

## Indian science: catch up with India, then worry about China

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In the last few years, there have been several comments that compare the scientific output from China and worry about India lagging far behind. Madhan *et al.*<sup>1</sup> have pointed out that the average citations per paper appear slightly better for India than for China, comparing the highly cited papers from both nations. This conclusion appears meaningless when one realizes that the total number of papers published from China is about ten times higher than that from India. Giridhar and Desiraju<sup>2</sup> have looked at all the papers published and pointed out that the average citations have remained more or less the same in the last several years and so the increase in quantity in the case of China has not been at the cost of quality. Balaram<sup>3</sup> has cautioned against the blind use of scientometrics, going to the extent of calling it a dismal science. I have pointed out that over-emphasizing these parameters has led to many of our scientists and engineers working on problems that can be published and not on problems that need to be solved<sup>4</sup>. This has led to the situation that India does not care much about her scientists.

Tata Motors announced its plans to build the cheapest car in the world and has done so. ISRO announced the launch of *Chandrayan* and did it successfully. According to the book by Bagla and Menon<sup>5</sup>, it appears that the main contribution from Indian Institute of Science (IISc), Bangalore, the premiere institution in the country to the programme, was the suggestion that India should not go ahead with it. Considering the fact that the first Chairman of ISRO, Satish Dhawan also happened to be the Director of the IISc, one wonders what happened after his tenure. *Chandrayan* led to an important scientific finding: the presence of water on the moon. Naturally, the nation celebrated the 'scientists' from ISRO who were part of the *Chandrayan* mission. The real scientists from India remain largely unknown to the nation. While, scientists are busy nitpicking who has a larger *h*-index<sup>6</sup>, India has been progressing leaving Indian science far behind. Indian scientists seem to be living in an imaginary ivory tower with opaque windows. We need to catch up with India, before we can worry about China.

India is progressing in other fields as well, like sports, cinema, arts, writing, commerce, industry, etc. In these fields Indians are competing with the best in the world and winning. Not surprisingly, these are fields in which it is easier to define merit compared to science.

The problems plaguing Indian science are well known. In essence, independence is condemned and nepotism is rewarded. We have many scientists who are critical about the system privately, but do not have the courage to speak up when it matters. Not only nepotism, often silence is rewarded too. Several committees making important decisions are chaired by people who have retired. While the system should enable those capable of doing good science to continue beyond retirement, it is not clear why retired people should continue to chair committees making important decisions. Inbreeding is avoided in the best of the Institutions worldwide. Indiscriminate inbreeding is still practised in some premiere institutions in India.

Although personal ego is not confined to Indians, we take it to the extreme. Some leaders of science are so consumed with their personal agenda that they cannot be bothered about the future of an institution, the nation or science. Thankfully, today's India does what needs to be done to these individuals: ignore them and carry on with the progress.

Thanks to the rapidly increasing economic power, today India is willing to invest big in science and technology. We do not seem to have enough scientists willing to ask the big questions and address them. Often solving big problems requires meaningful collaboration cutting across disciplines. However, in India collaboration is encouraged only on the public stage and not in the board rooms discussing the promotion of individuals. Hence, we end up doing incremental science. Many active scientists today are convinced that we cannot do difficult experiments here and so are not even willing to try. Even those who learn state-of-the-art-experiments during their training abroad, end up looking for safe alternatives after returning to India. Being an experimental physical chemist, I have mentioned about doing difficult

experiments. However, I must point out that this applies equally to both experimentalists and theoreticians cutting across all fields in science and engineering. Not many are willing to take up challenging projects.

Science and perhaps journalism are still waiting to see a growth as in other fields. Journalism is still practised mostly by the elites and naturally the talent pool that a diverse India can offer has not contributed to its growth. This is certainly more applicable to science. The problem with the elite is that, solving mundane problems, however important it may be to the nation, is not exciting for them. Their dominance has ensured that few laboratories building equipment and doing challenging experiments survive in India today.

Let me end with a quote by John W. Gardner, Secretary of Health, Education and Welfare, USA, under President Lyndon B. Johnson: 'The society which scorns excellence in plumbing as a humble activity and tolerates shoddiness in philosophy because it is an exalted activity will have neither good plumbing nor good philosophy: neither its pipes nor its theories will hold water'. Indian science not only needs excellent philosophers, but also excellent plumbers in the institutions and the scientific community must learn to respect them both equally for its survival.

1. Madhan, M., Chandrasekar, G. and Arunachalam, S., *Curr. Sci.*, 2010, **99**, 738–749.
2. Madras, G. and Desiraju, G. R., <http://www.nature.com/nindia/2010/10110/full/nindia.2010.156.html>
3. Balaram, P., *Curr. Sci.*, 2008, **95**, 431–432.
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6. Balaram, P., *Curr. Sci.*, 2010, **99**, 857–858.

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