

India needs system reforms in education, infrastructure, culture to grow innovation and commercialization efforts

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(Phys.org)—India remains one of the world's fastest growing economies. But cultural, educational, infrastructure and leadership challenges are inhibiting growth of its innovation and commercialization efforts, a new study by a Purdue University professor shows.

Pankaj Sharma, a Purdue professor with a courtesy appointment in technology leadership and [innovation](#) and a native of India who moved to the United States in 1982, said India needs systems-driven reforms to promote growth and innovation and sustain the economic growth it has achieved in recent decades.

His study, titled "India's National and Regional Innovation Systems: Challenges, Opportunities and Recommendations for Policy Makers," has been published this month in the *Journal of Industry and Innovation*. The study was done in conjunction with Sharma's appointment as a U.S. State Department Fulbright New Century Scholar.

"There is a need for necessary reforms to affect major change in the innovation system of India, but there are both social and cultural barriers, such as limited teamwork education and the enduring importance of upward hierarchical progression," among other obstacles, Sharma said. "A lack of confidence in innovation capabilities is coupled with a failure to positively reinforce innovation efforts and a strong need for control, which gets in the way of cooperation with other

organizations."

A key challenge facing Indian universities, research institutions and corporations is an educational system established during the pre-liberalization era that emphasizes learning through [memorization](#) rather than factual understanding, teamwork and creative thinking.

"The lack of quality education has churned out a workforce with inefficient and inadequate skills, rendering the industry-academia linkage relatively weak over time," said Sharma, who also serves as managing director of Purdue's Global Sustainability Institute in Discovery Park.

Researchers in India also seem more motivated by publication of their research, not patenting and commercialization that could advance the impact of their efforts, he said.

Sharma says India faces a shortage, and even an absence in some cases, of the necessary support mechanisms that foster commercialization and innovation - research funds, venture capital funds, and start-up capital, as well as awareness programs and initiatives.

"A lack of these support systems has resulted in a limited number of innovative ideas, relatively few motivated individuals, and subsequently, very few or minimal incentives for people to generate innovative ideas," he said.

Since its independence from Great Britain in 1947, India's economy has surged by more than 200 times its per capita annual income, led by increases in the size of a middle-class consumer, a relatively young labor force, the manufacturing sector and considerable foreign investments. India's economy ranks as the 11th largest in the world and is the third largest based on purchasing power.

Despite those enviable statistics and an economy ranking among the world's leaders in the mid-2000s, Indian corporations still face major infrastructure, leadership and cultural challenges.

To address those, Sharma says Indian companies must focus on local needs by improving basic civil infrastructure such as transportation, sanitation and water, health-care and energy systems. Nearly 400 million people in India, for example, lack access to electricity. India spends less than 1 percent of its gross domestic product on health care.

For its educational and research institutions, India must scale up its entrepreneurial courses and programs and focus on research and technology development relevant to India's infrastructure needs - water purification, energy, pharmaceuticals and pesticides for crops, for example.

He encouraged Indian institutions to reach out to foreign universities to bolster their technology commercialization efforts and heighten collaboration with industry to transfer knowledge as technology. Moreover, the nation can provide networking opportunities and offer funding incentives that encourage researchers to start companies.

"Most people in Indian society are risk-averse. Failure is neither tolerated nor accepted by such people," Sharma said. "This lack of tolerance toward failure instills the fear of taking risks ... thus making it difficult for them to generate innovative ideas or to promote existing ones."

Eight regional clusters of business incubators, educational/research institutions and corporations have been identified. The Mumbai and Pune clusters accounted for the largest number of patent applications followed by the Bangalore and Delhi clusters. A policy recommendation is to foster local interaction among these actors to exploit synergy to

promote innovation and regional economic development.

Ian P. McCarthy, the Canada Research Chair in Technology & Operations Management and director of the CMA Innovation Centre at Simon Fraser University in Vancouver, said the work by Sharma provides insights on how the growth of clusters, and associated industries, contributes to the recent economic growth and development within a number of regions across India.

"Research on the interplay between innovation systems and economic development is regarded as being important to national and regional competitiveness. Yet, there is a dearth of research on how these mechanisms function in the India," McCarthy said.

Miranda Schreurs, director of the Environmental Policy Research Centre at Germany's Freie University in Berlin, pointed out that Sharma and his co-authors surveyed more than 30 business incubators, funding agencies and [research institutions](#), determining what stimulates innovation and what obstructs it. They identify locations in [India](#) that generate many patents, an indication of innovation.

"Governments, Professor Sharma argues, could stimulate greater innovation by investing in the development of science and technology entrepreneurial parks and technology business incubators that place scientists and researchers in close proximity with business entrepreneurs," she said.

"Although he focuses his attention on the Indian context, much of what he argues applies to other countries as well."

Provided by Purdue University

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