

EDITORIAL

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Industrial R&D; Carbon footprint; Academic research; Bayh-Dole Act, IP; academia-industry interaction

The high level of interest in drying R&D, particularly in the academic institutions around the globe, is evident from the series of successful conferences devoted to drying that were held in 2009. It is heartening for me to note this continuing intense activity even after three decades since the first major conference, the biennial International Drying Symposium (IDS) series was launched in Montreal in 1978. By the nature of R&D, especially in highly specialized area like drying technology, the half life of any field is rather short as new areas emerge and take up the limited human and financial resources. Despite the fast emergence of bio-nano-info areas, drying R&D has remained an active area in most parts of the world with notable exceptions, which prove the rule. Of course, the half-life by definition is finite and unless we redirect the effort, while remaining within the drying technology, there is potential for a decline in the global level of activity.

I have repeatedly noted the need for greater industry participation in drying R&D even if carried out fully in academia. Drying is a multi-disciplinary applied area, which can thrive only as industry introduces new ideas that emerge from academic R&D. In fact, drying R&D can be justified only on the basis of advantages to industrial practice. Improved energy efficiency, reduced environmental impact resulting from reduced carbon or ecological footprint of novel dryers, enhanced product quality, safer operation, etc. are among the advantages drying R&D can offer to industry and indeed to the society at large.

Often there is disconnect between industrial R&D and academic research. They arise from the different time scales of the two processes and also the basic approach and objectives. While industry is rightfully interested in faster turnaround (shorter time scale) motivated by the need to make a profit, academia are charged with the task of educating a researcher and producing knowledge without the profit motive. While the industry is interested in R&D to enhance products and processes, academics must focus on generating knowledge (know-why as opposed to knowhow) and on training highly skilled manpower for R&D. This makes active cooperation between universities and industry difficult, but with careful appreciation of the needs of each party it is possible to develop a win-win strategy. Industry must recognize the limitations of academic research but also recognize that such research is ultimately beneficial for industry both in terms of the new knowledge generated but also in terms of capable researchers that they can employ. A tangible contribution to academic R&D should be considered as an investment rather than an expense.

As pointed out by an industry colleague of mine, although academic research is typically not driven by the profit motive, recent developments in the higher education sector has seen dramatic change since the well known Bayh-Dole act of the 1980's which encouraged universities in the USA to seek ownership of IP created as a by-product of their research activities. This can be considered academic research driven by a profit motive-traditionally the realm of industry. The focus on owning IP (often at the expense of effort needed to generate results worthy of IP) can be detrimental in the long run by discouraging interaction with and tangible support of industry. When academic research becomes business, industry participation is reduced and not enhanced due to increased costs of overheads and legal formalities involved. Clearly this is nonproductive. A proper cost-benefit analysis of the current state with regard to IP-focused R&D is not quantified yet, as far as I know. Informal interactions between academia and industry at technical conferences and through journal/book publication thus become especially valuable as a bridge between academics and industry. Even developing countries are now focusing attention on IP and how they can "make money" on their R&D effort. Time alone will show if this policy will trigger innovation or suppress it.

Another stumbling block faced by academics is the need to publish in high impact journals and seek high number of citations to enhance chances of securing research grants as well as promotion/tenure even at non-research intensive universities. While for engineers and applied scientists this is not a good measure of true impact of their research, they are forced to deviate from true engineering research to areas that are in vogue which attract more citations and funding. This widens the gap between industrial needs and academic requirements. Until a good quantitative measure can be found to evaluate impact of engineering research, this state of affairs is likely to continue and even spread globally.

As for the key R&D area that should remain in focus around the world it is obvious that the nexus of food, energy and water- all inexorably associated with drying- is an obvious prediction. Energy conservation and enhancement of thermal efficiency of all dehydration operations with both incremental and radical innovations are also very important but rather neglected areas of R&D and design. If performance guarantees regarding energy consumption per unit of water removed as well as the associated carbon footprint are enforced by law for drying hardware, I am sure we will see a step jump in both figures in the marketplace since this can be achieved today even without major breakthroughs.

Use of renewable energy sources for drying, particularly in the agro-sector must be encouraged. Today the effort is sporadic and half-hearted. A global scale project by networks of excellence combining the widely dispersed expertise and scattered experience around the world in this area need to be properly consolidated for the common good. Drying systems using solar, thermal, photovoltaic, wind energy as well as sources such as geothermal and tidal energy should be examined systematically including thermal and electrical storage systems to take care of the inherently intermittent nature of these energy sources. A global scale effort is needed to ensure large scale impact. Greenhouse gas emissions and climate change will also be alleviated if the application is on a global scale.

I hope that future conferences such as IDS, ADC, IADC, NDC, CDC etc will attract more industry participants. As academic institutions become focused on IP issues, such conferences provide an ideal platform for useful industry-academia dialog. In this globalized world industry can benefit from the widely distributed talent participating in these events. This is essential for rapid technology transfer. I also hope these conferences will evolve to meet current and future challenges and thus justify their continuing existence. Strong leadership and vision is needed to accomplish the lofty proposals I have made in this short editorial to stimulate thinking and action by our esteemed readership. There are ample opportunities for personal interactions between industry and academia. I hope that such meetings will help promote innovation on a global scale.

Are we up to this challenge?

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