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#globalinfra

Foreword

Infrastructure is firmly at the top of government agendas. It's the lynchpin of political platforms; the hope for sluggish economies; the unifier of regional diversity; the solution to climate change; an instrument for social change. For a host of economic, social and political reasons, all governments — at all levels — are keenly focused on infrastructure.

The problem is that — over the past few years in particular — the rules of the game have changed. As this edition of *Insight* magazine clearly illustrates, the traditional approaches to infrastructure delivery have been disrupted. And this is creating massive opportunities for some, but also significant risks for many.

This is a pivotal point for most markets and societies; many of the decisions made today will reverberate for generations. The great fear is that some markets may look at all this disruption and choose to retreat inwards — to vainly try to protect their frail advantages with barriers and subsidies.

The great hope is that governments (strongly supported by their populations) will choose to redouble their integration into the global marketplace recognizing that, while there will be short-term pains, the long-term gains will be immense.

In this edition of *Insight* magazine, we have sought to highlight both the good and the bad of globalization. We hope to inspire some leaders to emulate the good and catalyze others to stamp out the bad. Moreover, we hope to clearly articulate the real and fundamental benefits that globalization can bring in this new world order and at the same time highlight some of the risks.

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We also recognize that ideas often require concrete examples. So, for this edition of *Insight* magazine, we identified projects in our past *Infrastructure 100* reports that illustrate some of the big themes carried through this edition of our magazine. This review offers not only inspirational examples, but also deep insight into the opportunities being created in this disrupted environment.

While globalization is certainly front and center in this publication, we have also included articles that are closely related to the topic. For example, this edition of *Insight* magazine contains our view of the key trends that will influence infrastructure markets in 2017 (don't be surprised to see globalization on the list). It also contains an interesting discussion on the link between data, sustainable development and globalization.

On behalf of KPMG's global network of infrastructure professionals, we would like to thank all those who contributed to this edition of *Insight* magazine. We hope that — in this world of continuous disruption and uncertainty — this edition offers not only solid ideas, but also a firm foundation for future globalization and growth.

To explore any of the themes identified in this publication — or to discuss your own unique infrastructure challenges — we encourage you to contact your local KPMG member fi or any of the authors who contributed to this magazine. ■

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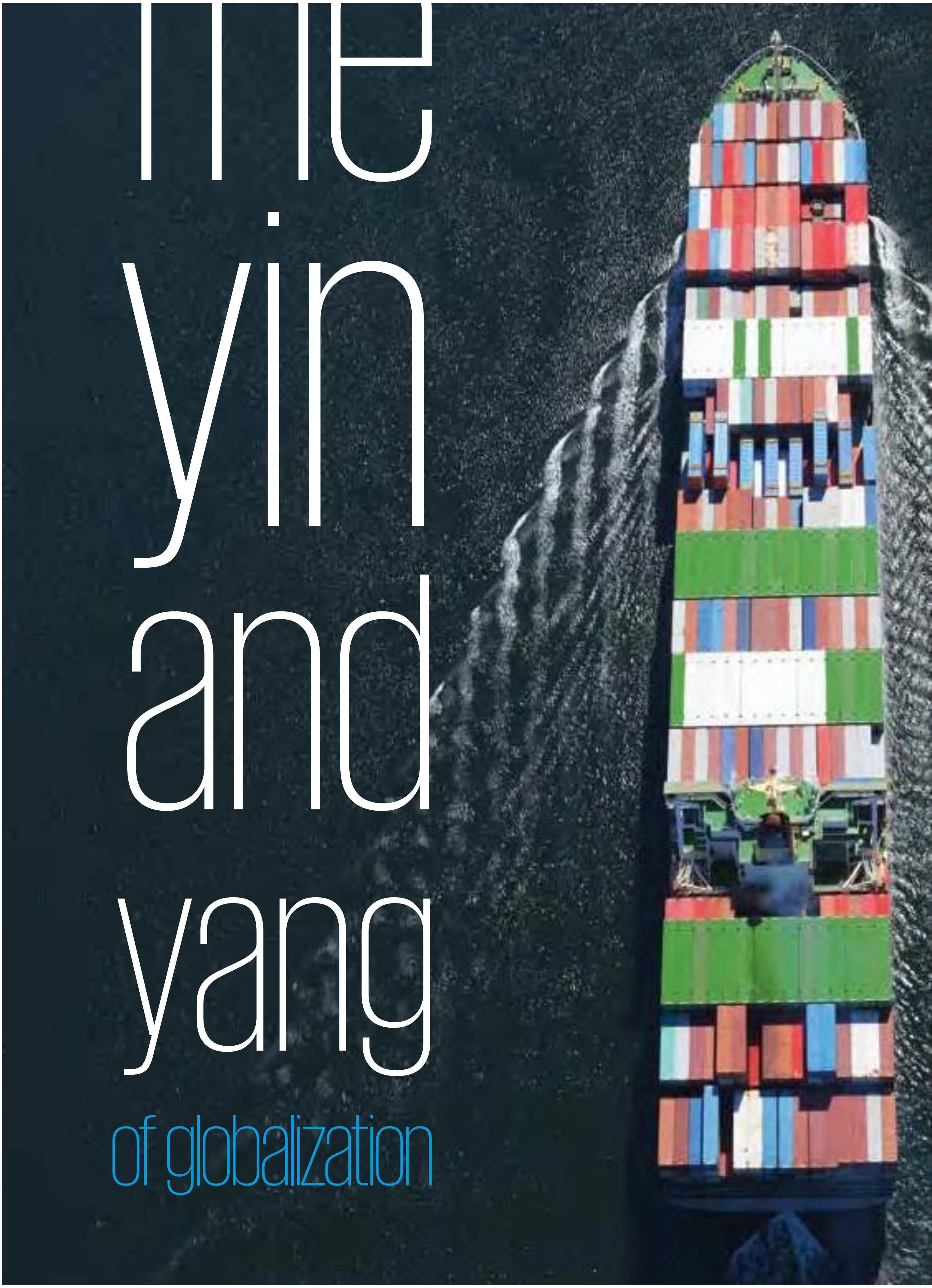
The yin and yang of globalization



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As a new world order takes shape, the debate over the merits of globalization are raging. Let's hope sensible heads prevail.

The debate over globalization is not new. Yet until recently, the battle lines were fairly clearly drawn. On the pro-globalization side stood the 'establishment' — governments, businesses and institutions that understood the macro benefits that globalization could unlock. On the anti-globalization side stood a mish-mash of anti-establishment groups — Occupy Wall Street protesters, authoritarian states, environmental activists and the like.

Today, everything has changed. Anti-establishment rhetoric has proven to be a winning political platform and globalization has become the sacrificial lamb. The election of Donald Trump, the vote for Britain to leave the European Union (EU), the rise of populist parties in Europe all point to a decidedly anti-establishment and anti-globalization fervor.

While that may be the narrative in the west, it is not the view shared in the east. In the emerging markets, globalization continues to be seen as the key to development, growth and prosperity. New trade agreements are being penned, regional bodies are being formed and protectionist measures are being removed.

The blurred lines of support for globalization are not entirely surprising. That is because globalization has both good and bad implications. And depending on where you sit, it could be a massive opportunity or a terrible risk.

So, there is a yin and a yang to globalization. It allows for simultaneous access to technology which is wonderful for emerging markets but a massive risk for the mature markets as competition increases. It opens up global trade and investment, unlocking productivity in low-cost markets but eroding job prospects in high-cost ones. It reduces consumer costs and improves standards — something the developing world dearly needs — but it also reduces profit margins and commoditizes products. Some see disruption where others see opportunity. Some see fiscal risk where others see stability.

There is also a yin and a yang to the current debate and shifting of lines on globalization. On the one hand, risk and uncertainly has skyrocketed as key markets retract and rethink their embrace of globalization. But it has also created some good: namely a healthy (and hopefully serious) public debate about what we want as nations and societies.

The concern is that, rather than create new ways of moving forward, the forces against globalization will instigate a retreat, swiftly removing some of the hard-fought gains that have been won in the west and sapping the gains anticipated in the east.

For KPMGs part, we hope that, ultimately, sensible heads will prevail. We firmly believe that globalization and open markets are the key to providing the much needed infrastructure investment across the world and delivering it quickly and at the lowest cost possible. In the debate about the merits of globalization, this publication is decidedly pro.

“The blurred lines of support for globalization are not entirely surprising. That is because globalization has both good and bad implications. And depending on where you sit, it could be a massive opportunity or a terrible risk.”

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Infrastructure for everyone: Unblock the pipelines

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The benefits of globalization will continue to be uneven until governments fi d ways to unblock their infrastructure pipelines. It's time to take serious steps.

One of the great rallying cries against globalization is that its benefits are often unevenly distributed — between countries, within regions, across nations and even within cities. And, generally speaking, it has often been the poorest and most isolated of communities that have struggled most to secure the benefits of globalization. There is some truth to the view that the rich are getting richer and the poor are getting poorer.

The problem isn't that globalization is weighted towards the rich, but rather that its benefits are often inaccessible to the poor. In Africa, where only around half of all households have access to reliable electricity, where roads are often in disrepair, where broadband is a luxury and where regulation is often a barrier, few (if any) benefits of globalization currently trickle down to the average family.

Similar challenges (albeit to varying degrees) face working-class families in North America, rural families in Asia and migrants in the Middle East. Simply put, these people lack the infrastructure that is required to ensure the benefits of globalization are shared evenly. And, as a result, those with the infrastructure keep winning while those without it keep losing.

This state of affairs cannot be allowed to continue. If it does, we will see more strife between nations, more disruption and political upheaval, more migration and more protectionism. Opposition to globalization will be wide-spread but it will also be well-founded.

We believe that a major way for globalization to flourish and for populations to share in its benefits is through improved access to infrastructure. And that will require governments, development agencies, multilaterals and private investors to put much more effort towards unblocking infrastructure pipelines around the world.

The greatest challenge that must be overcome is that of funding (i.e. who will ultimately pay for the assets being delivered). In the emerging markets, public balance sheets are woefully unprepared to carry the burden of all the assets required and few consumers are able to pay the costs directly through user fees. In the mature markets (where public balance sheets are not that much better), many politicians have taken a hard line against new taxes, essentially slamming the door on new sources of traditional funding.

In this environment, governments will need to be much more creative and much more active in encouraging their markets if they hope to find ways to fund their infrastructure pipeline.

To be sure, there are encouraging signs that steps are being taken, particularly by emerging market leaders and governments. In this edition of *Insight* magazine, we spotlight some of these initiatives — such as Indonesia's Infrastructure Guarantee Fund (page 22) and the Project Development Facilities being created by multilateral organizations (page 34). USAID's Power Africa initiative is another great example of what can be done. But we also recognize that more must be done, particularly in the development of national, regional and local capabilities (see my article on page 16 for more on this).

We believe that it is time for governments, multilaterals and investors to take big steps to unblock their pipelines and release the benefits of globalization to their populations. The good news is that — in this era of disruption and change — new opportunities are presenting themselves all the time.

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“In this environment, governments will need to be much more creative and much more active in encouraging their markets if they hope to fi ways to fund their infrastructure pipeline.”

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Empire lost: Why protectionism doesn't lead to better infrastructure

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Some mature markets are flirting with isolationism and protectionism. And in doing so, they may be plotting their own demise. Empires can be lost as quickly as they can be found.

Even before Brexit and the vote for Donald Trump, some of the mature markets were starting to turn inwards. Fences were springing up across Europe to slow the tide of refugees. Economic defi in Southern Europe were calling the strength of the Eurozone into question. And, around the world, some governments were cancelling infrastructure deals with foreign buyers, ostensibly on the basis of 'national security'.

Yet over the past year, there has been a worrying uptick in protectionist fervor. And this is creating real long-term challenges for the infrastructure sector in general. In some markets, new regulations and laws are being promulgated to create and enforce tighter national procurement requirements and localization quotas for infrastructure players on greenfield projects. We are also seeing new restrictions 'to protect the national interest' on asset sales. Others are reexamining vital global trade agreements, seeking to gain a 'better deal' for their populations and potentially rewriting existing agreements.

The drivers behind this sentiment are understandable enough. Many, particularly middle-class workers in the developed world, are deeply concerned that their jobs may be moving to lower cost destinations. They are feeling disrupted by the rapid advance of technology, particularly in the workplace. They feel that the spoils of globalization are now flowing to other benefactors and they are putting pressure on their politicians to halt the rising tide.

The problem is that, from an infrastructure perspective, protectionism is not the answer to the ills and challenges now facing these increasingly introverted developed markets. And it is not going to drive the type of infrastructure development and innovation these markets (and their populations) require. In fact, isolationism is the worst possible medicine that could be administered, akin to a doctor prescribing chemotherapy to stamp out a cold. It is harmful and it is unnecessary.

Protectionism is harmful to governments and taxpayers because it effectively raises the cost of infrastructure and services by limiting competition in an increasingly global supply market. It is harmful to consumers and infrastructure users because it shuts out international best practices and quality. It is harmful to businesses because it creates barriers to growth, slows the flow of capital and increases costs. And it is harmful to a country's future prosperity because it isolates markets from the new ideas and innovations being created overseas.

Protectionism is also restrictive. If the goal of political leaders is to leverage infrastructure to drive prosperity, improve the quality of life, enhance security and protect the environment, then the most prudent course of action is to open up markets, encourage competition, break down barriers, collaborate on global issues and enact policies that enable better sharing of benefits among local populations. Protectionism should not be encouraged (let alone institutionalized) but rather stamped out.

The great economic empires of the West were created on the back of globalization. But should the West decide to give in to its protectionist desire, there are many others ready to pick up the banner of globalization. Empires can be lost as quickly as they can be found. ■

> "Over the past year, there has been a worrying uptick in protectionist fervor. And this is creating real long-term challenges for the infrastructure sector in general."

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Leading in a disrupted world

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In today's rapidly changing geopolitical environment, infrastructure can either be a catalyst or an obstacle to solving many of the world's most intractable challenges. In this roundtable discussion, Stephen Beatty, Americas region and Indian Head of KPMG's Global Infrastructure practice, asked three experts to share some of the pressures they are tracking in the current geopolitical environment, and offer some suggestions for infrastructure players and governments seeking to become leaders in a disrupted world.

This article provides the highlights of the discussion between ***Lord Michael Hastings CBE, KPMG's Global Head of Corporate Citizenship, Dr. Khalid Koser MBE, Chair of the World Economic Forum's Global Future Council on Migration*** *and* ***Anahita Arora, Senior Analyst with the Eurasia Group****.*

> "One of the most pressing issues today is greater migration within countries and around the world."

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Stephen Beatty (SB): What are some of the big pressures facing world leaders today?

Lord Michael Hastings (LMH): I think some of the challenges are fairly well understood and acknowledged. The environment, for example, remains at the top of World Economic Forum's list of global risks and it is becoming increasingly clear that we will face significant challenges meeting the targets set in Paris in 2015. Other pressures are maybe less well understood. Automation, for example, is improving efficiency and lowering costs, but it is also creating disruption in job markets and changing the entire nature of supply and demand in some sectors.

Khalid Koser (KK): I agree. The other somewhat unknown pressure comes from the demographic change now underway around the world. We are witnessing massive population growth in some parts of the world. But, at the same time, the 'rich' world is suffering from population decline and that is shifting the demand for infrastructure towards the emerging markets. Consider, for example, the fact that China will build 42 new international airports over the coming years while, in the UK, we will struggle to simply add a new runway.

Anahita Arora (AA): The other pressure we are seeing is the rise of populist agendas around the world, especially in industrialized countries where support for democracy, globalization and traditional values of economic and political liberalism is in decline. With changing politics, public

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and private institutions will increasingly have to cater to populist agendas. Also, as the industrialized world turns more inwards, we are likely to witness a weakening of the power of traditional supra-national institutions and the US-led global order, with greater influence from countries such as China in trade and investment.

SB: What is your greatest concern?

AA: I think it's clear that political instability is on the rise in both the developed and developing world. And we are now seeing some of the impacts of that instability play out through politics, economics and societies. One of the most pressing issues today is greater migration within countries and around the world. The current refugee crisis in Europe and the Middle East is a clear indication of the impact migration will have on infrastructure spending, particularly in urban areas.

LMH: Migration is absolutely one of the greatest long-term challenges facing the world today. And I think the stresses that migration creates on governments and society are massive. Just think about the growth of the size of our cities over the past few decades and the ongoing impact this is having on infrastructure spending and planning. Then consider the tremendous growth expected for Africa and the fact that — by 2100 — Nigeria will have a larger population than all of Western Europe, and it becomes clear that migration will continue to be a long-term challenge for governments around the world.

KK: The big challenge surrounding migration is actually one of integration. If we can get the integration right through proper education, training, language, cultural understanding and so on, then I think migration is actually exactly what the world needs for the future. The point is that we need to deal with some of the short-term stresses so that we can get to the longer-term dividends that migration can deliver.

SB: What role can infrastructure play in responding to these pressures?

LMH: When you consider the scale and scope of the infrastructure required to support this tremendous shift in people and demands, I think there is an obvious opportunity for infrastructure players. The key will be in turning these challenges into opportunities for business profitability, while safeguarding against exploitation. If we can unlock that equation, I believe that infrastructure will be the catalyst to responding to the other big pressures such as climate change, security, automation and migration.

KK: The antithesis of that, however, is that infrastructure can also be used to exclude people and stop the natural flow and integration of migrants, often with unintended consequences. But I also believe that infrastructure plays a balancing role to some of the shorter-term pain points. Governments live in perpetual short-term cycles whereas infrastructure developers, investors and operators think in 40, 50 or 60-year cycles and it's this type of longer-term strategic problem solving that we need in today's world. Unfortunately, we're not getting that level of leadership from most politicians, and the private sector is still quite reluctant to engage in migration policy.

AA: I think we are already seeing significant changes in infrastructure spend as a result of refugee and migrant shifts. Investment into border controls and equipment, policing and information technology infrastructure aimed at controlling the movement of people, for example. We're also seeing increased spend into projects aimed at improving integration such as hospitals, schools and social infrastructure. But as Khalid notes, these shifts are largely driven by political cycles so priorities greatly depend on how inward or outward-looking the government is at the time.

SB:What can governments do to respond?

LMH: I certainly believe there is sufficient capital and resources available in private markets to finance smart solutions. I think it's also obvious that we have the land-mass and the technology to create a more equitable society. What I believe is missing is the political will to make the hard decisions that are required. These aren't local or national issues, they are global and I'm not sure that any government or supra-government organization has the right mechanisms to deliver a solution without signifi involvement from the private sector.

AA: I think part of the challenge is that we are starting to see politics hold more importance than long-term economic benefit in rhetoric surrounding refugees and migrants in several developed countries. And what that means is that governments are increasingly being driven by nationalist pressures that cater to the voter base rather than thinking about what their policies mean for commerce, global trade, financial investment or economic stability.

KK: I agree that there is a real gap in political leadership in many countries, particularly around key issues such as migration. One of the biggest challenges is that the solution requires cooperation — across government departments, between governments and with the private sector — and that will require governments to adopt a much broader and more inclusive approach to infrastructure planning and delivery. But that will also require governments to think more proactively about the long-term growth of their economies rather than the short-term pain points. And I'm not sure many governments are quite 'there' yet. ■

“I believe that infrastructure will be the catalyst to responding to other big pressures such as climate change, security, automation and migration.”

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Going global:

Lessons from solar

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The rapid adoption, commercialization and globalization of solar energy offers lessons for other infrastructure sectors.

Just 20 years ago, solar power was largely the domain of geeks and wonks. Most projects were developed purely for research purposes or as proof-of-concepts. Technology was infantile and fractured. Just a handful of people — generally extreme environmentalists with deep pockets — boasted home solar capabilities.

Fast forward to today, and solar roof tiles are the 'concept'; large scale solar generation is the norm. Solar is now a mainstream technology — governments want to invest in it, consumers want to own it, investors want to profit from it and regulators understand it. Consider, for example, the fact that the UK installed nearly 9,000 megawatts of solar capacity in the last 7 years alone[1]. Or the fact that, between April and September 2016, solar provided more power to the UK's grid than the existing coal fleet[2].

Yet solar is not a 'privileged' technology. Solar projects are now operating in virtually every market around the world. Technologies have become standardized and global. And almost everyone — including the world's poorest and most isolated citizens — can now tap into cheap solar power at home.

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The massive growth in deployment has driven down costs and helped to establish a track record, standards and servicing capabilities that improve confi for investors.

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A unique story?

The rapid globalization and adoption of solar technology is clearly a remarkable achievement. But what has allowed solar to thrive where other technologies have struggled? What is different and unique about solar? More importantly, what can other sectors learn from the solar success story?

I recently had an opportunity to discuss the globalization of the solar sector with Jonathan Maxwell, Founder and CEO of Sustainable Development Capital LLP (SDCL), an investment banking fi focused on energy effi project fi And he notes that solar has shared many of the same benefits as other technologies and infrastructure sectors.

"Much like other capital-intensive industries and sectors, solar has certainly benefited from the historically low cost of capital over the past few years, and that has allowed markets to be fairly active in the solar market, from the development and construction phase through to operations," he notes. "The global drive to remove carbon from the energy mix and the recognition that resources continue to be strained also add impetus to solar and other alternative energy sources."

At the same time, it is clear that solar has enjoyed some very unique benefits as well. For a variety of reasons, solar has become the poster child of politicians and community groups alike. In all corners of the world, governments have created incentive programs and tax breaks to encourage the adoption of the technology. And international efforts to reduce carbon emissions have given solar a unique platform for growth and global cooperation.

Solar has also benefited from a massive push by China to dominate the solar panel manufacturing market. And this has catalyzed a rapid fall in the global cost of solar panels which, in turn, has helped unlock new solar developments.

Keeping it simple

Yet, it is the simplicity of solar that has perhaps done the most to drive its rapid growth. There is a simplicity to the technology. Besides the fan used to cool the electronic components, there are no moving parts in a 'traditional' solar solution, meaning less complexity, as well as lower upkeep and maintenance costs.

There is a simplicity to the feedstock. Solar is available to everyone around the world, but it's particularly abundant in regions that are in the most need of new, cost-effective energy sources. And, as Jonathan notes, solar is stable. "Other technologies face challenges related to fuel prices, security and quality; dealing with spent fuel is a constant challenge for some technologies. I think the market appreciates the simplicity of the entire solar value chain," he notes.

The growth of the market has also led to simplicity in the way projects are structured and financed. "The massive growth in deployment has driven down costs and helped to establish a track record, standards and servicing capabilities that improve confi for investors," Jonathan adds.

Lessons learned

For infrastructure players and participants, the key lesson should be that — with the right support, enablers and leadership — it is possible to radically alter the trajectory of a new idea or technology. But there are other insights that can be taken from the solar experience:

1. *Simplicity improves confi* Straight-forward contracting, project plans and fi arrangements have reduced investor risk and improved confi As Jonathan notes, "One of the things solar has done really well is achieve simplicity around contracting where other distributed technologies and structures may seem overly complicated for most investors."
2. *Industrialization drives investment.* With a track record of successful deployments and a well-organized supply chain, investors are able to apply a fairly standard approach to evaluating new projects. "A lot of the basic investment principles for solar apply internationally and at various scales, which makes it easy to compare viability and potential returns." notes Jonathan.
3. *Evolution inspires improvement.* The addition of battery storage to distributed generation solutions has unlocked new effi and created new models for investors and owners. "Whether batteries can be applied at utility scale has yet to be seen, but it has quickly become a central component of any decentralized energy solution," Jonathan notes.
4. *Cost is not everything.* While falling costs bring solar within reach of many emerging markets, investment is still hampered by a lack of institutional stability and project preparation capabilities. And, as Jonathan notes, "There is still some work to be done in bringing some consistency to the incentives being developed in some markets."
5. *Think long term.* While short-term pricing indicators may suggest a softening of the electricity market, investors are thinking about the longer-term view. "Solar is a very compelling market for the medium to long term and all signs suggest that its relative value will continue to improve against the electricity market," notes Jonathan. "It's a very attractive sector for serious investors."

Clearly, not all of solar's advantages are able to be duplicated by other technologies or infrastructure sectors. But the core advantages — contract simplicity, successful deployment and standardized approaches — are possible to replicate. It's time to learn some lessons from solar.

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/fi rends_March_2016.pdf
[2] https://www.theguardian.com/environment/2016/oct/04/solar-outstrips-coal-in-past-six-months-of-uk-electricity-generation

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Securing the benefits of globalization:

The sound of rolling thunder

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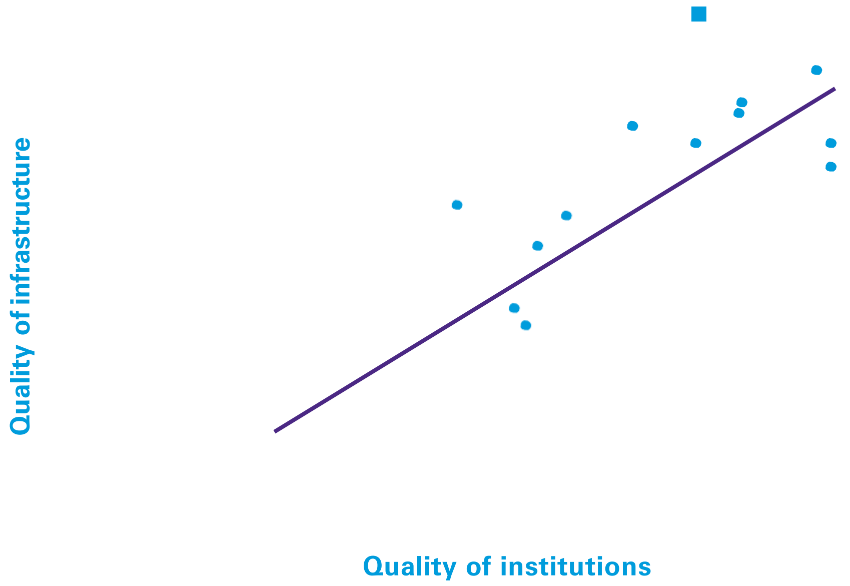
Focus on the fundamentals

Gaps remain

Sharing the benefi of globalization



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Opening up: Global operators in an era of uncertainty

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As governments around the world start to focus on attracting international experience, capital and capabilities into their infrastructure markets, opportunities for international operators and concessionaires are growing. So, too, are the risks and challenges.

*To fi out more about the evolving market for international operators, Mina Sekiguchi, KPMG in Japan, and Jesús de Isidro, KPMG in Spain, sat down with **Javier Pérez Fortea, CEO of Globalvia**, a global leader in transportation management, and **Satoru Tamiya, Head of Overseas Investment for Mitsubishi Corp's Water Business** to talk about competition, protectionism and growth in the new environment.*

> "When markets are new, there is a lot of uncertainty — nobody knows the cash flow or demand for certain — and so the risk is always much higher."

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Mina Sekiguchi (MS): Given the need for more private sector involvement and investment in infrastructure, are attitudes towards concession agreements changing?

Javier Pérez Fortea (JPF): I think more and more governments are starting to see the value of concession agreements, not only as a way to bring private sector capital into infrastructure, but also as a way to improve efficiency and deliver better service to customers. Attitudes towards concessions are certainly not homogenous around the world, but they are changing.

Satoru Tamiya (ST): Water and transport can both be very local issues, and much depends on the attitude of the municipal governments. But it is clear that concession models are starting to become more sophisticated between the private and public sector. I think governments and concessionaires have both learned a lot from some of the challenges they have faced in the past and this has made the relationship stronger.

Jesús de Isidro (JDI):Will the rising sense of protectionism now emerging in some markets impact the business model for international operators?

JPF: I suspect we are just starting to see how these sentiments evolve. However, I would always argue that isolating yourself from international experience and best practices would be a narrow approach to delivering infrastructure and would not result in the same benefit to governments or to the users.

ST: Water and wastewater are almost always a municipal issue, so we are somewhat shielded from some of these more national issues. In most markets, the decision to privatize or move towards a concession model is largely made by the municipality, so once the market for concessions is opened, we are often more focused on the local politics than the national politics.

MS:Are you seeing competition from new players, particularly from the emerging markets?

ST: There are always new players coming into the market and competition is becoming severe. But when it comes to water, governments want state-of-the-art-technology, global standards and international best practices and that is not easy for local municipalities or new competitors to deliver. If we have to compete purely on the cost of equity, however, new competitors from emerging markets certainly become a factor.

JPF: The same can be said for the road and rail sectors. And I suspect every global player is somewhat worried about having to compete against emerging market competitors based on the cost of equity. I think it's also very diffi for many of these new competitors — particularly from traditionally closed markets — to navigate through the transparency and tendering requirements that often surround public-private partnerships (PPPs) and concession agreements.

> “I think the greatest risk is that institutional investors seeking to deploy capital will take on a project without using a proper concessionaire to run that project.”

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JDI: Does that mean that new markets are opening up for international operators and concessionaires?

ST: New markets are certainly opening and that creates significant opportunities for concessionaires. But when markets are new, there is a lot of uncertainty — nobody knows the cash flow or demand for certain — and so the risk is always much higher. They can be an excellent investment if the market remains stable, but you have to be able to take the risk.

JPF: I would agree. But I think we still need to help some governments see the value of concession agreements. At the same time, I believe governments also need to do a better job at defi which projects can be fi and managed by the private sector and which cannot. Many governments want private sector involvement but do not want to lose any of the control.

MS: Do you have any advice for governments seeking to attract international operators and concessionaires?

ST: We spend a lot of time and investment working with local governments to help them develop their first concessions because we believe that these markets will expand significantly once they have built some experience. We are working in Myanmar, for example, and in a number of emerging markets. As an international player, we are able to help governments better understand what role private companies can play in the water sector.

JPF: Helping governments get experience with concessions is certainly important. I think the next challenge is to make sure they are choosing the right projects and that they are getting the risk allocation right. That means letting the technical experts decide on infrastructure priorities and — in some cases — taking on more risk in order to establish a stable reputation.

JDI: What do you see as the greatest risk facing your business today?

JPF: Honestly, I think the greatest risk is that institutional investors seeking to deploy capital will take on a project without using a proper concessionaire to run that project. Financial investors are not necessarily qualified to manage the construction and operation of a major asset; you can't run a successful concession on fi terms alone. And when a concession agreement fails, it often has a ripple effect across other markets.

ST: I would agree. The most important thing right now is to grow the market and that will require operators and concessionaires to focus on improving their track records and reputations. If it's a good experience for the municipality, for the government and for the users of the service, it will be an easy decision for the policy makers. ■

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No going back:

Disruptive trends reshaping the utilities sector

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> "Clearly, the disruption now underway across the energy market, driven by new technology, offers significant opportunity and a chance at a bright future for consumers."

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New technologies are disrupting today's energy markets, offering a bright and very different future for consumers. But, for traditional utilities, there are signifi challenges ahead as they adjust to a very different way of doing business.

There is nothing boring about today's power and utilities sector. Characterized by fast-evolving technologies, rapidly changing business models and nimble competitors, it often has more in common with the tech industry than with traditional utility models focused on managing physical assets, like pipes and wires.

In part, this disruption is being caused by changes in the way consumers interact with their utilities and the way they use energy. The growth of solar and, more recently, storage is reducing dependence on centralized networks in some markets. Adoption of smart meters and smart appliances is allowing people to reduce their personal energy use, or shift it to lower-cost times. Electric vehicles are already changing when and how power is consumed and discharged.

We have also seen dramatic cost reductions in large scale generating technologies, like onshore and offshore wind. The cost of ground-mount solar reached parity with coal in some markets last year.

As a result, policy makers and development organizations talk about solar delivering on the dual challenge of reducing energy bills while simultaneously managing carbon emissions. Consumer groups talk about the democratization of energy. Environmental lobbies expect utilities to champion the shift to renewables and help reach the Paris Climate Change targets. Many see a bright future in today's energy market disruption.

Envisioning a bright future

It is not difficult to envision a very different world — enabled by a very different energy sector — within the next 10 years. To start, power in many markets will increasingly be generated through decentralized low-carbon sources, predominantly solar and wind. The take-up of storage solutions (such as the battery that will power your car) will help manage power demand and increase the two-way flow on power networks.

Consumers energy usage and bills will be minimized automatically through smart applications. These applications will combine smart meter data, time of day pricing, big data and individual consumer preferences into a single interface to allow people to maximize usage, eliminate waste and reduce costs across all utilities and other services (like broadband). Other applications will allow consumers to automatically switch from one generation source to another depending on costs and personal preferences. And most consumers — whether as individuals or in groups — will have the capability to generate around 75 percent of their own power.

In this world, there will be less dependence on centralized power generation. Older power stations will be phased out, while the need for new power stations will be lower than before — potentially reducing the overall costs of running the energy system. The grid will become more of a 'back-up', rather than the 'backbone' of the energy network. The way the grid is paid for may need to change as a result.

Risks and opportunities ahead

While this vision of the future may offer some comfort to consumers and help policy makers square the circle between keeping bills down and commitments to decarbonization, it creates deep implications for infrastructure investors, developers and governments. And it creates massive disruption and complex challenges for utilities.

Let's start with the investors. For both strategic and financial investors, the emergence of new models for generation and distribution will almost certainly create new and interesting investment opportunities, but it will also raise the risk of asset obsolescence. At the same time, as sectors converge, a range of new adjacent (and investable) industries and business opportunities from hard assets through to customer interfaces will emerge, creating not only opportunities, but also competitors in their markets.

Governments and infrastructure planners will also find opportunities and challenges from the disruption in today's energy markets. The introduction of decentralized and distributed generation, for example, may help reduce dependence on imported fuels, improve access to electricity and lower carbon emissions. But, first, governments will need to ensure they have created the right regulatory frameworks and safeguards to incentivize those goals. This will be a real challenge for governments around the world as the pace of technological change continues to increase and drive markets developments.

Utilities will carry the burden…and the risk

For traditional utilities, the future is far from clear, with both opportunities and significant challenges ahead. At all points of the value chain — from generation and transmission through to distribution — new technologies, competitors and business models are creating deep uncertainty about the shape and nature of the market over the next decade.

Utility executives recognize that 'business as usual' simply isn't an option any longer. They look at other sectors, like telecoms and banking, that have been through periods of similar technological change and the dramatic effects that have been unleashed. Technology has attracted new market entrants, like Uber, Airbnb and Atom Bank, turned business models on their heads and, in some cases, triggered changes that have seen the disappearance of existing players.

In response, many are starting to partner with non-traditional players (such as technology companies) to develop a new and broader range of services for their customers. Those that hope to take advantage of the disrupted marketplace know they will need fresh business models, and perhaps corporate structures, to embrace the new tools and opportunities now available. The focus for utilities now is fi on customers, rather than just managing physical assets.

Clearly, the disruption now underway across the energy market, driven by new technology, offers signifi opportunity and a chance at a bright future for consumers. But 'getting there' will require massive change on the part of utilities. Some will adapt and change and succeed in this new marketplace. For those that don't, there may be challenging times ahead. There is no going back. ■

To read the full report 'No Going Back: Five disruptive trends reshaping the utilities sector' visit kpmg.com/uk

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Taking Indonesia to market: Leveraging global experience

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With investors starting to shift their eyes east, looking for better yields and new opportunities, Indonesia is rapidly coming into view. The country boasts the world's fourth largest population (around 260 million), placing it behind only China, India and the US in terms of size. And with a median age of just 29 years, all signs suggest that Indonesia may now be entering a period of sustained and accelerated growth.

Growth requires infrastructure. And Indonesia — like every other emerging market — has a long list of requirements. From power and ports through to hospitals and schools, significant investment is required to improve connectivity and productivity across Indonesia's many populated islands. The government estimates that around US$500 billion in infrastructure investment may be needed over the next 5 years alone.

Clearly, public budgets are insufficient to finance the total investment requirement. Everyone now recognizes that private sector investment will be vital to closing the gap.

According to Sinthya Roesly, CEO of the Indonesia Infrastructure Guarantee Fund (IIGF), Indonesia's government is keenly focused on driving private participation into infrastructure delivery. "It's an established policy direction and the current government is pushing hard to develop a framework to attract private participation," she noted in a recent interview. "All stakeholders now recognize that private participation is an absolute 'must' if we want our country to develop."

Creating clarity and comfort

Attracting private investment, however, is a challenge for most emerging markets and competition among markets is heating up. In response, Indonesia's government is focused on improving the investment environment and options for international investors.

"The real challenge for emerging markets is to create an environment that provides clarity, certainty and consistency across the legal, regulatory and institutional framework," Ms. Roesly noted. "At the same time, we want to help create a pipeline of projects that are fi ,economically, technically, environmentally and socially feasible."

That includes ensuring that risk assessments and allocations for projects are reasonable and that procurement processes are transparent and to global

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best practices. "The structure and framework we are developing should provide signifi comfort to private sector investors interested in Indonesia's infrastructure sector," she added. "But it also provides comfort to the public sector by creating a framework and providing accountability for private sector involvement."

Taking on the right risks

It is Ms. Roesly's organization that is perhaps the most unique and effective tool in Indonesia's efforts to attract private investors. Structured as a State-Owned Enterprise under the Ministry of Finance, the IIGF was established in late 2009 to provide a system of government guarantees for public-private partnership (PPP) infrastructure schemes.

Essentially, Indonesia's government has recognized that — in order to attract international investors — the country needs to establish a strong track record for successful PPP delivery. In the initial period, that will mean providing government guarantees to help the first wave of investors enter the market with confidence.

The IIGF is more than a pure guarantee scheme. The organization is also focused on improving the quality of Indonesia's projects and the success of the public-private relationships. "Our main mandate is to provide guarantees, but that starts with having a robust appraisal and evaluation system for projects," she noted. "We need to ensure that we are providing guarantees only to well-structured and high-quality projects."

While the IIGF is a central organization, Ms. Roesly's team spends a significant amount of time working with local government leaders and municipalities to help them apply the new frameworks and structure their projects. "We're trying to build awareness within the public sector of what can be done when you use the right framework," she added.

Getting the right advice

When establishing the IIGF, Ms. Roesly and the Indonesian government were adamant that the organization would adhere to the highest international standards. "World class operational norms and best practices provide stability and build confidence with international investors and financiers," she said. "This is important not only in the execution of the deal, but also in the way risk is allocated, projects are prepared and agreements are documented."

The organization has also taken great efforts to ensure that their processes, procedures and operations are aligned with the key multilateral organizations operating in the country. Working in cooperation with the World Bank and other International Financial Institutions and Development Banks, the IIGF developed leading standards and process.

"We engaged with a wide range of advisors to help us develop the right framework and build the right guarantee structure for the IIGF. Not only technical advisors, but also commercial advisors, fi advisors, legal experts and — of course — the private sector itself," she added. "We want to be able to deliver against the expectations of the international fi community."

> "The real challenge for emerging markets is to create an environment that provides clarity, certainty and consistency across the legal, regulatory and institutional framework."

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All signs suggest that Ms. Roesly's efforts are paying off. In the first 6 full years of operation, the IIGF has signed nine guarantee agreements for nine separate projects across four sectors (power, water, roads, and information and communications technology). In total, the projects represented more than US$7 billion in investment. Another US$13 billion worth of projects have been appraised and prepared for tender.

"We've been getting a lot of feedback from the market and we are seeing rising interest from investors who want to be involved in projects where the IIGF has had an involvement," she noted. "I think the business model and discipline that we bring to the market is proving to be a success."

A bright future ahead

Ms. Roesly recognizes that the global infrastructure market is rapidly evolving and that investor preferences are changing. Her team continuously engages with national, regional and global advisors to ensure that the IIGF's models and frameworks remain relevant. "It's critical to ensure that our capabilities and capacity remains aligned with global requirements," she noted.

However, she also believes that Indonesia's infrastructure market will also grow and evolve to meet investors requirements. So while the organization is currently focused on greenfield projects, Ms. Roesly expects that this focus will broaden to include brownfield deals in the near future.

"Once the construction stage has been completed, we expect some of these projects to be cycled to the private sector through secondary asset sales, thereby allowing capital to be reinvested into new projects and sectors," she forecasted. "That being said, the ultimate responsibility for infrastructure delivery falls on the public sector, so it will be critical to ensure that government remains involved throughout the lifecycle."

Ms. Roesly is quick to point out the robust pipeline of projects that her organization is helping bring to market. In fact, she expects the IIGF to extend guarantees to another 10 projects this year and to support another 20 to 30 new projects over the next 5 years.

"There is great optimism in Indonesia today and we believe that there are significant opportunities for both economic and social infrastructure as an investment in Indonesia," she added. "Together, we can build infrastructure that creates benefits not only for the people of Indonesia, but also for investors and stakeholders." ■

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To OECD or not to OECD?

Investors ponder new markets

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While some projects in the OECD markets enjoy fierce competition, those in non-OECD markets often struggle to attract any foreign investment at all. This creates opportunities for investors willing to take on the additional risk of the emerging markets. But it also creates challenges for global stability and growth.

*To talk more about the decision to invest in OECD or non-OECD markets, Dave Neuenhaus, KPMG's Global Head of Infrastructure Tax, sat down with **Ana Corvalán** from **Eaglestone Advisory**, a UK-based investment advisory firm, **Enrique Fuentes** from **StepStone Group**, a global private markets investment firm, and **Thierry Déau** from **Meridiam**, a global private investment firm.*

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> OECD countries may have much to learn from non-OECD markets, I think ideas could be shared both ways.

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Dave Neuenhaus (DN): What will it take to drive infrastructure investment to non-OECD markets?

Thierry Deau (TD): At the project level, there needs to be more focus placed on project preparation and development, particularly in building up capacity on the government side. But with the right structuring and a strong set of risk mitigation products — such as the Multilateral Investment Guarantee Agency's (MIGA) political risk insurance — these markets can be just as attractive to investors as their OECD equivalents.

Enrique Fuentes (EF): For governments, I think the next challenge is to create a very clear and visible pipeline of well-developed projects, preferably prioritized across departments and government units, that will be attractive to international investors. At the same time, efforts must be made to simplify the legal and regulatory environment for foreign investors. It's all about reducing complexity and making it as easy as possible for investors.

Ana Corvalán (AC): I certainly agree that there is a strong need for governments to develop a robust pipeline and build key capabilities. I think investors are looking for political and economic stability (including a sound foreign

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exchange (FX) policy to minimize FX and transferability risks) as well as a simplified legal system and regulatory framework with a view to making infrastructure investment attractive — be it foreign or local. Local pension funds and other institutional investors can also be key in securing a steady investment flow in the sector.

DN: Should non-OECD markets be trying to emulate the frameworks found in the developed markets?

EF: I certainly believe there are elements that can be borrowed. But there are also differences and peculiarities that must be recognized in each market. Some may be very interesting — those without incumbent operators, for example, have an opportunity to take a much more flexible and creative approach to developing frameworks adapted to new technologies for their market.

TD: I might go one step further and suggest that OECD countries may also have much to learn from non-OECD markets. South Africa and Morocco have both created very compelling models for steering the development of their renewables markets, where some other OECD markets have failed. I think ideas could be shared both ways.

AC: I think the energy sector is a really good example where some non-OECD countries are creating unique solutions to big challenges like the lack of grid connectivity across most of Sub-Saharan Africa. So, in some sectors, there might not be a standard model to follow. In other sectors, particularly transportation and accommodation, some non-OECD markets, such as Peru and Colombia, are seeing success in emulating the Canadian and Australian frameworks.

“It is often the markets that can least afford their infrastructure that pay the most for it.”

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DN: How can investors and other players help improve the investment climate in non-OECD markets?

AC: In some markets, it can be diffi I've been quite focused on Sub-Saharan Africa recently and it is clear to me that there is a need for Development Finance Institutions (DFI), multilaterals and other government initiatives to help channel investments into the region, until a more stable investment climate can be observed. UK Trade and Investment, for instance, is focused on opening doors to UK based companies in the region whether for trade or investment. The Department for International Development is making a mark on the water sector in Southern Africa (Southern African Development Community region), and a number of European DFIs have been helping public and private sector companies and fi institutions to channel liquidity with equity and debt. Their presence helps attract commercial banks and private sector investors where needed, though not to the sufficient degree the region needs. Equally important, DFIs and multilaterals are also introducing the concepts of additionality and sustainable development which should be considered in markets aiming to achieve a stable investment climate.

EF: Personally, I think that International Financial Institutions will need to play the greatest role in unlocking investment into non-OECD markets by better covering certain risks which cannot be managed efficiently by investors and developers. For example, while we already have a form of insurance against political risk through MIGA, it is very rigid and only works when a default has occurred. What is needed are mechanisms by which multilaterals can underwrite government payment obligations in public-private partnership contracts, as well as standardized mechanisms to help investors manage currency risk. That would reduce one of the biggest barriers to investment in non-OECD countries and would make the investment case much clearer for foreign investors.

TD: We believe that, as investors, we can help bring better organization to the project preparation and development phase in non-OECD markets. We spend a lot of time working in partnership with public authorities in places like Africa to essentially 'invent' new projects by helping to steer the procurement and development process. The approach certainly creates new challenges, but it also comes with signifi benefits — both fi and non-fi

DN: Are there particular non-OECD markets worth watching?

EF: As Ana mentioned, Peru and Colombia are both very exciting markets to watch and both seem to be on track to join the OECD group in the future. Peru has a centralized management agency and a good framework that is transparent with a strong track record of successful utilization. They also have a strong pipeline that is well articulated. These types of factors make a market worth watching.

AC: There are also a number of exciting markets in Africa — Ivory Coast, Kenya and Rwanda are great examples. Ethiopia and Uganda are making efforts too and getting there. Ghana has an interesting pipeline of projects and with the recent change of government there are hopes of a better managed fiscal budget, which should lift concerns regarding the International Monetary

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Fund's guard on the economy. It is worth watching the region.

TD: We also believe that Africa is one of the most attractive regions today, followed closely by Latin America. But each opportunity must be weighed appropriately. For example, Latin American markets boast some of the lowest default rates for project finance transactions, but they also suffer from a lack of project development capacity.

DN: You all seem very passionate about encouraging investment into non-OECD markets. Why should these markets be important to investors?

AC: I firmly believe that our global security is at risk. The more these non-OECD countries become decoupled from the levels of investment now being poured into the developed markets, the more we will see instability in areas like Sub-Saharan Africa. For Europe, that will mean more immigrants and refugees. For Africa itself, it could lead to a resurgence in regional instability. It's not the job of institutional investors to solve this dilemma, but I believe they should be contributing in the creation of new jobs by investing in non-OECD markets.

> "I think the energy sector is a really good example where some non-OECD countries are creating unique solutions to big challenges."

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EF: I absolutely agree. I think one of the best ways to improve the standards of living in developing economies is by improving its basic infrastructure, and I believe private procurement can efficiently deliver and operate that infrastructure. However, somewhat perversely, it is often the markets that can least afford their infrastructure that pay the most for it. As Ana notes, it is not the job of the investment community to tackle all the issues that increase the cost of infrastructure delivery in these regions, but I think the multilaterals, in cooperation with governments, could be doing more to help make the investment case much more attractive for investors.

TD: At the end of the day, we need to remember that infrastructure is never a pure fi asset — it must also deliver non-fi benefits to the owners, the users and the community. Whether we invest to achieve better yields, better risk mitigation or simply because we feel it is the right thing to do, we must always make sure our investments are leading to shared benefits with the community. We can never forget the impact we have on people's daily lives.

DN: Political rhetoric in some of the developed markets suggests that a new wave of infrastructure investment will soon be underway within the OECD. Will this infl the outlook for non-OECD markets?

AC: I certainly worry that it will. I think many investors have been drawn into emerging markets due to high competition in mature markets. If spending on infrastructure increases in the OECD — particularly given today's fiscal deficits — I think investors will start to question why they would want to take on the risks in an emerging market when they can get reasonable returns in stable markets.

EF: I would absolutely agree. But I would also argue that there is a limitation to how much new infrastructure is needed in the OECD markets versus the non-OECD. You can't create another 20 percent growth in air travel in developed markets just by building new airports. But 20 percent growth is just the low end of the expectation for some emerging markets in Latin America and Asia. And investors always like growth.

TD: I think that the non-OECD markets will represent a valuable and complementary investment opportunity for infrastructure investors. We firmly believe that some non-OECD markets will continue to deliver healthy premiums for those with the tenacity and the development skills necessary to succeed in the emerging markets. But remember that not all emerging markets are created equal. ■

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Incentivizing investment

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sales of existing assets where the capital

Unblocking infrastructure pipelines will require governments to take a much more active role in encouraging investment.

All governments, at all levels, want for infrastructure. They recognize that infrastructure supports development and enables economic growth. They understand that infrastructure improves quality of life and helps build social cohesion. And they know that their citizens and businesses will continue to demand more (and better) infrastructure access and services.

Yet, all governments are also struggling to secure the capital they need to deliver on their infrastructure agendas. The biggest problem — in the developing markets and the mature markets — comes down to funding. Simply put, who is going to ultimately pay for the infrastructure.

Governments recognize that some infrastructure (such as utilities) can be funded entirely through user-pay mechanisms, while other infrastructure (such as community centers and public hospitals) must be funded through the public budget. It's the broad basket of projects that lie in the middle that are causing the biggest problems; those that require a mix of funding sources (and therefore some level of private investment) to deliver.

Governments need to recognize the

Some are taking measures to unlock new sources of capital, often through is reinvested into new assets without adding to the public balance sheet. But it is clear these sources of capital will not be suffi to deliver all of the assets that are currently needed.

Seeing the bigger picture

We believe that — on the whole — governments have been too conservative in their attempts to create and encourage infrastructure markets. In part, this is because most governments have become overly focused on allocating risks to the private sector and have lost sight of their primary objective: to get deals done and infrastructure delivered. Far too many good projects have failed to reach development because procurement authorities misunderstood the private sector's risk tolerance and nit-pick over the commercial terms.

In much the same way, governments also often seem disinclined to inject their own capital into projects with user paid revenues in order to get them into development. But in waiting for a completely 'off-book' solution (in the developed world through a private investor; in the emerging markets through a multilateral loan), viable and much-needed projects remain stuck in the pipeline.

ultimate benefactor of infrastructure is the public. Yes, the private sector will seek to achieve a profit from its participation. But, we believe that governments need to focus more on the bigger picture — delivering on the longer-term economic, social and environmental requirements of their citizens — and less on the shorter-term goals of absolute risk mitigation and cost avoidance.

Getting more active

For many governments — particularly those with non-existent or less-developed infrastructure markets — this may require the public sector to assume larger portions of risk, at least until investors become more comfortable with assessing and managing those risks for themselves. In the emerging markets, this could include land acquisition risks, political risks, currency risks or environmental risks.

Other governments may want to consider creating new support mechanisms designed to instill confi in their markets. Many, from the UK to Indonesia, have developed Infrastructure Guarantee Funds to help investors tap into higher credit ratings or implicit financing guarantees for certain

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projects. Some, like the US, have updated their tax regimes to offer additional support to foreign pension funds investing into infrastructure.

Not a long-term solution

While the development of these types of measures are to be encouraged, governments should also think clearly about how they structure their participation in order to maximize their balance sheets and encourage ongoing investment. Simply put, while the benefits should be long term, the investment of public funds should not be.

Those investing capital directly into infrastructure projects, for example, will want to ensure they include clauses that permit the government to exit the deal at a time when alternative financing becomes available. New deals should be structured with potential exit strategies built-in to allow the government the flexibility to recycle their capital into new projects.

Those creating support mechanisms such as Guarantee Funds will want to consider pricing their initiatives in such a way that encourages owners to seek out competitive options rather than simply defaulting to the guarantee facility, or to repay the facility once better financing options become available.

By taking this approach, governments can help to encourage their national infrastructure markets, drive projects out of the pipeline and protect their longer-term balance sheets. And, in doing so, they can build longer-term confidence in their markets that, in turn, will help reduce the requirement for government incentives in the first place.

Unblock those pipelines

To be fair, not all of the responsibility falls onto government shoulders. Multilaterals should continue to play a major role, particularly in encouraging the flow of private capital and helping build institutional capacity within markets.The bigger challenge will be in creating some form of currency risk insurance, similar to the Multilateral Investment Guarantee Agency's (MIGA) political risk insurance, that helps investors overcome the biggest barrier to emerging market investment.

At the same time, private investors will need to work harder to find ways to work with governments to get projects out of the pipelines. More debt financing will be needed. More capacity building will be required. And more best practices and viewpoints will need to be shared.

However, at a time when so much infrastructure is so dearly needed — governments, multilaterals and private investors need to increasingly work together to take a more active role in unblocking infrastructure pipelines. ■

> “We believe that — on the whole — governments have been too conservative in their attempts to create and encourage infrastructure markets.”

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Not welcome here: The rising threat of protectionism

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The continued globalization of infrastructure is a good thing. Let's not let populist sentiment get in the way.

Over the past few years, two clear trends have emerged. The first is that infrastructure is globalizing. The second is that governments are becoming more protectionist. The collision of these two trends could have huge implications for the sector.

The good, the bad and the ugly

Regular readers of this publication will likely agree that the globalization of the infrastructure sector is a good thing. Increased global competition with international expertise and capabilities leads to improved standards and better quality, and helps reduce the delivery and operational risk of public infrastructure. International fi and investment enables the development of projects and drives cost efficiency. International operators and owners bring global best practices and often innovative technology.

The rising sentiment of infrastructure protectionism, on the other hand, is a worrying counter trend. All infrastructure projects and services create local jobs and protectionism claims to offer more. But what's missing is the cost to users and society when going local becomes more expensive, or provides sub-optimal quality, than going global. In the long term, it is more likely that isolationism and protectionism will do more to degrade a market's economic growth than to enhance it.

Protectionism could potentially impede the flow of new ideas, technology and — critically — capital across borders. It can lead to increased costs and even lower-quality infrastructure. It strains national resources and capabilities. And, most importantly, it creates massive political risk for investors which, in turn, damages the long-term competitiveness of markets.

As China's President Xi Jinping told the World Economic Forum audience at Davos this year, "Pursuing protectionism is just like locking one's self in a dark room: wind and rain might be kept outside, but so are light and air."[1] In fact, protectionism is largely a developed world phenomena. Most emerging markets clearly recognize the vital importance of foreign capital, resources and technology. They may suffer from other political risks, but they are unlikely to turn away foreign capital and assistance based purely on nationality.

Sending mixed messages

Where these protectionist trends are already starting to play out is under the guise of 'national security concerns'. Take, for example, Australia's last-minute decision in 2016 to block Chinese companies from purchasing AusGrid — one of the country's larger electricity distributors. While a deal was struck just 2 months later with a national superannuation fund and a national infrastructure manager, reports suggest that the government lost around AUD5 billion — 20 percent of the initial sale price — in immediate revenue by blocking the deal.[2]

For many, the decision came out of the blue. The two blocked Chinese companies already owned majority stakes in many of Australia's power distribution and transmission grids across the country, including 51 percent of the sole power distributor in South Australia, and 50 percent of the grid in the Australian Capital Territory. And only a year before, a consortium made up of Canadian and Middle Eastern investors (supported by some local investors) had been awarded a 99-year lease for TransGrid, another large Australian state electricity transmitter. This type of political interference — even in a mature market — can only have a negative impact on market confidence.

> "But governments must decide where and how to strike the balance between populism and the economy. They may not always be in conflict but, similarly, they may not always align."

Australia is not the only country to have allowed 'national security' concerns to potentially compromise the best interests of its economy. Ten years ago, the US House of Representatives blocked the purchase of P&O's US ports by DP World (Dubai), citing national security concerns (and defying appeals by then-President George W Bush to let the deal pass). Since then, there have been a series of similar events that seem to suggest that governments are prioritizing short-term political agendas over longer-term economic growth and benefit.

Turn back the tide

I believe that the better option to protectionism is to embrace globalization. Rather than barring certain developers, operators and investors of different nationalities from participating in their markets, governments should instead be focused on improving their controls and security protocols. In today's technology environment, the onus is on government to proactively 'lead from the front' to protect national security, no matter who owns or controls the asset; after all, hackers care little about the ownership structures of their targets.

Governments and politicians will also need to strive to better educate their populations about the actual risks of foreign ownership. There is often a big difference between the rhetoric politicians use at home and the smooth messages they deliver while on trade missions. More must be done to bring the two discussions into harmony.

Setting clear rules

However, it would be foolish to believe that we could rid the world of protectionist sentiment. Indeed, some protectionism may be justified in certain sectors or markets. But governments must decide where and how to strike the balance between populism and the economy. They may not always be in conflict but, similarly, they may not always align. The lines must be clearly drawn and the logic easily understood. Transparency is key.

In an earlier wave of protectionist fervor in the 1930s, the US created the Buy American Act (1933) — which was revitalized in 2009 as part of former-President Barack Obama's stimulus package. It clearly laid out the rules for foreign procurement by government entities in a very non-discriminatory and transparent way. Everybody knew the rules of the game and everyone was treated equally, for better or for worse.

More recently, South Africa's massive rolling stock procurement initiative also managed to combine clarity, transparency, competition and localization together in a way that encouraged global participation but also drove local benefits. Having faced signifi flak for their AusGrid decision last year, Australia has also now moved to deliver greater clarity on ownership requirements for assets in certain 'high-risk' sectors (currently limited to electricity and communications networks, water and ports).[4] More of that is required around the world.

What is clear is that globalization — not protectionism — will drive the delivery, operations and investments into the high-quality infrastructure that people deserve. Invoking some nationalistic or protectionist sentiment is perfectly understandable, but it must be clear and transparent. And it certainly cannot come at the expense of your country's economic growth and prosperity. ■

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Data, sustainable development and decision making

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As governments and development organizations look to infrastructure to help achieve the UN's Sustainable Development Goals (SDGs), the need for high-quality, reliable and multi-dimensional data and statistics has skyrocketed.

*To learn more about the impact this data revolution is having on development and infrastructure decision making, Katherine Maloney, KPMG in the US, sat down at UN Headquarters in New York City with **Stefan Schweinfest, Director, UN Department of Economic and Social Affairs — Statistics Division** and **Davinder Sandhu, KPMG in India and former Advisor to the Executive Director of the World Bank Group,** to discuss data, sustainable development and decision making.*

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Katherine Maloney (KM): Over the past decade, there has been an explosion of data — not only more volume but also more sources. How has this impacted decision making for infrastructure and development initiatives?

Davinder Sandhu (DS): In the past, I think many leaders would make their decisions based on little more than a hunch or a one-dimensional view of the problem. The data revolution means that we can start to make really smart, evidence-based decisions that take into account multiple factors. As countries like India continue to invest into long-term infrastructure as part of our development path, data and evidence-based decisions have become increasingly important.

Stefan Schweinfest (SS): Davinder is absolutely right. And this has really pushed the topic of data and statistics onto center stage. Statistics used to be a very introspective business — collecting, curating and disseminating data — but now we are getting signifi exposure. I spend a lot of my time building partnerships with public and private entities, communicating data and talking to the media whereas, in the past, statisticians had very little real infl on the decision-making process.

KM: What role does data play in helping governments and development organizations achieve the SDGs?

DS: The reality is that infrastructure underpins many of the objectives we hope to achieve through the SDGs. But we also recognize that infrastructure is long term and expensive, so we need to make sure the investments we are making are not only delivering assets in the short term, but also delivering on the SDG objectives to be achieved by 2030. And that requires a signifi amount of data, from a number of different sources, to be analyzed and properly communicated.

> “Data plays a massive role. At the UN Statistical Division, there are 230 indicators that we track to help gauge progress on the SDGs, across more than 190 countries.”

Stefan Schweinfest
UN Department of Economic and Social Affairs — Statistics Division
@UNStats

SS: Data plays a massive role. At the UN Statistical Division, there are 230 indicators that we track to help gauge progress on the SDGs, across more than 190 countries. The data supports both ends of the spectrum — it helps guide decision making so that investments can be better aligned to the SDGs, and it helps governments monitor their progress and adjust their strategy as their situations evolve between now and 2030.

KM: Is there a single source of good quality data for infrastructure decision makers and investors?

SS: No, and that is a significant problem. Here at the UN Statistical Office, we rely primarily on the countries themselves to provide data through their own statistical offi and then we work closely with the wider UN ecosystem for much of our data. For example, the World Health Organization provides data through its statistical offi on health and the UN Educational, Scientifi and Cultural Organization provides education statistics. Like many statisticians, our role has become much more about coordinating data than curating it.

DS: This is certainly an important role that is played by Stefan and his colleagues. I think countries like India often struggle to aggregate the data they receive from various official and non-official sources. And that means information isn't always directed to the correct person or time is wasted in re-keying or 'cleaning' up data so that decisions can be made.

KM: Do all countries have the capacity to deliver good quality, trusted data?

SS: I think about three layers of capacity with statistics — resource capacity, technical capacity and institutional capacity — and we need to analyze all three when we consider a country's national capacity. The UN Statistical Office has been very focused on helping our national counterparts build capacity and this has led to the development of our Global Action Plan that outlines what countries need to be doing in order to improve statistical capacity.

DS: India makes a good case in point, I believe. About 15 years ago, most of our statistics were conducted independently by line ministries and data was often kept in silos. But today, the Ministry of Statistics and Program Implementation is very highly regarded and plays a key role in centralizing data and statistics in the country. Given where we were, I think India now has a very robust statistical system. But everyone recognizes that it needs to continuously improve.

KM: The ability to disaggregate data has become increasingly important as decision makers seek to address the needs of specifi segments within their populations so that nobody gets left behind. How is this impacting the complexity of data analytics and management?

SS: Obviously, the more detail you go into, the more complex and more expensive the analytics become. There are also big questions about the ethical implications of using some data. I think that, particularly with the introduction of geospatial information, the ability to drill down to very small segments of data is extremely powerful. But we need to be careful that we are using it appropriately and drawing the right conclusions from it.

> “The data revolution means that we can start to make really smart, evidence-based decisions that take into account multiple factors.”

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DS: I would agree that disaggregated data can provide some very meaningful insights. The challenge in many countries is that there isn't the right level of data to enable this type of analysis. Until recently, citizen feedback data in India was gathered by a show of hands at a village meeting or through local village councils so there are often technical and cultural barriers to disaggregating data that must be considered.

KM: What can those outside of the development community do to help improve the quality and access of data globally?

SS: I think governments and their relevant statistical offices will play a central role, not only in improving or conducting traditional statistical operations such as a national census, but also in helping improve the quality of the data they receive from other sources. Of course, the challenge often comes down to funding and investment. Governments will need to invest more and I would hope the private sector would also contribute more. Global cooperation at all levels is a good fi step.

DS: I would agree on the need for more cooperation and investment. The private sector is developing mountains of data and statistics every day and some of it could be very valuable in helping drive public policy and investment decisions. I think the key — to development growth, to sound infrastructure investments and to achieving the SDGs — lies in data. And, more importantly, in how we use it. ■

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Stepping into bigger shoes: The changing role of multilateral banks

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In a world buffeted by disruptive forces, multilateral banks are fi to become more effective. Most have already initiated massive reform programs, but many worry that they may be moving too slowly — and too timidly — to meet the demands of their shareholders and borrowers. Today's environment offers multilaterals a valuable opportunity to reinvent themselves. We encourage them to seize it.

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Taking center stage

Nearly all governments recognize the vital importance of infrastructure. It is key to fulfilling national and global climate change and sustainability targets. It is central to the fight against social inequality and poverty. It is a catalyst to economic growth and development. It connects markets, people and nations, and — in some cases — it allows governments to project regional power.

Outward-looking governments also recognize that — outside of direct sovereign loans — multilateral banks represent the principal lever for governments to drive investment into foreign infrastructure. And therefore multilateral banks are increasingly viewed as one of the primary ways for governments to collectively influence and achieve global objectives.

Given the disruption shaking the current world order, multilateral banks may also represent a modicum of stability in an environment wrought with political risk and uncertainty. Many believe that — with their signifi experience working in developing markets — the multilaterals represent a much-needed bridge between the developed and developing markets.

"It is fairly clear that the major markets of the world see multilateral development banks as central to delivering improved infrastructure and, hence, economic growth to the emerging markets," Chris Heathcote, CEO of the Global Infrastructure Hub (an initiative established by the G20), recently told me.

The launch of the UN's Sustainable Development Goals (SDGs) should also enhance the value and role of the multilateral banks as shareholders (i.e. donor governments) start to ask difficult questions about the social, environmental and development impact of their investments. It may not be long before multilaterals start to set sustainable development targets to sit alongside their existing sustainable environment targets.

Clearly, today's current environment offers multilaterals a perfect opportunity to enhance their relevance within the world order. The problem is that it comes at a time when their old models are failing and most are struggling to reform their approach and mandates.

Changing the script

To be clear, the basic premise behind multilateral banks remains sound: developed markets leverage their strong credit ratings to raise and lend capital which, in turn, helps fund projects in markets with lower (often cost-prohibitive) credit ratings.The idea was that interest paid on these loans would then be channeled back into funding other loans in a virtuous cycle.

Unfortunately, two factors are disrupting this equation.The fi is obvious: the ongoing low-interest rate environment has slashed returns. Interest payments are not covering the basic needs of the funds and this is forcing a growing number of multilaterals to go back to their shareholders with calls for more capital. And no government is in the mood to start pouring more money into unexpected foreign obligations.

The second factor is one of volume. Demand for infrastructure is rising around the world. And the size of those investments is rapidly growing. Megaprojects are now the norm in developed and developing markets and this is ratcheting up the size and volume of the projects now looking for funding. Simply put, the multilaterals cannot keep up with demand.

Recognizing these pressures, most of the world's multilaterals are now talking about a different role and model; one where their job is more about mobilizing and facilitating private capital than lending stakeholder capital. They are starting to rethink their range of products and investment models to focus on credit enhancement rather than straight credit provision. They are exploring opportunities to 'open up' markets for private investment and they are looking for new ways to help get deals out of the pipeline.

"By 'crowding in' private fi the multilaterals will not only extend their fi reach, but also give countries a route to accessing Foreign Direct Investment," Chris Heathcote added. "It's a very important agenda, and one that is close to the hearts of many of the multilateral funding partners."

The talk has been encouraging. Unfortunately, the action has been largely underwhelming and ineffective. Few have managed to institute real and lasting change in their models. Most are moving far too slowly to meet the rapidly evolving environment.

Looking into the lights

Broadly speaking, most multilaterals are facing four main challenges in delivering on their reform agendas.The first is the cultural change that will be required to enable the shift from lending money to mobilizing money. This will require not only a change in the tone from the top, but also a change in the way behaviors are incentivized and success is measured. Rather than setting organizational lending targets, employees

The view from the World Bank Group

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In an evolving world characterized by shifting challenges and opportunities, it is our responsibility as multilateral development agents to adapt and evolve to meet our clients' and the world's development needs.

There is an urgent need for change if we hope to achieve the SDGs. And we recognize the importance of the challenges James' article raises for multilaterals, particularly in terms of incentives, skills, products and the nature of client demands.

While we certainly do not underestimate those challenges, we also see grounds for optimism.

Collaboration is rapidly increasing. Last spring, for example, the MDBs co-hosted the fi Global Infrastructure Forum, and the next forum will take place 22 April in Washington, DC.

It is also encouraging to see the multilaterals collaborating on a variety of tools and platforms to help governments prepare more sustainable infrastructure projects with private financing. Some of the more notable initiatives include the recently released Public-Private Partnership (PPP) Certifi scheme, the International Infrastructure Support System (a project preparation platform released in 2015 with over 60 projects from 22 countries), the PPP Knowledge Lab and the Global Infrastructure Facility.

In terms of new products, we see the Managed Co-Lending Portfolio Program announced last October by the International Finance Corporation (IFC) as an exciting new way to allow institutional investors to invest in infrastructure in emerging markets.

We agree that the multilateral community has much work to do. But we also see encouraging signs and signifi progress being made.

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should be rewarded for the volume of private capital they are able to attract.

This leads to the second main challenge: skills and capabilities at multilaterals have not kept pace with the change in models. Mobilizing and facilitating private capital to a deal is not the same as structuring a loan. Negotiating complex agreements with governments and private investors requires new capabilities. So, too, do most strategies aimed at opening up markets for investment.

The third challenge relates to the development of new products. Creating credit enhancement vehicles such as mezzanine products, fi loss capital products or guarantee products requires a different approach, execution capability and product structure. To date, most attempts to develop these structures have become embroiled in complexity — often counteracting the value they deliver.

Therein lies the fi big challenge: borrowers do not tend to want complex products that require them to reform in order to attract private capital. For various reasons — many of them justifiable from a borrower's perspective — these stakeholders would prefer straight loans with clear structures.

As a result, there is a growing disconnect between what the shareholders want, what the board is able to infl what products are being developed and what the staff in the organization are actually doing.

Studying new lines

We believe that multilaterals will need to overcome this disconnect in order to remain relevant — indeed, to lead — in the new world order.

In part, this will require increased cooperation between multilateral banks, their shareholders and borrowers. Tough leadership may be needed, but finding the right balance between lenders and borrowers' needs will be key to improving overall governance and decision making.

More cooperation will also be required between the multilaterals themselves. The reality is that, for certain projects, competition between multilaterals is often fierce. In a world of signifi capital constraints, it is critical that multilaterals make the best use of their (combined) available capital and resources.

Multilaterals will also want to focus on improving their own operations, skills, capabilities and governance. In many cases, bureaucracy will need to be reduced and processes streamlined. New skill sets will need to be developed and retained, not only at the operational and deal-making level, but also within executive and board leadership.

At the same time, multilaterals will need to recognize — even embrace — the need for increased flexibility in their approach to individual markets. Attracting private capital to established infrastructure markets is fairly simple. Opening up and developing new markets will require multilaterals to take a different approach — likely by taking on more risk in the initial period with a strategy to exit those positions as the market develops. Too much complexity and a low risk appetite will lead to nothing happening at all.

The view from the BNDES

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We agree that more collaboration between development agencies is greatly needed. And we believe that a good example of multilateral collaboration is happening now in Brazil.

As the local development bank, BNDES is focused on tackling a number of market failures that are restricting private financing for infrastructure projects. These market failures include lack of liquidity in the infrastructure market for infrastructure bonds, lack of a robust and steady pipeline, and few projects with an attractive balance of risk and return compared to Brazilian sovereign bonds (NTN-B).

Tackling these market failures is not easy, particularly in the context of high interest rates (current market rates in Brazil are around 13 percent). But we also recognize that, for Brazil to achieve its potential growth, it is critical that the country has access to different sources of long-term fi instead of relying exclusively on BNDES.

That is why BNDES is in discussions with the World Bank and the IFC to create a long-term facility focused on pre-completion deals in order to enhance credit ratings and reduce risks. Similar discussions are ongoing with the Development Bank of Latin America (CAF). BNDES wants to be a catalyst for creating complementary solutions to the current long-term fi of infrastructure projects.

BNDES is developing these alternative debt solutions in order to establish a strong infrastructure pipeline of projects with risk return profiles that can be attractive to international investors. With sustainability also a priority when tackling market failures, BNDES, in partnership with the Climate Bond Initiative, is tendering a fund manager position to develop a green energy fund. The green fund will be positioned to specifi address the current funding gap on sustainable projects.

> It is fairly clear that the major markets of the world see multilateral development banks as central to delivering improved infrastructure and, hence, economic growth to the emerging markets.

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Embracing the new role

Happily, there are encouraging signs that multilaterals are moving in the right direction. The European Bank for Reconstruction and Development (EBRD), for example, is one of the market leaders with its Project Development Facilities and new credit enhancement products.

We have also seen signs of greater collaboration (albeit countered by equal signs of increased competition) between multilaterals. Some are collaborating on efforts to open up new markets. Others are taking a more innovative approach through initiatives such as debt swaps.

However, in order to achieve their aims and mandates, we believe that more must be done and more urgency must be added. Today's environment offers multilateral banks a unique opportunity to shape and influence the global order. It would be a pity to move too slowly. ■

Taking a new approach: EBRD focuses on mobilization

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*In this one-on-one interview, **Matthew Jordon-Tank, Head of Infrastructure Policy at EBRD,** talks about the changes taking place within the EBRD and its impact on lending and private sector investment.*

James Stewart (JS): How has EBRD's investment into infrastructure changed over the past 5 years?

Matthew Jordan-Tank (MJT): From a direct lending perspective, our investments into infrastructure have essentially doubled over the past 5 years. Today, when taking EBRD as a whole, around 50 percent of our new loans are allocated to infrastructure projects in some way or other. Just as importantly, we have also doubled the number of projects we invest into directly. So we are not just spending twice as much, we are actually reaching twice as many people and beneficiaries.

JS: Can the EBRD continue to keep increasing its direct lending to infrastructure?

MJT: We are demand driven of course, and while we're likely to see some growth, I think everyone recognizes that this level of growth is unsustainable. But more importantly, I think many governments got the message fi at the G20 Summit in Australia in 2014 (repeated by the G20 Presidencies from Turkey in 2015 and China in 2016) where there was a concerted call for multilaterals and International Financial Institutions (IFIs) to do more to foster private sector investment in infrastructure, rather than build out their own balance sheets. The adoption of the SDGs has only sharpened the demand for IFIs to do more to mobilize private sector investment.

JS:What are some of the big challenges to mobilizing and facilitating private capital towards infrastructure investment today?

MJT: I think people recognize that there is an overall lack of credible, high-quality pipelines in the emerging markets and so one of our main areas of focus has been to help improve the quality of infrastructure pipelines. Two years ago, we set up a EUR40 million Infrastructure Project Preparation Facility (IPPF) to help our countries tap into the experience and advisors needed to create credible projects and pipelines. That, in turn, should allow, over an initial 3-year period, around 10 new projects to attract private funding that may not have been forthcoming without the proper support, with another 20 that will be done on a commercialized, sub-sovereign basis, a key step of course to improving the quality of infrastructure and related services.

JS: There are currently a wide range of credit enhancement products in the market. What is infl the development of these products within EBRD?

MJT: There are certainly a lot of options already in the market. But our research, done in collaboration with the World Economic Forum, suggests that less than 5 percent of all IFI lending in infrastructure is channeled through one of these existing IFI products. Clearly, the current suite of products is not working to its fullest potential so we have been focused on understanding what the market wants and creating the right products to meet unique needs. In Turkey, for example, we recently provided an innovative credit enhancement mechanism in the form of an unfunded liquidity facility that worked in concert with the Multilateral Investment Guarantee Agency (MIGA) to attract a broader pool of private sector institutional investors to the Elazig Hospital PPP project. The exciting part of this initiative is that, when combined with MIGA's political risk insurance, it enabled Moody's to assign a Baa2 rating to the bond issuance, two notches above the current rating of Turkey, thus enabling participation of a larger pool of institutional investors and mobilizing new sources of funding. We think this has great potential to be replicated in many places.

JS: Are you working with other IFIs to help improve the global approach to private sector mobilization?

MJT: Absolutely. There are currently a number of IFI working groups looking at different aspects of private sector mobilization. One important effort is focused on defi 'direct mobilization' versus a broader effort at 'catalyzation', where upstream institutional and regulatory frameworks are shaped to allow for bankable projects to crystalize. Others are working with shareholders to help determine the level of available investment going forward — efforts at blended finance and credit enhancement are central to this. Finally, IFIs are working closely on joint knowledge platforms, like Infrascope, the PPP Knowledge Lab and the International Infrastructure Support System, as Laurence mentioned, to build capacity from the bottom up. So, yes, I believe the IFIs as a group are focused on trying to improve access to private sector financing for infrastructure projects.

JS: Given the pace of disruption in the market today, do you expect these trends to continue?

MJT: Only time will tell how these trends infl investment. For the past few years, emerging market infrastructure has been a hot investment market. While many suspect that has more to do with a simple hunt for yield, and that as yields start to rise in the mature markets, this keen interest in emerging markets infrastructure may wane. However, we know very well that there will still be a real need for private sector investment, emerging markets are the places where the vast majority of global growth will occur in the next few decades, and infrastructure is one of the main enablers of growth, so, we'll stay focused on the task at hand.

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Global infrastructure in a local market

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How should infrastructure businesses react to the rising tide of anti-globalization?

2016 blind-sided globalization with Brexit and Donald Trump. Hipster and peer-to-peer economies further emerged and look capable of disrupting the conventional global trade model led by multinationals, which has underpinned more than a half-century of world economic growth.

'Post-Truth' has paved a path for 'Post-Global' as business leaders struggle to wrap their Master of Business Administration (MBA) around a changing world where cost is potentially less influential in shaping spending habits for goods and services than nationalism and appeals to emotion and personal belief.

The anti-globalization backlash is real and is a trend set to grow in 2017. Consumer priorities are also changing. Location matters, the supply chain matters, local investment matters and quality matters — but are consumers prepared to pay more?

Last summer, somewhere between Brexit and Trump, I watched Gregory Caruso's documentary *Making the American Man* on Netfl This fi confi something that I had already come to suspect — that passionate localism and craftsmanship were circling back into mainstream western economies through a new generation of artisans and manufacturers. This 'hipster-esque' economy consists of a thread of independent businesses that desire to create more personal relationships with their customers. In some cases, these are the efforts of well-educated professionals that spun out of the global fi crisis and re-established manufacturing and cottage industry in their local communities. These businesses are the opposite of a global franchise. They aspire to be local and contribute to their community. They are enabled by technology. They choose to focus on quality, not quantity; individual products, not product lines; and they go for premium not bargain purchasers.

But what of infrastructure development, procurement, management and investment? How do these potentially short-term economic fads impact the businesses responsible for the longer-term physical assets and investments that underpin our global economy?

Buy American, but at what price?

President Trump has said his administration will follow two simple rules to procure US$1 trillion of infrastructure investment — buy American and hire American. But what does that mean for a global toll road operator like Transurban, which is listed on the Australian Securities Exchange, or Meridiam, the French-based global infrastructure investor? Both companies have active staff and assets operating in the United States.

Realistically, Trump's economic nationalism shouldn't impact the ability for companies with US operations to continue to invest in and work with US infrastructure. They already hire domestic staff who live and work in the country, and if Trump wants to limit the supply chain to favor American goods and services — it will only change how companies position themselves and bid for contracts as they account for local prices. This is not a new challenge. Multinational infrastructure firms already tackled this issue when Congress included the 'Buy American' provision in the American Recovery and Reinvestment Act of 2009.

It's possible the supply chain will see some disruption, but even that is not very straight forward. Bombardier is a Canadian company that keeps its rail division headquarters in Germany and employs more than 7,000 people at 37 facilities — including four manufacturing sites across the United States. But will assembling in the US be enough for Trump? How deep into the supply chain will companies have to reach to 'Buy American'? How much local content will have to go into the nuts and bolts of building a passenger train or a grader used in road construction?

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A global workforce

Infrastructure is a global commodity — especially in more competitive free markets like Europe and the US. The professional expertise and technical skills required, particularly for complex projects like nuclear power, are not readily available in every country. They must cross borders. The more complex the infrastructure — the higher the likelihood that foreign content will be there.

If governments do not want to import expertise and capability, then they must be willing to invest in developing it. The UK announced a National College for Nuclear in 2016 to nurture world-class skills in a new generation of workers to match its growing energy ambitions. This follows the country's earlier success establishing the GBP13 million Tunnelling and Underground Construction Academy to train workers and deliver projects like Crossrail and Thames Tideway Tunnel.

At the same time, the UK is launching another program designed to attract an entire nation of foreign investors. The UK-China Infrastructure Academy will train Chinese offi and business people in the intricacies of investing in UK infrastructure. It's a bold initiative to address the unceasing need for more money to bridge the country's infrastructure gap.

Investment is up, but what can we afford?

The UK is not alone. The combined scale of individual country infrastructure needs already exceeds global capacity to afford and deliver it. In 2013, the World Economic Forum estimated the annual global demand for infrastructure investment was US$3.7 trillion. Only about US$2.7 trillion is invested each year leaving a trillion dollar gap of under investment.

It is not for a lack of capital. Infrastructure is an attractive asset class for private investment and has long been viewed as a safe haven by global investors. The sector has seen plenty of money raised and poured into it from all around the world over the past decade.

International investment in infrastructure is on the rise. According to InfraDeals, it took just 3 years from 2010 to 2013 for annual global transaction activity (Fig. 1) to nearly double following a dip from the financial crisis, and only 2 more years to nearly triple the volume by 2015.

Affordability is the bigger concern as there is a noticeable gap between what governments want and what citizens can afford. There is also a gap between how governments perceive value-for-money and how investors achieve an acceptable rate-of-return. The concern with Trump and Brexit is that if countries adopt protectionist measures restricting foreign competition, it may drive up costs adding further stress to affordability and ultimately meaning less infrastructure gets built.

So what does the future hold for a global infrastructure business?

Asset ownership is diversifying

The DNA of infrastructure ownership has been evolving — and varies by region. Eighty and 84 percent of ownership in Latin America and Asia respectively is controlled by 'corporates' according to InfraDeals, while Europe and North America's ownership group is far more diverse, attracting a higher proportion of institutional investment via infrastructure funds, public and private pension funds, and sovereign wealth funds (among others).

As infrastructure markets have globalized over the past 20 years, international businesses have favored more diverse, transparent and competitive markets attracting both institutional capital and technical expertise for the delivery of high-quality assets. In recent years, the gravitational center of this market has shifted from Europe and North America to the Far East. China is stepping up its global and regional leadership via 'One Belt, One Road' and the Asian Infrastructure Investment Bank (AIIB) at a time when western governments are becoming more isolationist. Japan, South Korea and the Association of Southeast Asian Nations (ASEAN) countries are equally influential and ambitious.

What's old is new

In a world moving east, multinationals are doing what they've always done. They are picking the markets and opportunities they can compete in — and they are investing in local teams and resources. In that regard, global infrastructure strategies haven't changed as a result of Trump or Brexit.

Businesses will continue to think about how they can combine global experience and expertise with local knowledge to support the development of national, regional and community-focused infrastructure. They will continue to create opportunities for the local workforce, investing in new skills and supporting the ambitions of national, regional and local governments. Successful infrastructure businesses adapt and fi ways to compete through changing circumstances. So even with anti-globalization on the rise, the outlook for global infrastructure remains the same as it has been since the global financial crisis nearly 10 years ago — success is driven by political will, funding and affordability in local markets. ■

Global transaction activity by value and number

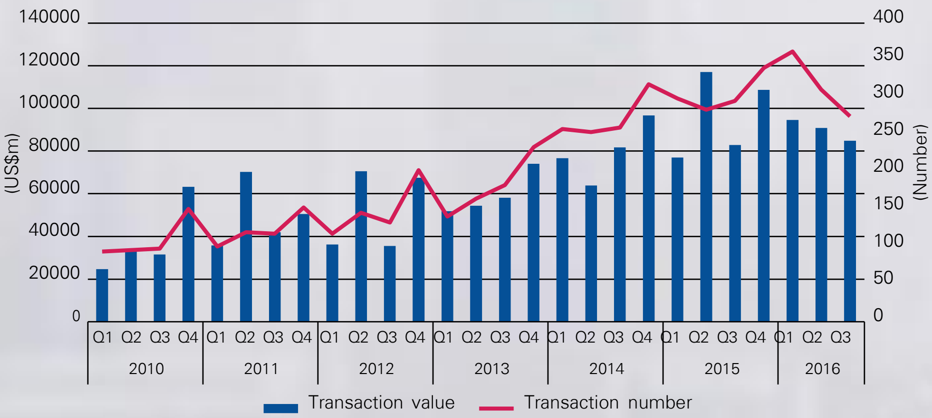

Fig. 1: InfraDeals, 2016

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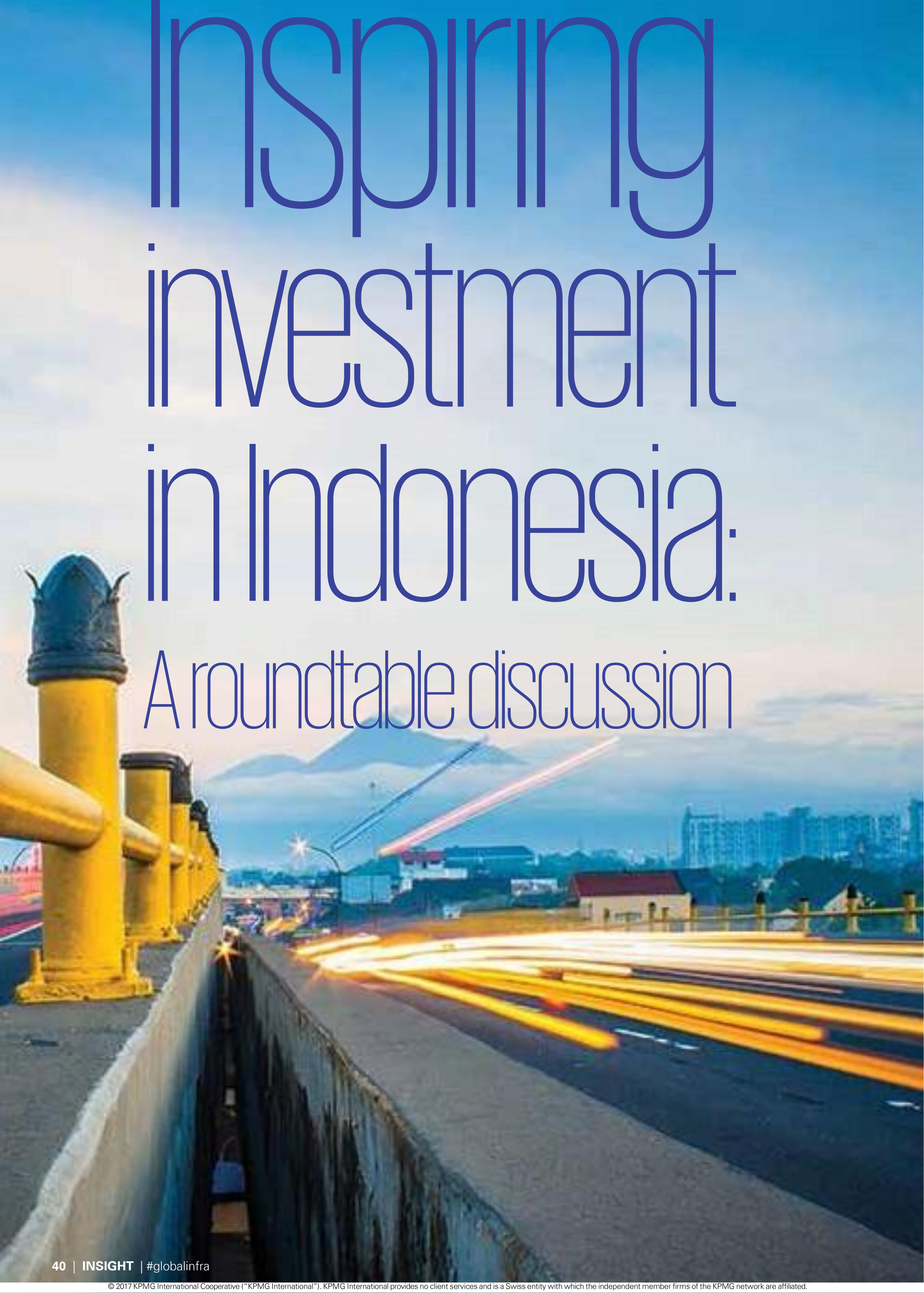
Inspiring investment in Indonesia:

A roundtable discussion



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Like many fast-emerging markets, Indonesia has a long list of infrastructure needs. And investors are starting to listen.

To fi out how Indonesia is winning in Asia's competitive infrastructure market, Sharad Somani, Head of KPMG's Association of Southeast Asian Nations (ASEAN) Infrastructure Advisory practice, sat down with three of the country's institutional leaders: ***Pradana Murti****, Head of Development at* ***PT Sarana Multi Infrastruktur (SMI)****,* ***Rainier Haryanto****, Program Director of the* ***Committee for Acceleration of Priority Infrastructure Projects (KPPIP)****, and* ***Harold Tjiptadjaja****, Managing Director of* ***Indonesia Infrastructure Finance (IIF)****.*

Their insights provide valuable lessons for international investors seeking new opportunities and for emerging market leaders hoping to catalyze their own infrastructure markets.

Sharad Somani (SS): When infrastructure investors talk about the next big investment market, they are usually talking about Indonesia. And many investors recognize that the market is rapidly maturing. What has been attracting private investors to Indonesia's infrastructure market?

Pradana Murti (PM): I think we are starting to demonstrate a good track record for public-private partnerships (PPPs). We started out slowly and it took almost 5 years to move the fi PPP project into the market, but we've since been able to identify a lot of the challenges we faced and overcome them.

Harold Tjiptadjaja (HT): Right. And I believe that investors recognize that the Indonesian government is working hard to make regulations and permitting processes to be more investor-friendly for both private sector and foreign investors. At the same time, there is a massive backlog of projects at the national, regional and municipal level — investors have lots of choice in projects which fit in their risk appetite.

Rainier Haryanto (RH): The government has also made great strides in making the institutions and processes more professional. To support such effort, Indonesia is producing a number of strong initiatives and institutions focused on attracting, facilitating and supporting private investment into infrastructure and I think there is a general acknowledgement in government that you need a mix of private and public sector professionals to run a world-class institution.

> There is a massive backlog of projects at the national, regional and municipal level — investors have lots of choice in projects, which fit in their risk appetite.

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SS: Tell us about the role that your organizations play in attracting private investment to Indonesia.

PM: PT SMI is a State Owned Enterprise (SOE) established by the Ministry of Finance in 2009 to act as an infrastructure financing company. But we were also given a mandate to provide advice and support to public and private entities developing infrastructure in the country. Our focus is now on helping governments, particularly at the municipal and local level, understand their options and how to tap into them.

HT: IIF is much more focused on mobilizing private sector funding and investment into the infrastructure sector. We were established in 2010, essentially to get the best leverage possible for government investments. And so far, we've been fairly successful. We now have funding commitments of around US$1 billion, leveraging the government's initial commitment of just US$50 million. So we are continuously focusing on finding and unlocking new sources of investment.

RH: Where SMI offers advice and financing, and IIF mobilizes funding, our mandate at KPPIP is focused on accelerating priority projects. There was a broad recognition that the government needed a centralizing body to help drive their projects including key PPP initiatives. So our job is to be involved at any phase of the project to achieve successful project delivery. This means our role stretches from the preparation phase through to the operations and maintenance phase — to remove bottlenecks and facilitate delivery, working across government entities and with private sector.

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SS: According to Pak Rudiantara, Indonesia's Communications and Information Minister, "Our ultimate goal is to make infrastructure development the foundation for our economy. We cannot afford to delay investment in infrastructure, which supports trade flows and investment in this country". Indonesia clearly boasts very strong institutions and levers for driving infrastructure investment. What is currently holding investors back?

HT: I think many investors are worried about two classic challenges — permitting process and land acquisition processes. The good news is that the government has been working very hard to simplify the permit and licensing processes, acknowledging that such processes will take some time. On the land acquisition process the government also passed a new law in 2012 with full implementation guidelines in 2014 in order to streamline the land acquisition process for infrastructure projects and that has helped improve transparency significantly.

RH: I think investors also want to see a strong, prioritized pipeline of projects before they really start looking at investing in a market. But that requires a good source of reliable centralized data on the projects being prepared. So one of our objectives has been to set the pipeline of priority/strategic projects, collect that data and make it available to private sector investors to help them get a better view of the opportunities available in the market.

PM: Like all markets, Indonesia struggles with financing. But I think the bigger challenge isn't the financing itself, but rather the quality of the projects. At the state-level, there are a number of projects — many of which we support — that are very professional. But when you get down to the municipal level, governments still need a lot of assistance.

SS:There are now 516 municipalities in Indonesia, each with a list of projects to deliver. What are the key challenges for municipal investment?

PM: The municipalities have been facing a challenging environment. There have been three successive budget adjustments recently and that — combined with a recognition that low resource prices will likely lead to further fi tightening — is forcing municipalities to start thinking about other options. I think the good municipalities are now embracing the challenge and seeing the opportunities.

RH: On the challenge, there is also a very different level of understanding about PPPs across the country. I think part of the solution will be in creating more standardized contracting and prequalification criteria. But more work will need to be done to help municipal leaders — particularly those from regions without signifi resources — unlock alternative sources of capital for infrastructure.

"More work will need to be done to help municipal leaders — particularly those from regions without signifi resources — unlock alternative sources of capital for infrastructure."

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HT: I think it's also important to ensure the right capital is flowing to the right projects. We want to attract large foreign investors to those projects where their expertise and capital can have the most impact, and not to small, isolated projects. So we are focused on helping to build capacity that helps accelerate bigger projects, not looking from the viewpoint of the state budget down, but rather from private participation coming up.

SS: What will it take to catalyze faster growth and development for Indonesia's infrastructure market?

HT: I have been very vocal about Indonesia's need for a centralized PPP unit that puts all of the government's infrastructure tender processes under one roof. That would help drive transparency for domestic and foreign participants. And it would allow for a single, prioritized and coordinated pipeline of projects to be produced.

RH: I suspect that the SOEs will still continue to play a significant role in catalyzing the infrastructure markets.

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Not only because they are able to leverage government funding but also because foreign investors and operators would require local partners and the SOEs want to improve their capabilities.

PM: When you look at the markets that have moved quickly, they are often the ones that have seen a sudden change in competition or market realities. Open skies forced airports to step up their game. Heightened competition led SOEs to broaden their investment portfolios and start selling assets. We'll certainly make steady progress without a sudden change in the market, but good things often come from change.

SS: In a recent conversation, Pak Rudiantara stated "We must continuously push for measures that will ultimately make infrastructure in Indonesia more effi and benefi to the public". Given the country's recent successes and current trajectory, what is your forecast for Indonesia's market over the next 3 to 5 years?

HT: I think we picked up good momentum in 2016 with a number of major PPP projects achieving financial close — these projects include power and drinking water installation initiatives like Batang IPP and Umbulan East Java respectively, and broadband developments like the Palapa Ring program for Western and Central Indonesia. And I think we'll see that number start to pick up significantly as investors starts to gain more comfort in the market. Ultimately, Indonesia is resource rich and I think investors recognize that there are many ways to finance their projects. I'm very optimistic about Indonesia's future.

RH: I absolutely agree with Harold's statement. I think in the next 3 years, we will continue to pick up momentum and will see both the size of the market and the diversity of the players grow signifi . At the same time, I believe that the domestic markets will also grow, improving local financing options and creating more opportunities for local businesses and retail investors.

PM: I also agree with my colleagues. I would, however, remind investors that it takes time to make the changes that are required. Over the next year, important changes will certainly be made and the market will become much more attractive. Now is the time to engage with the Indonesian market so that — when the opportunities do emerge — you are ready to take advantage of them. ■

> "Now is the time to engage with the Indonesian market so that — when the opportunities do emerge — you are ready to take advantage of them."

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Putting stakeholders and communications at the heart of major infrastructure

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"We've seen fi
how effective and meaningful engagement with stakeholders, enabling them to be part of the development process, has resulted in goodwill and support for a project."

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In January 2016, David Cameron was the British Prime Minister and Donald Trump seemed like a long-shot to become the US President. Globalization was an engine for economic growth, and businesses worked on an assumption that new technologies and evolving business models presented more opportunities than obstacles.

But all was not as it seemed. Pundits and politicians alike dismissed (or ignored) a groundswell of resentment from the general population for a world that threatened to move past them and an establishment that seemed unconnected to smaller cities and rural communities. People felt like they were losing control, so they voted to take it back. The British elected to leave the European Union and ended up with a new government focused on delivering Brexit. Americans, through the US Electoral College, decided in favor of the outsider Trump, who promised to hold back the forces of globalization and bring about a new age of prosperity with a 10-year, trillion-dollar infrastructure plan.

Communication is key

Project promoters and authorities that are likely to benefit from Trump's infrastructure plans should also learn from his and Brexit's unexpected victories. In an environment where public sentiment is of empowerment, independence and even defiance, it has never

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been more important to involve stakeholders in the planning and decision making for new infrastructure projects that will signifi affect their lives. Infrastructure businesses are increasingly recognizing the importance of communicating openly with stakeholders at the earliest stages in the development lifecycle, setting out their vision of a better future to justify why the project is needed.

Historically, projects were rolled out with limited engagement with the wider stakeholder community. Projects such as the decommissioning of Brent Spar in the North Sea and obtaining consent for Terminal 5 at London's Heathrow Airport are well-known examples of where project owners failed to engage early enough, transparently enough or widely enough with stakeholders and paid a heavy price in time, money and reputation.

In the US, construction of the Dakota Access Pipeline, which will connect the rapidly expanding Bakken and Three Forks production areas in North Dakota to wider refining markets via Illinois, was halted after the Army Corps of Engineers announced it would not approve permits under a reservoir on the Missouri River. The announcement comes after months of intense protests led by the nearby Standing Rock Native American community leaving the fi al segment of the pipeline uncompleted. One only needs to search for '#StandingRock' on Twitter to see how badly things have escalated for the promoters and authorities supporting this project.

This is a global challenge for developers and not exclusive to any particular country. Global trends towards devolution of decision making to local communities, the availability of online information (and 'PostTruth' misinformation), Freedom of Information and other transparency legislation, and the rise in the power of social media enhance the need to have a very well designed stakeholder engagement strategy from the outset.

"We've seen fi how effective and meaningful engagement with stakeholders, enabling them to be part of the development process, has resulted in goodwill and support for a project," said CJ Associates' engagement director Gary Sargent. "Even in cases where stakeholders are initially categorically opposed to a project, when they become effectively involved in the decision-making process, they begin to understand the problem the project is designed to solve. When they are engaged in how the different options are developed and how the socio-economic and environmental impacts can be mitigated this has resulted in a much higher degree of public support."

The power of public opinion

Mr. Sargent has witnessed how the power of public opinion can make or break a project, with more than 15 years of experience in the development of major transport infrastructure in the UK. Globalization has only raised the stakes as, increasingly, project proponents include foreign investors and developers, which can add to local distrust. According to Sargent, the objectives of early stakeholder engagement are to establish relationships and dialogue with those most impacted, most opposed or interested in a project; to inform and build support and advocacy for a project; to capture the relevant economic, environmental and social impacts of possible options, including obtaining intelligence on issues of importance to local communities; to obtain technical information to continue to develop the route options so as to optimize design and development; and to inform the business case and demonstrate value for money.

> "The exact boundaries of the social license can change overnight with community expectations being the key determinant."

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The risks of not engaging far outweigh the effort required, as with the Dakota Access Pipeline, several important infrastructure projects have faltered and failed due to lack of public support. In March 2016, the Royal Institution of Chartered Surveyors (RICS) produced a comparative study of two major tunneling projects in Australia and the UK, specifically examining how the quality of stakeholder engagement was a determiner of project success or failure. They analyzed the quality and frequency of information exchanged with stakeholders throughout the project and across six main issue areas. Where there was insufficient communication flow between the key project team and the wider community, there was signifi misalignment between the project's strategic intents and the public needs and expectations, and in the case of the Australian tunnel, the project was widely viewed as having been halted by its failures on stakeholder consultations.

Conversely, in their analysis of the Paddington Station Crossrail project, the key project players took central, visible communications positions and as a result Crossrail enjoys a signifi higher level of public support and is considered an excellent example of putting stakeholder engagement at the forefront. These findings closely reflect Sargent's experience of the power of working closely and collaboratively with stakeholders. Not only does it mitigate the reputational risks to the project owner and the risk of project delay, it usually also leads to a better overall project with greater benefits and less adverse impact on stakeholders.

Boundaries to social license

With any new infrastructure project there will almost certainly be signifi impacts on local communities and the environment; both during the construction and operation phases. There will be many who will be deeply opposed to a scheme on any number of grounds — social, political, environmental. "Measuring the elasticity of a social license is not easy; some projects may enjoy wide leeway depending on the expected outcomes and benefits for the wider community," says Richard Boele, KPMG's Head of Human Rights and Social Impact Services. "The exact boundaries of the social license can change overnight with community expectations being the key determinant." That is why it is so important to engage early and often throughout the lifecycle of a project, listening to stakeholder views, making them feel heard and invested into the process, asking the right questions and being prepared to address valid concerns is critical to project success.

Communities across Europe and America have recently demonstrated their ability to buck the norms and provide counter-intuitive outcomes based on a lack of trust in government, politicians, institutions and corporations and a zeitgeist of taking back control. With the tide of public opinion able to be turned in an instant, the power of stakeholders and the possibility of negative public perceptions derailing major infrastructure projects cannot be underestimated. If engagement and communications are not planned and executed appropriately and effectively, affected communities and stakeholders can organize themselves and develop their own powerful campaigns with precision and effect. The old rules and approach to engagement no longer apply. Welcome to localization — and a new world of globalization. ■

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Listening in: Infrastructure in a protectionist world

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Social listening is key to success in the infrastructure sector. It allows organizations and policy makers to track patterns, understand sentiment and draw conclusions based on where and when conversations happen and who is talking. And it helps developers and owners avoid the types of delays, costs and reputational damage that can result from negative social media sentiment.

In our last edition of *Insight* magazine, we offered a general overview of social listening (it's worth reviewing if you are new to social listening) and provided some analysis of the top infrastructure-related conversations on social media at the time.

For this edition, we take a look at two major events over the past year: Brexit and the election of Donald Trump as President of the US. Clearly, social media played a key influencing role in both events — some suggest that misuse of social media may have tilted public opinion in the fi days of both campaigns. So we tried to strip out the fake news and irrelevant noise to offer a clearer view into the social media chatter surrounding each event.

Given the subject matter of this publication, we focused our search on topics related to infrastructure. We then looked at each event from three views: pre-event, the immediate post-event and the discussion since the start of 2017. Here's what we found:

Brexit

Pre-event

Social media chatter clearly increased in the 6 months leading up to the European Union (EU) referendum in the UK. Not surprisingly, the patterns illustrate strong opinions and opposing perspectives (often with negative

Social listening before and after EU referendum decision

	Pre-EU referendum 1 January 2016–23 June 2016	**Post-Brexit decision** 24 June 2016–31 December 2016
Volume of tweets	3,000	12,700
Potential reach	15,500,000	92,000,000
Top terms and hashtags	1. #brexit 2. #euref 3. #voteleave 4. #infrastructure 5. #strongerin 6. #investment 7. #eureferendum 8. #ukineu 9. #leaveeu 10. #davidcameron	1. #brexit 2. #infrastructure 3. #luisrodriguezrd 4. #commit2infra 5. #euref 6. #nexit 7. #daxit 8. #uk 9. brick wall 10. #leaveeu

Source: Sprout social, Spredfast Intelligence social listening platform

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sentiment). Top trending hashtags at this point were #voteleave and #strongerin. Infrastructure loomed large in many of the topics being discussed; immigration, border controls, investment and industry were all high on the list. Those using the #voteleave hashtag tended to voice concerns about the movement of migrants to the UK and the associated pressures this had caused on local schools, hospitals and other infrastructure. The #strongerin group stressed their view that infrastructure investment would fall if the UK left the EU.

Immediate post-event

Volume on social media spiked immediately following the event, with some conversations receiving quadruple the volume from before the vote. Interestingly, the tone of the conversations quickly moved away from the 'blame game' to focus instead on the need for more investment, particularly into infrastructure. In fact, #infrastructure and #commit2infra were two of the top four hashtags immediately following the vote.

So far in 2017

In general, the tone of the conversation has become more neutral. Many conversations are focused on addressing the need for more infrastructure in this 'new normal' and has largely been constructive. That being said, the hashtag #brexitreallymeans has been trending recently, with users following up with their perceived negative consequences of Brexit. Another hashtag worth watching is the #industrialstrategy hashtag, which has been associated with conversations related to British infrastructure, industry and government action plans.

The election of Donald Trump

Pre-event

Social media certainly played a central role throughout the US election. Indeed, the Republicans essentially used Twitter as a key communication tool throughout the election campaign. Perhaps not surprisingly, #debatenight was among the top hashtags during this period, with usage spiking as the debates occurred. Overall sentiment tended towards the negative, with many (on both the Republican and Democrat sides) using social media to voice challenges to the two infrastructure plans being proposed. Many of the top engaged conversations picked up on key phrases from the debates — Trump's criticism of America's "crumbling infrastructure" and his proposal to "at least double" the Democrat infrastructure spending projections.

Immediate post-event

Conversations regarding President Trump's infrastructure plans kept a steady pace in the period between his election and the inauguration. Many of the same key phrases continued to see high usage during this time. But the conversation also started to shift to questions about implementation. Many used social media to discuss announcements made during this period — particularly nominations for key cabinet posts. The nomination for the Transportation Secretary was a key infrastructure-related topic on Twitter. Issues related to tax reform and potential tax breaks for corporates were also high on the agenda.

Since the inauguration

President Trump kicked off the first month of his administration with a slew of massive announcements, providing lots of fodder for social media conversations. In particular, the executive orders related to highly- controversial energy and infrastructure projects like Keystone XL and the Dakota Access pipeline received significant social media attention with hashtags such as #nodapl, #nokxl and #theresistance all within the top 10 trending topics. The confirmation of Elaine Chao as Transportation Secretary also served as breaking news on social media during this period.

Honing your ear to cut the clutter

No matter how sophisticated your social media tool, there is no replacing the value that human intuition can add to a social listening exercise.

When we conducted our research for this article, we chose to conduct as simple a search as possible to ensure that we captured relevant conversations and cut through the noise. For the election of Donald Trump, for example, this is a simplified version of our search query: (Trump OR Donald Trump OR election 2016) AND (infrastructure OR infra OR rail OR construction OR transport OR subway). In other words, we wanted to find conversations that were highly relevant to infrastructure that also referred to Trump.

Our results, however, did initially return a number of conversations that were unrelated to the objective of the search — conversations about hate crimes on subways during the election period, for example. While it is a reality of events that took place — that skewed the results in one direction or another for the purposes of this analysis. For the next iteration of the search, results like these were omitted, providing a much more targeted analysis of infrastructure-related conversations.

The key takeaway is that data alone never tells the full story. It takes experienced users who understand the tool, know the subject matter and the medium to drive real insights that lead to better-informed decisions. ■

Social listening before and after US election win

	Pre-election 19 July 2016 (official nominee)–8 November 2016	**Post-election win** 9 November 2016–19 January 2017 (per-inauguration)
Volume of tweets	211,000	222,000
Potential reach	600,000,000	3,100,000,000
Top terms and hashtags	1. donald trump 2. #trump 3. #debatenight 4. #maga 5. hillary clinton 6. #infrastructure 7. public transit 8. renewable energy 9. human rights 10. #donaldtrump	1. donald trump 2. #trump 3. tax breaks 4. #maga 5. #infrastructure 6. maternity leave 7. #transportation 8. #news 9. tax cuts 10. transportation

Source: Sprout social, Spredfast Intelligence social listening platform

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Infrastructure 100: Looking back to see ahead

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Spotlight 100

In every corner of the world, new and innovative infrastructure projects are being developed. And since 2010, KPMG's member firms have leveraged its global reach and industry connections to develop a list of the top 100 infrastructure projects in the world.

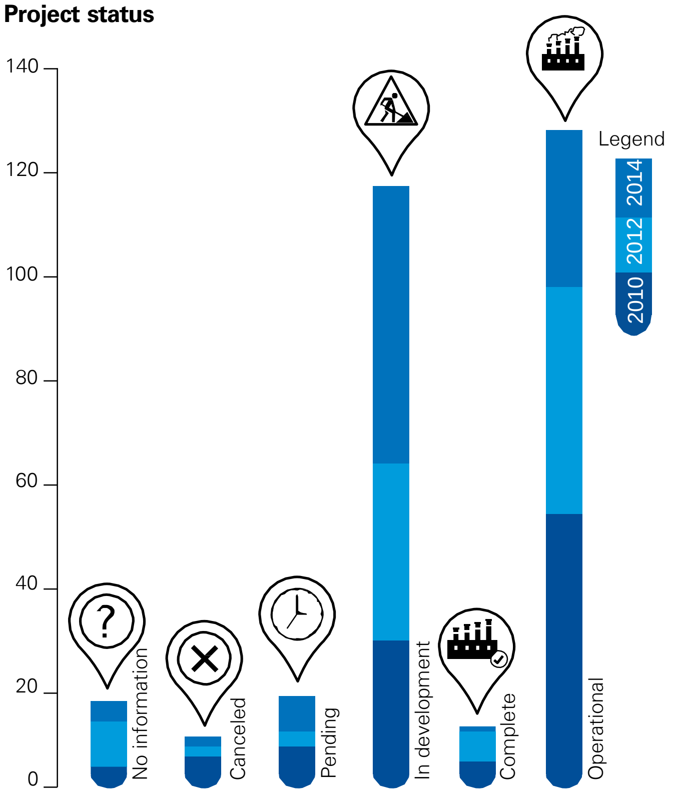
Guided by a group of distinguished public and private sector judges from around the world, the *Infrastructure 100* report series quickly became a key reference document for many investors, planners and governments throughout the infrastructure sector.

More than just a glamour show, the list recognized projects that demonstrated forward-thinking approaches. It focused on developments that were creating fundamental change in their regions and markets. It offered lessons and — hopefully — inspiration for those struggling with their own infrastructure challenges. Simply put, it provided a glimpse into the future.

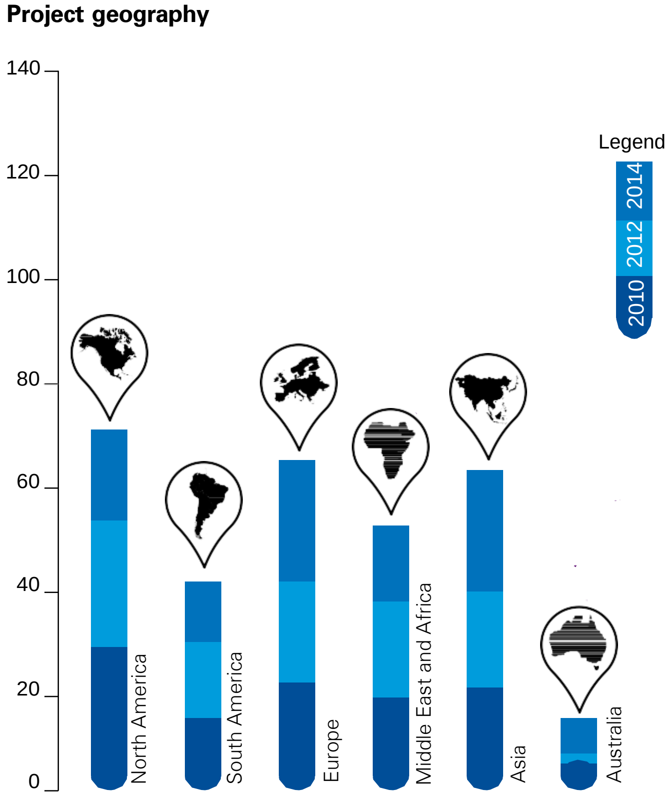
In this Special Report, we draw from our past *Infrastructure 100* lists to explore some of the big themes raised in this edition of *Insight* magazine. From the changing face of globalization and the shift of power towards the east through to the evolving funding environment and the impact of local customs and norms, we have selected projects that continue to offer forward-looking lessons to the infrastructure sector.

We hope this new look at our past *Infrastructure 100* reports offers readers valuable insights into the future of the sector. Sometimes, you need to look back in order to see ahead.

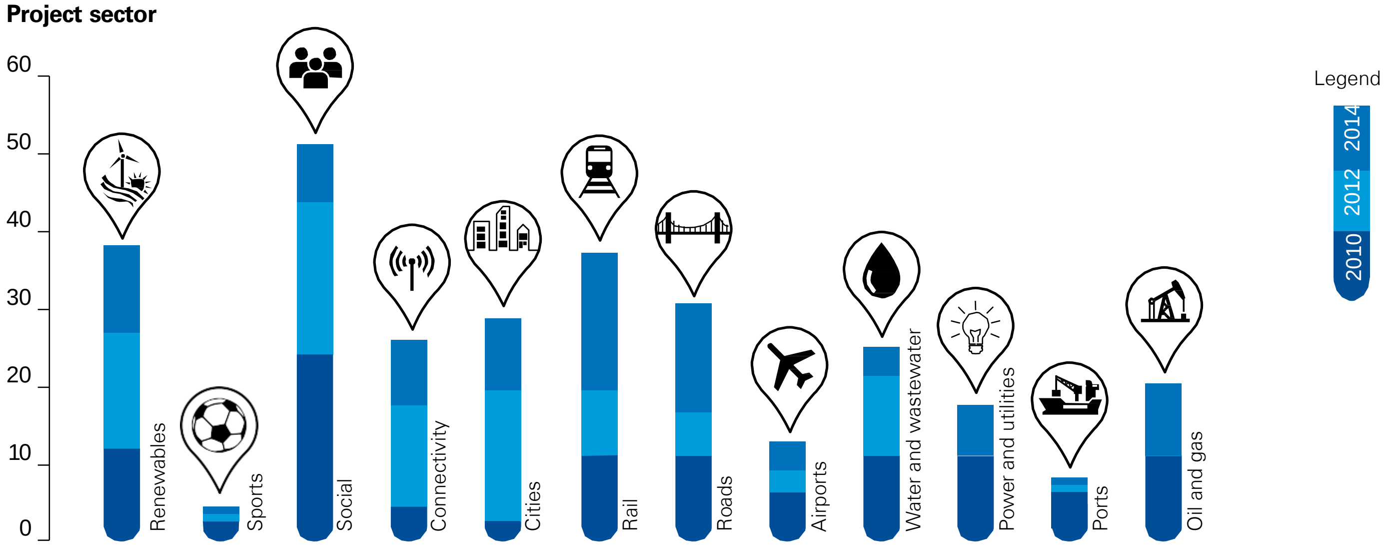
Project status



Project geography



Project sector



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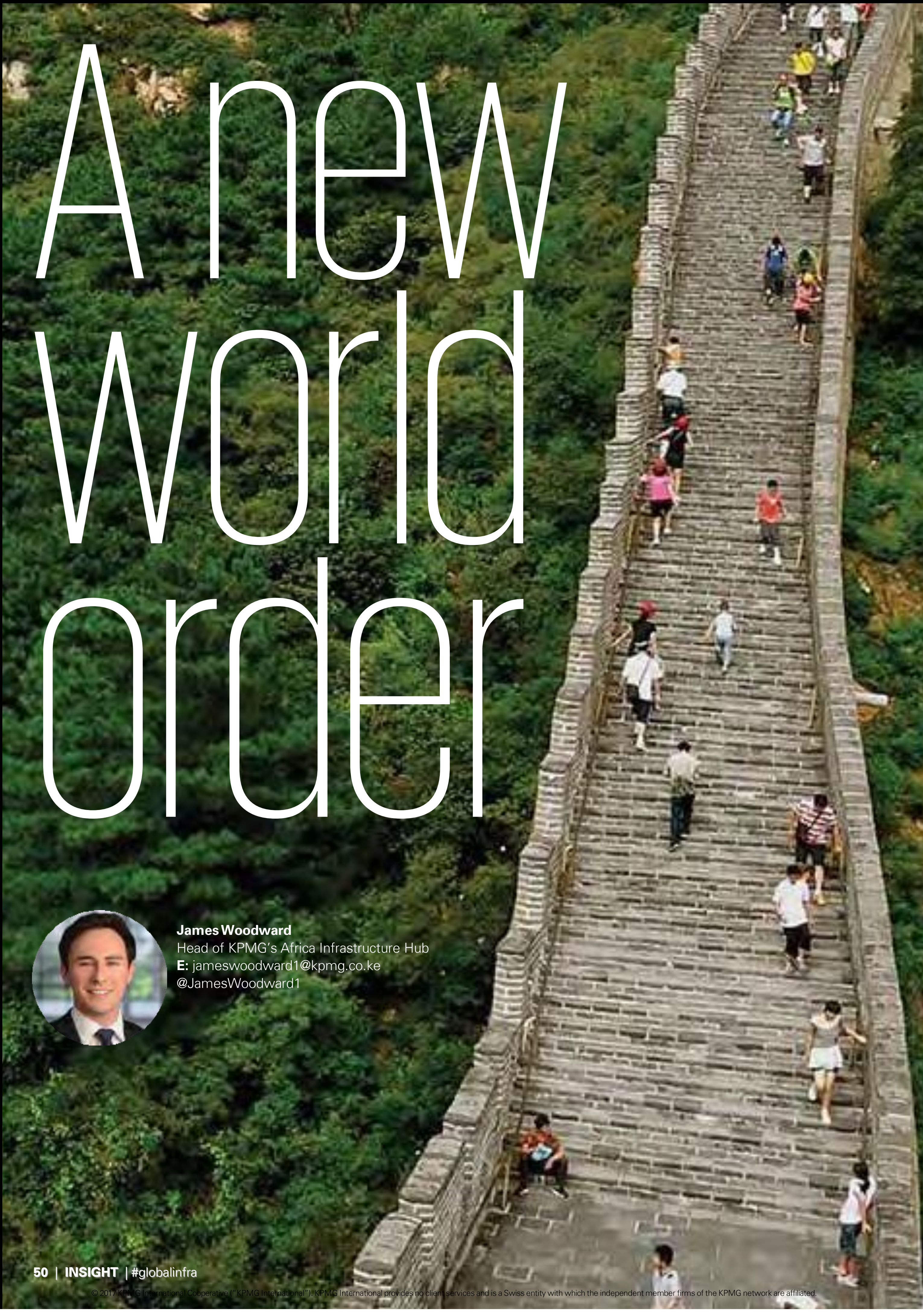

A new world order

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Spotlight 100

> The shift east is not a short-term market gyration or trend. It is real. It is underway. And it will change the very foundation of our current world order.

It was notable that — at the 2017 World Economic Forum Summit in Davos — it was the Chinese that were extolling the virtues of globalization and the US that was unpicking it. To those in the emerging markets, it was yet another telling sign that the balance of power was undeniably shifting from the west to the east.

Nowhere is this more obvious than in the infrastructure sector. China has led the charge. From the creation of the Asian Infrastructure Investment Bank (AIIB) and the funding (via State Owned Enterprises) of emerging market projects through to the rise of their tenacious global operators and the development of their visionary regional projects, China has demonstrated that it intends to take a leading role in infrastructure markets from now on.

While China leads the shift east, it is certainly not alone. Mature markets in Asia (such as Singapore and Japan) are also flexing their infrastructure muscles; other emerging markets in the region (particularly India and Indonesia) are creating and exporting home-grown solutions. In the Middle East, the shift away from hydrocarbons is driving signifi investment into infrastructure. And Africa may well emerge as a leading power in solar energy.

The reality is that this shift has been underway for some time. In the 2012 edition of Infrastructure 100, we highlighted the **Ethiopia Djibouti Railway**. And then in 2014, we spotlighted the **Nigeria High Speed Rail** project. Both are now operational. Both were delivered despite local political risk and currency concerns. Both were developed by China Civil Engineering Construction Corp (CCECC). Both are being operated (for a period) by China Railway Group employees. And both were majority funded by China's Exim Bank. Based on their success, more projects are now underway across the continent.

The **New Silk Road** — now more commonly referred to as the **One Belt One Road** initiative — is another example of eastern leadership driving globalization. The project was spotlighted in our 2014 edition of Infrastructure 100 as a "bold yet unrealized dream". But over the past 2 years, China has worked hard to make that dream a reality. And in doing so, China has not only helped to cement its position in the region, it has also helped catalyze infrastructure markets, increase transparency and improve cooperation across fi e subcontinents.

Looking back: Ethiopia Djibouti Railway

Infrastructure 100: World Cities Edition (2012)

The Ethiopia Djibouti Railway is part of Ethiopia's ambitious plans to develop national railway infrastructure and is notable for its sheer scale and for the signifi positive impact that it could have on economic growth in the Horn of Africa. The 656 kilometer line will connect Addis Ababa, the Ethiopian capital, with the tiny Red Sea state of Djibouti. The US$1.2 billion project would have huge economic significance for landlocked Ethiopia as Djibouti represents the country's only seaport access and would considerably reduce goods transportation costs.

Looking back: Nigeria High Speed Rail

Infrastructure 100: World Markets Report (2014)

Financing for Nigeria's massive new US$13 billion high-speed rail network is primarily in the form of a loan from China's Export Import Bank. The China Railway Construction Corporation is set to build the 3,128-kilometer network, which will be a major boost to the economy, connecting Lagos, Kano, Kaduna, Warri, Bauchi, Abuja and Port Harcourt. The system will be digitally operated using fi -optic cables, radio communication and wireless services. Judges appreciated that the project, which will remove heavy freight from Nigeria's stressed roads, could save the country millions on road maintenance.

Looking back: New Silk Road

Infrastructure 100: World Markets Report (2014)

A bold but as yet unrealized dream is the New Silk Road from China to Western Europe via Kazakhstan and Russia. Over 8,400 kilometers long and costing an estimated US$7 billion, this new economic corridor aims to open up new trade opportunities to encourage regional stability. The concept is particularly important to China and Russia, according to our judges. Multilateral institutions already have a stake in different sections of this project, with some considering the added value of integrating other types of infrastructure (such as solar energy) into a broader Silk Road Economic Belt.

Looking back: Hinkley Point C

Infrastructure 100: World Markets Report (2014)

Hinkley Point C will be the fi new nuclear power plant to be constructed in the UK in over 20 years, once the final investment decision is taken. The project will generate around 25,000 jobs during its 9 years of construction and provide a boost for UK business, with around 57 percent of the value of construction expected to go to UK fi The project will also improve UK skills, especially in the southwest, where EDF has worked with local colleges to establish energy and construction skills courses to maximize the opportunities for local people. The new plant will provide for around 7 percent of UK electricity demand, equivalent to some fi e million homes.

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Looking back: NYU Abu Dhabi Campus

The Infrastructure 100 (2010)

The final university project to be included is the NYU Abu Dhabi Campus. Judges were impressed by the plans for development believing it to have the potential to be an outstanding facility from a technical standpoint, while also having a transformative effect on education in the region.The project is intended to be the fi comprehensive liberal arts and science campus in the Middle East to be operated abroad by a major American research university. The development is intended to form part of a wider scheme in Abu Dhabi with plans for a central business district, ecological zone and cultural district alongside housing for 150,000 people.

Looking back: Paris-Sorbonne University Abu Dhabi

Infrastructure 100: World Cities Edition (2012)

Also set to bolster the growing reputation of the Middle East's university sector is the Paris-Sorbonne University Abu Dhabi, which will see a world-class university setting up a campus overseas. The project combines both academic excellence with cutting-edge infrastructure and architectural design. It is also a strong example of participation between private and public sectors, being developed as a public-private partnership (PPP) with a long-term build-own-operate-transfer structure. The university provides courses in arts, languages and political sciences, all being taught in French.

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Spotlight 100

It's not just in the emerging markets that the east has been making its mark. Emerging market money (and, increasingly, capabilities) have also helped unlock major infrastructure projects in the west. The **Hinkley Point C Nuclear Power Station** (highlighted in our 2014 edition) is a good case in point. Until China General Nuclear stepped in with a promise to take a 33 percent stake in the deal, the project seemed stuck. And while China's participation in such a sensitive project sparked some controversy in the UK, all signs suggest that the project will go ahead.

What has the west done to counter this shift? For the most part, very little. Notwithstanding a few open-minded markets in Europe (plus Canada and Australia), most of the west's response has focused on closing borders, raising trade barriers and protecting national interests.

That being said, those that recognized this shift early have taken measures to capitalize on the trend. In 2010, we spotlighted the **NYU Abu Dhabi Campus** and 2 years later, we noted the **Paris-Sorbonne University Abu Dhabi**. Both reflected not only impressive infrastructure planning and vision, but also a shift towards the globalization of the education sector. Both institutions — NYU and Paris-Sorbonne University — saw the opportunity to leverage their brand reputations to capitalize on the growth of the emerging markets. Both projects are now developed and operational.

The shift east is not a short-term market gyration or trend. It is real. It is underway. And it will change the very foundation of our current world order. Infrastructure players must therefore decide where they want to play in the new world order and how they are going to get there. ■

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Innovative approaches to unblock projects

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Every government and multilateral recognizes the need to drive private investment into infrastructure. They understand that demand for new and improved infrastructure is outstripping their ability to invest. And they recognize that they will need to leverage their own balance sheets if they hope to deliver the infrastructure now required around the world.

Over the past few years, we have seen governments, multilaterals and development banks take innovative steps to unlock projects that — without the additional catalyst — likely would have never been developed.

Take, for example the **Mersey Gateway** (a project we spotlighted in the 2012 edition of Infrastructure 100), just outside of Liverpool, England. The plan for a new route to ease congestion across the River Mersey was fi approved by the Department of Transport in 2006, but then stalled as the district (of just 118,000 people) had to complete a very challenging planning and approvals process, and the government struggled to approve the business case allowing procurement to commence. In March 2014, the UK announced that the project would be covered under the HM Treasury Guarantee Scheme, thus credit enhancing the financing and lowering the cost of capital.

In much the same way, multilaterals and development banks are also using their balance sheets and their clout to push worthy projects into development. **The Eurasia Tunnel**, a 5-kilometer tunnel connecting Asia to Europe under the Bosphorus Strait,

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Spotlight 100

> Ultimately, these examples point to a new spirit of innovation from some governments and multilaterals who are thinking creatively.

for example, was developed largely thanks to the consensus-building efforts of the European Bank for Reconstruction and Development (EBRD), who brought the parties (including the European Investment Bank, Korea's Exim Bank and a number of private banks) together to ensure the deal was done. The tunnel opened for operations in December 2016.

EBRD played a similar role in helping Russia deliver its fi major public-private partnership (PPP) project involving international partners. The **Pulkovo Airport PPP** (a project we noted in our 2012 edition of Infrastructure 100), was financed through the EBRD, the International Finance Corporation (IFC) and a number of development and international banks. The participation of these international organizations not only ensured that the financing was secured, it also gave comfort to foreign investors worried about the political risks of investing into long-term assets in Russia. The project was spotlighted by the IFC as one of the 40 best PPPs in the emerging markets in 2013.

At the same time, multilaterals and development banks continue to focus their resources on driving much-needed development to some of the world's most impoverished nations. The **KivuWatt** project, highlighted by us in 2014, is one such example. On paper, the plan seems idealistic: methane from Lake Kivu will be hoovered up and used to generate enough power to more than double Rwanda's current installed capacity. But with concerted effort on the part of the African Development Bank, the Netherlands' FMO bank, the Emerging Africa Infrastructure Fund and the Belgian Development Bank, fi was secured and construction on the fi phase of the project is now complete.

Ultimately, these examples point to a new spirit of innovation from some governments and multilaterals who are thinking creatively about how they can use their balance sheets, their political capital and their consensus-building capabilities to help unblock the pipeline for vital projects.

However, our view is that — while many innovative ideas have been tabled and structured — few have translated into closed deals and delivered assets. Creativity will be part of the solution, but more action and a greater focus on simplicity will also be key to ensuring these initiatives deliver. ■

Looking back: Mersey Gateway

The Infrastructure 100 (2012)

The Mersey Gateway in the UK doesn't connect continents but offers an equally impressive and desperately needed solution to improving mobility and economic growth throughout the Liverpool city region, north Cheshire and north west of the UK. The PPP comprises construction of a new three-by-two lane cable-stayed toll bridge with a one kilometer span over the River Mersey between the towns of Runcorn and Widnes. The concession includes construction of associated link roads and the upgrading and tolling of the existing Silver Jubilee Bridge.

Looking back: Eurasia Tunnel

The Infrastructure 100 (2012)

The US$1.1 billion Bosphorus Tunnel — or Eurasia Tunnel as it is also known — is an ambitious project being developed as a PPP to connect both sides of Turkey's capital, Istanbul, via a 5.4-kilometer twin-deck tunnel beneath the seabed. What impressed judges most was the asset's aim to ease congestion, cut journey times and stimulate economic growth in the dense environment of one of the world's oldest cities. In addition, the historic project also brings Asia and Europe just a little bit closer together.

Looking back: Pulkovo Airport PPP

The Infrastructure 100 (2012)

Another pathfinder singled out by judges was the US$1.4 billion Pulkovo Airport PPP in St. Petersburg, Russia. The project was launched off the back of a new law enabling PPPs with a 30-year concession covering the building, fi and operation of the airport facilities — including a new international terminal and modernization of the domestic terminal. "As well as being a leading project in Russia," one judge remarked, "it is also important in that its progress will be keenly watched and its delivery will open up the country for further developments."

Looking back: KivuWatt

Infrastructure 100: World Markets Report (2014)

In Africa, one power-based infrastructure project was designed to avert catastrophe, not react to it. Lake Kivu is probably Rwanda's greatest natural resource but also its biggest liability, as it can spontaneously erupt carbon dioxide and methane, with disastrous effects on the local environment. KivuWatt is a unique new 100 MW power plant on the lake shore, which extracts the methane to generate electricity. At US$92 million, this is Rwanda's fi independent power project and largest single private investment, with financing arranged by the Emerging Africa Infrastructure Fund, African Development Bank, Netherlands Development Finance Company, BIO (the Belgian Investment Company for Developing Countries), and Belgian Development Bank.

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Business not as usual

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Infrastructure players are increasingly recognizing that the traditional path to procurement will not always lead to the delivery of assets. In an era of megaprojects and grand regional initiatives, there is often no 'traditional' path to development at all.

In this environment, we have seen project owners take big steps and overcome massive challenges to deliver much-needed projects. Some have created 'coalitions of the willing' and multilateral partnerships to leverage international ideas and mitigate future challenges. Others have created an entirely new pathway — recognizing their own unique complexities — to deliver on their objectives. And in each case, they have upturned the status quo.

Take, for example, the **UAE Nuclear Energy** project**,** an initiative we highlighted in our 2010 edition of Infrastructure 100. As a new nuclear development in the Middle East, the project could have become caught up in the non-proliferation quagmire of global geo-politics. But instead, the UAE selected KEPCO, Korea's power company and growing nuclear developer, to build and operate the facility and — importantly — to source and contract the required nuclear fuel. Construction will be completed in 2020.

The **Nord Stream** project offers a similar case in point. When the project was fi announced, it was against a backdrop of signifi energy tension and security concerns across Europe. Rather than see the project delayed by challenges and environmental concerns, the Nord Stream team chose to incorporate — indeed, surpass — the highest standards and expectations in the world. Tremendous expense went into protecting the environment. Massive political capital went into soothing national and regional concerns. And much thought went into structuring and financing the project through international organizations. The fi pipeline opened in 2011 and a second in 2012.

Some projects are so large and so transformational that there are no 'traditional'

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Looking back: Ohio River Bridges

Infrastructure 100: World Markets Report (2014)

The award-winning Ohio River Bridges project involves both Ohio and Indiana authorities working closely together, with each state effectively responsible for one of the two major river crossings. Although each bridge has a different funding mechanism (one is PPP and the other a tax-exempt, bond-funded, design-build model), both are tolled, with the proceeds split 50:50, offering a unique solution to a major bi-state priority project.

Looking back: UAE Nuclear Energy

The Infrastructure 100 (2010)

The United Arab Emirates Nuclear Energy project was seen by certain judges as a truly 'transformative' project. It will be the fi nuclear power project in the Gulf region, potentially opening the floodgates for other countries in the Middle East to launch nuclear power projects. The US$20 billion turn-key contract is also the world's largest power contract ever announced. One of the main pillars of the program is the UAE's decision to develop it with safety and non-proliferation as its core principles and to forego domestic enrichment and reprocessing of nuclear fuel, the two parts of the nuclear fuel cycle that can most readily be used for non-peaceful purposes. International observers and non-proliferation experts have called the UAE model the 'gold standard' for developing a nuclear energy program. The project will be built by a Korean consortium — heralding a new international player for the sector, coming on the scene in time for what is set to be a big wave of nuclear new-guild worldwide.

Looking back: Square Kilometer Array

Infrastructure 100: World Markets Report (2014)

The Square Kilometer Array (SKA) project is an international collaborative effort to build the world's largest radio telescope, with an incredible one million square meters of collecting area. Costing US$900 million, this is one of the largest scientific endeavors in history, bringing together some of the world's top scientists, engineers and policy makers. By using hundreds of thousands of radio telescopes in Australia and South Africa, the SKA will be able to survey the entire sky thousands of times faster than any current system, breaking new ground in astronomical observations. The SKA Organization is a not-for-profit company with members from 10 countries. Construction is set to begin in 2016.

Looking back: Nord Stream

The Infrastructure 100 (2010)

The politically controversial Nord Stream project made waves as the first pipeline to fully bypass the former Soviet space that acts as a conduit for much of Western Europe's gas flow from Gazprom's Siberian fields. The dual onshore/offshore pipeline will cross an unprecedented fi e state jurisdictions to reach its German terminus. Carrying a total 55 billion cubic meters (bcm) of gas per annum, the US$9.3 billion pipeline is seen as key to plugging the 120 bcm supply gap set to drain Europe over the coming years.

routes to development. The **Square Kilometer Array** is one such project. As we noted in our 2014 edition of Infrastructure 100, the project is one of the largest endeavors in history with installations planned in South Africa, Australia and, eventually, eight other countries in Africa. While the project has still not secured its full funding requirements for Phase 1 (some US$900 million), it has attracted the support of 10 key countries including China, India, the UK, the Netherlands, Australia and Canada. This, plus the strong support of the scientifi community, has helped the project pass several key milestones. Construction is now anticipated to start in 2018.

In the US, demand for two new bridges across the Ohio River gave local authorities the opportunity for an interesting experiment. One of the **Ohio River Bridges** was structured as a 35-year public-private partnership (PPP) concession while the other was developed through traditional means — a tax-exempt, bond-funded, design-build model. Pundits hoped to finally discover which approach would deliver better results. In the end, however, both succeeded equally well. The real test in the experiment would have been if either (or both) projects had experienced delays or cost overruns. Both projects achieved substantial completion in 2016, reinforcing the fact that governments now have multiple options available when developing large infrastructure projects.

As the forces of globalization continue and countries become more comfortable with international suppliers and operators for critical infrastructure, we expect to see governments and infrastructure owners make bigger efforts to overcome the roadblocks to delivering much-needed assets. It will no longer be business as usual. ■

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Adapting to culture and customs

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There was a time when infrastructure decisions were beyond reproach. Governments decided what was best for their constituents and they delivered it, no matter what stood in the way. Indeed, all of the great cities of today were largely built by executive order, not popular consensus.

In the 1980's, things started to change. Many OECD countries started to introduce public consultation mechanisms to gather feedback from constituents. Pressure groups formed to give voice to public issues. And governments began to recognize that local support would be critical to successful infrastructure delivery going forward.

Today, the world has once again changed. Public consultation and evidence-based decision making is now the norm in most democratic markets. Social media has amplified the voice and the reach of pressure groups. And infrastructure owners are defining their projects and their delivery based on the realities of local customs and cultures. Simply put, we are now building infrastructure assets that people want rather than assets that we want them to want.

The **Princess Nora Bint Abdulrahman University forWomen** in the Kingdom of Saudi Arabia is an excellent example. Offi opened in 2011, the sprawling campus — spanning 8 million square meters with 15 colleges and space for 60,000 students — is one of the largest women-only education centers in the world. As we noted when we featured the campus in our 2012 edition of Infrastructure 100, the project stands as a major landmark for a region with strict gender segregation in the education system. However, by taking careful consideration of local requirements, customs and culture, the Kingdom was able to develop an institution that signifi advanced the role of women in society while also recognizing local religious and cultural requirements. With many graduates recently appointed to c-suite positions in some of Saudi Arabia's largest companies and institutions, the reward for such an ambitious project is clearly in view.

The BELB Schools and Facilities project (or, rather, a set of projects that includes the

> The Keystone Oil Pipeline Extension project illustrates how mismanaged local concerns can scuttle even the largest projects.

Belfast Model School for Girls and the North Belfast City Learning Centre) offers another case in point. Conceived in Northern Ireland as part of the peace process (and noted in our 2010 edition of Infrastructure 100), the project is more about opening access to education and infrastructure than it is about delivering new infrastructure (though that was also involved). At the core of the projects' success has been a strong commitment to community engagement, across political and class lines, to create solutions that deliver results for the entire city.

In the energy sector — a sector often fraught with local challenges and risks — the development of **Papua New Guinea's Liquefied Natural Gas (LNG)** resources has demonstrated the value of rigorous local outreach and consultation. The project had wide scope for problems; the facilities and pipelines cross hundreds of kilometers that include pristine environmental regions, populated areas and parks. But ExxonMobile spent considerable time and effort talking to local communities — those directly and indirectly impacted — to ensure the project would not be delayed by unanticipated concerns. And, as a result, the company was able to complete the project months ahead of schedule.

In contrast, the **Keystone Oil Pipeline Extension project** illustrates how mismanaged local concerns can scuttle even the largest projects. While there are indications that — under the Trump Administration — the project may be revived, the past 6 years of legal wrangling and environmental protest have certainly increased the cost and heightened the risk for project owners and investors. Similar lessons are being learned by the sponsors of the Dakota Access pipeline in North Dakota.

To be fair, most infrastructure developers and owners are not deliberately trying to run rough-shod over local populations. The challenge is that they are toeing a rapidly moving 'line' that often changes even in the midst of a project. Infrastructure players, therefore, need to go beyond the base expectations (or regulatory requirements) for assessing and responding to local concerns, whether they be environmental, economic, cultural or simply customs.

As the forces of globalization pick up steam and infrastructure operators and developers continue to move into foreign markets, ensuring that culture and customs have been addressed will become increasingly important.

Looking back: BELB Schools and Facilities

Infrastructure 100: World Cities Edition (2012)
The final project was outside of the university sector and widely acknowledged to be among the strongest in terms of its transformative impact on society. The BELB Schools and Facilities project comprises the North Belfast City Learning Centre coupled with the Belfast Model School for Girls and Ashfield Girls' High School. The respective centers are located in a region, Northern Ireland, associated with high levels of political tension, violence and socioeconomic deprivation. These projects were submitted separately, but the judges felt they should be combined and noted together for the positive social impact they are having in the region.

Looking back: Princess Nora Bint Abdulrahman University for Women

The Infrastructure 100 (2012)
The Princess Nora Bint Abdulrahman University for Women in Saudi Arabia was widely lauded by the judges and is considered a major step in obtaining equal education for women in the Middle East. The self-contained campus will cover 8 million square meters just outside Riyadh and accommodate 40,000 students. The university will have the capacity to offer places to 60 percent of the city's female high-school graduates and will offer degrees in medicine, pharmacy, management and information technology — which have typically been male-dominated subjects and sometimes difficult for Saudi women to access. According to the judges, the project has a 'generational theme' and its effect will ripple across the whole country for years to come.

Looking back: Papua New Guinea's LNG

The Infrastructure 100 (2010)
Another project with a comparable social impact is the Papua New Guinea (PNG) LNG project, the single largest project financing deal of all time, coming in at US$15 billion. The exploration and production project is the first large scale infrastructure development to be planned for PNG. Although implementation has not been without trouble, the substantial import appetite from key Asian utilities has kept the ExxonMobil sponsored project fi viable.

Looking back: Keystone Oil Pipeline Extension

Infrastructure 100: World Markets Report (2014)
The Keystone Oil Pipeline Extension was listed in favor of the more expensive LNG and gas pipeline projects currently in development in Canada. Set to transfer 1.1 million barrels per day by 2012, the project will span 3,134 kilometers from Alberta, Canada through Saskatchewan, Montana, South Dakota and Nebraska before reaching its terminus in Oklahoma, US. This project is seen as key to improving US energy security and easing any future reliance on external supply.

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Rethinking infrastructure project selection: Breaking the cycle of new construction

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With demand for infrastructure growing rapidly, we, as an industry, need to think hard about how we spend our limited investment resources and ensure that the right infrastructure projects are selected — those that will improve productivity, global competitiveness and economic prosperity. Future productivity is at stake if we don't rethink how we select our projects. We need to shift the balance from new, large-scale construction projects to also assessing demand management, capacity enhancement and asset management strategies to ensure we have more productive, high-quality infrastructure.

High-quality and effi infrastructure is a major driver of national economic growth and productivity. At fi glance Australia appears to have a positive infrastructure environment. Announcements about transport projects frequent the media, while cranes in our city skylines indicate a flurry of development. However with a closer look, it is evident that the quality of our infrastructure assets is falling, we are facing increasing levels of transport congestion and our pace of innovation in the communications and technology space is far behind our peers[1]. If this doesn't change then our national productivity, global competitiveness and standards of living are at risk.

This unenviable situation can be attributed to a range of causes including a double whammy of public infrastructure underspending[2] and a project selection process that leans towards new construction. While the benefits of increasing infrastructure spend are widely accepted, these investments need to be directed to the 'right' projects, and underpinned by a selection process that gives full consideration to all potential options.

Is our project selection process going wrong?

The traditional selection processes used for infrastructure planning and prioritization are subject to detailed assessment frameworks. The approach to developing business cases is evidence based with detailed economic analysis, gateway reviews and specialized independent infrastructure agencies contributing to a transparent governance process. However, are we selecting the right projects or just selecting pre-determined solutions that are, more often than not, large new-builds or expansions? Infrastructure Australia's *Infrastructure Priority List (February 2017)* provides a good example of this observation. Some reasons why the selection process leans towards new builds might include:

Business case development: The role of the business case appears to be more about justifying pre-determined projects and less about considering and analyzing alternative solutions to address the problem. By the time governments begin the business case process, the decision around the solution has, in some cases, already been made and often it is a new-build. A more critical time in the assessment of alternative solutions may come when long term transport plans or long term infrastructure strategies are being determined.

Limitations of assessment guidelines: Existing methodologies and tools, including relevant guidelines, such as the Australian Transport Assessment and Planning (ATAP) guidelines that are used to assess demand and undertake economic appraisals are biased towards the selection of new projects. While the theory and general principles can be applied to both 'build' and 'non-build'/ technology-based initiatives, a lack of proven examples for non-build initiatives means that practitioners must invest signifi more time, resources and political capital to demonstrate that the implemented approach is consistent with the recommended approach.

Similarly, the strategic demand modelling tools used by transport planning agencies to assess demand and the impacts of new initiatives are not suited to new technology-led initiatives. For example, the network wide Intelligent Transport Solutions (ITS).

Political infl Adding to the problem is the issue that infrastructure planning and delivery, more often than not, is politically infl Political leaders now understand the importance of being 'seen' to deliver on infrastructure. Projects that announce new jobs, ribbon-cutting or new project unveilings tend to come out in front of projects that do not. It would be naïve to think that we can completely remove politics from infrastructure. Nevertheless, there is a pressing need to focus on evaluating all available options prior to justifying such 'pre-determined projects'. This includes a full and upfront assessment of evidence-based data, including technology considerations and cross-agency collaboration.

Where should we shift our focus?

The role of demand management and supply side enhancement: Given our fi constraints, our focus needs to shift from just delivering large new build 'mega' infrastructure projects to also making sure that we are fully investigating and investing in demand management and capacity enhancement

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opportunities, as well as properly assessing the asset management requirements. Such a shift makes good fi sense (as these responses are more likely to cost less than new builds) and will ensure that we are improving the productivity of existing infrastructure. This approach also has positive impacts on asset quality.

Demand management: Rather than continuing to build new capacity to meet peak demand, adopting approaches to smooth out the peaks should be considered. For example encouraging changes in travel patterns/behaviors and imposing road user charges are effective demand management strategies. New technologies can help provide us with ways of implementing demand management.

Capacity enhancement: At the same time, we need to look for opportunities where incremental investments can deliver signifi capacity enhancements. For example, new signaling systems that allow trains to run closer together, smart traffi lights that help improve the flow of traffi across the whole network, or better maintenance analytics that prevent system outages and reduce system downtime are critical to getting more out of existing infrastructure. Major improvements can be achieved by doing more with less — and in turn help enhance our economic growth and prosperity.

Greater focus on asset management: Investing in more sophisticated asset management techniques has long-term benefits for sustaining the quality of existing infrastructure. For example, by embedding assets, such as bridges, with digital sensors, governments and operators can measure their use and stress, helping to predict wear and tear, support maintenance planning and better inform budgets compared to traditional asset management methods. In turn, the productivity losses from speed restrictions or road/track closures can be avoided (or kept to a minimum). Asset management investments, particularly those with demonstrated technology benefits should be assessed as stand-alone options at the project selection phase, and not simply considered as a secondary piece of analysis on a 'pre-determined' project.

What needs to change?

If we return to the essential reason for infrastructure investment — to build a more globally competitive and productive future — we must rethink the way projects are selected. Australia has the opportunity to break its addiction to new, construction-based infrastructure projects and genuinely consider all available alternatives if we can:

— Ensure investment decisions focus on the productivity growth outcomes of a project

— Assess lower cost, demand management and capacity enhancement solutions on an equal footing with construction options

— Make changes to project selection processes (business case guidelines) to ensure that technology-based options are fairly evaluated

— Invest in more sophisticated asset management techniques. ■

Technology to the rescue

Global Positioning Systems will allow us to track distance traveled and time-of-day usage to aid trip planning and ultimately reduce congestion. Advances in Information and Communication Technology that support increased up-take of remote working also have the potential to lower the need for travel, particularly during peak periods.

Even a marginal decline in peak period travel has the potential to signifi enhance network-wide performance. For example modeling by KPMG for Infrastructure Victoria[3] demonstrates that a 5 percent reduction in traffic in the morning peak period can result in doubling the travel speed. For context, a 5 percent reduction in traffi is similar to that seen during school holidays.

Another effective demand management example can be found on the High Occupancy Toll (HOT) lanes in the US, which use advanced technology to determine a demand responsive fee to help manage vehicle flow and speed.

Get traffic moving

The smart, synchronized traffic lights in Singapore (the Green Link Determining (GLIDE) system)[4] maximizes the vehicle throughput and smooths traffi flow based on demand. Traffic lights across the road network allocate 'green time' and synchronized traffi lights provide 'green wave' based on demand to minimize the number of stops by vehicles.

Other examples include advances in vehicle-to-vehicle and vehicle-to-infrastructure communication technologies, which can make platooning on freeways feasible and enhance the effective capacity of our expressways by around 60 percent[5].

In rail, Electronic Train Control Systems enable trains to travel at higher speeds and closer together. Slightly lifting travel speeds can bring large productivity gains and economic benefits.

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Ten trends that will change the world of infrastructure in 2017

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Around the world, uncertainty is rife. Political agendas and social expectations are changing. Global, regional and national institutions are weakening. Power is shifting. And technology is disrupting everything.

In 2016, we led our *Emerging Trends* report with the prediction that 'no normal will become the new normal'. Not much has changed. Political uncertainty continues, both in the developed and the emerging markets. Funding, as opposed to fi remains a key challenge. The demand to get more from existing investments has only heightened.

At the same time, new trends are emerging (or, in some cases, evolving). Governments are rethinking their approach to funding and capital investment. Transparency in public sector decision making is increasing as public discourse rises. And access to new technologies is changing the way governments and investors plan and manage infrastructure.

This year, we expect a shift towards more responsible leadership, both from governments and from the private sector. And this will require the public and the private sector to rethink their approach to funding, developing and operating infrastructure. It will also require them to gain a better understanding of what their constituents, stakeholders and users actually want.

While much uncertainty remains, we believe there are 10 trends that will have a signifi impact on the infrastructure sector over the next 12 months. Here are our predictions for how they will play out.

1 The confluence of energy, transportation and technology sharpens

The traditional lines between energy, transportation and technology have been blurring for years. But as governments start to think more holistically about their long-term infrastructure objectives, many are starting to recognize the need for a new approach.

Over the coming year, we expect governments to look for new ways to improve alignment and drive integrated planning across the three sectors. We also expect this year to bring some exciting developments and ideas that will continue to disrupt the way governments and consumers view energy, new transportation and technology. This will not only lead to a shifting of priorities (as we note in Trend 4), but also signifi challenges as governments decide which technologies to invest in and when.

The long view:

- Infrastructure planning will be difficult for governments as they balance increased demand for low-carbon energy against the realities of their current energy mix. For the developing world, this will create signifi opportunities to leapfrog the west. But delivering against growing demand for energy-intensive technology and electric transportation will be a continuous struggle for all governments over the next decade.

2 The populist agenda disrupts infrastructure markets

Last year, we predicted that political and social uncertainty would rise. It seems we (like many) may have understated the extent.

What is clear is that the underlying current has shifted towards more populist agendas. And that has pushed infrastructure onto center stage as a form of policy mitigation. We believe this will lead to three key 'sub' trends for the infrastructure sector: bigger public budgets, shifting priorities and rising protectionism.

While some of these shifts will be positive, great care will need to be taken to ensure that protectionist ideals do not diminish the value that international experience, ideas and capabilities can offer. Leaders should remember that, at its ugliest, protectionism only increases the cost of infrastructure delivery and results in lower-quality assets.

The long view:

- Governments will continue to put 'people first' projects at the top of the agenda, thereby allowing social equality and other issues to influence infrastructure planning and shift priorities. For governments and international developers, contractors and operators, the long-term challenge will be to articulate a much clearer story about the value they plan to deliver while seeking to allay local concerns.

3 Understanding consumer behavior will be the key to infrastructure planning and management

Changes in the way consumers now interact with infrastructure are turning common wisdom on its head. And infrastructure planners are struggling to keep up.

Over the coming year, we expect governments to take a more 'bottom-up' approach to infrastructure planning and development, taking the time to understand the changing demands of both current users and future generations to help shape their infrastructure agendas.

We also expect some governments to take advantage of these changes to solve some of their larger infrastructure challenges. Incentivizing Millennials to ride bicycles to work, for example, would respond to their desire for low-carbon, low-cost transportation. Improving access to solar generation sources in Africa would not only provide power to rural areas, it would also drive economic growth and help create a new consumer class.

The long view:

- While this trend may cause some consternation for planners over the next decade or so, we believe that changing consumer preferences and demographics may eventually bring demand and supply back into line. However, as the 'micro' decisions of consumers start to infl the 'macro' infrastructure agenda, new areas of demand may emerge.

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4 Investors starting to care about social and environmental impacts… not just financial returns

Over the past year, we have seen increasing pressure on decision makers to prioritize infrastructure investments that deliver greater social and environmental benefit; simply put, to become more responsible leaders.

To be clear, this is not about sacrificing returns in the pursuit of social benefit. This is about measuring and assessing the wider basket of benefits that an investment delivers to understand its true value.

The challenge will be in formulating a consistent and appropriate approach to measuring and reporting on social and environmental impacts. But over the coming year, we expect investors (public and private) to make serious efforts in this regard. And this may lead to difficult choices as stakeholders gain greater awareness of their social and environmental footprint.

The long view:

Once institutional investors and governments start reporting on social and environmental benefits using a generally-accepted set of measures, the pressure to deliver even greater benefits will start to rise. And as measurement and reporting becomes more sophisticated, we expect investors to move towards achieving a true 'triple bottom line'.

5 Technology enables greater infrastructure productivity and increases obsolescence risk

Technology is fundamentally changing how we plan, design, develop and operate our infrastructure. It is also creating growing concerns among investors about technological obsolescence.

This year, we expect infrastructure owners and operators to start focusing on developing robust technology plans, balancing the need for competitive advantage against the desire to achieve quick returns on their investments.

At the macro/society level, we expect to see entirely new technologies start to gain traction and become increasingly commercialized. At the same time, the true value of data and analytics will begin to emerge, helping to improve capacity, performance, reliability and reduce operational costs. And automation tools that eliminate human error and enhance performance will be adopted.

Unfortunately, those who fail to take technological change into account will start to fall behind.

The long view:

With little experience of forecasting technology trends, infrastructure planners and investors will likely continue to struggle with the longer-term challenge of understanding consumer/citizen behavior and demand in an ever-changing technology environment. The challenge will be particularly acute in the energy and transportation sectors where the pace of technological change seems to be picking up speed.

6 Getting more out of existing infrastructure

With demand for infrastructure at an all-time high, governments around the world are now thinking about demand management and capacity enhancement. Rather than build entirely new capacity to meet ever-higher peaks, governments at all levels are now thinking about ways to smooth out the peaks instead.

In the developing world, the challenge will continue to revolve around the need for basic infrastructure. But in the mature markets, we expect infrastructure owners to focus on making smaller investments that, in turn, unlock improved performance, capacity, reliability and service delivery.

The long view:

As consumers get more (and more timely) data and information on their infrastructure, they will increasingly be able to adjust and change their usage patterns and behaviors. And as infrastructure systems become more sophisticated, owners will find increased ability to adjust pricing to manage demand and more finely calibrate their operations.

In some cases, technology will allow infrastructure to be delivered at a much smaller — more personal — scale, which should also gradually reduce peak demand on existing power infrastructure in developed markets and create new power models in the developing markets.

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7 Governments look to unlock the funding paradigm

Infrastructure pipelines around the world have remained blocked, largely because governments are still struggling to decide how to pay for the assets that must be delivered. And over the past year, governments have continued to devise innovative alternative funding sources.

We expect this year to bring renewed focus on asset 'recycling' as governments focus their efforts on selling existing and profitable assets in order to help fund the development of new assets. This, however, will require governments to be clear with their populations about how the proceeds will be used.

We also expect to see governments (particularly in the less developed markets) fi ways to use their own money to fi the initial development of infrastructure assets and then sell down once the project is operational and 'de-risked'.

The long view:	In the mature markets, populations will become more comfortable with the idea of asset recycling and governments will start to look deeper for less obvious, and potentially more controversial assets to monetize. In the developing world, asset selection will be key.The long-term value is there, but strong cash flows and the ability to implement will be key.

8 Credit enhancement facilities go back to basics

While funding remains a challenge, some governments and multilateral organizations are making valiant efforts to help unclog infrastructure pipelines by developing increasingly-sophisticated credit enhancement facilities and vehicles.

But few credit enhancement deals have actually been struck.The challenge seems to be that governments and multilaterals have, on the whole, been far too focused on creating 'perfect' structures and not nearly focused enough on getting the deals done.

Over the coming year, however, we expect (and encourage) governments and multilaterals to recognize that — for many of these projects — their choice is to either find a way to work with the private sector or not deliver the project at all.

The development of credit enhancement facilities is vitally important. But they also need to work.

The long view:	Governments and multilaterals will move at different paces to simplify their financial instruments and take on more risk in order to help build the track record and capabilities of markets. This will be as much about changing culture and historic practices as structural change.

9 The search for yield drives convergence in the investment market

Increased competition for 'investable' infrastructure assets is driving up competition and pushing down yields. And this is driving more sophisticated investors into higher-risk markets, projects and sectors.

As a result, infrastructure investment teams are starting to grow and become much more sophisticated in how they hold and manage their investments; many are developing operational capabilities. At the same time, operators are developing fi capabilities and developers are building up strategic and fi skills.

Over the coming year, we expect to see the lines blur further as the search for yield continues. Some will make the transition successfully. The risk, however, is that some may move too quickly and, in doing so, take on risks that they do not fully understand with unexpected results.

The long view:	This trend will continue to have an impact on the infrastructure 'value chain' for some time as players jockey for position and assess their capabilities. But over the longer term, we expect lines to be reestablished as players start to focus on one or two areas of expertise. So once the dust settles, don't expect any of today's players to look the same.

10 The globalization of infrastructure continues

As investors, developers and, increasingly, operators expand their global capabilities and transcend national borders, there has been a signifi shift towards the globalization of the infrastructure sector.

At the same time, we have noted a relative 'globalization' of models and approaches as governments start to learn from each other and share best practices. And this, in turn, is helping international players standardize and improve key capabilities.

In 2017, we expect this trend to continue and, in many cases, pick up speed. But we also recognize that there will be forces acting against globalization: rising protectionism and nationalist agendas, shifting social preferences, increasing focus on 'localization', disruptive trade negotiations and other uncertainties will all attempt to dampen enthusiasm for globalization. ■

The long view:	The big and ultimate test for globalization is whether it brings down costs, improves accessibility and increases value of infrastructure around the world, through improved competition and greater levels of innovation. Ultimately, we expect that these benefits will drive governments and their populations to once again shift towards a more open and global marketplace.

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Around the world in infrastructure

Europe

The UK

Hinkley Point C gets the green light

After years of political, legal and fi wrangling, the UK government fi approved the development of the Hinkley Point C Nuclear Power Station. The GBP18 billion project, part owned by France's EDF and part funded by China's CGN Group, will be the largest construction site in Europe, creating some 25,000 construction jobs and generating 3,200 megawatts (MW) of electricity (enough to power about 6 million homes with low-carbon energy). Critics, who worry that the project may be too expensive and may leave the UK too reliant on foreign powers for energy, were offered some additional safeguards and reminded of the massive benefits that the project would deliver over its 60-year lifetime.

More wind farms for Scotland

With a much-deserved reputation for strong, steady winds, Scotland has attracted signifi investment into both onshore and offshore wind generation capacity. The latest announcement is expected to see the development of around 1,110 MW of capacity in the Moray Firth, 13 miles off the coast of Scotland. While the winning consortium say they remain committed to the project,[1] some suspect that the European partners may wait to see what impact Brexit will have on the future viability of the project.

Sweden

Going around — and under — Stockholm

Construction is now well underway on Sweden's 21-kilometer Stockholm bypass. The EUR3.1 billion project includes more than 18 kilometers of tunnel (designed to reduce the environmental and cultural impact of the roadway), making it one of the longest road tunnels in the world. Sweden's Transportation Administration (Trafi erket) estimates that by 2035, more than 175,000 vehicles will use the bypass each day, providing much-needed relief of congestion on Stockholm's arterial and inner city roads and improving the resilience of the city's traffi system.[2]

Asia

Kazakhstan

Modernizing a link in the Western Europe-Western China corridor

Efforts to upgrade and modernize Kazakhstan's portion of the Western Europe-Western China International Transit Corridor are moving ahead. In the fi phase, the project plans to upgrade the busy Almaty-Khorgos road section, involving the installment of several bypasses, bridges, interchanges and ancillary facilities. The second phase of the US$1.25 billion project will see the management of the remaining corridor within Kazakhstan modernized. The project is being fi by the International Bank for Reconstruction and Development (IBRD).[3]

India

A rising tide of investment for India's ports

India's Central and State Governments are moving ahead with the massive Sagarmala initiative aimed at developing India's 7,500 kilometers of coastline and creating an interconnected network of ports and hinterland infrastructure. In January 2017, India's President Pranab Mukherjee noted the government had already allocated (INR3 lakh crore) to implement 199 projects over the next 3 years.[4] The Sagarmala National Perspective Plan (released in April 2016) includes 53 port modernization projects, 83 port connectivity projects, 29 industrialization projects and 8 community development projects.[5]

Hong Kong

Back on stable footings

The 50-kilometer tunnel and bridge link connecting Hong Kong, Macau and mainland China is nearing completion. Construction — which began in 2009 — has been delayed due to the drifting of reclaimed land (some parts of one artifi island have moved more than seven meters over the past 5 years) but is now scheduled for completion by the end of this year.[6] The Hong Kong-Zhuhai-Macau Bridge, once completed, will include almost 7 kilometers of underwater tunnels, two artifi islands for the tunnel landings and almost 30 kilometers of new 3-lane carriageways.[7]

Myanmar

Good connections make good neighbors

The India-Myanmar-Thailand Trilateral Highway is slowly moving forward, albeit in fits and starts. India and Thailand have both completed their portions of the highway, but Myanmar has struggled to secure funding and developers for their portion of the 1,360-kilometer highway. Over the past year, however, India has agreed to fund the construction of 69 new bridges and 260 kilometers of highway reconstruction and Thailand has agreed to fi another 68 kilometers of roadways. Myanmar has also secured a loan from the Asian Development Bank (ADB) for another 66-kilometer stretch. Construction is underway along many parts of the highway with completion of the project now scheduled for 2020. It is understood that the Government of India is also exploring the possibility of extending the Trilateral Highway to Cambodia, Lao PDR and Vietnam. The proposed extension is viewed to be an important connectivity project that would facilitate trade networks across the Indochinese Peninsula.[8]

Middle East

Saudi Arabia

Heavy work on light rail in Saudi Arabia

Boring machines punched through to the downtown station of Riyadh Metro Line 3 at the end of 2016, part of the massive 177-kilometer, 85-station network planned for Saudi Arabia's capital. It is part of an ambitious set of megaprojects aimed at shifting the public from private cars to public transport. Similar projects are underway in Jeddah, including both a metro system spanning 150 kilometers and 85 stations and a new 37-kilometer light rail line. Mecca is expected to receive a 4-line metro system with 88 stations across 182 kilometers of track and Medina will eventually boast a 3-line metro spanning 95 kilometers.[9]

Creating a global education leader

Saudi Arabia's education ministry showcased its plans to partner with the private sector in a recent Investment and Finance in Educational Buildings Conference held in Riyadh in January.[10] As part of the Kingdom's wider Vision 2030 strategy, the education ministry hopes to launch a series of public-private partnerships (PPPs) in the sector and is currently talking with different players to develop opportunities that are exciting and rewarding for private sector participants.[11] Combined with Saudi Arabia's existing stock of world-class educational facilities (such as the Princess Nora Bint AbdulRahman University for Women), this program is expected to solidify the Kingdom's position as a global center for education and learning.

Jordon

Connecting the Red and the Dead Seas

Almost 200 years after the idea was fi mooted, Jordon's government (in partnership with

Source:

[1] http://www.edpr.com/moray-offshore-renewables-granted-consent-for-1-116-mw-offshore-wind-development-in-the-outer-moray-firth/

[2] http://www.trafikverket.se/en/thestockholmbypass

[3] http://projects.worldbank.org/P128050/east-west-roads-western-europe-western-china-international-transit-corridor-carec-1b?lang=en

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[5] http://pib.nic.in/newsite/PrintRelease.aspx?relid=147470

[6] http://www.scmp.com/news/hong-kong/article/1860898/seven-metre-drift-hong-kong-artificial-island-reclaimed-bridge

[7] http://www.hyd.gov.hk/en/road_and_railway/hzmb_projects/6835th/

[8] http://www.mea.gov.in/rajya-sabha.htm?dtl/27794/QUESTION+NO2578+INDIA MYANMARTHAILAND+HIGHWAY

[9] *Global Mass Transit Report*, December 2016

[10] http://www.arabnews.com/node/1037256/saudi-arabia

[11] http://www.tradearabia.com/news/CONS_318000.html

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Israel and the Palestinian Authority) is moving to build a canal between the Red Sea and the Dead Sea. In part, the project aims to reduce water scarcity in the Jordan Valley (the fi phase will add more than 200 million cubic meters of fresh water per year to the system). But it also hopes to replenish the troubled Dead Sea which is falling by about 1 meter per year. In November 2016, Jordon's government announced that it had shortlisted fi e consortiums for the fi phase of the project, which is expected to commence in 2018.[12]

Africa

Ethiopia

A vital trade artery for Ethiopia

Ethiopia's railway link to the port in Djibouti offi opened in October 2016, reducing travel time between Addis Ababa and Djibouti from 3 days to just 12 hours. With more than 90 percent of Ethiopia's foreign trade already flowing through Djibouti, the project was seen as a vital step towards driving further development and prosperity in the region.[13] The US$3.4 billion project was majority fi by China's Exim Bank and was built by China Railway Group, China Railway Construction Corporation and China Civil Engineering Construction. Chinese workers will also operate the rolling stock and manage the operations for the fi 5 years of operation.

A power renaissance for East Africa

Ethiopia's massive dam on the Nile River is more than 70 percent complete and is on track to start operations this year. The Grand Ethiopian Renaissance Dam will be Africa's largest hydro dam and is expected to generate more than US$1 billion each year in new revenues for Ethiopia.[14] Besides its size and impact, the project is notable for two reasons: it has been funded almost entirely through taxes and government bonds; and it has (so far) successfully navigated the regional ownership issues surrounding the waters of the Nile which has frequently been a flash point between Ethiopia, Sudan and Egypt.

Kenya

Roads PPP program gets underway

Kenya launched its long-awaited roads PPP program to a packed investor conference in Nairobi in November 2016. Within days, tenders were opened for the fi phase of construction on the 175-kilometer Nairobi-Nakuru-Mau Summit Highway.[15] Structured as a design-build-fi transfer availably model with a dedicated funding facility to act as a backstop in the case of toll revenue shortage, ten consortia have been shortlisted for this project (the fi of four road PPPs in Kenya). The release of the pre-qualifi notice for the second project, Thika Road operations and maintenance (O&M) contract, is expected to be released by mid-March[16].

Harnessing Africa's winds

Africa's largest wind farm is due to start operations on schedule towards the end of 2017. The US$680 million Lake Turkana Wind Power project is expected to provide around 310 MW of generating capacity (equal to around 18 percent of Kenya's current installed capacity) and reduce CO2 emissions by more than 730,000 tons annually. The project has been financed through a mix of equity debt, mezzanine debt and senior debt, and will be funded through a fixed price, 20-year Power Purchase Agreement with Kenya Power & Lighting Company (KPLC).[17]

North America

Canada

Improving connectivity in the Greater Toronto Area (GTA)

Infrastructure Ontario is hoping to move ahead with a US$1.1 billion light rail transit (LRT) line between the cities of Mississauga and Brampton. The plan envisions a 20-kilometer, 22-stop dedicated right-of-way line that will eventually double capacity within the corridor. The Hurontario LRT is the fi O&M project for Infrastructure Ontario and Metrolinx (the regional transportation authority) and signals the Provincial Government's commitment to create an integrated transit system for the Greater Toronto Area.[18]

La belle infrastructure

Plans for a new integrated transportation network for downtown Montreal, Quebec are being fi ed. Once developed, the Reseau Electrique de Montreal will be one of the world's largest automated transportation systems, boasting 27 stations along the 67-kilometer route. Currently, the project is expected to cost almost US$6 billion, with much of the fi provided by the Caisse de dépôt et placement du Québec (CDPQ), Transport Canada and Transports Quebec.[19] While early estimates suggested a completion date of 2020, many expect the project to be held up further by local and provincial politics.

A bridge over tunneled waters

The new 10-lane bridge being planned to replace the congested George Massey Tunnel in Vancouver, British Columbia received the green light from the Province's Environment Minister in February 2017, clearing the way for construction to start later this year. The US$2.7 billion project includes the construction of a new 10-lane bridge, improvements on existing highways, dedicated transit/high-occupancy vehicle lanes and a multi-use pathway.[20] The original 4-lane tunnel, constructed in 1957, has become a serious bottleneck and a growing safety concern for Vancouver-area motorists. The new bridge project will be funded in part by user tolls, but the government is also exploring other funding partnership opportunities.

United States

Manhattan moves west

New York City's US$20 billion Hudson Yards redevelopment project — billed as the largest private real estate development in the history of the US — is moving ahead quickly. The fi major building in the development (10 Hudson Yards) opened in mid-2016; the new subway station (funded through an initial bond offering) started operations in 2015; the High Line — an elevated park on a disused rail line —[21] was completed in 2014. The redevelopment project has been planned, funded and constructed under a set of agreements between the City of New York, the State of New York, and the Metropolitan Transportation Authority and the site is scheduled for completion by 2025.

Mexico

More pipes for the Gulf

The contract for the proposed US$2.1 billion Sur de Texas-Tuxpan offshore natural gas pipeline was awarded to a joint venture between TransCanada, Infraestructura Marina del Golfo and IEnova (a subsidiary of Sempra Energy). The 800-kilometer pipeline was awarded under a build-own-operate model, supported by a 25-year natural gas transportation contract with Mexico's state-owned power company, Comisión Federal de Electricidad.[22] The project is currently working towards a late-2018 completion date, at which point the pipeline will connect to two other recently developed TransCanada pipelines (the Tamazunchale and the Tuxpan-Tula pipelines) in the region.[23]

Brazil

Fresh water for all

Brazil's efforts to deliver universal access to water and sewage services received an important boost in December when Brazil's National Development Bank (BNDES) signed agreements with 18 State Governments to support the development of new concession and PPP models for the sector. The universalization plan, which could cost up to US$100 billion, is expected to deliver water services to 99 percent of the population and sewage services to 92 percent of the population by 2033. BNDES will function as the project offi for the State Governments and will lead the contracting of consultants and technical studies for the States.[24] ■

Source:

[12] http://www.jordantimes.com/news/local/5-alliances-shortlisted-execute-red-dead%E2%80%99s-phase-i
[13] www.bbc.com/news/world-africa-37562177
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Insight is a semi-annual magazine that provides a broad scope of local, regional and global perspectives on many of the key issues facing today's infrastructure industry.

Issue No. 8 — Infrastructure Morality

This edition focuses on hard issues such as migration, corruption, social equality and affordability — and asks the diffi questions of infrastructure leaders at the forefront of the morality debate. It also includes a Special Report on Asset Delivery.

Issue No. 7 — Who controls our infrastructure?

This edition explores some of the big challenges and trends influencing the debate around infrastructure control. It also includes a Special Report on Rail, a sector often at the epicenter of the debate around control.

Issue No. 6 — Population

This edition takes a closer look at the link between unprecedented population changes and demographic shifts underway and the infrastructure needed to meet these challenges. It also includes a Special Report on Asia Pacific's infrastructure market.

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This edition explores some of the world's most impactful stories of infrastructure resilience. It also includes an exciting Special Report on the important changes and opportunities within Latin America's infrastructure market.

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Foresight is a series of articles that feature our take on the most recent topics, trends and issues facing our fi ' clients.

SPECIAL EDITION: Emerging trends in 2017

In the fifth edition of this special report, three KPMG's Global Infrastructure leaders share their views on new trends that will influence the world of infrastructure in 2017 and beyond.

India strengthens its commitment to infrastructure investment in 2017 budget

By pledging one of the highest ever levels of annual infrastructure spend, the Indian government has signaled its firm commitment to this vital sector.

Energy2Go: The new battleground for energy customers

A combination of deregulation and technology is breaking down borders and could soon enable consumers to buy energy from a single provider — anywhere in the world.

Navigating infrastructure opportunities under the new US administration

In his inauguration speech, President Trump voiced a firm commitment to improving infrastructure by promising US$1 trillion, signaling a busy time ahead for investors and construction companies.

Not all equity is the same: When contractors become equity investors

As public-private partnerships get larger and capital costs continue to rise, new equity investors and equity structures are starting to play a larger role in infrastructure delivery.

Increasing due diligence to reduce cost variances in infrastructure megaprojects

Infrastructure newsfeeds are filled with stories of projects that have gone over budget; it's rarely a question of 'if' costs will overrun, but rather a question of 'by how much'. This needs to change.

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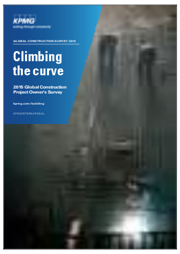
Global construction survey series

The Global Construction Survey monitors engineering and construction issues to provide timely insights that help clients make informed decisions.

2016 Global Construction Survey: Building a technology advantage

KPMG's 10th annual Global Construction Survey shows that despite huge investments in technology, the construction industry is struggling to gain the full benefits of advanced data and analytics, drones, automation, robotics and visualization.

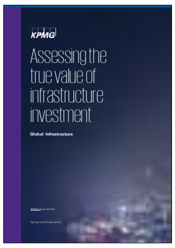


2015 Global Construction Survey: Climbing the curve

In the ninth edition, we focus on the challenges facing owners as they strive for a balance between power, responsibility and control.This report gauges the views of over 100 senior executives of leading private and public organizations from around the world.

Global infrastructure reports

KPMG member fi are privileged to work across many sectors and at various stages of the lifecycle of infrastructure. We continuously seek to share the insights we are gaining in the process.



Assessing the true value of infrastructure investment

Based on global research and supported by case studies, this report provides valuable insights on the current infrastructure assessment and prioritization process in Brazil, India, South Africa and the UK.

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This article series addresses the challenges and opportunities facing cities as urbanization changes the dynamics of our world, and how we can work together to create better, more sustainable places to live and work.

Infrastructure 100:World Markets Report

In the third edition, KPMG highlights key trends driving infrastructure investment around the world and a global panel of independent industry experts identify 100 of the world's most innovative and impactful projects.

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KPMG's Global Infrastructure practice

Integrated services | **Impartial advice** | **Industry experience**

Nobody knows infrastructure like KPMG. And nobody understands the local implications of globalization like KPMG professionals. Every day, our network of more than 2,500 highly-experienced people work shoulder-to-shoulder with infrastructure leaders across more than 150 countries to share industry best practices and develop effective local strategies.

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In times of disruption, we inspire confi and empower positive change in government organizations, infrastructure contractors, operators and investors. Our member fi help clients ask the right questions that reflect the challenges they are facing at every stage in the lifecycle of infrastructure assets and programs. From planning, strategy, fi and construction through to operations, divestment and decommissioning, our Global Infrastructure professionals apply passion and purpose to help clients solve some of the most signifi challenges of the 21st century.

By combining valuable global insight with hands-on local experience, we understand the unique challenges facing different clients in their individual markets and in the rapidly-evolving global marketplace. By bringing together valuable interrelated disciplines — including economics, engineering, project fi project management, strategic consulting, tax and accounting — KPMG's Global Infrastructure professionals provide integrated advice that achieve effective results and help clients succeed.

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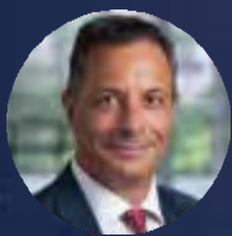

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