

SCIENCE IS IN TROUBLE



Gone are the days when science was a pursuit of an individual's passionate urge. Whether in India or England, science started as a means to satisfy men's curiosity to understand nature or natural phenomena. In modern times in India, Mahendra Lal Sircar, Jagadish Chandra Bose, Ramanujan and others used their own money and wealth to pursue science to satisfy their scientific curiosity in their own way. They were free to choose their own subject of research and their own way to arrive at the conclusion. There was natural competition—competition to find out the truth but no rush or race to publish papers in journals for promotion and awards. And it worked well as is evident from the simple fact that the only Nobel Prize in science won by a native Indian who worked in that era remain unsurpassed even today in spite of the growth in funds and infrastructure.

Science is no longer a personal matter of satisfying curiosity. It has been institutionalized long back from the early twentieth century and is becoming a collective endeavor with the progress of time.

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With the technological advances and arrival of sophisticated instruments, gone are the days when instruments were designed and custom-made by the scientists themselves for their own experiment. It is said that C.V. Raman, the only Nobel Laureate in Physics from India, had used an indigenous apparatus which cost Rupees Three hundred only. J.C. Bose used trivial raw materials as resources and used ordinary but devoted persons such as tinsmith and others to build his own apparatus for sophisticated science. Science is funded in India primarily by government organizations these days.

Gone is the Nehruvian period where the philosophy was to provide funds to scientists without asking any question. The assumption was that scientists will make good use of the money and deliver well for the nation. Gone

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are the days when autonomy granted to any institution came with the privilege of using the fund and authority in one's own way for the overall progress of the institution. Now this privilege is shrinking and there are good reasons for it. Now a funding authority expects to see the results within a specified period of

time. A Corporate like structure is gradually replacing the earlier classical structure everywhere and research institutes are no exception. Only difference is that the measuring stick in corporate houses is clearly defined: it is business-oriented, basically the funds need to be generated for your own and company's sustenance by developing and

marketing products or providing improved services etc. It is hard to define a yardstick by which the performance of a scientist can be measured. There are some parameters like number of publications in high impact factor journals, grants awarded, awards received etc., but in contrast to corporate houses no hard target is in place and therefore there is no apparent difference between an apple and an orange. As a result scientists enjoy life-time security of job no matter what s/he does, in contrast to corporate houses where employees are sacked not only on the basis of their personal performance but also if the company fails to meet their business target. More importantly, judgement of merit in academic institutes is dismal, biased, where no one wants to be the 'bad guy' by denying incentives such as 'promotion' in contrast to corporate houses where incentives are given strictly on the basis of merits and performance. It is said that government funded institutions recruit the best of the lot and transform them to 'mediocre' within a few years while corporate houses recruit mediocre persons in many cases and transform them to 'useful'. Having said that it is to be noted that no system is hundred percent foolproof. Evaluating scientists on a yearly basis is redundant as any novel finding needs several years of committed hard work.

Science is no longer a human activity to pursue at one's own pace. Scientists are now subject to the pressure of producing results, submitting reports in time to get more funds in future and in that mad rush sometimes the essence of science is compromised. This pressure is, of course, more in the West than in India. In the United States, academic research in sciences heavily depends on outside grants because university grants alone cannot afford to pay their salaries, assistants and other costs in the laboratory. "In many cases the expectations were and often still are that faculty should cover at least 75 percent of the salary on grants" as expressed by an American professor. Science is now stained with incentives— incentives linked with grants, incentives linked with publications and finally all these are linked to promotions and awards.

'Science is in big trouble for many reasons' has been realized by many scientists worldwide. A recent survey was held world-wide on a simple question: "If you could change one thing about how science works today, what would it be and why?" Responses received from scientists, which include senior professors, laboratory heads, post-docs and graduate students, are vastly revealing. In spite of the fact that the results are little bit skewed as the responders are mainly from the communities of biomedical and social sciences, the results of the survey and some of the opinions expressed as given below are universal in nature and pertinent and timely for Indian science as well.

It has been reasoned that scientist's success is no longer measured by the quality of the problem they pose or the accuracy of the methods' used. Instead, it is measured by how much grant money they receive, number of papers published and 'how they spin their findings to appeal to the public'. They admitted that "in a variety of ways, their careers are being hijacked by perverse incentives. The result is bad science". Scientists are now in a dilemma whether to venture into a new idea with an uncertain outcome. Scientists are reluctant to

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take any risk which might jeopardize their career and prefer to deal with a project whose outcome is known or at least predictable. Professor Simine Vazire who is also a journal editor vented "I would make rewards based on the rigor of the research methods, rather than the outcome of the research. Grants, publications, jobs, awards, and even media coverage should be based more on how good the study design and methods were, rather than whether the result was significant or surprising." Foundations and agencies are toying with the idea of funding specific people and labs for a certain period of time rather than granting project proposals to individuals. A system like this may work better because scientists would get greater freedom and may choose to take risks in their work.

Some suggested changes in the performance review. Many of the published works are simple confirmation of another laboratory's results and therefore have little value in terms of science. The argument they have is that all results matter, not just the "flashy, paradigm-shifting results". Journals should be incentivized to publish negative results as well when obtained with sound scientific method.

The moot point is that scientists worldwide are

concerned about the degradation of scientific values and are trying to save before it is doomed. Are Indian scientists listening? What are they doing about it? However, conclusion of the survey is a simple four word sentence "Science is not doomed", which is good enough to give us a sense of immediate relief but grave enough to ponder about the future. □

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