

Keys to Working with Universities Real World Issues and Solutions

Over the last 20 years, the US private sector has increasingly relied on universities to undertake some of the basic research that spawns breakthrough products of the future - research that entrepreneurs and companies are either not equipped to undertake themselves or are not able to fund internally with their focus on near term product development that affects the bottom line. At the same time, US universities have substantially ramped up their programs to commercialize technologies to the greater impact of society. It's important to realize that university technology transfer is a relatively young field, having been truly active only since the Bayh-Dole Act of 1980, but it's growing dramatically as evidenced by the data to the left, albeit with its share of growing pains. More to the point, much of the market success in this field has been catalyzed by research and licensing collaborations with entrepreneurs and small businesses, a trend that is rapidly accelerating.

Achieving these results has taken a dedicated effort by many groups in the university and the private sector, ranging from faculty and students to administrators, entrepreneurs, and industrial partners. Each stakeholder in the process, whether internal (students, staff, faculty, and administration), or external (industrial partners, entrepreneurs, and investors) to the university plays a key role in making the university effective and proactive at generating and commercializing technology. Robust university / industry collaboration and technology transfer 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 entrepreneurs / industry partners understand each other's cultural differences, key motivators, and other critical factors affecting the collaborative environment.

The Cultural Divide

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,

As of 2006, US universities produced substantial tech. transfer results including:

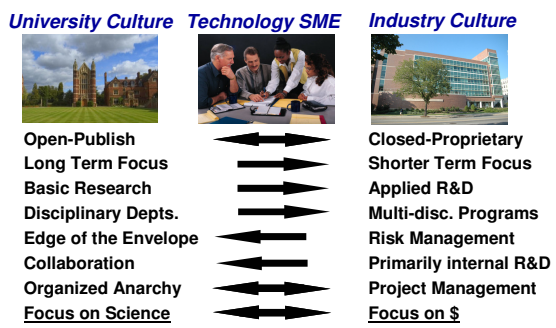
- 3,200+ US patents issued to US universities in 2006 compared with less than 250 in 1980.
- 697 products launched on university or nonprofit research results introduced in 2006 in the US alone.
- More than 4,300 new US university-based products introduced to the US market since 1998.
- 5,724 spin-out companies from US universities, hospitals & research institutes since 1980.
- 64% of licenses and options executed in 2006 to entrepreneurs and small companies.

Source: Association of University Technology Managers 2006 Survey (www.autm.net)



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, obstacles to successful university / industry collaborations and subsequent technology transfer 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 and transfer of a technology to a private sector client such as an entrepreneur or small business. While it's always dangerous to generalize, one can readily see that the cultural gaps between universities, small

Biggest Collaboration Challenge is Cultural



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 many university researchers and views of what is considered technology transfer can vary greatly among the contributors. For example, the figure to the right shows what one could argue are all valid, yet myriad, definitions of industrial collaboration and technology transfer

Different Views - What Constitutes Tech Transfer

- 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



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.

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, concrete 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. Boilerplate industry sponsored research agreements in universities usually include a first option to a royalty bearing license to technology produced in the research project on a good-faith negotiations basis. While this type of uncertain language can often cause heartburn for entrepreneurs working with a university, and more to the point providing the funds for university research to support a future product, the result is that the university and its researchers are able to benefit from the fruits of their inventiveness, the entrepreneur or company is able to stake an exclusive or semi-exclusive position in commercializing the technology, and the public benefits from research that is commercialized for the common good.

Limited private sector resources for external research support – Again generalizing, over the last 10 years, overall large company 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 bottom line. 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. No longer can faculty count on multi-year industrial contracts with ill-defined objectives. The entrepreneurial picture is even more demanding as each decision to allocate scarce resources to research and development is a decision to pull those dollars from other very key parts of the company's lifeline including marketing, operations, sales, etc. However, entrepreneurs need to clearly understand that only a very small percentage of university technologies are anywhere near ready to go to market. Most technologies that are licensed by universities to the private sector (entrepreneurs, small, or large companies) require months to years of development to make them market ready and entrepreneurs need to account for this in their budgeting. They must also realize that they are now dealing with and relying on follow-on research with an organization (the university) and professionals (the faculty and graduate students) that are influenced by different cultural drivers and timeframes as discussed above.

Research guidance/focus to meet company specific needs – As is clearly evident to those who have experienced the university, entrepreneur, and industry cultures, the university's dedication to knowledge for the sake of knowledge and discovery (basic research) rather than the more definitive industrial profit motive of bringing technology to market (applied research) is a wonderful and necessary facet of society, but can also be foreign and frustrating to an entrepreneur or industry research manager who is being pushed to justify university research investments in terms of potential effect on the bottom line. Entrepreneurs and industry researchers aiming to maximize their collaborations with universities must understand and appreciate that discovery is not as predictable as development and the nature of a university's research "workforce" (graduate students, post docs) means that the R&D 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't be ignored. At the same time, a university researcher's up-front 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. This is an especially





critical element for entrepreneurs that are often living on a razor's edge of timelines and budgets and must get the most from each collaboration or license or risk the future well being of their company.

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 and an entrepreneur's desires 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.

Working with universities – 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 education / lifelong learning
- Sponsored research
- Product / Technology donations
- Support for student clubs
- Student scholarships, fellowships, endowments, professorships
- Participation in short courses, seminars, workshops

Conclusion

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 the figure to the left, one can see that success in these areas can lead to substantial gains for all parties.

About the Author

Erik Sander, President of V2R Group, is an entrepreneur and technology pioneer with more than 20 years of experience in all facets of technology development and commercialization. Leveraging his experience in leading university and federal laboratory technology development and commercialization programs, Sander has driven projects and companies to success through a combination of technology and business expertise. You can reach him by email at es@v2r.com. Information on V2R Group can be found at www.v2r.com.

