

Editorial: Some Thoughts on R&D

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academia, carried out with public support although the only beneficiaries of the outcome are not universities but industries who have free access to the results all over the globe. This is very unlike the way industrial R&D is carried out for good reason.

One deterrent to investing in R&D, especially for small and medium scale enterprises, is the high level of risk associated with the research part, which must precede development. In my opinion, risk is the soul of research, while risk abatement is the goal of development; an optimal mix of the two makes for effective R&D. Without an element of risk there can be no research, by definition. If one knows the proposed project is one hundred percent feasible and can accurately predict the outcome within given time and resources, then one wonders if there is any element of true research in it. Yet, this is how most research is funded. Selecting and managing projects for funding requires vision, experience and understanding of the R&D process, expertise in the domain and how it is actually carried out. Without having done R&D it is understandably hard to select and manage large R&D programs in particular. Depending solely on external expert advice can also give biased evaluation for a number of reasons. There is no simple solution to this problem.

To ensure R&D is sustainable, both in academia and industry, it must deliver value. This can only be done if the level of support for R&D is adequate and recognizes the longer time scale and the inherent risk involved. As someone has said, if all your projects are successful then you are not doing something right. The presence of the element of risk means that some projects will necessarily fail. If this does not occur at all then one must check if the projects are really R&D projects!

Industrial R&D generally emphasizes development, which typically has lower risk. It is an essential step for commercialization. Academics stress basic research, which is not ready for commercial exploitation without further development that includes scale-up, economic evaluation and, in recent years, life cycle analysis. The time scale of research in academia is much longer than that of industrial development; this poses one of several difficulties encountered in successful academia-industry collaboration. The need to publish results and not-for-profit objective also differ from the industrial objectives to protect intellectual property from competitors and ultimately make profit for stakeholders. It is ironic that when knowledge is generated for public good and is beneficial to very large readership, the generator of such knowledge, the researcher, is not rewarded as handsomely as an industrial researcher whose research outcomes are available exclusively to very few beneficiaries. Academic research is all-inclusive, while industrial R&D is exclusive. This journal, for example, publishes peer-reviewed research outcomes mostly from

The aim of R&D is to innovate. As I have previously noted elsewhere, renovation or novelty do not qualify as innovation although very often they masquerade as such. Sometimes the older way of doing things is better than the newer ways. Novelty does not guarantee better performance—a true innovation does. Also, it should be noted that the higher risk associated with radical innovations makes them unattractive to industries, especially if the innovation involves high capital costs. A series of incremental innovations are more likely to be adopted in practice. This is another area where academic and industrial interests diverge. Furthermore, industrial R&D is affected by market forces, real or as perceived by management. Industrial researchers must be willing to drop projects and take on new ones without being “attached” to the ones that are dropped unfinished. Academics cannot follow such a policy since academic research requires longer term commitment as well as the requirement to train researchers who must typically complete a thesis and try to get into an archival publication.

To sum, it is important to bear in mind the differences in academic research and industrial R&D. It is still possible and indeed highly desirable that both parties understand the key differences and build valuable bridges and make useful contribution to the society at large.

Arun S. Mujumdar
Singapore