

Transferring Technology

More Entrepreneurs, Capital Needed for Growth

There's a real possibility that something you use daily (a medication, computer software program, household item) was created in a college or university by a faculty member.

The process of moving technology from the research setting into the hands of users – known as technology transfer and technology commercialization – is one vital piece of economic development and growth for any state.

The Indiana Chamber has cited enhanced technology transfer as a vehicle to developing a dynamic and creative culture in its long-range economic development plan – *Indiana Vision 2025*. The objective is to increase the amount of technology transfer from higher education institutions and attain a “Top 5” ranking per capita among all states.

“Very few people 20 or 30 years ago recognized that universities were going to be engines for economic development, including the federal government, which provided money for research but didn't expect more to come out of the research except for knowledge,” asserts Walt Plosila, Ph.D., a Maryland-based independent management consulting professional and former vice president of technology partnership practice for Battelle.

“The higher education institution leadership has recognized tech transfer as a vehicle to get more legislative and public support for higher education in general. Research doesn't necessarily attract (the support), unless you can turn it into jobs and talent. Higher education is seeing that this is an

important function,” he adds.

Richard Cox, director of the Office of Technology Transfer at the University of Notre Dame, emphasizes the need for more technology transfer and innovation.

“How does increased economic growth come about? An increased labor pool. So we have to have more people working, or increase the ideas and innovation and market opportunities. A good educational system and adequate funding for research are key drivers here,” Cox declares.

“There's nothing like having a goal in front of you to shoot for and make people strive to achieve it. Beyond the substantive things – education being a driver and (having those) willing to invest – make sure the goal itself is prominent and known so that people don't lose sight of it.”

It starts with talent

Hoosier public and private higher education institutions are at various stages of technology transfer – some long established and others just starting out.

A quick snapshot of the technology transfer landscape at a few universities:

- Purdue's Office of Technology Commercialization was ranked sixth nationally for start-up creation through technology transfer activities in 2011 by the Association of University Technology Managers. Early in 2011, the school launched the Innovation and Commercialization Center to increase the value of Purdue-owned intellectual property.
- In the last three years, 17 start-up companies have been

Technology used in a variety of industries, and possibly in Hoosier households, often comes from research universities. Purdue University associate professor Michael Capano (left) and Purdue researcher Rakesh Agrawal (right) are experimenting with emerging technologies in a variety of fields and uses (Purdue University photos/Mark Simons).



established through IU faculty research or with the \$10 million Innovate Indiana Fund, which is managed by the Indiana University Research & Technology Corporation (IURTC).

- IU had more than 200 inventions disclosed in 2011; Purdue University sees about 300 inventions disclosed each year on average; over the past five years, Notre Dame faculty have disclosed more than 200 inventions.
- Earlier this year, the University of Southern Indiana hosted a Technology Commercialization Academy with engineering and business students to develop ideas for commercializing patents from the Naval Surface Warfare Center, Crane Division. Ball State University students are also able to work with U.S. Navy researchers through the Military 2 Market educational partnership with Crane.

One of Indiana's real benefits, according to Plosila, is the talented graduates its universities churn out. But keeping those graduates in the state and working in an entrepreneurial setting is one of the state's biggest hurdles to cross.

"The bottom-line point is that higher education in Indiana is doing really well in graduating technology and engineering graduates," he stresses. "It's harder to regain than to retain graduates, so doing more to retain, and less in regaining, is one of the thoughts. There is a good talent pool to build upon. Talent is part of tech transfer; if you don't have the talent, transfer doesn't work."

Calling all entrepreneurs

Indiana's entrepreneurial culture has grown over the last 20 years, but still isn't as rich as other areas of the country. Unfortunately, the question of how to continue building upon that culture is an unanswered one.

"Money is important, but having available talent is a critical factor – and one of the things that everybody recognizes that we suffer from. We don't have that frothy culture of entrepreneurial talent that is constantly in and out of their present or next door to their former venture," Cox notes.

"A lot of those folks who may still have that entrepreneurial spirit are fully engaged with the things they are doing. I don't know how you solve that problem."

Joe Hornett, senior vice president, treasurer and COO of the Purdue Research Foundation, agrees.

"We do not have a critical mass of serial entrepreneurs in the state, individuals who have built multiple companies from fledgling technologies. That's probably a competitive advantage of the coasts. They have the knowledge of entrepreneurs who have been there, done that," he affirms. "We're getting better, but still have a ways to go."

From Plosila's perspective, the Midwest's mass of well-established, larger companies – a positive from most angles – has hindered Hoosier-grown entrepreneurship.

"Engineers could work for small, young, growing companies, but historically career offices and faculty want everybody to work for the best companies," he offers. "The entrepreneurial culture is brewing, but it just isn't the same as California or Massachusetts yet. A lot of the things in the last decade have been put into place and more is happening to do that. You've got to do more in terms of turning research into commercial products and make sure the best talent stays in Indiana and works in an entrepreneurial setting to encourage the next generation of companies."

Show me the (early) money

Marie Kerbeshian, vice president of technology commercialization at the IURTC, points to increased early-stage venture capital as necessary for success.



"I never thought, in my wildest dreams, that I would be able to take something from the laboratory to the bedside. I thought we'd start something and someone else would refine it over a couple of generations of research careers. To have this happen is incredible," offers David S. Wilkes, Indiana University professor and co-founder of ImmuneWorks. Wilkes discovered a type of collagen that might stop the human body from rejecting a transplanted lung (Indiana University photo).

“Some early-stage companies coming out of our university aren’t ready for an angel investment, just a small amount or to get a prototype accomplished. Then once that’s done, they look at the \$250,000 to \$500,000 funding level. It’s very different from getting major venture capital,” she attests.

The IURTC has created a program called SpinUp to “nurture” young technologies and help create very basic companies for faculty, post-doctoral or graduate student inventors.

“We work to try and get research dollars into that barebones company. The idea is once those research dollars have proven that (technology) even more, we help them go out and find an entrepreneur to take it to the next level,” she explains. “We’ve had wonderfully huge response from faculty interested in the program. We’ve had, within the first year, a successful funding of one company through Small Business Innovation Research grants and the submissions just keep growing.”

It’s more than just money, Kerbeshian adds.

“I think the biggest thing that we need to do is work very closely with the university on fostering partnerships between the university and industry, in terms of funding, but also in terms of combining resources, whether that’s scientific knowledge or equipment that IU might have and a small company doesn’t,” she mentions.

One partnership is a collaborative research agreement announced in June between Indiana University and Crane to enhance research and product development. The agreement allows the partners to exchange technology-related assistance and develop private-sector partners.

“Crane has a lot of technology they’ve developed specifically for the military use, but it’s often the case that innovations that come from military technologies have a larger impact on non-military users,” Kerbeshian says.

Reality of the situation

The partnership between industry and universities is critical to getting more of those inventions patented and moved to market.

Mark Long, president of Long Performance Advisors and former president and CEO of the IURTC, highlights that industry role.

“The ‘gaps’ would be in the willingness and capability of industry partners to share in the risk profile of some of these early-stage projects, rather than ‘sitting by the sidelines’ and waiting to see if they develop and letting the university bear all the risk and expense of development and patenting the potential technology,” he expresses in an e-mail. “It takes a true partnership, in many cases, to develop a complex technology.”

More risk equals more reward, if industry partners are willing to take the leap.

“Part of what happens at universities, there are good ideas, but they are so much in their infancy that a lot of times their commercial potential is not fully evident, which makes it difficult to license them,” Hornett adds. “Sometimes, if there would be additional funding to move inventions further down the path, their chance of making it in the marketplace would be much better.”

Hornett also points to a matter of lost focus in some instances on the university’s behalf.

“The invention disclosure process is open to most of the faculty. Resources are not being focused where things are likely to happen or where the highest returns are,” he describes. “It somewhat runs against the grain

of culture of higher education – the pursuit of knowledge for knowledge’s sake. We want to look for this stuff or mine gold where we believe the gold actually is. It’s an economic reality that bumps up against the academic culture.”

Overcoming Indiana’s “Hoosier humbleness problem” could also help the situation. Long affirms that Indiana is a “much more progressive state with great research universities than most people think. We just need to do a better job of letting people know how progressive we are.”



The University of Notre Dame has ramped up its technology transfer efforts over the last several years, with more than 50 inventions disclosed annually (University of Notre Dame photos).

INFORMATION LINK

Resources: Walt Plosila, national technology transfer expert

Joe Hornett, Purdue Research Foundation, at www.prf.org

Marie Kerbeshian, Indiana University Research & Technology Corporation, at innovate.indiana.edu/iurtc

Richard Cox, University of Notre Dame Office of Technology Transfer, at ott.nd.edu

Mark Long, Long Performance Advisors, at www.longperformanceadvisors.com