



# Harnessing innovation is the path to growth in developing countries

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For ambitious economies that have recently overcome historical economic obstacles and become stable and vibrant engines of growth, the question now is how to make growth sustainable and inclusive.

For the People's Republic of China and India, innovation is now the key to their economic futures. Yet the legacies of their growth present troubling issues, chiefly environmental degradation. Both economies are also striving to avoid the middle-income trap that can, in the case of China, undermine sustainability or, in the case of India, undermine inclusiveness.

Although they share characteristics—a large population and territory, as well as a long history of civilization—they are different in important ways.

To grasp the impact of China's and India's innovation efforts, scholars track their inputs and outputs. Among the preferred input metrics are rates of research and development spending. In China, investment in innovation went from below 0.6% of gross domestic product in 1996 to 2.0% in 2012. This matches typical expenditures in Organisation of Economic Co-operation and Development countries, which usually range from 2% to 3% of GDP. India, by contrast, has research and development spending ranging from 0.6% to 0.8% of GDP, despite liberalizing the economy in 1991.

China's innovation investment as measured in 2011 dollars is 120 times more than that of India. And China has five times more the research development personnel than India. China surpassed the United States in total number of researchers in 2005, although it still trails the United States and Japan in researchers as a percentage of the population.

Innovation outputs primarily focus on patents, particularly as certified by the United States patent office. China and India have had most of their patents granted in the past 5

years. Patents are studied in a lifecycle, starting from scientific and technical journal articles. India produces a quarter of the number of articles that China does.

Despite some claims to the contrary, innovation affects an economy through high-tech exports. Tracking this output shows a different configuration of economic effects, since India has maintained a service sector balanced with exports. By contrast, China has tilted most of its high-tech efforts to exports rather than services.

Although still substantially behind such OECD members as the United States in journal publication, rates in China and India have climbed steadily, with China passing Japan in 2007.

Together, these inputs and outputs combine to show a complementary relationship between capital and innovation through technology in China. A more disruptive pattern is evident in India, where abrupt transitions can both impede and promote innovation.

China did invest in innovation before its 1978 economic reforms, but subsequent efforts were more explicitly designed to work with industry, and central among these efforts was a shift to technology. Longer-term plans included development plans to stimulate innovation in China's western region and the Pearl River Delta.

India has faced obstacles similar to China's in establishing a national innovation strategy. Having inherited an economic model based on colonial institutions, India faced a research climate lacking in industrial dynamism. R&D institutes that had depended on government funds found themselves with reduced support. Instead, researchers would benefit from government knowledge and policies designed to create a climate of innovation.

If firms dedicated to R&D want to prosper, they need to respond to market demand. By 1998, India's integrated system included ministerial councils and research units, along with 3,000 public institutes, and when by 2014 India had integrated science and technology with industry, there were 2,500 R&D company centers.

Assessing the results of these respective strategies shows how urbanization models have dominated in China and India. Within high-tech innovation, the relationship between cities and patents has become increasingly apparent. In India, for example, Bangalore alone accounts for 36% of all patents granted.

How then to ensure that cities do not perpetuate the legacy of regional inequality? By making policies that ensure that innovation is balanced regionally.

In China, the seven most innovative cities by various measures are all in the eastern part of the country. In India, innovation centers are distributed in a more balanced way although Bangalore still generates enough patents to nearly match the combined total generated by six other regionally diverse Indian cities. These are not the most populous or productive cities, but the seven are emerging as the powerful locus of national innovation.

Shifting to an innovation-based regime forces economies to better understand the influence of multinational corporations. China complements the efforts of multinational corporations in its domestic sector, tying together the strands of its ambitions into a coherent strategy. India shows a much more marked dependence on multinational corporations, with 8 of the top 10 best-performing firms in the country based in the United States.

Completing the picture is a survey on the initiatives from both countries to stitch together a comprehensive strategy.

While China has retained some basic independent research, it has focused its growth potential on select high-tech-friendly regions, but its inability to spread the benefits of its innovation policies throughout the country could undermine future economic sustainability.

For India, its inability to measure up to China's performance is tempered by a regionally broad national innovation system that invests more in economic sustainability by ensuring innovation is inclusive and not too top-heavily geared to urban centers.

By drawing on their specific strengths, China and India have shown new ways of cultivating overall innovative capability and harnessing it for national growth.

The episode was based on [research](#) done for ADBI by Peilei Fan, an associate professor of urban and regional planning at Michigan State University, Michigan, the United States.

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