
From Equines to Economic Development: The Story of the University Research Park

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The story of the University Research Park in Madison provides an instructive case study of how favorable outcomes can arise from university-established parks focused on fostering commercialization of university research.

It is widely understood and even expected that commercialization of research coming out of university research laboratories should make strong positive contributions to economic development (*e.g.* Fischer, 2005; Palminteri, 2005). Moreover university-associated research parks, where they provide a favorable environment for research commercialization and growth and development of small companies spun out from university research, are often net contributors to the economy of their regions while serving to foster the university's role of service and outreach. The story of the University Research Park (URP or "the Park") in Madison provides an instructive case study of how favorable outcomes can arise from university-established parks focused on fostering commercialization of university research.

The operant word in the term "University Research Park" is *university*. Without its affiliation with UW-Madison, URP would be just another modern office park that may or may not house technologically innovative companies or companies focused on developing novel, cutting-edge products. Research parks can and do exist without the involvement of a university but close proximity to, and association with, a research university greatly enhances potential for local economic growth while serving to enhance the development of emerging young companies that take up residence within the park.

Before moving to specifics of the UW-Madison and the URP, we need to back up several steps to place the story in a twenty-first century economic development context. We live in a knowledge economy and it is commonly understood that the first step in the path to economic growth is new knowledge. For convenience, we borrow here from a characterization drawn from a publication of the Wisconsin Technology Council in its *Vision 2020* plan for growth for the high-tech economy in Wisconsin (Wisconsin Technology Council, 2002). In that report, the path from knowledge to growth included four major steps:

- New knowledge. Otherwise known as technology or more simply put: know-how. New knowledge is the raw material that drives the subsequent steps. It is the ability to do something—usually something that had not been done before, or not done before as quickly or cheaply.
- Technology innovation. The key next step is the application of the knowledge to a practical problem to create a new and novel way of doing something.
- Competitive advantage. Competitive advantage is added to the mix when an innovation uniquely solves a problem better than other prior or current approaches. Implicit with competitive advantage is the understanding that someone is willing to pay to have access to this new innovative solution.
- Economic growth. This is the end-point of technological innovation. It is where the three preceding components come together to enable the growth of a sustainable business that expands the workforce, generates income for employees and wealth for investors.

New knowledge can come from anywhere. Similarly, technology innovation can arise from anywhere independent of the source of the new knowledge. But universities are fundamentally in the knowledge business. They transfer knowledge (primarily in the form of graduates from varied degree programs) and they create knowledge (in the form of research). Thus, it is not surprising that universities, particularly research universities, are associated with regions having strong economic growth.

THE ESSENTIAL UNIVERSITY

Let us take the idea that today universities and economic development are, in fact, closely linked and go a step further. If we think about what a university is, it tends to be in terms of observable characteristic phenomena. For example, a university might be thought of as a collection of facilities—classroom buildings, lecture halls, laboratories, sports facilities, arts facilities, housing for students and offices for faculty and staff. On top of that view, we might layer a vision of a university in terms of its academics—a collection of programs related to degrees conferred, curricula, courses, the myriad academic departments that dispense teaching and learning. A university might also be understood in terms of its people—the faculty, students, staff and visiting scholars. For those in the research-associated fields, a university may even be thought of in terms of its research capabilities, its research accomplishments, its intellectual property and centers and institutes.

In light of our topic about the link between universities and economic growth, I suggest a different approach about how to conceptualize a university. It can be thought of as a community where bright people come together to exchange ideas. In this view, the essence of a university is its role as a center to facilitate the free flow of ideas—a center where ideas are born and exchanged. In a knowledge economy, this phenomenon takes on special importance. The collective creative energies of actively inquisitive people associated with the university community generate new knowledge. That new knowledge, when channeled or facilitated by appropriate institutions, flows as a benefit to the local community and to society at large. The quantity and quality of the new knowledge generated is a function of the diversity of talent and expertise associated with the multiple schools and colleges that populate the campus. A great university is not just the sum total of the capabilities of its faculty staff and students in its component colleges. What distinguishes a great university is the synergistic excellence that occurs as a result of the co-location and cross-fertilization of so many talented and inquisitive people. One could argue that the broader the representation of disciplines housed at a university and the greater their skills, the greater will be the potential for creation of new knowledge.

This is important because innovations—the novel integration of new ways of thinking about “what we do” and “how we do”—are integral to growth in the twenty-first century economy. Therefore, universities—particularly research universities—are significant generators of new knowledge in an era in which innovation and incorporation of new ideas into business and industry are key to growth of the economy.

Then, if a university is in essence a place where people come together to exchange and create ideas, then how does one move from the knowledge to the economic growth? In other words, what of those other steps? The conventional view is that universities offer access to research and new knowledge. But that ignores the other steps needed to produce those economic gains. Universities indeed generate new knowledge and provide access to their research through tech transfer. But new knowledge is not simply something that can be harvested like a ripe peach picked from a tree. New knowledge requires the addition of innovation and creation of competitive advantage to fulfill its potential. The value of a great university is that the convergence of open and inquisitive minds typical of that environment serves as a magnet to draw other creative types seeking high-energy settings that are open and creativity-friendly. These environments span the arts, culture as well as science and they involve entrepreneurs and others who seek opportunities in novel ideas.

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UW-MADISON SNAPSHOT

My first major point is that the university is a key part of a university research park and the story of any university-affiliated park is inherently tied closely to the resources, capabilities and culture of its affiliated university.

As one of the nation's premiere universities, the University of Wisconsin-Madison fits perfectly the above described model of a university community as a magnet for ideas. UW-Madison offers a broad array of human and educational resources that serve to enrich the immediate surrounding community, in this case the city of Madison and the other cities and towns that comprise the greater Madison area. The tremendous research advances and business resources originating from UW-Madison benefit the local and regional economies, impact business development in the state, and provide an ever-growing base of knowledge and human capital to Wisconsin. A recent economic study found that the UW-Madison has a \$4.7 billion economic contribution to the regional economy (Winters, 2002). To provide an understanding of the size and scope of the UW-Madison as a major institution of higher learning and as a contributor to innovation and technology commercialization, consider the following:

- UW-Madison is ranked as seventh best public university in the United States (2004)
- More than forty UW-Madison academic programs are ranked in the top ten (2005)
- 2005 total student enrollment was 41,480
 - Undergraduate: 28,458
 - Graduate: 8,841
 - Professional: 2,533
 - Special students: 1,648
- UW-Madison consistently ranks in the top five nationally on doctorates conferred; Harvard ties UW-Madison in having fifteen grads as CEOs of S&P 500 companies, according to *Bloomberg Markets Magazine*.

The University of Wisconsin-Madison ranks fourth among research institutions nationally according to 2005 figures available from the National Science Foundation, with \$721 million in R&D spending. UW-Madison has been engaged in research for a long time and key accomplishments over the past 100 years include:

- First test of butterfat content in milk (1890)
- Discovery of vitamin A (1913), vitamin B (1916) and methods to enrich food with vitamin D (1924)
- Methods to iodize salt (1930s)
- Blood anticoagulants (coumarol, Warfarin) (1952)
- First bone marrow transplant (1968)
- Creation of the first synthetic gene (1970)
- Vitamin D derivatives (1971)
- Nation's first on-campus blood-donation center (1973)
- MRI imaging technology (1985)

- Organ transplant solution, used in transplant surgery (1989)
- Vitamin D analogues (1990s)
- Human embryonic stem cells (1998)

The university continues to build on its research excellence. In early 2006, it announced additional commitment of \$150 million, with \$50 million each from the Wisconsin Alumni Research Foundation (WARF), the state of Wisconsin and UW-Madison alumni John and Tashia Morgridge, for the creation of the Wisconsin Institutes for Discovery, a public-private research partnership. The private side of this partnership is the establishment of the Morgridge Institute for Research modeled on successful research centers on the east and west coasts, such as the Whitehead Institute at MIT and the Clark Center at Stanford.

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In an opinion column by Carl Schramm, President of the Ewing Marion Kauffman Foundation, UW-Madison was named as one of the top-five universities in the United States for its ability to work proactively with industry (Schramm, 2005). This is significant because a frequent Schramm thesis is that many university innovations are either mired in outdated and inefficient policies or are paralyzed by lack of skills and resources needed to apply them.

UW-Madison has also been long active in generating spinout companies based on university research and innovation. UW-Madison technology commercialization has resulted in formation of more than 218 new companies with connections to the university. One hundred and fourteen of these are direct spin-offs due to UW research, 104 are located in the City of Madison, which collectively generate more than \$1 billion in gross revenues and employ 6,700 people.

Technology transfer and commercialization at UW-Madison rests with three organizations:

- WARF
- OCR (Office of Corporate Relations)
- URP

The Office of Corporate Relations is the front door to the university for business and industry, helping companies access those university resources that can make a difference in building their businesses and strengthening their competitiveness. It is organized within the chancellor's office, therefore its operational scope is campus-wide, and it serves principally to connect business and industry with resources of the university in the following areas:

- Graduate recruitment
- Intern placement
- Continuing education and professional development
- Assistance from faculty experts, sponsored research
- Access to research centers and consortia
- Assistance with International business issues and global markets
- Transferring technology to the private sector

The Office of Corporate Relations maintains a targeted communications program to strengthen recognition of the university by business and industry. Its mission also includes fostering growth of startup businesses based on university research. Through its New Business Startup Initiative, OCR works with nascent and emerging spinouts from the UW-Madison to assist in their growth and development.

The Wisconsin Alumni Research Foundation patents the discoveries of UW-Madison researchers and licenses these technologies to leading companies in Wisconsin, the United States and worldwide. Through licensing, WARF facilitates the use of UW-Madison research for the maximum benefit of society, business and industry.

Unlike many university technology-transfer offices, WARF is an independent not-for-profit foundation. Thus, it is entirely separate from the university and is not an organizational entity of state government. Founded by UW alumni in 1925, WARF operates with the express purpose of benefiting research at UW-Madison and ranks in the top ten nationally on technology-transfer metrics almost every year. Currently, it makes royalty distributions to more than 300 faculty researchers. Beyond payments of inventor's share of royalty proceeds, WARF's annual gift to UW-Madison for the last several years has been in the \$40–55 million range.

The Wisconsin Alumni Research Foundation operates with a staff of fifty and maintains a west coast satellite office in order to be closer to its customer base, which is substantially located in California's life science sector. In 2005, WARF was awarded the National Medal of Technology, the nation's highest honor in recognition of achievements in technology and innovation.

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THE UNIVERSITY RESEARCH PARK

My second main point is that a university-affiliated research park is an excellent tool to facilitate the journey from new knowledge to economic development. The URP is an internationally respected research and technology park, the approach and innovative tenant solutions of which help encourage development and commercialization of new ideas.

The URP's mission is to encourage technology development and commercialization that advances the economy and benefits research and educational programs at UW-Madison. In fulfilling this mission, the Park serves to provide the physical lab and office space where faculty- and staff-based start-up ventures can take root and grow. In supporting this entrepreneurial activity, the Park is creating and building an asset for the UW-Madison, stimulating growth of high-tech jobs in the Madison community and serving as a recruitment and retention tool for UW-Madison faculty.

Founded in 1984, the Park was more than 20 years in the making and the subject of considerable debate by university leaders (Hove, 2006). It is built on former university research land. The equines referred to in the title of this paper roamed the pastures that are now the Park. A small number of horses remain on the site today as part of a facility run by the UW School of Veterinary Medicine. Tenants in the Park must have some relationship with the UW-Madison and rents have always been at market rates. Strict building standards and green-space minimums are in place to assure that the Park remains an aesthetically attractive part of the City of Madison. Developments in the Park are limited to research facilities and corporate offices with no commercial or retail development. The Park is managed by a wholly separate 501 c (3) corporation. Although the URP, Inc., is an entity separate from the university, its staff members are university employees.

Today the Park's 255 acres are more than 90% built out with similarly high occupancy. Some 1.5 million square feet of space are under roof in thirty-four buildings, about half of which are owned by the Park. The Park pays \$3.5 million per year in property taxes to the City of Madison based on assessed valuation of the properties of more than \$160 million. The Park's 114 tenant companies employ more than 4,000 with an annual payroll of nearly \$260 million.

Because a key part of the Park's mission is the encouragement of commercialization of technology, significant effort has gone into the development of the Madison Gas and Electric (MG&E) Innovation Center as the centerpiece of the Park. The local electric and gas utility provided significant initial capital to build what has now grown to a 113,000 square-foot facility providing wet-lab and office space, support equipment and personnel to tenant companies. The initial Innovation Center was opened in 1989 in an early Park building with just 10,000 square feet. The current MG&E Innovation Center, now housed in its own building, opened in 1999 at more than 50,000 square feet and doubled in size 2 years later. The Center is 100% occupied, with forty companies in eighty-five incubator suites. Amenities include:

- UW Library access
- DS-3 data connection
- Nine conference rooms
- Dining commons
- Admin support
- 24-hour access
- Shared lab equipment

- Storage
- Machine shop
- Small animal facility

The early growth and success of the URP have led to the development of a Phase 2 location in Madison, which will provide over fifty building sites on 270 acres. The new site, 3 miles west of the Park, is also on land owned by UW-Madison and formerly used for agricultural research. When fully developed URP-2 will be home to more than 200 tenant companies with estimated employment of 10,000–15,000.

CONCLUSION

With more than 20 years of operating history, the Park has met its objectives in virtually every respect. In terms of economic development, several of the tenant companies of the MG&E Innovation Center have grown and moved on to occupy their own buildings in the Park or have moved to other larger facilities elsewhere in the Madison area. These include Third Wave Technologies, Tetrionics (now owned by Sigma Aldrich), Pan Vera, (now owned by Invitrogen), Novagen (now owned by EMD Biosciences) and Epic Systems. The Park's role in providing the physical facilities for startup companies to grow has served to foster commercialization of UW-Madison research while providing a recruitment tool to attract new faculty. The growth of value of the Park properties themselves has created a vastly greater asset for the UW-Madison. Cash flows from Park operations are just beginning to enable URP to make dividend payments back to UW-Madison to support research, much in the same way WARF has made annual gifts for years from its operations to support research at the university.

More importantly, the Park has had a broad impact on the area as a whole by helping to grow Madison's biotechnology industry and by contributing to the high-technology cluster that has emerged. In 2004, *Forbes Magazine* called Madison a "Hot-bed of Bi-capitalism" in its annual review of best cities for business (Badenhausen, 2004). That year, Madison was named the number-one city under 500,000 population as a place in which to do business. During the initial years of operation of the Park, tenants were typically spinouts from the university. Recently, the Park has come to the attention of companies interested in relocating to the Madison area because of the high profile of the university and the opportunities of being associated with the university research environment. Although the Park remains the single largest concentration of high-tech companies in the Madison area, the region is showing its growth and viability in that several other centers of high-tech company concentration are emerging there.

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Mr. Dines joined the UW-Madison in June 2001, bringing with him more than 25 years of experience in industry and technology management. In his initial position as assistant director for business development within the graduate school, he served as a “faculty coach” for university-based startups. In 2002, he co-founded the Midwest Research University Network (MRUN), an alliance of twenty-two midwest research institutions dedicated to regional cooperation in the commercialization of university research through new business creation. Currently he serves as president of MRUN. He also serves on advisory boards of Urban Technology Catalyst, Candela Solutions, LLC, the AEISEC Madison Chapter and the UW-Madison Entrepreneurship Association.

Dines holds degrees from the University of Michigan including a BS, an MBA, and a Masters in Natural Resources.