

Panel Discussion Transcript: 2pm-3pm Friday 8 August 2014

Panel members:

Professor Edwina Cornish (Provost, Monash University)
Professor Anuradda Ganesh (Professor IIT Bombay and Cummins India)
Dr Manish Gupta (Vice President, Xerox Research Centre India)
Dr Kumar Iyer (Vice President Innovation, JSW)
Dr Surendra Kulkarni (Formerly, SABIC)
Professor Pauline Nestor (Senior Vice Provost, Research, Monash University)
Professor Ravi Sinha (Dean, Alumni and Corporate Relations, IIT Bombay)

Moderators

Prof Mohan Krishnamoorthy (CEO, Monash-IITB Research Academy)
Ms Annie Santhana (Regional Director –Education, VGBO)

R&D ecosystem in India

[Manish Gupta] What is your assessment of R&D ecosystem in India? Is it growing, shrinking, stalled? And how would you arrive at that assessment?

MG said he has noticed a distinct improvement in PhD production especially in the field of Computer Science. There is growth in numbers and quality and the upward trend is happening because of the demand. Number of MNCs including Fortune 500 companies have setup R&D centres in India and are leveraging India for R&D activities. And although companies like HP and GM have closed down their R&D centres; for every closed centre, new ones have opened up. The number of R&D centres have increased from around 100 in 2002 to 1300 currently. Start-up activity is on the rise especially in Bangalore and it is interesting to see new kinds of start-ups such as Flipkart recruiting PhDs for their research work.

[Surendra Kulkarni] What do you think is the appetite and prospects of importing R&D services among the leading R&D driven India-based companies (or MNCs R&D labs in India) and research establishments of national importance?

Firstly, core sciences such as Chemical/Mechanical and Material Science Engineering are not as rosy as Electronics and Computer Science fields. Brighter students do not prefer core sciences as SK's personal experience has been in the last 10 years. However, if any company wants to setup a R&D centre, talent pool is available. Prior to 2000, it was difficult to get IIT PhDs for a 1 year temporary industrial position in the local industry. Between 2000-2005, this started changing and especially in the last few years percentage of people returning from US has increased and are getting absorbed. Plus, the quality of the talent has certainly gone up except that the ratio of talent availability between core sciences and electronics and computer sciences is still uneven.

When asked about the bifurcation between R and D and which one is bigger, SK cited the example of GE suggesting GE initially focused on getting more D but have gradually shifted to more and more R. They got their Development done in China because of the business potential and kept basic research to India because of poor IP protection in China. SK, further pointed out that most companies who are market-oriented tend to keep R in HQ and delegate D in developing countries which SK believes is a wrong strategy as he rubbished the norm that intelligent people are in HQ and was of the opinion that inventive work outside the HQ

[Anuradda Ganesh / Ravi Sinha] What about career options for young students. Is R&D, particularly, Industrial R&D? *Is research a career option in India?*

RS' frank assessment was current PhD opportunities are not on the track to transform the student to turn into a CEO or a decision maker. Students are hired for only doing good research and not for grooming to become future leaders of the company. Thus in India, research is a good career option for those who want to stay in the lab but not for being business or global leaders in the field.

AG put in a different perspective saying most opt for PhD for research interest and don't have a career option or career track in mind. They are not trained to do research for the industry and they are not getting in that mode at all. Academics are helping to give an industry perspective from day one with a balance of fundamental science and application-orientation. From the industry side, if the candidate shows good leadership quality there is no reason why he should not be accepted by the industry. Today, industry is looking for parallel career paths – technical and managerial.

Mohan Krishnamurthy summed up saying back in the 70's, 80's, 90's opportunities were limited to faculty positions in DRDO, ISRO or IITs but today with 1300 research laboratories there are career options available for PhD's.

Models for industry-academia linkages in India and globally

[Ravi Sinha] What are the existing models of research collaboration between Indian Industry and academia? In your view, do these models work well? Is more needed?

There are multiple models in place such as the successful IIT-Monash one, contract research model, research centres setup by a particular company or industry consortia. Other way is companies are sending high potential employees to research and seek out problems faced of the company from a research institution like IIT. There are multiple channels and potential for collaborations to explore. Collaborations in fields like Chemical Engineering are not large enough because of lack of effort in trying different models. Overall, there has been positive development in the last 10 years with regards to industry-academia collaboration.

[Edwina Cornish] How do you think that these models for collaboration between Indian Industry and academia vary if we think more globally. What can we learn in India from these models for collaborations?

Firstly, in the next 25 years – the economies, industries, the geo-political situation will be very different and driven by innovation that cannot be imagined now. EC emphasized this point to students saying that they need not worry much about how their career will evolve and should follow their passions, take risks and contribute to the ecosystem. In Australia, the focus is on building a diverse eco-system and the key question is how to encourage more entrepreneurial career option. Just as all economies have to compete in a rapidly changing world and have to compete through innovations. As regards to models, Australia looks at what's happening in Silicon-valley and Europe and as universities (e.g. Monash), look at how to support students to take risks that weren't taken in the past. Because of which in a university like Monash, currently students are more entrepreneurial than the staff and they are not only looking at building a corporate or academic career, but are trying to be innovators and entrepreneurs.

Australian Government has had very good schemes to foster research linkages. We have collaborative research centres that support long term funding. We have something called linkage scheme which is a funding option for first class and competitive research linking

academia with industry. Then there is CSIRO, Australia's nodal agency for research offers funding for long term partnerships with universities linked to solve industrial problems. Currently in addition to basic research in universities, increasingly academia are looking at the portfolio approach on how the research can be applied and the Australian policy is underpinning this change on how our universities are evolving.

[Pauline Nestor] What, in your view, are the key expectations and attributes of the research partners, both industry and academia?

[Pauline Nestor] What are the key industry challenges that can be addressed through academic R&D? And where is the line/divide (if any) between academic research and industry research?

Situation in Australia is slightly different from India. India has a massive market, Industry wants to come to India and not Australia. So for starters Australia don't have R&D components of industry. Thus, the government are very keen to encourage new innovation to keep up, thrive and to find a niche. What universities can do to the industry is offer interdisciplinary capabilities which often Industries can't do. To address the complex problems of the world, Universities can bring together teams that in some ways the industries may not even know that they want to be brought together. Key concern in Australia is (where education isn't respected as it is in India), Academics and Industry are at two ends of the spectrum criticizing each other. The challenge is to find a sweet spot where the academia truly understands the challenges faced by the industry and industry understands the capabilities of what academia can do.

[Anuradda Ganesh] Having been on both sides of the divide, what do you think are the key drivers for Indian Industry – University research collaborations? What helps? What factors assist better collaborations?

The driver is already there, as all industries are keen for academic collaboration. What the Industries are looking for is Solutions that cannot be found within themselves, some exploratory fundamental science which is not there and for which they don't have time to investigate. At the same time, they are looking for concluding results, managed well in time (whether positive or negative). Mutual Understanding of requirement is the key driver. From personal experience, important aspect is some project management has to be put across to faculties – this will bridge the gap between industry and academics as managing and communicating efficiently is more important than the numbers, intuitions, or timely results.

[Kumar Iyer] Can you wrap up the discussion so far? How does it all sit with you from an industry perspective and also being IIT alumni?

Coming from a traditional industry, there was not a single project presented today with a remotest of connection to the Steel industry. Students of today don't want to get their hands dirty, rather do Software/Simulation/Modelling projects. Currently we are sitting on Iron Ore/Resource crisis globally yet no one working on developing alternate resources, alternate technologies. We are sponsoring projects at IIT Monash but nothing conducted in core area for JSW which is where the money is. The current projects are good, help build the profile of a good image for JSW but not the bottom-line. JSW has invested huge amounts, have 80 strong R&D team yet only 2 PhDs. Mindset is these dirty jobs don't seem to attract students.

EC to KI Why is it collectively we have been able to articulate the excitement? Is it because of the nature of research questions or nature of work?

Aspirations of students have changed. While doing interviews we wanted to recruit students to do research at JSW and then come back to JSW to head the program; however students wanted to continue with the academia. Nobody wants to follow through on the started work despite the fact that if project is completed as per expectations, we would definitely not let the resource go elsewhere. Again, coming from a traditional industry we are not able to establish the connect with the students.

SK to KI Is your industry willing to give core/critical problems to institutes?

Projects started here with the collaboration have been tweaked to convert to core projects but still students are not willing to join despite offering them the role of a PPO. Plus steel industries are nowhere near metros and are located around 150-200 km from the cities. We had projects with no takers because of the dirty nature of the industry.

Intellectual Property, Entity Structuring and Regulatory Framework

[Ravi Sinha] Your views on IP in the context of industry-academia conversations...

Multiple system/opportunities are coming in place. So the current way of looking at innovations is more from the legacy of industrial age than from what we are entering into which is a knowledge age. For Industry, IP is looked at as what will give them command over product delivery. For academia, IP is about validation or proof of high quality R&D. Increasingly technologies are becoming disruptive. Increasingly value of IP is diminishing fast as alternative or better ways of doing the same thing are coming up. So although IP is the starting point of discussion for industries/academia alike, to address the needs of the changing world/economies, it needs to be looked more holistically. IP has to be discussed in two parts – i. Identification of ownership which is relatively easier ii. Difficult part is how to assign a value for IP in the place deployed. How much % to the inventor? But in general too much time is spent on discussing IP.

[Manish Gupta] Your views on IP in the context of industry-academia conversations...

It is irritating to see IP coming in the way of collaboration over imaginary concerns. When industries partner with Institutions that have little history or experience in real research, there is a tendency for the institutions to come up with imaginary concerns about IP and how to get their piece. On the other hand, Industry has often been greedy and wanting to become the only beneficiary. Having a predefined template of one or standard models that universities and companies can create and choose together instead of starting the whole process of discussion of IP for every instance.

Kumar Iyer joined the discussion - stating some stats that reflected that 97% of patents have lapsed and only 3% get renewed regularly. Industry should be willing to take a chance to make IP open source so that at least somebody benefits out of it rather than just sitting on it (unless someone is really committed to the project). MG further called it as the open collaborative model from both sides so that everything is created in public domain. For academia who get too much hung up on IP, it is reported that the income generated by well-known universities from their IP portfolio is much lesser than the contributions from the alumni. Thus instead of worrying about IP value, it would be prudent to educate students, have good relationships with alumni and this could lead to generating more value through them.

Decision Making process

[Surendra Kulkarni] What are the key parameters that you think will impact the selection of a research institute with which you will collaborate? -- For example, Infrastructure, University/ institutions ranking, Staff and resources available, Experience of working with the industry, Established planning and coordination, Effective project management, Past experience.

Firstly, institution should have expertise in particular area of interest so that relevant industry can go after at any cost. Secondly whether it is perceived or real, the feel of secure IP allows the industry to come forward. Thirdly and finally, timelines to keep up with (e.g. submitting timely quarterly reports).

Annie to SK: What are the parameters for foreign universities?

Some universities that have established credibility have done quite well. But most of the MNCs go to MIT, Harvard, Caltech to get a brand name. And I haven't seen a great spark (idea) coming out of these universities however on the other hand some of the small institutes or start-ups have come up with a great product. Unfortunately, in remote places like India or Australia, branding is the key. SK cited the example of the Dalian Institute in China who are better in selling and the speed at which the government works benefits them more.

[Kumar Iyer]

Firstly, reputation of institute is the key. But most important parameter is how close the academics personnel are working as to the industry relevance. Because in an industry like steel, the projects are not futuristic and aimed at problems anticipated in the next 2 to 3 years. The steel industry has hardly evolved in the last 25 years in terms of technological breakthroughs; only the processes have become more efficient. Thus the industry is expecting the academic participation to improve and develop the efficiency of the processes and not come up with new disruptive technologies. Thirdly, the industry looks at how willing the students would be to come back and re-join the same industry vertical. The industry doesn't see research giving tangible benefit in short term but medium to long term in terms of building relationship and getting an asset for the organization.

Timelines

MK to the Panel:

There is an issue about research timelines that tend to be 4 – 6 years whereas Industry wants results in 6-9 months. How do you bridge this divide in expectations and delivery?

[Anuradda Ganesh]

Divide the research in two accounts. First the research has to be taken to a certain level from where the industry can pick up from there. At the first level, the timelines are taken care of by the government funding. For e.g. in the Prime Minister Fellowship, one of the solutions given was the industry can pick up students after they enter their 1st and 2nd year when the initial work is already done and then after knowing the results and direction; the industry can take it to application level. The research cannot be speed up; the results will come but at the same time there should be no compromise in terms of research timelines.

[Pauline Nestor]

The whole thing is about relationships. Best collaborations are built on people that have experiences, and been successful in building trust. The academia has to be better at giving progress reports. Solution is in complex relationships with the industry. Monash has one such relationship functioning in its 6 year that has taken lot of efforts in building the trust and maturity and it has come to a point where there is a funding of \$25 billion for the first five years and equal amount for the next five and the industry partners now believe that they can get the research they want. However the kind of research varies from short term literature research to supporting PhD scholarships for identifying solutions to long term problems. In the middle, there is an option of working with researchers on agreed things. In this case, the continuity of funding is the key which is only possible if there is trust and relationship with the industry.