FOREWORD

As leaders gather in Osaka for the G20 Summit, the world faces a great risk of unilateralism and trade protectionism undermining the healthy development of the global economy. Facing acute headwinds, many countries have realized that fighting trade protectionism requires joint efforts to prop up globalization and protect the current multilateral trading mechanisms.

Chinese President Xi Jinping has pointed out that building an open global economy is a key solution. He first proposed the building of an open global economy to the international community as early as in 2013 when he first attended the G20 Summit as head of state in St Petersburg. He has reaffirmed the concept since then, and at the 2018 G20 Summit held in Buenos Aires, he called on all countries to aim for an open global economy, and fight protectionism and unilateralism.

In this spirit, China Daily and the Chinese Academy of Social Sciences (CASS) will jointly hold the International Forum for Open Global Economy to come up with solutions. China Watch Institute, China Daily's communication-led think tank, which published three preview policy reports on the Sino-European Summit, the China-African Forum and the G20 Argentina Summit, has produced this report in collaboration with the Institute of World Economics and Politics of CASS, China's representative think tank in the T20, whose knowledge and endorsement have greatly enriched the contents and broadened the scope of the report.

The report explores why an open global economy matters, especially in the current global context, and how to improve it through wide policy synergy, expanded cooperation at various levels and sectors, and through inclusive and sustainable development.

In this report, insightful opinions such as "An open global economy brings benefits to all" by Zhang Yuyan, a member of the CASS and director of the IWEP; "Infrastructure being built now has to be totally sustainable" by Nicholas Stern, chair of the Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science; and 13 other leading scholars worldwide offer valuable pointers and indepth thinking of how to build an open global economy.

I greatly appreciate the contribution of thinkers and scholars to this report.

周树春 **Zhou Shuchun**

Member of the standing committee of the 13th National Committee
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AN OPEN GLOBAL ECONOMY BRINGS BENEFITS TO ALL

By Zhang Yuyan

Economic globalization generates greater trade, investment facilitation, people flows and technological advancement.

The current risks and challenges facing the world's economy are not byproducts of economic globalization but the result of some countries' outdated notions of a zero-sum game and winner-takes-all, which derails the world economy from the path of inclusiveness and win-win development.

Therefore, Chinese President Xi Jinping pointed out in the speech delivered at the opening ceremony of the Second Belt and Road Forum for International Cooperation in April that we should promote trade and investment liberalization and facilitation, say no to protectionism, and make economic globalization more open, inclusive, balanced and beneficial to all.

That's exactly what is required to build an open global economy. It is based on a deep understanding of the tide of the times, in line with the trend of the world's increasingly integrated and interdependent economy and politics, and contains profound economic logic.

Further opening up promotes greater specialization in division of labor, boosts technological advancement, attracts more human resources, speeds up institutional innovation and increases productivity, which together lead to sustained growth.

Opening up for greater specialization

Each country or company has its own absolute advantage through which it gets profits through division of labor, specialization and trading.

Over 2,000 years ago, in his *Records of the Grand Historian*, Sima Qian mentioned trading what you have in plenty for what you lack, which encapsulates the ancient understanding of division of labor. Another Chinese classic *Journal of Master Huainan* proposed that you should trade what you have for what you don't and trade what you're good at making for what you are not. From the perspective of modern economics, it means achieving profits and economic development on the basis of division of labor.

In *The Wealth of Nations*, Adam Smith called this kind of profit "benefits of free trade", that is, each country produces goods or services with its unique advantages and the wellbeing of all is improved. As long as more countries, companies and individuals keep entering the market, "benefits of free trade" can be realized through division of labor and trade. As a result, economic prosperity and greater employment come naturally from more specialized division of labor as the market expands.

In one sense, the 40 years of reform and opening-up of China is a successful example of maximizing absolute and comparative advantages by enlarging the market and enhancing division of labor. More specifically, China achieved fast development by boosting the flow of production factors, lowering transaction costs, creating a unified domestic market and engaging in international division of labor and exchanges. In the past four decades China's trade in goods soared from $20.6 billion to $4 trillion and now ranks first in the world.

Despite some countries' moves toward unilateralism, trade protectionism and trade bullying, China continues with its commitment to greater openness with the aim of expanding markets through free trade and boosting trade through deepened division of labor. In this way countries will enjoy win-win development and work together toward a community with a shared future for mankind.

Opening up for technological advancement

As a direct driver of productivity, technological advancement has played a pivotal role in maintaining economic growth. From Karl Marx's point of view, the evolution of world history is a result of the development of productivity, which is represented by industrial and technological revolutions. In Germany, he observed that thanks to the application of machines, steam and division of labor, large industries were able to join the international market, trade and division of labor.

It could be said that progress of productivity is closely related to technological advancement, and the latter plays a fundamental role in deepening division of labor. Deng Xiaoping said that science and technology are the primary productive forces, which gives a clear picture of the positive contribution made by technological progress to enhanced productivity.

Modern economics theories often take technological advancement as an important variable in economic growth. In Joseph Schumpeter's *Theory of Economic Development*, he wrote that economic growth originates from innovations, in particular those closely related to technological development. As for the drivers of technological development, some come from market entities' innovation for greater profits and others emerge from advanced technologies.

The role of technological advancement is becoming more salient in the current world, and inter-country competition is more about science and technology. Since science and technology have prominent global and contemporary features, one who wants to promote them must have a global perspective.

Therefore, independent innovation can never happen with doors closed, but in an open environment. So it is necessary for China to get a global viewpoint in planning for and promoting technological innovation, enhance international science and innovation cooperation across the board, actively participate in the global technological innovation network and in the global governance system of science and technology.

Opening up for more human resources

In a speech delivered to Chinese academicians in May 2018, President Xi stressed that of all the things and beings in the world man is the most valuable, because man is the creator of all innovations.

Both hard power and soft power have their roots in man's strength. The history of science and technology has proven that those who have first-class talents and scientists will have the advantage in innovation. These judgments vividly depict the importance of man in economic growth and social progress.

There were several hundred million illiterate people in China when reform and opening-up started. But now nine-year compulsory education has covered 93.8 percent of the total population, and the average education received by the labor force has reached 10.5 years. Through reform and opening-up, the caliber of the Chinese has been enhanced and talents are developed by means of introducing technical and management expertise, conducting international exchanges and cooperation and sharing knowledge. As a result, the Chinese improved their ability of creating wealth and maintained long-term rapid economic growth.

The world's economy has been facing sluggish growth for lack of a driving force. To foster new growth engines, President Xi proposed new development concepts and the innovation-driven development strategy. The essence of innovation-driven growth lies in talents since they are the first and foremost resource for innovation. The lack of high-caliber talents, particularly in science and technology, is hindering high-quality development.

Against the backdrop of economic globalization, the accumulation of talents relies more on international exchanges and cooperation. The goal of China's talents strategy is to cultivate large numbers of science, technology and young talents and innovation teams with global perspective and international standards.

Opening up for institutional innovation

The basic function of a system or an institution is to define property rights clearly, urge entities to abide by contracts and make sure the government and the market play their respective roles.

A well-functioning institution can stimulate people and lower transaction costs. Trade and technology can both boost economic growth, but they can only function within an effective institutional arrangement. In addition, institutional reform can expand the benefits of free trade and technological advancement.

Governments play a vital role in institutional reform and innovation. They should define and protect property rights, safeguard contracts and make sure that the market plays the decisive role in resource allocation. Meanwhile, governments can promote the improvement of international institutions and rules as well.

In some sense, China has both reformed its own institutions and helped build international rules during reform and opening-up. It has joined virtually all international treaties and organizations, signed free trade agreements and trade protection agreements with many countries and regions, initiated the Asian Infrastructure Investment Bank and the New Development Bank, and proposed the Belt and Road Initiative.

All have lowered the cost of international economic cooperation. But if China wants to participate in and lead economic globalization and develop an open economy at a higher level, it must make adjustments and improvements to some of its own systems and institutions.

In short, openness brings socioeconomic development and national prosperity. No matter how the international landscape evolves, China will continue following the trends of history with greater openness, a more innovative mentality and more practical actions, and work toward new historic achievements in building an open global economy.

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NO PROTECTIONISM: TRADE WAR IN DANGER OF TURNING INTO COLD WAR

By Stephen Roach

Amid charges and counter-charges, the US-China trade conflict has now moved squarely into the danger zone. Washington's penchant for China-bashing has been taken to an entirely new level. Republicans and Democrats agree on very little these days but blaming China for America's economic ills resonates across the political spectrum.

Today's China-bashing has gone well beyond the strain of anti-Japan sentiment that was evident some 30 years ago. Back then, the US manufacturing sector was experiencing its first taste of pressures on jobs and real wages that could be traced to a sharply widening trade deficit. A mercantilist Japan, fixated on suppressing the value of the yen and accounting for about 42 percent of the total US merchandise trade deficit in the first half of the 1980s, was the culprit. This led to the so-called Plaza Accord of 1985, when the so-called G5 coalition of leading industrial nations put Japan in a strait jacket of currency appreciation that led to asset bubbles and a string of lost decades of economic stagnation and deflation. Having studied the lessons of Japan very carefully, China's leadership has resisted comparable advice from the West. And so Washington has embraced different and tougher tactics to address a Chinese threat that it judges to be far more serious than that which arose from Japan back in the late 1980s.

From Japan to China, the United States has been quick to see itself as the victim, choosing to blame others for economic problems that are very much of its own making. Yet this blame game flies in the face of some of the basic and most elementary principles of macroeconomics. Economics students are quickly taught the simple national income accounting identity that investment must always be based on savings. The problem comes in the corollary: When nations are short of savings and want to invest and grow, they must borrow surplus savings from abroad and run current account deficits in order to attract foreign capital. These balance-of-payments deficits — which the US has experienced every year since 1982 (with the exception of 1991, when the US ran a small surplus by charging other nations for its military campaign to wage the Gulf War) — are a recipe for trade deficits. But since the trade deficits stem from macro saving-investment imbalances, they tend to be broad based, or multilateral, in scope. Indeed, in 2018, the United States had merchandise trade deficits with 102 countries.

Therein lies the pitfalls of China-bashing. Yes, China accounted for fully 48 percent of the US' massive $879 billion merchandise trade deficit in 2018. That makes it a lightning rod in the current US policy debate. Eliminating the Chinese share of the deficit, goes the argument, is the only way to "make America great again" and thereby alleviate pressures on US workers.

If it were only that easy. For a savings-short US economy, there is no bilateral fix for a multilateral problem. A China-centric solution is like "whack-a-mole". Eliminating one piece of the trade deficit without fixing the saving problem — a very real possibility in light of a further depression of domestic savings following the ill-timed Trump tax cuts of late 2017 — simply means that trade will be diverted from China to other foreign producers. Inasmuch as China is one of the US' lowest cost foreign suppliers, that means the trade diversion will invariably go to higher cost foreign producers — the functional equivalent of a tax hike on US consumers.

The likelihood that China-bashing will backfire for a savings-short US economy raises a far deeper question: Why does Washington pursue such a flagrantly inconsistent strategy? The answer is as much an outgrowth of hegemonic overreach as it is a reflection China's alleged unfair trading practices. With the dollar pre-eminent as the world's reserve currency, the United States has developed a sense of entitlement toward open-ended budget deficits that are funded by dollar-denominated debt issuance in its own currency.

Never mind the inefficiencies of a healthcare system that eats up 18 percent of GDP, or a defense budget that is essentially equal to the combined military outlays of the next seven largest defense budgets around the world, or low tax rates that put the current 16.5 percent revenue share of US GDP well below the 17.4 percent average of the past 50 years. Washington would rather pursue fiscal recklessness than come clean with the US public. And it would rather blame the consequences of such a strategy on the trading practices of others than take a long hard look in the mirror.

Indeed, considerable effort has gone into the construction of a false narrative on China in order to justify Washington's aggressive trade policies. From allegations of intellectual property theft and forced technology transfer to charges of cyberhacking and unfair industrial policies orchestrated by state-owned enterprises, China has been charged with a number of so-called Section 301 violations of the US Trade Act of 1974 and vilified, accordingly, in the arena of US public opinion. Yet the evidence behind such allegations is flimsy at best and outright misleading at worst. Apparently, it is much easier to find comfort in the false narrative than to accept responsibility for fiscal excesses and savings shortfalls that spawn the macroeconomic imbalances that give rise to multilateral trade deficits.

The tragic irony of a possible trade deal, if it does occur, is that it is likely to focus on a multi-year commitment by China to purchase over $1 trillion of US-made goods in an effort to narrow the bilateral trade imbalance between the two nations. This is pure political theater at its worst — underscoring the folly of a bilateral fix for a multilateral problem. It is based on the false premise that this "solution" will address the squeeze on US manufacturing and provide relief to pressures on jobs and real wages of factory workers. Yet nothing could be further from the truth. As noted above, the bilateral fix is a recipe for trade diversion that does next to nothing in providing lasting relief for US workers and consumers.

Most significantly, the fixation on the bilateral trade deficit fails to address the structural issues that threaten lasting tensions between the two nations. Market access is at the top of that list — the opportunity of multinational corporations in both nations to invest freely in each other's markets. The US claims that China's joint venture requirements imposed on such investments is a recipe for forced technology transfer. As highlighted in the March 2018 Section 301 report of the US Trade Representative (USTR), this charge has become the poster child of the US-China dispute and the foundational evidence for Trump's tariffs. This has occurred despite the fact that the USTR admits (on page 19 of the March 2018 report) that there is no direct evidence to support the allegation that technology transfer is forced by joint ventures that represent voluntary agreements between US and Chinese partners. Once again, the false narrative apparently matters more than fact-based analytics.

Notwithstanding the politics of the blame game, there are plenty of realistic options for resolution. Three, in particular, stand out:

Bilateral investment treaty. Market access is best addressed through the formalization of cross-border investment rules and standards that are stipulated in a bilateral investment treaty (BIT). The United States currently has 42 BITs on the books and China has 145. Under a BIT, foreign ownership caps can be eliminated, thereby rendering joint ventures unnecessary and taking allegations of forced technology transfer off the table. Prior to the 2016 presidential election in the United Sates, the US and China spent 10 years attempting to negotiate a BIT. Stymied by Trump's tariffs, those negotiations have been suspended. Restarting BIT negotiations would be the single best strategy to resolve the thorny issue of forced technology transfer.

Trans-Pacific Partnership. The political decision to abrogate Washington's commitment to TPP in the first days of the Trump presidency was a mistake. This multilateral agreement provided a high-quality framework linking 12 nations accounting for 40 percent of world GDP through cross-border trade liberalization, labor standards, intellectual property rules, internet protocols, and environmental norms. With China on the outside looking in, TPP would have provided a powerful mechanism for Chinese conformity to many of the structural norms that are currently being contested. While a rethinking of the US' TPP strategy may not be politically possible for President Trump, it may well be a realistic option after the 2020 presidential election.

Global cyber accord. The September 2015 accord between Presidents Xi and Obama clearly did not go far enough in defusing persistent tensions over cyber espionage, hacking, and other related disruptions. Like the trade conflict, this is not a bilateral problem. The US and China should take the lead in forging a global cyber accord, complete with pooled metrics of cyber incursions, attack-reduction targets and a robust dispute-resolution mechanism.

The United States and China are on a collision course. The world's two largest economies have accounted for fully 44 percent of world GDP growth since 2008. If they opt for a superficial resolution or fail to come to terms on their trade conflict, the global economy could well falter. Resolution is possible but it won't be easy in the current climate. Savings-short America's bipartisan political support of China-bashing is especially problematic in threatening to turn a trade war into a protracted and destructive economic cold war. Now, more than ever, a fragile world is in desperate need of political will and wisdom.

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ROLE OF MULTILATERAL MECHANISMS MUST BE SAFEGUARDED

By Xiong Aizong

Since there is no such thing as a world government, multilateral mechanisms, with their inclusiveness and effectiveness, have become important frameworks for global governance.

Over the past several decades globalization has enhanced integration among countries in economic, political, social and cultural aspects, but also magnified certain local problems to the transnational level, which may give rise to new global issues.

To tackle global issues, multilateral mechanisms are the best solution.

Most multilateral mechanisms contain a considerable number of member states and stress equal status among them. International affairs are resolved through negotiations instead of being decided by one or two powerful countries. Interests and objectives of member states are all accommodated, which helps reach consensus, fight against unilateralism and promote international cooperation. Since a large number of entities are involved, the consensus or rules of multilateral mechanisms are readily accepted, and thus problems are easier to solve.

The majority of current multilateral mechanisms were established after World War II, and have long played a positive role in addressing global issues and ensuring the world's economic stability and development. But as time passes by, some of these mechanisms have run into challenges.

Some are faced with the danger of being weakened. For example, if a certain country fails to abide by the purposes and principles of the UN Charter, its actions may expose other countries and regions to the risk of conflict and war.

The WTO is another example; its free trade principles are often challenged, which leads to damage to the world's open economic system, rising trade protectionism and slowdown in economic recovery. Therefore, the international community should reiterate the need to follow the purposes and principles of these multilateral mechanisms and defend their position and role in global governance.

Some multilateral mechanisms have failed to transform their governance structure in line with the change in the world's economic and political landscape. As a result, they are now not representative and inclusive enough. As emerging and developing economies become more important in the world's economy, their role in global governance can no longer be ignored. But since some multilateral mechanisms were established long before and are dominated by developed economies, emerging nations often find it hard to get a voice compatible with their economic strength and contribution.

In reality, reforms are often slow. The IMF, for example, approved a plan on reforming its share and governance structure in 2010, but the plan was passed by the US Congress at the end of 2015 and as a result, came into effect only in 2016.

The role of some multilateral mechanisms has been impaired in global governance as they failed to upgrade their functions to cope with the challenges and uncertainties of the world's economy.

For example, the IMF did not prove capable of preventing a crisis, failed to control fluctuations and was even criticized for the negative part it played in crisis relief.

Similarly, the WTO is facing an unprecedented crisis as its dispute solving mechanism is challenged, its clauses of security exceptions and unilateral measures are abused, and negotiations on some agendas progress slowly.

To solve such problems, we need to improve and consolidate multilateral mechanisms as soon as possible.

In particular, issues concerning war, conflict, environmental protection, climate change, international financial fluctuations, and trade and investment protectionism are constantly emerging in recent years. They transcend borders of countries and regions, cannot effectively be solved by one or several nations, and can only be dealt with through extensive and indepth international cooperation by all countries concerned.

China is a staunch champion of multilateralism and has been defending it with concrete actions. As countries become more domestic-focused and unilateralism as well as protectionism are rising, China's support for, and promotion of, multilateralism is more important than ever, and efforts could be made in the following aspects.

First, China promotes an open global economy. Openness is one prominent feature of multilateralism. As the world is now at the crossroads of openness, cooperation and reform or isolation, seclusion and conservatism, China, as a major responsible country, is pushing forward reform and opening-up with steadfast actions. It lowered tariffs on some imported commodities and held the first China International Import Expo in 2018, and enacted the Foreign Investment Law in March 2019.

In his speech delivered at the closing ceremony of the China-France Global Governance Seminar in March 2019, Chinese President Xi Jinping stressed that we should safeguard the UN's authoritative role in multilateralism, give full play to the constructive role of such multilateral mechanisms as the WTO, the IMF, the World Bank, the G20 and the EU, and build a community with a shared future for mankind. This showcases China's resolve to defend multilateral mechanisms and promote economic globalization.

Second, China promotes international cooperation within the framework of the Belt and Road Initiative (BRI) to offer public goods to multilateralism and economic globalization.

Although the BRI was proposed by China, its opportunities and achievements belong to the whole world. Statistics from the National Development and Reform Commission show that by April 2019, six years into its inception, 173 cooperation documents have been signed between China and 125 countries, both developed and developing, and 29 international organizations.

The BRI follows the principles of consultation and collaboration for shared benefits, advocates equality of nations regardless of their size, strength and wealth, and calls for joint actions to deal with global deficits from a global perspective. The BRI represents a major contribution to multilateralism and international cooperation by China.

Third, China takes active part in the agendas of the main multilateral mechanisms. As the world's most representative inter-governmental organization with the greatest authority, the UN stands as the flag of multilateralism. China staunchly safeguards the authority of the UN, supports its positive role in international affairs and takes part in UN peace-keeping missions and efforts for sustainable development.

China also values cooperation with the G20, will continue to safeguard its role as a major platform for international economic cooperation, and will work to play a constructive part. China has been working with G20 presidencies in macroeconomic policy coordination, global financial governance and sustainable development. China held a successful G20 Hangzhou Summit in 2016 where it contributed Chinese wisdom and Chinese solutions to global economic governance.

At the same time, China supports such highly professional, representative and influential international organizations as the IMF, the World Bank and the WTO to play an active role since they are important pillars of the world's economic stability and development. China supports their efforts at governance structure reform and improving capabilities to play a more positive role in the global economy.

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A NEW MULTILATERALISM MUST PROTECT GLOBAL COMMON GOODS

By Kevin P. Gallagher and Richard Kozul-Wright

As G20 leaders gather in Japan, they should call for a new multilateralism that combines mission-oriented rules with a commitment to shared prosperity and environmental recovery and that leads by example, with or without the US, which Financial Times columnist Martin Wolf describes as a "rogue superpower".

The original Bretton Woods system did promise a value-driven, mission-oriented, and rules-based international economic order for the post-World War II world. That order was tasked with keeping the financial system stable and with coordinating policies in support of full employment, productive investment and increased trade; avoiding imported deflation and pre-empting beggar-thy-neighbor policies were priorities. Still, the rules ensured that there was ample policy space for sovereign states at all levels of development to pursue their particular national priorities.

The system began to break down in the 1970s as the US economy struggled to contain its twin deficits and as corporate and financial elites began circumventing national regulations in pursuit of global markets and investment opportunities. Initially under the umbrella of GATT (and later the WTO and thousands of regional and bilateral trade and investment treaties) and with the active engagement of the IMF and the World Bank, a new set of enabling norms and rules emerged that allow footloose finance and firms to move freely within and across borders and into ever expanding spaces for profit making. What is more, these norms and rules are actively enforced by a combination of market disciplines and "investor-state dispute resolution systems" where the interests of foreign investors trump governments and citizens.

This has resulted in a world that is inherently unstable, increasingly unequal, and politically paralyzed. Many of the current proposals — from abandoning special and differential treatment at the WTO to more securitized financial instruments to leverage investment, to ramped-up public-private partnerships — won't solve these problems. In fact, some of them are why we are facing these problems in the first place.

As a handful of powerful corporate actors have assumed ever greater control of markets and supply chains, they have been less inclined to reinvest the resulting profits in decent jobs and a deeper skill base, or the local communities where they reside. Since 1980 the size of the financial system has grown by a factor of 25 to over $300 trillion but real investment in productive and employment-driven growth has remained at less than 20 percent of GDP.

Instead, the financial system feeds on itself and has triggered a major financial crisis somewhere in the world every half decade since the early 1980s. And despite rising debt levels and surging asset prices since the crisis, wages (with the exception of a handful of Asian countries) have remained stagnant and labor's aggregate share of global income declining and inequality on the rise everywhere.

In 2015 the global community came together at the United Nations to fashion a new and ambitious mission for itself, the Sustainable Development Goals (SDGs). Their delivery requires significant investments across the world to raise standards of living in an environmentally sustainable and inclusive manner, within and across countries. Parts of the international system, especially development banks, began to align their activities to this new mission, and new momentum appeared to be on the horizon. But with no matching ambition to reform the international trade and financial system, reaching the SDGs by 2030 will increasingly become an unlikely prospect.

A new multilateralism must prioritize the role of global public goods needed to deliver shared prosperity and a healthy planet, promote cooperation and collective actions to bring fairness and balance to market outcomes, coordinate policy initiatives to mitigate common risks, and ensure that no nation's pursuit of these broader goals infringes on the ability of other nations to pursue them. In short, we need a global green new deal to reclaim multilateralism.

With the SDGs providing the mission, we have, in a series of deliberations at the United Nations in Geneva, advanced a series of design principles for a new multilateralism:

• Global rules should be calibrated toward the overarching goals of social and economic stability, shared prosperity and environmental sustainability, and be protected against capture by the most powerful players.

• States share common but differentiated responsibilities in a multilateral system built to advance global public goods and protect the global common goods.

• The right of states to pursue national development strategies should be enshrined in global rules.

• Global regulations should be designed both to strengthen a dynamic international division of labor and to prevent destructive unilateral economic actions that prevent other nations from realizing common goals.

• Global public institutions must be accountable to their full membership, open to a diversity of viewpoints, cognizant of new voices, and have balanced dispute resolution systems.

As the US has signalled its intent to withdraw from the Paris Agreement, others such as China, Germany and the United Kingdom are leading by phasing out fossil fuels, investing in clean technologies and advancing green industrial policies; but actions at home must be globalized.

G20 members should collectively task their finance ministers and central banks to join The Coalition of Finance Ministers for Climate Action and the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) and engage in industrial and innovation policies for green growth and good jobs.

The G20 should push for a reformed IMF tasked with reducing speculative financial flows and augmenting those in support of productive, low-carbon investments, including through the monitoring and elimination of misguided subsidies and the elimination of illicit financial flows. And when crises do occur, the remedy should be for a counter-cyclical and inclusive response rather than austerity and social unrest.

Development banks across the world, at the national and global level, will need to work together to help countries identify low-carbon high-productivity activities and design appropriate industrial policies, to scale up their resources in sustainable infrastructure and to support a just transition for workers and communities attached to carbon-intensive and outdated economic activity.

Perhaps most importantly, trade ministers should work to introduce reforms to the WTO and the myriad trade and investment treaties to accelerate trade and investment in net zero carbon economic activity, to eliminate incentives for trade and investment in sectors that are in need of a phase-out, and to accelerate green industrial policies for full employment at living wages. And they should do so in full knowledge that developing countries face specific challenges that will need differential support.

We have just under a dozen years to reduce carbon emissions and achieve the broader set of SDGs. The increase in climate-related catastrophes, social unrest, and the rise of right-wing populism are early warnings of what will become a new normal in hot-house earth. Even if the United States has foregone its leadership role then it is up to other G20 leaders in Osaka to stand up and lead themselves. Time is running out.

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COUNTRIES CAN RECORD PROGRESS ON PAST INITIATIVES

By Jim O'Neill

As we approach the Osaka G20 summit, a problem looms large in my mind as being hugely relevant to the success of the meeting. How effective is the G20? And what can be done to further improve its efficiency?

I have become well known, at least in international business and economic circles, as in late 2001, I dreamed up the acronym BRIC, standing for the ongoing rise of the economies of Brazil, Russia, India and China. In the very first paper where I mentioned the phrase, "The World Needs Better Economic BRICs", I argued that linked to their rise, as well as the beginning of the European Monetary Union on continental Europe, the world needed to shift away from the — then — dominance of G7 global governance.

By 2008, due to the global financial crisis, the G20 appeared on the scene, a much expanded group from the G7, which incorporated the four BRIC countries, as well as a number of other important so-called emerging economies. In its first 12 months of heightened importance, the G20 appeared to be an effective force, being credited after its initial late 2008 meeting, and especially after the London 2009 meeting, as ensuring that global monetary and fiscal policy would be coordinated to a degree that the fallout from the financial crisis could be managed.

Phrases like "shock and awe" were thrown around in admiration in media commentary as a complimentary sign of how G20 leaders responded to the challenge. It seemed to herald a new order. Eleven years later, it is not so clear that the G20 can repeat this feat regularly or in areas outside of monetary and fiscal policy cooperation, indeed, even if they can do this.

Let me step back further to the 1980s briefly to an era when I first started working in international finance. By 1985, years of sustained excessive dollar strength despite the widening US trade deficit led to a dramatic policy initiative from the finance leaders of the so-called Group of Five countries — the US, Japan, Germany, France and the UK — at the time, the five nations that dominated world economic and financial affairs. The infamous Plaza Accord, as it became known, was soon regarded as a major success in halting protectionist pressures in the United States, although it didn't do much for the trend of the US trade balance. It certainly ended the period of dollar strength, and in subsequent years, repeated declines of the dollar were either allowed, or occasionally orchestrated by Western policymakers led by the US.

Since 1976 when the G5 expanded to become the G7, with Canada and Italy added to the other five in recognition of their rise in global economic importance, the G7 countries had remained at the heart of international economic for a long time, and with increasing frequency, international social and broader topics, and policy making. In 1997, the G8 was born when Russia officially joined the other seven, which certainly meant the G8 took on a regularly broader remit than mere finance and economics when the leaders held their annual meeting.

Looking back in some ways, the introduction of Russia into the center of global governance itself opened up my mind, as I am sure it did to others, especially post-Asian Financial Crisis, to the growing global relevance of China, and these thoughts, together with the horrors of the terrorist atrocities of 2001, led to me dreaming up the BRIC acronym.

It was more than apparent, as early as 2001, that a growing number of genuinely global economic and social challenges could not be successfully met unless some other big countries, China, in particular, joined the group. And so when President George W. Bush dragged the then little known established entity of the G20 to the forefront of global policy in late 2008, I was at the forefront of welcoming the foresight of this move. It might have, and still does, involve a lot more countries, but it was certainly a much more representative group for global governance.

The G20 might be taking improved efficiency into consideration; it is not an easy task, but not insurmountable.

It could be argued that all such international bodies frequently struggle to be effective, never mind efficient, and a realist might suggest that, in practice, any of these bodies are effective when their collective interests are vastly larger than their individual ones. As it relates to the G20, certainly the scale of the 2007/8 financial crisis seemed to bring the best out of the group, with many countries happy to try to present their monetary and fiscal policy response in a collective way, which allowed observers to appreciate the massive scale of the economic policy response.

However, what to do when there is no imminent crisis making headlines all over the world?

One thing to consider is to have each of the G20 countries give some kind of scorecard themselves for the progress they have made toward past initiatives that featured in G20 statements. It would, of course, be tricky and subject to gaming by some countries, and might — as other ideas — suffer from the fact there is no permanent G20 staff or secretariat. One way around this would be to give that responsibility to the IMF, which certainly on economic matters, would be relatively easy.

An example to specifically consider dates back to the South Korean-hosted G20 in 2010. Some countries, as well as giving the best policy response, shifted their attention to focusing on the underlying causes, and in this regard, the global balance of payments imbalances, especially between the US and China.

And there was a failed attempt to consider some kind of broad rule that when a country's current account balance went above a certain level (whether surplus or deficit) it would get called out, and result in some kind of G20 attention. This struck me as a rather good idea, but China and Germany appeared to be quite opposed, not least as they regarded these issues as sovereign.

In addition to asking each G20 country to record progress — or lack of — on any past initiatives, it might be an idea to really test countries, often the hosts, that want to bring a new issue on to the G20 agenda. For example, this year, it looks as though Japan is going to try to feature the issue of global governance of technology in terms of some common rules. Perhaps Japan needs to be pushed, as all other countries in the future who have ideas for new focus areas, as to precisely what they want to achieve in doing so. It is all very well to make very general grand statements, but unless anything specific occurs between and across G20 countries, what is really the point?

This must surely become a prerequisite for the G20 at this year's meeting and into the future.

Jim O'Neill is chair of the Chatham House based in London.

CHINA, JAPAN NEED TO GRASP OPPORTUNITIES ON OFFER

By Yang Bojiang

In 2012, Japan announced its plan to nationalize the Diaoyu Islands, provoking China's wrath and plunging Sino-Japanese relations to an all-time low. The next year witnessed some of darkest moments of the relationship since the normalization of bilateral relations in 1972. In April 2013 Prime Minister Abe Shinzo claimed in the Upper House that the definition of "aggression" has yet to be established either among academics or by the international community, and in December he officially paid homage at Yasukuni Shrine, which honors, among others, 14 Class-A war criminals.

In November 2014, at the APEC Leaders Meeting in Beijing, the leaders of both countries had a brief meeting. Several days prior, the two countries reached a four-point consensus on improving China-Japan ties, a gesture that both were willing to work on improving relations.

In 2017, the Japanese government sent delegates to attend China's first Belt and Road Forum for International Cooperation. In 2018, Premier Li Keqiang visited Japan and Prime Minister Abe visited China, signifying that bilateral relations eventually returned to the right track.

Regarding the twists and turns, the improvement is driven by common interests and policies. The biggest driving force is the two nations' innate, constant demands of social and economic development.

External factors, especially the US, are not the primary driving force in the improvement of bilateral relations. In last few years, in particular, the China-US trade friction has escalated as have Japan-US conflicts. Japan and the US have different views on trade, trading mechanisms, the security of Northeast Asia and the denuclearization of the Korean Peninsula, and even about US arms sales policies.

Another noteworthy factor is the growing clout of China and Japan in the Asia-Pacific region. The region, after the Cold War, used to be primarily dominated by the US. However, the dynamics have changed recently, thanks to the Chinese Belt and Road Initiative. Moreover, Japan has become more visible and more vocal in the Asia-Pacific community, despite lackluster economic growth. It has readjusted its national security strategy and defense policies to increase its international profile. It has actively engaged in the CPTPP (Comprehensive Progressive Trans-Pacific Partnership) talks and signed the EU-Japan Economic Partnership Agreement (EPA), the trade agreement to create the largest free-trade zone in the world.

However, a better Sino-Japanese relationship hinges on the efforts, strategies and policies of both sides.

First, both sides should be clearly aware that the potential for bilateral cooperation lies in the complementary strengths of the two countries. As early as in the 1960s, Masataka Kousaka, a renowned Japanese scholar of international politics, pointed out that China should not be viewed as an archenemy of Japan. Kenichi Ohmae, another prestigious scholar of management in modern times, also recommended Japan treat China as a "patron" in the 21st century, as the Chinese market would be big for Japanese goods. Meanwhile, China wants Japanese know-how in energy conservation and environmental protection, and experience in social governance, regional cooperation and even in surviving a trade war.

Second, for smooth and sustainable relations, both countries need to handle disputes properly, especially the remaining sensitive issues that cannot be addressed in the near future. The first step in solving any problem is recognizing there is one. Acknowledging the thorny issues including the disputes over the Diaoyu Islands can help manage the tension or even create conditions for a mutually-acceptable solution in the future. We have to face the problems head-on, not bury our heads in the sand.

Third, both sides should enhance dialogue and expand the scope of communication. China and Japan have shared goals in promoting free trade zones and regional cooperation, but they also have disputes or even conflicts with each other. A more assertive Japan does not necessarily see eye to eye with a rising China. For instance, as the host of this year's G20 summit, Japan's stance on WTO reforms, e-business and cyber security transparency, is aligned more with the Western world than China.

To increase the stability and sustainability of China-Japan relations, we should deal with the old burdens of the past properly and seek more common interests. Specifically, both countries need to face reality squarely, properly handle disputes and move solutions forward. Both need to see bilateral relations in a bigger context when the world is undergoing profound changes unseen in a century.

At such a historical juncture, China needs to understand Japan better, and vice versa. For instance, the experience of Japan in managing to keep the Gini coefficient, an index of income inequality, low. The Heisei Era has just concluded, but Chinese scholars do not have sufficient knowledge about the mainstream social and political trends during the Heisei Era or post-war Japan at large.

The expectation for a closer relationship will be reduced to wishful thinking if not backed up by real projects and initiatives. It is imperative to reinforce concrete collaboration. For instance, pressing ahead projects in third markets will help both sides to overcome the cultural gap.

China is keen on promoting new international relations and a community of shared destiny for mankind, while Japan has set its sight on exploring a new development path in the Reiwa Era. It is the goal of both nations to seize the historical opportunities, safeguard peace and stability, and work together to tackle the challenges ahead.

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INSTITUTIONS NEEDED TO GUARANTEE FREE TRADE IS RULES-BASED

By Guillermo Santa Cruz

In Buenos Aires, from where I write this piece, Bertolt Brecht's *Mother Courage and her Children* was restaged. This is the story of a woman with three children, who makes a living trading in the middle of a war... sometimes with great success. As the plot develops, the audience understands that all that war gives, war also takes away.

Drawing a parallel between this plot and the current situation in world trade is an exaggeration. However, I cannot refrain from thinking of these final words anytime I hear people trying to take advantage of current international trade tensions. Any gain will be temporary, and the most harmed will be the weaker countries.

Similarly, in an environment characterized by uncertainty and the contraction of world trade and investments, the most affected are small and medium-sized enterprises. Unlike multinationals, they are incapable of redirecting exports to alternative markets and are not equipped with back offices to deal with new regulations.

Building an open global economy with strong multilateral institutions is in everyone's best interest, especially less developed and developing countries.

On the one hand, the benefits of free trade are indisputable. Countries grow when they increase productivity; free exchange is the way to channel resources toward the most productive activities. On the other, institutions are needed to guarantee that so-called free trade is conducted according to the rules of the game that countries have agreed upon.

Free trade and institutions go hand in hand: free trade without clear and fair rules is no other than the law of the jungle, where only the strongest survive. Therein lies the importance of multilateral institutions since they allow relatively weaker countries to join forces to set up rules that would be hard to frame unilaterally.

But if free trade and the institutions that come along with it are so good, why is it that protectionist and isolationist ideologies are on the rise? One common explanation is that the expected benefits derived from the free flow of goods, services and resources were not as expected. It is true that there are sectors that did not benefit from it directly. Let's remember, for example, workers from developed countries who were previously working in industries that moved their factories to countries with lower salaries or cost of production. Let's also remember the impact on developing countries that saw local inefficient industries challenged by cheap imports.

It is also true that institutions that should have regulated the flow of goods did not perform as expected. Take, for example, the time needed to solve a commercial dispute or the struggle weak countries face when dealing with no-tariff barriers in their export markets.

A falling tree makes more noise than a growing forest. This discontent works as a breeding ground, used by left- and right-wing politicians to hold power by offering simple solutions to complex problems. This narrative is becoming omnipresent in public discussions and, in some cases, it is even set as an example of the best course of action. This kind of proposals will very unlikely contribute to solving anything.

In this context, we all have challenges ahead:

Governments should provide their economies with flexibility so as to be able to adapt to the vertiginous changes faced by open and global integrated societies. At the same time, they have to build safety nets so that temporary losers can be swiftly reincorporated into social and productive activities.

The challenge (and responsibility) of great powers, is to ensure that deals are real win-win situations as they state them to be. Of course, relatively weak countries cannot demand great powers to protect their interests. But as today's societies are more empowered than ever before, more actors have the power to veto; yet nobody is single-handedly capable of imposing long-term conditions on anybody. Without inclusive growth, we will be bogged down.

Lastly, the role of individuals… that is to say, us. We have the challenge of keeping an open attitude to change, to competition and to continuous learning. If we do not maintain this philosophy, I think it won't be possible to successfully surf the waves of change that characterize our times. By the way, this change has just started... as an example, every time I go to the supermarket and see the lines of cashiers manually scanning products, I think that soon, their jobs, as well as many others, will be gone. And we cannot blame any country or company for that; it is none other than creative destruction, boosted by the incredible technological progress of our time.

Perhaps the major medium- and long-term consequence of the trade war is not only the uncertainty and combative narrative used by populist politicians from the entire political spectrum which divide us, but also all the great developments that we are missing out on. I am referring to the opportunity for great powers of this century to pool their resources and face, through fair competition or direct cooperation, the serious challenges we face as a global society: climate change, new jobs, progress and stability of marginalized regions, the agenda on women, children and the elderly, among others.

We are at a point where we need to strengthen the message of openness, integration and fair competition that will take us to a shared prosperity.

As humans grow, they leave behind the anxiety of teenage years, and the quest for power of young adulthood. In general, when reaching maturity, they become aware that the goal in life is to be happy, in equilibrium with themselves and their surroundings.

As we evolve as a global society, we should follow the same path.

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CASE STUDY: FROM CHIANG MAI INITIATIVE TO GLOBAL FINANCIAL SAFETY NET

By Gao Haihong

After the 1997-1998 Asian Financial Crisis, Asian countries decided to build a regional financial cooperation mechanism. In 2000, the ASEAN Plus Three (China, Japan and South Korea) launched the Chiang Mai Initiative (CMI) to provide liquidity relief during financial crises strikes in Asia and to act as a supplement to the International Monetary Fund.

In the initial stages, CMI was only a network of bilateral currency swap agreements between member states and with limited funds, it was no more than symbolic. During 2003 and 2004, a comprehensive review of the CMI was conducted and in 2008 a CMI fund was established.

The 2008 global financial crisis, which broke out in the US and spread across the globe, further nudged Asian countries toward financial cooperation. They set up the Chiang Mai Initiative Multilateralization (CMIM) in 2010, which greatly improved relief capacity, decision making and institution building in the region. It was further expanded in 2012 with the reserve fund increasing to $240 billion.

In 2011 AMRO, the ASEAN Plus Three Macroeconomic Research Office, was launched and has since become the most important platform for policy dialogue and economic surveillance in Asia, signifying a milestone in institutionalized financial cooperation in the region. AMRO officially became an international financial organization in 2016 to perform functions of monitoring and regulating regional economic operation and financial stability.

As key platforms for financial cooperation, both CMIM and AMRO have now become multilateral and institutional arrangements ensuring financial stability.

In retrospect, regional economic integration is the ultimate driving force of ASEAN Plus Three financial institutional cooperation. As the Asian Development Bank estimates in its Asian Economic Integration Report 2018, trade within the region accounts for as much as 57.8 percent of the total trade in Asia. Foreign direct investment from countries within the region is increasing fast, making up 50.2 percent of total FDI. Although regional financial integration lags behind trade and investment interaction, capital flows have been on the rise over the years and cross-border debt instrument holdings have reached 25.5 percent.

The progress of regional integration owes its success to the driving force of the regional industrial chain and various countries' efforts in economic restructuring and opening up of the financial sector.

However, enhanced regional integration calls for greater policy coordination and crisis relief efforts of all countries involved. Because regional financial coordination helps tackle financial risks. Judging from the structure of capital flows over the years, direct investment in Asia remains relatively stable, while security capital flows often run into ups and downs. Unlike direct investment, security capital flows are procyclical, in particular short-term capital, are highly speculative, and thus pose huge threats to financial stability.

For example, when the Fed tightened its monetary policy and the dollar appreciated in the second half of 2017 and the first half of 2018, large-scale capital flight and currency depreciation took place in Argentina, Turkey and some other emerging markets. Despite the sound external conditions of Asian emerging markets, there was still capital flight from some of Asian countries and even major currency depreciation in Indonesia and the Philippines from January to August 2018.

From this perspective, to cope with the risks of capital flight, a sound international balance of payment and adequate international reserves are necessary while joint rescue efforts of related countries can also help defend against the risks of cross-border capital flight and financial crises.

The ASEAN Plus Three financial cooperation mechanism has prominent regional features, and the high saving ratios is one of them. In Singapore, for example, the household saving rate exceeds 50 percent, and in Indonesia and Thailand the rate is 30-40 percent. A series of measures are paying off in optimizing the allocation of savings in the region. The ASEAN Plus Three Bond Market Forum (ABMF) and the Credit Guarantee and Investment (CGIF) have been put in place, while the Asian Bond Market Initiative (ABMI) is also making progress. In addition, Asian countries have been developing their capital markets as well as opening up the financial sector.

Since the global financial crisis of 2008, the IMF, the World Bank and other international financial institutions have been pursuing reform. And such newly established institutions as the Asian Infrastructure Investment Bank (AIIB) and the BRICS New Development Bank (BRICS-NDB) have taken shape.

These changes call for Asia to move along the trend of times, enhancing cooperation with international institutions and mechanisms on the one hand and promoting reform within the current cooperation mechanisms on the other.

First, as a financial firewall for Asia and a major link in the Global Financial Safety Net (GFSN), CMIM should become a bridge connecting national policies with multilateral mechanisms. This means that in building the GFSN, CMIM is an important supplement to the IMF, and the two should conduct regular joint relief tests to ensure unified and coordinated action.

In addition, CMIM could conduct joint research with other regional financial cooperation mechanisms, such as the European Stability Mechanism (ESM) and the Latin American Reserve Fund (FLAR), promote cross-region coordination and build a multi-layered global financial safety net, on which the G20 has already reached consensus: it should contain national, regional and international mechanisms to address crises.

Second, as an important organ for regional economic monitoring, AMRO should enhance its capacity building to ensure the effectiveness of its work. Whether Asian countries can rely on CMIM for timely and effective rescue when crises strike, largely depends on the capacity of AMRO and the accuracy of its periodic review of member states' economic and financial health. Looking forward, AMRO needs to enhance cooperation with CMIM and further integrate its governance structure with CMIM for greater coordination and synergetic development in the region.

Third, CMIM should improve its work in credit facility, fund sources and conditionality. With credit facility, for example, CMIM should include not just standby facilities but also precautionary facilities to strengthen risk prevention. CMIM could learn from the experience of ESM that apart from funds committed by member governments, private financial institutions could be invited to boost its financial strength.

As for conditionality, 70 percent of the initial capital of CMIM is linked to the IMF's conditionality, which helps reduce moral hazards of rescuing countries and decrease member states' enthusiasm of using the CMIM fund. With the first round of review on CMIM completed and the revised CMIM clauses coming into effect soon, the way has been paved for establishing the conditionality that is suited to the realities of the region.

Last, the current CMIM reserve fund is totally in dollars. As the reserve currencies of Asian countries become more diversified, they should play a bigger part in the fund to make sure that local currencies are put into wider use. In the statement of the 22nd ASEAN Plus Three Finance Ministers' and Central Bank Governors' meeting in May 2019, the future of CMIM was clearly mapped out. The meeting endorsed the General Guidance on Local Currency Contribution to CMIM, which created the precondition for local currencies to be included in swap agreements.

These measures will not only increase the demand for local currencies in trade, investment and financial transactions in the Asian region, but also boost the development of regional financial markets and financial integration. Financial integration will, in turn, enhance the need for regional financial cooperation and bring it to higher levels.

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INFRASTRUCTURE BEING BUILT NOW HAS TO BE TOTALLY SUSTAINABLE

By Nicholas Stern

A key issue, indeed the most important issue, for G20 leaders is how to generate sustainable and inclusive economic development and growth across the world over the coming decades.

The G20 account for about 80 percent of the world's gross domestic product today, and their policies largely determine the health of the global economy.

Ten years ago, the world was facing a huge financial crisis and economic downturn, the impact of which is still being felt today. G20 leaders met in London to agree an emergency package of measures to stop the world from plunging from crisis into economic depression.

That crash was driven by unsustainable investments by financial institutions, regulatory and cultural, particularly in the housing market in the United States, together with inadequate structures which allowed systemic risk to develop and which managed it badly.

The G20 nations can safeguard against one potential important element in future financial crises by prioritizing wise investments in the transition to zero-carbon and climate-resilient growth and development. An inadequate, slow or badly managed transition can destabilize our economies, slow or reverse growth and severely damage our environment.

Critical to creating sustainable economies is the quantity and quality of infrastructure. The Global Commission on the Economy and Climate, of which I am co-chair, pointed out in its landmark 2014 report “Better Growth Better Climate” that $90 trillion would be spent on new infrastructure between 2015 and 2030, mostly in developing countries.

This investment will double the amount of infrastructure in the world. If it is similar to our existing infrastructure, it could lock in pollution, waste, inefficiency and climate vulnerability. It could prevent the world from realizing its collective international ambitions, including the Sustainable Development Goals and the Paris Agreement.

Infrastructure that facilitates more local air pollution and rises in greenhouse gas emissions is unsustainable. Infrastructure that is exposed and vulnerable to the impacts of climate change is unsustainable.

So it is absolutely crucial that the infrastructure we are now building around the world is sustainable.

A report published by the World Bank in early 2019 highlighted the huge need for infrastructure to eliminate poverty and raise living standards, with 940 million people living without electricity, 663 million lacking adequate sources of drinking water, 2.4 billion lacking decent sanitation facilities, 1 billion live more than 2 kilometers from an all-season road, and 4 billion people lack internet access.

It found that the spending of developing countries on infrastructure was mostly 3.5-5 percent of gross domestic product.

The report concluded that developing countries should be able to build the infrastructure necessary to realize the Sustainable Development Goals through investments equivalent to about 4.5 percent of their gross domestic product.

Such investments will be of profound importance in our cities, where more than half of the world’s population now lives and 70 percent of GDP is created, to ensure they are places where we can live, breathe, move safely and be productive.

The G20 nations must lead by example on this imperative, and especially the two world's biggest economies, the United States and China.

US President Donald Trump has recognized the need for better infrastructure, and that it would be hugely damaging to the US economy if this is outdated, dirty, inefficient and vulnerable, instead of modern, clean, smart and resilient.

China is demonstrating leadership through its significant investments in zero-carbon energy, particularly renewable power. China's support for solar power has directly contributed to the astonishingly rapid fall in the production costs of panel units, making it now the cheapest source of electricity in many parts of the world.

China can provide even greater leadership through the Belt and Road Initiative if it encourages the application of robust sustainability tests to investments in new infrastructure in partner countries.

It is not in the interests of China or its partners to waste money on infrastructure that is incompatible with the development of a zero-carbon and climate-resilient economy.

All across the world, short-sighted investors are already losing money on coal-fired power stations which are no longer viable in economies where the real costs of local air pollution and climate change from greenhouse gas emissions are properly taken into account.

The G20 nations should be wise with their investments within their own countries and abroad. They should promote the role of international financial institutions, and multilateral development banks in particular, in lowering the cost of capital for sustainable infrastructure. Indeed, the necessary pace and scale of transition requires a substantial expansion of that role.

In many countries, zero-carbon and climate-resilient infrastructure is often considered by private investors to be risky, partly because the associated financial returns depend on strong, clear and consistent policy.

Multilateral development banks have a vital role to partner investments in sustainable infrastructure, reducing the risks for other investors, by fostering and supporting good policy, by using their convening power to assemble good financing, partnerships, and deploying their range of risk management and sharing financial instruments effectively.

In October 2018, the G20 Eminent Persons Group on Global Financial Governance, of which I was a member, published a major report "Making the Global Financial System Work for All", highlighting the important role of multilateral development banks in promoting sustainable infrastructure and crowding in private investment.

Many of the multilateral development banks have already started to re-direct their support toward sustainable infrastructure.

The New Development Bank has already funded 30 projects, with a combined contract value amounting to $8 billion, most of which have been "green", including renewable energy. These investments are likely to reach $30 billion to $40 billion by the end of 2021.

I am a member of the International Advisory Panel for the Asian Infrastructure Investment Bank (AIIB), which in early 2019, on the basis of good management, a strong portfolio and a clear strategy achieved a very successful first global bond to raise $2.5 billion to support sustainable infrastructure, cross-border connectivity, and environmental, social and governance investment practices in emerging economies in Asia.

But there simply is not yet the scale of the investment required.

In earlier 2019, the AIIB published its inaugural report on Asian infrastructure finance. It concluded that there has been no significant breakthrough in Asia in mobilizing private capital for infrastructure.

The leadership of the AIIB recognizes the urgent need to increase efforts to attract private capital to sustainable infrastructure, and that multilateral development banks need to further contribute toward improving project preparation, improving country policy frameworks and maintaining the supporting conditions by, for instance, providing better information for market players.

The Leaders' Declaration from the G20 Summit in Buenos Aires in 2018 recognized that "infrastructure is a key driver of economic prosperity, sustainable development and inclusive growth". It endorsed the Roadmap to Infrastructure as an Asset Class, and the G20 Principles for the Infrastructure Project Preparation Phase.

The roadmap pointed out that private savings in the hands of institutional investors are currently at an all-time high of $80 trillion in assets under management. Yet the infrastructure investment gap remains significant in both developed and emerging economies.

The aim of the roadmap is to address common barriers to the emergence of infrastructure as an asset class, including the heterogeneous nature of infrastructure assets, the lack of a critical mass of bankable projects and insufficient data to track asset performance.

Through such leadership, the G20 nations can promote sustainable economic growth and development, reduce poverty and improve living standards across the world. They can lay the foundations for a sustainable future. But they must move quickly and on scale. The climate crisis is real and now; delay will be profoundly dangerous.

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SUSTAINABLE INVESTMENT NEEDED FOR INFRASTRUCTURE

By Tian Huifang

Population growth, migration and urbanization across the world need a continued supply of infrastructure. Estimates from Standard & Poor's in 2014 show that by 2030, the total investment in global infrastructure will hit $57 trillion, which means $3.4 trillion a year.

On a global scale, the need for infrastructure is more urgent in emerging economies. In Africa, for example, only 40 percent of the population have access to electricity, 33 percent of rural population have access to public transportation, and 5 percent of farmland has access to irrigation. As much as $100 billion is needed annually for infrastructure investment.

It's fair to say that the shortage of infrastructure investment will continue to be a major bottleneck for regional social and economic development.

As an integral part of a country's national economy, infrastructure investment can directly increase national income with the output generated by it. Infrastructure investment can also promote the upgrading of other industrial structures through the linkage effect between industries. At the international level, infrastructure connectivity will also produce a huge "spillover effect" in logistics, trade, information and other fields, and promote the flow of economic elements, efficient allocation of resources and deep integration of markets.

Especially for developing countries and countries in transition, infrastructure acts as a catalyst to their economic and social development. The weaker the development foundation and the lower the per-capita income, the stronger the role infrastructure plays in a country's introduction of external resources and economic growth.

Therefore, both the 17 Sustainable Development Goals (SDGs) and the Paris Agreement incorporate the building of green, clean and quality infrastructure as goals. For example, Goal 9 advocates to "build resilient infrastructure, promote sustainable industrialization and foster innovation".

To improve infrastructure investment and to make it more sustainable, it is necessary to integrate it deeply with the 17 SDGs of the 2030 Agenda for Sustainable Development. A mature infrastructure means convenience in transportation, communication and production as it reduces trade costs, improves logistics efficiency, facilitates exports, attracts capital inflows, promotes national economic growth, and offsets the impact of declining global trade on countries. It also helps create jobs, promotes technology transfer and human capital development, and enhances the competitiveness of enterprises, which ultimately attain the sustainable development goals.

Apart from Goal 9, infrastructure construction can also make a difference in many other sustainable development goals, for example, through improved infrastructure and public services to reduce people's exposure and vulnerability to climate-related extreme events and to reduce the environmental shocks and disasters (Goal 1); through increased investment in the infrastructure of rural areas to achieve food security, to address the nutritional needs of people and to promote sustainable agriculture (Goal 2); to provide access to essential healthcare services for all through investment in quality urban rural health-care centers and hospitals (Goal 3); through sustainable water infrastructure to improve people's lives and manage scarce resources in a sustainable way (Goal 6); to ensure sustainable and modern energy supplies by the expansion of energy infrastructure (Goal 7).

Besides, we need to avoid traditional high-carbon investment and to reduce the negative externality in the environment and society.

Infrastructure projects often involve environmental pollution, ecological destruction, resource development, land acquisition, resettlement and compensation, community impact and a series of other complex and unavoidable problems. As a result, in the construction of infrastructure, we need to take into consideration many aspects, such as whether the investment is rational enough and whether it is well planned. It is imperative to lower the negative externality as much as possible to make room for the ambitious goal of decarbonizing the world economy by 2050.

Let's take the Asian Infrastructure Investment Bank (AIIB) as an example. This multilateral financial institution initiated by China focuses on infrastructure construction to fill the long-term huge void in financing in Asia. It also incorporates the concept of greenness in its mission "lean, clean and green", which is totally different from traditional investment banks.

The Chinese government has also issued a series of policy documents to regulate overseas investment, and to closely monitor all relevant shareholders in its overseas investment, so as to ensure that enterprises deal with environmental and social risks seriously. The documents include the Green Credit Guidelines issued by the China Banking Regulatory Commission in 2012; the Guiding Opinions of the China Banking Regulatory Commission on Regulating Banking Services for Enterprises Heading Overseas and Strengthening Risk Prevention and Control in 2017; the Guideline of Environment Protection for Overseas Investment and Cooperation released jointly by the Ministry of Commerce and the Ministry of Ecology and Environment in 2013; the Guidelines for Social Responsibility in Outbound Mining Investments and Chinese Due Diligence Guidelines for Responsible Mineral Supply Chains by the China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters (CCCMC) in 2015; and the Environmental Risk Management Initiative for China's Overseas Investment released by seven major associations including the China Banking Association in January 2017.

All these documents, though having a different context from the 2030 Agenda, have set sustainable development as the main goal and are dedicated to the low-carbon construction and management of infrastructure.

Last but not least, to enhance infrastructure investment and its sustainability, there should be closer financial and policy links between countries and regions to increase the global supply of public goods.

Infrastructure connectivity is the key to sustainable development and common prosperity on a global scale. In regions with weak infrastructure, improving the connectivity of cross-border infrastructure can reduce transportation costs, promote trade, improve the value chain of regional and global trade, and help them to be part of the global trade and supply network.

To achieve this connectivity, it is key to strengthen the planning of infrastructure construction and the docking of technical standards. Cross-border infrastructure investment, though highly needed, is faced with challenges brought about by complicated technologies, environmental pressure, resource transfer, differences in the system and management framework, and it is not cost-effective. When it comes to the application of operational standards, participating countries need to work together.

At the G20 Hangzhou Summit in 2016, leaders of the bloc initiated a Global Infrastructure Connectivity Alliance, or GICA, to promote the construction of a cross-border infrastructure network, and the flow of logistics, work force, information and other elements. Its membership has now grown to 17, including not only sovereign nations but also multilateral development banks, international organizations and associations.

In 2017, UN Environment and China's Ministry of Ecology and Environment jointly initiated the Belt and Road International Alliance for Green Development. It aims at greener development along the BRI routes while helping improve infrastructure there under the BRI framework. The alliance was formally established in 2019 at the second Belt and Road Forum for International Cooperation, with more than 80 institutions as partners.

All these measures will help strengthen the overall coordination of infrastructure projects, promote close cooperation between the private sector, the public sector and multilateral institutions, and push the global economy toward the goal of "strong, sustainable, balanced and inclusive growth".

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BOTH URGENCY AND OPTIMISM ON TACKLING CLIMATE CHANGE

By Fred Krupp

No single issue impacts as many countries as the unprecedented warming of our climate, which threatens to drag down growth and human wellbeing in developed and emerging economies alike.

This is not new news.

What is new is the mounting urgency as the window for effective countermeasures begins to close. New as well are the evolving geopolitics of climate solutions — in particular the increasingly influential role that China is playing in creating innovative policies to address the problem.

The Earth has already warmed by about 1 C since the dawn of the industrial age. Accumulation of past and current emissions means another half a degree is all but inevitable. More than 180 countries have ratified the Paris Agreement, pledging to keep global temperature increase in this century to 2 C or less above pre-industrial levels — the point at which scientists say the effects on our societies would go from bad to catastrophic.

Staying below the 2 C threshold will be a monumental challenge, perhaps the greatest faced by humanity. And yet, we need not lose hope.

The good news is, we have the technologies at our disposal today to turn the corner, putting greenhouse gas emissions on a downward trajectory in line with the goal of climate stability. The extraordinary innovation of the past decade has made the greening of the global economy feasible if we have the political will.

In many places, it is cheaper to build renewables than to run existing coal-fired plants. Breakthroughs in battery technologies offer prospects for breaking oil's domination of the transportation sector.

Natural climate solutions, including the protection of tropical forests and their vast stores of carbon, can contribute immediate emissions reductions, while also sustaining traditional forest communities and preserving biodiversity. In addition, new negative emission technologies, or NETs, are growing in sophistication, though they remain costly and require additional development.

At the same time, there is a growing focus on highly potent, short-lived climate pollutants like methane, which had largely been ignored until recently. Methane has more than 80 times the warming power of carbon dioxide over 20 years after it is emitted; emissions from human activities are causing more than a quarter of the warming we are experiencing today.

In fact, the International Energy Agency says we can reduce 75 percent of methane emissions from the oil and gas sector cost-effectively. This is the fastest way to reduce the rate of warming right now, even as we continue to transition toward 100 percent clean energy.

These and other opportunities to cut emissions mean that addressing climate change — at least in the foreseeable future — is no longer a scientific or engineering problem. Instead, it is a problem of politics, and of overcoming a status quo so closely tied to the unabated use of fossil fuels that many people have a hard time imaging an alternative. Making that alternate reality our own requires an economic framework that accelerates and rewards the rapid and widespread transformation.

This is where the G20 leaders have a crucial role to play.

Some say it is better to wait until cleaner technology becomes even cheaper before setting climate goals. But this is not how technology progresses. In the real world, it is scale that drives innovation and cost reduction, not the other way around. To achieve the speed and scale we need, we need to get technology out of the lab into a competitive marketplace.

For that to happen, innovators need to know that emission reductions pay off. Unlike the latest smart phone, however, there is no natural market in which to reap rewards for cutting pollution. That's because polluting is free until governments say it isn't. In order to fully capitalize on the low-carbon technologies at their disposal today, policy makers must set strong, clear and durable emissions targets.

Officials can further accelerate the process by creating a market not just for technology, but also for emissions savings themselves. Putting a price on carbon creates an incentive to reduce emissions. Allowing companies that reduce emissions beyond legal requirements to sell their extra credits to others with higher costs or longer timelines also rewards initiative and innovation, as well as lowers overall net cost for everyone.

This approach has proven so successful that more than 50 jurisdictions around the world have carbon markets in place, and more are on the way.

Until recently, the world looked principally toward Europe and North America for these kinds of solutions. But that is no longer the case. Just as it has become a major innovator in clean technology, China has also begun to lay out ambitious strategies for protecting the climate. Since 2013, for example, China has introduced local carbon markets in two provinces and five cities across the country. Four years later, the government began planning for a national emissions trading program that is slated to become the world's largest carbon market.

As with many things in China, the potential size of the opportunity is remarkable. For example, the country's power sector generates 63 percent of its electricity from coal, resulting in 3.5 billion tons of CO_2 emissions a year. That means that, when fully operational, China's national carbon market could be almost twice as big as the EU carbon market, and 10 times the size of California's system.

The climate crisis is, by definition, a global crisis. While many nations seem to be turning their attention inward, institutions like the G20 have never been more important. Countries cannot thrive or prosper if the natural systems we depend on are in chaos. No nation need sacrifice its sovereignty or pride to solve this problem, but all must proceed from a common commitment.

If preservation of a habitable climate is the biggest economic challenge of the 21st century, then it is going to take every bit of creative and entrepreneurial energy we can muster to fix it. Governments need to create the conditions that make it possible for the private sector to work its competitive magic.

That, in short, is the awesome responsibility that awaits the G20 leaders.

Fred Krupp is president of Environmental Defense Fund, a non-profit organization.

TIME FOR A 21ST-CENTURY INNOVATION AGENDA

By Dennis Pamlin

With accelerated adaption of new innovations all around us, the opportunities and challenges are enormous. We are facing technologies and innovations that can disrupt the very fabric of society, from AI and genome editing to brain-computer interfaces (BCI) and nanotechnology. All of these technologies are very powerful on their own, but when they converge and combine with new business models and values, significant disruptions on a global scale can happen.

Many companies, policymakers and journalists oscillate between hope and despair in relation to the new generation of technologies. It is easy to feel confused as different experts seem convinced that these technologies will either solve all our problems, or beget the end of our civilization.

The truth, however, is that they can be pretty much what we want them to be. They are tools, powerful tools, but still only tools.

There are unforeseen consequences and complexities that make it hard to guide technology exactly in the direction we want, but people are choosing how to implement the technologies and the frameworks that will guide innovation. The challenge is that innovation-driven development in the first decades of the 21st century will take place in a historically unique situation.

For more than 300,000 years, human innovation has mainly focused on developing technology to enhance and extend our bodies to make us stronger, faster and more efficient with the help of machines and tools; the reason has been the urge to survive, to reduce material scarcity. But we needed “more”: more food, more shelter, more medicines... We created tools like GDP to measure progress based on “more”, and we became used to view growth as something generally positive.

This focus on “more” has resulted in unprecedented material wealth. Humans on average live longer, are healthier, have access to better food, medicine and shelter. We can and should celebrate this progress. Few of us would like to live in a time when we do not know if we will have enough to eat the next day, or when a simple infection will kill you. But as with all things in nature, unlimited growth is neither possible nor desirable; in our own bodies unlimited growth is called cancer.

When it comes to everything from food to medicine, we have arrived at a point where we need to move beyond and ask deeper questions, and in no other field is this more true than innovation.

As we are closing in on, or in many cases, have already passed the point when we do not need or can have “more”, there is a need to direct our innovation skills to the structures guiding innovation. Moving forward, three 21st-century questions should guide innovation:

- How can we ensure inclusion?
- How can we ensure a good life for all?
- How can we create an ecological civilization based on a half-earth approach?

Inclusion is one of the most discussed challenges of rapid innovation-driven development. With AI and robotics, in particular, we can create a future that will not require many humans to produce the material goods we need. In a similar way, many of the services that humans provide today, AI and connectivity will be able to do better, faster and cheaper.

The inclusion challenge is often framed around unemployment, but it is much more than this. It is a question of what role people will have in society. A universal basic income or similar measures will ensure that people do not starve to death, but they will not ensure that people have something meaningful to do. Instead of framing the question of inclusion as a question of income or right to work, we need to ask how we can guide innovation in a way where everyone has the opportunity to make an important contribution to society.

It is also important to approach inclusion as an educational and access challenge. With technologies that are not just about making us stronger and faster, but also smarter, it becomes important for everyone to be able to discuss what kind of values that these technologies are based on. Who has the right to data about us and who has the right to filter and guide what information we can access are core questions that must be discussed.

With material scarcity becoming more about redistribution and less about the need for increased productivity, we must ask what we want if it is not just "more". Again, we must look beyond the simple approach when the focus just turns to "optimal". It is obviously important that we eat optimally to avoid obesity and that we aim for more optimal ways of transport to avoid climate change and congestion. Still, if we look at any framework for human wellbeing from Maslow's hierarchy of needs to Max-Neef's taxonomy of fundamental human needs, it is clear that we need a conversation about the role of innovation in relation to what kind of society we want.

It is not an exaggeration to say that much of the innovation is making trivial or even meaningless contributions to society. If you open the app store on your smart phones and compare that to the most important challenges in society it is hard to see much overlap.

Many companies in their hunt for more are trying to create needs by making people insecure and satisfy this uncertainty through consumption. A lot of innovation is driven by companies that do not really provide any significant value to society, from fast fashion (providing inexpensive new apparel multiple times a year) to fast food (simple and unhealthy food eaten without any deeper satisfaction). These companies use innovation to push people down the scale of human evolution rather than up. Progress in art and science as well as in human enlightenment are substituted by triviality, increased tensions and irrationality in society.

A discussion of what companies contribute to society and how governments use technology is urgent.

Last, but no least, we must redefine our relationship with nature. Currently we are destroying the very fabric of life that we all depend on, and to a large extent we do this with innovations aimed at delivering us more of the stuff we don't need or really want. Instead of a reactive or negative approach where we try to put a price on nature, or find limits for how much we can destroy, we should explore the opportunities for a positive vision.

The concept of half-earth could help us broaden our ethical horizon and move away from a simple anthropocentric perspective to a future where innovation is guided by structures where nature also has an intrinsic value.

The G20 Osaka Summit, where innovation is a key theme, provides a great opportunity for leading stakeholders to take the next step in innovation-driven development. It is time for the innovation agenda to move away from only making what we do today faster and cheaper, increasing productivity, and ask what the innovations actually contribute. All major companies, universities and authorities should start applying 21st-century questions for their innovation strategies where the focus shifts from quantity to quality.

Increased productivity is still needed in many areas, and many around still need more of even basic goods, but it is time for a 21st-century innovation agenda.

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BUSINESSES HAVE A BIG ROLE IN ACCELERATING INNOVATION

By Yann Bonduelle

The world is not short of challenges where technology can and should play a significant role. Reaching the UN's 17 Sustainable Development Goals (SDGs) will require major technology achievements, particularly in energy, connectivity, mobility and healthcare.

The pressure is on to ensure that technology innovations drive development effectively and consistently. How should governments at a macro level and businesses at a micro level work together to develop the right conditions to accelerate the positive impact of technology innovation?

Macro tools include carrots and sticks such as tax incentives, trade policies, safeguarding of intellectual property rights and legal support. Scholars such as Jakob Edler and Jan Fagerberg provide a list of 15 categories of tools in "Innovation policy: what, why, and how" in the Oxford Review of Economic Policy.

On the micro side, businesses can amplify or minimize the effects of macro measures created to promote innovation. Apple's products are good examples of innovations benefiting from supportive macro measures: Apple used 13 technologies resulting from public investments including DRAM cache and Click Wheel. Apple has mastered how to leverage macro-driven technology advances, and how to combine them with its own innovation ingredients.

However, there are limits to using macro measures to drive innovation. Solar energy's penetration is still marginal despite technology subsidies. Many innovation hubs fail to achieve their ambitions despite government help. The reasons for these failures include timing, poorly designed incentives, and unclear value propositions. Despite good intentions, macro measures will only work if businesses are working in the right direction as well.

To accelerate innovation-driven development, businesses have a critical role to play. They can be the most effective relay of government's macro measures supporting innovation. This is easy for the Apples of the world. It is less obvious for traditional businesses that need to transform through adoption of technology. The challenge for these traditional businesses is to adopt the right technology such as robotics, connectivity and artificial intelligence.

Creating commercially successful innovations usually follows a three-stage innovation process. First, a small-scale experiment establishes a Proof of Concept, or PoC, establishing that the innovative idea can be built and will deliver what is expected. A PoC is usually quick and requires few resources. Then a larger scale pilot application is built and if that is successful, a fully scaled-up version of the innovation is constructed. Each step requires increased investment.

At company level, effectiveness in scaling up innovation is driven by four elements.

The first element is a burning platform. Is there an existential threat to the organization which requires increasing investments in innovation? Without a burning platform, making sustainable, consistent changes is difficult.

Countries experience macro issues that impact sectors of the economy very differently. For example, aging populations and a gradual fertility decline combined with low unemployment create major stresses in an organizations' ability to recruit the people it needs.

The Japan Ministry of Economy, Trade and Industry has been active in promoting measures to adapt to the new reality of an aging population, for example, the importance of constant learning.

Increased domestic and international competition, including unexpected competitors, is often an effective burning platform for businesses. In retail banking, the entry of competitive payment options and digital banks is threatening incumbents.

For the Japanese government, the burning platform is the increasing cost of healthcare and pensions. This motivated the launch of a new visa system for foreign workers: 345,150 blue-collar workers in construction, farming and nursing care are expected to come to Japan over the next five years.

The second element is innovation culture. Are working practices in individual countries in line with what is required to develop successful innovation? Commercially successful innovation requires a culture of experimentation; a willingness to fail fast; a systematic application of agile development methodology, and establishing trusted partnerships to create better products, services and processes. Networking and sharing information with organizations is also crucial.

There are wide differences across G20 countries in these areas. In some cultures, being trustworthy is seen as part of a person's fundamental personality. A person is judged to be trustworthy based on personal character, and is expected to always be trustworthy — no matter the context.

However, in other cultures, individual behavior, including trustworthiness, depends on context. While a person can be judged to be trustworthy by a partner in a joint venture context, that does not mean that they will always behave the same way with that partner, regardless of context. This makes partnerships between individuals or companies of different cultures interesting and sometimes unpredictable.

The third element is innovation discipline. Many business organizations realize they need to become data-driven, incorporating new technologies. That requires developing innovation in-house with partners, contracting innovation, or buying innovation. Whatever the solution, commercial success will take a few years and investments will be required throughout.

Innovation investments are unlikely to become very quickly clear successes or failures and that means developing a portfolio of innovation projects and monitoring those regularly. When the road is bumpy and investments do not show expected progress, it is tempting to redirect investment into other areas requiring a short-term boost.

On the other hand, when results are clearly negative, it is tempting to try just one more test. Making the right decisions is influenced by an organization's corporate culture, the importance of hierarchies, the presence of or trust in real technical experts, and duration in each job.

The fourth element is innovation hot skills. Most businesses are launching or growing their own innovation programs. As a result, there is a shortage of emerging tech skills. In the 2019 PwC CEO survey, CEOs felt that "shortage of talent with analytical skills" was the No 1 factor preventing them from making more data-driven decisions.

Beyond analytical and emerging tech skills, people who can leverage external innovation into a company's products, services and processes are also in short supply. Organizations therefore need to take responsibility to train their employees in these new skills. That in itself is a long-term investment.

Generally speaking, innovation ingredients are nurtured or starved by the environment in each country and organization. Innovation-driven development is at its most effective when organizations amplify the national measures that promote innovation. That happens when organizations score well in the four categories of innovation ingredients outlined here.

The ingredients will be more or less present in different types of organizations. Startups are long on innovation culture and hot skills, while not always great on innovation discipline. Established organizations are short on innovation hot skills and innovation culture, and should be long on innovation discipline. In other words, businesses must conduct a review of their innovation environment to paint a realistic picture of innovation potential. That in turn should guide expectations and help identify partners with complementary strengths.

Yann Bonduelle is partner and data & analytics leader of PwC Japan Group.

WE NEED TO ACCELERATE NEW ENERGY ADOPTION

By Frank Rijsberman

Renewable energy has gained a foothold in many countries as the technology of choice, accounting for one-third of the world's total energy capacity. The energy transformation has picked up momentum over the past few years due to a combination of better technology, lower prices and the benefits of scale, leading countries to realize the immense renewable potential, which could meet the global energy demand by 2050.

The past 10 years have also seen soaring global investment in renewable energy capacity, as wind and solar have emerged as cost-effective power sources. Hydropower attracted the most investment in renewable energy up to 2008, while wind turbines were at the forefront in 2009, and solar panels became the dominant investment choice by 2016.

In 2015, more money was invested in renewables than fossil fuels for electricity production for the first time. In 2017, more investments were made in solar than in all other low-carbon technologies combined. Analysis by the investment bank Lazard shows that it's now cheaper to build a new wind farm than to keep a coal plant running in some parts of the US where coal plants are shutting down because of this, and the scenario is expected to be repeated in other places in near future. Both the wind and solar industries are driving down costs and improving technology performance, and the technologies are now better positioned to compete than ever before.

Renewable-power prices are now competitive with traditional sources of power, turning what was once a novel approach to energy generation into a big, viable business. New solar photovoltaic (PV) and wind energy plants are more profitable than fossil and nuclear plants in a fast-growing number of regions around the world.

This also indicates that we can now bust the myth that green growth and growing the economy sustainably is an expensive option. Solar energy, even combined with batteries for energy storage, is already commercially attractive where diesel energy is the alternative such as in small islands off the grid, or where power outages are common.

GGGI and its 32 member countries believe that green growth is the only viable option for a sustainable future — and that it is already commercially attractive in many cases. While solar and wind energy dominate the disruption in electricity production, bioenergy remains the leading source of renewable energy due to its use for heating buildings and in transportation. Renewables are expected to continue their expansion in the next five years, covering 40 percent of worldwide energy consumption growth.

Many technologies make a positive contribution, from renewable energy in batteries as some of the base technologies, leading to electrification and transport. The largest area where we need to see progress is in buildings and infrastructure. In Asia, smart cities are very popular. In Africa they are called green cities as they are often realized through green buildings that are better insulated or public transportation that is electrified, recycling waste into energy and so on. It is actually possible to build passive houses — houses that do not emit greenhouse gases in construction or when in use — through smarter use of insulation, and smarter use of district heating or cooling.

When Rwanda set to build its new airport in Kigali, for example, I asked the government to rethink the design to make it a zero-emission airport that was actually cheaper to construct. To be completed in 2020, the Bugesera International Airport will be a net zero emissions complex through energy and water efficiency and solar power, making it one of the greenest airports on the continent once completed.

Mongolia has one of the coldest winters on earth, where many low-income households in the “ger” (tent) districts burn low-grade brown coal, the cheapest way to keep warm. This contributes to 80 percent of Ulaanbaatar’s serious winter emissions.

To deal with this, Mongolia has set a target of achieving the goal of renewable energy accounting for 20 percent of all power by 2020, and 30 percent by 2030. Today, about 7 percent of the total energy comes from renewables and by the end of this year, Mongolia expects that number to be double. However, it is difficult for renewable energy to compete with coal for heating purposes because Mongolia does not have viable or affordable technology for heating supplies based on renewable energy. Also, a big issue is that cities in Mongolia do not have geothermal energy resources. As a short-term measure to solve air pollution issues, the government is proposing to use electricity for heating supplies and to provide a subsidized price for consumers at night. As a long-term solution, Mongolia envisions the introduction of renewable energy technologies for consumers and households.

In Asia, the primary driver of green or green tech may not be climate change but air pollution, which causes asthma and deadly diseases. Beijing had more blue skies this year than in previous years, as coal mines have been closed and more electric buses are on the roads. China has confirmed that it will stay in the Paris Agreement, and become a leader in certain areas of clean technology. It is commercially exploiting these opportunities, for example in constructing solar panels.

Likewise, in Europe, wind energy provides a thriving industry and many commercial opportunities. Japan is pushing for a hydrogen economy, and various countries are finding out that these could bring a new generation of prosperity.

Despite all the good news, greenhouse gas emissions are not coming down fast enough to avert a climate disaster. We will need to find ways to accelerate renewable energy adoption. That is particularly true for least developed countries, where only 20-30 percent of the population have access to electrical energy, instead relying on unsustainable and unhealthy biomass energy such as fuel wood and charcoal for basic needs such as cooking. Renewable energy not only helps reduce emissions in developing countries, but also has a key role in increasing access to clean energy for all.

Frank Rijsberman is a director-general in Global Green Growth Institute, an international organization headquartered in Seoul, South Korea.

CASE STUDY: FOOD TRANSFORMATION TO LEVERAGE COMMON FUTURE

By Olav Kjørven

The trade war between the two largest economies, the United States and China, is capturing headlines around the globe. While much is at stake for the global economy if this dispute is not resolved soon, there is another pressing challenge concerning the future of human beings.

Alarm bells are now ringing loudly on behalf of planet Earth: We are rapidly running out of time to secure a safe future for humanity; we have a climate crisis on our hands, and we have entered an era of mass extinction of species with grave consequences for humanity.

However, this is not a time for pessimism or defeatism. With leadership from the right places and with sharp focus on the most strategic levers of change, humanity can turn this crisis into an opportunity.

Food is one such lever, and China is in a unique position to unleash and drive a great food transformation that will both inspire the world and help secure our common future.

In January 2019, the EAT-Lancet Commission on Food, Planet and Health published its scientific assessment Food in the Anthropocene. The assessment concludes that without fundamentally transforming production and consumption of food, we will fail to achieve the Sustainable Development Goals (SDGs), we will fail to stay within 1.5 to 2 degrees of global warming, and we will not be able to slow down the extinction of species.

However, the assessment also states emphatically that food systems offer an incredible opportunity: If we start making different policy, investment and business decisions along the entire food value chain, we can unleash unprecedented progress toward a safer, more sustainable and even more prosperous future where we can indeed feed all of humanity well without destroying our shared home. As we like to say in EAT: food can fix it.

Addressing this challenge, China's role is pivotal. After several decades of uninterrupted high-speed development, unmatched in human history with 800 million people lifted out of poverty, China is today an example for the world when it comes to effective economic policymaking, mobilization of capital at home and abroad for productive purposes, and investment in its people.

Looking forward, China will — due to its size and role in the global economy and pathbreaking initiatives such as the Belt and Road Initiative and an open economy — continue to increasingly shape global supply and demand. This will also be true when it comes to food, which seen as a sector, represents no less than 30 percent of the global economy. If China sets explicit, science-based targets to guide a transition to healthy diets from sustainably produced foods, it will reverberate along the Belt and Road and through the entire global food market place and most likely change it for good.

The most recent Chinese nutritional guidelines, published in 2016, provided an excellent starting point for reviewing policies and strategies across key sectors such as agriculture, fisheries, health, education, science and technology and optimizing them for healthier, more sustainable and more productive results.

China still has significant challenges when it comes to its food system: There are still pockets of under-nutrition among the remaining poor. And like most of the world, it is seeing rising levels of diabetes and obesity — and associated rising healthcare costs — largely due to a shift in diets toward more processed and ultra-processed foods heavy on sugar, salt, unhealthy fats and a rising meat intake.

At its heart, the Chinese attitude to food has always been driven by the underlying principle of health and eating healthily, and China's young generation appears to express the strongest interest in charting a more healthy and sustainable course when it comes to food.

Well educated and increasingly exposed to modern fads and trends, and seeing the negative consequences of unhealthy diets and unsustainable food production around the globe, a growing share of millennials appear to crave a future rich in diversity and taste, light in environmental footprint, and wholesome for body and mind.

Taking a more long-term historic and cultural perspective, China brings a unique and incredibly rich culinary tradition to the global table. China's culinary history and richly adaptable and plant-heavy food is a treasure trove for the world, as we must learn to grow a much greater variety of nutritious foods from a wider variety of plants, while also learning how to produce animal-based foods responsibly and sustainably.

But China's deep intellectual and spiritual wisdom in relation to food is also of enormous value, and today this wisdom is contributing real, deeply anchored content to the concept of Ecological Civilization. This wisdom, as seen in ancient tradition, for example, connects food to the health and wellbeing of humans and the world as a whole. In essence, the concepts of Yin and Yang capture and powerfully explain why human wellbeing and the health of our planet are in fact intimately interlinked, something I personally came to appreciate when in 2008 I had the chance to attend an environmental conference organized by the Daoist Ecological Temples Network in Maoshan.

Similarly, Chinese Buddhism also has much to offer in terms of values, insights and practices. While humanity does not need to go vegan or vegetarian in order to save our planet, the vegetarian tradition of the Chinese Buddhists demonstrate that a stronger reliance on plant-based sources of food is palatable and eminently doable, even at great scale.

China can show the way to a safer, healthier and more sustainable food future, by taking bold action at home and inspiring and engaging the rest of the world. President Xi Jinping's call to "building a community with a shared future for mankind" can and should involve getting it right on food, guided both by what science is now telling us loud and clear and by the wisdom inherent in Chinese food culture and traditions.

It is unclear how much attention the G20 will give to the urgent global environmental crisis that we are now confronting. But the most important business is usually discussed informally on the sidelines — often around a dining table or during coffee and tea breaks — between representatives of different governments, with guests from international organizations, research organizations and think tanks, and industry.

And one, two or three years later, these discussions may morph into real commitments and real actions, in some cases even shared by the entire membership, especially when one or more countries are demonstrating leadership in practice.

The alarm bells from science regarding our planet and the opportunities for action through food provide urgent, fertile grounds for such discussions. Why not take the opportunity that the G20 meeting provides to sow the seeds that will grow into the healthy and sustainable food transformation people and planet need?

Olav Kjørven is chief strategy officer of EAT, a global platform for food system transformation based in Stockholm.

KEY FINDINGS OF THE REPORT

Fifteen renowned experts worldwide shed light in this report, offering a few key takeaways and pathways for building an open global economy:

• The current risks and challenges facing the world's economy are not byproducts of economic globalization but the result of obsolete concepts of a zero-sum game and winner-takes-all.

• An open global economy features greater specialization and facilitates trade and rules-based governance, which boosts technological advancement, nurtures more high-caliber talents, and promotes innovation and inclusive development.

• Multilateral mechanisms, including the G20, remain the center of gravity in global governance for tackling complex, transnational issues; but they should dovetail with regional and sub-regional mechanisms as well as special arrangements in such fields as finance, infrastructure and climate change.

• Building an open global economy is in everyone's best interest, with governments being more flexible to vertiginous changes, businesses being more adaptive to innovation, and individuals having an open attitude to change, competition and continuous learning.

Pathways:

• Trans-national policy coordination should be reinforced through top-level communication, multilateral mechanisms and bilateral dialogues, as well as new public tools such as the Belt and Road Initiative.

• Innovation and new tech should be advocated which improve the efficiency of resource use and create alternative solutions to current and future challenges.

• Overarching development goals for humankind, such as the Sustainable Development Goals, should be well interwoven in the process of building an open global economy to benefit all.

List of G20 Meetings of Finance Ministers and Central Bank Governors (1999-2007) and G20 Summits (since 2008)

Time	Location	Themes
Dec 1999	Berlin, Germany	Discussing regional economic and financial situations
Oct 2000	Montreal, Canada	Respond to the challenges of globalization
Nov 2001	Ottawa, Canada	Combating terrorist financing
Nov 2002	New Delhi, India	Terrorist financing
Oct 2003	Morelia, Mexico	Financial crisis preparedness and response
Nov 2004	Berlin, Germany	Promoting stability and growth, and regional integration context of globalization
Oct 2005	Beijing, China	Strengthening global cooperation: to achieve balanced and orderly development of the world economy
Nov 2006	Melbourne, Australia	Construction and maintenance of prosperity
Nov 2007	Cape Town, South Africa	Ensure world financial market stability
Nov 2008	Washington, USA	Global recovery, financial regulation
Apr 2009	London, UK	Reform of the international financial system
Sep 2009	Pittsburgh, USA	Reform of the international financial system and the unbalanced world Economy
Jun 2010	Toronto, Canada	Full recovery of the world economy
Nov 2010	Seoul, South Korea	Exchange rate, global financial safety nets and reform and the development of the international financial system
Nov 2011	Cannes, France	New world, new thinking patterns
Jun 2012	Los Cabos, Mexico	Strengthening the international financial system and employment, development and trade
Sep 2013	St Petersburg, Russia	Modernization bond issuance and management system
Nov 2014	Brisbane, Australia	Promote private sector growth and increased global economic impact and to consolidate the global system
Nov 2015	Antalya, Turkey	Collective action for inclusive and robust growth
Sep 2016	Hangzhou, China	Toward an innovative, invigorated, interconnected and inclusive world economy
Jun 2017	Hamburg, Germany	Shaping an interconnected world
Nov 2018	Buenos Aires, Argentina	Building consensus for fair and sustainable development
Jun 2019	Osaka, Japan	Global economy, trade and investment, innovation, environment and energy, employment, women's empowerment, development, health
2020	Saudi Arabia	
2021	Italy	
2022	India	