

## 'Focus on disruptive technologies to boost Make in India'

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A new study, 'Make in India: How could we be strategic?' has identified five key technologies as having the maximum potential to stimulate growth in Indian manufacturing: biotechnology, nanotechnology, micro and nanoelectronics, photonics, and advanced materials. These five knowledge intensive technology areas have wide-ranging applications across various industrial sectors with the potential to meet national security priorities, stimulate economic growth as well as meet social development imperatives.

The study by the Council on Energy, Environment and Water (CEEW) was released days after the introduction of the National Capital Goods Policy during the Make in India Week programme in Mumbai. The National Capital Goods Policy includes a provision for a Technology Development Fund and other commitments such as increasing skill availability, ensuring mandatory standards and promoting growth and capacity building of Micro, Small and Medium Enterprises (MSMEs). The study identifies how to deploy the fund most effectively.

Mr Vaibhav Gupta, junior research associate, CEEW, said, "Our analysis finds that a large share of the total manufacturing output (calculated in terms of gross value addition) can be impacted by the identified technologies: Biotechnology (15 percent), nanotechnology (86 percent), micro and nanoelectronics (100 percent), photonics (19 percent), and advanced materials (40 percent)."

However, the existing innovation support system to help translate research efforts across these identified technologies and other areas into commercial products is nascent in India. One key hurdle preventing India from becoming an innovation hub is the abysmal participation of the private sector in R&D, by way of financing. The private sector contributes to less than one-third of the overall R&D spending in the country due to the associated risks in investment and technology failure. Importing components and licensing of intellectual property (from overseas) is the current approach across the strategic sectors. In the long run, this presents the biggest threat to innovation in India.

The study recommends that the public sector must don the role of 'risk capital' provider and move away from granting soft-loans for research to a royalty based system that allows for revenues to flow back to the public corpus, should the idea become a commercial success.

As a solution the study also showcases the design of a centralised one-stop technology information portal that provides a range of information - open funding opportunities, status of existing grants, outcomes, partner opportunities, etc. Such an extensive database could help identify emerging areas of research, reduce doubling of effort, target limited resources more strategically, and assess the impact of R&D investments especially in facilitating more links between technology developers and industry.

Another key challenge is the inefficient and understaffed Indian Patents Office (IPO). The IPO has an ever increasing backlog of unexamined patents and trademark applications. In 2012 there were 123,255 pending patent applications, which have further increased to 246,495 pending patent applications (in addition to the 532,682 pending trademark applications) in 2015. IPO staff in India experience the highest per capita workload (20 applications a month, as compared with seven in Europe and China, eight in the United States) at the lowest pay. However, 490 patent personnel have been recently recruited to improve the efficiency of the Indian Patent Office.

The study suggests that capacity expansion of the IPO (both funding and manpower) and outsourcing 'prior-art' searches to third party service providers will significantly improve the efficiency of the patent filing and approval process. In addition, fast-track IP courts for patent infringements and a patent prosecution highway would accelerate patent prosecution procedures. A fee based revenue model is necessary to enable the IPO to sustain its operations in the long run and operate in autonomy.

The third significant factor hampering the pursuit of strategic technologies is the quality and standards associated with domestically manufactured finished-goods and intermediates. Indian industry, to remain competitive and keep costs lower, must have significant backward integration with domestic suppliers of components and raw materials. However, in many cases the physical and chemical properties of intermediates and raw materials do not meet international (or even) national standards. This in turn, adversely impacts the quality of final products.

The study finds a pivotal role for an accreditation entity such as (NABL) to certify the bulk of testing laboratories across the country. Currently, only one percent of the laboratories are accredited by NABL. To promote the development of quality products in the five identified areas, mandatory certification of products enabled by these technologies must be enforced. This will set the bar for new entrants and create a larger market for domestically manufactured goods.

Dr Arunabha Ghosh, CEO, CEEW, said, "For a competitive manufacturing driven economy, we have to focus on three transitions: from resource vulnerability to securing resources, from acquiring technology from overseas (for domestic use) to developing high technology domestically, and from education and skills to R&D and innovation. A slew of reforms identified in the study are necessary to set the innovation ecosystem in India right. Creating this sustaining eco-system must be made an important objective of the Make in India campaign." .