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Our IITs fulfilled their mandate. Now they have to reach even higher.

Written by [Anil Kakodkar](#) | Published: June 7, 2011 2:08:29 am

Environment Minister Jairam Ramesh's comments have, this time, stirred up a debate on the Indian Institutes of Technology. Our established IITs are around 50 years old. Everyone would agree that IIT graduates have a high brand value globally. In that sense IITs have in fact fulfilled the mandate with which they were started. Research at IITs started becoming a significant component a little later and there is no denying that among the technological research and educational institutions in the country, IITs stand tall. Even in terms of global ranking among institutions in its class, IITs rank fairly high. Running such institutions down in fact serves no purpose except demotivating the system.

Having said that, it is important to look at the role of the IITs in the national context and search for avenues to take these institutions to even higher levels. I had an opportunity to chair a committee to do precisely that. A report on this work is available on the website of the ministry of human resource development.

A country of India's size, on a rapid economic growth path, would require in today's context a significant emphasis on large-scale technology-oriented research at the highest levels of excellence. This is necessary to push the frontiers of knowledge and create new cutting-edge technologies and thereby sustain India's progress as a

leading country in today's competitive global environment. We need to nurture a large science and technology-based innovation ecosystem that creates solutions for India's inclusive development and economic growth. The creation of a large pool of researchers (with PhDs), commensurate with the size of our population and economy as well as our aspirations, is a key necessity for the realisation of these objectives. At present our PhD output in engineering and technology is an order of magnitude smaller than both the US's and China's. The IITs, being the largest system for high-quality human resource development in an ambience of high-level engineering R&D, have thus to take on the challenge of creating an advanced research-based technology and innovation ecosystem that, on a national scale, is large enough to make a significant positive difference.

Such a scale-up, apart from addressing the quality issue through high-calibre faculty in adequate numbers, should also provide for a large enough and comprehensive research infrastructure; funding support to identified groups that have the potential to be among the best in the world; innovation ecosystems in partnership with industry present on the campus; laboratories to create technologies for the socio-economic development of the nation; and address some grand challenges of national importance in a coordinated effort involving a number of faculty groups working together. It is expected that this would create a considerably enriched and holistic knowledge environment for IIT faculty and students with useful linkages between them and the external world and make research at the IITs more meaningful. To create an impact and not lose out on account of sub-critical efforts, we need systems larger than what they are at present.

The quality of research would also depend on high-quality engineering graduates taking up research and teaching as a career at the IITs in large numbers. Apart from meeting needs of the growing IIT system, this is the key to enhance quality in our higher-level technological enterprises. This would require engaging with the undergraduate students at IITs as well as at other institutions to

initiate them into research right in the third year. A distinctive feature of BTech at IIT is the learning opportunity in an ambience of large-scale high-level research, a feature that needs to be emulated in other institutions.

The general engineering education scene in the country is characterised by a massive augmentation of the capacity with declining quality. This has led to difficulties in recruiting quality engineers needed for nation-building and at the same time frustration among a large number of graduating engineers. Engagement of the IITs with some of the better-performing institutions could contribute to their further upgrade while creating a feeder of requisite size and quality to support scaled-up research at the IITs.

World-class institutions are characterised by the existence of a large high-quality talent pool (faculty, students and visiting researchers), vibrant academic and research linkages with external better-quality institutions, availability of liberal resources and a flexible and conducive governance system that can recognise and selectively support credible new ideas in a hassle-free manner. Funding and autonomy of the IITs are thus key areas that need serious attention. Inherent in encouraging quality research and innovation is the ability to facilitate rapid movement in new and uncharted territories following case-specific pathways. This is not possible without full autonomy for the IITs. Rigid rule-based approaches can hardly respond to such needs in a timely manner.

A possible way to create financial autonomy in government-funded institutions is to make them operationally independent while taking care of capital investment needs on the basis that R&D leads to building knowledge assets. Accountability of the institutions can be through key deliverables like number and quality of students graduating in different disciplines, quality of research as adjudged by peers, technologies and enterprise created, impact on national development and other such parameters. The operational cost of education can be recovered by the government fully supporting students for their fees and living on the campus except those

undergraduate students who are in a position to pay. A hassle-free loan facility without any collateral should be available for all those who may need it. A detailed analysis shows that such an approach is feasible. In any case, full autonomy is a must for the IITs to become world-class.

The writer is former chairman, Atomic Energy Commission of India. He chaired the Kakodkar Committee on reforms in IITs



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