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Pump priming with US horsepower

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Leadership in science and technology (S&T) is the key to economic and political power. This has been proven through history, and is also the reason why the US is so obsessed with 'losing the innovation edge'.

Though China has emerged as an economic superpower it, like India, faces some crucial shortages to realising its ambition of being a global S&T leader. The most critical is the low levels of production of PhDs, both in terms of quality and quantity.

China has embarked on a bold strategy to address this, with the help of the US in an unexpected way. The programme is simple and brilliant. PhD students in Chinese universities are given fellowships to spend 12 to 24 months in some US professor's laboratory, when they are ready to start their dissertation research.

During this period, the candidate defines his research problem, does most of the research work, and then comes back to complete his PhD in the parent university in China. An attendant benefit is the collaboration created between the US and Chinese faculty, which can lead to more international exposure for the latter, something which is also high on the priority list of the Chinese administration. It is estimated that approximately 4,000 Chinese students will be the beneficiaries of this programme in the 2007-08 academic year.

The programme leverages the excellent mentoring and guidance capability of US academics to overcome the hurdle of China not having enough faculty to guide a large number of PhD students. In addition, by getting Chinese scholars do their research in US, the new generation of scholars that will be produced will be much more attuned to the current trends and technology and build linkages with these labs for the future. As the reduced R&D funding in the US has many academics looking for resources to do their work, this scheme is attractive to them as well — they get free manpower to do their research.

Pakistan too has started a similar scheme to boost the number of researchers and PhDs it has. It is funding hundreds of people to do PhD in countries like New Zealand and Australia. The number of fellowships granted in the last batch is about 400. In addition, they also have a scheme to send their existing faculty to research groups and universities abroad for six months.

There is no reason why a similar model cannot be employed in India. Given the current state of the university system and lack of research support in them, India cannot build PhD resources all by itself at the pace needed, even if all support is given. However, India is better positioned for a collaborative model like the one China is following. Indian students know English and have a good reputation in the US on account of which they are preferred. In addition, there are a lot of academics of Indian origin in the US, who are eager to contribute to the development of R&D in India.

Such a programme in India can be along the following: The government of India should announce that it will give 1,000 fellowships each year to PhD scholars to spend up to two years overseas. The top 20 R&D centres can be given 50 fellowships each. Each institute/university then admits students in their programme against these fellowships. So, each student, at the time of admission, gets the fellowship, which can be availed after completing the course work at the institute, passing the necessary exams to start research, and having fixed his PhD advisor in India.

The advisor and the student together select the place the scholar can spend his two years. A researcher in the US (or elsewhere in the world) is selected as a co-guide and a topic of mutual interest is chosen. The scholar then goes to the co-guide's lab and spends 1-2 years there refining the topic and doing research. The expenses are covered by the fellowship. The student then returns to the university in India, finishes his work, and completes the PhD thesis. The fellowship can also have a component to allow the Indian supervisor to spend a few weeks with the co-guide, while the PhD scholar is visiting.

The model has many benefits. First, with these fellowships, we may be able to attract more bright students to join the PhD programme. For this, this fellowship should be awarded at admission time, as it can become a big incentive to attract bright people to the PhD programme. Through this programme, the selected candidates will not only get to live abroad for an extended period, but also visit and work in a world-class group or university.

This collaboration and increased PhD production will help boost the R&D output of Indian universities and build linkages with good universities and research groups internationally. The programme will be of tremendous help to existing faculty members: as their research output and international interaction increase, they get more intelligent PhD scholars.

The cost of this programme is small. The total fellowship for a scholar will be about \$40,000. So, if 1,000 such fellowships are granted every year, it will mean a commitment of \$40 million per year — which is a small sum if it indeed attracts so many people to the PhD programme. Note that as the scholar is not going as a student but rather as an exchange scientist, he/she does not have to pay the extremely high tuition fees of the US universities.

While there is no guarantee that no PhD scholar will not stay back abroad, this is unlikely. First, given the expected trajectory of employment prospects, India is much more promising a place than the west for R&D jobs now, and the compensation package for researchers in the Indian private sector has now reached global levels. Second, the students get their degrees from Indian universities, which make the employment and movement overseas a little harder.

Finally, and perhaps most importantly, the students come to the US on J-1 visa which requires the scholar to return to their home country for at least 12 months immediately after completing their programme. Also, since the degree is to be finally awarded by the Indian institute, if the candidate does not come back, he will have to forgo the PhD degree.

The window of opportunity for such a programme may not be too large especially since China has its programme already going. The hope is that through programmes like this the government and the academic institutions will take the challenge of substantially increasing the the number of PhD-holders , which is absolutely essential if India is to tap the emerging opportunities in the knowledge sector.

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