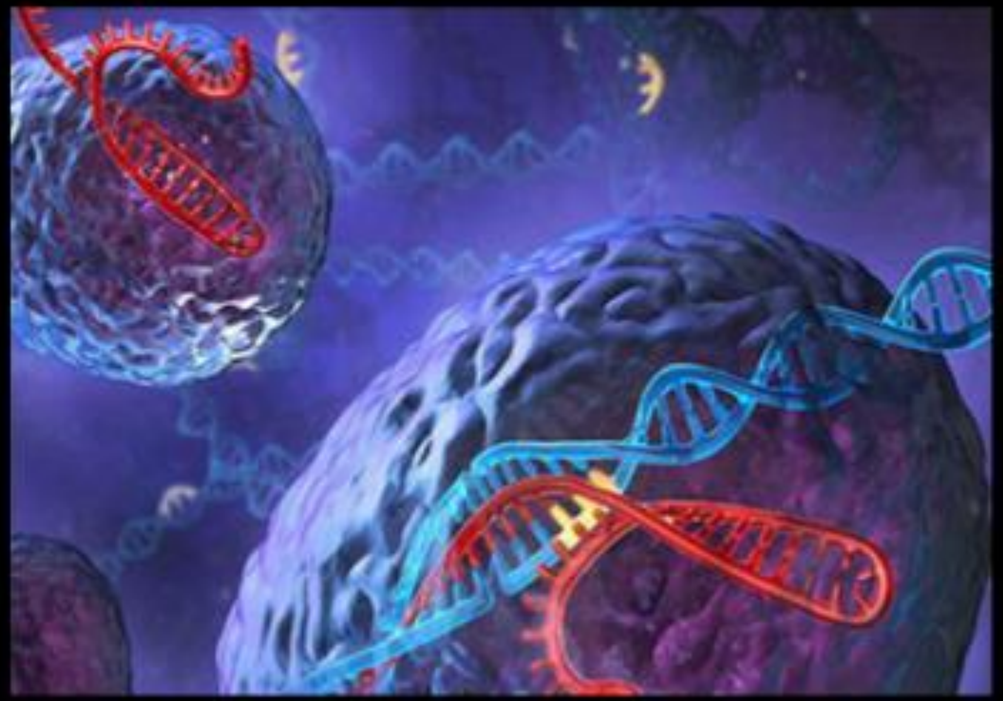
We've accepted your order, and we're getting it ready. Come back to this page for updates on your shipment status.

2 My Full DNA: Whole Genome Sequencing with mtDNA €338.00 EUR

Subtotal	€338.00 EUR
Shipping	Free
Total	€338.00 EUR

HEALTH RELATED EXPONENTIAL DEVELOPMENT

CRISPR 2.0 CAN CHANGE A SINGLE NUCLEOTIDE, EASILY, ACCURATELY

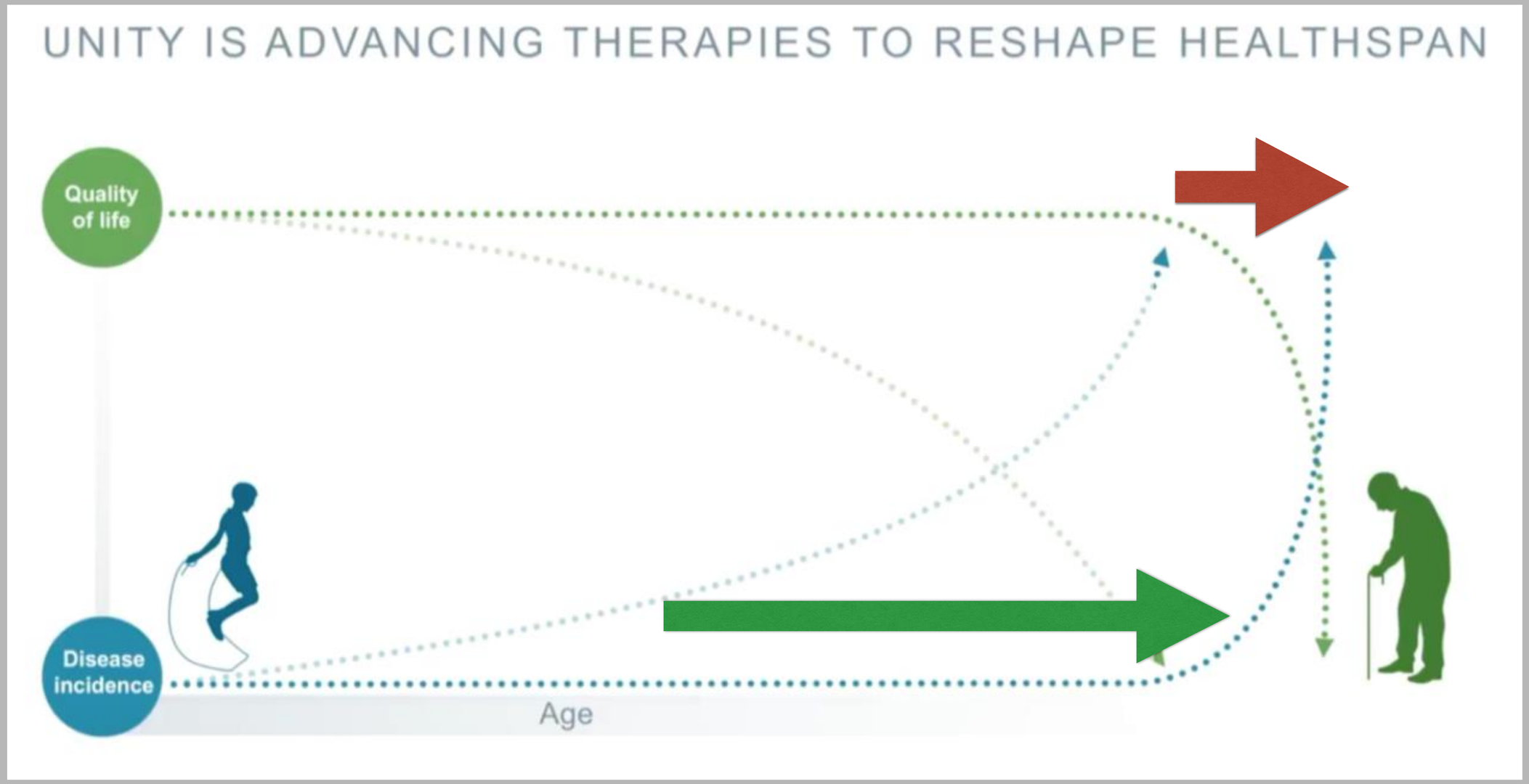


MIT & Harvard have discovered new “single base editing”.

32,000 out of 50,000 diseases are caused by single-point mutations.

AI + DIAGNOSTICS + DIGITAL BIOLOGY + GENETICS = PARADIGM SHIFT

HEALTH RELATED EXPONENTIAL DEVELOPMENT



DIAGNOSTICS + DIGITAL BIOLOGY + GENETICS = PARADIGM SHIFT

HEALTH RELATED EXPONENTIAL DEVELOPMENT

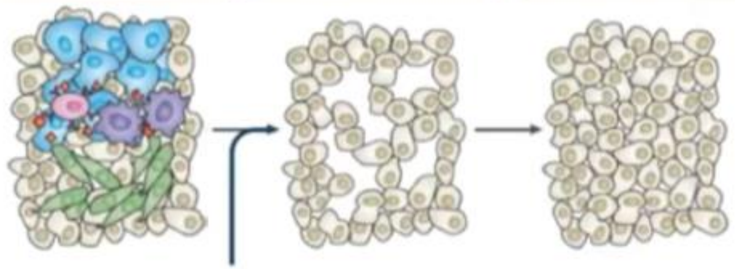
DIAGNOSTICS + DIGITAL BIOLOGY + GENETICS = PARADIGM SHIFT

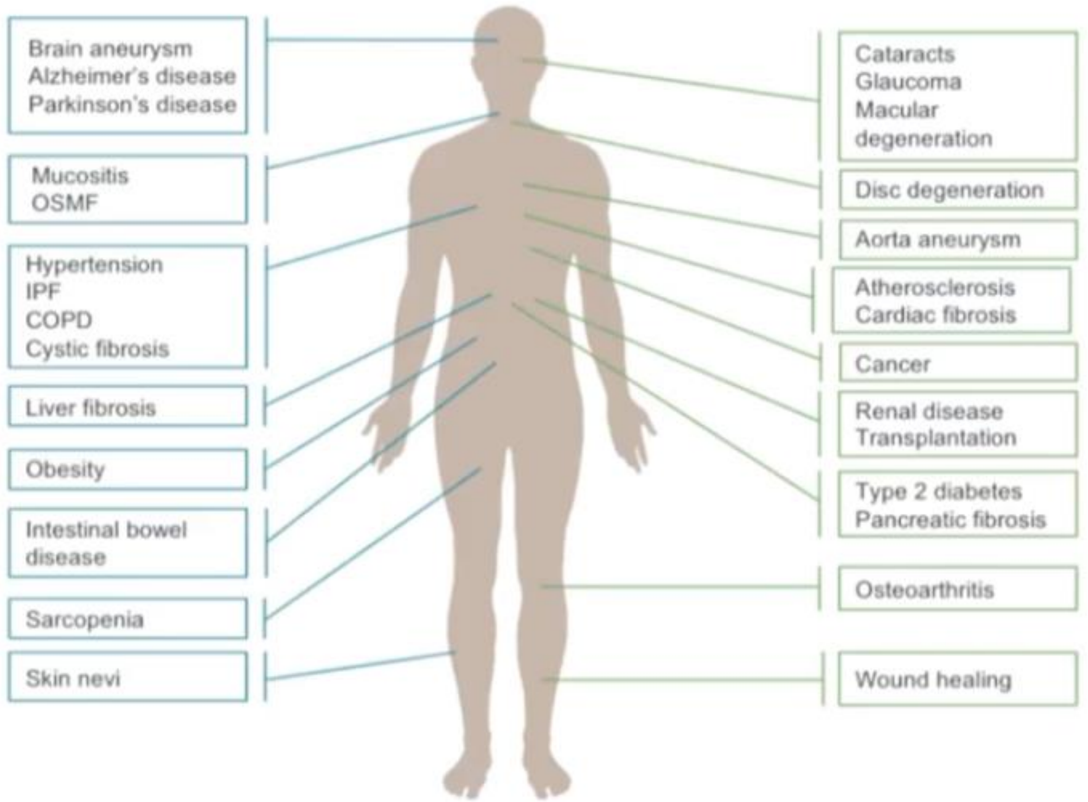
HEALTH RELATED EXPONENTIAL DEVELOPMENT

SnCs ARE IMPLICATED IN NUMEROUS CONDITIONS OF AGING

UNITY therapeutic paradigm

Spread of senescence and inflammation	Clearance of SnCs with a UNITY Tx	Regeneration and restoration of function

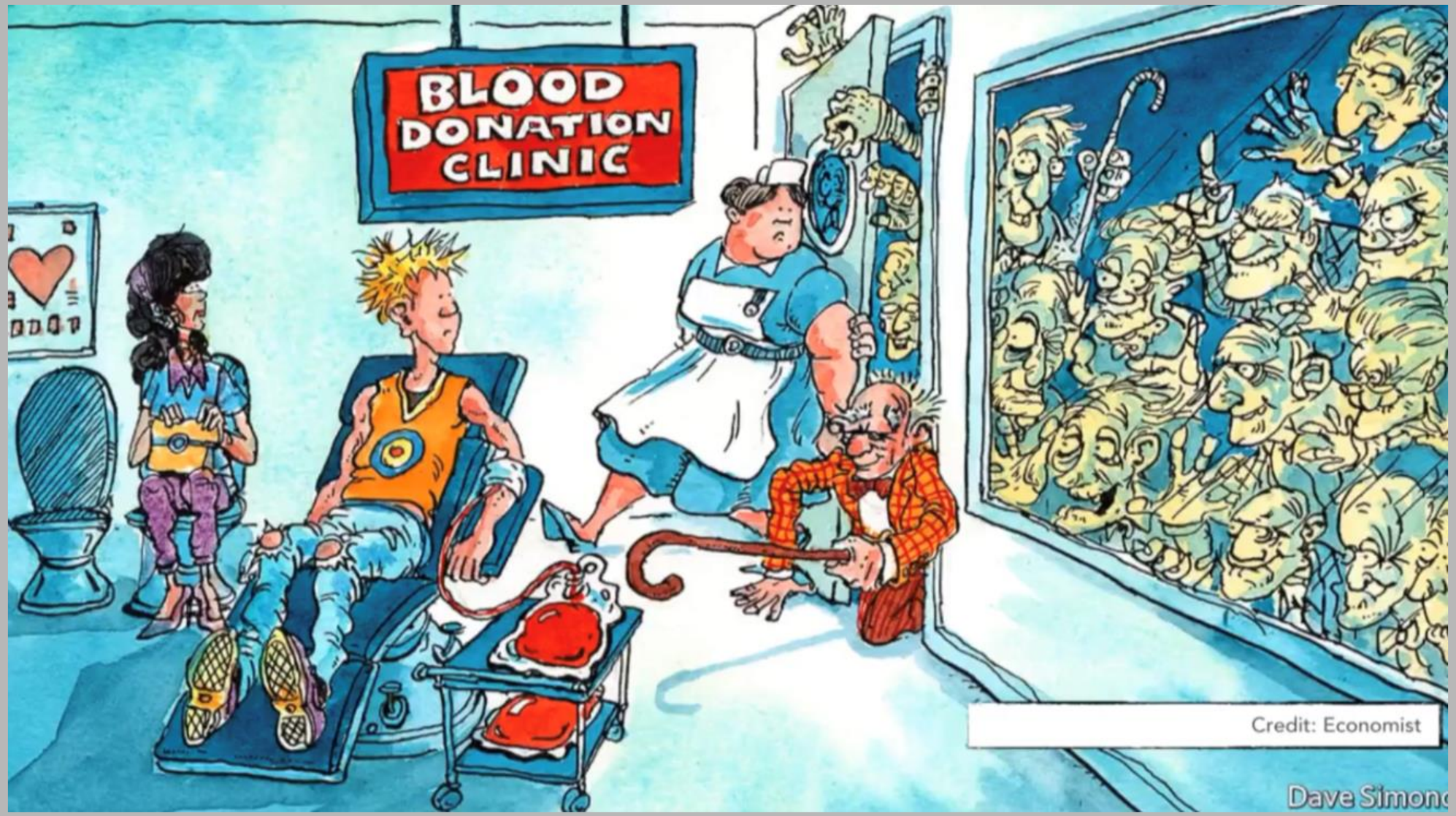




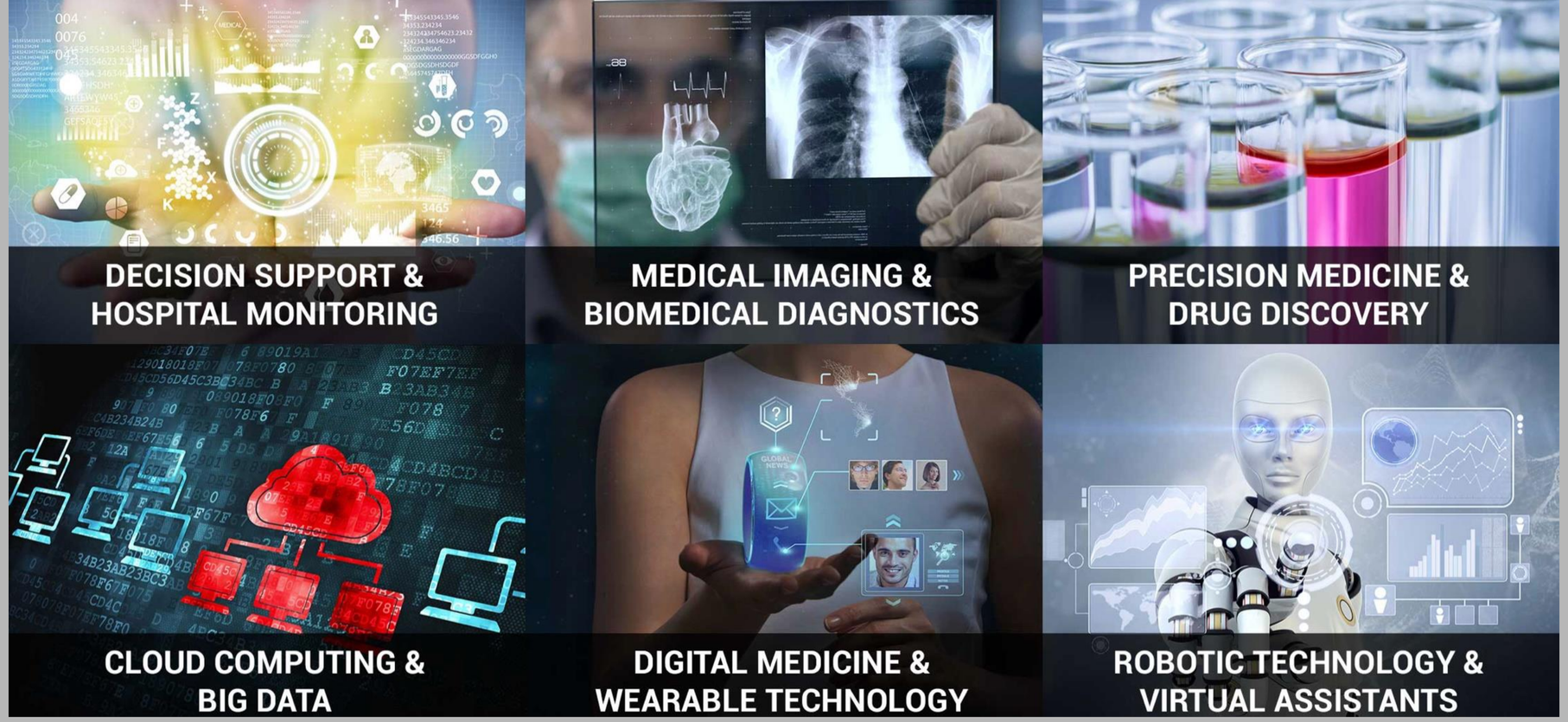
Given the numerous possible indications, senolytic drugs could have broad utility

DIAGNOSTICS + DIGITAL BIOLOGY + GENETICS = PARADIGM SHIFT

HEALTH RELATED EXPONENTIAL DEVELOPMENT



DIAGNOSTICS + DIGITAL BIOLOGY + GENETICS = PARADIGM SHIFT



Paradigm Shift in Healthcare Delivery

From Treating Sick to Preventing from Becoming Sick.
Value Based, Patient Centric, and Personalised Healthcare.
Exponential Technologies changing Healthcare Delivery.

Everyone talks about AI and ML … me too!

ARTIFICIAL INTELLIGENCE

As Spiros Margaris, renowned venture capitalist and thought leader in AI and Fintech so eloquently said,

If startups and companies rely only on cutting-edge AI and machine learning algorithms to compete—it will be not enough.

AI will be not a competitive advantage but a requirement. Do you hear anyone saying they use electricity as a competitive edge?

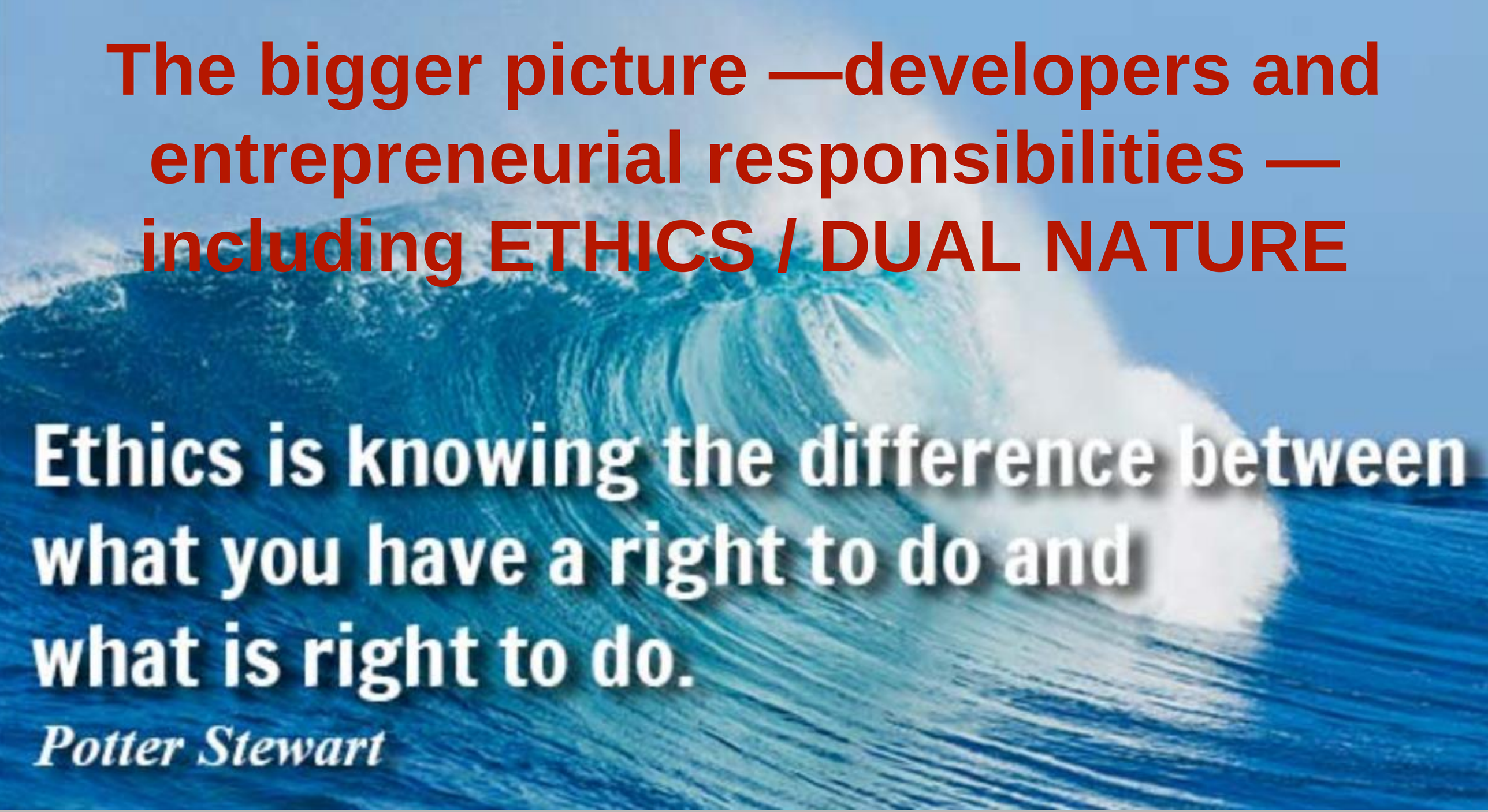
How the World Is Preparing for the AI Apocalypse

*"I don't think there's a need to panic, but…the people who say 'Let's not worry at all,' I don't agree with that."—**Bill Gates***

*"The pace of progress in artificial intelligence (I'm not referring to narrow AI) is incredibly fast. Unless you have direct exposure to groups like DeepMind, you have no idea how fast—it is growing at a pace close to exponential. The risk of something seriously dangerous happening is in the five-year time frame. Ten years at most."—**Elon Musk***

*"The development of full artificial intelligence could spell the end of the human race…It would take off on its own and redesign itself at an ever-increasing rate. Humans, who are limited by slow biological evolution, couldn't compete and would be superseded."—**Stephen Hawking***

The bigger picture —developers and entrepreneurial responsibilities — including ETHICS / DUAL NATURE

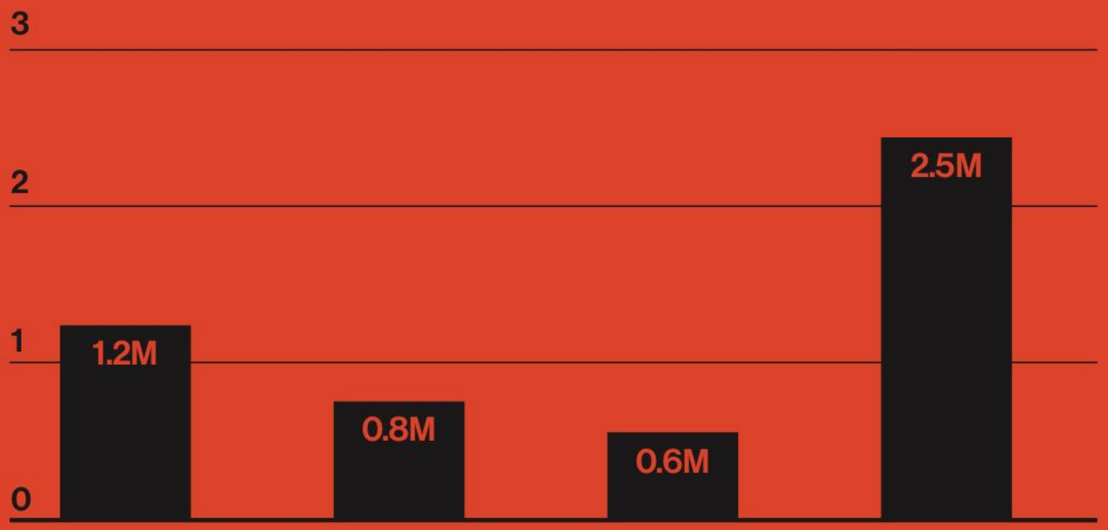


EU - Iniative

Launch of a process that would pave the way towards a common, internationally recognised ethical and legal framework for the DESIGN, PRODUCTION, USE and GOVERNANCE of artificial intelligence, robotics and 'autonomous' systems.

What will be the impact of jobs lost to automation? It could be huge.

Average annual workers displaced, scaled to the size of the 2016 total US labor force (in millions)



Agriculture to industry 1900–1940
Nearly 40% of labor force displaced

Manufacturing 1970–1990
Nearly 13% of labor force displaced

Construction 2007–2010
Nearly 0.5% of labor force displaced

The Great Transformation 2020 onward
20%–25% of labor force displaced

BAIN & CO.: LABOR 2030

~50% of current work activities in the US are technically automatable by adapting existing technologies

6 of 10 current occupations have more than 30% of activities that are technically automatable

MCKINSEY GLOBAL INSTITUTE

Most Americans favor limits on replacing jobs through automation.

A 2017 Pew Research Center poll found that a majority of adults thought businesses should be limited in their use of machines that replace humans.

41%
Businesses are justified in replacing human workers if machines can do a better job at a lower cost

58%
Should be limits on number of jobs businesses can replace with machines, even if they are better and cheaper than humans

PEW RESEARCH CENTER

from 3.

The demand for various skills is rapidly changing, with winners and losers.

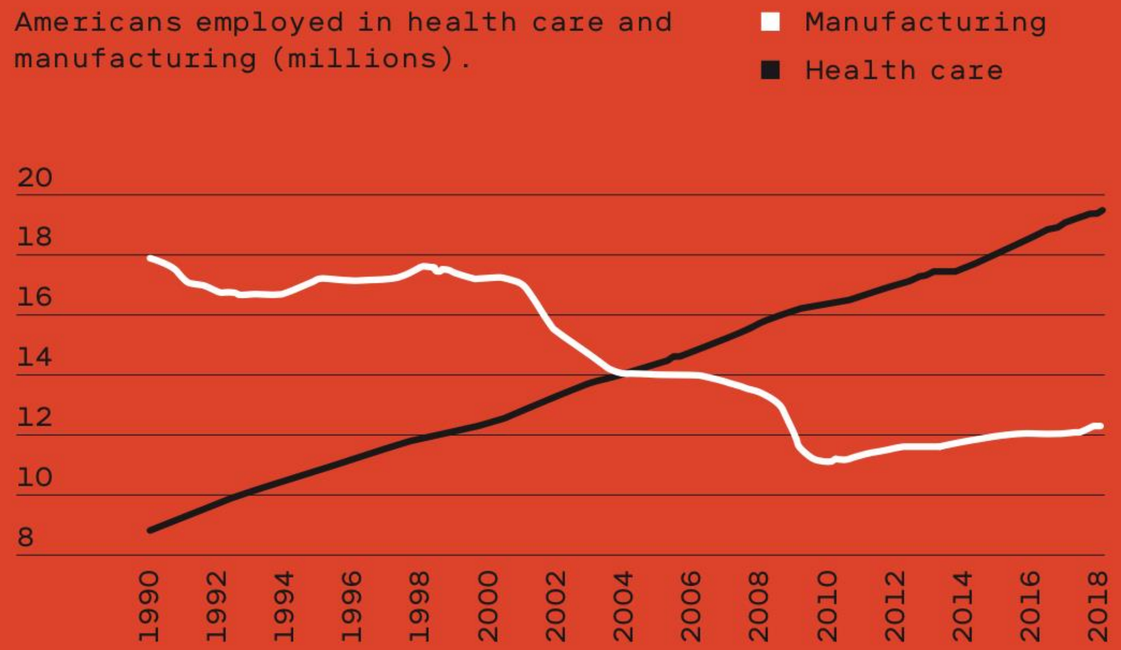
Automation and AI will mean less need for physical labor and much more demand for high-tech and social skills.

	United States		Western Europe	
Skills	**Hours worked in 2016 (billions)**	**Change in hours worked by 2030 (%)**	**Hours worked in 2016 (billions)**	**Change in hours worked by 2030 (%)**
Physical and manual	90	-11	113	-16
Basic cognitive	53	-14	62	-17
Higher cognitive	62	+09	78	+07
Social and emotional	52	+26	67	+22
Technological	31	+60	90	+52

MCKINSEY

Employment in health care is soaring. In manufacturing, not so much.

Americans employed in health care and manufacturing (millions).



ABOVE: US BUREAU OF LABOR STATISTICS; BELOW: ACEMOGLU/RESTREPO 2017

Each industrial robot in manufacturing replaces 6 workers.

+1 robot = -6 jobs

from 3.

Artificial Intelligence will not replace radiologists.

However, radiologists who use AI will replace those who don't.

Bertalan Meskó, MD, PhD

Director at The Medical Futurist Institute

FIRST OPINION

The rise of artificial intelligence means doctors must redefine what they do

By BRYAN VARTABEDIAN
OCTOBER 16, 2017

In a brilliant stroke of irony, I suspect that it may be Khosla's clinical machines that help us solve our professional dilemma. In his book, "The Most Human Human," Brian Christian suggests that only through machines will we be able to understand what it is to be human. He describes the rise of artificial intelligence as a type of maggot therapy: It consumes only those portions of the physician's work that are no longer human, restoring us to health.

https://www.statnews.com/2017/10/16/artificial-intelligence-physicians/

Artificial Intelligence / Machine+Deep Learning / Big Data / Robotics / Sensors

WIRED Technology | Science | Culture | Video | Reviews | Magazine | More

Artificial Intelligence

IBM's Watson is better at diagnosing cancer than human doctors

https://youtu.be/-_4eylYEho4

December 13, 2016

Adapting to Artificial Intelligence

Radiologists and Pathologists as Information Specialists

Saurabh Jha, MBBS, MRCS, MS[1]; Eric J. Topol, MD[2]

» Author Affiliations

JAMA. 2016;316(22):2353-2354. doi:10.1001/jama.2016.17438

YOUR ALGORITHM WILL SEE YOU NOW ...

Discipline	Algorithm	Human
Dermatology Melanoma	Accuracy 95% (IBM) Accuracy 91% (Stanford)	Accuracy 75% - 84%
Pathology Lung Cancer Tissue	Accuracy 81% (Stanford)	Accuracy 73 %
Radiology Mammographic Screening	Accuracy 87.4% (IBM)	Accuracy 81.1%
Pathology Mammographic Metast.	Accuracy 92.%% (MIT/Harvard Med /Beth Israel)	Accuracy 73.2 %
Diabetic Retinopathy	Accuracy 90% (Google) Accuracy 86% (IBM)	Accuracy 87.1%

Literature References on demand

What stops us from implementation?

What needs to change?

How do we integrate that into the clinical workflow?

How do we pay for the development and use?

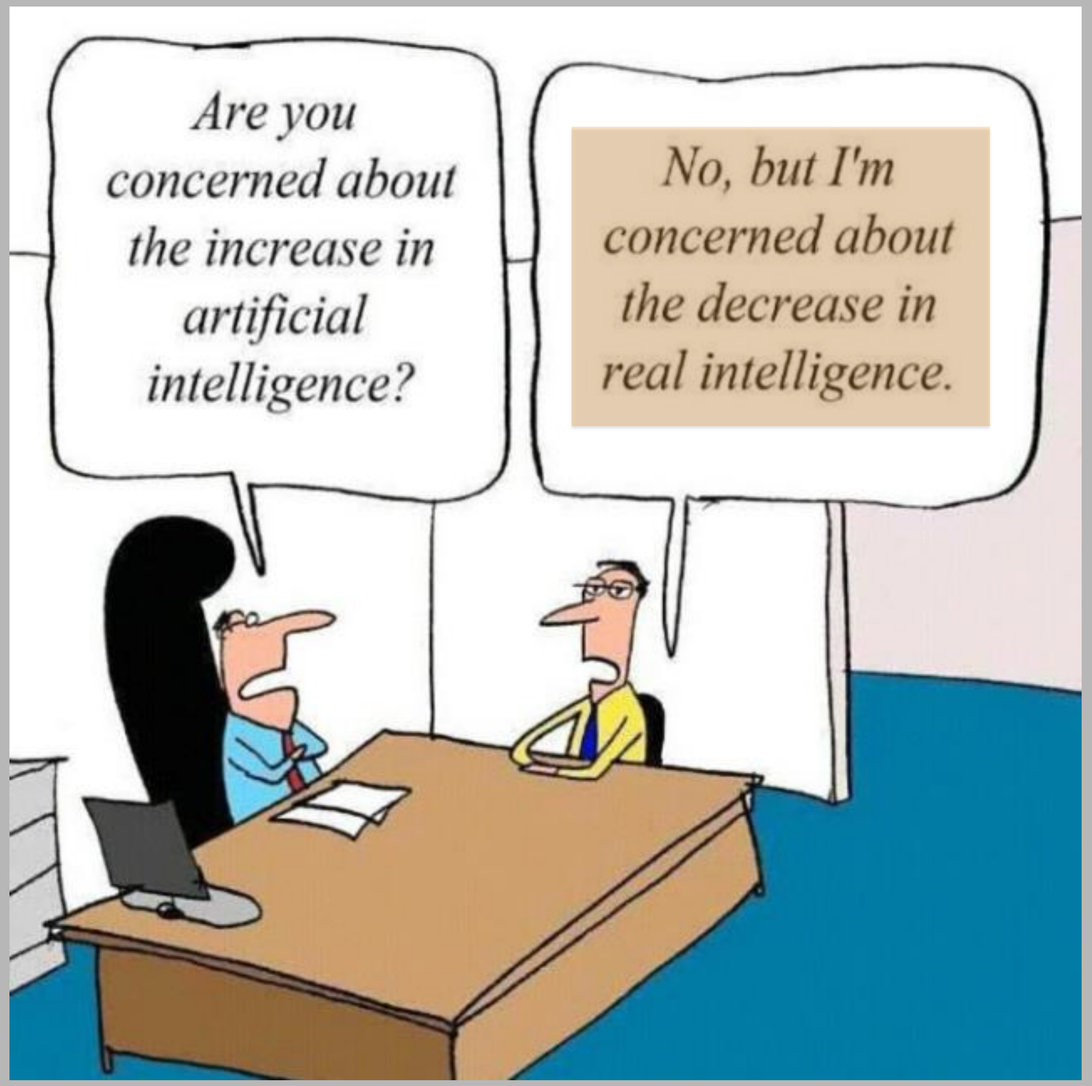
What happens to the human factor?

ANI - Artifical Narrow Intelligence

Company	FDA Approval	Indication
Aidoc	August 2018	CT Brain bleed diagnosis
iCAD	August 2018	Breast density via mammography
Zebra Medical	July 2018	Coronary calcium scoring
Bay Labs	June 2018	Echocardiogram EF determination
Neural Analytics	May 2018	Device for paramedic stroke diagnosis
IDx	April 2018	Diabetic retinopathy diagnosis
Icometrix	April 2018	MRI brain interpretation
Imagen	March 2018	X-ray wrist fracture diagnosis
Viz.ai	February 2018	CT Stroke diagnosis
Arterys	February 2018	Liver and lung cancer (MRI,CT) diagnosis
MaxQ-AI	January 2018	CT Brain bleed diagnosis
Alivecor	November 2017	Atrial fibrillation detection via Apple Watch
Arterys	January 2017	MRI heart interpretation

Artificial Intelligence / Machine+Deep Learning / Big Data

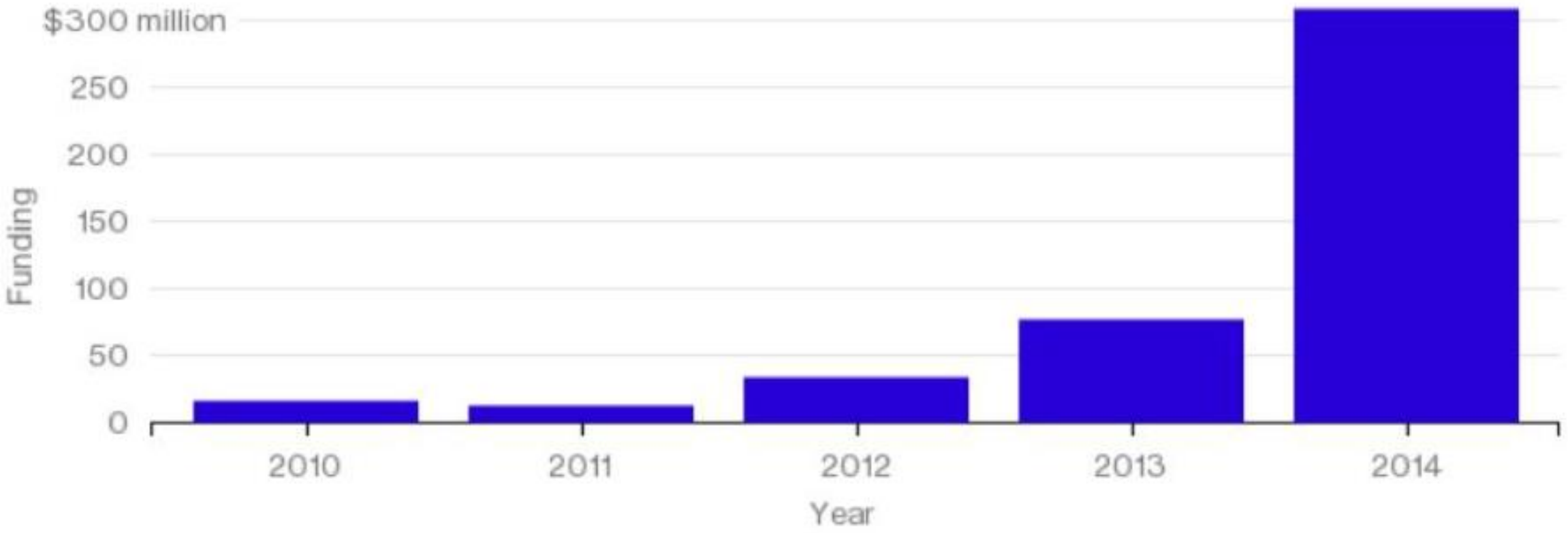
Dr AI is ready to see you
(at your convenience,
and at no charge)



The key Questions! Can you answer that?

Artificial Intelligence, Real Money

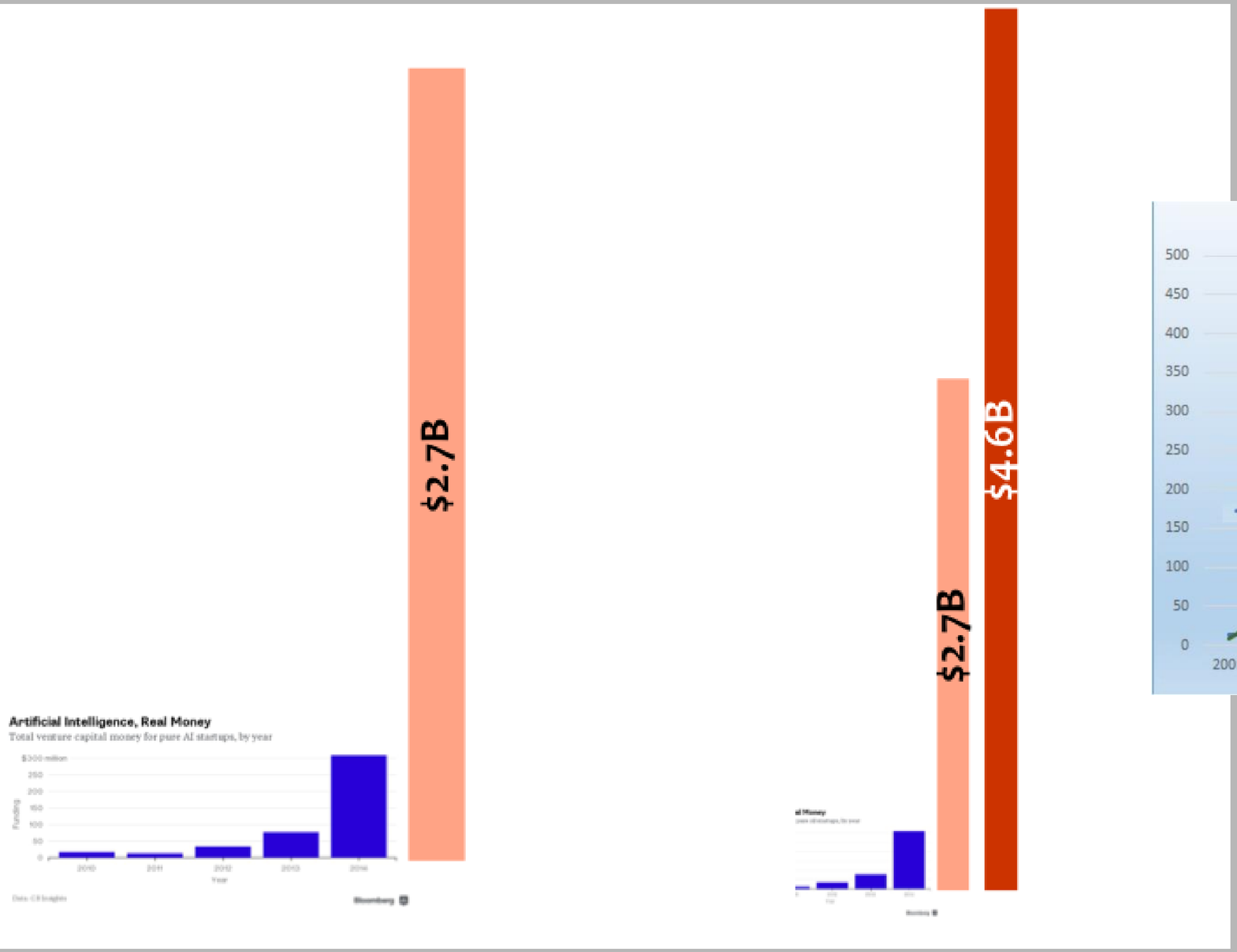
Total venture capital money for pure AI startups, by year

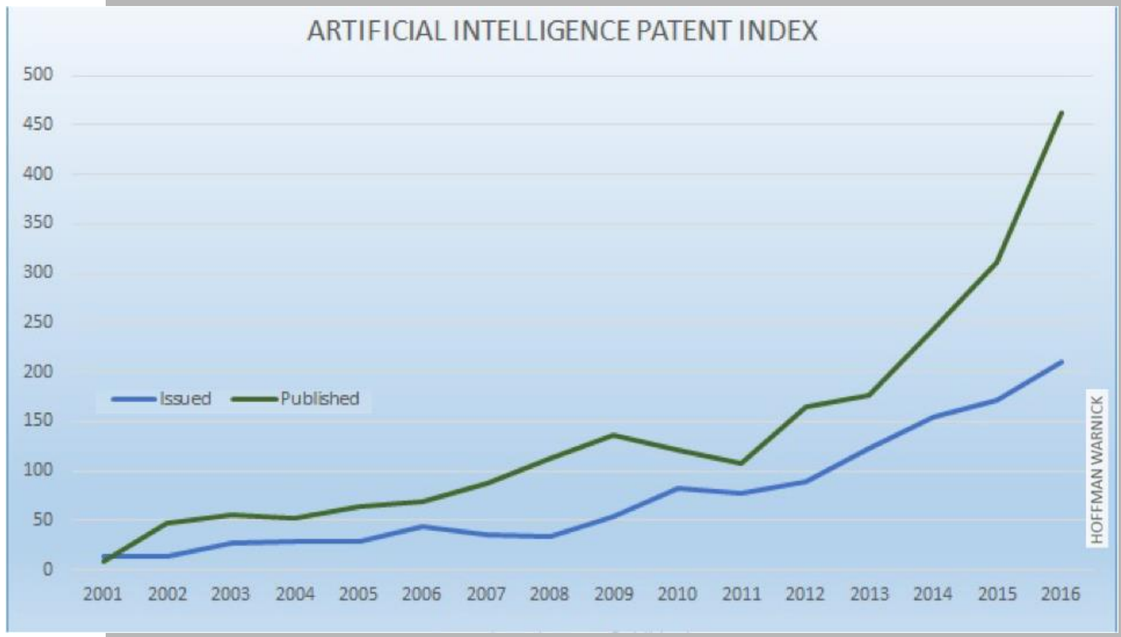


Data: CB Insights

Bloomberg

Artificial Intelligence / Machine+Deep Learning / Big Data






TECHNOLOGY'S IMPACT ON MEDICAL SPECIALTIES
The most and least influenced fields
Radiology
Dermatology
Oncology
Pathology
Primary Care


Psychology
Psychiatry
Nursing
Emergency Medicine
TMF+
THE MEDICAL FUTURIST

Medical Legal / Certification

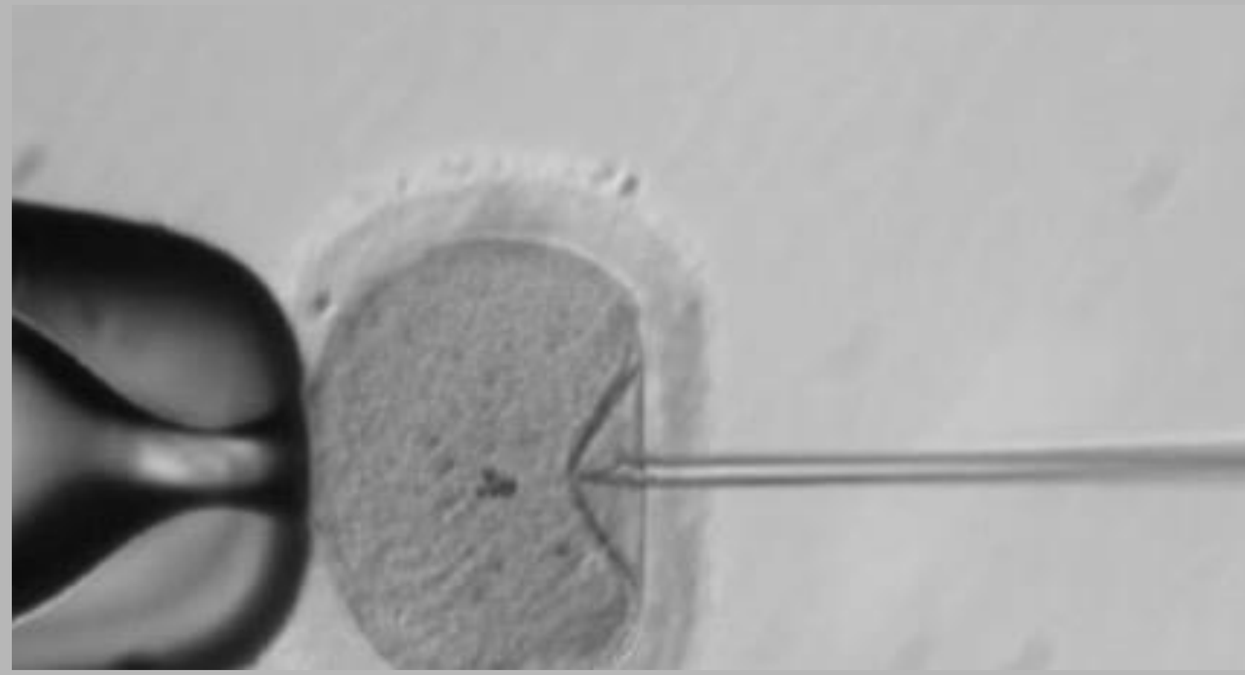
MIT Technology Review

Rewriting Life

First Human Embryos Edited in U.S.

Researchers have demonstrated they can efficiently improve the DNA of human embryos.

by Steve Connor July 26, 2017

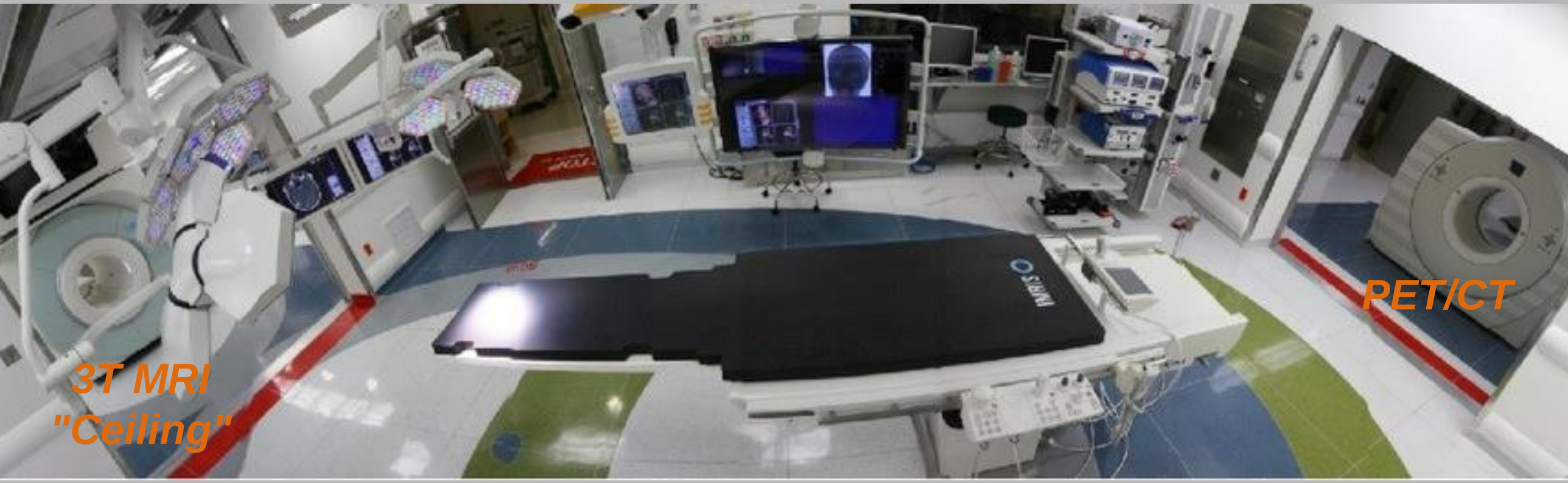


Please consider MORAL, ETHICAL and LEGAL implications on that and other technologies!

PERSONAL CHALLENGES

THERAPY MATCHING DIAGNOSTIC CAPABILITIES + EQUAL OPPORTUNITIES

Will these devices be the ones that benefit everyone?



Advanced **M**ultimodality **I**mage **G**uided **O**perating (**AMIGO**) SUITE -- **National Center for Image Guided Therapy**

Is this the FUTURE in Healthcare?

Will these devices be the ones that benefit everyone?

Performance: (1 + 1) > N.A. (1.5?)

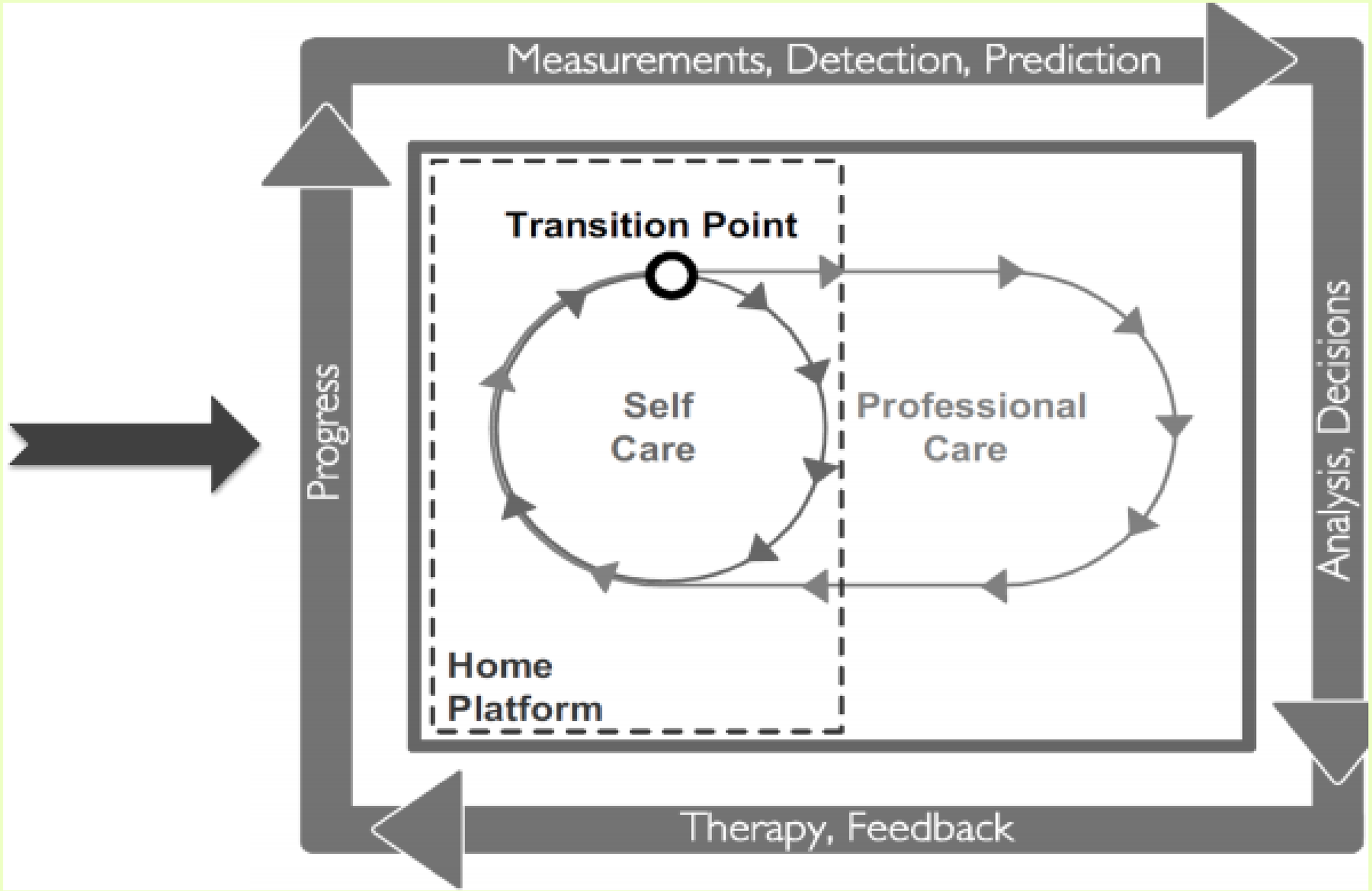
Cost: (1 + 1) = 6!

Gene Saragnese, CEO Imaging at Philips Healthcare, says:

> *"This is an exciting development that could benefit many current and future cancer patients. Cancer is a major global disease that we hope to control with more targeted treatments. MRI is emerging in oncology applications because of its excellent real-time 3D visualization of soft tissue. Together with our partners, all leaders in radiation therapy delivery, we are convinced that the integrated MRI-guided radiation therapy system has the potential to become a game changer in cancer care on a global scale."*

Niklas Savander, President and CEO of Elekta, also has high expectations:

> *"We expect that high-field MRI-guided radiation therapy will become the standard of care within the next 10 years."*


Measurements, Detection, Prediction
Analysis, Decisions
Therapy, Feedback
Progress
Transition Point
Self Care
Professional Care
Home Platform

Development Advice

HACKERNOON SPONSORED BY PubNub

Large companies fail to innovate because they're great at what they do. But they're not organized to develop and distribute the latest technology.

The Thought Process Behind Startup Ideas
Quora

FAST COMPANY

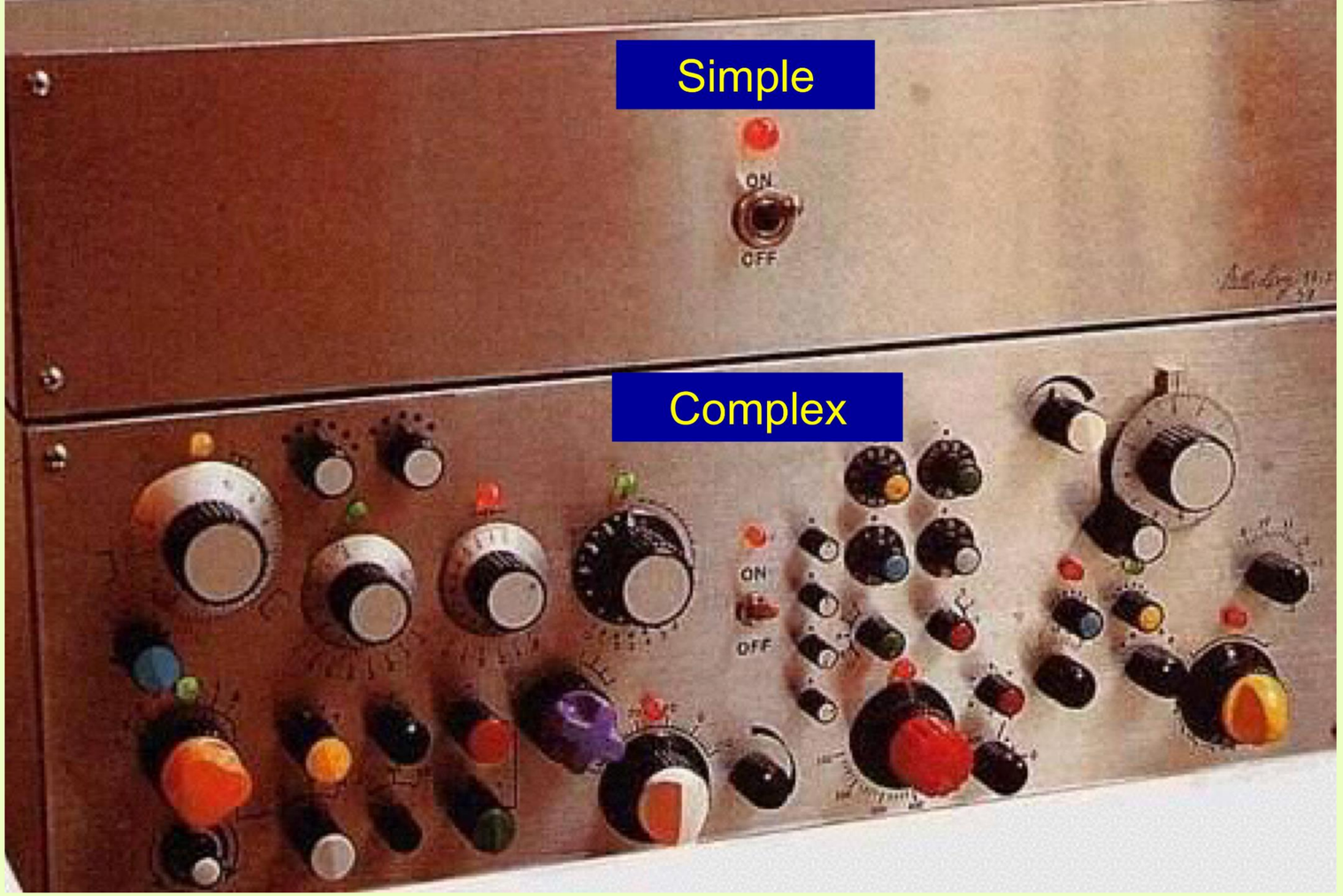
Clayton Christensen's theory of disruptive innovation highlights that needs are often left unmet not because they can't be met, but because the incumbents have been innovating at the high end of the market, chasing ever larger margins. It is the role of the disruptor, then, to meet the needs of those who have been ignored–and steal market share from the incumbent.

We Need Breakthrough Business Models, No..
Fast Company

HACKERNOON SPONSORED BY PubNub

There is only one reason disruptive technologies take off, and that is because **they reduce the cost of satisfying a demand.**

The Blockchain Revolution in 3 Easy Steps
Robert Clark



Future Development Goal (should be):

Effective, Cheap, Easy to Use, Small Footprint, Intelligent, Digitized and Connected (IoT), Robust / Transportable, Scalable

Easy MRI Contrast Media Injector

Issues:

- Weight - 30kg+
- Not fully MR compatible
- Battery backed drive

Lead to -- Hydraulic Drive

Did NOT look at:

- Complexity
- Cost
- Handling

COST: € 20.000

DISRUPTIVE:

€ 20?

€ 200?

NESPRESSO Concept Contrast Media Injector

NESPRESSO Concept Contrast Media Injector

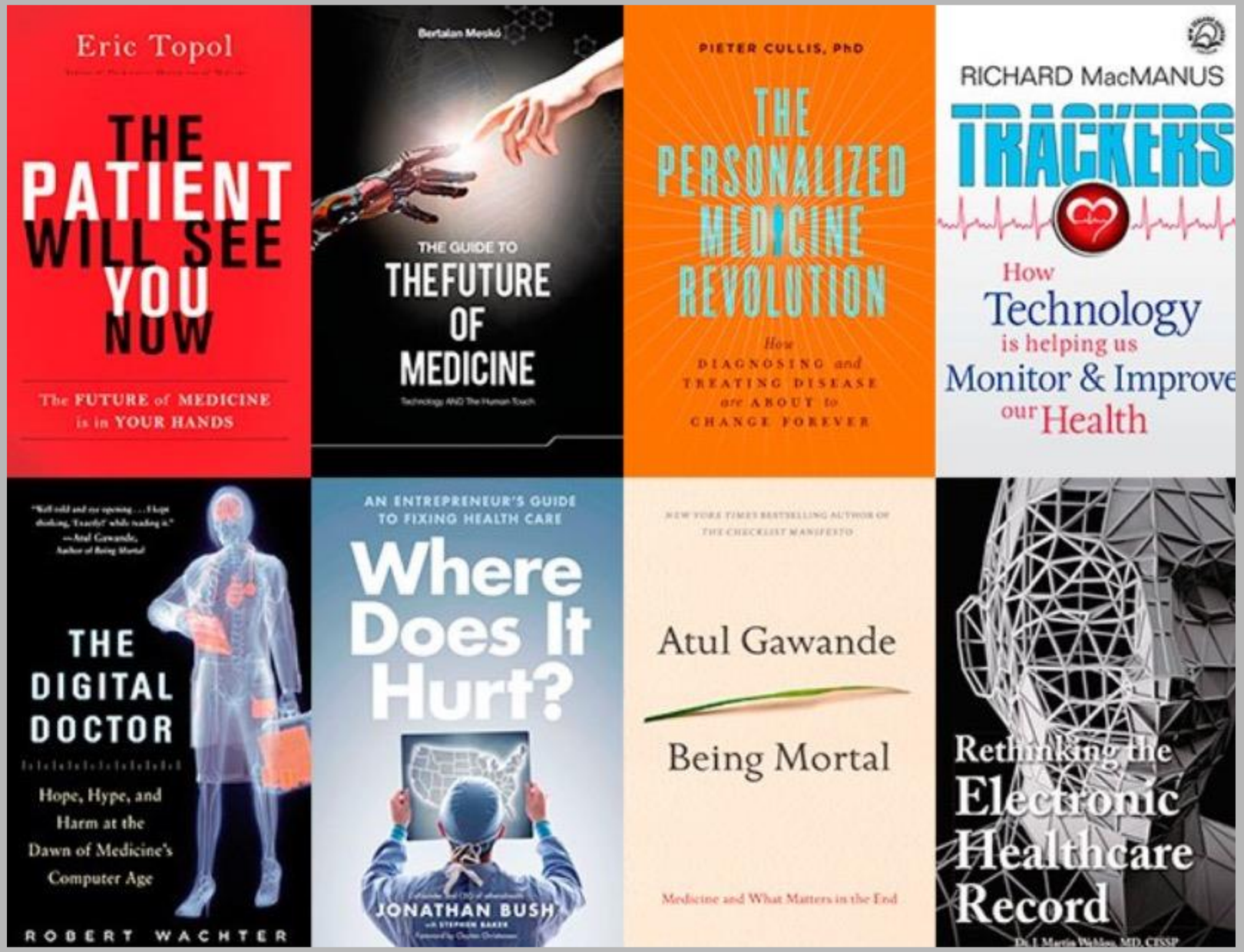
SUMMARY I

- **Developments — even in Healthcare and Medical Technology — will be faster than you can imagine („exponential“)**
- **Move to *HOMECARE, PREVENTION, and TELESERVICES* will come and need dedicated tools and services — Entreprenuerial Activities Neeed**
- **Adaptation will be slow due to regulatory issues — *Is this Good or Bad?***
- **Digitization and mobile accessability will change Healthcare delivery dramatically in the next decides**

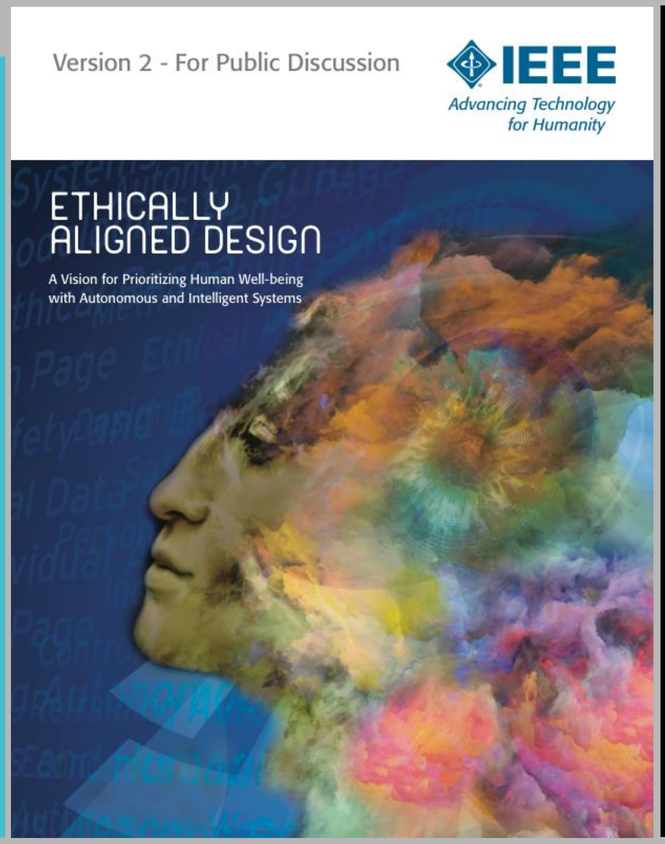
SUMMARY II

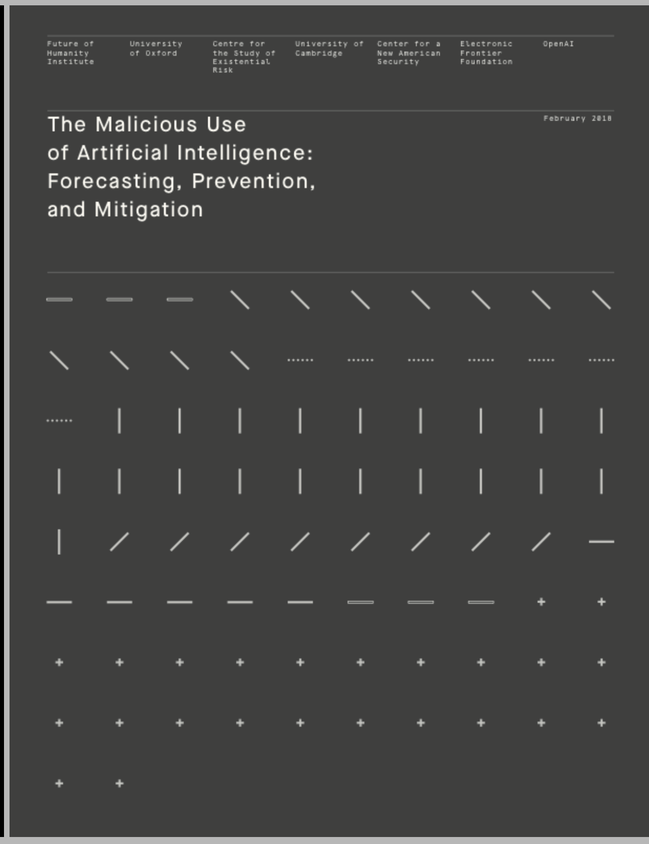
- **University Education and interdisciplinary academic development efforts need to be revised to reflect the changes — *do we need PHD‘s in the Future? And If, how many and how long should it take?***
- **Research (at least most of it) cannot continue to work in PHD timing schedules — *see above!***
- **We are very often developing too complex … rather than to completely rethink processes and goals we add — think 10x rather than 10% — have a *MOONSHOT and think DISRUPTIVE***

HEALTHCARE FUTURE - LITERATURE



HEALTHCARE ETHICS





1.

http://ec.europa.eu/research/ege/pdf/ege_ai_statement_2018.pdf

2.

Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems, Version 2. IEEE, 2017. http://standards.ieee.org/develop/indconn/ec/autonomous_ systems.html.

3.

https://more.su.org/mfg-report.html

4.

https://arxiv.org/abs/1802.07228

https://www.technologyreview.com/s/609048/the-seven-deadly-sins-of-ai-predictions/

https://medium.com/mit-technology-review/the-great-ai-paradox-441da8f8747c

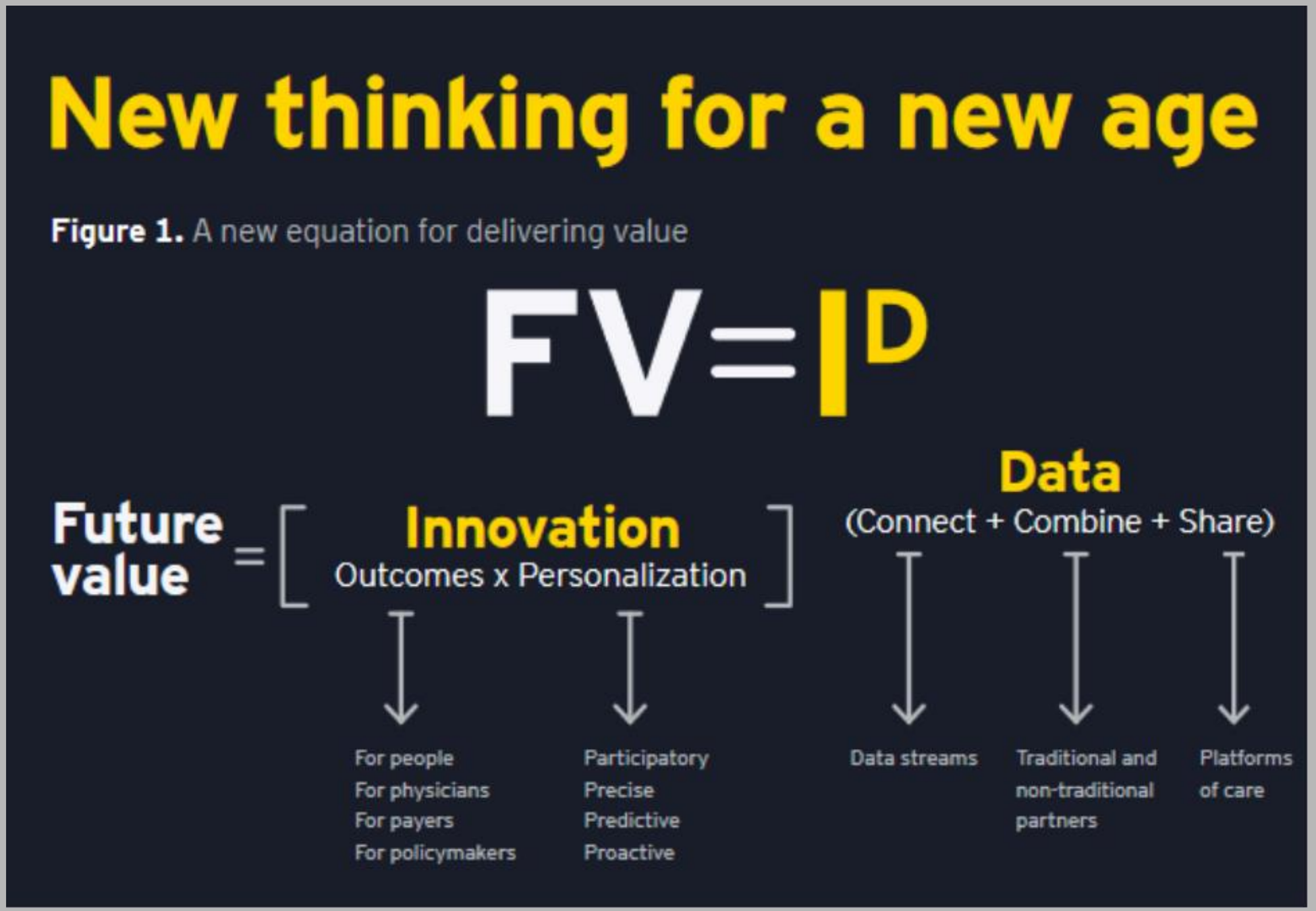
MEDTECH — Innovation Generation, Disruption and Exponential Technologies

http://www.healthcare-innovation.de/wp-content/uploads/2017/08/BME-IDEA-Buch_final-1.pdf

Michael Friebe

New thinking for a new age

Figure 1. A new equation for delivering value



PREDICTIONS

2018: Quantum Supremacy Achieved: The first demonstration of a quantum computation that can't be simulated with classical supercomputers is announced.
2020: Flying car operations take off in a dozen cities in the world.
The 5G Network unleashes 10 – 100 Gigabit connection speeds for mobile phones around the world.
2022: Robots are commonplace in most middle-income homes, able to reliably read lips and recognize face, mouth and hand gestures. All toys are "smart" with built-in machine learning.
2024: The first private human missions have launched for the surface of Mars. The first "one cent per kilowatt-hour" deals for solar and wind are signed.
2026: Car ownership is dead and autonomous cars dominate our roadways. 100,000 people commute by VTOL each day in each of L.A., Tokyo, Sao Paulo and London.
2028: Solar and wind represent nearly 100% of new electricity generation.
Autonomous, electric vehicles account for half of all miles driven in large city centers.
2030: AI passes the Turing test, meaning it can match (and exceed) human intelligence in every area.
Humanity has achieved "Longevity Escape Velocity" for the wealthiest.
2032: Medical nanorobots demonstrated in humans are able to extend the immune system.
Avatar Robots become popular, allowing everyone the ability to "teleport" their consciousness to remote locations all over the world.
2034: Companies like Kernel have made significant, reliable connections between the human cortex and the Cloud.
Robots act as maids, butlers, nurses and nannies, and become full companions. They support extended elderly independence at home.
2036: Longevity treatments are routinely available and covered by life insurance policies, extending the average human lifespan 30 – 40 years.
2038: Everyday life is now unrecognizable - incredibly good and hyper VR and AI augment all parts of the world and every aspect of daily human life.

Dr. Peter Diamandis, www.a360.digital

Longevity Escape Velocity

Gaining more lifetime through technology than you loose

MOST IMPORTANT GOAL

Stay alive for at least another 15-20 years to benefit from the new HC developments

... and lets hope that there are no crazy politics/politicians in our way!

THANK YOU FOR LISTENING!

Prof. Michael Friebe — michael.friebe@ovgu.de