

DesignIntelligence® Quarterly



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DesignIntelligence™ Quarterly

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From the Management & Editors

For the first *DesignIntelligence Quarterly* edition of 2018, we have two major announcements that could each be worth a separate introduction: a major change in our approach to sustainable publishing, and a new approach to providing actionable foresight for A/E/C organizations.

Seventeen years ago, our leadership organization, the Design Futures Council, convened one of the earliest gatherings of sustainability leaders in architecture, engineering, and construction. Since that time, DesignIntelligence has been steadfast in its commitment to environmental stewardship, but unsatisfied with our collective progress as an industry on such an essential issue.

For example, in the past few months we've conducted conversations with multiple organizations including architecture, engineering, and construction firms who readily admit that the move to net-zero and/or carbon neutral buildings is still an exception rather than the rule. Far too many inhibiting variables are still encountered in U.S. A/E/C to make the leaps forward that must be made to turn around the damage to date.

DesignIntelligence has decided to take some risks toward a greener world. We are moving all our publications to electronic formats, including our flagship, *DesignIntelligence Quarterly*. As of the 1Q edition you are now reading, the *DesignIntelligence Quarterly* will be published exclusively on our recently upgraded, web-reader platform. This move will be applauded by some and derided by others. Nevertheless, we're placing our convictions where our mouth alone has been for too many years.

This edition of the Quarterly not only differs in its physical form, but also takes a new approach to its content. It is our attempt to peer into the fog and develop a view of the near-term future. We don't seek to predict, but to look broadly at the complex conditions that shape the context of A/E/C practice and bring meaning to what we see.

As we make the transition from the first to second quarter of 2018, the view ahead is no clearer than it was six months ago. Whether we are talking about politics, economics, security, technology, or any of the other topics we cover, the most consistent threads seem to be paradox and unpredictable change.

Many of our other editions, including prior ones that took a look forward at the start of a new year, included an extensive survey as the main component. This one is different. This 1Q edition leverages the capabilities of DI Research to explore seven topics that, taken together, yield a perspective of the forces that influence global A/E/C business: geopolitics, economics, mass movements of people, security, climate conditions and natural resources, infrastructure, and technology.

The broader topics are balanced by two sections that focus on the perspective of A/E/C leaders. The first is a series of interviews with leaders of major architecture and multidisciplinary design firms who provide us their perspective on how professional service firms will evolve to meet the opportunities of the new marketplace.

Our goal, as we look together into the remainder of 2018, is to help you better understand the rapidly changing context of A/E/C business and make decisions about how to navigate the uncertain waters ahead. We hope you find the latest edition of the Quarterly, and our recently upgraded digital platform, effective tools in the effort.

All this being said, we encourage you to take your time wading into this edition. It is deep, meaningful, and will yield insights uncommon among other industry publications. One last request . . . let us hear from you. Your feedback and encouragement would be helpful.



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GLOBAL ECONOMY

The start of 2018 brings with it good news about the global economy. This section will give an overview of the global economy as well as possible factors that could derail it; globalization versus protectionism; banking and the financial markets; competitiveness and areas in the world where doing business is easiest; the current and potential impact of Brexit on business; the costs of terrorism and climate change; and some massive projects with the potential to impact the world's economy.

In December 2007, the United States began a sharp economic decline—later termed the Great Recession—that caused significant damage to the world's economy. The slump began in the U.S. with the “housing bubble,” where the housing market went from boom to bust. Vast numbers of mortgages went into default, causing bank failures. With the bank failures came loss of investment, extreme cutbacks in consumer spending, with the resulting chaos causing massive job losses across the United States. With more than 8 million jobs lost, American households lost trillions of dollars of wealth. The recession was so severe that financial markets, companies and people across the globe were impacted. It was the worst global recession since the Great Depression.

During the Great Recession and its aftermath, there were other global factors that contributed to the devastating effects. There were geopolitical events like Arab Spring and Brexit, and terrorist events from ISIS and other groups, all of which contributed to economic volatility and uncertainty. There was the European debt crisis, much like the U.S. debt crisis. And there were fluctuations in oil prices and production. Capital flows and investment simply dried up.

Even though the Great Recession officially ended in the United States in 2009, many people around the world are still feeling its effects today. In the U.S., countless households have not gained back the wealth they lost. While the unemployment

rate is low, there are hundreds of thousands of long-term unemployed and “marginally attached” people to the labor force. In addition, there are underemployed individuals (those working part-time who want full-time work). The way we look at work has been completely upended. Some types of jobs were lost and will never return, leaving people without the skills and education they need in order to compete in the global market.

RECOVERY

The U.S. economy and the world economy are recovering, though. After years of weak growth (even after the official end of the recession in 2009) the outlook for the global economy for 2018 is healthy growth. It seems that the indicators are all pointing to strengthening activity worldwide. Market volatility is low. Consumers are confident ... and buying. Employment is generally up. So is business investment in plants, equipment and technology. Manufacturing has increased globally, especially in Asia, with purchasing managers' indices underscoring increased manufacturing output. Strong consumer confidence drives demand, which drives increases in manufacturing. Inflation, at this time, is fairly low. Oil prices are stabilizing and increasing slightly.

In 2017 global economic growth was stronger than expected. The International Monetary Fund (IMF) estimates that global output grew by 3.7 percent in 2017. The World Bank forecasts that 2018 growth around the world will be about 3.1 percent; the IMF forecasts 2018 global economic growth at 3.8 percent. As central banks such as the Fed loosen and/or remove the fiscal tools used to help improve conditions from the Great Recession, growth in 2018 will likely moderate in the larger, more advanced economies. Emerging markets, as well as the economies in developing countries, will be even stronger this year over 2017.

In fact, the global economy is projected to be at or near capacity in 2018—for the first time since before the Great Recession. But for long-term resilience and growth in the global economy, new perspectives and innovation will need to be considered.

The United States

Economists project the growth rate in the United States to be around 2.5 percent in 2018. The U.S. tax policy changes enacted in late December—for both individuals and corporations—are expected to increase economic activity, especially in the short-term. These tax reforms will

3.8%

GLOBAL ECONOMIC
GROWTH IN 2018
(IMF)

3.1%

GLOBAL ECONOMIC
GROWTH IN 2018
(World Bank)

2.5%

UNITED STATES ECONOMIC
GROWTH IN 2018

drive renewed and increased business investment. Companies will also increase hiring and investments in technology and equipment in order to meet increased demand. And consumers will likely loosen their purse strings because they feel more confident in the economy and jobs.

“Have we learned anything from the Great Recession? Are financial systems infrastructures in place to prevent something so devastating from happening again?”

U.S. trading partners will be bolstered by the tax reforms as well, although there are angry rumblings over President Trump’s proposed tariffs. He is making good on a campaign promise he made to blue-collar workers: to impose tariffs on imports of steel and aluminum. Why tariffs? Trump says that low-priced steel and aluminum from China, for example, hurt American workers through lost jobs. That’s because China is making and selling steel and aluminum at a non-competitive price. Foreign producers of steel and aluminum have promised tariffs of their own. Retaliatory? Maybe. And these actions could set off a trade war. In recent days, though (as of this writing), the president has indicated that he might ease up on the tariffs—specifically, exempting some countries from paying the tariffs. This could help mitigate some of the potential damage to the economy as well as retaliatory tariffs.

And while the United States has withdrawn from the Trans-Pacific Partnership (TPP), the remaining countries (11 of them) are planning to continue. The United Kingdom, in a possible move to mitigate trade losses because of Brexit, is a potential newcomer to the pact.

Unemployment in the United States stands at 4.1 percent, which is a 17-year low. In February 2018, the economy added 313,000 jobs. The year-over-year wage growth was at 2.6 percent in February. The construction industry is booming, even now in the off season. In February, employers added 61,000 jobs in the industry, with total gains of 185,000 over the last four months.

Currently, inflation is at 2.38 percent for 2018.

There are some potential risk factors to the economic growth in the U.S. One is the Fed raising rates to normalize policy. Another potential risk is if tax reform isn’t the economic boon it is projected to be. The U.S. is also facing low productivity, even though employment is high and there are 6 million open jobs in the U.S. And finally, trade and Trump’s tariffs, which we mentioned above.

Unemployment has fallen globally from post-recession highs, causing consumers to feel more confident. In fact, the low unemployment levels, low inflation, and low costs of borrowing all add to consumer sentiment and business confidence.

The World

In the eurozone, growth is the strongest it has been in a decade, and economists predict the EU is moving toward “a golden period of low-inflationary expansion,” according to *Bloomberg Businessweek*. Late last year, the European Central Bank (ECB), in a move to expand monetary policy, announced that it will keep buying up public and private sector debt. And unlike the Federal Reserve’s modest rate hikes, the ECB says it will not raise interest rates, at least not in the near future. But the world is watching to see how French President Macron and German Chancellor Merkel work together to determine what the EU will look like in the future.

Germany, Italy and the Netherlands are all experiencing increased demand, both domestically and from other countries. But Spain, due to political uncertainty in Catalonia, is expected to see a slight retraction in growth. Catalonia is a very wealthy part of Spain, and if it secedes, one-fifth of Spain’s economy will go with it.

What’s more, the growth across the European region seems to be having a positive effect on the global economy; as in a rising tide lifts all boats. Angel Talavera, an economist at Oxford Economics in London, said that in the eurozone, “Absent an unexpected shock, we should see several more years of economic growth.”

Asian advanced economies, especially Japan, are expecting stronger growth over the next two years because of increased demand for technology, global trade and

foreign investment. Japanese companies are expected to invest in technology, equipment and workers to boost productivity. The developing economies in Asia are expected to account for about half of the world’s economic growth—somewhere around 6.5 percent over the next two years. China’s growth is projected to moderate, with President Xi Jinping (now set up as ruler for life) expected to make moves like shutting down unproductive, weak companies—which will be disruptive to China’s economy in the short-term, but in the long run it will be good for its economy.

India’s growth is set to take off. In fact, India is projected to be the fastest-growing economy in the world for the next 10 years. In the next few years it will also have the largest population in the world. These factors will combine to make India’s economy fifth largest in the world. But there is much disparity in India; most of the Indian people are poor or very poor.

DI INSIGHT

Another threat to the global economy is political instability. The potential shifts in the international balance of power could create a new world order that we haven’t seen—which will affect the global economy. Let us hope that cooler heads will prevail; that trade conflicts will be peacefully negotiated, that democracy and capitalism will regain positive momentum and favorability, and that innovation and competition will thrive.

2018 PROJECTED GROWTH HIGHLIGHTS

Canada

Canada's economy is projected to grow at a 2.2 percent pace overall in 2018. There was an unemployment uptick in January that may likely be tied to recent increases in the minimum wage. NAFTA and its undoing is still a concern, which will impact the economy. Negotiations are ongoing, and while there is cautious optimism, Canada is looking at what may happen if the U.S. pulls out of NAFTA. In January, inflation dipped and housing prices rose.

China

China continues to report moderately strong growth, despite some slowdown in economic activity. The modest growth is expected to continue in 2018. But there are longer-term issues that China faces: fewer younger workers and an aging population; skills gaps in new technology; lack of transparency in government and media; debt, especially in local governments.

Japan

In Japan, the economy marked in Q4 the longest period of sustained growth in three decades. The Bank of Japan's ultra-loose monetary policy and healthy global trade flows spurred manufacturing activity, which translated into lower unemployment and stronger investment. While wages also increased throughout last year, rises have been limited.

Eurozone

Growth in the Eurozone is the strongest it has been in 10 years. The Eurozone GDP is projected to grow at a 2.3 percent pace overall in 2018. However, in January and February, sentiment cooled slightly. The Purchasing Managers' Index slipped as well. Despite the downtick in January and February, overall growth is still projected to be strong. Unemployment remained stable. But there are geopolitical storms brewing, such as the Italian election, Catalonia's bid for independence from Spain, Germany's uneasy grand coalition, Brexit uncertainty and the EU's future.

France

Growth in France is projected to be 2.1 percent overall in 2018, with brisk economic activity. Consumer prices dropped .1 percent in February, and consumer confidence declined. However, changes in the country's tax laws should foster investment growth this year.

Germany

A grand coalition has been reached to form a new government. The economy is expected to put in solid growth this year. Unemployment is down; consumer sentiment is up. Private consumption, demand from other countries and investment will be the prominent growth drivers in Germany's economy over the next year.

sources:

<https://www2.deloitte.com/insights/us/en/economy/>

<https://www.focus-economics.com/regions/major-economies>

<https://www.focus-economics.com/countries/>

Italy

Italy's growth is projected to be about 1.5 percent in 2018. Political uncertainty after the March 4 elections may hinder growth, though. The country needs some economic reforms, but it remains to be seen if that will happen. But declining unemployment and low inflation should bolster consumer spending. Consumer prices had a slight uptick in February, but business confidence strengthened.

Mexico

Mexico is facing some economic uncertainty due to several factors—NAFTA, tariffs, drug wars, “the wall” and more. The stability the country has achieved over several years could be at risk. With presidential elections to be held this year, Mexico will need a solid macroeconomic policy to navigate the waters.

Turkey

Turkey's economy is on the upswing, supported by strong private consumption, investments and exports. While the short-term outlook seems promising, rising inflation could derail growth.

United Kingdom

Brexit uncertainty will cause growth to slow to a projected 1.5 percent in 2018. Private spending is expected to slow—in fact, consumer sentiment was down in February. Housing prices dipped as well, with inflation steady but elevated. The government is trying to lower the country's deficit.

In Latin America, the recovery is expected to strengthen. Mexico's economy will improve because of growth in the U.S. economy. Brazil's economy is also expected to grow. Other countries that export commodities will also have a better year. However, Venezuela has the world's most miserable economy for the fourth year in a row. Out of control hyperinflation and prices, along with non-existent jobs and nothing to buy combine to create dire circumstances for the Venezuelan people. Estimates of more than 1.5 million people have left the country in the past two years; it is a humanitarian crisis.

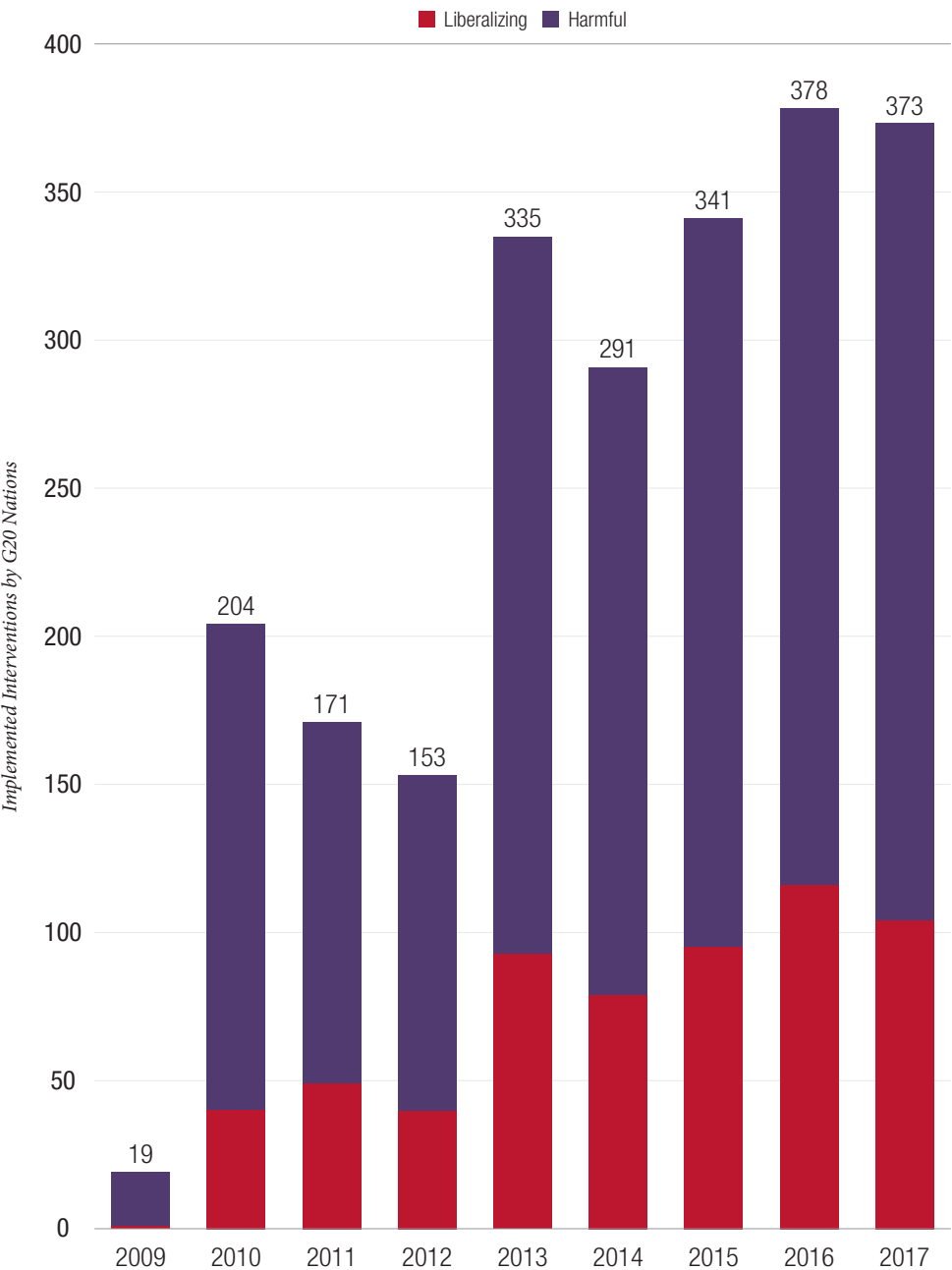
MENA countries (Middle East/North Africa) countries will also experience growth in the coming year. Stronger oil prices are contributing to growth in these economies, but fiscal reforms are needed.

Sub-Saharan Africa is projected to grow by 3.3 percent in the coming year. South Africa's growth prospects are projected to be less than one percent, however, due to political instability.

Russia and the Commonwealth of Independent States will experience modest growth in 2018–19.

There is much uncertainty around Brexit and the UK, however. The transition is expected to be complete by March 29, 2019. This is the date the new relationship between the UK and the EU is set to begin. But a lot has to happen between now and then. Prime Minister Theresa May wants the UK to be autonomous from the EU

Trade Measures of G20 Nations:
Steady Increase Since 2012



sources: Centre for Economic Policy Research; Deloitte University Press

but still able to do business across the EU the way it has been doing—including the benefit of no tariffs. In the interest of security, May has said that she doesn't want the UK to allow people from other countries to be able to freely enter and leave the UK any longer. The "Leave" vote indicated that the British people wanted immigration to be reduced.

As far as the UK's economy: the first predictions after the referendum were that the economy would tank. That hasn't happened. Instead, the economy grew at a steady, respectable, albeit slow pace in 2017. The latest numbers (as of this writing) show some weakness in 2018, with consumers a little skittish about spending because of prices rising. Firms appeared reluctant to spend as well. The unemployment rate, especially among people under the age of 24, is at 4.4 percent (in February 2018).

A deal has yet to be hammered out between the EU and the UK.

RISKS

While all of this is great news and the picture looks rosy, we have to ask: Have we learned anything from the lessons of the Great Recession? Are infrastructures in place in our financial systems to prevent something so devastating from happening again?

History offers us much wisdom and insight into risk. Consumer spending has increased to such levels that households are again burdened with a lot of debt. This is an especially troubling phenomenon

in some emerging economies. For example, Rumki Majumdar and Akrur Barua, writing for Deloitte Insights, say, "In the Asia-Pacific region, ... household debt as a share of disposable income is now higher than what it was in the United States prior to the outbreak of the Great Recession."

And in those areas, it may be that another real estate/housing bubble is in the works—there is a lot of real estate debt in several countries.

"Unemployment in the United States is at a 17-year low."

Debt levels in governments around the world are close to historic highs. Even though the economy is humming along, there will be the inevitable downturn—as we all know, the economy is cyclical.

During the recession and its aftermath, governments were able to borrow cheaply since interest rates were so low. And the citizens of many countries needed social services types of assistance; hence, debt is now high. Since the economy is doing well, more people are working, consumers are spending, so it may be a good time for governments to begin to tackle their debt.

Another risk is that central banks, like the Fed, are beginning to bring monetary policy back into line. The extraordinary measures the Fed (and other central banks around the world) put in place to help boost the economy during the Great Reces-

sion are no longer needed. They are easing and in some cases removing the tools they put in place to alleviate the effects of and control some of the damage of the recession and its aftermath. These current moves will affect borrowing costs, flows of money into investments, even impacting exchange rates and more, with the potential of causing slowdowns. And slowdowns in advanced economies have a ripple effect around the world.

While the global economy is adding jobs, the growth in labor productivity has slowed in the U.S. and across Europe. Labor productivity growth drives economic growth; i.e., gives consumers more money to purchase goods and services. There are many potential reasons for this slowdown in productivity growth: digitization, the recession and its accompanying uncertainty, and the aging of the population and a declining birthrate (i.e., fewer workers to fill open jobs).

Brexit, NAFTA, TPP, protectionist rhetoric—all are causing uncertainty and nervousness. What will happen with NAFTA negotiations? Will Trump's tariffs

cause trade wars? How will exports and demand for goods be affected? The full impact of Brexit has yet to be felt because it hasn't been fully implemented—but we already know that two major institutions are moving out of the UK, taking more than 1,000 plum jobs with them. There will also be disruptions in technology because of cyberattacks, as well as exponential developments in AI. And rising geopolitical tensions and terrorist groups such as ISIS—who even though they've lost the caliphate are still seeking more followers and more targets—are added risks to the infrastructure of the global economy.

In addition, financial markets might not do well even if the global economy does. “Prices of stocks and bonds are so high that it wouldn't take much of a jolt to send investors rushing for the exits.” In addition, the World Bank has cautioned that “new trade restrictions and persistent policy uncertainty could dampen market confidence and investment.”

So it is wise to look ahead and to look back—to forecast but to remember what happened in the Great Recession. While everything in the economy looks to be a “go”—and we do have a real yet fragile recovery on our hands—we must look with clear eyes at the news, the numbers and the indicators and be discerning. History can repeat itself if we forget the lessons.

Let's not rest on the good news we're hearing. As World Bank President Jim Yong Kim said, “This is a great opportunity to

DI INSIGHT

There is a looming labor shortage due to an aging labor force. Coupled with unskilled labor and productivity declines, will the growth in the economy be sustainable? Inflation is another factor that could trigger a correction.

invest in human and physical capital. If policy makers around the world focus on these key investments, they can increase their countries' productivity, boost workforce participation, and move closer to the goals of ending extreme poverty and boosting shared productivity."

WHERE IN THE WORLD TO DO BUSINESS

With this positive view on the economy, companies who want to expand to other areas of the world may wonder where business opportunities look strong versus where they may be in decline.

Despite the uncertainty and unease about Brexit around the world, it appears that top U.S. banks are, at least for now, staying put in London. The UK derives much of its economic growth from services—including banking and insurance. Predictions were that investment banks would leave London and head for friendlier cities, such as Paris and Frankfurt, taking top jobs with them. But numbers indicate that the five largest U.S. investment banks (JPMorgan, Morgan Stanley, Citigroup, Bank of America Merrill Lynch, and Goldman Sachs) are hiring—with more than 1,500 job postings in London—and they are also renewing leases for office space. In addition, they are planning new initiatives for the UK (like the innovation lab by Citigroup).

The UK still stayed in the top ten in this year's *Doing Business* ranking by World Bank. For the *Doing Business* report, World Bank researchers use 11 indicators to measure business regulation in and

Where in the world to do business

1. United Kingdom
\$2.629B GDP
2. New Zealand
\$182B GDP
3. Netherlands
\$778B GDP
4. Sweden
\$511B GDP
5. Canada
\$1,530B GDP
6. Hong Kong
\$321B GDP
7. Denmark
\$307B GDP
8. Ireland
\$304B GDP
9. Singapore
\$297B GDP
10. Switzerland
\$669B GDP
11. Australia
\$1,262B GDP
12. United States
\$18,620B GDP

Sources: Forbes Best Countries for Business;
Dec. 2017

rank 190 countries worldwide. The project “encourages economies to compete towards more efficient regulation; offers benchmarks for reform; and serves as a resource for policymakers, academics, journalists, private sector researchers and others interested in the business climate of each economy.”

Although India ranked 100th in the *Doing Business* report, it was named a Top 10 Improver. Over the next five years, India plans to build 83,666 kilometers of roads. This is India’s largest-ever infrastructure spend on road construction. The cost is projected to be \$108 billion, and should be a boon for investment.

“India is projected to be the fastest-growing economy in the world for the next 10 years.”

GLOBAL COMPETITIVENESS

Another report, the World Economic Forum’s Global Competitiveness Report, uses an index, the GCI, of 114 indicators that relate to productivity and long-term prosperity. Those indicators are then grouped into 12 pillars, such as infrastructure, financial market readiness, macro-economic environment, technological readiness, and innovation.

The report shows that 10 years after the economic crisis of 2008, the financial sector is still vulnerable. The GCI reveals a remaining weakness in the foundations of the banking sector.

The report also found that more countries are now able to innovate, but there’s still a wide gap between the newcomers and those countries with a proven track record of innovation. In addition, these countries need to be more intentional about sharing the benefits by helping their people and firms keep up with new technology rather than leaving whole groups of the public behind. One advantage to making sure their people have the means and education to use the technology is that it increases the talent and knowledge pool to draw from and feed future innovation.

A third finding showed that “both labor market flexibility and worker protection are needed to ensure shared prosperity in the Fourth Industrial Revolution era.” A large number of countries—60 percent—are proving that labor market flexibility and workers’ rights are not mutually exclusive.

GLOBALIZATION VS. PROTECTIONISM

The world has become more and more integrated and connected, especially in the economic arena. But this globalization is now under pressure.

After the financial crisis of 2008, in an effort to speed up economic recovery and growth, global leaders committed to avoiding protectionism. However, the G20 nations didn’t keep their pledge. Instead of using standard deterrents to trade like tariffs, they employed less obvious means.

The globalization in the late 20th century resulted in many far-ranging rewards,

including prosperity and better living standards for the countries that could integrate with the marketplace of the world. Businesses and employment also became more global and integrated, with the help of modern communication and technology.

The drawbacks of globalization, however, include an interconnectedness that leaves low-income nations especially vulnerable to global risks. Increased income inequality is a problem too.

People in the lower echelons of society believe they are losing their jobs to immigrants or foreign competitors, but often, job loss can be linked to technology and automation. For those who have lost jobs, though, the anxiety about the future and frustration over the changes in their lives and societies leads them to protest immigration and trade. This outcry of those who feel left behind has resulted in increased support for populism—with its uncertainty around policy—in several nations, including the U.S. and others in the West. In fact, the Brexit vote was about this very topic—by viewing immigration as detrimental to their way of life, their jobs and their economy. Voters in Italy have also brought in a populist protectionist government in their latest elections. Along with slowing trade, protectionism will slow growth.

Yet, the advantages of globalization are not generally known or recognized. While globalization is beneficial to many—and has brought prosperity to many people who lived in poverty—it has not been beneficial to everyone. For example, China can produce steel cheaper than the U.S. or the UK, causing steel workers to lose their jobs. This is causing the outcry around the world for protectionist measures—i.e., tariffs and limitations on imports from other countries.

But globalization brings advantages: economic growth, the spread of technology and knowledge, integration of people and nations, freer trade and exchange of goods, and more. In some form or fashion, globalization has been around for thousands of years. And maybe, trying to unravel it may do more harm than good.

A CHILL IN THE AIR IN CHINA

According to a 2017 business climate survey conducted by the American Chamber of Commerce in China, American businesses have noticed a cooler, less welcoming atmosphere in China as well as “murky regulatory hurdles.” More than half of those surveyed said they had been treated unfairly. They listed several possible causes for the change in attitude: increased protectionism, a challenging economic environment, more support for domestic businesses. The report

4.1%

UNEMPLOYMENT
IN THE UNITED STATES

2.6%

WAGE GROWTH
IN THE UNITED STATES

2.38%

INFLATION
IN THE UNITED STATES

said that American businesses in China may rethink their investment because of the continued challenges of making a profit and growing a business there.

President Xi Jinping has made the move toward a centralized government, with himself as ruler for life. There are no more checks and balances. Huang Yasheng, a professor at the MIT Sloan School of Management, said that the West bears some responsibility for the rise of strongman politics, pointing out that the 2008 economic downturn and the election of Trump “‘have gone a very long way to dismantle the legitimacy of economic capitalism and political capitalism.’”

Jinping’s predecessor Deng Xiaoping opened up the Chinese economy to the world; separated the community party from the government; and had a low-key approach to foreign policy and security policy. Jinping has reversed all that. In addition, Chinese GDP growth is built on debt and widespread prosperity bubbles. If those bubbles burst, we may see another global recession.

Other problems in China that will affect their economy and the global economy, too, include environmental conditions: contaminated water (plus water scarcity), lethal levels of air pollution and high levels of carbon monoxide emissions are literally threatening the lives of the people in China.

OTHER ISSUES OF NOTE

The UN chief, United Nations Secretary-General António Guterres, called on the global community to mobilize the agreed-upon \$100 billion annually for developing countries to address climate change. This fund could help stimulate growth for the A/E/C industry as the demand for sustainable buildings continues to grow.

The impact of terrorism on the global economy in 2015 was estimated to have reached \$90 billion. With the near-elimination of ISIS, the figure for 2017, which was not available at the time of this writing, should be somewhat lower. However, all signs seem to indicate that terrorism will continue to be a major global and economic concern. ISIS continues to recruit.

DI INSIGHT

While the picture for the global economy in 2018 looks good, looming on the horizon are mountains of debt in many, many countries and many households around the world. This debt will cause serious challenges. Developing and emerging economies cloud the picture a little because of the unknown. The rapid rise in the

cost of healthcare (and aging populations) as well as the rising costs of social programs present another looming crisis for governments. As these programs require more and more money, they can take funds away from other programs and increase the debt load.

Boko Haram is still wreaking havoc in Nigeria. And Al-Qaeda has been quietly rebuilding and recruiting.

THE SIGNIFICANCE OF SAUDI ARABIA'S NEOM

Siemens is helping Saudi Arabia move toward its economic diversification goals by playing a part in the development of the kingdom's mega city, Neom. The city will be 26,500 square kilometers, spreading into Egypt, Jordan and Saudi Arabia.

Siemens' global CEO, Joe Kaeser, said in an article for The National: "Saudi Arabia, which is heavily dependent on sale of hydrocarbons for revenues, is pursuing a fiscal and economic reform agenda under the overarching Vision 2030 programme and aims to open up the biggest Arab economy to foreign investment. ... Siemens has the ability to provide Neom with solutions for affordable, reliable and sustainable power; efficient network of transportation; security and safety; water and waste water management and sustainable efficient buildings."

Another possible partner on the Neom project could be Virgin Hyperloop One, the futuristic transportation concept inspired by Elon Musk.

"What I think I see is that the UAE, Egypt and Saudi Arabia now are really coming together and lead by purpose in this region, which I believe is a blessing for the whole world," said Kaeser. "That's a big benefit. On the global scale if there's a shaky Middle East, there's a shaky world."

The significance of the Neom project lies in many areas: its impact not only on investors and the economy, but on the future of sustainable energies and the buildings being fueled from them, plus the coming together of three economies/people groups to potentially lead to a better future in the region and be an inspiration to other parts of the world.

After more than a decade, Citigroup is back in **Saudi Arabia** and should be open for business by the end of this quarter. Citigroup plans to capitalise on opportunities in debt and equity capital markets, the lender's regional chief executive said." Citigroup "will offer a full range of investment banking, debt and equity capital markets and research services to institutional clients."

Source: Reuters

DesignIntelligence caught up with Bob Hughes, Senior Research Fellow with the American Institute for Economic Research and DesignIntelligence Economics Fellow, to talk about the state of the global and the U.S. economies. Bob talked about what to watch for in 2018, the characteristics of an economic bubble, and potential disruptions, threats and opportunities for the economy. And he talked about the perspectives that leaders of A/E/C firms need to take as they plan for the future.

DesignIntelligence: What is your take on the state of the global and U.S. economies in 2018?

Bob Hughes: Overall, the U.S. economy and the global economy are in good shape and ticking up. Consumer price inflation is generally low and steady, particularly in developing economies, and has been decelerating across a lot of the emerging markets. We're also seeing a pickup in global exports, which is a very good sign. Global trade took a sharp hit during the global recession so it's good to see that rebounding.

In most countries, unemployment rates have been falling which will help to sustain growth. Equity markets across the globe have seen strong performances. Bond yields are generally low, which is good for funding capital-intensive investment projects.

DI: What are some potential threats and opportunities you see for 2018?

BH: I have four key things that I feel are most important right now. First is policy, particularly monetary policy. In the U.S., the Federal Reserve is embarking on a series of interest rate increases. These increases have been moving at a slow pace by historical standards, and they are expected to continue given the current economic growth. The Fed is also reducing its holding of securities on its balance sheet. This will be a slow and gradual way to reduce the Fed's balance sheet. In general, monetary conditions are tightening, but at a slow pace here in the U.S.

Within the policy realm is also fiscal policy. We have new tax cut legislation that has

just been passed. Tax cuts are generally stimulative, but there is a downside of potentially increasing the federal deficit.

We must also keep an eye on asset prices. Rapidly rising asset prices may be a sign of overheating in the economy. If asset prices and consumer prices are rising too quickly, the result could be a triggering of more aggressive monetary policy.

“Overall, the U.S. economy and the global economy are in good shape and ticking up.”

The labor market is another area to watch. The cost of wages has been growing very slowly, but as the labor market tightens, pressure on wages rises. Our unemployment rate has dropped to 4.1 percent, which is a multi-decade low. With growth prospects still looking good, it will be important to see if labor markets continue to tighten, if there's enough labor supply and whether wage price pressures build up in the economy.

And finally, we need to watch commodity prices. Energy and industrial metal prices have seen some significant gains. Price pressures in these two commodities in particular are very consistent with a pickup in both domestic and global growth. We're seeing signs of an economy that's been in expansion mode for quite some time and growth rates are picking up, possibly leading to overheating of the economy. These are the risks worth watching.

DI: If I'm the leader of an A/E/C firm, what should I be looking at in the economy?

BH: Watch the details of money, credit and prices. Look for excessive risk taking in equity markets and local land prices. Think about the business cycle. When first coming out of the bottom of a cycle, it's relatively lower risk to be taking on new projects since there's probably pent-up demand, but as an expansion occurs, particularly a long one, it becomes much more important to prepare for the eventual top of the expansion. We usually don't know when that's coming but we can watch for warning signs. So if there's advice to give it's this: When everyone else is feeling pretty good, that's when we should be more cautious. At this point, it's good to watch for potential changes in financing conditions, or prices starting to rise too quickly. That's when we need to be a little more conservative.

DI: Are there any other questions we should have asked you about what's around the corner for us in 2018?

BH: It's always a matter of staying on top of the latest data, the latest news, looking for signs of changes in conditions or policy. One of the important non-data issues is the dysfunction in Washington and the seeming inability to pass any legislation easily and in a bipartisan fashion. A very important issue is the federal financial position (i.e., the debt of the U.S.). It's easy to put an issue like that on the back burner. Congress keeps kicking the can down the road. But the level of federal debt raises a lot of concern.

GLOBAL GEOPOLITICS

In 2018, big issues, hot spots, and old rivals continue to headline in geopolitics. Global geopolitical tension will escalate over the year as the threats posed by all types of terrorism, and the ability for asymmetrically-powerful state and non-state actors to adversely affect the international order and the global balance of power. Tensions are also rising because people—citizens—are increasingly dissatisfied and angry, questioning and rethinking the government’s relationship to their lives. As people around the world demand more from their governments—like security, social justice, prosperity and more—unrest continues to escalate.

At the same time, under the Trump administration, the influence and perception of the United States in the world is changing. When the United States is perceived as less involved, a vacuum is created for authoritarian powers like China and Russia to move in, causing more risk for conflict around the world. In addition, when the United States steps back, there is the real problem of less focus on global human rights.

The international order seems to be in crisis.

REGION: NORTH AMERICA **United States**

President Trump took office on January 20, 2017, and the year seemed dominated by tweets, insults, legal issues, protests, investigations, cries of “fake news” and more.

Relations between the United States and the rest of the world are likely to deteriorate in 2018 after the Trump administration presented a \$285 million cut to the 2018–2019 fiscal year United Nations budget. The continued rhetoric and reversals by the president

on global issues—everything from tariffs and trade to the lack of a foreign policy—cause people around the world to be nervous.

Almost immediately after taking office, Trump introduced the first in a series of travel bans targeting refugees and citizens from seven predominately Muslim-majority nations. In May 2017, Trump withdrew the United States from the Paris Climate Agreement. Months later, the United States pulled out of UNESCO, the United Nations' Educational, Scientific and Cultural Organization, citing anti-Israel bias from the U.N. The administration has also taken aim at Obama's Iran nuclear deal.

But clearly, there have been what supporters would call successes: Supreme Court Justice Neil Gorsuch; a bill to protect whistleblowers (and fire incompetent employees) at the Department of Veterans Affairs; bills unwinding all or parts of Obama-era regulations; and lately, tax reform.

What of the new tax reform legislation? In late December 2017, Republicans and President Trump enacted the most sweeping overhaul of the United States tax system in more than three decades. Key elements include: corporate tax rates set at 21 percent instead of 35 percent; individual tax rates lowered; inheritance tax rate lowered; expanded child tax credit; lower taxes on overseas profits, and more. As of this writing, more than 350 companies have given employees raises, 401(k) boosts, bonuses and more, impacting more than 3.5 million American workers.

Boeing is among a number of companies that have said the Trump administration's tax law changes have allowed for billions in additional investment into its business.

"This is one of the best things that's happened in the last few months, the passage of tax reform," Muilenburg told CNBC's "Squawk on the Street." "You know, frankly, I'd like to thank the administration on the Hill for getting that done."

The law also raises the standard deduction and ends the individual mandate of Obamacare.

Immigration is a defining issue for the Trump presidency. One of President Trump's campaign promises was to build a border wall between the United States and Mexico. While construction on a border wall hasn't even begun, Trump's administration has quietly erected a steep, invisible wall that limits migration to the U.S., according to interviews with lawyers and refugee groups. Some of these roadblocks received considerable attention, like the three versions of a travel ban on people from (originally) seven Muslim-majority countries and the cancellation of Deferred Action for Childhood Arrivals (DACA).

The travel ban is in its third iteration, with varying levels of restrictions on foreign nationals from these countries: Chad, Iran, Libya, North Korea, Syria, Venezuela, Somalia and Yemen. However, the 4th U.S. Circuit Court of Appeals has ruled against it. But the Supreme Court had already agreed to take up a separate challenge to the president's proclamation.

For now, the Supreme Court has allowed the travel ban to fully go into effect pending resolution of the issue by late June.

Attorney General Jeff Sessions declared the Supreme Court's action "a substantial victory for the safety and security of the American people." Indeed, the Supreme Court's action sent a strong signal that it will likely uphold the ban when the case comes up again this year.

While the travel ban works to keep possible terrorists out of the U.S., arrests of immigrants in the U.S. increased 30 percent over 2016 under the Trump administration. (However, the number of arrests decreased sharply from 297,898 in 2009 to 143,470 in 2017). Within the first week of taking office, President Trump signed an executive order that instructed government agencies to remove "anyone who has committed a 'chargeable criminal offense,'" including entering the U.S. illegally. In contrast, the Obama administration focused on undocumented immigrants convicted of serious crimes and recent immigrants caught at the border.

Immigrants with past criminal convictions accounted for 74 percent of all arrests made by U.S. Immigrations and Customs Enforcement (ICE) agents in 2017, according to data from the agency. Of the remaining 26 percent—16 percent had pending criminal charges and 11 percent had no known criminal convictions or charges.

DACA

What is DACA? The DACA program was formed by President Barack Obama in 2012 through executive order. The program allowed certain people who came to the U.S. illegally as minors to be protected from immediate deportation. Recipients, called "Dreamers," were able to request "consideration of deferred action" for a period of two years. This was subject to renewal. To request DACA status, individuals had to be under the age of 31 on June 15, 2012, had to be brought to the U.S. before turning 16 and continuously lived here since June 15, 2007. They also had to have a high school diploma or GED, been honorably discharged from the military or still be in school. DACA does not provide "legal status."

In September 2017, the Trump administration announced a plan to phase out DACA with a six-month delay for recipients. And

30%

INCREASE IN IMMIGRANT
ARRESTS UNDER TRUMP
ADMINISTRATION

\$285M

PROPOSED CUT TO U.N.
2018–19 BUDGET UNDER
TRUMP ADMINISTRATION

earlier in 2017, the president released his four pillars of immigration reform, which included a provision for legal status for DACA recipients and others eligible for DACA status.

There are nearly 800,000 youth under DACA's umbrella.

The six-month extension of the program is set to expire in early March. However, even after a government shutdown over this issue, a month of negotiations, and four bills brought to the Senate floor, no agreement has been reached. As of this writing, there is no permanent fix.

2018 Midterm Elections

In November 2018, U.S. voters will go to the polls for the midterm elections. All 435 seats in the House are up for election, and 34 seats in the Senate are up for election. The Democrats need only 24 seats to flip the House and two seats to retake the Senate. Indeed, a Democrat wave has been predicted.

However, in the Senate, the battleground offers more liabilities than opportunities for Democrats because the 33 states in

play are redder than average. Some seats are in states that Trump won handily. And in the House, Democrats will need to win the popular vote by an especially wide margin to overcome GOP gerrymandering and the Democrats' own natural geographic handicap. That basically means that the Democrats can't take the chamber without a landslide.

In recent weeks, the Democrats' midterm advantage is narrowing, from double digits to 5 percent, according to a CNN poll conducted in January 2018. And the president's approval rating has risen to 42 percent in February 2018.

Mexico

On July 1, Mexican voters will go to the polls to elect a new president. The leading candidate, Andrés Manuel López Obrador, currently has an 11-point lead over his rivals Ricard Anaya (with 23 percent support) and Jose Antonio Mead (with 18 percent support).

López Obrador has an image of being a "left-wing, populist rabble-rouser with Hugo Chávez-like tendencies." Trying to overcome this image, he has proposed austerity, low taxes, transparency and non-intervention, with a campaign platform focused on corruption of politicians and the extreme violence plaguing the country. He has also promised to address inequality by increasing the minimum wage and pensions, and guaranteeing jobs and education for more than 2.5 million young people.

800,000 YOUTH

UNDER DACA'S UMBRELLA

If elected, he will institute policy changes toward the U.S. in energy exploration, security cooperation and support for democracy in the region. In addition, he will likely stop cooperating with the U.S. in the fight against drug cartels. There is animosity between López Obrador and President Trump, with the front runner comparing Trump to Hitler and promising to put him “in his place.”

While voters in Mexico are preparing to go to the polls to voice their frustration at the establishment, the U.S. is voicing concern that Russia will try to influence Mexico's election, as well as those in Colombia and other regions in Latin America. A White House spokesperson said, “We see some of Russia's fingerprints around elections that have occurred in Europe. ... We are seeing similar activity in this hemisphere.” In fact, intelligence officials report that “Russia is running a state-sponsored disinformation machine.”

And that does not bode well for the elections. These elections will determine not only the next president of Mexico but every senator and representative, several governors, and some local posts as well. More than 3000 positions will be decided that day. It will be the “largest turnover of officials in Mexico's modern history”—a critical moment in the country's history that will affect its future for decades to come.

And Trump's repeated demands for a border wall, threats to tear up NAFTA, and inflammatory rhetoric of Mexicans as crim-

Latin America's Super Election Cycle Is Wide Open

Between November 2017 and December 2018, eight countries in this region will hold presidential elections—and there will be six more presidential elections in 2019—that are so important because of feelings of populism. In addition, the voters have low confidence in elections and political parties. Also, the region has been characterized by low growth over the past couple of years. Combine all of that with incumbent unpopularity, and it could be a chaotic election cycle. “The result of this electoral marathon will define the characteristics, direction, and intensity of the political change to be experienced by the region in the next few years. This will have a major impact not only within the countries but also in the process of regional integration. At the same time, this set of elections will be key to assessing the quality of democracy and integrity of these processes in Latin America.”

Source: <https://www.brookings.edu>

inals and rapists have given Russian actors some tools to play on and feed hard feelings toward the U.S. If those hard feelings translate into wins for anti-American candidates like López Obrador, it could derail Mexico's economic transformation, damage the trust and cooperation that others have worked toward for decades—all changing the nation's forward trajectory.

Both the immigration crackdown and possible Russian interference in the Mexican elections could have serious consequences in Mexico/U.S. relations. If an anti-American is elected in 2018, there could be far-reaching negative effects in both the business and economic realms.

“At least 11 journalists were killed in Mexico in 2017.”

Drug Wars

While Mexican President Enrique Peña Nieto and his predecessor in office, Felipe Calderón, have both waged war against criminal gangs for more than a decade, it has shown little result. In fact, more than 200,000 people have been killed or have just gone missing since Mexico's government declared war on organized crime and drugs in December 2006.

In January 2016, Joaquin “El Chapo” Guzmán, considered the most powerful drug lord in the world, was arrested by Mexican authorities. He was extradited almost immediately to the United States to face

charges. This put him out of reach of his Sinaloa Cartel, who had helped him escape Mexican prisons twice before.

With El Chapo in prison in the U.S., a power vacuum was created and turf wars began, battling for control. As a result, Mexico experienced its most violent year in 2017 with more than 25,000 murders. It is the highest annual murder tally since modern records began. And untold numbers of people have gone missing, presumably kidnapped and murdered.

At least 11 journalists were killed in Mexico in 2017.

With the drug cartels making between \$19 and \$29 billion dollars from the drug trade just from the U.S., it is not surprising that there is so much violence.

Negative Views of the United States

Over the past year, there has been a dramatic shift in how the citizens of Mexico view the United States.

Sixty-five percent of Mexicans express a negative opinion of the United States. This is a sharp increase from 2015 when only 29 percent viewed the U.S. negatively. The economic relationship is also crumbling, according to Mexicans—in 2013, 70 percent of Mexicans said economic ties between Mexico and the U.S. were good for their country; that number is down to 55 percent. Ninety-four percent of Mexicans oppose the border wall, and only 5 percent of Mexicans believe Trump will do the right thing in world affairs.

The North American Free Trade Agreement (NAFTA) is still viewed favorably by Mexicans: 60 percent view NAFTA as good for their country. And a slim majority—55 percent—still believe that life in the U.S. is better for those who move here.

Canada

Although President Trump hasn't directly insulted Canadians (like he did Mexicans), only 22 percent of Canadians said they believed he would do the right thing in world affairs. A large majority of Canadians also have a low opinion of the president. This marks a dramatic shift in relations with the U.S. northern neighbor.

Another sticking point is the North American Free Trade Agreement (NAFTA)—which went into effect in 1994 and impacted the U.S., Canada and Mexico. President Trump signaled to Congress in May 2017 that he wanted to renegotiate the terms of the agreement. He has threatened to tear up the agreement because he believes that a trade imbalance is the

reason for the loss of millions of U.S. jobs. And he has threatened to withdraw from negotiations if the new agreement doesn't favor American interests. As of this writing, the seventh round of talks between the three nations to revise NAFTA are being held in Mexico City.

Trump's proposals include the mandate of more U.S.-made parts in cars (at least 50 percent), letting the pact expire every 5 years in order to be renegotiated, and ways to resolve conflict between the governments and the companies. Several of the points of negotiation have already been agreed to.

Canada's Prime Minister Justin Trudeau spent several days traveling in the United States to talk up the agreement among the people and legislators up for re-election. Even so, both Canada and Mexico aren't going to sit on their hands waiting to see what happens. Both countries have signed on to other trade agreements like Trans-Pacific Partnership; the Pacific Alliance; and Canada has

DI INSIGHT

With all of the tension around the world, DI recommends keeping a close eye on pressure points. Terrorism is still a threat—even though deaths are down and ISIS has been dealt a blow. The world is changing, and in many countries, people are asking their governments for more. They want their governments to promise to provide more peace and

better prosperity. This is giving rise to populism—and people are voicing their feelings with their votes. Also, there are increasing tensions between countries and within them. These tensions create vacuums for larger players like Russia and China to move in. The uncertainty about America's stance in the world doesn't help matters.

a new trade pact with the European Union (EU) and Mexico expects talks to begin this spring for its own pact with the EU.

Trudeau also visited India in February for meetings with some of that country's biggest companies—some of whom say they want to invest more money in Canada. As a result of these meetings, Trudeau revealed an investment deal between the two countries worth more than \$1 billion and will create 5,000 jobs in Canada. The deal is two-way.

But Canadian businesses are calling for Trudeau's government to cut corporate tax rates for Canadian businesses (after the U.S. tax cuts) to help them stay competitive.

And while the U.S. and Mexico have major elections this year, so does Canada. Ontario, Toronto, Quebec, New Brunswick, Vancouver and Ottawa are all holding municipal elections with many seats up for grabs. Some promise to be tight races, some will be a cakewalk.

REGION: CENTRAL AND SOUTH AMERICA

Between November 2017 and December 2018, eight presidential elections will occur in eight Latin American countries. Like Mexico, Latin America's elections could very well be affected by less support for democracy internationally, including the U.S., and by Trump's continued disparagement of Mexico and his hard-line approach to immigration.

In addition, outside forces such as Russia will continue their track record of influencing and manipulating elections by creating

and disseminating propaganda campaigns and fake news. And since China wants to be the dominant world power, it could increase its influence in Latin America too.

With factors like these, Latin America's elections will be rife with possibilities for manipulation and influence without the chance for democracy to flourish.

In Venezuela, conditions continue to worsen. Inflation is soaring out of control. Even people who have money cannot buy necessities because their money is worth nothing and there's nothing to buy. Oil production continues to decline because of mismanagement and corruption ... even though are rich reserves. The government, the economy and even society have broken down, causing great instability in all areas of life in the country. And more than 1.5 million people have left Venezuela in the last two years. The humanitarian crisis is extreme, with countless people being persecuted, jailed and tortured, starving and dying.

Neighboring countries are securing their borders because they simply cannot absorb and care for the sheer numbers of Venezuelan refugees.

Maduro remains in power, but his power is weakened.

Cuba is another country facing elections this spring. In April, Cubans will go to the polls to vote in a new president and to approve pre-chosen candidates for

Parliament. The country's president, Raúl Castro, is stepping down. Voters say they want meaningful change, signifying a generational shift in views.

The people say they want a better life, a better standard of living, a better direction for the country. Indeed, Cuba's economy is in the tank and relations with the U.S. are souring (again) with the election of Trump. And foreign investment in Cuba is hard to come by.

Younger generations in Cuba believe this is the country's chance to have something different, something new, something better with the Castro regime out of the picture. Many others wish for a better relationship with the U.S. and a growing economy. However, dissidents and critics are saying that the pre-chosen candidates are just more of the same (i.e., Castro puppets).

One thing is for sure: many Cubans need hope and a fresh vision for their lives and their country, and fresh leadership may be a good place to start.

REGION: EUROPE

Brexit and the UK

During 2018, the world will be watching to see what will happen in the EU as Brexit approaches—i.e., what will change; what companies will leave the U.K.; how will workers be affected; what about the balance of power; what about regulatory processes; border policies and migration, trades and tariffs, and so much more. Brexit is projected

to be complete in March 2019, with the new rules governing how the EU and U.K. interact scheduled to be in place. Another big issue is how the different visions and approaches of U.K. Prime Minister Theresa May, French President Emmanuel Macron and German Chancellor Angela Merkel will all work out as they work on a separation (or exit) treaty.

With the U.K. leaving the European Union, two of the EU's largest London-based agencies are leaving the U.K.—the European Medicines Agency is moving to Amsterdam and the European Banking Authority is moving to Paris. Between these two important agencies, more than 1,000 jobs will be leaving with them.

“This marks the beginning of the jobs Exodus,” says Vince Cable, leader of the opposition Liberal Democrats in the U.K. “Large private-sector organizations are also considering moving to Europe, and we can expect many to do so over the next few years.”

The exodus of jobs because of Brexit could lead to vacant or unused building space in the U.K, especially London. Would a glut

DI INSIGHT

Brexit may encourage other nations within the EU to exit. There are some whisperings even now to that effect. The EU must work to allay the people's concerns about immigration, regain the people's faith in leadership and government, and create jobs and prosperity.

of available property then lead to a possible commercial real estate crash? Might the EU benefit from the opposite effect of not only more jobs but more building and a better economy? In terms of the solutions and consequences of Brexit, there are so many more questions right now than answers.

Germany

In the wake of critical elections in France and Germany last year, electorates across Europe continue to be angry and nervous over policies on immigration, the economy, and the future of the EU.

“After months of negotiations, Merkel finally sealed a deal on a new government. But she had to give up key ministries, making her appear more vulnerable than ever.”

Though German Chancellor Angela Merkel won re-election last September (with the most votes but the worst election result), Germany began 2018 with a caretaker government. After the election, the Social Democratic Party (SPD) finally agreed to begin talks with Merkel's Christian Democratic Union (CDU) to form a grand coalition. As of this writing, the talks produced an agreement between the two parties, and Merkel's party has approved the deal. SPD will vote in early March.

Migration is a fast-moving, hot button issue in German politics that also directly impacts Germany's role within the EU. If Chancellor

Merkel falls out of favor or is seen as someone who cannot govern, especially on topics like immigration, the stability of the German government could be in question. This is particularly important as Merkel's Germany is considered one of the top influencers in the survival of the EU after Brexit.

France

In the 2017 elections in France, Emmanuel Macron won almost two-thirds of the votes. He beat far-right National Front leader Marine Le Pen in the run-off. President Macron is considered “pro-European,” and surprised his critics by winning less than a year after launching a new centrist party.

President Macron has promised reforms, as well as more EU integration. He and France's Prime Minister Édouard Philippe will focus their reform efforts in three main areas: fiscal measures to lower taxes (corporate and personal) and to foster investment; apprenticeship programs and unemployment benefits; immigration laws that will be reformed to deport people who have entered the country illegally but that will also welcome more highly skilled migrants.

As of this writing, however, Mr. Macron's approval rating is now under 50 percent. Even though he promised to deeply-transform the nation, his critics have chided him for his authoritarian tendencies. For example, he is planning to reform the SNCF rail company by executive decree possibly without a parliamentary vote. If he continues with this politically controversial reform

plan, the union representing the workers have threatened a series of strikes that will affect the rail system over the Easter break. The rail workers have special “job-for-life” employment rights, but the rail system is falling deeper and deeper into debt.

5 Challenges Europe Needs to Tackle Now

1. Moving toward a human-centered economy
2. Management of migration and borders
3. Leading global sustainability
4. Dealing with threats to citizen safety
5. How to be relevant, trusted and responsive

Source: <https://www.weforum.org>

Catalonia

Spain is facing its biggest political crisis in 40 years. Catalonia, located in northeast Spain, is a very wealthy and semi-autonomous region with about 7.5 million people. Even though it has its own flag and language, anthem and parliament, it is still a part of Spain.

In October 2017, the Catalonia’s pro-independence leaders held a referendum. The referendum was declared illegal and

unconstitutional by Spain’s constitutional court. (fn: BBC article) Ninety percent of voters backed the measure of independence from Spain—but the turnout was only 43 percent of voters.

Madrid, under Article 155 emergency powers, dissolved Catalan’s parliament, arrested its leadership—even as some of them fled to other countries for asylum—and called for a “snap” election to be held in December 2017. The government hoped that the snap election would crush the move for independence. But the split was voted in with a very slim majority.

There are still party factions within Catalan that want to stay with Spain. In the meantime, the region has suffered both economically—companies have moved out of the region—and politically, as surrounding countries aren’t providing any support. But Spain has suffered as well, and there is no end in sight.

REGION: MIDDLE EAST

Israel

When he started making good on campaign promises regarding Israel and immigration last year, President Trump sent shock waves around the world. In December, Trump officially recognized Jerusalem as the capital of Israel and announced that the United States embassy in Israel would be relocated from Tel Aviv to Jerusalem. His announcement set off a firestorm of objections from leaders around the world—from Arab leaders to the pope and Europe in between.

The controversy surrounding the move of the embassy has been going on for decades. Since both Palestine and Israel claim Jerusalem as their capital, the international community, including the U.S. (until now), has not recognized Jerusalem as Israel's capital.

President Trump's announcement, which he said was the right thing to do and would help advance peace in the region, was met with vehement disagreement around the world. Palestinian President Mahmoud Abbas has declared that President Trump is "unfit" to broker peace talks between Palestine and Israel. There have also been warnings about violent protests at U.S. consulates in the region.

The U.S. embassy is set to open in Jerusalem in May 2018, which will coincide with the 70th anniversary of Israel declaring its independence. Israel's Prime Minister Benjamin Netanyahu has praised the move, as well as members of Israel's cabinet.

Saudi Arabia

In November, Saudi Arabia began an anti-corruption campaign by detaining a sizable group of business executives, government officials, princes and more. The government has announced (as of this writing), settlements with more than 375 of the people who were detained, with many more awaiting trial. The purge has netted more than \$100 billion (American).

But is it truly an anti-corruption campaign to clean up the economy, or is it a purge of political opponents? Is the crackdown a way for Crown Prince bin Salman to garner more political power and money for himself, or is it really a way to reduce corruption? No one disputes that the corruption is widespread and needs to be cleaned up.

Investors are concerned, though.

The campaign signals a shift of power by the Saudi government that presumably

DI INSIGHT

In 2017, the pace of illegal immigration and deportation in the U.S. slowed dramatically. Heightened fear among immigrant communities may be one causal factor. The overloaded U.S. court system may be another reason for fewer deportations. President Trump charged ICE to deport anyone in the country illegally with no exceptions. And yet, this administration deported fewer people than under Obama's last year as president.

Deportations take cooperation from several agencies, yet 142 jurisdictions nationwide refused to hold unauthorized, undocumented immigrants until they could be arrested. And it's costly, too. The U.S. has the resources to deport just 400,000 people per year (vs. the estimated 11 million illegal immigrants living in the U.S.). Trump's policies haven't endeared him or the U.S. to its neighbors or the world.

consolidates the configuration of the ruling government and potentially affects the Middle East—just how is unknown. It may also send a clear message to its people that those who perpetuate crimes, no matter who they are or what the cost, will be removed from leadership, allowing for societal progress including alternative means of prosperity like Saudi Arabia's mega city, Neom.

Syria

The violence in Syria shows no signs of abating. The country has seen unprecedented suffering after seven years of violence and more than 500,000 dead. Over 13 million people are in extreme need as the dangers in the country grow. More and more people have been displaced—at least 300,000 in the Idlib province in December alone—and still more are trying to flee the bloody conflict. In January, two chlorine gas attacks were launched, and another in February. The Syrian government has been blamed.

The conflict in Syria has many players:

For the Syrian government:

- Russia
- Iran
- Hezbollah
- Shia Muslim militias

For the rebels:

- Turkey
- Gulf Arab States
- The United States
- Jordan

And then there are the Kurds and ISIS.

A political solution in this extremely complex and volatile situation seems further away than ever.

ISIS

Speaking of ISIS: Yes, the caliphate in Syria and Iraq has been defeated. However, that doesn't mean ISIS has disappeared. The group still holds a very small section in Iraq and a few small villages on the Euphrates in Syria. But they've turned their eyes on areas in Africa and Yemen, Pakistan and the Philippines. They still want to increase in Afghanistan, but that country's armed forces along with the U.S. are applying increased pressure to wipe them out.

Those small pockets of militant fighters are still dangerous. And yet, if they launch a second insurrection, it is unlikely that the world will be slow to react. In fact, the U.S. is still launching attacks on ISIS strongholds in Yemen.

Iran

Calling the Iran nuclear deal that was negotiated during the Obama era "disastrous," President Trump has set an ultimatum to fix its "flaws." He has given the U.S. and the European allies until mid-May to amend the pact; if that's not possible, the U.S. will withdraw from the pact. Iran has threatened to retaliate against any new sanctions the U.S. will impose if an agreement isn't reached, calling Trump's actions illegal and that the pact is not negotiable.

For the U.S. to remain in the pact, Iran has to let international inspectors on all sites; the limits on the Iran's nuclear program must

not expire; sanctions will be imposed if there are any missile tests; and any violations of the pact would reinstate the sanctions on Iran.

The stakes are high—if no agreement between the U.S. and European allies cannot be reached, the U.S. will withdraw from the pact.

REGION: ASIA

North Korea

North Korea continues to be a hot spot in the world, and relations with the United States are becoming more tense. President Trump added North Korea back onto the list of countries that are considered state sponsors of terrorism. President George W. Bush had removed North Korea from the list in 2008, during negotiations of a nuclear disarmament deal that ultimately failed. North Korea has launched three intercontinental ballistic missiles—all in the past year since Trump took office.

However, South Korea's President Moon Jae-in (acting as intermediary) says that North Korea is willing to open up the dialogue between North and South Korea in order to ease tensions between the two countries. And apparently, North Korea wants to talk with the United States as well, presumably to ease economic sanctions due to their missile tests. But North Korea threatened the U.S. with a nuclear attack as recently as January 2018. Mr. Trump declares there's not much to talk about if North Korea doesn't make plans to denuclearize.

It does seem that the Winter Olympics have done much to begin break a diplomatic impasse between South and North Korea.

The attitude of the White House on talks with North Korea? Wait and see.

DI INSIGHT

2018 promises to be a wild ride in the global arena of geopolitics. The world wonders each day what President Trump will tweet or say. Midterm elections in the U.S. could once again shift the balance of power. The UK's Brexit is a referendum on the EU, and no one knows what's going to happen or how it will all turn out. Mexico, Canada and Cuba are also facing elections that will be a turning point. South Korea still faces an uneasy truce and a threat from its neighbor to the

north. China's Belt and Road Initiative looks like a land and power grab, but China also has high debt. Their claims of the South China Sea are causing increased tension, possibly becoming a flashpoint, as they build islands and have navy patrols in the area. Vladimir Putin has won another six-year term in office, using the power of his state-run media to make sure of it. The U.S. Treasury Department announced sanctions on Russia for the 2016 election meddling.

South Korea

In the meantime, South Korean President Moon Jae-in has long wanted to engage with North Korea to negotiate over its nuclear program. During the Winter Olympics, he met with senior leadership of North Korea—it was the most significant diplomatic encounter of the two countries in decades. Moon was desperate to use the games as an opportunity to restore regular communication with North Korea. But Moon didn't count on the reaction from his countrymen. Many South Koreans weren't sure that a revived dialogue between the two countries would have any benefit, and may in fact, bring harm.

After the Olympics, North Korea has invited South Korea for talks on the relationship between the two nations as well as trying to set up talks between the U.S. and North Korea. The tough stance taken by the Trump administration—"denuke and then we'll talk"—makes the possibility of these talks happening tricky.

The upcoming (as of this writing) diplomatic summit between the Koreas will be held in Pyongyang, North Korea's capital. A ten-member delegation from South Korea will attend the summit.

Japan

While the Olympics seem to have facilitated a thawing of sorts between North and South Korea, Japan isn't so sure. Japan's Prime Minister Shinzo Abe and Vice President Mike Pence have said their countries will keep the pressure on

North Korea. The Netherlands, along with Japan, are vocal that the U.N. should continue the sanctions on North Korea. Japan's Foreign Minister Taro Kono said that North Korea's ballistic missiles "are a grave threat to the whole of Europe."

Abe is up for re-election in October. If he wins—and it seems certain that he will—it will be his third term. Characterized by a strong administration and much popularity, he received a mandate from the people in October 2017, when his party won 284 of 465 seats in their House of Representatives. It does appear that Abe's candidacy will be challenged by at least two people.

One of his promises in 2017 was to amend the country's constitution—which has been in effect since WWII and has not been amended—but to do this, there are four hurdles to clear. First, draft the amendments; second, reconciling his party's position with other parties in the ruling coalition; third, both houses must agree with two-thirds majorities; and finally, having a national vote to ratify the changes. 2018 is an important year for Shinzo Abe.

China

Since President Xi Jinping took office, China has been aggressively planning and building infrastructure projects. He has said that China should "take center stage in the world" and he has set about trying to do just that. China has laid claim to much of the contested South China Sea by building artificial islands with military bases.

Xi is also expanding China's trade and military reach through the Belt and Road Initiative, a plan which calls for infrastructure investments and projects totaling more than \$1 trillion across Asia, Africa and Europe. Similar to the Neom project in Saudi Arabia, the Belt and Road plan could change the landscape/people-scape in the region—it stretches across some 60 countries with the goal of connecting nations and fueling economic growth.

“A majority of Russians support Putin’s aggressive stand against the West. In fact, many people believe Putin isn’t tough enough with the West.”

Xi has also purged corrupt or disloyal officials, many of whom were high-ranking military officers. This purge, along with the Communist Party's move to abolish term limits for Xi—setting him up to govern for life—and more centralized government control and financial oversight is causing many people to worry that companies that may be hesitant to invest in China.

In addition, the government will exert greater control over the Internet—monitoring the people's online behavior. Cash will become obsolete—online payments will be the only way to pay, some say by 2020, so financial movement will be easier to track. New regulations in the

auto industry will require manufacturers to dramatically increase production and sales of electric vehicles. Steel, cement and coal will be very highly regulated as to pollution control, production output and more.

Xi presents today's China not as threat to the U.S. but as an equal partner ... or as the U.S.'s better. But can China's leadership be trusted or not? Historically, the U.S. has not been in alliance with China because of its communism. Could Xi's mammoth Belt and Road project and other factors change that? Is China exhibiting leadership that the United States isn't? The world is watching.

India

India is another country facing important elections in 2018, with eight states heading for the polls. The government is planning a political “play” to loosen up the budget to help those in the lower income brackets. The government is also planning to fast-track some corruption cases against politicians—and the rules are if a person is convicted, he or she cannot contest election results. As the world's largest democracy, India is expected to become the world's most populous nation by 2028—overtaking China. India is also emerging as an important regional power due to its accelerating economy. But there are problems—social, environmental, and economic inequality. India's people are still very poor, even though the economy is picking up.

Prime Minister Modi won in 2014 because of the voters in the poorest states. He has instituted major structural reforms and is taking steps to simplify the country's tax system. He has reduced internal trade barriers, and has a construction program to improve the highways. Still, he must work to shed the huge financial inequality that exists in India today.

Russia

Russia's presidential election was held on March 18. With eight candidates running, Vladimir Putin has an 80 percent approval rating and is expected to win handily. Putin's most vocal critic, and perhaps the would-be candidate who might have given Putin a challenge, is Alexei Navalny. He was barred from running because of a criminal conviction—which Navalny says was politically motivated.

A majority of Russians support Putin's aggressive stand against the West. In fact, many people believe Putin isn't tough enough with the West, indicating that he should increase the aggression. The economy is only just now beginning to recover from the recession and the criticism of Putin's annexation of Crimea in 2014.

And in the meantime, Putin is trying to convince Netanyahu not to do anything to escalate the volatile situation in Syria with Iran. A drone was sent into Israel by Iran, and Israel retaliated with heavy air strikes. Putin is attempting to use diplomacy to curb the tension.

REGION: ASIA PACIFIC

In Australia, concern over President Trump's aluminum and steel tariffs is growing. There has been no detail of Trump's plans and how the tariffs will affect Australia, according to Prime Minister Turnbull and Trade Minister Steve Ciobo. Trump's (current) position seems to be that America's trade deals are all bad for America, and even the allies of the U.S. will not be exempt from the tariffs.

Australia (and Europe) are bracing for the impact, warning that trade wars may erupt, stock markets will be impacted, and economies will once again slow, causing much uncertainty around the globe.

Australia's trade surplus has already declined significantly at the end of December 2017. Iron ore and coal exports have fallen off sharply for many reasons; one being that pollution controls have gotten more stringent in several countries, causing demand for iron ore and coal to decline.

After the United States withdrew from the Trans-Pacific Partnership in 2017, a smaller deal with the 11 remaining countries has been renegotiated and is slated to be signed in March. Prime Minister Turnbull announced that the resurrected TPP is good for Australia and will create more jobs. But Labor isn't so sure.

Another impact to Australia's trade is Turnbull's plan to become a major weapons manufacturer and exporter over the next ten years. He is touting the plan as good for jobs, investment and a positive boost for

industry in Australia. But others are critical of the plan, with objections from “it is blood money” to “why aren’t we investing in renewable energy instead?” to “we should be promoting peace instead.”

There is also a rising concern about China’s influence over Australian politics—which China denies. However, some damaging revelations about Australian Senator Sam Dastyari were leaked about his dealings with Chinese businessman Huang Xiangmo, and he has agreed to resign his leadership roles. Dastyari has charged that the revelations were politically motivated. Prime Minister Turnbull has announced a crackdown on foreign interference in politics and elections.

Both China and Russia are gaining a reputation worldwide of influencing and sometimes interfering in politics, governments and elections outside their own countries.

China might also be trying to exert influence over Australia’s academic realm as well. In four prominent cases in 2017, Chinese students at Australian universities have complained that teaching materials were incorrect or insulting to China. Are Chinese students trying to undermine freedom of expression on Australian campuses? And is the Chinese embassy pressuring Australian universities as well?

With its apparent penchant for Australian politics and academia, China seems to be working in the wings to take “center stage” as well as in the open. The world would do well to pay attention.

REGION: AFRICA

South Africa

South African President Jacob Zuma has been mired in corruption and scandal for years. His tenure as president has been chaotic and tumultuous, resulting in economic decline and instability and uncertainty in the country. He has already been replaced in his position as head of his political party (ANC), and they have asked him to resign before his term ends next year. Cyril Ramaphosa, the “president in waiting,” along with the ANC party, have been negotiating the terms for the end of Zuma’s reign. But apparently, the talks are at an impasse.

South Sudan

Another country mired in civil conflict, displaced people and extreme poverty is South Sudan. After four years of war, the

5 African Crises to Watch in 2018

- Lake Chad Basin
- Democratic Republic of Congo and the Central African Republic
- Mali
- Sudan and South Sudan
- Horn of Africa

Source: Devex.com

country's politicians are forced by the international community to do something to help alleviate the people's suffering. Every day, almost two million people are on the brink of starvation. Children have not been to school since the war began in 2013; schools have actually been destroyed. And the country's healthcare system is broken. More than 100,000 people have died since the war began.

President Salva Kiir has promised reconciliation, restoration and peace for the country in 2018. But the president and his ruling party will not sign the proposed Declaration of Principles (DOP) saying instead that they want more weapons and more people in parliament. They've also demanded either less punishment or no punishment for war crimes. The United States declared an arms embargo on the country resulting in protests at the U.S. embassy in Juba, South Sudan. Demonstrators said the unilateral embargo would only help the rebels, and accused the U.S. of aiding them through the U.N. peacekeeping mission.

However, even if the DOP is signed, will Kiir's government be able to enforce it?

Zimbabwe

When Zimbabwe despot, Mugabe, was overthrown by the army, people took to the streets to celebrate his undoing. According to Wongai Zhangazha in the *Zimbabwe Independent*, "Zimbabwe, once Africa's breadbasket and a manufacturing power, has food shortages and 90 percent unemployment. No wonder we're cheering the military."

Former Vice President Mnangagwa will presumably take over. Elections will take place later this year. As in other countries around the world, people in Zimbabwe—from all age groups and different political affiliations—feel that their country now has a chance to see new leadership and with it, new prosperity.

There are numerous threats to the people of Africa, a continent torn apart by civil war and violence—leading to millions of displaced people, extreme poverty and food insecurity, disease outbreaks that are difficult to treat because of the brokenness of the healthcare system, and more. Here is yet another desperate humanitarian crisis in the world today.

With terrorism, nuclear threats, and cyber-attacks in the news, global security is on everyone's mind. From defense spending to security strategy to terrorism trends to cyber issues, here are some things you should know for 2018.

Global Defense Spending

According to a recent IHS Jane's report, global defense spending is predicted to increase 3.3 percent this year over 2017. That would be the fastest growth rate in a decade. The U.S.'s potential 4.7 percent increase in military spending would be a major contributor to the growth spurt. In addition, in his first State of the Union address, President Trump asked Congress to "modernize and rebuild our nuclear arsenal." His unspoken rationale was that President Vladimir V. Putin of Russia has accelerated a dangerous game that the United States must match, even if the price tag soars above \$1.2 trillion. That is the latest estimate from the Congressional Budget Office, one that many experts think is low by a half-trillion dollars.

Overall, global defense spending in 2018 is expected to reach \$1.67 trillion (not including President Trump's new spending), the "highest level since the end of Cold War."

NATO has called for its members to spend 2 percent of their GDP on defense. Only five members met that goal in 2017, but nine of NATO's 28 countries are on track to reach it in 2018. They are Estonia, Latvia, Lithuania, the U.S., the U.K., Turkey, Poland, Romania and Greece. Those not in compliance are: France, Norway, Portugal, Bulgaria, Canada, Albania, Germany, Denmark, Netherlands, Slovak Republic, Italy, Czech Republic, Hungary, Croatia, Spain, Belgium, Luxembourg, Slovenia and Iceland.

3.3%

PREDICTED INCREASE IN
GLOBAL DEFENSE SPENDING

4.7%

POTENTIAL INCREASE IN
U.S. MILITARY SPENDING

2%

TARGET PERCENTAGE
OF GDP ON DEFENSE FOR
NATO MEMBERS

The fastest-growing rise in defense spending is in **Eastern Europe**, largely because of the Baltic region's worries over Russia's aggressive agenda. In the Baltic area, defense spending will have more than doubled since 2014.

Russia's spending actually remains below its 2015 level, however, and will drop even more in 2018 because of lower oil prices. This decrease has not stopped Russia from implementing military reforms, however. Russian defense spending numbers are deceptive, though. The country is far more militarized than its defense spending suggests. That level of security spending is only sustainable at the expense of Russia's future.

Western Europe will have an increase of 1.3 percent this year, although they "trended lower" between 2009 and 2015. The growth in Western Europe will be motivated by "stabilizing government balance sheets, the perceived threat from Russia on NATO's eastern border, and several key procurement programs coming online," according to Fenella McGerty, principal analyst at IHS Jane's. Also, military ground vehicle sales are up, with Europe as the leading purchaser.

The **U.S.**, which accounts for about 40 percent of global defense expenditures, will have its largest year-over-year growth since 2008. In December, President Trump signed the National Defense Authorization Act, authorizing nearly \$700 billion for national defense spending in fiscal 2018. This figure does not include the "new" spending he called for in his State of the Union address.

Asia-Pacific (which includes Australia, China, India, Indonesia, Japan, Republic of Korea, Malaysia, Mongolia, New Zealand, Pakistan, Singapore, and more) is expected to be the driver behind long-term growth in global defense expenditures, according to Craig Caffrey, principal analyst at IHS Jane's. He cites economic growth as the main reason for the increase, but additional factors for the extra funds are Chinese actions in the East and South China Sea, the North Korean ballistic missile threat, and civil war and unrest throughout South East Asia.

China is forecast to spend \$203.3 billion this year, nearly 6 percent more than the \$192.5 billion in 2017. Over the last few years, in its bid to become a dominant world power, China has increased its development and production of warships, stealth combat aircraft and advanced missiles.

DI INSIGHT

With the growth of global economies, more national funds are being allocated to defense spending. It is suspected that in some cases, increased spending on offensive military readiness is growing, raising the stakes on overall military security (or insecurity) globally. With more spending and military readiness, the probabilities of conflict might actually lower if the doctrine of "Peace through Strength" is understood. Said another way: The risks of offensive action outweigh the possible gains.

U.S. National Security Strategy (NSS)

President Trump's National Security Strategy (NSS), released in December, differs from past presidents' strategies in some ways and falls within bi-partisan parameters in others, according to analysts.

Presidents Bush and Obama's national security strategies were more aspirational and internationally inclusive in tone than Trump's. They alluded to the moral and strategic imperative of reducing global poverty. They positioned the role of the United States as being a partner in global efforts to bring progress and development to the rest of the world, even where a linkage wasn't readily apparent. That is, if other countries succeed, so does the U.S.

Trump's NSS, perhaps not surprisingly, focuses on the America First platform and does not stress the U.S.'s position as part of the global community. The U.S. will continue to assist fragile and emerging economies, but the NSS states that development assistance must support U.S. interests. Priority is given to those vulnerable areas where threats to America's security would increase should that area fail.

Trump's strategy does not prioritize development or the alleviation of global poverty as a main objective. It does not mention the importance of advancing democracy nor does it address the refugee crisis. The particulars of development in the strategy, however, are, in general, constructive and middle of the road.

The Four Pillars of the National Security Strategy

- I Protect the American People, the Homeland, and the American Way of Life**
 - Secure U.S. Borders and Territory
 - Pursue Threats to Their Source
 - Keep America Safe in the Cyber Era
 - Promote American Resilience
- II Promote American Prosperity**
 - Rejuvenate the Domestic Economy
 - Promote Free, Fair, and Reciprocal Economic Relationships Lead in Research, Technology, Invention, and Innovation
 - Promote and Protect the U.S. National Security Innovation Base
 - Embrace Energy Dominance
- III Preserve Peace Through Strength**
 - Renew America's Competitive Advantages
 - Renew Capabilities
 - Diplomacy and Statecraft
- IV Advance American Influence**
 - Encourage Aspiring Partners
 - Achieve Better Outcomes in Multilateral Forums
 - Champion American Values

Source: [whitehouse.gov](https://www.whitehouse.gov)

This strategy makes explicit what other presidents' NSS have implied: that "American economic strength is the foundation of American geopolitical strength, so efforts to improve the economy can be considered part of 'national security.'" Trump reminds readers that the U.S. "faces competition and even exploitation from adversaries and partners alike." And when those countries—China and others—try to steal U.S. intellectual property, it should be considered not just an economic problem, but also fundamentally as a national security threat.

Trump's NSS calls out China as a revisionist power that "actively competes against the U.S. and its allies." It is no secret that China is making huge moves to become the dominant world power and diminish U.S. influence. It has set its sights on becoming a global leader in national strength and international influence by mid-century. One way China plans to attain this dominant position is by forming a global network of partnerships to help advance its agenda.

According to World Politics Review, the U.S. and China are "locked in an intractable rivalry for primacy in Asia and, increasingly, at the global systemic level." Each country will follow its "own competitive policies in a way that avoids open confrontation" while employing cyber and clandestine intelligence operations around the world. China will likely cajole and perhaps threaten the countries along the Silk Belt and Maritime Silk Road (aka the Belt and Road Initiative) to align themselves with it. Both the U.S. and China must display leadership that is far-sighted and nuanced for prosperity and stability around the world.

Russia, the other country that Trump's NSS identified as "challenging American power, influence, and interests," has been rolling out military reforms and building up its capabilities in several areas, even though its defense spending has been down.

Russia will likely continue to focus on getting and keeping firepower superiority over an

DI INSIGHT

Mitt Romney's 2012 statement regarding Russia being America's number one geopolitical foe was prophetically correct. As the Economist put it, "With Russia hacking the American election, presiding over mass slaughter in Syria, annexing Crimea and talking casually about using nuclear weapons, Mr. Romney's view has

become conventional wisdom." Unlike China which uses subtlety, globally massaged propaganda, and economic leverage to promote its agenda, Russia's brash, overt, and aggressive geopolitical muscle flexing is predictable in expression but unpredictable in targeting, timing, and outcomes.

adversary and avoiding protracted conflict with peers. It may also use or threaten to use nuclear weapons if a conventional attack “would undermine the regime’s control of the state or threaten Russia’s nuclear deterrent.” With a propensity for speed and surprise, Russian operations favor a rapid, coordinated surprise attack, with the objective of quickly achieving campaign objectives. This will likely continue.

“The world is paying a steep price for violent conflict. The United Nations’ 2018 appeal for humanitarian aid funding was record-setting: \$22.5 billion to provide aid to 91 million people.”

Source: Brookings Institute

Terrorism

According to recent research from RAND, “terrorism since 9/11 is down—and dramatically so—in countries not suffering from civil wars and insurgencies.” Indeed, the assumption that terrorism is increasing worldwide is inaccurate. A rise in the numbers applies only to a limited set of places: countries with high Muslim populations beset by civil war and particularly, perhaps surprisingly, those where Western intervention is taking place.

Terrorist activity usually takes place when and where there’s active insurgency. Since 2001, insurgency in Islamist areas has risen and so have the terrorist attacks there.

While it’s true that terrorism has become more widespread and has endured over the last 15 years, it still remains more local than global. In the last 10 years, over 70 percent of the attacks took place in just two regions—North Africa/Middle East and South-Central Asia, sites where major insurgency and civil conflict have wreaked havoc on the population.

Surprisingly, according to RAND’s research, Western intervention in support of the governments engaged in civil wars in Muslim countries actually seems to raise terrorism, rather than curtail it. In fact, the models showed that when Western countries get involved, there’s “a two to five-fold increase in the expected number of domestic attacks.”

The numbers call for a serious look at the U.S. policy on global terrorism. Does the perceived threat of terrorism justify the resources put toward it? And what of the risks of involvement?

Some recommendations include focusing on the few international terrorist organizations that have “the capacity to conduct external operations” and working toward “reducing the incidence of civil war” that gives rise to so much of terrorism.

One important consideration of fighting extremist organizations is the potential impact on the U.S. military’s “readiness for a fight against a nation-state foe such as North Korea or Iran.”

The Ten Countries Most Impacted by Terrorism

- | | |
|----------------|------------|
| 1. Iraq | 6. Yemen |
| 2. Afghanistan | 7. Somalia |
| 3. Nigeria | 8. India |
| 4. Syria | 9. Turkey |
| 5. Pakistan | 10. Libya |



“Nine of these countries featured on last year’s list with the only change being the inclusion of Turkey and the exclusion of Egypt.”

Source:

Institute for Economics & Peace (IEP),
Global Terrorism Index – 2017

Another sobering aspect is the actual cost. According to the Global Terrorism Index (GTI) 2017, released by the Institute for Economics and Peace (IEP), the global economic impact of terrorism was US\$84 billion in 2016.

The staggering cost aside, the GTI confirms that terrorism is down. In fact, for the second year in a row, “the total number of deaths resulting from terrorism decreased [and is] providing some optimism for future trends.”

ISIL [Islamic State of Iraq and the Levant group (also known as ISIS)] was the deadliest group in 2016, responsible for 50 percent more deaths than in 2015. Now, ISIL is almost completely defeated in Iraq and Syria, and its revenue base is greatly diminished. ISIL, along with the next three deadliest terror groups— Boko Haram, al-Qa’ida and the Taliban—get their revenue from money transfers, donations, trafficking, taxation and extortion.

Unlike ISIL, in 2016 Boko Haram, al-Qa’ida and the Taliban had a decrease in the number of deaths caused by their attacks.

In Nigeria, deaths from terrorism decreased markedly with 3,000 fewer fatalities. This decrease was due in large part to the efforts of the Multinational Joint Task Force working to defeat Boko Haram externally and internal fractures weakening the group as well.

In keeping with the RAND research above, the GTI shows that conflict breeds terrorism. “Ninety-nine percent (99 percent) of

terrorism occurs in countries in conflict or with high levels of political terror.” In addition, attacks in countries in conflict generally result in more fatalities than in countries not in conflict.

In addition to trends and statistics, the Global Terrorism Index gives insight into the factors behind why a person would join a terrorist group. Some factors are the same reasons why a person would join any group: “companionship, survival and security, status, power, control and achievement ... interdependence, perception of collective group identity and a shared purpose or goal.”

Interestingly, studies on terrorism have found that members of these radical groups “may feel relatively deprived economically or socially even in situations where in an absolute sense they are not.” Not only is poverty not a factor in radicalization but often terrorists actually come from families or countries that have money. The more experts learn about what attracts people to extremist groups, the better able the world will be at combating them.

The United Nations’ 2018 appeal for humanitarian aid funding reached an all-time high: \$22.5 billion for aid to 91 million people.

Most of the need for humanitarian aid, according to the Brookings Institute, is caused by conflict and could be prevented. “Renewed thinking and focus on conflict prevention is urgent, as it is far more effective and less expensive to prevent conflict than respond to it.”

Successful conflict prevention calls for “robust international, multilateral commitments”—commitments that have not been made or met. Last year was marked by “dramatic failures in conflict prevention: ...the ethnic cleansing of the Rohingya minority in Myanmar; the economic, humanitarian, and political crises in Venezuela; and the degradation of diplomacy in managing North Korea. These failures demonstrate the difficulties of preventing conflict given an international system under stress.”

“Terrorism since 9/11 is down—and dramatically so—in countries not suffering from civil wars and insurgencies.”

Source: RAND Corporation, “Terrorism Before and During the War on Terror: A Look at the Numbers”

In **Myanmar**, 650,000 Rohingya—more than half of the population—have fled or been displaced. The number of people who have been killed is not known. The violence was predicted, even as recently as in 2016, by the U.S. Atrocities Prevention Board. The atrocity in Myanmar is a breakdown of international norm R2P or the Responsibility to Protect. “Mandates under R2P are...increasingly difficult to pass in a world of resurgent realpolitik.” For example, China and Russia blocked the UNSC from passing a resolution that would have condemned the violence against the Rohingya.

The R2P also failed in protecting civilians in Darfur and Syria as well as the Yazidis in Iraq.

“Renewed thinking and focus on conflict prevention is urgent, as it is far more effective and less expensive to prevent conflict than respond to it.”

Source: Brookings Institute

Venezuela is at risk of civil war or coup, having suffered extreme fragility last year. Venezuela is facing a devastating economic and humanitarian crisis--malnutrition, hyperinflation, medicine shortages, violent political unrest and more have caused huge suffering there. Hundreds of thousands of Venezuelans fled to neighboring countries, while Russia “undermined regional governments’ efforts to coordinate a multilateral response” to the repressive Maduro regime. In addition, both Russia and China boycotted a United Nations Security Council meeting on Venezuela, thereby blocking Security Council action. Along with Venezuela, several other countries (including Kenya, Liberia, Honduras and Guatemala) were destabilized last year by the manipulation of electoral and institutional systems.

North Korea, with its nuclear capabilities, also represents a glaring failure in potential

conflict prevention, a “failure of the most successful systemic global conflict prevention of the post-WWII world order: disarmament and nuclear non-proliferation.” Experts believe that the U.S. is, or soon will be, within range of North Korea’s ballistic—possibly nuclear—missiles. The possibility of conflict within the United States is now on the public’s radar.

Conflict prevention, though difficult, is critical, perhaps now more than ever. The increase in war and violence around the world has strained states and international organizations. According to Brookings Institute, “Increased risks of inter-state war, including nuclear war, overlaid with de-stabilizing civil conflicts in multiple regions, make conflict prevention an increasingly existential imperative.”

While bombings and explosions are the methods used most often in terror attacks, another practice has become more prevalent in recent years: vehicular attacks, where terrorists ram vehicles into crowds of unsuspecting people. The first vehicular attacks were employed in Israel and the Palestinian territories more than 20 years ago. Since 2010, al-Qaida has repeatedly suggested and encouraged the implementation of relatively easy do-it-yourself attacks.

Not all of the vehicular strikes can be officially traced to terrorism; some of them were simply mentally unstable people without a terrorist agenda. But terrorists who were inspired and spurred on by

jihad committed most of the recent attacks, and most of those drivers died as a result.

Since 2014, more than 40 vehicular strikes have taken place, with more than 20 in 2017 alone. In the past 18 months worldwide, over 150 people have died because of these homicidal drivers, and nearly 800 more have been injured, many seriously.

In the United States, seven attacks have occurred since 2006. On Halloween last year, a pickup truck mowed down eight bicyclists in New York City. In response, NY legislators are working to pass laws to make it harder for terrorists to rent vehicles.

Using traditional barriers and barricades could create more problems than they would solve, such as impeding access for emergency vehicles and disabled people. Typical barriers would have limited effectiveness on a large scale, since city streets all over the world are filled with pedestrians and cyclists. Barriers would also change and detract from the urban landscape, and constant reminders of the possibility of an attack could contribute to a sense of unease among the population.

Perhaps technology could be of some use in preventing vehicular terrorist attacks. Sweden is considering “the possibility of geo-fencing, using technology to create a virtual boundary” in busy urban areas.



Understanding the Drivers of Extreme Terrorism

- Poverty
- Unemployment
- Lack of opportunity
- Material enticements
- Criticism of the government
- Weak regulation of religious institutions
- Weak public administration
- Inefficient judicial systems
- Loss of family values
- Loss of solidarity

Source: Institute for Economics & Peace (IEP),
Global Terrorism Index – 2017

Cyber Security

No discussion on global security would be complete without a discussion of the latest trends and issues in cyber security. A recent analysis, the first of its kind, examined the relationship between cyber activities and physical violence during war and found little evidence that cyber attacks change battlefield events. Data from both the armed conflict in Ukraine as well as Syria's civil war showed that “cyber attacks have had ‘little or no impact on fighting.’” Both Ukraine and Russia use cyber tools extensively, but hackers from

both countries “had difficulty responding to battlefield events, much less shaping them.” In Syria, the results were similar. “Cyber attacks are not (yet) effective as tools of coercion in war,” which has “significant implications for other armed conflicts with a digital front.”

On June 1, 2017, **China’s** Cyber Security Law (CSL) came into effect. An offshoot of the National Security Law, with cyber sovereignty and security as its main goals, this latest law, China says, will bring the country up to speed with global best practices for cyber security.

The CSL has been called “in some respects, more a policy document than an actionable law.” The vagueness of terms and lack of guidance in compliance have created uncertainty, which means that many are holding off on implementation until they see how it plays out.

The law “requires network operators to store select data within China and allows Chinese authorities to conduct spot-checks on a company’s network operations.” Chinese crime and security investigators will have “full access to data and unspecified ‘technical support’...upon request.” The law also requires mandatory testing and certification of computer equipment.

Provisions like these have raised concerns among international business leaders. Confirming the validity of such concerns, international law firms have also raised warning flags: “Companies could be asked to provide source code, encryption, or other crucial information for review by the authorities, increasing the risk of this information being lost, passed on to local competitors, or used by the authorities themselves.”

Further, ambiguous language and undefined concepts “increase the government’s grounds to make wide assertions about the need for investigation and reduce a foreign company’s ability to contest a government demand for data access.” All of these issues with the new law make China less friendly to American and other international business.

A growing cyber security issue in the U.S. involves law enforcement agencies gaining access to technology devices. Despite having proper legal authority, the Federal Bureau of Investigation could not pry open more than 7800 devices last year because of encryption. At a cyber security conference in New York, FBI Director Christopher Wray said that an increasingly large amount of FBI cases “rely heavily, if not exclusively, on electronic evidence.”

DI INSIGHT

Cyber security risks are now the most pervasive threat to social, economic, infrastructure, and military spheres in developed countries around the globe.

DI urges its readership to undertake proactive planning effort within their spheres of interaction and influence to protect applicable assets.

Wray affirmed that while the FBI “supports strong encryption and information security,” a solution requiring significant innovation must be found. He called it an “urgent public safety issue.”

Meanwhile, tech companies and cyber security experts have said that to allow law enforcement authorities “to access data from encrypted products would weaken cyber security for everyone.”

A recently-discovered set of security flaws could weaken cyber security for nearly every modern computing device. Security researchers said that flaws such as Meltdown and Spectre could allow hackers “to steal sensitive information from nearly every modern computing device containing chips from Intel Corp, Advanced Micro Devices Inc. and ARM Holdings.”

Meltdown, which affects Intel chips, could potentially let hackers read a computer’s memory and steal passwords. It could therefore affect not only individual computers but possibly entire server networks. Daniel Gruss, one of the researchers who discovered Meltdown, said it was “probably one of the worst CPU bugs ever found.”

Spectre, which affects chips from Intel, AMD, and ARM, enables hackers “to trick otherwise error-free applications into giving up secret information.”

Dan Guido, chief executive of cyber security consulting firm Trail of Bits, urged businesses to “update vulnerable systems”

immediately, before hackers can develop code that preys on the weaknesses. These and other flaws yet to be found could potentially impact electronic devices and computer-based systems in every sector of life.

Crime

In the U.S., the murder rate in America’s biggest cities decreased in 2017. New York and Los Angeles, the two largest cities, “are at or near the lowest levels of deadly violence in their modern histories.” The Brennan Center for Justice reports in its latest analysis that for 2017, crime overall is projected to fall 2.7 percent below the 2016 rate, with violent crime also dropping 1.1 percent compared to last year in the 30 largest cities of the U.S.

5 Facts About Crime in the U.S.

1. Violent crime in the U.S. has fallen sharply over the past quarter century.
2. Property crime has declined significantly over the long term.
3. Public perceptions about crime in the U.S. often don’t align with the data.
4. There are large geographic variations in crime rates.
5. Most crimes are not reported to police, and most reported crimes are not solved.

Source: John Gramlich, Pew Research Center, Jan. 30, 2018.

DesignIntelligence talked with Bob Bigman, founder and CEO of 2BSecure, for his perspective on cyber security, its relationship to physical security, as well as the top cyber risks and threats for leaders to focus on in the coming year.

DesignIntelligence: In your 30+ years in cyber and information security, do you find that we have become more vulnerable?

Or does it just appear that way because of the speed of change in technology?

Bob Bigman: We've become more vulnerable, and it is a result of interconnectivity. Systems are by default connected to networks—making them more easily accessible for bad guys—yet many people don't even realize the degree of connectivity they have when they connect to networks.

DI: So there are more doors in now?

BB: Yes. In the past, a bad guy had to physically be at the network that he wanted to attack. Today, we're all interconnected, from our Volvo to our house all the way through the Internet back to our offices. That's why recognizance in the hacking business is such a big issue: to find a pathway in. Before, the paths weren't even there.

DI: In the broader context, how does cyber security relate to other forms of security?

BB: I think the distinction between cyber, physical and even personal security will not be much of an issue in a few years.

And it's largely because of interconnectivity. For example, any physical security system we purchase includes connections almost by default back to various vendors who make the software and the hardware, who support it, who perform firmware updates and who monitor those networks.

It's not just the IoT network, it's the way we engineer the IoT networks to work. It's always focused on the ease of use for the end customer as opposed to safety and security. Very infrequently do I hear end customers demand security. They always demand the ability to remotely manage their sensor network from their laptop at home, for example. And companies are all rushing to give us that capability, but no one is asking the question about security.

DI: What are the top risks in cyber security that A/E/C firms must consider?

BB: First is the risk in the complexity of networking. For example, when a firm uses their own internal corporate network or cloud services, the interconnections between those firms and other vendors—like cloud services vendors, hardware vendors, software support people, maintenance people—are so complex it's hard to discern whether they are secure.

Second is the lack of security in computer systems which basically exhibit almost zero security, despite all the firewalls and encryption. We all heard about a significant flaw in the Intel chipsets. They are in every computer, making this a native vulnerability at the hardware level.

Third is the ease of use vs. security. The balance has tipped so far in favor of ease of use, ease of access, ease of support, that no matter what the security people do, it's hard to get a level playing field.

Fourth is we still haven't properly fixed the identity authentication problem. Passwords and even the biometric systems we use are fairly easy to break—a hacker just needs to crack the digital artifact of the biometrics.

And lastly, organizations don't understand their data—what's sensitive, who has access to it—or where it is actually located. This is not just particular to the A/E/C domain.

DI: As we build more smart buildings and they become more connected to the IoT, how should leaders be thinking about cyber security relative to the products they produce?

BB: From a technical perspective, they need to understand the networking that's performing all the IoT, sensor monitoring and control functions of their facilities. Do they have the right separation? Are the right controls in place? Are the right people monitoring it? Is it secured properly?

"I think the distinction between cyber, physical and even personal security will not be much of an issue in a few years."

DI: How do you think these kinds of cyber security threats are changing the way A/E/C firm leaders need to operate?

BB: It's not a cyber problem, it's an IT problem. The companies that do cyber well also do IT well. They have central planning, central management and central governance. So governance management oversight or infrastructure must be in place before a company can ever have any hope of getting cyber right. Leaders must take an active role in dictating specific mechanisms and policies as well performance characteristics and attributes for cyber security.

GLOBAL INFRASTRUCTURE

Most people don't think much about infrastructure until it stops working. Every morning before we get to work, we've made use of several types of infrastructure: we flip a switch and the lights come on and our coffee is made. We turn a couple of knobs and water comes out of the faucet. We hop in the car or on the train and travel over roads or tracks to the office, maybe dropping our kids off at school on the way. We make phone calls, send texts, video-conference clients and colleagues, and search online for whatever bit of information we need. Yet, if any one of those systems breaks down, our lives are disrupted for however long it takes to repair or reboot the system. While we wait, our frustration mounts, and we realize just how critical infrastructure really is.

Infrastructure, then, is “the basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons.” In all its various forms, infrastructure benefits both the society as well as the individual.

The World Economic Forum estimates the world's infrastructure investment gap at \$1 trillion with a \$4 trillion worldwide demand for infrastructure.

The world's population is projected to increase by 2 billion people by the year 2040. The demographic shifts of people moving from rural areas to urban areas will only continue to increase, with estimates of 46 percent more people living in cities by 2040. All of this will place more and more demand on existing infrastructure, much of which needs to be improved, upgraded to be more resilient, updated to cope with climate change, and/or newly built.

Infrastructure is tied to economic growth and vice versa. They depend on each

other. Infrastructure drives and sustains growth, because an economy needs a smooth, efficient, effective process for the flow of and distribution of its goods and services. Infrastructure can help to lift whole regions out of poverty. It helps to bring a better standard of living to the people through benefits such as electricity and plumbing, mobility and accessibility, education and healthcare. Even the process of developing and building infrastructure creates jobs, which contributes to the cycle of economic growth.

Despite all of the good that infrastructure can do for the world's people, securing funding for it is not easy. Projects are funded with public money or private investment, or some combination of the two. But there are risks involved in the spend:

- A project can take many years to complete—causing cost overruns, delays and more.
- Usually, a big investment is required up front for an infrastructure project; yet returns on the investment are over a long period of time.
- Benefits of infrastructure are spread over many entities—even to those who don't participate in the outlays.

And sometimes the risks are not understood, or they're even unknown at the outset of an infrastructure project. There are also costs associated with maintaining, repairing and modernizing of infrastructure over time.

However, even though infrastructure projects are complex and costly, the benefits can be long lasting.

WHAT IS THE CURRENT STATE OF INFRASTRUCTURE GLOBALLY?

Africa

The state of Africa's infrastructure remains grave. In fact, Africa's infrastructure is ranked below the infrastructure of all other developing countries in the world. Africa's total population is estimated by the UN at 1.278 billion people, yet across the continent, basic services are not available to millions of them. Statistics show that more than 315 million people do not have access to clean, reliable water to drink in Africa. Over 690 million people do not have even basic sanitation. Only 34 percent of the population has any access to roads. And in sub-Saharan Africa, more than 600 million people don't have electricity.

As we discussed earlier in this section, infrastructure investment is an important tool to bring economic development to a country or region. A lack of infrastructure severely limits a country as far as growth, trade, and the education and training of its people. In Africa, the Program for Infrastructure Development in Africa (PIDA), was developed to address and mitigate these infrastructure deficits by 2040.

PIDA has made some progress: they have created a comprehensive framework to evaluate progress, to request technical assistance, to fast track projects, and more. They have created

networks and funding initiatives to move projects along to development. But there are still many challenges PIDA must address. And despite getting some private investment, public funding is still the main source of money. But the public money they've been able to secure is still inadequate to meet all of the needs of a nonexistent or crumbling infrastructure.

“The impact of public investment on economic growth can be improved if [African] countries implement policies that make public investment more efficient,” says Punam Chuhan-Pole, World Bank Lead Economist and author of the report, *Africa's Pulse 2017*.

One of PIDA's strategies has had some success. The Presidential Infrastructure Champion Initiative (PICI) puts the responsibility on the presidents of each country to move projects forward, and as a result, regional projects have been implemented in these countries: Algeria, Nigeria, Senegal, South Africa, Republic of the Congo, Rwanda, Egypt, and Kenya.

The UN predicts that by 2100, 40 percent of the world's population will live in the continent of Africa. China has undertaken several very ambitious projects on the continent, and if these projects flourish, China will be a huge player in Africa. Why? Beijing encourages infrastructure investments that go hand in hand with its Belt and Road Initiative. Africa (specifically East Africa) will play a major role in the Belt and Road Initiative (BRI) because of factors like Ethiopia's manufacturing, Djibouti's ports, and power plant and line projects being planned for the region.

Recent completed BRI infrastructure projects in East Africa include a railway in Kenya between the port city of Mombasa and the capital, Nairobi; and the Karuma Hydroelectric Power Station in Uganda—a 600MW hydroelectric power project under construction. Significant improvements to port connectivity are also expected in the next five years—also BRI projects.

Interestingly, other infrastructure investments made by *private* Chinese companies have been curbed or reined in by the government over the past few months.

China is investing in infrastructure projects in Africa.

Here are the top 10 projects:

- Lagos-Calabar coastal railway
- Mombasa-Nairobi railway
- Addis Adaba-Djibouti railway
- Bagamoyo megaport
- Algeria East-West Highway
- New Cairo
- Congo-Brazzaville Special Economic Zone
- Lobito-Luau railway, Angola
- Abuja-Kaduna railway
- Modderfontein New City, South Africa

Source: *The Business Year*; Top 10: Africa Infrastructure Projects in 2018; Evan Pheiffer

Asia

President Trump has said that bridges and highways in the United States are “third world” and need to be upgraded. But developing countries in Asia and the Pacific also want American investment to build and upgrade their infrastructure. The Asian Development Bank (ADB) estimates that Asia needs to spend \$26 trillion in infrastructure projects through 2030 in order to maintain growth, address poverty, and mitigate and combat climate change.

Here are some of the massive infrastructure projects planned for Asia:

- ASEAN Power Grid Initiative
- Mumbai-Ahmedabad High Speed Rail
- Hanoi-Ho Chi Minh City Expressway
- Soekarno-Hatta International Airport Expansion
- Hong Kong-Zhuhai-Macao Bridge
- Mega Manila Subway

Source: Nikkei Asian Review; October 18, 2017;
Jun Suzuki

This amount of spending reflects the expectation that the region's current rapid economic and population growth will continue. That growth requires more infrastructure to meet the needs of the increasing population—from roads to ports and railroads, from hospitals and schools to the structures needed for communication and water.

In Asia, funding for such projects currently comes from the ADB, foreign government investments, and the Asian Infrastructure Investment Bank (of which China owns 26 percent of the shares). Other countries within Asia also go to the private sector for funding.

Interestingly enough, China has stepped in to help.

Through its Belt and Road Initiative, **China** is investing in ports, rail lines, and other infrastructure projects in Asia and the Pacific in order to integrate the region as one huge economic trading area. The Initiative currently spans more than 60 countries. Centered on land—with focus on energy and transportation infrastructure—and sea—with focus on ports and new trade routes, the Initiative is to restore the ancient trade routes, transporting goods from Asia across Europe along the ancient Silk Road. Practically, by developing these types of ties with other countries, physical and regulatory barriers to trade will either be reduced or eliminated.

China plans to spend \$900 billion and lend as much as \$8 trillion to 68 countries for infrastructure development and improvement, opening up a new era of commerce. Even more countries have signed agreements to collaborate or to operate as partners with China. The BRI will encompass more than 60 percent of the world's population and about a third of global GDP.

So why is China doing this? Certainly, Chinese companies will benefit, as will areas in China that are not developed or are underdeveloped. And the countries that participate along the belt and road, including poorer countries, will indeed have increased trade opportunities that will bring prosperity. By creating new markets for Chinese companies, President Jinping hopes to be able to export more of China's excess capacity in metals and steel. Another potential motivation might be his claims in the South China Sea—by investing in more projects for the “belt” (i.e., sea lanes and ports) his claims could be bolstered.

But there are countries who are suspicious and even distrustful of Jinping's motives behind this massive initiative. Are there political motivations behind these projects? Military motivations? Some analysts believe that through these projects, China's underlying goal is to cement ties and build relationships with these countries to the detriment of the United States, both economically and politically. Other opponents believe that China will leave countries and regions in a state of disrepair and wreak havoc on the environment.

The Asian Infrastructure Investment Bank (AIIB), launched in 2016, was proposed by Jinping in 2013 as a way to fund BRI projects. Sir Danny Alexander, vice president of the bank, says in an article in *The Telegraph*, “Asia is the fastest-growing part of the world economy. Infrastructure is not just important to Asian countries,” which is why many non-Asian countries have joined the bank.

Alexander believes that the development of Asia is being held back because by its lack of infrastructure, stating that even now there are hundreds of millions of people who don't have electricity. In fact, the development and construction of infrastructure in Asia is extremely important not only to Asia's growth but to global economic growth, both now and in the future.

“Global electricity systems are undergoing the most profound set of changes since Thomas Edison's inauguration of the Pearl Street Station, the world's first commercial power plant, in 1882.”

Source: World Economic Forum

The AIIB plays an important role in the development of these infrastructure projects. The bank currently has 57 shareholders—including the UK, France, Germany, Russia and China (but not the U.S.). Although China is the largest shareholder with a 26 percent holding, Alexander says the AIIB is not “the financial arm of China's Belt and Road Initiative.” They have similar goals, but separate initiatives and projects. In fact, the AIIB is an international organization, and is working on projects in cooperation with the World Bank and the ADB, according to Alexander.

The president of AIIB, Jin Liquin, said the bank will support the Belt and Road Initiative, but projects have to meet three

requirements: the project would have to promote growth, be socially acceptable and follow environmental laws. This remains to be seen.

In January 2018, the United States signed two agreements with **Japan** to offer high-quality, affordable infrastructure solutions in the Indo-Pacific region. This partnership move is a new strategy for the region—one that doesn't include China's BRI. Because Japan and the U.S. are both concerned about the potential geopolitical and military purposes of China's BRI, the partnership also offers other emerging and developing economies in the region an alternative. Japan is a vocal opponent of the Belt and Road Initiative.

200,000 PEOPLE

MOVE FROM RURAL TO URBAN AREAS

EVERY DAY

The agreements—which include Pakistan, India and down to Southeast Asia—will advance the shared interests of Japan and the U.S. in the region. There are no specific projects or budget yet, however.

The U.S. Trade and Development Agency also signed an agreement for energy infrastructure with Japan's Trade Ministry.

These latest agreements will further expand Japan's reach and influence in southeast Asia. Even though Japan has led the pack

in the region for infrastructure development, China—with its Belt and Road Initiative—is becoming a competitor because it is partnering with more and more countries that the “road” runs through.

Infrastructure is driving growth in southeast Asia. And it will change the face of the cities in the region. As the economies there grow, people are flocking to the cities in search of a better life, better standard of living, better jobs. The rapid rise of urbanization is challenging governments to keep up with the demands placed on their infrastructure. Issues include lack of planning, project prioritization, and fiscal constraints.

In fact, the Asian Development Bank estimates that the region has to spend at least \$60 billion a year on upgrades to infrastructure. For example, Indonesia has more than 250 projects on the docket, the Philippines aims to \$180 billion toward various transportation channels, and Singapore looks to double its mass transit. When it comes to funding these projects, the region's richest economies, Japan and China, are investing in a type of “infrastructure race.”

The **ASEAN** (Association of Southeast Asian Nations) region is developing rapidly too—currently the seventh largest economy in the world with projected growth over the next few years at more than 5 percent. Manufacturers are moving their operations from China—manufacturing in ASEAN costs less, increases domestic consumption,

and offers improving infrastructure. Nevertheless, there are infrastructure gaps in this region as well.

The role of infrastructure development and investment in this bloc of countries promotes sustainable growth and improves connectivity among its economies, increasing trade growth. For example, better connectivity makes the region more competitive due to expanding trade and lower costs of goods.

India is growing its infrastructure ecosystem. A “World Bank and Australian Aid” report from 2013 projected that India also had an infrastructure gap that would need more than \$1 trillion in spending by 2020 to close it. Today, India’s growth is showing: in the 2017–2018 Global Competitiveness Report from the World Economic Forum, India rose from 68th place to 66th.

Two huge, current projects in India include building 83,000 kilometers of roads at a price tag of \$108 billion and the government’s plan for developing 100 Smart Cities in an effort to improve their infrastructure. The cities selected to participate in the ini-

tiative will benefit from upgrades to energy and water infrastructure, public transportation and Internet accessibility.

And it is worth noting that India is a vocal opponent of the Belt and Road Initiative.

In **Australia**, Prime Minister Malcolm Turnbull’s government has committed to investing \$75 billion in infrastructure over the next 10 years. This is a record—the largest infrastructure spend in Australia’s history. The projects are set to ease congestion and grow the regions, making a better life for all Australians.

The government will invest \$10 billion to the National Rail Program, \$8.4 billion for the Melbourne to Brisbane Inland Rail, \$5.3 to build the Western Sydney Airport, and record levels of additional funding for local roads and bridges. More than \$230 million is going to the Industry Growth Centres Initiative, to drive innovation, competitive and productivity in key industries. Funding is also going to naval shipbuilding and sustainment, as well as shipyard infrastructure to build those new ships.

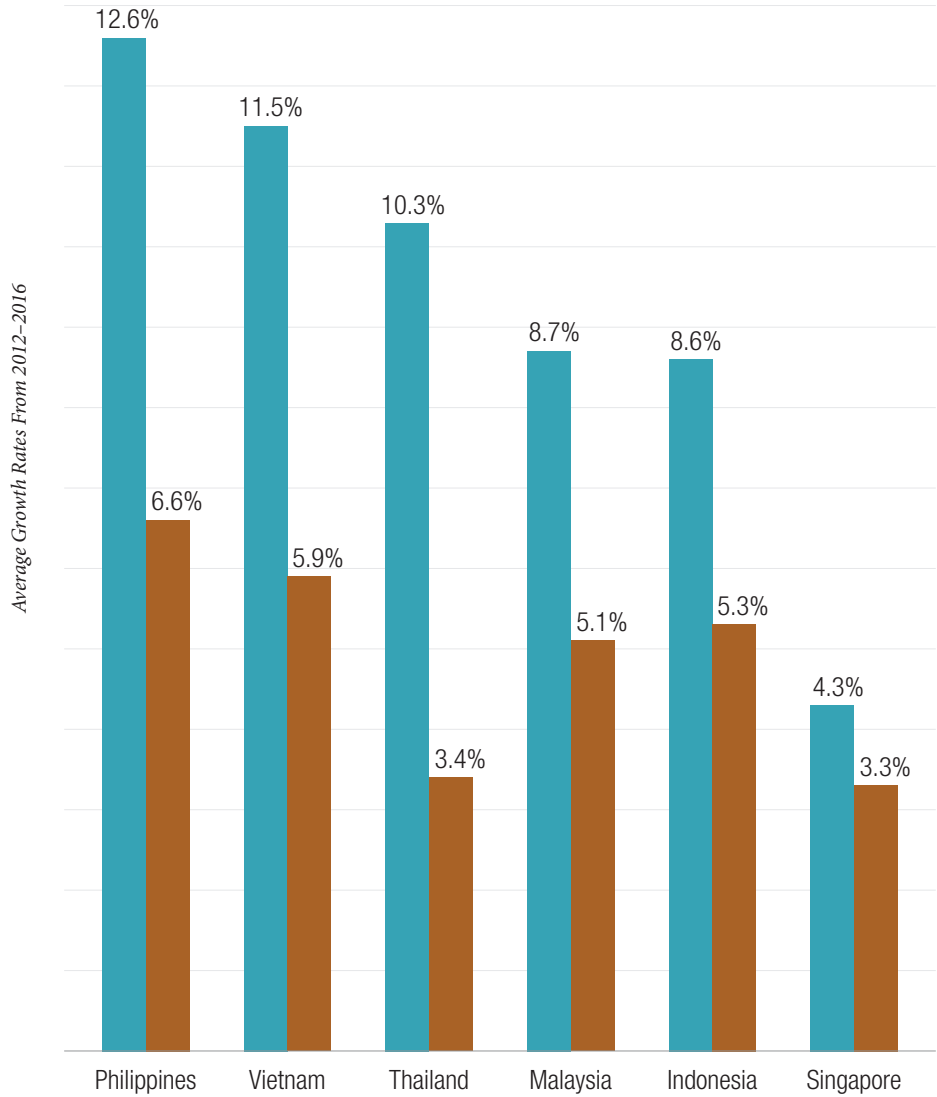
DI INSIGHT

Demographic shifts, aging infrastructure and climate change are all increasing the demand for more and better infrastructure around the globe. But in addition to rebuilding/repairing/updating existing assets, we must also look at issues like connectivity between cities

and rural areas for commuters; Internet access for those who don’t have it; green spaces that are safe; public utilities that are safe and accessible; public transport that is affordable and efficient; sustainability and availability in food production.

Understanding Infrastructure Opportunities in ASEAN
Infrastructure Spending and GDP Growth

■ Infrastructure Spending Growth (%) ■ GDP Growth (%)



Source: PwC, Infrastructure Series Report

Australia's population growth now outstrips the UK, Canada and the United States as one of the fastest growing in the OECD. 2017 was the 26th year of uninterrupted economic growth in Australia as well. Governments are planning for smarter city planning with mass passenger transport, employment hubs that are connected by passenger transport, and public green spaces and parks.

Infrastructure spending in **Europe** is low. After years of chronic under-investment, compounded by the worldwide recession, EU countries are putting their prosperity and growth at risk.

In fact, productivity in Europe has lagged over the past two decades. And more often these days, politicians are wondering if infrastructure spending will jump start economic growth.

But the needs for infrastructure upgrades, development and improvement are so great that investments need to come from private financiers. The taxpayer cannot fund all of the needs. Investor appetite is growing, though.

Still, there are some big projects in the works in Europe including:

- Birmingham (UK) Big Cities Plan
- Turkey Urban Renewal Project
- Switzerland's Gotthard Base Tunnel
- Norway's submerged floating tunnel beneath Sognefjord
- Moscow International Business Center

- London's Crossrail Project
 - Stockholm Bypass Project
 - The Marmaray Project in Istanbul
 - The London Array
 - Turkey's Canal Plan
- (see page 69 for more information)

In November 2017, the European Commission announced €1 billion investment in 39 transport projects. This investment is being made under the Connecting Europe Facility, the EU fund supporting infrastructure networks. The selected projects will upgrade Europe's rail network, further develop alternative fuels infrastructure and pave the way for zero emission water transport.

Proposed projects are concentrated on the strategic sections of Europe's transport network with the largest funding going to the European rail network. Upgrading roads, ports and inland waterways are also receiving large portions of the funding.

Projects include increasing the speed of the railway access line between Denmark and Germany; upgrading Slovenia's railway line; developing more than 300 electric car charging stations in 13 EU countries; and upgrading Belgium's Albert Canal and Poland's Port of Gdansk.

2 BILLION

GLOBAL POPULATION INCREASE
BY 2040

Latin America's infrastructure, as in other areas of the world, is also in need of development and repair. More than 60 percent of the region's roads are unpaved. Cows wander along the unfinished Trans-nordestina railway (and \$1.8 billion has already been spent on the project which has been under construction for more than 10 years). Commuters to jobs in areas such as Bogota or Lima spend as much or more time in transit as they do at the office. And in many villages, there is still no electricity or running water or paved roads. This region spends a smaller share of its GDP on infrastructure than any other country or region in the world, with the exception of sub-Saharan Africa.

Still, there are some bright spots, like Chile's roads and Uruguay's electricity and telecoms are as good as some larger countries. Even so, if the region would upgrade its infrastructure, economists estimate its growth rates would be two or more percentage points higher.

While opportunities for upgrades—like low interest rates and leaders who are

development friendly—have the potential to open the region, scandals, bloated bureaucracies and cumbersome policies have combined to shut down some projects and delay others.

Some governments are passing reform laws and are forming public/private partnerships. China is also investing in Latin America. Transparency, prioritizing projects and spending efficiency will all go a long way toward improving infrastructure in Latin America.

In early 2018 President Trump released his plan to rebuild U.S. infrastructure. In early 2018. According to the White House website, his plan includes:

- \$200 billion in Federal funds to spur at least \$1.5 trillion in infrastructure investments with partners at the state, local, tribal and private level.
- New investments will be made in rural America, which he says has been left behind for too long.
- Decision-making authority will be returned to state and local governments.

DI INSIGHT

It is estimated that, around the globe, more than 200,000 people are moving from rural areas to urban areas every day. Let that sink in for a moment. All of those people will need housing. They'll also place demands on infrastructure—transportation, utilities, social. These demographic shifts are having and will

have an enormous impact on the environment, the economy (both locally and globally) and the wider society (from both perspectives: where they're moving from and where they're moving to). Our profession can effect transformative change in closing the infrastructure gap and boosting the global economy.

Giant Infrastructure Projects in Europe

Birmingham's Big City Plan: \$12.2 billion to transform the city center. It'll be much bigger with thousands more homes and thousands more jobs.

Turkey Urban Renewal Project: a 20-year project set to demolish about 7 million buildings and constructing earthquake-resistant structures in their place. Estimated cost: \$400 billion.

Switzerland's Gotthard Base Tunnel: opened in June 2016, 35 miles long; the longest and deepest train tunnel in the world.

Norway's Floating Tunnel: \$25 billion commitment to build a submerged, floating tunnel beneath the Sognefjord, a body of water more than 4,000 feet deep and 3,000 feet wide to link two disparate regions.

Moscow International Business Center: \$12 billion in investments, containing many of the tallest buildings in Europe.

London's Crossrail Project: a massive upgrade to the existing underground system with 10 new train lines, connecting 30 stations over 73 miles of track. Full service slated in 2020.

Stockholm Bypass Project: developed to reduce heavy traffic in the city of Stockholm. Set to be completed in 2025 with an additional 13 miles of underground roadway.

Marmaray Project in Istanbul, Turkey: an underground railway project linking both sides of the Bosphorous Strait.

London Array: offshore wind farm with 175 turbines generating 630 megawatts of electricity, which can power 300,000 homes.

Turkey's Canal Plan: proposed by President Erdogan as an alternative to the Bosphorous Strait; 32 miles of intercoastal canal.

- Regulatory barriers that needlessly get in the way of infrastructure projects will be removed.
- Permitting for infrastructure projects will be streamlined and shortened.
- America's workforce will be supported and strengthened.

Source: whitehouse.gov

Indeed, the 2017 "Infrastructure Report Card" by the American Society of Civil Engineers gives the U.S. a score of D+ on infrastructure. Their solution to the problem includes investment that is strategic and sustained; bold leadership; and thoughtful planning and preparation for the needs of the future. In this way, we can build resilient, sustainable infrastructure so that families and communities and businesses cannot only survive, but prosper.

"Asia is the fastest-growing part of the world economy."

Sir Danny Alexander, vice president of Asian Infrastructure Investment Bank

Today in the U.S., according to the World Economic Forum, roughly 33 percent of our roads are in bad shape; more than 50,000 bridges have deficiencies that are structural as well as capacity; more than 60 million people have been exposed to drinking water that is unsafe; and more than 60 million people do not have access to the Internet. The U.S. is the richest country in the world, but only ranks 11th in the world for infrastructure competitiveness.

The last time we had a major infrastructure campaign was in the 1930s with President Roosevelt's New Deal. Could Trump's plan become the New New Deal? The rebuilding of our infrastructure has the potential to promote and grow a prosperity that is shared across all communities, rural and urban, rich and poor, to the betterment of us all.

Canada's Public Policy Forum (PPF) expects infrastructure spending in the country over the next 10 years to be from CAD 500 billion to 750 billion. Some infrastructure projects have already begun to lower the age of Canada's infrastructure. Even so, the World Economic Forum's Competitiveness Index for 2017–2018 ranked Canada 16th globally in the infrastructure category (the U.S. ranked 11th). And there is still a shortfall in funding needed infrastructure projects by up to CAD 1 trillion, predicts Canada's Advisory Council on Economic Growth.

The Investing in Canada Plan is the Canadian government's initiative to invest more than \$180 billion over the next 12 years in these five categories: public transit, green infrastructure, social infrastructure, trade and transportation infrastructure, and rural and northern communities' infrastructure.

The Canadian Infrastructure Bank (CIB) was developed as part of the Investing in Canada Plan. CIB is charged with both investing at least CAD 35 billion in revenue-generating projects and attracting private funding and

institutional investment for infrastructure development and improvement—projects that are in the interest of the people and that will spur long-term growth. Vancouver’s rapid rail project and Montreal’s automated rail system are the outcomes of successful and innovative public-private partnerships by CIB.

If the CIB can maintain its independence and autonomy from the government (it operates at arm’s length from the government and has a board of directors), then infrastructure projects may be improved because decisions won’t be made based on politics.

Financing—The Role of Capital

Today, major global cities are facing increased challenges to find funding for the myriad of infrastructure projects that are needed. The growing demand for updated basic systems for water, power and transportation, not to mention development of Internet connectivity and accessibility, all are leaving national and local governments in the position of looking for new, different funding options.

In many countries around the world, a key strategy for funding infrastructure is private investment. Because governments need to stretch tax dollars, public-private

DI INSIGHT

The Role of A/E/C

The A/E/C industry can play a leading role in closing infrastructure gaps. By embracing innovation and technology, the professions can help to increase the efficiency and effectiveness of infrastructure moving forward. By always being cognizant of the impact of the infrastructure and built environment on a city, state, country or region, we as an industry can reverse the problem of congested, polluted cities. Increasing productivity, improving project selection (with data and fact-based decisions), upgrading skills among the workforce and creating better designs and urban plans will help to mitigate the problems that come with infrastructure that is lacking.

Project delivery is also a very important place the industry can make an impact—early planning and delivering the project on budget, on time. Innovation, resilience and sustainability has to be ingrained in every project, not just from the planning or development stages, but also to make it last even longer. Vulnerabilities to infrastructure today include natural disasters and climate change, terrorism and technological disruption, all are big challenges where A/E/C can effect change.

Together, the professions can build infrastructure that, in the big picture, can bring prosperity and a better future for people all around the world.

partnerships (P3 or PPP) are becoming more and more prevalent. Not only are P3s able to develop and complete projects less expensively and quicker, they provide an important source of new capital for governments. P3s bring the discipline of the private sector into the public-sector arena. PPP does require a different way of working with firms investing their own capital, taking on more risk financially. The Trump administration says that it will push for more of these types of projects in its new infrastructure plan.

These innovative funding models, which have been around for many years, are helping to close the gap in funding. Local governments and cities are expanding partnerships with the private sector and institutional investors.

Land value capture (LVC) is also a promising infrastructure financing model that recovers either a portion or all of the value generated by upgrading or developing public infrastructure. LVC is based on a common perception or general recognition that infrastructure creates economic benefits

that exceed costs and that landowners or home owners or even developers would be willing to pay a premium for well-serviced commercial and residential properties, as well as some of the costs of developing the infrastructure. This method helps to ensure delivery of projects without incurring more tax burden on taxpayers.

Still, for the near future, it appears that most infrastructure projects will be funded by public (taxpayer) money and by the corporate sector. Governments can also expand sources of funding by selling existing assets and using the money for new development, and by increasing user fees. Capturing property value is another revenue add.

Cities facing infrastructure funding gaps and increased demand for services will have to become more creative in expanding their funding streams, leveraging investment partnerships that help to curb massive overspending, all while continuing to receive support from the federal and state governments.

Investing in Infrastructure: The Meat Loaf Perspective

By Julian Anderson, FRICS, FAACE

The term “infrastructure” means different things to different people, but for the purposes of this article I will use the simple definition cited in the *Oxford English Dictionary*: “The basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise.”

Do note that this definition precludes such forward-focused, high-tech projects such as energy-generating highways; the Hyperloop; smart, sensor-enabled bridges; or bullet trains. We’re talking just the basics: asphalt, concrete, steel, and iron.

The most recent American Society of Civil Engineers’ (ASCE) 2017 Infrastructure Report Card found that the overall national grade for infrastructure remains at a dismal D+—the same rating the United

States received in 2013—suggesting only incremental progress has been made over the last four years toward restoring the country’s infrastructure. ASCE evaluated 16 categories of infrastructure in the report, with grades ranging from a B for Rail to a D- for Transit.

Why do these poor ratings persist in the most advanced economy in the world? According to the ASCE, it is simply a failure to invest.

The United States Chamber of Commerce observes:

Most Americans agree that our roads, bridges, mass transit systems, air and seaports, and water infrastructure are critical national assets that drive growth, jobs, safety, and global competitiveness.

What we can't seem to agree on is how to pay for badly needed maintenance and repairs. It's time to stop thinking about infrastructure as a problem, but as an opportunity for bipartisan agreement to invest wisely and carefully in our most critical needs, while eliminating wasteful spending.

(Of course, we *are* paying for it—but in the negative, colloquial sense of the word. ASCE points out that in 2014, Americans spent 6.9 billion hours delayed in traffic, and families lose \$3,400 annually in disposable income because of infrastructure deficiencies.)

“The failure to invest now in infrastructure is not only a tax in financial terms, but it’s a broader burden, more cultural in nature—it is a tax on the future of the United States and its citizens.”

So, if the public and politicians are agreed that action is necessary, what is keeping us from seriously addressing the problem? From my perspective, the reason is three-fold.

First, the large tax cuts introduced by the federal government have further increased the projected national deficit. In a note to clients written on February 18, Goldman Sachs warned that federal deficit spending

was “entering uncharted territory,” thanks to a combination of spending increases on programs such as Social Security and Medicare, and tax cuts. What does this mean for infrastructure? There is no money—or at least not enough money—that government wishes to allocate to infrastructure.

Second, the much-hyped solution to harness private funds for infrastructure programs using Public Private Partnerships is somewhat hollow. The private sector will not invest in anything without the prospect of a financial return, so any project that uses private funds must develop a profitable income stream; think toll roads, water and waste-water fees, lease-back of buildings, etc. So, while new freeways provide expedited travel time and potential revenue, and some water treatment and some waste water facilities can be monetized, the repair of existing roads, bridges, and dams typically cannot be monetized because citizens expect their current taxes will cover the cost of basic repairs and maintenance; furthermore, they believe they pay enough in tolls and taxes already. And, since government has to be a partner in any P3 endeavor, what, beyond a crumbling road or bridge, does it bring to the table for repair projects?

The recently released White House plan calls for \$1.5 trillion for repairing and upgrading America's infrastructure. However, only \$200 billion will come from direct federal spending, with the balance expected to come from the equally cash-strapped state and local governments (which are

somehow expected to match any federal allocation by at least a four-to-one ratio). It is true that a few projects, mostly transit, will be able to move forward once the federal cash becomes available because they are already largely funded and will simply need a top-up.

Third—and to my mind, the real nut of the problem—is that, fearing an electoral backlash, politicians don't have the will to raise taxes to pay for infrastructure. Of the courses they could take, few have a viable chance of success. Possible plans include:

- Increase the gas tax, which is problematic for low-income earners but might be overcome by either an increase in the minimum wage combined with a further increase in the tax-free threshold
- Impose a federal tax on vehicle mileage, which has long been rejected as too much of a “big brother” action
- Use the taxes expected to come from the repatriation of overseas profits—but these have already been 100 percent allocated toward paying for the recent tax cuts
- Increase income tax across the board
- Introduce a surcharge on top income earners; a move that clearly will not happen after the recent tax cuts; or
- An idea suggested by the American Institute of Architects Arizona chapter: use the \$25 billion requested by the president for building a new border wall to repair existing infrastructure

Of course, there is the option of public debt-financing for infrastructure work, and the Economic Policy Institute makes a case that this could pay for itself fairly quickly through the creation of new jobs, but the question remains whether Congress has already increased the deficit too much to make further deficit financing politically viable.

When it comes to infrastructure, government representatives are singing a slightly paraphrased song by Meat Loaf (my lyrics):

*I want you, I need you
But there ain't no way I'm
ever gonna pay for you.
Now don't be sad
Cause two out of three ain't bad.*

It is my opinion that the situation *is* bad. The failure to invest now in infrastructure is not only a tax in financial terms, but it's a broader burden, more cultural in nature—it is a tax on the future of the United States and its citizens.

Julian Anderson is global board chairman of Rider Levett Bucknall.

GLOBAL MASS MOVEMENTS OF PEOPLE

Whether they're migrating for positive reasons like a better opportunity, or even if it's illegal immigration, people are on the move all over the world. The World Economic Forum estimates that more than 1 billion people are migrants. That's about one-seventh of the world's population. And the numbers are expected to keep growing.

In this section, we'll look at the types of migrations as well as the causes. What would compel a person to pack up or sell his belongings, leave his home and family behind for parts unknown, possibly forever? What sort of fate might await a migrant along the way and at his destination? Where in the world is migration more likely to occur? Finally, what are some solutions that can be employed to address this growing challenge? And what about urbanization—people moving from rural areas to urban areas?

Migration Governance

Today, more than 240 million people are considered international migrants—that is, they've left their homes (or places of origin) and moved to foreign countries. There are also an estimated 763 million people who are considered internal migrants—that is, they are people displaced usually by some sort of conflict, and they are not living in their home villages or cities, but they are still within the borders of their country. Refugees total about 22.5 million people (this figure is included in the totals above).

Most migrants live and work in their destination country legally.

With such a huge number of migrants across the globe, world leaders are engaging to address the challenges of migration (How do we care for them? How do we provide shelter for them? Jobs? and more) as well as migration governance. The problem cannot be ignored—mass people movements will likely continue in the years ahead. Yet unregulated mass migration gives the impression that governments are not in control; worse, when people who migrate are desperate, and there are no plans to manage the migration, the people who live in destination countries feel their borders are being assailed.

To help countries set up migration management protocols that are compassionate yet visionary, the United Nations has been developing two international compacts that address human mobility: the Global

Compact on Safe, Orderly and Regular Migration (GCM) and the Global Compact on Refugees. The UN's goal is that these two pacts are adopted and go into effect in 2018. The pacts are nonbinding yet present an opportunity for world leaders to take charge of unregulated mass people movements.

Whether a person is a migrant or a refugee, whether they leave their home voluntarily or involuntarily, whatever the reason they leave, they have the same needs and issues: security, shelter, health, education, jobs, dignity and more. So the two pacts will likely work best together to present international migration governance and comprehensive protection of all people who are migrating.

In December 2017, global migration governance had a setback when the United States pulled out of the UN's Global Compact on Migration. The State Department issued a press release that stated that the GCM had

DI INSIGHT

Human capital is defined as “the collective skills, knowledge, or other intangible assets of individuals that can be used to create economic value for the person, their employer and their community.” People are our greatest asset. When we invest in people—and in their knowledge and skills—we are investing in the economy and the firm and the society of the future. As our world becomes smaller, we have the opportunity to broaden the diversity of our teams.

“Our industry will continue to be more demographically diverse than ever before. The whole issue of immigration reform has a huge impact on our industry. Being able to tackle the available labor source from around the globe is going to be an issue that we as a design industry need to tackle as well,” says Griff Davenport (see Section 8 – “The Future of Professional Practice”).

policy goals that were not consistent with the laws and policy of the United States. Essentially, the State Department felt that the GCM would undermine the ability of the U.S. to secure its own borders and enforce U.S. immigration laws.

Overview of Migration

In an era of increasing globalization and connectivity, migration is a complex topic that impacts all of the world's people. It involves people from different backgrounds, different situations, different walks of life, different levels of education. People migrate for many reasons—from better opportunity to escaping civil war; from reuniting with family to avoiding persecution; from escaping the effects of climate change to working a seasonal job; from an Ebola outbreak in Sierra Leone to high unemployment in Italy, and more. Migration is also wrapped up in geopolitical, economic and social phenomena. Refugees, displaced persons, human trafficking and slavery, seasonal workers, the persecuted, asylum seekers, those who migrate within their country, as well as those seeking a better life and better opportunity, and more, are included in this term “migration.”

Almost daily we hear and read stories about immigration and migration, but generally it's not good news. While migration has been going on for thousands of years, today's stories often involve a polarized populace and confusing rhetoric. Violent extremism is a sensitive topic around the phenomenon of migration. While safety and security—and

other things like integration into the community, funding, infrastructure, housing, skills training, education, jobs, etc.—is a major concern both for those who migrate and the communities that receive them, leaders in nations around the world are beginning to recognize and address these issues.

Despite consistently negative news on migration, Louise Arbour, Special Representative of the UN Secretary-General for International Migration, said migration is a benefit to all of us due to migrant workers' contribution to a country's GDP, their contribution to the workforce by building up vacancies due to an aging workforce, and more.

“Architecture has become the litmus test of society's capacity for holistic and compassionate security.”

Sean Anderson, CNN.com

However, migration must be properly managed. But recently, migration management has tended toward immigration controls and talk of walls. Rather, political leaders around the world need to understand the data and make strategic plans in order to provide a way to turn a potential problem into an opportunity for prosperity.

Governments' immigration policies focus on these desired outcomes: to counter long-term population decline, address population aging, meet labor requirements, and safeguard employment opportunities

Bangladesh is very vulnerable to climate change because of its location (low-lying coastal region). A major source of internal displacement in the country is natural disasters, like monsoon flooding and tropical cyclones. There have been 185 natural catastrophes in Bangladesh over the last 20 years, causing more than US\$2 billion in damages.

for nationals. And in 2015, more than 70 percent of governments either allowed immigration or didn't change the current level of international migrants, according to the World Economic Forum.

TYPES OF MIGRATION

According to the World Economic Forum, migration usually falls into three types or categories. First, when migration is classified as *political*, it can be either *internal migration*, which means crossing political boundaries within a country, or *international migration*, which involves crossing country borders. Second, migration by movement patterns means that people might move from a rural area to an urban area; they might move between multiple locations as in a seasonal laborer, especially in agriculture; or they might return home after an extended stay elsewhere (such as for school or a job assignment, etc.).

The third category of migration is *by decision-making*, i.e., whether the movement is voluntary—by a person's "free will"—or involuntary, which is forced movement because of external factors. Those factors could be sociopolitical (war, natural disasters, famine) or developmental (substantial infrastructure projects, mining, deforestation).

Involuntary migration is a person leaving a bad situation—such as Syrian farmers leaving their homes due to a major drought—either on his own or because he is forced to leave—such as an area rife with civil war, violent conflict or persecution. If a person leaves her home but does not cross any borders (i.e., stays within her own country), she is considered an internationally-displaced person (IDP).

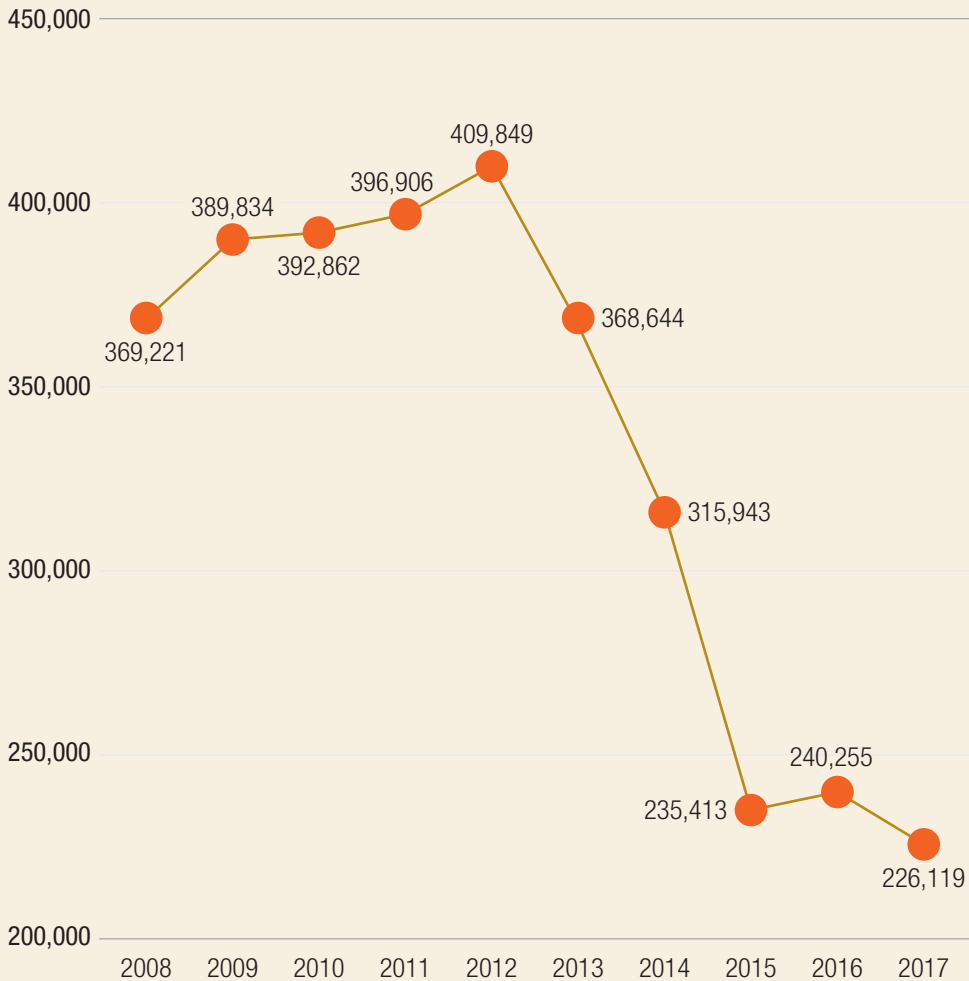
Let's take a look at what causes migration.

Causes and Trends of Migration

The **causes** of migration are economic, sociopolitical, and ecological. These factors work both ways: pushing people away from their homes and/or pulling them toward another destination. For example, unemployment and rural poverty push people to migrate, while the promise, or perceived promise, of job opportunities and better income pulls them to new areas, according to the World Economic Forum Report titled "Migration and Its Impact on Cities."

Migration is boosting populations in some countries faster than the birth rate. In fact, in key developing areas, migration

Have Deportations of Unauthorized Immigrants Increased Under President Trump? FY 2008–2017 Removals



Today, there are few issues in the U.S. that are more contentious than the approximately 11 million people who are thought to be living in the States illegally. President Obama was at one time called the "deporter in chief." When President Trump took office, he charged the U.S. Immigration & Customs Enforcement (ICE) with deporting anyone in the country illegally with no exceptions. Yet, in 2017, deportations actually dropped to 226,119. Here is a depiction of ICE removals for the years 2008–2017.

Source: ICE.gov; Politifact

is actually driving the growth of the population. And in some countries, the death rate of the resident population is surpassing the birth rate, despite population growth from migration. For example, projections by the UN Department of Economic and Social Affairs show that in Europe, the growth of the death rate over the birth rate after 2020 will be significant enough to decrease the population (without any net immigration). Experts predict the same for North America: between 2030 and 2040, population growth will increase only because of net migration over the birth rate of current citizens.

Since the majority of migrants are young and working age adults, a key benefit of migration is the net increase in the working age population. The World Economic Forum reports that in the U.S., migrants accounted for 47 percent of the increase in the workforce, and 70 percent of the increase in workforce in Europe. That's over the past decade.

Desired Destinations

According to the WEF's "Migration and Its Impact on Cities" 2017 report, the United States has been the main country of destination since 1970. Twenty-one percent of the adult population worldwide would move to the United States as their desired destination country in the near future. That's almost 147 million adults. Other attractive destination countries include Germany, Canada, the United Kingdom, France, Australia and Saudi Arabia, each with at least 25 million adults desiring to move there.

Even so, the majority of people who migrate choose to stay close to their home country (more than 60 percent; that's internal migration). They plan to either stay in their region or move to a country next door.

Global cities such as Sydney, London, New York, Dubai and Brussels are destinations as well, with as many as one third to one half of those populations currently comprised of migrants.

The Bigger Challenge: Internal Migration and Urbanization

Internal migration is a much greater reality than international migration—as much as three times more, with an estimated 763 million internal migrants.

People migrate to cities for many reasons, but the primary one is to earn a better livelihood leading to a better quality of life. According to the WEF Report, economic migrants are a majority of the migrant population around the world.

A majority of immigrants in major countries in the world live in urban areas: 92 percent in the U.S., 95 percent in the United Kingdom and Canada, and 99 percent in Australia, according to the McKinsey Global Institute.

22.5 MILLION

REFUGEES IN THE WORLD

In the **United States**, more Americans are moving away from rather than moving to Los Angeles and New York, but the number of international migrants to those cities more than makes up the difference. However, more *internal* migrants have relocated to certain metropolitan areas—like Dallas, Houston and Phoenix—and knowledge hubs—like Seattle, San Francisco and Washington DC.

Latin America has mostly shifted from rural to urban. In fact, about 83 percent of Latin America's population now lives in the cities. Those percentages are even higher in Brazil. More than 1.5 million people have left Venezuela in the last two years, however, due to its rapidly deteriorating economic situation. Gang and drug violence is causing high rates of displacement in Central America and Mexico. Scores of people in Mexico have simply disappeared due to the drug wars. Colombia is facing a crisis of displaced persons as well.

In **Africa**, the growth rate of the urban population is more than ten times higher than that of Europe. Rural to urban migration along with negative events such as conflicts and disasters are the main drivers of that rate.

Economic inequities and economic opportunities are driving the huge interstate migrations in **India**. Over the past 10 years, the increase of migration within India has been at 4.5 percent annually.

Over the last three decades, **China's** urban population has increased to more than half

Percentage of urban population in total population by continent in 2017

North America

81%

Latin America & the Caribbean

80%

Europe

74%

Oceania

69%

Worldwide

54%

Asia

49%

Africa

41%

This statistic shows the percentage of total population living in areas that are defined as “cities” in the countries respectively.

Source: *Statista.com*

of its 1.3 billion citizens. That growth trend is expected to continue, with an estimated 1 billion people living in the cities by 2030. If Jinping's China is still open for international business over the next decade, there will be significant opportunities for infrastructure and building, as well as strategies for improved air quality.

According to the WEF Report, as of January 2016, more than 19 million people were living in a different EU state than the state where they were born. Over 60 percent of the EU's population is centered in five areas: France, Germany, Italy, Spain and the UK.

“With all of the growth toward urban areas and cities, another phenomenon is surfacing. While urbanization has existed for years, deurbanization goes hand in hand with people movements.”

And with Brexit, it is expected that many of the people who moved to the UK will return to their home countries.

In **Australia**, Melbourne added more than 6,500 people in 2014–15 due to internal migration. Sydney reported the greatest net loss of population at minus 15,900.

Urbanization and internal migration place huge stress on the destination cities and regions. As we talk about in the Global

Infrastructure section, the state of the world's infrastructure is not good. With massive influxes of people, systems like water and sewer, transportation, even schools and hospitals become overburdened.

In addition, migrants need to be integrated within their new communities; studies show that those who aren't become disenchanted, marginalized, and may even become radicalized. Not only that, when migration isn't effectively managed and cities don't make cohesive plans and strategies, newcomers are left to their own devices. Then, in addition to language and cultural barriers, migrants often have to try to figure out how to meet their own needs. Discrimination and alienation can then ensue from the population of the destination area.

And Then There's Deurbanization—Incredible Shrinking Cities

With all of the growth toward urban areas and cities, another phenomenon is surfacing. While urbanization has existed for years, deurbanization goes hand in hand with people movements. A significant number of cities around the world are facing a “depopulation” of sorts. This is becoming a serious problem.

There are three main reasons for deurbanization, or depopulation. First, with declining fertility rates, a country's population will drop. Without immigration, the urban population will also experience decline. In Japan, for instance, the current fertility rate is 1.44. To have a stable

population size, the birthrate should be around 2.1. But if current fertility rates continue, the population of Japan is projected to drop from its present 126.5 million to 88 million in 2065.

The second reason for deurbanization is that jobs in industries like mining and manufacturing (and others) are disappearing in many cities. For example, the population of St. Louis, Cleveland, Pittsburgh and Cincinnati all declined between 1950–2010. The decline in these cities ranged from 41 percent (Cincinnati) to 63 percent (St. Louis).

Finally, factors like technological advances and depletion of natural resources have impacted populations in countries around the world. For example, in the northeast corridor of China sits a city that borders Russia called Yichun. In the 1950s, Yichun became an urban city with the boom of the region's logging industry. However, over time the bustling town and booming industry began dying out as the logging became unsustainable. The city lost more

than 12 percent of its population between 2012 and 2016. This resource exhaustion is happening in many cities in China, causing the trend of depopulation.

Another example of resource depletion happened in Bangladesh. In the city of Khulna, the jute industry was very prosperous and a massive driver of growth. But when that industry began to decline, the population declined as well, to the tune of 150,000 people during the decade of 2001–2011.

When deurbanization happens, cities are also faced with overbuilt infrastructure that they no longer need. Nor can they afford to maintain what was built for a much larger population. Housing, schools and more are left desolate.

Meeting the Needs of Migrants

There are many challenges in meeting the needs of migrants in both transit areas (i.e., areas migrants travel through to get to a destination area) and the areas they're trying to reach (i.e., destination areas).

DI INSIGHT

In many areas of the world today, there is an outcry for protectionism. Voices are raised in protest against changes brought about by globalization. People who feel they are losing their jobs to immigrants, or who are under-employed or unemployed, or who don't make very much money all are anxious about trade and immigration and the uncertainty of policy.

The outcry is causing government leaders to back restrictive measures on immigration—barriers of one kind or another. This is also causing a rise in populism, as many countries have recently voted in populist leaders. But populism can build distrust, pitting people against each other. A real issue or an imagined one—it doesn't matter.

There are immediate needs like shelter and food, but long-term needs like jobs, education, healthcare and more are bigger challenges that require careful thought and planning before they become a problem.

In the World Economic Forum Report on “Migration and Its Impact on Cities,” 22 countries responded on meeting the needs of migrants. There are many key challenges and opportunities for cities, necessitating a change in attitude and creative thinking to move migration from something that must be dealt with to an opportunity to be embraced.

According to the World Economic Forum, migration is mostly positive and good for the economy and society at large. But when cities don’t have a plan for migration management and when cities don’t offer or provide services and facilities for migrants, those potential benefits are reduced—sometimes causing migration to become a negative. And it increases the costs and risks associated with migration. Angel Gurría, the Secretary-General of the OECD (Organisation for Economic Cooperation and Development), said that “In almost all OECD countries, migrants contribute more than they take in social benefits.”

Migrants tend to stay in the city where they first arrive in their destination country, where they contribute to the economy and society in significant ways. They increase the size of the labor force by working in fast growing and declining sectors of the economy. They pay taxes

and contribute to society. They contribute to the human capital of their destination countries through their education and their skill levels. With their diversity of culture, they enrich the society of their new home nation. They have a better chance at becoming integrated when they find communities where their own language is spoken and where support groups exist. Because they understand the needs of migrants, when they become integrated into a community, they can then contribute in planning and policy making. They are energetic and innovative, and help to mitigate the effects of an aging population. And when the private sector steps in and helps with integration efforts, migrants are more loyal to their employers, and they are motivated and productive as well.

For the nations they leave behind, there are also benefits. Many, many times they send money back home to their families, lowering the need for public aid by those families. If they do return home, they then bring education, skills, money and more to their family and their country of origin.

REFUGEES

Africa

It’s a scene that echoes American Civil War-period slave movies—African men being auctioned off as slaves. But this isn’t a movie and the men aren’t actors. It’s a real video obtained and verified by CNN, and it shows a recent auction in **Libya** where an African man, a migrant, is being sold for farm work for the equivalent of \$800. The video set off a global outcry.

Migrants have flooded to Libya because from Tripoli (located in northwest Libya; largest city in Libya and its capital city), it's only 300 km to the Italian island of Lampedusa. Because of this phenomenon, Libya has become a transit destination (i.e., a country migrants travel through to get somewhere else). It has become a hub not only for migrants trying to reach Europe through Lampedusa, but also for traffickers and smugglers too. The trafficking/smuggling ring reaches across Africa to Bangladesh. Incidentally, Lampedusa has a constant police presence these days because of the influx of migrants that Europe calls “illegals.”

51%

OF REFUGEES
ARE CHILDREN

84%

OF REFUGEES ARE HOSTED
BY DEVELOPING REGIONS

This situation has become a crisis. After the overthrow and death of dictator Muammar Gaddafi in 2011, the Libyan government collapsed. The new U.N. based-government in Tripoli is weak, and rival militia groups fight for control of territory and oil. Because of the fighting, difficult economic circumstances, and other factors, a large number of Libyans are IDPs (or Internally Displaced Persons).

Add to that a large and growing number of refugees who have been turned back from the passage to Europe as well as new migrants from other African nations arriving all the time.

Libya, without a central government, struggles to meet the demands placed on its resources and infrastructure—even for its own people. Refugees are put in jam-packed detention centers where, according to Refugees International, they are victims of violence and abuse like rape, murder and forced labor.

As the UN High Commissioner for Human Rights noted in a recent statement, “The increasing interventions of the EU and its member states have done nothing so far to reduce the level of abuses suffered by migrants [in Libya].” Instead, the situation is dire. Late in 2017, the EU, the African Union (AU) and the United Nations formed a task force to help return migrants and refugees from Libya to their original countries and to resettle in third countries those people who need international protection.

Eritreans are among those refugees who have tried to go to Europe through Libya. Fleeing one of the most repressive governments in the world, Eritrean migration can be considered “forced” migration. A country no longer ruled by law, the Eritrean government routinely commits human rights abuses and requires forced military service indefinitely.

The Eritrean migrants are easy targets for smugglers who make false claims about how good and safe their lives will be in Europe. Yet, in neighboring Ethiopia, Sudan, and Israel, Eritreans are not safe or welcome: hundreds of thousands of them are already there and are facing abuse, restrictions, and deportation.

President Trump wants to ban immigration from these countries:

Chad, Libya and Yemen:

indefinitely suspends all immigrant travel and travel by nonimmigrants on B visas.

Iran:

indefinitely suspends all immigrant and nonimmigrant travel except for students and exchange visitors on certain types of visas, which received enhanced screening and vetting.

North Korea and Syria:

indefinitely suspends all immigrant and non-immigrant travel.

Somalia:

indefinitely suspends all immigrant travel; additional scrutiny for all non-immigrant travel by Somalians.

Venezuela:

indefinitely suspends travel by certain government officials and their immediate family members on B visas.

The Supreme Court has agreed to take on the case of the latest challenges to the travel ban.

Source: *Inside Higher Ed*

In Egypt, which offers an alternative to Libya as a launching point to Europe, conditions for Eritreans and other migrants are harsh. In 2017, Egypt passed a law against human smuggling, which the IOM (International Organization on Migration) believes will be a strong deterrent for smugglers. The clampdown on trafficking dramatically dropped the number of people who are smuggled. Encouraged by the law's success, the E.U. has pledged cooperation on migration.

Meanwhile, the 8,000 or so Eritrean refugees who are now stuck in Egypt are desperate to leave.

Middle East

The largest number of refugees and internally displaced people in the world are coming from and going to the Middle East.

For seven years now, **Syria's** migration crisis has resulted in five million registered Syrian refugees. One million of them are in Lebanon, where tens of thousands have little or no shelter, food or assistance.

The IRC (International Rescue Committee) and the UN Refugee Agency provide aid to refugees and IDPs in Syria—with 2.6 million refugees living in the vicinity of the civil war fighting.

The plight of migrants in **Iraq** is also dire. Millions of people have been driven from their homes; many of those subjected to horrendous acts of violence. Many more have been murdered. Human rights abuses

have committed on an unprecedented scale in the war-torn, terror-torn country. This includes 3 million displaced people within Iraq's borders and almost 300,000 Iraqis living as refugees in other countries—all because of the terrorism of ISIS.

Although on December 2017, Iraq's Prime Minister declared victory over ISIS in Iraq, the country's military continues to hunt down and element ISIS elements still remaining in the country.

Experts estimate than more than 11 million Iraqis need humanitarian aid.

Myanmar (Burma) and Bangladesh

A major source of internal displacement in **Bangladesh** is natural disasters, like monsoon flooding and tropical cyclones. There have been 185 natural catastrophes in Bangladesh over the last 20 years, causing more than US\$2 billion in damages.

Bangladesh is a country that is very vulnerable to climate change because of its location (low-lying coastal region). Because of the high density of its population and

climate change factors, it is likely that the people of Bangladesh will face more displacement events. The government is poor, the people are poor, and there is no financial support for those who have lost their homes, land and property due to weather-related events.

In addition to its own IDPs, late last year **Bangladesh** was flooded with refugees from neighboring **Myanmar**, also known as Burma. Over 600,000 Rohingya refugees from Myanmar sought shelter from what is being called an ethnic cleansing. Since the late 1970s, the predominantly Buddhist Myanmar has practiced discriminatory policies against the Muslim Rohingya. The decades of violence had already driven hundreds of thousands of Rohingya to Bangladesh, but there are now more than 1 million Rohingya refugees in Bangladesh.

At first, the refugees were welcomed, but now the people of Bangladesh are beginning to worry how their poor nation can care for these people. Not only that, there is no plan in place to provide for the needs

DI INSIGHT

In many once-thriving, now-declining cities around the world, long-abandoned buildings are being used to house migrants and refugees. Montreal's Olympic stadium, Berlin's Templehof Airport, Athens City Plaza Hotel, an industrial complex in East Germany, and more—all are vacant and abandoned, and are

now home to thousands of people on the move. By introducing new, creative ideas and reimagining how these spaces could be utilized to benefit migrants—which also benefits their new communities—can go a long way to revitalizing cities, alleviating poverty, and providing opportunities to newcomers.

of the refugees, as well as the people of Bangladesh who have lost their homes due to flooding.

The Rohingya have been denied citizenship in Myanmar, and now the government in Bangladesh will not give them refugee status. They don't have legal status in either country. That sets up a vicious cycle of international aid organizations not being allowed to provide support. Meanwhile, the 1 million Rohingya refugees are living in a 3,000-acre camp. Health conditions there are dire.

More than **60% of global migration** consists of people moving to **neighboring countries** or to **countries in the same part of the world**.

South America, Central America and Mexico

Criminal violence in the Northern Triangle of **Central America** (NTCA)—comprised of El Salvador, Guatemala and Honduras—is a major force in international displacement. Homicide levels are high as these areas are home to some of the worst armed conflicts in the world. In addition, kidnapping, rape, murder, extortion and gang-forced recruitment are rampant.

More than 500,000 people try to cross into **Mexico** every year from the NTCA—fleeing violence. But the journey is dangerous, with a 68 percent chance that those desperate to leave their country will be victims along the way.

Honduras took an important step forward in becoming a case study for the Comprehensive Refugee Response Framework (CRRF), which links humanitarian action with development assistance in mass migration. The framework's findings will be used in the development of the UN's Global Compact on Refugees.

A full-scale political and economic upheaval in **Venezuela** has given rise to millions of refugees, rivaling and possibly surpassing the humanitarian crisis of civil war-torn Syria. The number of refugees has been estimated between 1.5 to 4 million people.

Once the home of the world's largest oil reserves, Venezuela was an economic leader in the Western hemisphere. But that began to change when Hugo Chávez took power in 1999. Chávez instituted socialist economic reforms, creating an unsustainable system of state spending. In 2013, he was succeeded by Nicolas Maduro, and global oil prices plunged in 2014. As a result, Venezuela suffered a crash that rivaled the U.S. Great Depression, losing about 35 percent of the country's wealth. Since then, conditions have continued to worsen because of price controls set by the government. Hence, the people are leaving the country by the millions.

DI INSIGHT

The A/E/C industry has an opportunity to make an impact as well. By incorporating sustainability and regenerative design into all that we build, we can be a part of helping to mitigate migration that is due to climate change. Due to the stressed infrastructure and the massive need for building (housing,

schools, medical facilities and more) around the world, job opportunities are a way to help migrants integrate into their destination countries and communities. And adaptive reuse is another way to innovatively use existing buildings that is economical and ecological.

Neighboring countries Colombia and Brazil are feeling the strain of the refugees, and tensions are running high. Colombia estimates that at least 1 million Venezuelan refugees have settled there since 2015.

The international community is calling for Maduro to step down. Even so, it'll be decades before Venezuela is back to a baseline. In the meantime, millions of its people are displaced.

What Can We Do?

Mass people movement has been going on for centuries, and while the vast majority of migration is positive, there are also downsides. But migration doesn't have to mean suffering. While there are millions of refugees around the world—and they migrate for many reasons like violence and the effects

of climate change—there are many millions more who migrate for economic reasons or family reasons. And as we stated before, the majority of migrants are living and working in their destination countries legally.

Government leaders around the world can help by working to address the drivers of conflict in their countries and create stability and opportunities for all. Robust development planning and concerted action by governments will provide vision and support for migrants, no matter why they are migrating. Partnering with humanitarian organizations as well as planning for migration management can help migrants integrate into their new communities. The two new UN global compacts may be a good place for governments to start, too.

GLOBAL CLIMATE CONDITIONS AND NATURAL RESOURCES

DesignIntelligence perspectives on sustainable design have significantly contributed to the positive shifts we've seen across the North American built environment. Yet all our prior efforts are nowhere near enough. The damage done to the environment, natural resources, and communities we live in has far exceeded our collective progress in the past twenty years.

The choices before us, common to many organizations, are clear:

- Just give up and accept the defeat, acknowledging that it's just too difficult a challenge to overcome or,
- Acknowledge the challenge yet don't waste time and resources beyond the norm; after all, it's not wholly our problem and we can only do what we can do or,
- Stay in it, fight the good fight, lean into the challenge, and dare to make a difference far beyond our borders, our space, our stretch. Take the risk of being labeled, being deemed foolish, being different. Operate from a base of conviction, expand our relationships, and apply our best intelligence.

We believe the heart of the matter resides in human thinking, speaking, and behavior. As a society, we've become so used to—and complacent about—our environment that we respond to environmental happenings with a shrug and a turn, rationalizing that it will all work out somehow. Our shortsightedness comes with incalculable costs to the planet, its inhabitants, and the generations that follow.

There's no doubt that the Earth's climate has changed over history and that our climate is warming. NASA says that over countless millennia there have been glacial advances/retreats more than seven times. And it's interesting to note, also according to NASA, that some of these changes in Earth's climate—which have happened over hundreds of thousands of years of history—can be

10%

OF THE U.S. IS IN SEVERE
TO EXTREME DROUGHT

3%

OF THE U.S. IS SEVERELY
TO EXTREMELY WET

27%

OF THE U.S. IS IN MODERATE
TO SEVERE DROUGHT

attributed to small changes in the planet's orbit. These small changes in Earth's orbit are what affects the amount of energy the planet receives from the sun.

Planet in Peril—Climate Change and Natural Resources

In 2013, the International Panel on Climate Change (IPCC) concluded that it's "extremely likely that human influence has been the dominant cause of the observed warming over the 20th century." The emission of greenhouse gases such as carbon dioxide and methane are the main causes of humanity's impact on climate change. The climate models project that the temperature will increase anywhere from 0.5°F to 8.6 °F, depending on the levels of emissions (low to high). According to the models, then, not only will the temperatures increase, but the glaciers and sea ice will melt and retreat, and oceans will rise. There will be more extreme weather events like hurricanes and droughts and cyclones as well.

Earth's natural resources are feeling the pinch, as well. At its fundamental level, every product we make depends on and is composed of natural resources. We depend on air, water, minerals, forests, lakes and oceans, the animal kingdom, soil and sun-

light, and so much more to physically support us as human beings. Along with climate change, overconsumption and growth may impact the availability of our planet's natural resources. Not only do our natural resources provide for our sustainability as humans, but also provide for economic growth.

Some resources—like geothermal energy, air, solar radiation—are found everywhere, all over the globe. But most resources are only located in certain areas or regions, so there can be periods of increasing scarcity and even shortages. Resource-related disruptions, therefore, will have political, environmental, and social implications, as well as economic ones. The consequences of disruptions will likely vary in scope and scale (i.e., for poorer people and nations).

Since supply chains tend to be global in today's world, we can no longer think that resource depletion or lack of availability is a regional or even local concern. Gone, too, is the hope that a lack of resource availability may be temporary. Instead, understanding that the global economy is also tied to natural resources; in other words, reliable supply and access to natural resources is

DI INSIGHT

A/E/C has a role to play in combatting climate change and resource depletion. Regenerative design can be a foundational part of the solution. Regenerate means to "revive, remake or reconstitute, especially in a better form or

condition." By deploying innovation and technology to our professions, we can lead the way in building answers to the world's environmental and climate change problems.

critical to the supply chains that operate the global economic engine. Any disruption in supply or availability of a resource can cause damage to output. As we know, scarcity in supply of a “good” can cause panic (case in point: the oil/gas shortage of the 1970s; there are other examples too). Low-income families around the world bear the majority of the brunt of such disruptions. Economic decline, social unrest, political instability and mass people movements result.

The world’s population is projected to grow by about 2.5 billion people over the next 30 years. This will increase the size of the emerging middle class by at least 3 billion people, putting more pressure on the economic cycle and its growth as well as increased strain on natural resources (which are already facing unprecedented demand). Continued environmental degradation increases the risk of ecosystem collapse.

Social inequity and social injustice are a factor in natural resource depletion. Because many natural resources are located in developing countries, the overconsumption of their resources can lead to the loss of their livelihoods and their ecosystems.

The Earth’s biodiversity is declining as well. According to a report in *Science*, as much as 65 percent of the world’s land surface has experienced decline in its local ecosystems. In the latest edition of the “Living Planet Report” (by WWF), the vertebrate species population (including mammals, fish, birds and others) has declined by roughly 58 percent between 1970 and 2012.

Greenhouse Gas Emissions Reduction

Some technologies and practices to reduce GHG (besides renewables and efficiency):

- Carbon capture and storage
- Purchase and use of carbon offsets
- Carpools, cycling, mass transit
- Teleworking for employees
- Methane emissions reduction and/or reuse

Source: U.S. Bureau of Labor Statistics

There seems to be a ripple effect when resources are depleted and biodiversity is threatened. For example, deforestation is a problem. Our forests, which cover about 30 percent of the Earth’s surface, are being cleared at an alarming scale. Rainforests, like the Amazon, could completely disappear in a century. These are essential habitats for millions of species. Agriculture and logging are the biggest drivers of deforestation today.

Deforestation has a negative impact on the biodiversity of the planet. When their homes are destroyed, many species of plants or animals cannot survive it. Deforestation also is a factor in climate change. Forests “inhale” carbon dioxide emissions;

when the trees are cut down, more CO₂ is released into the atmosphere. And fewer forests mean less carbon dioxide is “in-haled.” Trees also return water vapor back into the atmosphere as a part of the Earth’s water cycle.

The circular economy designs products that can be used and remade again:

Looking beyond the current take-make-dispose extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles:

1. Design out waste and pollution
2. Keep products and materials in use
3. Regenerate natural systems

Source: Ellen MacArthur Foundation

Are we overextending our planetary “credit” and living beyond our means?

Climate Change

As the growing effects of climate change continue to impact the globe, fragility and vulnerabilities in our ecosystems are being exposed.

Since the late 19th century, Earth’s average surface temperature has risen about 2 degrees Fahrenheit. This warming is largely attributed to human emissions and increased carbon dioxide released into the atmosphere. All of the top 10 warmest years on record worldwide have occurred since 1998. The oceans have warmed about 0.3 degree Fahrenheit since 1969 because much of Earth’s increased warming has been absorbed by the top 2,000 feet of its waters. Over the last 100 years, global sea level has risen about 8 inches.

Because of ocean warming and atmospheric warming, the Greenland and Antarctic ice sheets have decreased in mass. Data from NASA’s Gravity Recovery and Climate Experiment show Greenland lost as much as 60 cubic miles of ice *each year* between 2002 and 2006. Antarctica lost about 36 cubic miles of ice between 2002 and 2005. Around the world, glaciers are retreating in the Rockies, the Andes, and more.

And as we’ve all noticed, there have been more extreme weather events over the past few years. Hurricane Katrina and Hurricane Harvey are “tied” as the costliest tropical cyclones ever recorded. Katrina was also one of the five deadliest natural

disasters in U.S. history, causing more than 1,200 deaths and \$125 billion of damage. Harvey dumped more than 40 inches of rain in some areas of Texas. At least \$125 billion of damage was inflicted by Harvey, with more than 105 confirmed deaths. Hurricane Irma crushed everything in its path. Bangladesh, India and Nepal experienced the worst flooding in a century after a monsoon in August 2017. Forty-one million people in Asia were affected by these floods as their homes and their farms were devastated. The death toll was at least 1200 people.

According to the National Oceanic and Atmospheric Administration (NOAA), the main conditions that define an active Atlantic hurricane season are warmer North Atlantic sea surface temperatures (SSTs), increased thunderstorm activity, and reduced vertical wind shear, and more. More intense hurricanes are associated with these conditions.

But has Atlantic hurricane activity increased over the years? Again, according to NOAA, the historical record shows an increase in Atlantic hurricanes since the early 1900s. But when considering the pre-satellite era and adjusting for an estimate of storms “that stayed at sea and were likely ‘missed’ [before satellites], there is no significant increase in Atlantic hurricanes since the late 1800s.” NOAA could not assess with confidence the trends in major hurricanes that happened before satellites over the past century, but “the number of hurricanes that make U.S. landfall has not significantly increased or decreased.” However, since the

early 1970s, the numbers of Atlantic hurricanes have increased, especially since 1995 when the oceans began to warm. At that time, conditions became more favorable to increased hurricane activity, much like the previous period of increased hurricane activity in the 1950s and 60s.

The Geophysical Fluid Dynamics Laboratory (of NOAA) has studied global warming and hurricanes. Based on research findings, GFDL concludes (as of January 24, 2018):

“It is premature to conclude that human activities—and particularly greenhouse gas emissions that cause global warming—have already had a *detectable* impact on Atlantic hurricane or global tropical cyclone activity. That said, human activities may have already caused changes that are not yet detectable due to the small magnitude of the changes or observational limitations, or are not yet confidently modeled (e.g., aerosol effects on regional climate).”

Source: GFDL.NOAA.gov

The report also indicates that tropical cyclones by the end of the 21st century will likely be more powerful and intense than average because of warming.

The number of wildfires in the United States since the year 2010 have fluctuated somewhat (see chart “Wildfires in the U.S. since 2010”) despite drought conditions in portions of the United States. According to National Centers for Environmental Information (NCEI, a division of NOAA), as of January 31, 2018, about 10 percent of the contiguous U.S. was in “severe to extreme drought” and 27 percent fell in the category of “moderate to extreme drought.” About 3 percent of the U.S. was labeled as “severely to extremely wet” as of January 31. The weekly U.S. Drought Monitor classified about 38 percent of the contiguous U.S. as experiencing “moderate to exceptional drought” at the end of January (this number fell to 26 percent for the week of March 14–20, 2018).

Incidentally, the NCEI says that the 1980s and 90s had unusual wetness and short period of extensive drought. The 1930s and 50s had long periods of extensive droughts with little rainfall. And 2000–2010 experienced both extensive drought and wetness.

Temperatures in February 2018 globally—for both land and sea—was 1.17 degrees above the average for the 20th century (53.9 degrees). February 2018 was also the 11th highest temperature for the month of February in the 1880–2018 record.

Another aspect to the effects and impact of climate change is the human factor. A new report by the World Bank talks about climate change and its impact on mass migration (which we discussed in Section 5). The report shows that more than 140 million people will be internal migrants (i.e., moving within the borders of their home countries) by the year 2050 ... due to the worsening effects of climate change. Droughts and flooding, rising sea levels and storm surges, inadequate crops and deforestation are just some of the reasons that people are forced to move from vulnerable places to viable places because of climate change.

For example, Glen Murray—executive director of the Pembina Institute—says that the crisis in Syria can be traced all the way

DI INSIGHT

The interactions the built environment has on the natural environment are not simple; in fact, they are quite complex. So sustainability is inherently a complex concept that casts a wide net that includes energy production and consumption and the production and consumption of natural resources. Building regeneratively and sustainably address-

es climate change and efficient practices for utilizing resources. And when we use practices like life-cycle assessment and conservation, we show respect and consideration for the environment and its natural processes, as well as practical considerations like cost of capital and the value of a long-term asset.

back to climate change as well as socio-economic factors. A prolonged drought in Syria (from 2006–10) caused massive crop failures for the farmers, driving them into the cities. This led to political instability—exacerbating other tensions like unemployment and social inequality—all of which interacted with the Arab Spring revolution creating a massive refugee crisis and a bloody civil war. (See Glen’s interview later in this section.)

Is it possible that we are approaching a point of no return that even our money cannot fix?

Paris Climate Agreement

The Paris Climate Agreement is a universal global climate accord that 195 countries signed on to in December 2015. The nations agreed to keep the increase in global average temperature below 2 degrees Centigrade, with a 1.5 degrees Centigrade limit on the continued increase. The countries also submitted national climate action plans for their countries.

In June 2017, President Trump said that the United States would withdraw from the Paris Accord because the agreement disadvantages American taxpayers and workers. America would lose at least 2.7 million jobs by 2025 to meet the extreme burdens and drastic energy restrictions the Agreement requires from the United States. Taxpayers would have to absorb the cost in terms of lost jobs and the diminished economic production as a result of the Agreement’s conditions. And, according to Trump, the

Paris Climate Agreement doesn’t actually live up to what it’s trying to accomplish for the climate, and there are no real, meaningful responsibilities placed on other signatories whose countries are among the leading polluters on the planet.

“Substantial efficiency gains are already in play. The U.S. economy, for example, has not increased its electricity use over the last 10 years, despite substantial pollution and economic growth.”

Luis Bettencourt, World Economic Forum

Interestingly, in 2017, global carbon dioxide emissions rose 2 percent around the globe, reports James Taylor writing in *Forbes*. Citing “Carbon Brief,” the article reports that during 2017, U.S. emissions declined 0.4 percent; India’s emissions rose 2 percent; but China’s increase in carbon dioxide emissions—at 3.5 percent—was a sizable increase for that country over 2016. In fact, China’s emissions have increased more than any nation’s in the world over the past ten years. U.S. emissions make up only a small portion of the world’s emissions, at only 15 percent in 2015, according to Carbon Brief. Because of plans to reduce carbon emissions and the discovery and extraction of plentiful, cheap natural gas that is replacing coal as a main power source, the U.S. has reduced carbon emissions ... while experiencing economic growth at the same time.

Growth in carbon emissions for 2018 is currently project to rise 2 percent globally.

What Can We Do?

Can we save the Earth from climate change and resource depletion? Is it possible to slow down and even correct the damage we've done to our environment?

The extreme weather events and other environmental destruction we've seen and experienced lately are just scratching the surface. Writing in a World Economic Forum article titled, "We Can Still Save This Planet from Climate Change," John Rockstrom says that Earth's resilience is our common heritage. It is the ultimate global commons, but it is facing challenges. There is a tipping point that we must avoid. Rockstrom says that immediate action is needed in energy, food production, consumption, urbanization, and consumption. The good news, he says, is that there is a global shift toward stewardship of the planet and responsible management of the commons.

According to the Stockholm Resilience Centre, we must reconnect to the biosphere. The biosphere supports life on Earth with ecosystems that provide us with water, air, food, minerals, and many, many other goods. We can no longer see ourselves as separate and apart from nature.

Over the last 200 years, economic development, technology and innovation, international cooperation and more have caused growth, lifted people out of poverty and

increased the standard of living—for many people—around the world. But now, with our global interconnectedness, our natural ecosystems are suffering from unsustainable methods. Increased demand and our fast pace of living have altered our planet's biosphere. By truly understanding that nature is fundamental to our existence vs. something we can ignore or like or not, can we as humanity become more integrated, more connected, to the biosphere.

“Too many consider environmental issues to be an obstacle for development. But the conflict between financial growth and ecological sustainability is nothing but a mental construction.”

Carl Folke, science director, Stockholm Resilience Centre

Our ecological systems are under stress, though, with more than half of our planet's systems classified as declining or degraded. One example is food and its production. It is estimated that more than 1/3 of the food that is produced is wasted because of unsustainable production systems and patterns of consumption. Since the projected global population is expected to be approximately 9.5 billion people by 2050, how will we feed them? And how will we care for them? By increasing environmental sustainability and resilient through flexible, adaptive management approaches. In addition, social networks and local and regional

governments are in tune with and better able to manage ecosystems and create collaboration among businesses, farmers, the local government and the citizens.

“Poverty alleviation and future human development cannot take place without a wider recognition of nature’s contribution to our well-being, health and security.”

Stockholm Resilience Centre

Extreme weather and climate change demand agile, resilient organizations. Because prices on resources are increasing (and will continue to increase), resilient companies will have already created products that require fewer resources all along the supply chain. By using less “stuff” to create their goods and services—i.e., dematerializing, they are reducing risk. For example, if a flood in Texas keeps manufacturers from being able to purchase the goods they need or ship orders or actually floods the plant or the field, etc., agile companies who had strategic foresight will be able to shift production to another plant. With strategic foresight, risk can be mitigated, even in this world of extreme weather events.

Technological breakthroughs are helping to lower carbon emissions and ease resource strains. For example, electric cars, ride sharing, driverless cars along with the use of lighter weight materials in cars is changing the auto industry. It is projected that these changes will both reduce the demand for oil and the demand for cars because cars using less steel are more fuel efficient. Less money will need to be spent on roads because there will be fewer cars on the roads. According to Scott Nyquist, et al., writing in the *McKinsey Quarterly*, this is a shift in the resource intensity of transportation. Vehicles consume almost 50 percent of the world’s oil and are responsible for more than 20 percent of the world’s carbon emissions.

Other commodities are in the same boat. Natural gas demand is growing. The article writers don’t see demand for electricity slowing down, but contained within the electricity mix now is solar technology and wind technology. In the near future, almost 80 percent of electricity generation growth will be from renewables—wind, solar. This will drive down the costs for electricity and make it cleaner.

In fact, there is much momentum toward renewables already. Many cities around the world are making the shift to renewables.

DI INSIGHT

The Circular Economy keeps our resources in use as long as possible. It extracts maximum value in a regenerative system. It is a “foresight” economy in that it is different from our traditional

industrial system of “make and throw away”—rather, through maintenance, repair, remanufacturing, reuse, refurbish and more, we extend the life-cycle of our resources.

For example: 80 cities in the UK, more than 50 cities in the U.S., plus 40 other cities around the globe have either shifted to 100 percent renewables or have made the commitment to switch to renewables in the near future. These include big cities like San Diego, Basel (Switzerland), Reykjavik (Iceland), Manchester and Birmingham (UK), and Atlanta, Georgia.

Data analytics, robotics, drones and Internet of Things (IoT) will have a huge effect on resource extraction and consumption—for example, reducing resource intensity

in buildings; improving efficiency and yield in oil wells; reducing electricity in homes via smart thermostats; and so much more. Innovation and technology will influence resource demand as well as climate change.

Technology today is the new “oil.” The commodity markets have a new model (vs. the usual way of just “dig and deliver”), and demand is changing for resources. How organizations and producers manage the resources they already have is more important than the quantity of resources they have. According to Harvard Business Review, resource producers are now able to deploy innovative technology to raise the efficiency of their operations. What was once inaccessible—like underwater pipelines, mines, wells—is now being reached by technology, making extraction ever more efficient. Innovation is reducing waste, increasing the productivity of and recycling of resources, and affecting the prospective output of natural resources.

Statistics from the U.S. Department of Energy show that buildings are the number one energy consumer in the U.S. Another way to help combat climate change and resource depletion is net-zero energy. Currently, the technology is available for buildings to produce the energy they need, yet these types of projects have not become mainstream in new builds. According to David Hill writing for *Architect Magazine*, the New Buildings Institute (NBI) reports that at the end of 2016 there were 332 verified or anticipated net-zero buildings in

U.S. Energy Production (2016):

Coal
17.4%

Natural Gas
38.3%

Crude Oil
22.1%

Renewables
12.2%

Nuclear
10%

Source: U.S. Energy Information Administration

DI INSIGHT

Each spade of soil, each foot of foundation, each yard of pavement alters, changes, and in most cases, destroys the natural habitat. There are better, more effective ways to interact with what existed before us. We are the encroachers, the uninvited guests whose natural responsibility is to conform to the context we enter rather than alter and destroy it. As leaders in sustainable design, the larger question of a resilient ecology is begging a response, “What

will you think and say and do to save and restore and reconcile the built environment with the rest of creation?”

Will we be known as leading with conviction toward a reconciled relationship? Or will we be marked as hypocritical followers checking boxes to achieve minimal compliance, yet all the while leaving our context worse off than when we arrived?

the U.S. and Canada. In that same article, Amanda Sturgeon, CEO of the International Living Future Institute (ILFI), said, “The investment to go net-zero is now about half of what it was about three or four years ago. And it can pay back quickly, generally in less than five years, and in some places, even less.”

The added costs of going net zero, however, may be difficult to estimate and measure because of many variables, like climate zone, the type of building, and costs of constructing the building. But because of technological advances—in construction tech, renewable energy systems and more—going net zero is becoming more and more doable.

The amount of resources that are used and/or wasted in building have a big impact on the environment. Inherent in the problem are not only new construction, but the effects of demolition and even redevelopment of a building. There are practical constraints on recycling, as well. Throughout the construction cycle and the life-cycle of the building, resource waste is an issue. Yet, by investing in resilience by utilizing technology for better use of resources, using innovative products that reduce energy and the use of resources, and keeping regenerative design in the forefront as we work will make a positive impact on climate change, on resource depletion, on our world.

The Role of Private Enterprise in Creating a More Sustainable World

DesignIntelligence sat down with Glen Murray—the former minister of the environment and climate change in Toronto, Ontario, and the current executive director of the Pembina Institute in Alberta—to talk about how roles are changing between governments, private enterprise and nonprofit organizations in helping us to create a more sustainable world.

DesignIntelligence: How would you characterize where we are today in the realm of environmental stewardship?

Glen Murray: Chemist John Polanyi, a Canadian Nobel laureate, says, “We live in the age of acceleration.” He makes the point that the problem with climate change isn’t the fact that climate is changing—it’s always changing. It’s just changing at such an accelerated rate that it’s outstripping our ability to adapt.

We’re living in a world now where natural systems and human systems are almost unmanageable, and we’re beyond our ability to adapt intellectually or physically to the world’s pace of change. There is this friction that we can never actually arrive in time with a solution that fits these changing conditions ... because it’s all changing so fast.

The reality is we simply have only a couple of decades to fix the problem of climate change.

Markets and market systems employ capital, talent and technology at such an accelerated rate; they’re one of the few mechanisms we have for mass deployment of new technologies. A large part of the solution is to use those markets, especially the speed of markets, to deliver net-zero technologies. Markets can convince consumers that the value proposition of a new phone or a new car is sufficient for them to completely change out their technology, for example. So how do we use the power of markets to actually drive mass deployment of clean and net-zero technologies at the same pace they manage to shift our aesthetic and consumer choices?

I don’t think this is going to happen primarily from government regulation; instead, I believe it will come from innovative environmental leaders working with entrepreneurial business leaders, as well as markets contributing to a social good rather than just an economic good.

DI: It sounds like you believe there's a lot of untapped potential in markets to be a part of the solution, as opposed to one of the biggest parts of the problem.

GM: Yes, and that comes not from making the environmental argument—instead, it comes from raw profit and convincing companies that a zero-waste, zero-carbon approach is a better business proposition. It's better for shareholders. We have an opportunity here to embrace this low-carbon, zero-waste revolution on purely economic terms.

DI: What do we need to focus on in 2018?

GM: We need to look to the economics of the environmental questions, which is not often within the competence of the environmental movement.

Pembina Institute is an organization predominantly made up of engineers and economists. We look at the economics of choices. We look at ways to make choices that don't just minimize damage to the environment, but that make the environment better.

I think the economic case *is* the environmental case. This focus is the best future for higher paying jobs and higher investment as well as the restoration of our communities and their health. The two things that stand between us and a sustainable, livable, net-zero world are leadership and imagination. Since leadership and imagination come from humanity, they would be the two resources that we have in greatest abundance.

There is great irony in the world that the crises we're facing both economically and environmentally are due to a lack of two resources: leadership and imagination—both of which are free and plentiful.

DI: What is the right role of government, nonprofits and NGOs within that new model?

GM: How do we get at this idea of ending the subsidy of the old economy that is carbon-intensive, heavily polluting and creating less-rewarding, lower-paying jobs as time goes on? How do we manage out of the old economy into the new economy? One of the ways to do that is through carbon utilization. There is some excellent work being done where carbon dioxide and methane are switched from being pollutants to being utilized in the production of materials like carbon-cured cement. The carbon is not stored and it is not subsidized, but it is being used in a way that locks it in as an improved product that creates greater value.

For the environmental community, we can look at a much more comprehensive, driven agenda against perverse subsidies. We can look at ways to more rapidly deploy clean technology and zero-carbon technology. And we can more directly engage with business to bring solutions to the market that help to create a more sustainable world.

I don't think we wait for government. Instead, environmental leaders and progressive business leaders need to stand shoulder-to-shoulder and drive change.

GLOBAL TECHNOLOGY

One constant with technology is that it is always changing. Before some innovations can even be properly adopted, there's some sort of an update or a "2.0" or something altogether new. In this section on global technology, we have included a few recent and emerging advances in fields as wide-ranging as energy, space, biology, and agriculture. First, let's look at some of the latest new tools and innovation in A/E/C.

Living in the Past?

In the past, the architecture, engineering and construction industry has relied on "paper and pencil." Well, maybe not 100 percent literally, but somewhat figuratively. Historically slow to incorporate new technologies and applications into their business models as well as their day-to-day work, the industry is facing ever-increasing risks due to security, labor and materials costs, scope creep and delays and more, and frankly, obsolescence and even extinction.

Incorporating new innovation and technology, however, can help streamline workflows and keep projects on time and on budget. It can increase worker safety

and eco-efficiency. It can help the industry collaborate and everyone has access to all plans, schedules and documentation. Data collection about sites and about buildings—which is becoming more and more important because of the life cycle of a building, the increased interest in energy efficiency and more—becomes an easier and improved process. And the utilization of new technology, such as sensors, drones, 3D printing, robotics, prefabrication and more, can increase competitive advantage over those who don't adapt.

The building industry is so huge and so important globally. It impacts the lives of nearly everyone in some way: all of the jobs

the industry creates, all of the buildings the industry builds (homes, offices, churches, hospitals, places to play and more), plus all of the public infrastructure that we depend on. In fact, the World Economic Forum estimates that the construction industry alone accounts for 6 percent of global GDP and has annual worldwide revenues of close to \$10 trillion. It is also the largest consumer of resources globally, and generates about 40 percent of the world's solid waste—from production to construction to destruction and everything in between. And the built environment is responsible for 25–40 percent of the world's carbon emissions.

Because of the industry's size and impact on the world, adapting technology and new applications and innovations can save substantial amounts of money. The World Economic Forum says that even a small change or improvement in a \$10T industry could be a huge boon to the world's people. Improvements due to innovation and technology will reduce carbon emissions, making the built environment more environmentally responsible. There are many more examples of the ways that improvements will impact the costs—time, money, worker safety, environmental efficiency, etc.—of the sector.

Moreover, there does not seem to be a shortage or scarcity of new technology and innovation that can be used in this industry. Everything from BIM to VR, from AI to 3D printing, from wearable technology to prefabrication, from robotics to drones, can be used to transform companies and the sector ... causing the industry to thrive. The increased productivity that is a result of innovation can help the industry to grow, creating an even greater impact on meeting the world's needs for shelter and workspace and infrastructure.

Is the problem that companies don't know which technology to choose? Which innovation would be most helpful to the company? How to use new applications? What about the age of the workforce? Does that have an impact on how and if the industry embraces technology and different ways of working?

According to Geno Armstrong—International Sector Leader of Engineering & Construction, KPMG, U.S.—“Many lack a clear technology strategy, and either adopt it in a piecemeal fashion or not at all. ... Projects around the world are becoming bigger, bolder and more complex—and with complexity comes risk.”

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The rate of change in technology and innovation today is unprecedented. One thing is for sure: tomorrow won't look the same as today. But disruptions in the rate of change can occur anywhere along the chain: things like

government regulation, the morality of certain changes, cyber security and terrorism, the public's rate of acceptance to innovation, and more can impact trends.

It seems that engaging with technology can be modeled industry wide, to show all parts of the sector that adopting new technology really works. New technology has benefits, both real and potential, that can increase the productivity of the industry as well as the quality of life for people.

Within the industry, we hear a lot about regenerative design as the next phase of sustainable design. Regenerate means to “bring new and more vigorous life to.” Maybe we should apply this term to the industry as a whole instead of just to design. Technology and innovation is how we can bring about regeneration to the A/E/C sector. The building industry—and all of the professions and people it touches—is vital. It matters.

**“We shape our buildings,
thereafter they shape us.”**

Winston Churchill

New Technologies (and Updates) for A/E/C

Now, let’s talk about some of the new and/or updated technology that is available for the building industry to adopt and utilize. This list will not be exhaustive.

Tools like Autodesk BIM 360, Bluebeam and others are driving collaboration across the sector and across teams by helping them manage projects. Bluebeam is a PDF program that is revolutionizing documentation. BIM 360 improves construction quality control, safety for workers and

others, facilitates collaboration and design reviews, as well as documentation. Visual design and construction (VDC) is another tool that professionals are using to improve communication for designers and constructors with visuals.

Imagine a virtual “walk through” for stakeholders that allows them to “see” their project or their building at all phases—from the planning stages of design to stages of completion. This is VR (virtual reality), which more and more industry professionals are incorporating into their toolbox. This early intervention can help to alleviate mistakes before they happen; cost overruns before there’s a problem; on-the-jobsite execution issues before time is wasted.

3D laser scanning, drones, 3D printing, high definition photography, robotics—all are beginning to be utilized more often, but that use is not pervasive across the industry. But embracing these technologies can have substantial benefits. For example, 3D laser scanning can enhance the design process, speed up data collection while reducing errors, and saves money and time. Used for surveying, mobile mapping, scanning buildings and interiors, and even archaeology, 3D laser scanning digitally captures the shapes of landscapes, buildings and objects, creating a “point cloud” of data. The data can then be used to make a 3D representation or model of the physical object.

Drone use is transforming the way job sites operate. According to Richard Celender—vice president of the Pittsburgh-based

Civil & Environmental Consultants (CEC)—drones can be used in numerous types of projects, “from creating volumetric maps of material stockpiles for large mining companies to inspecting natural-gas processing plants and identifying the boundaries of protected wetlands.” With thermal cameras, drones can “see” more than just what’s visible. For example, drone sensors can detect gas vapor, radiation, light intensity and more.

Drones can survey large areas in a short amount of time. Whereas a survey in the past took days, with a drone it can take just a few hours. A drone can inspect areas that

are dangerous or inaccessible—like inside a mine, underwater, or support beams in a cell phone tower—keeping workers and the public safe (as well as saving lots of time and money). With a drone, project managers can keep up with the day-to-day progress of multiple projects across multiple jobsites ... in real time.

3D printing has enormous potential in the industry. It can be used to create construction components, or even to “print” entire buildings. While there are many projects in construction that have successfully utilized 3D printing, there are challenges such as quality control, regulation, as well as the technology itself (which can be slow if used for printing large projects).

For the near future, it seems that 3D printing won’t be replacing construction firms and the need for well-trained workers and managers. Instead, 3D printing’s utilization will more than likely be in producing building components—like walls, brackets and more. “Much of construction is going to be moved into the factory ... allowing you to make a better-quality product, in a short time frame, in a safer environment,” says Dominic Thasarathar of Autodesk.

Engineers and architects will need to learn how the technology and software of 3D printing works. But learning to work with automated technology will also be an increasingly important requirement for the skilled workers, like welders, masons, bricklayers, carpenters and others who physically build our houses and offices too. As MX3D’s

Where does your state rank in solar?

1. California
2. North Carolina
3. Arizona
4. Nevada
5. New Jersey
6. Massachusetts
7. Texas
8. Utah
9. Georgia
10. Florida

*As of 12.31.17. Ranking based on solar power capacity and solar installations during the year.

Source: Solar Energy Industries Association

Tim Geurtjens concludes: “Some jobs will be completed much more efficiently by robots than by people, but you always need skilled craftsmen on the spot. The one thing you can’t teach a robot is to be creative.”

There are many more technological advances that can be used to support the industry, making it more cost and time efficient, etc. But one important issue for companies in the professions will be which technology to choose, what technology will work best for their company/situation/clients, and how these new technologies can best be integrated into their operations, processes and workflows, and then how to make the innovations stick.

Other Important Innovations to Watch for the Industry

Adam Higgins of Autodesk weighs in with his 2018 watch list for the industry. His top technology to keep an eye on? Virtual reality.

1. Virtual Reality is becoming increasingly mainstream, especially for the A/E/C industry. VR allows stakeholders to “see” their project before all the plans are finalized.
2. Augmented Reality allows stakeholders to actually be in a real 3D environment.
3. Wearable Technology is helping worksites be ever safer. Wearable tech offers alerts to works about potential hazards and dangerous areas. Wearables also alert someone when a worker has tripped or fallen.

4. Machine Learning gathers visual data and information from worksites.
5. Prefabrication, which isn’t really new, now has new technology to facilitate integration of prefab pieces into a project or process.
6. Predictive Analytics helps a construction company to manage its risk.
7. Connected Job Sites are mitigating communication delays. Everyone has access to all drawings and documents. Issues are quickly identified and communicated, making the process more efficient and productive.

Source: Autodesk.com

New Technologies That Can Change the World

Technology is being invented, expanded and changed at an ever-faster pace. There are technological advances that make our lives easier; that make us more productive and efficient; that help us explore the depths of the ocean and the reaches of outer space; that can drive us where we need to go; that can entertain us; that can help us to be smarter or more creative; that can diagnose illnesses, and everything in between.

But does technology make us less human? Diminish us somehow? Or does it bring us closer together? Can it help us to solve the world’s problems?

John Mecklin, editor in chief of the *Bulletin of the Atomic Scientists*, had this to say about technology: “[We have] for more than 70 years aggressively pushed the idea that humans can control the technology they create and use it for the benefit of humanity, rather than its destruction.” The *Bulletin* reached out to find new and emerging technologies that could literally change the world:

- Because climate change is an increasing danger in our world today, it is becoming more and more important to reduce carbon emissions. There are new energy technologies that can help—for example, electric cars that are powered by batteries that have the potential of availability to and usage by a larger percentage of people.

Another example is Elon Musk and Tesla’s 129MW hour battery—the largest battery in the world—that has been developed, built and recently unveiled in South Australia. The region has had a string of power outages and black-outs over the past year or two, and the battery can reportedly power up to 30,000 homes—providing a way toward energy security.

- In December 2017, Iraq’s prime minister announced the defeat of ISIS. Even so, there are still ISIS fighters and cells—as well as other terrorist organizations—around the globe. Even though the caliphate is over, the world cannot relax its vigilance over terrorism because

there are plenty of fighters still out there fighting. Perhaps one of the gravest dangers is the possibility of a terrorist organization obtaining a nuclear weapon or even nuclear materials in order to make a “dirty” bomb. Hundreds of thousands of people could die if these insurgents exploded this type of bomb. With new technology, however, there is now the potential to remotely detect nuclear materials—and the ability to identify where these materials are located and even who might want to steal them.

“The United States and China are in a world race to develop the latest breakthrough technology in AI.”

- Exciting advances in gene editing are causing a buzz in the scientific community. CRISPR-Cas9 is a simple yet powerful tool for “editing” genes. Researchers have been able to successfully modify and/or completely alter the DNA in plants, animals, even humans. Scientists can precisely insert new genetic material into a DNA sequence, or just completely cut the gene, breaking its code. CRISPR-Cas9 can be used in the food industry, especially in applications that use bacterial cultures. The tool has been used to “cut” and modify the DNA in laboratory mice, plants, fish, fruit flies and humans. In cancer research, exciting advances are being made using CRISPR-Cas9. It is being used to

“turn on and off” the function of mutated genes (which is the cause of cancer).

In medicine, the applications have been as varied as creating new antibiotics to fight infectious diseases, treating inherited diseases, and more. Of course, there are potential ethical issues that may be on the horizon with CRISPR-Cas9, but the future looks bright.

- Food insecurity affects millions of people around the world every day. In fact, the United Nations estimates that 815 million people go hungry (with more than 40 million Americans as a part of that total). The world population is expected to grow by more than 2 billion people by 2050 (to somewhere between 9 and 10 billion people). While enough food is produced in the world to feed everyone, hunger is actually on the rise. Economic slowdowns, violent conflicts, droughts and floods, and more, contribute to the causes. One new technology, however, looks promising. Cellular agriculture—which “applies methods of tissue engineering to food production to make meat and dairy products that are molecularly identical to those

made via conventional methods,”—can decrease the world’s dependence on animal products for protein. This would have a dramatic impact on the environment, as well as making food available for all.

Bernard Marr, writing in *Forbes*, believes that “some technology trends are so significant that they transform our world and how we live in it.” Indeed, these technology trends (below)—Marr’s list of nine—will have an impact on how we relate to each other personally and professionally, and how we relate to the world:

- Trend 1: Datafication—Almost everything we do today leaves a trail of data crumbs—when we go to the doctor, when we order something online, when we make a phone call or send an email, when we use a GPS, and more. This constant data gathering on the populace will only increase.
- Trend 2: Internet of Things (IoT)—Devices that we use every day, from smart phones to crockpots to building sensors, are becoming smarter and even more connected with each other. These devices are

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There are many other tech innovations that will impact and define 2018—so many that we couldn’t cover them here. But be on the lookout for AI and how it will be infused into product design; blockchain’s expanded role in medicine and government; increased accessibility of technology with

human-centered design; anonymous data to help us stay, well, anonymous; super tiny medical robots that travel through the bloodstream; enhanced electric cars and more ride-sharing. Policy and regulations surrounding such technological advances must be agile without stifling innovation.

always gathering data (see Trend 1) and sharing that information with connected devices. This data gathering and sharing happens without our intervention and even sometimes without our knowledge.

- Trend 3: Computing Power—The exponential growth of the power of computers is fueling technological innovations.
- Trend 4: Artificial Intelligence (AI)—Because of the rise of AI, computers are able to “think” and “learn.” This leap in AI capabilities has been made possible because of the increases in data gathering and computing power.
- Trend 5: Automation—As machines become smarter, the more decisions they can make, the more they can be involved in systems or processes, and they’ll be able to do more and more for humanity. And at some point, automation will make a bigger impact on human jobs and create a ripple affect across different industries.
- Trend 6: 3D Printing—As 3D printing evolves, it will also reframe how we work in industries such as manufacturing ... and A/E/C (as we discussed earlier).
- Trend 7: Technology Interactions—Because we can now complete so many tasks on the run with our smart phones, computers and tablets, how we interact with technology in our work lives and personal lives has been disrupted (both in positive and negative ways). Voice searches, IoT, AI and more has made a huge impact on how we conduct our lives. This will only increase.
- Trend 8: Blockchains—In simple terms, blockchain is a secure, decentralized database that stores, authenticates and protects data. Information is stored in blocks and is attached to each other in chains. Blockchains can be used in many industries and professions, and for many different types of transactions: e-commerce, real estate, legal transactions, medical records, cryptocurrency, supply chains, pharmacies and more.
- Trend 9: Platforms—Essentially a digital or physical network that facilitates connections and exchanges between people, a platform provides a safe and easy way for participants to make interactions for information, products or services.

Source: Forbes.com

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In the A/E/C professions, massive opportunities for growth and cost savings reside in the adoption of technology. Collaboration will be key in the industry within this digital age. And because data is everywhere, sharing it across

partnerships will bring about continuous improvement and growth. And as we discussed, there is an increasing need for security—to keep details of our projects out of the hands of bad actors and to keep our business networks secure.

Cyberwarfare and Technology

Cyberwarfare is a growing and far-reaching problem, with attacks becoming more devious in 2017. In May, a ransomware worm called “WannaCry” infected more than 300,000 computers globally. The worm exploited a vulnerability in older systems, withholding data access “stolen” from infected devices, demanding the data owners to pay a ransom. The virus affected banks, hospitals, businesses and more, all around the world. And barely a month later, another virus called “NotPetya” wiped data on infected devices.

Generally, these types of attacks exploit vulnerabilities, or backdoors, in software. The Defense Advanced Research Projects Agency (DARPA) has identified seven classes of hardware weaknesses that, if fixed, could close almost half of the software backdoors. These weaknesses include permissions and privileges, buffer errors, resource management, information leakage, numeric errors, crypto errors and code injection.

DARPA has granted the University of Michigan a \$3.6 million grant to create an unhackable computer. This represents a completely different approach to attacking this problem. In the past, the “solution” to vulnerabilities has been software patches, but the patches are created and applied generally after there has been a breach or attack. The unhackable computer project, called Morpheus, will instead offer the solution in the hardware. The premise is that the new hardware will randomly move

Cyber Security: Special Problems for A/E/C

When entrance to or exit from buildings is denied, ransomware takes on special meaning. A/E/C firms hold architectural, structural and construction models of buildings in various stages of design, construction and maintenance. What happens if those documents are held for ransom? What happens if they are compromised by changing the specifications for windows from one company to another? What happens if they are stolen and used for unauthorized access to a building years after construction is completed?

Access to buildings is fundamentally different from access to corporate or government information systems; typically, for example, no one needs a password or user account to enter a building. Fifteen years ago, when a person walked into a building, they walked into a building. Today, they are likely to be carrying all manner of devices that can compromise both building information systems (who lives where?) and building control systems (i.e., elevators, heating/cooling systems, door locks, etc.).

Blaine Wishart is a senior principal of the Strategic Technologies Practice of DI Strategic Advisors.

and even destroy information (if needed), constantly changing the location of the information. Not only will the hardware be unhackable, it will also protect against future threats and attacks.

So even if a hacker finds sensitive data once, the data will be moved somewhere else before the hacker can properly access and exploit it. By going on the offensive rather than taking a defensive posture, there is the potential to greatly reduce (or even eliminate) the number of breaches, intrusions, attacks and viruses, saving businesses and individuals money, time and heartache.

“Blockchain is a secure, decentralized database that stores, authenticates and protects data.”

On China and AI

China has a three-year plan to become the world leader in the development of artificial intelligence. So the United States and China are in a world race to develop the latest breakthrough technology in AI—with the potentially high stakes of the “winner” being the dominant economics/geopolitical leader

for many years to come. China has some advantages over the U.S.—AI requires access to scores of data and China has approximately 700 million Internet users; the Chinese government has no qualms about user privacy; and the Chinese government is pouring in vast sums of money for research and development. On the other hand, the U.S. still has the most talented developers, and the U.S. government isn’t running the show—private sector companies are.

Solar Power

Solar power is the fastest-growing segment of India’s clean energy market. In 2016, the country added 715 megawatts to its system, putting it at 1.3 gigawatts of solar energy, with an estimated 9.5 GW by 2022. Over the last five years, the cost of rooftop units has decreased 50 percent in India, making solar energy less expensive than industrial or commercial energy. The cost to get started is less than the global average by 39–50 percent, and commercial and industrial users are driving the growth in the energy market. Net metering, which is selling the surplus power back to the electricity utility, could be all that is needed to get homeowners involved. Since most homes do not require power during the day, a surplus can easily be built up and sold to the utility.

DesignIntelligence talked with Phil Bernstein, lecturer in professional practice at the Yale School of Architecture, about the intersection of technology and professional practice, and machine learning, artificial intelligence and big data, and how technology will impact the design practice in the future.

DesignIntelligence: Let's talk about the intersection of technology and professional practice.

Phil Bernstein: Most of the work I've been doing lately is considering how technology is a catalyst or an enabler in changing the architect's role in the system of delivery. I'm particularly interested in questions of value proposition, like how does technology change the architect's value proposition in the overall economic system of project delivery? There's a big disconnect between the value that we as architects actually bring to the building industry process and how we plug in and convert that value.

DI: How should leaders of professional service firms be thinking about technology?

PB: There are a few dimensions to this. The first is that as architects, we generate a tremendous amount of information that

is broadly useful across the delivery spectrum. But we tend to hoard it and not see it as a value opportunity or as a way to plug into the system.

Second, "Big Data" is going to be a very necessary piece of design practice in the future. Data comes from a number of sources, like internal archives of digital information about projects, information that can be gathered during the course of the construction or operation of projects, large scale externally accessible databases, drone scanning and more. As architects, we must learn to understand and manage these large swaths of information.

Third, architects must think about and get ahead of the curve on machine learning and artificial intelligence, because it's going to be an opportunity in the medium term. But in the longer term, it's going to be a threat, in my opinion. There are

many things that architects do that will be automated in the future. We need to have a stance on what that means and a stake in the process of developing and integrating it into the way we work.

DI: When you talk about a swath of what architects do today being eventually automated, can you give any examples?

PB: Let's look at two or three potential categories of where machine learning-based automation might consume a part of the architect's responsibilities. The first is in technical analytics, like code evaluation or cost estimating or energy analysis, which will rapidly transform from analysis formulas and algorithms that are managed by architects to machine learning algorithms that tell us the answers.

The second category is around information management—i.e., orchestrating and managing the flow of data and information among the design team and the construction team during a project that is largely the architect's responsibility as part of coordinating the work.

The third category is to look at the entire spectrum of traditional basic services and estimate what percentage of those fees are just straight up and down production work, like producing standard documents, schedules, details, etc.; production items that are relatively straightforward to automate. We're already seeing the early automation of that in BIM—does anyone create a door schedule by hand anymore?

The next wave is BIM meets machine learning, and so we're likely to need fewer people to do all of that production work. What does that mean?

In an interesting book called *Only Humans Need Apply*, Thomas Davenport and Julia Kirby argue that the professions will be besieged by artificial intelligence. They recommend that we get out in front of the problem and start designing the parts of the practice that we think are best supported by machine learning and help chart the relationship between the humans and the machines.

DI: Can technology help us create new value propositions?

PB: Yes. On many different dimensions. The two I think are most interesting and provocative is first, the value of design information and its utility in the overall delivery chain. The second is this question of analysis and prediction. Algorithms are going to make the world a more predictable place within a certain set of limited, highly rational constraints. If that's the case, how do architects leverage that predictability to increase their value proposition? In other words, instead of just buying my services as a low-price commodity, if I can make a commitment that X is going to happen, then I'd like to get paid when X happens.

DI: Do you believe there's a core of what architects contribute that can never be replaced by a machine?

PB: Yes, primarily in the ineffable aspects of good design. But I wonder whether the normative pressures of the delivery system may overwhelm the system. There's a synthetic, intuitive, innately human quality to solving complicated problems that I don't think machines will ever replace. But the opposite side of that coin is there's a certain number of highly normative buildings where nobody's looking to solve a particularly complicated problem. They're just trying to get between A and B as quickly as possible. Soon it won't be hard to design a strip mall with a machine learning algorithm.

DI: With all of these technology issues and opportunities that will shape professional practice in the future, can the architecture profession alone solve these problems? Or will it require participation of others in the design and delivery process?

PB: Yes, by definition, anything that is transformational or even interesting that happens in the building industry is a multi-disciplinary problem. But when there's a complex, ambiguous, multi-dimensional problem that requires a synthetic answer, architects are usually the ones who step in to that environment and help formulate the answer. That's what we're trained to do and where we could take a leadership role in moving things forward.

DI: Does cyber security become a part of the overall public health, safety and welfare mandate?

PB: I think so, but not so much from the perspective of data protection. What we're going to find over the next several decades is that buildings, cities, cars and our phones are enormous data collectors that create big sources of information from which insight can be derived. What do we do with this insight? What is its implication on designers and how we build and how we live in the buildings that we build?

As a profession, we need to get in front of all of this, because data and technology will be an important and necessary piece of design practice in the future.

“Data comes from a number of sources, like internal archives of digital information about projects, information that can be gathered during the course of the construction or operation of projects, large scale externally accessible databases, drone scanning and more. As architects, we must learn to understand and manage these large swaths of information.”

FUTURE OF PROFESSIONAL PRACTICE

For years, changes to the roles and patterns of influence in the design and delivery process have caused architects (and others) to examine their relevance within the wider picture of A/E/C practice. Some firms have responded by plowing ahead with their traditional structures and offerings, ignoring the signs and factors of change. Others have waited and watched, adopting new models once they are proven. A few have embraced the idea of change, charging headlong into new business models and ways to deliver value, on the belief that those who move first take the advantage.

The following pages include interviews with six leaders of major firms that are helping shape the future of professional practice. The firms, which operate from a national to a global scale, have each taken their own approach to developing strategy, creating pilot programs, and putting innovation into practice. Their stories are a window into the ways in which architecture and design firms are changing how they have a positive impact on the clients and communities they serve, and how leaders within the firms guide both teams and clients through the process.

Tom Vandever

Principal



With more than 40 years of industry experience, Tom has lived around the world, giving him both a U.S. and a global perspective in his work. DesignIntelligence asked him about the future of professional practice, how he helps clients to better understand the changes they need to make in their markets, methods of delivery and more.

DesignIntelligence: How are you at HDR looking at the evolution of professional practices in the future?

Tom Vandever: My perspective is influenced by the clients that we work with—mostly institutional and specifically healthcare. In the healthcare market, there has been, and will likely continue to be, a consolidation of smaller providers into larger systems. With economies of scale and strategic geographic presence in key markets, the larger systems can respond more effectively to pressures to reduce cost and efficiently deliver quality healthcare to a larger population of clients.

There will be winners and losers, and I believe this is also true in the market for professional services. Our clients are redefining themselves to meet the challenges

of a changing market. Some approaches are different but they're all getting larger. They're acquiring firms, they're dropping their costs through acquisition and economies of scale and using data to clarify future trends, allowing them to target which services will be in greatest demand.

Increasingly, the services we provide early on a project assist our clients with strategic visioning, innovation, scenario modeling, market analysis, and other such services. Our education and training as architects and designers allow our professionals to bring design thinking to the increasingly complex problems that our clients face. We're partnering with our clients to help them create a future vision on which they can build a strategy. As we help our clients to better understand the changes they may need to make to succeed in their markets,

they help us better understand how their needs are changing and evolving. Data is becoming a big part of this because it is increasingly available. The growth of available data is exponential. Being able to turn the data into actionable knowledge is the key.

I foresee our practice evolving toward highly integrated collaborative teams that include expertise from many different disciplines—far more than we have experienced in our traditional practice. Some of this expertise resides within our firm; others do not. The team is increasingly informed by data, turned to knowledge by the advances in technology and computational firepower. There's a wealth of data available, which will continue to expand.

The key is finding a way to turn the data into information that helps our clients chart their future course. Quite often that turns into a building. At present, the business model of architecture involves billing for hours spent on projects. Historically, a significant part of effort has been spent on construction documents. But we are seeing this change. In the recent past, probably 90 percent of the work we did utilized a design, bid, build delivery methodology. Now that's significantly reduced with different delivery models becoming more common. It will be interesting to see if the profession of architecture can change the business model to be compensated based on the value we bring to our clients instead of charging for the hours and expenses required to deliver projects.

Part of what is driving our clients to different models of delivery is their frustration over claims and litigation, and their interest in reducing the risk of cost overruns and schedule delays. Design-Build has increased as it offers our clients a single responsible source for all design and construction. But where contractors dominate and direct the design process, which is not their strength, we have seen compromises in outcomes that on highly complicated, program driven buildings such as hospitals and laboratories are unacceptable.

“Clients have different objectives. Some are more committed than others. Some say they want integrated project delivery but in practice, still keep to their old habits and attitudes.”

What is really interesting to me is integrated project delivery. We're doing four or five of these projects now and they are all different. Even though they are all called integrated project delivery, they're all set up differently. There are many legal issues that need to be worked through. Clients have different objectives. Some are more committed than others. Some say they want integrated project delivery but in practice, still keep to their old habits and attitudes.

In the most successful instances, integrated project delivery brings together all key project stakeholders and establishes a

common legal and business framework that promotes collaboration by incentivizing all participants for achieving key performance metrics. If integrated project delivery proves to be successful, I think we're going to see more of it. That will be interesting to watch.

DI: Earlier you mentioned design thinking and helping your clients envision their futures in a way that helps them build a strategy. How do you see service offerings and business models at your firm evolving in the future?

“As we help our clients to better understand the changes they may need to make to succeed in their markets, they help us better understand how their needs are changing and evolving. Data is becoming a big part of this.”

TV: We have always worked in teams. The traditional model is a project team, project manager, project designer. We have different disciplines, but those disciplines are mostly focused on the build environment. I sense an opportunity to redefine our profession to maintain and expand our relevance to society. The marginalization of the profession of architecture is a concern of mine. I think the use of problem solving collaborative teams will expand and the disciplines involved will grow to meet the demands of specialized expertise.

In our practice, we have hired a number of data scientists. The use of data analytics increasingly informs the designs and projects we perform. And our clients are demanding proof of claims made at the outset of a project to be validated with demonstrated with actual, measured results.

Increasingly, our clients are asking for proof that our value propositions are realistic and achievable (or have been achieved). When we claim we can save them money by creating an energy-efficient building, or achieve operational efficiencies such as reducing travel distances for staff, they say “prove it.” This a fair challenge that we need to meet.

Our teams will include more expertise and non-traditional disciplines. One person may never have enough knowledge to deliver a robust, comprehensive solution to the complicated problems we face today. I hope the role of the architect is one that brings a clear vision of the future, and a clear vision of the central idea that will help clients meet their needs and leave the build environment improved, regenerated. It's the individual who can work collaboratively across multiple disciplines, tapping into the depth of knowledge that each offers, supported by data analytics. My hope for the future is that the architect is the one that who truly brings this deep understanding and vision, can facilitate collaboration, and lead the team to achieving their goals.

DI: So really, the architect of the future will be as much an integrator as anything else.

TV: There's a lot to integrate, so yes. But it is essential that the architect be the genesis of the central idea; the one who uses creativity and design thinking to generate the ideas that really move the needle for clients—and to help everybody involved in the project to see that same vision.

DI: You've talked about data, and you mentioned that you all have an increasing number of data scientists in the firm. What other disciplines will populate the firm of the future?

TV: We continue to offer services that are more upstream from our traditional offerings. We have people who love to analyze organizations and how to maximize operations for different clients. It really helps them measure what is currently happening in their organizations or, if our clients already have that data, we can take it from them and help them analyze it.

We are working more in operational simulation. Rather than manually generating a limited number of schemes for review, we generate a million schemes with technology, testing those against key performance metrics, and backing up decisions made with data.

It used to be the architect wore many hats. In the past, the architect as master builder

was a material scientist, designer, technologist, artist, and even construction manager. Today our industry is fragmented by specialization, and there is both good and bad with that.

DI: Would you like to share any other thoughts on the future of architecture and professional practice?

TV: It is my belief—and as an Architect I'm biased in this—that the training one receives as an architect lends itself perfectly to solving complicated problems. It is my hope that the architect's skillset and training will be used to address some of our society's most challenging problems. If we do, we reclaim some of the ground that we have lost through the years as various pieces of our traditional practice were carved off by others.

I'm not suggesting that the architect is the mysterious black-caped individual who has all the answers but won't tell you what they are. It's really someone who is effective working with multiple disciplines and teaming with clients to tackle some of the most difficult problems that we face as a society and solving them in a creative way through design thinking—not only addressing the problem, but also adding beauty and content to our society and our communities.

Griff Davenport

CEO



Griff heads the firm's executive leadership team, collaborating with them to set business strategy and elevate DLR Group's design. DesignIntelligence caught up recently with Davenport to ask how he sees the future evolution of the architecture and design profession, professional practices, and the architecture and design market.

DesignIntelligence: Overall, what is the greatest challenge you see for the architecture and design professions?

Griff Davenport: Clearly, our profession is changing at a very rapid pace. When people have asked me, what keeps me awake at night, it's probably the pace of change in our industry.

In the role of certainly the chief executive, we have more obligation than ever to be looking as far out over the horizon as we can see. We've got a good group of leadership that really has to deal with the here and now, but more than ever before, there's got to be an individual or group of people looking at what's next and trying to stay out front the best we can.

DI: What about the future of leadership in professional practices? Will there be

new models of leadership and organizational structures as things change for professional practices?

GD: For quite some time we've practiced in a decentralized leadership structure. We've got 29 locations right now. I feel very strongly that decentralized leadership in a growing large firm is an essential operational consideration to master. For us, it's opened the door to people, regardless of where they sit, either domestically or even internationally.

Our Monday morning meetings or boardroom, as a large firm, is a Zoom conference call every two weeks. We're able to go find the very best talent in a senior leadership role and park them in a place, virtually as necessary, and make things work.

It takes a little while to grow into a firm where all the executives aren't parked down the hall upstairs on the top floor. I think that is very much changing in the industry as different expertise is applied to firms, whether it be developing a director of research or a chief marketing officer or brand communications people, that in our cases, are all decentralized.

DI: Do you feel like this model will continue to work for DLR Group as it evolves through the future?

GD: I absolutely think it will work. It speaks to the ability to bring senior leadership face-to-face with more people in the company, which helps maintain some level of cultural consistency. If we have a group of board members and senior leaders that are all believing and seeking the same things, who all know our strategic direction and vision, and it's decentralized, I can't find any negatives in that. In fact, I think it only helps.

There are influences that we and our clients are certainly dealing with, such as real estate compression. I don't think our industry's going to be exempt from it. We've got to believe in more virtual locations of our staff, virtual access with our clients, working in and with our clients. I think spreading the firm out, not just from a leadership standpoint, is going to be something we're all going to see more of. As a firm today, we probably are doing as well as anybody in being able to execute with virtual teams to serve our clients and to preserve culture.

DI: It seems like quite a delicate balance.

GD: Very definitely. I don't think we'll ever evolve to office-less firms. I think there still is a need to be together in firms doing integrated design. It requires face-to-face collaboration, some hands-on conversation. I don't think that will go away in the near future.

DI: How do you think that client needs will evolve in the future?

GD: Technology is allowing us to leverage access to our clients more than ever before. That's a two-way street. It's a convenience to us, but I think many clients expect us to be available whenever they need us. I think our whole society is—right or wrong—kind of a get-it-now society: look it up, find it, buy it. We've been talking about 24/7 access now for years. I don't see that going away. The lines are certainly blurred of what we consider to be the workday or work time. Work gets done when it gets done where it gets done, not necessarily in our offices from 7:30 a.m. to 6 p.m.

Client decision-makers are accessing us all the time. They expect access to experts when they need them, whether it be someone monitoring a mechanical system, which we are doing in some cases, and providing remote service to some of our clients. I think that's just one way that we are enabling ourselves to serve the immediate needs of our clients more effectively.

We are also seeing the whole idea of existing infrastructure being put to better use—particularly in our cities and urban environments—being taken more seriously. We’re seeing a lot of that around public education. Education can happen just about anywhere so long as the spaces are designed correctly.

“There’s a huge opportunity in building optimization. It will continue to be a growing service. Leveraging technologies available to us today will only help us maintain connectivity with a client.”

There will continue to be some emphasis on creating some differentiation in our urban and suburban areas. There continues to be a risk that our urban centers begin to take on a very similar feel, and so how do we differentiate that suburban shopping center from another suburban shopping center? How do we differentiate our neighborhoods? That will be a challenge our clients will learn to expect: that coming to work ought to be a special experience, where we work and play ought to be a special experience, and hopefully not deteriorate to a monolithic form or expression in some cases.

DI: If the market evolves in the way that we’ve talked about, what will be the future of service offerings and business models? In other words, what will the firms of the future do, and how will they be structured to do it?

GD: As automation moves into our industry, I think the real value that we provide as architects will be design thinking. We’re often hired that way, but then the bulk of our fees today are generated by construction document preparation and more traditional methodologies that over time become more and more automated and integrated with the construction industry.

I really believe that the design industry will do more and more in highly specialized services, whether it be acoustics, environmental services, energy management services; those kinds of things.

I see parametric design becoming even more of a play in the industry, letting data drive design iteration—more so than it does today.

DI: What does the future staffing profile look like?

GD: The staff mix will change. The production architect today is probably more of a design thinker and someone who is an integrator with other services perhaps, other industries, other partners. Maybe the use of the word “integrator” is relevant here, because I do think that’s part of a design thinking methodology.

In the near term, and I’m saying out the next 20 years, I think it will be a very slow transition, but parametric design is already changing the way we iterate today. As proficiencies with parametric design become more prevalent in the

industry, that will change, I think, what architects and engineers do really right out of school.

As we all begin to collect the data that we input into our BIM software, it will be interesting to see how we use the data that we're inputting today a year from now, or two years from now, to our benefit and to the greater benefit of our clients.

DI: There seems to be continuous learning in the professions on how we use the data that we collect or generate in the design process.

GD: Learning how to use the data that we collect or that we input is a huge part of our industry. How do we connect our BIM models to the construction industry? How do we connect our BIM models to the operations of a client's facility? There are pieces of our profession today dealing with just that. How does the data that we input in BIM connect to a cost model or to a subcontractor or vendor supplier? Those connections I think will become much more evident as time goes on, and there'll be a lot more awareness of the impact of the data that we're creating and inputting.

DI: How are we going to see design and delivery models shift and evolve?

GD: We've talked a lot about parametric design specifically. I think automation will begin to play into this. I think the firms that learn how to integrate, for example, augmented reality and virtual reality into their delivery models and delivery

products are going to be the ones that thrive. We're working very hard on how we integrate those delivery tools into the products that we're delivering to our clients today.

We are slowly but surely moving to a process of using data to design a better product. Even today, clients are asking us to prove design concepts and the performance of our design. I think we'll see much more of that as time goes on.

DI: Do you think we'll see architects and designers more involved with the building beyond when it's commissioned?

GD: I think there's a huge opportunity in building optimization. It will continue to be a growing service. Leveraging technologies available to us today will only help us maintain connectivity with a client.

The building operating systems will always change. They'll always get to a point where there's a lifecycle of sorts to those building systems that will need to be modified or changed as technology advances.

An ongoing challenge is ensuring a building is being operated as designed. If we deliver an advanced, technology-rich system to a client, and educate and mentor their staff in the proper operation of the building to deliver the modeled efficiency, what happens when operational staff departs? The intended building efficiencies decline. This human factor is a crucial part of the design, especially if we deliver

high performance building to achieve the goal of Architecture 2030. The solution is simple, ongoing relationships and strategic consulting with the owner after the building is delivered.

DI: How do you see the future of talent in design organizations?

GD: I think certainly the lack of labor supply is one that we're already dealing with. This is not an attack on our school systems and our university systems at all. However, we are at a point where the demand for design thinkers and architects is outpacing the available labor supply. We have to look at the origins of the problem as an industry—and it goes beyond our industry—but we've got to find a way for building sciences to become part of a STEM career path at a very early age. Right now, architecture and building engineering, building sciences, aren't necessarily recognized as STEM careers and therefore something that we must introduce to a student—a creative young mind—early in their development.

Our industry will continue to be more demographically diverse than ever before. The whole issue of immigration reform has a huge impact on our industry. Being able to tackle the available labor source from around the globe is going to be an issue that we as a design industry need to tackle as well.

There is something for everyone in the design industry. I always try to tell students when I'm out talking with them that they may find a path of developing details and

building specific building sciences. They may find a path in telling the story about design, or they may find a path in marketing and communications.

“There are just so many avenues for people to explore—I'll even call it change pathways—in their own professional development. ... There's just somebody else with a different professional passion that makes the firm stronger but also provides another opportunity or another service or another interest or another capability to deliver design thinking to our clients.”

As we acknowledge the wide variety of ways in which someone can practice, maybe that will open up the limitations of our labor force as we see it today.

DI: After all, what is a firm but the people in it?

GD: Exactly. There are just so many avenues for people to explore—I'll even call it change pathways—in their own professional development. You see it every day. There's just somebody else with a different professional passion that makes the firm stronger but also provides another opportunity or another service or another interest or another capability to deliver design thinking to our clients.

Dan Noble

President & CEO

HKS

Dan's focus is on the big picture of ideas. DesignIntelligence talked with him recently to find out how he sees the future evolution of the architecture and design profession, centralized and decentralized leadership in multi-office firms, structuring the teams of the future, and more.

DesignIntelligence: How do you see leadership and design organizations changing in the future?

Dan Noble: Leadership and organizational structures will be flatter. I believe there'll be more opportunity for ownership; or at least a different avenue to ownership. Things like limited partnerships or connected types of peripheral work to our traditional core business have an enormous potential in our industry. For example, we developed a group, LOGE, which is a limited partnership that helps us perform financial and operational feasibility studies and potentially tap into funds to help these large complicated, institutional, PPP consortiums get off the ground. We can also organize and manage long-term operational and life cycle performance aspects of these structures that sometimes go on for fifty years.

I think younger people are looking for ways to have ownership or skin in the game

without the long-term commitment we were expecting. If they have the goods, they want opportunities to challenge their talents—now. We can tap into this passion by developing R&D initiatives, sustainability foci, development of artificial intelligence and nontraditional teaming opportunities to our current work offerings. We can channel this talent and energy into startup initiatives and skunk-work type exercises for one-off projects that bring value to our clients and amplify our revenue stream. Architecture attracts creative types that are also grounded with a pragmatic sensibility; a kind of person that can push creativity and innovation and do it with their head in the skies, but also with their feet firmly planted on the ground. This is a perfect combination for design thinking and problem seeking/solving for many different activities and revenue streams.

DI: What is your view of centralized versus decentralized leadership in the multi-office firm?

DN: There are pros and cons. The centralized leadership format is very efficient and provides a unique ability to control quality and disperse innovation across the enterprise. We have 600 people in Dallas that leverage efficiency through technology, a culture of communication and a concentration of talent. We also have 900 people in our other 23 offices, so we average about 40 people in our other offices. These offices are regionally organized typically with two or three other offices that allow them to play above their weight—as one virtual office in the region with over 100 people—and we’re one profit center, sharing of unique specialized talent is encouraged. So, we are able to do more, almost anywhere. This requires a culture of trust, teamwork, and open communication. For us, the ideal structure is this centralized operations group with distributed strategic leadership, one that encourages autonomy and an entrepreneurial spirit but has loose protocols in place to maintain quality and our brand. This organization allows our regional offices to leverage the full value of our proposition across the entire enterprise and enables a guy like Shannon Kraus, who’s running an office in DC of about 60 people, to compete toe to toe with a 300-person firm in the same market.

Also, our overhead and rent in Dallas are inexpensive compared to many of our other offices. Plus, you can get anywhere from Dallas very quickly. Being centralized with a low overhead structure makes financial sense. The flip side of this is that

we sometimes get labeled as a Dallas firm even though fifty percent more of our firm is from outside Dallas.

DI: How do you see market demands and the client needs evolving in the future?

DN: Hopefully they will find value in a more strategic, innovative, research-oriented relationship with the design team. I think firms will be less about designing just buildings and more about design thinking which will include buildings but also be connected to a more robust solution that includes financial analysis, demographic studies, population-based planning, operations, life cycle costs, building performance, analytics research, feedback and artificial intelligence. Architects can do so much more than just create shelter; they can understand their clients’ business and be an ally to the business at hand on all fronts.

I think the shared economy will play a larger role as well. If you look around Dallas now you’ll see, I think, five bicycle rideshare programs. When we start getting into bigger things, such as the shared economy of cars and office spaces, what are you going to do with things like parking garages? Do you need them? Do you need them part-time? Will they be repurposed? Many unintended consequences and opportunities will spring up from innovations born of the shared economy.

DI: What is the future of service offerings and business models for an architecture and design firm?

DN: Firms will need to rise above the fee-based commoditized world where the front-end capital cost and building structure is the end game. We will need to develop a relationship with our clients where the dial is pointed to the long-term life cycle cost and the value of performance for the buildings but, more importantly, for the people who interact within and around it. The building could become less relevant than the people inside the building and how they use it through time.

We will still develop well designed buildings that are attractive, that don't leak and that keep the cold out and the heat in when needed. That's sort of the price of admission; that's baseline. That's maybe fifty percent of the equation. The other fifty percent deals with questions like: How are the people going to use the building? How flexible is the building going to be? When things change, as the shared economy example we just talked about, what can the building do to respond to that? How does a parking garage become a mixed-use development? Those kinds of things require a bit more curious client.

DI: How will design teams be structured in the future to deal with this new way of designing and delivering projects and providing new types of services?

DN: Design teams will consist of design thinkers who are inspired by the notion that we actually can and do create environments that enhance the human experience. They will include diverse specialties such

as anthropologists, ethnographers, sociologists, behavioral psychologists, engineers, doctors, athletes and be much more about thinking holistically than limited to myopic disciplines. Sort of like treating the whole patient. Design thinking.

Many of these disciplines exist on our teams today. Those are the people that will help to shape the environments going forward. The architects can take that input and interpret it into the logistics and aesthetics it takes to make space out of it.

“Design teams will consist of design thinkers who are inspired by the notion that we actually can and do create environments that enhance the human experience. They will include diverse specialties such as anthropologists, ethnographers, sociologists, behavioral psychologists, engineers, doctors, athletes and be much more about thinking holistically than limited to myopic disciplines.”

The building and how people interact with it is all connected—it is organic, so just as you treat the whole patient in the health field, you treat the whole experience in the building environment. If you treat the building and you think of that building as an organism, it's not

really totally alive until it's filled with the systems, the people and how they interact with it over time through the space. The users change it immensely.

DI: What questions do you most struggle with as a leader?

“If you treat the building and you think of that building as an organism, it's not really totally alive until it's filled with the systems, the people and how they interact with it over time through the space. The users change it immensely.”

DN: Well, I ask myself, is all this just wishful thinking; idealistic wishful thinking? Grist for the mill? Or is it really something that will gain traction? Will clients look beyond quarterly returns and into a longer, higher value, payback proposition? Like I said, right now we enjoy a client base of 10–15 percent that are interested in seeing beyond the first capital cost and really examine the total life cycle costs. They are investing in that. But that's not

enough to sustain this kind of more robust overall business model. We need more clients that are interested in this more intense engagement. Is it realistic? Will people see the value in it? And what about our investment clients—does this even resonate with them?

I just don't know the answer to that. I wish I did. I clearly see the value, but sometimes you get caught up inside your own head and lose objectivity. Are we so embroiled in this sort of thinking that we can't see that it really isn't broadly feasible? It's a process and a commitment that delivers higher value and better life cycle results. It's a great idea but, when you get down to it, it's got to be worth the time and money for our clients and investors.

There are always things you can't answer, like: How long will the economy remain strong? Will the fragile geopolitical situation explode? On the one hand, you could say: You shouldn't worry about things you can't control. That might be a wise man's response. But if you're trying to plan a firm's future, those are the things that are a little frustrating and, ironically, the ones that can keep you up at night.

Andy Cohen

Co-CEO

Gensler

A hands-on leader, Andy oversees Gensler's global platform and its day-to-day operations. DesignIntelligence talked with him to ask how he sees the future evolution and market demand of the professions, how client needs will impact his firm, globalization, and more.

DesignIntelligence: Let's start by talking about the future of market demand. How do you see client needs evolving in the future?

Andy Cohen: This is the most dynamic time for the future of our world. As architects, designers and urban planners, what we're seeing, and you're hearing it in the news every day, is an incredible number of complex and important drivers of change. First, technology's impact on design and, specifically, process innovations from AR and VR to technological breakthroughs like driverless cars. We have been leading research and industry presentations on the game-changing impacts of the driverless car on the future of our cities.

Second, demographics. The millennial generation is becoming the majority in the workforce, and, therefore, there needs to be a new approach to how we design by integrating live, work and play. For example, the significant dynamic change in mobility

and millennial buying trends can make a tremendous impact in how we approach and deliver design.

Third, the profound impacts of climate change. Tied with urban planning, we are living through the greatest period of urbanization in the history of our world. Sustainable design in the building sector has become the catalyst and driver toward environmental design and how we can help design smart buildings that cap CO² emissions—and give energy back to the grid.

And finally, globalization and its global political implications. There's a lot of change going on right now and we as design leaders are at the epicenter. We are intensely focused on the current global volatility and all of these trends that are rippling around the world. These are all the issues our clients experience every day—as we work closely with them through our powerful global network.

Our vision at Gensler is “to create a better world through the power of design.” Our collective intelligence and diverse talent allows us to create innovative designs that our clients need in this time of dramatic change. The power of our design really matters, and it’s changing and impacting millions of people’s lives around the world every day.

One of the themes that our teams have been out there speaking a lot about is the tremendous, game-changing impact of the driverless car on the future of cities and the human experience. Our research shows that no longer will cars dominate our cities. We’ll be able to take our city streets and parking lots and give them back to the people, and in turn, help to enrich the human experience. We’ll be able to implement everything we’ve been talking about—by creating cities that are about walkability, vibrancy, green spaces, dynamic amenities and sustainability.

I’m hearing from every technology and automotive expert that we collaborate with that in the next 10 to 15 years the autonomous vehicle revolution will take place. When it does, we, as architects and urban designers, have the opportunity to really reshape our global cities for the next generation.

DI: As all of these trends continue to drive change, how do they affect the service offerings and business models for a firm like Gensler? In other words, what will the firm of the future do and how will that firm be structured to do it?

AC: We take pride in our collaborative leadership model. We call it the “One-Firm Firm.” We really act as one, integrated, seamless practice around the world. We design projects in many countries, in fact last year we designed projects in more than 100 countries. Our strength in design innovation, thought leadership and knowledge sharing is integrated around the world and focused on our “One-Firm Firm” strategy. For example, our foundation is the belief in human-centered design. Clients are increasingly putting people at the center of performance and their visions and strategies. We’re seeing it over and over again.

These are the key areas where we think we can make an impact and differentiate ourselves in the local and global markets. Over the course of a year, we work with 3,500 clients on 8,000 projects. This is all accomplished by having diversity of leadership, diversity of knowledge, diversity of talent, and bringing those diverse talents together through an integrated global platform.

DI: It sounds like the best mix of centralization and decentralization.

AC: That’s a good point. In fact, to prove the focus on our “One-Firm Firm” culture, we actually don’t have a headquarters right now. We used to have a headquarters in San Francisco, but now Diane Hoskins, my Co-CEO partner, is located in D.C. and I’m located in L.A. Our executive committee, Joe Brancato and Robin Klehr Avia, are located in New York, and Dan Winey is in San Francisco, our board of directors and management committee span the

globe. We are decentralized, but always connected—in this world of technology it doesn't matter where you sit. Because of this, we practice a collaborative leadership model and a flat organization. We work fluidly around the world leveraging all our global resources to create the best teams. In most cases, we have two leaders who are leading each office, region, practice area and design synergy team. We really believe one plus one equals five. If you take the best expertise and passions of people and you put them together, it really creates a better and stronger leadership team. Diversity drives innovation.

DI: How do you find the right balance between creating that common Gensler experience for people who work for the firm and assimilation into local culture?

AC: One of our key strategies is to be local while also being a global firm of knowledge. We're not a firm that flies in and out on clients. Every office has grown organically from strong local roots. We believe strongly in being located close to our clients, to be their trusted advisor. That's why we have 45 global offices in 10 regions. We want to be local and global to best serve our clients. When we open an office, we usually open it with someone who's been with the firm for 20, 25, 30 years, a veteran that knows and understands our unique culture, values and guiding principles really well. We pair that Gensler veteran with a local leader who has the local knowledge and talent and is steeped in the local culture. This is what helps us tailor the team specifically for each client. Because we're local, we can be next to our clients and

really understand their goals and aspirations. In turn, the global reach allows us to bring in the best expertise and practice leaders from around the firm as well. It's a global expertise, but laser-focused locally with our clients.

That combination of leadership skills and "One-Firm Firm" culture is the opportunity. We are embedded in the local culture and as the office matures, up to 90 percent of the office consists of local talent.

DI: Do you think that there will continue to be a diversity of delivery models into the future? Will you still have to do different things in different ways in different places?

"Our research shows that no longer will cars dominate our cities. We'll be able to take our city streets and parking lots and give them back to the people, and in turn, help to enrich the human experience."

AC: Yes, different countries absolutely do it differently. The one area where we don't like to provide services is when it's a competitive design bid build process. We do a lot of "negotiated bid" projects where we're working hand in glove with the construction industry in a collaborative partnership. Whether it's a design build or negotiated bid process, the contractor and builders are on a unified team with us. It's an integrated team. Our goal is a seamless, integrated design and construction process for our clients.

DI: When you think about the future of architecture and design, what are other key issues?

AC: The subject that comes up over and over again is talent: attracting and retaining the best people—our firm is all about our talented, entrepreneurial people. We have 5,500 current team members, and we're constantly focused on our training and learning programs to continue to create the best place to work. We encourage risk-taking and enlisting the entrepreneurial mindset, and we believe that's the future. Design is only as good as the talent you have, so we're spending a lot of time on investing in our current talent and attracting talent with diverse, unique backgrounds.

DI: Tell me more about how you feel research will play a role in design.

“Our people are taking on the toughest questions of our day, applying research findings to real-world challenges and creating positive impact for our clients and communities.”

AC: Having the latest trends, the latest information, and the latest research at our fingertips, not only informs our projects and work, but it will only make our work better. The only way we can be the industry leader is to have a really robust research

group that is looking at the latest trends, driving innovation and change—then making sure that we're implementing this unique knowledge and research directly into our design work.

Our design philosophy is centered on enhancing the human experience. As a firm and community, we are committed to making a positive impact on how people live and work in our modern world. To truly enhance the lives of people, our design approach is informed by insight, observation and research. We call this the design/research cycle.

As our lives are molded by remarkable flux and transformational change, our projects are becoming more nuanced and complex than ever. It's clear to us that design solutions for this new world cannot be based on yesterday's models. Great design today directly addresses the transformational forces shaping our world with elegant, empirical solutions that enhance human experience and chart a new path forward.

That's where our research comes in. Our people are taking on the toughest questions of our day, applying research findings to real-world challenges and creating positive impact for our clients and communities. Not only do the insights we uncover shape the innovative outcomes of our large projects like Shanghai Tower; they also inform our approach to every project we touch, from a retail store to a law firm design. Research is woven into everything we design.

Tim Carl

CEO



Tim supports a highly collaborative design process, promoting a “studio approach” within HGA’s multidisciplinary environment. DesignIntelligence talked with him to ask how he sees the future evolution of the architecture and design profession, professional practices, how client needs will evolve, diversity in the firms of the future, and more.

DesignIntelligence: What do you see as the future of leadership in professional practices? Will there be new models of leadership and organizational structures?

Tim Carl: Like many larger firms, HGA’s initial geographic expansion was built on a centralized leadership model that has been evolving over the last several years to a more collaborative matrix of leaders. Our local and regional leadership teams are empowered and accountable to sustainably grow their practice. They, in turn, have access to and benefit from the knowledge and resources of national leaders guiding market strategy, operations and financial performance. In order to effectively leverage that matrix of leadership across the firm, we have made structural changes that incentivize leadership at both the local and national scale and make them accountable to collaborate effectively.

This organizational model is designed to leverage collective strength and, we believe, is key to sustainable growth for a firm of our size. A matrixed structure is more adaptable to the differing cultural and generational expectations and nimbler in terms of sharing staff across offices and markets based on demand.

DI: How will client needs evolve in the future?

TC: Recently a client shared with me valuable insight into how her needs were evolving. She told me that we were well positioned to win work at her university based on our reputation for truly listening to our clients and working to solve their specific needs. However, what she has learned is that, while listening is a differentiator in our field (many architects do not truly listen to their clients in her

opinion), it is not enough. In the higher education world, they are trying to address rapidly changing needs and solve often unprecedented challenges. To be successful, her consultants need to bring a rigorous process that, in addition to listening, helps them think differently about the challenges they are facing.

Increasingly our differentiator will be a research-based approach to our work that understands the intersection of social and technological developments with market specific challenges. Our process must delve deeply and specifically into a client's world, employing a host of tools to understand what is critical to the quality of our work with each.

DI: How do you see service offerings and business models evolving in the future?

TC: Our client's needs are evolving to require a more consultative business model where we must illustrate how our work is driven by strategy with research-based metrics demonstrating the measurable value—both qualitative and quantitative—of that strategy. Architects must elevate the science and the art of what we do. At HGA we are looking at our 21st century version of the Bauhaus—structuring ourselves to leverage the collective strength of very diverse mindsets and designing how architects, engineers and interior designers collaborate with researchers, scientists, process engineers, and other design thinkers to leverage data to predict and measure

performance. There must be strategy behind this complement of disciplines that is both targeted and serendipitous with an openness to new and differing points of view.

“We are structuring ourselves to leverage the collective strength of very diverse mindsets and designing how architects, engineers and interior designers collaborate with researchers, scientists, process engineers, and other design thinkers to leverage data to predict and measure performance.”

DI: What do you feel is the future of design and delivery models? In other words, what will the context of future practice be, and who will participate in the design and delivery process?

TC: Like all A/E firms, we are navigating how we both influence and become more effective in the design and delivery process. Regardless of what delivery method is employed, we are consistently successful when we have a strong, collaborative relationship with the contractor, construction manager, design builder, P3 partner, etc. Critical to our industry's future success is to learn from those relationships and influence how delivery evolves.

One aspect of delivery that we are currently navigating is the more prescriptive act of construction through pre-manufactured and modular solutions that provide an array of choices. The design professional becomes the curator and artist instead of the technology-driven detailer. As machines fabricate instructions provided by computers, design professionals must learn how to manipulate the parts and pieces to continue to meet our aspirations for architecture; to borrow from Vitruvius, to deliver “firmness, commodity and delight.”

DI: Who will populate the firm of the future?

TC: Our success will depend on our ability to leverage the collective strength of a diversely talented, emotionally intelligent, and complementary work force. Fostering an environment that values diversity in gender and race is foundational to this; we have a gap in the A/E/C industry and we believe this should be an urgent focus over the coming years. In order to build genuine diversity our organizations must understand how both the culture and structure of our practice supports an equitable and inclusive work environment. The work we have done in this area just in the past two years shows an enormous benefit in attracting and retaining fantastic talent and clients.

A/E/C RISKS MINI-SURVEY RESULTS

“Risk” is a word that inspires unease. However, hidden within risk are opportunities that can mean the difference between thriving and merely getting by. The opportunities come from mastery of the essential skills of identifying, understanding, mitigating, and managing risk.

Risk, after all, is neither inherently positive nor negative: it simply is.

During the most recent two Design Futures Council events, DI Research conducted surveys and workshop exercises that explored A/E/C leaders’ attitudes toward and perceptions of risk. The findings are presented in the following pages.

Methodology

DI Research conducted the survey on risks in A/E/C at the Design Futures Council’s Leadership Summit on the Business of Design, which was held in New York on November 13, 2017. The theme of the event was “Faces of Risk.” Respondents included 61 senior-level design and business leaders from architecture, interiors, landscape architecture, planning, engineering, construction, or real estate firms.

The cybersecurity risks list of top concerns was collected from participants in the 2018 Design Futures Council Leadership

Summit on Technology & Applied Innovation. The participants included business, design, and technical leaders from architecture, interiors, landscape architecture, planning, engineering, and construction firms, as well as deans of colleges and schools of architecture and design. Participants were divided into small groups and asked to provide the top three cybersecurity risks they see within their firms and organizations. Their responses were coded and tallied in real time at the event.

RISK SURVEY

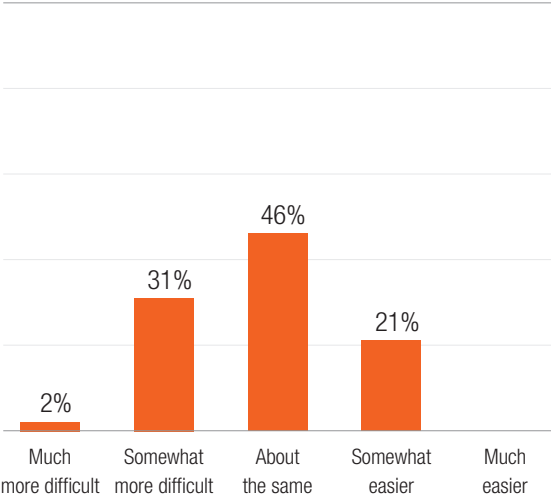
How do you feel the overall business environment for A/E/C in 2018 will compare to 2017?

Top cybersecurity risks according to 79 business, design, and technology leaders at the DFC Leadership Summit on Technology & Applied Innovation 2018

- 1. People and their behavior
- 2. Password management and storage in browsers
- 3. Reactive versus proactive approach to cybersecurity
- 4. Culture/how we deal with cybersecurity problems
- 5. Speed of change/challenges of staying current
- 6. Lack of knowledge/ignorance of problems

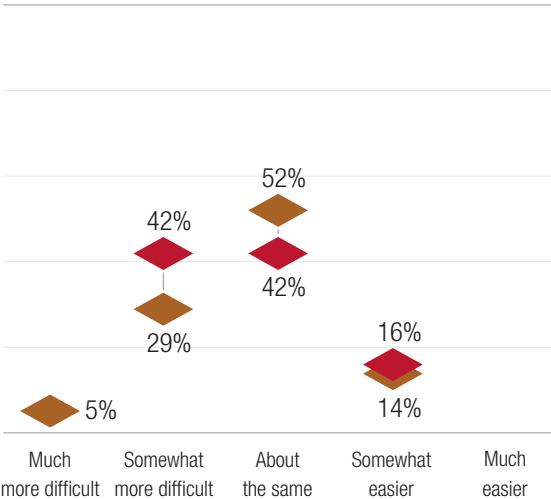
All Firms

1–500+ employees



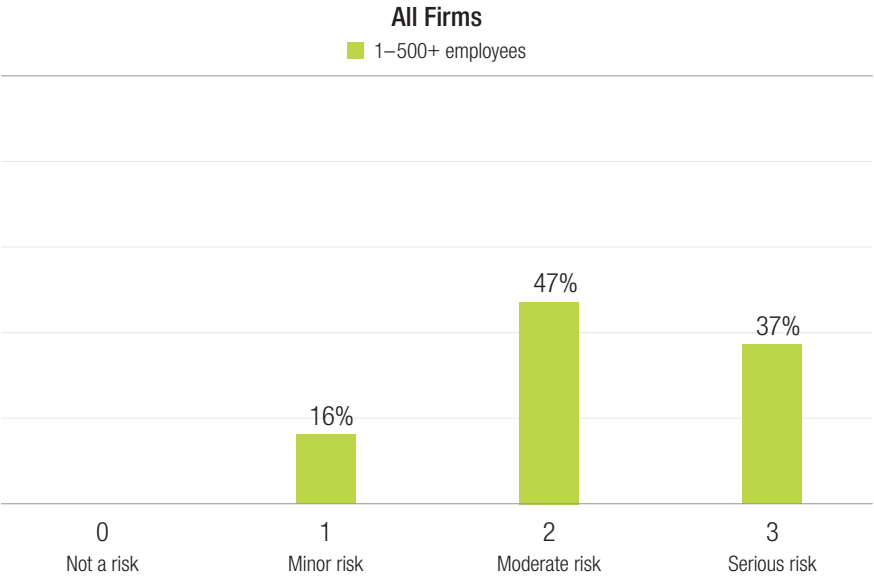
Medium vs. Large Firms

500+ employees 101–500 employees



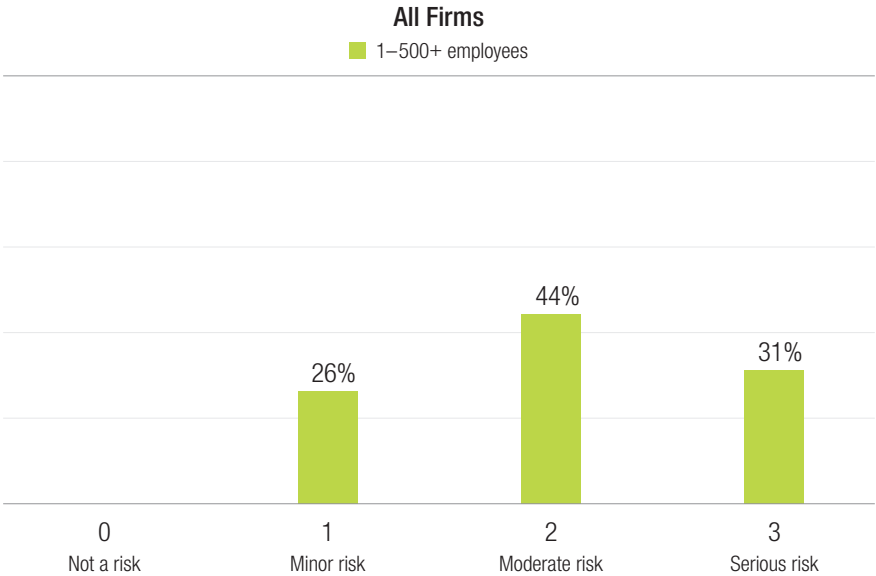
RISK SURVEY: TALENT

Inability to find experienced talent to staff projects



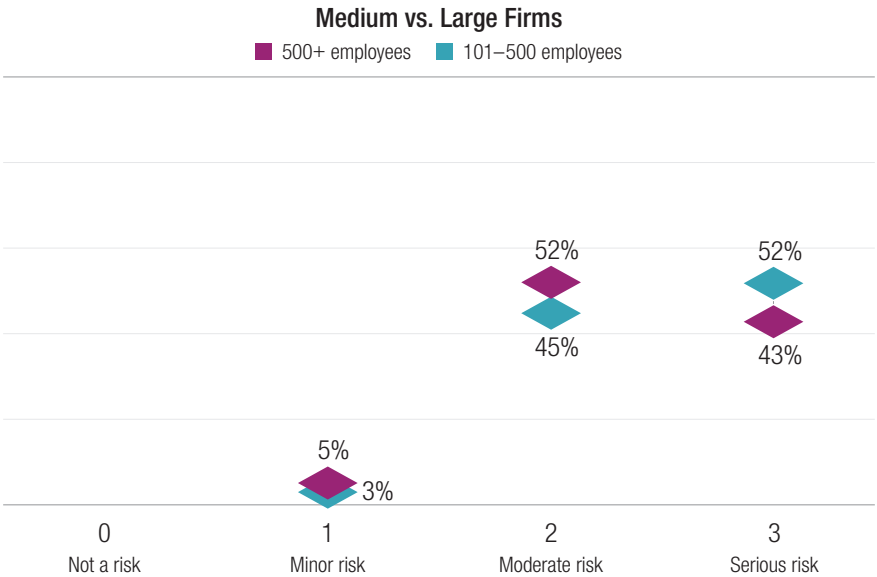
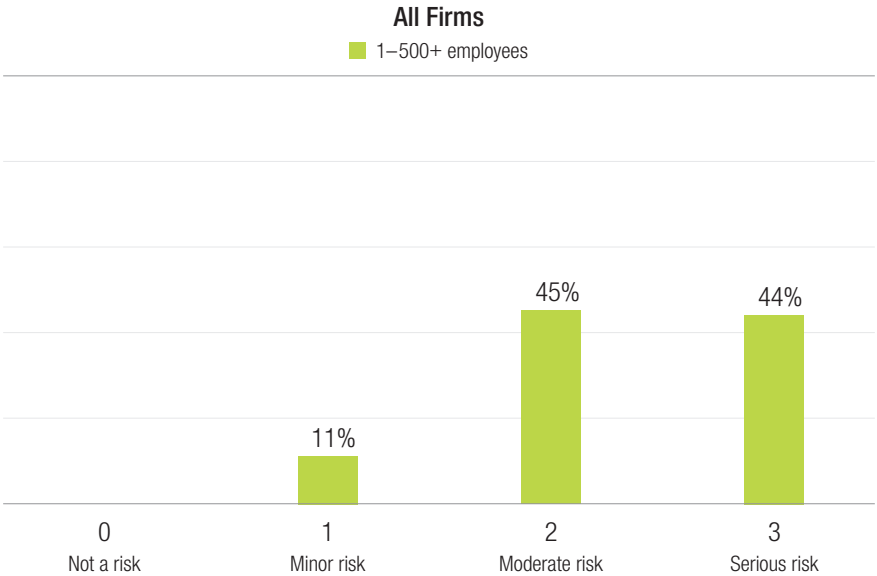
RISK SURVEY: TALENT

Rising cost of compensating talent



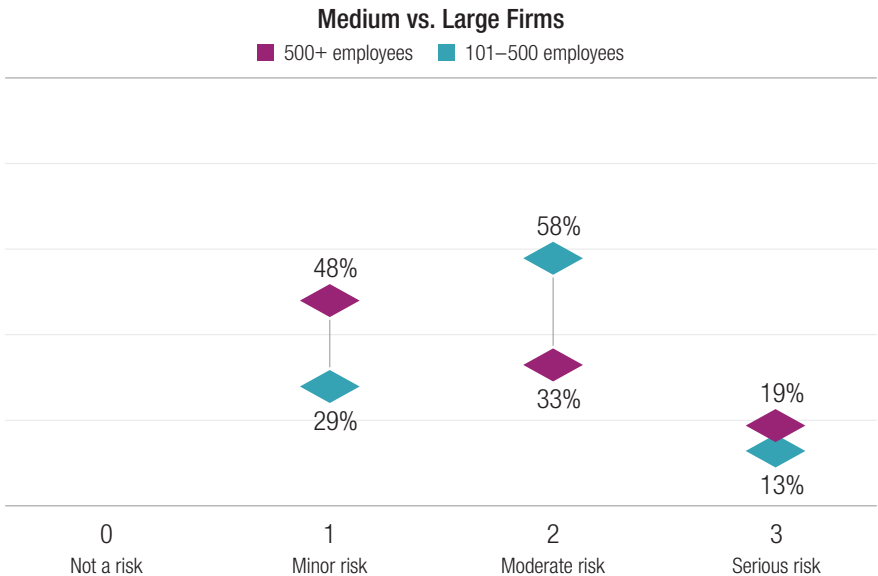
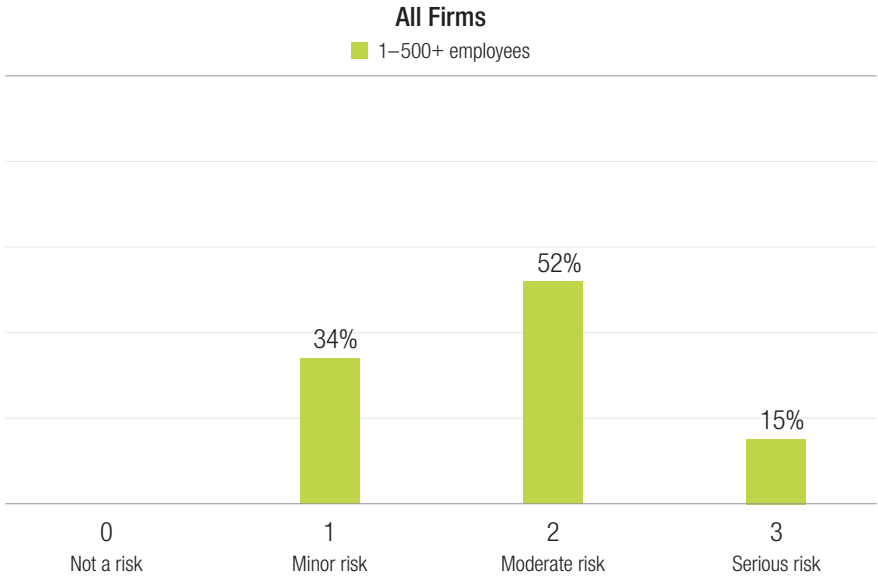
RISK SURVEY: TALENT

Competition for talent



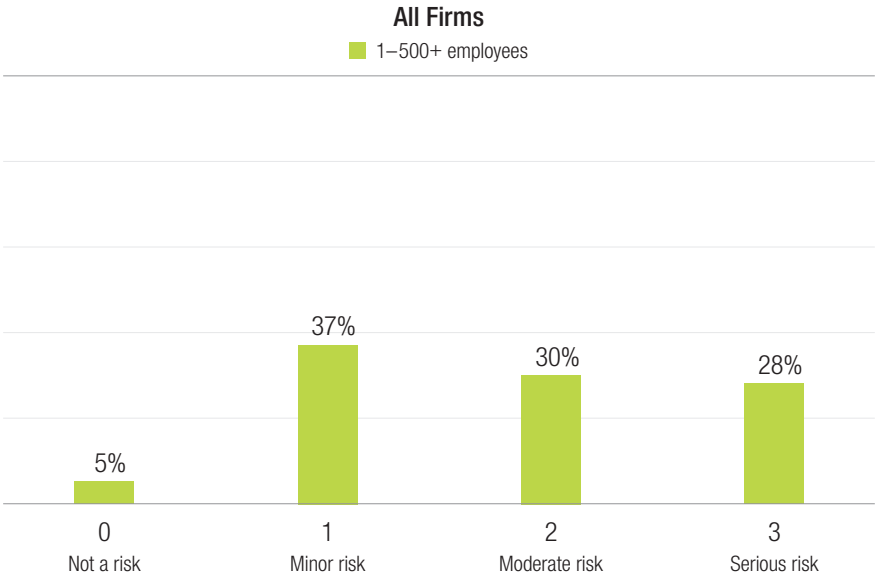
RISK SURVEY: ECONOMIC

Economic downturn that negatively impacts A/E/C



RISK SURVEY: ECONOMIC

Downward fee pressure from clients

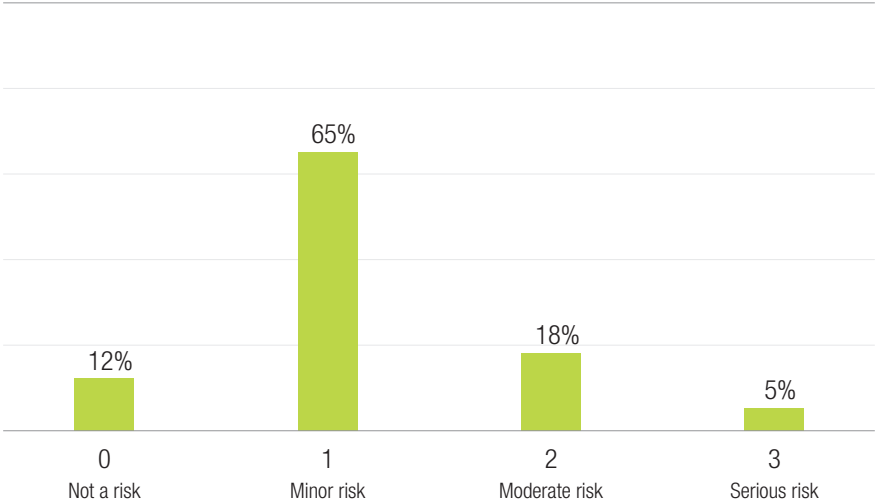


RISK SURVEY: ECONOMIC

Increasing interest rates

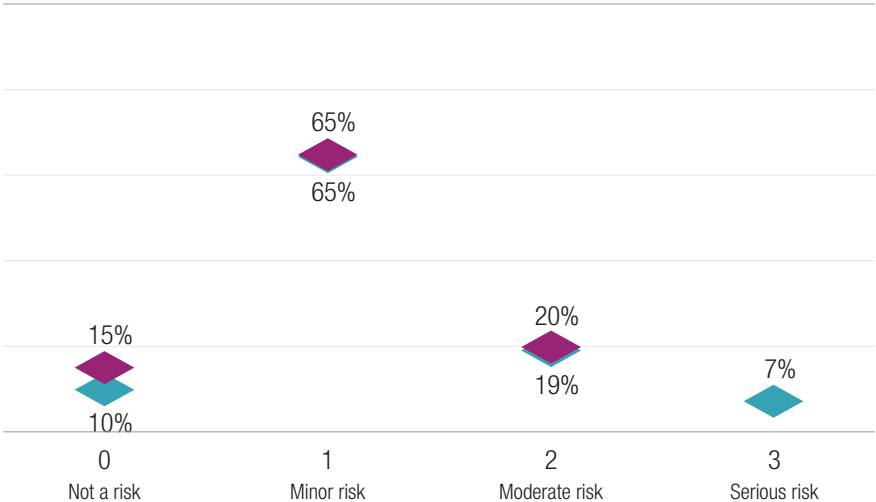
All Firms

■ 1–500+ employees



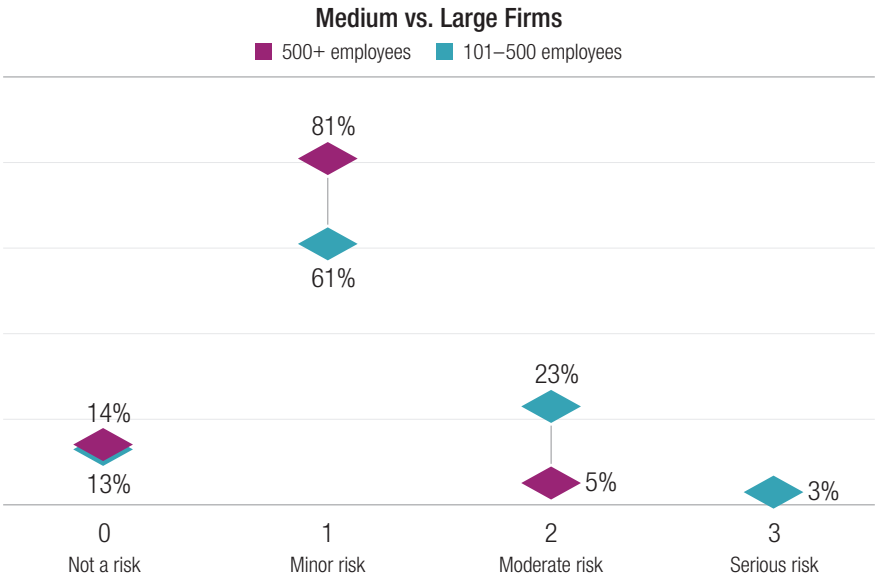
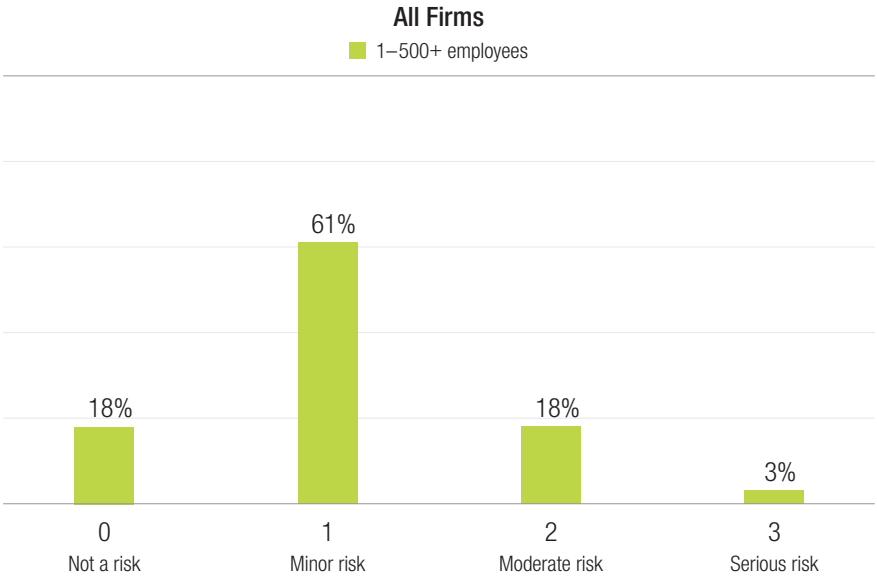
Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees



RISK SURVEY: POLITICAL

Disruption to A/E/C from U.S. midterm elections

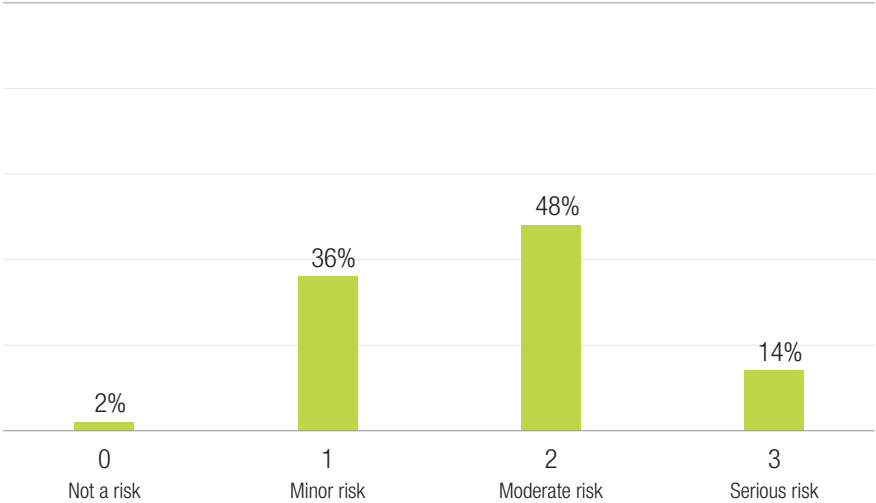


RISK SURVEY: POLITICAL

Geopolitical conflict that causes damage to North American economies

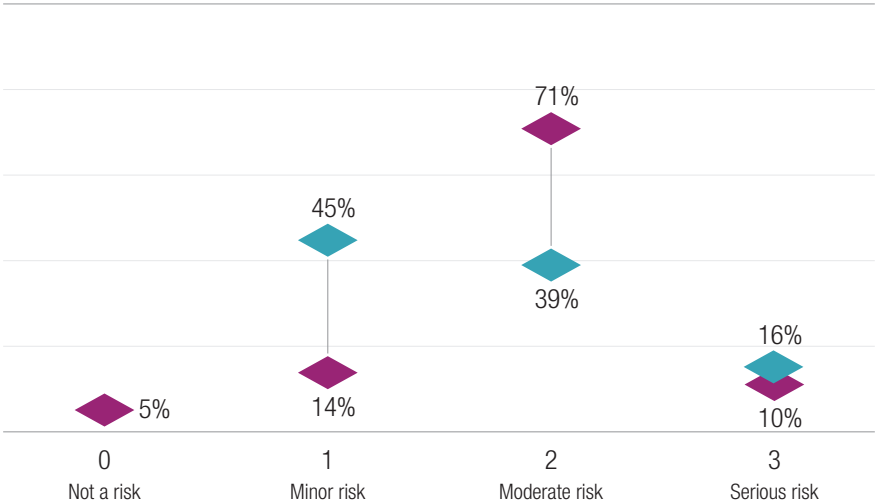
All Firms

■ 1–500+ employees



Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees

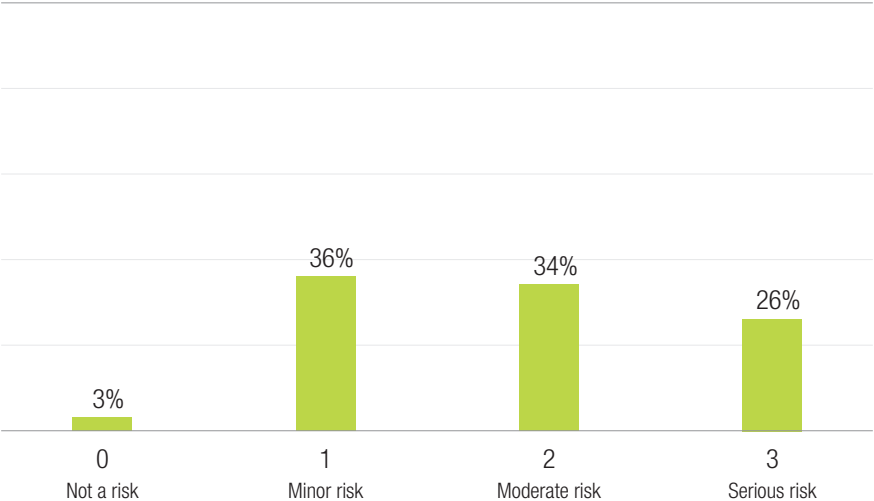


RISK SURVEY: TECHNOLOGY

Security of my firm's computer and data systems

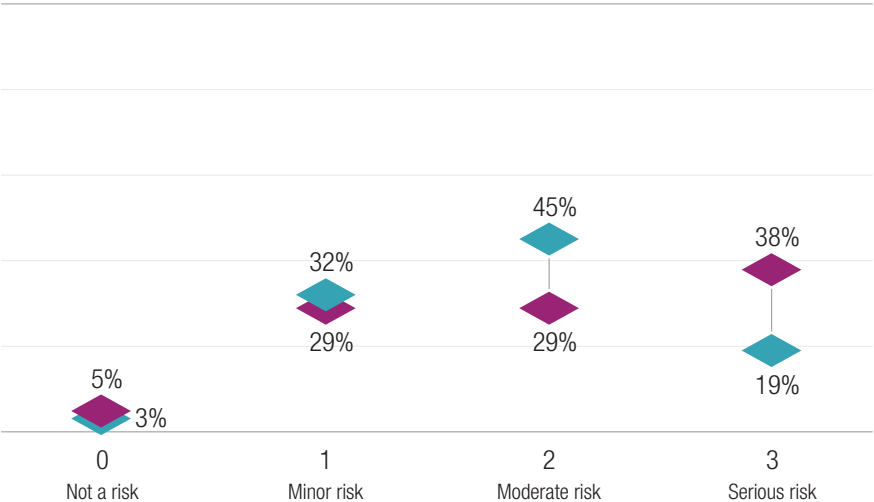
All Firms

■ 1–500+ employees



Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees

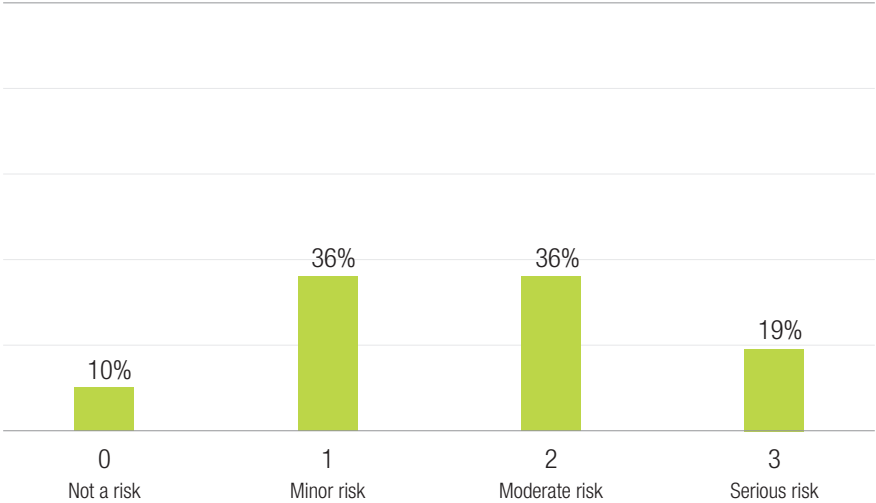


RISK SURVEY: TECHNOLOGY

Cybersecurity in smart buildings

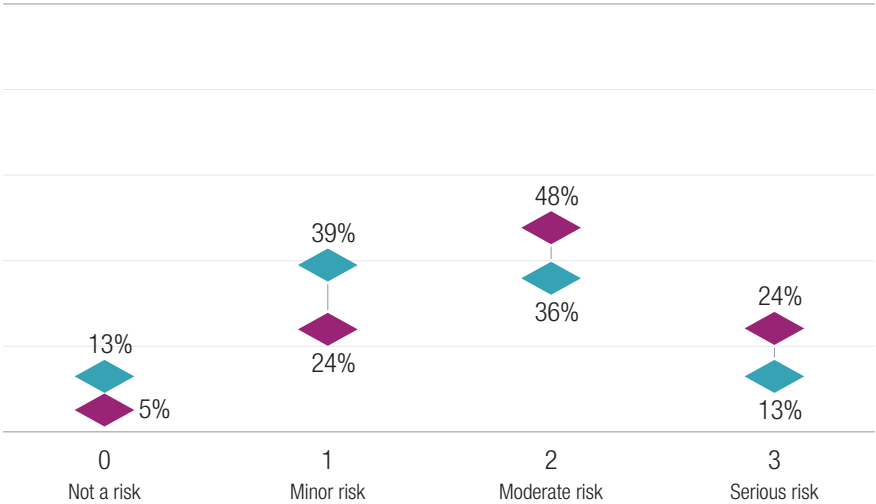
All Firms

■ 1–500+ employees



Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees

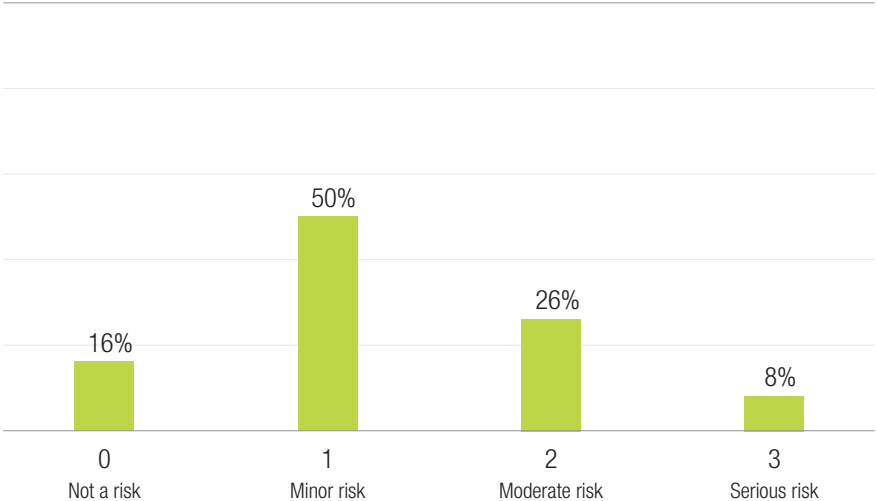


RISK SURVEY: TECHNOLOGY

Automation of design

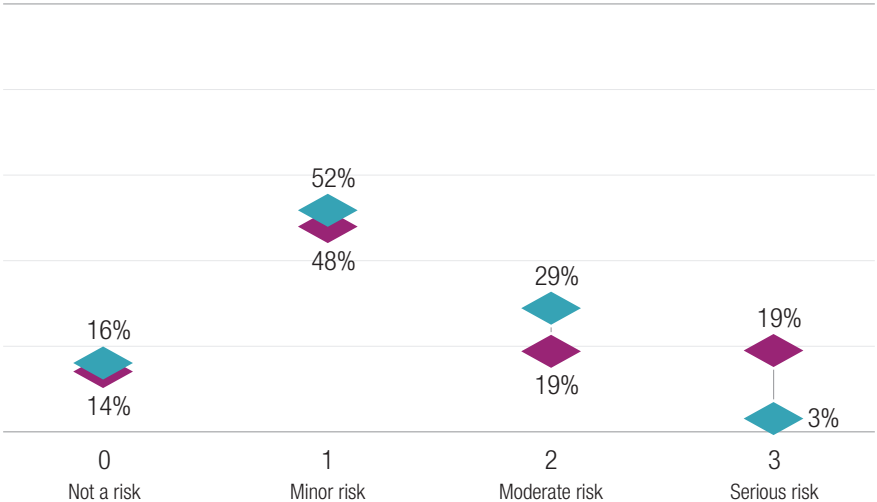
All Firms

■ 1–500+ employees



Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees

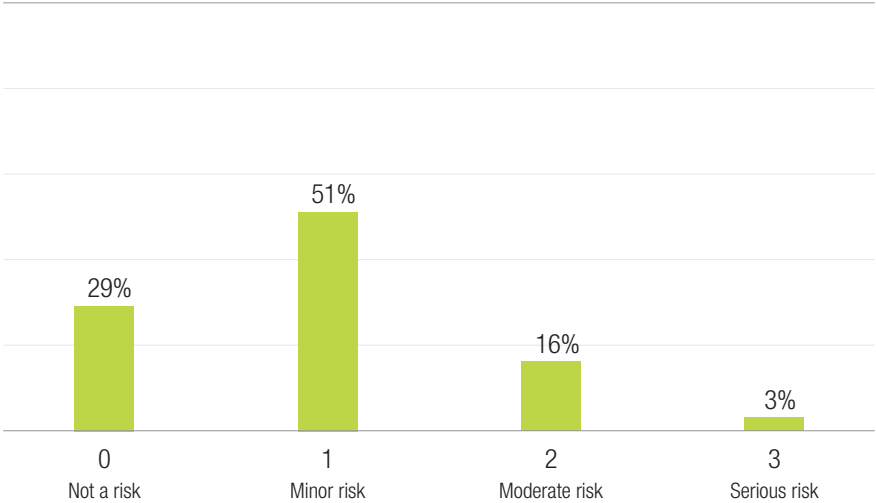


RISK SURVEY: TECHNOLOGY

Automation of construction (robotics)

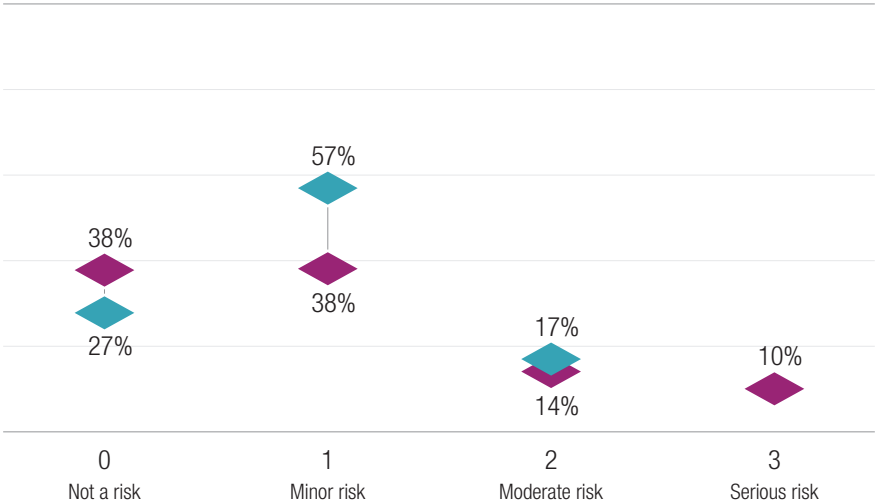
All Firms

■ 1–500+ employees



Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees

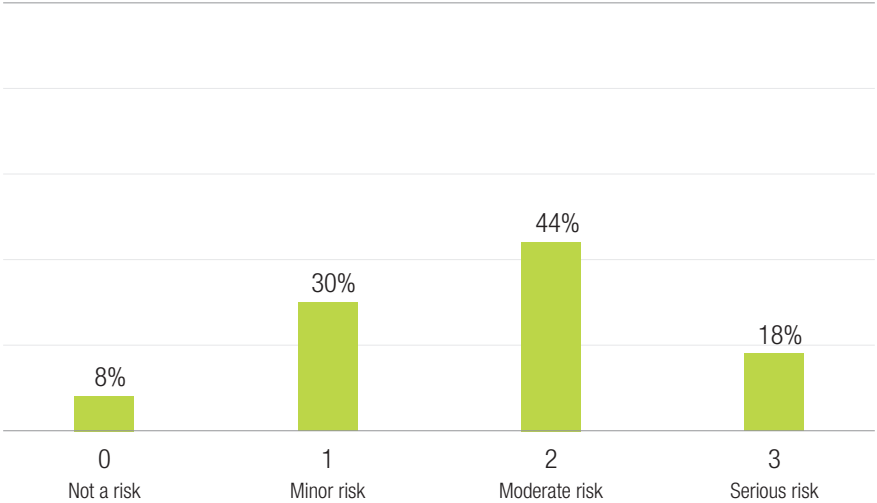


RISK SURVEY: TECHNOLOGY

Increasing cost of technology
needed to run the firm

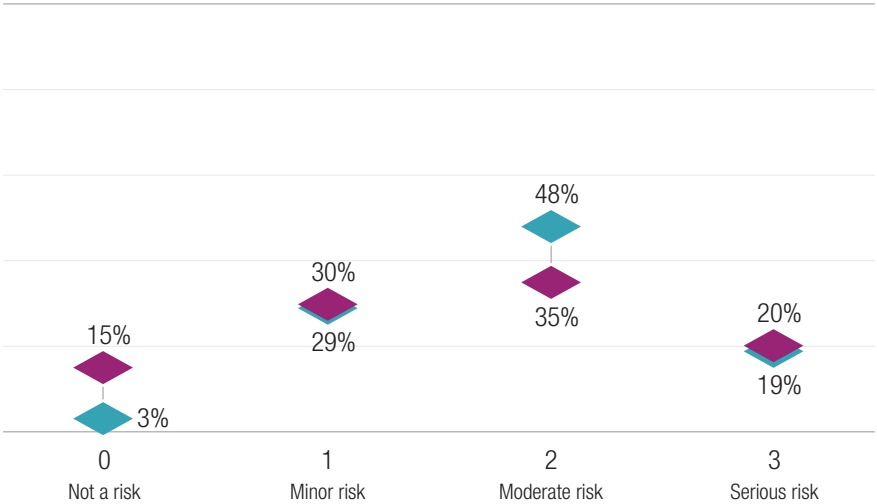
All Firms

■ 1–500+ employees



Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees

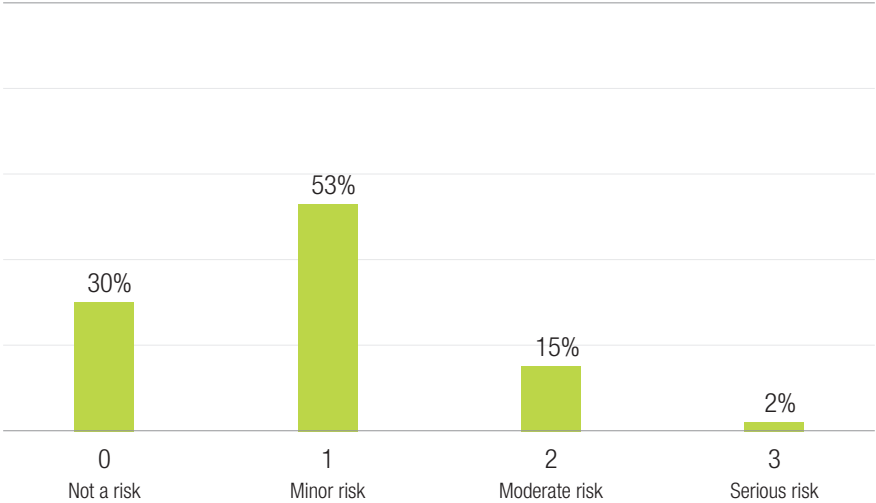


RISK SURVEY: TECHNOLOGY

Technology decreasing my clients' need for space

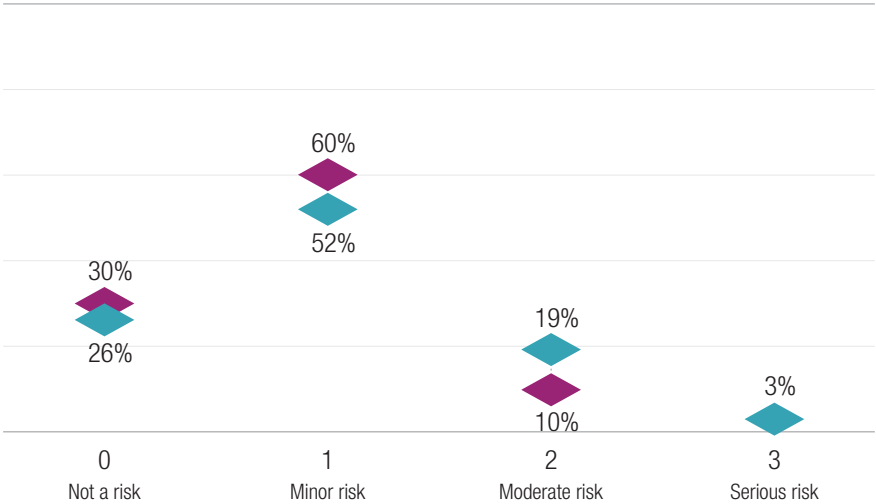
All Firms

■ 1–500+ employees



Medium vs. Large Firms

■ 500+ employees ■ 101–500 employees



Bibliography

Global Economy

Babones, Salvatore. "India May be the World's Fastest Growing Economy," Forbes, January 2018; <https://www.forbes.com/sites/salvatorebabones/2018/01/10/india-may-be-the-worlds-fastest-growing-economy-but-regional-disparity-is-a-serious-challenge/#ae6e1fa53ace>

Balachandran, Manu. "India Is Planning to Build 83,000 km of Roads," World Economic Forum, November 6, 2017; <https://www.weforum.org/agenda/2017/11/india-is-planning-to-build-83-000-km-of-roads>

Barua, Akrur. "Growth Is the Headline, but Inflation Is a Worry," Deloitte Insights, February 16, 2018; <https://www2.deloitte.com/insights/us/en/economy/emea/turkey-economic-outlook.html>

Cohen, Patricia. "U.S. Added 313,000 Jobs in February," New York Times, March 9, 2018; <https://www.nytimes.com/2018/03/09/business/economy/jobs-report.html>

Coy, Peter. "The Global Economy Looks Good for 2018," Bloomberg Businessweek, Nov. 2017; <https://www.bloomberg.com/news/articles/2017-11-02/the-global-economy-looks-good-for-2018-unless-somebody-does-something-dumb>

Davidson, Paul. "How Trump's Planned Steel, Aluminum Tariffs Affect You," USA Today, March 6, 2018; <https://www.usatoday.com/story/money/2018/03/05/tariffs-trump-impact/395314002/>

Derhally, Massoud and Sarmad Khan. "Siemens Eyes Role in Development of Saudi Arabia's \$500bn Neom Mega City," The National, November 6, 2017; <https://www.thenational.ae/business/economy/exclusive-siemens-eyes-role-in-development-of-saudi-arabia-s-500bn-neom-mega-city-1.673449>

Doris, Annie and Sarah Hong. "China Experts Analyze 19th Party Congress," The Harvard Crimson, October 24, 2017; <http://www.thecrimson.com/article/2017/10/24/china-party-congress/>

“Fifteen Years of Reforms to Improve Business Climate Worldwide,” World Bank, October 31, 2017; <http://www.worldbank.org/en/news/immersive-story/2017/10/31/15-years-of-reforms-to-improve-business-climate-worldwide>

Focus Economics; February 2018; <https://www.focus-economics.com/regions/major-economies>

“Global Economy to Edge Up to 3.1 percent in 2018 but Future Potential Growth a Concern,” Press Release, The World Bank, January 9, 2018; <http://www.worldbank.org/en/news/press-release/2018/01/09/global-economy-to-edge-up-to-3-1-percent-in-2018-but-future-potential-growth-a-concern>

“The Global Competitiveness Report 2017-2018,” World Economic Forum; <https://www.weforum.org/reports/the-global-competitiveness-report-2017-2018>

Gray, Alex. “What Is Globalization Anyway?” World Economic Forum, January 10, 2017; <https://www.weforum.org/agenda/2017/01/what-is-globalization-explainer/>

Henley, John. “As One EU Headache Subsides in Germany, Another Starts in Italy,” The Guardian, March 6, 2018; <https://www.theguardian.com/world/2018/mar/06/italy-germany-election-coalition-eu-crisis-angela-merkel>

Hunt, Alex and Brian Wheeler. “Brexit: All You Need to Know,” BBC News, March 2018; <http://www.bbc.com/news/uk-politics-32810887>

Jamrisko, Michelle and Catarina Saraiva. “These Are the World’s Most Miserable Economies,” Bloomberg, February 2018; <https://www.bloomberg.com/news/articles/2018-02-14/most-miserable-economies-of-2018-stay-haunted-by-inflation-beast>

Kalish, Ira. “China: Slow but Steady,” Deloitte Insights, February 19, 2018; <https://www2.deloitte.com/insights/us/en/economy/asia-pacific/china-economic-outlook.html>

Majumdar, Rumki and Akrur Barua. “The Global Economy: Set to Hit the Gas, Yet Wary of Roadblocks,” January 2018; <https://www2.deloitte.com/insights/us/en/economy/state-of-global-economy-2018-outlook.html>

Majumdar, Rumki. “Why Reversing Globalization May Not Be a Good Idea,” Deloitte Insights, August 2017; <https://www2.deloitte.com/insights/us/en/economy/global-economic-outlook/2017/q3-impact-of-reversing-globalization.html>

Meyers, Jessica. "American Businesses Say Working with China Is Getting Harder," Los Angeles Times, January 18, 2017;

<http://www.latimes.com/business/la-fg-china-us-trade-20170118-story.html>

Nikolaeva, Maya and Sinead Cruise. "A Year to Go Before Brexit, U.S. Investment Banks Still Bet on London," Reuters Business News, March 2, 2018; <https://uk.reuters.com/article/uk-britain-eu-jobs/a-year-to-go-before-brexit-u-s-investment-banks-still-bet-on-london-idUKKCN1GE2A2>

Randow, Jana. "Euro Economy is Heading Toward a Golden Period," Bloomberg Businessweek, November 12, 2017; <https://www.bloomberg.com/news/articles/2017-11-13/from-lost-decade-to-golden-years-euro-economy-picks-up-the-pace>

Remes, Jaana, James Manyika, Jacques Bughin, et al. "Solving the Productivity Puzzle," McKinsey Global Institute, February 2018; <https://www.mckinsey.com/global-themes/meeting-societys-expectations/solving-the-productivity-puzzle>

Rosenberg, Christoph, "The Struggle to Manage Debt," International Monetary Fund, March 1, 2018; <https://blogs.imf.org/2018/03/01/the-struggle-to-manage-debt/>

Trujillo, Jesus Leal. "Mexico: Uncertainty Looms," Deloitte Insights, February 1, 2018; <https://www2.deloitte.com/insights/us/en/economy/americas/mexico-economic-outlook.html>

"Unity, solidarity and collaboration' can turn tide on terrorism, bolster human rights, says UN chief," UN News, November 16, 2017;

<https://news.un.org/en/story/2017/11/636352-unity-solidarity-and-collaboration-can-turn-tide-terrorism-bolster-human-rights>

World Bank Group, 2018; <http://www.doingbusiness.org/~media/WBG/DoingBusiness/Documents/Annual-Reports/English/DB2018-Full-Report.pdf>

World Economic Outlook Update; International Monetary Fund, January 2018; <https://www.imf.org/en/Publications/WEO/Issues/2018/01/11/world-economic-outlook-update-january-2018>

Global Geopolitics

“As China's Xi Jinping Gains Power, Parliament Prepares to Bolster Risk Battle,” NDTV.com/Reuters, March 2, 2018; <https://www.ndtv.com/world-news/as-chinas-xi-jinping-gains-power-parliament-prepares-to-bolster-risk-battle-1818900>

Bialik, Kristen. “Most Immigrants Arrested Have Prior Criminal Convictions a Big Change from 2009,” Pew Research, February 15, 2018; <http://www.pewresearch.org/fact-tank/2018/02/15/most-immigrants-arrested-by-ice-have-prior-criminal-convictions-a-big-change-from-2009/>

Binker, Brian. “2017 Ends as Deadliest Year in Mexican Drug War, Outlook for 2018 Grim,” Opslens, December 30, 2017; <https://www.opslens.com/2017/12/30/2017-ends-deadliest-year-mexican-drug-war-outlook-2018-grim>

Black, Eric. “U.S. Favorability Among Mexicans Plummets,” MinnPost, December 19, 2017; <https://www.minnpost.com/eric-black-ink/2017/12/us-favorability-among-mexicans-plummets>

“Breaking News: South Sudan Government Wants More Weapons, Larger Parliament and No Punitive Measures for Peace Violation,” Nyamile, February 10, 2018; <http://nyamile.com/2018/02/10/breaking-news-south-sudan-governments-wants-more-weapons-larger-parliament-and-no-punitive-measures-for-peace-violation-2/>

“Catalonia's Bid for Independence from Spain Explained,” BBC News, January 31, 2018; <http://www.bbc.com/news/world-europe-29478415>

Chandorkar, Aashish. “Top Five Developments in Politics in 2017, and Five Predictions for 2018,” [for India], Swarajya magazine, December 31, 2017; <https://swarajyamag.com/politics/top-five-developments-in-politics-in-2017-and-five-predictions-for-2018>

“China's Strongman,” The Week, November 25, 2017; <http://theweek.com/articles/739076/chinas-strongman>

Chrisafis, Angelique. “Emmanuel Macron Takes on French Unions to Cut Rail Workers' Rights,” The Guardian, February 26, 2018; <https://www.theguardian.com/world/2018/feb/26/emmanuel-macron-takes-on-french-unions-to-cut-rail-workers-rights>

Connelly, Kate. "Merkel Wins CDU Party's Backing for German Coalition Deal," *The Guardian*, February 26, 2018; <https://www.theguardian.com/world/2018/feb/26/angela-merkel-cdu-to-vote-on-german-coalition-deal>

Crunden, E. A. "2018 Isn't Looking Good for U.S. World Relations," *Think Progress*, December 26, 2017; <https://thinkprogress.org/2018-us-international-relations-e8840525f841/>

De Vogue, Ariane. "Appeals Court Rules Against Latest Trump Travel Ban," *CNN News*, February 15, 2018; <https://www.cnn.com/2018/02/15/politics/travel-ban-ruling/index.html>

Derhally, Massoud A. and Sarmad Khan, "Siemens Eyes Role in Development of Saudi Arabia's 500bn Neom Mega City," *The National*, November 6, 2017; <https://www.thenational.ae/business/economy/exclusive-siemens-eyes-role-in-development-of-saudi-arabia-s-500bn-neom-mega-city-1.673449>

DiChristopher, Tom. "Trump's Iran Nuclear Deal Deadline Is Forcing Tough Talks with Europe," *CNBC*, March 1, 2018; <https://www.cnn.com/2018/03/01/trump-forcing-europe-us-to-resolve-differences-over-iran-nuclear-deal.html>

Donahue, Patric, Arne Delfs and Rainer Buergin. "Angela Merkel Pays a Steep Price to Stay in Power," *Bloomberg Businessweek*, February 15, 2018; <https://www.bloomberg.com/news/articles/2018-02-15/angela-merkel-pays-a-steep-price-to-stay-in-power>

Dudley, Dominic. "Saudi Anti-Corruption Drive Hits Its \$100B Target," *Forbes*, January 30, 2018; <https://www.forbes.com/sites/dominicdudley/2018/01/30/saudi-anti-corruption-drive-hits-its-100b-target-but-at-what-cost/#58bce6be6af7>

Faiola, Anthony. "The Crisis Next Door," *The Washington Post*, March 2, 2018; https://www.washingtonpost.com/news/world/wp/2018/03/02/feature/i-cant-go-back-venezuelans-are-fleeing-their-crisis-torn-country-en-masse/?utm_term=.0f4593141b99

"France in 2018: More Policy Reforms," *The Economist*, January 19, 2018; <http://country.eiu.com/article.aspx?articleid=1676327951&Country=France&topic=Politics&subtopic=Recent+developments>

“France’s Macron Vows to Keep Up Pace of Reforms,” Reuters, December 31, 2017; <https://www.reuters.com/article/us-new-year-france-macron/frances-macron-vows-to-keep-up-pace-of-reforms-idUSKBN1EP0MF>

“The Guardian View on Syria: The Suffering Grows and the World Turns Away,” The Guardian, February 9, 2018; <https://www.theguardian.com/commentisfree/2018/feb/09/the-guardian-view-on-syria-the-suffering-grows-and-the-world-turns-away>

“Germany coalition deal reached after months of wrangling,” BBC News, February 7, 2018; <http://www.bbc.com/news/world-europe-42973419>

Higgins, Eliot. “For the Third Time This Year, Chlorine Is Used as a Chemical Weapon in Douma, Damascus,” Bellingcat News, February 1, 2018; <https://www.bellingcat.com/news/mena/2018/02/01/third-time-year-chlorine-used-chemical-weapon-douma-damascus/>

Ho, Gwyneth. “Why Australian Universities Have Upset Chinese Students,” BBC News, September 5, 2017; <http://www.bbc.com/news/world-australia-41104634>

Holpuch, Amanda. “The Invisible Wall,” The Guardian, December 2017; <https://www.theguardian.com/us-news/2017/dec/23/donald-trump-mexico-border-wall-invisible-immigration>

Hubbard, Ben. “Mike Pence Says U.S. Embassy Will Open in Jerusalem This Year,” New York Times, January 22, 2018; <https://www.nytimes.com/2018/01/22/world/middleeast/jerusalem-embassy-israel.html>

Hurley, Lawrence. “Supreme Court Lets Trump’s Latest Travel Ban Go into Full Effect,” Reuters, December 4, 2017; <https://www.reuters.com/article/us-usa-court-immigration/supreme-court-lets-trumps-latest-travel-ban-go-into-full-effect-idUSKBN1DY2NY>

India Country Profile, BBC News, January 23, 2018; <http://www.bbc.com/news/world-south-asia-1255738>

Iran Nuclear Deal: Key Details. BBC News, October 13, 2017; <http://www.bbc.com/news/world-middle-east-33521655>

Isachenkov, Vladimir. "Meet the 7 Candidates Running Against Vladimir Putin in Russia's Presidential Election," Business Insider, February 8, 2018; <http://www.businessinsider.com/ap-putin-7-rivals-register-for-russias-presidential-race-2018-2>

"Israeli Leader Gives Surprising Time Scale for U.S. Embassy Move," CBS News, January 17, 2018; <https://www.cbsnews.com/news/israel-benjamin-netanyahu-us-embassy-move-jerusalem-this-year/>

"Japan and the Netherlands Affirm Cooperation on North Korea Sanctions," Japan Times, February 10, 2018; <https://www.japantimes.co.jp/news/2018/02/10/national/politics-diplomacy/japan-netherlands-affirm-cooperation-north-korea-sanctions/#.WpyARRiZPdd>

Kartch, John. "List of Tax Reform Good News," ATR, March 2018; <https://www.atr.org/list>

Kim, E. Tammy. "Politics Are Center Stage at a South Korean Winter Olympics," The New Yorker, February 7, 2018; <https://www.newyorker.com/news/sporting-scene/politics-are-center-stage-at-a-south-korean-olympics>

Lam, Katherine. "Syrian Civilians Hit in Poisonous Gas Attack," Fox News, January 22, 2018; <http://www.foxnews.com/world/2018/01/22/syrian-civilians-hit-in-poisonous-gas-attack-rescuers-say.print.html>

Larkin, Martina. "5 Challenges Europe Needs to Address," World Economic Forum, September 13, 2017; <https://www.weforum.org/agenda/2017/09/europe-eu-challenges-junker-address/>

Liebermann, Oren. "Why Moving the U.S. Embassy to Jerusalem Is So Controversial," CNN, December 6, 2017; <https://www.cnn.com/2017/01/24/middleeast/donald-trump-us-embassy-israel-explainer/index.html>

Lynfield, Ben. "Can Russia Defuse the Confrontation with Iran?" Jerusalem Post, February 11, 2018; <http://www.jpost.com/Middle-East/Can-Russia-defuse-the-confrontation-with-Iran-542267>

Masamitsu, Takahashi. "Japan's Politics in 2018: Prospects for Abe's Constitutional Revision Agenda?", Nippon.com, January 11, 2018; <https://www.nippon.com/en/currents/d00374/>

McGuinness, Romina. "Macron in Crisis as Popularity PLUMMETS and France Braces for Crippling Train Strikes," *Express*, February 28, 2018; <https://www.express.co.uk/news/world/925383/France-train-strikes-Macron-popularity-crisis>

"Mexico Leftist Leads Presidential Race," *TeleSUR News*, February 8, 2018; <https://www.telesurtv.net/english/news/Mexico-Leftist-Leads-Presidential-Race-by-11-Points-Poll.html>

Miles, Richard. "Is Mexico Ready for a Populist President," *Foreign Policy*, February 9, 2018; <http://foreignpolicy.com/2018/02/09/is-mexico-ready-for-a-populist-president/>

"North Korean leader Kim Jong Un invites South Korean President Moon Jae-in to Pyongyang for summit," *Japan Times*, February 10, 2018; <https://www.japantimes.co.jp/news/2018/02/10/asia-pacific/politics-diplomacy-asia-pacific/south-korean-president-hosts-lunch-kim-jong-uns-sister/#.WpxlahiZOjR>

Oluoch, Fred. "Make or Break for South Sudan in 2018 as International Interest Wanes," *The East African*, December 31, 2017; <http://www.theeastafrican.co.ke/news/Make-or-break-for-South-Sudan-in-2018/2558-4246440-oj1dfpz/index.html>

Oppenheimer, Andres. "Growing Consensus in U.S.: Russia Will Try to Influence Mexican Elections," *Miami Herald*, February 7, 2018; <http://www.miamiherald.com/news/local/news-columns-blogs/andres-oppenheimer/article>

Orr, Gordon. "What Can We Expect in China in 2018?" *McKinsey & Company*, December 2017; <https://www.mckinsey.com/global-themes/china/what-can-we-expect-in-china-in-2018>

Porritt, Richard. "Brexodus Begins as 1,000 Jobs Go," *The New European*, November 20, 2017; <http://www.theneweuropean.co.uk/top-stories/brexodus-begins-as-1-000-jobs-go-1-5288500>

"Protestors in South Sudan Denounce U.S. Arms Embargo," *New York Times*, February 6, 2018; https://www.nytimes.com/2018/02/06/world/africa/south-sudan-protests-us-arms-embargo.html?ref=collection%2Ftimestopic%2FSudan&action=click&content-Collection=world®ion=stream&module=stream_unit&version=latest&contentPlace-ment=2&pgtype=collection

Roby, Christin. "5 African Crises to Watch in 2018," Devex, January 8, 2018; <https://www.devex.com/news/5-african-crises-to-watch-in-2018-91836>

"S. Africa political deadlock as Jacob Zuma clings to power," Daily Nation, February 10, 2018; <https://www.nation.co.ke/news/africa/South-Africa-political-deadlock-as-Zuma-clings-to-power-/1066-4299086-xiuv6v/index.html>

Sang-Hun, Choe. "North Korea Is Willing to Talk with U.S., South's Leader Says," New York Times, February 25, 2018; <https://www.nytimes.com/2018/02/25/world/asia/north-korea-us-talks.html>

Schallhorn, Kaitlyn. "What Is DACA and Why Is the Trump Administration Ending It?" Fox News, March 7, 2018; <http://www.foxnews.com/politics/2018/02/14/what-is-daca-and-why-is-trump-administration-ending-it/>

Schallhorn, Kaitlyn. "Why Trump's Promise to Move U.S. Embassy to Jerusalem Is So Controversial," Fox News, February 23, 2018; <http://www.foxnews.com/politics/2018/02/23/why-trumps-promise-to-move-us-embassy-to-jerusalem-is-so-controversial.html>

Seitz-Walk, Alex. "Everything You Need to Know About the 2018 Midterm Elections," NBC News, December 2017; <https://www.nbcnews.com/politics/elections/everything-you-need-know-about-2018-midterm-elections>

Sharkov, Damian. "Russia and the West: Russians Happy with Putin and His Anti-U.S. Policies," Newsweek, July 2017; <http://www.newsweek.com/russia-wants-more-putin-and-no-thaw-west-631948>

Sheetz, Michael. "Trump's Tax Cuts Were a Big Way 'to Unleash Economic Energy' in America, Boeing CEO Says," CNBC, February 15, 2018; <https://www.cnbc.com/2018/02/15/boeing-ceo-trump-tax-cuts-were-a-big-way-to-unleash-economic-energy.html>

Snow, Shawn. "New in 2018: The Fight Against ISIS Evolves," Military Times, December 31, 2017; <https://www.militarytimes.com/flashpoints/2017/12/31/new-in-2018-the-fight-against-isis-evolves/>

Stothard, Michael. "Spain's 'surgical strike' on Catalonia turns into arduous campaign," Financial Times, March 1, 2018; <https://www.ft.com/content/c7b2ccb2-1c9b-11e8-aaca-4574d7dabfb6>

Stowell, Joshua. "12 Predictions for Geopolitics for 2018 and Beyond," *Global Security Review*, February 10, 2018; <https://globalsecurityreview.com/world-will-look-like-2025/>

Tanner, Michael. "Scorecard: Trump's First Six Months," *National Review*, July 2017; <https://www.nationalreview.com/2017/07/scorecard-trump-first-six-months/>

Toyana, Mfuneko and Alexander Winning. "End Game Looms for South Africa's Zuma," *Reuters*, February 7, 2018; <https://www.reuters.com/article/us-safrica-politics-zuma/end-game-looms-for-south-africas-zuma-idUSKBN1FR0M2>

"Trump's Immigration Dragnet," *The Week*, December 3, 2017; <http://theweek.com/articles/740518/trumps-immigrant-dragnet>

Tucker, Duncan. "Mexico's Most Wanted: A Guide to the Drug Cartels," *BBC News*, January 2018; <http://www.bbc.com/news/world-latin-america-40480405>

"Venezuela Is the One to Watch on Oil," *Financial Times*, March 4, 2018; <https://www.ft.com/content/d76e9ac4-1d67-11e8-aaca-4574d7dabfb6>

Vice, Margaret. "Mexican Views of the U.S. Turn Sharply Negative," *Pew Research*, September 14, 2017; <http://www.pewglobal.org/2017/09/14/mexican-views-of-the-us-turn-sharply-negative>

Whitefield, Mimi. "As the Selection of a New President Approaches, Cubans Say They Want Meaningful Change," *Miami Herald*, March 1, 2018; <http://www.miamiherald.com/news/nation-world/world/americas/cuba/article202746109.html>

Whiteman, Hilary and Sophie Jeong. "White House on North Korea Talks, 'We Will See,'" *CNN*, February 25, 2018; <https://www.cnn.com/2018/02/25/asia/north-korea-us-talks-intl/index.html>

"Why 2018 is a Big Election Year for India," *Indian Express*, January 1, 2018; <http://indianexpress.com/article/india/politics-in-2018-here-is-a-list-of-states-that-go-to-polls-this-year-5006983/>

"Xi Jinping Has More Clout Than Donald Trump," *The Economist*, October 14, 2017; <https://www.economist.com/news/leaders/21730144-do-not-expect-mr-xi-change-china-or-world-better-xi-jinping-has-more-clout>

“Zimbabwe Army Takes Control – But Denies Coup,” *The Week*, November 15, 2017; <http://www.theweek.co.uk/89703/is-zimbabwe-undergoing-a-coup>

Zovatto, Daniel. “Latin America’s Super Election Cycle Is Wide Open,” *Brookings Institute*, November 6, 2017; <https://www.brookings.edu/blog/order-from-chaos/2017/11/06/latin-americas-super-election-cycle-is-wide-open/>

Global Security

Bershidsky, Leonid. “Russia’s Military Is Leaner, But Meaner,” Dec. 14, 2017; <https://www.bloomberg.com/view/articles/2017-12-14/russia-s-military-is-leaner-but-meaner>

Boston, Scott and Dara Massicot, “The Russian Way of Warfare: A Primer,” Dec. 7, 2017; <https://www.rand.org/pubs/perspectives/PE231.html>

Busvine, Douglas and Stephen Nellis, “Security Flaws Put Virtually All Phones, Computers at Risk,” Jan. 3, 2018; <https://www.reuters.com/article/us-cyber-intel/security-flaws-put-virtually-all-phones-computers-at-risk-idUSKBN1ES1BO>

Collin, Katy. “The Year in Failed Conflict Prevention,” Dec. 14, 2017; <https://www.brookings.edu/blog/order-from-chaos/2017/12/14/the-year-in-failed-conflict-prevention/>

Daniels, Jeff. “Global defense spending to reach levels not seen since end of Cold War,” Dec. 18, 2017; <https://www.cnbc.com/amp/2017/12/18/ihs-janes-global-defense-spending-to-see-best-growth-rate-in-decade.html>

Elinson, Zusha Elinson and Zolan Kanno-Youngs, “Big-City Murders Drop to Historic Lows,” Jan. 5, 2018; <https://www.wsj.com/articles/big-city-murders-drop-to-historic-lows-1515148200>

Feaver, Peter. “Five Takeaways from Trump’s National Security Strategy,” Dec. 18, 2017; <http://foreignpolicy.com/2017/12/18/five-takeaways-from-trumps-national-security-strategy/>

Heath, Timothy R. “America’s New Security Strategy Reflects the Intensifying Strategic Competition with China,” Dec. 27, 2017; <https://www.rand.org/blog/2017/12/americas-new-security-strategy-reflects-the-intensifying.html>

Heath, Timothy R. "Trump's National Security Strategy Ratchets Up U.S. Competition with China," Dec. 26, 2017; <https://www.worldpoliticsreview.com/articles/23889/trump-s-national-security-strategy-ratchets-up-u-s-competition-with-china>

Ingram, George. "Development as a Featured Theme in U.S. National Security Strategies Since 2002," Dec. 22, 2017; <https://www.brookings.edu/blog/up-front/2017/12/22/development-as-a-featured-theme-in-us-national-security-strategies-since-2002/>

Institute for Economics & Peace, "Global Terrorism Index – 2017: Measuring and Understanding the Impact of Terrorism"; <https://reliefweb.int/sites/reliefweb.int/files/resources/Global%20Terrorism%20Index%202017%20%284%29.pdf>

Jenkins, Brian Michael. "Navigating the Latest Terrorism Trend," Dec. 19, 2017; <https://www.rand.org/blog/2017/12/navigating-the-latest-terrorism-trend.html>

Kostyuck, Nadiya and Yuri M. Zhukov. "Invisible Digital Front – Can Cyber Attacks Shape Battlefield Events?" first published Nov. 10, 2017; <http://journals.sagepub.com/eprint/59a3BYDjDj8x9nyGtVg/full>

McKenzie, Paul D. "New Cybersecurity Law Comes Online," June 1, 2017; https://www.amchamchina.org/news/new-cybersecurity-law-comes-online?utm_source=newsletter&utm_campaign=top-10-stories-of-2017&utm_medium=email

Mock, Brentin. "The Truth About Violent Crime in America's Cities," Dec. 21, 2017; <https://www.citylab.com/equity/2017/12/telling-the-truth-about-crime-in-americas-cities/548930/>

Sanger, David E. and William J. Broad, "To Counter Russia, U.S. Signals Nuclear Arms Are Back in a Big Way," Feb. 4, 2018; <https://www.nytimes.com/2018/02/04/us/politics/trump-nuclear-russia.html>

Volz, Dustin. "FBI Chief Calls Unbreakable Encryption 'Urgent Public Safety Issue,'" Jan. 9, 2018; <https://www.reuters.com/article/us-usa-cyber-fbi/fbi-chief-calls-unbreakable-encryption-urgent-public-safety-issue-idUSKBN1EY1S7>

Wagner, Jack. "China's Cybersecurity Law: What You Need to Know," June 1, 2017; <https://thediplomat.com/2017/06/chinas-cybersecurity-law-what-you-need-to-know/>

Zeigler, Sean M. and Meagan L. Smith, "Terrorism Before and During the War on Terror: A Look at the Numbers," Dec. 12, 2017; <https://www.rand.org/blog/2017/12/terrorism-before-and-during-the-war-on-terror-a-look.html>

Global Infrastructure

"2017 Infrastructure Score Card," Infrastructure Report Card 2017; <https://www.infrastructurereportcard.org/solutions/>

Alegado, Siegrid. "Japan Still Beating China in Southeast Asia Infrastructure Race," Bloomberg Businessweek, February 8, 2018; <https://www.bloomberg.com/news/articles/2018-02-08/japan-still-beating-china-in-southeast-asia-infrastructure-race>

"As ASEAN Continues to Integrate, New Report Addresses Progress and Gaps in Connectivity," The World Bank, May 10, 2017; <http://www.worldbank.org/en/news/feature/2017/05/09/as-asean-continues-to-integrate-new-report-addresses-progress-and-gaps-in-connectivity>

Balachandran, Manu. "India Is Planning to Build 83,000 km of Roads," World Economic Forum, November 6, 2017; <https://www.weforum.org/agenda/2017/11/india-is-planning-to-build-83-000-km-of-roads>

Breene, Keith. "7 Chinese Superstructures That Leave the Rest of the World in the Shade," World Economic Forum, August 2017; <https://www.weforum.org/agenda/2017/08/chinese-superstructures-that-leave-the-rest-of-the-world-in-the-shade/>

Bruce-Lockhart, Anna. "China's \$900 billion New Silk Road. What You Need to Know," World Economic Forum, June 2017; <https://www.weforum.org/agenda/2017/06/china-new-silk-road-explainer/>

"Building a Stronger America: President Donald J. Trump's American Infrastructure Initiative," February 12, 2018; <https://www.whitehouse.gov/briefings-statements/building-stronger-america-president-donald-j-trumps-american-infrastructure-initiative/>

Burke, Michael S. "How to Plan Wonder into Tomorrow's Cities," World Economic Forum, January 19, 2018; <https://www.weforum.org/agenda/2018/01/how-to-plan-wonder-into-tomorrows-cities/>

Canada Infrastructure Bank. <http://www.infrastructure.gc.ca/CIB-BIC/index-eng.html>

“China’s Silk Road Cuts Through Some of the World’s Riskiest Countries,” Bloomberg News, October 2017; <https://www.bloomberg.com/news/articles/2017-10-25/china-s-new-silk-road-runs-mostly-through-junk-rated-territory>

Collins, Michael. “European Infrastructure Needs More Than Public Funding,” Euractiv, January 2, 2017; <https://www.euractiv.com/section/euro-finance/opinion/european-infrastructure-needs-more-than-public-funding/>

“EU invests €1 billion in transport network development,” European Commission on Mobility and Transport, November 2017; https://ec.europa.eu/transport/themes/infrastructure/news/2017-11-30-eu-invest-1-billion-euro-in-transport_en

“Financing Infrastructure in Asia and the Pacific,” Asian Development Bank Institute Report, 2018; <https://www.adb.org/sites/default/files/publication/394191/adbi-financing-infrastructure-asia-capturing-impacts-and-new-sources.pdf>

“Future Cities—Planning for Our Growing Population,” Infrastructure Australia; <http://infrastructureaustralia.gov.au/news-media/speeches-presentations/future-cities.aspx>

“The Future of Infrastructure (2018) Report,” AECOM, 2018; <https://infrastructure.aecom.com>

Giugliano, Ferdinando. “For Europe, Infrastructure Is the Wrong Priority,” Bloomberg View, May 24, 2017; <https://www.bloomberg.com/view/articles/2017-05-24/europe-needs-more-than-infrastructure-spending-to-thrive>

“Infrastructure & Industry,” Prime Minister of Australia Malcolm Turnbull; <https://www.pm.gov.au/priorities/infrastructure-industry>

“Latin America Needs an Infrastructure Upgrade,” The Economist, March 10, 2018; <https://www.economist.com/news/americas/21738419-governments-risk-wasting-gold-en-opportunity-improve-regions-transport-sanitation-and>

“Long-Term Investing, Infrastructure and Development,” World Economic Forum, <https://toplink.weforum.org/knowledge/insight/a1Gb0000001k6JwEAI/explore/summary>

“Migration and Its Impact on Cities Report,” World Economic Forum, October 2017; http://www3.weforum.org/docs/Migration_Impact_Cities_report_2017_low.pdf

Moody, Andrew. “Infrastructure bank ‘is global institution,” The Telegraph, May 24, 2017; <https://www.telegraph.co.uk/news/world/china-watch/business/danny-alexander-on-the-aiib/>

Pheiffer, Evan. “Top 10: Africa Infrastructure Projects in 2018,” The Business Year, December 13, 2017; <https://www.thebusinessyear.com/top-10-china-infrastructure-projects-in-africa-2018/focus>

Ramamurthy, Satya. “From rapid to planned urbanization: How infrastructure can change the face of cities in South East Asia,” World Economic Forum, 10 May 2017; <https://www.weforum.org/agenda/2017/05/planning-the-city-in-south-east-asia/>

Reynolds, Isabel. “As Trump Heads to China, U.S.-Japan Sign Infrastructure Deals,” Bloomberg Businessweek, November 7, 2017; <https://www.bloomberg.com/news/articles/2017-11-07/as-trump-heads-to-china-u-s-japan-sign-infrastructure-deals>

Ryan, Tim. “How Better Infrastructure Could Ensure More Americans Prosper,” World Economic Forum, January 2018; <https://www.weforum.org/agenda/2018/01/inclusive-infrastructure-united-states-new-deal-tim-ryan/>

“Shaping the Future of Long-Term Investing, Infrastructure and Development,” World Economic Forum, 2018; <https://www.weforum.org/system-initiatives/shaping-the-future-of-long-term-investing-infrastructure-and-development>

Signe, Landry. “The Road Ahead for Fixing Africa’s Infrastructure Deficit,” Brookings Institute, November 16, 2017; <https://www.brookings.edu/blog/africa-in-focus/2017/11/16/the-road-ahead-for-fixing-africas-infrastructure-deficit/>

“Smart City Contest – Government Launched Rs 50-lakh Prize Money,” Smart Cities Project, September 11, 2017, <http://www.smartcitiesprojects.com/2180-2/#more-2180>

“Spending Better, not Necessarily More, Key to Improving Infrastructure in Latin America and the Caribbean,” The World Bank, Press Release, April 7, 2017; <http://www.worldbank.org/en/news/press-release/2017/04/07/spending-better-not-necessarily-more-key-to-improving-infrastructure-in-latin-america-and-the-caribbean>

Suzuki, Jun. “Asia has \$26tn in Infrastructure Projects Up for Grabs,” *Nikkei Asian Review*, October 18, 2017; <https://asia.nikkei.com/Politics-Economy/Economy/Asia-has-26tn-in-infrastructure-projects-up-for-grabs>

“Understanding infrastructure opportunities in ASEAN,” Report 1, PwC, September 2017; <https://www.pwc.com/sg/en/publications/cpi-mas-infrastructure-opportunities-in-asean.html>

Weller, Chris. “11 giant infrastructure projects that could reshape Europe,” *Business Insider*, March 2017; <http://www.businessinsider.com/infrastructure-projects-reshape-europe-2017/>

“What Is China’s Belt and Road Initiative?” *The Economist*, May 2017; <https://www.economist.com/blogs/economist-explains/2017/05/economist-explains-11>

“Why We Need to Close the Infrastructure Gap in Sub-Saharan Africa,” World Bank, April 2017; <http://www.worldbank.org/en/region/afr/publication/why-we-need-to-close-the-infrastructure-gap-in-sub-saharan-africa>

Global Mass Movements of People

“A World on the Move: The Benefits of Migration,” Laura Thompson speech, International Organization for Migration, September 25, 2014; <https://www.iom.int/speeches-and-talks/world-move-benefits-migration>

“Africa and the Middle East,” *Global Security Review*, October 2017; <https://globalsecurityreview.com/africa-middle-east/>

Albert, Eleanor. “The Rohingya Crisis,” Council on Foreign Relations, February 9, 2018; <https://www.cfr.org/background/rohingya-crisis>

<https://www.amnesty.org/en/latest/news/2017/11/one-of-the-worlds-poorest-countries-confronts-ethnic-cleansing-on-its-doorstep/>

Anderson, Sean. “How Architecture Can Help Redefine the Refugee Crisis,” September 8, 2017; <https://www.cnn.com/style/article/sean-anderson-moma-refugee-architecture/index.html>

Bahar, Dany. "Venezuela's Refugee Crisis Will Exceed Syria's," The Hill, February 9, 2018; <http://thehill.com/opinion/international/373132-venezuelas-refugee-crisis-will-exceed-syrias-we-must-help>

Brhane, Mogos O. "Understanding why Eritreans go to Europe," Forced Migration Review; <http://www.fmreview.org/destination-europe/brhane.html>

Bruni, Carla. "Vacant Buildings for Refugees," US ICOMOS, 2017; <http://www.usicomos.org/vacant-buildings-for-refugees-a-case-study-in-the-power-of-adaptive-reuse-of-older-and-historic-buildings-for-resilience/>

Charles, Alice. "We Need to Get Better at Integrating Migrants into Our Cities," World Economic Forum, October 2017; <https://www.weforum.org/agenda/2017/10/we-need-to-get-better-at-integrating-migrants-into-our-cities-here-s-how>

"Degree of Urbanization," Statista, 2017; <https://www.statista.com/statistics/270860/urbanization-by-continent/>

"Displacement in the Middle East," Forced Migration Review, February 2018; <http://www.fmreview.org/middle-east-cfa.html>

el-Gamaty, Guma. "Migrant Crisis: Europe Should Stop Using Libya as a Dumping Ground," Middle East Eye, November 2017; <http://www.middleeasteye.net/columns/libya-geopolitics-migration-and-failed-european-policy-290797703>

Elbagir, Nima, Raja Razek, Alex Platt and Bryony Jones. "People for Sale: Where Lives Are Auctioned," CNN.com, November 15, 2017; <https://www.cnn.com/2017/11/14/africa/libya-migrant-auctions/index.html>

"Ensuring the Rights of Climate-Displaced People in Bangladesh," Forced Migration Review, February 2017; <http://www.fmreview.org/resettlement/barua-shahjahan-rahman-rahman-molla.html>

"Europe Failing in Its Responsibilities toward Refugees and Migrants in Libya," Refugees International, December 15, 2017; <https://www.refugeesinternational.org/advocacy-letters-1/2017/12/15/europe-failing-in-its-responsibilities-toward-refugees-and-migrants-in-libya>

“Fighting displaces 210,000 in northwest Syria in the depths of winter,” International Rescue Committee, January 12, 2018; <https://www.rescue.org/article/fighting-displaces-210000-northwest-syria-depths-winter>

Guterres, António. “Migration Can Benefit the World,” The Guardian, January 11, 2018; <https://www.theguardian.com/commentisfree/2018/jan/11/migration-benefit-world-un-global-compact>

“Hope and Inclusion: Investing in Refugees in Serbia,” The World Bank, March 6, 2018; <http://www.worldbank.org/en/news/immersive-story/2018/03/06/hope-and-inclusion-investing-in-stranded-refugees-in-serbia>

ICE Immigration Removals; <https://www.ice.gov/removal-statistics/2016>

“Iraq—Complex Emergency Fact Sheet #4,” U.S. AID, February 2018; https://www.usaid.gov/sites/default/files/documents/1866/iraq_ce_fs04_02-09-2018.pdf

“Iraq Emergency,” UNHCR; <http://www.unhcr.org/en-us/iraq-emergency.html>

“Is Migration Good for the Economy?” Migration Policy Debates, OECD, 2014; <https://www.oecd.org/migration/OECD%20Migration%20Policy%20Debates%20Numero%202.pdf>

Jubilut, Liliana Lyra. “Global Compacts on Migration and on Refugees,” World Economic Forum, December 12, 2017; <https://www.weforum.org/agenda/2017/12/compacts-for-migrants-and-refugees-can-be-separate-but-must-reflect-what-they-share/>

Khaled, Lisa. “UNHCR steps up aid as displaced Syrians brace for winter,” UNHCR, December 22, 2017; <http://www.unhcr.org/en-us/news/stories/2017/12/5a3cfd384/unhcr-steps-aid-displaced-syrians-brace-winter.html>

Majumdar, Rumki. “Why Reversing Globalization May Not Be a Good Idea,” Deloitte Insights, August, 2017; <https://www2.deloitte.com/insights/us/en/economy/global-economic-outlook/2017/q3-impact-of-reversing-globalization.html#endnote-sup-6>

“Meet the Human Faces of Climate Migration,” The World Bank, March 19, 2018; <http://www.worldbank.org/en/news/feature/2018/03/19/meet-the-human-faces-of-climate-migration>

“Migration and Its Impact on Cities,” Report, World Economic Forum, October 2017; <https://www.weforum.org/reports/migration-and-its-impact-on-cities>

O'Reilly, Andrew. "Venezuela's Migrant Crisis Could Match Scale of Syria's Catastrophe, Experts Say," Fox News, February 20, 2018; <http://www.foxnews.com/world/2018/02/20/venezuelas-migrant-crisis-could-match-scale-syrias-catastrophe-experts-say.html>

Pollard, Suzanna N. "Criminal Violence in Honduras as a Driver of Displacement," Forced Migration Review; <http://www.fmreview.org/latinamerica-caribbean/nelsonpollard.html>

https://publications.iom.int/system/files/pdf/wmr_2018_en.pdf

Reidy, Eric. "The Route Is Shut," News Deeply | Refugees Deeply, August 1, 2017; <https://www.newsdeeply.com/refugees/articles/2017/08/01/the-route-is-shut-eritreans-trapped-by-egypts-smuggling-crackdown>

Redden, Elizabeth. "A Year of Travel Bans," Inside Higher Ed, February 1, 2018; <https://www.insidehighered.com/news/2018/02/01/year-later-trump-administrations-travel-restrictions-opposed-many-higher-ed-are>

Shead, Sam. "The Story of Berlin's Tempelhof Airport," The Independent, June 20, 2017; <https://www.independent.co.uk/news/world/world-history/the-story-of-berlins-wwii-tempelhof-airport-which-is-now-germanys-largest-refugee-shelter-a7799296.html>

S.M. "Donald Trump's Travel Ban Heads Back to the Supreme Court," The Economist, January 23, 2018; <https://www.economist.com/blogs/democracyinamerica/2018/01/travelling-ban>

Soszynska, Marta. "A Neglected Crisis: Central American refugees leave home only to face more danger," BBC, 2017; <http://www.bbc.com/storyworks/innovations-with-impact/a-neglected-crisis>

<http://www.unocha.org/sites/dms/Documents/GuidingPrinciplesDispl.pdf>

"U.S. Ends Participation in the Global Compact on Migration," State Department press release; December 3, 2017; <https://www.state.gov/secretary/remarks/2017/12/276190.htm>

Waraich, Omar. "One of the World's Poorest Countries Confronts Ethnic Cleansing on Its Doorstep," Amnesty International, November 2017;

Warn, Elizabeth and Susan B. Adamo. "The Impact of Climate Change: Migration and Cities in South America," World Meteorological Organization, 2014; <https://public.wmo.int/en/resources/bulletin/impact-of-climate-change-migration-and-cities-south-america>

World Migration Report, International Organization for Migration; https://publications.iom.int/system/files/pdf/wmr_2018_en.pdf

Yun, Wang. “Yichun: The Timber Town That Banned Logging,” Sixth Tone; <http://interaction.sixthtone.com/feature/2018/shrinking-cities/yichun.html>

Global Climate Conditions and Natural Resources

“2016 Renewable Energy Data Book,” Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy, Dec. 2017; <https://www.nrel.gov/docs/fy18osti/70231.pdf>

Appleby, Kyra. “Can 100% of a City’s Electricity Come from Renewables?” World Economic Forum, March 8, 2018; <https://www.weforum.org/agenda/2018/03/clean-energy-can-provide-100-of-a-city-s-electricity-here-s-how>

“Assessing the Global Climate in February 2018,” NOAA, March 2018; <https://www.ncei.noaa.gov/news/global-climate-201802>

Blackman, Sue Anne Batey and William J. Baumol. “Natural Resources,” The Concise Encyclopedia of Economics; <http://www.econolib.org/library/enc/naturalresources.html>

Chitty, Tom. “We’re on Track to Triple Our Use of Natural Resources by 2050,” CNBC, September 11, 2017; <https://www.cnbc.com/2017/09/11/were-on-track-to-triple-our-use-of-natural-resources-by-2050.html>

Circular Economy Overview. <https://www.ellenmacarthurfoundation.org/circular-economy/overview/concept>

“Climate Change: How Do We Know?” <https://climate.nasa.gov/evidence/>

“Drought – February 2018,” NOAA; <https://www.ncdc.noaa.gov/sotc/drought/201801>

“Each Country’s Share of CO2 Emissions,” Union of Concerned Scientists; <https://www.ucsusa.org/global-warming/science-and-impacts/science/each-countrys-share-of-co2.html#.WrfZEBiZNZ1>

Farand, Chloe. "Floods in India, Bangladesh and Nepal Kill 1,200 and Leave Millions Homeless," *The Independent*, August 29, 2017; <https://www.independent.co.uk/news/world/asia/india-floods-bangladesh-nepal-deaths-millions-homeless-latest-news-up-dates-a7919006.html>

Folke, Carl. "Reconnect to the Biosphere," Stockholm Resilience Center; <http://www.stockholmresilience.org/research/research-news/2015-02-19-reconnect-to-the-biosphere.html>

"Global Warming and Hurricanes," Geophysical Fluid Dynamics Laboratory, revised January 24, 2018; <https://www.gfdl.noaa.gov/global-warming-and-hurricanes/>

Hausfather, Zeke. "Global CO2 Emissions Set to Rise," Carbon Brief, November 2017; <https://www.carbonbrief.org/analysis-global-co2-emissions-set-to-rise-2-percent-in-2017-following-three-year-plateau>

Hill, David Hill. "What It Takes to Go Net-Zero," *Architect Magazine*, Oct. 2017; <http://www.architectmagazine.com/practice/what-it-takes-to-go-net-zero>

Mooney, Chris. "CO2 Emissions Are Rising Again," *Washington Post*, November 2017; <https://www.sciencealert.com/fossil-fuel-emissions-will-reach-an-all-time-high-in-2017?perpetual=yes&limitstart=1>

Newbold, Tim, Lawrence Hudson, Andrew Arnell, Sara Contu, et al., "Has Land Use Pushed Terrestrial Biodiversity Beyond the Planetary Boundary? A Global Assessment," *Science*, July 2016; <http://science.sciencemag.org/content/353/6296/288>

Nyquist, Scott, Matt Rogers and Jonathan Woetzel. "The Future Is Now," McKinsey Quarterly, October 2016; <https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-future-is-now-how-to-win-the-resource-revolution>

Paris Agreement. https://ec.europa.eu/clima/policies/international/negotiations/paris_en

Rockstrom, Johan. "We Can Still Rescue This Planet from Climate Change," *World Economic Forum*, September 19, 2017; <https://www.weforum.org/agenda/2017/09/planet-climate-change-johan-rockstrom>

"Statement by President Trump on the Paris Climate Accord," June 1, 2017; <https://www.whitehouse.gov/briefings-statements/statement-president-trump-paris-climate-accord/>

Taylor, James. "Emissions Without Borders," *Forbes*, January 17, 2018; <https://www.forbes.com/sites/jamestaylor/2018/01/17/emissions-without-borders-2017-data-show-global-co2-challenges/#c63453267d90>

"U.S. Wildfires," NOAA; <https://www.ncdc.noaa.gov/societal-impacts/wildfires/>

Vaughn, Adam. "Biodiversity Is Below Safe Levels Across More Than Half of the World's Land," *The Guardian*, July 2016; <https://www.theguardian.com/environment/2016/jul/14/biodiversity-below-safe-levels-across-over-half-of-worlds-land-study>

"What Are Some Examples of Green Technologies?" U.S. Bureau of Labor Statistics; <https://www.bls.gov/respondents/gtp/examples.htm>

"What Is the Difference Between Weather and Climate?" NOAA, https://oceanservice.noaa.gov/facts/weather_climate.html; accessed 2/1/18.

"Where Is Drought This Week?" Drought.gov; <https://www.drought.gov/drought/>

Winston, Andrew. "Leading in a World of Resource Constraints and Extreme Weather," *Harvard Business Review*, June 2015; <https://hbr.org/2015/06/leading-in-a-world-of-resource-constraints-and-extreme-weather>

Woetzel, Jonathan and Scott Nyquist. "How the Natural Resources Business Is Turning into a Technology Industry," *Harvard Business Review*, June 2017; <https://hbr.org/2017/06/how-the-natural-resources-business-is-turning-into-a-technology-industry>

WWF's Living Planet Report, 2016; http://wwf.panda.org/about_our_earth/all_publications/lpr_2016/

Global Technology

Balch, Oliver. "Building By Numbers: How 3D Printing Is Shaking Up the Construction Industry," *The Guardian*, January 31, 2017; <https://www.theguardian.com/sustainable-business/2017/jan/31/building-by-numbers-how-3d-printing-is-shaking-up-the-construction-industry>

Brownell, Blaine. "Material Trends to Watch in 2018," *Architect Magazine*, Jan. 25, 2018; http://www.architectmagazine.com/practice/material-trends-to-watch-in-2018_o

“Construction Industry Behind Curve in Cutting-Edge Tech,” *Economic Times*, September 14, 2016; <https://economictimes.indiatimes.com/industry/services/consultancy/-audit/construction-industry-behind-curve-in-cutting-edge-tech-kpmg/article-show/54331518.cms>

DiChristopher, Tom. “Solar Power: Here’s Where Your State Now Ranks,” *CNBC*, March 15, 2018; <https://www.cnn.com/2018/03/15/solar-power-heres-where-your-state-now-ranks.html>

Heiskanen, Aarni. “How Drones Are Speeding Up Construction,” *AEC-Business*, July 2017; <https://aec-business.com/drones-speeding-construction/>

Higgins, Adam. “7 Major Construction Technology Innovations to Watch in 2018,” *Autodesk*, Dec. 21, 2017; <https://connect.bim360.autodesk.com/construction-innovation-2017>

Link, Jeff. “Here comes the Next Big Technological Boom: Drones in Construction,” *Autodesk*, November 2016; <https://www.autodesk.com/redshift/drones-in-construction/>

Love, Tessa. “How India’s Rooftops Are Leading a Solar Revolution,” *World Economic Forum*, December 13, 2017; <https://www.weforum.org/agenda/2017/12/how-indias-rooftops-are-leading-a-solar-revolution>

Marr, Bernard. “9 Technology Mega Trends That Will Change the World in 2018,” *Forbes*, December 4, 2017; <https://www.forbes.com/sites/bernardmarr/2017/12/04/9-technology-mega-trends-that-will-change-the-world-in-2018/>

Mecklin, John. *The Bulletin of the Atomic Scientists*, 2018; vol. 74, No. 1, 1; <https://thebulletin.org/2018/january/introduction-good-news-perilous-times>

Moore, Nicole Casal. “Unhackable Computer Under Development,” *Michigan News*, December 20, 2017; <http://ns.umich.edu/new/releases/25336-unhackable-computer-under-development-with-3-6m-darpa-grant>

Pak, Ekaterina. “CRISPR: A Game-Changing Genetic Engineering Technique,” *Harvard University Graduate School of Arts & Sciences*, November 2014; <http://sitn.hms.harvard.edu/flash/2014/crispr-a-game-changing-genetic-engineering-technique/>

“Shaping the Further of Construction,” World Economic Forum, 2017; <http://www3.weforum.org/docs/WEF-Shaping-the-Future-of-Construction-Inspiring-Innovators-redefine-the-industry-2017.pdf>

“Tesla Just Finished Building the World’s Biggest Battery on a Wind Farm in Australia,” Fortune, November 22, 2017; <http://fortune.com/2017/11/22/tesla-australia-battery-grid-australia/>

“What is Cellular Agriculture?” August 16, 2016; <http://www.newharvest.org/what-is-cellular-agriculture>

Notable Quotes

Zaha Hadid

“Obviously for some people there is a big connection between music and the way you can create a space.”

“I don’t think that architecture is only about shelter, is only about a very simple enclosure. It should be able to excite you, to calm you, to make you think.”

“You have to really believe not only in yourself; you have to believe that the world is actually worth your sacrifices.”

“I am sure that as a woman I can do a very good skyscraper.”

“If everyone used
this software we just
developed for ourselves,
it would revolutionize
the professions.”

“But, we’re not a software
company, are we?”

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2018 Leadership Summit Events

Each year the Design Futures Council gathers together around a series of essential themes ruddering the A/E/C industry. The gatherings are always titled as Leadership Summits or Forums. Each gathering is attended by leaders from property development, architecture, design, engineering, construction, finance, banking, building product manufacturing, academia, and more. The overarching goals for these exchanges are:

- **relational connectedness among attendees,**
- **challenging the status quo of design and delivery,**
- **presentation of thought-leading content that alters perspectives,**
- **staging the questions every industry leader should be asking,**
- **and more.**

The schedule of remaining DFC events for 2018 is:

Leadership Forum on Design Education & Talent

June 20 (New York, NY - USA) – Minding the gap between education and professional practice, this gathering seeks to bring the development of talent together. There is an emphasis on morphing educational approaches and professional talent management toward resilient ends.

Leadership Summit of the Future of Architecture...Preparation, Practice, Posture

October 9-11 (Venice - ITALY) – Centering around the La Biennale di Venezia, this event will bring together A/E/C leaders from across the globe to grapple with the accelerated changes encountered daily in the profession and highlights both opportunities and challenges.

Leadership Summit on the Business of Design

November 12-13 (New York, NY - USA) – All things business. This gathering deals with leadership, risk, organizational constructs, finance, marketing, and an ever-relevant list of themes every leader needs to know.

All gatherings are limited to 100 executive-level participants to ensure the relational connectedness and personal dynamic the DFC has been known to sustain for over twenty years.



Other Events in 2018

In addition to the DFC leadership summits and forums, DesignIntelligence (through DI Research) is also convening a special series of half day, action-oriented forums that focus on challenging the status quo and discovering new approaches to practical, effective, and regenerative practice.

Action Forums: From Sustainable, to Resilient, to Regenerative Design

April through August, 2018 – Action Forums will be held in Los Angeles, Chicago, New York, Boston, Atlanta, and Seattle. More information can be found at: www.di.net/research-forums/



Design Futures Council Leadership Summit on Technology & Applied Innovation—La Jolla, CA; January 2018
Engaging Leaders with One Another and the Future





“The top three decision makers at the firm are all over 60. What is going to happen when they retire?”

“You’d think we would have a plan for that, wouldn’t you?”

For when you need to think about leadership and the future.

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ANNOUNCING THE DI RESEARCH ACTION FORUMS:

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Chicago 5/15 hosted by USG
NYC 6/4 hosted by KPF
Atlanta 6/14 hosted by tvsdesign

Coming later this summer:

Boston and **Seattle**

EVENTS ARE LIMITED TO 40 LEADERS.

The Call to a Regenerative Future

DesignIntelligence and DI Research are convening a series of half day, action-oriented forums for leaders from across the spectrum of architecture, engineering, construction, and design. The forums will focus on challenging the status quo and finding new approaches to practical, effective, and regenerative practice.

FOR MORE INFORMATION

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