

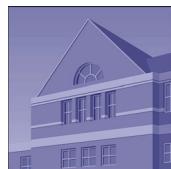
Best Practices in the Implementation of Cluster-Focused Strategy

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Introduction

Cluster-based planning for economic development has swept across the U.S., Europe and Asia during the past decade. Many regions have engaged consultants to help identify existing, emerging and potential clusters. The challenge all these regions have faced following the completion of the cluster analysis is “what to do next?”

The Research Triangle region faces a similar challenge. In 2000, regional leaders contracted with a consulting group led by Harvard University’s Michael Porter to identify “clusters of innovation” for the counties that constitute the greater Research Triangle region.¹ The group’s report was released with much fanfare in January 2002.²

Rather than allowing that study to stimulate only the interest of analysts, as some other regions have done, a group of leaders from the region’s business and academic sectors (the “Future Clusters” task force) engaged local experts to help move from cluster analysis to cluster implementation. One part of that effort — represented by this report — is to document best practices in cluster implementation from around the world.

This report draws heavily from two sources: reports by the U.S. Economic Development Administration (EDA) and Regional Technology Strategies, Inc. (RTS) of Chapel Hill (for the National Governors Association). The former is significant because the EDA, under Assistant Secretary David Sampson, has actively promoted cluster-based planning as a key ingredient for regional competitiveness. The latter

1. The federal Bureau of Economic Analysis describes the Raleigh-Durham economic area to include Chatham, Durham, Edgecombe, Franklin, Granville, Halifax, Harnett, Johnson, Lee, Nash, Northampton, Orange, Person, Sampson, Vance, Wake, Warren, and Wilson counties, and the Porter team used this definition for the Research Triangle region. Twelve of these counties are served by the Research Triangle Regional Partnership, along with Moore county.

2. Porter, Michael E., Monitor Group, ontheFRONTIER, and Council on Competitiveness. *Clusters of Innovation Initiative: Research Triangle*. Final Report, January 2002.

source is useful because it synthesizes the experiences of regions around the world, including many with which RTS has worked on cluster implementation. This report also incorporates insights from other studies, published during the past three years, and from the UNC-Chapel Hill Office of Economic Development's (OED) own involvement in cluster-based planning.

The remainder of this report is divided into three parts. The first is an overview of EDA's lessons about cluster implementation, along with examples appropriate for the Research Triangle region to consider. Those are "big-picture" considerations about how to approach cluster-based economic development. The second part focuses on a variety of specific policies and strategies that are working elsewhere in developing and propelling clusters of firms, based on a framework offered by RTS. The third and final part offers suggestions for how the Research Triangle region should move forward in a cluster implementation strategy.

PART I

General lessons from cluster implementation

According to the EDA, in its report, *Cluster-Based Economic Development: A Key to Regional Competitiveness*, there are five overall imperatives for any successful cluster-focused effort:³

- 1) Recruit highly committed leadership
- 2) Develop a strategy to ensure adequate resources throughout the process
- 3) Choose the right geographic level of focus (what is the region?)
- 4) Find tools to sustain momentum between stages
- 5) Engage potential implementing institutions from the earliest stages of the process

The Research Triangle region has already taken items 1 and 5 seriously in this process, with the establishment of the task force chaired by former Governor James B. Hunt and the involvement of numerous institutional partners that expect to be involved in various aspects of implementation. A key finding from a similar process in Edmonton, Canada, after its first year of implementation was that its key industry leaders and community champions needed to be more involved in the Greater Edmonton Competitiveness Strategy. Implementation moved faster when there were strong leaders pushing the clusters. They found that the commitment and leadership of key government officials plays a critical role in overcoming regional jealousies.⁴

Because of the importance of collaborative regional leadership, which does not just happen naturally, EDA's report goes on to explore and explicate more fully the success factors for collaborative strategy, as follows:

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3. EDA, 1997, p.2.
 4. Western Centre for Economic Research, 2002, p. 43.

- 1) Hold events that confront and engage participants from key industries and institutions in the region
- 2) Select working group leaders who are committed and can recruit high-profile participants reflecting small and large companies in the region
- 3) Create accountability mechanisms and progress milestones throughout the process
- 4) Develop concrete action plans focusing on reform and redesign of services, adding value to existing resources, and enabling market innovation
- 5) Establish the market viability of each initiative to ensure the necessary support from stakeholders for taking action

Well-executed events, as the Council for Entrepreneurial Development and the N.C. Biotechnology Center routinely organize, are more successful than regular meetings in luring busy business executives to network together. Washington Manufacturing Networks brought firms together to do what individual firms could not.⁵ However it may begin, **any effort will have to demonstrate how it adds value, saves time, or otherwise leads to competitive advantage in the marketplace to keep businesses at the table.**

How can public or non-profit leaders help create this ongoing sense of value to companies from cluster participation? Frankie Roman of the Kenan Institute Asia has observed two key success factors for cluster sustainability. First, the *cluster coordinator*, a person or group who can build consensus, is a key ingredient. In many state efforts, this person is the governor. Second, there needs to be a *focal point* around which all the companies have an interest. A tangible outcome, like a shared piece of equipment, a design center, or a changed regulation, can be a good way to galvanize firm participation.⁶

The challenges of sustaining any regional effort are well known. The success factors for sustained implementation of a cluster-based approach, according to EDA, are:

- 1) A management stewardship group
- 2) Strong supply and demand connections
- 3) Ongoing funding commensurate with the scale and type of initiatives
- 4) Sustained leadership
- 5) Monitoring/benchmarking

The **stewardship group** should be a new or existing organization to spearhead and oversee the initiative — it cannot simply be volunteers. This is sometimes also referred to as the “cluster management organization,” an entity whose

5. EDA, p. 3.

6. Roman, p. 5.

purpose is to deliver services to cluster members and provide the glue that keeps the cluster together. The Research Triangle Regional Partnership has played such a role so far in this region. OED has worked with two other such organizations in the past year: the Internet Coast in south Florida, and lab.3000 in Melbourne, Australia.⁷

The first of these has been successful in bringing counties together that historically competed for economic activity — Palm Beach, Broward, and Dade — around common clusters. The group's initial focus was an IT cluster (hence the name Internet Coast), but its interest expanded to biotech, leading in October 2003 to the successful recruitment of Scripps Laboratories to the region.

Lab.3000 is successfully implementing a digital design cluster in eastern Victoria, in Australia. The management team was set up by the Royal Melbourne Institute of Technology, but consists of professional business managers with experience in digital design and marketing.

Strong **supply and demand linkages** are one way to show companies how their bottom-line interests are served by the cluster. A common role of the cluster management organization is to connect buyers and suppliers within the cluster and between the cluster and the rest of the world. **Funding** needs to be realistic and have the continuity not to break momentum. The **leadership plan** needs to allow for new leaders to come in easily and prior leaders to exit after they have mentored the new ones, but before burnout sets in.

Finally, the **measurement** of outcomes needs to be both for demonstrating the increased competitiveness that results (or not) from the initiative and for continuous improvement of program design. It can be difficult to separate outcomes of cluster strategies from effects that would have occurred in their absence. Also, some cluster initiatives work with economic development agencies, making it difficult to measure the impact of a cluster initiative alone.⁸

7. See www.internetcoast.com; www.lab.3000.com.au.

8. Western Centre, 2002, pp. 11–13.

PART II

Policies to develop, assist and propel clusters

Once the overall strategy has some leaders, stakeholders and managers lined up, what exactly do they do to carry out a cluster-based approach? What do the firms get out of it that they would not otherwise?

The EDA and RTS reports address these questions in similar ways, though at different levels of detail. RTS provides four main elements for a successful cluster implementation strategy:

- 1) Organize **service delivery** to address cluster businesses' needs collectively
- 2) Target **investments** — in innovation, entrepreneurship, and recruitment — to clusters
- 3) Increase clusters' **networking and learning** for competitive advantage
- 4) Improve the **workforce** and its readiness for work in the cluster

The first of these elements encompasses EDA's recommendation for clusters to receive appropriate regulatory or tax assistance. The second is consistent with EDA's call for investing in information technology, other physical infrastructure, or quality-of-life enhancements to improve cluster industry performance. One aspect of the third RTS element, networking and learning, is what EDA calls technology access: connecting technology providers with product developers. And the fourth is the same as EDA's focus on workforce training.

Any of RTS's strategies can help the competitiveness of a group of businesses. Having a more focused and streamlined system that CEOs can tap into for technical assistance, financing, networking or finding skilled labor saves them time and aggravation, and it helps them focus on and grow their core business. These types of assistance, especially the networking, can also help spur the innovation process.

A closer look at each of these four policies follows, along with examples of specific ways they have been implemented in other regions.

1) Organize service delivery around clusters

Strategies for organizing service delivery to meet cluster needs can both make the process more streamlined from the firms' perspective and help focus the limited resources of service providers. A few of the specific best practices in this arena are:

- cross-agency quick-response teams
- one-stop shops
- government incentives for multi-firm activity
- regulatory or tax reform

Companies in similar industries banding together to influence public regulatory and fiscal policy predates the notion of clusters. Many states have industry associations that are now becoming active players within clusters. The North Carolina Electronics and Information Technologies Association, for example, has helped develop language and support for a research and development tax credit like those of most other high-tech states. Joint Venture Silicon Valley completed a Smart Permit project using information technology to streamline the permitting process, and developed a book with a blueprint for other regions. Additional examples are shown in Table 1.

Table 1. Examples of service delivery for clusters

Strategy/program	Example where used	Cited in
Improving the regulatory environment	Connecticut Governor's Council on Economic Competitiveness and Technology	Rosenfeld, 2001, p. 20
Grants for joint planning among firms	N.C. Alliance for Competitive Technologies (no longer exists)	Rosenfeld, 2001, p. 12
Tax structures leveled to treat technology-driven and manufacturing firms equally	Colorado biosciences cluster	Colorado, 2003, p. 10
Industry associations represent cluster in public policy discussions and come together around programs of mutual interest (e.g., outreach to schools)	Puget Sound (Everett)	Sommers, p. 25
Specialized industry associations to support networking, competitiveness needs of cluster	Tampa Bay	Hagen, p. 5
Several corporate law, accounting, specialized real estate, and risk insurance firms have specialized cluster thrusts	Central Florida and throughout state	Hagen, p. 5
Regional laws fund collaborative activities and research at a testing center at a local university	Sassoulo, Italy's ceramic tile cluster	Rosenfeld, 2002 (a), p. 11.

There is actually an advantage from a public-sector standpoint as well. When a cluster develops a set of desired policy initiatives, it limits the policy initiatives presented to government to those that serve most or all of the firms in the cluster and avoids competing and contradictory claims on government (Roman, 2002(b), p.3).

2) Target investments to clusters

Many cluster support services can be grouped under this category. A few examples of actions to target investment to clusters are to:

- invest in R&D and innovation in the cluster
- support entrepreneurial activity in the cluster
- invest in cluster technology
- market clusters and build cluster markets
- provide infrastructure needed by the cluster

Several of the types of cluster support services characterized by EDA come under this category. For example:

Infrastructure

- Leading bioscience regions have private markets that provide facilities offering space for bioscience companies. Access to specialized facilities and equipment, such as core labs, and animal facilities, is readily available (Colorado, 2003).
- Detroit and other older cities are supporting the environmental clean-up of brownfield sites to satisfy an increasing demand for urban industrial parks (HUD Detroit, 2003).
- Edmonton's transportation and logistics infrastructure flagship initiatives include an innovative funding package for a street overpass project, extension of a highway, and initiation of a commodity-flow survey (Western Centre, 2002).
- Federal government support for transportation infrastructure enhancements is contributing to the development of Jacksonville as a transportation hub (HUD Jacksonville, 2003).
- Regions can help provide a supply of real estate available for the three corporate growth stages: start-up, initial self-supporting phase, and full-fledged operations. Developers are more willing to build facilities on a speculative basis if a critical mass of companies creates steady demand (Walcott, 2002).

Advanced communications

- North Carolina, Virginia and other states are discussing providing supercomputing or grid computing as the next cutting-edge competitive advantage for bioinformatics and advanced manufacturing companies.

Technology transfer

- Universities' commitment to technology transfer is a critical factor in successful bioscience regions (Colorado, 2003).
- San Diego pioneered some effective technology transfer arrangements in bioscience. Stanford successfully applied MIT's model of tech transfer, based on frequent communication between participants to create Silicon Valley. This in turn inspired the chancellor of the University of California to follow Stanford's success by building a biotech base through university tech transfers in San Diego in the 1980s (Walcott, 2002).

Financing

- After the skilled workers of the declining German-owned company Noemi bought surplus equipment and established hosiery firms in Castle Goffredo, Italy, the local cooperative bank underwrote the hosiery technology center, funded cluster studies, and made loans to firms (Rosenfeld, 2002(b)).
- Best practice bioscience states and regions have created programs to address the commercialization, pre-seed, and seed financing gaps to help establish and build firms. Active informal angel networks invest in the biosciences. Investors include private, philanthropic, and public entities. Every major technology region in the U.S. has also received significant federal discretionary funding (Colorado, 2003).
- San Diego was fortunate to combine a nearby supply of venture capitalists and a major pharmaceutical company's interest in one company's product application potential — the firm, Hybritech, spawned 44 companies! (Walcott, 2002).
- Edmonton's flagship initiatives for generating deal flow have included Investor Forum, Boot Camp at University, and an Angel/Investor Data Base (Western Centre, 2002).
- With targeted industry efforts, state budgets are strategically focused and "get the biggest bang for the buck" (Humphrey Institute, 2002).

Table 2 offers numerous additional examples of strategies that direct investments, public or private, to specific clusters.

Table 2. Examples of investments targeted to clusters

Strategy/program	Example where used	Cited in
Recruitment of new industry, using cluster support structure	Connecticut Governor's Council on Economic Competitiveness and Technology	Rosenfeld, 2001, p. 11
Recruit entrepreneurs and vendors from declining clusters	Suggested for Florida medical technology cluster	Hagen, p. 23
Major investment, e.g., large industrial park	Environmental technology, Oak Ridge/Knoxville, Tennessee	Rosenfeld, 2001, p. 13
Specialized bioscience incubators and research parks	Bioscience regions*	Colorado, p. 10
ATRI** manages two business incubators, a venture capital fund, and an internship program for the cluster	New York's Southern Tier: ceramics, glass, advanced materials	Turner, p. 31
Created new optics research centers at the University of Arizona	Arizona, optics cluster	Turner, p. 28
Collective promotion	"Made in Oregon" campaign of the Wood Products Competitiveness Corp.	Rosenfeld, 2001, p. 11
Started Ottawa branding campaign	Ottawa, Ontario	Western Centre, p. 9
Nonprofit org. promotes region locally and nationally	San Antonio, Texas: San Antonio Technology Accelerator Initiative (SATAI)	Western Centre, p. 10
Established brand name/image around technology themes	Bioscience regions*	Colorado, p.10
Specialized industry associations to encourage innovation and entrepreneurship	Tampa Bay	Hagen, p. 5
Create vehicles for technology commercialization	Bioscience regions*	Colorado, p.10
Export promotion	Appalachian Regional Commission; New Zealand's Joint Action Groups; British Columbia	Rosenfeld, 2001, p. 16
Public-private export promotion program Joint action groups for exports were formed around clusters with similar or common markets. Most firms in the cluster are small, but cluster helps them sell as collective unit	Arizona, optics cluster New Zealand and Arizona's Environmental Technology Industry Cluster	Turner, p. 28 Rosenfeld, 2002(a), p. 29; www.azetic.com/index.asp
Host cluster conventions and trade shows to establish brand	N.C. and Copenhagen furniture shows, Sassoulo Italy ceramic tile show	Rosenfeld, 2002(a), p. 30

* The regions included in this study were San Francisco, Boston, Baltimore/D.C., N.Y./N.J., San Diego.

** Alfred Technology Resources Inc. (ATRI) was created through the efforts of Alfred University and Corning Incorporated, with funding assistance from the State of New York, to serve as the focal point for the development of the ceramics, glass, and advanced materials in the Southern Tier region.

3) Strengthen networking and build bridges

The networking aspect of clusters takes some support as well, at least initially until companies see a benefit and want to continue. Examples of these strategies include:

- recognize existing cluster organizations
- establish new ones to fill gaps
- facilitate linkages from cluster to assets
- encourage cluster communications channels
- facilitate external linkages (e.g., through international benchmarking, study tours, global professional organizations)

Frequently the linkages are facilitated by a dedicated organization like the N.C. Biotechnology Center or San Antonio's Technology Accelerator Initiative (SATAI). Some of the types of assets that such efforts try to link firms to include: distributors and exporters, engineering consultants, financial institutions, industry lawyers and accountants, maintenance and repair facilities, marketing consultants, nonprofit organizations with industry focus, R&D centers, technology extension centers, trade associations, training programs, and testing laboratories (Rosenfeld, 2002(b)). Linkages to various types of specialized business support infrastructure can be a strong regional competitive advantage.

Networks formed for economic purposes sometimes take on other issues as well. Joint Venture Silicon Valley (JVS) was founded in part on the stated interests of Silicon Valley companies to address transportation, education, environment and affordable housing issues as a group, in an effort to maintain the region's quality of life. JVS's board includes industry CEOs, local government officials, and education leaders. Examples of recent achievements are the development of photo simulation tools to promote smart growth, and the Children's Readiness for Kindergarten initiative.

Table 3. Examples of cluster networking strategies

Strategy/program	Example where used	Cited in
Cluster councils (for organizing and aggregating demand; sometimes with cluster coaches)	Arizona	Rosenfeld, 2001, p. 12
Pyramid 3-tier maps of export-based companies, suppliers and foundations in region; cluster councils	Palm Beach County, Florida	Rosenfeld, 2001, p. 20
High tech councils to work on local issues	Puget Sound (Everett)	Sommers, p. 25
Organization (SATAI) links existing regional assets & creates programs to fill gaps	San Antonio, Texas	Western Centre, p. 10
Electronic communities of commerce	Ben Franklin Partnership/Industrial Resource Centers, Pennsylvania	Rosenfeld, 2001, p. 13
Learning networks	Portland, Oregon; Australia	Rosenfeld, 2001, p. 15
Extensive collaborations among industry, academia, and state and local government — active technology intermediary organizations	Bioscience regions*	Colorado, p. 9
Industry funded research program at university — a way for companies to contract with specific research groups	Puget Sound (Bothell)	Sommers, p. 23
Industry associations represent cluster in public policy discussions and come together around programs of mutual interest (e.g. outreach to schools)	Puget Sound (Everett)	Sommers, p. 25
Specialized industry associations to support networking, competitiveness needs of cluster	Tampa Bay	Hagen, p. 5
Several corporate law, accounting, specialized real estate, and risk insurance firms have specialized cluster thrusts	Central Florida and throughout state	Hagen, p. 5
Cluster org's web site includes a manufacturers' database, a supplier's database, a clearinghouse for business opportunities, personnel and job postings	N.C.'s hosiery cluster	Rosenfeld, 2002(a), p. 21
Govt distributed info thru media, business associations, shops, and published newsletters on potential value of networks	Denmark "1+1=3" network program information campaign	Rosenfeld, 2002(a), p.22
Benchmarked European counterparts, visited tech and research centers, trade associations and tool builders, then applied new ideas at home	N.C.'s hosiery cluster reps' study tour to hosiery cluster in northern Italy	Rosenfeld, 2002(a), p. 24

* San Francisco, Boston, Baltimore/D.C., N.Y./N.J., San Diego.

4) Develop human resources for clusters

Workforce development strategies to ensure that businesses can access the skilled labor they need on a sustained basis are a critical aspect of life sciences and many other clusters. It takes considerable creativity in joining workforce and economic development strategies, which in many regions are not well integrated. Examples of human resource (HR) strategies include:

- develop more skills and specialized labor force
- establish cluster skills centers
- qualify people for employment
- engage community-based employment intermediaries
- establish new ones to fill gaps
- support regional skills alliances

One broad strategy in EDA's words is "linking education providers with employers." In the successful bioscience regions studied by Colorado, educational institutions from K-12 through higher education are responsive to training students to meet needs for cluster workers at all skill levels — scientists, technicians, and production workers (Colorado, 2003).

OED completed a plan in 2000 to develop human resources for clusters for the N.C. Community College System.⁹ The rationale behind what was called Industry Cluster Resource Centers was to induce community colleges to team up and create specialized training programs appropriate for the types of workers that would be demanded by emerging clusters of businesses in the state. As stated in that report, a cluster center that maximizes its impact on regional and state economies:

- is demand driven by cluster firms
- is industry-led
- is collaborative
- is semi-autonomous from the college
- connects work-based to theoretical competencies
- has in-depth industry expertise and experience among its management and staff
- exhibits and supports associative behavior among firms
- is connected externally
- operates as a continually learning "knowledge network"

9. *Maintaining Competitiveness in the New Millennium: A Plan to Establish Industry Cluster Resource Centers in North Carolina*. For the North Carolina Community College System; Lucy Gorham, Michael I. Luger, Leslie Stewart, Stuart Rosenfeld, and James Jacobs. December 2000.

- addresses needs of under-represented populations
- serves as a catalyst for broader economic development
- serves as a resource for all firms in the cluster anywhere in the state, and for all programs serving the cluster
- earns the trust of members of cluster

That report also suggested industry cluster focus areas for a cluster center in each region of the state. For example, Biotechnology and Pharmaceuticals in the Research Triangle region; Medical Services and Laboratories in the Eastern Region; Metalworking and Industrial Machinery in the Piedmont Triad; and Plastics and Composite Materials in AdvantageWest. The recommended process was to ask each region's community colleges to submit competitive proposals to host the cluster center and make a case for its economic impact, community and private-sector support, and sustainability.

Table 4 offers several additional specific examples of HR strategies tailored to particular clusters.

Table 4. Examples of human resource strategies for clusters

Strategy/program	Example where used	Cited in
Cluster skills centers	South Carolina technical colleges	Rosenfeld, 2001
Regional skills alliance	Regional Skills Alliance program, U.S. Dept. of Labor	Rosenfeld, 2001
Educational institutions at all levels offer training to meet needs for cluster workers at all skill levels (scientists, techs, production workers)	Bioscience regions*	Colorado, p. 9
Local colleges have organized an inter-collegiate education center to support the cluster	Spokane area	Sommers, p. 15
Local community college developed specialized degree program designed to support manufacturers in cluster	Tampa Bay area also N.C.: rural part of Research Triangle region for bio and Hickory area for hosiery	Hagen, p. 6
Developed new community college curriculum for optics technicians	Arizona	Turner, p. 28
Local community college developed specialized degree program designed to support manufacturers in cluster	Tampa Bay area also N.C.: rural part of Research Triangle region for bio and Hickory area for hosiery	Hagen, p. 6
Created global learning center to increase awareness of local learning opportunities	Ottawa, Ontario	Western Centre, p. 9
Working with state and local governments to improve school-to-work programs, incumbent worker training programs, and supplier upgrading assistance	Wisconsin Regional Training Partnership	Turner, p. 29
Initiated a Targeted Industry Partnership Project to work with universities, community colleges, and K-12 school districts to develop curriculum that meets industry standards for targeted clusters	Minnesota State Colleges and Universities System	Turner, p. 26
IBM, in cooperation with other regional business groups and area colleges has helped create a Center for Advanced Technology to train technicians for the chip fabrication plants in the region	Hudson Valley	Turner, p. 18
Specialized centers of vocational excellence that match needs of local economies at higher education colleges	United Kingdom	Rosenfeld, 2002(a), p. 25

* San Francisco, Boston, Baltimore/D.C., N.Y./N.J., San Diego.

PART III

Implications for the Research Triangle region

To avoid some of the problems of places that may be spreading their efforts too thinly on many clusters at a time (e.g., Connecticut), the Research Triangle region should start its cluster implementation strategies in a limited number of focus areas, through a process that is well-documented and adapted over time. As Rural Center research director Chris Beacham suggests in a recent working paper, strategies could be developed on a demonstration basis for one already working cluster and one more latent cluster.¹⁰ Each of these chosen clusters, following the example of Arizona in organizing clusters, could: catalogue the key components of the cluster, articulate an achievable vision of what the cluster can become over the next 10–20 years, and identify specific opportunities for growing the cluster and realizing greater synergies. Specific opportunities can be drawn from the menu of ideas offered in Part II of this report.

Drawing from the work of Frankie Roman and others, one first step in determining which clusters to begin with is to see where a cluster champion volunteers or can easily be recruited. CEOs in a latent cluster will need either a champion from a similar company or a model with a proven return to companies in another cluster to be convinced to spend any time or energy joining a cluster effort. As Beacham notes, a few of the returns a firm might see from cluster participation include:

- finding new customers or vendors
- learning about and shaping training curricula to yield required workforce
- learning about new technology applications to increase productivity
- increasing political clout to affect policy and competitiveness

10. Beacham borrows this terminology of working and latent clusters from a survey analysis by Michael Enright.

One appealing feature of a cluster approach is that the particular strategies and required benefits can be determined by the participating firms depending on their markets and interests, not by a recipe that each cluster follows.

Another similar way to launch the effort is to start with clusters where there is likely to be the most immediate return. For example, in a cluster where technology advances are rapid, the firms may easily see the benefit of combining their knowledge. Alternatively, in a cluster where companies are in a position to hire but currently scrambling to find skilled workers, the returns once a workforce strategy can be developed will be clear. If the region can support cluster strategies that provide tangible benefits to companies' bottom lines, the rollout both to other clusters and to the rural areas will be much simpler to sell. For example, as Mary Jo Waits reported about Arizona's experience in the optics cluster, one CEO calculated a \$700,000 increase in new business for the \$50,000 he spent on cluster activities (Waits, p. 45).

Building on the work of RTI International for this competitiveness initiative, one way to recruit cluster champions and participants may be to invite experts about RTI's identified emerging technology areas to address company CEOs in relevant sectors, from companies of all sizes, and see who self-identifies as a potential user of those technologies. This group can become a test group for deciding what types of service delivery, investments, networking or workforce strategies will help them best leverage the new technologies in enhancing productivity and creating jobs.

Considering the current record of more analysis than implementation around clusters, it is important to recognize that much of the documented success that North Carolina and other places have had in supporting clusters has come through the active participation of community colleges. The hosiery center at Catawba Valley Community College is one oft-cited example of a successful strategy focused on a traditional cluster. The BioWork program at Vance-Granville and the viticulture program at Surry Community College are receiving national attention now for their focus on the emerging clusters of bioprocessing and wine production, respectively. In addition to the OED report on industry cluster resource centers noted earlier, Rosenfeld *et al.* detail the establishment of industry-cluster-focused initiatives for community colleges.

As Michael Porter indicated in the Clusters of Innovation study that prompted the formation of the Research Triangle region's clusters task force, focusing on clusters without the emphasis on innovation will not gain much. The bottom line for the success of cluster implementation in the region — and competitiveness initiatives more broadly — is to change the culture to one that embraces continuous innovation. The corporations, entrepreneurs, educators, governments and service providers within a cluster must understand and demonstrate how the inno-

vative use of existing resources, as well as the creation of new processes, products and markets, is what drives economic growth — not just pulling company CEOs together in a cluster council. As former IBM head Lou Gerstner noted at the 2003 Emerging Issues Forum: “Culture is not part of the game. It is the game. Culture is what people do without being told” (Institute for Emerging Issues, 2003).

This culture change will be particularly difficult in some of the rural areas of the region that are reeling from the loss of traditional manufacturing jobs and only just starting to think about how to participate in the new economy. Rosenfeld’s work with the European Union and others on cluster strategies for “less-favored regions” is insightful and highly applicable to the more remote counties of this region. It should be required reading for CEOs and other leaders in our rural locations. Similarly, serving clusters in rural areas may require the aggregation of disperse local resources into regional networks, such as a multi-county hub.¹¹

If the regional competitiveness initiative can seed the development of a few new actively engaged clusters and support existing ones in innovative ways, the success in terms of job creation, productivity and profitability will be all the proof that other employers, workers and intermediaries need to embrace similar cultural change in their own organizations. If the region does not have some demonstrable successes in the next few years as models, however, this culture change will continue to be slow and impede the next such initiative.

11. See *Feasibility of Mini-Hubs for the Research Triangle Region*, Luger 2003 (www.oed.unc.edu) and the five-county initiative to develop a hub in the Kerr-Tar region (www.kerrtarhub.org).

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