RESEARCH PARKS AND JOB CREATION: INNOVATION THROUGH COOPERATION

Testimony of

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Research Parks in the Twenty-first Century

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Science and technology research parks are increasingly seen as a means to create dynamic clusters that accelerate economic growth and international competitiveness. A concept that is now over sixty years old, research parks are widely believed to encourage greater collaboration among universities, research laboratories, and large and small companies, providing a means to help convert new ideas into the innovative technologies for the market. Research parks are seen as a proven tool to create successful new companies, sustain them, attract new ones – especially in the science, technology, and innovation sector – and make existing companies more successful through R&D.

Today, countries as diverse as China, Singapore, and France are among those undertaking substantial national efforts to develop research parks of significant scale and scientific and innovative potential. In many cases, these research parks are expected to generate benefits that go beyond regional development and job creation. Indeed, to the extent that research parks are effective, they have the potential to shift the terms of global competition, not least in leading technological sectors. For example, research parks focused on software design in India have supported that nation's emergence as a global leader in software design and services.

Yet, while investments by the world's leading nations in research parks reflects an appreciation of their capacity to spur knowledge-based growth and enhance technological competitiveness through innovation, this potential of research parks appears to be less widely understood in the United States.

To better understand the role of research parks can play as sources of innovation, regional growth, and national competitiveness for the United States and to document recent developments in the growth of research parks around the world, the National Academies' Board on Science, Technology, and Economic Policy convened a conference of leading figures from governments, universities, industry, and research parks from the United States and around the world. The conference demonstrated the range of objectives and the substantial differences in scope and scale of activity characterizing research parks around the world, while also identifying common challenges.

PARKS LEVERAGE NATIONAL INVESTEMENTS IN RESEARCH

Research parks can play an important role in commercializing university research. Dr. C. D. Mote, President of the University of Maryland has emphasized the role that university research parks play in helping the university reach beyond its walls to help develop innovation clusters. In addition, President James Barker of Clemson University has stressed the role that research parks can play in promoting university-industry collaborations. The Clemson University-International Center for Automotive Research (CU-ICAR) is a positive example of how such collaborations can help support technologically advanced manufacturing in the United States. Given the challenges of getting these research parks off the ground and integrating them with their universities' missions, however, both university leaders stressed the importance of timely financial support from the state and federal government.

National Laboratories also represent significant national investments in the production of new knowledge and are the locus of significant scientific aptitude. To fulfill their institutional missions and to serve as the nuclei for the growth of innovation clusters, national laboratories such as Sandia, NASA-Ames and the National Cancer Institute understand that they must stay abreast of the rapid technological change that is taking place in the commercial arena. These laboratories find that research parks are a key tool for building and maintaining ties to the private sector.

PARKS AND REGIONAL GROWTH CLUSTERS

By advancing the research and commercialization missions of universities and national laboratories, research parks often serve as catalysts for the development of innovative clusters. In the United States, such clusters have often developed around a government-funded nucleus; one example is the high-technology industries that emerged and grew around the government laboratories and major universities in the Boston area. In other cases (e.g., Silicon Valley) multiple private industries interacting with a major university, and irrigated with substantial and sustained federal funding, created powerful developmental synergies.

In contrast to the relatively spontaneous emergence of these innovation clusters, a third approach to the development of innovation clusters is through the deliberate creation of research parks. The co-location of creative activity within the concentrated geographical area of a research park can help create a "community of innovation" needed to transfer of new ideas from universities and national laboratories to the marketplace. Today, successfully created innovation clusters, such as North Carolina's Research Triangle, are being emulated around the world, often on a larger scale.

SUPPORT FOR PARKS AROUND THE WORLD

Today, research parks, in their many different forms, exist in most parts of the world. They are seen as a proven policy tool to spur economic growth and enhance technological competitiveness. Moreover, they benefit from significant financial and policy support from national and state governments.

China's Support for Parks

China is a leading practitioner of the research parks strategy for economic and regional development. China's large science and technology industrial parks symbolize that nation's strong determination to grow and become internationally competitive through significant national and regional investments in science-based economic development. Both the absolute number and scale of Chinese research parks are remarkable. China's 54 state-level science and technology industrial parks are designed to help develop the industrial base for rising industries in electronics and information technology, new materials, and bio-medicine.

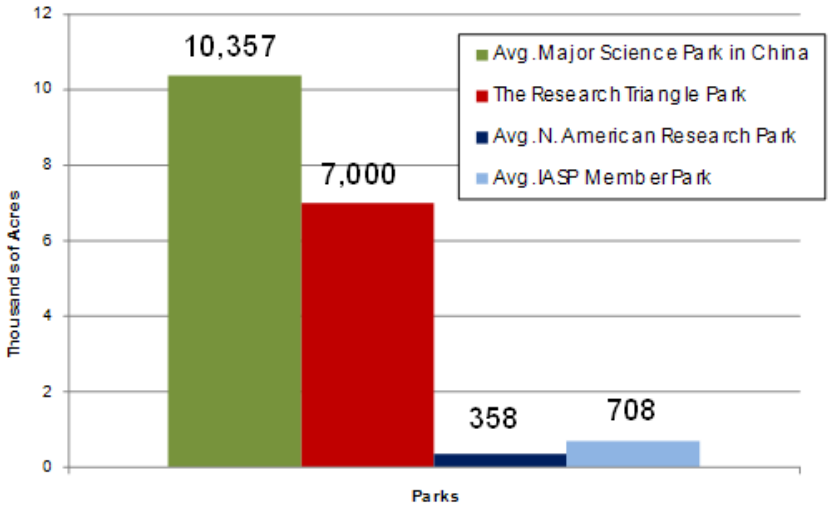

FIGURE 1: Research Parks in Comparative Perspective—an Issue of Scale[1]

One example of the scale of Chinese efforts is the Zhongguancun Science Park in Beijing. The park hosts over 20,000 enterprises and 950,000 employees, receiving total income of 850 billion Yuan (about US$ 124 billion). More than 800 enterprises have income exceeding 100 million Yuan. The park includes information technology firms (56.6 percent), green energy firms (12.5 percent), and biomedical firms (12.3 percent), advanced manufacturing (9.4 percent), and advanced materials firms (8.4 percent). The park has attracted almost 10,000 "sea turtles," Chinese scientists who return home after acquiring skills abroad, that have set up 4,200 companies in Zhongguancun Science Park.

The scale of China's investments in research parks may be comparable to the massive efforts undertaken in the United States during the Cold War in building national laboratories. To the extent that these more commercially oriented investments are successful, they may well have a significant impact on the competitive position of Chinese industry.

Singapore's Parks Strategy: Investing for the Future

An island nation of 4.8 million, Singapore, has recently allocated nearly $10 billion over five years to strengthen its research and development base. A major element in this strategy is the Biopolis research park, planned as the future "biomedical hub of Asia." Located in

[1] "Average North American Research Park" data are from "Characteristics and Trends in North American Research Parks: 21st Century Directions," commissioned by AURP and prepared by Battelle, October 2007; "Average IASP Member Park" data are from the International Association of Science Parks annual survey, published in the 2005-2006 International Association of Science Parks directory.

central Singapore, Biopolis is designed to attract scientists from all over the world based on the quality of scientific research and a cosmopolitan living environment.

Joining Biopolis is Fusionopolis, billed as an integrated and comprehensive work-live-and-play environment. Both the Biopolis and the Fusionopolis are located within One-North region of Singapore, which also encompasses the National University of Singapore, the National University Hospital, part of the Nanyang Technological University, Singapore Science Park, and the Ministry of Education. One-North is located just 10 minutes from the city center and 20 minutes from the Changi International Airport.

Support for France's Grenoble-Minatec

France has an active policy to capture the benefits of its strong investments in research and to reinforce the now vibrant Grenoble high technology cluster. Once a relatively small alpine community of 450,000, Grenoble was selected in 1957 as the site as one of 10 national centers dedicated to French nuclear research. Around the year 2000, as the potential for industry-government high-tech partnerships became clear, and as traditional nuclear engineering stagnated, the idea for Minatec was born. It offered a place and a rationale for formalizing new public-private partnerships within a major S&T park that could expand into new fields of cutting-edge research.

The development of a research park in Grenoble has benefitted from a substantial 3.2-billion-euro investment from the French government, with the local government adding about 150 million euro, most of it to pay for infrastructure, such as highways and access roads. This investment has since been paid back in the form of corporate taxes over the four-year period, and the local government is still benefiting from a net positive of 1,000 technical jobs and perhaps three times as many support jobs.

The Minatec model has influenced how other science and technology clusters in France are financed. France is trying to decentralize its financial system, with the regions promoting more of their own economic development. Local agencies to promote competitive clusters, called "pôles de croissance," are creating groups to screen project applications and then apply for funding from the central government.

IMPLICATIONS FOR THE UNITED STATES

Research parks foster a more robust interface between universities and laboratories and entrepreneurs and small and large businesses. They are a proven policy tool to grow innovation clusters and realize large and highly visible returns on a nation's R&D investments.

National governments around the world recognize this. They are making substantial investments in research parks to facilitate the commercialization of new technologies, to attract leading high technology companies from around the world, to benefit from and contribute to university research and "market ready" students, and to create centers of regional and national economic development.

The United States remains an exception in this regard, where state and local governments principally undertake support for research parks with only limited participation by the federal government. Many state governments are experimenting with technology zones to support research parks and technology incubators, and to increase technology-led economic development clusters. Given the limited scale of these efforts, however, some advocates believe that the United States government should pursue a more comprehensive strategy to capture the potential benefits of research parks for economic growth and national competitiveness.