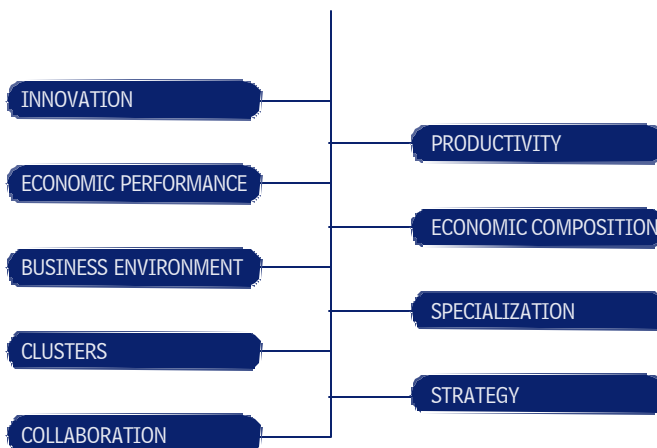


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Monitor Group
ontheFRONTIER
Council on Competitiveness

CLUSTERS of INNOVATION: Regional Foundations of U.S. Competitiveness



CLUSTERS OF INNOVATION INITIATIVE





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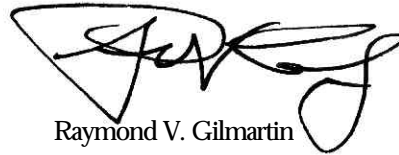
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Foreword by the Chairman of the
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The Clusters of Innovation Initiative is perhaps the most ambitious project in the nearly 20-year history of the Council on Competitiveness. As cited in the Acknowledgments, many individuals and organizations played key roles in the project's success. None, however, gave more of their time, attention, and expertise than the project's co-chairs, Duane Ackerman, chairman and CEO of BellSouth, and Michael Porter of Harvard University, both of whom are members of the Council's Executive Committee. Duane brought his tremendous leadership and prestige, and Michael his international reputation as the leading expert on cluster theory and competitiveness. Michael's pioneering work on innovation and industry clusters is embedded in this project. The Council on Competitiveness owes a debt of gratitude to them both.



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Foreword by the Co-Chairs of the Clusters of Innovation Initiative

Since its founding nearly two decades ago, the Council on Competitiveness has addressed a wide range of economic issues affecting the nation including trade policy, technology policy, the federal budget, and workforce skills. Competitiveness has tended to be seen primarily from a federal perspective, and national policies and circumstances surely affect the prosperity of our economy. However, the Clusters of Innovation Initiative was undertaken with the realization that the real work of raising productivity and innovative capacity usually occurs not in our nation's capital, but in the cities and regions where firms are based and competition actually takes place.

Regional economies are the building blocks of U.S. competitiveness. The nation's ability to produce high-value products and services depends on the creation and strengthening of regional clusters of industries that become hubs of innovation. Understanding is growing about how these clusters enhance productivity and spur innovation by bringing together technology, information, specialized talent, competing companies, academic institutions, and other organizations. Close proximity, and the accompanying tight linkages, yield better market insights, more refined research agendas, larger pools of specialized talent, and faster deployment of new knowledge.

Utilizing a unique database developed at the Institute for Strategy and Competitiveness at the Harvard Business School, we are now able to systematically measure the relative strength of regional economies and their clusters and track their economic and innovation performance over time. In addition, a team consisting of individuals at Monitor Group and its affiliate on the FRONTIER, the Council on Competitiveness, and the Institute have conducted surveys, in-depth interviews, and strategic analyses in order to assess the strengths and challenges of five pilot regions: Atlanta, Pittsburgh, the Research Triangle in North Carolina, San Diego, and Wichita.

This national report draws heavily upon the five regional studies and synthesizes the implications for any region that seeks to improve its economic performance. The report examines the composition and performance of regional economies, how industry clusters develop and innovation arises, how clusters affect a region's economic future, and how a region can establish a strategy and action program to drive its economy and clusters forward. The framework employed and the lessons learned apply to every region of the country.

We wish to acknowledge the support we received from the national steering committee, advisors in the participating regions, the many individuals who gave their valuable time to be surveyed and interviewed, and the many project sponsors. All of you have helped us to create a unique knowledge base and a process for catalyzing action. Your thoughts and insights are embedded in this report, and will, hopefully, benefit not only the five regions that participated in the study but other parts of the country as well.



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ACKNOWLEDGMENTS

This report benefits from the leadership of co-chairs Duane Ackerman, BellSouth Corporation; Professor Michael Porter, Harvard University; as well as a national steering committee. They have guided a partnership involving Monitor Group and its affiliate, ontheFRONTIER, the Institute for Strategy and Competitiveness at Harvard Business School, and the Council on Competitiveness.

Professor Porter provided the theoretical and methodological framework for the Initiative and led the research and writing of this national report.

Jeff Grogan of the Monitor Group served as overall project leader. Kurt Dassel of the Monitor Group managed the efforts in each of the five regions studied. Kurt Dassel and Pedro Arboleda of the Monitor Group, with assistance and guidance from Jeff Grogan and Mark Fuller of the Monitor Group, took the lead in preparing this report. Pedro Arboleda, and Randall Kempner, Kyle Peterson, and Michael Brennan of OntheFRONTIER, under the guidance of Professor Porter, Jeff Grogan, and Kurt Dassel, prepared the regional reports from which this report draws. These four individuals performed the basic economic and cluster analyses and were the primary contacts with business and government leaders in each region.

The Institute for Strategy and Competitiveness, led by Professor Porter, conducted the Cluster Mapping Project, a multi-year research effort that developed the data for benchmarking regional and cluster performance. Elisabeth de Fontenay, Weifeng Weng, Daniel Vasquez and other staff at the Institute for Strategy and Competitiveness contributed to the conceptual development of the project and the interpretation of economic and cluster data presented in the regional reports and the national report. These individuals include Christian Ketels, Veronica Ingham and Orjan Solvell.

John Yochelson and Alan Magazine at the Council on Competitiveness provided project coordination and interfaced with business and government leaders. Michelle Lennihan coordinated the fieldwork, performed data analysis, and contributed to the regional and national reports. Debra VanOpstal and Jackie Mathewson provided additional national economic data and analysis, as well as ongoing review and critique of the research. Judith Phair and Lea Kleinschmidt at the Council on Competitiveness and Jodie Klein, KleinOnPoint, helped communicate the findings of the regional and national reports to the media and other groups.

Lily Rappoli, Alyson Lee, and Julie Sherman at the DesignStudio at Monitor Group illustrated, designed, and created the layout of the regional reports and this report.

Almost 1300 business and government leaders contributed to this project in some way by providing background information, submitting to interviews, completing surveys, and offering their views. Regional advisors provided the Initiative valuable information and coordination assistance in the regions. While this report aims to reflect the consensus view of those interviewed and surveyed, it cannot do justice to all their contributions. Any errors, omissions or inconsistencies are the responsibility of the report writers and not any one individual or institution.

For additional information on this research, contact Kurt Dassel at Monitor Group (e-mail: Kurt_Dassel@monitor.com), Christian Ketels at the Institute for Strategy and Competitiveness (e-mail: Cketels@hbs.edu), or Michelle Lennihan at the Council on Competitiveness (e-mail: Lennihan@compete.org).

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EXECUTIVE SUMMARY OF THE CLUSTERS OF INNOVATION NATIONAL REPORT

Introduction

During the 1990s, Americans found a way to do what seemed no longer possible — grow the economy, create jobs, and increase the standard of living, without driving up inflation. Much of the credit goes to the nation’s ability to develop and commercialize new technology. The result: one of the most robust periods of economic expansion and prosperity of the past century.

Today, the nation is experiencing an economic downturn. While fiscal and monetary policies pump dollars into the economy to boost the level of activity, innovation infuses the economy with growth-incubating new ideas, new products, services, and technologies. National policies and national investment choices have much to do with the growth and capacity of the American economy. For innovation, however, the real locus of innovation is at the regional level. The vitality of the U.S. economy then depends on creating innovation and competitiveness at the regional level.

In healthy regions, competitiveness and innovation are concentrated in **clusters**, or interrelated industries, in which the region specializes. The nation’s ability to produce high-value products and services that support high wage jobs depends on the creation and strengthening of these regional hubs of competitiveness and innovation.

The Clusters of Innovation Initiative was launched to help meet this challenge. The Initiative examined five regions around the country: Atlanta, Pittsburgh, the Research Triangle, San Diego and Wichita. These regions were selected to provide a diversity of size, geography, economic maturity, and perceived economic success. The regions were similar enough to allow interesting comparisons, yet diverse enough to encompass a wide variety of challenges and opportunities in regional economic development.

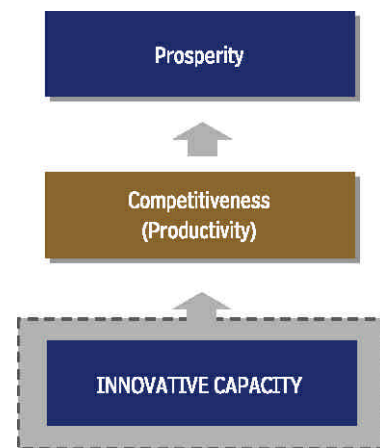
Data for the study were drawn from a number of sources, but the principal sources of data were the Cluster Mapping Project of the Institute for Strategy and Competitiveness, the Clusters of Innovation Initiative Regional Surveys™, and in-depth interviews of business and government leaders in each region.

A summary of the findings and implications is provided below:

Regional Competitiveness and Innovative Capacity

- The economic goal for regions should be a high and rising standard of living.
- This depends upon creating a high-quality business environment that fosters **innovation** and rising **productivity**.
- **Strong** and **competitive clusters** are a critical component of a good business environment and are the driving force behind regional innovation and rising productivity.
- The prosperity of a region depends on the productivity of all its industries.
- Productivity does not depend on what industries a region competes in, but on how it competes.

Innovation and the Standard of Living



- The most important sources of prosperity are created not inherited.
- Any regional economic development effort has to start with an assessment of regional economic performance.
- Economic performance is best measured on multiple levels to capture prosperity, productivity and innovative capacity.
- Regional economies are composed of three types of industries: traded, resource-driven and local industries. While local industries account for the majority of employment in regional economies, **traded industries are the dynamic core of a regional economy.**
- The evolution of regional economies is a lengthy process. While inherited factors, geography, climate, and population are important, other factors such as entrepreneurship, the presence of research and training institutions, the composition of the regional economy, and public and private sector actions are important influences.
- All levels of government can influence the business environment and the productivity of clusters.
- While government can help foster a favorable business environment, companies and industries must ultimately achieve and sustain competitive advantage.
- Formal and informal **institutions for collaboration** such as regional economic development organizations and alumni of large influential companies are important contributors to cooperation in advanced economies.

Findings and Implications

Economic Performance of Regions

- **Regions vary greatly in terms of economic performance:** Some regions have high average wages, while others have low average wages; some regions are growing rapidly, while others are shrinking.
- **A region's average wages must be assessed in the context of that region's cost of living:** Regions that exhibit high growth do not necessarily prosper due to cost of living increases that negate or diminish gains in average wages.

Economic Performance Indicators

Overall Economy	Innovation Output
<ul style="list-style-type: none"> ■ Employment Growth Rate of employment growth ■ Unemployment Percentage of persons unemployed ■ Average Wages Payroll per person ■ Wage Growth Growth rate for payroll per person ■ Cost of Living Cost of living index ■ Exports Value of manufactured and commodity exports per worker 	<ul style="list-style-type: none"> ■ Patents Number of patents and patents per worker ■ Establishment Formation Growth rate of number of establishments ■ Venture Capital Investments Value of venture capital invested per worker ■ Initial Public Offerings Number of initial public offerings per worker ■ Fast Growth Firms Number of firms on the Inc. 500 list vs. overall size of the regional economy

- **Higher levels of innovation output lead to higher levels of prosperity:** Above-average economic performance measures are not enough to ensure regional prosperity. Maintaining, much less increasing, a region's standard of living requires the steady growth of productivity, which in turn requires innovation.
- **Innovation output varies greatly across regions:** Just as regional economies have different levels of average wages and job creation, so too do they have very different levels of innovation output.

- **The relative effectiveness of commercialization greatly affects the economic impact of research:** Commercialization of basic research is a difficult but important ingredient for generating entrepreneurship. Some regions have high levels of R&D investments and numerous specialized research centers, but still lag in terms of innovation output because knowledge is not effectively or rapidly transferred to companies.

Implications:

- **The need for a distinctive strategy:** No single policy or strategy will work for all regions. Each region must craft a distinctive approach based on its unique assets and relative strengths.
- **Growth vs. prosperity:** Growth is not the same as prosperity. Growth is only desirable if the standard of living of citizens rises. High growth per se often leads to a rising cost of living that erodes prosperity and degrades natural resources and physical infrastructure that support quality of life.
- **From efficiency to innovation:** Current economic performance does not assure future performance. Maintaining, much less increasing, a region's standard of living requires the steady growth of productivity. Innovation output leads to higher productivity levels, and is critically important if a region is to reach the upper quartile of high-performing regions.
- **Measuring multiple dimensions of performance:** Measuring only a few indicators of performance will not give an accurate view of a region's strengths and weaknesses. A number of performance measures need to be assessed, including economic performance, innovation output, and effectiveness of commercialization.

Economic Composition of Regions

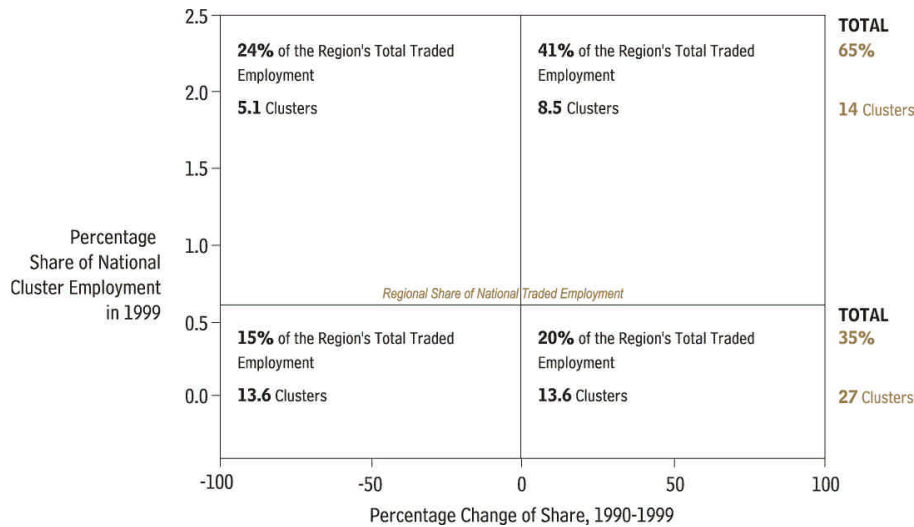
- **The composition of regional economies differs greatly:** The Cluster Mapping Project has identified 41 types of clusters in the U.S. economy. While any given region will have some employment in the vast majority of these clusters, regional economies are typically very strong in only a handful.
- **A wider geographic focus often identifies more available assets in a region:** Regions tend to focus on narrow geographic areas when devising economic development strategies. A broader geographic area is sometimes more appropriate.
- **Some regional economies are highly dependent on a few clusters or even companies:** Although all regional economies specialize in a few areas, some have especially narrow breadth. These economies have a disproportionate share of employment in one cluster, and even in a handful of companies, which makes them unnecessarily vulnerable.
- **“High-Tech” clusters account for a small percentage of jobs and wages in most regional economies:** Several types of clusters are especially innovative: communications equipment, analytical instruments, biotechnology/pharmaceuticals, and information technology. These clusters are very productive, and pay high wages, and regions with strength in these clusters certainly benefit from their presence. However, the overall impact of these clusters on a regional economy is usually relatively small.

- **Higher wages in traded clusters tend to pull up wages in local clusters:** The way to increase prosperity of an entire region is to increase average wages in traded industries.

Implications

- **Defining the right region:** The composition of regional economies can shift significantly depending upon the geographic area considered. Regions have a tendency to follow political jurisdictions and omit important surrounding areas and assets. A broader, geographic definition widens opportunities and brings constituencies together.
- **Building a strategy:** Successful regions build strategies on their unique assets and strong clusters, where they have the greatest advantages. Strength then spreads to additional clusters over time.
- **Clusters of clusters:** Focus on a few clusters exposes a regional economy to booms and busts. Regional strategies should encompass a wide range of clusters, and be attentive to clusters that overlap. Overlapping clusters offer potential synergies in skill, technology, and partnership.
- **Widen innovative capacity to many clusters:** The majority of traded jobs in any region are in clusters that are not generally perceived to be “high-tech” (e.g., business services, financial services, education and knowledge creation, transportation and logistics, and hospitality and tourism). In order to meaningfully increase overall regional prosperity, innovative capacity must be built in many clusters.

Specialization of Economic Areas, Narrow Cluster Definition



Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

Evolution of Regional Economies

- **Successful regions leverage their unique mix of assets to build specialized clusters:** Successful regions do not pick winners, but build on their inherited assets (e.g., geography, climate, population, research centers, companies, governmental organizations), to create specialized economies that both differ from other regions and offer comparative advantages to local companies.
- **Building strong regional economies takes decades:** There are many steps in building a regional economy—developing inherited assets, creating new assets, linking companies to these assets, attracting outside companies—and this process takes time.
- **Institutions for collaboration play an important role in building regional economies:** Institutions for collaboration help build regional economies by facilitating the flow of information, ideas, and resources among firms and supporting institutions.

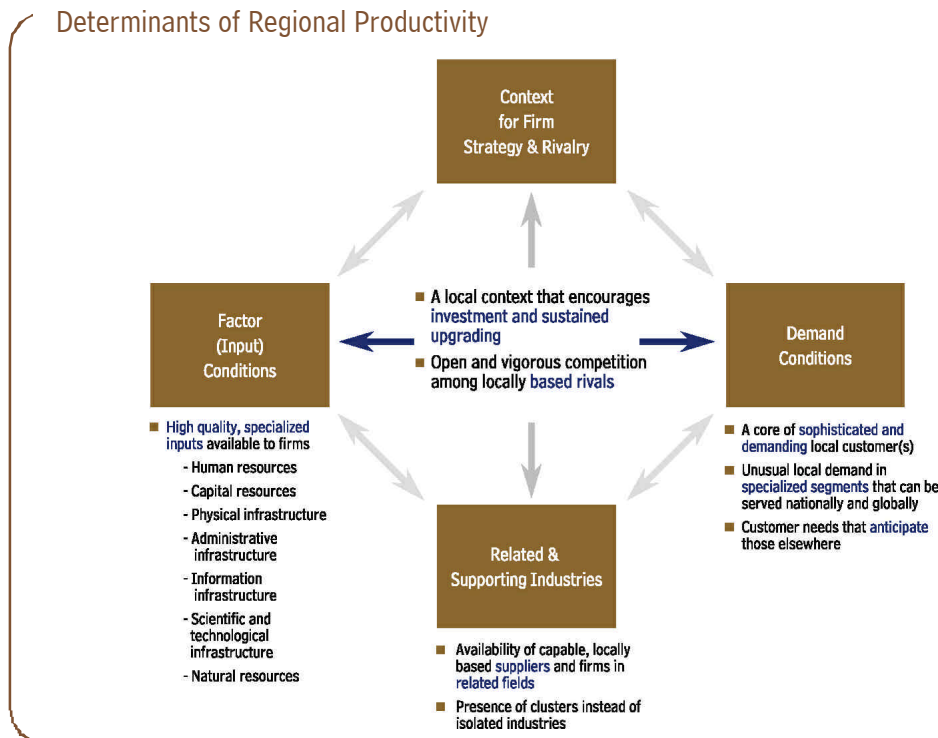
Implications

- **Long time horizon:** Meaningful changes in regional development require investments that generally take decades before significant dividends are reaped. Long time horizons create challenges for leaders seeking reelection, and make it more difficult to mobilize community support behind an economic development strategy. These realities highlight the need for an institutional structure for regional development that goes beyond government, as well as the need for private sector involvement.
- **Building on traditional industries:** Inherited assets matter to a region's economic development. Established and already emerging clusters offer the greatest prospects for near term growth. Strengthening established clusters should be one of the early priorities in regional economic development.
- **Investing in unique and specialized assets:** Many inputs in regional prosperity often require substantial investments in specialized assets such as university campuses, research programs, logistical infrastructure, and the like.

Regional Business Environment

- **A strong physical and information infrastructure is a baseline requirement to establish and sustain a prosperous regional economy:** Good quality roads, highways, airports, railroads, water, and power support the efficient movement of people, goods, and services as well as the quality of life of citizens.
- **A strong K-12 educational system is important for developing local talent and attracting outside talent:** The quality of K-12 education is growing ever more critical because it establishes the baseline of talent for entry-level jobs and the pool of specialized talent critical to cluster development. It also helps in the recruitment of individuals and companies.
- **Universities and specialized research centers are the driving force behind innovation in nearly every region:** Although companies and individuals do create a large number of innovations, universities and research centers institutionalize entrepreneurship and ensure a steady flow of new ideas.
- **Specialized talent and training are more important than abundant labor:** It is not abundant low wage labor that attracts innovative companies, but rather highly talented, specialized, and often expensive labor.
- **Government can have a significant influence on the business environment, both positively and negatively:** Government at all levels influences the business environment through policies and services that influence factor inputs, context for firm rivalry, demand conditions, and related and supporting industries.

- **Poor coordination among local jurisdictions impedes efforts to improve the business environment:** Regional economies encompass many political jurisdictions. Efficient coordination among them is important for maintaining and improving physical infrastructure (e.g., road, airports, water ports, communications systems), creating strong K-12 education, offering a business-responsive political environment, and promoting cross-cluster collaboration.



Implications:

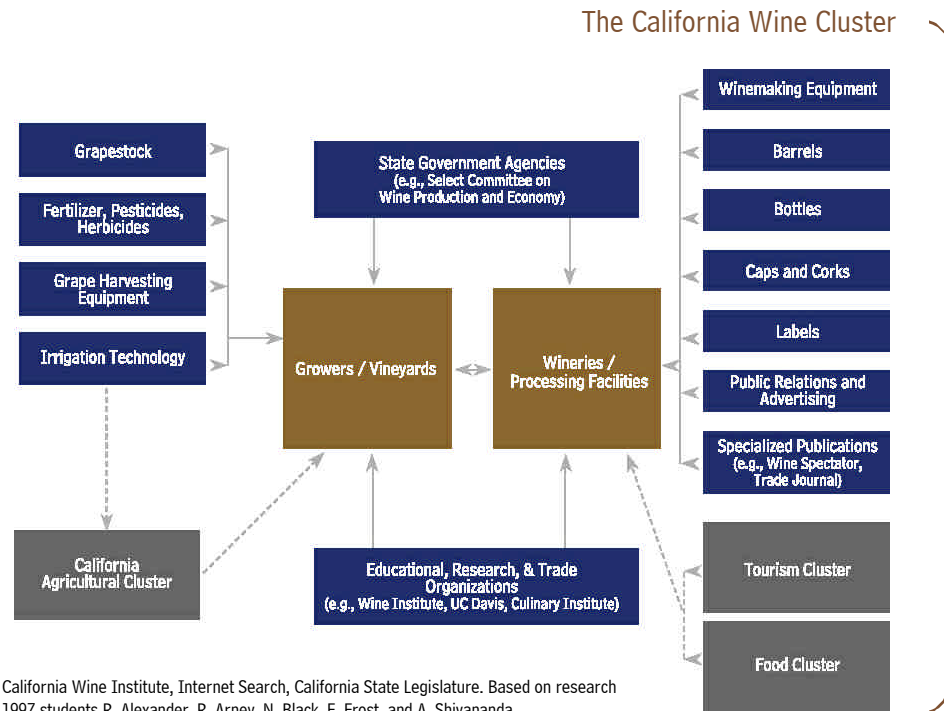
- **Challenges of success:** Successful regional economies tend to experience rapid growth, which stresses the physical infrastructure. Foresight and a conscious strategy are needed to maintain and improve infrastructure in advance of the strains caused by growth.
- **Recognize the need for strategic transitions:** Over time, regional development strategies run their course. Success at one strategy creates the challenges that need to be addressed by the next strategy.
- **Institutionalizing innovation:** Successful regions do not rely on chance, but rather seek to institutionalize the innovative process by building strong universities and research centers, and by attracting research divisions of major companies, to create continuous innovation and entrepreneurship.
- **Moving to commercialization:** Commercialization is a vital step in the innovation process. Some regions have high levels of R&D investments and numerous specialized research centers, but still lag in terms of innovation output because knowledge is not effectively transferred to companies. Having many different types of research institutions (e.g., public universities, private universities, for-profit research centers, non-profit research centers, etc.) appears to foster commercialization.

Clusters

- **Proximity fosters productivity and innovation:** When members of a cluster are located in close proximity, they can capture synergies that increase productivity, innovative capacity, and new business formation.
- **Clusters often share common industries:** Some industries are in more than one cluster. Overlaps provide opportunities to use strength in one cluster and build new clusters.
- **Clusters with depth and breadth enjoy advantages over narrower clusters:** Clusters with strength across a broad range of subclusters have advantages over more narrow clusters due to the extensive market, technical, and other specialized information which accumulates within a regional cluster.
- **Cluster strength is often disproportionately concentrated in a few subclusters:** Clusters are composed of many subclusters. Even relatively weak clusters can often have strength in a few subclusters.
- **Cluster-specific institutions for collaboration facilitate the flow of information and resources throughout the cluster:** Diverse groups (e.g., rival firms, related and supporting industries, universities and research centers, training institutions, government, and so forth) contribute to cluster strength, but their contribution is not automatic. An organization dedicated to mobilizing these groups does much to strengthen a cluster.

Implications:

- **Subcluster interactions:** Even if full clusters are relatively weak in a region, there may be a constellation of related subclusters that constitute a differentiating advantage.
- **Proximity:** Firms can be encouraged to locate near each other through zoning, and the provision of easily accessible infrastructure.



The Development of Clusters

- **Clusters can be strengthened by increasing awareness of the cluster among local firms and organizations:** Not only must firms be aware of the presence of a local cluster, they must also get together and coordinate activities to improve the cluster's business environment. Acceptance of new companies is important if the cluster is to grow quickly and reach a critical mass.
- **New firm and cluster opportunities arise at the intersection of existing clusters:** Economic development strategies can leverage these opportunities to diversify a regional economy.
- **Anchor companies play a disproportionate role in seeding cluster development:** Anchor companies support cluster development by acting as magnets for other major companies; organizing other companies in the cluster for collective action; supporting projects that improve the local quality of life; and producing numerous spin-out companies, which strengthen key elements of the cluster.
- **Institutions for collaboration can significantly increase the success rate of start-up companies:** Cluster development depends in large part on generating new companies from within a region. Successful regions almost always have a hospitable environment for start-ups.

Implications

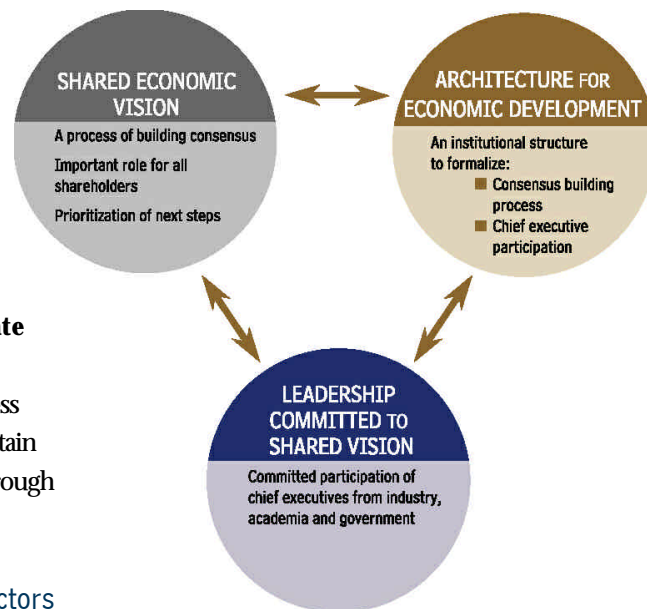
- **An explicit cluster development program:** Although chance events play a role in the formation and development of clusters, conscious efforts to raise cluster competitiveness and innovative capacity can meaningfully influence the trajectory of cluster development.
- **Recruiting for clusters:** Recruitment strategies at the regional level should target clusters in which the region has strength, or clusters which overlap with other clusters. This allows the region to market its unique assets rather than compete on subsidies. In recruiting efforts, regions should also identify gaps within clusters, and seek to attract companies to fill them.
- **Opportunities at the intersection of clusters:** Opportunities for growth often arise at the intersection of clusters where a region has strength.

Creating and Implementing a Regional Strategy

- **Regions often encounter a common set of pitfalls:** Because no single nationwide policy will be entirely appropriate for every region, policy setting at the regional level is especially important.
- **Regions need to overcome transition points in the development of their economies:** Regional leaders encounter transitional challenges as they develop their economies. Addressing these challenges should be targets of regional economic development strategies.
- **Broad-based collaboration is needed for development strategies to succeed:** Successful regional economies benefit from the contributions of a wide array of organizations. Organizing for action entails arriving at consensus and creating the capacity for regions to implement development strategies.
- **A shared economic vision helps elicit broad support and coordinate activities:** To achieve good coordination among many diverse groups, a shared vision of common objectives and methods is vital.

- **Strong leadership is a necessary part of any successful economic development strategy:** Strong leadership committed to regional economic development is needed to ensure that companies, knowledge centers, governments, and collaborative institutions contribute to their full potential.
- **An overarching organization for economic development helps coordinate and routinize the process:** A formal organizational structure and process for working on economic issues helps maintain a consensus behind an economic strategy through periods of economic and political change.

Creating the Capacity to Act



Action Agendas for the Public and Private Sectors

FEDERAL GOVERNMENT

- Invest in the foundations of science and technology.
 - Increase federal funding of research at universities and other research centers.
 - Establish federal overhead recovery rules, and other policies, to encourage investment in universities' science and technology infrastructure.
 - Provide federal support for specialized training programs in science and engineering.
- Improve the innovation policy context.
 - Fortify intellectual property protection.
 - Strengthen and enforce anti-trust laws with a greater weight on innovation.
 - Reinforce federal tax incentives that encourage business investment in R&D and industry-university collaboration.
- Allocate federal resources to reinforce cluster development.
 - Distribute federal research funding through a system of peer-reviewed competitive grants in a way that fosters cluster development
 - Encourage locally-based federal agencies to communicate and coordinate with local business, institutions for collaboration, and educational and research centers based around clusters.
- Provide better data for measuring regional economic composition and performance.
 - Collect more up-to-date data down to the county level.
 - Collect measures of both economic performance and innovation.
- Encourage the development of regional economic development strategies that stress innovation.
- Provide federal matching funds for innovation-focused state and regional economic development strategies.

STATE GOVERNMENT

- Invest in the foundations of science and technology.
 - Recognize the state government's important role in supporting R&D funding at state universities.
 - Establish and maintain high levels of state support for community colleges and specialized training centers.
 - Create a strong university or college presence in all major regions of the state.
- Sponsor state programs that encourage cluster development.
 - Build cluster thinking into research parks and incubators.
 - Organize state systems of higher education around local clusters.
- Focus business recruitment around strong clusters.
 - Coordinate activities with firms, universities, and training centers to recruit anchor companies to their region.
- Create regional dimension to state economic development strategy.
 - Encourage and assist regions to develop economic strategies.
 - Cultivate attitudes toward collaboration and sharing of information among firms, universities, training centers, labor, institutions for collaboration, and government.
- Improve information systems to regularly collect data and measure progress.

REGIONAL AND LOCAL GOVERNMENT

- Strongly support K-12 education, and create strong standards and accountability.
- Upgrade core business infrastructure.
 - Transportation infrastructure.
 - Communications infrastructure.
 - Ensure specialized training programs are a high priority in any economic development strategy.
- Develop a regional strategy that involves all stakeholders.
 - Support regional benchmarking initiatives.
 - Encourage a common vision and collaboration among firms, universities, and training centers.
 - Work with firms, universities, institutions for collaboration, and state government to create an organizational structure to help implement a regional strategy.
- Encourage cluster development.
 - Establish research and industrial parks that encourage innovation-based competition.
 - Implement cluster-focused and innovation focused recruitment efforts.

UNIVERSITIES AND RESEARCH INSTITUTES

- Recognize the important role of universities in regional economic development.
 - Take the lead on, and participate in, regional and cluster development efforts.
- Create and support technology transfer offices.
 - Work with firms and venture capital to streamline the technology transfer process.
 - Benchmark the commercialization of university-created intellectual property using measures that promote efficient dissemination of knowledge.
- Actively participate in cluster development efforts.
- Align university curricula and research to meet the needs of local clusters.

- Create cluster-specific institutions to support collaboration between academia and industry clusters.
- Work with local industry to create areas of excellence within universities that differentiate the university and complement local industry strengths.
- Integrate research and training efforts with the needs of local industry.
- Participate in the recruitment of companies.
- Support company start-up efforts by professors and students through mentorship, entrepreneurial education, and financing.

CLUSTER-SPECIFIC INSTITUTIONS FOR COLLABORATION

- Promote cluster awareness.
- Engage in ongoing diagnosis of cluster's competitive position.
 - Compare position relative to other regional clusters.
 - Identify constraints, obstacles, and advantages.
- Develop training and management programs.
 - Provide programs through institutions for collaboration.
 - Coordinate with local institutions to provide programs.
- Actively participate with government in recruitment efforts.
 - Communicate with firms in clusters to identify gaps in the cluster and recruit accordingly.
- Widen institutional membership to include all cluster constituents.

FIRMS

- Recognize the importance of location to competitive advantage.
- Take an active role in improving competitive environment.
 - Consistently communicate your needs and desires (e.g., for talent, ideas, patents) to local universities, research institutes, and training centers.
- See their cluster as a competitive asset.
- Contribute actively to cluster development activities.
 - Actively participate in cluster activities to identify issues of common concern and opportunities for mutual gain (e.g., regulatory matters, new buyer needs, innovative supplier capabilities).
 - Support recruitment activities of local chambers and other regional economic development officials to bring in companies that will fill missing niches in the cluster (e.g., suppliers, services providers, competitors).
 - Contribute to programs that support new ventures (e.g., improving access to risk capital, mentoring programs, and specialized services) in order to build-out cluster.

INTRODUCTION

Why Innovation Matters

During the 1990s, Americans found a way to do what seemed no longer possible — grow the economy, create jobs, and increase the standard of living, without driving up inflation. Much of the credit goes to the nation's ability to develop and commercialize new technology. The result: one of the most robust periods of economic expansion and prosperity of the past century.

Today, the nation is experiencing an economic downturn. As business and government leaders wrestle with this new context, most of the attention has been focused on monetary stimulus through lower interest rates, and fiscal stimulus through lower tax rates and government spending. These are important tools to affect economic growth in the short run. However, neither addresses the fundamental causes of prosperity. Prosperity depends upon the productivity with which the U.S. economy uses labor and capital to produce goods and services. Productivity rises because of innovation. Moreover, sustained economic growth will require continued innovation at all levels of the U.S. economy, especially as we enter a new era when the workforce will be increasing more slowly.

While fiscal and monetary policies pump dollars into the economy to boost the level of activity, innovation infuses the economy with growth-incubating new ideas, new products and services, and new technologies. National policies and national investment choices have much to do with the growth and capacity of the American economy. For innovation, however, the real locus of innovation is at the regional level. The vitality of the U.S. economy then depends on creating innovation and competitiveness at the regional level.

About the Clusters of Innovation Initiative

The Clusters of Innovation Initiative offers a new way of thinking about economies that has begun to take hold as communities across the nation confront the successes of California's Silicon Valley, and Massachusetts' Route 128, Austin, Texas and other areas. In healthy regions, competitiveness and innovation are concentrated in clusters, or groups of interrelated firms and industries, in which regions specialize. The nation's ability to produce high-value products and services that support high wage jobs depends on the creation and strengthening of these regional hubs of competitiveness and innovation.

The Clusters of Innovation Initiative was launched to help meet this challenge. Under the leadership of Professor Michael Porter, Harvard University; Duane Ackerman, BellSouth Corporation; and a national steering committee—and supported by a partnership of Monitor Group and its affiliate, ontheFRONTIER, the Institute for Strategy and Competitiveness at Harvard Business School, and the Council on Competitiveness—the Initiative has worked to understand how regional economies develop, how clusters form and gain or lose competitiveness, and how innovative capacity is built. It offers recommendations for government, universities, the private sector, and other regional institutions. It aims to inform key decision makers across the country and provide a methodology for analysis that any region can utilize.

The Initiative studied five regions around the country: Atlanta, Pittsburgh, the Research Triangle, San Diego and Wichita. These regions were selected to provide a diversity of size, geography, economic maturity, and perceived economic success. The regions were similar enough to allow interesting comparisons, yet diverse enough to encompass a wide variety of challenges and opportunities in regional economic development.

Data for the study were drawn from a number of sources, but the principal sources of data were the Cluster Mapping Project of the Institute for Strategy and Competitiveness, the Clusters of Innovation Initiative Regional Surveys, and in-depth interviews of business and government leaders in each region.

The Cluster Mapping Project is perhaps the most detailed data set related to economic composition and performance ever compiled. Comparing regional economies has historically been difficult because clusters have not been systematically defined and their incidence charted across all U.S. regions. The Cluster Mapping Project created a detailed statistical analysis using county-level business data, including detailed metrics on regional economic performance, and data defining 41 types of clusters (e.g., information technology, automotive, business services) that are found in regions throughout the U.S. economy. The Cluster Mapping Data also mapped regional economies by cluster and constituent industry and compared regions to others on various indicators of economic vitality and future competitiveness. One of the goals of the Cluster Mapping Project is to disseminate this data widely to practitioners. (To access the data over the Internet, go to www.isc.hbs.edu.)

Monitor Group, its affiliate ontheFRONTIER, in concert with staff from the Council on Competitiveness designed and implemented a broad reaching survey—the Clusters of Innovation Initiative Regional Survey™—to study the business environment and cluster competitiveness in each region. Over 1025 business and government leaders were surveyed and 264 in-depth interviews were conducted to determine the historical growth, recent performance and composition of local economies. Fifteen clusters in the five regions were studied as well.

While many projects around the United States and elsewhere have studied one particular region or one particular cluster or groups of clusters, the Clusters of Innovation Initiative is unique in its coverage of five regions and 15 individual clusters using a common methodology, individually and comparatively. The Cluster Mapping Data, surveys and interviews provide a unique, outstanding information resource for these regions and the nation as a whole.

Organization of the Report

This report is organized as follows:

- **Section 1** describes the fundamental determinants of regional economic performance and innovative capacity.
- **Section 2** builds upon this foundation to describe how economic performance can be determined and how U.S. regions compare.
- **Section 3** describes the composition of regional economies. It highlights the importance of industries that trade, and the specialization of regional economies by clusters. It describes how the mix of clusters and the performance of clusters combine to drive regional economic success.
- **Section 4** describes how regions develop and the factors that shape the trajectory of their development.
- **Section 5** describes a framework for analyzing the business environment in a region and how it shapes innovation and economic competitiveness.
- **Section 6** demonstrates the importance of industry clusters to regional and national competitiveness and innovation output, and how to assess the strength of a cluster.
- **Section 7** describes the process by which clusters develop and evolve and what forms of intervention positively or negatively influence their development.
- **Section 8** explains the process by which regions create and implement economic strategies.
- **Section 9** outlines a potential action agenda for multiple layers of government, universities, research centers, companies, and institutions for collaboration.

The **Appendices** includes a “how-to” guide for assessing economic performance and innovative capacity; a definition of measurements used; and detailed findings of the Clusters of Innovation Initiative Regional Survey.TM

This report summarizes a multi-year, multi-regional analysis. It aims to stimulate other efforts in regions across the nation to enhance innovation and, through it, lasting economic competitiveness.

