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GUEST EDITORIAL

Industry–University collaboration – more bang for the same buck

The topic of this editorial has been stated, and debated and discussed under various names for at least three decades in India, such as industry–university interaction, partnership, dialogue, affiliation, synergy, ecosystem, etc. I had the privilege of participating in two such discussion sessions in recent months[1,2], and hence decided to pen down my thoughts, lest they are lost forever. Now more than ever before there seems to be a necessity and urgency for a handshake between academia and industry. Whitesides[3] has persuasively argued in a recent article that chemistry needs to reinvent itself if it has to survive as a vibrant subject for another 50 years. Collaboration between academia and industry to deliver new products for the society is a crucial linchpin in his action plan. The initiative of UGC and MHRD to foster increased partnership between universities/institutes and the private sector[4], promoting research and innovation, and linking education with society and employability are all pointers in the same direction. Rather than enumerating problems and hurdles which have prevented a smooth public–private dialogue in the past, I will attempt to discuss how we can move forward from here and make it happen.

The classic model of collaboration between academia and industry is that a professor in his usual course of research comes up with a result which he felt would interest industry. He approaches the concerned company and in some cases this results in a handshake and follow-up discussions. But rarely did this evolve into a full-fledged collaboration. In my opinion, this model served a limited utility and is almost obsolete today. We need a more dynamic, interactive and 'for the masses' systemic solution. Industry should focus on the bottom of the academic thinktank to find low-hanging fruits. For this I propose a flexible and adaptive translation model.

(1) A list of topics and areas in which industry is interested to find solutions from academia. Industry knows what areas and topics academics are working on. This information is freely available on their websites and in their publications. The reverse is not true. So the first step to industry–academia dialogue would be that industry places a list of problems and questions it would like the academic community to address on their company website. Alternatively, a neutral web location can be started where companies deposit their non-confidential questions without even their names being open to the public. By academic community I mean the entire pyramid from the professor to the young faculty and the postdocs and final year Ph D students and even M Sc/M Tech students. The base of the pyramid has far more risk-taking appetite and motivation to adopt the innovation model, and hence there is a need to democratize the entire exchange of ideas and problems platform to a virtual portal.

(2) The universities must evolve a fast and easy calculator for project costing. In the present method, the budgetary discussion on an industry project usually starts from scratch. This process can be short-circuited for both sides. The university should make a ready full time equivalent (FTE) calculation. This means one manpower salary + all consumables costs + all usage of instruments + share of department and university = Rs XXX for one month. Because the consumables and instruments will be different in say life sciences and chemistry, a subject-wise FTE cost may be worked out. Having done this, then all the academic partner has to decide with industry is the number of FTEs and number of months for a given sponsored project. To balance the project costs (money used to carry out the project) and overhead costs (in exchange for which the industry is able to use the university infrastructure and instruments) equitably, I would suggest a 60 : 40 break-up of the total cost between the investigator and the institute/department.

(3) Confidentiality and IP and revenue sharing in industry-sponsored projects. Understandably industry is more conscious of data confidentiality, intellectual property issues and timelines than an average academic. Here I would suggest two changes to what I believe is the standard practice in most universities in terms of rules. Simplify the non-disclosure agreement (NDA) format to no more than a page or two; let the sponsoring company decide how many years it wishes to protect data exclusively (5, 10, 20), and be ready to negotiate on the jurisdiction of the agreement. Many an agreements fall-off for the last reason, when the university/institute is located in one state and the sponsoring company is from another state. The other issue on which universities tend to stand on a rigid high ground is IP sharing. Here a degree of reality is called for. If it is a short-term project, say 3–6 months, then it is usually a specific question or a

measurement for which industry is seeking help from the academic, and this would be part of a much bigger programme in the industry. Perhaps a FTE-based, IP-free model is more likely to work in such a situation. However, for longer duration projects of a year or more and involving significant intellectual inputs from the academic, the rules will be different. In short, there is no one-size-fits-all format and a degree of flexibility from the university is called for. If several menu options are kept ready as templates covering FTE, NDA, IP and revenue model, then a quick matching can be done for a given project instead of needless months being wasted in paper trail.

(4) Catch them young to innovate. Fresh Ph D students and postdocs and young faculty are more likely to be attracted to the new interactive and collaborative model of doing science. The second is the there is no alternative factor (TINA). The pressure of finding a job in a competitive marketplace or just the 'let's do it boldness' is more likely to yield results with the younger generation. Here the industry should be proactive and organize competitions in which the listed topics in section (1) are awarded as projects to the best ideas. The success of the biotechnology ignition grant of the BIRAC[5] since its launch in 2012, is a clear indicator that innovation will thrive and prosper in the hands of young scientists. The infrastructure support and laboratory space for such projects may be worked out in partnership with host institutes and a mentor for the young scientist be assigned to carry out the research project in say 8–12 months duration.

(5) The next point is to link education with employability. An oft-quoted comment is that M Sc and Ph D students are not ready for the job market after graduation. Short-term bridge courses or certification classes can be run on campus taught by university faculty and research scientists and alumni. Ph D students should start to think beyond their specialization and register for on-line courses to supplement their knowledge in say commerce, accounting, intellectual property, patenting, entrepreneurship, innovation, business decision tree, etc. It is time a Ph D student asked the question[6]: What is the social and economic relevance of my research? Will it improve anyone's life? Because finally it is the Government and taxpayer who is financing research in public institutions.

(6) Delinking the administration of innovation cluster from that of the university/institute. Most public funded universities and institutes (IISc, IITs, NITs, Central Universities (CUs)) have a finance and administration structure which is guided by their parent body – MHRD and UGC. This leaves little scope for any lateral movement or case-wise decisions. Moreover, the routine functioning of these public-funded bodies should and must follow the laid down norms. Hence there is an immediate need to create an Entrepreneur Society or an Innovation Company, which is a distinct legal entity from the host university. IISc and several IITs and a few CUs have already taken this crucial step. Such a body will allow implementing the industry–university collaboration projects and measuring the innovation output based on a dynamic model determined by a combination of factors such as nature of the technology, time period and cost of incubation and translation for that project, risk factors, marketability of the product/invention, and so on. This entity should evolve a collaboration model on a moving scale to suit the needs of short-term projects (say for Ph Ds, postdocs, young faculty) and that for long term, deep partnerships (say as a Centre of research). It should then be possible for an investigator to 'dial in the right number' and get started. Technology transfer, which is the first step of graduation for an entrepreneur, should be strengthened to match the needs of the growing innovator ecosystem on university campus.

Before signing off, I should acknowledge the lone warriors from the 1980s era. They made industry–institute partnerships happen, often against several odds. A few examples from the Biotech and Pharma space are Shanta Biotech, Bharat Biotech, Cadilla, Biocon, etc. However, one should be reminded that in most of these cases, the Managing Director of the Company and the Head of the Institute were both championing the collaboration cause. There is a need to democratize the partnership model so that there is a free-flowing system in place, and hence the justification to share these ideas with the stakeholders.

The collaboration and synergy between university and industry will survive the test of time only if there is a win-win partnership for both. In the past this was a matter of choice. The compulsions of higher productivity, shorter timelines and limited budgets mean that synergy in science will become a necessity.

1. Brain storming session for inputs into National Education Policy, Role of Basic Science and Research, IISER, Pune, 22–23 July 2015.
2. DRILS SYNERGY-2015: Fostering Industry Academia Ecosystem, Dr Reddy's Institute of Life Sciences, University of Hyderabad Campus, 29 August 2015.
3. Whitesides, G. M., *Angew. Chem. Int. Ed. Engl.*, 2015, **54**, 3196–3209; doi:10.1002/anie.201410884
4. Letter of UGC-MHRD dated 24 June 2015 on the subject of framing a New Education Policy.
5. BIG grant; www.birac.nic.in.
6. Ravishankara, A. R., *Curr. Sci.*, 2015, **109**, 659–660.

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