Research Parks and Job Creation: Innovation Through Cooperation

Testimony Before the
U.S. Senate
Senate Committee on Commerce, Science & Transportation

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Summary
I believe that the federal government can maximize the benefits of science and research parks, an integral part of sparking innovation and creating jobs in the US, by supporting regional innovation clusters to promote a comprehensive, long-term economic growth and development plans across regions in the United States.

My recommendation is that regional innovation clusters should become the centerpiece of a re-authorized Economic Development Administration (EDA), empowering the agency to work with businesses, universities, community colleges, state and local governments and community leaders to foster regional competitiveness strategies. This will help boost job creation and business growth by spurring the creation and growth of successful regional ecosystems, striking exactly the right balance between federal leadership and local responsibility and between the private and public sectors. Science parks and regional innovation clusters are two vital parts to a long-term solution – science parks will drive the clusters forward while the regional innovation cluster will strengthen and support the local framework in which the park can thrive. This broader effort will be the most effective and sustainable.

Testimony

Introduction
Chairman Rockefeller, Ranking Member Bailey Hutchinson, and members of the Committee on Commerce, Science & Transportation, thank you for the opportunity to testify today on innovation through collaboration and cooperation – particularly in the realm of regional and innovation "clusters."

Innovation is central to economic prosperity – driving productivity, ensuring sustainable broad-based economic growth, creating quality jobs and shared prosperity, and increasing national competitiveness. Innovation will aid economic recovery by: creating new jobs in high-tech and traditional sectors; creating higher returns to workers and increase living standards from better, more quality jobs; and making the economy more resilient and dynamic in the long-run, adapting to future challenges.

With the current economic crisis and increasing unemployment throughout the nation, state budgets are tighter than ever, reducing education spending and R&D efforts, making this the best time to consider how the federal government can work with state and local entities, business, universities, community colleges and communities to restore long-term economic health to our nation.

Your focus today on the manner in which research, science, and technology parks can serve as a model for economic growth is welcome – and important. For too long, the federal government has administered programs for economic growth disconnected from regional strategies for growth and development. That is an omission that, in this economy and in a very literal sense, we can no longer afford.

In September, Science Progress, of the Center for American Progress, released a paper that I co-authored with Ed Paisley and Justin Masterman[ii]. In that paper, we set forth the reasons why, we believe, the federal government should take an active role in supporting regional economic strategies. I should emphasize that when we talk about "regional innovation clusters", we do not mean that regional growth is necessarily focused on high-technology businesses. Rather, we mean that local leadership has the resources necessary to promote innovative strategies for economic growth – from any sector, from any kind of business, in any kind of region – urban, rural or suburban.

Science Progress, led by Ed Paisley, is now engaged in a new project to extend those lessons to the Pittsburgh region. That geography includes Western Pennsylvania, Northern West Virginia and Eastern Ohio. The specific goal of our work is to identify the manner in which federal efforts currently contribute to economic growth in that region, and to recommend specific ways in which the federal government could do an even better job in the future.

We aim to advance the understanding of two important questions:

- What is the current impact of federal efforts on regional growth and job creation, and
- How could the federal government be more effective in supporting local leadership?

In this manner, the study of the Pittsburgh region will, we hope, yield national lessons of general application.

The Pittsburgh region offers specific advantages to our work. It crosses state lines, which is characteristic of America's regional economies but which poses obvious challenges in terms of state coordination and even the deployment of federal efforts. It mixes the old and the new, from hard-hit automobile manufacturing in Ohio, to web-based start-ups in Pittsburgh and, of course, the National Energy Technology Laboratory in Morgantown, West Virginia. It spans urban and rural economies. It includes institutions, including foundations, universities and non-governmental organizations that have carefully considered and implemented strategies of growth. Finally, and like the rest of America, the people and businesses of the Pittsburgh region are searching for better, more effective, means of creating jobs and growing their economy.

In this work, we are building on much that is already known about the impact of regional economic units.

The Geography of Innovation

We know that "clusters" – geographically concentrated areas of specialization – form the foundation of regional, and the basis for national, competitiveness.[iii] Clusters are geographic concentrations of firms, suppliers, support services, specialized infrastructure, producers of related products, and specialized institutions (such as training programs) whose expertise reinforces one another's. So, for example, a successful cluster can connect firms with academic institutions, research labs, and other nonprofit organizations in order to create the kind of virtuous cycle of competitiveness that creates jobs, stimulates business formation, and improves productivity. Examples of U.S. clusters include metal manufacturing in the upper Midwest,

entertainment in Los Angeles, information technology in Silicon Valley, and furniture in Mississippi. Clusters are common to every advanced economy.

What are the kinds of advantages that are shared by the participants in clusters? They could be a set of workers who have honed particular skills, like building boats in Maine. Or community colleges that offer training to advanced manufacturing workers in places where advanced manufacturers have located. Or research centers that conduct basic research in biotechnology close to biotechnology firms. Anything, really, that creates what an economist would call a "positive externality" – a benefit that is captured not just by a single firm, but that enriches the community as a whole. Positive externalities are nothing new – the externalities produced by K-12 education is the basis for our public school system – but what is new is this: The notion that regions can consciously focus on the creation of shared advantages within clusters to create jobs, help businesses be created and, of course, stimulate long-term economic growth.

Regional clusters enhance collaboration and value-creation, drive productivity, and play a fundamental role in knowledge creation, innovation, the accumulation of skills, and the development of pools of employees with specialized skills. They effectively lower the cost of capital, increase accessibility to specialized labor, create positive learning effects and decrease the cost of finding talented workers. They create an ecosystem that is helpful to the creation of new firms in which specialized advantages reinforce each other to the benefit of firms, workers and communities. Their operating principles could be phrased as *"Innovation, Collaboration, Value Creation."*

Scholarship from leading scholars[iv] has established the real advantages of "clusters" for a growing economy, including strong correlations between:

- Per-capita GDP and cluster concentration,
- Cluster strength and wage levels, and
- Cluster strength and higher wages.[v]

In other words, clusters are good homes for the high-growth, high-wage companies that move quickly to take advantage of competitive opportunity and create jobs as a result. And that means, of course, that successful clusters are important to the creation and application of successful innovation policy. Innovation – the use of emerging and old information to create new forms of value – is absolutely critical to the future economic success of the United States. Indeed, in a globalized economy, our ability to be a smart economy is basically our ability to be growing economy. Innovation not only boosts the creation of value, but it also helps ensure that economic growth is sustainable – from the perspectives of both economic and environmental concerns. For example, increased advanced manufacturing correlates highly with increases in energy-efficient manufacturing – the more process technologies evolve, the more that they can do more with less. From this perspective, cluster policy *is* innovation policy.

If clusters work on their own, what can be done to help them work even better? Specifically, what kinds of efforts can speed regional economic growth? In our paper, we identify four "lessons" that we believe are very important for policymakers to understand:

First, *Place Matters*. It is important for regional economies to emphasize what they can do best, capitalizing on existing strengths or new strengths that spring naturally from existing advantages. Solar power is a good strategy for New Mexico, hydroelectric power is not. Existence of institutions of knowledge-creation, availability of capital and the presence of high-skill labor with programs to spur talent generation will all be parts of a region's assessment of its competitive strengths.

Second, *Networks Are Key*. The economic theory of a cluster recognizes the importance of both competition, which makes businesses more successful and increases consumer welfare, and cooperation, to create an environment of mutual advantage. Universities and community colleges, for example, can add to the store of knowledge and help educate workers in a manner that advantages multiple, even competing, local businesses. But that is best done with explicit networks of collaboration and knowledge-sharing of the kind found, for example, connected to the Albany nanotechnology cluster.

Third, *Practice Makes Perfect.* As demonstrated by North Carolina's Research Triangle and the Greater Phoenix cluster, it can take a long time, even decades, to build a new cluster from scratch. The observation re-emphasizes our belief that short-term gains will come mainly from existing advantages that have yet to be fully realized. For example, in our paper, we describe an analysis of Tennessee's furniture cluster that both identifies existing strengths, as in office furniture, but only areas in which the region can be potentially competitive, such as mattress manufacturing. Areas of potential strength are likely to be areas that will result in quicker results.

Fourth, *Success Depends on Local Leadership.* There is no substitute for the ability of local businesses, governments, non-profits, universities and colleges to all work together. That has been demonstrated in areas and industries as diverse as San Diego's CONNECT program, Toledo's photovoltaic cluster, and Minneapolis's medical devices cluster. Toledo is a particularly good example. University of Toledo (UT), recognizing its strong engineering and manufacturing science programs and the city's highly skilled workforce and economic infrastructure, led a 20-year effort to create a new photovoltaics and clean-energy cluster. UT has assembled a team of world-class faculty in photovoltaics and has built laboratories and support centers that have spun off dozens of businesses and reinvigorated the city. In partnership, the state of Ohio committed $18.6 million to UT in 2007 to spur the continued development of the photovoltaics cluster, generate new high-tech jobs, and to increase industry revenue. From this university and government leadership, the Wright Center for Photovoltaics Innovation and commercializiation is now an internationally recognized photovoltaics research and development center with infrastructure attractive to companies incubating the future generations of photovoltaic technologies.

Federal Support for Regional Economic Strategies

Against, this backdrop what can the federal government accomplish? And how?

Let me begin with the specific proposal, S.583, introduced by Senator Pryor to provide support for the development of science parks. The legislation begins quite specifically, and quite rightly, by emphasizing the creation of science parks "to promote the clustering of innovation…." That is

quite wise, and in complete accord with the experience of regional innovation that I have described above.

In carrying out its goals, the legislation specifically calls for cooperation, including with institutions of higher learning, for the exchange of knowledge, through, for example, technology transfer and for the award of federal funds through a competitive process.

In other words, S.583 is an embodiment of the lessons we have learned for the stimulation of regional economic growth.

Analysis of successful clusters has shown that they succeed with local leadership from industry, non-governmental organizations, including universities and community colleges, and the public sector. Regional leaders have the best grasp of their own competitive advantages and prospects and they are in the best position to execute the kind of collaborative, bottom-up strategies that enhance cluster success.

There is, however, a problem – and one only exacerbated by our current economic crisis. Cluster initiatives are "too few" and they are "thin and uneven in levels of geographic and industry coverage, level and consistency of effort, and organizational capacity."[vi] Moreover, traditional clusters are under terrible stress as state governments, under tight budget constraints, are cutting their own support for regional economic development.

Now is the time for the federal government to play a critical role in supporting regional efforts by framing, facilitating and funding cluster strategies. By that I mean that the federal government can identify the critical national goals, like energy independence, that serve the national interests – an approach endorsed by Congress in the America Competes Act of 2007. The federal government can improve the efficiency of cluster strategies by improving the delivery of various forms of federal expertise to the clusters that need them and by increasing the ability of clusters to learn from each other. And, of course, in difficult fiscal times for states, the federal government can provide additional resources that can smartly leverage existing local and private funds.

Thus, in my judgment, S.583 should be supported by a broader effort. Rather, an emphasis on any particular means of regional economic growth, such as science parks or business incubators, should be incorporated into a broader federal strategy that supports the full range of tools that can support regional economies.

First, we need an explicit federal focus on regional economic growth. The starting point should be the establishment of the President's regional innovation cluster initiative at the Economic Development Administration of the Department of Commerce.

The President's FY2010 budget provides "$50 million for regional planning and matching grants within the EDA to support the creation of regional innovation clusters… and $50 million to create a nationwide network of public-private business incubators to encourage entrepreneurial activity in economically distressed areas."[vii]

My recommendation is that this proposal – the conscious federal adoption for the very first time of a plan to work with state and local governments to foster regional competitiveness strategies – becomes the centerpiece of a re-authorized EDA. In my view, it strikes exactly the right balance between federal leadership and local responsibility and between the private and public sectors.

For example, the EDA could ask regions, to compete for federal matching funds by offering proposals created in collaboration with their companies, universities, research facilities and non-profits. Funding would be provided for implementation of the best strategies. The EDA should establish a set of criteria that allow the plans with the biggest impact and best prospects for success to be funded quickly. Such criteria could include identifying the proposals that:

- Move fast, with significant impact,
- Use public-private partnerships and other forms of regional collaboration,
- Have a proven track record,
- Integrate distressed areas into larger regional economies, and
- Further the goals of national "challenges" in areas such as energy, healthcare, manufacturing and life sciences.

The federal program should be flexible, of course, in order to respond to the best ideas that come from the regions. The cluster initiative could provide federal matching funds for targeted, high-leveraged activities, such as university research consortia, business incubators, for community-college training programs and technology-transfer efforts focused on small and medium-sized firms.

At the same time, small planning grants would be made available for those regions that have yet to formulate a cluster strategy. An advantage of the cluster approach, especially as we move into an era of budget-deficit reduction, is that the federal funding need not be enormous – indeed, the President's proposal of $50 million for regional innovation cluster and another $50 million for associated business incubators will get these efforts off to a strong start.

The establishment of this EDA effort would not, of course, be enough. That is why the second key ingredient for effective federal involvement is this: Agencies that already support regional economies should tie their efforts specifically to locally-led regional economic strategies.

Right now, the federal government spends roughly $150 billion annually on R&D. But, by our calculation, none of that money goes specifically to support regional economic strategies and only about $650 million goes to efforts that indirectly support regional innovation clusters. Nonetheless, important current efforts could be better harnessed to this goal, including additional programs from the Department of Commerce, the Small Business Administration (including the SBIR and STTR programs), the Department of Energy, the Department of Labor, the National Science Foundation and the Department of Agriculture. That should be encouraged.

Third, federal efforts can work better together and the federal government can work better in support of local leadership.

The implications are larger, of course, than the EDA alone. One of the advantages of the regional cluster initiative is that it provides the Executive Branch as a whole with a good way of ensuring

that micro-economic initiatives are effective and efficient. I would like to see the EDA become an evangelist for high-performance government, tailoring federal efforts to best meet regional needs, fostering collaboration among federal programs that are too often operated in "stovepipe" isolation, and ensuring that federal funds are well-spent.

For example, the Department of Commerce is the agency that, more than any other, focuses on economic competitiveness. Its programs range from assisting exporters to working with minority businesses and the telecommunications sector, to protecting our seas and coastlines, to gathering data on our nation, to working with small and medium-sized manufacturers, to creating industry standards, which are a critical infrastructure innovation. The National Institute of Standards and Technology, for example, has a highly successful manufacturing extension program and has worked with regional economic clusters through its Partnerships for Regional Innovation. As the EDA implements its "clusters" initiative, the Department more generally can align its efforts with the specific needs of regional economies. In this way, for example, the creation of business incubators, as proposed in the President's FY2010 budget, should be constructed to dovetail immediately with regional clusters.

The federal government also offers many forms of economic assistance to boost business creation and help communities grow economies that could be better aligned with regional competitiveness strategies. Federal efforts in the Department of Labor, the National Science Foundation, the Department of Energy and the Small Business Administration could all focus on clusters.

In this way, the federal emphasis on clusters can act as the "mortar" to bind together the "bricks" of economic recovery, providing, in essence, a multiplier effect that makes thriving initiatives even more successful.

In sum, a huge opportunity beckons when the nation needs economic renewal the most. Science and innovation are critical to the overall renewal of the American economy and to the restoration of the American job market. We know that clusters represent an increasingly important economic unit, but unfortunately it is one that has been virtually ignored in policymaking at the federal level in the United States. By including regional competitiveness as a key mandate, a cluster approach can allow Federal policies to be implemented more effectively by better connecting them to regional leadership. In addition, Federal policy based on cluster principles will reinforce economic specialization across states and regions, increasing productivity in the economy as a whole. Ultimately, we can create the launching pads for what America needs the most right now – jobs and long-term, sustainable economic growth.

Conclusion

Some of our strongest international competitors, including Japan, South Korea, and many European countries, have invested in significant national cluster initiatives, directing great amounts of money and resources toward making innovation clusters the main focus of their economic and innovation policies. The irony is obvious—foreign innovation policymakers have come to the United States to study our successes and consult with our experts and yet the United States has conspicuously failed to embrace cluster initiatives as an explicit part of its own innovation policy.

France, for example, has a €1.5 billion program called Pôles de Compétitivité that is focused entirely on creating, supporting, and encouraging the growth of innovation clusters throughout the country. In fact, 26 of 31 European Union countries have cluster initiative programs in place. Japan has made similarly large investments in two cluster programs called the Knowledge Cluster Initiative and the Industrial Cluster Program, while South Korea has made innovation clusters the central organizing concept of its industrial policy. Numerous other countries in Europe and Asia, especially China, boast nation programs dedicated explicitly to promoting the development of specific regional innovation clusters.

The lesson is clear. Economic strategies that have been "Made in America" must be "Applied in America" by the federal government and local leaders in order to employ more Americans and restore long-term economic growth. S.583 would be an important step towards implementing the lessons of clusters by promoting regional recovery and growth.

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[i] Jonathan Sallet served as Assistant to the Secretary of the Department of Commerce and Director of the Office of Policy & Strategic Planning from 1993-96. He is employed by The Glover Park Group, a private consulting firm. This testimony reflects Mr. Sallet's personal views.

[ii] http://www.scienceprogress.org/wp-content/uploads/2009/09/eda_paper.pdf

[iii] Among Professor Porter's extensive writings on the importance and nature of "clusters" is a recent paper summarizing both his academic work and his public-policy recommendations. "Clusters and Economic Policy: Aligning Public Policy with the New Economics of Competition" (Revised December 17, 2008). His analysis is based on extensive research into the sources of competitive advantage, which he first discussed in *The Competitive Advantage of Nations*, (New York: Free Press, 1990) and explained in, for example, "Clusters and the New Economics of Competition" (Harvard Business Review, 1998).

[iv] Important additional research on this topic includes Karen G. Mills, Elisabeth B. Reynolds and Andrew Reamer, "Clusters and Competitiveness: A New Federal Role for Stimulating Regional Economies," (Washington, Brookings, 2008) and Robert Atkinson and Howard Wial, "Boosting Productivity, Innovation, and Growth through a National Innovation Foundation," (Washington, Brookings, 2008).

[v] Mills, Reynolds and Reamer, "Clusters and Competitiveness."

[vi] Mills, Reynolds and Reamer, "Clusters and Competitiveness."

[vii] Office of Management and Budget, "A New Era of Responsibility."