Industry–academia partnership

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Effective industry–academia partnership is crucial to the advancement of the science and engineering of deployable technologies that ultimately contribute to our well being and security. This was featured in a Panel Discussion, “Academia–Industry Collaboration in Sustainable Development” at the 8th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES 2012) held in Ohrid, Macedonia. The author reflected on the discussion in the panel session and have had some additional thoughts on this issue.

The relationship between academia and industry has been examined at various fora, panel, and strategic discussions. A quick search through Google Scholar revealed approximately 170,000 publications containing those words. The most common interactions of academia with industry have been described as relationship, partnership, technology and know-how transfer, collaboration, synergy, innovations, challenges, reconciliation, opportunities, perspectives, and even cross fertilization. The search for the exact phrase “Industry–academia relationship” provided about 80 results from very wide range of activities. To sum up: a lot of assessment, description, and recommendation is available.

However, let us consider this partnership from a little more relaxed angle. This has always been like a marriage,

and like most marriages, the relationship can sometimes be somewhat uneasy. Both industry and academia need each other for their successful existence and growth. However, their interests and priorities are by definition different in a number of ways. One of the aims of this contribution is to point out and suggest possible solutions on situations where the two partners have identical interests and where sources of possible conflicts of interest exist.

The industrial ventures need to maximise profit by producing useful, low cost products demanded by the market, i.e., customers. Well running and commercially successful production is a priority to most production managers. A potential innovation is in many cases undertaken only when there is no option to extending or keeping the commercially successful process. It usually carries some extra cost and possible complications for changing a well-managed production. The industry needs rather specific and well-targeted research leading to an optimal level of the innovation. The level of innovation varies in different branches of industry. In branches such as microelectronics the innovation cycle has been accelerating and products need to be continually improved for keeping or growing their market share sometimes even after a few months. Fast innovation cycle is a sign of highly successful research and innovation policy. However, this can trigger problems leading to creation of a considerable amount of waste, which is created by the fast obsolescence of products.

The industrial partners have usually have only a limited number of academic institutions with whom to partner. Initial interactions are fraught with pitfalls. It requires time to develop mutual confidence. The industrial partner needs a reasonable assurance that the academic research has a good chance to be successful. Longer time relationship offers better chances of success and maintenance of confidentiality.

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Collaboration with large corporations and smaller companies (called SMS—Small to Medium Enterprise in European Commission terminology) offer different challenges. Big companies usually build relationship with academia over some period of time and beyond research results are also interested in the professional staff development and training. Another incentive for a closer collaboration can be procurement of best graduates.

The author experienced successful industry–academia relationship in his previous affiliation at UMIST (University of Manchester Institute of Science and Technology). The Process Integration Research Consortium (PIRC) at UMIST recently commemorated 30 years of successful functioning. The PIRC membership has been based on flexible contracts renewable annually. Among its members have been mostly large corporations, in some cases SME, and even industrially orientated universities. Some of them stayed for the full period of 30 years. The overall number of consortium members reached over this period to more than 150, with the highest annual membership close to 35.

Another positive experience of the author is running well at the present affiliation—The University of Pannonia. This university closely collaborates with MOL Hungarian Oil Company. This relationship includes both collaborative industry–academia research and dedicated MSc level course. On the other side of the globe the author enjoyed a close collaboration with Process Systems Engineering Centre (PROSPECT), which is a centre of excellence within the Faculty of Chemical Engineering, Universiti Teknologi Malaysia. PROSPECT research centre specializes in planning, design and creation of sustainable process and product supply chains as well as optimal and efficient operation of process systems. PROSPECT has an outstanding record in collaborating with industry large and small, and also in organising numerous courses, workshops, seminars, and presentations for the industry. Student placement in industry has also been commendable.

Similar successful stories can be found world-wide and their number has been growing. Another very successful example of an SMS type high tech company is CALGAVIN Ltd., Warwickshire, UK. Their dedicated and innovation driven management fully exploited several EC supported

project. They supported targeted novel research at several high profile academic institutions in the UK and across Europe. As a result they developed hiTRAN Heat Transfer Enhancement System, tube inserts for increasing the performance of heat exchangers used in the process industries. It demonstrates the technical opportunities available in reducing overall energy use by relatively simple measures. Emphasis is made on the use of enhancement technology retrofitted to existing heat exchangers.

On the other side of the fence of this partnership are the academic institutions. The primary task of academic institutions is higher education, which means production of well-trained graduates. However, a substantial part of universities' activities is targeted to research and innovation. Those activities have been rather important especially for high quality postgraduate teaching. And of course, the research has been also an important source of income for academia. However, the academia, by the rules imposed by the governing authorities and by motivations for recognition, is interested in early research publication. This is a problem with industry, which often demands confidentiality. A frequent case is that an industrial partner is financing the research and they want benefit from an exclusive ownership of novel information, which conflicts with early publication. Academia is by definition open to wide networking and collaboration, which are important conditions for facilitating research. However, when mutual industry–academia confidence is built over time, those problems can be overcome.

Another specific issue to be discussed is sources of funding from countries' governmental institutions and from the European Community projects. They require some industrial participation and co-financing. Conflicts can exist here in setting priorities, which are not always in line with individual industry's needs. The lengthy project selection and contract negotiating procedure can create delays, which are not welcome by innovation-driven industry.

The author has long-term experience from a number of collaborative research, demonstration, training and teaching projects with industrial participation, and believes that this editorial can encourage more discussion resulting in increased industry–academia collaboration, for the benefits of both industry and academia.