

Job Creation on a Budget:

How Regional Industry Clusters Can Add Jobs, Bolster Entrepreneurship, and Spark Innovation

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Summary

The best way to create more jobs in a state is to grow them at home, rather than poach them from elsewhere: Some 95 percent of all job gains in a year in an average state come from the expansion of existing businesses or the birth of new establishments. However, the usual recipe of tax credits, R&D, training programs, and physical infrastructure is not sufficient, by itself, to spur such “organic” job creation. States also need to cultivate their industry clusters—geographic concentrations of interconnected firms and supporting organizations. Properly designed, cluster strategies are a low-cost way to stimulate innovation, new-firm start-ups, and job creation by helping to link and align the many factors that influence firm and regional growth. Additionally, thinking in terms of clusters gives governors a way to articulate a positive vision of economic prosperity, engage broad groups of stakeholders in driving recovery, boost the export intensity of the economy, and bring focus and discipline to myriad state investments and policies.

Specifically, states should:

- Develop and use data and rigorous analysis to identify industry clusters, target policy, and track performance
- Establish a modest grants program to address discrete gaps in cluster performance
- Reorient existing economic development programs, policies, and initiatives to support clusters

I. Introduction

States across the country need to swiftly and cheaply reignite innovation, entrepreneurship, and job creation in their metropolitan and rural areas in order to get back on the road to prosperity. Supporting regional industry or innovation clusters—geographic concentrations of interconnected firms and supporting organizations—stands out as one low-cost means of achieving that goal.¹

Clusters matter because these geographic concentrations of companies, suppliers, coordinating entities, and institutions like universities or community colleges—whether in “cleantech” in metro Denver or around the convergence of batteries and automotive technology in Michigan—unleash powerful synergies and efficiencies among member firms that have the power to markedly boost the performance of the state economy.² Cluster strategies provide a direct route to economic renewal because they build on existing assets to promote growth in regions by enhancing the interactions by which firms complete transactions, share ideas, start new enterprises, and create jobs. In this fashion,

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industry clusters have the power not just to revitalize regions but also to improve states' standing in the emerging "next" economy that will likely be more export-oriented, lower carbon, and innovation-driven.

Jobs-focused governors should, therefore, introduce or enhance state-level cluster programs to foster regional growth and job creation. Since regional economies anchor state economies and clusters anchor regions, putting such programs in place represents a critical step toward embracing bottom-up, back-to-basics economic development. States should:

- ▶ Develop and use data and rigorous analysis to identify clusters, target policy, and track performance
- ▶ Establish a modest grants program to address discrete gaps in cluster performance
- ▶ Reorient existing economic development programs, policies, and initiatives to support clusters

These steps, meanwhile, mirror and complement those recommended in companion briefs from Brookings on strengthening state export initiatives and boosting community college performance. (See "Boosting Exports, Delivering Jobs and Economic Growth" and "Community College Performance and Regional Economic Development: Strategies for State Action.") This is no accident: In key respects cluster strategy is or should be export strategy and vice versa, just as any sound cluster push must be backed by a supportive human capital pipeline. Export concentrations—whether international or domestic—should always rate among the region's top priorities in cluster development. Likewise, workforce training programs and efforts designed to boost community college performance should also be oriented toward filling discrete skill gaps in the local labor market with an eye to cluster and export development. All three areas can benefit from sharper data analysis and an aligned, multi-agency, cross-initiative approach.

In short, the cluster paradigm offers newly elected governors an important pragmatic concept as they seek to govern for growth at time of gridlock in Washington. All in one, cluster frameworks offer governors an attractive set of concepts for articulating a vision of economic prosperity, engaging broad groups of stakeholders in driving recovery, and bringing focus and discipline to myriad state investments and policies. Governors should leverage clusters (as many already have) to drive their economic competitiveness efforts at a challenging moment.

II. The Challenge

Regional industry clusters—synergistic regional concentrations of industry and related activity in particular fields—represent a powerful source of growth, new-firm starts, and quality jobs at a moment of economic uncertainty. However, too few states are engaged in rigorous and robust efforts to bolster these dynamic sources of regional growth.

Too often, state economic policies have placed external business recruitment at the center of their efforts, not realizing that such "smokestack" or headquarters chasing is typically wasteful at a time when resources are scarce.³ The hard fact: No more than 2 percent of annual state job gains can be attributed to business relocations nationally while more than 95 percent comes from the expansion of existing businesses (nearly 42 percent) and the birth of new establishments (56 percent).⁴

At the same time, when states do look inward to foster "organic" growth based on existing strengths, they have not always recognized the centrality of their regional economies. Instead, state competitiveness efforts have tended to focus too narrowly on what economist Greg Tassej calls the "black box" model of development, which assumes that jobs will magically appear in the presence of the right inputs to growth, usually defined as tax credits, R&D, training programs, and physical infrastructure.⁵ The problem is, states must also attend to how those inputs are utilized and combined through the intense, day-to-day dynamics that drive regional economies.

Against this background, many states have recognized that a well-informed, well-implemented cluster-oriented program that builds up existing regional assets and collaborative dynamics can be a grounded, practical, and cost-effective alternative to more conventional economic development efforts.⁶ Even so, to the extent that states pursue cluster-based approaches, their efforts are still typically contained within the broader conventions of state-led economic development and often suffer from a variety of shortcomings.

Regional industry clusters exist in all states and across a range of industries

Colorado Cleantech Cluster: More than 1,500 companies comprise Colorado's burgeoning clean-energy cluster, the fastest growing sector in the state and a magnet for venture capital. Institutions like the National Renewable Energy Laboratory (NREL) and the Colorado Renewable Energy Collaboratory—a collaboration between NREL and the region's universities—nourish the cluster with groundbreaking research while giants like Vestas and Siemens add to the region's manufacturing capacity. Top-class universities like Colorado State, the University of Colorado at Boulder, and the Colorado School of Mines supply a skilled and highly specialized workforce. Ultimately this cluster owes much of its success to strategic state policymaking that established a market and fostered an environment in which it could grow.

Indiana Life Sciences Cluster: Anchored by several large pharmaceutical, agricultural feedstock, and medical device companies, the region has also developed a concentration of 50 companies and over 8,000 skilled workers specialized in sophisticated bio-pharma services such as contract research, contract manufacturing, and logistics. Spurred by the efforts of the Biocrossroads cluster initiative, the state's 17.2 percent national life sciences job growth outpaced the nation's from 2001 to 2008 enabling employment to reach some 52,800 workers.

Michigan Battery Cluster: An existing core of 330 automotive R&D centers and over 65,000 engineers—complemented by targeted state incentives to promote related manufacturing and technology commercialization—positions the state to build up the regional battery value chain, from materials, cell, and pack manufacturing, to contract and original equipment manufacturing, and ultimately to powertrain integrators. Sixteen advanced battery companies are now located in Michigan, representing almost \$6 billion in total investment and the potential to create 62,000 new jobs.

New York Nanotechnology Cluster: New York's Capital District secured its credentials as a leading nanotechnology cluster after SEMATECH, the global semiconductor manufacturers' industry group, moved its headquarters and greatly expanded its R&D presence in the Albany area in 2007. Catalytic for the cluster, though, was the siting of a New York State Center of Excellence in Nanotechnology and Nanoelectronics at the University at Albany's College of Nanoscale Science and Engineering (CSNE) in 2004. Today over 2,500 scientists, researchers, engineers, students, and faculty work on the campus, including researchers from over 250 corporate partners like IBM, AMD, SONY, Toshiba, Honeywell, Applied Materials, and Tokyo Electron. Significant spillovers are accruing to the wider region as fabrication facilities, headquarters, and other operations settle in the cluster, and partnerships with the Army National Lab and other federal agencies mature and bear fruit.

Northeast Ohio Polymers Cluster: Northeast Ohio's polymers cluster boasts a critical mass of polymer and advanced material manufacturers, specialized academic institutions, suppliers, and end users, and the cluster is establishing a particular niche in flexible electronics. PolymerOhio, a public-private-university technology center and one of many organizations supporting the cluster in the region and the state, serves as a networking and information hub. Kent State's Liquid Crystal Institute, the University of Akron's College of Polymer Science & Engineering, and Case Western's Center for Applied Polymer Research all contribute to the cluster's knowledge stock. The University of Akron's tech transfer program, for its part, ranks among the nation's best.

Puget Sound Interactive Media Cluster: Built off of the Seattle area's talent base in software, art, and design, the region's video game industry cluster boasts over 15,000 well-paying, high-skilled jobs across 150 companies, generates \$4.2 billion in annual output, and supports an additional 50,000 to 68,000 jobs throughout the Washington state economy. Region-wide, jobs at established employers grew by 14 percent (or over 5,000 workers) between 2006 and 2008 and 11 educational institutions offering curriculum around video game development continue to supply the sector with needed new talent.

Tennessee Agricultural R&D Cluster: Oak Ridge National Lab—the world's largest multidisciplinary research institution—and the University of Tennessee, with a \$242 million annual research budget, have helped catalyze an agricultural R&D cluster in Eastern Tennessee's Knoxville-Oak Ridge Innovation Valley around biofuels. At the BioEnergy Science Center university and lab researchers work to develop clean fuel sources, and leading companies like DuPont Tate & Lyle BioProducts, DuPont Danisco Cellulosic Ethanol (DDCE), and Genera Energy all conduct research in the region. DDCE and Genera, for their parts, along with the University of Tennessee's BioSciences Initiative, opened a collaborative, pilot-scale, commercialization-oriented biorefinery earlier this year.

Regional and cluster-based development leaders frequently find that, when they exist, state cluster policies and programs often:

- ▶ **Focus too broadly.** State cluster programs are frequently generic and ill-defined. Numerous states, for example, proclaim a focus on such sprawling, amorphous categories as “life sciences,” “high technology,” and “clean energy” and call it a cluster strategy.⁷ But such vast and fuzzy industry groupings are almost meaningless in understanding and constructing specific regional advantage, and, at any rate, these are frequently the same fields on the radar for nearly every other state in the country.⁸
- ▶ **Fail to use rigorous data and analysis.** State cluster programs frequently fail to build in sufficient top-quality data collection, market analysis, and impact measurement. Without an empirical grounding, states risk attempting to create clusters where no true competitive advantage exists. Furthermore, reliance on only a few or the wrong indicators can lead strategy-setting astray.⁹ And without credible impact measurement, it is difficult to win long-term buy-in and maintain effectiveness in a rapidly-changing economy. As a result, cluster efforts lacking an empirical grounding end up fraught with selection issues, nebulous strategy and design, and likely ineffectiveness and waste.
- ▶ **Remain overly top-down.** Typically cluster policy tends to emanate from governors’ offices as a form of top-down industrial policy. As a result, typical cluster efforts do not often enough flow from or connect to the industry and civic leaders who have the networks, experiences, or resources necessary to galvanize regional buy-in, design interventions, and sustain them. Without local consultations, states risk altogether overlooking many clusters which, by definition, do not match cleanly with existing industrial classifications. What is more, cluster efforts dictated from the top run the risk of abruptly ending or changing course with the political cycle.
- ▶ **Continue to focus on business attraction.** All too often, state economic development practitioners invoke cluster concepts and terminology even as they continue to pursue typical marketing and business recruitment efforts, including tax breaks, in a priority industry. While targeted business attraction can certainly be a part of cluster strategies, particularly to fill a gap in a relevant supply chain, relocation efforts are rarely sufficient to catalyze strong regional cluster growth and remain largely antithetical to it.¹⁰
- ▶ **Remain divorced from other relevant state programs.** Typically, states view their cluster effort as a stand-alone program conducted out of their economic development offices, rather than as an organizing paradigm for linking, leveraging, and aligning all existing as well as potentially new offerings across the administration and across the state’s economically-integrated metropolitan and rural areas. The resulting lack of coordination diffuses resources across too many disconnected activities and geographies, leaves a host of potential synergies untapped, and ultimately dilutes the total impact of state investments.

In sum, state economic competitiveness have too often neglected or misconstrued the catalytic potential of smartly designed regional innovation cluster strategies.

III. A New State Approach

States should inaugurate a new generation of cluster programs designed to strategically catalyze more intense regional entrepreneurship and job creation in existing firms and emerging industries. Such efforts should not only represent something entirely different from traditional business relocation-oriented state economic development programs, but improve upon and sharpen existing “cluster” and cluster-relevant offerings for metropolitan and rural regions.

Specifically, the new state efforts should:

- ▶ Use data and analysis to identify valuable clusters, inform initiatives, and track performance
- ▶ Target modest resources to address discrete gaps in cluster performance
- ▶ Employ cluster data and paradigms to better inform, link, leverage, and align existing programs and offerings across state agencies

Along these lines, incoming pragmatic governors—depending on their states’ existing offerings—should:

Prioritize cluster data and rigorous analysis. Through existing state economic development offices, university research offices, or business and/or civic partners, state executives should (if they have not already done so) immediately move to gather quality information—both quantitative and more qualitative insights where official statistics fall short—about their industry clusters. On this front, state leaders will soon be able to draw on a suite of new information resources being assembled by a number of federal agencies, most notably the federal Economic Development Administration (EDA) which is now advancing a major nationwide cluster “mapping” initiative.¹¹ But in the meantime and starting now smart governors will insist that existing or new cluster strategies or policy interventions are grounded in rigorous empirical information and analysis so that decisionmakers can focus on truly viable, distinctive, competitive specializations and make objective assessments about the prospects of different regional industry concentrations. Three sorts of empirics are necessary:

- ▶ **Objective market analysis** to document the natural presence of clusters, their global market positioning, their export intensity, and the possible relevance of cluster-oriented development initiatives
- ▶ **Fine-grained information about local clusters’ institutional or resource deficiencies** to target and bound proposed interventions
- ▶ **Performance measurement** to evaluate the efficacy of cluster investments and hold strategies accountable on key indicators such as jobs created, firms established or grown, exports increased (especially in small and medium-sized firms), investment attracted, and market share grown

In addition to publically-available cluster empirics, states should maintain a catalogue of various cluster initiatives in the state and disseminate across them knowledge about best practices, success factors under various circumstances, and technical assistance as appropriate and needed.

With this suite of data and information in hand, state leaders will be better positioned to articulate their cluster vision, focus strategies, target investments, and help businesses make strategic decisions regarding site location, R&D spending, and workforce development, among other issues.

Using Data in Maine: Analysis, Evaluation, Learning, and Accountability at the Maine Technology Institute

Since its founding in 1999, the Maine Technology Institute (MTI)—an industry-led, publicly-funded non-profit organization—has awarded \$106 million in grants for 1,295 projects in support of the state’s technology clusters.¹² Yet that is not the only state-of-the-art aspect of its activities. Every two years the University of Southern Maine conducts for MTI a rigorous, independent evaluation of the impact and effectiveness of its programs. Criteria include the number and value of grants awarded; total matching funds (public or private) leveraged; employment growth, revenue growth, and export growth among recipient firms; intellectual property protection secured; equity attracted; and new products commercialized.¹³ Once the analysis is complete MTI prepares a major public report on the findings over and above the university’s published analysis.

The evaluation is not a pro-forma exercise. Armed with the university’s independent evaluation of its cluster and related activities, MTI constantly assesses and tunes its investments, sharpening their focus, and balancing the overall portfolio. Using the evaluation information, MTI has been able to repeatedly demonstrate to the legislature real value to the state economy and robust return on taxpayer investment. With figures reporting that, for example, every \$1 awarded by MTI leverages more than \$14 in public and private investment into Maine’s innovation economy, MTI has garnered considerable buy-in across party lines, legislative terms, and throughout this largely rural state.¹⁴

For more information: visit www.mainetechnology.org

Provide grants to support cluster initiatives. Informed by strong market information, state leaders should consider establishing a cluster initiative program that provides modest grants on a competitive basis to support a manageable number of cluster initiatives across various regions and industries with high export potential. Such grants might be supplied through existing state economic development or related offices or through a newly created entity, and they should seek to expand the capacity of the actors (often public-private partnerships) that represent the state's economic regions and serve as cluster intermediaries. Initiatives representing the many clusters that cross state lines should of course be given equal consideration in the application process, potentially with research and initiative costs shared between the home states.

Three different types of grants could be offered according to the maturity of the cluster actors and the development stage of the cluster itself:

- ▶ **Planning grants** of \$40,000 to \$100,000 would fund initial feasibility studies to evaluate the viability of any cluster initiative aimed at strengthening particular local and/or regional industry concentrations. These grants would be offered:
 - To regional development authorities or consortia of local governments, universities and colleges, and/or industry players that are overseeing new cluster initiatives
 - As a one-time award for any particular cluster initiative
 - Without any matching requirements
 - On an open, rolling-basis as funds are made available
- ▶ **Start-up and technical assistance grants** of \$100,000 to \$500,000 would be made to new and early-stage cluster initiatives to sharpen and energize management, facility, and program operations. These grants would be offered:
 - To early-stage regional cluster initiatives that have well-informed plans based on quality market data and letters of commitment from key regional stakeholders, including business, civic organizations, local governments, and universities
 - With at least a 1:1 matching fund requirement
 - As a one-time award for any particular cluster initiative in any given year, although applicants for any cluster initiative can re-apply for a second round of funding at a higher matching rate
 - On an open, rolling-basis, as funds are made available
- ▶ **Competitive program grants** of \$500,000 to \$2.5 million would support well-defined, collaborative, cluster-specific activities in areas like training, R&D, technology transfer and adoption, and marketing, among others, to overcome identified cluster gaps and documented constraints and help boost cluster performance. The grants would be offered:
 - To established cluster initiatives that have letters of commitment from key regional stakeholders, including business, civic organizations, local governments, and universities. (Grants should flow only to genuine multi-actor regional intermediaries, and never to single municipalities or specific companies)
 - According to transparent evaluation on the basis of strict criteria that assess the sponsoring entity's organizational capacity; the degree of regional buy-in around the cluster initiative; the market case for the proposed cluster initiative activity; and the expected ability to raise future funds to sustain the activity once the award is expended
 - With a 1:1 matching fund requirement
 - On a competitive annual basis

Note that all of this grantmaking would provide a more focused stateside variant of the array of federal competitive grants that have been rolled out in the last year by the EDA, the Small Business Association, and other federal agencies.¹⁵ The new federal programs hold out useful opportunities for “layering” federal resources behind state cluster initiatives.

Link, leverage, and align existing approaches, programs, and initiatives to support clusters. Finally, states should aim over the next two years to better organize in light of the cluster paradigm. State cluster strategy—properly viewed and implemented—need not be confined to specifically titled “cluster” programs and policy products. Instead, it can and should also be adopted as a paradigm for informing, drawing in, and organizing multiple activities. Thus, the specific, targeted cluster-oriented programs and initiatives laid out above are clearly desirable, but equal value and added impact may well come from drawing other, more generally relevant, programs into the cluster orbit, whether it be

R&D and tech transfer initiatives, export promotion, banking regulations and tax credits for venture capital, or education and workforce training policy.¹⁶ Aligning these existing cluster-relevant programs and initiatives horizontally would enable states to maximize the impact of their investments at no additional cost.

Concrete actions that governors can take to link, leverage, and align existing offerings in accordance with the cluster framework include:

- ▶ Prioritizing collaborative applications across departments that tackle cross-cutting cluster-relevant issues like workforce training or infrastructure when awarding competitive grants
- ▶ Tuning department and program objectives and offerings across the administration to cluster needs. Any policy that affects skills, tech transfer, venture capital, or land use, among other issues, impacts cluster dynamics directly
- ▶ Creating a small cross-agency pool of funds to support cross-cutting, bottom-up regional and local efforts to transform their economies

Similarly, a new or renewed state cluster focus should also seek to better organize incoming federal resources as well as help coordinate local cluster-building efforts.

In this sense, smart cluster strategy should entail not only specific new “cluster” programs and initiatives but robust efforts (informed by cluster analysis) to ensure a supply of high-quality cluster inputs and build up basic public and quasi-public goods that have a significant impact on many linked businesses.

Organizing Investments in Ohio: Ohio’s Hubs of Innovation and Opportunity

Ohio’s Hubs of Innovation and Opportunity program aims to give an overarching direction to the state’s array of economic development offerings by imbuing local and state policy with a more strategic, asset-based approach that builds on metropolitan strengths and concentrates the state’s scarce resources on existing clusters of excellence. Over the past year, Ohio has designated each of its seven major metropolitan areas a hub in a particular area of expertise, such as consumer marketing in Cincinnati, solar technology in Toledo, and biomedicine in Cleveland, and awarded \$250,000 in discretionary grant money to each.

In practice, the hubs program proposes a classic effort to link, leverage, and align existing state efforts in service of bolstering cluster dynamics. Going forward, the program will target the application of traditional economic development tools such as brownfield redevelopment incentives and neighborhood revitalization tax credits to discrete geographies anchored by major hub players like universities, R&D centers, and groups of related firms. By encouraging related business to locate centrally in these hubs, the state also hopes to foster knowledge spillovers and other benefits of proximity to simultaneously grow its major regions and revitalize their urban cores.¹⁷

Hub offerings take into account the locus of Third Frontier venture capital awards and intentionally seek to maximize the impact of these investments from that flagship technology-based economic development program.¹⁸ In this way, the hubs are already becoming a popular organizing principle across multiple state agencies and programs: The Department of Transportation intends to start linking a portion of its investments directly to hub needs. In sum, Ohio’s Hubs of Innovation and Opportunity program underscores that cluster strategy properly conceived entails leveraging and aligning existing programs as much as creating new ones.

For more information visit: www.development.ohio.gov/Urban/OhioHubs.htm

Other model cluster strategies:

In addition to Maine and Ohio, whose programs are detailed in this paper, other states have recognized that a well-informed, well-implemented cluster-oriented program that builds upon existing regional assets can offer a real, practical, and cost-effective alternative to more conventional economic development efforts. Examples of additional cluster-informed best practices in state economic development policy include:

California: www.business.ca.gov/WhyCA/InnovationHubs.aspx

Ohio (in addition to the Hubs program described above): <http://ohiothirdfrontier.com/>

Oregon: www.oregonbusinessplan.org/

Pennsylvania: www.portal.state.pa.us/portal/server.pt?open=514&objID=575072&mode=2

IV. Conclusion

Growth-minded governors should embrace the cluster paradigm as an organizing principle for state economic policy and create a set of specific cluster initiative programs to support the competitiveness of the geographic concentrations of interconnected firms and supporting organizations that form the foundation of the state economy. To that end, the steps outlined here promise not only to bolster innovation, entrepreneurship, and job creation at a tough time but also to focus and streamline state economic development policy for maximum efficiency in an era of scarce resources. Governors-elect should seize on the cluster paradigm to design a set of smart, cheap, and transformative regional economic policies that reignite innovation, entrepreneurship, and job creation in metropolitan regions and adjacent rural areas and prepare their states to prosper in the next economy.

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Endnotes

1. "Regional industry clusters" and "regional innovation clusters" are, for our purposes, synonymous, as industry clustering itself encourages innovation. Academic literature most often uses the term regional industry clusters; much policy literature and the Obama administration use the term regional innovation clusters.
2. Mark Muro and Bruce Katz, "The New 'Cluster Moment': How Regional Innovation Clusters Can Foster the Next Economy" (Washington: Brookings Institution, September 2010).
3. Emphasizing firm recruitment places an outward focus on state economic development policy at the expense of the state's existing economic activity. Winning a relocation might make the headlines, but as research from the Public Policy Institute of California (PPIC) shows, job gains and losses are overwhelmingly driven by intra-state business dynamics rather than the between-state movement of firms (see next note). Furthermore, the tax incentives that smokestack-chasing relies on have steep present and future costs but offer only varying and uncertain benefits. State resources would then be better spent supporting the many factors that drive entrepreneurship and help firms to grow—efforts which properly designed cluster strategies can inform. For more see: William Fulton, *Romancing the Smokestack: How Cities and States Pursue Prosperity* (Ventura, CA: California Planning and Development Report, 2010); Greg LeRoy, *The Great American Jobs Scam* (Berrett-Koehler, 2005); Timothy Bartik, "Solving the Problem of Economic Development Incentives." In Ann Markusen, ed., *Reining in Competition for Capital* (Kalamazoo: W.E. Upjohn Institute for Employment Research, 2007); S. Ellis and C. Rogers, "Local Economic Development as a Prisoner's Dilemma: The Role of Business Climate," *Review of Regional Studies*, 30 (2000): pp.315-30; Daniel Levine, "Incentives and the Interstate Competition for Jobs," *Site Selection Magazine* (November 2010): p836-838; and Mark Drabenstott, "A Review of the Federal Role in Regional Economic Development" (Kansas City: Federal Reserve Bank of Kansas City, 2005).
4. Jed Kolko, "Business Relocation and Homegrown Jobs," (Sacramento: Public Policy Institute of California, September 2010). Studying the period 1992 to 2006, Kolko found that only 1.9 percent of job gains and 2.0 percent of job losses in a year in the average state were attributable to business relocations. By contrast, fully 41.8 percent of job gains come from the expansion of existing businesses, and a whopping 56.3 percent from the birth of new establishments.
5. Gregory Tassej, "Rationales and Mechanisms for Revitalizing U.S. Manufacturing R&D Strategies" (Washington, National Institutes of Standards and Technology, 2009). See also Mark Muro, "AmericaCOMPETES: Regionalize It?" *The Avenue*, a blog of *The New Republic*, April 21, 2010. Available at www.tnr.com/blog/the-avenue/america-competes-regionalize-it
6. States have turned to clusters to inform their economic development policies to varying degrees, and with varying interpretations of the concept, for nearly two decades now. Arizona and Oregon are credited with designing the first state cluster strategies in 1992. Oregon's efforts continue to this day, with a private-sector led organization, the Oregon Business Council, having picked up the torch to advise and collaborate with the government on cluster policy and on seeing myriad other economic issues through the cluster lens (see www.oregonbusinessplan.org/ for more). Recognizing the centrality of its industry clusters to prosperity, Texas in 2003 passed legislation to develop a cluster-based competitiveness strategy, which continues to frame policy on everything from education to infrastructure and was reinvigorated with the 2008 release of the Governor's Competitiveness Council report (see governor.state.tx.us/priorities/economy/industry_cluster_efforts/governors_competitiveness_council/ for more). Connecticut, for its part, launched an industry cluster initiative to invest in and coordinate and leverage funds to support its nine industry clusters in 1998 in an effort that the Economic Development Administration lauds as a best practice, and clusters continue to form a core component of the state's strategic economic plan (see www.ct.gov/ecd/lib/ecd/connecticut_esp-final.pdf for more). Today California's Innovation Hubs (iHub) initiative sets out to stimulate economic development and job creation around regional clusters of expertise and research by leveraging assets like labs, universities, and research parks (see www.business.ca.gov/WhyCA/InnovationHubs.aspx for more). Ohio has advanced down a similar route with its Ohio Hubs of Innovation and Opportunity program, a regional economic development initiative to build on existing urban clusters of expertise to drive innovation, foster opportunity, and generate new firms (visit www.development.ohio.gov/Urban/OhioHubs.htm for more).

7. A non-scientific survey of state economic development websites found that California, Colorado, Georgia, Florida, Illinois, Michigan, New Mexico, New York, Ohio, Oregon, and Washington—in other words every state visited—all list “life sciences,” “cleantech,” and “information technology,” or some close derivation thereof, as target industries.
8. Note that clusters often do not conform to existing industry classifications, however, which makes their identification difficult and emphasizes the needs for bottom-up, self-identification by cluster actors.
9. At its most basic, an exercise to identify clusters based on employment shares versus export intensities would present two drastically different cluster portfolios, for example.
10. Terry Buss, “The Case Against Targeted Industry Strategies,” *Economic Development Quarterly* 13 (1999): 339-359.
11. Economic Development Administration, “Institute for Strategy and Competitiveness at Harvard Business School to Map Clusters in U.S. Regions.” Press Release. December 1, 2010. Available at www.eda.gov/NewsEvents/PressReleases/MAclustermapping_12110
12. “About Maine Technology Institute,” available at www.mainetechnology.org/about. Figures reported through 2009.
13. Charles Colgan and Bruce Andrews, “Evaluation of Maine Technology Institute Programs,” (Portland, ME: University of Southern Maine Center for Economic and Business Research, January 15, 2009), available at www.mainetechnology.org/docs/mti_evaluation_2006-2008_011509.pdf
14. Comments by Betsy Biemann, President, Maine Technology Institute, at Brookings Institution event “Regional Innovation Clusters: Advancing the Next Economy,” September 23, 2010, transcript available at www.brookings.edu/~media/Files/events/2010/0923_innovation_clusters/20100923_innovation_clusters.pdf
15. Key federal offerings include the Economic Development Administration’s i6 Challenge grants, the Small Business Administration’s Regional Innovation Clusters program, the U.S. Department of Agriculture’s Rural Innovation Initiative, and the National Science Foundation’s “Innovation Ecosystems” effort. For a listing of these and other new programs see Mark Muro and Bruce Katz, “The New ‘Cluster Moment:’ How Regional Innovation Clusters Can Foster the Next Economy.” (Washington: Brookings Institution, 2010). See also Sarah Rahman and Mark Muro, “Budget 2011: Industry Clusters as a Paradigm for Job Growth.” *The Avenue*, a blog of *The New Republic*. February 2, 2010.
16. See Mark Muro and Bruce Katz, “The New ‘Cluster Moment.’”
17. Personal communication with Mark Lundine, Ohio Department of Development, October 26, 2010.
18. For more information on Ohio’s Third Frontier program, visit ohiothirdfrontier.com/ThirdFrontierCalendar/Default.aspx

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