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Year End | Technology

He Ming and Sun Yunchuan

If 5G is here, can 6G be far behind?

He Ming is a senior engineer at Chengdu Institute of Research and Development of China Mobile.

Sun Yunchuan is a professor at International Institute of Big Data in Finance, at Business School of Beijing Normal University.

The rolling out of 5G services has triggered a wave of competition across the world and, more importantly, triggered a race to develop 6G.

An official Chinese research team on 6G was established last month. And developed economies such as the United States, Japan, the Republic of Korea and some European countries have started devising research and development plans for 6G, as the telecommunications sector has always been a hotspot for competition.

5G technology aims to create a comprehensive perceptual sensory system in which information and tools can be easily accessed. On the other hand, 6G will help build a perceptual nervous system integrating artificial intelligence (AI) and wireless cognition, which can give intelligent responses.

Compared with 5G technology, 6G will have lower latency, higher speed and more bandwidth. And this advanced technology will help connect the real world with the virtual digital world. It will also make product design, R&D and experiments significantly more efficient and greatly reduce their costs while making it possible to produce digital products in the physical world through high-tech including 3D printing. Which, along with the seamless connection and intelligent coupling of the physical and digital worlds, will lead to a thorough reconstruction of the division of labor and societal cooperation.

In terms of economic development, 3G fostered e-commerce while 4G boosted e-commerce and mobile payment. 5G infrastructure building and application marked the beginning of Chinese enterprises' intelligent manufacturing and provided the basis for the sector's rapid development. Similarly, wireless cognition technology associated with 6G technology, once it matures, will further boost the development of the digital economy.

In digital economy, intelligence based on big data will become the real impetus for innovation, and 6G networks not only will be highways for transmitting data, but will also much more seamlessly integrate edge and core computing as part of a combined communications/computation infrastructure framework. Which will provide many potential advantages as 6G technology becomes operational, including access to AI capabilities.

Digital economy based on 6G will become the determining factor of a country's competitiveness in the future. And 6G technology with wireless cognition as its major characteristic will become the pivotal, core technology and main driver of the digital economy.

6G is expected to support 1 terabyte per second speeds, an unprecedented level of capacity and latency, which will extend the performance of 5G applications aside from expanding the scope of capabilities in support of increasingly new and innovative applications across the realms of wireless cognition, sensing and imaging.

China remained a passive player in the field of advanced technology before 4G services were rolled out, mainly following the United States and European countries and had not set standards for telecom technology. But by developing 4G technology at the same time as the developed economies, China became a big player in the field and contributed to the rule-making process. That China's 4G network is the most advanced and pervasive in the world has also helped the rapid development of mobile payment in the country.

Starting with 5G, the Chinese telecom industry, thanks to its extensive R&D input, has taken the lead in standardizing and manufacturing 5G telecom equipment. And now that the US and European countries lag behind China in 5G technology development, they want to drag China down using non-competitive means such as restricting the development of Chinese companies such as Huawei, and by launching R&D in 6G before China in order to cash in on the advantage they enjoy in the millimeter wave industrial chain.

The competition in 6G will start with the setting of standards, which will determine the level of R&D needed for the launch of the technology and thus decide the market share of the emerging industry. As far as R&D in 5G technology is concerned, China enjoys two advantages. First, it is a global leader in the telecom sector and has a solid reserve of talents. And second, it has a relatively complete industrial chain that covers R&D, design, manufacturing and application, and is home to leading 5G equipment maker Huawei.

Recent history shows whoever leads the telecom technology sector sets the standards for telecom products and services and plays a bigger role in the industry's future development. And since 6G technology will become the engine of a new round of economic development, the Chinese government, enterprises and research organizations should strengthen cooperation to succeed in the competition to develop 6G.

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Sri Mulyani Indrawati

Seize the new tech frontier for growth

MA XUEJING / CHINA DAILY

Rapid technological transformation will be a key feature of economies well into the future. At the national, regional and global levels, frontier technologies are offering promising new opportunities, as well as prompting new policy challenges.

Technological innovation has long boosted economic performance, improved efficiency, and expedited economic globalization, transforming human society in the process. But as the defining issue of our time, the digital revolution demands renewed policy cooperation at all levels of governance. After all, the latest wave of technological change is especially broad, and it is coming fast. It is fundamentally altering how goods, services and ideas are exchanged. And as rapidly declining costs make digital technologies even more affordable and accessible, they will continue to transform people's lives and livelihoods.

And yet there is a danger that these gains will not reach the world's poorest people. An estimated 3 billion people could still not have access to the internet by 2023, and many more will have little or no opportunity to reap the benefits of digital technologies. Which means there should be no delay in addressing the problem of digital exclusion.

Fortunately, the Pathways for Prosperity Commission on Technology and Inclusive Development, which I co-chair with Melinda Gates, former Microsoft general manager, has shown developing countries can still harness the new wave of frontier technologies for the benefit of all. Digital technologies have unlocked new routes to prosperity through agriculture, manufacturing, trade in services, the linking of informal and formal sectors, and domestic interconnectivity. Low- and middle-income countries around the world now have the chance to build new industries, deliver better services, and improve peoples' lives.

But digital technologies can also entrench existing forms of exclusion, disrupt livelihoods, and provide new tools for the powerful to abuse and exploit the weak. Developing countries, in particular, are starting from a difficult position, because they are already grappling with the challenges of low human capital, ineffective institutions, and a difficult business environment. Still, policymakers must not allow themselves to be paralyzed in the face of change. Rather than becoming passive observers of the technology revolution, they must take control of their countries' economic futures.

All developing countries and emerging economies should be able to capture at least some of the new opportunities on offer. As the commission has shown, governments have several policy options to achieve more inclusive growth. But technology alone will not guarantee success. Policymakers must also consider local contexts and conditions, so they can create social, political and economic ecosystems in which technology creates jobs and drives inclusive growth.

To compete globally, all countries need to prepare themselves for new and upcoming technologies, by maximizing inclusiveness and guiding markets toward the right types of innovation. Governments should start by realizing the challenge is not just about "digital policy". Rather, it calls for a "whole-of-economy" — indeed, a "most-of-society" — approach. And since inclusion is the key to success, support for marginalized groups will need to be built into the policy process from the outset. To that end, national governments should start planning for digital readiness in four areas: infrastructure, human capital, policy and regulation, and finance. These are the technical pillars of the future economy.

At the same time, regional-level policymakers — particularly in the Asia-Pacific region — need to start building momentum on policy cooperation, which will be necessary for harnessing frontier technologies for the greater good. And at the global level, cross-border issues related to frontier technologies will need to be addressed multilaterally.

That means multilateral organizations themselves should be developing an antenna for identifying new technological and developmental challenges. It is already clear that more must be done to mitigate technological disruptions to employment, boost investment in human capital, and ensure fair taxation in the new digital economy.

We should not underestimate the power of multilateralism. For decades, countries have been coming together in global forums to safeguard public goods and pursue common prosperity. Yet the existing architecture for multilateralism will need to be adapted to reflect the changing needs. To capture the benefits of the fourth industrial revolution, we also will need to strengthen public-private partnerships and make our economies more efficient and flexible. With the world's population projected to reach 10 billion by mid-century, global governance will become even more complex than it is today.

For its part, Indonesia recognizes the need for policies to manage the new digital economy. In addition to addressing the impact of technological disruption and ensuring fair taxation, the key will be to put people at the center of the agenda. Beyond furnishing workers with the right skills, we must create a digital world where all people have a voice, and where those who are not benefiting from change have the support they need.

As is usually the case, the challenge we face is also an opportunity. Digital and frontier technologies have enormous potential to improve government administration and the delivery of public services. It is time for a new kind of conversation, one that involves governments, business leaders, innovators, civil society and citizens alike. For developing countries, the task is clear: we must ride the wave of technological change, rather than wait for it to crash down on us.

The author is finance minister of Indonesia and former chair of the World Bank Group's Development Committee.
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Sui Jigang

Basic scientific research can boost industrial transformation

The new round of scientific and technological revolution has triggered drastic changes in production modes, industrial organizations and structures, and played a significant role in determining global industrial transformation patterns while greatly influencing trade and the international division of labor.

However, due to its sensitivity to external environment, scientific and technological innovation needs a suitable institutional setup to promote development. As such, the scientific and technological system should adapt to the new changes. For that, however, the authorities need to establish better coordination among government departments, and set up a sound innovation governance system to boost scientific and technological development.

In the seven decades since the founding of the People's Republic of China, the government has continuously reformed the scientific and technological system and promoted innovation. But to promote comprehensive industrial transformation, the authorities have to further improve the existing scientific and technological system.

China's innovation program faces some problems. For example, there is a lack of coordination among different innovation-promotion organizations, and the market and intellectual property rights protection mechanisms are not foolproof, which is not conducive to promoting comprehensive industrial transformation.

The traditional management system should be compatible with the new industrial revolution. Since the traditional industrial system follows the top-down bureaucratic model, the new industrial revolution is focused more on creativity, equality, collaboration and opening-up, which could be a challenge for the innovation system.

Although the selective industrial policy is beneficial to developing economies trying to catch up with the developed countries, in the new age of industrial transformation, if a country sticks to the traditional policy paradigm, it could stunt the development of emerging technologies and industries. Therefore, it is important for the government to explore a scientific and technological system that could boost China's innovation capacity.

In order to avail of the opportunities offered by the new round of scientific and technological revolution and realize industrial transformation, as well as face the challenge of global competition, the authorities should further reform the scientific and technological system and build a strong innovation governance system.

To begin with, they need to strike the right balance between the government and the market. And to sharpen China's competitive edge, the authorities should allow the market to play a decisive role in resource allocation in order to promote innovation. But when it comes to strategically sensitive sectors, which concern national security and public interests, the authorities should integrate the government's institutional advantages to enhance the country's strategic scientific and technological power.

While strengthening coordination among different government departments and policies, the authorities should also combine science and technology policies with industrial, trade and financial policies to boost innovation. In particular, the government should deregulate emerging industries and create a flexible market environment to encourage enterprises to accelerate innovation.

Besides, the government should optimize research and development activities. By improving basic R&D, it can help researchers to focus more on fundamental scientific research which would facilitate more in-depth research in specific scientific fields. The government should also encourage enterprises to conduct basic research in applied sciences, so that the result of scientific research can be applied to industry and thus boost innovation and the production of innovative products.

The authorities also need to establish a management and evaluation system that will promote the cultivation of talents in the science and technology field, and improve the overall efficiency of the innovation promotion system.

Furthermore, the government needs to boost the innovation capacity of core technology fields, and strengthen innovation cooperation with other countries. As a responsible major power, China should take measures for the globalization of innovation, and contribute Chinese wisdom to international cooperation in innovation.

The author is a researcher at the Institutes of Science and Development, the Chinese Academy of Sciences. The views don't necessarily represent those of China Daily.