

# Competitiveness and Economic Development: Where Does Texas Stand?

Professor Michael E. Porter  
Harvard Business School

*Texas Economic Summit  
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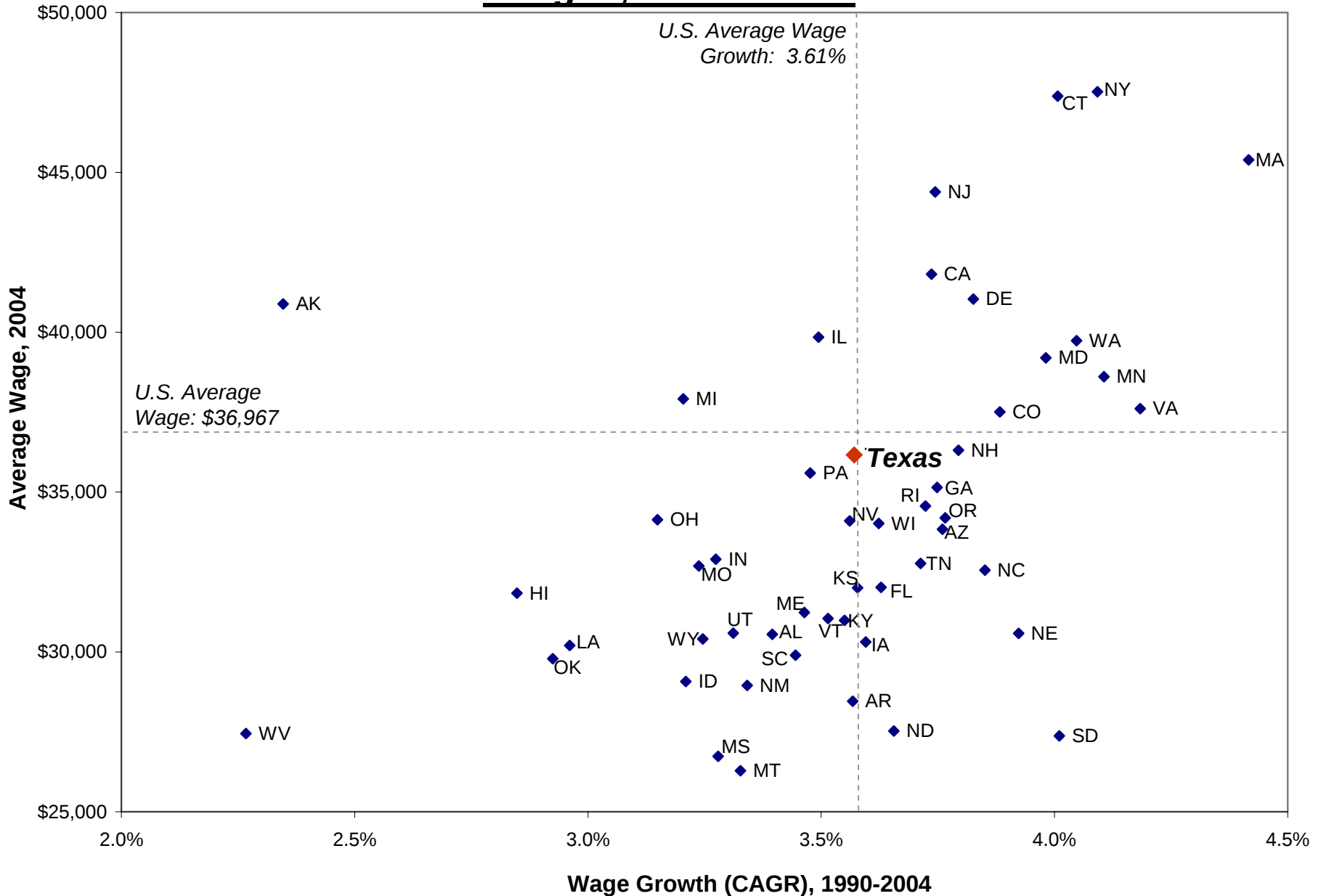
This presentation draws on ideas from Professor Porter's articles and books, in particular, The Competitive Advantage of Nations (The Free Press, 1990), "Clusters and the New Competitive Agenda for Companies and Governments" in On Competition (Harvard Business School Press, 1998), the *Clusters of Innovation Initiative* ([www.compete.org](http://www.compete.org)), a joint effort of the Council on Competitiveness, Monitor Group, Professor Porter, and the Cluster Mapping Project at Harvard Business School, and on "Competitiveness in U.S. Rural Regions: Learning and Research Agenda," a project report on rural economic development for the EDA with Christian Ketels, Kaia Miller, and Richard Bryden.

Additional information may be found at the website of the Institute for Strategy and Competitiveness, [www.isc.hbs.edu](http://www.isc.hbs.edu)

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# Comparative Performance of U.S. States

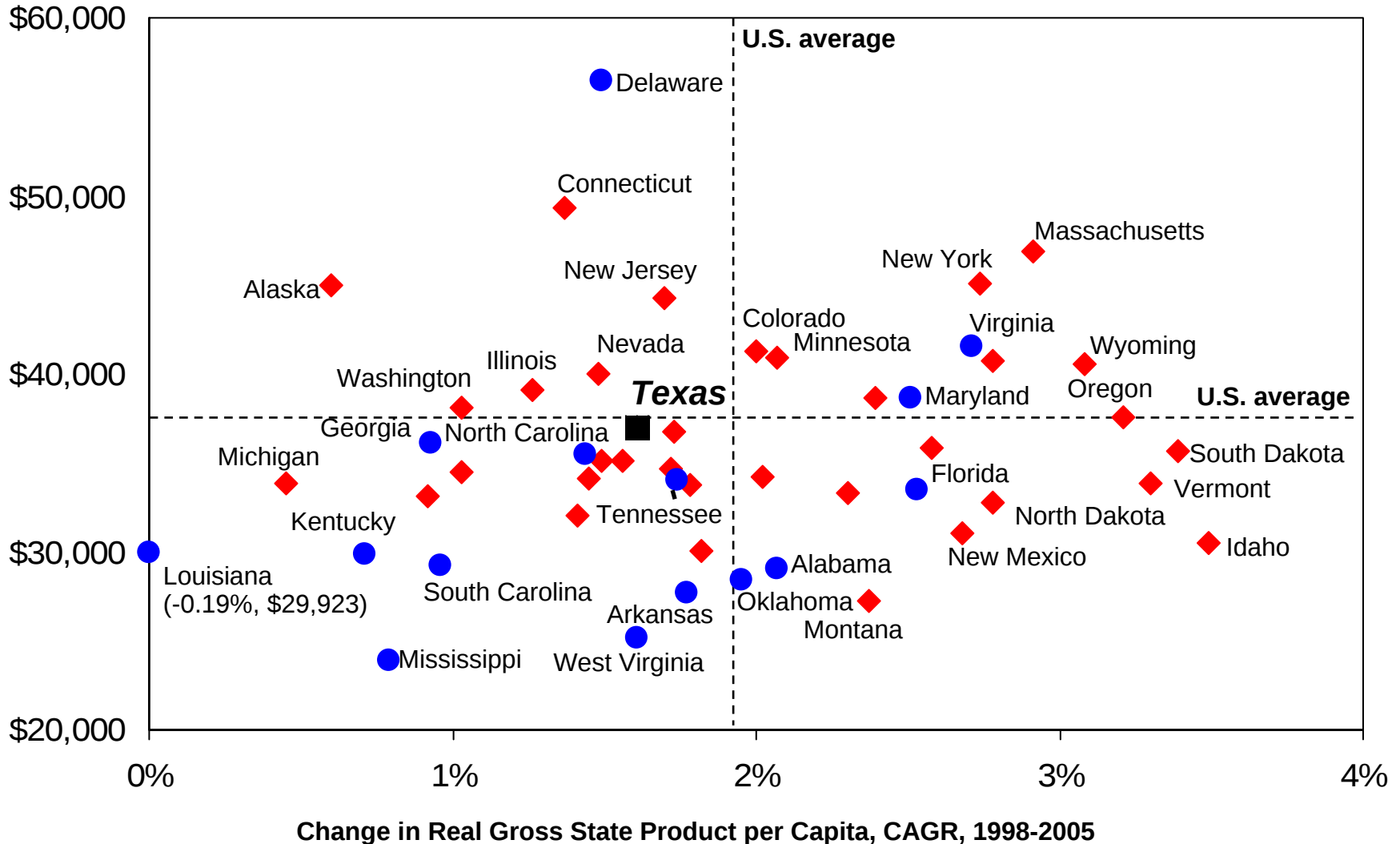
## Wages, 1990 – 2004



# Comparative Performance of U.S. States

## Gross State Product per Capita, 1998 – 2005

Real Gross State  
Product per Capita, 2005



Note: Southern states as defined by the U.S. census highlighted in blue. All figures in chained 2000 dollars.

Source: BEA, 2006.

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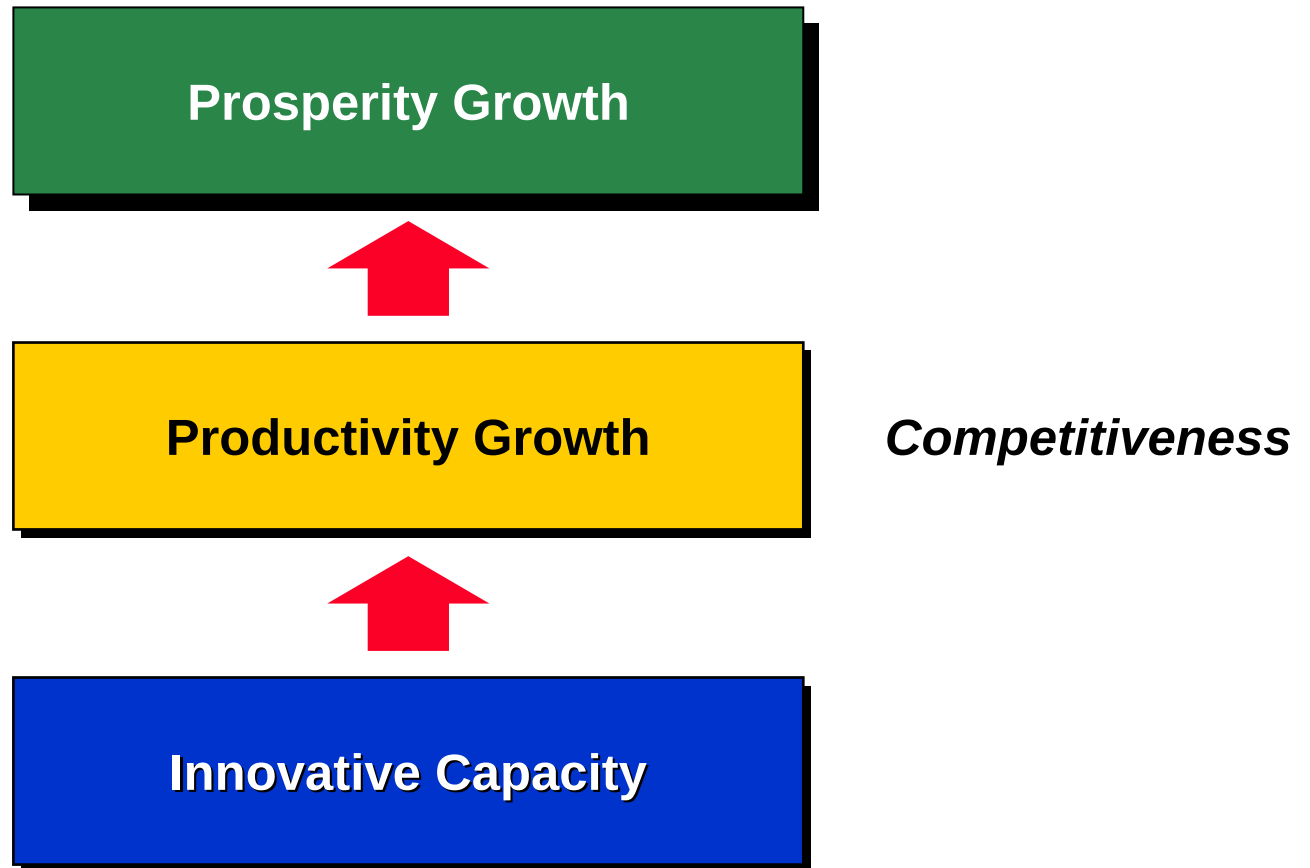
# What is Competitiveness?

- Competitiveness is the **productivity** (value per unit of input) with which a nation, region, or cluster utilizes its human, capital, and natural resources. Productivity sets a nation's or region's standard of living (wages, returns on capital, returns on natural resources)
  - Productivity depends both on the **value** of products and services (e.g. uniqueness, quality) as well as the **efficiency** with which they are produced.
  - It is not **what** industries a nation or region competes in that matters for prosperity, but **how** firms compete in those industries
  - Productivity in a nation or region is a reflection of what both domestic and foreign firms **choose to do in that location**. The location of ownership is secondary for prosperity.
  - The productivity of **“local”** industries is of fundamental importance to competitiveness, not just that of traded industries

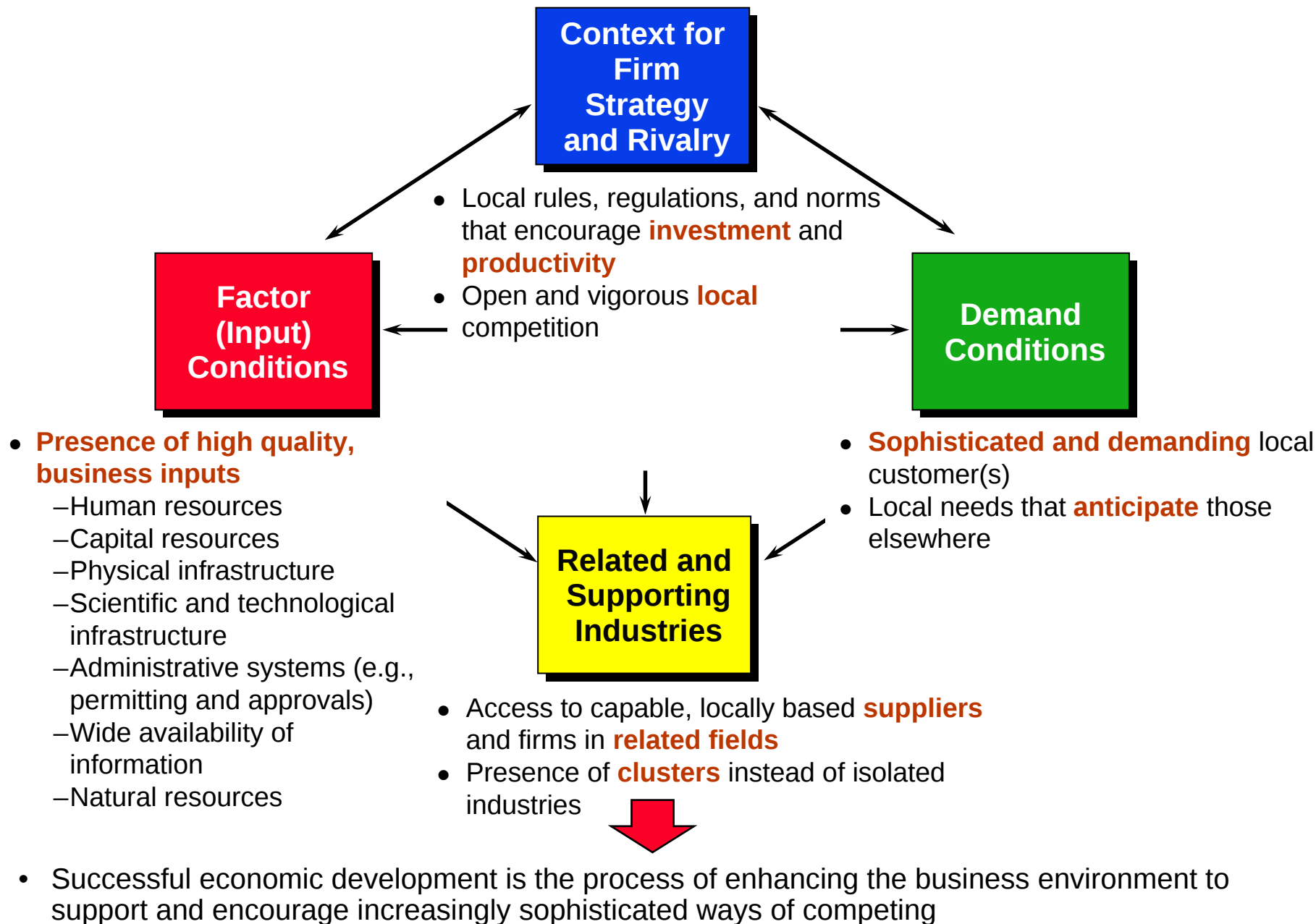


- Nations or regions compete in offering the **most productive environment** for business

# Innovation and Competitiveness

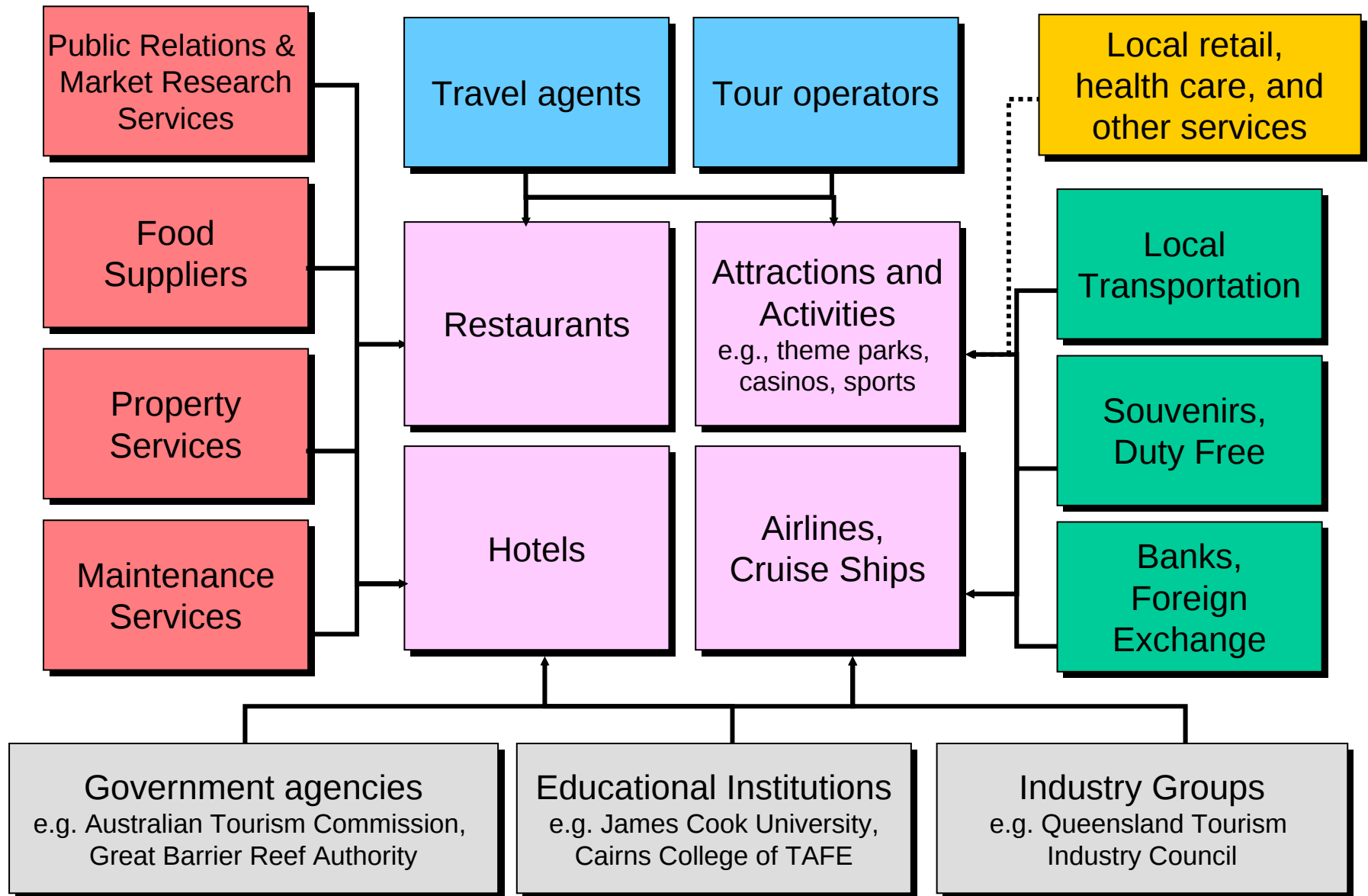


# Enhancing Competitiveness: Improving the Business Environment



# Enhancing Competitiveness: Developing Clusters

## Hospitality and Tourism in Cairns (Australia)

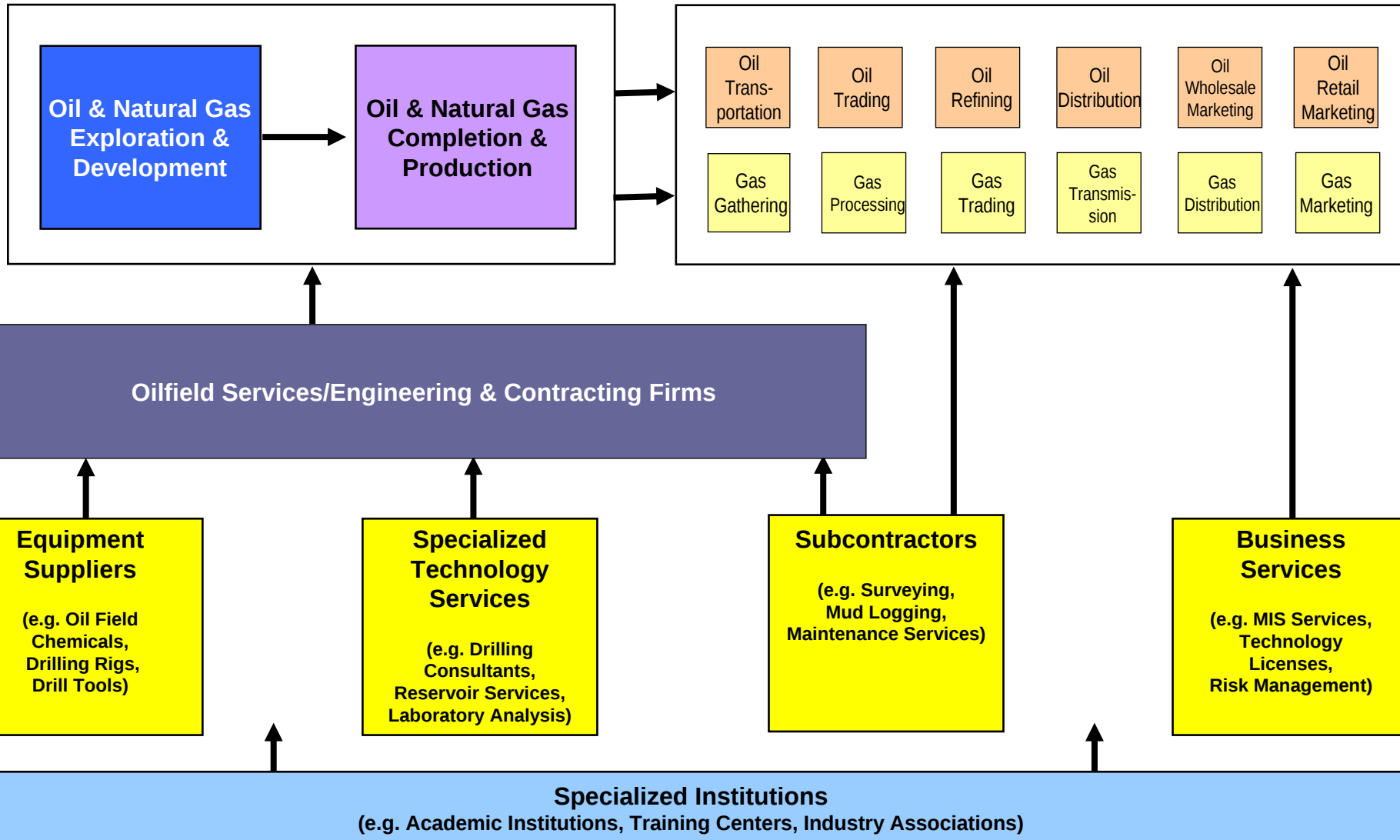


# Enhancing Competitiveness: Developing Clusters

## Oil and Gas in Houston

Upstream

Downstream



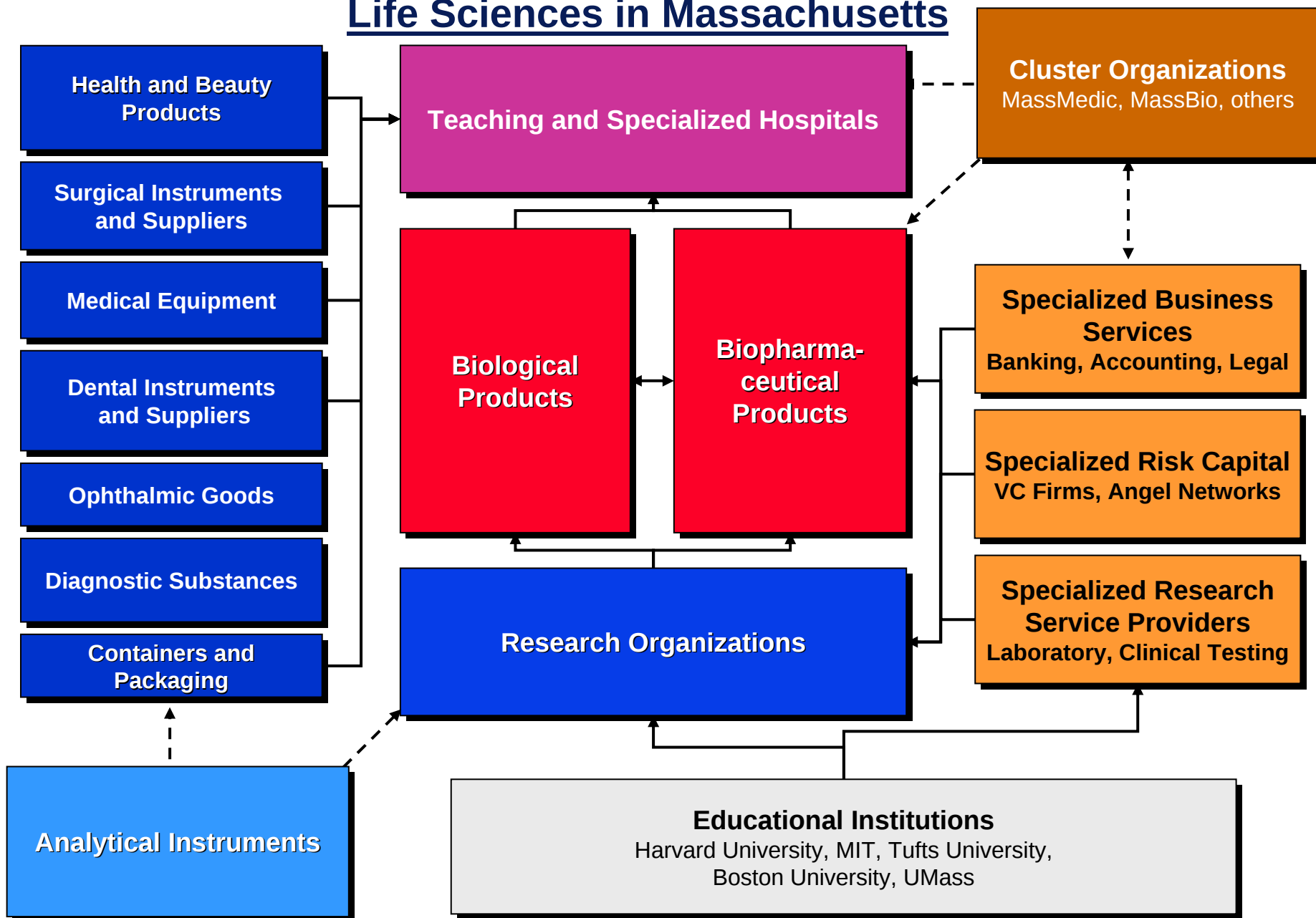
# Clusters and Competitiveness

- **Clusters Increase Productivity**
  - Efficient **access** to specialized inputs, services, employees, information, institutions, and “public goods” (e.g. training programs)
  - Ease of **coordination** and transactions across firms
  - Rapid **diffusion** of best practices
  - Ongoing, visible **performance comparisons** and strong incentives to improve vs. local rivals
- **Clusters Stimulate and Enable Innovations**
  - Enhanced ability to **perceive innovation opportunities**
  - Presence of multiple entities involved in specialized **knowledge creation**
  - Ease of **experimentation** given locally available resources
- **Clusters Facilitate Commercialization and New Business Formation**
  - Opportunities for **new companies** and **new lines of established business** are more apparent
  - **Commercializing** new products and starting new companies is easier because of available skills, suppliers, financing, etc.



Clusters reflect the fundamental influence in competition of **linkages and spill-overs** across firms and associated institutions

## Life Sciences in Massachusetts



# **Institutions for Collaboration**

## **Massachusetts Life Sciences, Selected Organizations**

### **Life Sciences Industry Associations**

- Massachusetts Biotechnology Council
- Massachusetts Medical Device Industry Council
- Massachusetts Hospital Association

### **General Industry Associations**

- Associated Industries of Massachusetts
- Greater Boston Chamber of Commerce
- High Tech Council of Massachusetts

### **Economic Development Initiatives**

- Massachusetts Technology Collaborative
- Mass Biomedical Initiatives
- Mass Development
- Massachusetts Alliance for Economic Development

### **University Initiatives**

- Harvard Biomedical Community
- MIT Enterprise Forum
- Biotech Club at Harvard Medical School
- Technology Transfer offices

### **Informal networks**

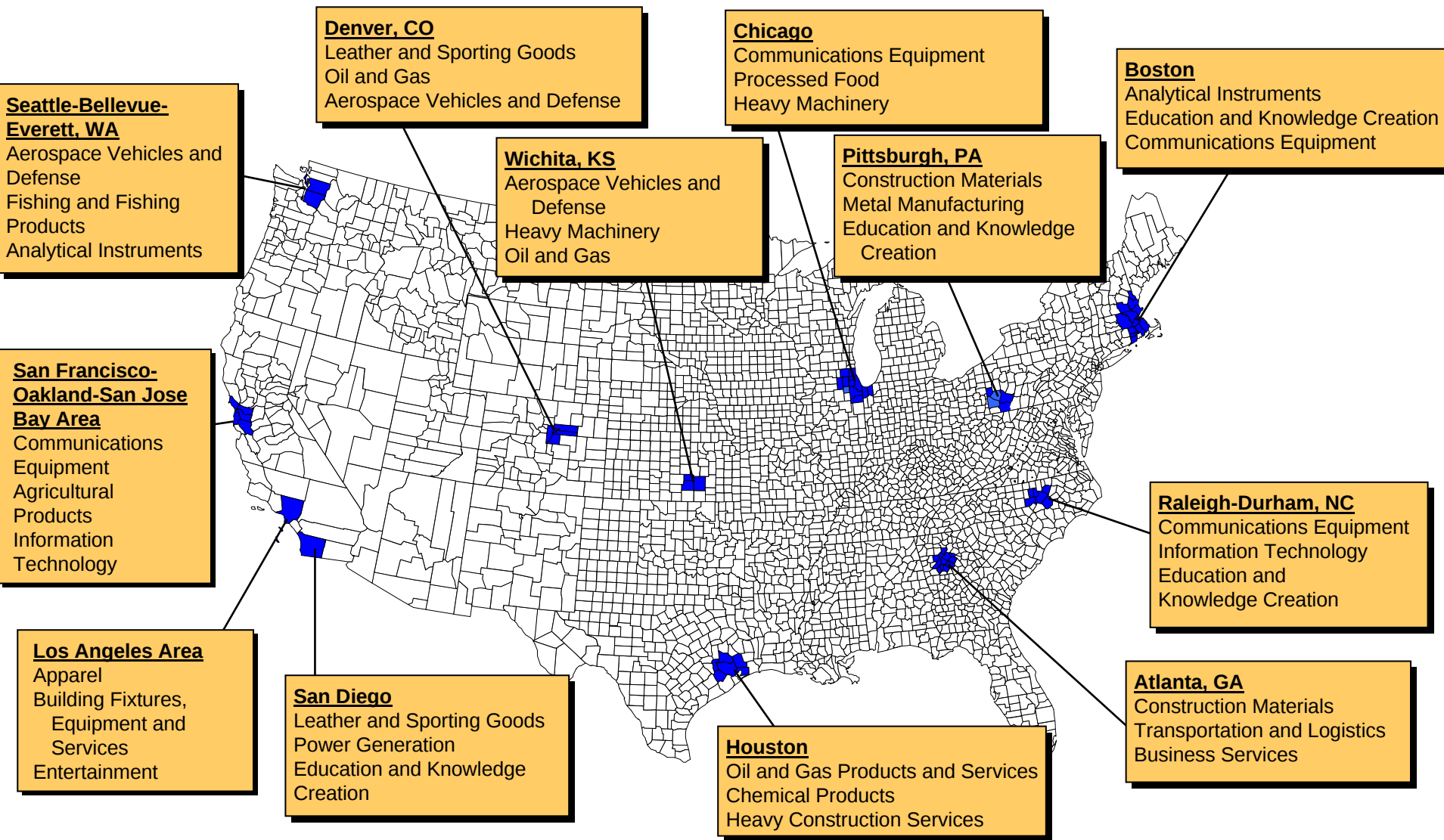
- Company alumni groups
- Venture capital community
- University alumni groups

### **Joint Research Initiatives**

- New England Healthcare Institute
- Whitehead Institute For Biomedical Research
- Center for Integration of Medicine and Innovative Technology (CIMIT)

# Specialization of Regional Economies

## Select U.S. Geographic Areas



Note: Clusters listed are the three highest ranking clusters in terms of share of national employment  
 Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

# The Composition of Regional Economies

## United States, 2004

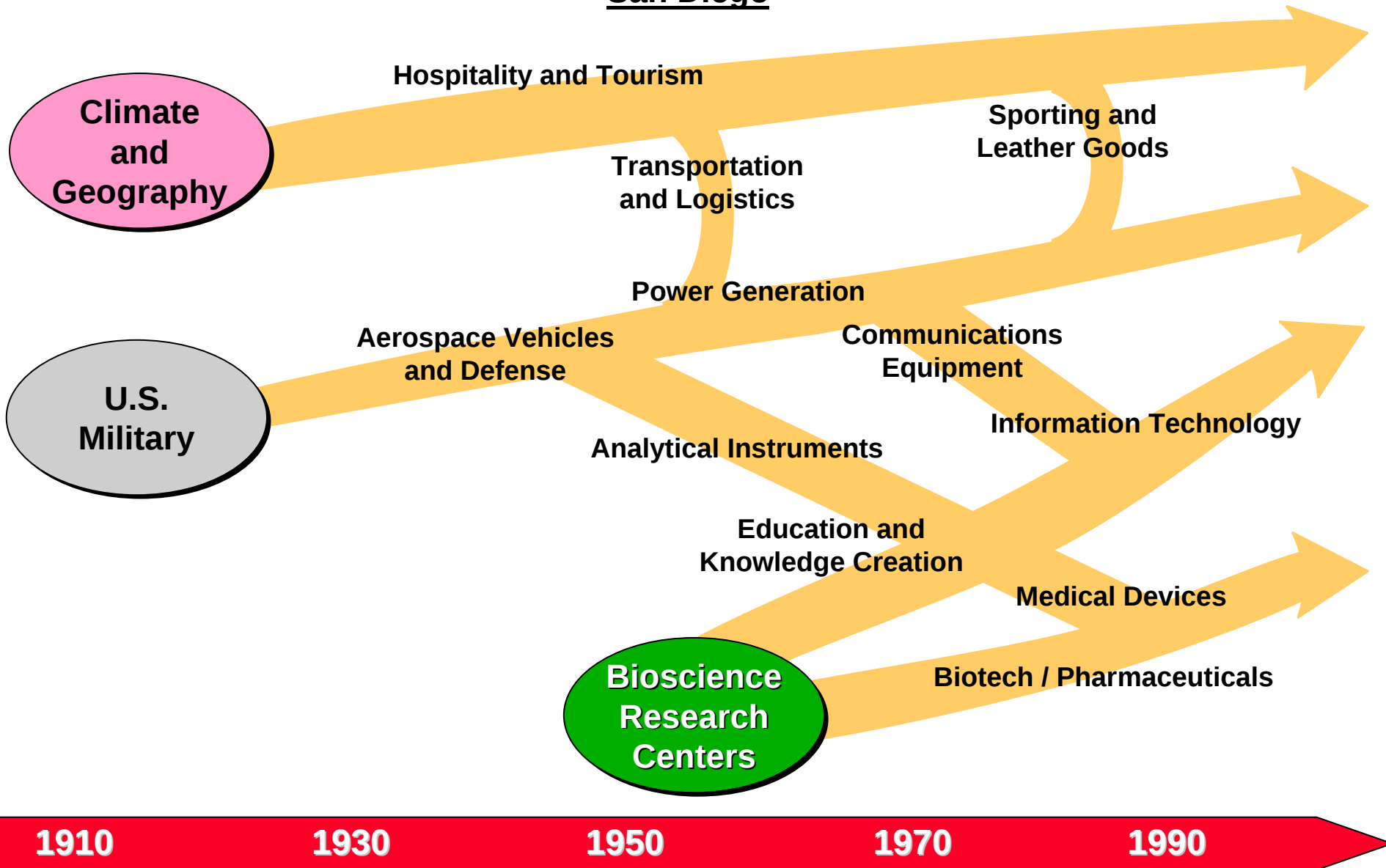
|                                         | Traded   | Local    | Natural<br>Resource-Driven |
|-----------------------------------------|----------|----------|----------------------------|
| Share of Employment                     | 29.3%    | 70.0%    | 0.7%                       |
| Employment Growth Rate,<br>1990 to 2004 | 0.7%     | 2.4%     | -1.2%                      |
| Average Wage                            | \$49,367 | \$30,416 | \$35,815                   |
| Relative Wage                           | 137.2%   | 84.5     | 99.5                       |
| Wage Growth                             | 4.2%     | 3.4%     | 2.1%                       |
| Relative Productivity                   | 144.1    | 79.3     | 140.1                      |
| Patents per 10,000<br>Employees         | 20.4     | 0.4      | 3.0                        |
| Number of SIC Industries                | 590      | 241      | 48                         |

Note: 2004 data, except relative productivity which uses 1997 data.

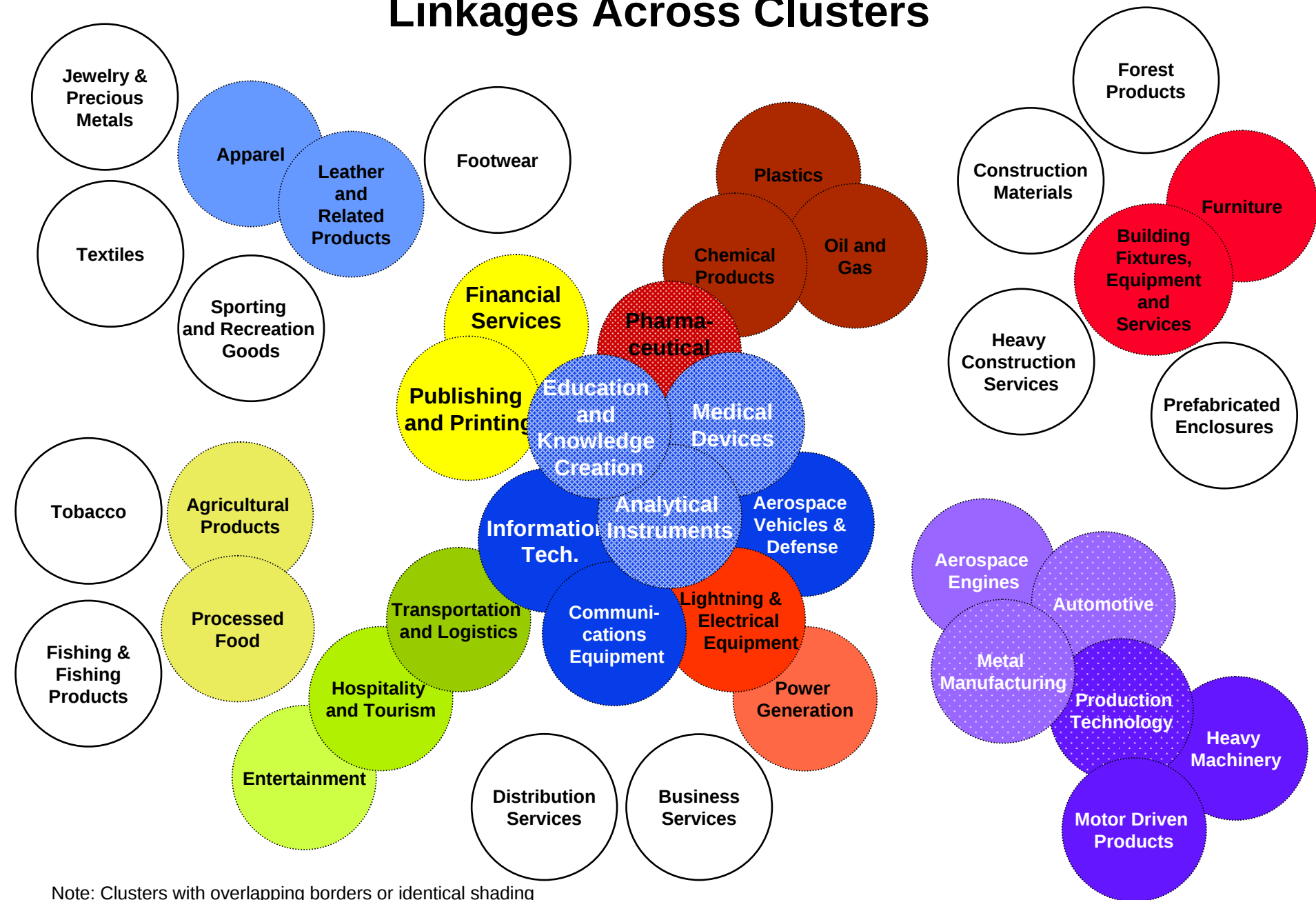
Source: Prof. Michael E. Porter, Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

# The Evolution of Regional Economies

## San Diego



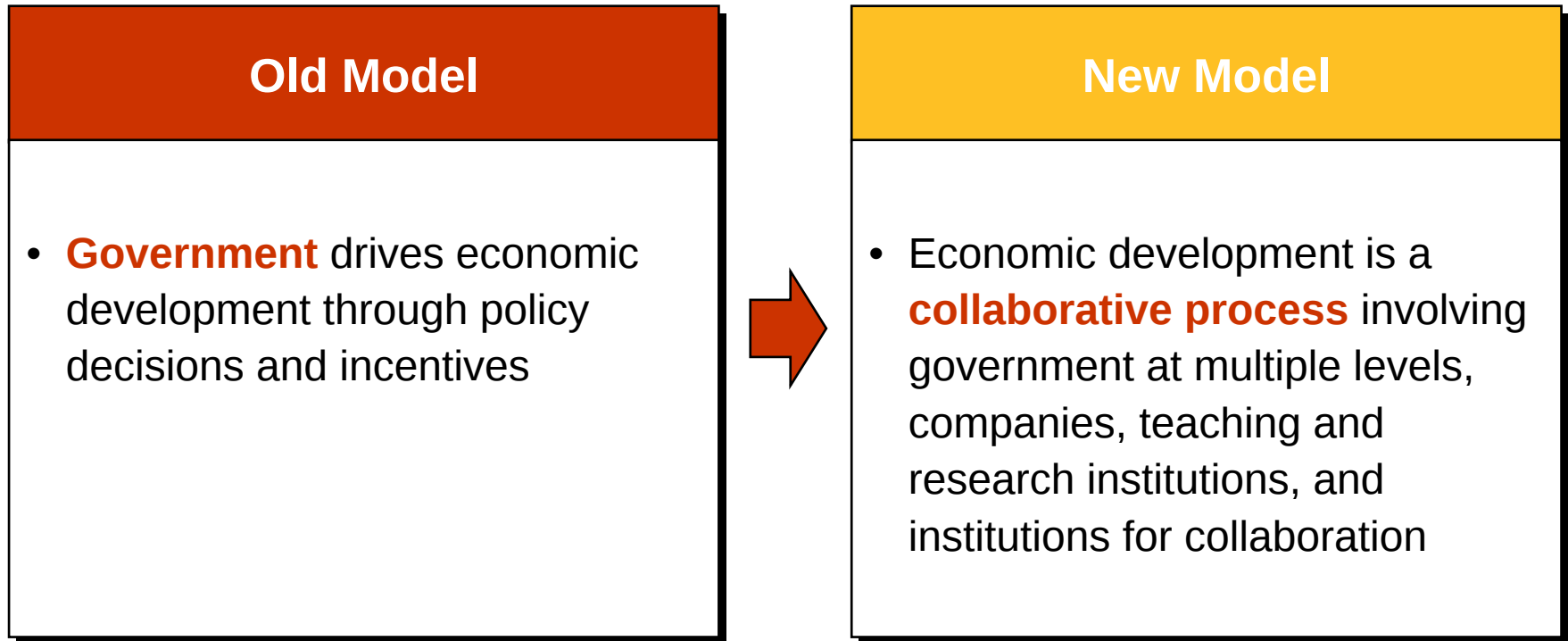
# Linkages Across Clusters



Note: Clusters with overlapping borders or identical shading have at least 20% overlap (by number of industries) in both directions

# The Process of Economic Development

## Shifting Roles and Responsibilities



- Competitiveness must become a **bottom-up process** in which many individuals, companies, clusters, and institutions take responsibility
- Every** region and cluster can take steps to enhance competitiveness

# Economic Performance Indicators

## Texas

### Economic Performance

#### Employment, 2004

- in Texas: 8,118,483 (rank 2)
- % of US: 7.05%

#### Employment, annual growth rate, 1990 to 2004

- in Texas: 2.35% (rank 12)
- in the US: 1.50%

#### Gross State Product per capita, 2005

- in Texas: \$42,975 (rank 16)
- in the US: \$41,844
- Texas % above US: 2.70%

#### Average wage, 2004

- in Texas: \$36,161 (rank 17)
- in the US: \$36,967
- Texas % below US: 2.18%

#### Real Gross State Product per capita, annual growth rate, 1997- 2005

- in Texas: 1.66% (rank 24)
- in the US: 1.83%

#### Average wage, annual growth rate, 1990 to 2004

- in Texas: 3.57% (rank 28)
- in the US: 3.61%

#### Share of Employment in Traded Clusters, 2004

- in Texas: 27.4% (rank 33)
- in the US: 29.3%

#### Change in Share of Employment in Traded Clusters, 1990 to 2004

- in Texas: -2.6% (rank 23)
- in the US: -4.8%

### Innovation Output

#### Patents per 10,000 employees, 2004

- in Texas: 7.35 (rank 16)
- in the US: 7.29

#### Total patents, annual growth rate, 1990 to 2004

- in Texas: 5.41% (rank 15)
- in the US: 4.36%

#### Traded establishment formation, annual rate, 1990 to 2004

- in Texas: 3.33% (rank 22)
- in the US: 3.15%

#### Total establishment formation, annual rate, 1990 to 2004

- in Texas: 1.58% (rank 18)
- in the US: 1.29%

### Demographic Profile

#### Population, 2005

- in Texas: 22,859,968 (rank 2)
- % of US: 7.71%

#### Population, annual growth rate, 1990 to 2005

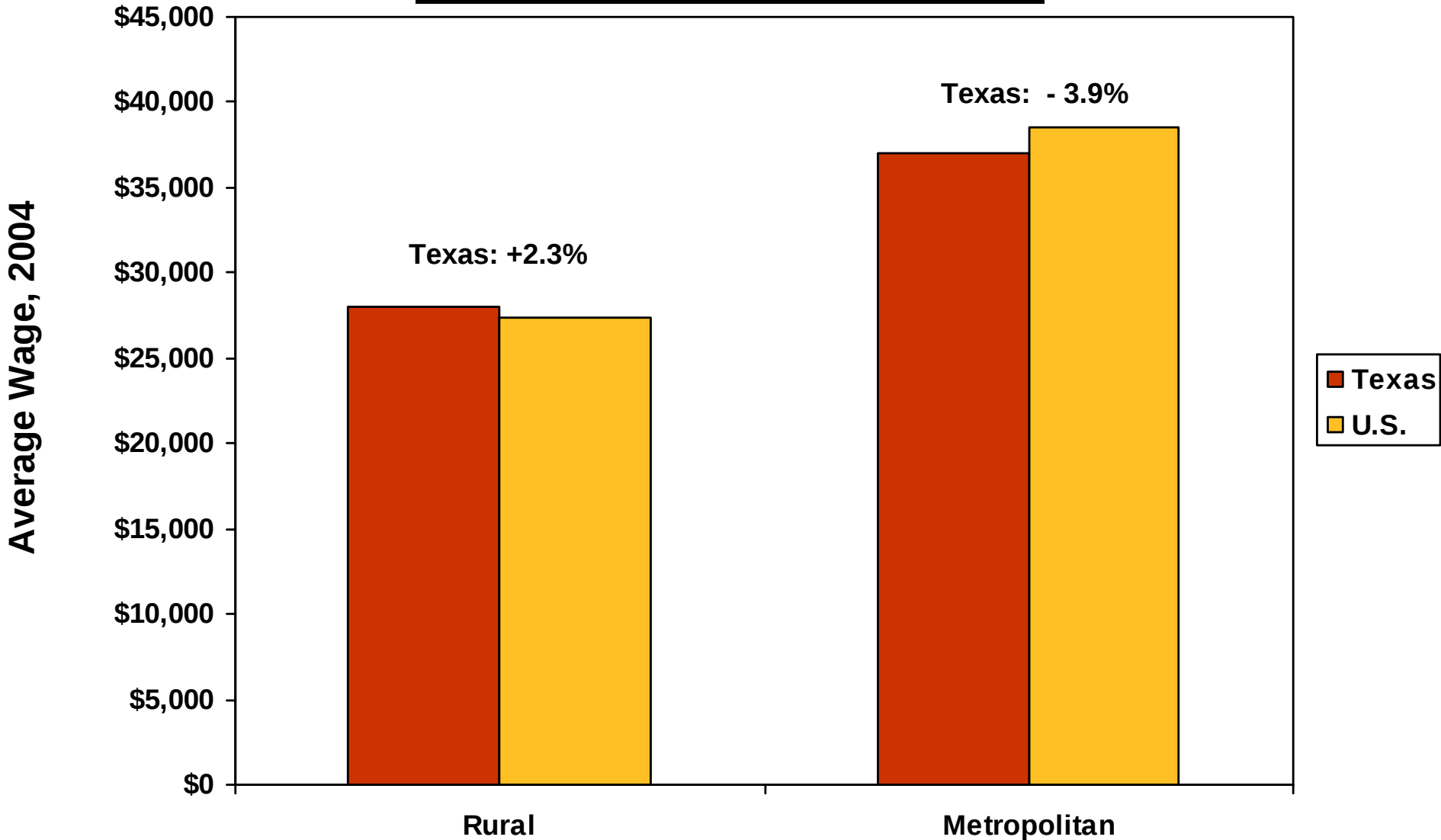
- in Texas: 1.98% (rank 8)
- in the US: 1.16%

#### Population Density, inhabitants per square mile, 2005

- in Texas: 64.9 (rank 30)
- US state median: 94.4

# Texas

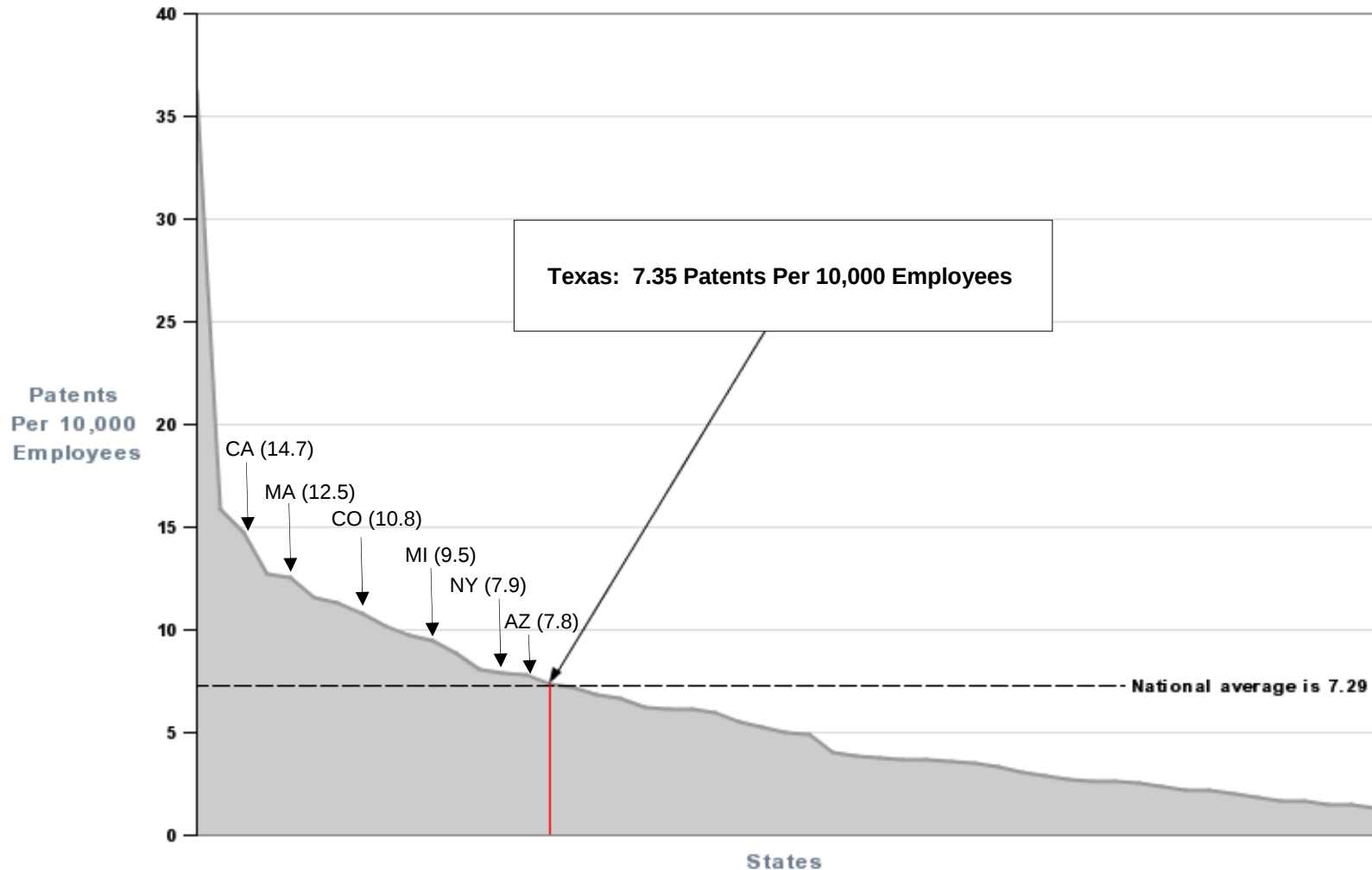
## Rural and Metropolitan Wages, 2004



- Rural employment is 10.5% percent of total in Texas versus 16.0% nationwide.
  - Texas is less rural than the US by this measure
- The average wage in the Texas is higher than the national benchmark.

# Texas

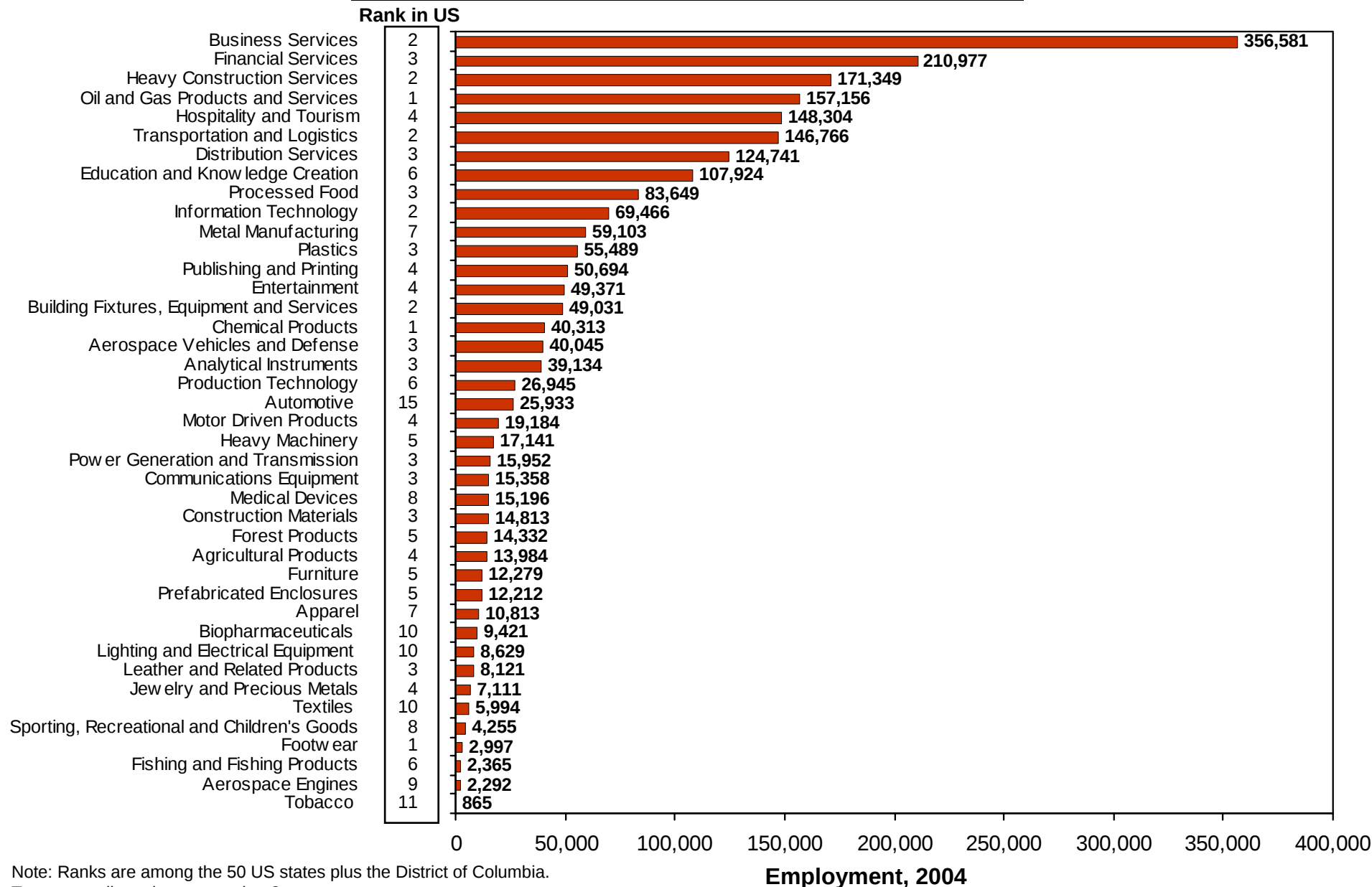
## Patenting per 10,000 Employees, 2004



Texas patenting per employee rank: **16** of 51 states plus D.C.

# Composition of the Texas Economy

## Employment by Traded Cluster, 2004



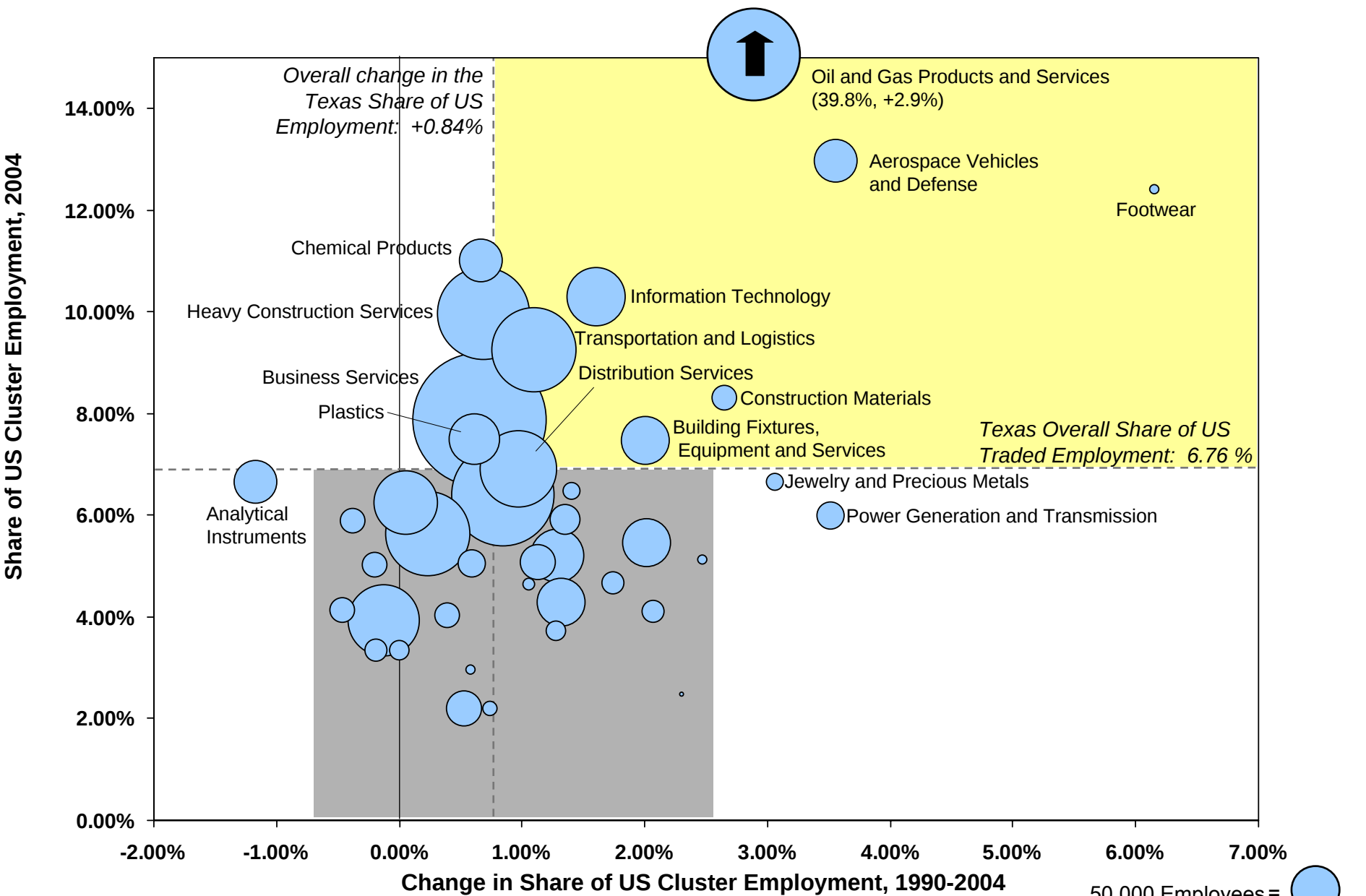
Note: Ranks are among the 50 US states plus the District of Columbia.

Texas overall employment rank = 2.

Source: Prof. Michael E. Porter, Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School; Richard Bryden, Project Director.

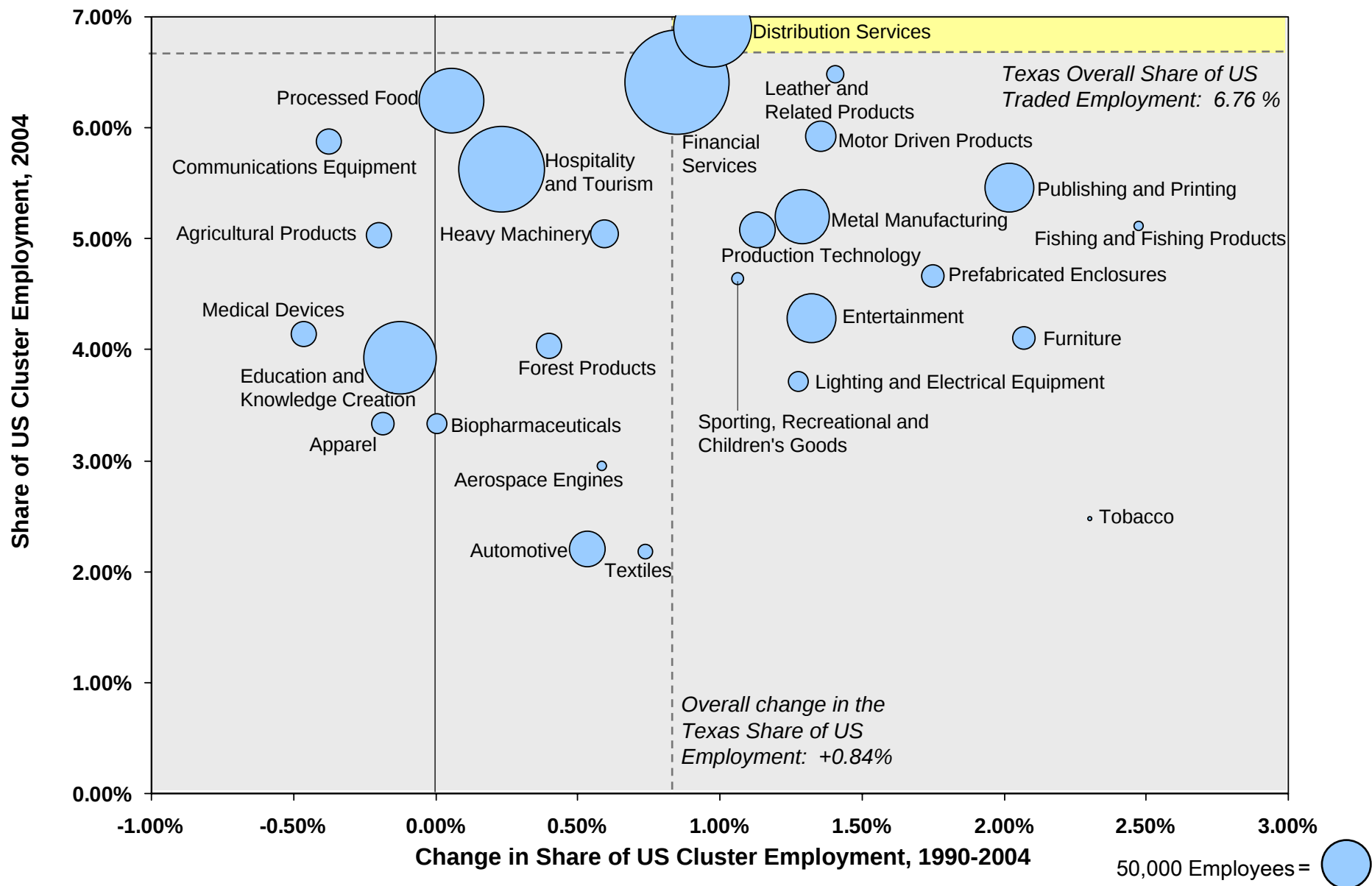
# Texas

## Specialization by Traded Cluster, 1990-2004



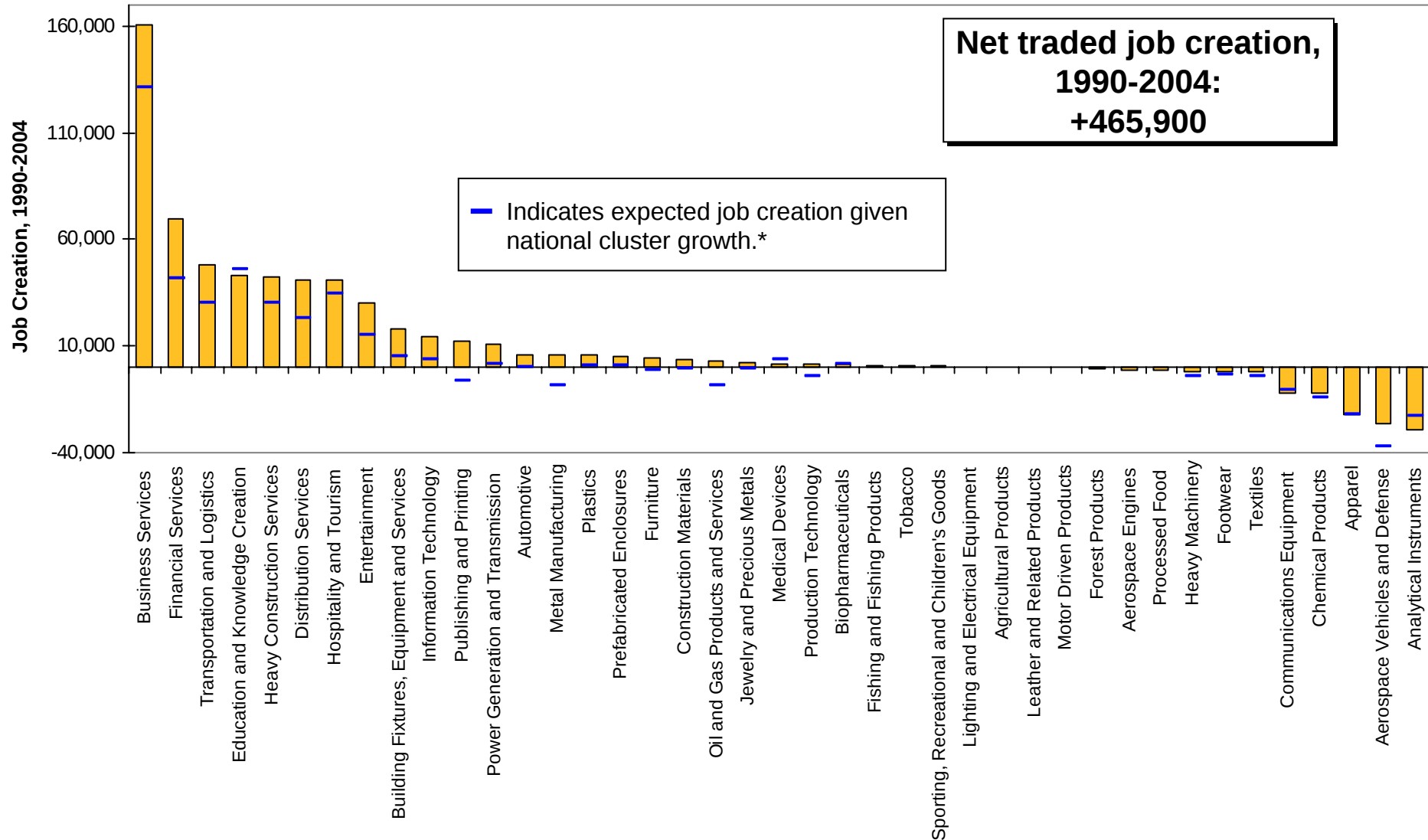
# Texas

## Specialization by Traded Cluster, 1990-2004 (continued)



# Texas Economic Growth

## Job Creation by Traded Cluster, 1990-2004

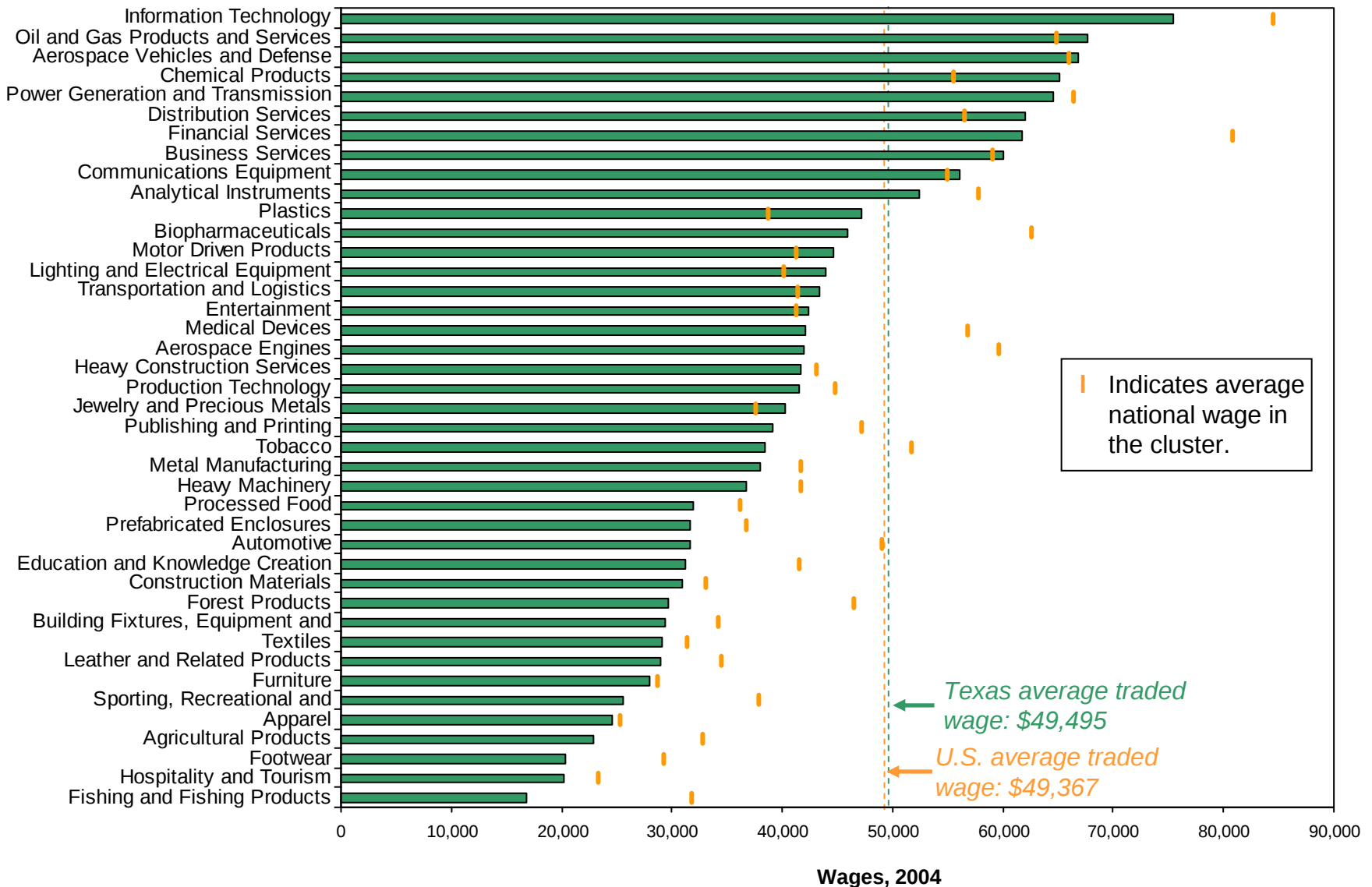


\* Percent change in national benchmark times starting regional employment. Overall traded job creation in Texas, if it matched national benchmarks, would be +205,776.

Source: Prof. Michael E. Porter, Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School; Richard Bryden, Project Director.

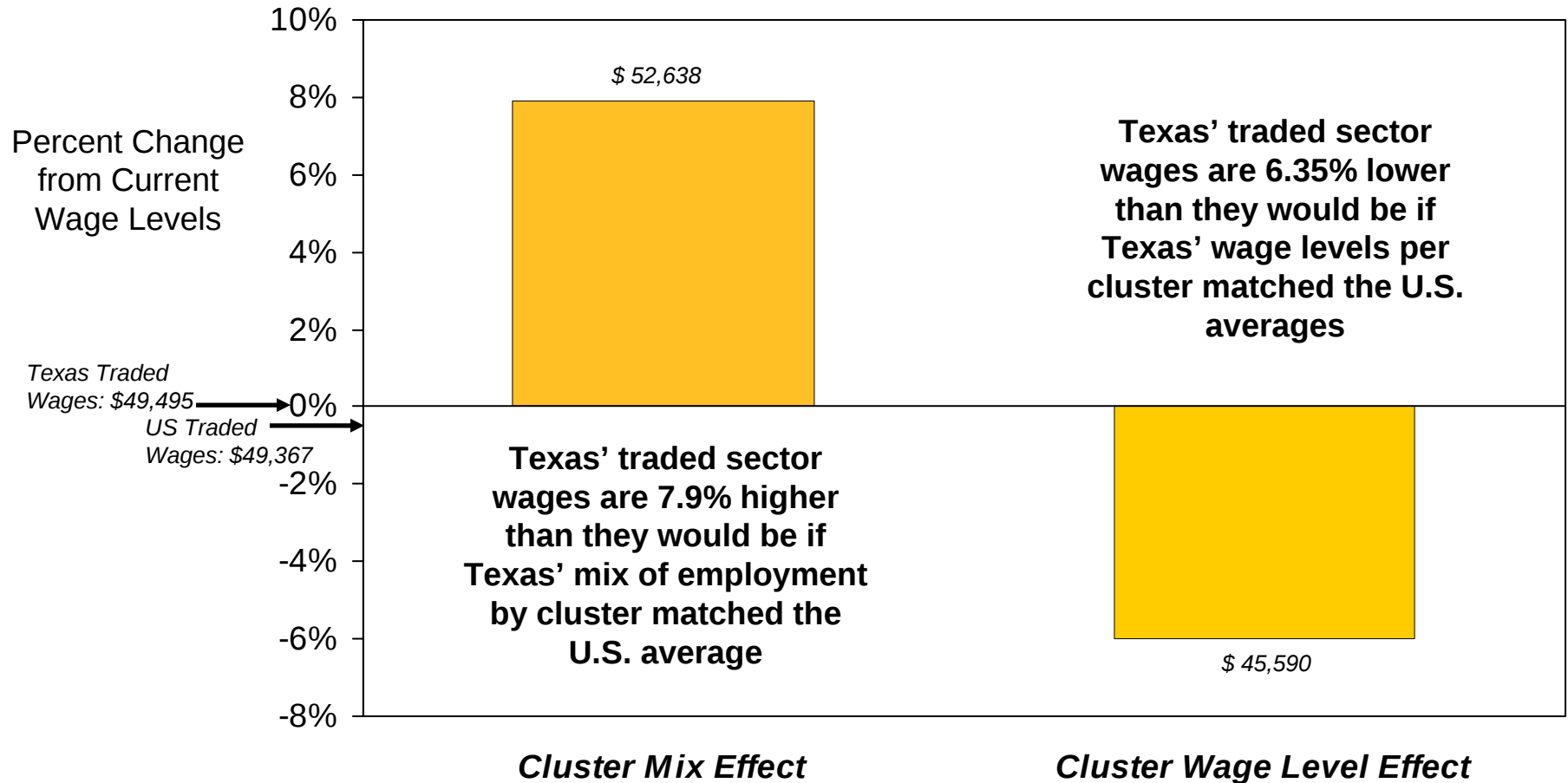
# Composition of the Texas Economy

## Wages by Traded Cluster vs. National Benchmarks



# Impact of Cluster Mix on Average Wages

## Texas Traded Clusters, 2004



# Top Patenting Universities and Research Institutes

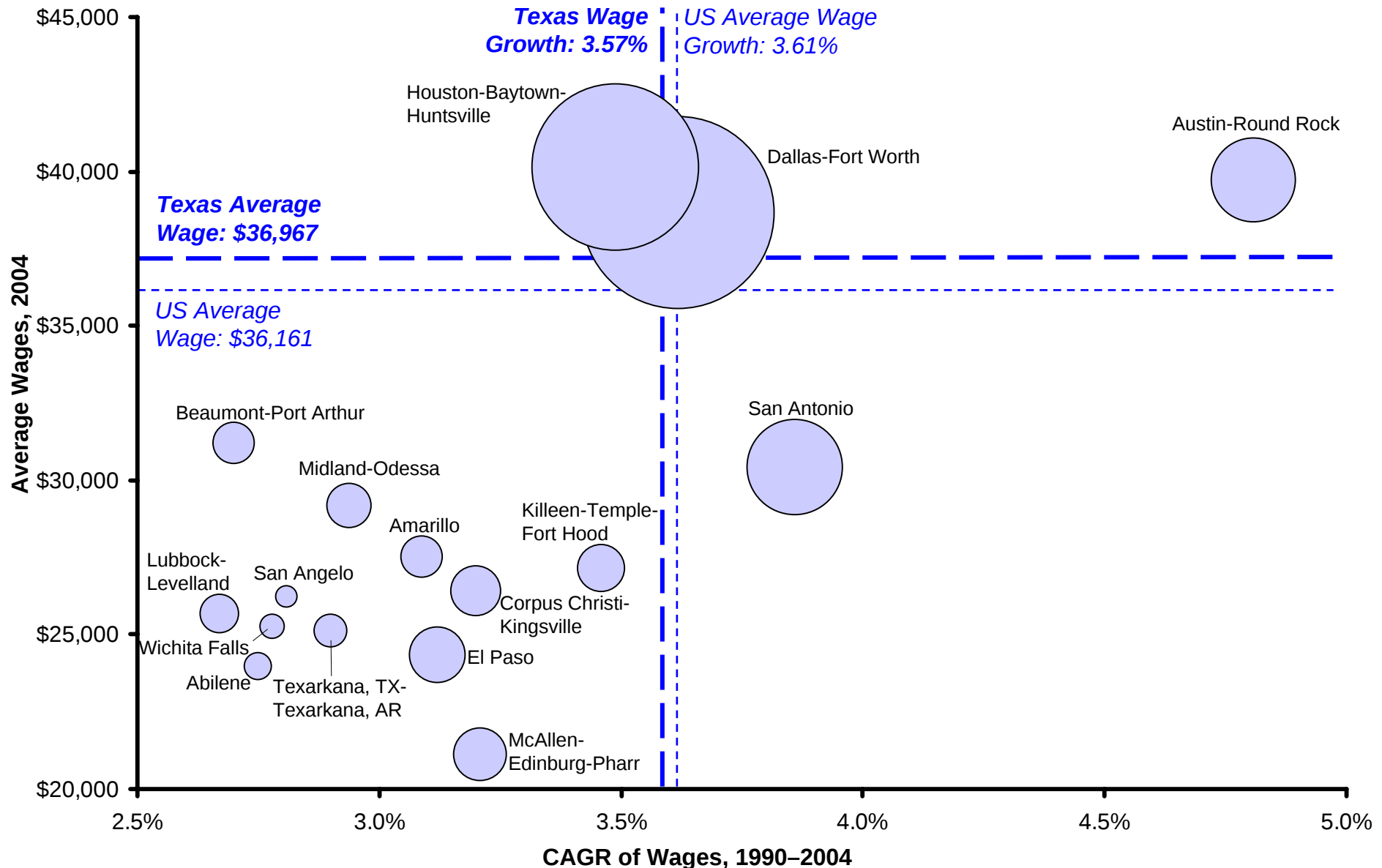
| Rank | Organization                                                 | Patents Issued from 2000 to 2004 |
|------|--------------------------------------------------------------|----------------------------------|
| 1    | UNIVERSITY OF CALIFORNIA, THE REGENTS OF                     | 2107                             |
| 2    | HARVARD UNIVERSITY                                           | 698                              |
| 3    | MASSACHUSETTS INSTITUTE OF TECHNOLOGY                        | 614                              |
| 4    | CALIFORNIA INSTITUTE OF TECHNOLOGY                           | 586                              |
| 5    | UNIVERSITY OF TEXAS                                          | 454                              |
| 6    | STANFORD UNIVERSITY, LELAND JUNIOR, THE BOARD OF TRUSTEES OF | 434                              |
| 7    | JOHNS HOPKINS UNIVERSITY                                     | 397                              |
| 8    | WISCONSIN ALUMNI RESEARCH FOUNDATION                         | 361                              |
| 9    | UNIVERSITY OF MICHIGAN                                       | 293                              |
| 10   | COLUMBIA UNIVERSITY                                          | 266                              |
| 11   | BATTELLE MEMORIAL INSTITUTE                                  | 257                              |
| 12   | CORNELL RESEARCH FOUNDATION INC.                             | 235                              |
| 13   | PENN STATE RESEARCH FOUNDATION, INC.                         | 220                              |
| 14   | RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK          | 215                              |
| 15   | UNIVERSITY OF WASHINGTON                                     | 209                              |
| 16   | MICHIGAN STATE UNIVERSITY                                    | 205                              |
| 17   | UNIVERSITY OF MINNESOTA, THE REGENTS OF                      | 200                              |
| 18   | DUKE UNIVERSITY INC.                                         | 188                              |
| 19   | UNIVERSITY OF ILLINOIS                                       | 187                              |
| 20   | GEORGIA TECH RESEARCH CORP.                                  | 184                              |
| 21   | UNIVERSITY OF PENNSYLVANIA                                   | 184                              |
| 22   | UNIVERSITY OF FLORIDA BOARD OF REGENTS                       | 170                              |
| 23   | NORTH CAROLINA STATE UNIVERSITY                              | 167                              |
| 24   | THE SCRIPPS RESEARCH INSTITUTE                               | 165                              |
| 25   | SOUTHWEST RESEARCH INSTITUTE                                 | 155                              |
| 40   | TEXAS A&M UNIVERSITY SYSTEM                                  | 116                              |
| 59   | BAYLOR COLLEGE OF MEDICINE                                   | 81                               |
| 120  | TEXAS TECH UNIVERSITY                                        | 24                               |

Note: Texas organizations highlighted.

Source: Prof. Michael E. Porter, Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School; Richard Bryden, Project Director.

# Regions in the Texas Economy

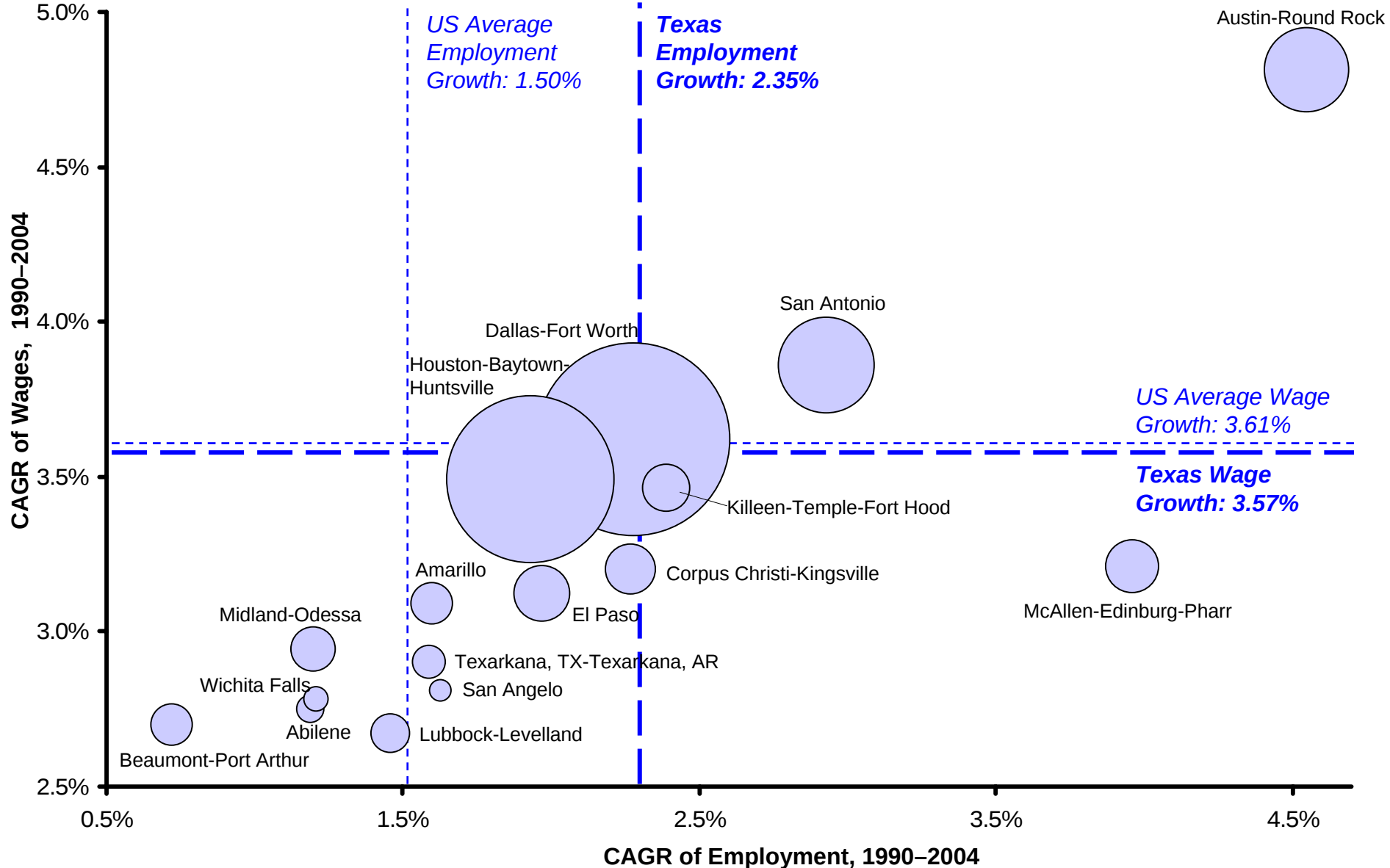
## Comparative Wage Performance of Economic Areas



Data: private, non-agricultural employment. Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

# Regions in the Texas Economy

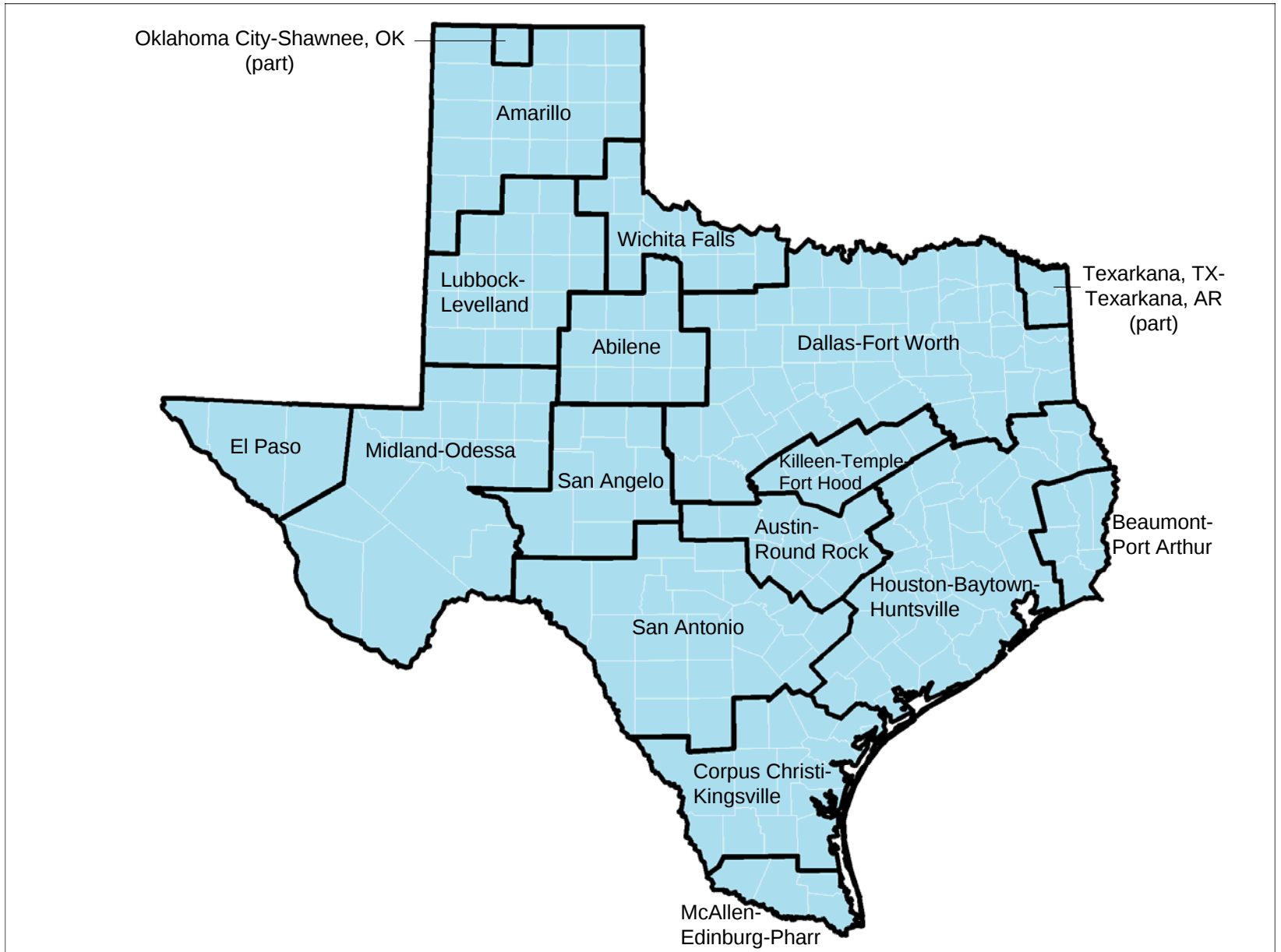
## Comparative Employment Performance of Economic Areas



Data: private, non-agricultural employment. Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

# Texas

## Economic Areas



# Texas Economic Development Strategy

## Cluster Initiatives

Advanced  
Technologies and  
Manufacturing

Aerospace and  
Defense

Biotechnology and  
Life Sciences

- Nanotechnology and Materials
- Micro-electromechanical Systems
- Semiconductor Manufacturing
- Automotive Manufacturing

Information  
Technology and  
Computer  
Technology

Energy

Petroleum  
Refining and  
Chemical Products

- Communications Equipment
- Computing Equipment and Semiconductors
- Information Technology

- Oil and Gas Production
- Power Generation and Transmission
- Manufactured Energy Systems

## Financing Mechanism

Emerging Technology Fund

## Cross-Cutting Initiatives

Business Climate

Education

Workforce

# Texas Economic Development Strategy

## Next Steps

- Refine **cluster definitions**

# Texas Economic Development Strategy

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- Widen the **range of participating clusters**

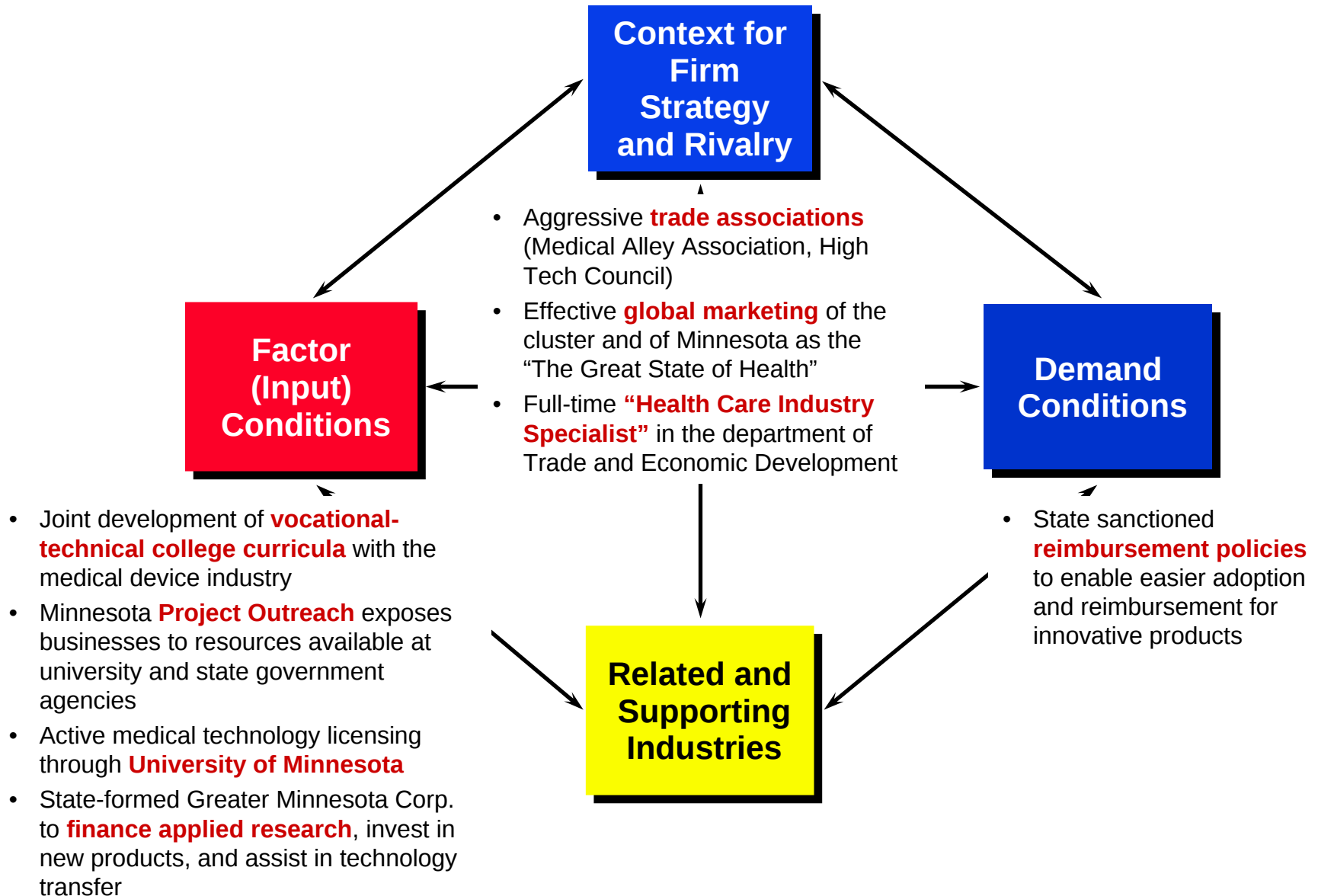
# Texas Economic Development Strategy

## Next Steps

- Refine **cluster definitions**
- Widen the **range of participating clusters**
- **Activate** and **institutionalize** the cluster development process
  - Upgrade institutions for collaboration
  - Matching funds for action plans
  - Organization of Department of Economic Development and Tourism

# Public / Private Cooperation in Cluster Upgrading

## Minnesota's Medical Device Cluster

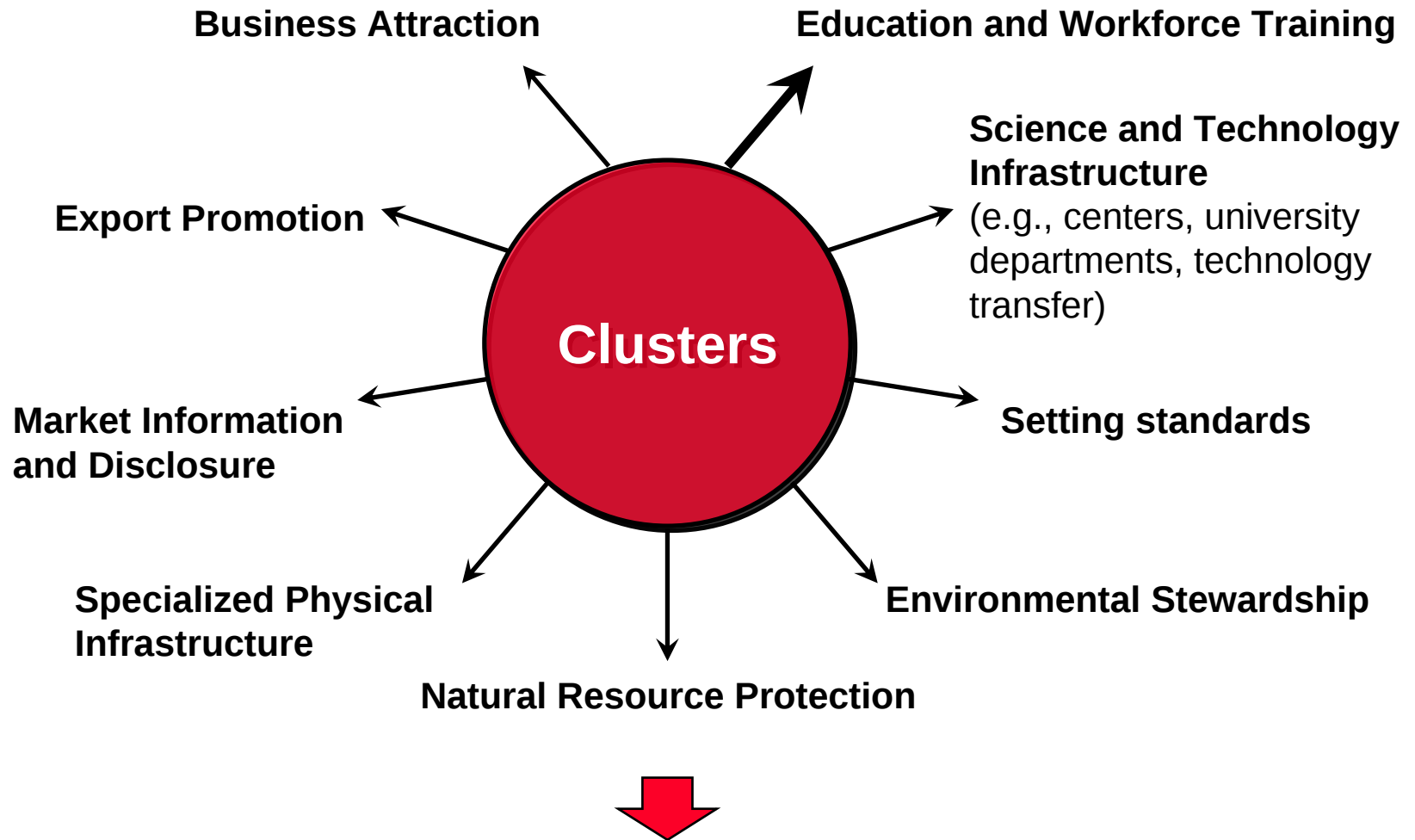


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- Focus **public policy** implementation around clusters

# Clusters and Public Policy



- Clusters provide a framework for **organizing the implementation** of public policy and public investments towards economic development

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- Drive economic development to the regional level
- Create an explicit strategy for addressing **economically distressed urban and rural communities**

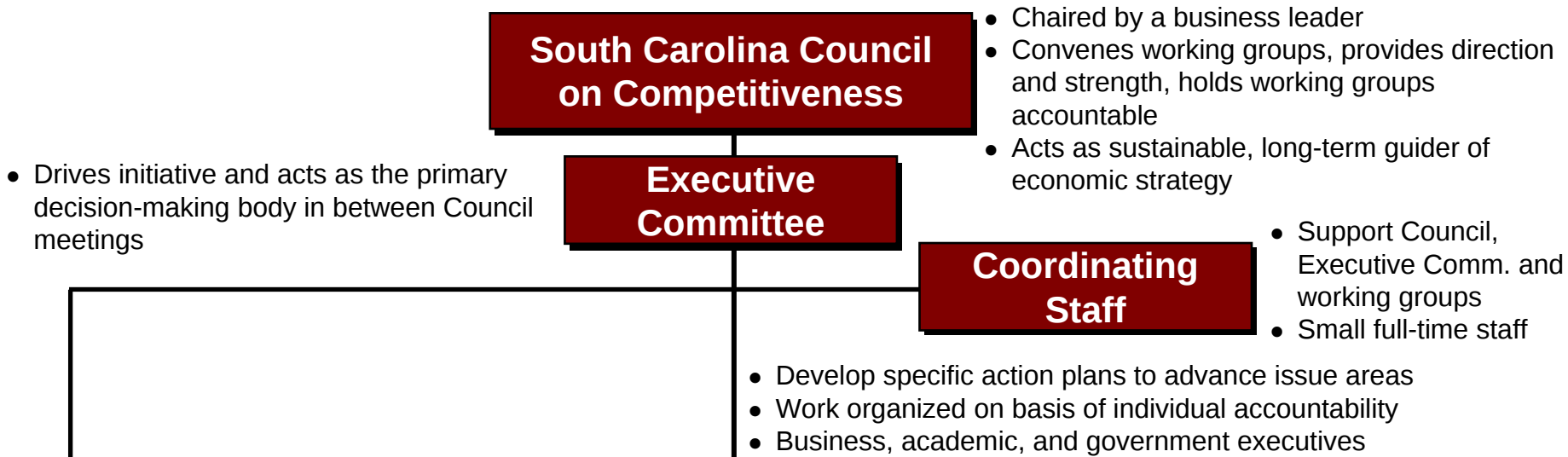
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- Drive economic development to the regional level
- Create an explicit strategy for addressing **economically distressed urban and rural communities**
- Create an overall **organizational structure** for economic development
  - Public-private collaboration
  - Coordinating mechanism for state agencies

# Organizing to Compete

## South Carolina Council on Competitiveness



### To Be Formed

New  
Institutions

Marketing

Others as  
Needed

### Cluster Committees

Automotives

Apparel

Hydrogen /  
Fuel Cells

Agriculture

Textiles

Travel and  
Tourism

### Task Forces

Cluster  
Activation

Education /  
Workforce

Research /  
Investment

Start-ups /  
Local Firms

Distressed /  
Disadvan.  
Areas

Measuring  
Progress

Note: As of 01/05

# Organizing to Compete

## Massachusetts Governor's Council

### **Governor's Council on Economic Growth and Technology**

#### **Industry Cluster Committees**

- Advanced Materials
- Biotechnology and Pharmaceuticals
- Defense
- Marine Science and Technology
- Medical Devices
- Software
- Telecommunications
- Textiles
- Information Technology

#### **Functional Task Forces**

- International Trade
- Marketing Massachusetts
- Tax Policy and Capital Formation
- Technology Policy and Defense Conversion

#### **Issue Groups**

- Cost of Doing Business
- Financing Emerging Companies
- Health Care
- Western Massachusetts
- Business Climate
- Competitive Benchmarking