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TO: Dr. David Patterson
FROM: Scott E. Simmons
RE: University Research Parks
DATE: February 1, 2008

The purpose of this memorandum is to provide a thorough review of the available literature addressing the potential impact of university research parks. Of particular interest is the economic impact on both the university itself, as well as on the local and state community surrounding the research park.

To achieve this end, research was conducted in various scholarly journals, including the *Journal of Administrative Research*, as well as the *Chronicle of Higher Education*. Furthermore, a comprehensive analytical analysis performed by Drs. Michael Luger and Harvey Goldstein, considered widely to be the premier scholars in the study of research parks, was examined at great length. Moreover, I met with two University of Tennessee at Knoxville research librarians, who provided extensive knowledge and assistance in my search.

Additionally, some background information was provided by a recently-conducted study set forth by Battelle Technology, which has coordinated a well-known partnership with the University of Tennessee for purposes of managing operations at the Oak Ridge National Laboratory.¹ Battelle serves primarily as an advocacy organization for university research parks, as it partners with many universities in a collaborative effort to promote the positive effects of such parks. As such, this information primarily focuses only on the positive effects of such parks.

Finally, information items were taken from the Web site of the Association of University Research Parks, a non-profit organization that promotes the development of research parks in the United States.

A. Research Park – Defined

A university research park is a property-based venture that includes several defining characteristics, among them:

¹ Partnerships for Innovation: UT-Battelle / ORNL Partnership, *Oak Ridge Associated Universities*, <http://www.ornl.org> (Jan. 31, 2008).

- A master-planned property with building designed primarily for private or public research
- Development facilities, high technology and science-based companies, and support services
- A contractual, formal or operational relationship with one or more science or research institutions of higher education
- A role in promoting the university's research and development through industry partnerships, assisting in the growth of new ventures while promoting economic development.
- A role in aiding the transfer of technology and business skills between university and industry teams, and
- A role in promoting technology-led economic development for the community or region.²

The park may be a not-for-profit or for-profit entity owned *wholly* or *partially* by a university or a university-related entity.³ Alternatively, the park may be owned by a non-university entity but have a contractual or other formal relationship with a university, including joint or cooperative ventures between a privately-developed research park and a university.⁴ The key factor differentiating a university research park from technology or industry parks is the meaningful interaction of the firms in the park with the university.⁵

B. Defining Success

The main problem in determining whether or not a university research park is successful is how such success is defined. Several groups of constituencies are involved in both the formulation and sustainability of a viable research park. In the interest of economic development, generally associated with area public officials, success may be attributed to the stimulation of new jobs and income.⁶

² Association of University Research Parks, <http://www.aurp.net>. (Nov. 1, 2007).

³ *Id.*

⁴ *Id.*

⁵ "Characteristics and Trends in North American Research Parks: 21st Century Directions," at 4. *Battelle Technology Partnership Practice* (October 2007).

⁶ Michael I. Luger and Harvey E. Goldstein, *Research Parks Redux: The Changing Landscape of the Garden* at 5 (2004).

A university, on the other hand, has differentiating measures of such success. The academic body will measure the success of the project based on how much the park contributes to the academic mission, both in the enhancement and attraction of research dollars and advancement of faculty research.

Furthermore, provisions should be made to provide research training opportunities for students. In addition, success will be measured by the ability of the park to serve as a liaison for commercialization of technologies developed by the members of the academic community.⁷

C. Emerging Demographic Trends

Battelle National, the world's largest non-profit independent research and development organization, recently conducted a survey of more than 134 university research parks in the United States and Canada to determine various characteristics and trends related to these institutions.⁸ Among the initial data found by Battelle are the following:

- University research parks employ more than 300,000 workers in North America
- Every job in a research park generates an average of 2.57 jobs in the economy
- The total estimated employment impact of North American research parks is estimated to be more than 750,000 jobs
- Research parks provide a location in which researchers and companies operate in close proximity, creating an environment that fosters collaboration and innovation and promotes the development and commercialization of technology.⁹

Tenants of research parks are primarily private corporations (72.0%); however, many parks also include university (14.0%) and government (5.0%) facilities.¹⁰ The typical park has 750 employees, with employment primarily in the following industry segments:

- Information technology, including both software (13.5%) and hardware (11.0%)
- Drug and pharmaceutical firms (10.6%)
- Scientific and engineering service providers (9.7%).¹¹

⁷ *Id.*

⁸ "University Research Parks Contribute to Economic Competitiveness of Regions, States & Nations," *PRNewswire* (Oct. 26, 2007).

⁹ "Battelle Technology Partnership Practice," at vii.

¹⁰ *Id.* at viii.

On average, research parks host approximately 40 tenants, while the median is 24 tenants.¹² Within the parks, approximately 80 percent of research-park employees are employed in the private sector, while only 11 percent of employees are university-affiliated and just six percent are government employees.¹³

Modern research parks are now placing heavy emphasis on supporting incubation and entrepreneurship to grow their client and tenant base.¹⁴ In addition, many research parks target their development towards a particular niche industry. Differentiation and specialization creates a more inviting environment to draw in specific companies with the goal of becoming a world-class organization.¹⁵

Slightly less than half (43.0%) of the research parks surveyed are directly managed by a university or a university-affiliated non-profit entity.¹⁶ Twenty-six percent are operated by independent, private non-profits that may or may not include university representation, while a minimal number of parks are managed either by government or a for-profit developer.¹⁷

D. Economic Trends & Impact

University research parks typically provide a range of business services to their client companies, and generally provide such services at low cost.¹⁸ Most parks have an operating budget of less than \$1 million annually. Most parks have limited or no profitability.¹⁹ Park revenues are typically drawn from park operations, but funds may also be obtained from universities, as well as from various levels of government.²⁰

Research parks provide a number of business services to tenant firms, including:

- Help in accessing state and other public programs
- Linking to or providing sources of capital
- Business planning
- Marketing and sales strategy advice, and

¹¹ *Id.*

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ *Id.* at 4.

¹⁷ *Id.*

¹⁸ *Id.* at viii.

¹⁹ *Id.* Seventy-five percent of parks have retained earnings of less than 10 percent. *Id.* at ix.

²⁰ *Id.* at ix.

- Technology and market assessment.²¹

With this in mind, nearly 800 firms have graduated from park incubators within the past five years.²² Additionally, about one in four of these graduates remains in the park and contributes to the park's vitality, while only 13 percent of these firms failed, and less than 10 percent left the economic region, creating indirect economic growth for the surrounding community.²³ As a result, many research parks are focusing their attention on entrepreneurship and start-up and emerging companies.²⁴ The keys to successful institution of these programs are: (1) requiring support from institutional leaders, (2) acquiring sufficient capital for development, and (3) recognizing that such partnerships are long-term ventures that require collaboration and teamwork.²⁵

Research parks benefit universities in a variety of ways. First and foremost, park facilities help to attract research faculty.²⁶ Additionally, such facilities help to increase the number of research agreements created as a result of the interactions between faculty and companies in the park.²⁷ Furthermore, these parks assist many students in obtaining employment, while giving university professors and departments an opportunity to commercialize intellectual property.²⁸

Employment in a university research park has regional economic benefits that extend beyond a particular job or company. Core research and technology-based industries have interdependent relationships with suppliers of other goods and services, and they also depend on other local companies for various other services (i.e legal, waste disposal).²⁹ For example, a 2003 study of the economic impacts of the Iowa State University Research Park found that the park links directly to more than \$88 million in industrial output, while businesses that provide services to park customers and employers generate an additional \$46.3 million.³⁰ Similarly, a study of economic impact of the University of Arizona Science and Technology Park found that the park

²¹ *Id.*

²² *Id.*

²³ *Id.*

²⁴ *Id.* at xiv.

²⁵ *Id.*

²⁶ *Id.* at 15.

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.*

³⁰ David Swenson, *The Economic Values of the ISU Research Park and its Tenants*, Department of Economics, Iowa State University (Feb. 2000).

contributed \$1.9 billion to the economy of Tucson and Pima County during 2004, creating 13,300 total jobs in the process.³¹

E. Possible Future Developments

More and more parks are discussing the possibility of including on-site amenities, such as restaurants and retail stores.³² Nearly seventy-five percent of survey respondents indicated a desire to have such amenities on-site, yet finding financing for such projects is difficult.³³

Among the primary concerns facing university research parks today is an often strained relationship between the academic and business communities. A park must be able to serve as an intermediary force that fosters integration and collaboration between the university and industry businesses.³⁴ Additionally, many research parks have extreme difficulties generating enough revenue to be self-sustaining.³⁵

University research parks use various mechanisms to foster university-industry relationships. The most effective mechanisms currently used include implementing staff whose purpose is to create and nurture relationships between industry and various academic departments, all while opening university core facilities to industry.³⁶ Additionally, these staff members assist in creating human resource matching programs to team up students and industry with opportunities for internships or co-ops.³⁷

Moreover, several research parks have begun to integrate a new “mixed-use” expansion, in which industry and academic researchers work side-by-side.³⁸ These expansions generally include several key components, among them:

- Substantial space for significant future research growth
- Planned, multi-tenant facilities to house both researchers and companies
- Housing and other amenities to attract younger faculty and graduate students

³¹ Vera Pavlakovich-Kochi and Alberta H. Charney, *Economic and Tax Revenue Impacts of The University of Arizona Science and Technology Park During FY 2003–2004*, The University of Arizona (Mar. 2005).

³² *Id.* at xi.

³³ *Id.*

³⁴ *Id.* at xiii.

³⁵ *Id.*

³⁶ *Id.* at 22.

³⁷ *Id.*

³⁸ *Id.* at 23.

- Flexible development options, in which the university takes the lead sometimes, while the developers take the lead at other times.³⁹

F. Possible Concerns

While one study has shown that research parks provide immense economic advantages for universities and their surrounding communities, there is contrary evidence showing that these parks can instead become a monetary dredge on the university. Often universities, in collaboration with political leaders, rush into hasty decisions about developing such parks without considering the potential financial drawbacks.

For example, in 1982 Washington State University collaborated with the city of Pullman to create a research park in hopes that the region, which had previously been spurred primarily by agriculture, would be able to become an area rich in highly-intensive technological solutions.⁴⁰ The results, however, were hardly indicative of the plan. Nearly a decade later, only one building in the 147-acre research park has been built, and it is only partially leased, half to WSU and the rest to 10 small companies.⁴¹

John Sherman, the town supervisor in Pullman, summed up the difficulties WSU has had with its park this way: “city officials thought all they had to do was put in the zoning and the utilities and put out the welcome mat, and the big-name firms would be here. I think we all had grandiose dreams.”⁴² City officials estimate that more than \$500 thousand was spent in vain promoting the park over a span of eight years, and that after that span of time they were “still waiting for the Boeing or Hewlett-Packard to move in.”⁴³ Along these lines, more than half of all university research parks are initially funded with public monies, which can in turn become a burden on the regional community rather than a benefit.⁴⁴

Charles Knapp, former president of the University of Georgia system, held off on a decision to create a research park, noting that “a research park is a very alluring concept if you’ve got the land. But in recruiting new businesses it can be a disadvantage if it’s an empty field.”⁴⁵ Instead,

³⁹ *Id.* at 24.

⁴⁰ Goldie Blumenstyk, *Pitfalls of Research Parks Lead Universities and States to Reassess Their Expectations*, *Chronicle of Higher Education* (July 5, 1990).

⁴¹ *Id.*

⁴² *Id.*

⁴³ *Id.*

⁴⁴ Link, Albert N., *University-Related Research Parks*, *Issues in Science & Technology* (Fall 2003).

⁴⁵ *See Pitfalls of Research Parks. See also Georgia Research Alliance, www.gra.org.*

Dr. Knapp concluded that the six research universities affiliated with the UGA systems should improve their research strengths before investing large sums of money to develop a park.⁴⁶

Further, even if research parks become economically and financially self-supporting, a study performed by professors Harvey Goldstein and Michael Luger of the University of North Carolina has shown that the parks themselves are not extremely helpful in promoting the state's economic goals. Their study, which included 116 research parks across 44 states, found that a vast majority of the new jobs created by companies housed inside the research parks are given to well-educated white men, rather than women or minorities.⁴⁷ Their report instead recommended that state and local government consider alternatives to research parks such as state-financed organizations that help businesses use technology developed by university researchers.⁴⁸

Professors Goldstein and Luger revamped their study in 2004, and this time even limited their study of which parks to analyze.⁴⁹ First and foremost, their study only considered parks that were more than four years old, because younger parks are often “parks in name only and have a high mortality rate.”⁵⁰ More importantly, the study concluded that many for-profit businesses have begun to shy away from research park inhabitation because “true research parks do not pass a commercial benefit-cost test.”⁵¹ In fact, many park sponsors have begun to place increased emphasis on appealing to the government for subsidies in order to hopefully make the park a viable entity.⁵²

Even more telling are the results of an extensive quantitative analysis performed by the two research professors, in which various economic indicators from 1986 in regional areas where there was a university research park were compared to the same indicators in the same geographical areas in 2001.⁵³ Both the average wage per job, as well as personal income per capita, were analyzed and compared, and the results “suggest that the presence of research parks had no significant effect on regional outcomes over the 1986-2001 period.”⁵⁴ Of the 53 regional economic areas studied in a survey created especially for the book, only 28 areas were considered successful when comparing 1986 results to 2001 results.⁵⁵ To be considered a

⁴⁶ See Pitfalls of Research Parks.

⁴⁷ Luger, Michael I. and Harvey A. Goldstein, *Technology in the Garden: Research Parks & Regional Economic Development* (1991).

⁴⁸ See *id.*

⁴⁹ *Research Parks Redux* at 17.

⁵⁰ *Id.*

⁵¹ *Id.* at 20.

⁵² *Id.*

⁵³ *Id.* at 28.

⁵⁴ *Id.* at 28-29.

⁵⁵ *Id.* at 31.

“success,” the gap in average wage per job had to increase from 1986 to 2001 (adjusted for real dollars).⁵⁶

Additionally, their study concluded that certain variables are more important than others when determining whether a research park will succeed or not. As far as what drivers are most telling, a university research park that focuses on incubator facilities has a significantly lower probability of becoming “successful.”⁵⁷ The probability of becoming “successful” is much higher when the park is established either as a non-profit corporation or as a foundation.⁵⁸

Furthermore, whether or not “success” is achieved is often a direct correlation to the girth that the university itself holds as a research institution.⁵⁹ When a university research park is located in an economic region that hosts a top-30 research university, the probability of being successful, in terms of growth in personal income, is nearly five times as large as the probability of being unsuccessful.⁶⁰

Moreover, there is often a disconnect between the culture of university faculty and that of big business and industry. Yves Fassin, a professor at Vlerick Leuven Gent Management School, noted that “the university scientist uses a long-term approach to research and is devoted to academic freedom and publication. Industry, on the other hand, emphasizes applied research, secrecy, protection through patents and typically employs a product-driven approach.”⁶¹ Fassin notes that in many academic cultures, applied research may not be rewarded as much as teaching or basic research. Instead, university faculty is often more concerned with tenure, promotion, and salary increases based on merit.⁶²

Furthermore, because the end goals of education and industry are frequently not aligned, costs associated with incubation and bringing new inventions to market are often underestimated.⁶³ Frequently, the prototype of an invention is rarely successful; further, moving a product from the prototype phase to an actual marketable product can be extremely expensive.⁶⁴ As a potential product progresses to the stages of marketability, the potential value of the project rises, but success of the launch of the product is still far from certain.⁶⁵ In fact, many technically superior

⁵⁶ *Id.* at 30.

⁵⁷ *Id.* at 31.

⁵⁸ *Id.*

⁵⁹ *Id.* at 32.

⁶⁰ *Id.*

⁶¹ Fassin, Yves, *The Strategic Role of University-Industry Liaison Offices*, *Journal of Research Administration* (June 22, 2000).

⁶² *See id.*

⁶³ *Id.*

⁶⁴ *Id.*

⁶⁵ *Id.*

processes and products fail, because there is no link between the production of the product by the university faculty and the marketing of the product by the commercial partner.⁶⁶

⁶⁶ *Id.*