SEVEN REVOLUTIONS

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Have you considered how a global population of 9 billion people by the middle of the century will impact your life? What are the challenges for the availability of food, water, and energy resources? How will society balance the benefits of technological innovation and advanced communication with cyber security? How will global economic integration and governance affect trade, markets, and labor?

Seven Revolutions, an ongoing effort of the Center for Strategic & International Studies (CSIS), examines major global issues out to the year 2035 and beyond. It promotes strategic thinking about the long-term trends that too few take the time to consider. We are constantly updating Seven Revolutions to reflect the latest data, research, and technologies as an effective tool for pushing audiences to think outside of their areas of expertise and beyond their familiar planning parameters. We've created this guide as a snapshot to drive that conversation.

REVOLUTION 1
POPULATION

Changes in global population over the next 3-7 decades will drive key questions: What will be the impacts of a larger population? What impact will rising (and falling) national populations have on the world? How will aging societies impact national priorities and the way we live? What changes might happen as the share of population living in cities continues to grow?

GROWTH World population is expected to grow from 7.5 billion in 2017 to 9.8 billion by 2050.

AGING Average global life expectancy in 1950 was 46.9 years; by 2050 it could rise to 77.8 years.

URBANIZATION The number of megacities (10 million or more people) is expected to grow from 28 today to 56 in 2035.

USEFUL RESOURCES The UN World Population Prospects 2017 website and related material, especially the "Key Findings" document.

REVOLUTION 2
RESOURCES

Major changes are expected in food consumption, water availability, energy usage, and impacts of climate change over the next 1-3 generations. Questions include: What kind of food will the world have, what foods will people want, and how much of it might there be in 20-40 years? How will a growing population adapt to a static water supply? What impact will energy consumption—and mix—have on other resources? How will communities prepare for and/or respond to climate change?

FOOD The International Diabetes Federation estimates that there will be 642 million people with diabetes in 2040, more than people who are hungry by that year.

WATER 33 countries are expected to experience "extremely high" water stress in 2040, according to the World Resources Institute. In addition, China, India, and the United States will experience "high stress."

ENERGY Despite advances in developed-world adoption of renewable sources of energy, the U.S. Department of Energy anticipates that global fossil fuel consumption will fall from 82% today to 78% of global energy production by 2040.

CLIMATE The Inter-governmental Panel on Climate Change estimates that climate change exceeding 2 degrees Celsius will lead to significant impacts on human society. Halting climate change at that level would require reducing fossil energy consumption to approximately 59% of total energy use by 2040.

USEFUL RESOURCES For more information on energy consumption, see the International Energy Outlook, an annual report produced by the U.S. Department of Energy's Energy Information Agency. The World Resources Institute has a series of interactive features on water availability and demand.

REVOLUTION 3
TECHNOLOGY

Technological advances are likely to have an even greater impact over the next 25 years than they have had over the past 25. Advances in not just computing speeds, but types of computing systems; computer-machine integration (robotics); and biotechnology will impact what activities can be technology-driven or managed, and how humanity interfaces with and leverages future technology.

COMPUTATION Emerging computation trends may alter the way we interact with computers and what we imagine them to be capable of.

ROBOTICS Advances in wearable robotics in fields as diverse as prosthetics and warehouse operations are changing both concepts of mobility and the way we think of human labor.

BIOTECHNOLOGY Advances in technology have enabled scientists to remove genetic pre-dispositions for harmful medical conditions in lab-based embryos, and soon will enable the creation of replacement organs, both potentially altering life expectancy.

USEFUL RESOURCES One of the technology fields that could drive the greatest change in coming decades is transformation of computing and artificial intelligence. Medium's "What's next in computing" will spark new thinking, while the role of robots and AI as significant shapers of future human landscape are addressed by Elon Musk in Robots will be better than humans at everything by 2030 and Mary Cummings at Duke University.

REVOLUTION 4
INFORMATION

Emerging technological access to information—and technologically enabled access to people—may change human society over the coming generation.

DATA GROWTH Over the next three years, global data generation is expected to nearly triple, expanding opportunities for artificial intelligence to learn and be applied to a wider range of human activity.

ACCESS/PRIVACY With nearly 9.2 billion web-enabled phones expected in circulation by 2020, and nearly 500 million new users, the ways in which humans engage with and learn from the internet will grow significantly.

KNOWLEDGE The ubiquity of information is resulting in rapid data consumption, but little knowledge development. Managing data flow and identifying ways to consistently drive to more knowledge will be key challenges.

USEFUL RESOURCES Numerous sources provide varying data and analysis in this area. Some starting points include Cisco's report on The Zettabyte Era; The Wall Street Journal's (with others) 2016 Global IT report; and Pew Research Center's program on Internet and Technology, which examines future internet trends.

REVOLUTION 5
ECONOMICS

Economics has always been a key barometer of what countries or regions are likely to be influential in the future. Stronger economies are more likely to have greater influence. Current trends show that long-standing economic relationships will shift in the coming decades. Considering some of the drivers of why will better prepare one for the changes—whether they occur gradually or suddenly.

GLOBALIZATION Supply chains for nearly all products are global. The iPhone, for example, is "made in China" and "designed by your friends in Cupertino." Yet components for the iPhone come from dozens of countries including South Korea, Italy, Germany, Taiwan, China, and the United States. What global trade means, and who benefits, is changing in ways that rhetoric often does not reflect.

NEW PLAYERS are emerging across the economic landscape. This includes rising economies—not just China and India, but places like

Brazil, Mexico, South Africa, and Nigeria. How they enter the global system, and what changes (or continuity) they seek will have an impact on the coming 25 years. Further, the incorporation of greater automation (or artificial intelligence) into work processes is likely to change the nature not only of international trade but of domestic labor markets.

TRADE Exports as a share of global GDP have grown from 12% in 1960 to 27% in 2015—but this is down from a high of 31% as recently as 2013. Does this suggest that trade is now in terminal decline, or is it simply what economists call a 'market correction?'

DEBT Since the 2008 financial crisis, debt has been a high-interest issue for the global economy. China's debt, for example, has quadrupled as a percentage of GDP since 2007; however, most debt is held by China's government or private sector, and is not seen as likely to result in systemic global economic risk.

USEFUL RESOURCES The World Bank publishes very large data sets on national and regional GDP, trade, and other measures of economic productivity. For U.S. domestic information, numerous federal agencies catalogue some or all of this information; for example, the Bureau of Labor Statistics catalogs many economic indicators such as employment and sectoral shifts or projections and the Census bureau measures international trade with the United States.

REVOLUTION 6
SECURITY

Longstanding norms and systems of security are being challenged in a multiplying number of ways. The existing structures have—so far—been sufficient to manage emerging challenges, but the signs of security-system stress are growing.

PARADIGM? As a result of 21st-century technology—from communication to ammunition—the means of disrupting security are becoming cheaper, easier to find, and easier to use. The structures designed to manage 20th-century problems are finding it difficult to cope with 21st-century technology that is moving more quickly than problem-management systems can adapt.

TRANSNATIONAL THREATS The time it takes disease to move from one area to another has fallen by orders of magnitude since the 1918 "Spanish" flu outbreak. That episode killed between 50-100 million people in a single flu season. Should such a virulent disease emerge in an era when it takes less than a day to travel to the farthest corners of the world, the potential consequences would be even greater.

NATURE OF CONFLICT How do countries (or companies) protect themselves from attacks when even clothes or hearing aids can be used to collect information or launch attacks? Our connected world creates great opportunity for individual human advancement, but also risks whole new forms of vulnerability.

USEFUL RESOURCES There are dozens of potential sources for this topic, depending on what specific areas one wishes to examine. Two potential options are the annual CSIS Global Security Forecast and SIPRI's publications on peace and security. Other sector leaders can be found at the Center for Think Tanks and Civil Society at the University of Pennsylvania.

REVOLUTION 7
GOVERNANCE

Governance explores how emerging trends may be manifestations of changes people seek in their relationship to governing structures.

IDENTITY 100 years ago, a person's identity was likely defined by the town they were born into, or their family and neighborhood in larger communities. Tomorrow's identity can be based on the internet chat rooms you find most engaging and the groups you meet online that you are willing to travel the physical world to join.

POPULISM Whether from the left or right of the political spectrum, populists seek to leverage the identity of a group supposedly dispossessed by an antagonist group—for example, immigrants and refugees or powerful international corporations. By seeking to deprive the antagonist group of power (economic or political) and transferring that power to the dispossessed group, populists secure support, at least in the short term. There are, however, few instances of long-term successful populist movements.

CIVIL SOCIETY How countries welcome (or oppose) domestic or international civil society organizations (some of which have larger budgets than the government ministries responsible for the same sector) who wish to operate within their borders will be a trend to watch in coming years.

USEFUL RESOURCES Stanford University has a good trove of academic articles focused on identity politics; CSIS recently published a short piece—with hyperlinked sources—on populism; and the World Economic Forum released a report on possible future roles for civil society.

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