South Dakota State University

CICEP | INNOVATION AND ECONOMIC PROSPERITY UNIVERSITIES AWARDS PROGRAM

CASE STUDY 2014

Growth and Development of an Economically Engaged University

An entrepreneurial spirit—perhaps driven by the self-motivating and self-reliant nature of Midwesterners—has been present at South Dakota State since its earliest years. The innovations commonly connected to the university started as solutions to problems, big and small.

Stephen Briggs, a student from a farm family, saw the problems created by overheating engines on early farm implements. The air-cooled engine he built in a campus laboratory, later known as the Briggs and Stratton, changed agriculture.

As a student, Edgar McFadden thought about ways to combat wheat rust, a common 20th-century epidemic. His ability to cross Marquis wheat and emmer yielded Hope, a rust-resistant wheat variety that has spawned several lines used by today's farmers. Those wheat varieties have fed millions of people.

Pigs raised in several Midwestern states also feed millions of people. When one animal contracts a disease, it threatens a herd and a swine producer's livelihood. SDSU researchers in mid-1990s, working with colleagues, developed the first Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) vaccine. Over 850 million doses of the vaccine have been given worldwide.

Al Kurtenbach and Duane Sander, colleagues in the College of Engineering, created a self-contained scoreboard for wrestling tournaments. Today, Daktronics is the largest private employer in Brookings and a world leader in LED signage systems. Daktronics employes 2,500 people worldwide including 250 full-time alumni and another 200 students and interns from the University.

THE CHALLENGE

Research and commercialization practices have changed since those inventions moved into the public sector. The University, however, had not adapted as it moved into the 21st century. The challenge was evident: University leaders, working with partners off campus, needed to create and sustain a research environment conducive to moving faculty discoveries to the marketplace—a full platform of entrepreneurial education, resources, technology transfer, and incentives for University employees and students to create their own vision for a commercial future with industrial partners.

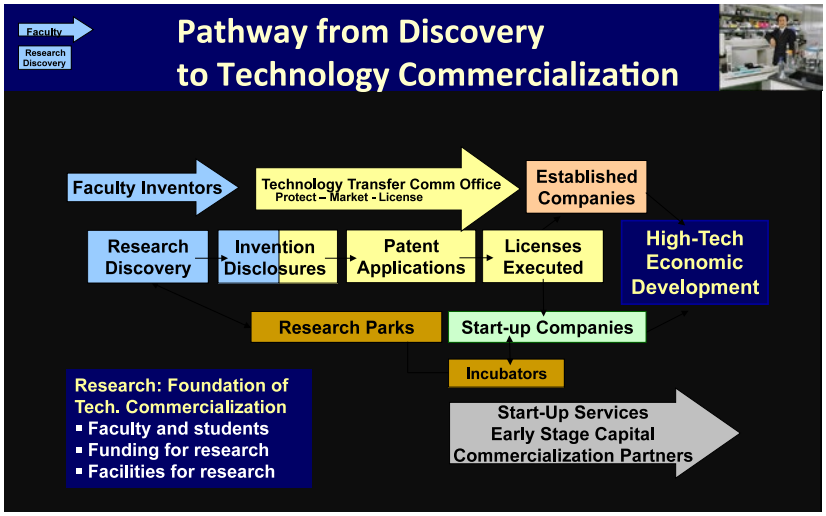
THE SOLUTION

Building a more entrepreneurial and economically engaged university requires a multi-faceted solution—part policy, part process, part programming, part collaboration, part infrastructure and part facilities.

The South Dakota Board of Regents (BOR) policies allow researchers to work as consultants or start businesses. BOR policies, after several revisions in the last 10 years, provide clarity on rights and responsibilities. As reinforced in the 2008 AAAS report, the technology transfer function needed attention. The research infrastructure was minimal in the early 2000s—seven Ph.D. programs, limited shared equipment, few dedicated laboratories, a combined office

for Research and the Graduate School and a small number of competitive grants awarded to faculty researchers.

The University needed a more robust process to move ideas along the commercialization pathway. One model is shown in Illustration 3. The state's first university-level Technology Transfer Office (TTO) was established in 2008. The development in 2009 of an agreement between the University and South Dakota Innovation Partners (SDIP) opened doors to early-stage assistance for inventors. Over the past two years, the TTO has created easy-to-negotiate standard agreements for industry collaborations including non-disclosure, material transfer, research collaboration, sponsored research and sponsored service. TTO staff has placed these agreements and other frequently requested documents, such as the Invention Disclosure Form, on the TTO website. In order to encourage current partners to continue to work with University researchers, the TTO also has master agreements for facility use and sponsored service for selected partners and a standard test-only MTA to foster industry interests in testing University plant varieties for potential future license or collaboration.



Multiple University Roles in the Regional Economy

Finally, community partnerships have provided funds, laboratories, and equipment for start-up companies and industrial relations. The Research Park at SDSU broke ground in 2007 as the first research park in South Dakota. Brookings BioSpace, two proof-of-concept labs, and Technology Center for Rural Enterprise, provide space for several start-up companies.

TTO Impact

Measurement	FY2010–FY2014 average	FY2014 total
Invention disclosures	49	38
Patents filed	13	15
Total agreements	192	250
Total licenses	7	13
Licenses with start-ups	3	6
Royalties per year	$ 2,040,045	$ 2,939,816

THE PROGRESS

The updated BOR polices on intellectual property clarifies the rights of researcher and the university.

The relevant numbers show the growth of industry relations and commercialization efforts. In 2003 the University executed five agreements involving intellectual property. From 2007 to

2009, the University averaged executing 63 of these agreements per year which has continued to increase, as shown in the table below. Sponsored research and sponsored services are measurements of such partnerships, and the University has seen an increase in these agreements from three in 2007 to more than 40 in 2013. Nonfederal sponsored funding increased from $7.5 million in 2007 to $30.6 million in 2013, a three-fold increase over the period. The TTO has also partnered with SDIP to establish a joint group of marketing analysts, graduate students in scientific disciplines. They are trained to analyze and give opinions on invention disclosures. In the first year of the program, these analysts evaluated more than 20 technologies, generated reports, participated in meetings with researchers and the TTO, and helped make informed decisions on patentability, market potential, and found connections within the marketplace for University innovation.

THE POTENTIAL IMPACT

The University and community partners have built the organizational structure to enable economic growth. The Growth Partnership, a non-profit organization, started construction in late 2006 on the Research Park at South Dakota State University, a 125-acre innovation campus on land formerly used for agriculture research. The city built utility infrastructure. The first building, the Innovation Center, opened in 2008. Following completion of a second building phase, the multi-tenant incubator houses 40 companies with approximately 100 employees, including start-ups and research and development functions.

Raven Industries, a publicly traded engineering and manufacturing company, in 2013 opened a research office to connect its engineering and precision agriculture technologies to University faculty and students. EleMech, an Illinois-based equipment and process controls integrator, opened an engineering office at the Research Park, in part for access to the Jerome J. Lohr College of Engineering and its students.