

# The Reinvention of America

How New Technologies & World Historic Forces  
are Transforming Our Era & Our Cities for the Better

By Peter Leyden / Founder of Reinvent

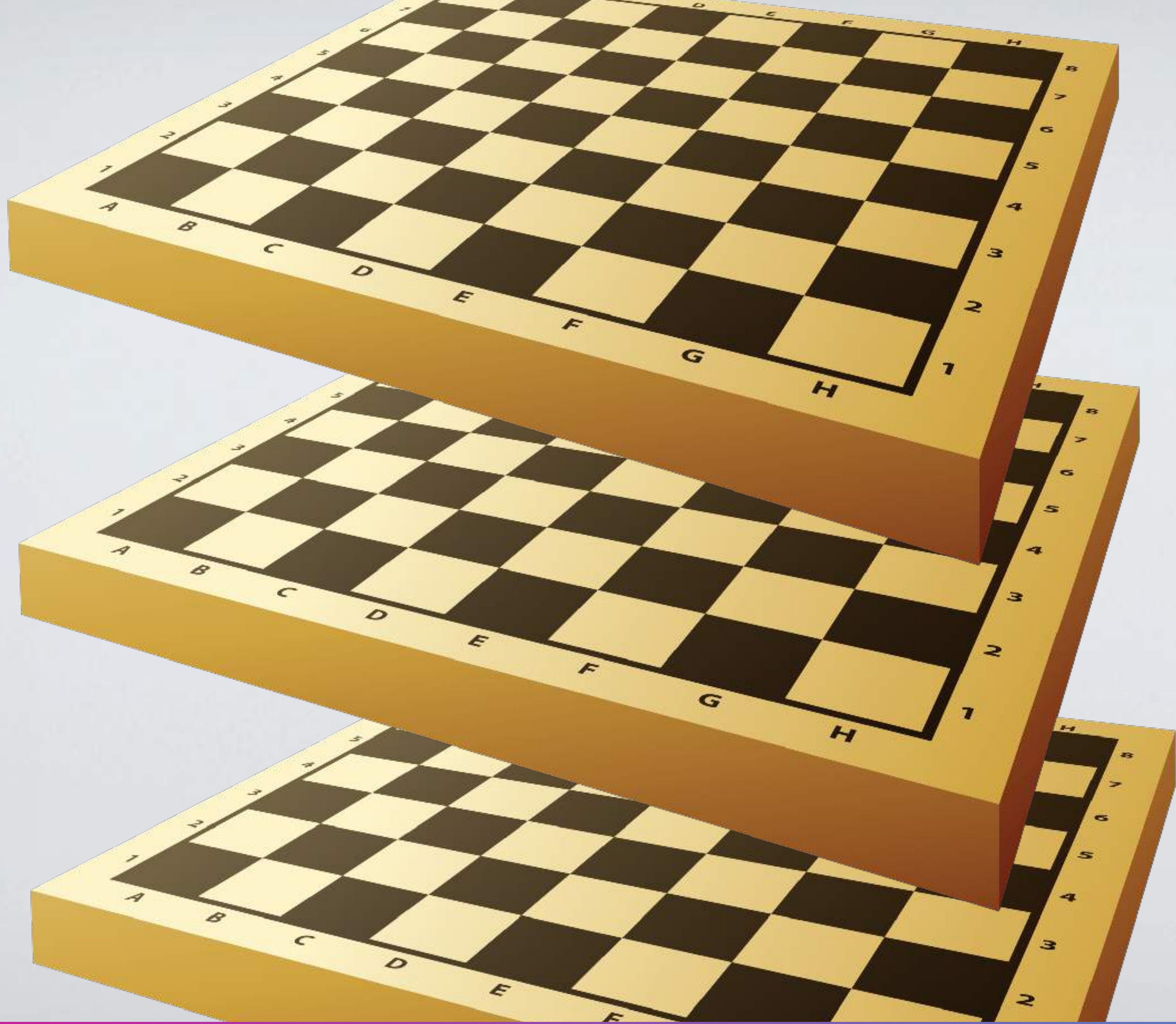




WIRED to Reinvent



# What's **NOW** San Francisco



# Three Dimensional Chess













中海太平洋  
CSCL PACIFIC OCEAN  
香港  
HONG KONG

CHINA SHIPPING LINE



Google

6NRE5

Google

California  
6VVA094

Lexus  
RX 450h

Google

self-driving













# World Historic Transformations



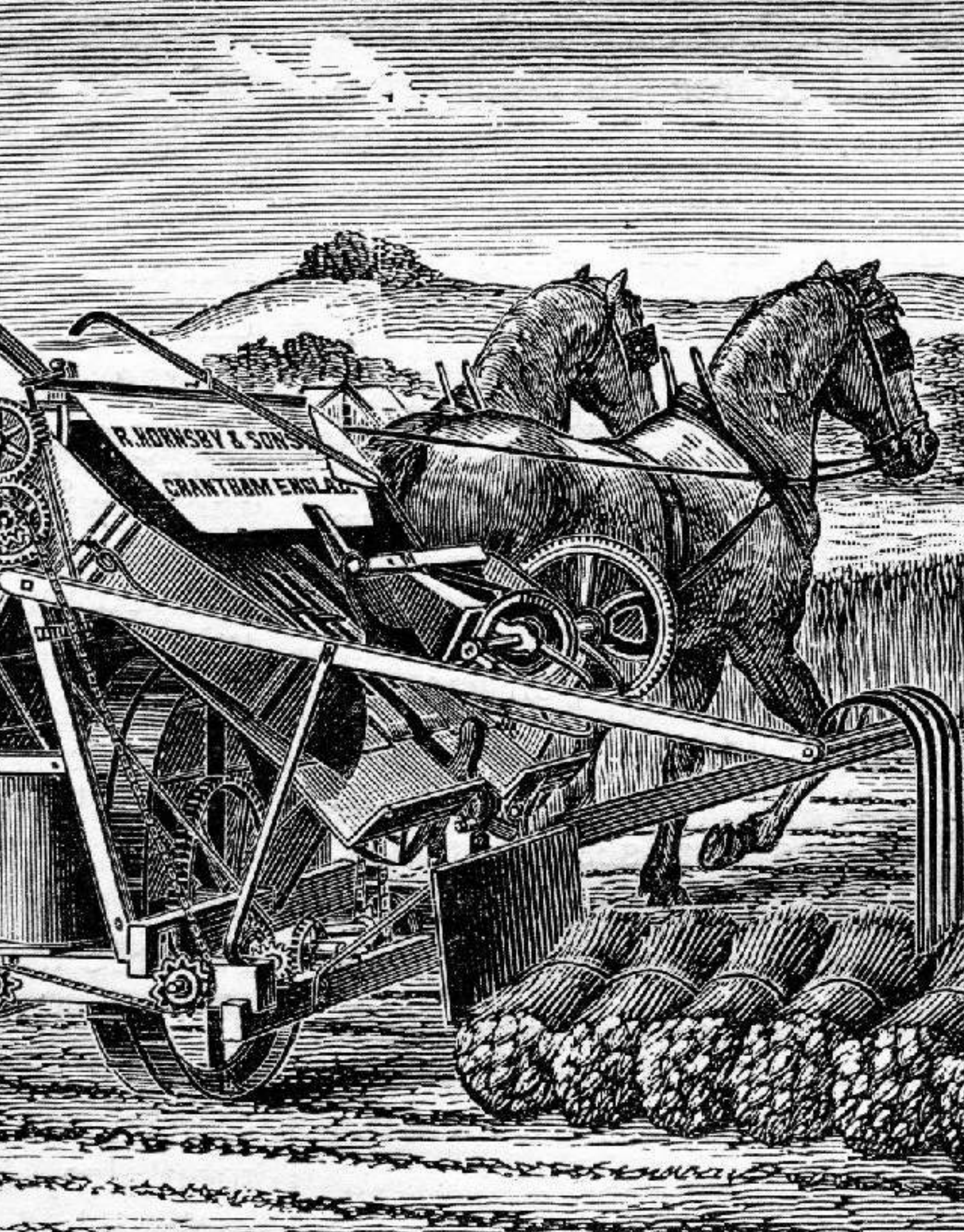


Deep Structural Changes

Unprecedented Challenges



# Periodic American Reinventions



Agricultural

1800 - 1850



Early Industrial

1850 - 1900



Urban Industrial

1900 - 1950

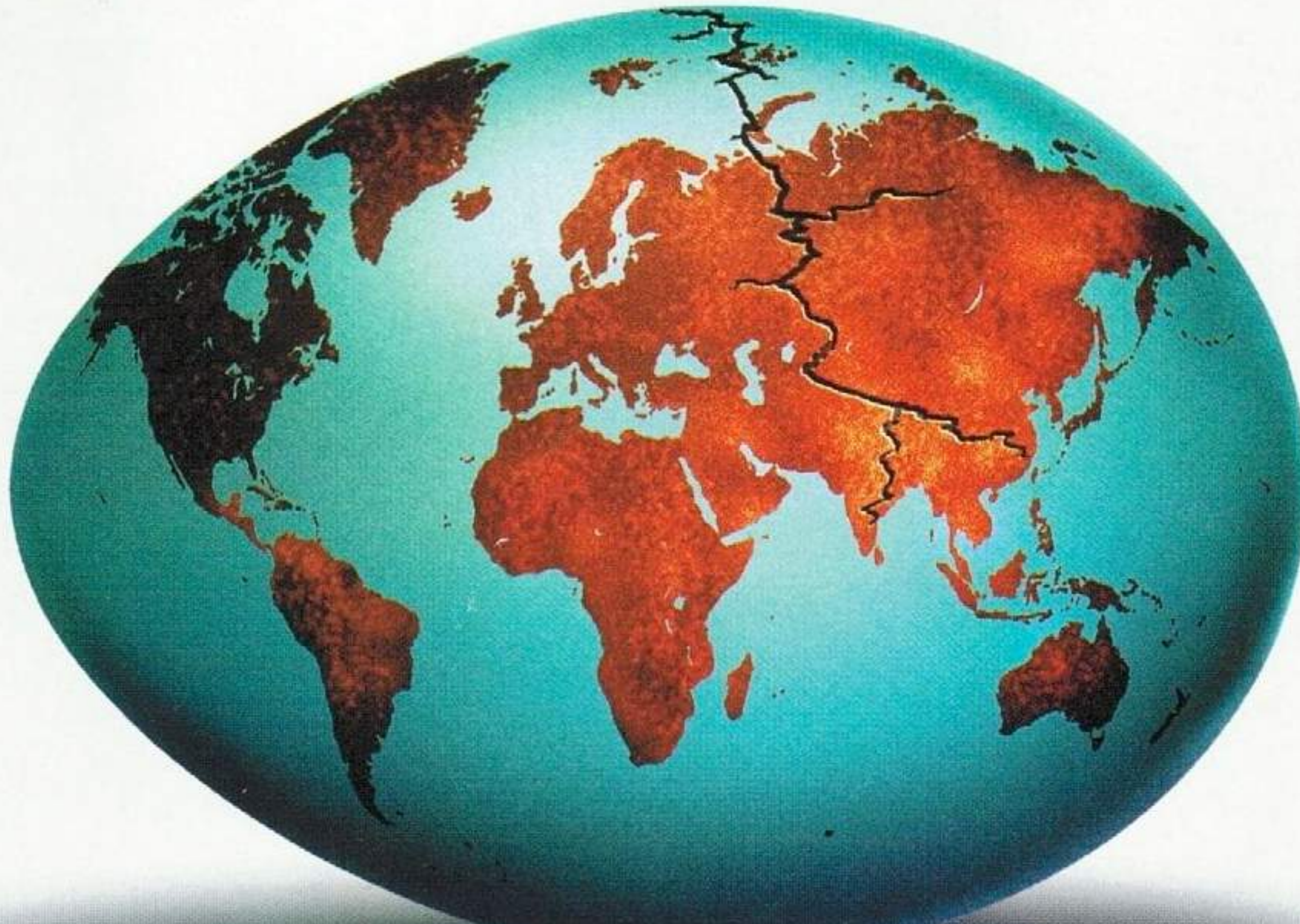


What's Now

2000 - 2050



# The Digitization of Everything



# The Globalization of Everything



# Our 21st Century Challenges



**Climate Change**

**Aging Populations**

**Water Shortages**

**Education Failures**

**Pandemics**

**Healthcare Costs**

**Mass Migration**

**Rising Inequality**

**Global Terrorism**

**Nuclear Proliferation**





Our Time of Reinvention

Day two of testing and the students are getting restless. Tomorrow is the math exam. 4 hours of math means that we probably won't use the typewriters much, but you never know. The tap of typebars can often revive a sluggish mind.



From Analog to Digital



# From Analog to Digital



# From National to Global



From National to Global



From Unsustainable to Sustainable



From Unsustainable to Sustainable



From 20th to 21st Century





From 20th to 21st Century



# The Sub-Transformations

# The Sub-Transformations



All Digital: The Revolution Continues

Fully Global: The Economic Long Boom

Future of Work: Smart High-Tech Cities

# The Sub-Transformations



Demographic Change: The Millennials

More Sustainable: The Clean Energy Shift

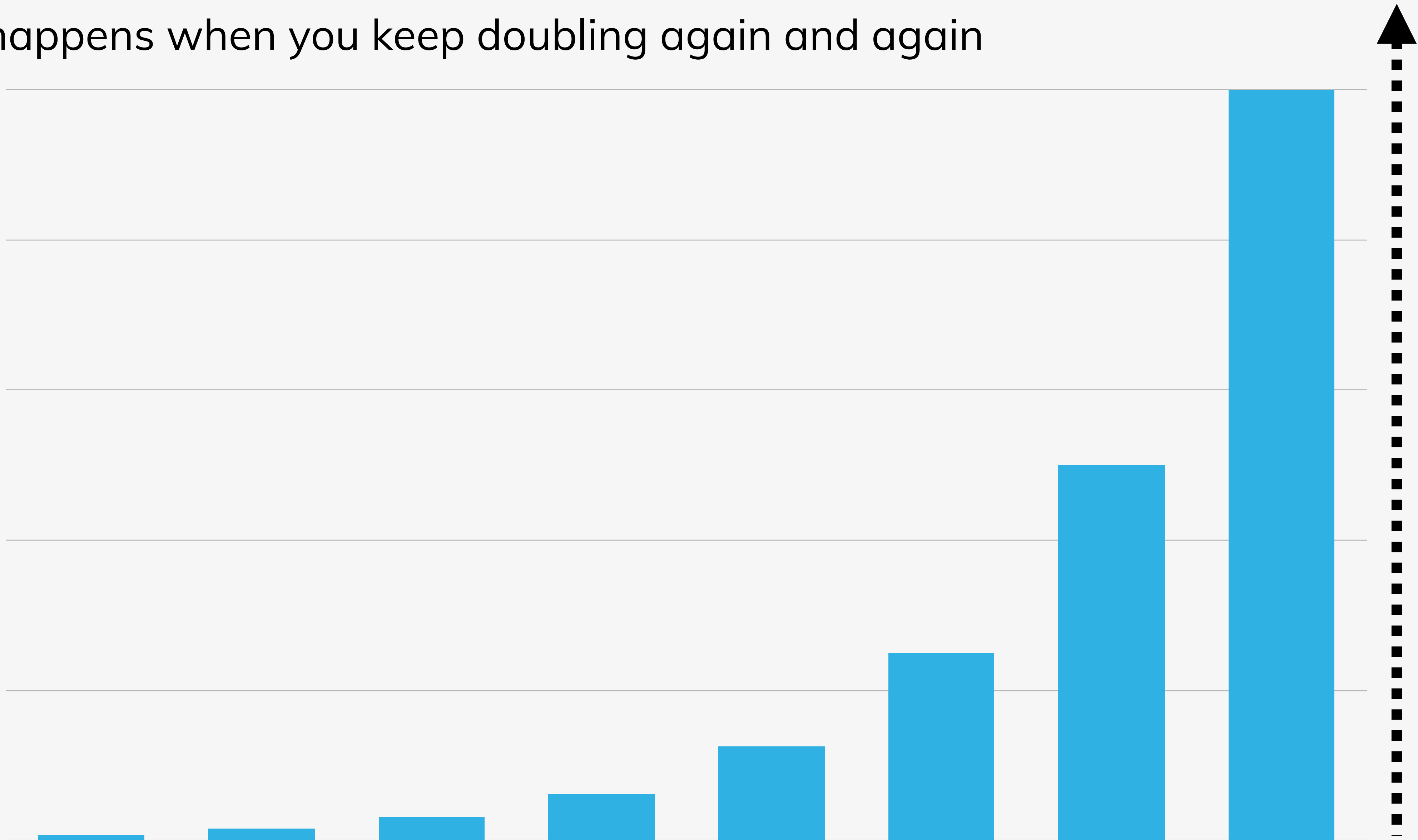
Politics: The Reinvention of America



All Digital: The Revolution Continues

# The Inexorable March of Moore's Law

What happens when you keep doubling again and again



# Exponential Increase in Power - Megahertz

Computers are Almost 25,000 Times More Powerful in 40 years



1977 Apple II  
1mhz for \$5,000  
\$5,000/mhz



2017 Dell  
4,000mhz for \$850  
\$0.21/mhz

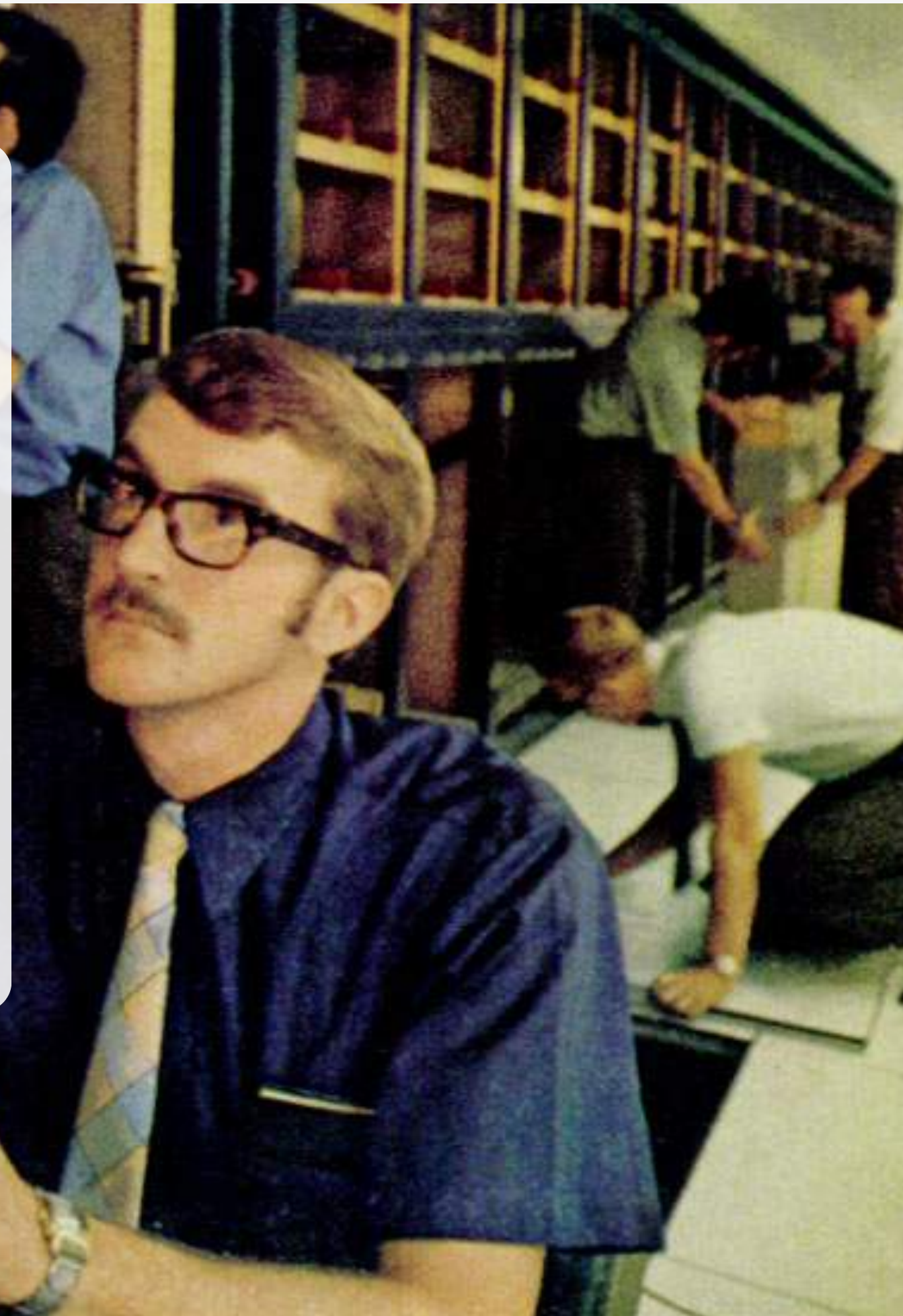
# Exponential Increase in Clock Speed - MFLOPS

The clock speed - as well as the size & price - are from different worlds

1975

ILLIAC IV  
Super Computer

200 MFLOPS  
\$31 Million



2017

iPhone 7

300 GFLOPS  
\$649

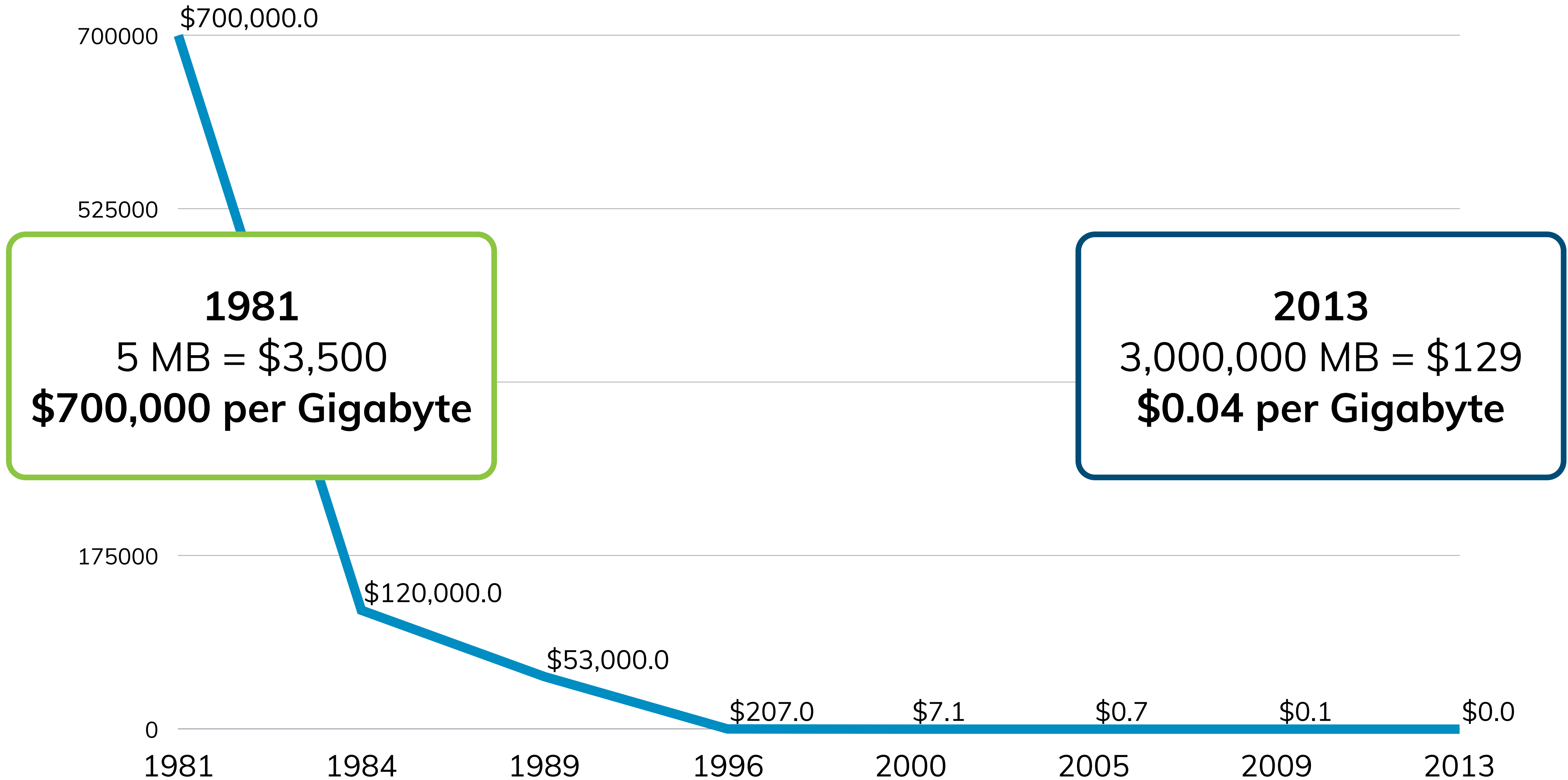




# Incredible Shrinking Size of Computers

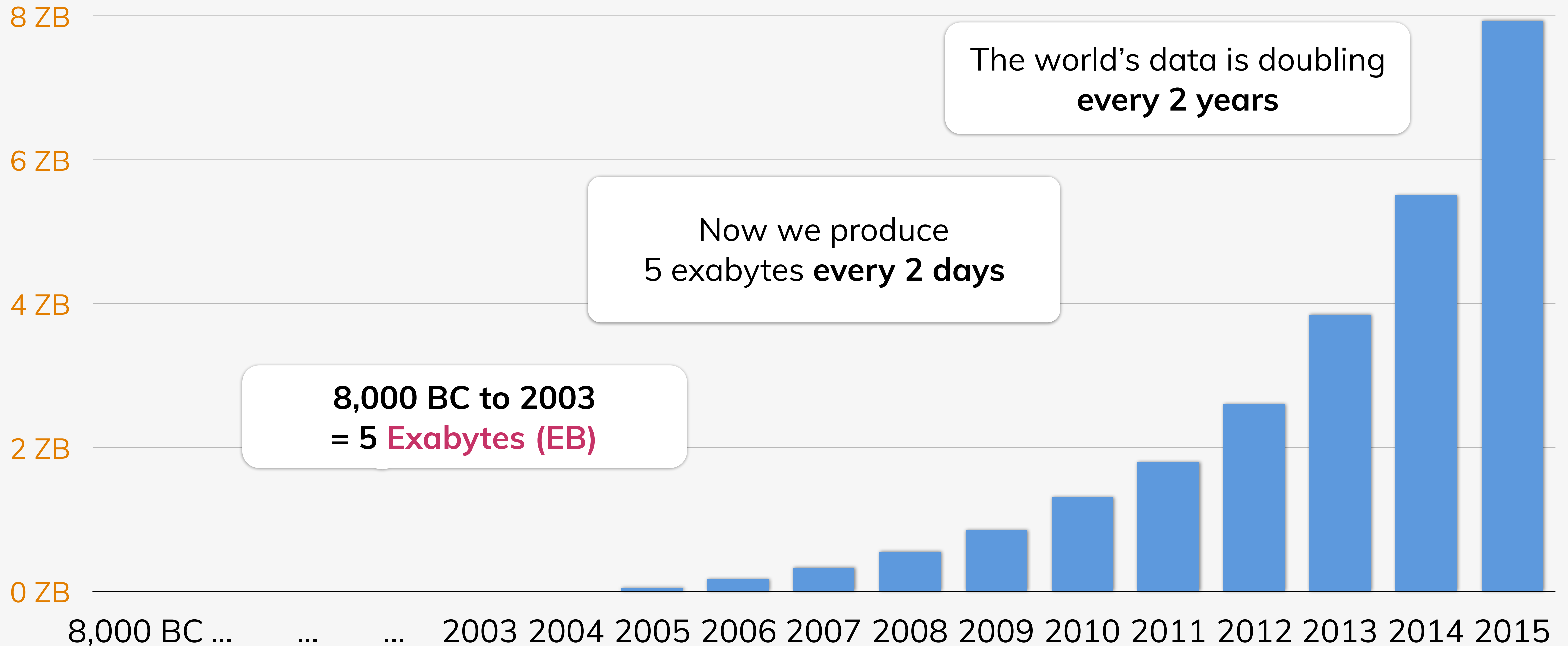


# Dramatic Decline in Cost - Storage



# The Piling up of Big Data

The doubling phenomenon hits data & the hockey stick ramping begins



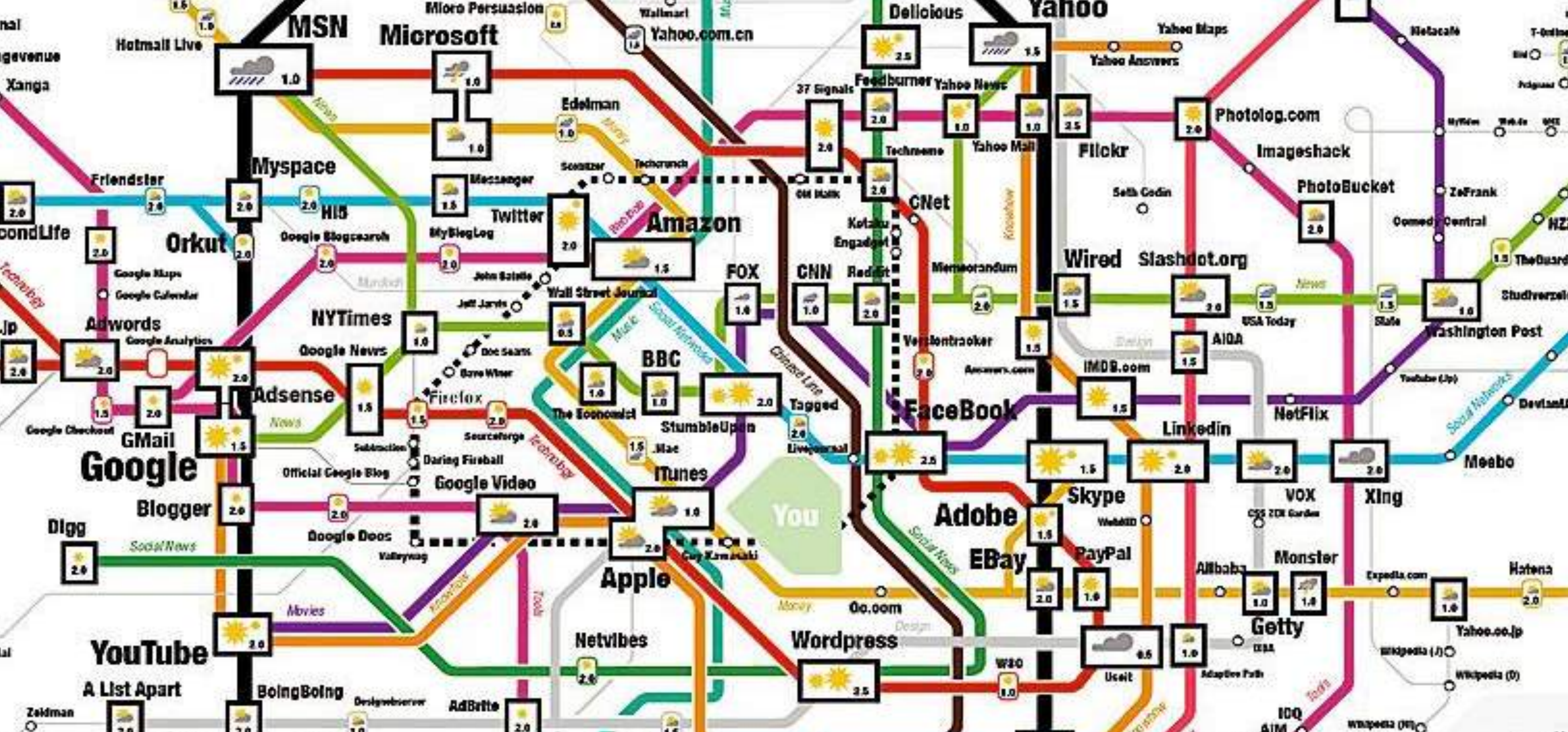


# More Tech Wonders to Come

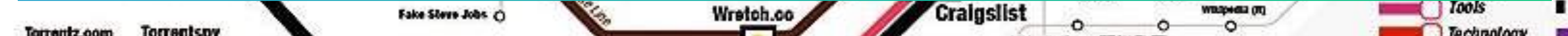




# The Coming of AI & Advanced Robotics

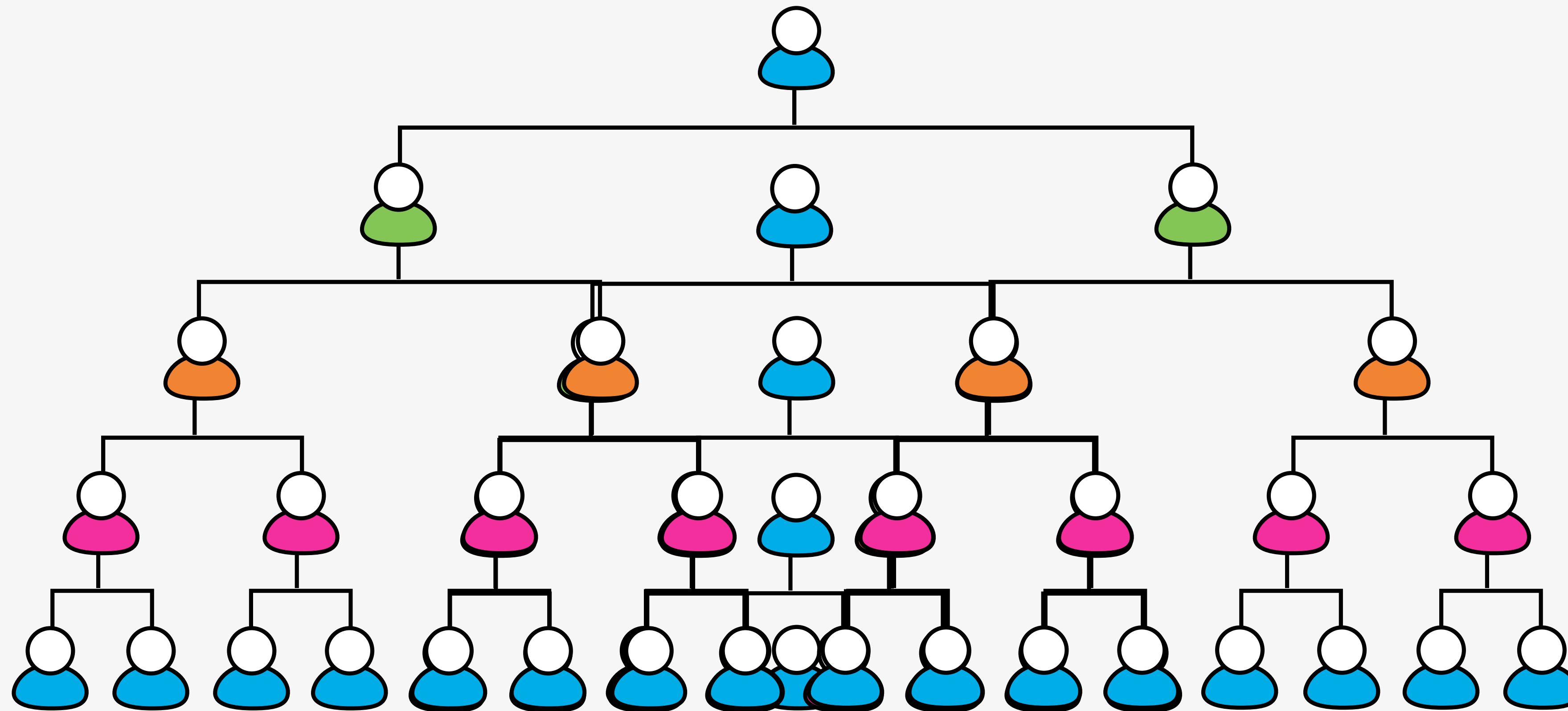


The Internet Revolution Continues



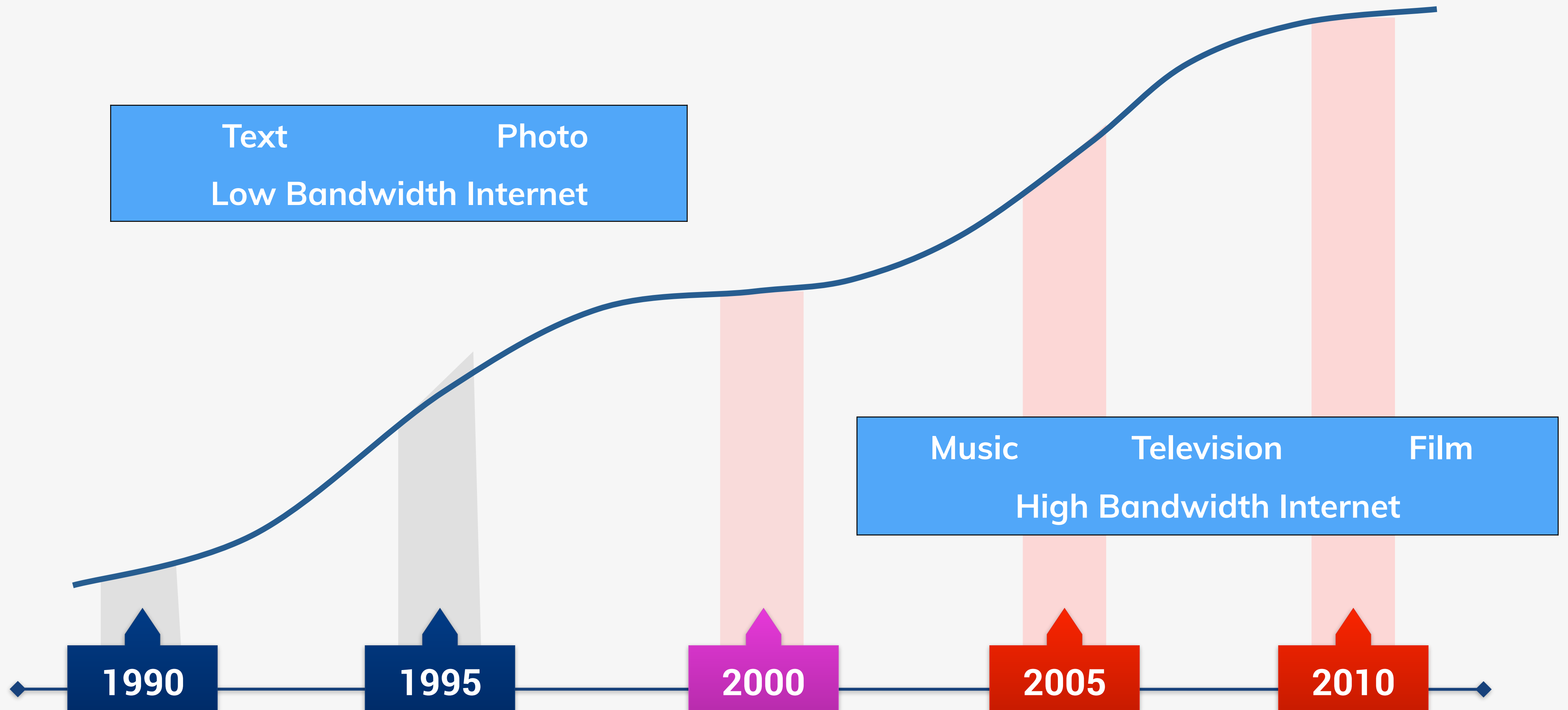
# The Network Effect & Exponential Growth

The Exponential Growth that comes when everyone invites just two



# The Two Internet Booms

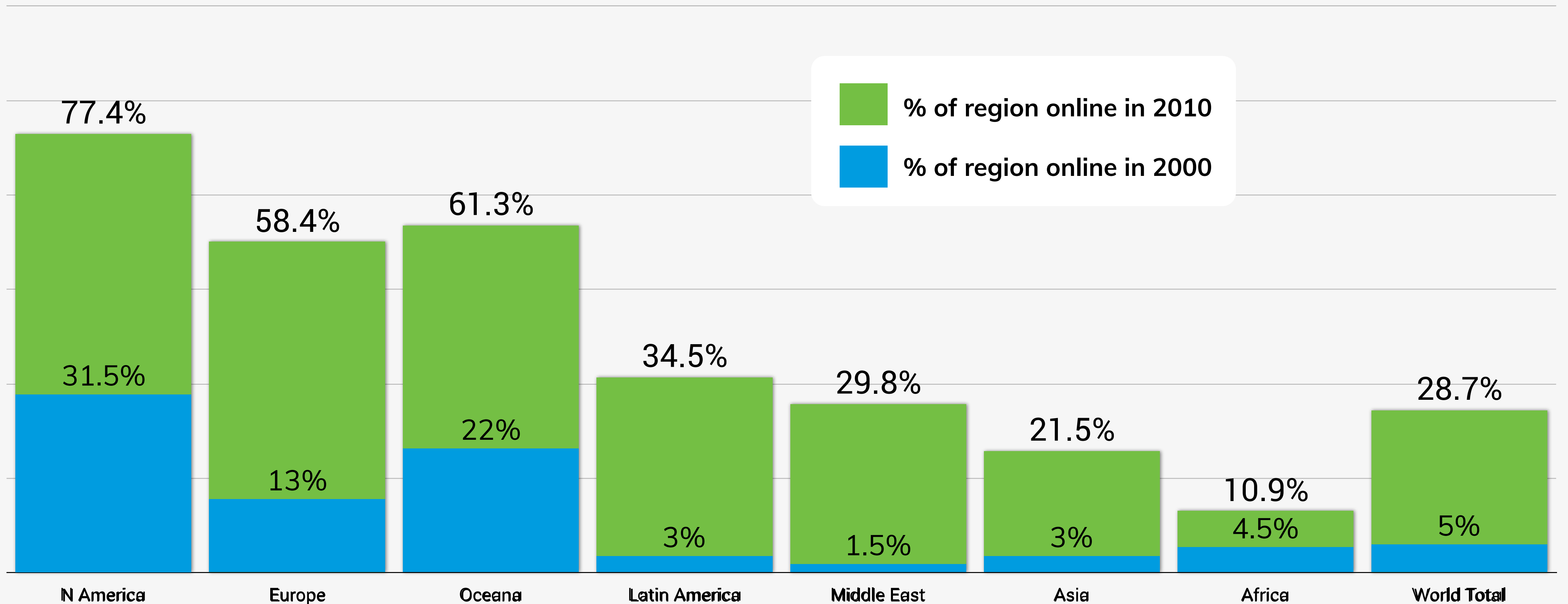
Before 1990 only 6 percent of world's data was digital. Now it's all digital.





# Percentage Online By Region of the World

The world is fast following the adoption in the West



# Telecom's Next 10 Years

Online connections will piggy-back on the explosion of mobile phones



## People on the Internet

- 40 Percent of World Population

## People with Mobile Phones

- 75 Percent of World Population

## Full Broadband Wireless

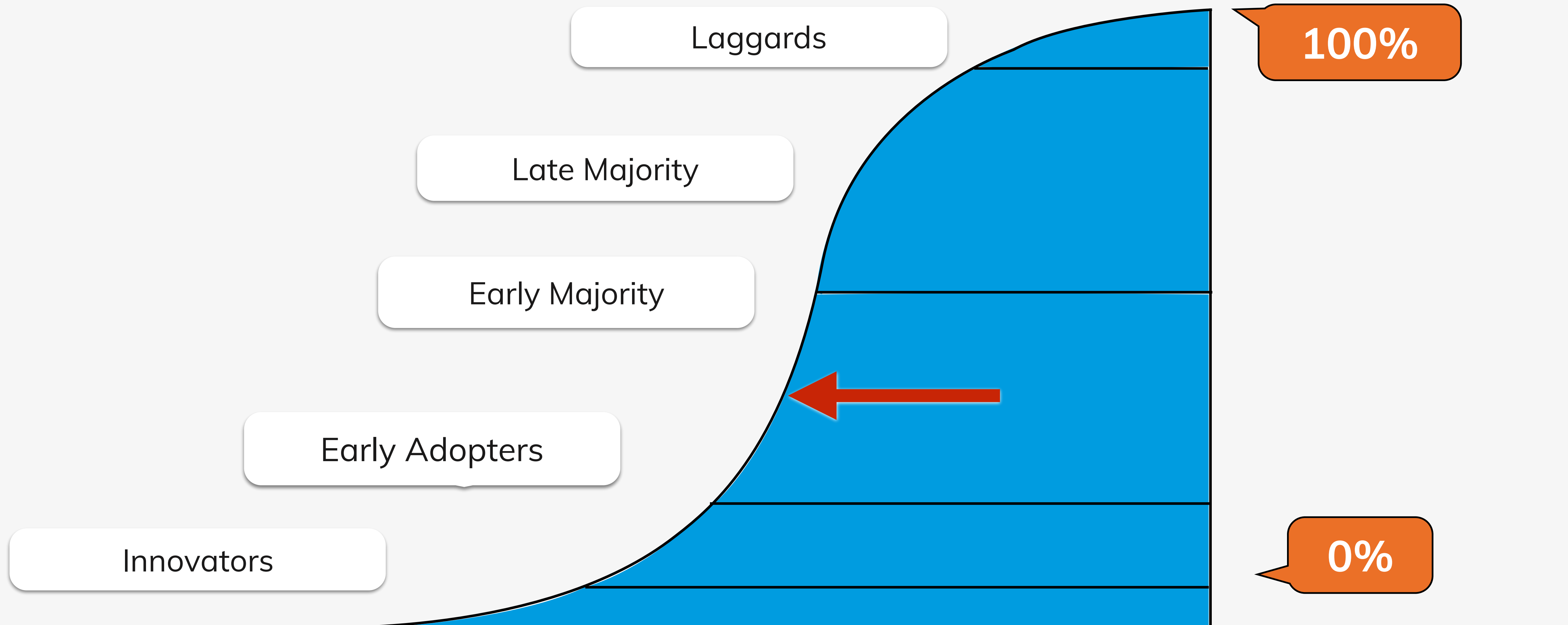
- Soon all will have access to 4G +



# How Paradigm Shifts Work

# Technology Adoption Curve

The classic process of adopting any technology into a society



# Mechanics of a Paradigm Shift

The process of a rapid shift from one prevailing paradigm to another

Old



New



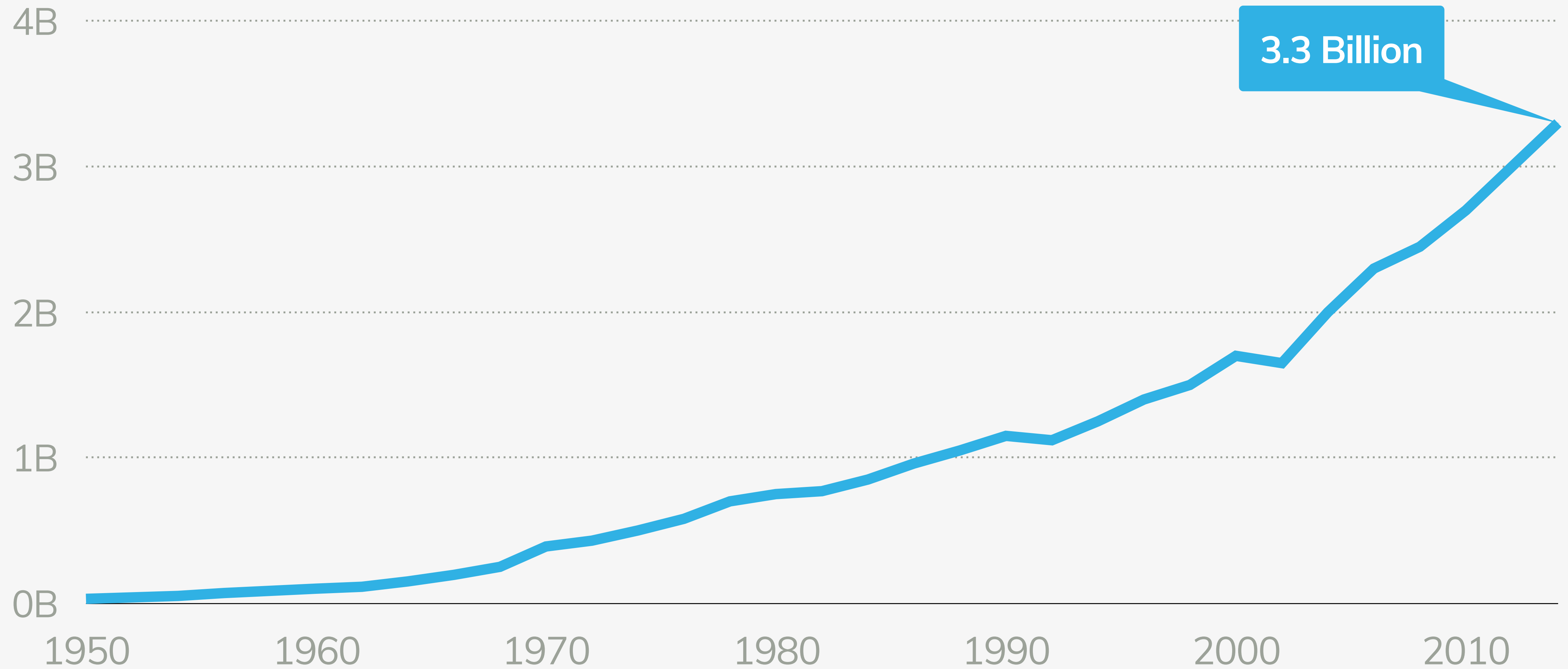


# Fully Global: The Globalization of Everything

# Moving Bodies Not Bits



# Inexorable Growth in Global Air Passenger Traffic





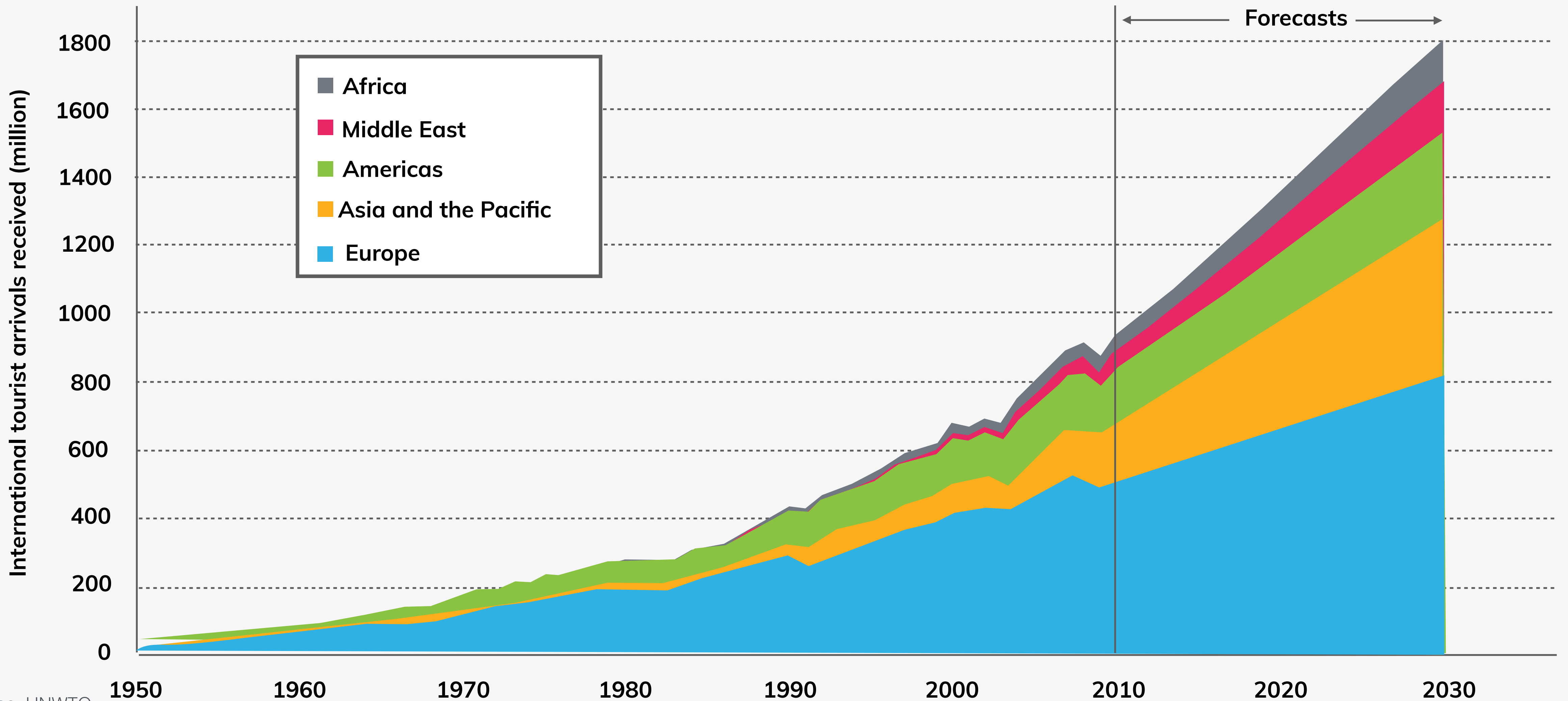
# Now 10 Percent of Global Economy is Travel & Tourism



- \$7.2 Trillion of Global GDP in 2015, representing 9.8%.
- Way more than Global oil revenues of \$5 Trillion

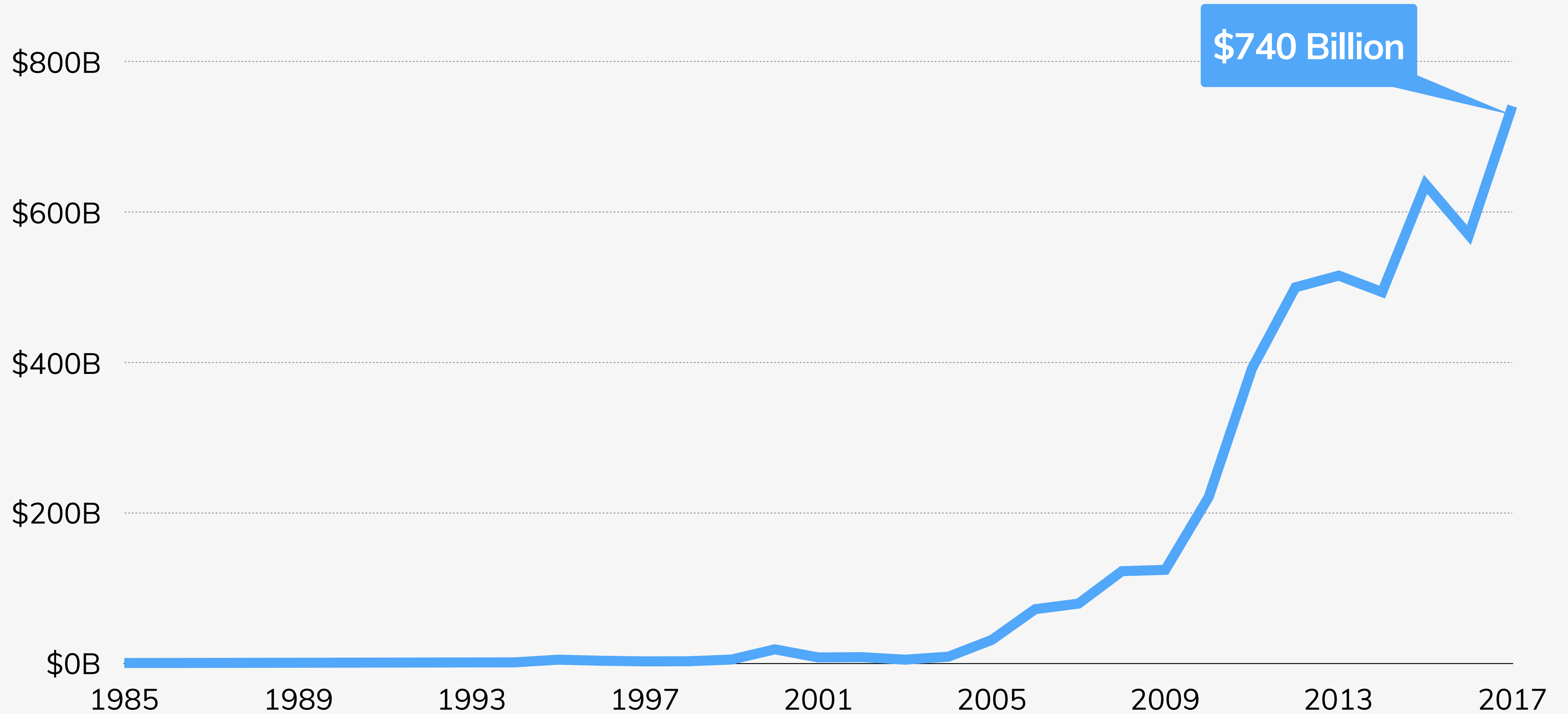
# Projected Tourist Arrivals Worldwide Until 2030

International tourist arrivals worldwide expected to reach 1.4B by 2020 and 1.8B by 2030



# Apple Tracking the Inevitable

From Visionary Startup to the Most Valuable Company in the World



# Top 5 companies in the World in 2001



**\$406B**



**\$365B**



**\$272B**



**\$261B**



**\$260B**

# Top 5 companies in the World in 2006



**\$446B**



**\$383B**



**\$372B**



**\$293B**



**\$273B**

# Top 5 companies in the World in 2011



**\$406B**



**\$376B**



**\$277B**



**\$237B**



**\$228B**

# Top 5 companies in the World in 2016



**\$582B**



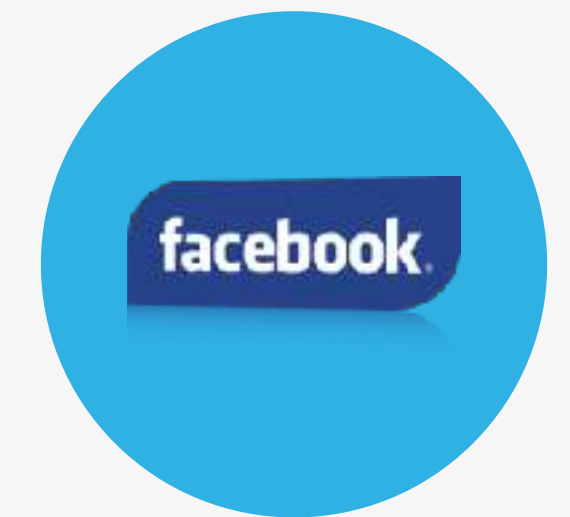
**\$556B**



**\$452B**



**\$364B**



**\$359B**

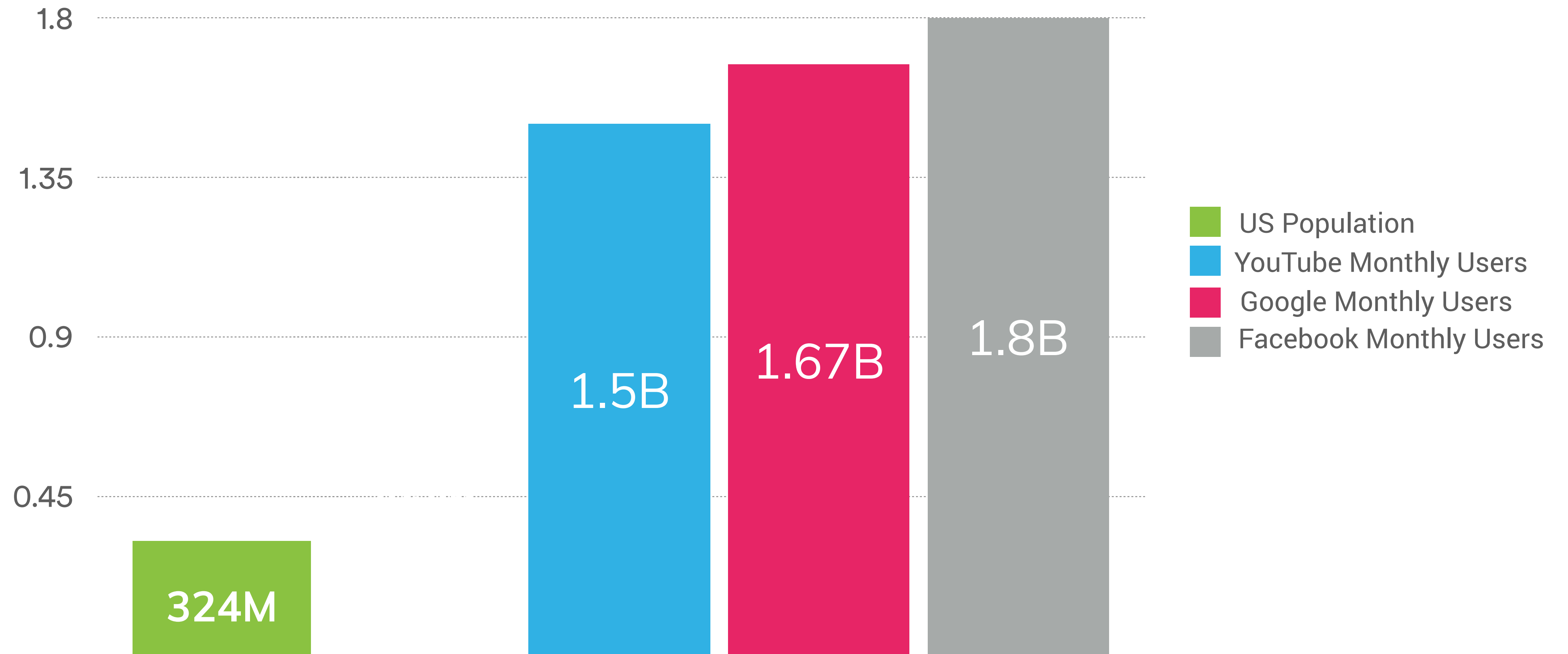


# The Value of Platforms



# The Growth in Tech Users is Global

The vast majority of tech customers come outside the United States

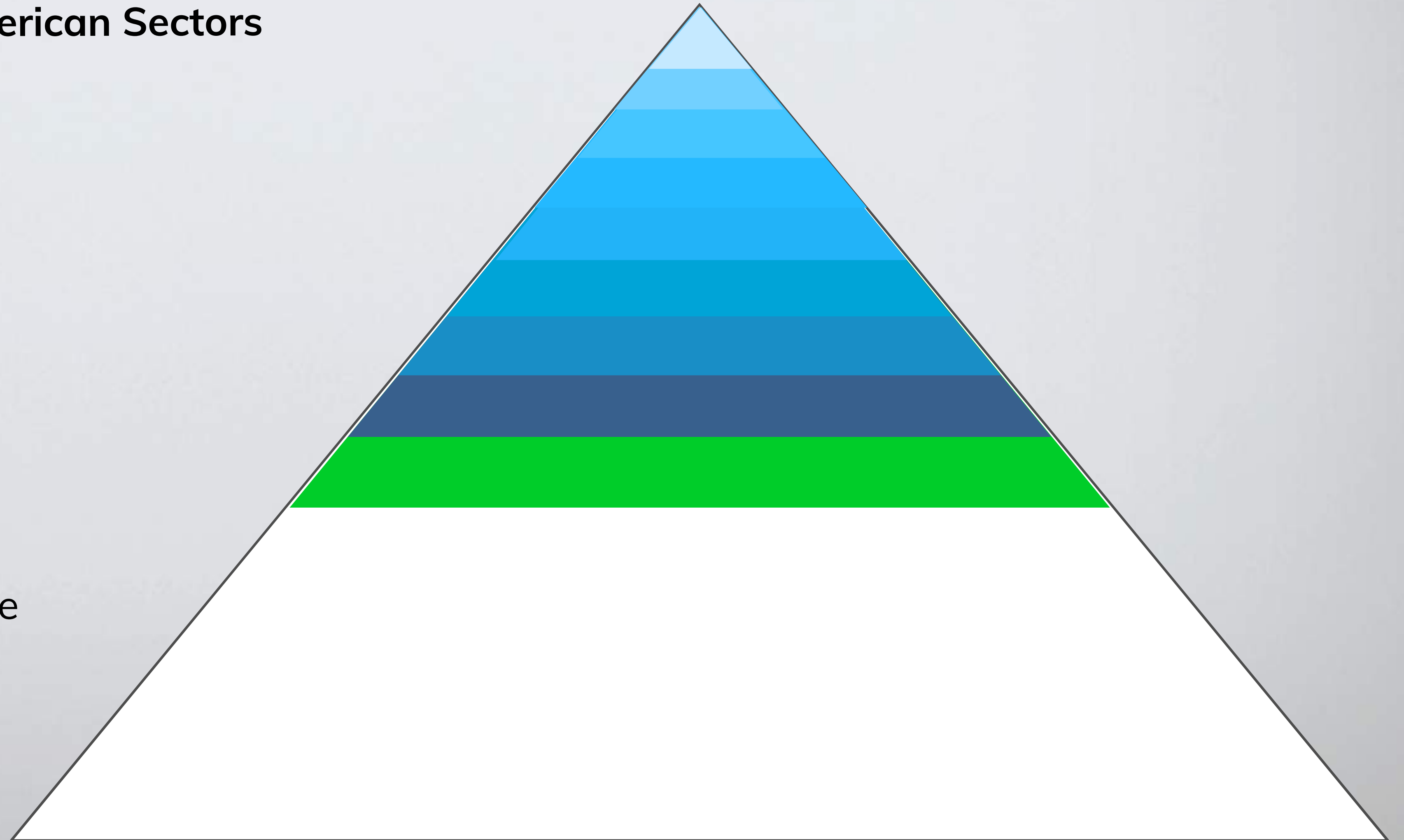


# American Sectors in the Global Context

America's Elite are now the Global Elite of a much bigger pie

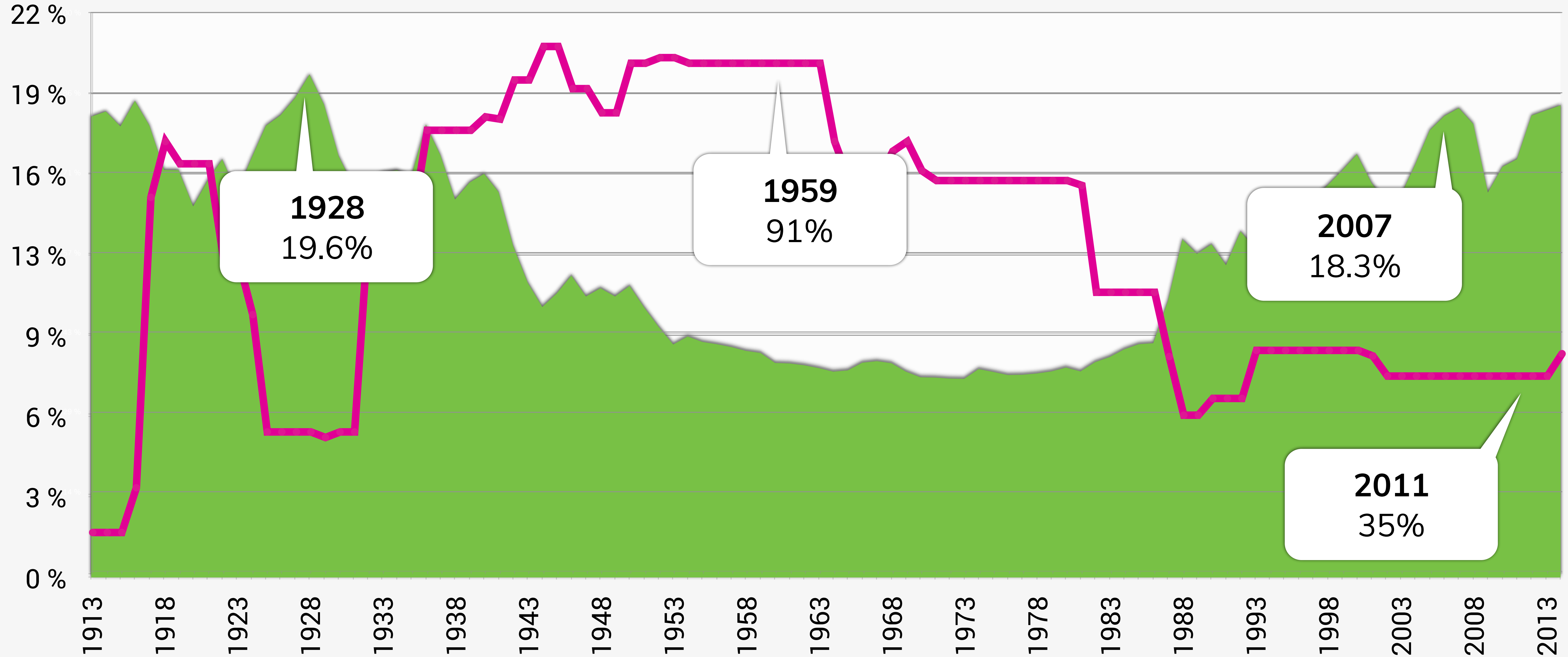
## Top Performing American Sectors

- Silicon Valley
- Hollywood
- Wall Street
- Biotechnology
- Aerospace
- Military
- Higher Education
- Healthcare
- Anything Innovative



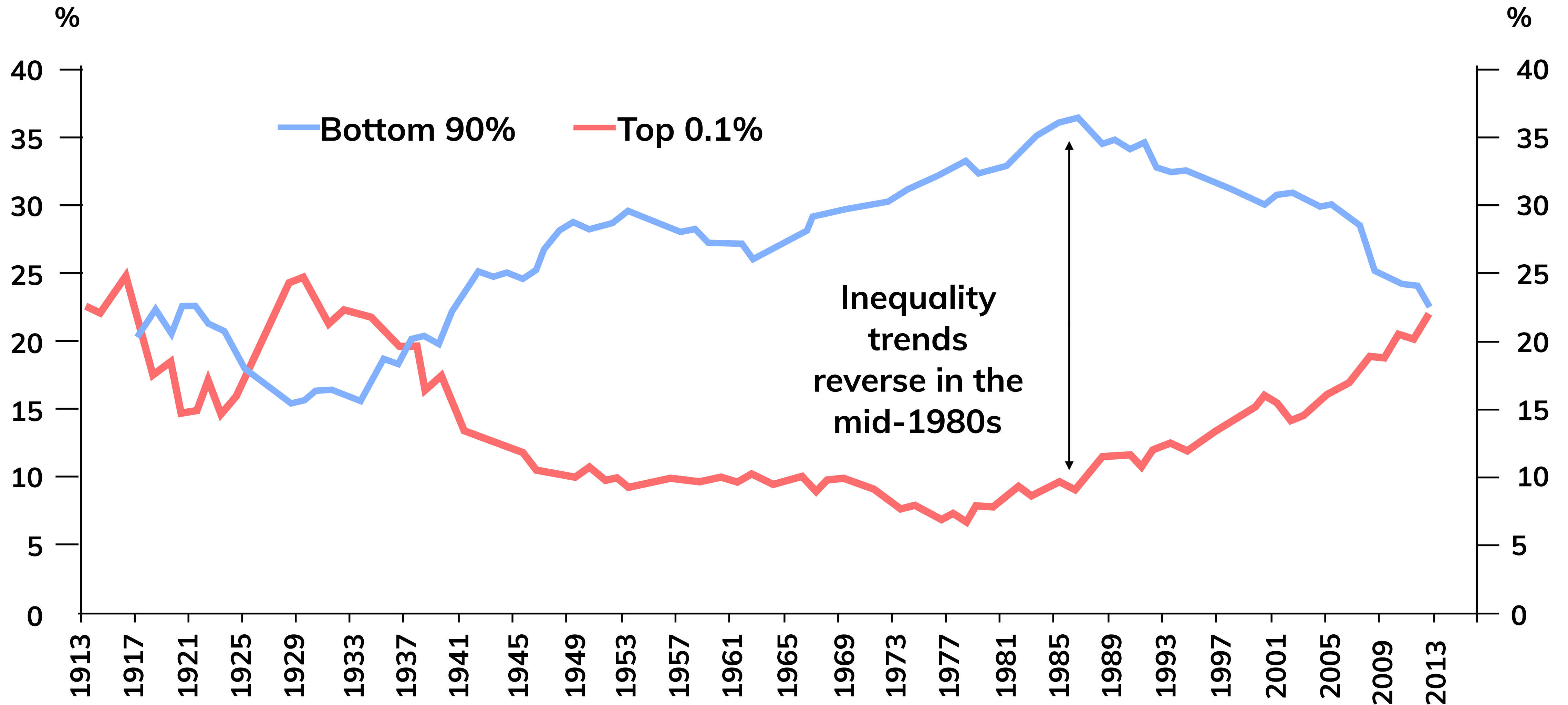
# Top 1% Share of Total Income

American incomes above \$398,900 in 2008 make the cut - like the 1920s



# Top 1% Owns as Many Assets as Bottom 90% Today

American inequality back where it was at the start of the Great Depression in 1930s

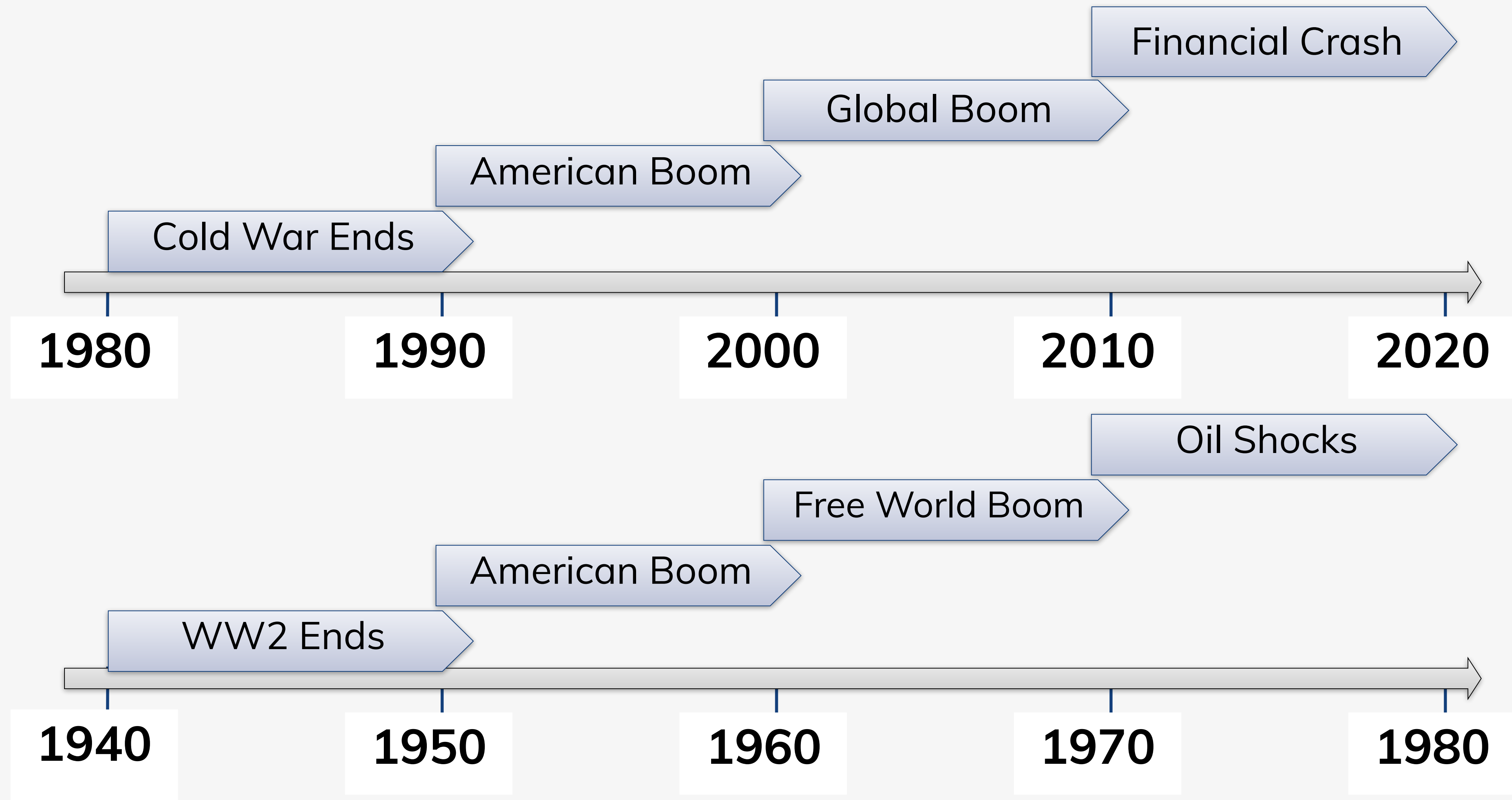




# The Long Boom

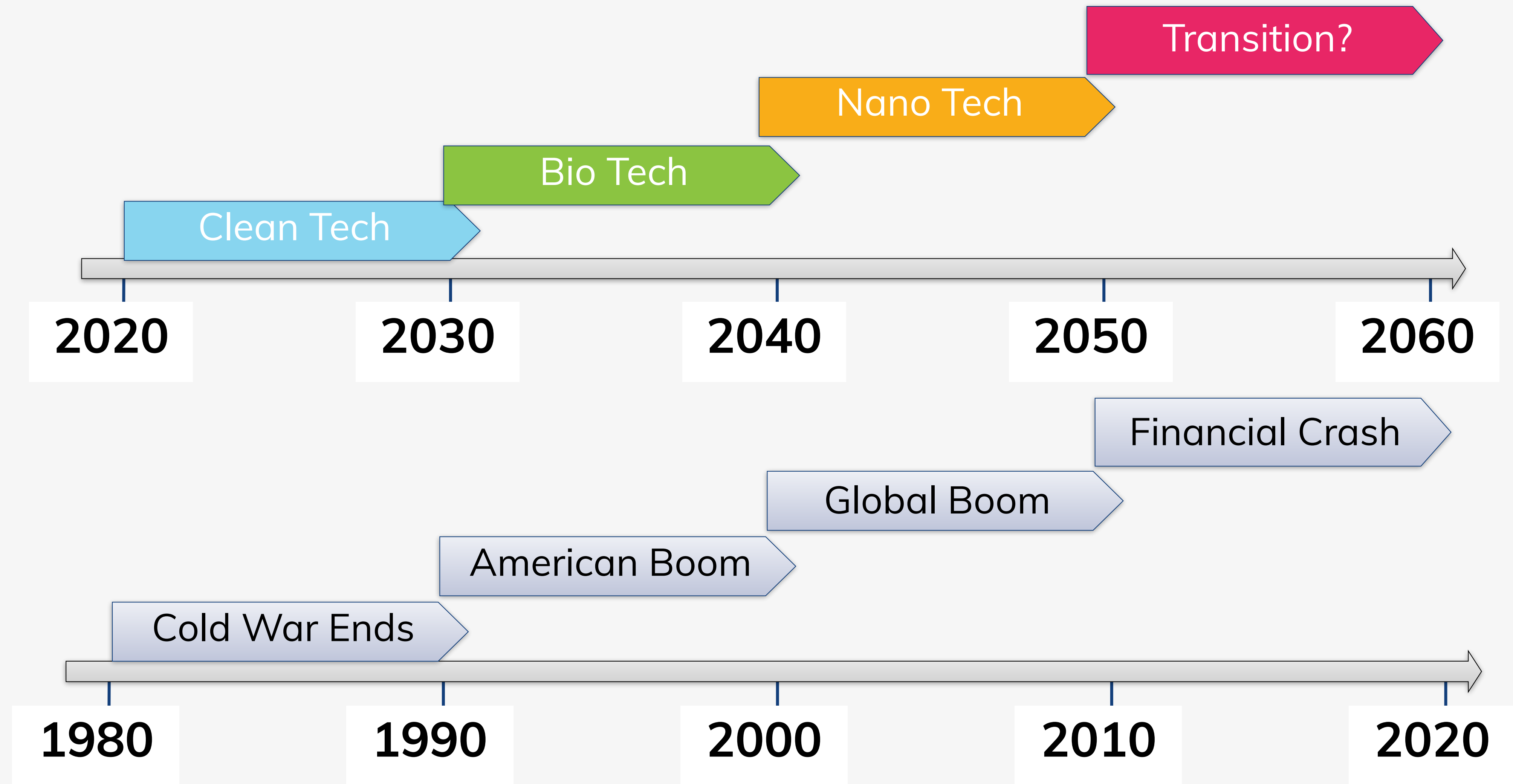
# The Long View of Long Booms

True economic growth is much more about core technologies & market integration



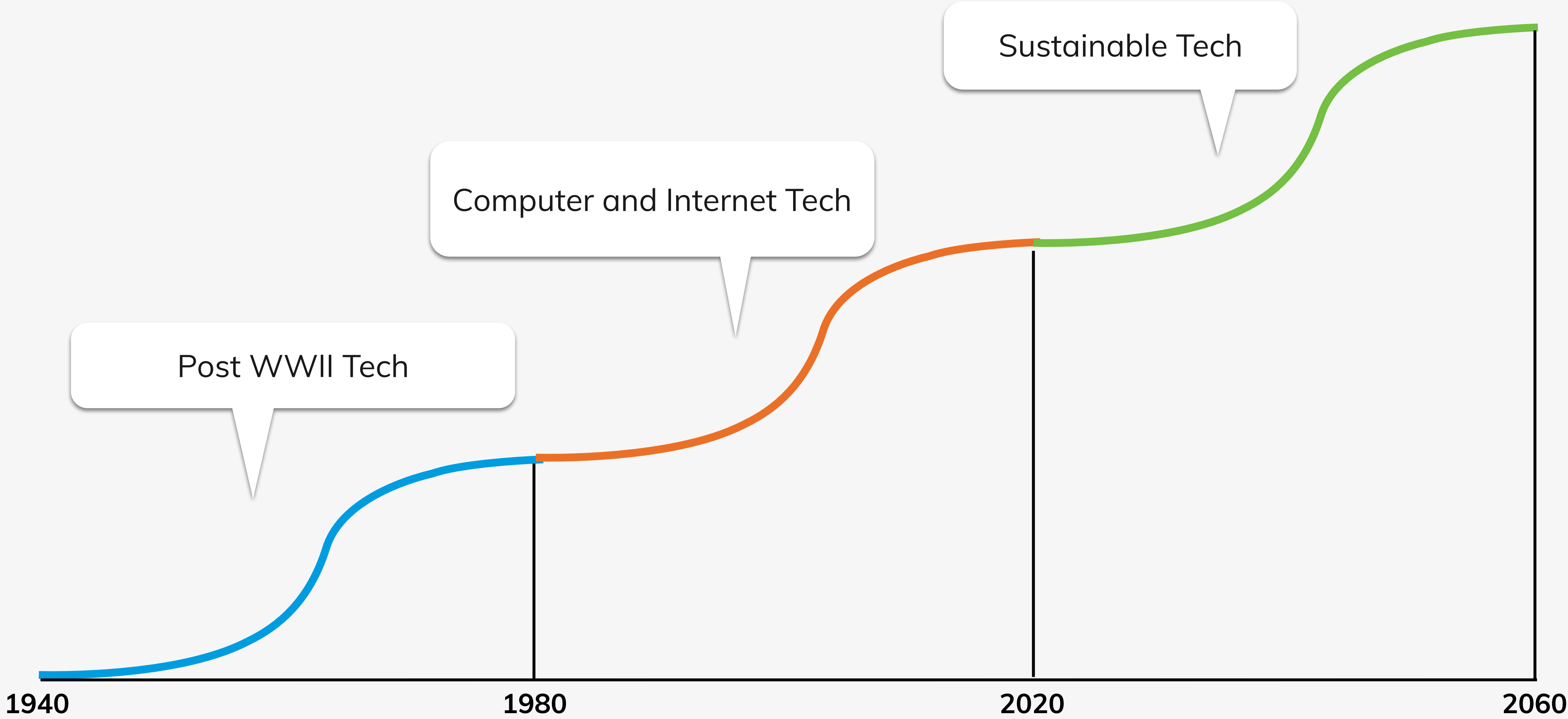
# The Long View of Long Booms

True economic growth is much more about core technologies & market integration



# The Next Mega Tech Adoption

Almost certainly a wide array of clean energy & sustainable technologies and infrastructure



Source: U.S. Bureau of Economic Analysis; [www.cnbc.com/id/20510977](http://www.cnbc.com/id/20510977)



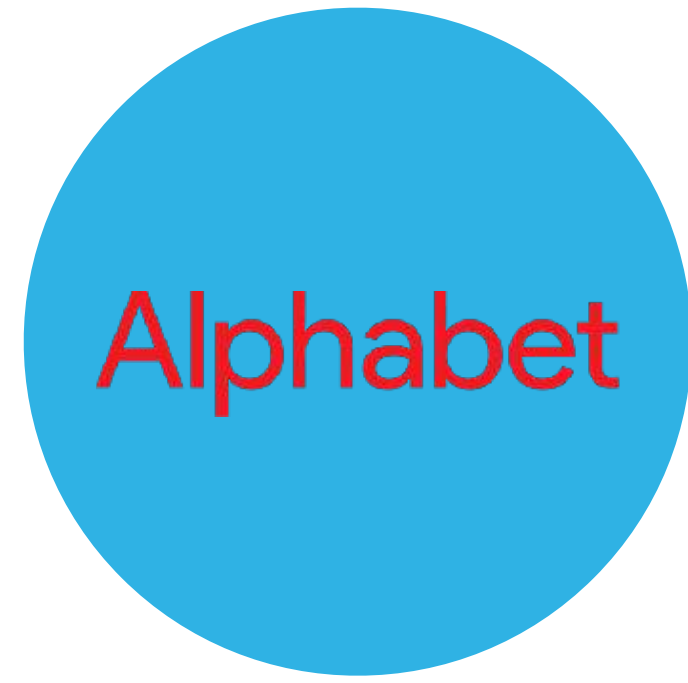


# The Chinese Long Boom

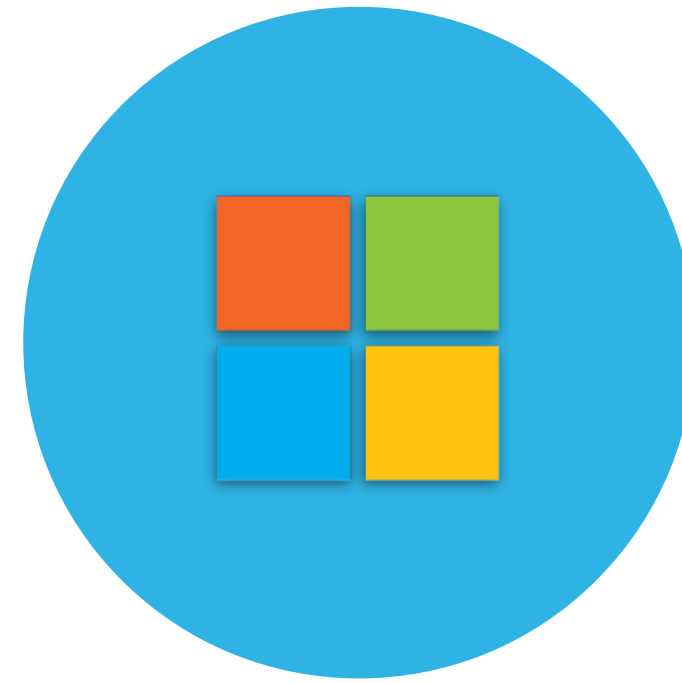
# 2017: Top Ten Companies in the World



**\$749B**



**\$628B**



**\$528B**



**\$491B**



**\$463B**



**\$442B**



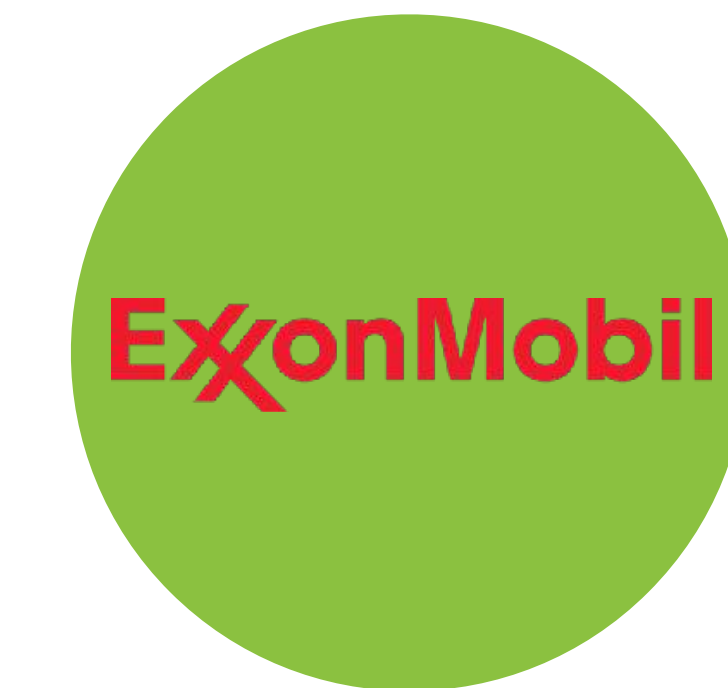
**\$440B**



**\$400B**



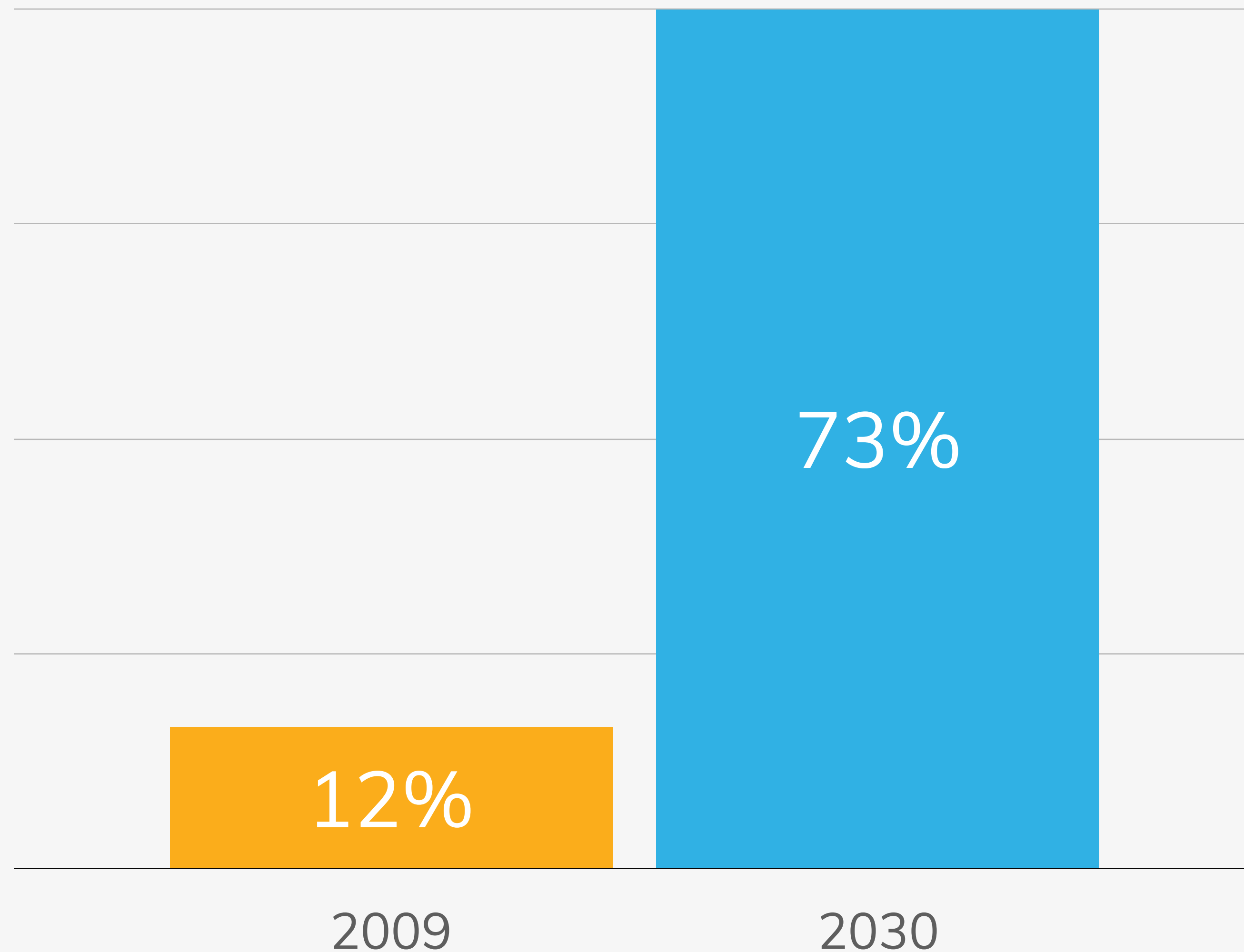
**\$358B**



**\$340B**

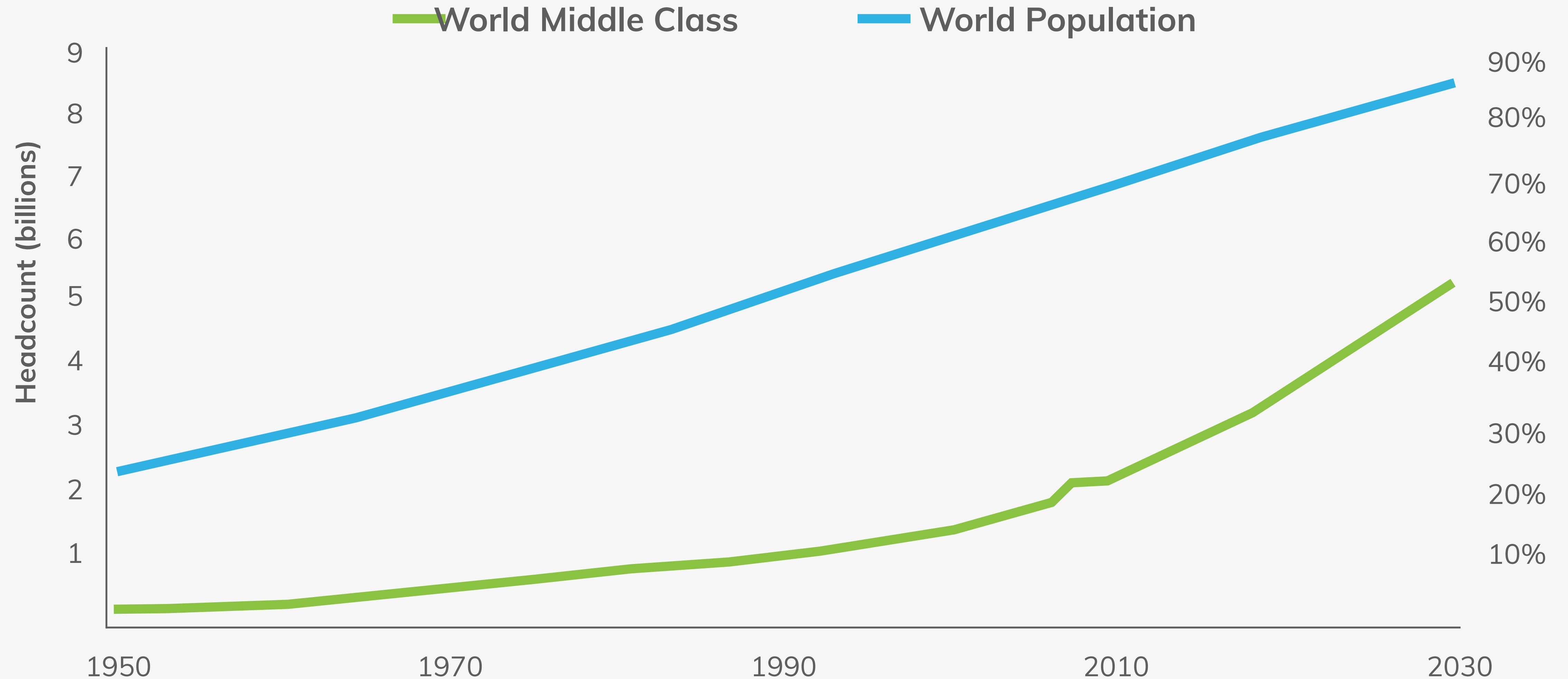
# Growth of the Chinese Middle Class

The Chinese Population of 1.3 Billion are dramatically moving to the Middle Class



# Growth of the Global Middle Class

The global middle class is growing at a faster rate than global population

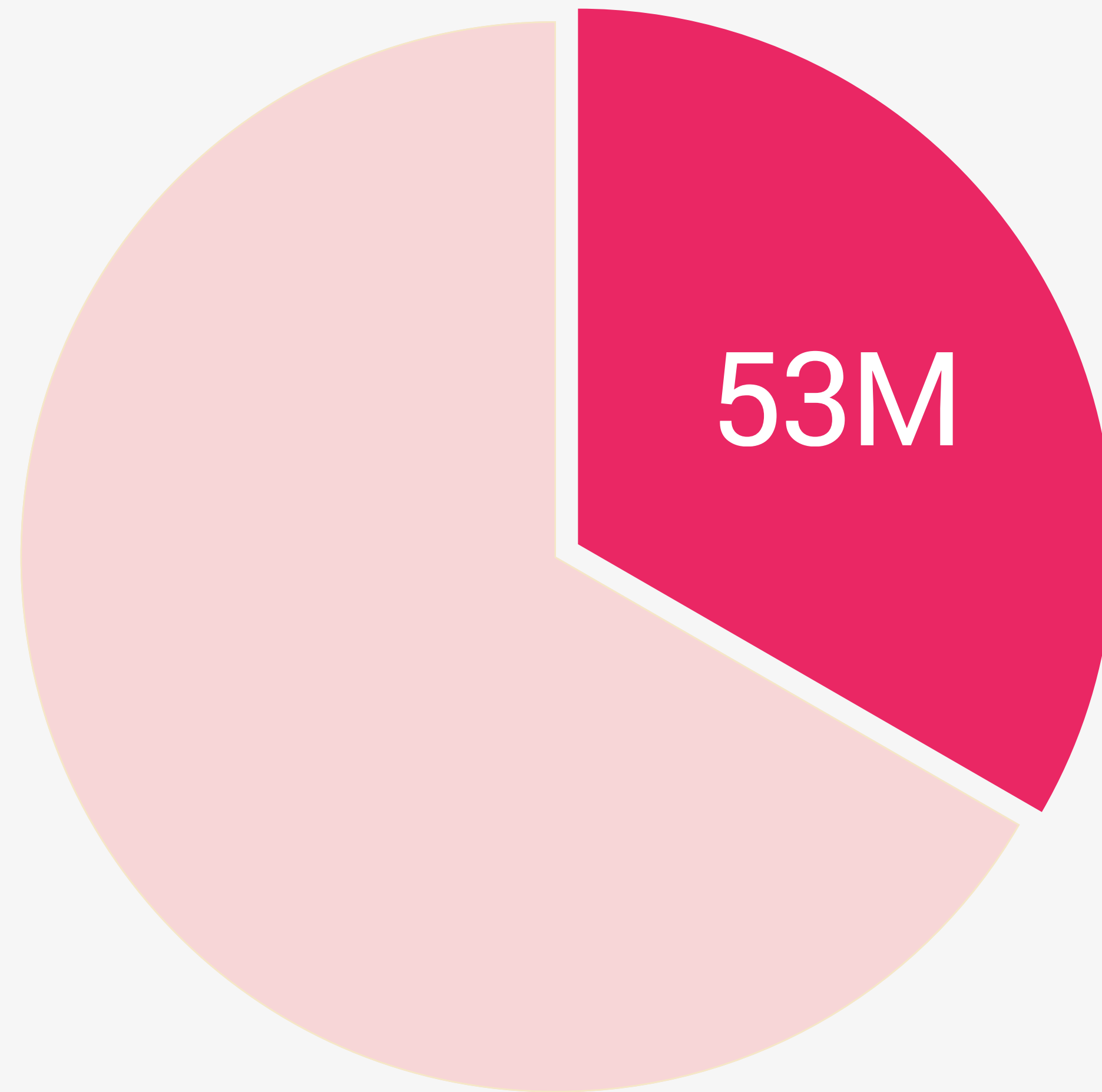


# Future of Work and Smart Cities



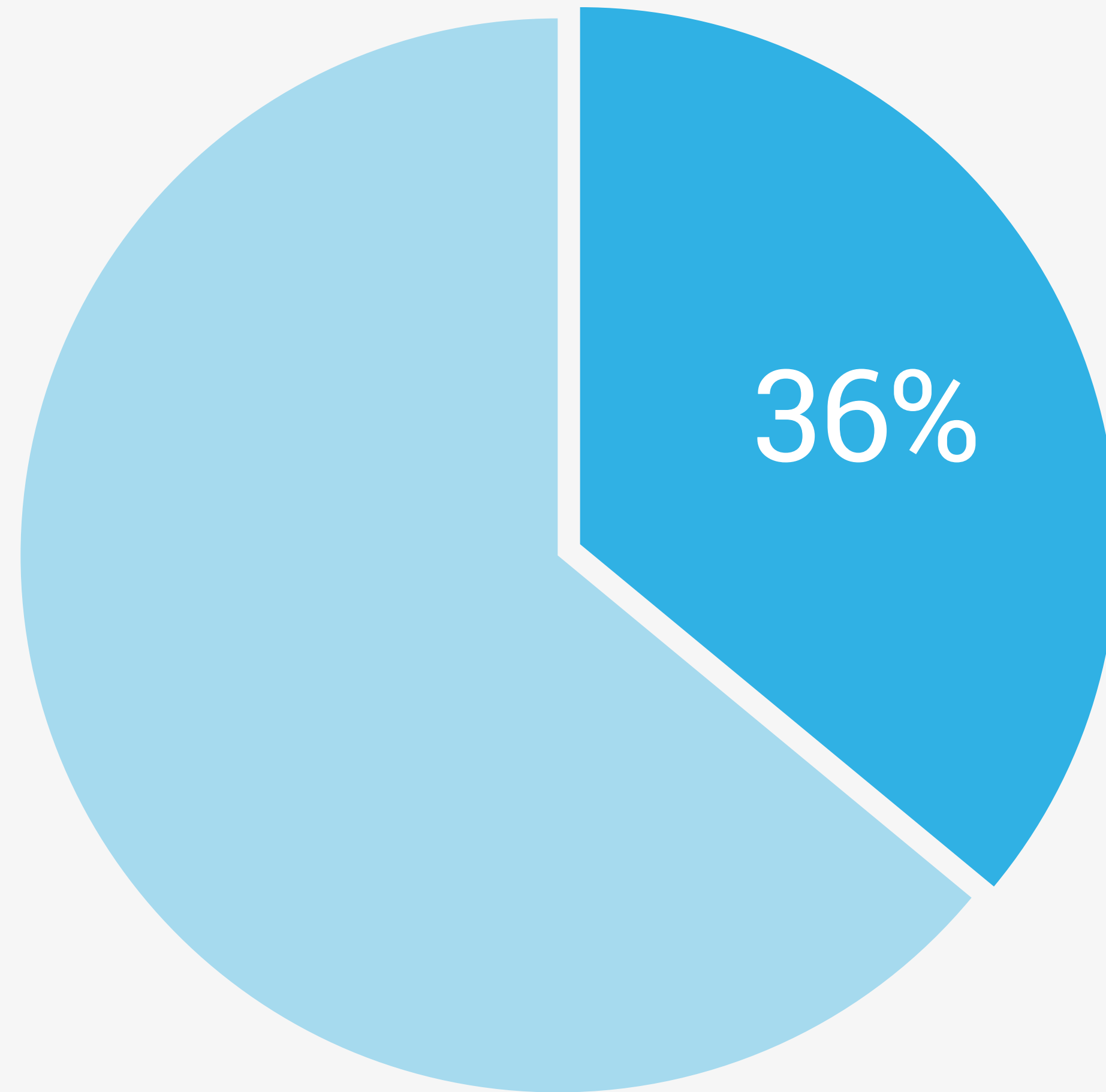
# More Workers Now Independent: One-Third of U.S.

The majority of freelancers & contractors consistently like it better than regular jobs

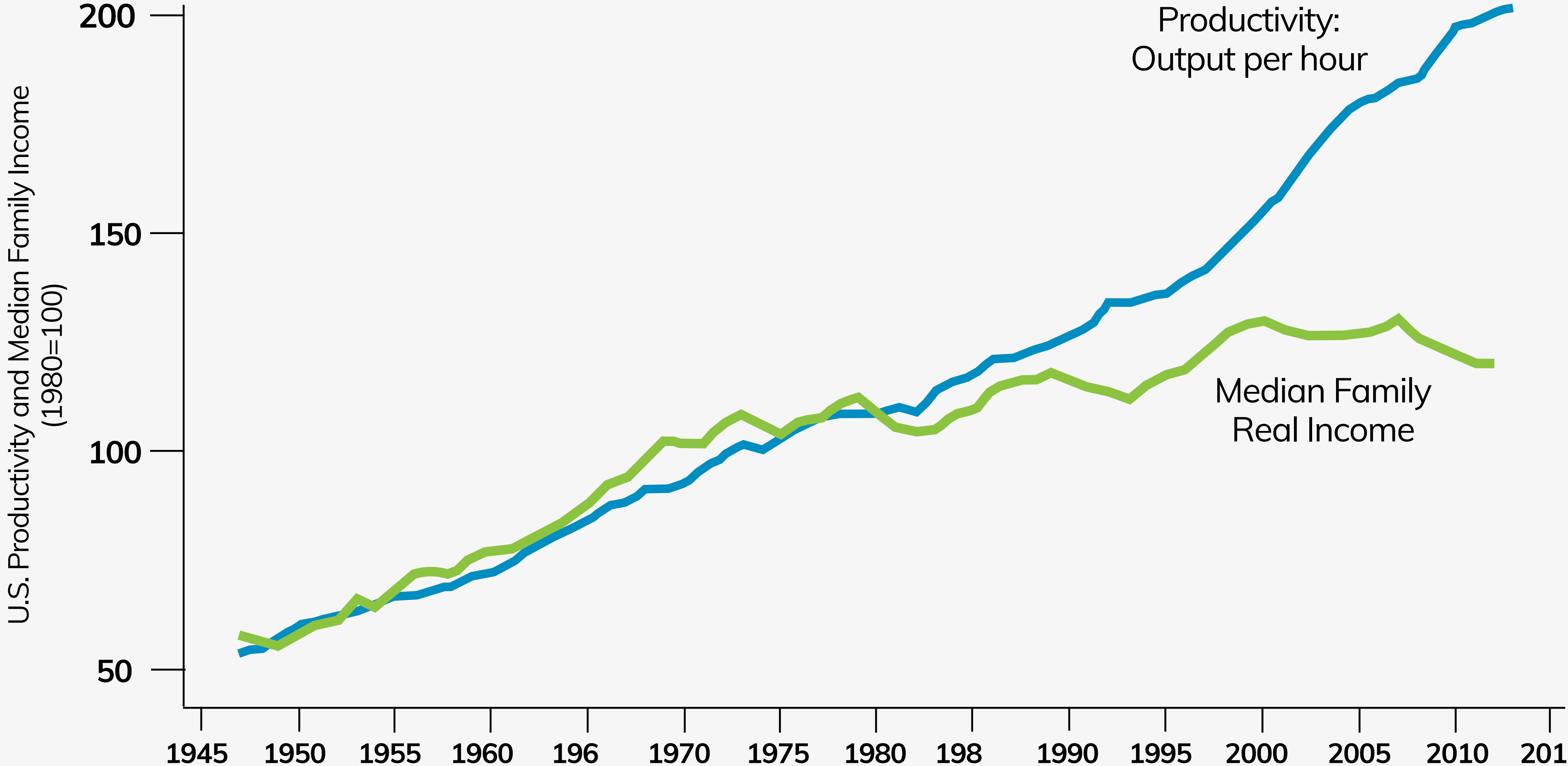


# More than One-Third of Americans Earn Multiple Incomes

Percent of Americans who reported income coming from more than 1 source

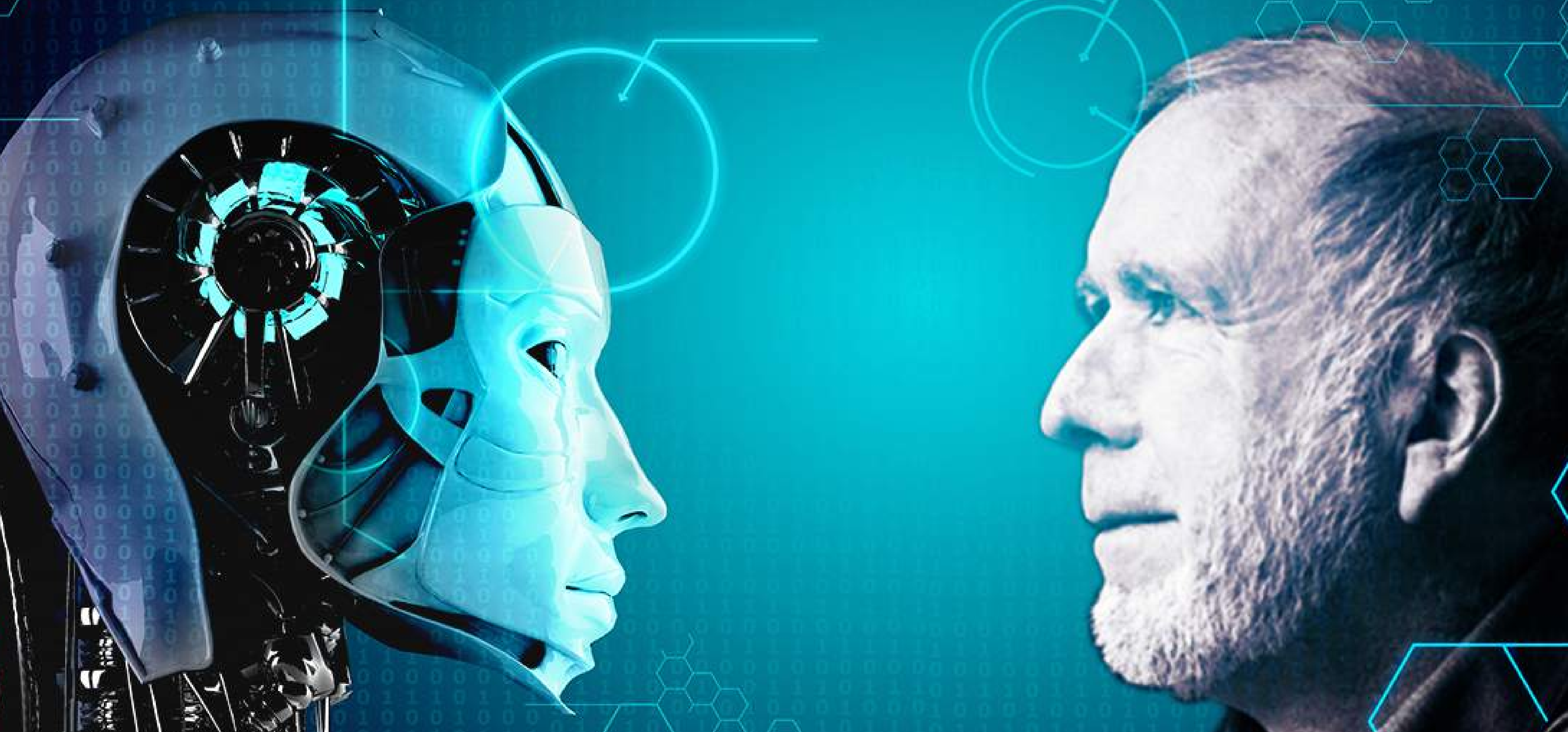


# Technology & the Rise of Labor Productivity

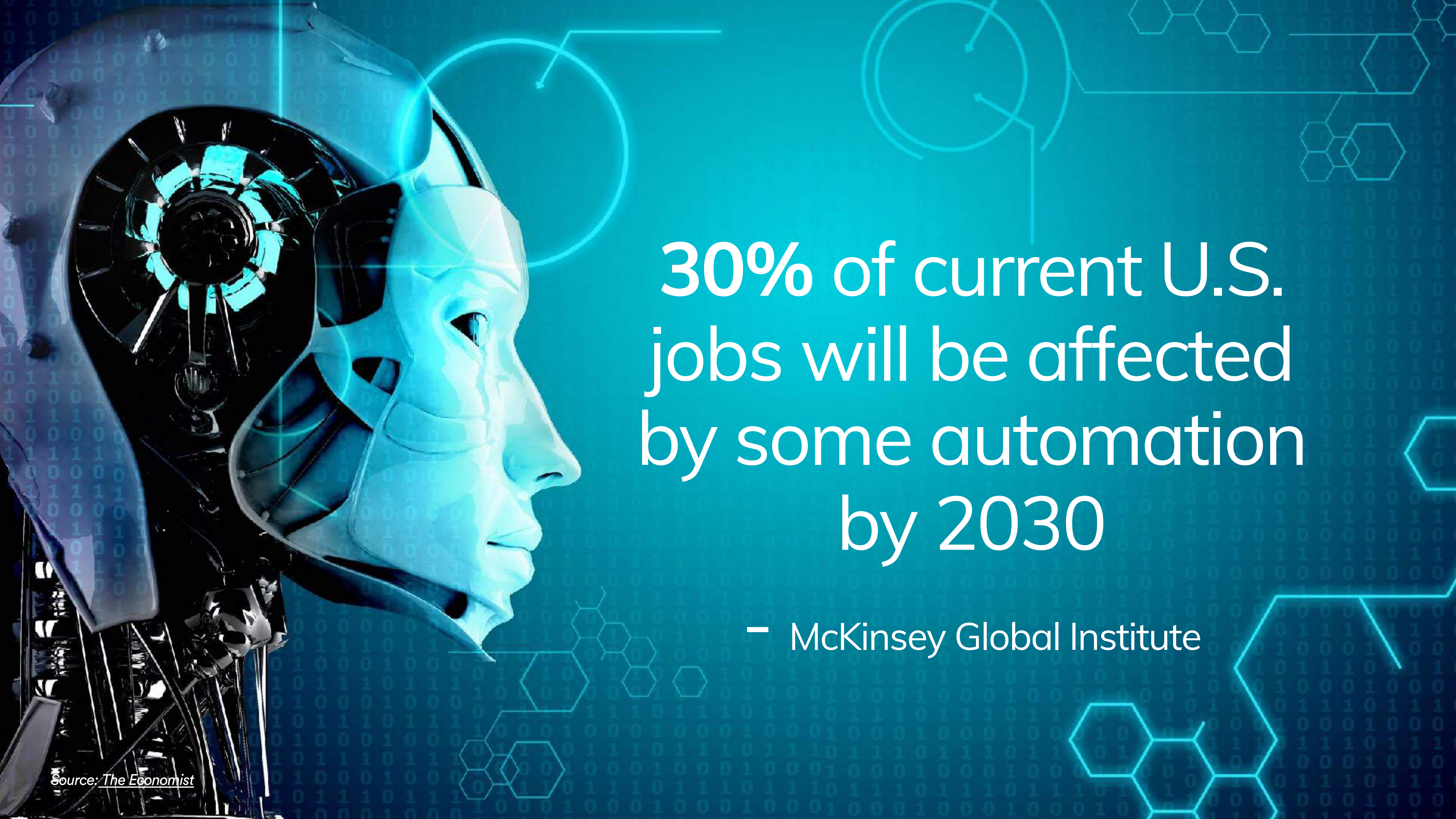


Source: [House of Debt](#)





# The Arrival of AI & Advanced Robotics



30% of current U.S.  
jobs will be affected  
by some automation  
by 2030

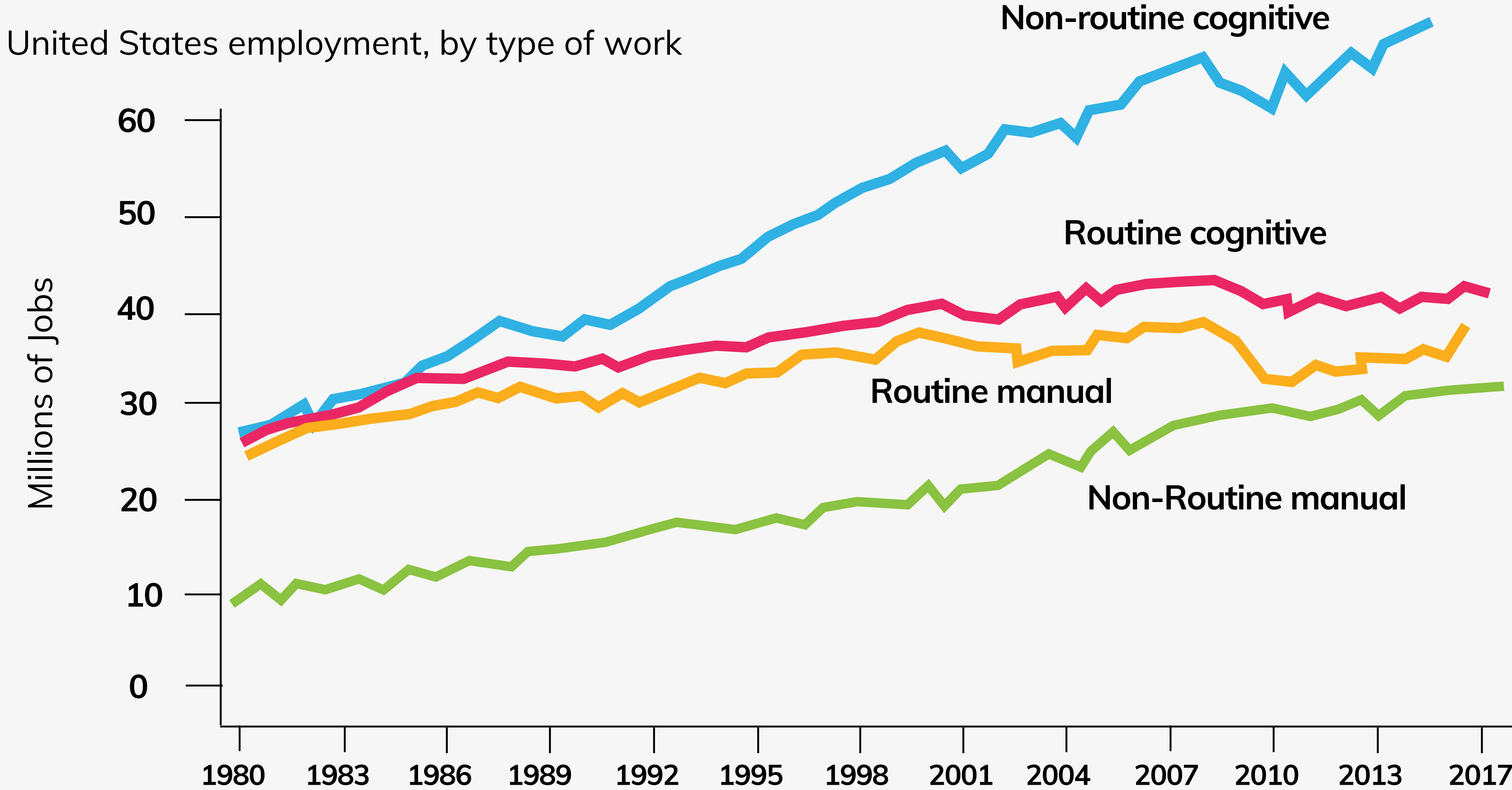
— McKinsey Global Institute



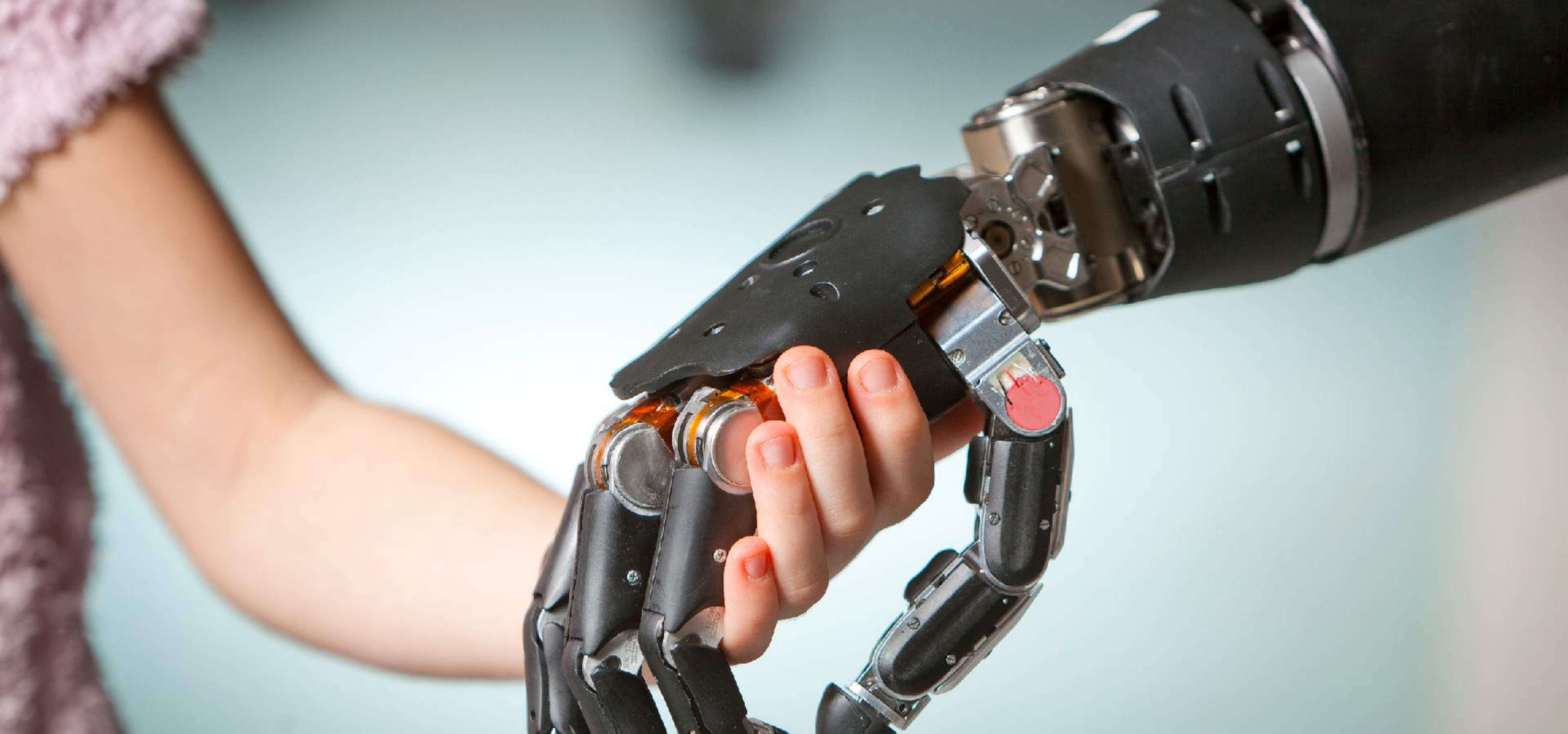
# Vulnerable White Collar Jobs Too



# Machines do Routine Work & Humans Non-routine



Source: [Economist](#)



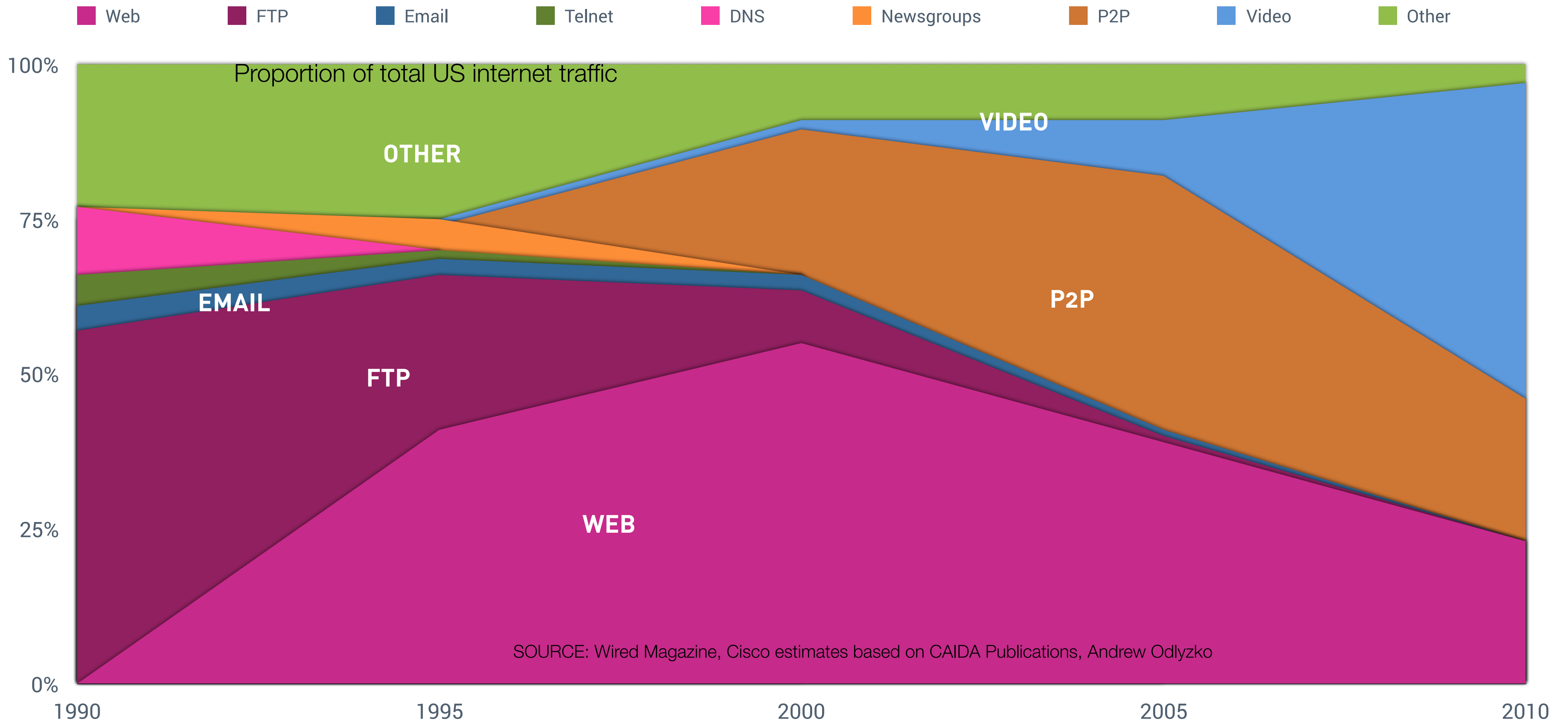
A Potentially Fruitful Coexistence



# A Video Paradigm Shift

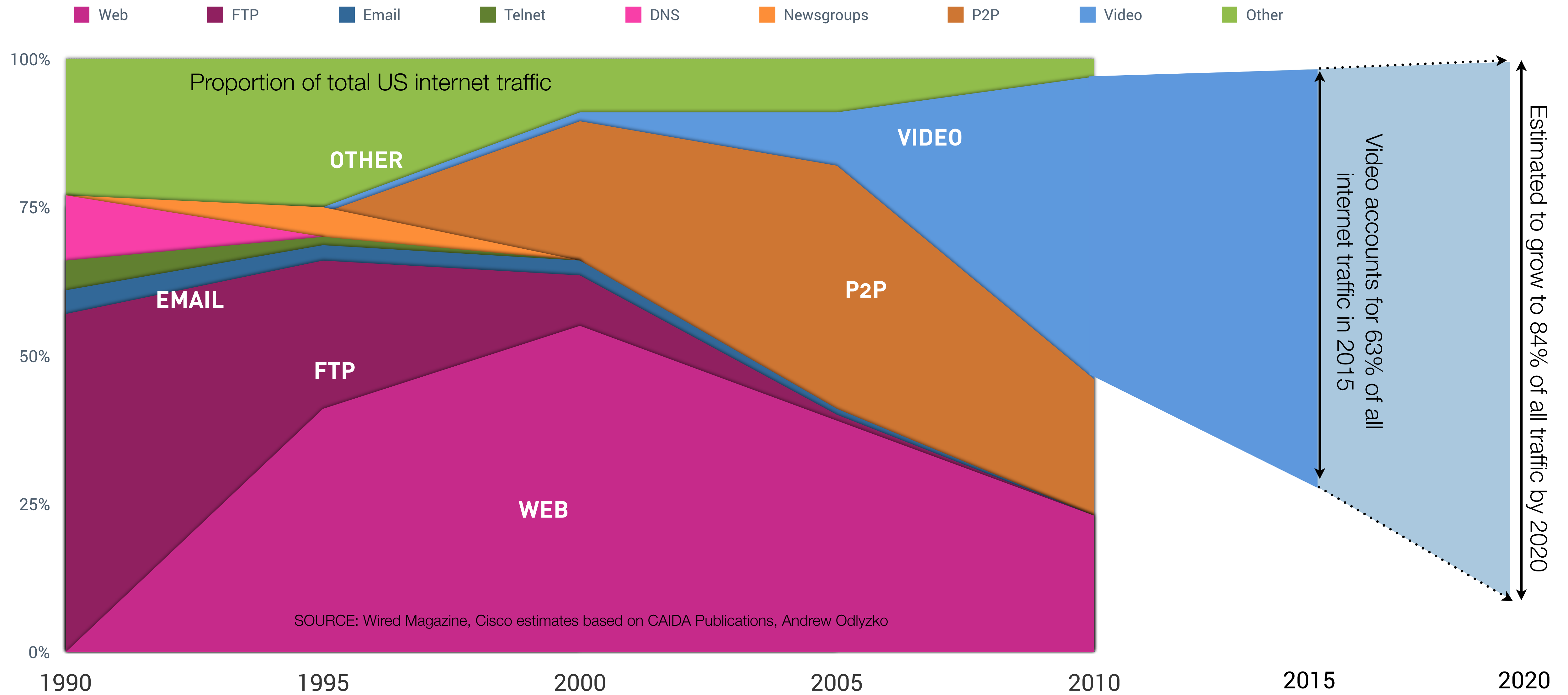
# The Internet Video Explosion

Since YouTube more than half of all internet traffic is video



# The Internet Video Explosion - Extended

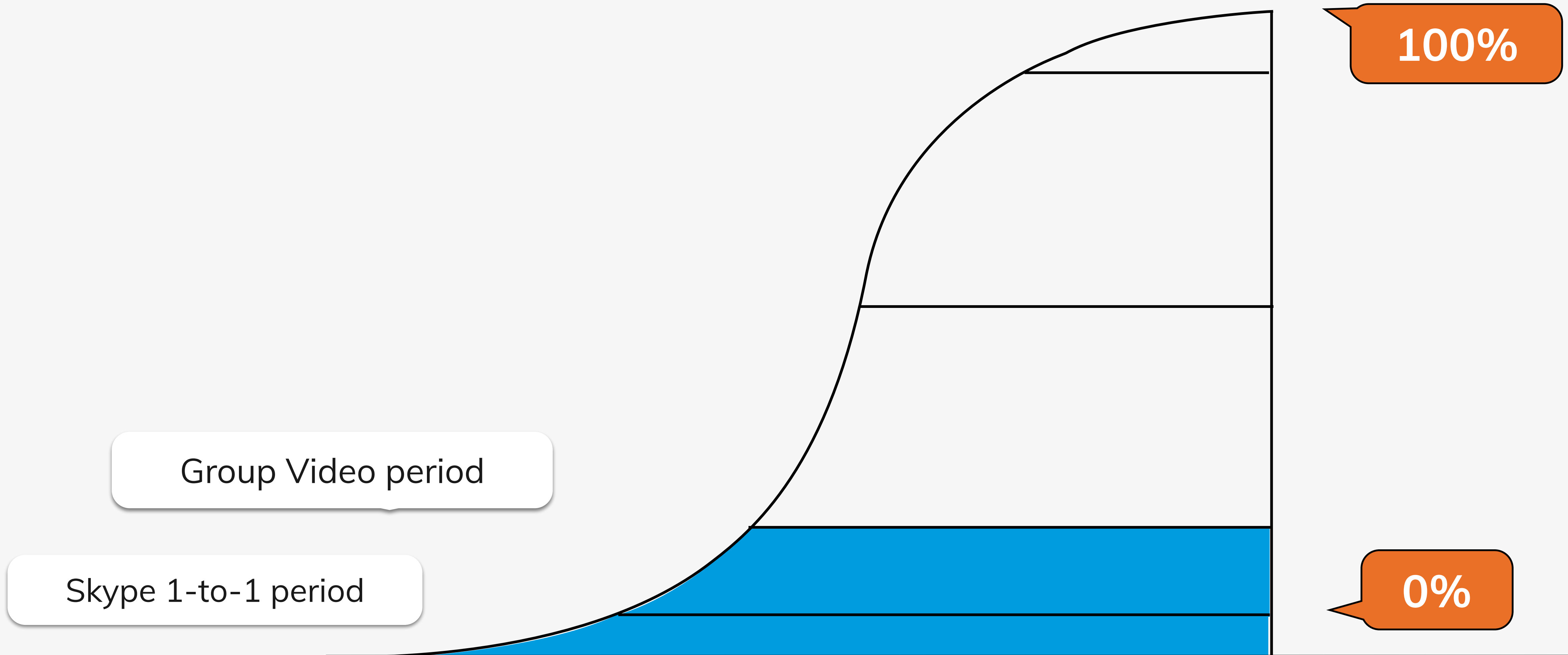
Since YouTube more than half of all internet traffic is video





# Group Video Adoption Curve

The classic process applied to interactive group video



*Note: figures are in billions of chained 2000 dollars*

Source: U.S. Bureau of Economic Analysis; [www.cnbc.com/id/20510977](http://www.cnbc.com/id/20510977)



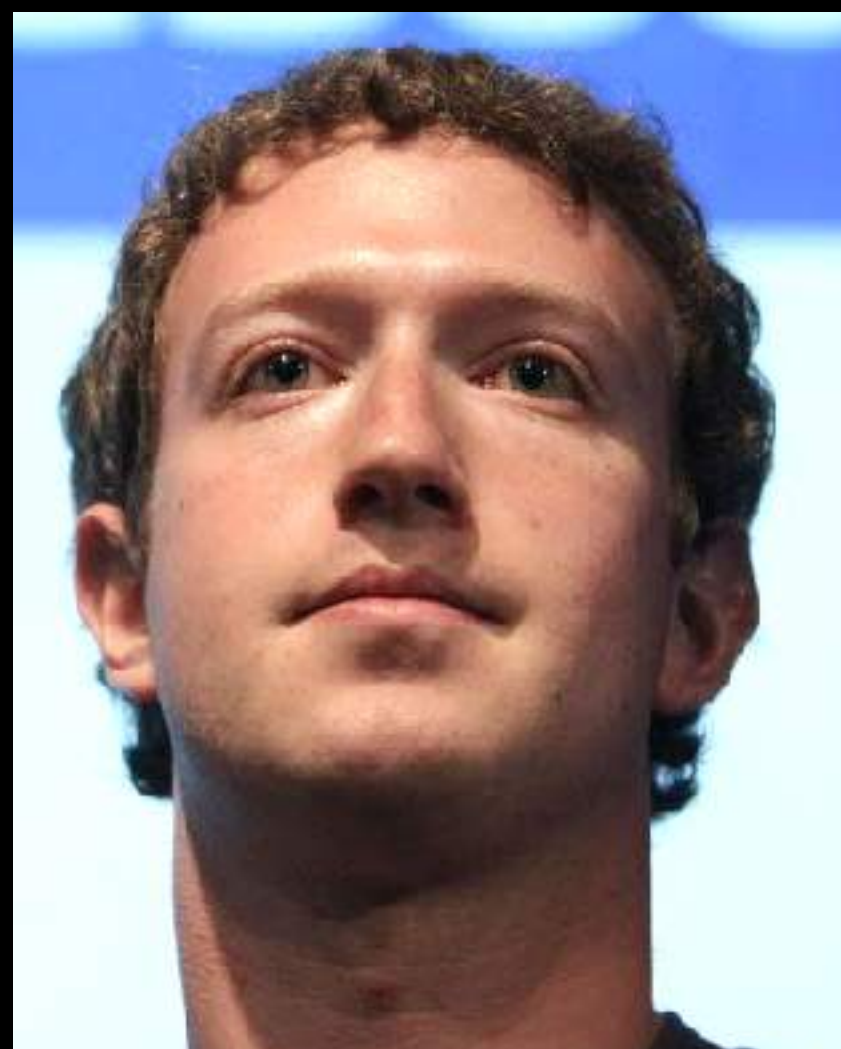
The Next Era of Complex Collaboration

# A Virtual Video Choir

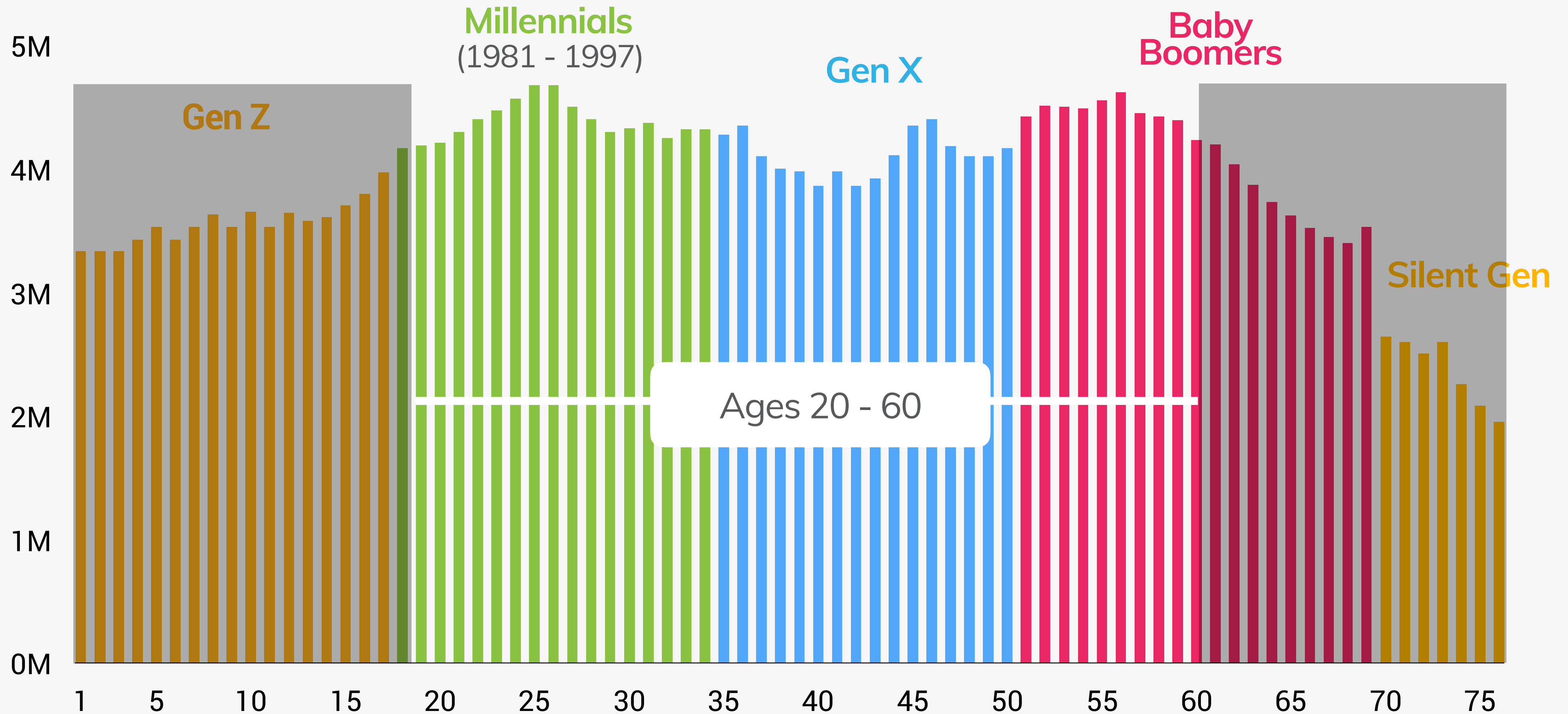
A prescient example of extremely nuanced, complex collaboration



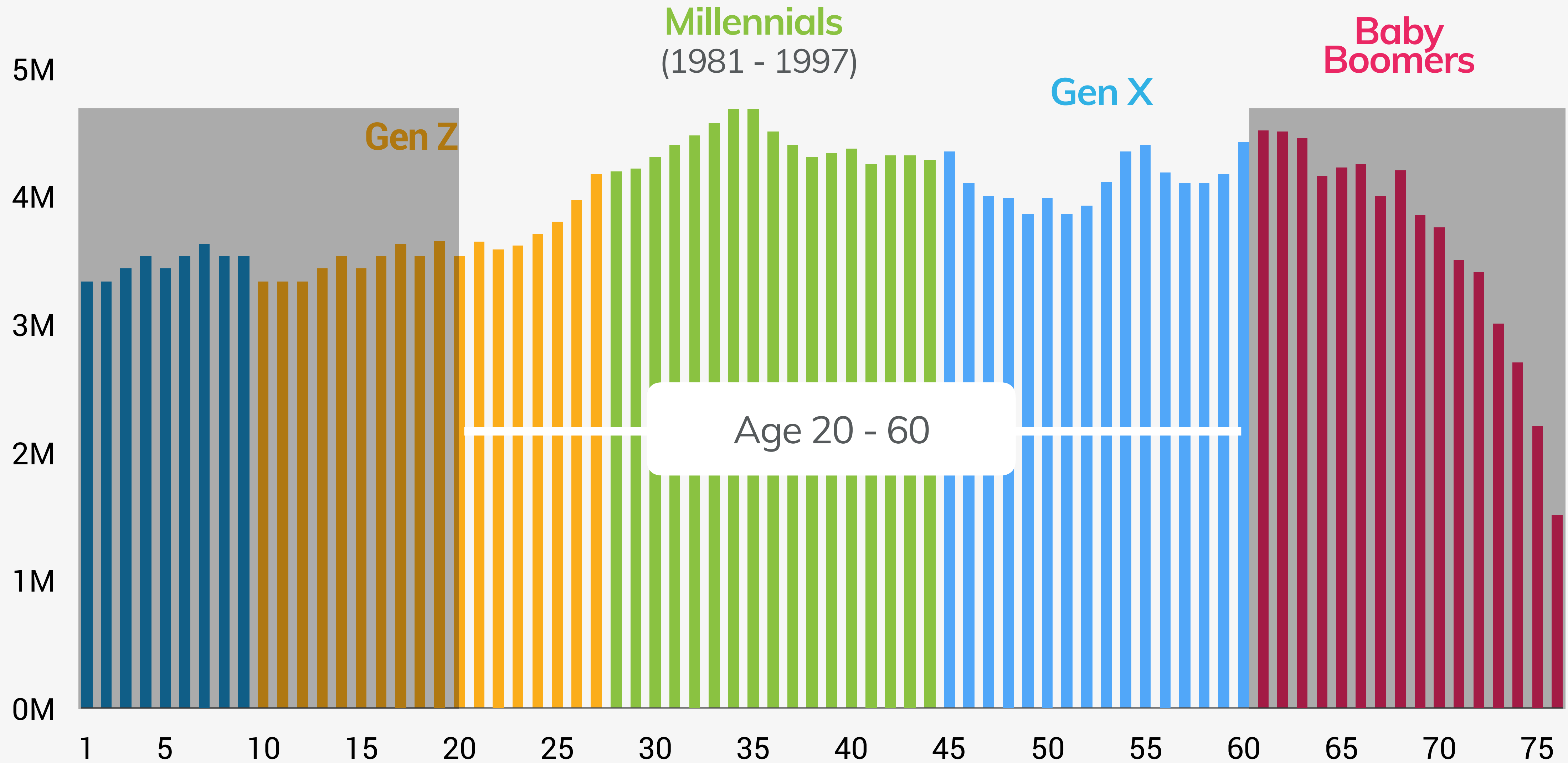
# The Millennial Generation



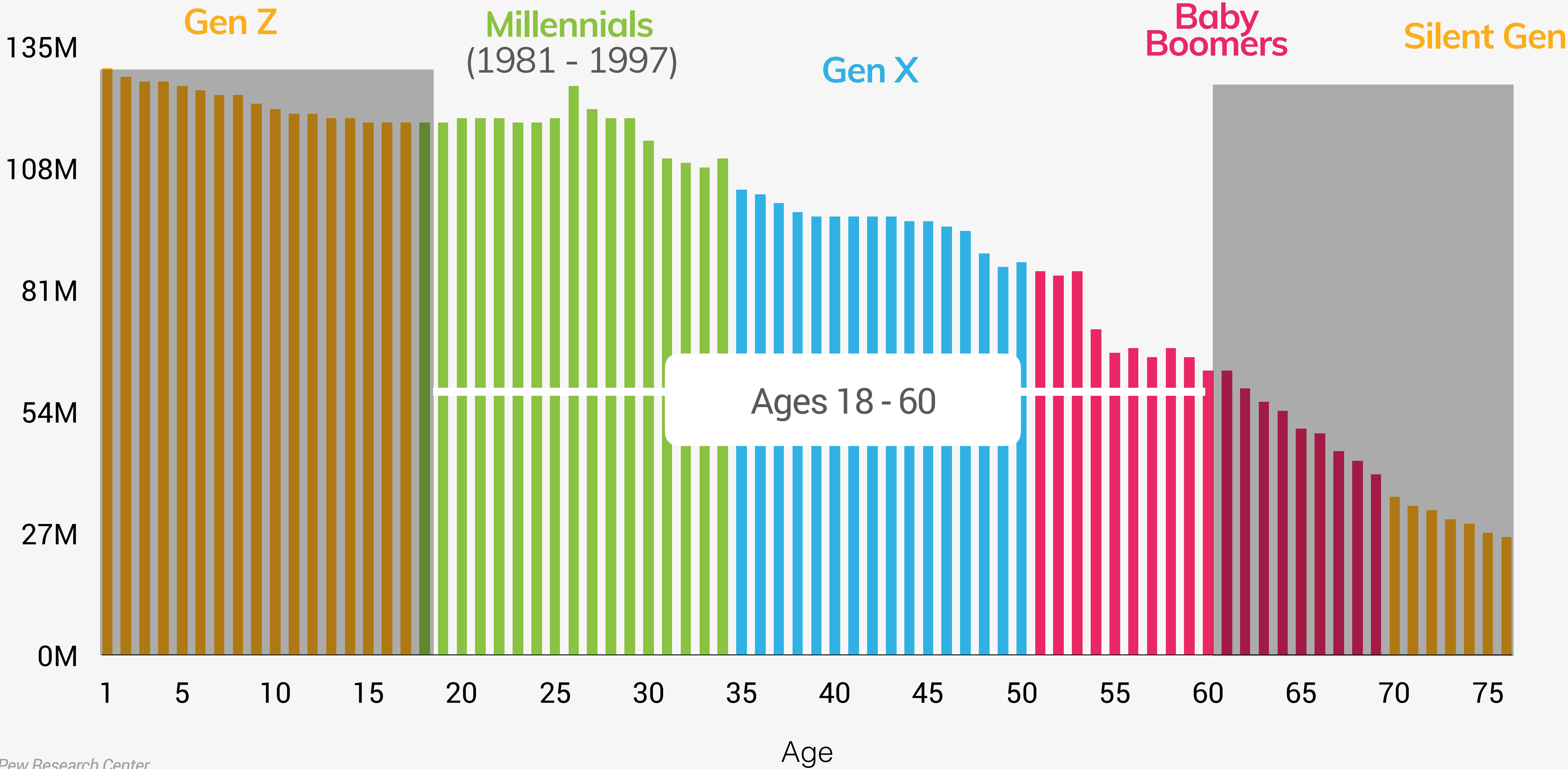
# The U.S. Millennial Generation Now Ascendant



# The U.S. Millennials Will Dominate By 2025

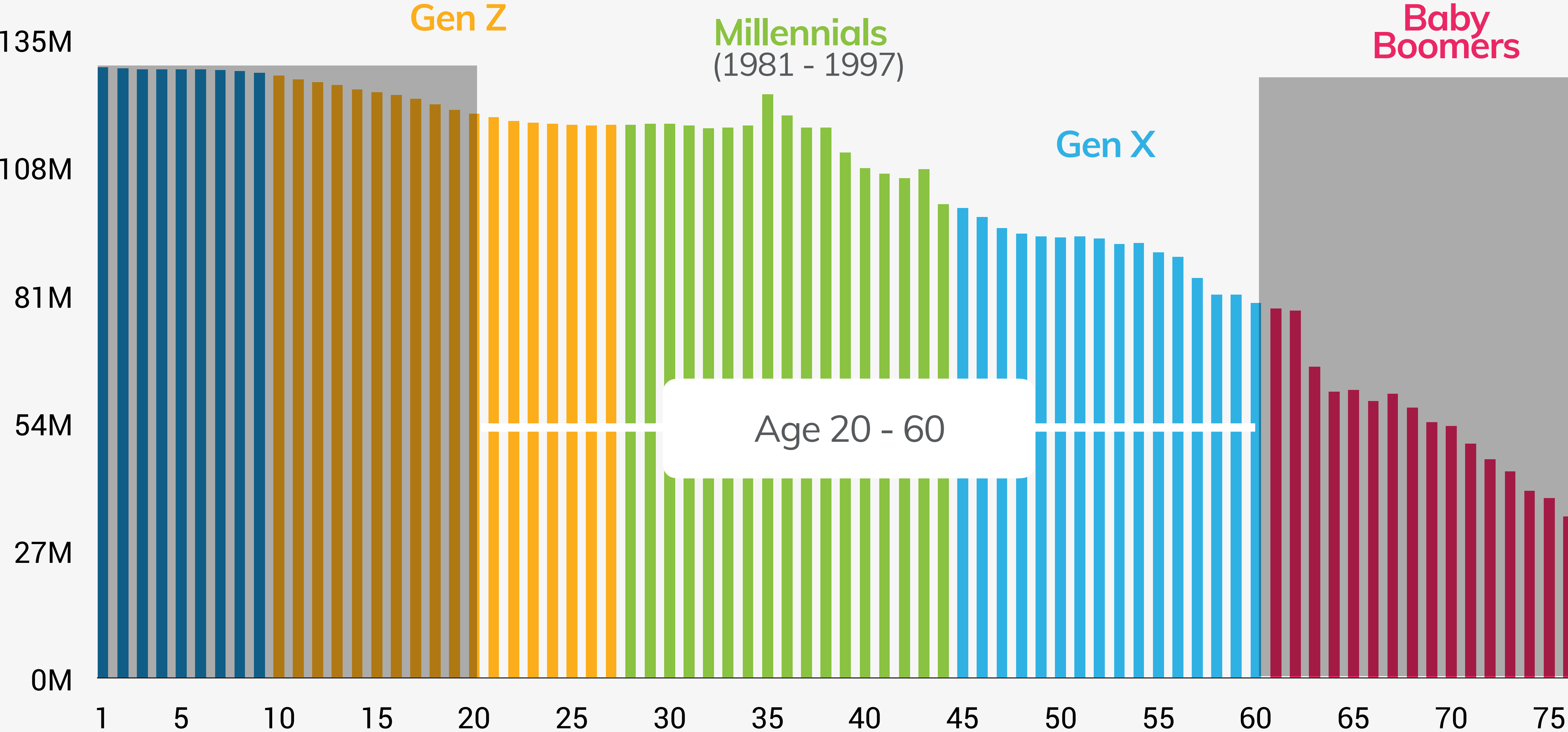


# Global Millennial Generation Even Larger Force Today



Source: *Pew Research Center*

# Global Millennial Generation Even More Impactful in



Source: [Pew Research Center](#)

Age





Tech Savvy

Collaborative

Civic-Minded

Racially Diverse

Global

Green



Media Savvy

Individualistic

Indulgent

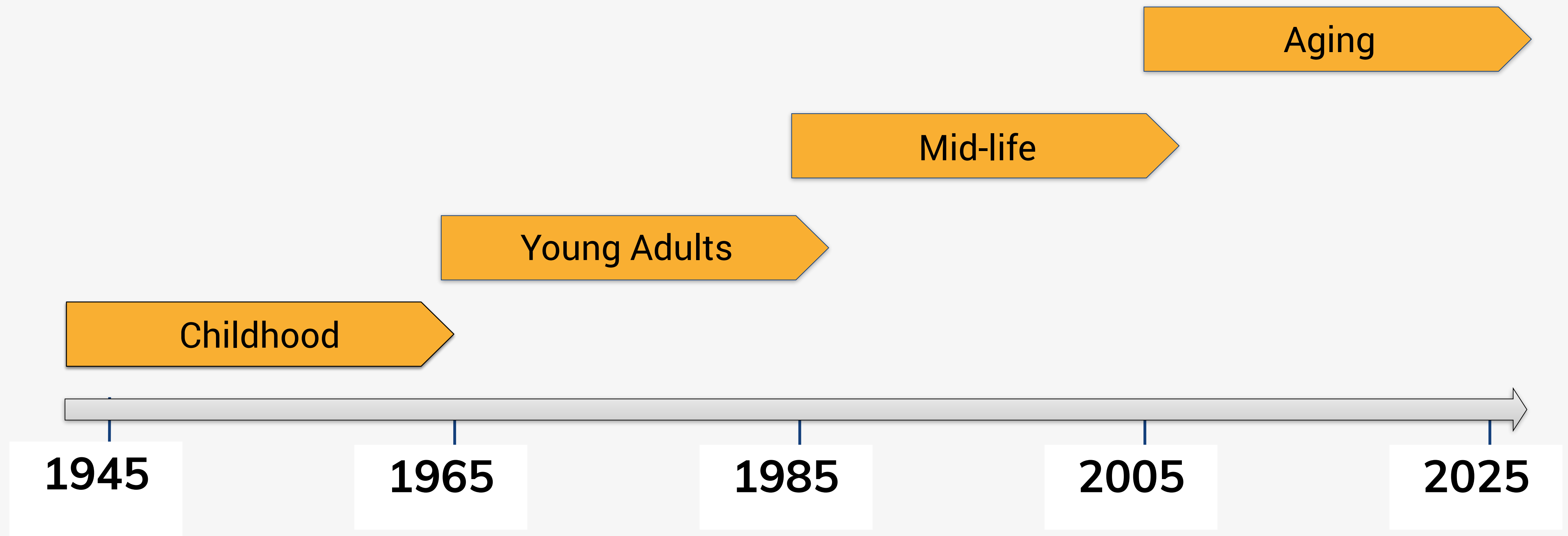
Largely White

Nationalistic

Principled

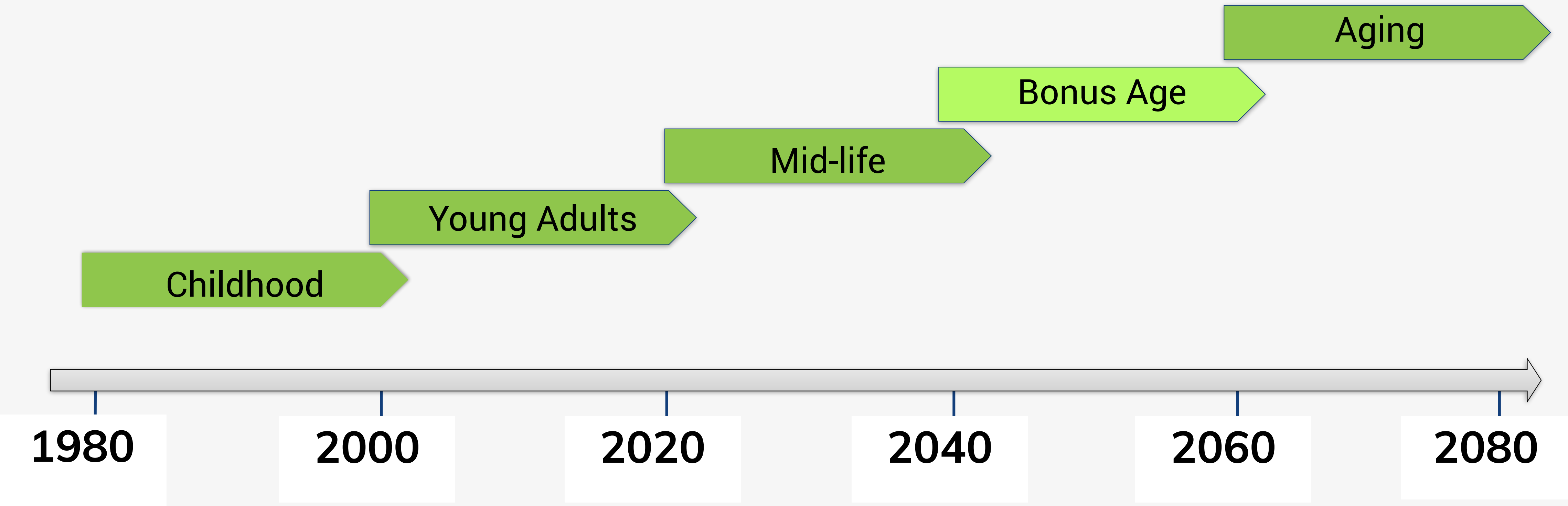
# Boomer Life Stage Timeline

At every life stage Boomers drove the economy & society and reshaped America



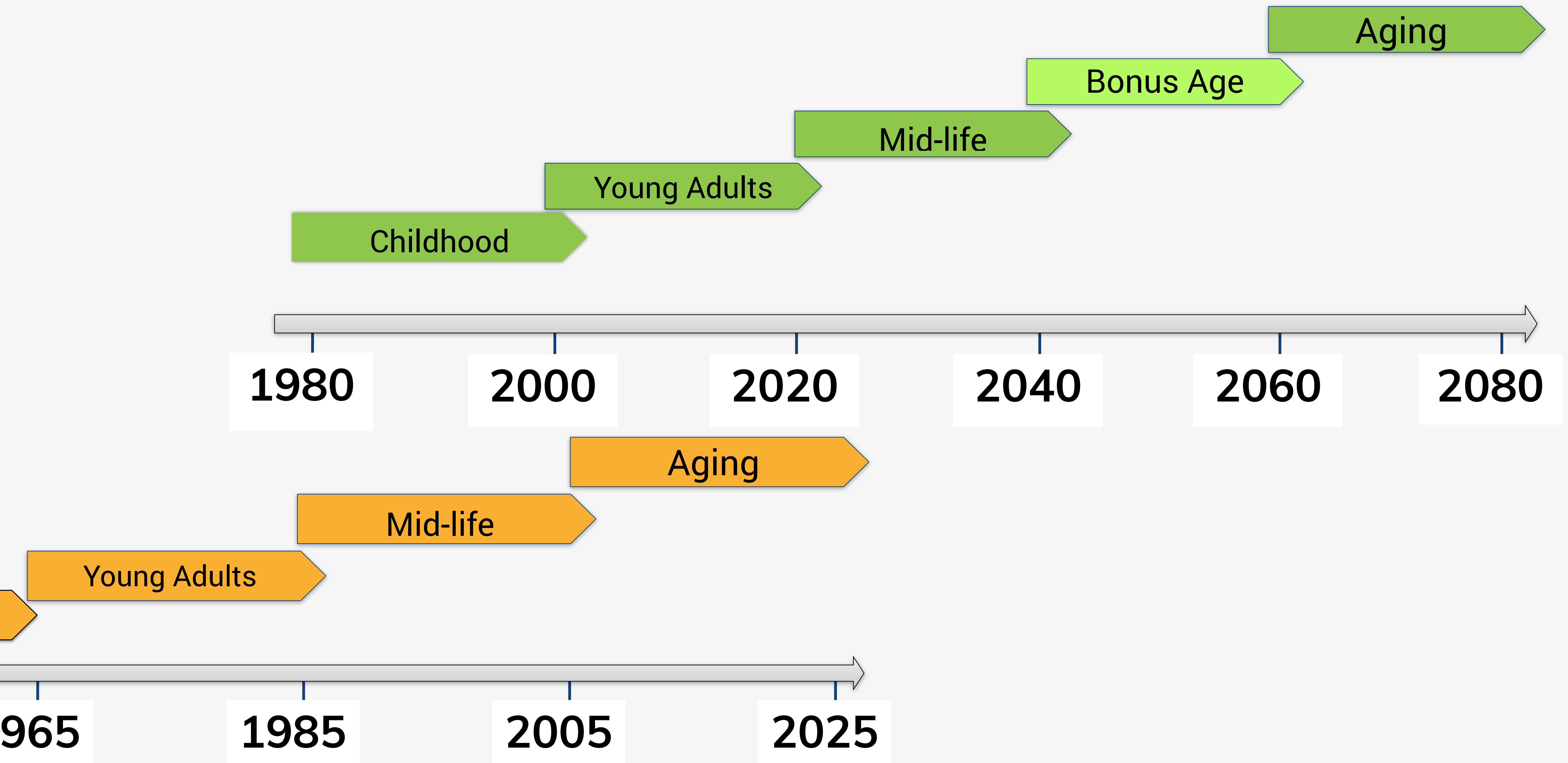
# Millennials Life Stage Timeline

Millennials similarly will drive the economy & society and reshape America this century



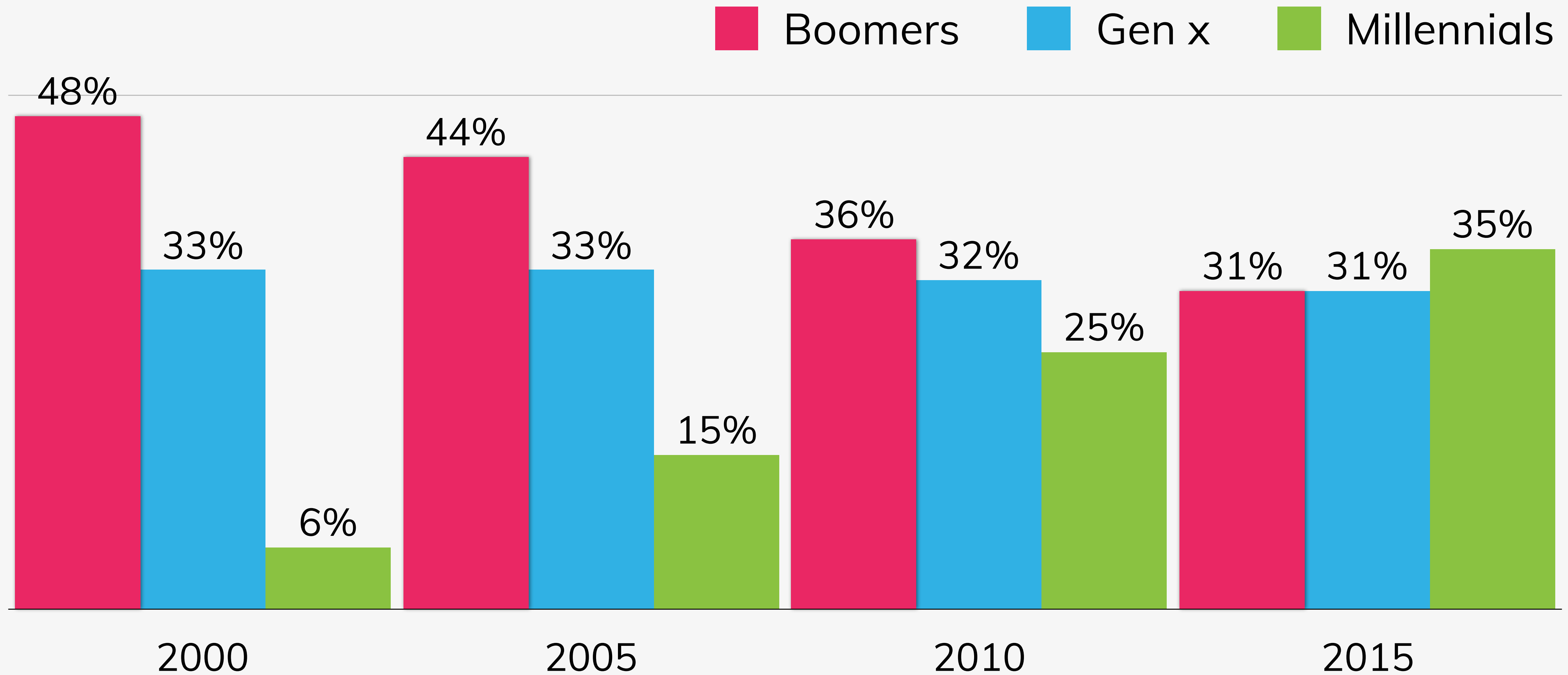
# Millennials Impact on the 21st Century

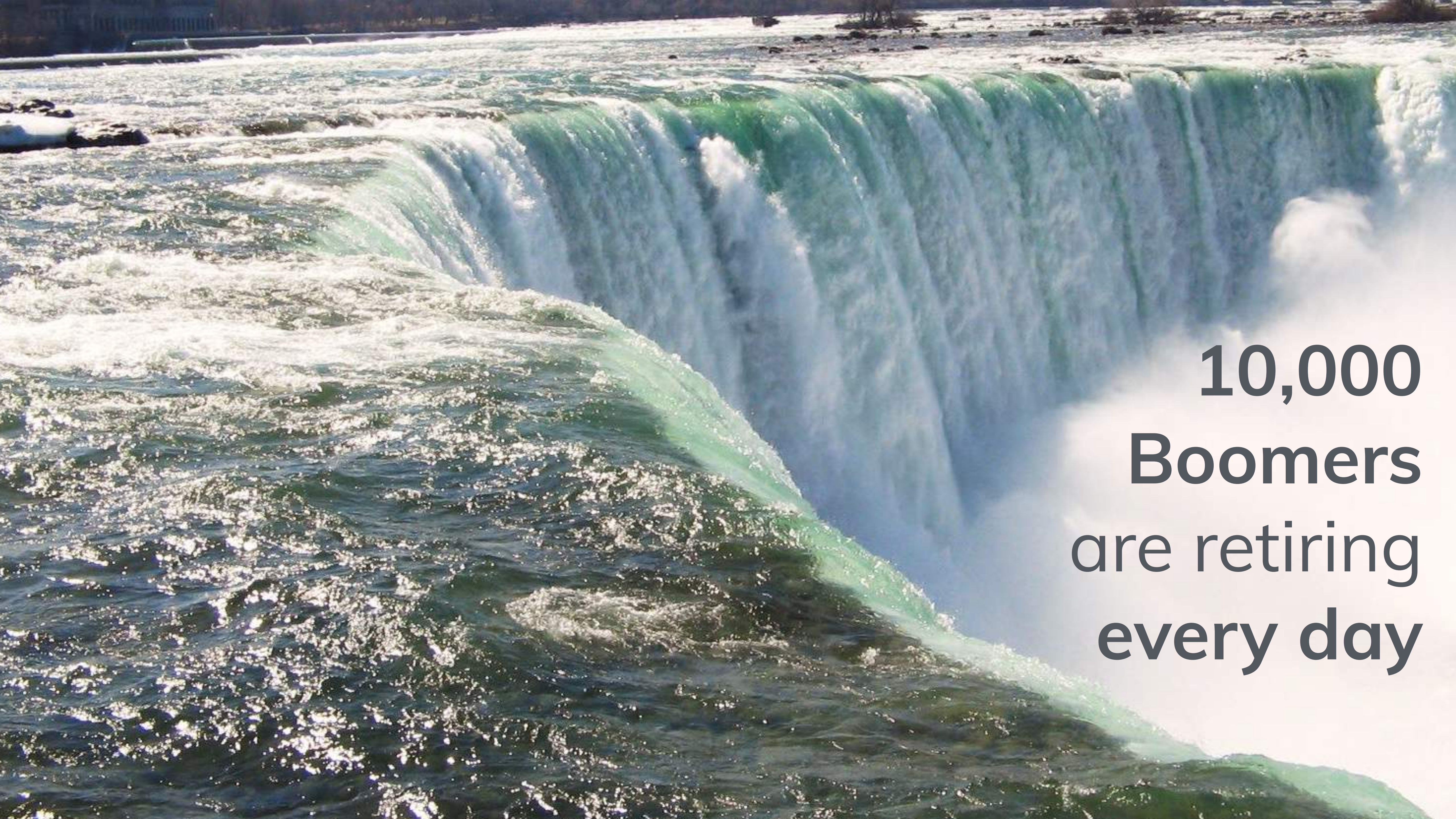
The Boomers are fading off the stage and the Millennials are just ramping up



# The Shifting American Workforce

The rise of the Millennials and the fall of the Boomers - not a theory, a fact





**10,000  
Boomers  
are retiring  
every day**

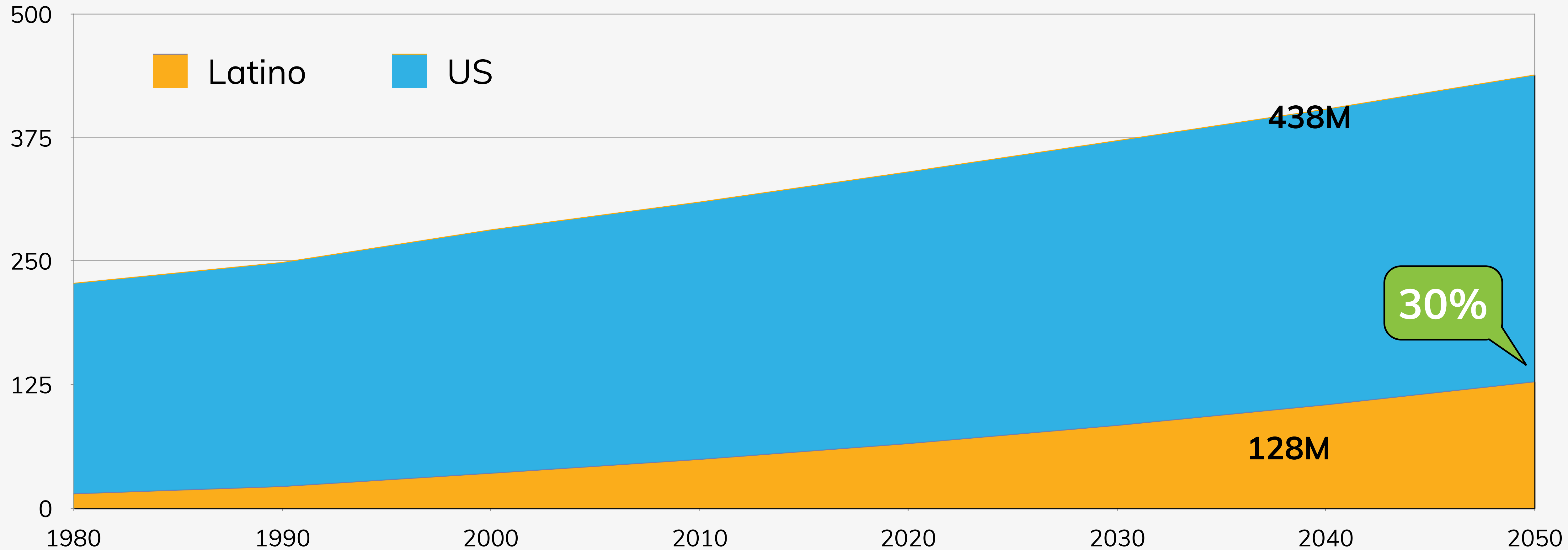
A large, diverse crowd of people is shown at a public event. Many individuals are holding small American flags, and the overall atmosphere appears celebratory. The crowd is composed of people of various ethnicities and ages, all looking towards the same direction, likely a speaker or a stage. The image is overlaid with a teal banner containing the text "The Melding of America".

# The Melding of America



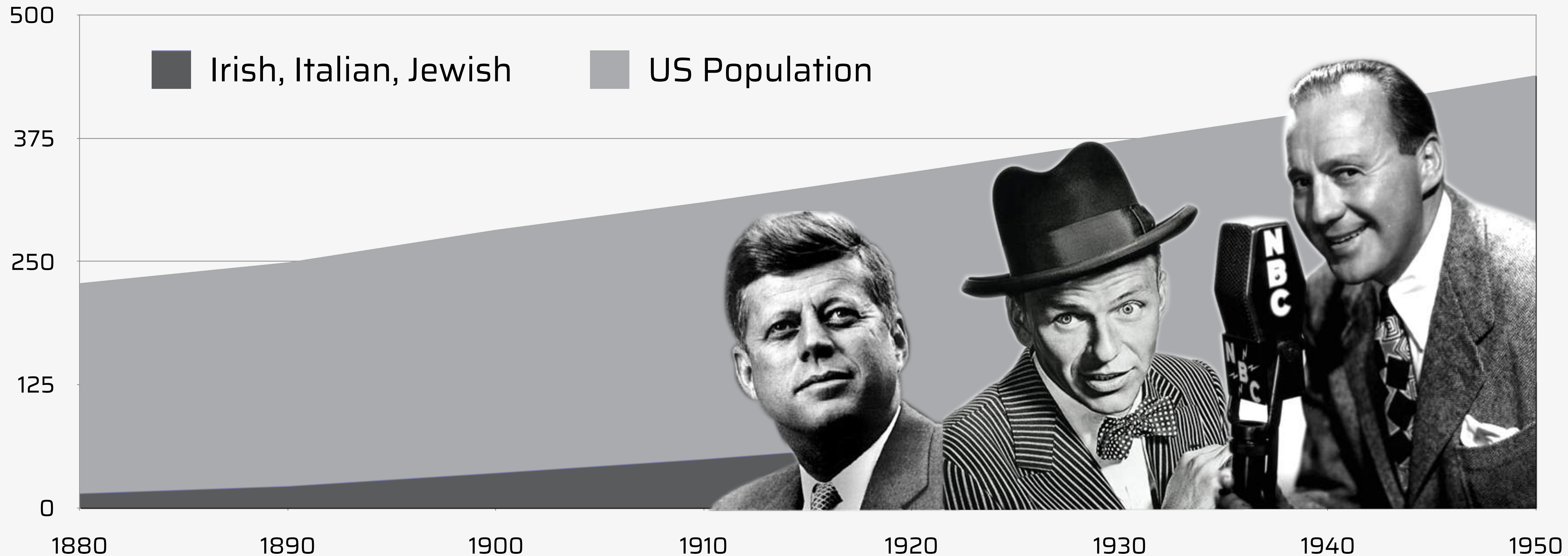
# Projected Hispanic Population Boom

By 2050 Hispanics will be Almost One in Three Americans



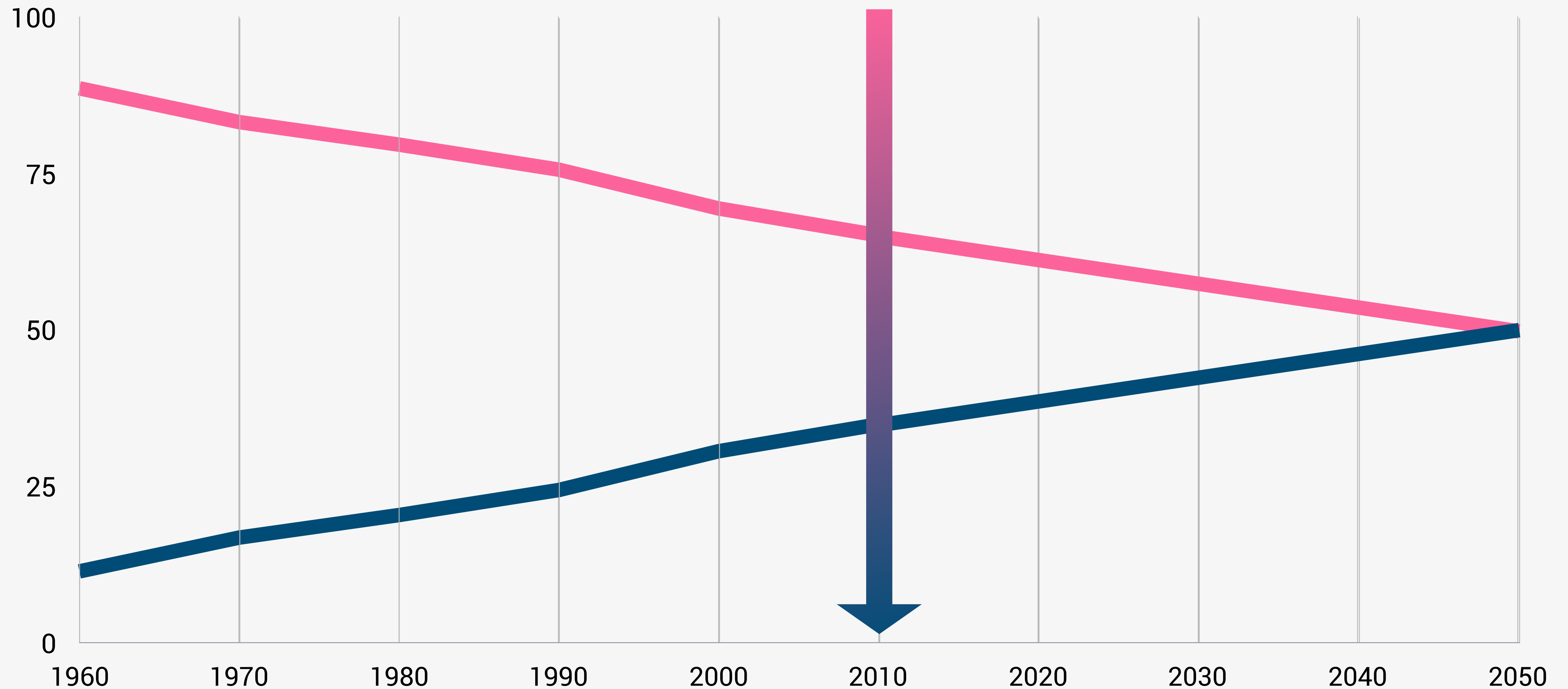
# Flashback to 20th Century Immigration

The Hispanics of that Era were Irish, Italian and Jewish



# The Melding of America

The U.S. Will be Majority Minority (47% White) by 2050 - like California today



Source: U.S. Census, March 2004; Pew Research Center, 2/11/08;

Courtesy of the New Politics Institute

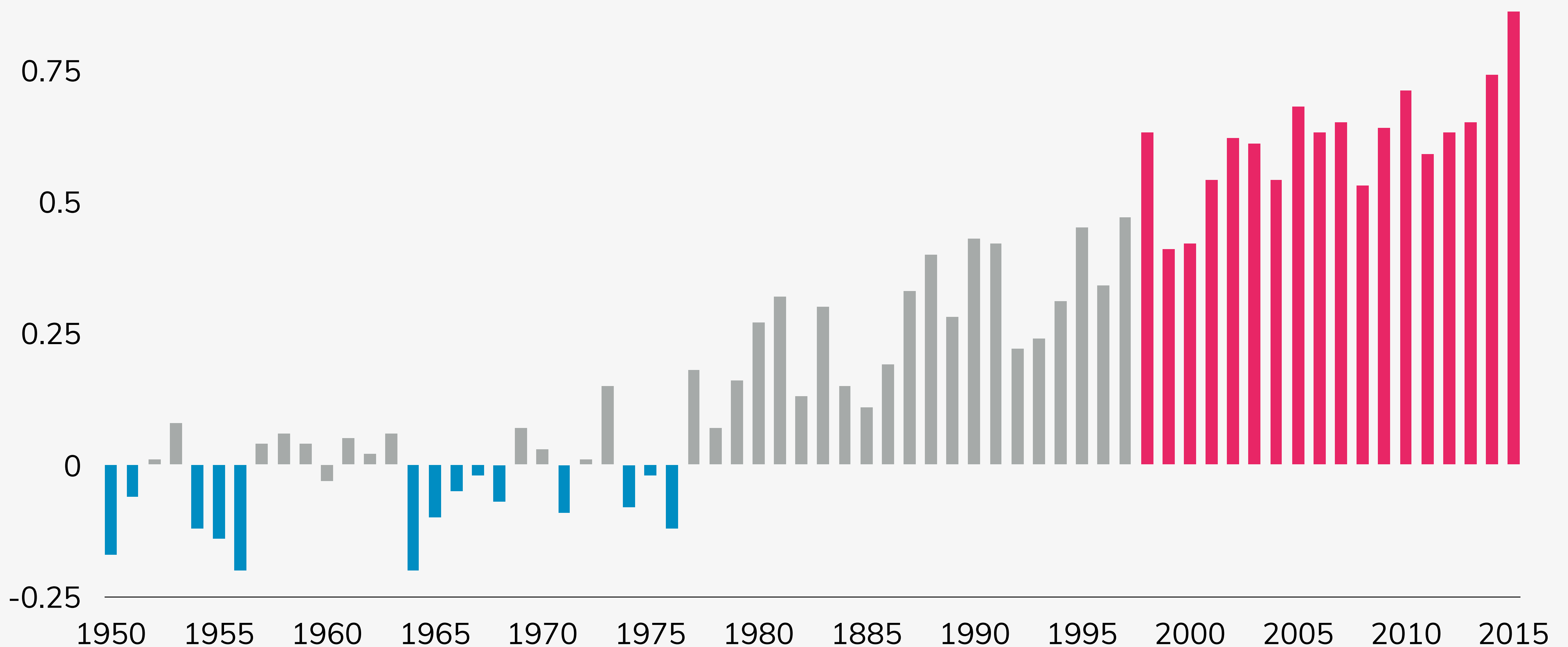


# Climate and Sustainability



# Our Record Setting Run since the 1880s

16 of the 17 hottest years on record all since 2001 - with 2016 the hottest ever

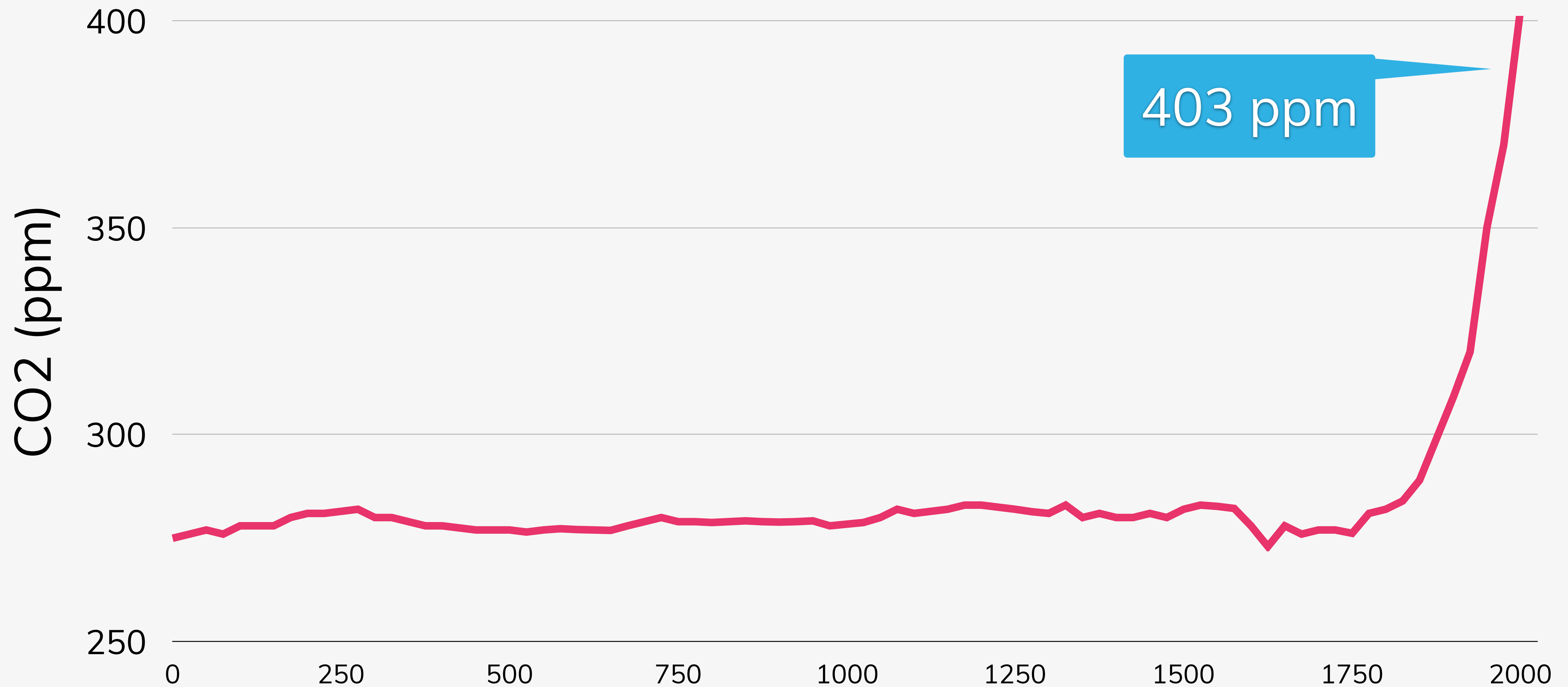


Source: [http://data.giss.nasa.gov/gistemp/graphs\\_v3/fig.A2.txt](http://data.giss.nasa.gov/gistemp/graphs_v3/fig.A2.txt)

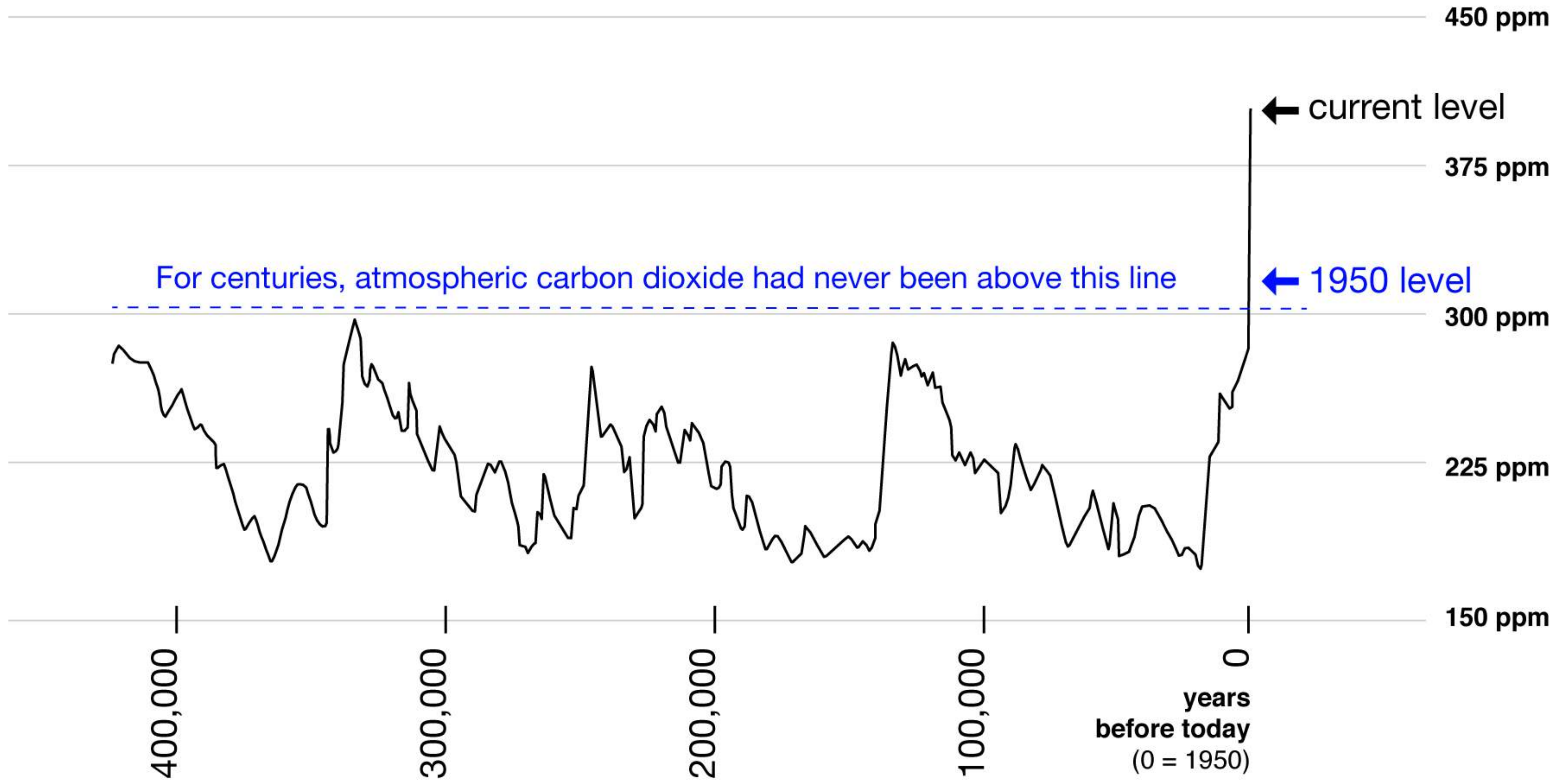
Global Land-Ocean Temperature Index (C) (Anomaly with Base: 1951-1980)

# CO2 Levels Over the Last 2000 Years

Concentration of CO2 from year 0 to 2000 - now highest level & counting



# CO2 Levels Last 400,000 Years - Since Humans

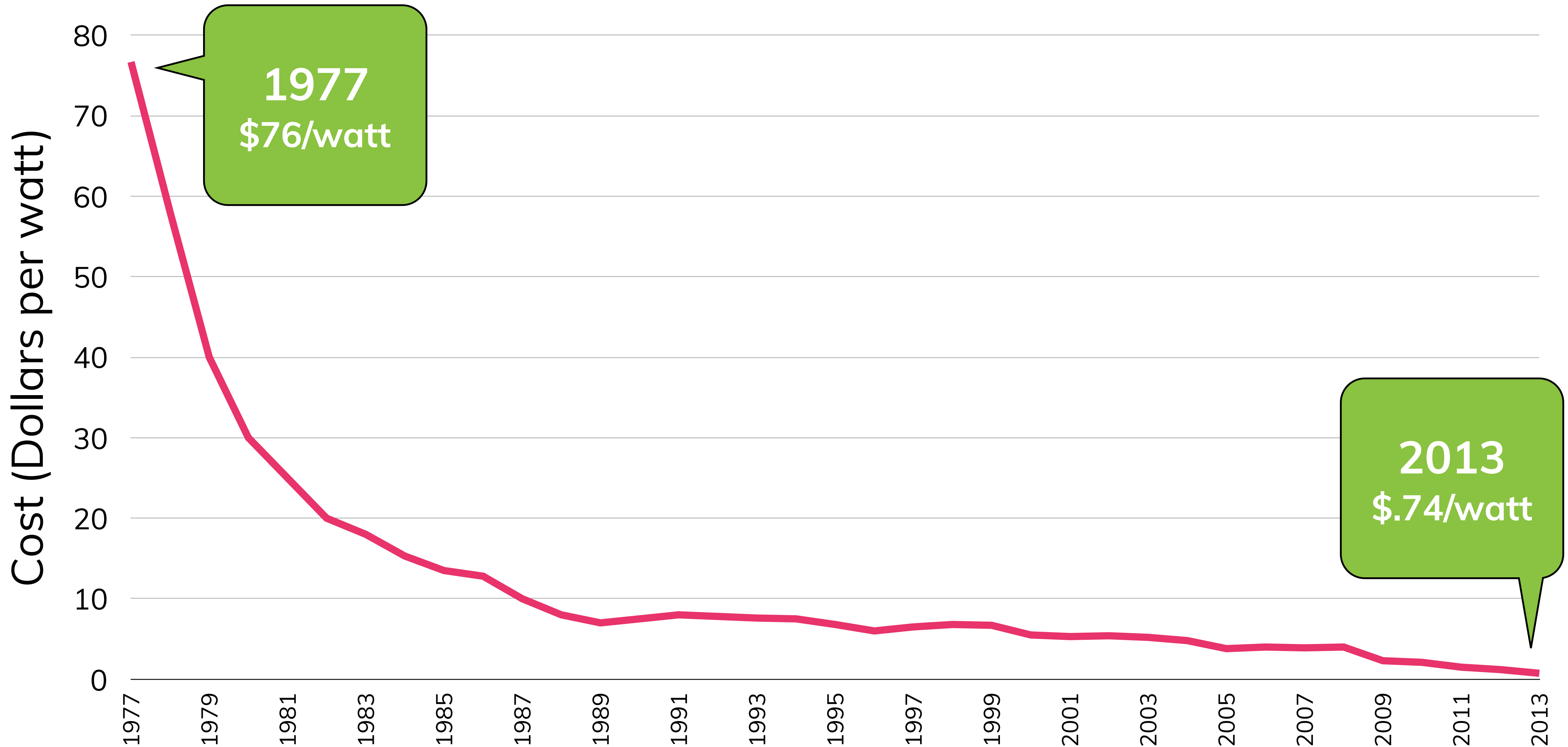




An Energy Transformation - Now a Tech Story

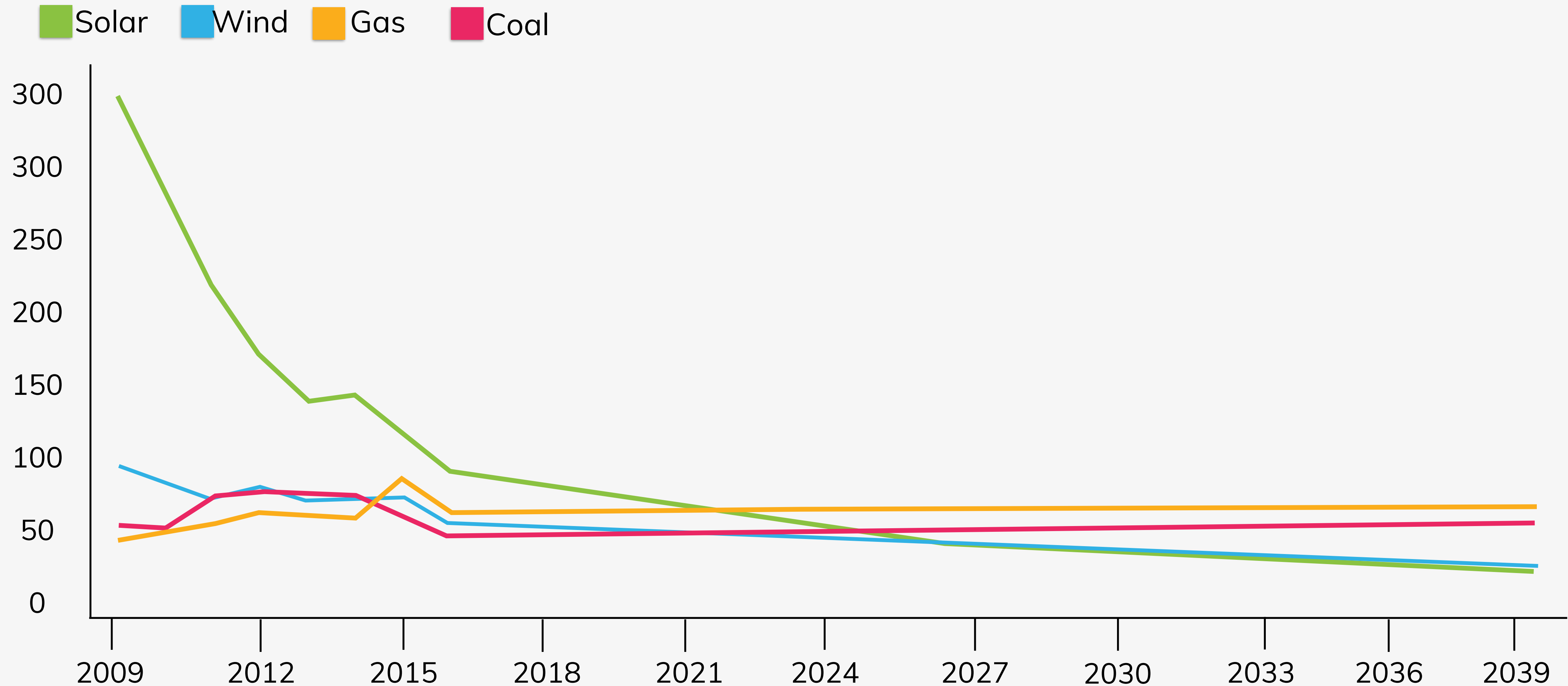


# The Swanson Effect - Price of PV cells



# Solar Should Be Cheaper Than Coal Very Soon

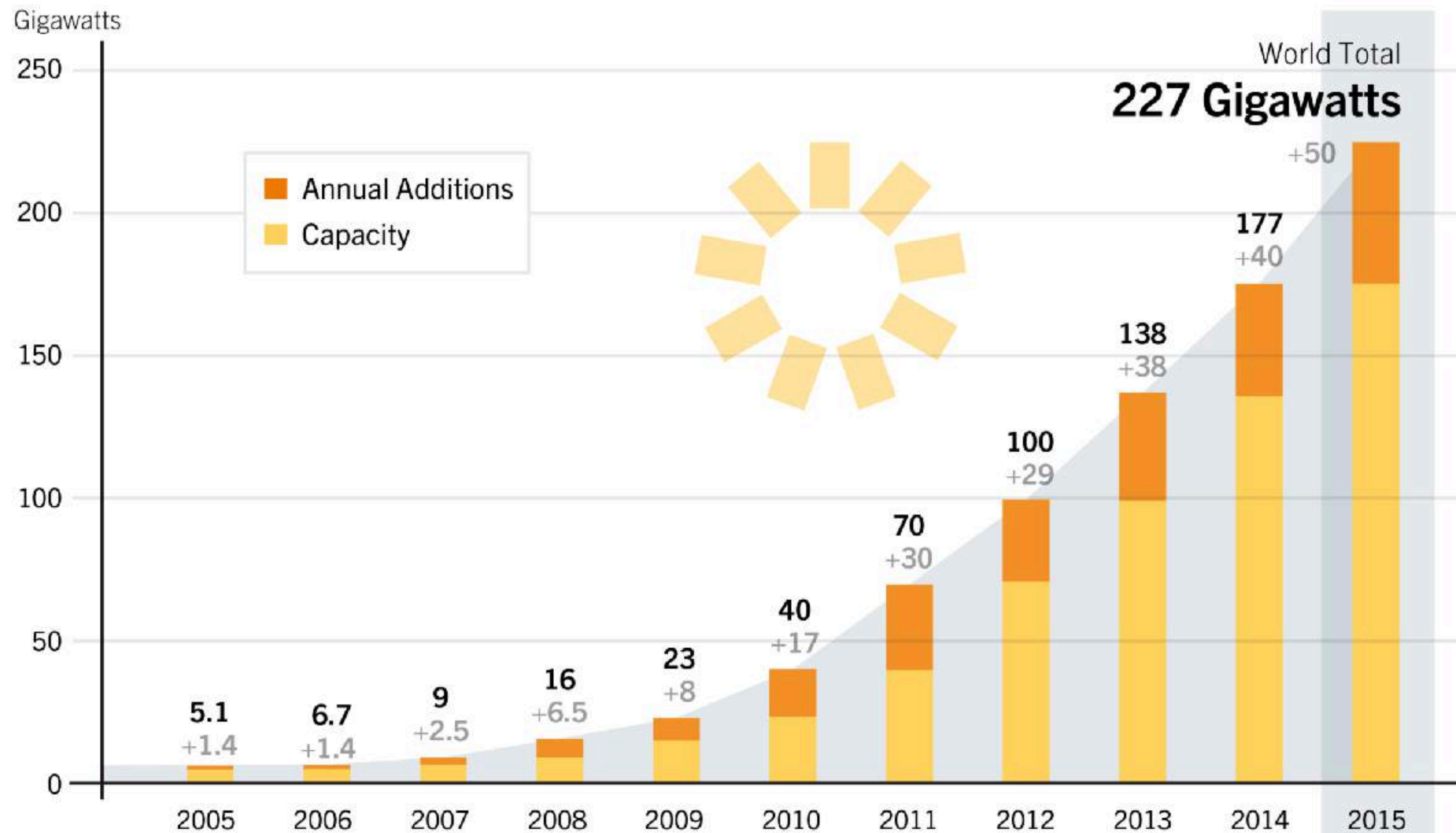
Solar's plummeting costs projected to continue by Bloomberg New Energy Finance



# Solar Hitting the Tipping Point

Solar panels start hitting tech economies of scale

Solar PV Global Capacity and Annual Additions, 2005–2015



# **DRAWDOWN**

**THE MOST COMPREHENSIVE  
PLAN EVER PROPOSED TO  
REVERSE GLOBAL WARMING  
EDITED BY PAUL HAWKEN**



# Food 321.93 GT

Reduced Food Waste 70.53 GT

Plant-Rich Diet 66.11 GT

Silvopasture 31.19 GT

Regenerative Agriculture 23.15 GT

Tropical Staple Tree Crops 20.19 GT

Conservation Agriculture 17.35 GT

Tree Intercropping 17.2 GT

Managed Grazing 16.34 GT

Clean Cookstoves 15.81 GT

Farmland Restoration 14.08 GT

Improved Rice Production 11.34 GT

# Energy 246.14 GT

Wind Turbines (Onshore) 84.6 GT

Solar Farms 36.9 GT

Rooftop Solar 24.6 GT

Geothermal 16.6 GT

Nuclear 16.09 GT

Wind Turbines (Offshore) 14.1 GT

Concentrated Solar 10.9 GT

Wave and Tidal 9.2 GT

Methane Digesters (large) 8.4 GT

Biomass 7.5 GT

Solar Water 6.08 GT

# Land Use 149.6 GT

Tropical Forests 61.23 GT

Temperate Forest 22.61 GT

Peatlands 21.57 GT

Afforestation 18.06 GT

Bamboo 7.22 GT

Forest Protection 6.2 GT

Indigenous Peoples' Land Management 6.19 GT

Perennial Biomass 3.33 GT

Coastal Wetlands 3.19 GT

# Women and Girls 121.26 GT

Educating Girls 59.6 GT

Family Planning 59.6 GT

# Materials 111.78 GT

Refrigerant Management 89.74 GT

Alternative Cements 6.69 GT

Water Saving - Household 4.61 GT

Bioplastics 4.3 GT

Household Recycling 2.77 GT

Industrial Recycling 2.77 GT

# Buildings and Cities 54.5 GT

District Heating 9.38 GT

Insulation 8.27 GT

LED Lighting (Household) 7.81 GT

Heat Pumps 5.2 GT

LED Lighting (Commercial) 5.04 GT

Building Automation 4.62 GT

Walkable Cities 2.92 GT

Smart Thermostats 2.62 GT

Landfill Methane 2.5 GT

Bike Infrastructure 2.31 GT

# Transport 45.7 GT

45.7 GT

Electric Vehicles 10.8 GT

Ships 7.87 GT

Mass Transit 6.57 GT

Trucks 6.18GT

Airplanes 5.05 GT

Cars (Hybrid) 4 GT

# Massive Infrastructure Rebuild

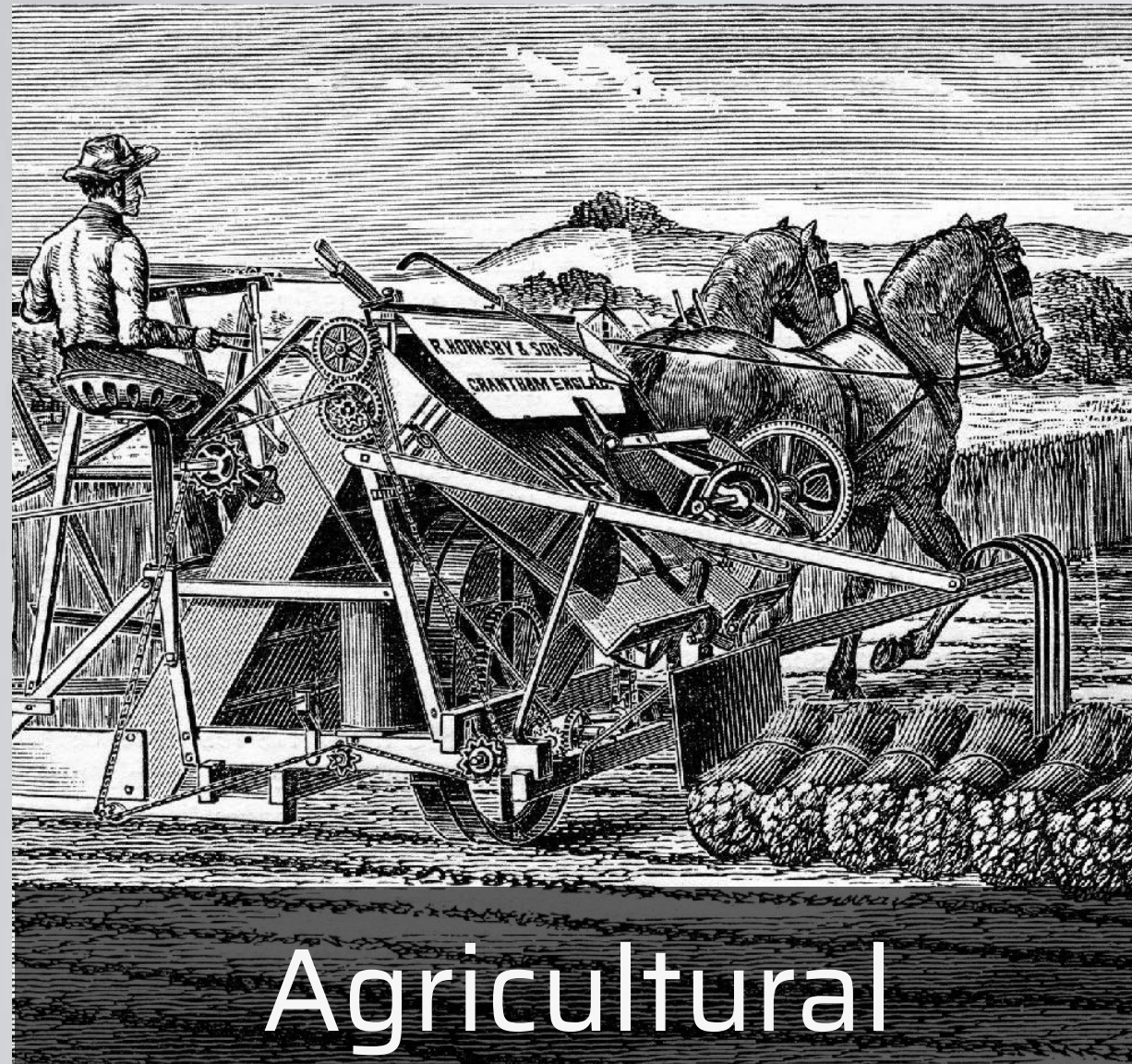
We would have a huge economic boost if we took a sustainable rebuild seriously

- The Energy Grid
- The Transportation System
- Reorganizing Urban Footprint
- Highly Efficient Housing & Buildings
- Sustainable Agriculture and Food
- Adaptability to Weather and Climate





# The Reinvention of America



Agricultural

1800s



Urban Industrial

1900 - 1950



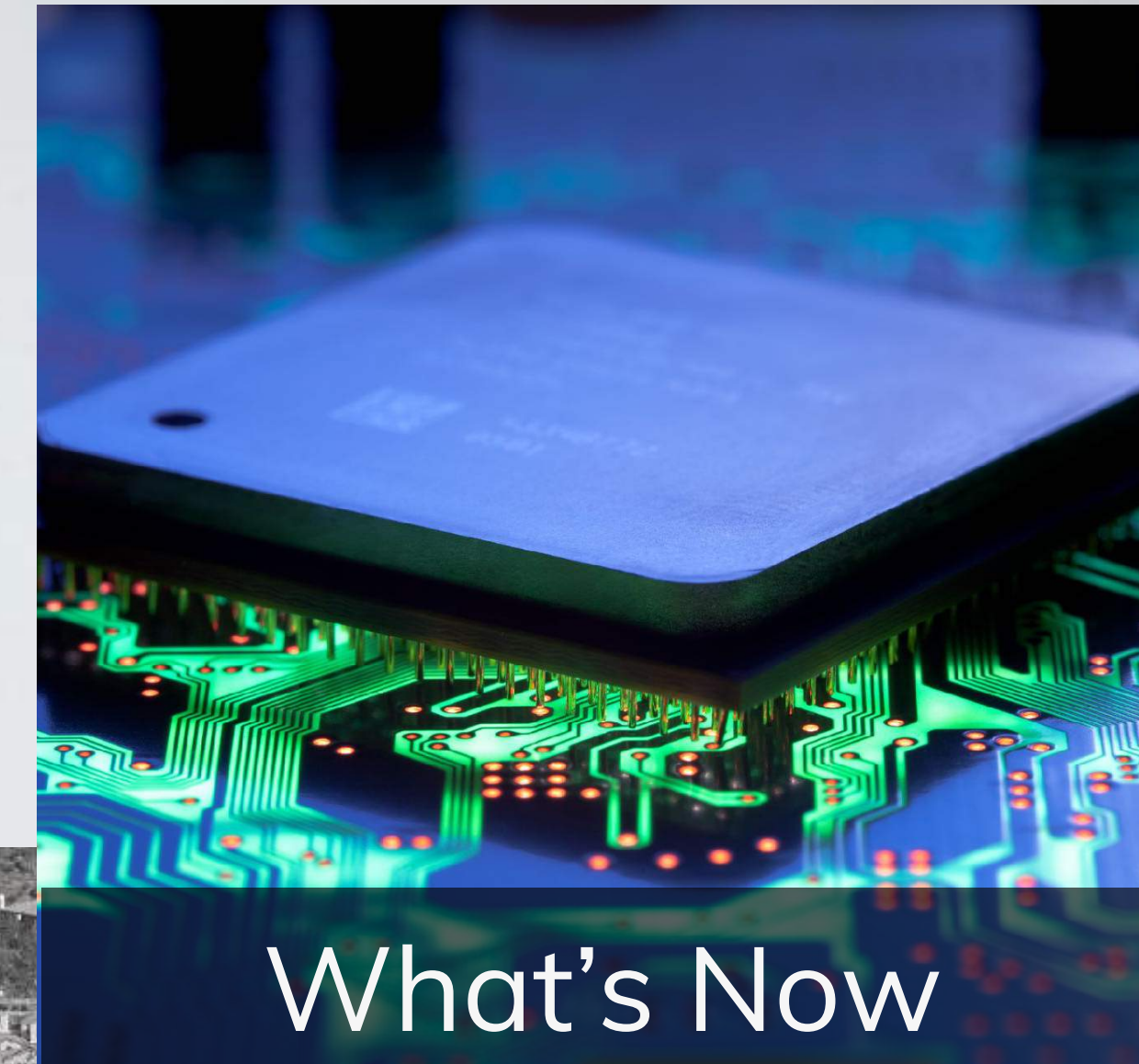
Early Industrial

1850 - 1900



Post-War Suburban

1950 - 2000

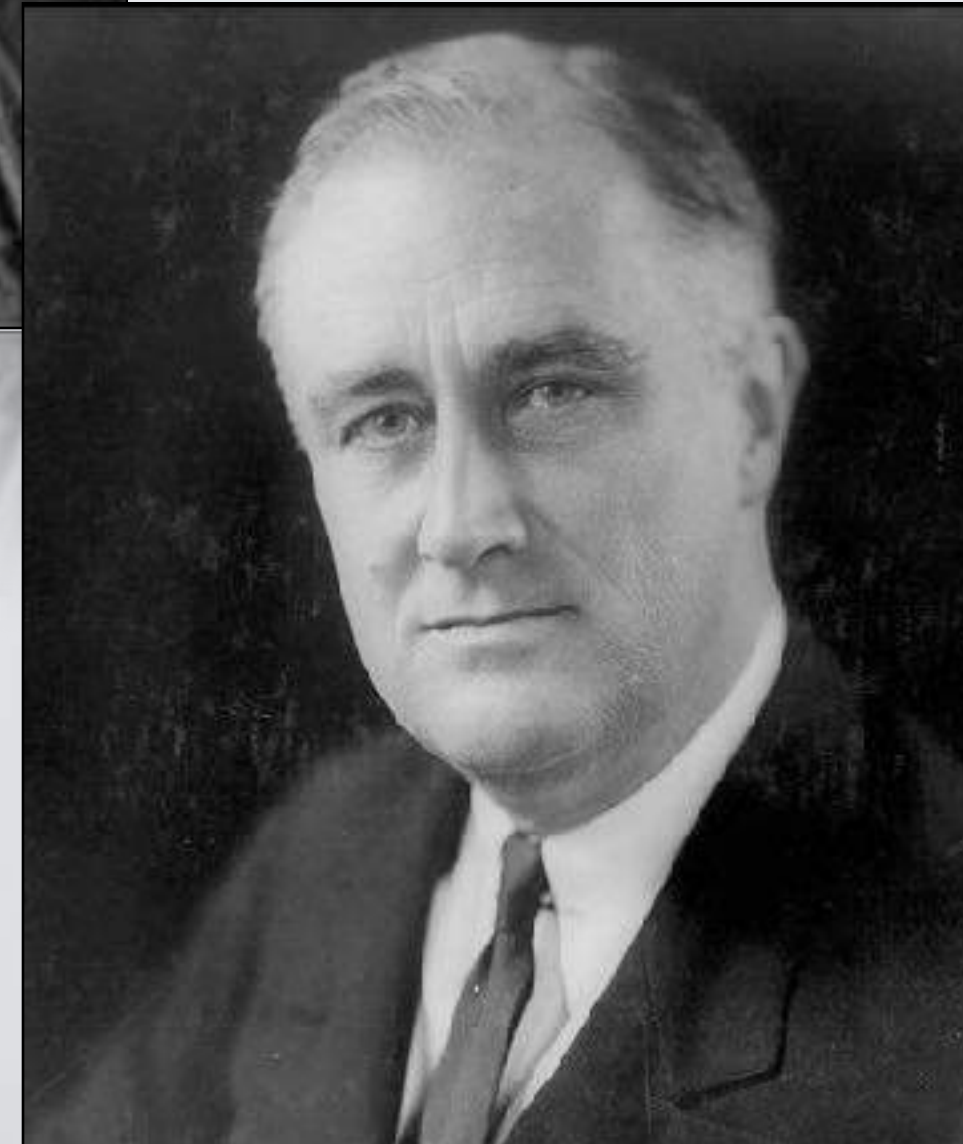
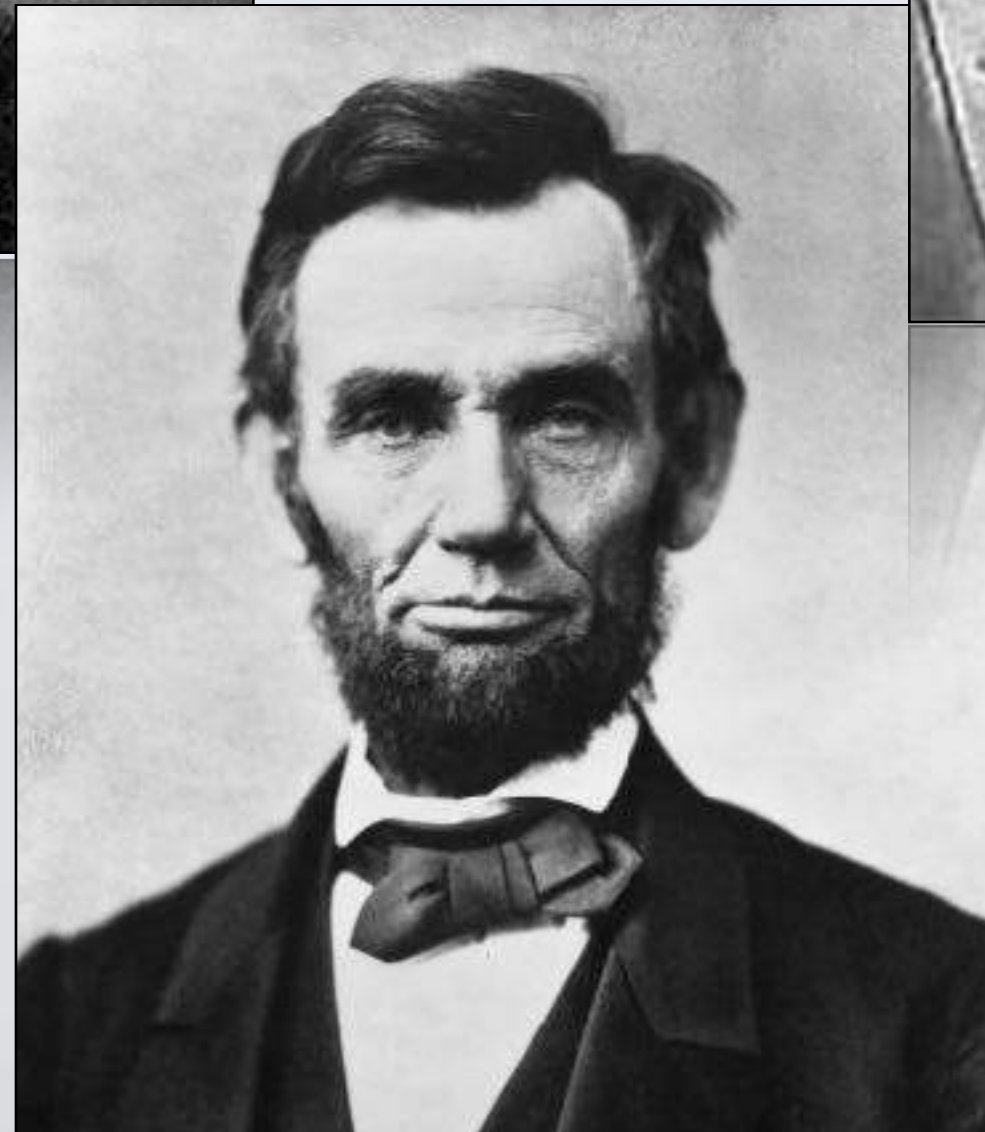
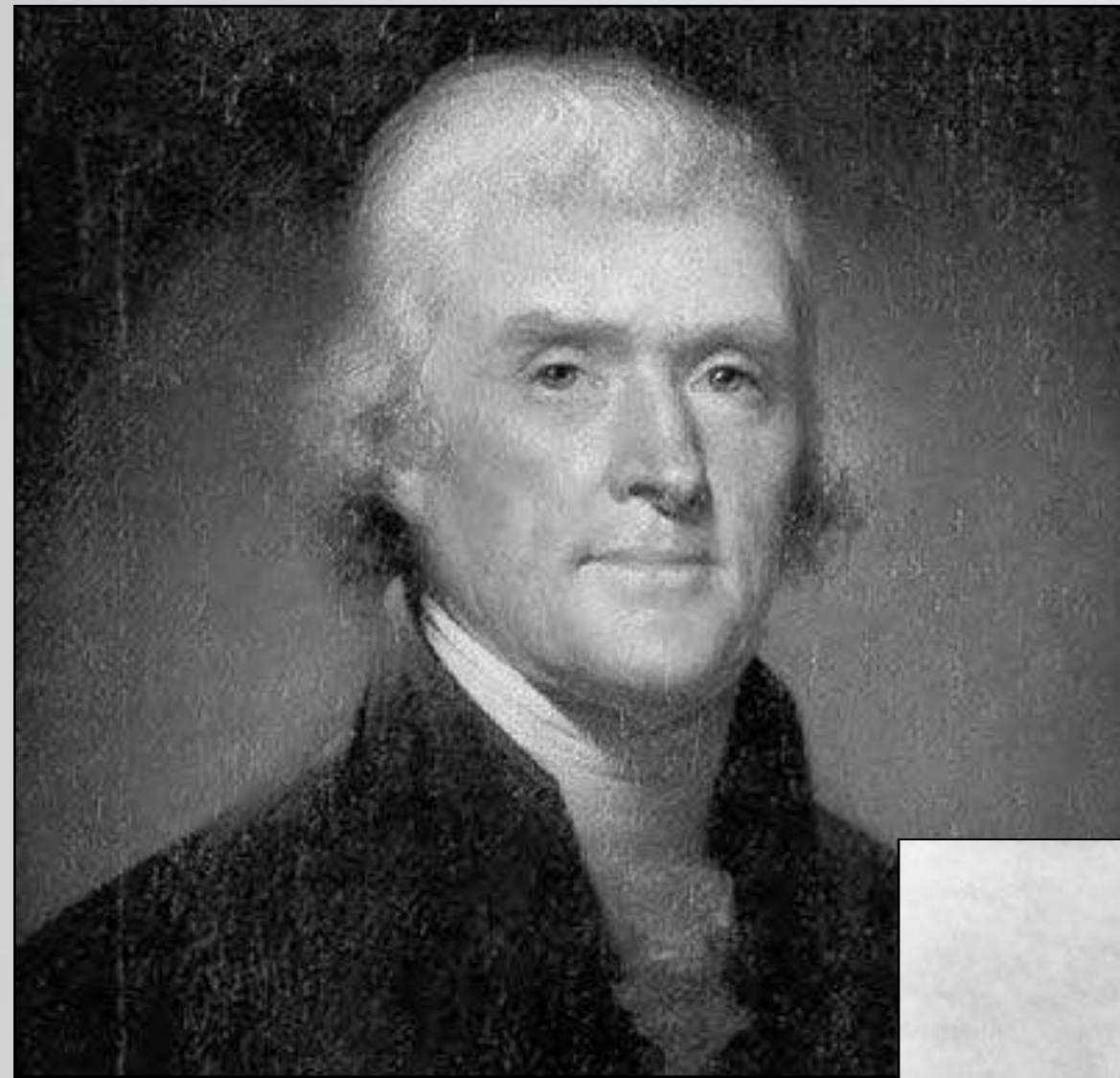


What's Now

2000 - 2050

Eras of Tech & Economic Change





# Eras of American Reinvention

All Digital

Fully Global

More Sustainable

Obama Laid the Foundation





One Classic Reaction to Change



# The Millennial Generation Arrives



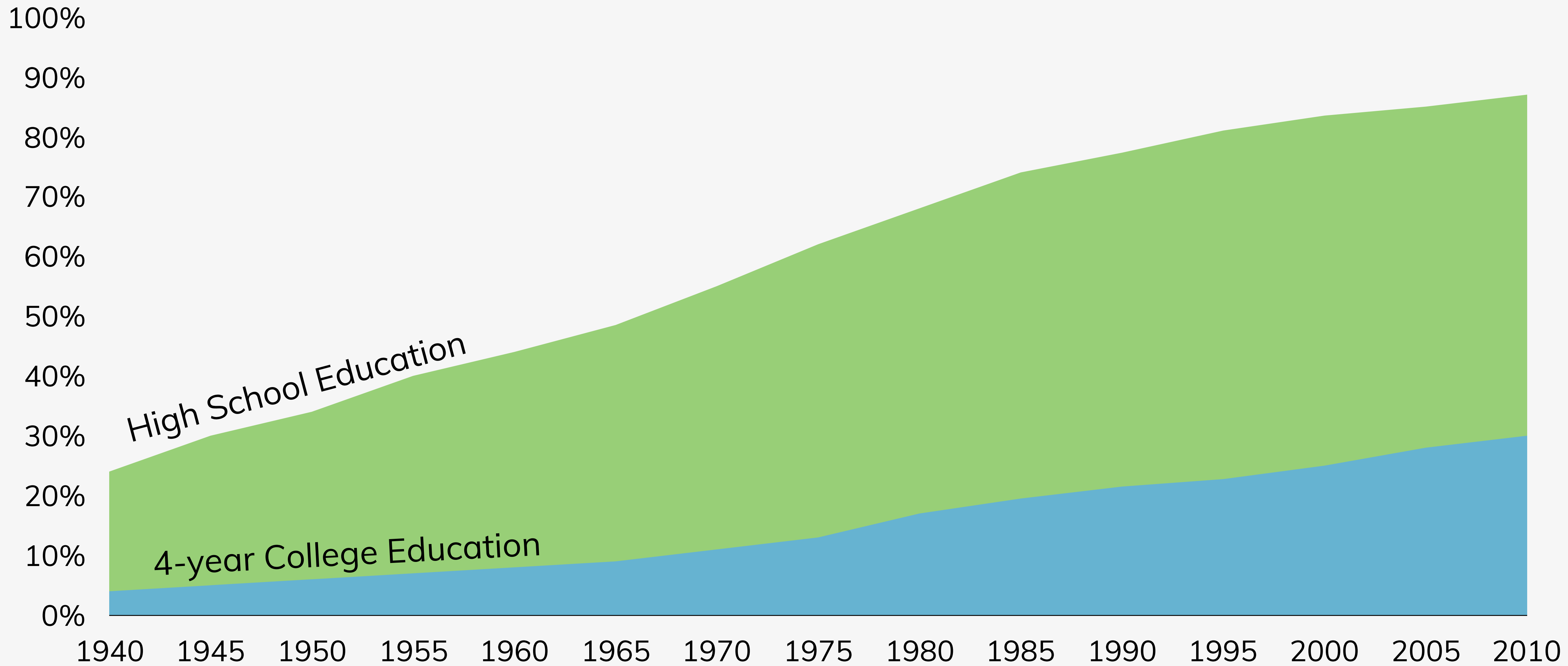
American Hispanics Will Never Forget



College Educated & Professionals

# One Third of Americans Now College Grads

Today 60 percent have some college experience - with 90 percent high school grads



Source: US Census



A New Way Forward



# CALIFORNIA IS THE FUTURE

An aerial topographic map of California is shown with a semi-transparent red overlay covering the state. A horizontal timeline is positioned at the bottom of the map, featuring a white line with vertical tick marks and white dots. The years 1975, 1980, 1985, and 1990 are labeled below the timeline. A white text box with a red-to-orange gradient background is centered over the map, containing the title "California's Conservative Era" in white text.

# California's Conservative Era

1975

1980

1985

1990



# Polarization & Paralysis: 1990 - 2005

1990

1995

2000

2005

An aerial topographic map of California is shown with a semi-transparent blue overlay covering the state. A horizontal timeline is positioned at the bottom of the map, featuring a white line with circular markers and vertical tick marks. The years 2005, 2010, 2015, and 2020 are labeled in white text below the timeline. A large, semi-transparent blue banner is centered over the map, containing the title text in white.

# California Begins Progressive Era: 2005 - 2020

2005

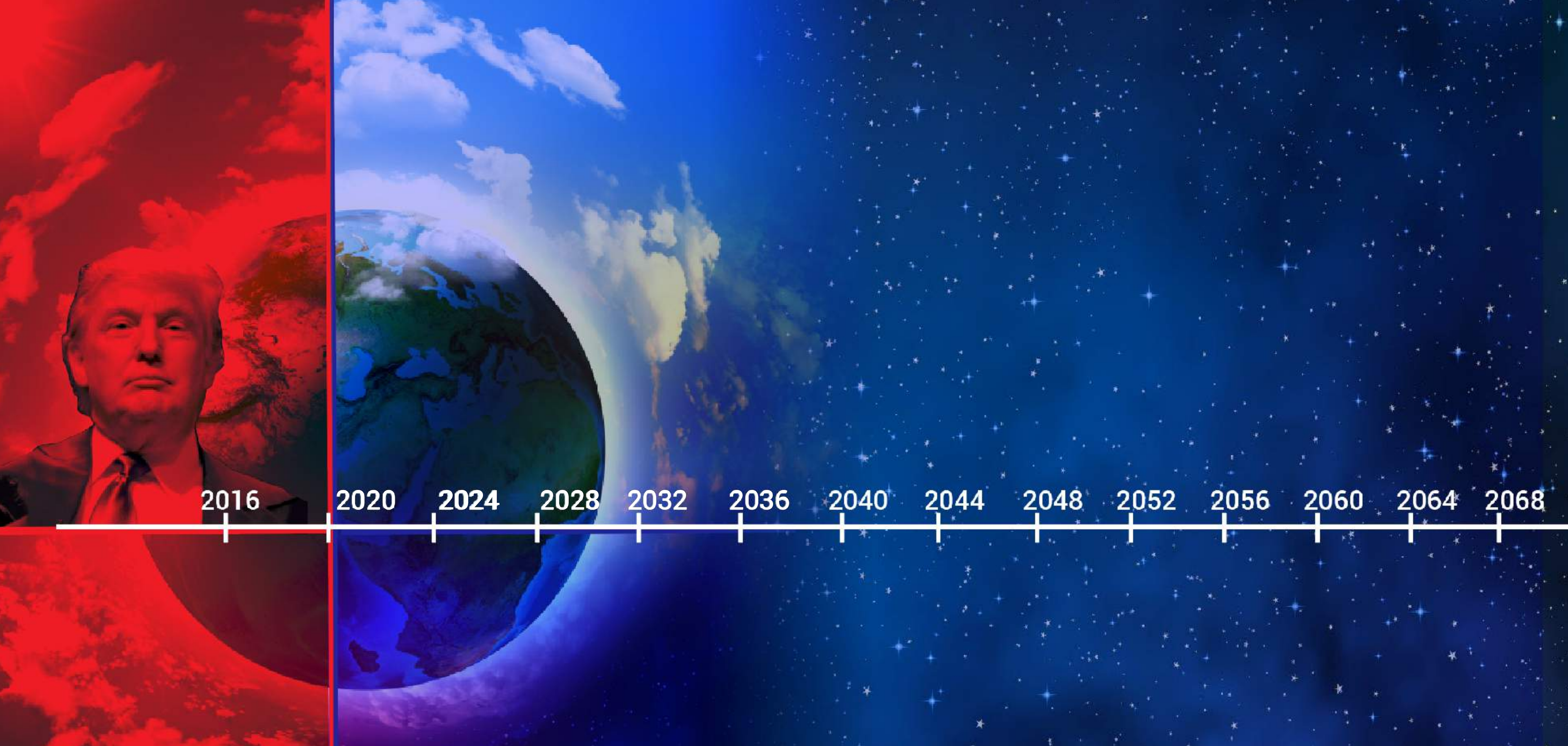
2010

2015

2020



# The Next Generation Leadership



2016

2020

2024

2028

2032

2036

2040

2044

2048

2052

2056

2060

2064

2068

A Long Period Similar to the Post-War Boom?



# The Last Era of Reinvention

A dark, monochromatic portrait of John Maynard Keynes, showing his face and upper torso. He has a mustache and is wearing a suit and tie. The background is dark and textured.

John Maynard Keynes,  
*Economic Possibilities for our Grandchildren*  
(1930)

“We are suffering just now from a bad attack of economic pessimism. It is common to hear people say that the epoch of enormous interpretation of what is happening to us. We are suffering, not from the rheumatics of old 19th century, is over; that the rapid age, but from the growing-pains of over-rapid improvement in the standard of life is now changes, from the painfulness of readjustment going to slow down — at any rate in Great Britain; that a decline in prosperity is more likely than an improvement in the decade which lies ahead of us.”





1932

1936

1940

1944

1948

1952

1956

1960

1964

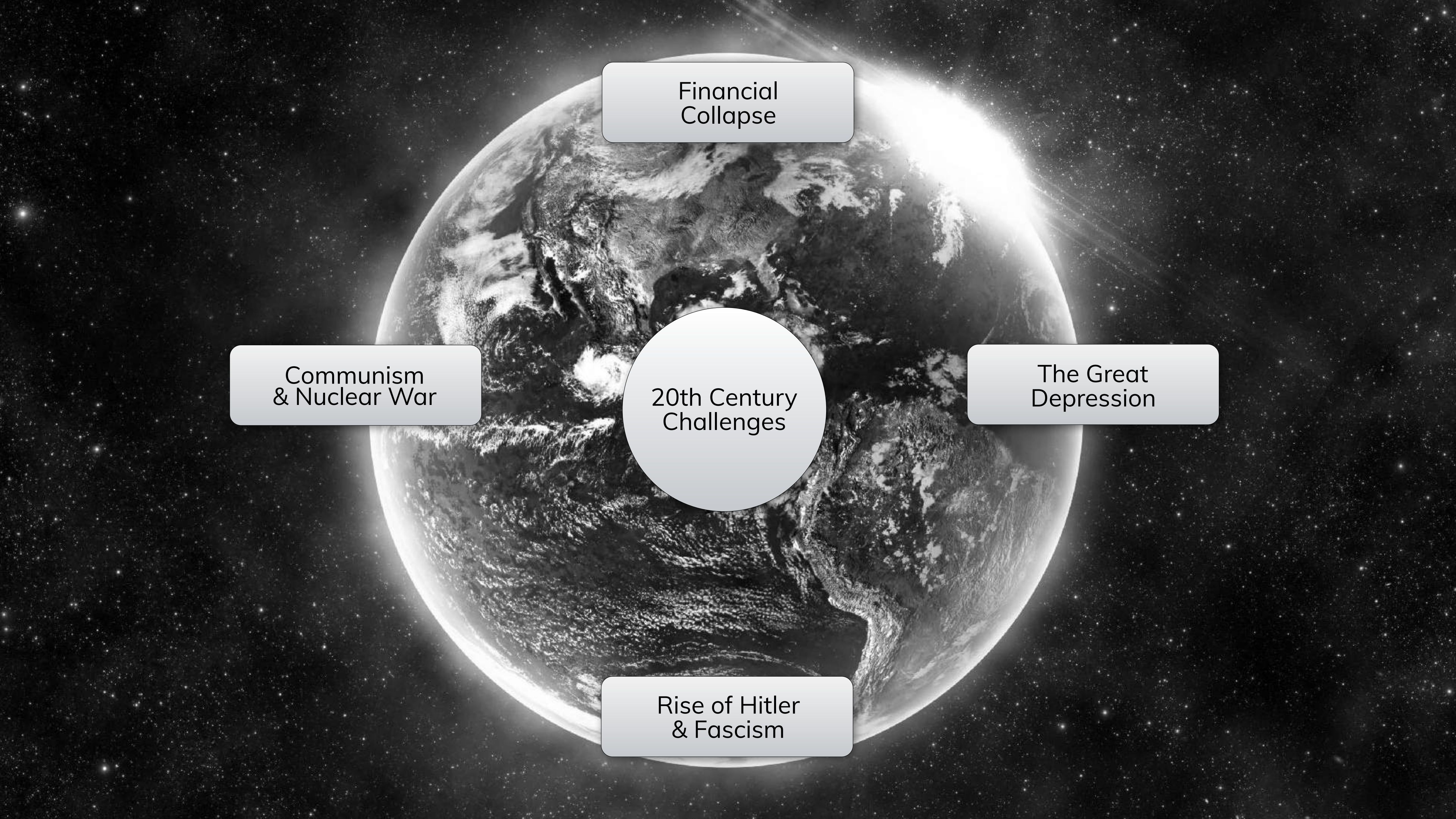
1968

1972

1976

1980

# The Post WWII Consensus & Economic Boom



Financial  
Collapse

Communism  
& Nuclear War

20th Century  
Challenges

The Great  
Depression

Rise of Hitler  
& Fascism

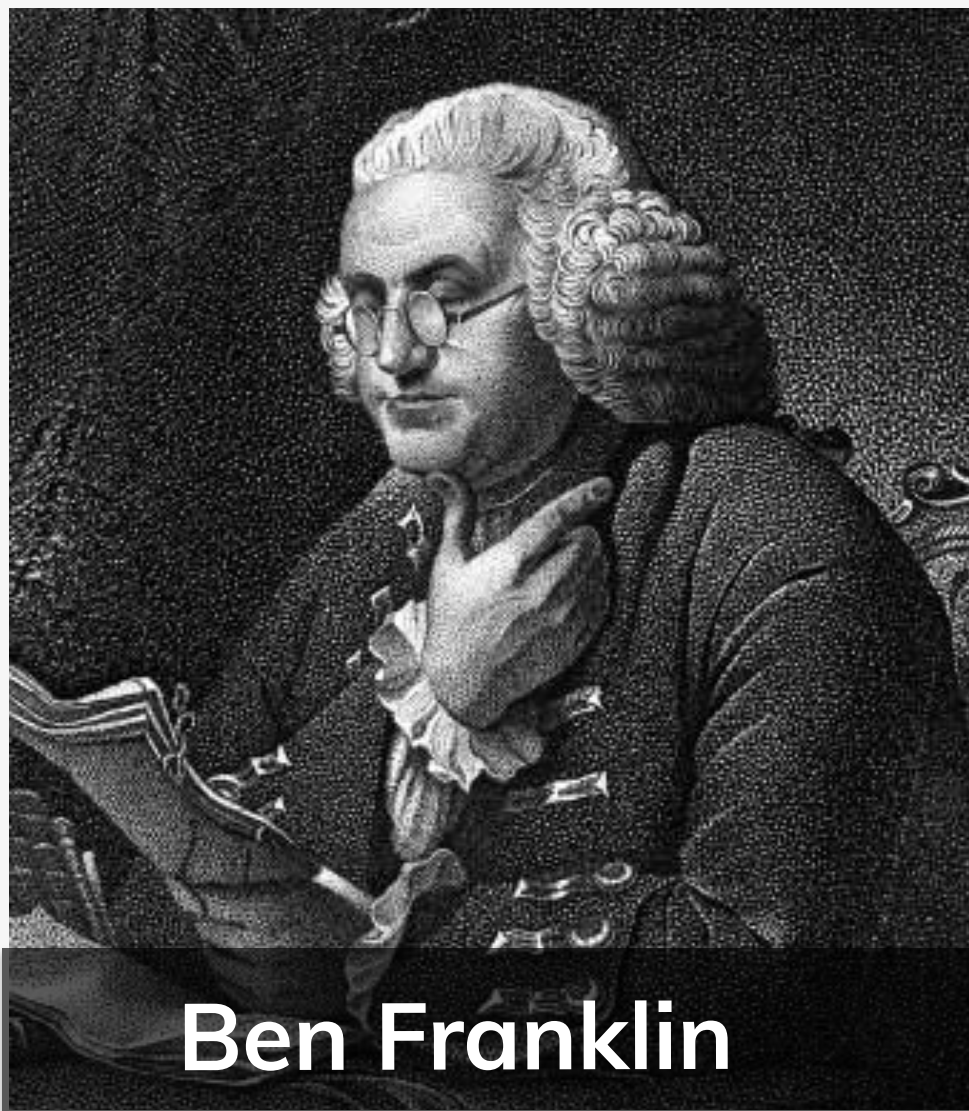


They Started Out Clueless

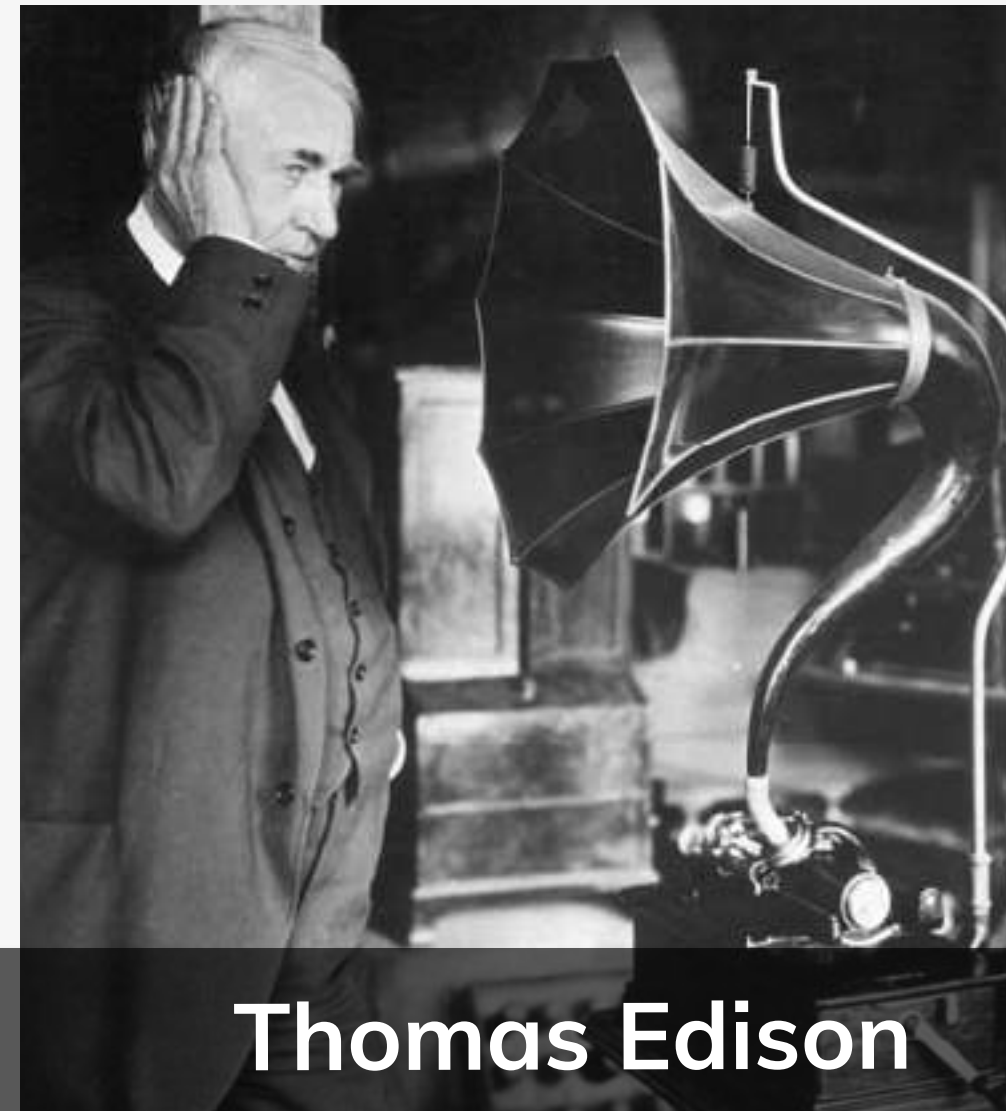
# The Only Existential Formula

In the end all you have is People plus Technology to solve your era's problems

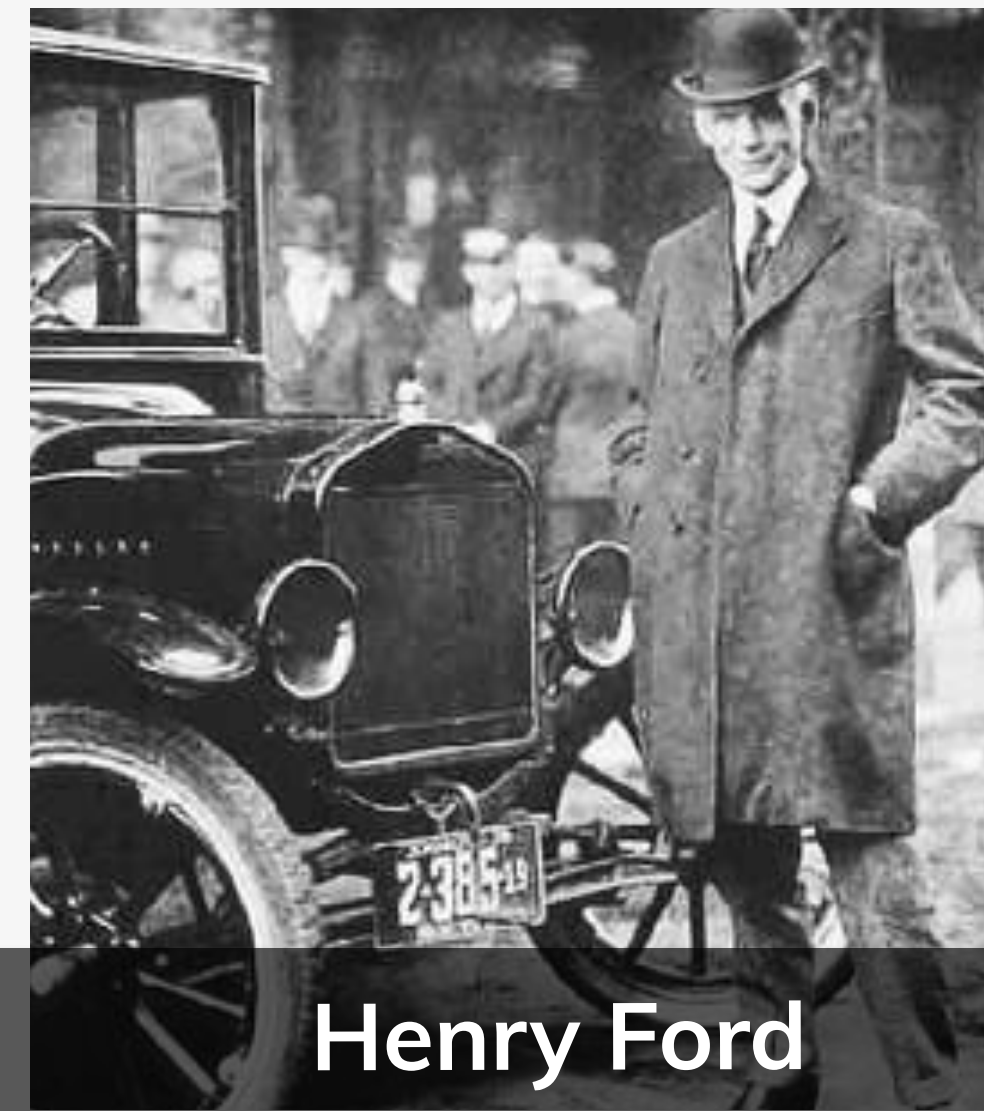
Human Resources + Available Technologies = Solutions



Ben Franklin



Thomas Edison



Henry Ford



Steve Jobs



Their Technologies and Human Resources

# The Tools & Talents of FDR's Era

Typewriter pools to scale up communication - and the underutilized talents of women



# Their Impressive Accomplishments

Pulled America out of Great Depression Via New Keynesian Economics

Defeated Fascism and Contained Communism with a Nuclear Balance

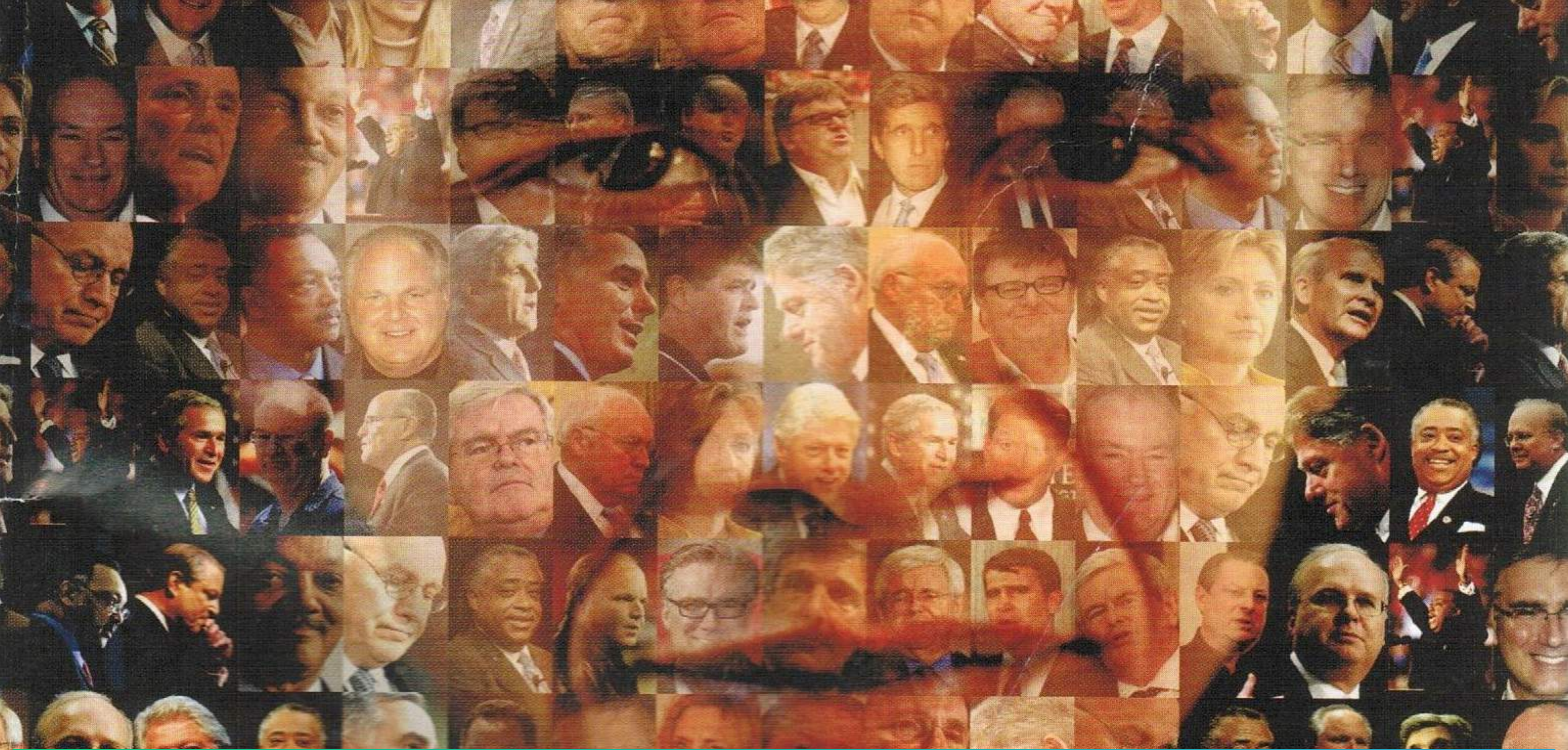
Built an International System with the United Nations, World Bank, IMF

Grew Middle Class with Social Security to GI Bill to FDIC Mortgages



A World Historic Era





# Our Moment in History



Ask Any Question in the World











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