LADIES AND GENTLEMEN, 
THE WINNERS ARE...

The Brain Prize 2020 is awarded to Professor Huda Zoghbi and Sir Adrian Bird for their fundamental and pioneering work on Rett syndrome. Their work established the importance of epigenetic regulation in both brain development and the maintenance of normal adult brain function. It also points to novel opportunities for treatment of this and other neurodevelopmental disorders.

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If you had to name a city in China where you could find over half of the top scientific experts in the nation, your answer would have to be Beijing. As the capital of China, Beijing has led the nation’s development on many fronts, particularly innovation. The city is transforming itself into a national science and technology innovation center.

Science and technology (S&T) is a crucial factor in the development of a nation and of society as a whole. History has shown that scientific revolutions can change the world. Nations that led the most revolutionary scientific advancements, from steam power to electricity, to the emergence of computers and the internet, became global leaders in industry, commerce, and culture. As China grows to become the world’s second largest economy, the country also strives to be a superpower in innovation.

Beijing is at the forefront of this scientific revolution. The city has made plans to develop cutting-edge technologies such as 5G, artificial intelligence (AI), and intelligent connected vehicles. It aims to foster key industries in each of its districts and apply the technology they bring to daily management of the city, improving the quality of urban life.

As an innovation center, Beijing will also play the lead role in coordinating development in the surrounding region and the rest of the country. In 2019, agreements made between Beijing, Tianjin city, and Hebei Province totaled RMB 30 billion (USD 4.3 billion). In addition, Beijing strongly supports the Xiong’an New Area, a core development hub of the Beijing–Tianjin–Hebei economic triangle. In Tibet, Xinjiang, and Inner Mongolia, Beijing’s technological innovations have lifted many out of poverty. In Xinjiang, technologies that improve soil quality and increase crop yields helped increase the average annual income of over 100 families by RMB 4,950 (USD 704) in 2019.

**An open environment**

The city is also a pivot point for interaction among some of the world’s best S&T institutes. Activities such as the Zhongguancun Forum, the Beijing International Academic Season, the China–Italy Science, Technology and Innovation Week, and the Beijing Design Week form a platform of communication for scientists, entrepreneurs, and investors around the globe. Meanwhile, Beijing has rolled out a plan to advance scientific innovation and interaction as part of the “One Belt, One Road” initiative, a global strategy to develop infrastructure and other projects in several countries, involving multilayer cooperation in S&T. According to the plan, Beijing will foster international conversation and cooperation in scientific innovation, open up its resources to the world, aid local companies to expand overseas, and attract international talent to the city.

As it transforms itself into an S&T hub, Beijing is revising its policies to welcome international talent. As President Xi Jinping put it, innovation should happen in an open environment. “We should never close our doors,” he says, “but should leverage all possibilities, plan, and push forward innovation with a global vision.”

The Beijing Municipal Science & Technology Commission (BMSTC) has been the “central nervous system” of strategic planning for Beijing’s S&T development, conducting research, communicating...
with stakeholders, and supervising and implementing policies. Since 2017, it has generated detailed annual plans—for as many as 220 projects each year.

Such development has already borne fruit: In 2019, the GDP per person in Beijing surpassed RMB 164,000 (USD 23,617)—the same level as found in some developed countries and regions.

**Robust R&D investment**

Beijing is among the Chinese cities that provides scientists and entrepreneurs with the most funding, and it is careful about where it invests this money.

R&D investment is the source and motive for innovation. Modest strengthening of R&D investment, technology and spurs innovation, in turn promoting economic development and enhancing the competitiveness of a city and a country.

In 2018, Beijing invested RMB 187 billion (USD 26.9 billion) in R&D—an increase of 18.4% over the previous year, ranking third in the country. The intensity of R&D investment (ratio of R&D expenditure to regional GDP) was 5.7%, ranking first in the country and surpassing some developed countries.

In addition to the continuous increase in investment, Beijing is also constantly optimizing its R&D funding by attaching greater importance to fundamental science research. The proportion of investment in basic research in the city continues to increase: In 2018, investment in basic research was RMB 27.8 billion (USD 4 billion), about one quarter of the total for the whole country and an increase of 19.5% over the previous year.

Five major fields comprise 96.5% of Beijing’s funding. Among them, over half (52.5%) of the investments in 2018 went to scientific research and the technical services industry, while 18.2% went to the telecommunications industry and the software and information technology services industry. The manufacturing and education industries received 14.2% and 11.5%, respectively.

In addition, Beijing’s companies are increasing their R&D expenditures in groundbreaking technologies and emerging areas such as 5G, AI, integrated circuits, the Internet of Things, quantum science, big data, and medicine and health. The total enterprise R&D expenditure was RMB 78.1 billion (USD 11.2 billion) in 2018, a 26.2% increase from the previous year.

2019 saw Beijing’s efforts rewarded with multiple scientific breakthroughs. Researchers at Peking University invented LEAPER (leveraging endogenous ADAR [adenosine deaminase acting on RNA] for programmable editing of RNA), a new gene-editing technique that increases the efficiency and accuracy of editing defective cells. Scientists at the Institute of Physics, Chinese Academy of Sciences, succeeded in folding a layer of graphene thinner than 0.2 nm, which creates materials with unique features that could function as electronic components in phones and computers. Tsinghua University produced Tianjic, a chip with hybrid coding schemes that not only accommodates machine-learning algorithms, but could also function in brain-inspired circuits. Beijing scientists were responsible for eight of China’s top 10 scientific advances for 2019, as announced by the Ministry of Science and Technology on February 27.

Some of the latest technologies, such as AI robots, facial recognition, and 5G data transmission, have been implemented in public infrastructures such as the Daxing International Airport and used for public events such as the 2019 Beijing International Horticultural Exhibition.
Beijing is aiming for a greener, more efficient, and more intelligent development strategy. It is trading scale for quality, and will maintain its strong R&D investments, particularly in these 10 high-tech industries: next-generation IT, integrated circuits, medicine and health, smart equipment, energy saving and environmental protection, future smart cars, new materials, AI, software and information services, and technology services industries.

Drivers of innovation: Academic institutes and enterprises

Beijing’s innovation is driven by its many academic institutions and enterprises. The city boasts more than half of the country’s top colleges and universities, including Tsinghua University, Peking University, and the Chinese Academy of Sciences. It is also home to numerous domestic and foreign S&T enterprises.

An important contributor to this drive is Beijing’s high-tech companies. They are characterized by high-innovation input and output, which play an important supporting role in economic and social development. For example, almost all the city’s IT enterprises have invested strategically in AI, which is vital for China’s long-term growth. As of today, Beijing has five of the world’s top 10 AI companies and 60% of the nation’s AI talent.

The high-tech companies currently in Beijing have steadily grown their research teams and R&D input over the past few years. Their R&D investment increased by 41.8% from 2016 to 2018, from RMB 192.6 billion (USD 27.7 billion) to RMB 273 billion (USD 28.8 billion). Meanwhile, the per capita R&D expenditure for S&T personnel increased from RMB 226,700 (USD 32,584) in 2016 to RMB 280,700 (USD 40,345) in 2018, also showing year-on-year growth.

Meanwhile, foreign enterprises and their research teams have become an indispensable part of Beijing’s drive to innovate. They directly apply their R&D to the Chinese market and help raise the level of collaboration in the city. Beijing welcomes such efforts and is reinvigorating its policies to help grow S&T innovation. Its policymakers believe a key to speeding the movement of technological innovation from the laboratory to production is to establish policies that provide efficient pathways for such transition—an agenda the city has been working on for years.

National laws, such as the “Law on Promoting the Transformation of Scientific and Technological Achievements,” as well as Beijing’s own regulations and plans, serve as such pathways. In 2019, Beijing issued the “Regulation of the Beijing Municipality on Promoting the Transformation of Scientific and Technological Achievements,” which is the first national policy to make institutional arrangements for the reform of ownership of S&T achievements in the form of local regulations, effectively solving bottleneck problems such as the ownership of those achievements.

With policies such as this, researchers have found it easier to industrialize their innovations. In 2017, Beijing ranked first in China in terms of the total value of contracts signed by scholars at colleges and research institutions for transformation of scientific achievements, reaching RMB 3.3 billion (USD 480 million), according to a 2019 report published by the government-affiliated National Center for Science and Technology Evaluation.

Embracing international talent with friendly policies

A skilled labor force is one of Beijing’s greatest advantages—and one of which it is very proud. It has an abundance of experts, along with impressive S&T resources both in terms of quantity and quality. There are more than 90 colleges and universities in Beijing, more than 1,000 scientific research institutes, and more than 180 National Key Laboratories and engineering technology research centers, as well as half of the nation’s academicians. About half of the first prizes for national S&T achievements and many of the top 10 S&T advancements are credited to Beijing each year.

Beijing has offered support in three major areas to high-level experts from outside the country:

First, foreign experts enjoy shortened approval times for a permanent stay in China—as short as 50 days—and those who meet certain criteria are allowed to apply for permanent residency (a Chinese green card). For people holding a foreign expert visa, the period of validity is as long as 10 years, and one is allowed to stay in the nation for 180 days consecutively. The visas will be approved on the second day of application and are free. Foreign experts could be exempted for certain
documents and offline procedures when coming to Beijing for innovative work in fields such as science, finance, and education.

Secondly, the city encourages foreign high-level talent to take the lead in undertaking national S&T projects as well as programs such as the National Natural Science Foundation’s Outstanding Youth Program. They can also be nominated for national S&T awards.

Last but not least, the city also takes care of accommodating foreign talent and educating their children. Beijing has fostered international talent communities in Chaoyang District, Zhongguancun Street, Changping’s Future Science City, and other areas, so that foreign experts can have full access to medical support, housing, and education. They enjoy the same level of welfare and medical insurance as Beijing citizens do, and are provided translational services at designated hospitals. Their children can choose to enter either public or private schools.

Innovative entrepreneurship: Beijing as an incubation hub

For companies that are looking for a vigorous business environment, Beijing is one of the best choices they could make.

The city has carried out ongoing reforms to make public services more easily accessible to the private sector, alleviating the burden of middle- and small-sized enterprises and facilitating the flow of capital and talent. In the World Bank’s 2019 report “Doing Business,” Beijing ranks No. 28 in the world, surpassing some European Union countries and Organization for Economic Cooperation and Development (OECD) members. It made the top 30 in indicators such as “starting a business,” “getting electricity,” “registering property,” “protecting minority investors,” and “enforcing contracts.”

Beijing is developing a more active innovation system, a better innovation ecosystem, and a bigger innovation space. It welcomes world-class S&T companies to come and grow there.

Beijing has a long history of incubation. It launched its first incubator platform, the Beijing High-Tech Start-Up Service Center, 31 years ago in 1989. Since then, it has evolved with time and has now formed a multifield, multimode incubation system that integrates global resources.

At present, there are more than 500 incubators in the city, occupying an area of 5 million square meters. Numerous startups and teams are in incubation, of which 300 are listed companies and 13 are unicorn companies (privately held startup companies valued at USD 1 million). These companies have produced more than 325,000 jobs.

There is no doubt that incubators speed up innovation in Beijing. In 2018, the city’s incubating enterprises held 86,112 valid intellectual property rights, an increase of 42.2% over 2017; the total investment obtained in 2018 was RMB 47.8 billion (USD 6.9 billion), an increase of 62.6% over 2017. Incubators and startups have become an important carrier for Beijing to accelerate the implementation of its innovation-driven development strategy.

Science and technology are the future of Beijing. The city is gathering its strength to offer a world-class S&T platform.

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