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EDITORIAL

Universities and Academic Institutions: Competition and Collaboration

Universities and research institutions worldwide, face intense pressure to move up the 'rankings lists', that are now produced annually by different bodies. The 'Shanghai rankings', first published a few years ago, have become as familiar to university administrators as the '*h*-index' and journal 'impact factors' are to scientists and publishers. In a competitive world it is inevitable that 'merit lists' of individuals, journals and institutions are becoming popular and widely used. Quantitative analysis of academic performance using the methodologies of scientometrics has come to stay, despite the fact that many of those who use the various indices seem to have little or no knowledge of their limitations. The space for personal judgements is shrinking, rapidly yielding ground to the growing acceptance of scientometric indices. For those who hold high administrative or political position the availability of ready available 'rankings' is a blessing. They can now pass judgements with little need to study their subjects. It has become an annual practice in India to bemoan the fact that Indian academic institutions do not seem to do well in the global rankings; with only a couple of entrants in lists which represent the 'top 500' in the world. In almost the same breath the very same administrators announce the need to create many new 'world class' institutions, rarely stopping to ask if they are clear about the strategies to achieve this undoubtedly desirable goal. University administrators, especially from the developed countries in Europe, America, Asia and Australia seem acutely aware of the need for their institutions to project a highly visible international profile. The dramatic rise of research productivity in China, as measured by the number and quality of scientific publications and investment in science, has attracted a great deal of attention in recent years. Many commentators seem to sense an imminent eastward shift in the balance of influence on the world scientific scene. In India, apart from the oft-heard laments, when the annual rankings appear, there is little by way of purposeful action, either at institutional or national level, to increase the visibility of our institutions by enhancing both quality and quantity of research output. There is little hope for a sudden surge unless there is a concerted and cooperative effort to raise scientific productivity and research impact. Over the years many small research institutions have been created, which are restricted to very few areas. These laboratories are staffed by many competent, dedicated and highly talented scientists and are often well funded by local standards. These are, however, too small to be even noticed in a global survey. Their major advantage is that their restricted size enables a high level of 'per capita' funding and insulates them from the problems of larger institutions. There is little scope for growth, and even high quality research output may pass unnoticed in the rapidly expanding scientific world. Efficient 'social networking' with corresponding communities of scientists in the West has helped small institutions to remain visible; a strategy that may prove less effective as competitive pressures increase.

In the last few years there has been a sudden increase in the number of foreign universities that come to India in search of collaborative arrangements. There appear to be two distinctly different motivations. Many foreign universities view arrangements with Indian institutions as an effective way of attracting both undergraduate and graduate students. Some autonomous institutions (deemed universities and others) often advertise these 'collaborative' arrangements as a device to attract students who will end up paying substantial fees. Foreign partners are often quite willing to permit usage of their 'brand names' if the price is right. At an entirely different level, foreign delegations travel around the country seeking to establish research collaborations which may permit exchange of researchers, both faculty and students. In many cases, these arrangements permit access to sources of funding that have been specifically earmarked for bilateral cooperation. The favourite instrument of collaboration is the 'memorandum of understanding' (MOU), usually signed amidst some fanfare, which provides a good photo-opportunity for functionaries and administrators. Most MOUs signed between institutions lie forgotten and unimplemented; there are relatively few examples of major successful collaborations between Indian and foreign institutions. While there has been a reasonable degree of collaborative research involving individuals or small groups of scientists, flourishing inter-institutional arrangements are the exception rather than the rule. An

interesting feature of the many foreign delegations that I have met is their clear sense of purpose and organization. Collaboration, both within countries as well as overseas, seems to be an excellent strategy to raise the level of research output, exploit complementary strengths and gain by cross-cultural practices. Most delegations seem to have members who focus on strategic issues, important for institutional progress. They also appear to have studied the terrain rather well; often aware of the strengths and weaknesses of our best institutions. Indian institutions however appear to be significantly dominated by individual interests, often unable to crystallize a coherent view of approaching collaborative arrangements. It is clear that our institutions will benefit by increasing the number of foreign academics, faculty and students, who work on our campuses. They will add in a significant way to the ambience of our institutions. Indeed the remarkable success of US and British universities over the last century has been in large part due to their ability to attract the best of students and faculty from all over the world. While this is a situation that is unlikely to happen in India in the near future, encouraging international collaboration may be a step in the right direction in energizing our old institutions, and accelerating the growth of new ones.

Collaboration is best catalysed by the availability of resources. There is a significant need to increase the magnitude of internal resources available at institutions to promote international collaboration. The grants system administered centrally is not flexible or nimble enough to respond to rapidly changing needs. At present there is a pronounced asymmetry in the interactions possible between foreign and most Indian institutions. This could, in principle, be addressed by earmarked institutional support for enhancing collaborative research. If the right partners are chosen, after careful assessment of complementary strengths, research outcomes will be significantly enhanced. How does one assess strengths and weaknesses of the scientific enterprise in institutions and countries. We must, of course, turn inevitably to the statistics of performance. The report entitled, *Science and Engineering Indicators 2010* produced by the National Science Board in the United States is an example of the kind of comprehensive study that is needed to guide policy. The biennial exercise carried out by the US National Science Foundation results in an extraordinary volume of data which helps analyse 'key aspects of the scope, quality and vitality of the Nation's science and engineering enterprise in the context of global science and technology'. I have extracted the quote from the memorandum signed by the Chairman to the US President and Congress. It is a clear statement of the intent and purpose of this elaborate study. The report begins with an overview that examines global trends in science and engineering, focusing on national spending, research output and outcomes, clearly providing a platform for basing public policy in an intensely competitive world. The seven chapters provide a detailed analysis of elementary and secondary mathematics and science education in the US, survey higher education, research in the academic and industrial sectors, examine the science and engineering labour force and discuss public attitudes and understanding of science. Almost every useful indicator of the health of science is employed in the analysis. The first page of the introductory overview notes that 'Asia's rapid ascent as a major world S&T center – beyond Japan – is driven by developments in China and several other Asian economies (Asia 9 – India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan and Thailand)'. The report suggests, somewhat alarmingly for Indian readers, that 'India's high gross domestic product (GDP) growth contrasts with a fledgling overall S&T performance'. The contributions of foreign students to academic research in the US are emphasized by the fact that they 'have earned more than half of US natural science and engineering doctorates since 2006. Half of these students are from East Asia, mostly from China (31%), India (14%) and South Korea (7%)'. If engineering is considered separately, the numbers are even more skewed with foreign nationals accounting for 68% of Ph D recipients in 2007. The report notes, I suspect with a tinge of satisfaction, that 60% of foreign students who received doctorates in 1997 'were gainfully employed in the United States in 2007 – the highest ten year stay rate ever observed'. There is much to mull over in the statistics so well presented in this report, especially for those who worry about 'brain drain and brain gain'. The report addresses the issue with which I began this column, foreign collaboration. The data presented suggests that 'the United States rate of international collaboration is similar to that of Japan and China but lower than that of the European Union (EU), where explicit EU policies coupled with incentives stimulate international, and specifically intra-EU collaboration'. In the competitive world of research, the need to promote collaborative effort must be recognized. In India there is a great need to encourage and facilitate collaboration, within institutions and between institutions in the country and elsewhere, if the goal of raising standards and enhancing research productivity is to be realized.

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