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What does the future hold for the IITs?

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IITs: vision 2050

The IIT system has been around now for over half a century. It started with a concept and the critical need earlier was to prove it. The IITs have done this handsomely. IITs also needed to play a leadership role in technical education, as this wasn't well established in India.

They have clearly succeeded in this task, as the existing style of technical education is similar to the IITs': a semester system, course-based, continuous evaluation and a grade system among other things are now standard.

In the early years, the IITs were clearly driven by these objectives. Having achieved success, however, no clear vision for the future seems to be emerging. It seems that the system as a whole is happy in its current state.

University systems have a long life, and a 30- or 40-year-old university is relatively young by global standards. The culture and nature of these long-lasting institutions is defined slowly, over many years, with universities redefining themselves to stay relevant.

The IITs clearly have a long way to go. In our country, great universities of the past have faded into mediocrity over time, and an university or institute has to constantly reinvent itself to avoid this fate.

Now, there is a need to define the role and vision of the IITs. It is only when this is clear can a concerted effort be made to move towards it in the decades to come. Given the dynamics of the system — the top administrators are chosen for every three or five years, and the MHRD ministers (the IIT's parent ministry) change regularly — it is very easy not to have a future vision and just exist.

On the face of it, it seems that everyone concerned has accepted that the IITs just need to exist in their current state, and keep improving their quality of education and R&D to keep up with the times. But is this what the IITs should be heading towards?

Let us look at some of the possible broad directions in which the IITs can go, by drawing analogies with the world's long-lasting universities.

First, they can continue essentially as they are, keeping up with the times. That is, continue with a top-class small undergraduate programme and an average research programme. In this state, each IIT will continue to produce about 400 to 500 BTechs a year, about as many MTechs and about 25 PhDs a year in engineering (not counting the PhDs in sciences).

As the country's technical education system and industry's needs grow, the IITs will be of little significance in the times to come.

The second possibility is to become a top-class research university, but of a small size, like CalTech. Here, the undergrad student intake remains at 500, but the post-grad programme becomes mostly a PhD programme and the research profile undergoes a large qualitative and quantitative change.

Though this may be considered desirable, it isn't clear how this vision can be achieved. A CalTech-like vision needs to be supported by a world-class faculty, and given that the IITs' existing faculty will be there for another 20 to 30 years, reaching this state is going to be a huge challenge.

The third possibility is to become a large technical university along the lines of Georgia Tech and MIT in the US or NTU in Singapore. In this model, each IIT will have 500 to 1,000+ faculty members, about 10,000 to 20,000 students (a student faculty ratio of 1:20), and a strong and large research programme.

The academic programmes will revolve around engineering and science, but will expand to include other related disciplines like management and economics. Here, about a third of the students will be post-graduate students, with a vast majority working towards a PhD.

This is an eminently feasible vision. The existing IITs have established themselves and have a large base of alumni support. All these can be leveraged to expand. That's not to say that expansion will be easy. But, given the IITs' reputation and history, this vision is achievable.

Of course, it cannot be achieved overnight, but should be achievable within the next two decades or so. Capital expenditure of about Rs 1,000 crore over the next 10 or 20 years will be needed to upgrade infrastructure to handle this size. The annual budgetary support will also have to increase in a commensurate manner to over Rs 200 crore.

And the fourth possibility is for an IIT to become a general purpose university along the lines of big public research universities like Berkeley, Illinois, Purdue, Penn State, Ohio State, etc. That is, an IIT becomes a large research university, but more general in scope and not limited to science and technology.

It should be mentioned that India does not really have a large world-class research university. Most of its universities have now become examination or teaching bodies with little research activity. Some could have become world-class research universities, but that was not to be, thanks to how the universities have been managed and interfered with.

The IITs, on the other hand, have evolved stable and independent systems with sufficient autonomy and internal checks to use the autonomy properly. Hence, if they grow into large general purpose research universities, they should be able to maintain their quality.

The number of students can be over 30,000, with 2,000+ faculty. This again is a worthy vision, one which will be consistent with the nation's growth. And again, this is a vision that will take a few decades to achieve and provide direction to the IITs.

The budgetary support for infrastructure as well as yearly budget will be somewhat larger than in the previous option.

Incidentally, it is not necessary for all IITs to follow the same vision. Some can become large general purpose research

universities, while others can become large technical universities. When the IITs are large and research-oriented, they will become serious players in the world academic community and not be regarded as places that produce good undergrads to feed other institutions.

Their impact in the country will, of course, increase and their importance preserved in times to come. IITs are at a threshold today, they have had an excellent first innings, but there is no clarity on the purpose of the second. A clear future vision needs to be defined for these institutes of national importance, such that they, along with the government, can work in a defined direction for their next innings.

The author is a professor at IIT Kanpur. The views expressed are personal

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