

Learning from China

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In order to develop a strong knowledge economy in Pakistan, we need to follow China's example and make science, technology and innovation the focal points for development.

China has turned around its economy in the last 35 years and become one of the most powerful countries in the world. In the 1980s, the country decided to focus on the following major areas to lift over a billion people out of poverty: agriculture; high-technology manufacturing; education, science, technology and innovation; and promoting the private sector and research and development.

After much deliberation, China decided on a strategic approach to focus on agriculture for short-term gains and on the manufacturing and export of medium/high-technology products in the long term. The world market is largely composed of medium and high-technology goods while natural resources and low-technology products have a low overall value and need to be replaced.

To manufacture high-technology products, a large number of leading scientists and engineers, and incentives were required. A massive programme was undertaken to send China's brightest students to top universities abroad to acquire training in key areas of science and engineering. This initiative started with about 800 students in 1978 and the number of students rose to about 600,000 by 2017.

Around 500,000 students are returning to China after completing their PhDs and postdoctoral training and being clustered in centres of excellence. China has emerged as a superpower with capabilities to build spacecraft, satellites, fighter aircraft and super computers. Indeed, it is now the world leader in quantum computing and is ahead of the US in this fast-emerging area of computer engineering.

China's well-thought-out strategy for socioeconomic development has worked. Its agriculture reform programme lifted millions of people out of poverty and generated enough income for investment in industrial innovations. The Spark Programme was launched in 1986 by the Ministry of Science and Technology and helped to transfer managerial and technological knowledge from more advanced sectors to rural enterprises. This helped to increase productivity and employment.

However, the real reason for the emergence of China as the next superpower is the country's clarity of vision and strategy. This was based on the understanding that progress in this knowledge-driven world can only be made through a dynamic interaction among the three key pillars of a country: its educational and research institutions; its private sector that is motivated to enter into high-tech manufacturing; and its enabling government policies.

The main programmes that brought about the transformation in China were the Key Technologies R&D Program, the 863 Program and the 973 Program, the Spark Program and the Torch Program. Each of these initiatives is a beacon of light for Pakistan.

The Key Technologies R&D Program, launched in 1982, was the single largest science and technology initiative of the 20th century. Aimed at massive economic reconstruction, it covered agriculture, electronic information, energy resources, transportation, materials, resources exploration, environmental protection, medical and healthcare, and several other fields. The programme engaged thousands of people from more than 1,000 scientific research institutions nationwide and shaped the face of China as it is today.

In March 1986, the National Hi-tech R&D Program (or the 863 Program) was launched, covering 20 themes, including information technology, lasers, robotics and automation, energy, biotechnology, space flight, new materials, and marine sciences.

China's most important programme to promote high-tech industries was the Torch Program launched in 1988. High-tech products were identified for industrial production and exports, and universities and research centres were strengthened to produce manpower that is capable of mass producing high-tech products. It wasn't confined to conventional fields, but included new and emerging areas. We need to implement this initiative under CPEC.

Science has opened up vast opportunities for those countries that understand the key ingredients of the Fourth Industrial Revolution, which has now begun. The truth is now stranger than fiction. For instance, new materials have been synthesised, which can bend light and make objects invisible (metamaterials). You can hang an elephant on a strand of graphene that is 150 times thinner than a human hair and the strand won't break because it is 200 times stronger than steel.

Nanotechnology-based filters are already available to purify water. An exciting new technique for accurately splicing genes (CRISPR/Cas9) has created possibilities to cut out salt-tolerant genes from sea weeds or cactuses and incorporate them into edible crops. Super-fast gene sequencing allows the entire human genome to be sequenced within minutes. Anti-ageing compounds have been discovered and when given to old mice, it made them younger. Stem cells promise to cure damaged organs and may change the manner in which medicine will be practised in the future.

Unfortunately, our Ministry of Science and Technology is in shambles because past governments lacked vision. They spent billions of rupees on greedy transportation schemes while the development budget released last year for the Ministry of Science and Technology was only Rs0.9 billion. We will need to grant a 'pioneering status' to high-tech industries along with providing them a suitable long-term, tax-free status to promote manufacturing and exports in high-tech fields. This could be accompanied by establishing regional industrial clusters to manufacture and export high-tech products, preferably in collaboration with China's private sector.

We will need resources to launch these programmes. Pakistan's immediate problems include the huge gap of about \$40 billion between imports (\$64 billion) and exports (\$24 billion). We, therefore, need to immediately impose a ban on all imports apart from industrial raw materials and essential commodities.

Cars with a capacity that is above 1,300cc should also be banned. We simultaneously need to reduce the cost of doing business by supplying cheap electricity to industrial states. This could be done by establishing new power plants that produce electricity at five cents per kilowatt hour and sell it to industrial states at seven cents per kilowatt hour. The huge losses being made by our public sector companies could be addressed by giving them away at nominal rates on a long-term lease so that this huge gap in our budget can be plugged.

The sum of \$200 billion stacked by corrupt politicians abroad should be brought back in the same way that Saudi Arabia dealt with corrupt officials. However, in our case we shouldn't detain politicians involved in corruption at a luxury hotel. Instead, they should be put in prisons with C-class facilities till they cough up plundered national wealth. They also shouldn't be provided the option of a plea bargain.

The writer is the former chairman of the HEC, and president of the Network of Academies of Science of OIC Countries (NASIC).

Email: ibne_sina@hotmail.com