KPMG

2019 Change Readiness Index

Assessing countries' ability to manage change and build a climate-ready future

KPMG International

kpmg.com/changereadiness

Quick reader guide

What is the Change Readiness Index (CRI)?

The index measures how effectively a *country's private and public enterprises, government, people and civil society anticipate, prepare for, manage and respond to change and cultivate opportunity. Examples of change include:

— shocks such as natural disasters and financial or social instability

— economic and political opportunities and risks such as changes in demographics, technology and government.

*All uses of the word 'country' or 'countries' in the 2019 Change Readiness Index (CRI) refers to both countries and jurisdictions. The term country is used for brevity.

How can I use the index?

A wide range of organizations can apply the data and insights from the CRI, for example to:

— inform investment decisions by highlighting the strengths and weaknesses of target countries

— improve government policy by benchmarking national strengths and weaknesses and identifying areas in need of reform

— build leading practices by stimulating debate on change readiness and learning from higher-ranking countries

— identify potential public and private sector partnerships by pinpointing areas to match capabilities and resources with highest priority needs.

Explore the CRI online tool

To really bring the CRI data to life, take advantage of our interactive online tool to compare and contrast locations, view in-depth country profiles and create customized CRI reports for export.

Go to kpmg.com/changereadiness.

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Foreword

It is not surprising that the three landmark global agreements in 2015 all clearly identified climate change as the major risk facing this and future generations.

In December, the Paris Climate agreement set out a framework among nations to contain the damage from greenhouse gas emissions and stem rising global temperatures. Just months before, world leaders agreed on the 17 Sustainable Development Goals (SDGs), and incorporated climate change mitigation and adaptation as critical steps in the quest for greater equity and sustainability. Earlier, in March of that year, the Sendai Framework for Disaster Risk Reduction renewed governments' commitment to address the costs of natural disasters, including climate change-related events.

These agreements share a common view on the nature of the challenge, recognizing that the response to global climate change requires joint leadership from national governments, businesses and civic groups. Moreover, while the cost is already high — measured in millions of lives affected and billions of dollars — risk from the incidence of floods, extreme storms, droughts, heat waves, sea level rise and other climate-related events is increasing.[1]

Like all complex problems, there is no single, simple solution to ensure a climate-ready future. In the 2019 edition of the KPMG Change Readiness Index (CRI), we have chosen to explore this complex topic by examining the capabilities societies need to successfully address climate change and mitigate climate risks.

The CRI captures data on over 150 variables across 140 countries to measure the capabilities of governments, the private sector and civil society to confront and prepare for change. It is a comprehensive tool that can be used by all sectors to inform decisions, improve policy and build leading practice for the benefit of societies around the world. The 2019 data can be used to provide insight for stakeholders into the SDGs, by highlighting strengths, weaknesses and progress around the world.

In the accompanying articles, we highlight the capabilities needed to mitigate and adapt to climate risks, speed up innovation in sustainable energy and energy efficiency and enable more effective roles for governments and civil society. In order to be climate-ready, societies must be able to address both sudden onset events — like natural disasters — and build resilience against long-term structural changes — like rising sea levels and temperatures. The analysis emphasizes that effective responses must be founded on collaboration and coordination among a variety of actors — both nationally and globally — and underscores the importance of 'scaling up' and targeting vulnerable groups in developing countries, like smallholder farmers.

Those that fail to recognize the impact of climate change as the 'new normal' and do not adapt accordingly are likely to be unprepared for its growing costs. These costs will be levied on citizens, businesses and economies across the globe, and so the solutions must also be global in scope. It is our hope that this report will contribute to the urgent discussion on how to move quickly on the path towards a sustainable future.

> "Climate change demands action, not tomorrow but today. Countries in developing and emerging markets face heightened risks. For governments, civil society and the private sector to build resilience and curb the drivers of risk, they need to anticipate, prepare for, prevent and respond to crisis events — and the global community needs to pull its resources together to help. This includes tools such as the Change Readiness Index, which aims to strengthen risk-informed decision-making for sustainable investment and identify opportunities for innovative partnerships."

Achim Steiner
Administrator
United Nations Development Programme

Laura Frigenti
Global Head, IDAS Institute
KPMG International

Timothy A. A. Stiles
Global Chair, International Development Assistance Services (IDAS)
KPMG International

[1] https://www.unisdr.org/files/61119_credeconomiclosses.pdf

Executive summary

How countries prepare for and react to sudden shocks or long-term trends has a significant impact on the success of citizens and institutions. The Change Readiness Index (CRI) captures the ability of a country's key sectors to capitalize on today's greatest challenges, including climate change.

About the CRI

6 new countries added

Albania

Croatia

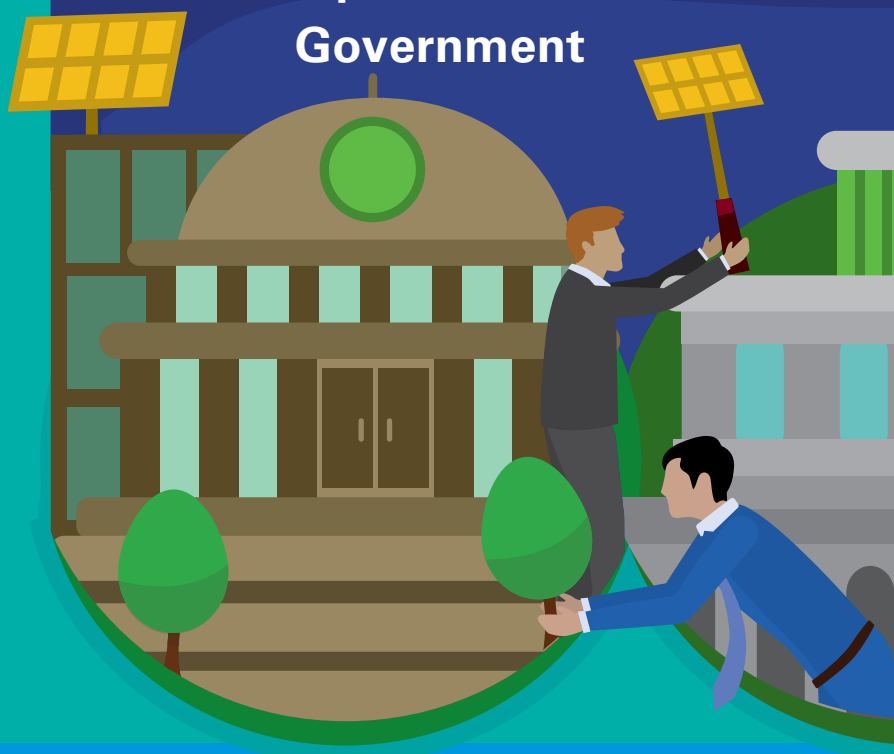
Estonia

Gabon

Mauritius

Uzbekistan

The CRI is comprised of three interrelated pillars



The #1 ranked country is ...

Switzerland

Characteristics of the Top 10

6/10

have been in the Top 10 since 2015

5/10

are in the Top 10 of the Environmental Performance Index

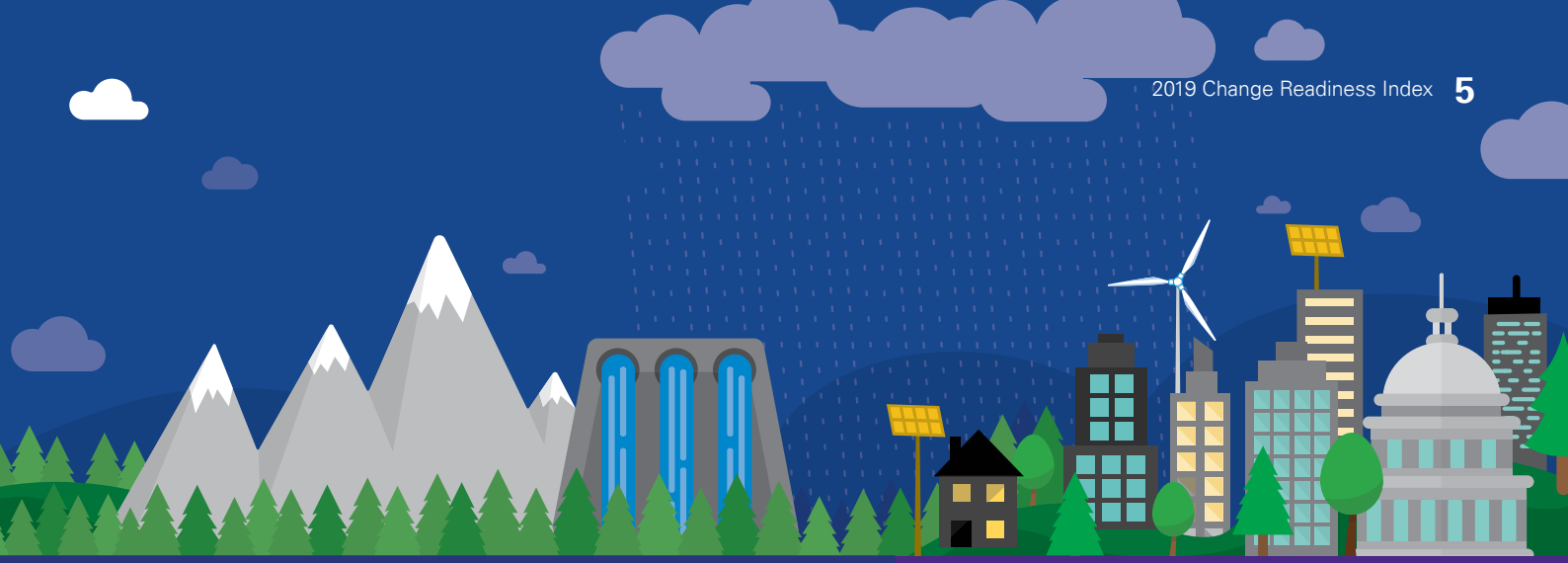
5/10

are in the Top 10 of the WEF's Inclusive Development Index

- The CRI now covers **140 countries**
- Secondary data include **over 125 variables**
- Primary data include responses from **1,400 country experts**

CRI insights

An enabling policy and regulatory environment driven by government is key to unlocking the investment and innovation needed to build sustainable infrastructure.



The climate challenge

Climate change is one of the most important challenges facing the global community.

The cost of adapting to climate change in developing countries could rise to between

US$280–$500 billion per year by 2050

4–5X greater than previous estimates (UNEP 2016)

The data and insights provided by the CRI allow users to pinpoint opportunities at a regional and country level.

There is no shortage of capital seeking long-term investment opportunities. Risk-sharing investment models can catalyze resources for innovation in sustainable energy.

Effective climate mitigation and adaptation requires cooperation across all sectors — public, private and civil society — to build institutional capacity, engage communities in decision-making and to scale solutions.

Facing climate change: Are countries ready?

The new normal

Climate change presents twin challenges for countries worldwide: the transformation to a low-carbon economy and adjusting to climate risks. These are large-scale challenges. Decarbonization requires significant investments as well as the development and widespread adoption of new and existing technologies and processes. Climate risks from hurricanes, typhoons, flooding, heat waves, drought and sea level rise are increasing and global in nature. To meet these challenges, governments, the private sector and civil society are adopting climate-ready policies and institutions. The 2019 Change Readiness Index (CRI) offers insights on the country-level capabilities for each of these sectors, analyzes factors that enable countries to adopt climate-ready approaches and offers a perspective on how prepared they are to respond to climate change.

Adopting climate-ready policies and institutions

The CRI captures a broad set of the variables that measure a country's capacity to adopt climate-ready policies and institutions, and can be used to benchmark climate readiness. Among these data are: medical and health service coverage, presence of safety nets, infrastructure coverage and quality, environmental and climate policies, food security and the depth of financial markets (see Figure 1). Taken together these data highlight the policies, institutions and technological innovations needed to move towards a low-carbon economy and reduce the costs of climate risk. Each sector has a role to play.

Enterprise: Climate change is impacting business models across sectors and industries. In insurance and banking, the long-term costs from increased claims from natural disasters and the potential losses from sunk assets in certain industries are leading to new transparency on climate risk exposure and new risk-pricing models. New products, such as parametric risk insurance, are being used to transfer climate risks from the agricultural sector and other affected parties. Producers are adopting processes that use less water and conserve energy, while farmers are adapting to new weather patterns and planting cycles. Many larger firms are adopting carbon pricing in their business models to account for both environmental and financial impact. Small businesses — many lacking insurance against flooding and other events — are developing contingency plans for their staff, supply chains, inventories and physical plants.[2] Investors are also factoring climate into their portfolio choices, discounting its impact on businesses and proactively investing in green bonds and other financial instruments.

Martin Chrisney
Senior Director, IDAS Institute
KPMG International

Figure 1: Relevant change readiness indicators for climate change

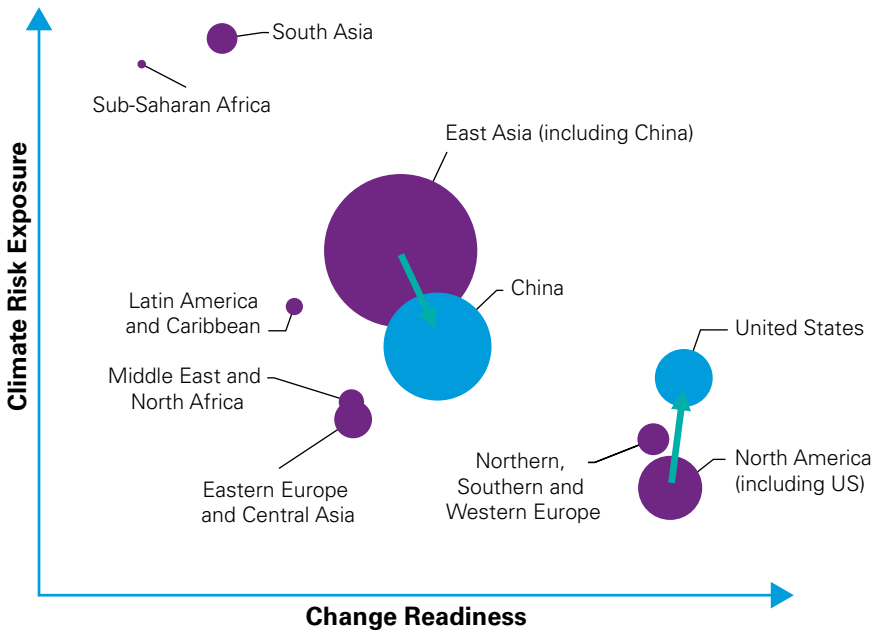
Enterprise	Government	People & civil society
Transport and utilities infrastructure	Food and energy security	Safety nets
Financial sector	Government strategic planning and foresight	Human capital
Enterprise sustainability	Environment and climate change	Civil society
Economic diversification	Public administration and state business relations	Inclusiveness of growth
Economic openness	Land and property rights	Health care coverage
Technology infrastructure	Macroeconomic framework	Access to information

[2] KPMG report: "Preparing MSMEs for Effective Disaster Management," April 2018. KPMG in India.

Government: The public sector is adopting approaches to reduce carbon emissions as part of its commitment under the Paris Agreement, as well as the Sustainable Development Goals (SDGs), to prevent an unbridled rise in global temperatures. These policies include taxes on carbon, cap-and-trade mechanisms for carbon credits, reductions in fossil fuel subsidies, targets for the use of renewable energy sources, more energy-efficient building codes, along with investments in new technologies and public transport. Municipal and national governments must also have infrastructure investments and urban plans with adaptation built-in as part of their design to ensure these assets withstand projected extreme weather events and structural changes, like rising sea levels.

People & civil society: NGOs and community organizations are actively working to ensure the inclusion of impacted groups, provide policy advice and offer additional support and resources in combination with government and private sector efforts. Many are advocating for new policies and greater accountability on the production of greenhouse gases (GHGs), while leading in the delivery of cost-effective solutions in local communities, like off-grid solar in rural areas in emerging markets. Further, the use of technologies, like blockchain and drones, is improving disaster response and increasing transparency for post-disaster relief and cash-based transfers to affected groups.

Figure 2: Change readiness, climate risk, territorial CO_2 emissions (%)



Source: Based on ND-Gain index data (2016), Global Carbon Project, and Change Readiness Index

As shown in the chart, East Asia and North America account for more than 64 percent of CO_2 emissions from fossil fuels in our sample (size of the purple circles), while the United States and China together account for 45 percent of that amount (blue circles). As regions/countries move to the right-hand side of the chart, they are more resilient and more capable of employing the policy, institutional and technology changes needed to successfully adapt to climate change. For example, sub-Saharan Africa and South Asia face greater risk factors and are less prepared than other regions. How low-income countries can make the transition to greater resilience is a question that is addressed here and in subsequent articles in the 2019 CRI report.

Change readiness and climate risk

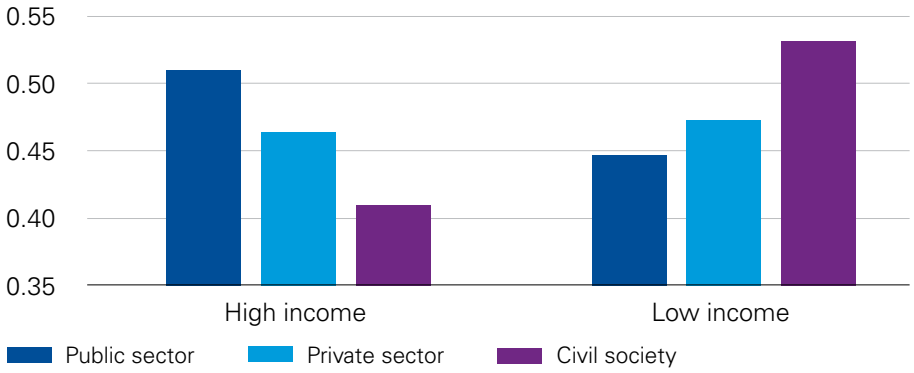
The CRI is a broad measure of a country's resilience to short-term disasters and capacity to adjust to longer-term structural changes, including rising temperatures and decarbonization. Combined with external data on countries' susceptibility to climate risks,[3] CRI data reveal that poorer countries face double jeopardy when it comes to climate change: a higher risk from the negative impacts of climate change and a lower capacity to implement climate-ready policies and institutions[4] (see Figure 2).

The CRI countries that are most susceptible to climate risks and least resilient are mostly low income and lower-middle income countries. Developing economies like Chad, South Sudan and Afghanistan top this category, as do regions like sub-Saharan Africa and South Asia. Among developed economies, Japan, Singapore and Hong Kong (SAR) are outliers owing to greater climate risk factors, but also demonstrate a higher degree of change readiness. The majority of higher income economies, however, are considered low risk/high readiness countries (see Figure 2).

Low-income economies face significant obstacles to improving their change readiness. Not only are budget

[3] The data are the combined indices for 'exposure' and 'sensitivity' from the ND-Gain index for 2016.
[4] A review by Moody's of rated sovereign credits identified 36 countries that were most susceptible to climate risks, with the majority in the developing world — 17 from Africa and 12 in Asia Pacific.

Figure 3: Varying opinions on the role of institutions in addressing climate change



Source: 2019 Change Readiness Index, KPMG International

While it may not be surprising that the public sector is rated better in addressing climate change in high income economies, the fact that civil society receives better marks in low income economies as an advocate for climate change draws an interesting distinction in the views of the local experts.

resources limited, but the institutional and regulatory framework is often not in place. Many of these countries are already weakened by natural disasters, political upheavals and conflict. A snapshot of the readiness gaps is seen by comparing developing economies with greater climate risk factors to those that are more resilient and share similar income levels.[5]

In relative terms, these high risk/low readiness countries can improve by developing their financial sector, which is an important safeguard for disaster-affected populations that need access to income transfers from governments, remittances and household savings. These countries also need to gain ground on technology capabilities, including access to information, which drive increased coverage for basic services for communication, payments, and early warning systems. Other key variables are increased investment in human capital and more active policies for inclusiveness and civil society advocacy. These variables are part of the private sector and civil society pillars of the CRI. Under the government pillar, these countries underperform most on the quality of state and business relations and land and property rights protections. These areas signal topics for special attention and deeper analysis as low-income countries prepare for climate change.

More broadly, the data also provide insights on the roles of various institutions. Primary survey data in the CRI allow users to compare perceptions of the effectiveness of the public sector, private sector and civil society institutions in meeting the challenge of climate change (see Figure 3). While it may not be surprising that the public sector is rated better in addressing climate change in high income economies, the fact that civil society receives better marks in low income economies as an advocate for climate change draws an interesting distinction in the views of the local experts. Notably, the private sector scores at similar levels in both the high income and low income groups — albeit with a slightly better performance in the latter.

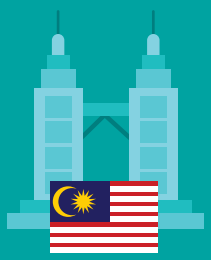
Charting a path forward

The CRI data reinforce that there is no single path towards being climate-ready. Policies and institutional reforms, technologies, investments and partnerships must be shaped by conditions in each country. The range of choices on how to reduce GHGs depends on the underlying productive structure and predominant sources of energy, among other factors, while the extent of risk varies by geography, frequency of climate events and their intensity. Even within countries, the social impacts are not spread evenly as some groups are more directly affected and others are particularly susceptible, like the poor, uninsured, elderly, and disabled. All of these elements are critical to the design and deployment of effective responses by government, the private sector and civil society. The CRI can offer timely signposts for those seeking guidance in charting a path towards climate readiness.

[5] In this case, we select from countries that have a climate risk above the median for all countries in the low and low-middle income group. These are high risk/low readiness countries (Afghanistan, Chad, Somalia, Sudan and South Sudan, which are compared to high risk/high readiness countries (India and the Philippines).

Key findings

About the top performers



Malaysia breaks into the Top 30
as the highest performing upper-middle income country

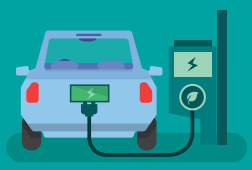
28 of the Top 30
countries are high income

Characteristics of the Top 10

6/10
have been in the Top 10 since 2015

5/10
are in the Top 10 of the Environmental Performance Index

5/10
are in the Top 10 of the WEF's Inclusive Development Index



5/10
seek to ban the sale of fossil fuel cars by 2040

Highest and lowest performers by region

	1 — Rank — 140	
East Asia and Pacific:	Singapore (2nd)	Papua New Guinea (130th)
Eastern Europe and Central Asia:	Estonia (21st)	Uzbekistan (95th)
Latin America and Caribbean:	Costa Rica (32nd)	Haiti (133rd)
Middle East and North Africa:	United Arab Emirates (5th)	Libya (135th)
North America:	United States (13th), Canada (16th)	
Northern, Southern and Western Europe:	Switzerland (1st)	Greece (65th)
Sub-Saharan Africa:	Mauritius (34th)	Somalia (140th)
South Asia:	India (53rd)	Afghanistan (137th)

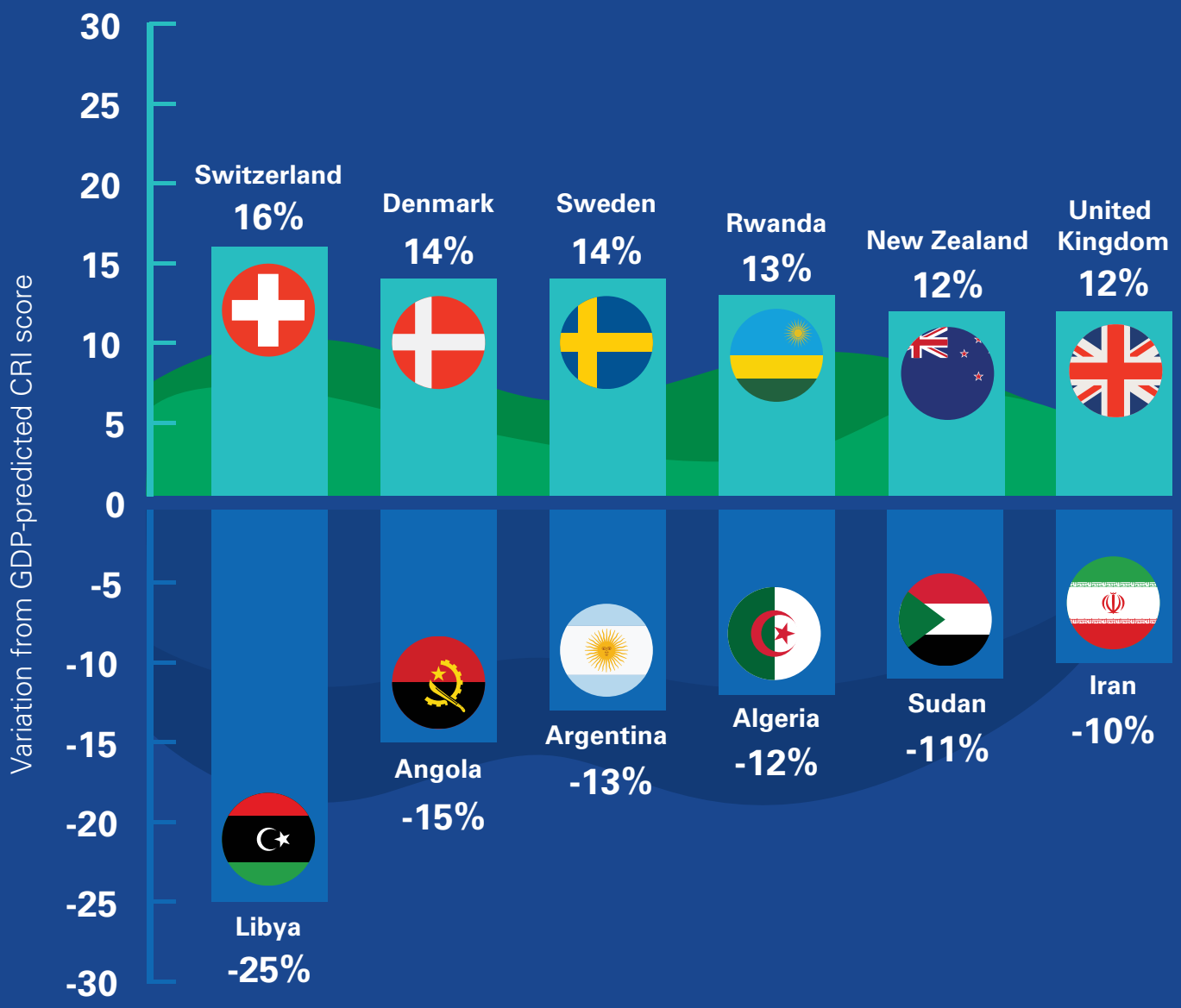
Highest and lowest performers by income group

	1 — Rank — 140	
High income:	Switzerland (1st)	Argentina (103rd)
Upper-middle income:	Malaysia (24th)	Libya (135th)
Lower-middle income:	Indonesia (41st)	Sudan (136th)
Low income:	Tajikistan (69th)	Somalia (140th)

Climate-readiness snapshot

- The European Union performs above the global average in environmental sustainability indicators across each CRI pillar.
- Asia outperforms the global average in terms of the public sector's ability to respond to climate change.
- Africa, Latin America and Eastern Europe underperform against the global average in the government environmental sustainability indicator.

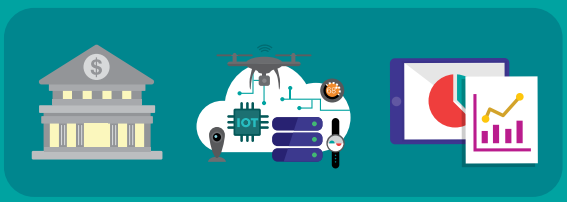
Punching above and below their weight



The CRI and susceptibility to climate events

Low and low-middle income countries face double jeopardy when it comes to climate change: a higher risk from the negative impacts of climate change and a lower capacity to implement climate-ready policies and institutions.

Wealth does not protect countries from climate risk. Rather, climate events tend to have greater economic costs in developed countries and greater social costs in developing countries.



Financial sector, technology infrastructure and access to information are some of the key factors that drive climate readiness, as seen by comparing developing economies with greater climate risk factors and more climate-ready countries at similar income levels.

Biggest movers

In a comparison of the 134 countries included in both the 2017 and 2019 CRI:

	Overall ranking	Enterprise	Government	People & civil society
Tonga	**36** places	**37** places	**38** places	**2** places
Russia	**29** places	**50** places	**11** places	**15** places
Egypt	**22** places	**25** places	**26** places	**16** places
Uganda	**-26** places	**-39** places	**-8** places	**-16** places
Zambia	**-25** places	**-40** places	**-28** places	**-4** places
Peru	**-24** places	**-37** places	**-18** places	**-12** places

Insight #1

Mobilizing green capital for sustainable energy

Success in meeting the Paris Climate goals and reducing societies' carbon footprint depends on mobilizing additional private finance and increasing innovation in sustainable energy technologies. Energy demand is expected to increase 60 percent by 2040, and 85 percent will be from developing countries.6 Clearly, the current range of technology solutions available for wind, solar and biomass needs to be complemented with new solutions in areas such as storage, carbon capture and hydrogen. Greater efforts are required to support increased energy efficiency that can be adapted to developing and developed economies alike.

Mike Hayes
Global Head of Renewables
KPMG International

Economies in the developing world face twin challenges: the outsized impact of climate events on their populations, and the greater policy uncertainty surrounding regulation and the macroeconomic environment that undermine access to long-term private capital. This makes mobilizing green capital for sustainable energy technologies in low-income economies a challenge. Here I would like to address how we can raise these funds to help address the needs of developing economies.

Is it all about the money?

The starting point should be a recognition that the costs of not adapting to the climate change are high. We are already seeing the impact on agriculture, health and economic development in emerging countries. Recurrent headlines highlight the devastating social impact of climate events and the enormous costs of disaster relief and rebuilding communities. In addition, developing economies have large unmet energy needs that add further layers of complexity and vulnerability: 1.2 billion people globally are without access to electricity.[7]

Against this background of urgent needs, it is noteworthy that there is no shortage of available capital worldwide seeking long-term investment opportunities. Capital in pension funds insurance firms, sovereign wealth funds and capital markets totals in the trillions of dollars. Already, private capital flows to the developing world average roughly US$1 trillion/year from direct investment, loans and portfolio investment, not to mention large transfers of remittances from residents in developed economies to their families overseas. At issue is how to tap these resources for greater social purposes, like innovation in sustainable energy, particularly given the perceived level of risk.

Making the shift to green capital

To create low-carbon economies, we have to address the barriers that inhibit greater technological innovation and limit its adoption in middle- and low-income countries. In the following pages are three key areas that, if targeted appropriately, offer great potential to expand private investment and accelerate the climate agenda.

[6] "Energy Access Outlook 2017: From Poverty to Prosperity." Paris: IEA, cited in IFC Reinventing Business.
[7] IEIEA, 2015. World Energy Outlook 2015. Available at: http://www.worldenergyoutlook.org/weo2015/

Sustainable Energy Innovation Fund: A blended finance model

KPMG and the World Economic Forum have proposed a blended finance model for the establishment of a Sustainable Energy Innovation Fund (SEIF).[9] The SEIF would support and accelerate breakthrough energy innovations with the potential to significantly reduce $C0_2$ emissions. To do so, it would use a blended capital model to bring much-needed equity capital to investee companies. The companies innovating in new energy technology need patient capital to develop, test and market their ideas. By combining public and private investment in different tranches that reflect differing risk appetites, the SEIF would leverage a larger pool of resources to key technologies in emerging economies. The model also uses an independent fund manager to oversee project selection and portfolio management to ensure a disciplined approach.

Investments could include innovations in energy storage, which is critical to underpin the future development of intermittent renewables like wind and solar, as well as the widespread adoption of electric vehicles. Other investible areas include development of carbon-based products and energy efficiency and biomass/bioenergy, which can impact off-the-grid rural areas and decentralize energy distribution, especially in middle- and low-income countries.

Policy environment

Attracting private capital requires an investment-ready policy environment. This is a complex issue since the innovations in renewable energy cut across a range of new and disruptive technologies. Policies will need to address the infrastructure for off-grid, 'pay-as-you go' distribution networks, mobile telecommunications for tracking usage and billing, blockchain and AI to optimize energy delivery and biotechnology, among other new sources of energy. Developing economies have the potential to leapfrog existing technologies and move to new business models that offer wider, more equitable access to sustainable energy.

Making this leap requires investment-ready policies. These policies include establishing the institutions and rules for property and land ownership and the legal structures that enable assets to be used as collateral. Sound regulation is needed to make capital markets transparent and reliable as a means to raise local currency finance and offer 'exits' for investors at different stages of the investment cycle. In addition, improved training and education are essential to create a technology-literate workforce.[8] The CRI captures some of these elements and shows the wide dispersion of capabilities among countries according to region and income level (see Figure 4).

A first step for policymakers is to review succesful practices from other countries on topics such as feed-in tariffs for renewables, the effective use of power purchase agreements, design of competitive models for service provision and the use of capital market instruments to fund renewables. There is also a role for multilateral development agencies to support these policies and build capacity among the new regulatory and oversight institutions.

Blended finance and overcoming the innovation deficit

Even in the best policy environment, however, there are inherent technology and commercialization risks that can inhibit innovation. Innovators must bear these 'first-mover' risks, in the hope of making profits, if these are to be overcome. In most developing economies, this type of risk-taking is constrained by insecure property rights and the limited role of early-stage risk capital or robust capital markets to provide equity for growth.

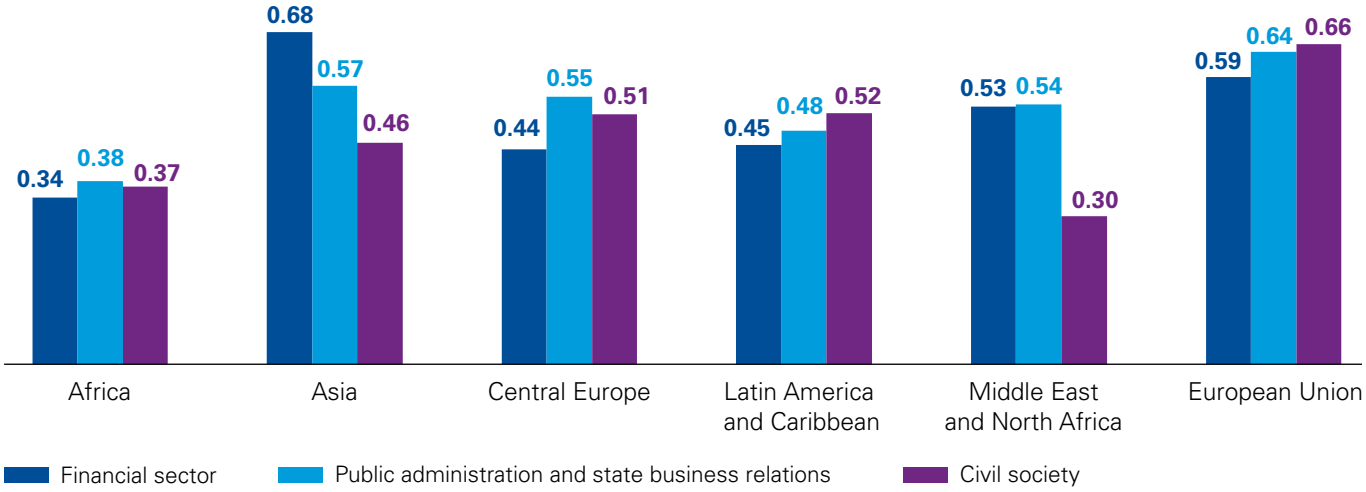
One approach to reduce the innovation deficit is to blend private and public capital. A blended finance approach uses public sector resources — whether from international donor agencies, multilateral banks, or national entities — to finance riskier mezzanine tranches that can catalyze additional private investment. When designed properly, this approach can ensure adequate longer-term finance for bankable projects, create an arm's-length relationship with investees for the public sector, protect intellectual property and successfully leverage private capital. An example of a blended-finance structure is the Sustainable Energy Innovation Fund currently being developed by KPMG and the World Economic Forum (see blue box on the left).

The development of early stage funding should not be viewed in isolation of the entire financing ecosystem. Additional sources of equity finance, mezzanine debt and long-term debt are needed to meet the needs of firms throughout their growth cycle. The innovations in the green bond market and the establishment of green banks show promise that lifecycle funding will be available as the sustainable energy markets mature.

[8] Reinventing Business through Disruptive Technologies: Sector Trends and Investment Opportunities for Firms in Emerging Markets, International Finance Corporation, Washington, D.C. January, 2019.

[9] Proposal for the First Global Sustainable Energy Innovation Fund to Tackle Climate Change Using Blended Public and Private Finance: January, 2019. World Economic Forum.

Figure 4: Capital readiness



Source: 2019 Change Readiness Index, KPMG International

Green capital readiness requires more than a strong financial sector. It also requires a strong culture of partnerships and public administration and state business relations capacity in order for countries to fund renewable energy investments and other sustainable solutions. Benchmarking these capacities in the CRI across regions allows government, private sector and civil society audiences to identify gaps and potential areas of discussion with policymakers and investors. The chart above shows that while Asia, on average, leads the pack for financial capital readiness, civil society capacity remains an issue and therefore an area for consideration as governments seek to build long-term partnerships across sectors. This civil society gap is most pronounced in the Middle East and North Africa region.

New partnerships

Efforts to carry out policy reform and build effective risk-taking investment models should be based on effective, long-term partnerships. Where these partnerships address the market failures that slow innovation, the results are more likely to be positive and more durable.

To identify the appropriate policy framework, governments can partner with international agencies, donors and technical advisors who can benchmark their arrangements against successful leading practices. In the transformation to new investment-ready policies, there is a need to de-risk projects through the use of seed capital and project preparation funding to jump-start sustainable energy markets.

The private sector at large — businesses, asset owners, fund managers and investors — also have important roles in forming partnerships. First, they can increase transparency by supporting the development of, and aligning with, accepted standards of practice for sustainability reporting. These efforts increase transparency and set benchmarks for market practice. Second, they can partner with institutions to support blended-finance vehicles, like the SEIF and others, that expand the range of financing tools and investment opportunities. Third, they can form partnerships to explore measurement of the long-term impact of their business operations and investment portfolios, while incorporating CO_2 pricing into their investment analysis. These steps can show that decisions made for financial returns are not done at the expense of positive societal results, like sustainable energy access, carbon reduction and other desirable social outcomes.

Conclusion

Today, it is widely recognized that our survival depends on achieving a low-carbon world. In response, markets are already mobilizing capital and there is a paradigm shift as businesses and investors incorporate climate risk into their investment decisions. There is also a growing realization that new technologies and business approaches are needed. An important piece of the solution will be mobilizing green capital to invest in the design, piloting and commercialization of these new technologies. If successful, we can accelerate the shift to a low-carbon world by making sustainable energy accessible across all countries, all geographies and all levels of society.

Insight #2

The case for public sector leadership in driving infrastructure sustainability

It is estimated that around US$90 trillion of infrastructure investment will be required in the next 15 years.[10] Rapid urbanization, climate change and resource depletion, particularly in emerging economies, will require sustainable solutions to meet tomorrow's energy, food and transportation needs. Governments are starting to encourage infrastructure investment towards projects that are environmentally sustainable, socially impactful and resilient. Infrastructure assets are increasingly adopting sustainable technology. Roads, housing, energy supply, water and sanitation and other long-lived assets are increasingly designed, built and operated taking into account their environmental impact and their ability to mitigate climate risks.

Governments are investing in a number of initiatives to drive the development and adoption of sustainable infrastructure. The challenge is identifying the right levers to foster innovation, unlock private sector capital, drive cross-sector collaboration and influence consumer and industry behaviors. In our experience, the most successful governments are starting to drive the sustainable infrastructure agenda through three key avenues:

— the development of integrated infrastructure planning that embeds sustainability as an explicit consideration

— the use of policy incentives to influence consumer and industry behavior and encourage the adoption of sustainable technologies

— the development of a culture of innovation that leverages academic and private sector skills and capabilities, mobilizes private capital to finance green infrastructure projects and accelerates the development of new sustainable technologies in partnership with the private sector.

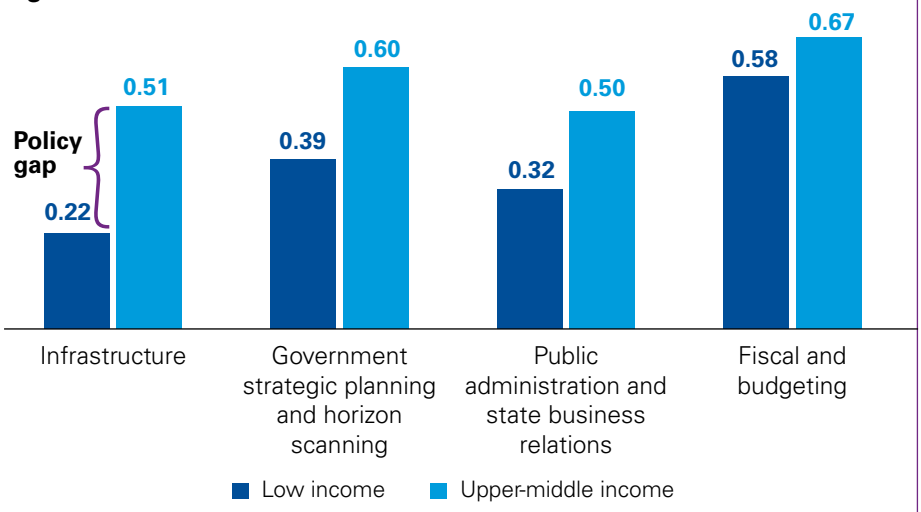
Embed sustainability in national infrastructure strategies

Integrated national infrastructure plans that embed sustainability considerations into the early stages of infrastructure planning are a key success factor in the development of sustainable infrastructure. We are starting to see the emergence of infrastructure strategies that consider

Richard Threlfall
Global Head of Infrastructure
KPMG International

[10] The New Climate Economy: The Global Commission on the Economy and Climate. Around $90 trillion in investment is needed due to ageing assets and new demand arising from population growth and urbanization. https://www.un.org/pga/71/wp-content/uploads/sites/40/2017/02/New-Climate-Economy-Report-2016-Executive-Summary.pdf

Figure 5: Infrastructure readiness



Source: 2019 Change Readiness Index, KPMG International

The infrastructure gap is large between low income and upper-middle income countries — leaving aside any comparison with high income countries. Closing the gap requires sound policy, regulatory and institutional frameworks. Some of these are captured in sub-pillars of the CRI. For example, low income countries also lag in government strategic planning and public administration and state business relations, while the fiscal performance gap is less acute. The CRI can identify potential areas where government can partner with others to overcome capacity limits.

sustainability measures for project planning, selection and implementation, and that require governance processes quantifying the economic, social and environmental impacts of infrastructure. For example, the United Kingdom National Infrastructure Plan integrates sustainability as a key criteria in the selection of its priority infrastructure projects, as well as quality, capacity, economic growth and ability to unlock significant private capital.[11]

These approaches may portray a more holistic picture to private and public sector stakeholders and increase the attractiveness to investors. Implementing national infrastructure sustainability strategies clearly communicates expectations and targets to the industry, creates consistency in public policy, clarity for investors and reflects the public sector's commitment and responsibility in driving the sustainability agenda.

Leverage public policy and incentives to change behaviors and encourage the adoption of sustainable technology

Public policy incentives are increasingly being used to sustainably shape consumer behavior, for example, with respect to reliance on fossil fuels in transport. Madrid, Paris, New York and Oslo are encouraging the 'car-free' movement, in which car-free zones are created in inner cities to increase the use of public transport and walking to improve public safety and air quality.[12] Governments are also setting targets to ban the sale of new gasoline and diesel vehicles. Norway is leading the way with a target of 2025, followed by India aiming for 2030, followed by the UK and France by 2040.[13]

Governments are also taking this approach with industry players. The UK's Renewable Transport Fuel Obligation (RTFO), for instance, aims to reduce the environmental impact of transport.[14] The percentage of fuel sources derived from renewables in the UK supply chain as of January 2019 increased to 8.5 percent from 7.25 percent in 2018 and is set to rise further.[15]

Sustainable technologies, such as solar and wind energy, are highly developed and becoming cost-competitive in some markets. Yet others, such as electric vehicles, remain expensive. In reaction to this, we are seeing governments taking steps to encourage the adoption of emerging technologies through targeted incentives. Norway's government has emerged as a leader in the promotion of electric vehicles by combating the comparatively higher price of electric vehicles through significant tax exemptions (VAT, import and purchase tax, road tax and toll charges) and subsidies (e.g. free parking).[16]

Create a culture of innovation in partnership with the private sector

The success of the Sustainable Development Goals, including mitigating climate change, relies on a successful partnership between the public and private sectors (including academia and research). Some governments are working to foster a culture of innovation, which leverages academic and private sector skills and capabilities, mobilizes private capital and accelerates the development of new sustainable technologies through cross-sector collaboration. The African Climate

[11] National Infrastructure Delivery Plan 2016–2021, Infrastructure and Projects Authority. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/520086/2904569_nidp_deliveryplan.pdf

[12] 15 major cities around the world that are starting to ban cars, Business Insider. 12 January 2019. https://www.businessinsider.com/cities-going-car-free-ban-2018-12?r=US&IR=T

[13] Signal of change/An increasing number of cities and countries are banning fossil fuel burning cars, Futures Centre. 28 November 2017. https://thefuturescentre.org/signals-of-change/212548/increasing-number-cities-and-countries-are-banning-fossil-fuel-burning-cars

[14] Guidance: Renewable Transport Fuel Obligation. https://www.gov.uk/guidance/renewable-transport-fuels-obligation

[15] Important changes to the Renewable Transport Fuel Obligation (RTFO). https://www.rix.co.uk/for-home/resource-centre/tips--advice/important-changes-to-the-renewable-transport-fuel-obligation-rtfo/

[16] Norway sees boom in electric cars, fueled by the government. 19 December 2018. https://phys.org/news/2018-12-norway-boom-electric-cars-fueled.html

Technology Centre (a project executed by the African Development Bank), for example, supports the research and deployment of low-carbon technologies for climate change mitigation in Africa. The initiative includes programs like supporting the Mauritanian Government Ministry of Water and Sanitation to design a strategy to use solar energy for providing safe drinking water and supporting the Energy Commission of Ghana to enhance energy efficiency of public and commercial buildings. In January 2019, we also saw the world's largest public sector energy efficiency company, the Indian Energy Efficiency Service Company, join the United Nations Environment Programme (UNEP) DTU Partnership to create a framework for long-term cooperation on energy efficiency improvement in India.[17]

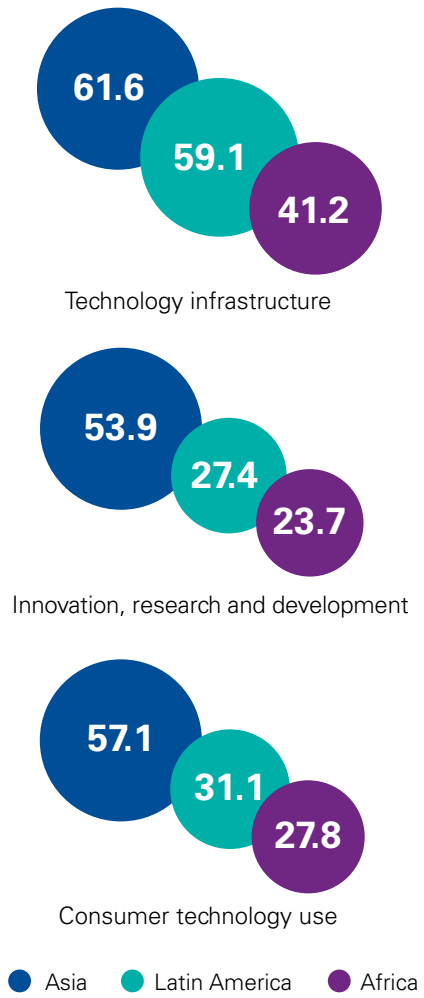
Publicly sponsored hackathons are another initiative being used by governments to foster innovation and industry collaboration to drive sustainable solutions. The UAE Hackathon 2019 represents a wide-ranging partnership between government, academia, the private sector and citizens to address current and future challenges facing society. Key themes include integrated infrastructure, data for sustainability, trending technologies and social development.[18]

In addition to fostering innovation, a key incentive in aligning with the private sector is to unlock existing capital to finance green infrastructure projects. The Egyptian government partnered with the International Finance Corporation and European Bank for Reconstruction and Development in securing private investment to finance the construction of the Benban Solar Park, providing affordable clean energy to 350,000 residents.[19] In addition to financing individual infrastructure projects, governments are also starting to look to the private sector to help mobilize existing capital in the early development of sustainable technology innovation by breaking down barriers to financing, taking on a greater share of the risk and creating blended finance vehicles/innovation funds. For example, the World Economic Forum is working with KPMG in Germany and KPMG in Ireland to help accelerate sustainable energy innovation by collaborating with stakeholders in Mission Innovation (a grouping of 23 countries that have come together to foster Energy Innovation as a result of the 2015 Paris accords) and the European Commission to develop co-investment mechanisms to increase private sector participation in early-stage energy innovation.

Conclusion

It is increasingly apparent that the development of sustainable infrastructure is reliant on governments' adoption of integrated planning and strategies, leveraging policy and incentives and forging strong cross-sector partnerships and alliances. This enables an element of influence over both consumer and industry, fosters a culture of innovation and unlocks private sector capital and expertise. A shared vision and a willingness to collaborate across sectors, industries and geographies are essential to build the required innovation ecosystem. It is this partnership that can enable the delivery of long-term, resilient infrastructure that is sustainable from a financial, technical, environmental and social perspective.

Figure 6: Technology readiness
(CRI scores — regional averages)



Source: 2019 Change Readiness Index, KPMG International

The CRI measures key aspects of a country's ability to respond to positive and negative change. In terms of infrastructure, indicators such as technology infrastructure, innovation, and consumer use can be used to highlight regional strengths and gaps. Doing so can kick-start conversations focused on pinpointing leading practices from other regions.

[17] New partnership for the future of energy efficiency in India, Copenhagen Centre on Effective Energy. 10 January 2019. http://www.energyefficiencycentre.org/nyheder/2019/01/kopi-af-new-partnership-for-the-future-of-energy-efficiency-in-india?id=664c7ff6-cb53-4914-b8cf-a72c47d943ca

[18] https://hackathon.ae/

[19] Arab Republic of Egypt: Providing Affordable Clean Energy, The World Bank. https://www.worldbank.org/en/about/partners/brief/arab-republic-of-egypt-providing-affordable-clean-energy

Insight #3

Scale and collaboration are key to a resilient Africa

In a situation that has become predictably familiar, parts of Africa this year faced the horrendous consequences of natural disasters that are linked to climate change.

Cyclone Idai tore through southern Africa in March, killing at least 700 people and wiping out entire villages. Early estimates said that 1.7 million people had been affected.[20] While the sheer ferocity of Idai was new, we can't say the same about the droughts which have been all too common in Africa. Currently, 10.7 million people are facing hunger[21] across Ethiopia, Kenya and Somalia following poor rains.

Climate risks have increased global inequality[22] with Africa, where 70 percent of the population depends on rain-fed, smallholder agriculture, among the worst affected regions. A recent study[23] shows that climate change has driven GDP per capita more than 20 percent lower than it would have been without climate change in sub-Saharan African countries including Sudan, Burkina Faso and Niger.

In the face of such a daunting challenge, the task ahead is clear and not easy. What is also clear is that while Africa is not short of tools and technologies to adapt, deploying these tools and technologies on a transformational scale is a challenge. The continent is also not short of resources or the intention to make these resources available; fragmention and poor coordination have resulted in wastage and marginal impact.

As evidenced by the CRI, in general, African nations are prominent among those with high climate vulnerability and the lowest readiness for change. Sudan, for example, is ranked at number 136 in this year's index, meaning that it is not in a strong position to cope with change, which is compounded by unpredictability as a result of climate impacts.

Three sectors, one goal

Working together to address these challenges is not a choice, it is the only way we can win. Three key partners — governments, private sector and civil society — all have a role to play.

The institution I head, the Alliance for a Green Revolution in Africa (AGRA), is dedicated to painting a new picture and creating a thriving African agricultural sector. We invest in boosting yields through improved seeds, fertilizers and climate-resilient technologies. We have been working to help farmers cope when the rains don't come, or come too strong.

We do not work alone. We cooperate with a wide range of partners: governments, the private sector, civil society, research institutions and implementing organizations to deliver technologies to farmers. Each of these partners has a unique role to play.

Where governments lead with targeted policies and creating an enabling environment, for instance, results are evident. For example, Rwanda's vision for 2050 envisages a developed climate resilient and low-carbon economy.[24]

Dr. Agnes Kalibata
President
Alliance for a Green Revolution in Africa (AGRA)

As President of AGRA, Dr. Kalibata leads the organization's efforts with public and private partners to ensure a food-secure and prosperous Africa through rapid, sustainable agricultural growth, improving the productivity and livelihoods of millions of smallholder farmers in Africa.

[20] https://www.bbc.com/news/world-africa-47678743
[21] https://www.oxfam.org/en/famine-and-hunger-crisis-ethiopia-food-crisis/drought-east-africa-if-rains-do-not-come-none-us-will
[22] http://time.com/5575523/climate-change-inequality/
[23] https://www.pnas.org/content/early/2019/04/16/1816020116
[24] https://climateknowledgeportal.worldbank.org/country/rwanda/adaptation

This will be driven by, among other things, sustainable intensification of agriculture; agricultural diversity in local and export markets; sustainable forestry, agroforestry and biomass energy; ecotourism, conservation and payment for ecosystem services promotion in protected areas; an integrated approach to sustainable land use planning and management; and integrated water resource management and planning. This positive change improves resilience as a result of targeted policies and enabling environment.

The profit imperative of the private sector is a powerful force for good, when properly directed by government policies encouraging investment, ownership and sustainable business practices. When I say private sector, I also mean farmers. African smallholder farmers provide 80 percent of the food eaten on the continent. We see them as businesses that can thrive given the right support.

Civil society — technical implementing organizations like AGRA, research institutions, especially the CGIAR, think tanks, community organizations, farmer organizations and many other actors — drives implementation with communities, particularly in places where government and the private sector are weaker. It advocates the needs of vulnerable groups to decision-makers and brings new knowledge and skills to local communities.

While each of these sectors make a valuable contribution, it is only by collaborating that we will effectively prepare societies, businesses and whole economies for the impacts of climate change.

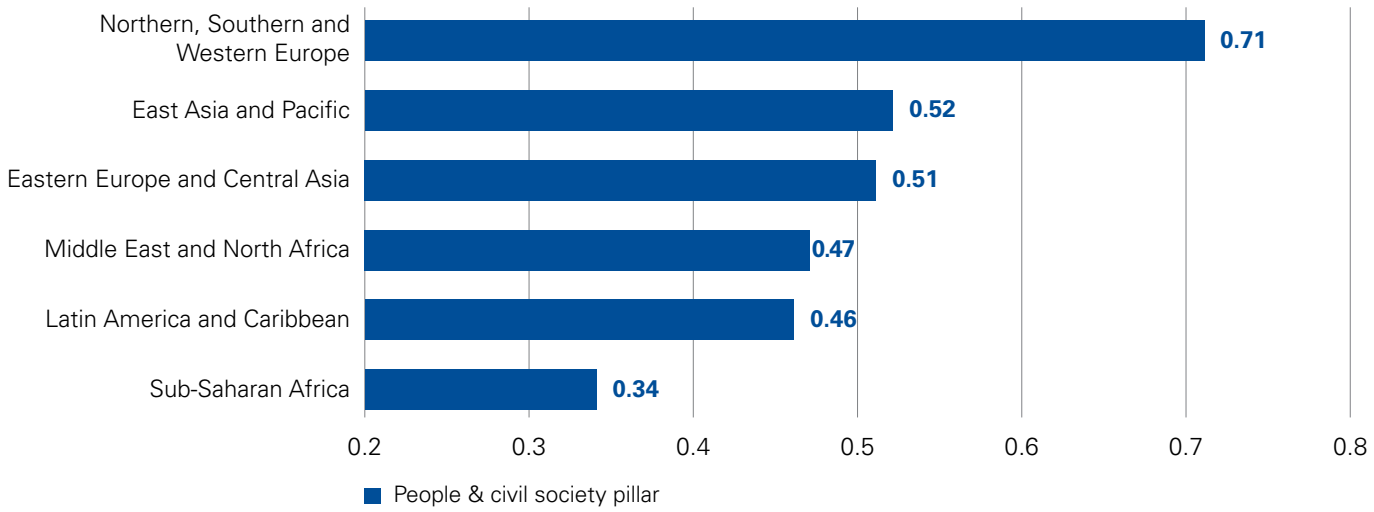
Coordinated interventions work

There are, of course, many ways to make farmers more resilient to climate change: crop diversification, agroforestry, adoption of more efficient and weather-tolerant crop varieties, drip-irrigation, appropriate fertilizers and soil fertility management. Importantly, digital and mapping technologies help farmers access climate models that improve farming choices, while encouraging innovations in finance and insurance against climate risks.

We are seeing a rise in the adoption of Africa's staple crops[25] for greater climate resilience. For example, the orange-fleshed sweet potato developed by the International Potato Center (CIP) and enriched with vitamin A is taking root in most parts of the continent. It offers the quickest nutritional returns compared to

Figure 7: Climate change in Africa: Preparing civil society for the challenge

Average CRI People & civil society scores by region



Source: 2019 Change Readiness Index, KPMG International

The CRI's People & civil society pillar measures important variables that greatly impact a country's ability to confront climate threats and events. These include sub-pillars on human capital, inclusiveness of growth, access to information, gender parity and voice of civil society. There are also primary data covering the effectiveness of climate change advocacy by civil society. 2019 CRI data show that, generally, differences between high income countries and low and lower-middle income countries are the most striking within the People & civil society pillar. In sub-Saharan Africa, the average People & civil society overall score ranks below all other regions. However, despite this overall trend, we observe variability within the pillar wherein income is not a determining factor for all indicators. For example, Zimbabwe's gender scores rank among those of many upper-middle income country levels.

[25] https://www.telegraph.co.uk/news/2018/05/25/british-government-sparks-new-green-revolution-100m-investment/

other tubers and matures in 3 months compared to cassava and yam that take up to a year. It is a definite winner against climate change. In Uganda, working with Oxfam, the Foundation for Urban and Rural Advancement program helps smallholders who cannot grow their traditional crops because of changing weather patterns. The program provides training on new crops, distributes seedlings and provides remediation against flooding.

These are valuable interventions. But a project here and a project there isn't going to transform whole economies and lead to widespread adaptation to climate risks. The public and private sectors need to work with civil society to scale up, avoid fragmentation of efforts and enhance coordination and alignment with countries' own efforts and priorities.

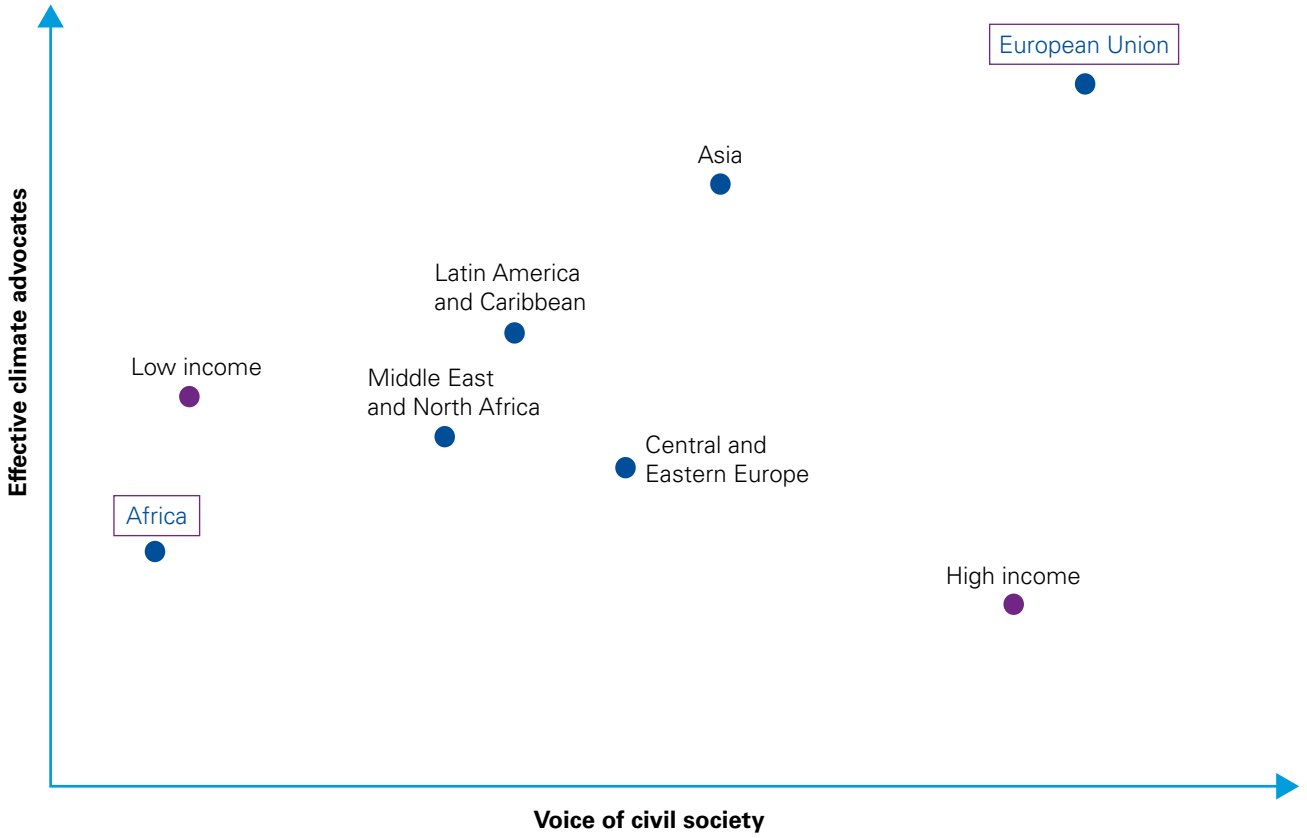
Achieving change at scale

In Western Kenya, for example, climate resilience is being promoted through a multipronged approach. The use of improved high-yield seeds, blended crop nutrition supplements and market diversification are combined with improved biodiversity and forest management. The target is to reach 100,000 farmers who adopt sustainable land management practices, increase maize production by 300,000 MT and put 10,000 hectares of degraded forest land under sustainable forest management.

Our experience is that initiatives like these must develop the capacity of local authorities and country governments to manage, monitor and regulate natural resources. Effective approaches need to engage communities, who create their own natural resources management committees. Initiatives also need to bring in the private sector as a key player in ensuring sustainability of the systems that are being developed. In short, all three sectors need to be united in one common purpose.

We must also ensure that scalable solutions are brought to the more challenging environments like South Sudan — which peforms below its income level on the CRI. In one example, civil society, development partners and the private sector are working together in the Partnership for Recovery and Resilience to tackle food insecurity and health risks, including those caused by climate change. While it is too early to talk of results, the approach shows promise by putting communities and people at the center. The hard work of building strong civil society engagement with implementing partners, development partners and the

Figure 8: The civil society voice varies across regions and income groups



Source: 2019 Change Readiness Index, KPMG International

The civil society voice: An advocate for climate change readiness

2019 CRI data measure civil society's ability to influence and participate in policymaking (voice of civil society), as well as its effectiveness in advocating for improved climate change policies (effective climate advocates). Notably, sub-Saharan Africa scores lower than the composite of all Low income countries on both fronts, and the European Union outperforms the averages for High income countries. The data suggest that, in sub-Saharan Africa, achieving climate-ready policies will benefit from a stronger voice for civil society and steps to improve advocacy for climate change.

private sector — and linking them with governments — is necessary for future success.

Adaptation is Africa's only hope

If we needed more evidence for action, the recent landmark report by the Intergovernmental Panel on Climate Change (IPCC), the UN's climate science body, shows that if global temperatures rise more than 1.5 °C by the end of the century, African countries will face irreversible damage.

The truth is, the end of the century is a reference point — these changes are already here with us. The short-term approach of reacting after disaster hits with food aid and finance is no longer sufficient. Every effort must be made to ensure that countries, communities, farmers and businesses are ready to cope.

Plainly put, we must adapt to live. Promoting ecosystems-based adaptation by building and sustainably managing natural capital from the farm level to national and regional levels is critical. This approach guarantees multiple development outcomes that increase resilience and change readiness capacities. We must also give farmers technologies, including seeds, that are adapted to local agro-ecological conditions and that are higher yielding.

Climate insurance and finance will also be critical. Efforts like those by African Risk Capacity (ARC)[26] should be upscaled. ARC targets to insure 30 countries against drought, flood and cyclone disasters by 2020. This translates to the possibility of US$1.5 billion in coverage for some 150 million people.

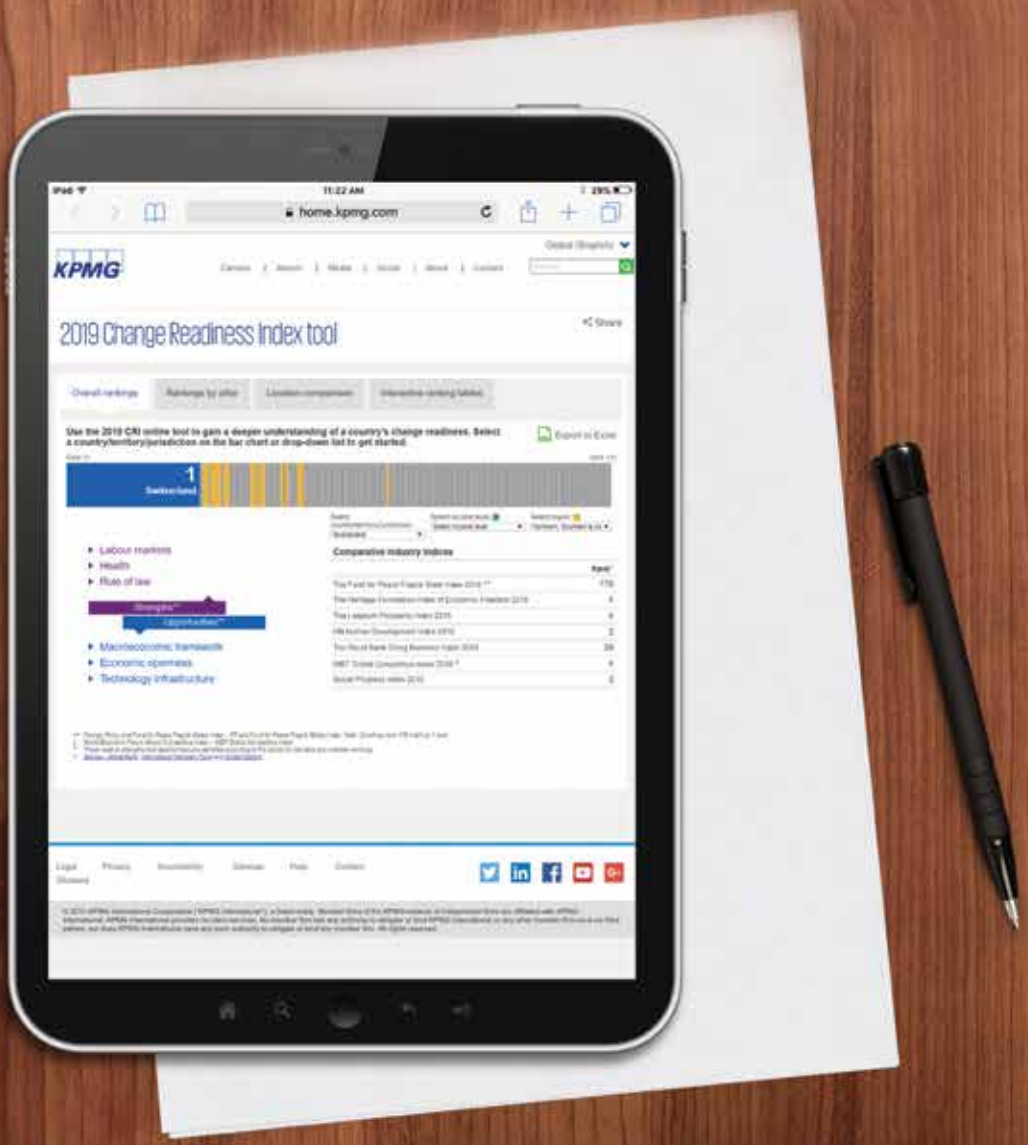
All these efforts will take the kind of inclusive, collaborative partnerships I have outlined here. We cannot be successful if we only plough our own furrows and do not work together for a prosperous Africa.

[26] https://reliefweb.int/report/world/arc-plans-insure-30-african-countries-against-climate-risks-2020

About the online tool

To learn more about the CRI and delve deeper into the data, visit kpmg.com/changereadiness where you can:

- use an interactive comparison tool to contrast different countries, regions and income groups
- view in-depth profiles for each of the 140 countries in the 2019 CRI
- compare CRI scores across years for different regions and income groups
- learn how the scores are compiled
- create tailored CRI reports that you can export in a variety of formats; and much more.



1 Appendix

Full index results table

Overall rank	Country	Region	Enterprise capability	Government capability	People & civil society capability
1	Switzerland	Northern, Southern and Western Europe	1	1	3
2	Singapore	East Asia and Pacific	2	2	10
3	Denmark	Northern, Southern and Western Europe	3	7	2
4	Sweden	Northern, Southern and Western Europe	8	5	1
5	United Arab Emirates	Middle East and North Africa	5	3	16
6	Norway	Northern, Southern and Western Europe	14	6	4
7	Germany	Northern, Southern and Western Europe	7	8	8
8	United Kingdom	Northern, Southern and Western Europe	6	11	6
9	New Zealand	East Asia and Pacific	10	9	11
10	Netherlands	Northern, Southern and Western Europe	9	12	7
11	Finland	Northern, Southern and Western Europe	15	10	5
12	Qatar	Middle East and North Africa	16	4	22
13	United States	North America	11	18	14
14	Australia	East Asia and Pacific	21	15	9
15	Hong Kong (SAR)	East Asia and Pacific	4	13	23
16	Canada	North America	22	14	12
17	Taiwan	East Asia and Pacific	12	17	18
18	Japan	East Asia and Pacific	13	16	21
19	Austria	Northern, Southern and Western Europe	17	20	17
20	Belgium	Northern, Southern and Western Europe	23	27	13
21	Estonia*	Europe and Central Asia	18	19	20
22	France	Northern, Southern and Western Europe	20	23	19
23	Ireland	Northern, Southern and Western Europe	27	26	15
24	Malaysia	East Asia and Pacific	19	24	31
25	Israel	Middle East and North Africa	25	29	26
26	South Korea	East Asia and Pacific	24	34	28
27	Czech Republic	Eastern Europe and Central Asia	28	28	29
28	China	East Asia and Pacific	26	25	41
29	Lithuania	Northern, Southern and Western Europe	30	31	34
30	Saudi Arabia	Middle East and North Africa	32	21	42
31	Portugal	Northern, Southern and Western Europe	29	44	24
32	Costa Rica	Latin America and Caribbean	36	35	30

* Countries that are new to the 2019 CRI

High income | Upper-middle income | Lower-middle income | Low income

Overall rank	Country	Region	Enterprise capability	Government capability	People & civil society capability
33	Poland	Eastern Europe and Central Asia	35	38	32
34	Mauritius*	Sub-Saharan Africa	31	33	40
35	Spain	Northern, Southern and Western Europe	34	50	27
36	Italy	Northern, Southern and Western Europe	33	57	25
37	Slovakia	Eastern Europe and Central Asia	37	40	35
38	Uruguay	Latin America and Caribbean	58	30	33
39	Chile	Latin America and Caribbean	43	36	36
40	Croatia*	Europe and Central Asia	39	45	37
41	Indonesia	East Asia and Pacific	38	41	55
42	Jordan	Middle East and North Africa	44	39	58
43	Namibia	Sub-Saharan Africa	60	32	54
44	Philippines	East Asia and Pacific	41	43	50
45	Armenia	Eastern Europe and Central Asia	42	56	46
46	Russia	Eastern Europe and Central Asia	40	59	49
47	Georgia	Eastern Europe and Central Asia	48	49	59
48	Hungary	Eastern Europe and Central Asia	45	65	47
49	Tonga	East Asia and Pacific	81	54	38
50	Serbia	Eastern Europe and Central Asia	46	73	43
51	Fiji	East Asia and Pacific	52	42	72
52	Panama	Latin America and Caribbean	54	51	62
53	India	South Asia	50	47	71
54	Romania	Eastern Europe and Central Asia	55	61	51
55	Turkey	Eastern Europe and Central Asia	49	64	63
56	Kazakhstan	Eastern Europe and Central Asia	61	66	45
57	Kyrgyzstan	Eastern Europe and Central Asia	75	58	48
58	Moldova	Eastern Europe and Central Asia	62	78	44
59	Kenya	Sub-Saharan Africa	63	68	64
60	Bulgaria	Eastern Europe and Central Asia	53	82	61
61	Macedonia	Eastern Europe and Central Asia	69	69	65
62	Azerbaijan	Eastern Europe and Central Asia	51	63	82
63	Bhutan	South Asia	92	22	103
64	Paraguay	Latin America and Caribbean	64	55	80

* Countries that are new to the 2019 CRI

High income | Upper-middle income | Lower-middle income | Low income

Overall rank	Country	Region	Enterprise capability	Government capability	People & civil society capability
65	Greece	Northern, Southern and Western Europe	70	111	39
66	Thailand	East Asia and Pacific	47	101	69
67	Morocco	Middle East and North Africa	56	53	93
68	Tunisia	Middle East and North Africa	84	72	53
69	Tajikistan	Eastern Europe and Central Asia	67	70	77
70	Rwanda	Sub-Saharan Africa	73	37	101
71	Colombia	Latin America and Caribbean	72	79	70
72	Ghana	Sub-Saharan Africa	86	48	83
73	Mexico	Latin America and Caribbean	66	100	67
74	Peru	Latin America and Caribbean	74	87	68
75	Jamaica	Latin America and Caribbean	82	91	57
76	Botswana	Sub-Saharan Africa	97	46	86
77	Lebanon	Middle East and North Africa	71	93	76
78	Ukraine	Eastern Europe and Central Asia	68	116	60
79	Dominican Republic	Latin America and Caribbean	83	83	73
80	Sri Lanka	South Asia	65	94	84
81	Egypt	Middle East and North Africa	57	81	95
82	Mongolia	East Asia and Pacific	108	88	56
83	Vietnam	East Asia and Pacific	79	86	87
84	Albania*	Europe and Central Asia	87	118	52
85	Côte d'Ivoire	Sub-Saharan Africa	77	52	114
86	Senegal	Sub-Saharan Africa	96	62	94
87	Brazil	Latin America and Caribbean	76	119	74
88	Gabon*	Sub-Saharan Africa	116	67	78
89	Cabo Verde	Sub-Saharan Africa	95	77	91
90	Guatemala	Latin America and Caribbean	59	110	97
91	El Salvador	Latin America and Caribbean	80	114	85
92	Honduras	Latin America and Caribbean	78	108	88
93	Iran	Middle East and North Africa	112	84	75
94	Lesotho	Sub-Saharan Africa	113	60	96
95	Uzbekistan*	Europe and Central Asia	89	80	104
96	South Africa	Sub-Saharan Africa	85	120	79
97	Ecuador	Latin America and Caribbean	102	105	81
98	Uganda	Sub-Saharan Africa	90	75	108
99	Myanmar	East Asia and Pacific	93	76	109
100	Tanzania	Sub-Saharan Africa	115	71	92
101	Bangladesh	South Asia	101	85	98
102	Guyana	Latin America and Caribbean	91	98	100

* Countries that are new to the 2019 CRI

High income | Upper-middle income | Lower-middle income | Low income

Overall rank	Country	Region	Enterprise capability	Government capability	People & civil society capability
103	Argentina	Latin America and Caribbean	105	134	66
104	Nepal	South Asia	104	113	89
105	Gambia	Sub-Saharan Africa	106	74	111
106	Timor-Leste	East Asia and Pacific	88	92	116
107	Cambodia	East Asia and Pacific	100	90	112
108	Zambia	Sub-Saharan Africa	103	95	110
109	Bosnia and Herzegovina	Eastern Europe and Central Asia	109	123	90
110	Nicaragua	Latin America and Caribbean	99	122	105
111	Algeria	Middle East and North Africa	111	103	106
112	Zimbabwe	Sub-Saharan Africa	126	109	99
113	Pakistan	South Asia	94	112	120
114	Liberia	Sub-Saharan Africa	132	89	107
115	Cameroon	Sub-Saharan Africa	121	96	115
116	Laos	East Asia and Pacific	98	115	126
117	Malawi	Sub-Saharan Africa	114	102	118
118	Benin	Sub-Saharan Africa	117	99	121
119	Bolivia	Latin America and Caribbean	120	127	102
120	Ethiopia	Sub-Saharan Africa	110	106	130
121	Guinea	Sub-Saharan Africa	107	121	128
122	Burkina Faso	Sub-Saharan Africa	125	104	123
123	Mali	Sub-Saharan Africa	119	107	125
124	Sierra Leone	Sub-Saharan Africa	127	126	113
125	Madagascar	Sub-Saharan Africa	128	97	129
126	Mauritania	Sub-Saharan Africa	123	117	127
127	Nigeria	Sub-Saharan Africa	118	128	122
128	Burundi	Sub-Saharan Africa	122	130	131
129	Mozambique	Sub-Saharan Africa	130	129	124
130	Papua New Guinea	East Asia and Pacific	129	131	132
131	Yemen	Middle East and North Africa	131	125	134
132	Congo, Democratic Republic of the	Sub-Saharan Africa	133	132	135
133	Haiti	Latin America and Caribbean	139	135	117
134	Angola	Sub-Saharan Africa	136	124	133
135	Libya	Middle East and North Africa	135	138	119
136	Sudan	Sub-Saharan Africa	124	136	136
137	Afghanistan	South Asia	134	137	140
138	Chad	Sub-Saharan Africa	140	133	138
139	South Sudan	Sub-Saharan Africa	137	139	139
140	Somalia	Sub-Saharan Africa	138	140	137

High income | Upper-middle income | Lower-middle income | Low income

2 Appendix

Methodology

Country selection

The CRI now covers 140 countries divided into four income levels. Countries included in this index were selected based on our ability to obtain sufficient or comparable primary and secondary data. Due to poor data availability, previously included countries Syria and Venezuela were not included in the 2019 CRI.

Scoring methodology

The 2019 CRI is structured around three pillars (enterprise capability, government capability and people & civil society capability), with subindices for each pillar. The composite/overall change readiness score is comprised of equally weighted pillar scores, which are derived from equally weighted standardized subindex scores. Subindex scores are derived from standardized primary survey question responses and secondary data, with equal weighting given per variable, whether it is a primary survey question or secondary data indicator. In addition to the secondary data, between December 2018 and February 2019, Oxford Economics conducted a survey of 1,400 country specialists, with 25 survey questions, with a minimum of 10 specialists per country.

Secondary data sources

More than 125 secondary data variables were used to calculate the 2019 CRI. A list of selected secondary data sources is below.

Bertelsmann* Stiftung	Legatum Institute
Cornell University	New York University
Economist Intelligence Unit	Property Rights Alliance
Fraser Institute	Reporters Without Borders
Fund for Peace	United Nations Conference on Trade and Development
Heritage Foundation	United Nations Development Programme
HelpAge** International	United Nations Educational, Scientific and Cultural Organization
Institute for Economics and Peace	United Nations E-Government Survey
Institute for Health Metrics and Evaluation	World Bank
International Energy Agency	World Economic Forum
International Labour Organization	World Health Organization
International Monetary Fund	Yale University
Inter-Parliamentary Union	

A detailed listing of the CRI survey questions, secondary sources and data used to develop these indices can be found online at kpmg.com/changereadiness.

Source:
*https://www.bertelsmann-stiftung.de/en/home/
**https://www.helpage.org/)

3 Appendix

Data sources

The CRI measures a country's change readiness against the following three main categories ('pillars').

1. **Enterprise capability:** the ability of private and state-owned organizations to manage change and grow within a dynamic economic environment.
2. **Government capability:** the ability of governmental and public regulatory institutions to manage and influence change.
3. **People & civil society capability:** the ability of individual citizens and wider society to cope with change and respond to opportunities.

Each pillar contains subindices based upon secondary data and primary survey responses.

Pillar 1 Enterprise capability

The total score is a combination of the scores for the following subindices.

1.1 Labor markets: a flexible labor market enables enterprises to respond to new opportunities and increases productivity. Flexibility is impacted by hiring and firing practices, labor-employer relations, flexible wages, and policies for pay and productivity.

1.2 Economic diversification: economically diverse countries have broader sources of income, respond faster to changing global demand and cope better with sector-specific shocks or structural changes. Diversification also brings new industries and technologies. Diversity of exports leads to reduced risk from price shocks.

1.3 Economic openness: an open economy has fewer barriers to imports and exports, with more limited tariff and non-tariff trade barriers, lower import and export costs and more rapid access to export and import markets. Overall trade freedom increases economic resilience and productivity. Increased competition stimulates the domestic market, leading to innovation and new industries.

1.4 Innovation, research and development (R&D): innovation helps economies better utilize resources, develop new products and services and build strong industries. Indicators include researchers per capita, R&D spend share of GDP and multi-stakeholder collaboration and the growth of innovative companies. More innovative economies have a more diverse workforce and a larger number of trademark applications.

1.5 Business environment: a strong business environment encourages investment in new ventures and enhances enterprises' ability to respond to changing market conditions. Indicators include business freedom, taxation, investor protection, bankruptcy procedures, market dominance and competition.

1.6 Financial sector: a sound financial infrastructure enables stable, efficient funding to enterprises and entrepreneurs, helping them exploit opportunities and manage cash flow shortfalls. Measures include availability of financial services for small and medium enterprises, of venture capital and sound banks, as well as availability of domestic credit.

1.7 Transport and utilities infrastructure: good infrastructure enhances internal and external trade, lowers production costs and speeds up response to natural disasters. Key elements are roads, air, rail, ports, power and broadband coverage. The indicators also include a measure of logistics performance.

1.8 Enterprise sustainability: climate change and environmental degradation require active engagement by the private sector who can, to a greater or lesser extent, play an active role in rising to the challenge of national preparedness and response. Indicators include measures of CO_2 emissions per unit of GDP, and the share of renewable energy in use.

1.9 Informal sector: this measures how quickly and effectively the informal sector is incorporated into the formal economy. Formal enterprises have greater change readiness due to better access to finance, technology and global markets. Indicators include the time and cost taken to start a formal business (which is a disincentive to formalization), as well as a measure of vulnerability of employment.

1.10 Technology infrastructure: a strong technology infrastructure enhances national competitiveness by giving businesses the tools to innovate, increase productivity and improve efficiency. This is measured through a global innovation index, as well as the penetration of mobile phone subscriptions.

Pillar 2

Government capability

The total score is a combination of the scores for the following subindices.

2.1 Macroeconomic framework: strong macroeconomic management provides a stable and more certain environment, minimizing risks of currency fluctuations and inflation. Countries with sound macroeconomic records have better credit ratings, creating favorable conditions to fund investments.

2.2 Public administration and state business relations: an effective and legitimate government bureaucracy can better manage change and support business with enterprise-friendly policies, with lower levels of political interference and corruption. Higher levels of female representation in parliament are also considered a positive indicator of more balanced democracy. More stable and peaceful political systems also promote sound change readiness.

2.3 Regulation: a positive regulatory policy enables regulations to be in the public interest and supports economic development by positively shaping the relationship between government, enterprise and citizens, with good governance.

2.4 Fiscal and budgeting: good fiscal and budget management stimulates effective government spending and macroeconomic stability, enabling countries to stabilize after a global economic downturn, commodity price fall or a natural disaster. Indicators include government average budget balance and debt stock share of GDP.

2.5 Rule of law: countries with stronger legal systems and rules of law are more attractive to investors, with greater protection for enterprises and citizens and more accountable governments. Indicators include measures of the rule of law and the efficiency of the legal framework in settlement of disputes.

2.6 Government strategic planning and horizon scanning: this factor reflects how government identifies and reacts to change readiness opportunities and threats, including exercises such as horizon scanning.

2.7 Environment and sustainability: the way in which government monitors, manages and responds to environmental risks and opportunities will impact enterprises and citizens.

2.8 Food and energy security: without clear policies in place, countries will be unable to respond to shocks or manage change. High levels of energy imports make the country more vulnerable to price or supply shocks.

2.9 Land rights: access and rights to land impact the ability of entrepreneurs and enterprises to conduct their businesses, provide gender and generational-transfer stability and can influence foreign investors' choice of location. High quality of land administration and secure international property rights are indicators of land rights.

2.10 Security: by protecting infrastructure, enterprises and citizens from crime and terrorism, countries can create an environment conducive for economic development and talent retention and better attract domestic and foreign investment. A high-quality police service is an important element in providing security.

Pillar 3

People & civil society capability

The total score is a combination of the scores for the following subindices.

3.1 Human capital: an educated, skilled workforce helps countries adapt to change and compete globally. Measures include adult literacy, university enrolment rates, school performance indicators at primary and secondary level, vocational training and workforce training.

3.2 Entrepreneurship: entrepreneurial attitudes, capabilities and support mechanisms (such as policy incentives) have a big influence on countries' ability to respond to opportunities and shocks.

3.3 Civil society: domestic institutions that build social cohesion and fill gaps in public services help countries manage shocks and change. NGOs and professional associations promote sustained growth. Indicators include political and social integration, voice and accountability, human rights, and democracy.

3.4 Safety nets: government social safety nets, official development assistance and foreign worker remittances aid cohesion and economic growth and help countries respond to shocks.

3.5 Technology use: the ability to adopt new technologies, including social media, can bring competitive advantage. Measures include the Global Innovation Index, creative use of technology and mobile usage financial transactions, and digital skills in the active population.

3.6 Gender: countries grow more slowly when women are undereducated and do not participate fully in the paid labor force. Labor participation, laws and customs determine gender equality. Indicators include measures of equality in education, in wages and in economic participation.

3.7 Inclusiveness of growth: inequality slows growth and impairs countries' ability to change. Indicators include the Gini coefficient, which represents the income distribution of a nation's residents, and the Fragile States Index for uneven economic development. They also include the share of the population with a bank account, and measures of absolute poverty and other measures of inequality.

3.8 Demographics: countries with large, educated, fast-growing working-age populations have the workforces to adapt to new industries and generate wealth to support the young, old and infirm. Access to migrant labor is a positive factor in managing demography.

3.9 Access to information: information and communications increase accountability, raise awareness of issues and enable speedy responses to natural disasters and economic shocks. Indicators of access include press freedom and government online services.

3.10 Health: better health incentivizes governments to invest in education, encourages individuals to save and produces a more productive workforce. Key measures include access to water and improved sanitation, as well as resources allocated to health, access to health, and availability of trained healthcare personnel.

How KPMG can help you

KPMG operates as a network of member firms offering audit, tax and advisory services. We work closely with our clients, helping them to identify risks and grasp opportunities.

KPMG's International Development Assistance Services (IDAS) professionals are on the front lines of the developing world. We work closely with emerging market stakeholders — government, civil society and the private sector — to create sustainable change for the benefit of citizens.

Our people have experience with government, NGOs and private enterprise, across multiple sectors. We can work with you to better understand the opportunities and risks presented by different regions and countries and formulate entry and exit strategies or, in the case of government agencies, to improve change readiness.

Some or all of the services described herein may not be permissible for KPMG audit clients and their affiliates.

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