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General Public Release

Technology and the Future of Insurance

Yossi Sirote, June 2018

Now is the Best Time to Live

The Better Angels of Our Nature - Steven Pinker

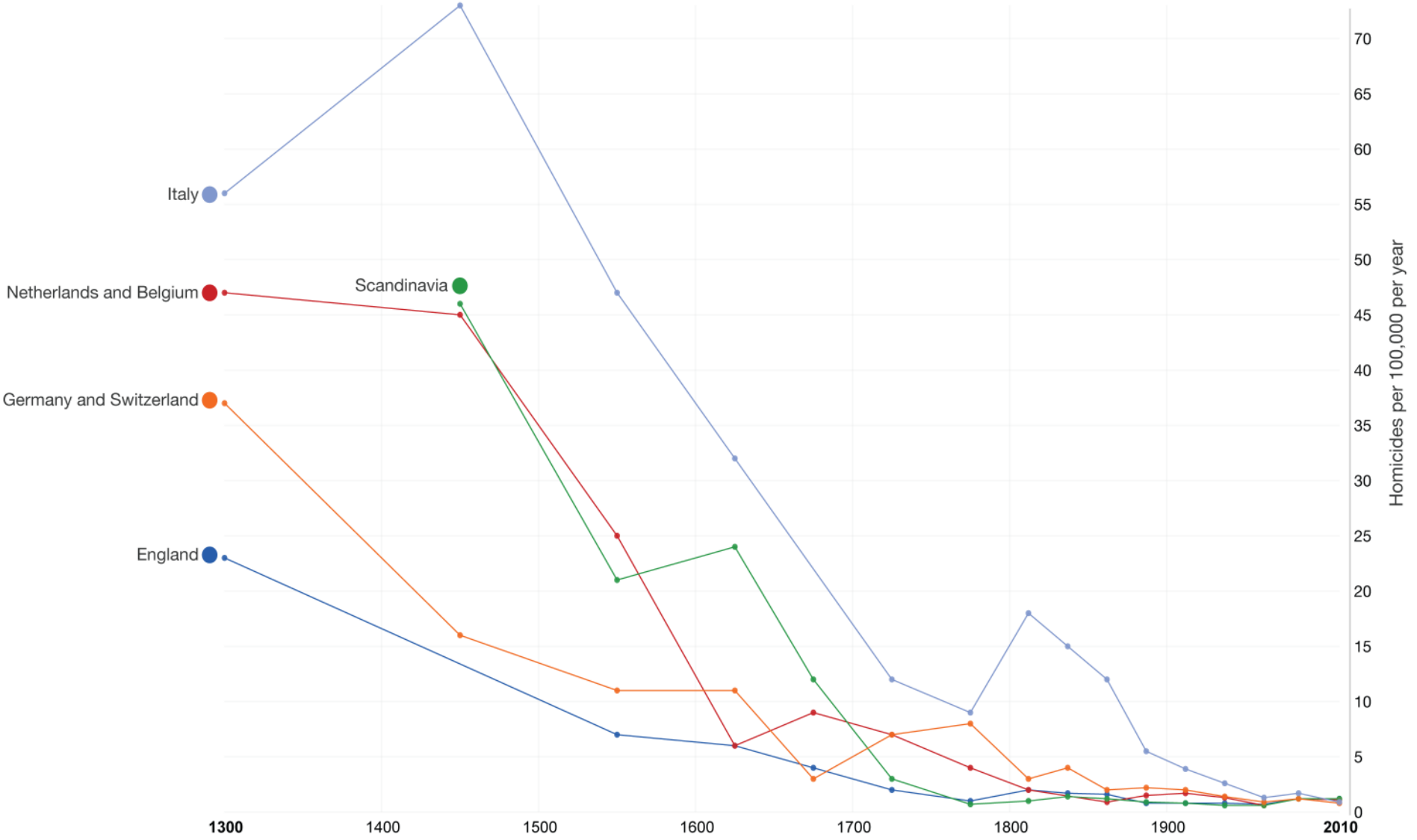
		1900	1980	2017
HEALTH	1. Life Expectancy	32	63	71.5
	2. Infant Mortality	19.5%	7.64%	3.05%
ECONOMICS	3. GDP Per Capita	$2000	$6000	$11,700
	4. % In Extreme Poverty	68.7%	42.6%	10.7%
EDUCATION	5. Literacy Rate	42%	70%	86%
	6. Internet Access	0%	0%	51%

http://startupguide.com/tag/the-world-is-getting-better/
http://www.who.int/gho/mortality_burden_disease/life_tables/situation_trends/en/
http://www.who.int/gho/child_health/mortality/neonatal_infant_text/en/
http://blogs.worldbank.org/developmenttalk/2017-global-poverty-update-world-bank
https://en.wikipedia.org/wiki/Global_Internet_usage
https://en.wikipedia.org/wiki/List_of_countries_by_literacy_rate

Our World in Data

Homicide rates in Europe since 1300

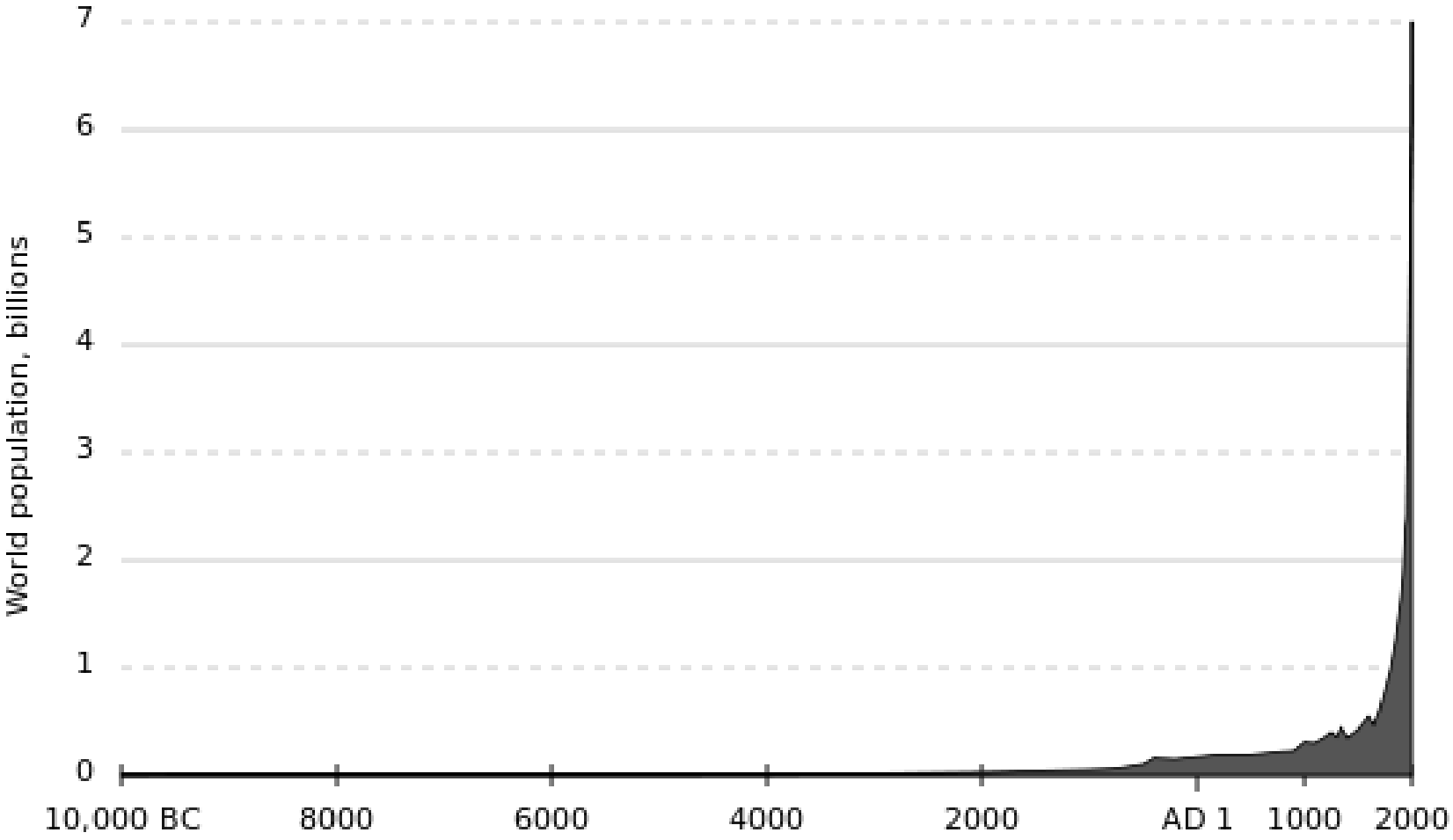
The observations are plotted at the midpoint of period they refer to.



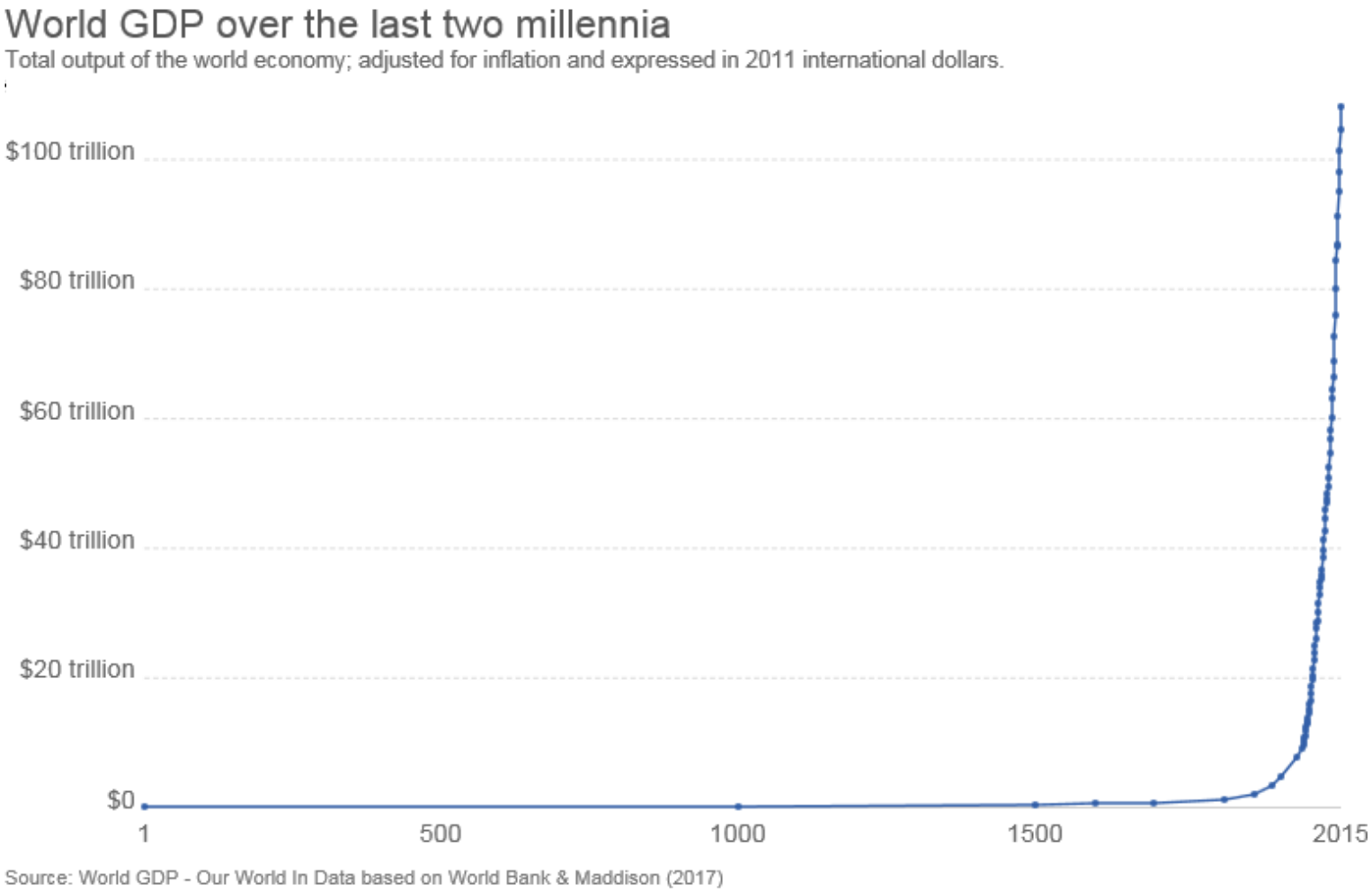
Data source: All but 2010 from Eisner (2003) – Long-Term Historical Trends in Violent Crime. In Crime and Justice, 30, 83–142. 2010 from UNODC Homicide statistic 2012.

The interactive data visualization is available at OurWorldinData.org. There you find the raw data and more visualizations on this topic.

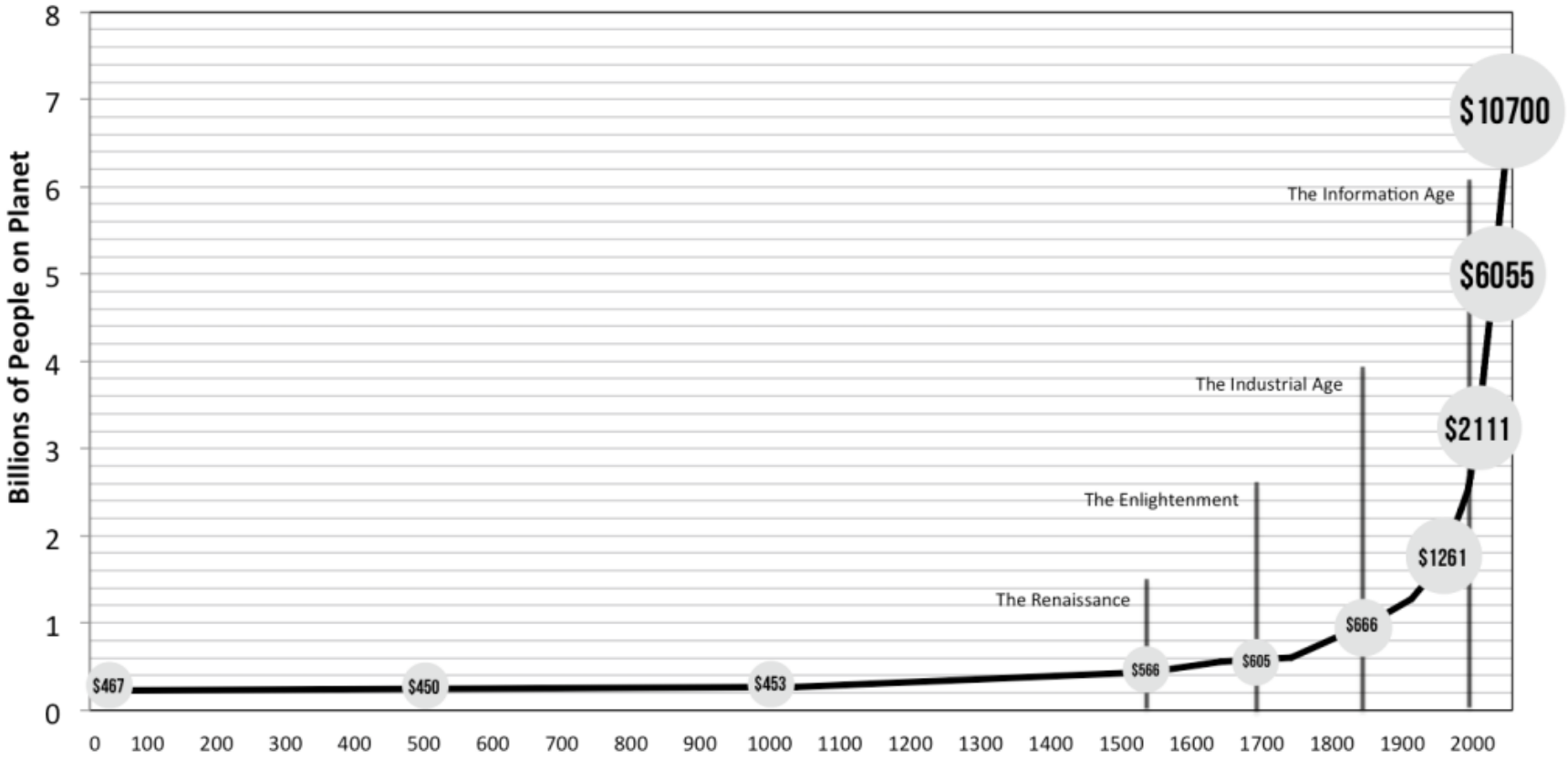
World Population Explosion

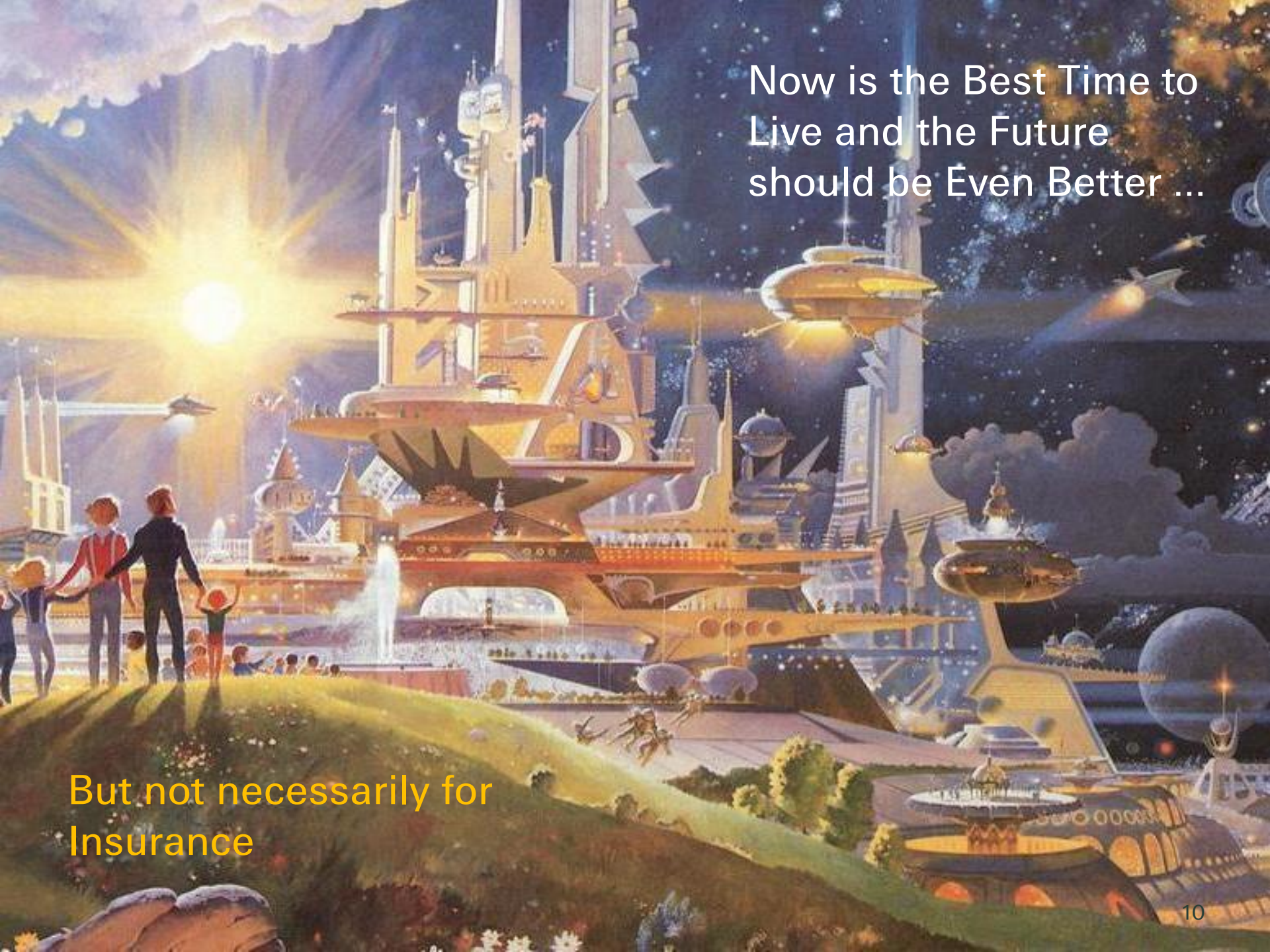


World GDP Explosion



World GDP per Capita Growth

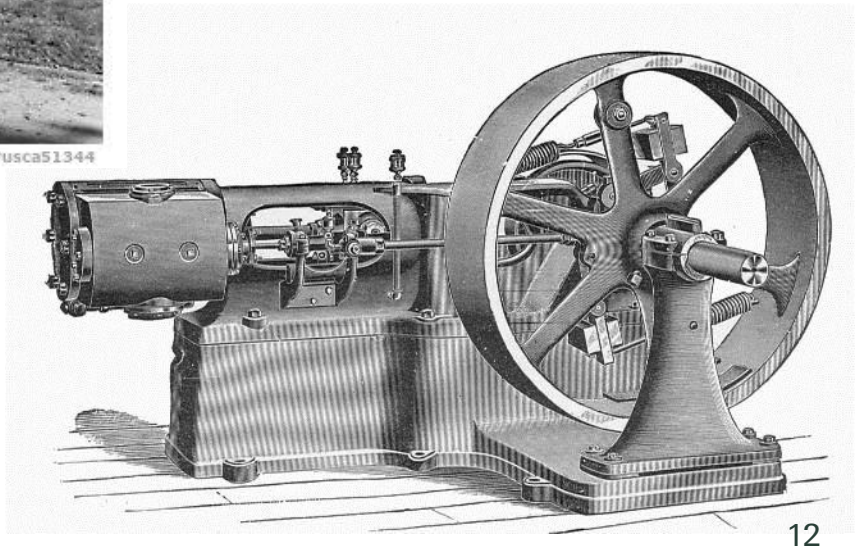



Now is the Best Time to Live and the Future should be Even Better ...
But not necessarily for Insurance

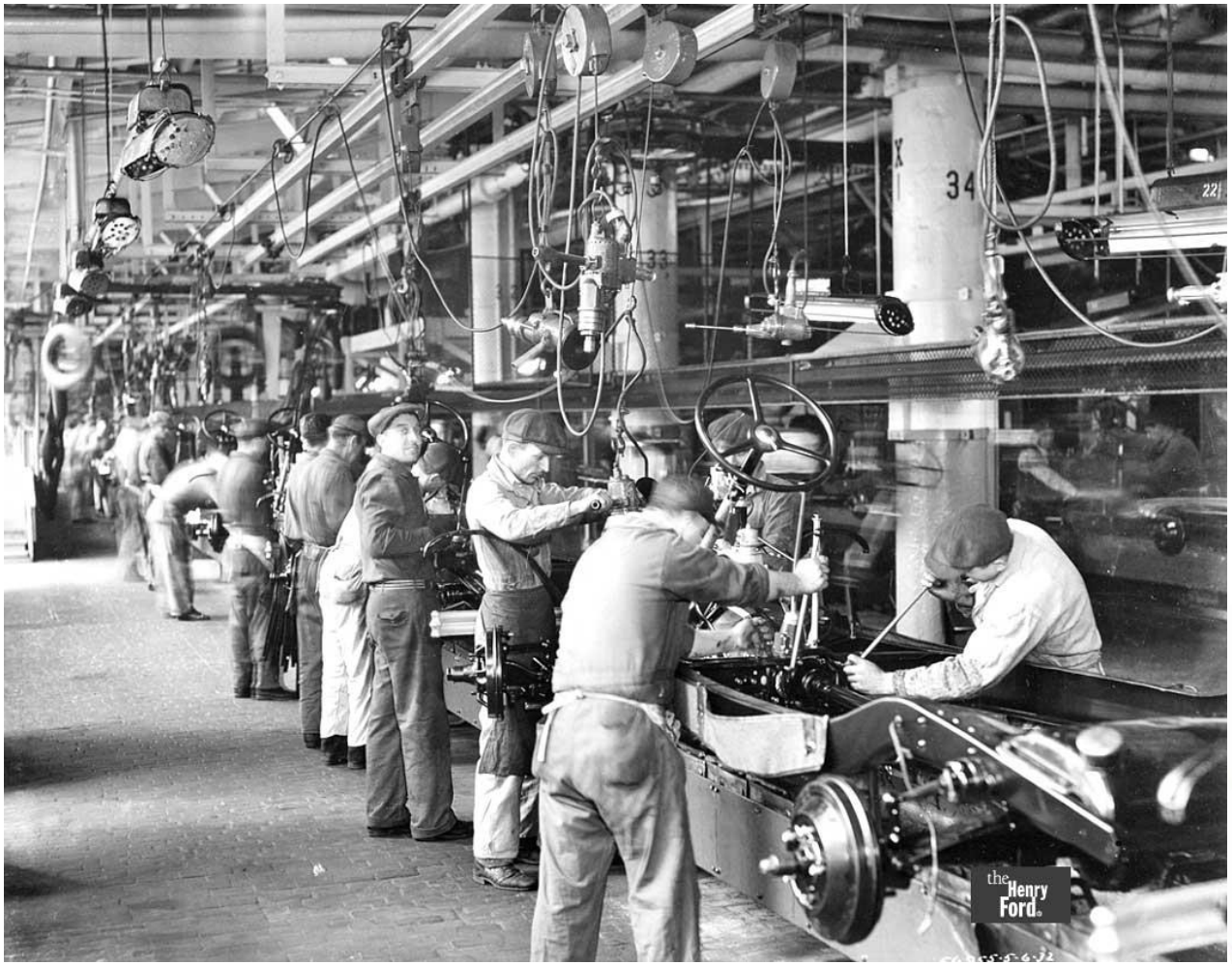
The Fourth Industrial Revolution

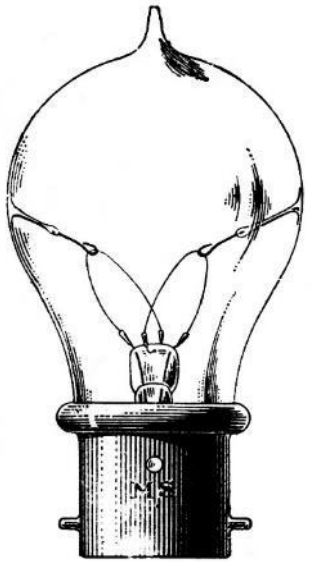
https://en.wikipedia.org/wiki/Fourth_Industrial_Revolution
https://trailhead.salesforce.com/en/modules/learn-about-the-fourth-industrial-revolution/units/meet-the-three-industrial-revolutions

The First Industrial Revolution (1760-1840): The Age of Mechanical Production

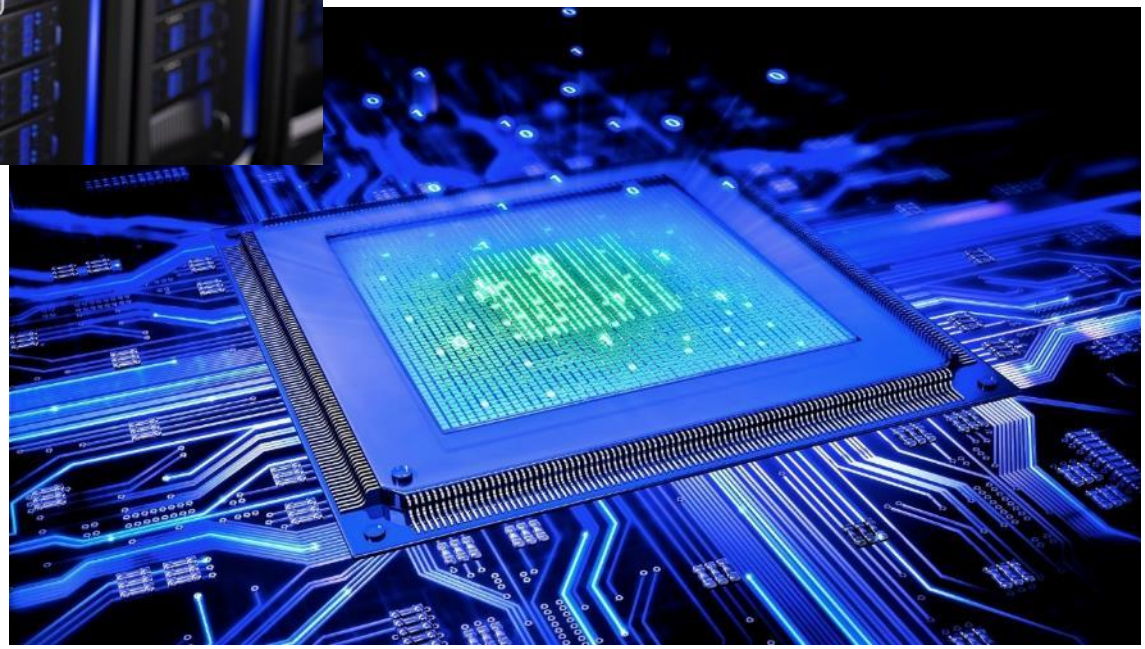


The Second Industrial Revolution (1870-1914): The Age of Science and Mass Production





The Third Industrial Revolution (1960-2000): The Digital Revolution




The 4th Industrial Revolution
Digitalisation
Ability to convert objects into digital representations
Computational power
Ever increasing & affordable computational power
Ubiquitous connectivity
Widespread, state of the art broadband connectivity
Real time access
Instant access to knowledge and talent
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Fundamental impacts from technology on main (Re)insurance drivers

COST	Systematic process automation, better data interfaces
GROWTH	Data driven acquisition & services, New ecosystems & models
RISK	Personalised, predictive & preventive, new risk pools access

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*Source: * PWC 2017 Insurance CEO survey*

Insuring the 4th Industrial Revolution

Technological advancements
(e.g. internet of things, cognitive computing, blockchain)

Implications for the industry

1 **Change of risk pools**

2 **Automation**

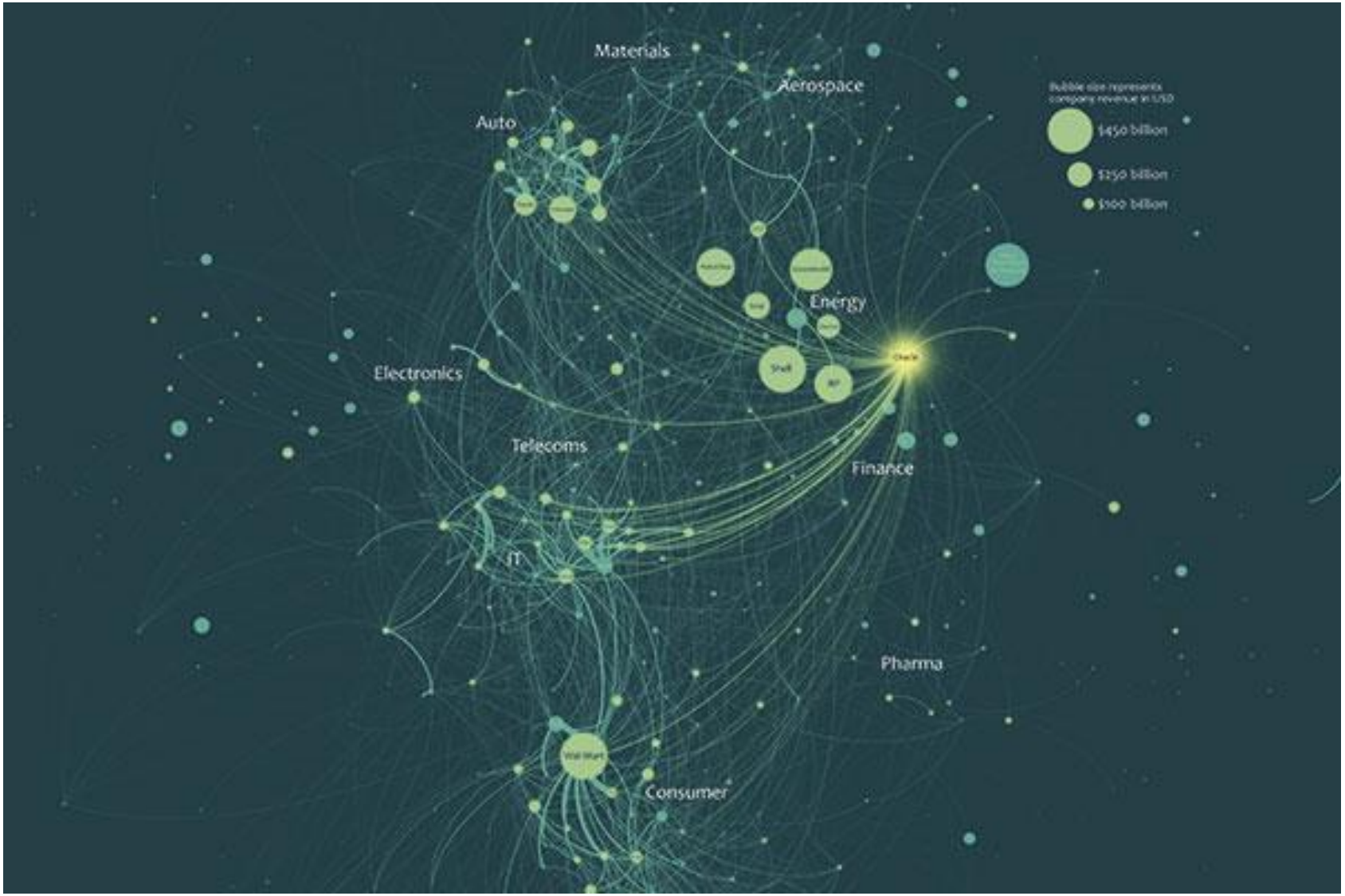
3 **Disruption of industry structure**

Catalysts / Inhibitors
(e.g. technological diffusion, regulation, consumer, competitors)

New Insurance Opportunities

Cyber Insurance

Cyber Accumulation Risk

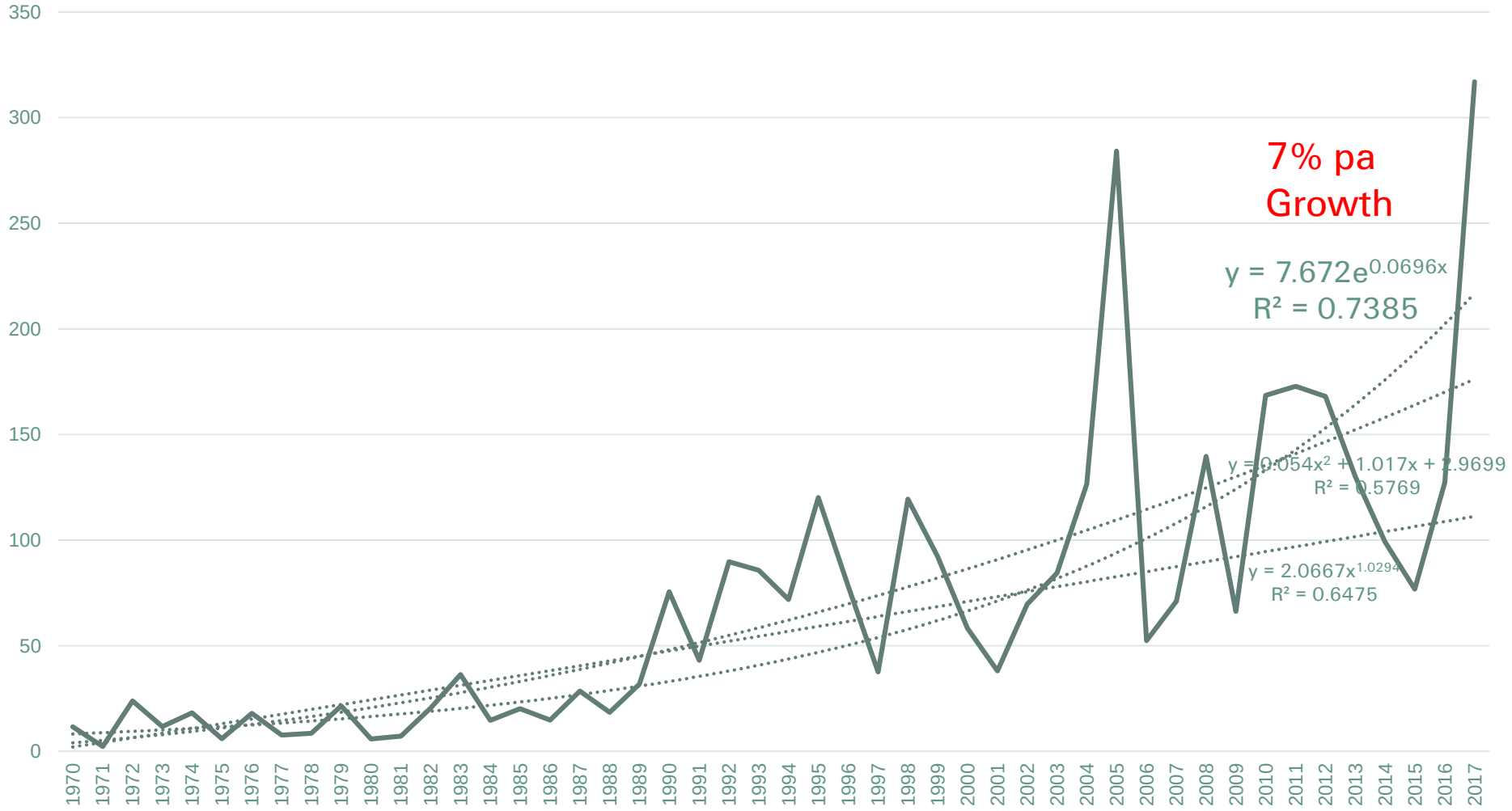


Other insurance correlated with Cyber Insurance

Cyber Catastrophe

Extreme Weather Insurance

Extreme Weather

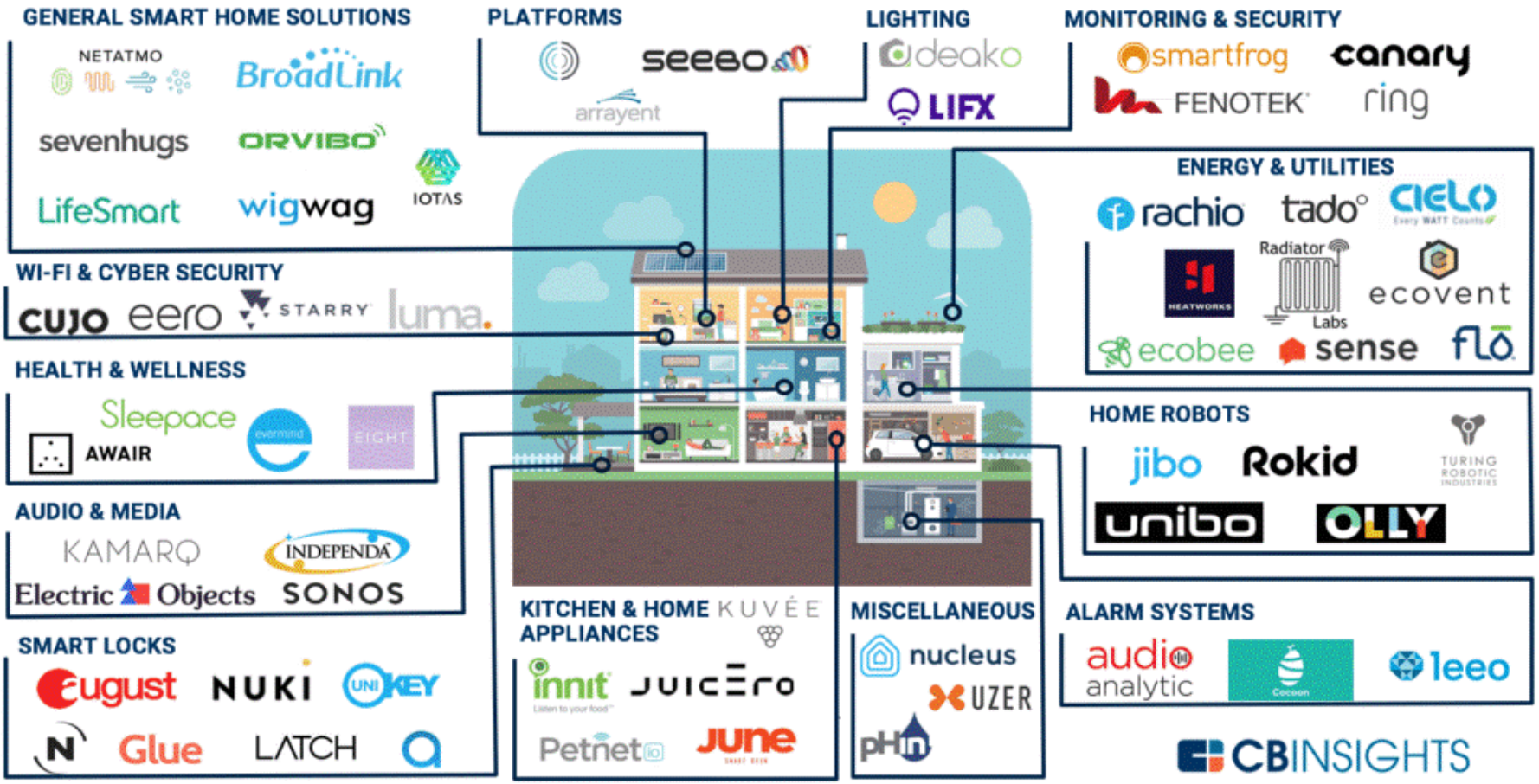


Weather related – Total, by Amount
Source: Swiss Re Institute, Sigma world insurance database

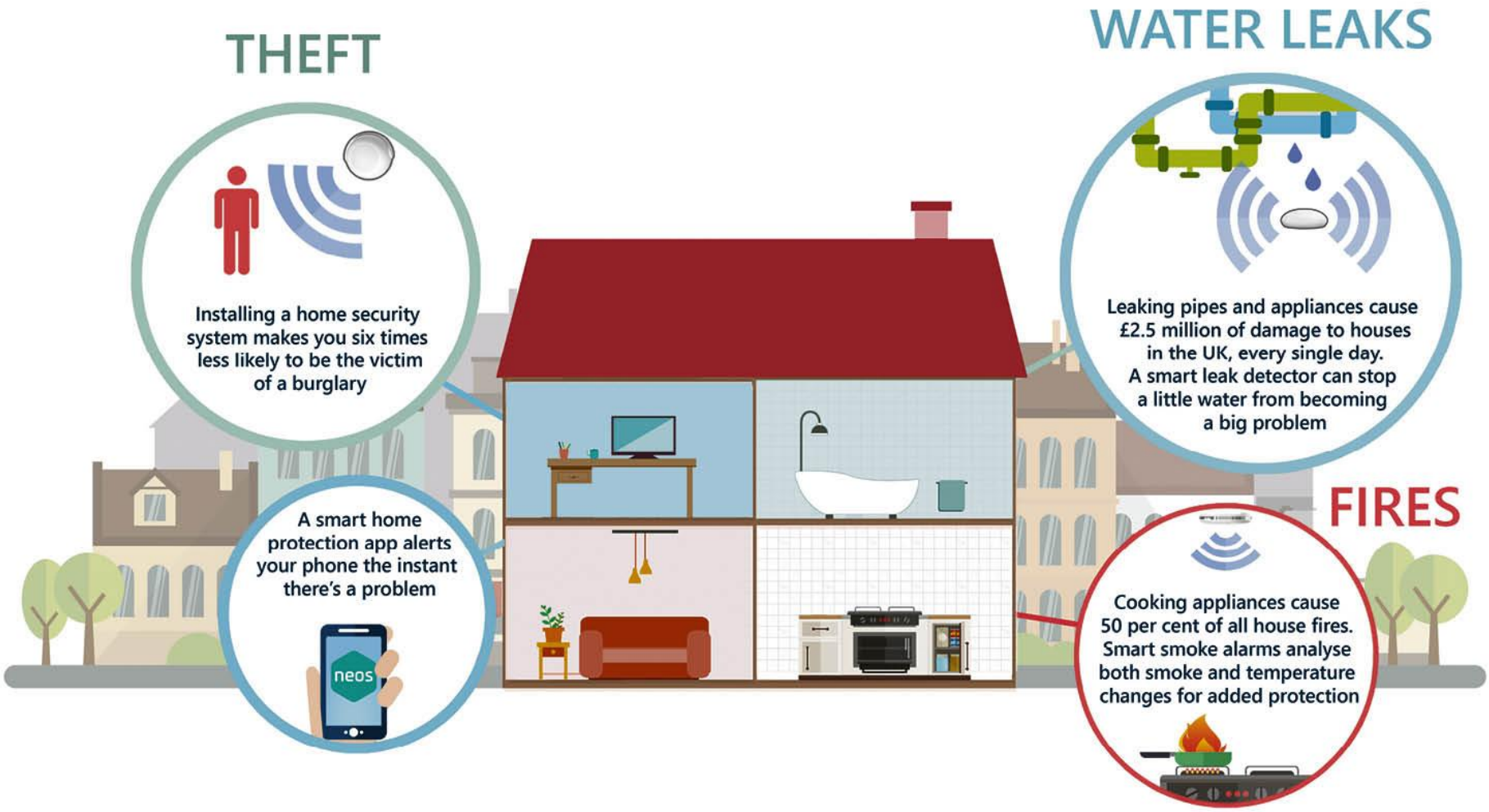
Property

Context is Everything

Smart Homes are emerging



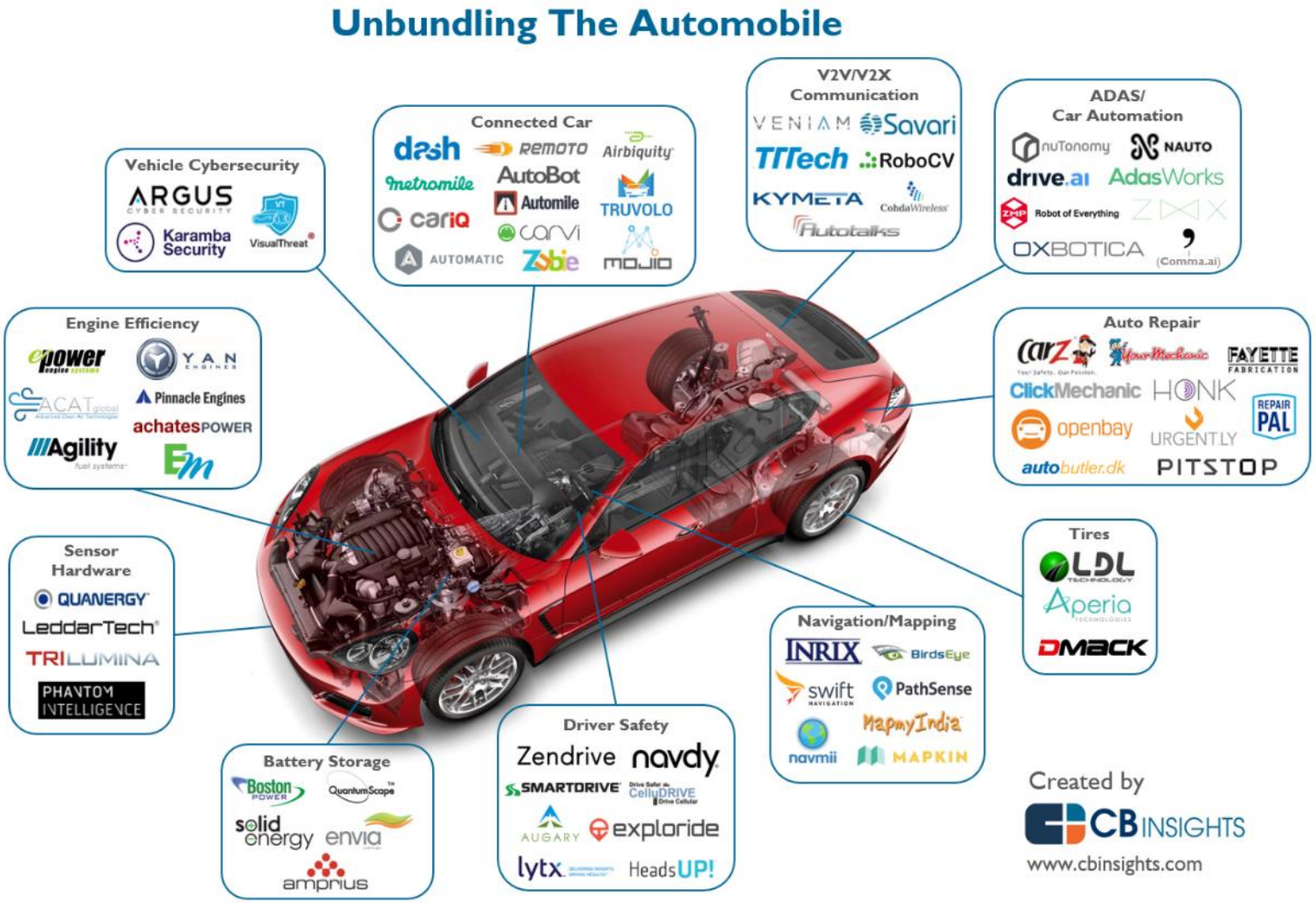
Smart How Guarantee ➔ Insurance



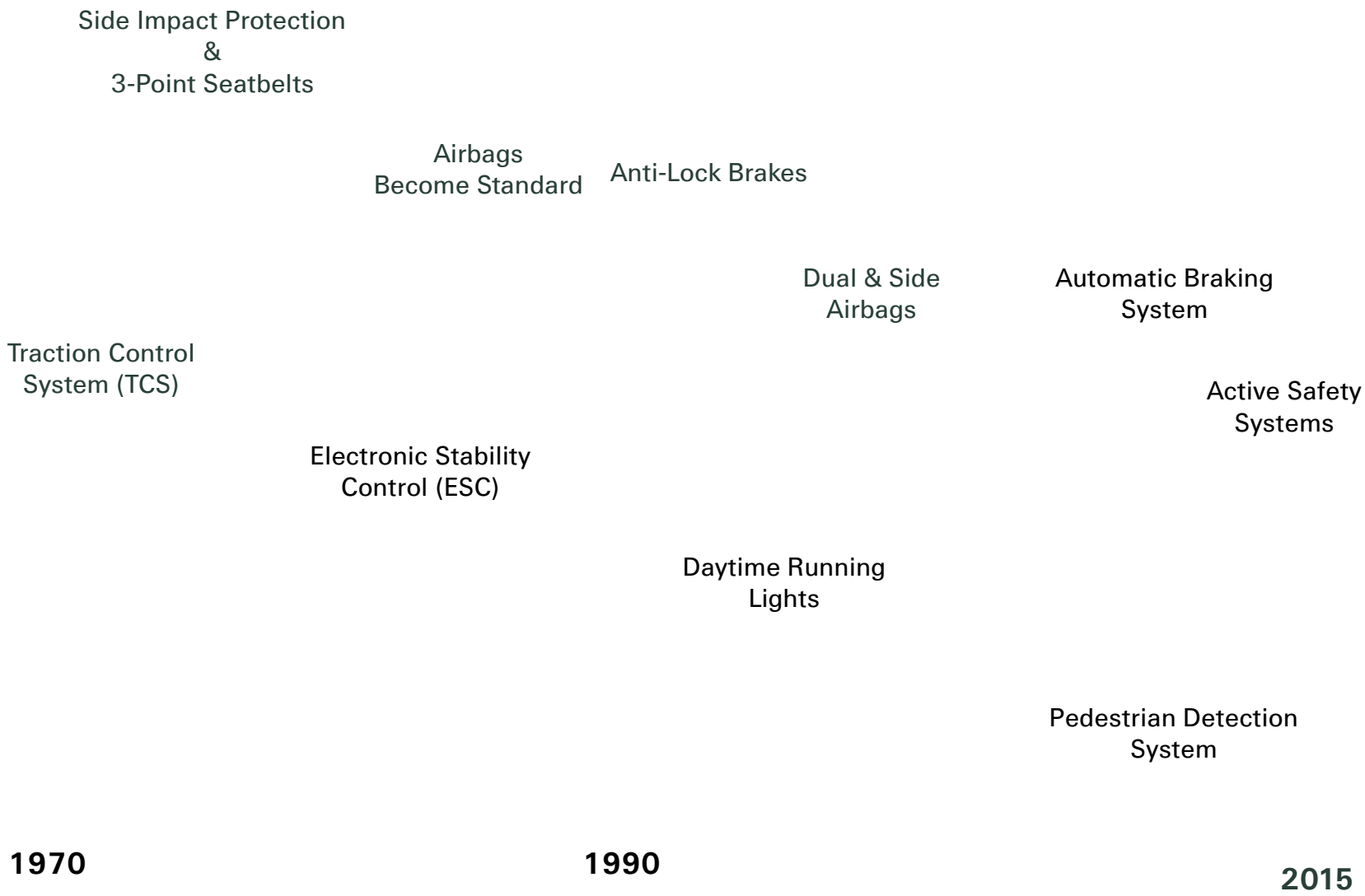
https://www.raconteur.net/sponsored/smarter-home-insurance
https://neos.co.uk/

Casualty
Motor

Autotech is not only Autonomous Vehicles



Innovation in Automotive Safety
1970-2015



Source: https://en.wikipedia.org/wiki/List_of_motor_vehicle_deaths_in_U.S._by_year

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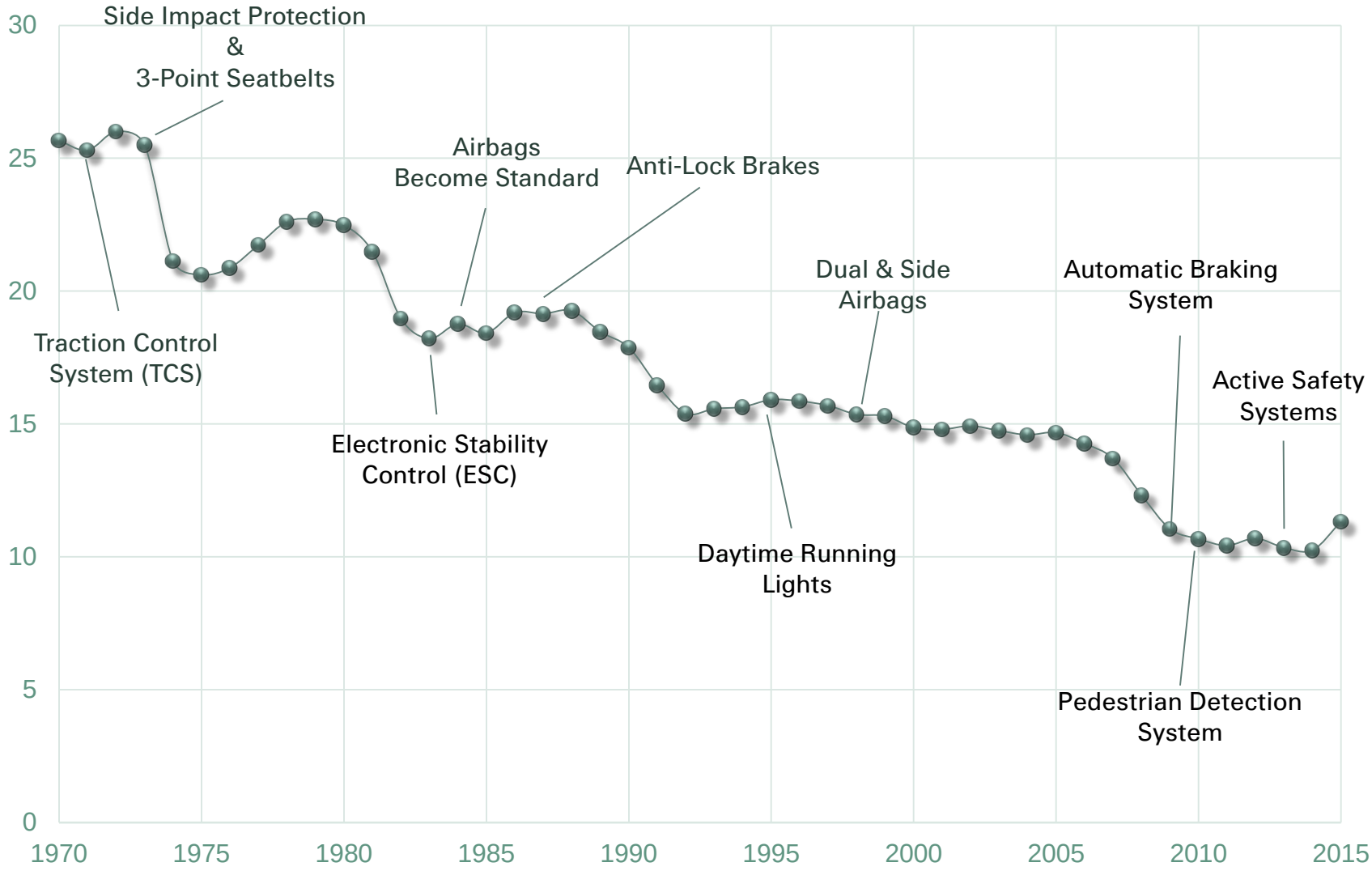
Annual Death Rate from Motor Vehicle Accidents

Per 100,000 Per Annum

1970-2015



Source: https://en.wikipedia.org/wiki/List_of_motor_vehicle_deaths_in_U.S._by_year

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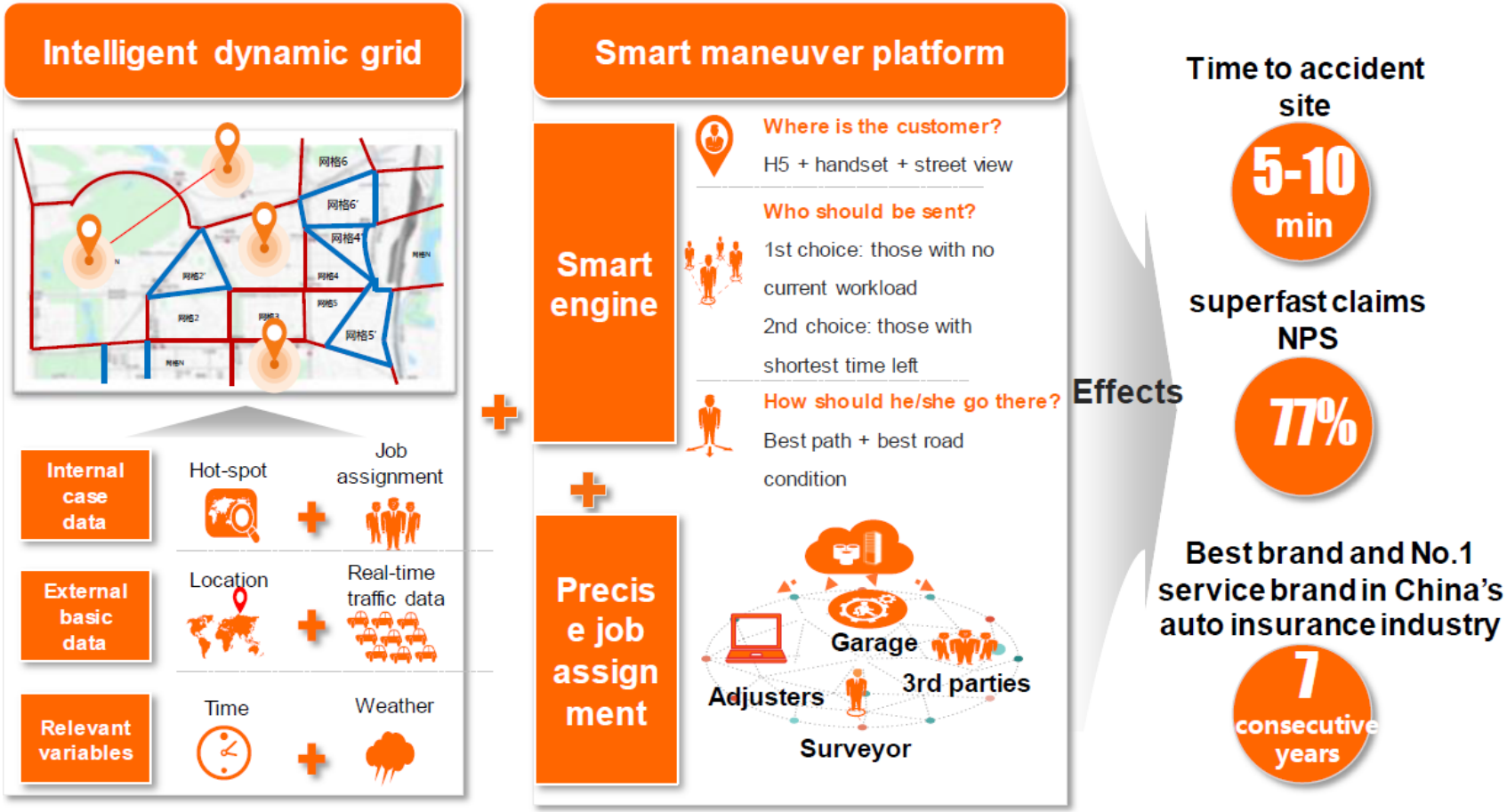
Ping An – Motors automated claims

✓ Use image recognition and remote video tech to automate investigations via real-time, dynamic and intelligent grid-based management (32M daily active users, 100k garages)



Source: Ping An Investor day 2017

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Ping An – Motors automated claims

✓ Developed world leading image recognition loss verification technology (1b claims photos)

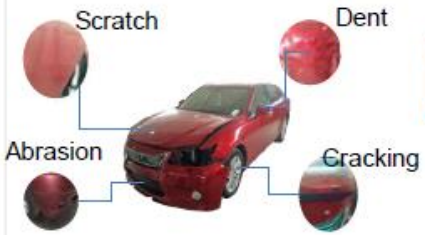
Image-based loss verification

①Smart vehicle type recognition
- 100,000+ pictures for recognition of vehicle type

②Image flow cleaning
- Fuzzy reminder and PS recognition

③Part division and grouping
- 100,000+ pictures for each part
- Covering 100% of visible parts

④Automatic identification of loss extent



⑤Automatic precise pricing

Covering
- 85% of spare parts
- 98% work hour items
- Local prices at 42 institutions across the country

⑥Intelligent anti-leakage
- 500+ risk factors
- 30000+ risk rules
- 100+ risk models
- 85% prevention rate of anti-leakage rules
- 60% prevention rate of anti-fraud rules

Effects

Loss verification accuracy

92%

One-click loss verification

Within seconds

Source: Ping An Investor day 2017

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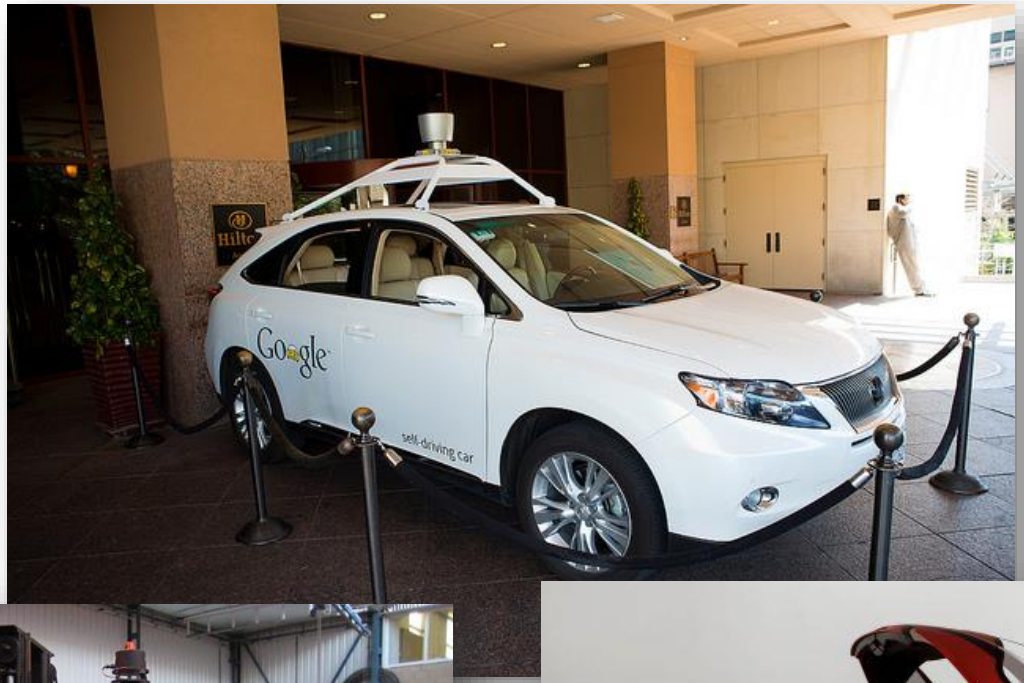
Short to Mid Term

- Telematics
  - 15x increase in telematics-based premium volume is expected by 2025. That's equivalent to 1/6 of today's worldwide motor premium volume.
- User Based Insurance (UBI)
- Driver and Driverless on Road at same time

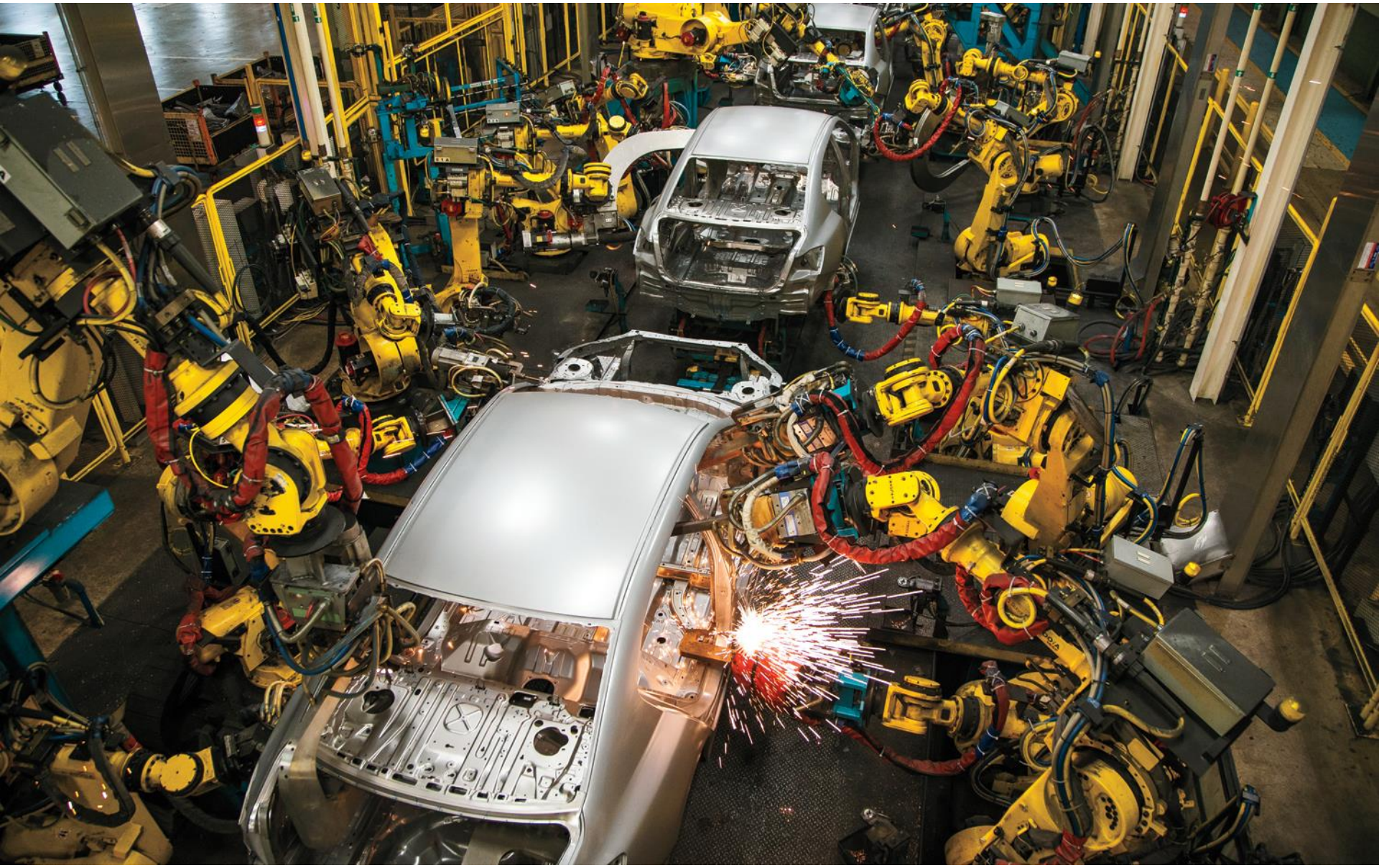
- 10 Years → Fully Autonomous Driving Cars on the Road
- 20 Years → 25% Cars Self Driving
- 50 Years → Illegal for Humans to Drive

Driverless Cars: Transformative Technology
Impacting All Industries




GM's EN-V

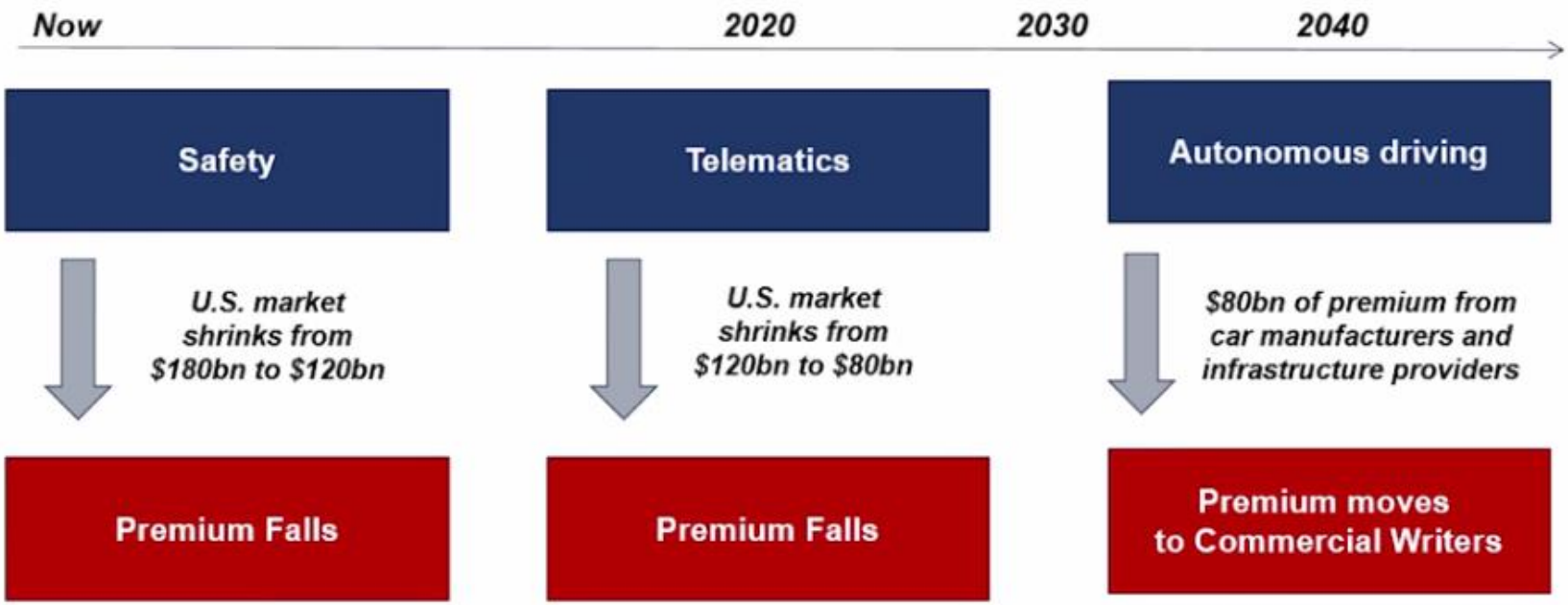
Original Equipment Manufacture



Self Driving Cars Don't Need Insurance

*We are investigating telematics and **broadening the value proposition for the connected customer**. If we are not effective in anticipating the impact of changing technology, including automotive technology, our ability to successfully operate may be impaired.*

- Allstate (currently $18bn of auto DPW, 66% of total premium)



Willis Capital Markets & Advisory

The Insurance Industry Experts

New York | London | Hong Kong | Sydney

Motor Accounts for 45% of P&C Premiums Worldwide
60% in Israel

Health


HealthTech is increasingly becoming part of our lives
68
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Disruptive Technologies with potential high impact to health outcomes

The Internet of Things

Health, ageing and chronic disease monitoring

Advanced Robotics

Robotic surgery and prosthetics

Artificial Intelligence

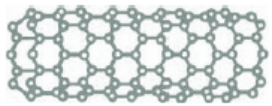
Better health outcomes with limited resources

Next-gen Genomics

Predictive health analytics

3D Printing

Organ bioprinting



Advanced Materials

Nanodrugs

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Keeping customers healthy

Source: Goqii Health

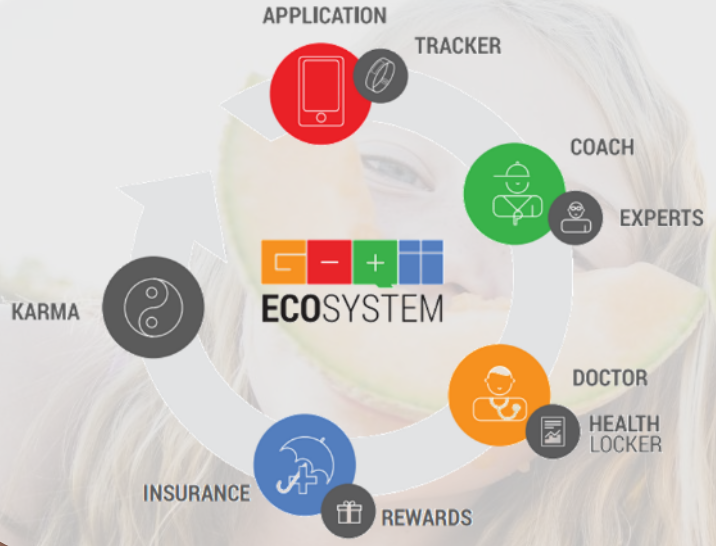
Collect
health & wellness data without being intrusive

Provide
personalised services and insights to engage on health status and prevention

Create
powerful dynamic pricing model

The Goqii Digital Wellness Platform

Through its unique coaching digital platform, Goqii, #1 wearable in India, motivate peoples to stay healthy by guiding them to make permanent shift to a better lifestyle and empower them to be the force of change.



Device-agnostic coaching app
API-based integrated app

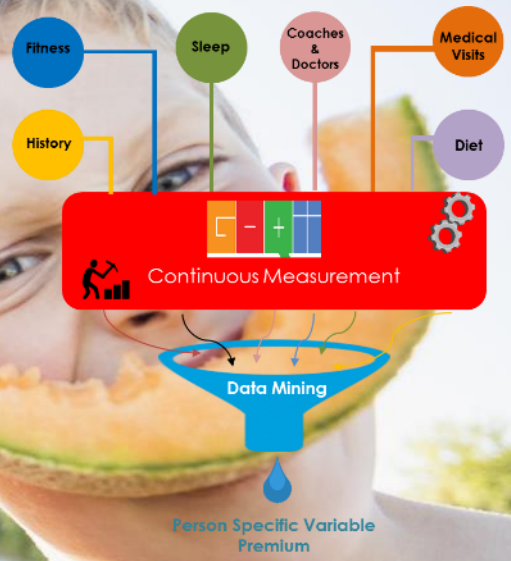
Personalized coaching
Expert Coaching done remotely

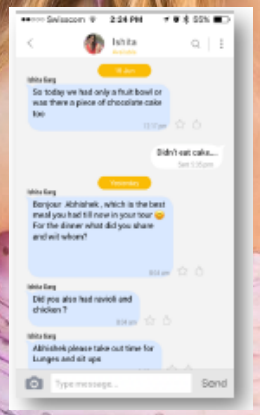
Doctor
Doctor consultation & diagnostics

Health Locker
Personal Health Records database

Insurance
Behaviour-driven Insurance benefits

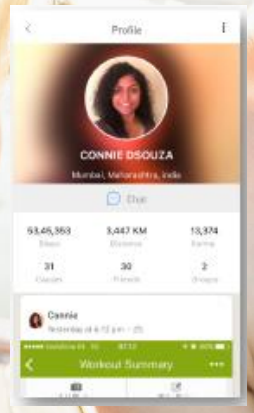
Karma
Social Giving as extrinsic motivator





Personal coach

AI food recognition



Social engagement

Source: Goqii Health

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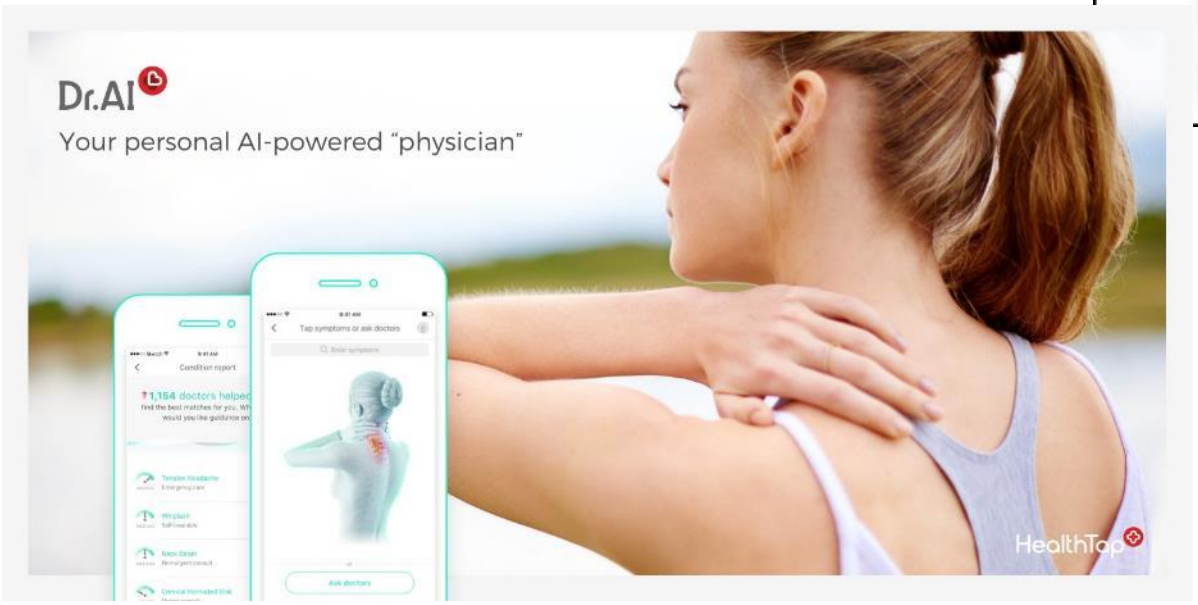
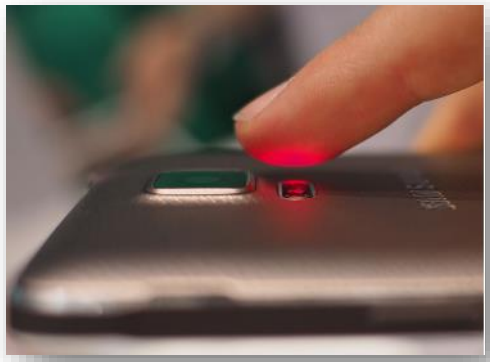
Developing Medical Technologies

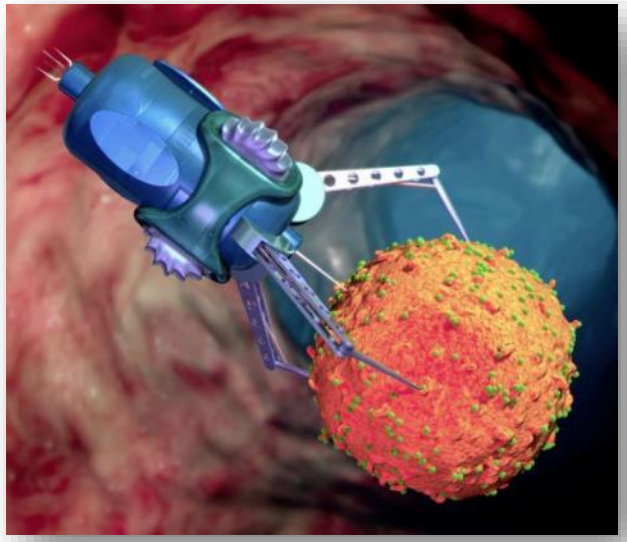
- Artificial Intelligent Doctor
- Smart Toilets



Medical Technological Innovations In Development

- Surgical & Humanoid Robots
- Genomics & Personalized Medicine
- Body Sensors
- Medical Tricorders & Portable Diagnostics
- Flying Ambulance Drones
- Nanotechnology





Life

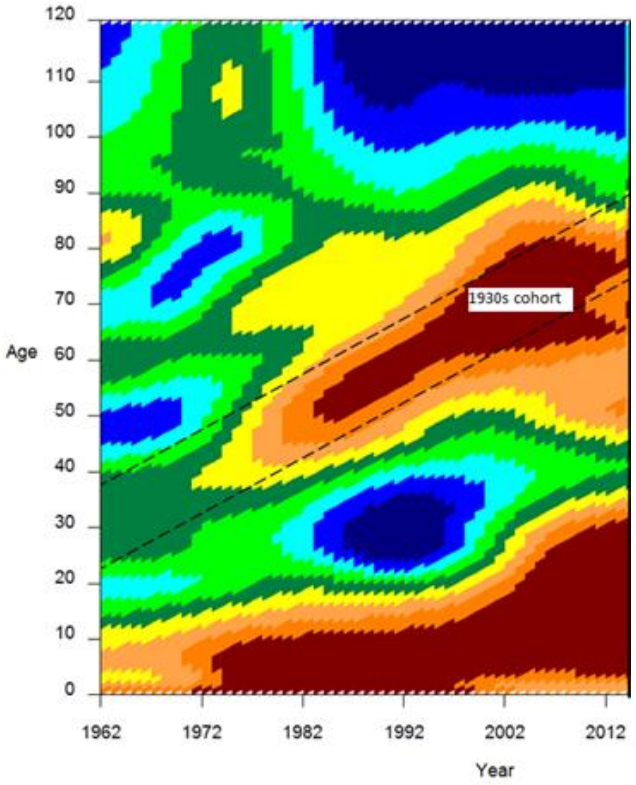
Mortality Improvements

Annualized Improvements	1940-1949 1933-1939	1950-1959 1940-1949	1960-1969 1950-1959	1970-1979 1960-1969	1980-1989 1970-1979	1990-1999 1980-1989	2000-2009 1990-1999	2010-2015 2000-2009
110+	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
105-109	0.0%	0.0%	0.0%	0.1%	0.0%	-0.1%	-0.1%	0.2%
100-104	0.0%	0.0%	-0.1%	0.3%	0.1%	-0.1%	-0.2%	0.4%
95-99	0.1%	0.1%	0.0%	0.5%	0.2%	0.0%	-0.2%	0.9%
90-94	0.2%	0.1%	0.0%	0.7%	0.5%	0.1%	-0.1%	1.4%
85-89	0.5%	0.6%	0.2%	1.0%	0.8%	0.3%	0.3%	2.1%
80-84	0.8%	0.8%	0.3%	1.2%	1.0%	0.6%	1.0%	2.2%
75-79	1.1%	1.1%	0.5%	1.3%	1.2%	0.9%	1.1%	2.4%
70-74	1.3%	1.2%	0.6%	0.9%	1.3%	1.1%	1.5%	2.6%
65-69	1.8%	1.0%	0.5%	1.3%	1.2%	1.2%	1.8%	2.6%
60-64	1.5%	1.1%	0.3%	1.3%	1.5%	1.3%	1.8%	1.9%
55-59	1.1%	1.6%	0.7%	1.1%	1.7%	1.6%	1.5%	0.5%
50-54	2.1%	1.7%	0.7%	1.4%	2.0%	1.7%	0.7%	0.8%
45-49	2.9%	2.2%	0.5%	1.1%	2.5%	1.1%	0.4%	2.1%
40-44	3.6%	2.8%	0.6%	1.1%	2.5%	0.1%	1.0%	2.8%
35-39	5.1%	3.9%	0.4%	1.1%	1.7%	-0.4%	2.0%	1.3%
30-34	5.4%	4.4%	0.5%	0.9%	0.8%	-0.1%	2.4%	-0.7%
25-29	6.2%	4.4%	0.5%	0.0%	1.0%	0.9%	1.1%	-0.1%
20-24	4.9%	4.3%	0.4%	-0.5%	1.8%	1.1%	0.7%	2.1%
15-19	5.3%	3.7%	0.3%	-0.5%	2.0%	0.6%	2.5%	5.5%
10-14	6.1%	4.8%	1.9%	1.2%	2.6%	1.6%	3.1%	4.2%
5-9	7.2%	5.0%	1.7%	1.8%	3.4%	3.0%	2.9%	4.2%
1-4	10.0%	5.3%	2.1%	2.7%	3.0%	2.8%	3.0%	3.2%
0	4.8%	3.5%	1.8%	3.8%	3.9%	2.9%	1.7%	2.9%

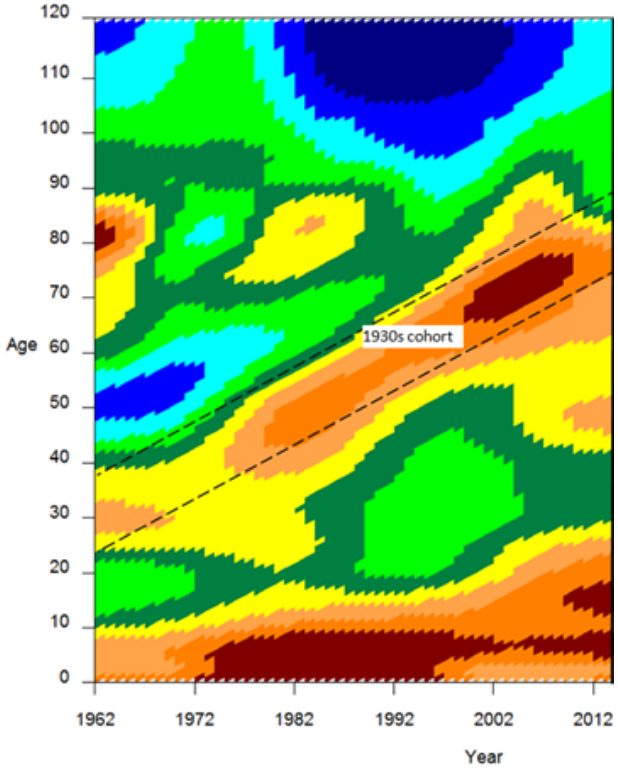
Source: Human Mortality Database, USA Population, Unisex

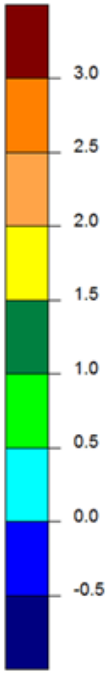
Historic percentage change in smoothed mortality rates, UK, 1962 to 2014

Male



Female

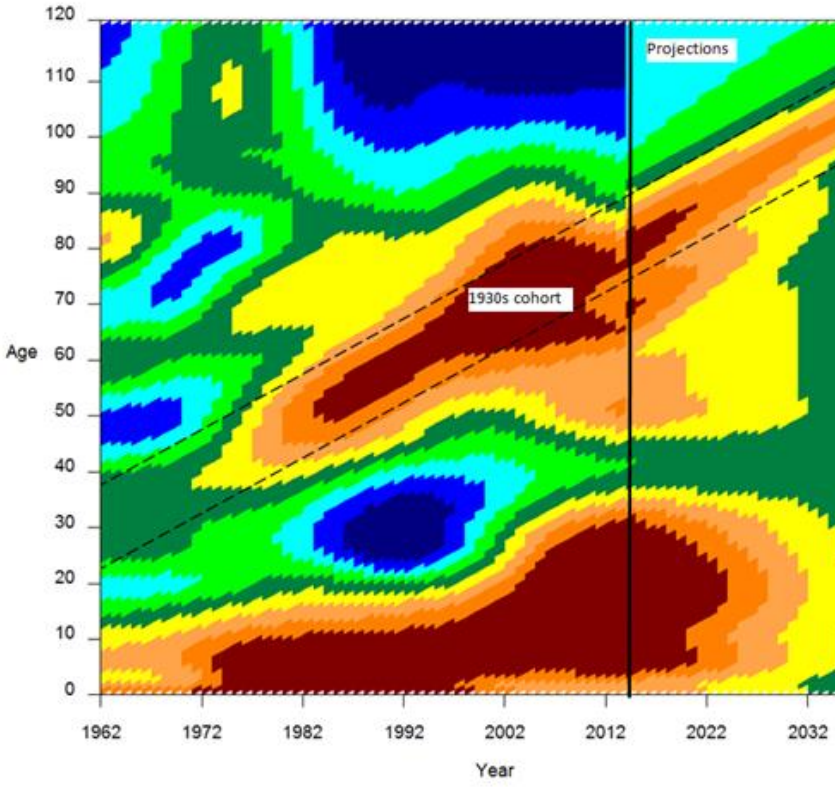




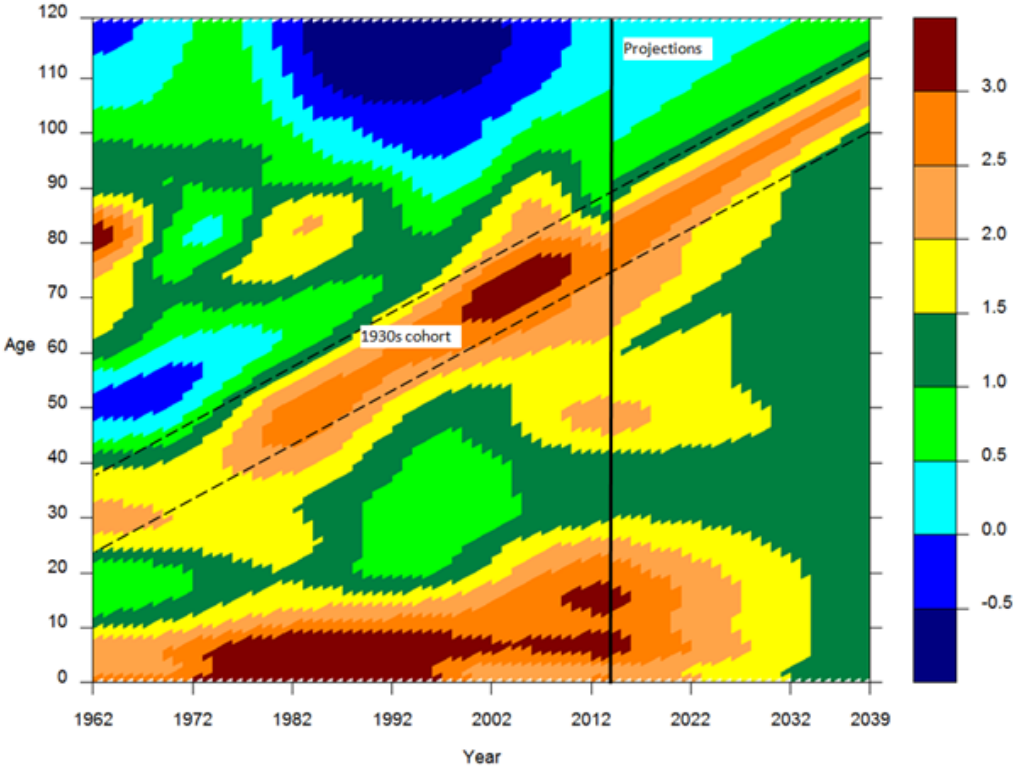
https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/compendium/nationalpopulationprojections/2014basedreferencevolumeseriespp2/chapter4mortality2014basednationalpopulationprojectionsreferencevolume

Historic and projected percentage change in smoothed mortality rates, UK, 1962 to 2039

Male



Female



https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/compendium/nationalpopulationprojections/2014basedreferencevolumeseriespp2/chapter4mortality2014basednationalpopulationprojectionsreferencevolume

Strategies for Engineered Negligible Senescence

SENS

Strategies for Engineered Negligible Senescence

Methuselah FOUNDATION

Aubrey D.N.J. de Grey

Organisms that don't age:
negligible senescence

Bowhead whale

Lobster

Naked mole rat

Rougheye rockfish

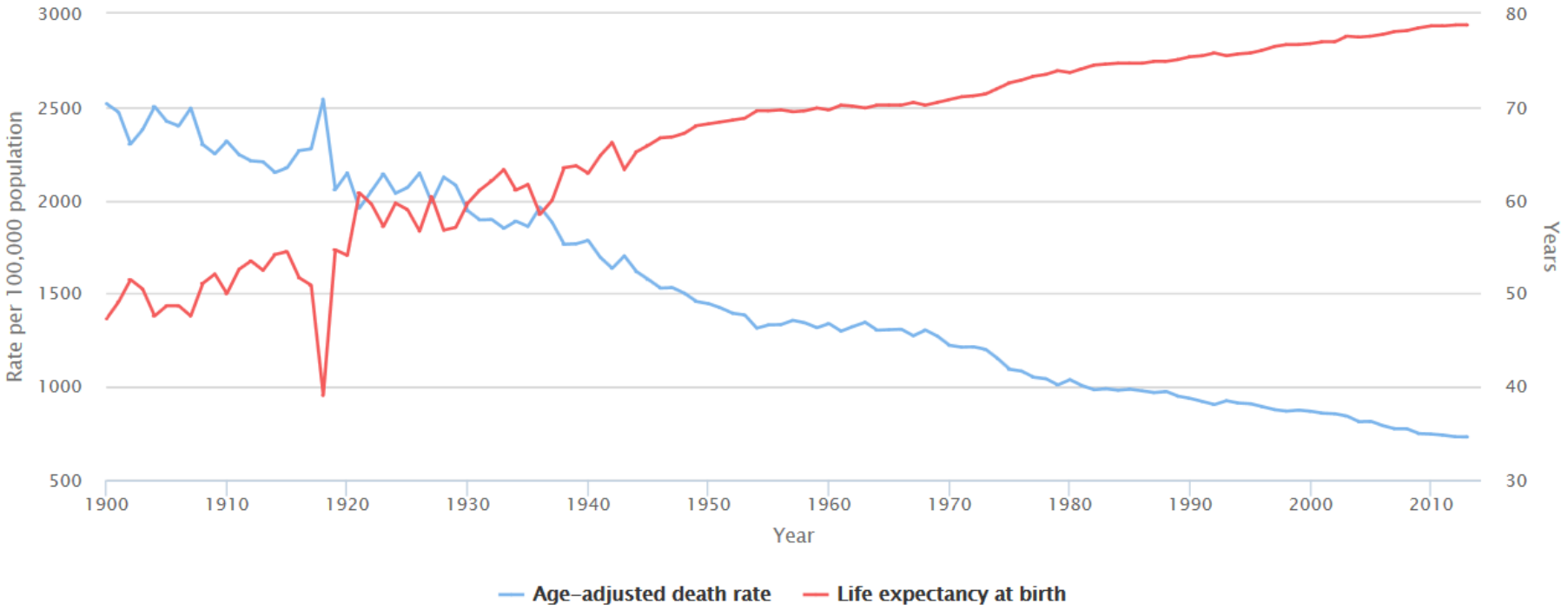
http://www.programmed-aging.org/negligible_senescence.html

Strategies for Engineered Negligible Senescence

Damage rising with age	*Reversible or obviatable by*
Cell loss, cell atrophy	Exercise, cell therapy, growth factors
Extracellular junk	Phagocytosis by immune stimulation
Extracellular crosslinks	ALT-711, other AGE-breakers
Cell senescence	Immune ablation of senescent cells
mtDNA mutations	Allotopic expression of 13 proteins
Lysosomal junk	Transgenic microbial hydrolases
Nuclear [epi]mutations (only cancer matters)	Telomerase/ALT gene deletion plus periodic stem cell reseeding

Aubrey D.N.J. de Grey, Department of Genetics, University of Cambridge

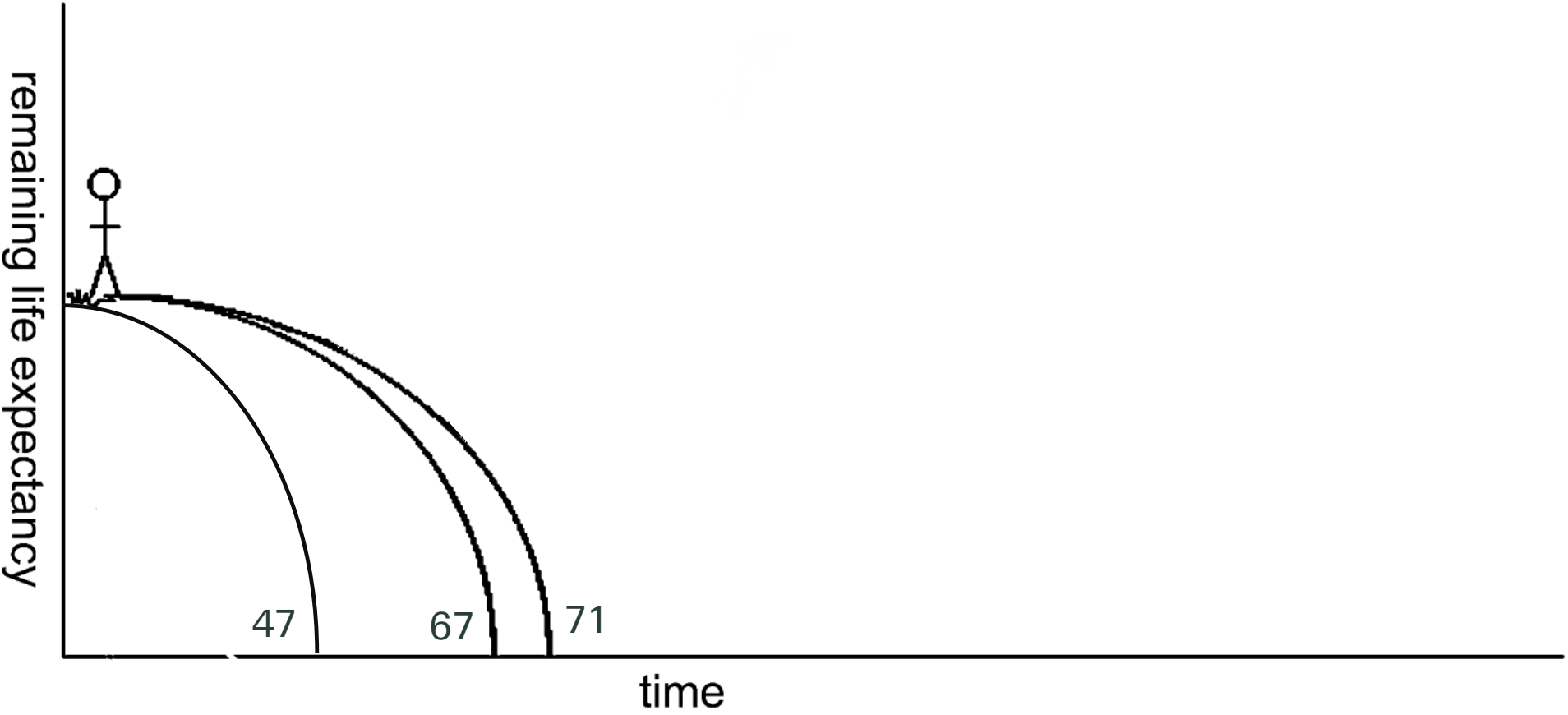
Figure 1: U.S. Mortality and Life Expectancy, 1900–2013



Death rate is age-adjusted to the 2000 Census population age distribution.

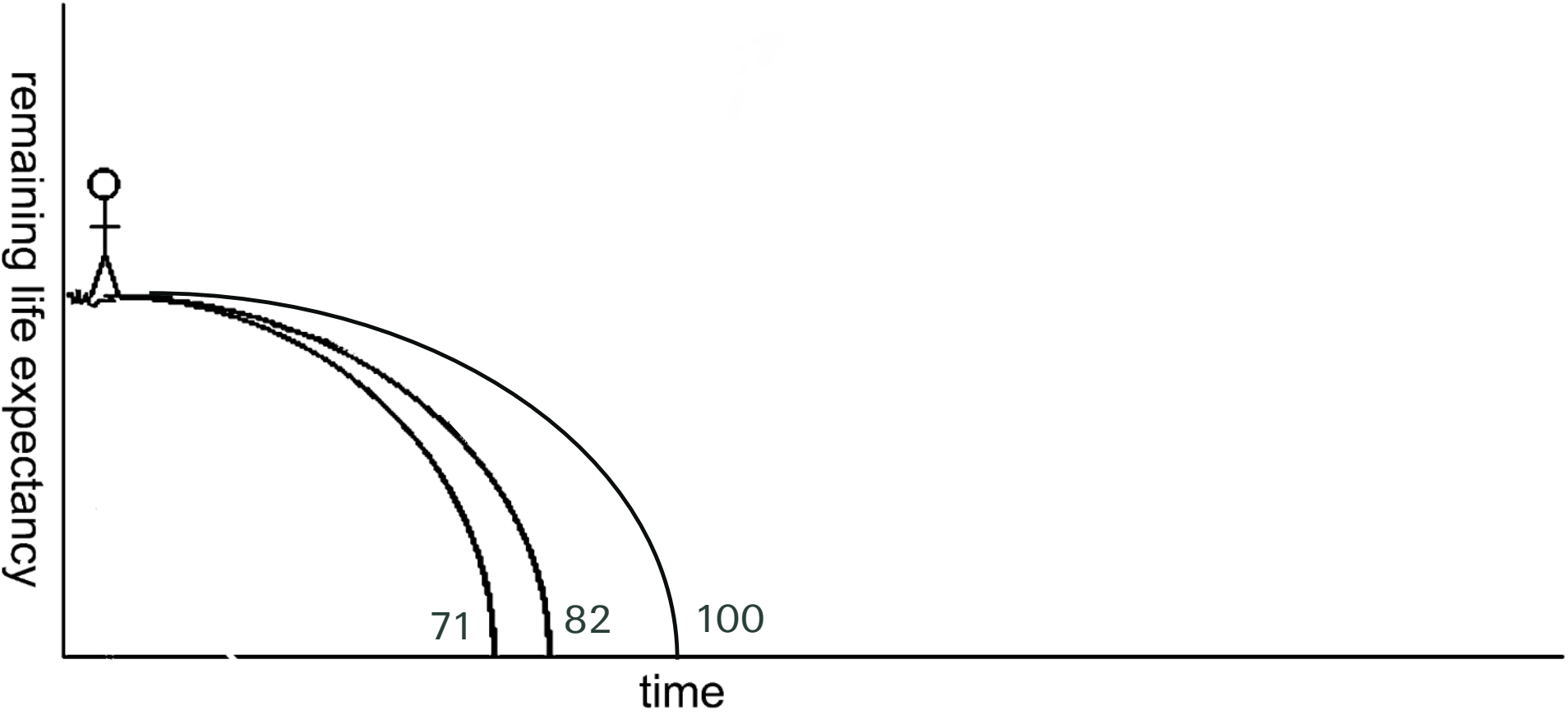
Source: Centers for Disease Control/National Center for Health Statistics.

Actuarial Life Expectancy, Bubby



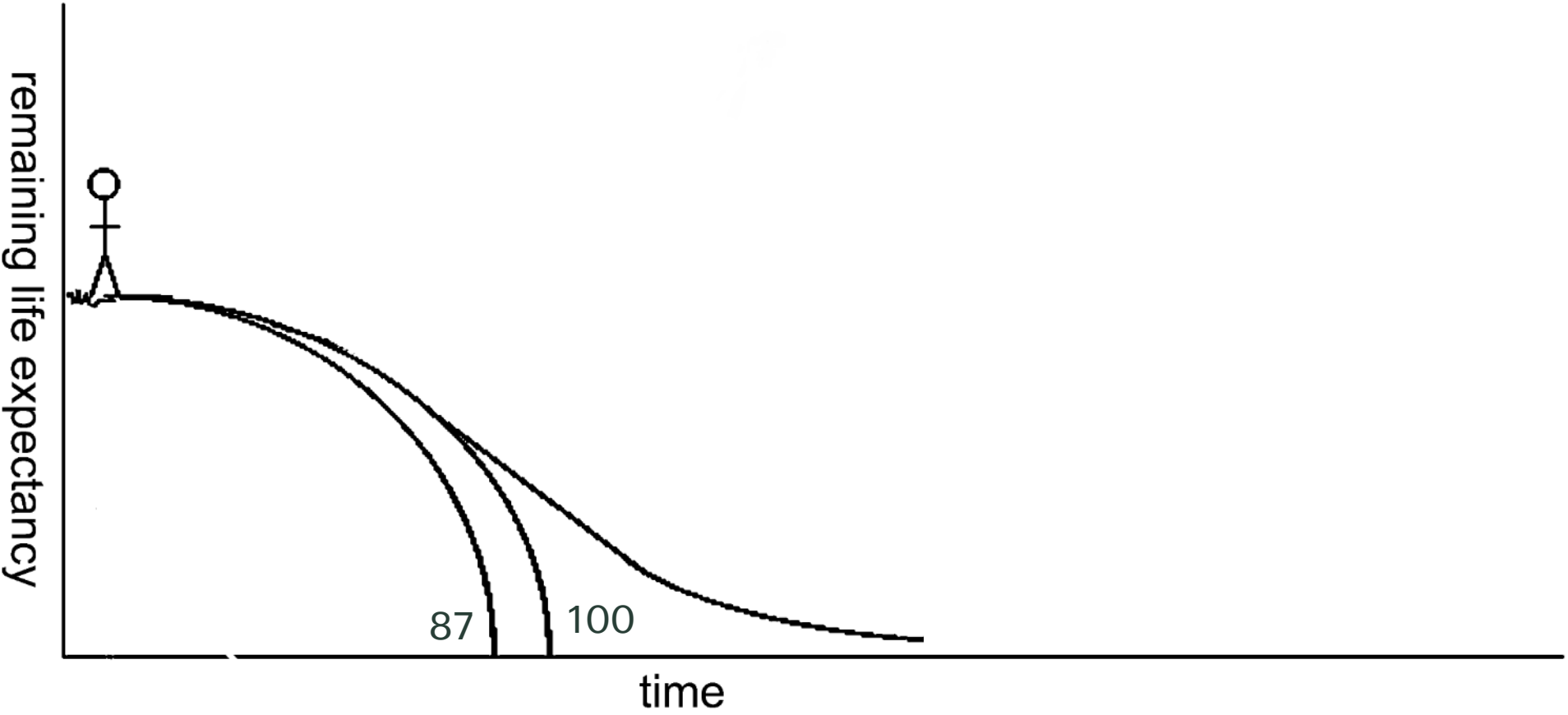
http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0020187

Actuarial Life Expectancy, Me



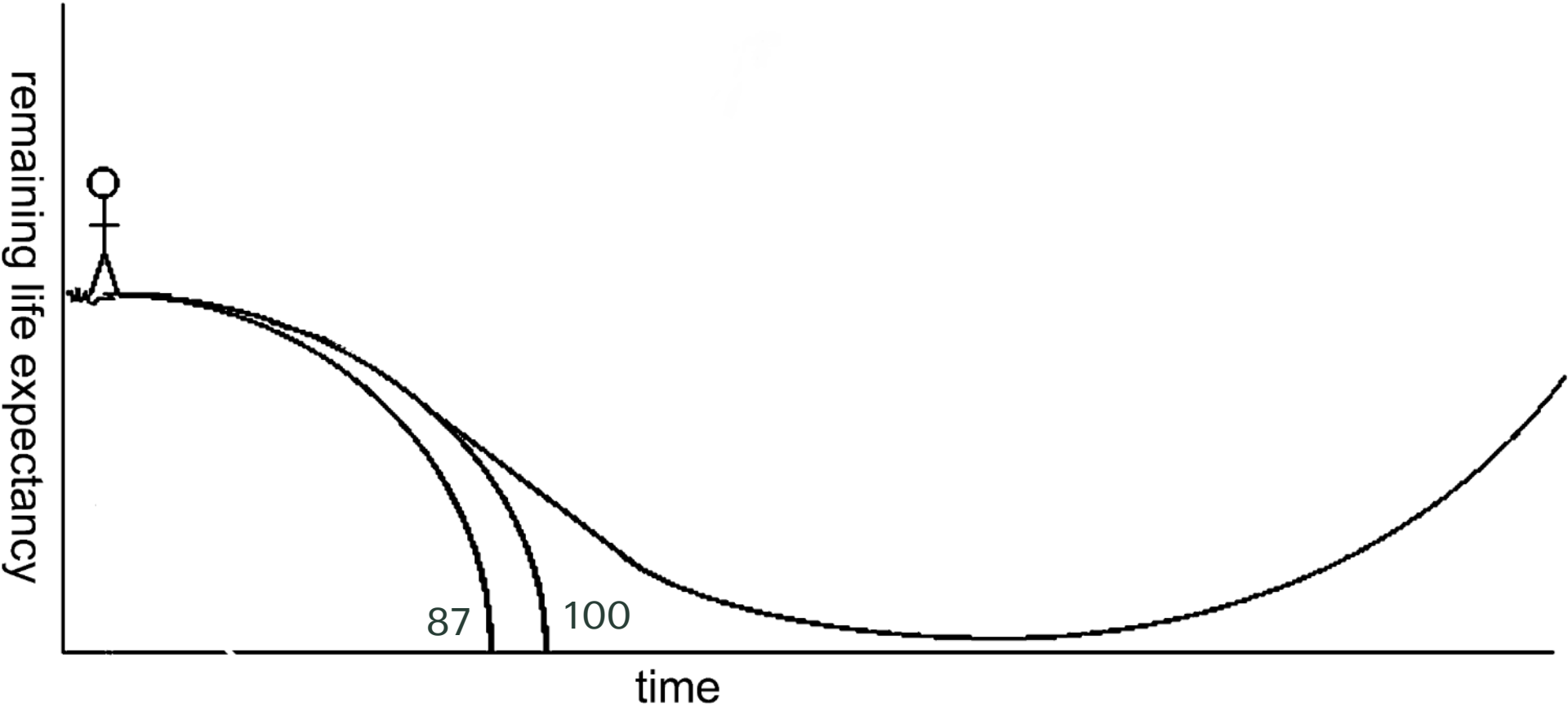
http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0020187

Actuarial Life Expectancy, My Granddaughter



http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0020187

Actuarial Escape Velocity



http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0020187

The Future

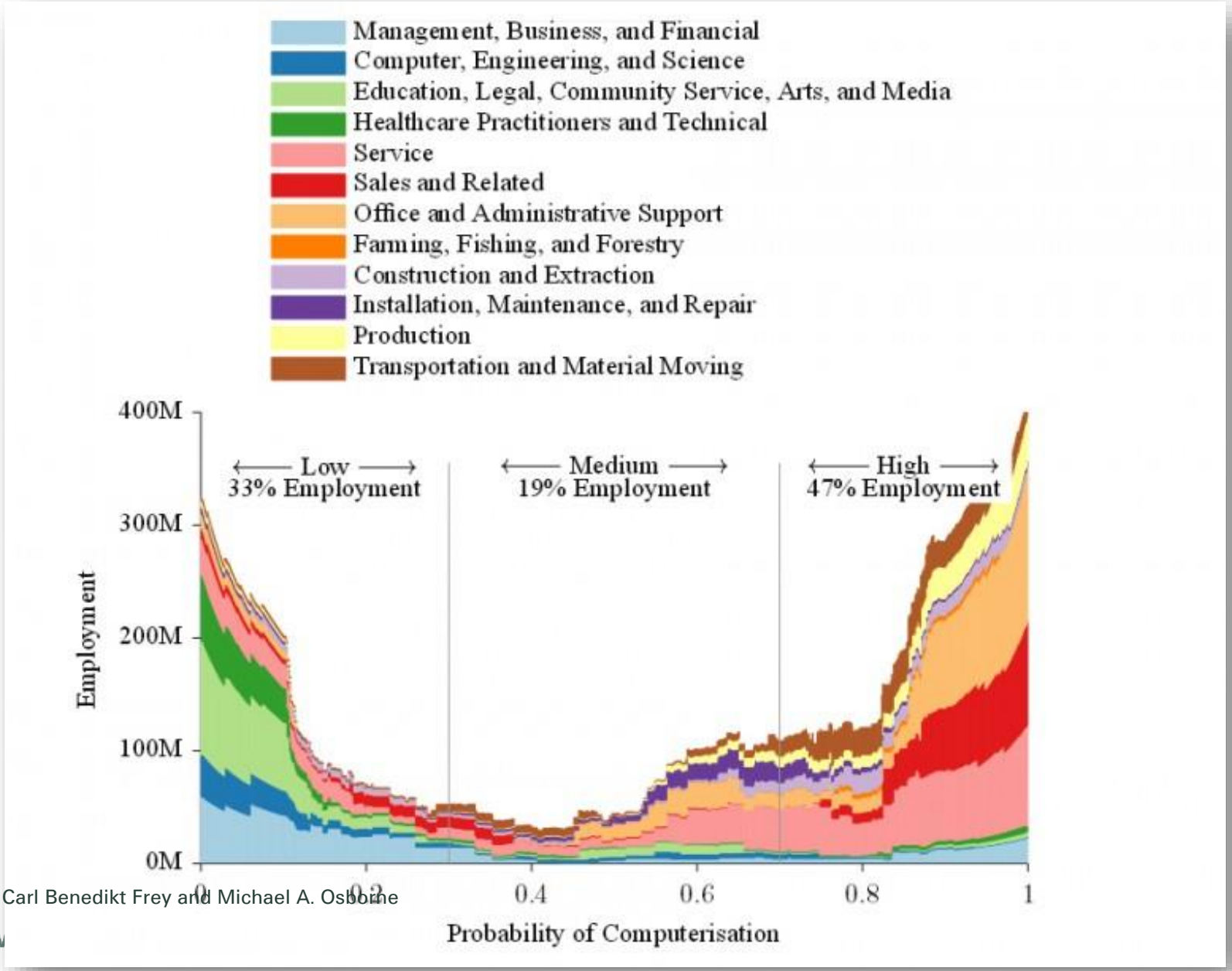
Dystopia

Before

Utopia

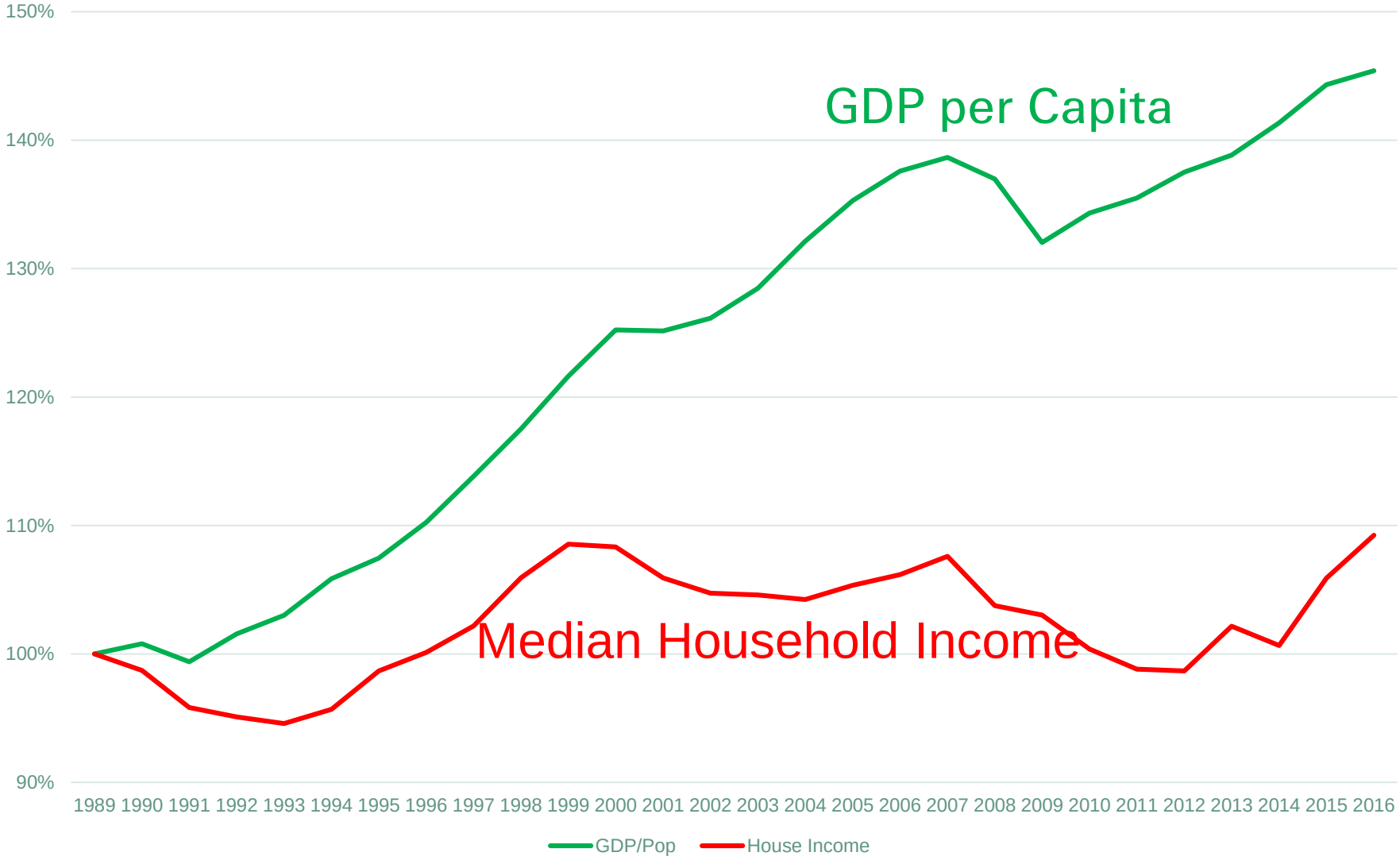
Threat of Computerization

Oxford Study: **47%** of US Jobs Under Threat



Source: Carl Benedikt Frey and Michael A. Osborne

US Productivity: GDP vs Household Income



https://fred.stlouisfed.org/graph/?graph_id=195323#
Real Median Household Income in the United States, Index 1989=100, Annual, Not Seasonally Adjusted
Gross Domestic Product / Population, Index 1989=100, Annual

The Future

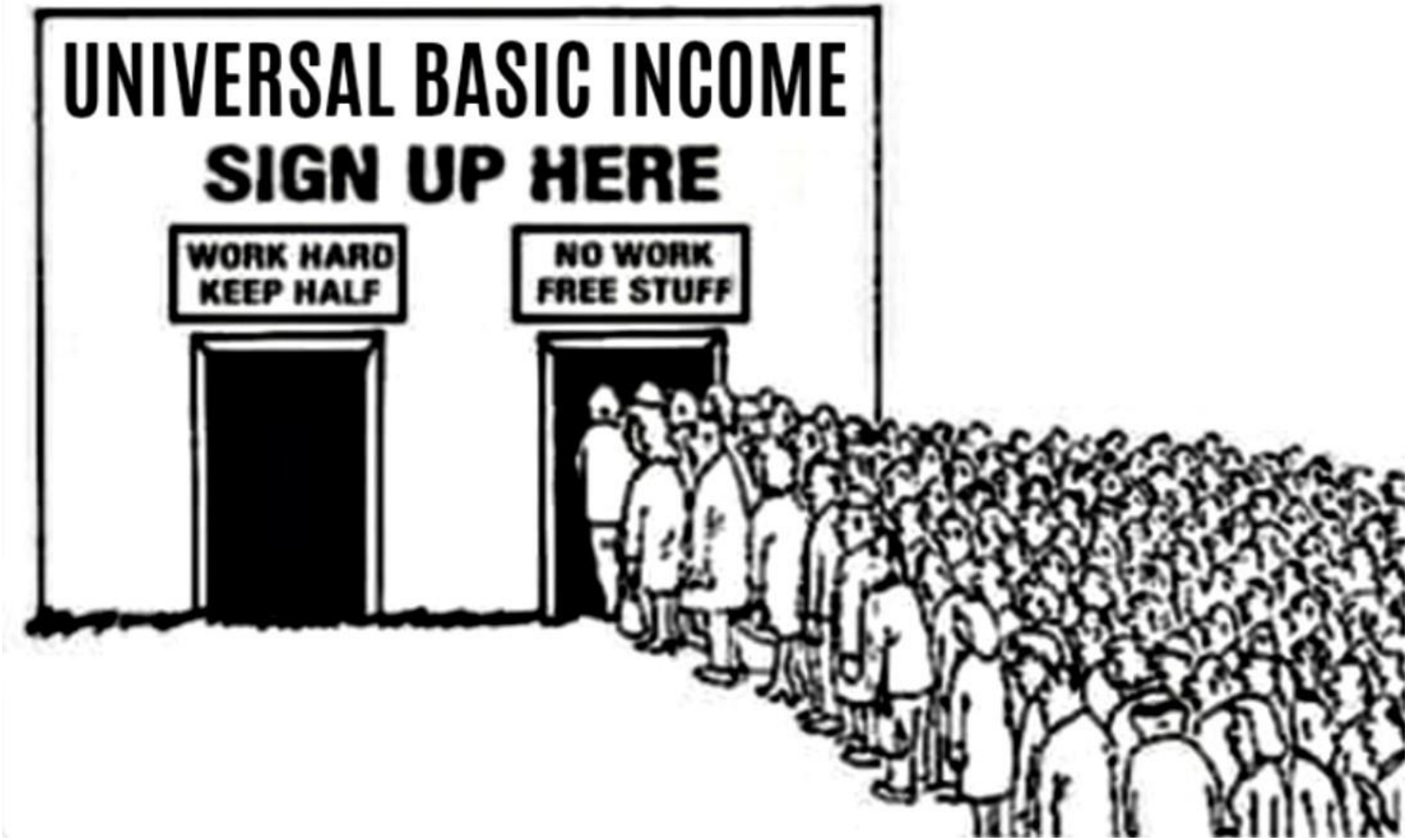
Dystopia

Before

Utopia


Utopia


BILL GATES WANTS
TO TAX ROBOTS


UNIVERSAL BASIC INCOME
SIGN UP HERE
WORK HARD
KEEP HALF
NO WORK
FREE STUFF

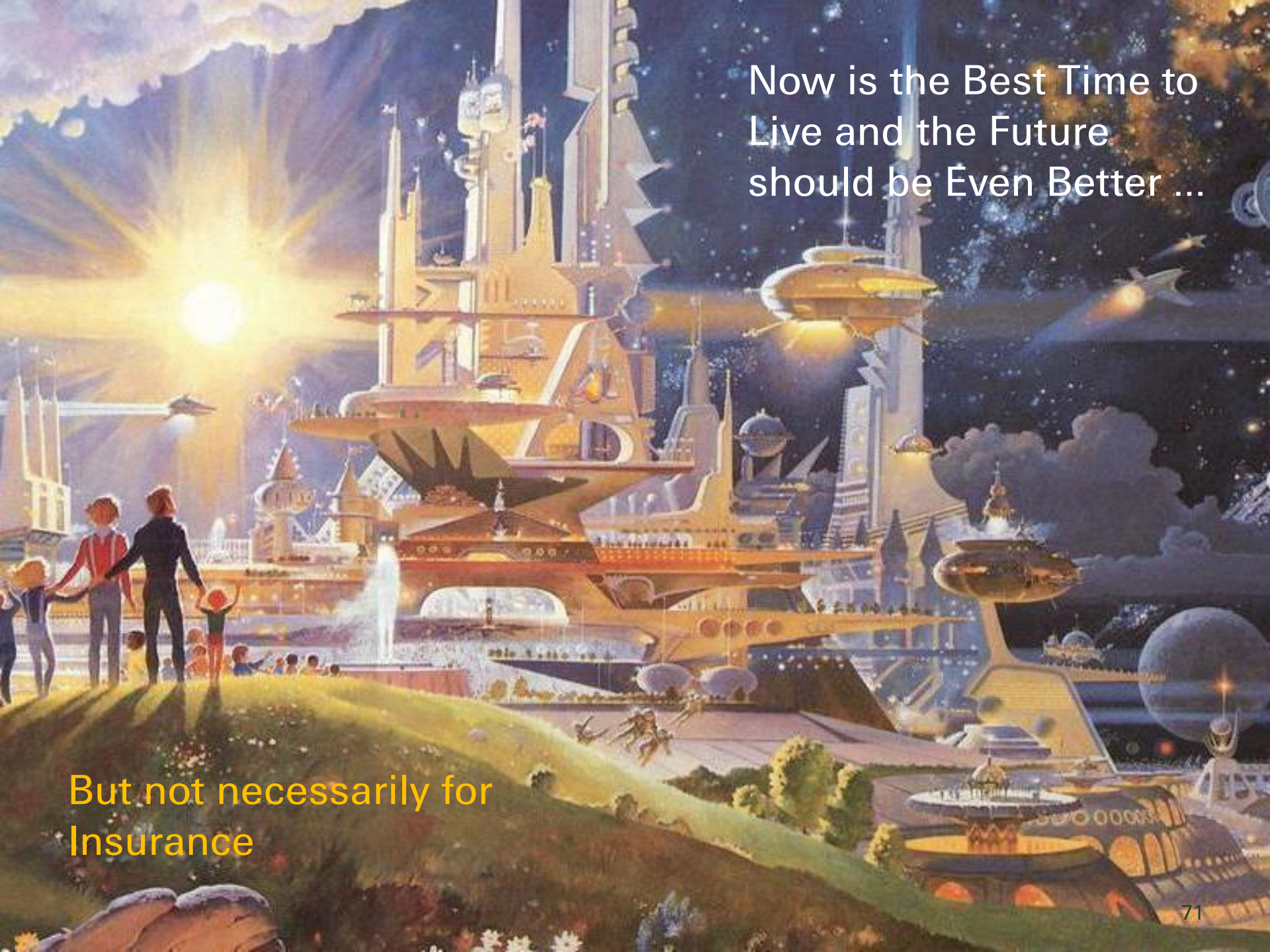
Universal Basic Income

Why do we need Life Insurance?

Why do we need Annuities / Pensions?

Why do we need Disability Income?

Summary

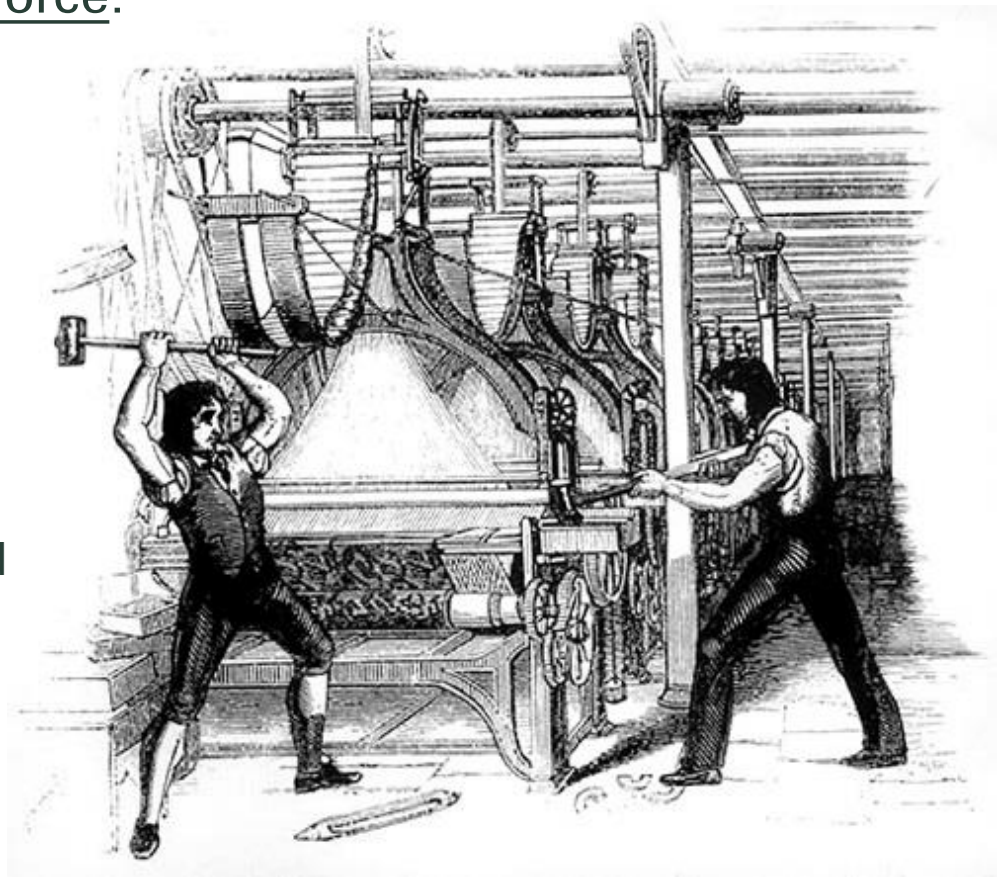

Now is the Best Time to Live and the Future should be Even Better ...
But not necessarily for Insurance

Is Yossi

A Luddite?

Luddites: Past vs Present

- Human Contribution to the Workforce:
  - Physical
  - Intellectual



- Historical:
  - Less Physical, More Intellectual
  - Gradual Phase-In: Society Adapted

- Modern Day:
  - Less Physical AND Intellectual: *What's Left?*
  - Phase-In Very Fast: *Adaptation Difficult!*

Is Yossi

A Luddite?

Absolutely

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