7REVOLUTIONS

What will the world be like in 2050? How different might life be for you and the more than 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 7.7 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; but many countries will shrink while Africa doubles from 1 to 2 billion.

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

URBANIZATION The percent 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 International migration rates increased by 60 percent between 2000 and 2017, driven by a range of factors from conflict to the effects of climate change—all of which will increase in decades ahead.

READ MORE The United Nations Department of Economic and Social Affairs "World Population Prospects 2019: Highlights" 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 CO2 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, we 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 threaten billions and cost trillions of dollars.

ENERGY According to the International Energy Agency, global energy demand will increase 27 percent to 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 59-98 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

The scale, speed, opportunity, and risk of emerging technologies are beyond any historical experience. We are experiencing both the onset of the Fourth Industrial Revolution and living in what must be 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 day-to-day lives will rapidly increase in decades ahead as humans and machines work side by side, from autonomous vehicles and drones to industrial and retail robotics.

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 we expect by 2030 spanning sectors and industries and representing the convergence between the physical and digital worlds.

AI In decades ahead we will make rapid progress in the application of artificial narrow intelligence and move to a world of artificial general intelligence—human-like intelligence with revolutionary and startling implications and ethical considerations.

BIOTECHNOLOGY The CRISPR-Cas9 gene editing tool was discovered only six years ago but is already transforming biotechnology—a field which is itself seeing beyond-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

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 Nearly half of the world is now online, and by 2030 it will likely be close to 100 percent.

DATA GROWTH The world now creates nearly 2.5 quintillion bytes of information per day, with 90 percent of all data—somewhere around 18 zettabytes—having been created in the past two years.

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 virtually reality (AR and VR) are transforming the way humans can connect with materials.

USEFUL RESOURCES Domo's annual "Data Never Sleeps" presents a remarkable picture of global information generation and storage. MIT Media Lab's video overview of "The Electome" project provides important context on social media and politics.

REVOLUTION 5
ECONOMICS

Seven five 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 to 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, the gaps within countries and between the world's richest and poorest continues 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, while 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 patent applications as a percent of world total increased from 10.5% in 2008 to 40.2% in 2017.

USEFUL RESOURCES Oxfam International's annual report on global inequality is always an eye-opener. CSIS's ChinaPower project asks the question, "Are patents indicative of Chinese innovation?"

REVOLUTION 6
SECURITY

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

MULTIPOLARITY The past few years have seen both 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—all with the United States playing a still important but diminishing role.

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

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

USEFUL RESOURCES CSIS's International Security Program leads an ongoing effort to understand the gray zone challenge and propose solutions.

REVOLUTION 7
GOVERNANCE

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 information technology draws new swathes of citizens around the world into politics with surging expectations. From the Arab Spring to populism across Western democracies, his insight proves truer by the day.

DEMOCRATIC DECLINE Freedom House reports that global democracy has declined for the past 12 consecutive years, and only a bare majority of the world's larger states remain democracies, with 39 percent of citizens living in a "free" country, 24 percent in a "party free" country, and 37 percent in a "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 "Freedom in the World 2019" report details trends in democracy worldwide. Pew Research has conducted survey analysis of "Trust and Distrust in America."

For more information please visit:
www.csis.org/programs/seven-revolutions