Editorial

There have been countless arguments in favor of as well as against basic or applied research in academia. Clearly, since basic research does not have a measurable return-on-investment within a reasonable time span, it is not surprising that profit-making firms cannot afford to devote any substantial effort and financial resources to conducting or supporting it. Almost without exception in all parts of the world, basic research is carried out under tax-payers' sponsorship. The results are made available globally and freely. Those with the necessary resources can assimilate and utilize these results often to commercial benefit after carrying out some applied or strategic R&D. Major inventions in the past few decades owe their birth to basic research conducted years earlier by someone or some group somewhere in the world. Thus, basic research is essential to keep the engine of innovation running smoothly. Applied R&D in future may not be able to generate truly epoch-making inventions although there are notable exceptions e.g. Gutenberg's printing press, Bell Labs transistor etc.

I have earlier proposed and written about the need to pursue a policy of "sustainable R&D". I have also elaborated on the need to get rid of the "closed loop approach" commonly found in academic institutions driven more by the need to raise the outcome in terms of citable publications in so-called high impact literature rather than by societal or industrial needs. I firmly believe that any research, be it academic or industrial, can be sustained over the long haul only if it is "appropriate". Hence I take the liberty to coin another new phrase: **Appropriate R&D**. Thus, both academia and industry anywhere in the world must carry out appropriate R&D to survive over the long term. It may need to be rather fundamental research in industry or applied R&D in academia depending on the current need at that location.

Perhaps a better and more general (and appropriate?) way to characterize R&D would be to assess if it is appropriate to the location where it is being performed and the time when it is performed. I do not believe conducting nanotechnology, bioinformatics or genetic engineering R&D in an underdeveloped nation would be appropriate R&D policy, despite the well-publicized potential of these technologies in future years. It is always possible even in lesser developed countries to divert their limited resources to R&D in high-tech areas; however, this can be done only at the expense of more appropriate R&D areas for the region. Of course, even in appropriate areas it is essential to be aware of the state-of-the-art since there is danger of repeating what is already known. With ready access to the internet it is much easier now to stay abreast of literature in any part the world. Before committing to basic or applied research, Associate Editor Larry Genskow recommends that one should try to have a good answer to the question: "What value might this work provide in the short or long term?" It certainly is a highly appropriate litmus test of worthiness of a research project.

Arun S. Mujumdar
Singapore