Developing Value Through Synergistic University / Industry Collaborations

Erik Sander
University of Florida College of Engineering
Director of Industry Programs
PO Box 116550, 300 Weil Hall
Gainesville, FL 32611-6550, USA
Email: esander@eng.ufl.edu

Abstract

Over the last 20 years, the US industrial sector has increasingly relied on universities to undertake some of the basic research that spawns breakthrough products of the future - research that companies are either not equipped to undertake themselves or are not able to fund internally with their focus on near term technology and product development that affects the bottom line. At the same time, US universities have ramped up their programs to commercialize university generated technologies to the greater impact of society.

Robust university / industry collaboration programs include a multitude of engagement mechanisms ranging from Industrial Advisory Boards which guide university research and educational efforts at various levels to sponsored and collaborative research and technology licensing and commercialization. These programs are most productive when the university and industry partners understand each other's cultural differences, key motivators, and other critical factors affecting the collaborative environment. Erik Sander will discuss how the University of Florida has built synergistic industrial collaboration programs including technology commercialization, industrial guidance, and entrepreneurship/company spin-out programs to best serve myriad industrial partners.

1.0 Introduction

While the general fields of university / industry collaboration and technology transfer have made significant advances over the last 20 years, universities and the private sector oftentimes continue to struggle in consistently coming to common ground when working together. Whether in implementing a university / industry collaborative research or education program, working with entrepreneurs to spin-out a university technology-based company, or entering into negotiations with a market leading company to move technology from a university lab to the marketplace through licensing and development, war stores of difficulties and failures abound despite a wealth of proven success in all of these areas. While one can point to various challenges that are highlighted in specific situations, these obstacles to successful university / industry collaborations are usually rooted in misconceptions of each sector's role, responsibilities, motivational drivers, and success criteria. In a word, the cultural differences inherent in the private and public sectors many times materialize as obstacles to a successful collaboration. While it's always dangerous to generalize, an examination of Figure 1 shows the cultural gaps between universities, small technology based companies, and large industry players can be evidenced in definitive ways that affect collaboration potential such as timeframes (semester vs. weeks), focus (basic vs. applied research), management (decentralized vs. hierarchical, project management driven), and bottom line focus (discovery vs. profit / shareholder value).

These cultural gaps are exacerbated within universities where philosophical struggles between and amongst administrators and researchers with regard to the proper balance between basic and applied research are common. This paper is not meant to

argue the merits of either side, only to point out that this internal struggle can affect the university's perceived willingness to work hand-in-glove with an industry partner or entrepreneur. Additionally, the field of US university technology transfer, while having made great strides since passage of the Bayh-Dole Act in 1980, is still somewhat foreign to some researchers and views of what is considered industrial collaboration and technology transfer can vary greatly among the contributors. For example, Figure 2 shows what one could argue are all valid, yet myriad, definitions of industrial collaboration and technology transfer avenues ranging from contractual mechanisms such as sponsored research agreements and technology licenses to "softer" ways to transfer information and technology from one organization to another – seminars, consultation, publications, and graduation, which without a doubt is the university's broadest means to affect industry with the results of its basic research.

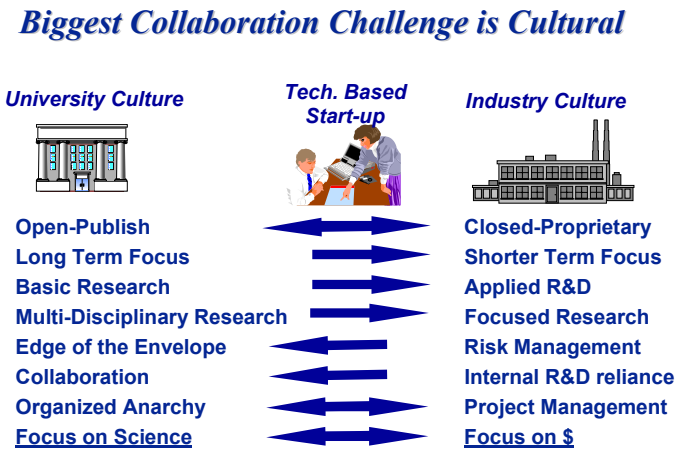

Figure 1 – Cultural gaps between large companies, small companies, and universities

- **Intellectual Property - knowledge "ownership"**
  - Patents, Copyrights, Know-how, Trade Secrets, Trademarks
- **Technology Transfer Professional Views**
  - Licensing, Sponsored Research Agreements, Cooperative R&D Agreements
- **Researcher Views**
  - Consulting, Publications, Collegial Interchange, Seminars, Conferences, Graduates
- **Company Views**
  - Licensing, Consulting

Figure 2 – Different views of what constitutes industrial collaboration and technology transfer

2.0 Primary Challenges to University / Industry Collaboration

While it's instructive to review the cultural foundation for many of the obstacles to universities, industry, and entrepreneurs working together, the author's experience in implementing industrial collaboration and technology transfer programs and individual projects from all three of these perspectives has highlighted four primary areas of collaborative obstacles that must be overcome:

- Intellectual Property – When potential university / industry / entrepreneur collaborations are considered, the first and foremost issue in frequency and intensity of argument is intellectual property ownership and rights. Each party will often demand full ownership of all intellectual property generated in a collaborative project and they come to loggerheads very quickly as this is often initially deemed a "deal breaker." However, experience shows and university technology licensing and industrial collaborative research data supports the premise that universities and the private sector have learned to overcome this obstacle. In spite of the occasional war story of "the university deal that went sour", US universities and industrial partners, whether large multi-national corporations or start-up companies, usually come to terms that provide the university with ownership of the intellectual property that their faculty and students develop, while providing sufficient commercialization rights to industry partners.

- Limited industrial resources for external research support – Again generalizing, over the last 10 years, overall industry discretionary budgets for external R&D support have been reeled in and focused on fewer areas with nearer term payoff potential and a very strong linkage to the company's definitive needs. While the validity of this strategy and the long term effect is beyond the scope of this paper, what is clear is that this has had a significant impact on industry sponsored and collaborative research with universities. University researchers have had to adjust their expectations of industry sponsorship and the deliverables / timelines that are being expected to meet the industrial researcher needs.

- Research guidance/focus to meet company specific needs – As is clearly evident to those who have experienced the university, entrepreneur, and industry cultures and as referenced above, the university's dedication to knowledge for the sake of knowledge and discovery rather than the more definitive industrial profit motive of bringing technology to market, is a wonderful and necessary facet of society, but can also seem foreign and frustrating to an entrepreneur or industry research manager who is being pushed to justify university research investments in terms of potential affect on the bottom line. Industry researchers who aim to maximize their collaborations with universities must understand and appreciate that discovery is usually not as predictable as development and the nature of a university's research "workforce" (graduate students, post docs) means that research results that industry is seeking must dovetail with the educational mission of the university. This can be very difficult for industry in the face of volatile industry environments (mergers, acquisitions, shrinking profit margins, etc.), but is still a university foundational element that can not be ignored. At the same time, a university researcher's up-font understanding of and industry's continued communication of the nature, timing, and criticality of a company sponsor's needs can go a long way toward establishing a research project that is truly focused on meeting the sponsor's needs and timelines.

- Confidentiality – University's in the past have suffered under the often false label of "leaking information like a sieve." This is due at least in part to the university's open culture of information exchange and collaboration in the pursuit of knowledge. While the academic and industry sectors have come to relatively common agreement on how confidential information should be transmitted between the organizations and protected, what can be problematic is publication requirements for students and faculty vs. industry's desire to withhold company sensitive information and proprietary research results from competitors and to protect intellectual property. The author would argue that this potential problem can usually be mitigated with clear, on-going communications throughout the collaborative research program so that confidential or proprietary information can be properly managed in publications without affecting a student's educational progress or unduly delaying a faculty member's publications or endangering patent positions.

3.0 Conclusions

By understanding and embracing the cultural differences that underpin the public and private sectors, universities, large companies, and entrepreneurs alike can leverage the power of university / industry collaborations in advancing their educational and research programs. When one considers the myriad and growing means of university / industry collaboration as shown in Table 1, one can see that success in these areas can lead to substantial gains for all parties.

Table 1

Increasing Industry Collaborations Mechanisms – It's Not Just About the Money

- Joint research with government sponsors
- College, Department and Center Advisory Boards
- Facility usage
- Proactive student recruitment
- Student internships and co-ops
- Faculty sabbaticals
- Visiting researchers and scientists
- Distance ed/lifelong learning
- Sponsored research
- Product / Technology donations
- Support for student clubs
- Student scholarships, fellowships, endowments, professorships
- Participation in short courses, seminars, workshops

Following the philosophies outlined in this paper, the University of Florida has established strong and diverse industrial collaboration, entrepreneurship, and technology transfer programs that lead to students better prepared to serve industry and academia upon graduation, industry partners that have a clearer path to collaborating with the university, and substantial economic returns through $37M in licensing income from over 100 products in the marketplace today.