

BUILDING SUCCESSFUL INDUSTRY/UNIVERSITY
PARTNERSHIPS IN
INFORMATION AND TELECOMMUNICATION SCIENCES

Victor S. Frost

Dan F. Servey Distinguished Professor,
Electrical Engineering and Computer Science
Acting Director, Information and Telecommunication Technology Center
University of Kansas

Introduction: Background and Statistics

During the last decade, advances in the information and telecommunication technology (IT) industry have moved this field of investigation to the forefront of research initiatives. Nationally it is recognized as a critical technology. It has also been identified as one of the strategic technologies for the Kansas economy.

The traditional economic strengths in Kansas are agriculture, aviation, energy, and biotechnology. The IT industry now also represents a strong segment of the economy and supports all other major segments of that economy. Communication industries employ about 20,000 individuals in Kansas, with industry giants such as Sprint currently employing more than *12,000 and expanding*.

The statistics are real. Economic growth in the United States during the 1990's has been fueled by information technology. Twenty-five percent of real economic growth in the U.S. between 1993 and 1998 came from IT and internet-related technologies. Add to this the fact that more than 7.4 million people work in IT and earn an average of \$46,000 annually. Significant growth is expected to continue due to expansion of e-commerce, the Internet, and associated services.

The Information and Telecommunication Technology Center

For more than a decade, the University of Kansas has been recognized internationally for its academic and research programs in IT, and a significant track record has been forged with the leaders of the telecommunications industry. The Information and Telecommunication Technology Center is dedicated to providing an interdisciplinary research environment, to attracting and graduating outstanding students, to leveraging resources from the public and private sectors, and to developing and transferring technological innovation to the private sector.

The Center currently employs nearly 100 students from electrical engineering, computer engineering, computer science, and mathematics. Twenty associated faculty and sixteen full-time staff researchers support the Center's activities. Its unique facilities are distinctive. The Center has state-of-the-art laboratories focusing on high-speed networking, lightwave technologies, and wireless and digital signal processing.

Since the early 1990's, the Center has invested approximately \$16.5 million in research, development and commercialization activities. It has been designated a State Center of Excellence and is supported by the Kansas Technology Enterprise Corporation. Additionally more than thirty percent of the Center's funding comes from the private sector including companies such as Sprint, NEC, Nortel, Hughes, and TRW. Another forty percent of the Center's income is generated by Federal research projects.

To a great extent, the Center's success is due to solving telecommunications and information technology research problems through integrated solutions. The IT research field includes more than simply the fiber or the facilities that enable the flow of information; it includes the networks and human capabilities, matched with services such as voice, data and video, and ultimately, the applications people use to gain value from the data they receive.

Models for Industry/University Interactions

Serving the private sector is a significant aspect of the Center's mission. There are a number of models for industry/university interactions. Here are a few examples:

- Direct sponsored research: Primarily conducted by faculty and students on campus, this research is private-sector driven and fully underwritten by the company.
- Joint Research: By engaging the experts in the company with university faculty and students, joint research leads to mutually satisfactory outcomes for both partners.
- Internships: Short-term projects conducted over the summer at the company's location. Internships introduce students to the private sector; often these are more effective when combined with an ongoing relationship during the regular school term.
- Graduate fellowships: Collaboration by faculty and the private sector staff often allows for development of a project or thesis topic for fellowship students.
- In-house short courses: Organized for the benefit of private sector companies, short-term courses give visibility to faculty and allow companies to increase the expertise of their employees in a certain area.
- Consulting: Faculty often provide limited consulting on short-term specific problems.

How do Industry/University Partnerships become Win/Win?

Industry benefits by acquiring the technology developed by the Center and licensing it for use. In many cases, time and money savings can be documented. Industry benefits significantly from those employees who enter the workforce familiar with both the process and the issues because they tackled “real-world” assignments in school. Finally, by working with Universities, the private sector gains a deeper understanding of the potential impact of impending technological innovations.

What are the Benefits to the University?

Students benefit by focusing their research on “real” industry problems. Faculty benefit from bringing the latest research results and industry directions into the classroom at the both the graduate and the undergraduate levels. In addition, research that is underwritten by private sector companies provides substantial overhead return to the University. And in the end, the University is providing “service” to the community.

Lessons Learned

From our experience in working with industry over the past fifteen years, we have found that it takes years of groundwork to establish working relationships with private sector companies. An important way to open a new door occurs when former students move into positions of responsibility and can champion the value of working with a University.

Concerns regarding intellectual property rights are always present but not insurmountable. When undertaking a project with industry, there are always issues and concerns that must be settled at the onset. The first and by far the most crucial is the question of intellectual property rights: who owns it and what is the patent application process?

Publication issues must also be settled. The university must have the right to publish the results of the research, with prior review by the industry to check for proprietary information. Publication must occur in a reasonable amount of time. We have found that publication issues can be resolved through close cooperation between the industrial partner and the University researchers.

Credibility is everything. It is important to establish realistic milestones, meet the milestones, and deliver abundantly on results. In the beginning, it is important to surpass the company’s expectations. It is not unreasonable to expect close supervision by the private sector company; they are there to gain knowledge from the process.

It is important to maximize the company’s opportunity to work with the students and evaluate them for future employment.

Industry leaders understand and support the concept of leveraged funding. They want to see this occur with organizations such as KTEC, NSF, and the University.

And finally, if quality, cost-effective work is delivered, the reputation of the University can spread within the corporation.

Successful industry/university relationships take time to nurture and are subject to the shifting tides of company focus, fortunes and the general economy. From a long-term investment perspective, these relationships not only directly improve the competitive position of the companies involved but also play a significant role in preparing the next generation of technology leaders.