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China's new leaders must keep science in focus

By bringing in people with more varied backgrounds, China's leadership change could benefit science, argues **Peng Gong**.

This is a big month for the world's superpowers. The United States elects its next president this week, and the following week brings the first change in China's leadership for ten years.

Since 1989, the political bureau (politburo) of the Communist Party of China has been dominated by officials trained in engineering. This time, appointees with backgrounds in economics and administration are expected to constitute more than half of the standing committee, the most powerful section of the politburo. The scientific community inside and outside the country is wondering how this shift will affect the future of scientific research in China.

I believe that China will continue to prioritize the development of science and technology over the next ten years. The country is half-way through a 15-year science and technology programme to transform it into an 'innovation-oriented society'. Internal desire and external pressure to deliver this are strong.

In 1978, the influential reformist Deng Xiaoping began economic reforms that saw China open its door to the world. He viewed science and technology as "the primary productive forces" of his strategy to transform a poor agricultural country into an affluent nation; a strategy that has been faithfully followed over the past three decades.

Meanwhile, the influx of large-scale foreign investment has attracted high-level management and technology talents from all over the world. However, many Chinese students educated abroad do not return after they graduate. To combat this, and to draw fresh talent to the country, China launched the 'Thousand Talents' programme in 2008 to entice the best researchers in science, technology, engineering and management. By the summer of 2012, the programme had attracted more than 2,000 such high-end professionals to China. Furthermore, the number of acquisitions of foreign companies by Chinese enterprises is increasing. It is to be expected that, as experience in the global market accumulates in the science and technology sectors, improvements will be seen at home.

Pressure to increase core competitiveness will also drive continued investment in science. China may have the second largest economy in the world, but that does not mean it is competitive. Recent reports suggest that profits from China's expected 2012 export of 1 billion mobile phones will be, on average, less than US$0.5 per phone.

Ubiquitous technology such as the remote control, personal computers, HTML (the markup language used to make Web pages) and the Global Positioning System (GPS), and specialized tools such as genetic sequencing and zero-emission fuel cells, are considered to be among the top 50 inventions of the past 50 years. None came out of China.

How can China's new leaders address these research issues? Three elements determine the fate of all organizations: people, resources and management.

With regard to people, China's talent pool is increasing, but there is still a shortage of scientists who are creative and original thinkers. In the next ten years, more foreign scientists must be recruited and China must enhance its own capacity to train original minds. To retain scientists from overseas, specially allocated research support should be provided for at least their first five years in China.

In terms of resources, research and development (R&D) investment in China has grown more than tenfold in ten years, from around US$12 billion in 2001 to about $135 billion in 2011. Investment in basic science and applied research increased more than sixfold; but the percentage of investment for public research organizations and universities dropped from 38% to 24%, indicating more input from the private and non-governmental sectors. The new leadership should increase investment in these institutions, particularly the major research universities.

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The biggest challenge in ensuring the healthy development of scientific research is management. Better management would improve academic culture, scientific ethics, resource sharing and communication and cooperation. China must pay talented individuals in accordance with international standards. Personnel and project review should encourage scientific adventure and tolerate failure. Dogmatic budgetary regulations on research projects must be revised to allow flexible requests of personnel, operational and material costs, and to give more freedom to principal investigators. These changes, even with the current level of R&D investment, have the potential to advance scientific research by making more effective use of funds.

The Chinese science system looks like it was designed by an engineer. Project conception time is included in grant accounting, there are mid-term and annual reviews with external audits to check on progress, including counts of the number of published papers. Science should not be managed as an engineering project. With more top administrators from economics, science, social science and management backgrounds, I hope that the new regime will change this for the better. ■

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