



Editorial: The Global R&D Scene—Challenges and Opportunities

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Recent survey results published by the esteemed *R&D Magazine* about the forecast for Global R&D Funding and the survey of researchers in several countries yield an optimistic picture. As noted in my earlier editorial,^[1] R&D is the engine for economic growth when coupled with higher education and a sustainable R&D policy that is locally appropriate but based on global consideration. In general, all signs point towards increased R&D funding and better support of academia as the economic conditions improve.

Surveys of researchers in the US as well as outside the US, interestingly enough, convey the same sentiments regarding the most critical challenges they perceive. At the top of their concerns are: limited budget, limited time to accomplish R&D, competition, shortage of skilled talent, intellectual property rights, etc. Surprisingly, effects of globalization, outsourcing, inflation, energy costs, etc., are not rated highly on the list of challenges.

Some of the other issues that come out of this extensive survey are the fact that the march of globalization continues relentlessly as a result of the narrowing of the so-called “scientific gap” between the high GDP and lower GDP nations. It is noteworthy that growth rate of publications in scientific literature as well as patents is much higher in emerging economies than in the advanced economies. The rate of scientific publications in specific areas is reported to be higher in emerging economies than in the developed ones. As noted in my earlier editorial on this theme, we have already noted the unique position China holds in both R&D and advanced education.

One of the trends that started several decades ago has seen some acceleration. This is the enhanced degree of collaboration in advanced education, particularly in science and engineering. Many institutions in advanced nations are establishing campuses in emerging countries or collaborating actively with local institutions. Many large corporations are establishing R&D centers in several emerging economies where the markets may be even larger and certainly growing faster than in their home countries.

Thus, R&D sites are migrating to where the major markets are. This trend is assisted by the lower costs of R&D and availability of suitable manpower at significantly lower cost. This has resulted in what is popularly termed “reverse innovation.” Products are developed, tested and marketed in emerging nations and then successfully introduced in their home country. Another evolving trend is that of resorting to “open innovation.” The “Not-Invented-Syndrome” has largely been abandoned by even some of the largest multi-nationals. These are important trends that one needs to recognize when working on a nation R&D policy. For major companies, often, a collaborator can turn into a powerful competitor as the world “flattens.” There is therefore the need to be constantly looking for innovative solutions to maintain market share.

As for drying R&D, the time scale of development is necessarily rather long, so the pressure to innovate is not as severe as in telecommunications, biotechnology or computer technology. Nevertheless, the need to improve performance and reduce carbon footprint will become increasingly pressing. As one of the most energy intensive technologies, drying will come under scrutiny sooner than later and may result in legislative requirements to enhance energy performance of drying systems by publishing their energy consumption and carbon footprint, as is required in many countries for household appliances like refrigerators, dishwashers and cloth dryers. I hope that dryer vendors will take the initiative and improve their equipment through sustained R&D before any legislative action. Academic researchers can help by proposing innovative and cost-effective solutions to dryer design and operation. Industry-academia interaction in drying will therefore become increasingly important.

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