Challenges in Industry-Academia Collaboration

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Academia-industry collaboration has always been a topic of discussion in both the sides. And still no model exists that is widely used. Indeed, the collaboration, world over, is quite limited. This just shows the difficulty of the problem. In this article, we discuss the different types of collaboration that are possible, particularly in the Indian scenario.

Producer-Consumer Interaction

The common interaction model between academia and industry is that of producer-consumer – a relationship that has existed for long between the two sides. This relationship necessitates some collaboration as the consumer has to ensure that the output of the producer satisfies the needs to a large extent. Hence, one form of collaboration, which is more in the nature of a feedback loop, is for the industry to provide inputs back to the academic institutions regarding their perception or evaluation of their products.

Interestingly, even this rather obvious kind of interaction does not occur in a structured manner, as both the sides maintain a distant relationship. Though there are many reasons for this (for example, the academia not taking kindly to the often self-serving suggestions of a company), the main reason is lack of suitable forums and platforms to facilitate this. Note that though general forums covering the issue at a broad level are useful, to implement this collaboration in any meaningful way, forums at institute level are necessary.

In India, currently due to shortage of high quality trained manpower, there is another possible area of collaboration. It is clear that the engineering education system, the way it has evolved, is currently not in best of shape, and will require a lot of help to improve. And it is also clear that, though traditionally the Government was responsible for higher education, relying on the Govt alone will not solve the problem fast enough. So, the industry and the established education players will have to pitch in. Some companies and institutes have started some initiatives of their own on this front. But this seems like a very viable area for collaboration, where joint programs have a better chance of success. However, not much seems to be happening in this area, even though both sides can gain substantially from it.

Collaboration in Continuing Education

One of the core competencies of academic institutions is teaching. And many institutes engaged in education at high end, have the courseware and ability to provide training for high-end manpower development. Many of these topics are of interest to industry. Therefore, a natural collaboration possibility is for the academic faculty and institutes to conduct training in topics of interest for industry.

This model has existed for long time and is reasonably well understood. This form of relationship is also beneficial to both. Typically, in this form of collaboration, continuing education programs are offered which are designed for industry participants. Or, short courses may be offered by some faculty in some company or some common place.

In India, as the level of technology and competence in industry has increased increases, the need for short term training program from academic institutions seems to be reducing. But the need for programs for working professionals seems to be increasing. Programs for working professionals in management are now picking up in India. However, such programs for technology areas have not developed in any serious manner. This is one area that can be potentially developed, and it is best done if both sides collaborate.

Collaboration in Research

Today in the world driven by Intellectual Property, there is an increased interest in collaboration in the area of research. For the purposes of our discussion, research can be considered as the activity of creating new knowledge. Though academicians in most good institutes engage in research, collaboration in this area is possible only if the industry has a need for research.

Though the goal of research is to create new knowledge, the purpose of research in a company is to create new knowledge which other parts of the company can use to improve the business. Research is typically not a business or a profit center but a long term investment, which helps a company generate more revenue and profits. In India, till recently there was no need for research in most companies – the knowledge that existed in the public domain was sufficient for the business the company was engaged in. But that seems to be changing now.

A technology player whose business depends on pushing technology advances needs research simply to develop new technologies that it can then use to bring out newer products in the market place. Though there were no technology driven companies in the country before, there are some that are now coming up.

Even a services company can benefit from research, particularly if it is a large player. Research can enhance the ability of a company to adapt to changes and the readiness for absorbing changes in technology. It can also help the company build a leadership position in leveraging the new technology for offering higher value. Research can help service the constant demand for improvement quality, lowering costs, and creating more value. And can also help develop new approaches for solving problems, as engineers and managers may not be able to do this – engineers work for using existing knowledge to provide a solution, and managers stick to proven methods to reduce risks. There are other areas like dealing with scale, providing inputs to consulting practices, etc. where research inputs are useful.

Besides these company-specific reasons, there is a general industry-wide reason as well for increasing research in companies. So far, most of the research has been done in the west as their businesses needed the innovation. It is clear that the business like the software services are shifting to India and in future this work will shrink further in the west. As a business shifts, the investments in research related to that business will reduce. That is, Indian companies which relied on knowledge from the west may find the ready flow of new knowledge reducing. In other words, as the work shifts to India, there is a need for R&D to also shift, so the innovation does not suffer and research becomes more aligned to the needs of the dominant business model of outsourcing.

So, we can safely say that need for research in Indian companies is increasing. Lets look at the nature of research. Research can be basic or applied. Applied research is where the knowledge is being created with the intent that it will be used for commercial gains. Earlier, academics often were engaged in basic research. But now both applied and basic research is being done in

academic institutions. Companies, by their nature, are generally interested in applied research. As academic institutions also now engage in this area, there is some convergence of interests.

Academic research is driven by the impact it will have on the global research community, and the measures of success are largely based on publications. Research in a company, on the other hand, is driven by the impact it will have on the company, and the measures of success are largely based on the long and short term value it creates for the company. Though these two objectives seem quite at odd with each other, in practice they are not so. Though publications are often not the objective in a company, many companies have also found that often it is hard to evaluate the work without subjecting it to the reviews and eyes of other researchers. Due to this, often companies do publish parts of their work (after camouflaging the confidential parts). This brings in commonality of goals among the academic and industry researchers. With this alignment of goals and nature of research, there is a clear possibility of collaboration between academicians and industry.

But there is a gap. Often academics are involved in academic or pure research which may not have applied aspect to it. With time the academicians tend to become too conceptual and too far removed from the real problems that the industry might be facing. And academicians realize that, leading to an underlying belief that the work they do is not useful for industry. This statement, in itself, is true. However, what it seems to imply is not. That is, the work the academician is doing may not be useful, but that does not mean that there is no common ground for common work. Academicians have a very strong ability to abstract from the problem and conceptualize and then solve it in the conceptual domain. This is an expertise that is woefully lacking in the industry, which is faced with down-to-earth problems day-in and day-out, often not letting the conceptualization skill to develop. And without proper conceptualization, there can really be no research, as research always tries to address a general problem (engineering on the other hand, may deal with a specific problem.) So, there is a natural synergy between the academic and the industry researcher – academician can lend the conceptualization and generalization skills and the industry can provide the practical reality in which the conceptualization can be rooted. What both sides have to realize is that bringing the two together requires a great deal of solid interaction as communication gaps exist. And there is no easy way to bridge this gap – both sides must simply spend time together to understand each others context and develop a common language.

Industry in India often looks for "consultants" in academic community – basically experts who can guide them in solving their problems. This model assumes that the academic is already working on those problems. As discussed, this is often not the case. Only after considerable time together can common issues be identified which may be addressable by joint research. Hence a main hurdle today is lack of structures and mechanisms to have researchers from two sides spend time together.

One practical way to bridge this gap is to have industry to invite academics who may have an interest in their problems to spend time at their facility, interacting with researchers and practitioners. And this should be done without a defined outcome or result of this visit. That is, initial visits will be to set the stage for further collaboration, which, incidentally, may or may not materialize. Perhaps due to these uncertainties, there are no real models to invite faculty to just spend time at their facility. But research is unpredictable and we have to learn to appreciate it.

So, in the end, for the research interaction to be given an impetus, the starting step is quite simple – concerned people from the two sides need to start spending reasonable time with each other. This is best done by hosting faculty visits during summer and other such times. And ensuring that enough interaction occurs during this visit for the visitor to get an understanding of the problems,

and possibly start some joint work. In other words, besides just inviting the faculty, it is important to involve the visitor in some research or exploratory projects and discussions. These visits, incidentally, can help academics also – besides potentially making the research more useful, appreciation of industrial problems by academicians can also help teaching. If this simple step can be widely practiced, we can hope to see an increase in collaboration in years to come.