

## SEVEN REVOLUTIONS INITIATIVE

**What will the world be like in 2050?** How different might life be for you and the other 9.8 billion other people on the planet? What are the forces of change reshaping human civilization? Overwhelmed by information saturation and the mounting challenges of each day, we seldom take the time to think long term. Absent active consideration of the future, we forfeit our ability to create a better world through decisions and actions necessary today. The urgent crowds out the important.

**Since 1992, Seven Revolutions has been an ongoing research initiative at the Center for Strategic and International Studies to identify the most important drivers of change defining our world over the next 30 years and beyond.**

Research findings are presented in a fast paced, data intensive, and visually rich presentation that uncovers the drivers reshaping the future of human population, resources, technology, information, economics, security, and governance. Taken together, these forces of change—the Seven Revolutions—are a call to action for leaders in government, business, and civil society to begin to envision and realize a better future.



### REVOLUTION 1 POPULATION

Some 200,000 years after humans first appeared on the planet, we have reached a global population of 8 billion. After doubling in size over the past 50 years, the absolute rate of human population growth is decreasing. But historic changes are occurring in relative rates of growth between countries and regions, and in demographic age structure, urbanization, and migration.

**GROWTH** World population is expected to grow to 9.8 billion by 2050; most countries will shrink, but Africa will grow from 1 to 2.5 billion.

**AGING** By 2050, nearly 25 percent of the population will be older than 65 in Europe, North America, East and Southeast Asia, Australia and New Zealand—matching the approximate demographic makeup of Japan today.

**URBANIZATION** The percentage of humans living in urban areas will increase from 55 percent today to 68 percent in 2050, with 1 in 8 people on the planet living in a megacity of 10 million or more.

**MIGRATION** In high-income countries, migration exceeded the balance of births over deaths between 2000 and 2020 and will be the sole driver of population growth over the next few decades. Between 2010 and 2021, 40 countries experienced a net inflow of more than 200,000 migrants.

**READ MORE** The United Nations Department of Economic and Social Affairs "[World Population Prospects 2022: Summary](#)" provides an outlook to the end of the century.



### REVOLUTION 2 RESOURCES

How quickly can we get to a net-zero emissions economy? No question is more important to the future of humanity, as the effects of climate change linked to CO<sub>2</sub> and other greenhouse gas emissions compound. Interrelated with this challenge are growing pressures on global food supply and water availability.

**CLIMATE** On our current course, the world will likely hit a 1.5-degree global climate increase above pre-industrial temperatures by around 2030 and could hit 2 degrees by 2050. As temperatures rise, a cascade of negative consequences will unfold in regions around the globe, projected to cost trillions of dollars.

**ENERGY** According to the International Energy Agency, global energy demand will increase 27 percent by 2040, largely driven by developing Asia, Africa, and the Middle East. And despite gains in renewables, 80 percent of that demand will be met with fossil fuels (oil, gas, and coal).

**FOOD** Global food production must increase by 59 to 98 percent by 2050 to meet projected demand, necessitating the equivalent of a second green revolution to overcome growing environmental challenges.

**WATER** Global water demand will increase by 40 percent by 2040 and the World Resources Institute warns that 63 percent of the world's megacities—those with 10 million or more inhabitants—are expected to be under high water stress by 2030.

**READ MORE** The International Energy Agency's [World Energy Outlook](#) provides a comprehensive energy supply/demand forecast to 2040. The [Intergovernmental Panel on Climate Change](#) provides international scientific consensus findings on the issue.

## REVOLUTION 3 TECHNOLOGY

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The scale, speed, opportunity, and risk of emerging technologies are beyond any historical precedence. We are experiencing the onset of the Fourth Industrial Revolution and living in what is regarded as the Biotechnology Century. The technologies we are now inventing and harnessing have the potential to fundamentally erase our existing limits in knowledge, memory, cognition, and perhaps even lifespans.

**ROBOTICS** The number of robots in our everyday lives will rapidly increase in decades ahead as humans and machines work side by side, from autonomous vehicles and drones to industrial and retail robots.

**3D PRINTING** The move to an all-digital supply chain is possible with a new generation of multi-material 3D printers that can produce everything from previously impossible design geometries to NASA's planned Mars habitats.

**IOT** The Internet of Things is an understatement for the 1 trillion or more connected devices expected by 2030, spanning sectors and industries in the convergence between physical and digital worlds.

**AI** In decades ahead, rapid progress in the application of narrow artificial intelligence will enable a world of general artificial intelligence; human-like intelligence with revolutionary implications and ethical considerations.

**BIOTECHNOLOGY** The CRISPR-Cas9 gene editing tool continues to transform biotechnology—a field which is seeing exponential progress and cost reductions.

**USEFUL RESOURCES** [The World Economic Forum](#) has led the conversation on the arrival and implications of the Fourth Industrial Revolution. [Vox](#) provides an accessible overview of CRISPR-Cas9 gene editing and the ongoing Biorevolution.

## REVOLUTION 4 INFORMATION

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We are continuing to grapple with the enormous consequences—positive and negative—of the information revolution. Global access to information is evolving in unexpected ways, amplifying the best and worst of human behavior. Two struggles underscore the era: one for freedom of knowledge and action, the other for truth and trust. Institutions and individuals are caught in the changes underway.

**ACCESS/PRIVACY** 63 percent of the world is now online, and by 2030 it will likely be close to 100 percent.

**DATA GROWTH** The world now creates 2.5 quintillion bytes of information per day. The total amount of data created, captured, copied and consumed is predicted to nearly double from 97 zettabytes in 2022 to 181 zettabytes in 2025.

**SOCIAL MEDIA** Social media has proven an unequaled disruptor to political discourse in countries around the globe, engineered to feed users information they like and exclude what they don't.

**FAKE NEWS** By no means a new phenomenon, fake information has been supercharged in scale and speed by information technologies, and a next generation of "deepfakes" or synthetic media produced by AI promises to amplify the problem immensely.

**KNOWLEDGE & LEARNING** Online and AI-assisted software can democratize education by enabling educators to personalize learning. Augmented and virtual reality (AR and VR) are transforming the way humans can connect with materials.

**USEFUL RESOURCES** Domo's latest "[Data Never Sleeps](#)" presents a remarkable picture of global information generation and storage. Pew Research [dives deep](#) on news consumption via social media in the United States.

## REVOLUTION 5 ECONOMICS

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75 years after the creation of the modern economic order at Bretton Woods, its future has reached a point of uncertainty. Nearly three decades without a new global trade round, and with growing protectionist and punitive trade measures, the fragmentation of the world economy is accelerating, putting future growth at risk.

**GLOBALIZATION** Over the past 30 years, developing markets have surged to overtake developed markets and comprise a growing share of world GDP, as the world's middle class has grown by billions.

**INEQUALITY** While the relative gaps in income have closed between many countries in the world, gaps within countries and between the world's richest and poorest continue to grow.

**DISLOCATION** According to Dell and the Institute for the Future, 85 percent of jobs that will exist in 2030 have yet to be invented, and the U.S. Bureau of Labor Statistics finds that today's students will have 8-10 jobs by the time they reach age 38.

**INNOVATION** According to the World Intellectual Property Organization (WIPO), Chinese applications for patents as a percent of world total increased from 10.5 percent in 2008 to 43.4 percent in 2019. China had more than twice the level of applications as the United States for 2019.

**USEFUL RESOURCES** Oxfam International's latest [report on global inequality](#) is always an eye-opener. The CSIS [Renewing American Innovation Project](#) asks the question, "[What Can Patent Data Reveal about U.S.-China Technology Competition?](#)"

## **REVOLUTION 6** **SECURITY**

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The U.S.-led world order following the Cold War is ending. In its place, a shifting constellation of bilateral and multilateral dynamics has appeared, as competition between countries spreads to new domains beyond and below the traditional thresholds of warfare. Nations today confront more threats from more actors than ever before.

**MULTIPOLARITY** The past few years have seen what Walter Russell Mead called a "return of geopolitics" amidst Chinese revisionism and Russian revanchism, and a new range of cooperative relationships between countries around the globe—among which the United States plays a decreasingly important role.

**THE GRAY ZONE** Countries including China, Russia, Iran, and North Korea have adopted tactics to seek advantage through a suite of coercive strategies and activities below the threshold of actions likely to provoke a conventional military response from targeted countries, including the United States.

**OTHER THREATS** Alongside these complex new dynamics are magnifying threats from past decades, including proliferation of drones on the battlefield; continued evolution and expansion of terrorism both in number of fighters and geographic span; and proliferation of missiles and precision strike capabilities.

**USEFUL RESOURCES** The CSIS [International Security Program](#) leads an ongoing effort to understand these challenges and propose solutions through its [Gray Zone Project](#).



## **REVOLUTION 7** **GOVERNANCE**

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The previous six revolutions come to a head with a question of how leaders and institutions grapple with the massive changes underway. Those in power face complex new challenges as they navigate the pressures of growing citizen expectations and a hypercharged media environment. Under current conditions, democratic governance is under assault and authoritarian systems are imposing new controls on their populations to combat these forces of change.

**POLITICAL AWAKENING** In 2008, Zbigniew Brzezinski described a "global political awakening" as social media draws new swathes of citizens around the world into politics with surging expectations. From the ~~landslides~~ <sup>landslides</sup> to rising populism across Western democracies, his insight proves truer by the day.

**DEMOCRATIC DECLINE** Freedom House reports that global democracy has declined for the past 16 consecutive years, with 60 countries suffering declines over the past year. In 2021, 8 in 10 people worldwide lived in a "partly free" or "not free" country.

**TRUST** Alongside the decline of democracy is decreasing trust in Western democracies of core institutions, particularly among younger generations. Repairing this trust deficit requires experimentation with new modes of government and governance.

**USEFUL RESOURCES** Freedom House's annual report, "[Freedom in the World 2022](#)," details trends in democracy worldwide. Pew Research has conducted a survey analysis of "[Trust and Distrust in America](#)."

*The Seven Revolutions Initiative is directed by Mr. John Schaus  
[jschaus@csis.org](mailto:jschaus@csis.org)  
202-775-3117*

*For more information please visit:  
<http://www.csis.org/programs/seven-revolutions>*