
Advantages of the Industry Cluster Approach to Economic Development

October 28, 2003

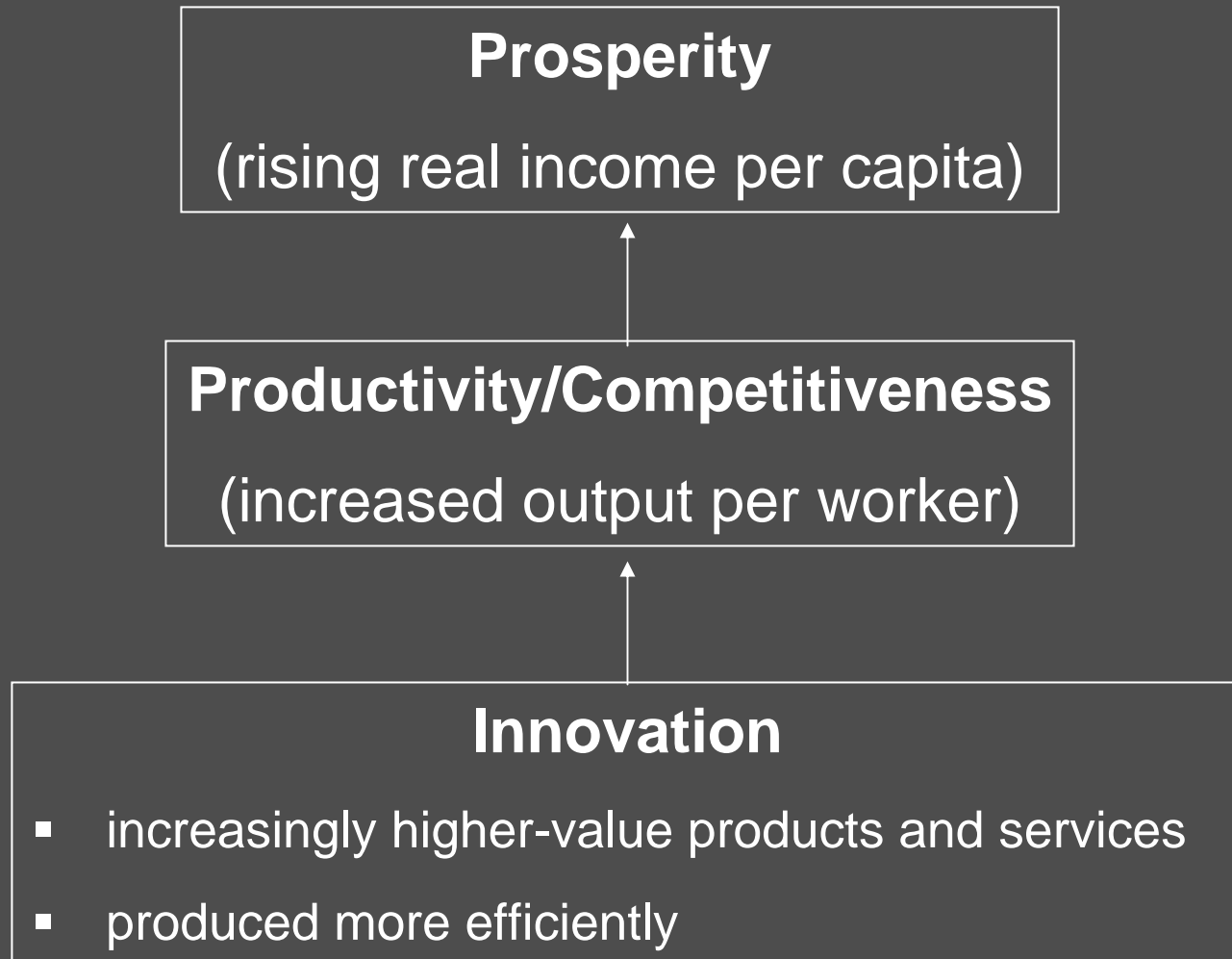
Mary Jo Waits
Morrison Institute for Public Policy
Arizona State University

Why New Approach to Economic Development

Key messages:

- Be more strategic / be a more intelligent player
- Old ways of analyzing the economy are not enough anymore
- Location still matters—but for different reasons

Competing on Innovation



New Ways of Analyzing the Economy

Industrial Economy

New Economy

Raw
Materials

Natural resources,
labor, capital

Ideas, knowledge

Enablers

Mass production

Internet, information, and
communications technologies

Organization

Large corporations,
economies of scale

Entrepreneurs, small scale, free
agents, networks

Success
Factors

Quantity, low
cost, stability,
control

Speed, innovation, flexibility,
customization

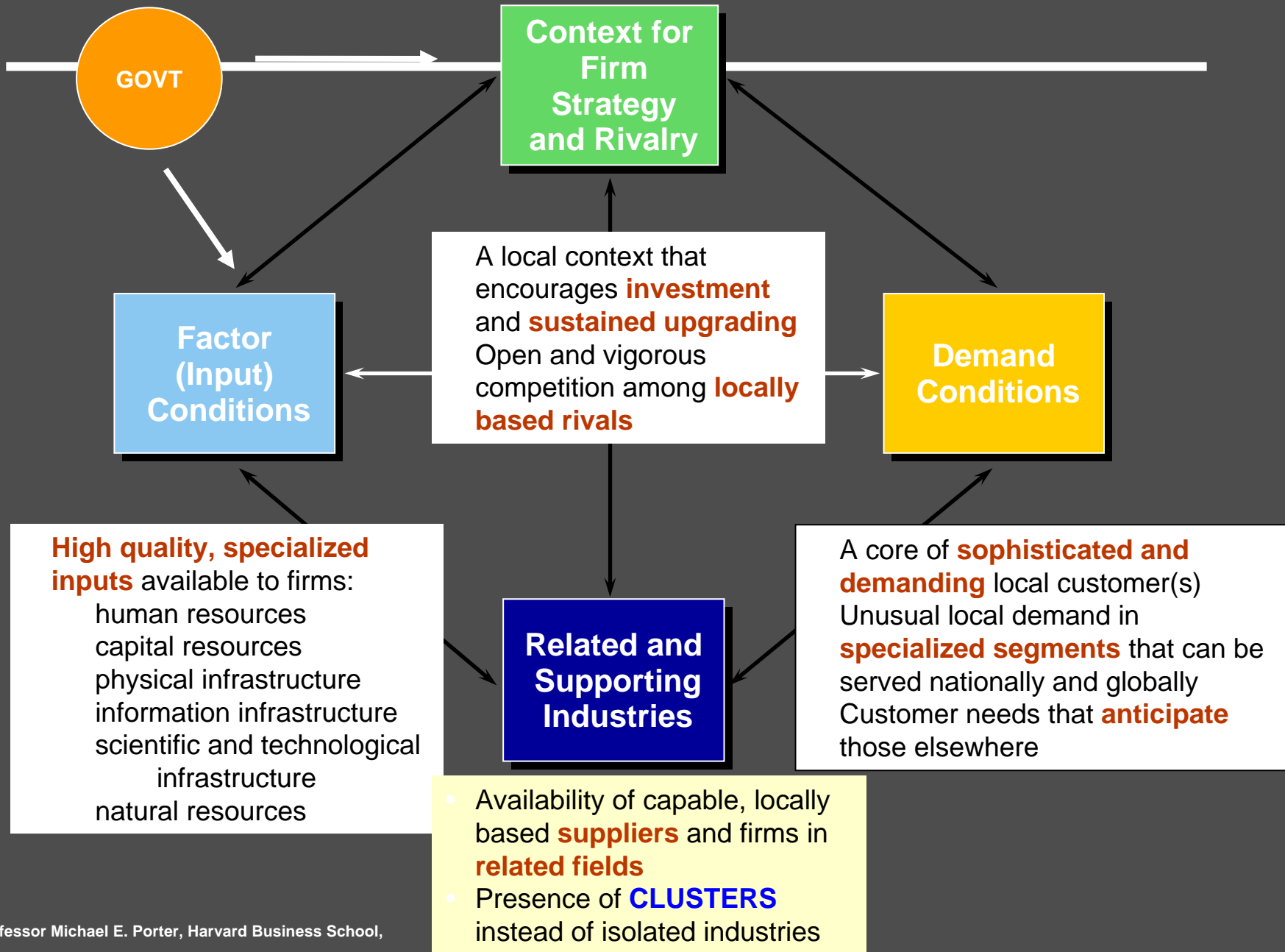
Place Still Matters — But for Different Reasons

“The enduring competitive advantages in a global economy lie increasingly in local things—**knowledge, relationships, motivation**—that distant rivals cannot match.”

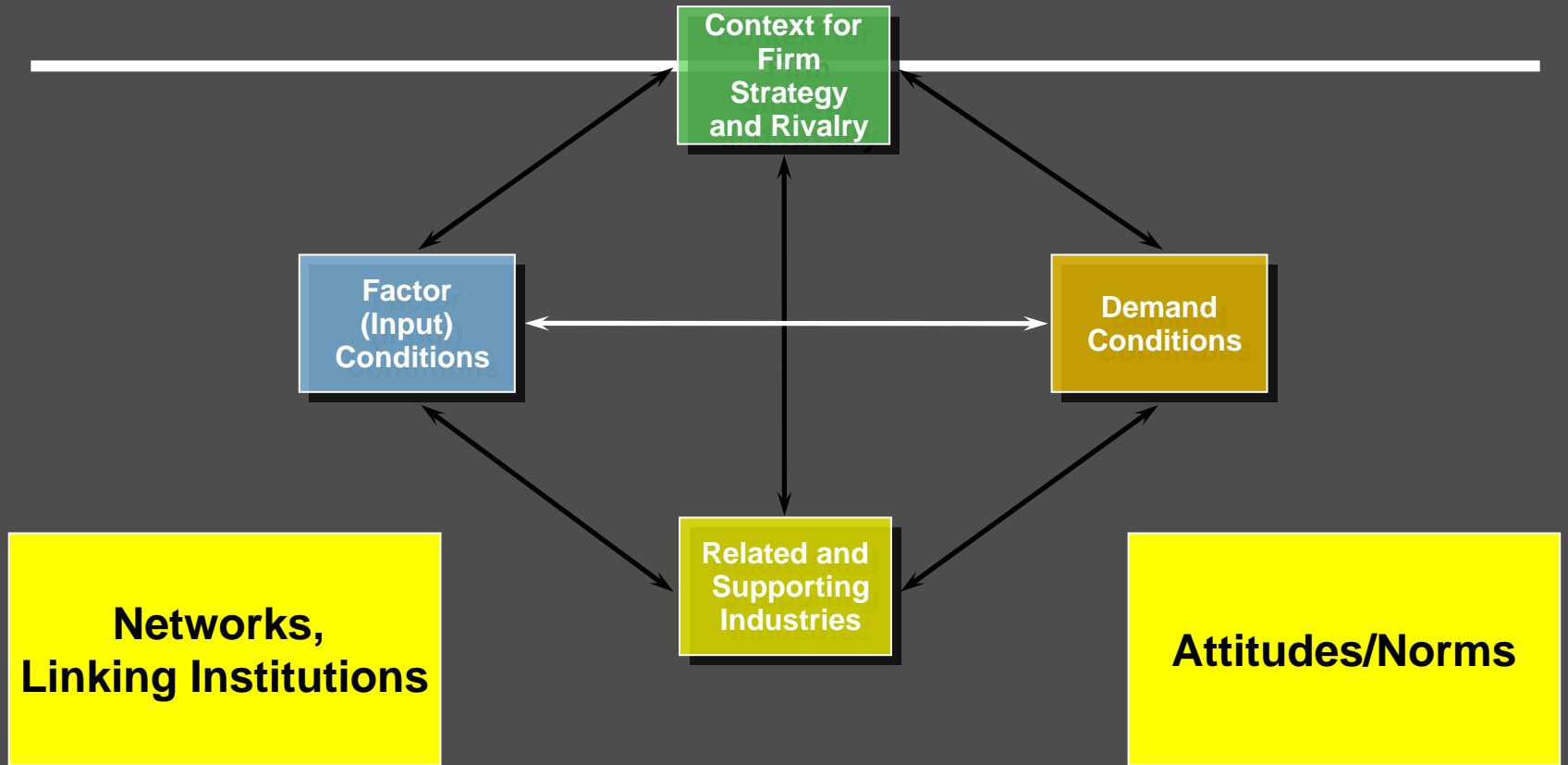
“This role of location has been long overlooked, despite striking evidence that innovation and competitive success in so many fields are geographically concentrated.”

Michael Porter

Enabling Innovation: The Regional Competitive Environment



Enabling Innovation: The Regional Competitive Environment



Formal and informal networks that generate key relationships and foster innovation:
Associations, Chambers, Tech Transfer Offices

Attitudes that support innovation: willingness to partner, risk-taking, tolerance of diverse people and perspectives, openness to new ideas

What's So Good About Clusters?

- **Increase Efficiency**
 - Efficient access to information, specialized inputs and employees, institutions, and “public goods”
 - Easier to achieve complementarities across businesses
- **Spur Innovation**
 - Improved ability to perceive and respond to innovation opportunities
 - More rapid diffusion of improvements
- **Facilitate New Business Formation**
 - Easier to identify opportunities for new businesses
 - Lowers barriers to entry (including perceived risk)

Experience using industry clusters

as...

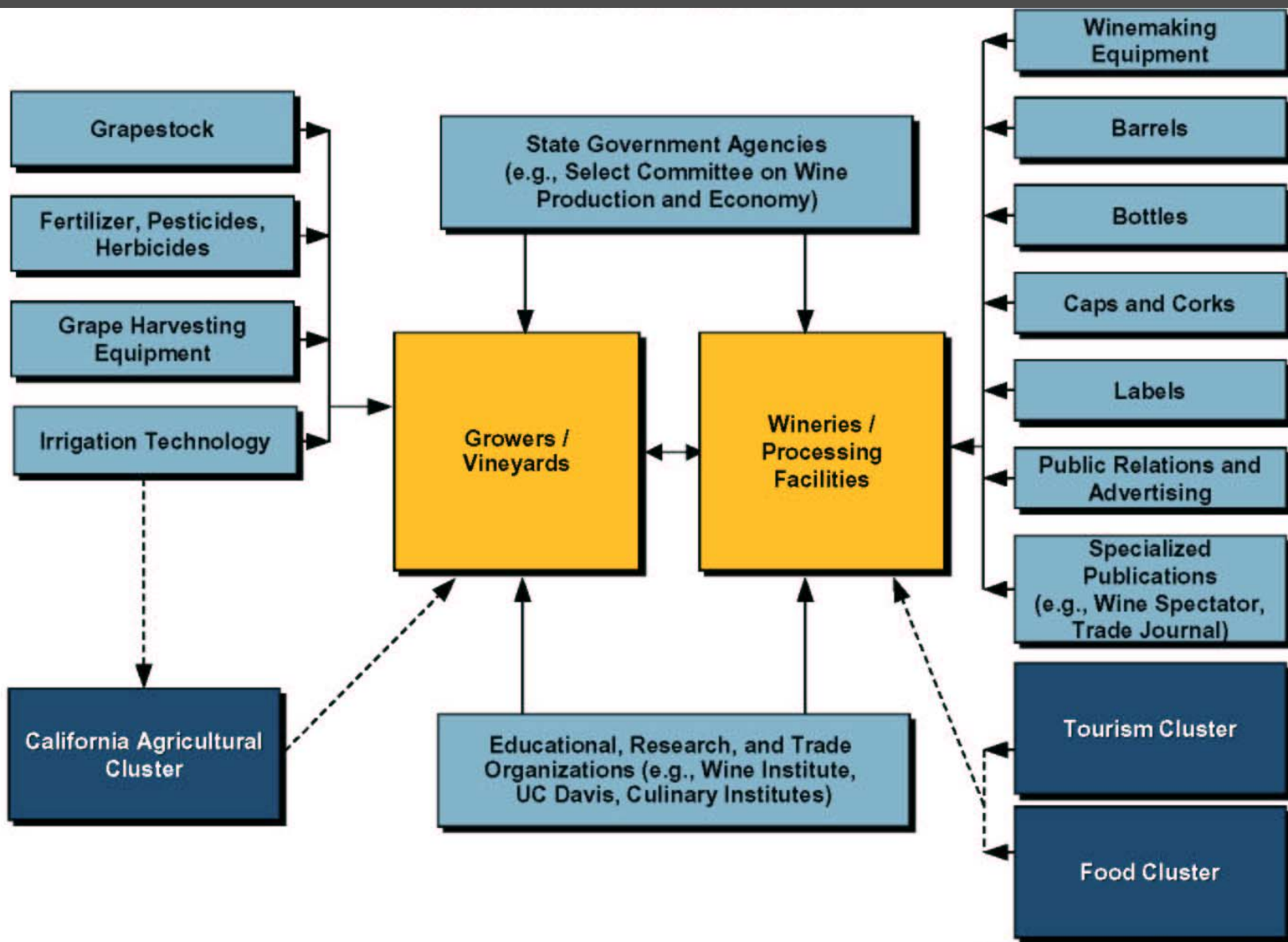
- **an analytical tool** (e.g., to better understand the economy and deploy resources strategically);
- **an organizational tool** (e.g., to engage industry leaders in a regional strategy and foster communication networking and improvement among companies); and
- **a service delivery tool** (e.g., to provide high-value specialized services)

Industry Clusters as an Analytical Tool

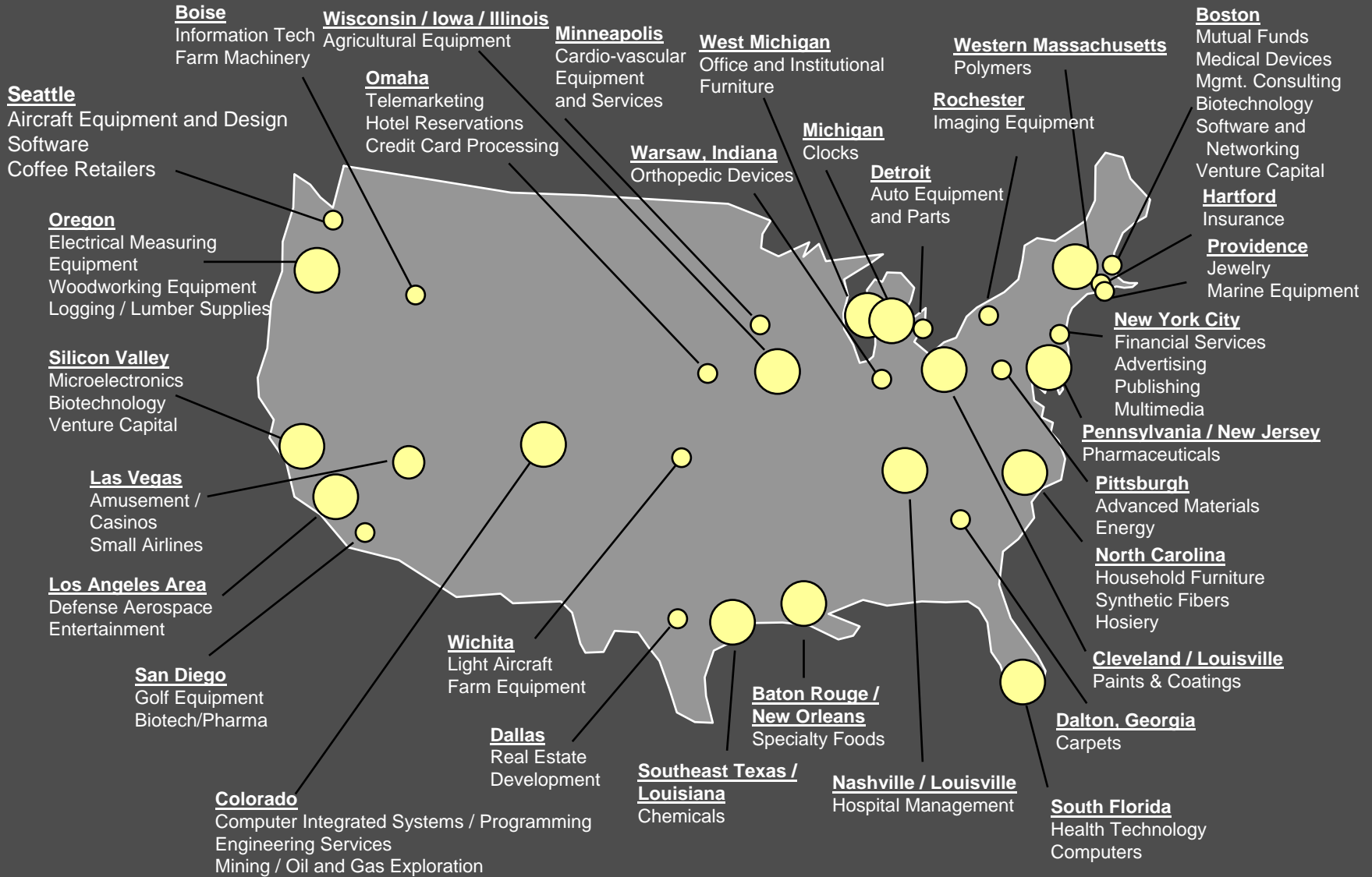
What is a Cluster?

A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field

The California Wine Cluster



Where Are Clusters? Everywhere...



Which Type of Clusters Matter Most?

	Traded Clusters	Local Clusters	Natural Resource-Driven Industries
Share of Employment	32.1%	67.1%	0.8%
Employment Growth, 1993 to 1999	2.5%	2.8%	-0.1%
Average Wage	\$41,678	\$26,049	\$31,264
Relative Wage	134.0	83.8	100.5
Wage Growth	5.0%	3.8%	2.5%
Relative Productivity	144.1	79.3	139.5
Patents per 10,000 Employees	20.48	1.38	6.40
Number of SIC Industries	592	241	46

Note: 1999 data, except relative productivity which is 1997 data, Patents data which is 1998 data.

Source: Harvard Institute on Strategy & Competitiveness, Cluster Mapping Project ,

Identifying Industry Clusters

Export Oriented:

Many of the companies in the cluster sell products or services to companies outside the region.

Concentration:

Employment in the cluster is more concentrated in the region than the national average, and the cluster is an existing or emerging area of specialization.

Business Interdependence:

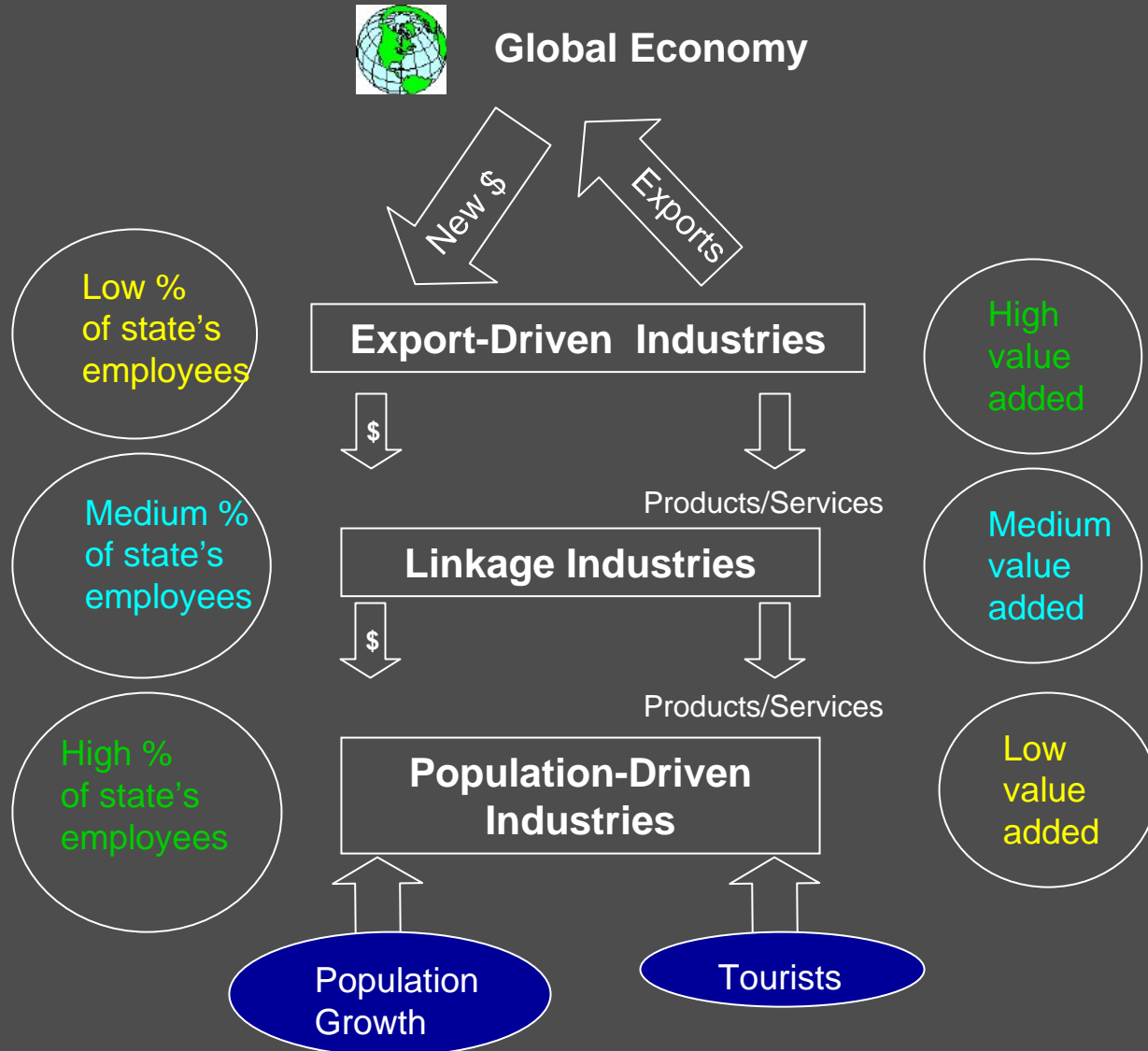
Businesses relate to each other through the buyer-supplier "food chain," as competitors, or as partners.

Significant Size or Rapid Growth:

The cluster is of a significant size or, if new, has an above average growth rate compared to that of the U.S. as a whole.

Assessing Strengths

Creating Wealth

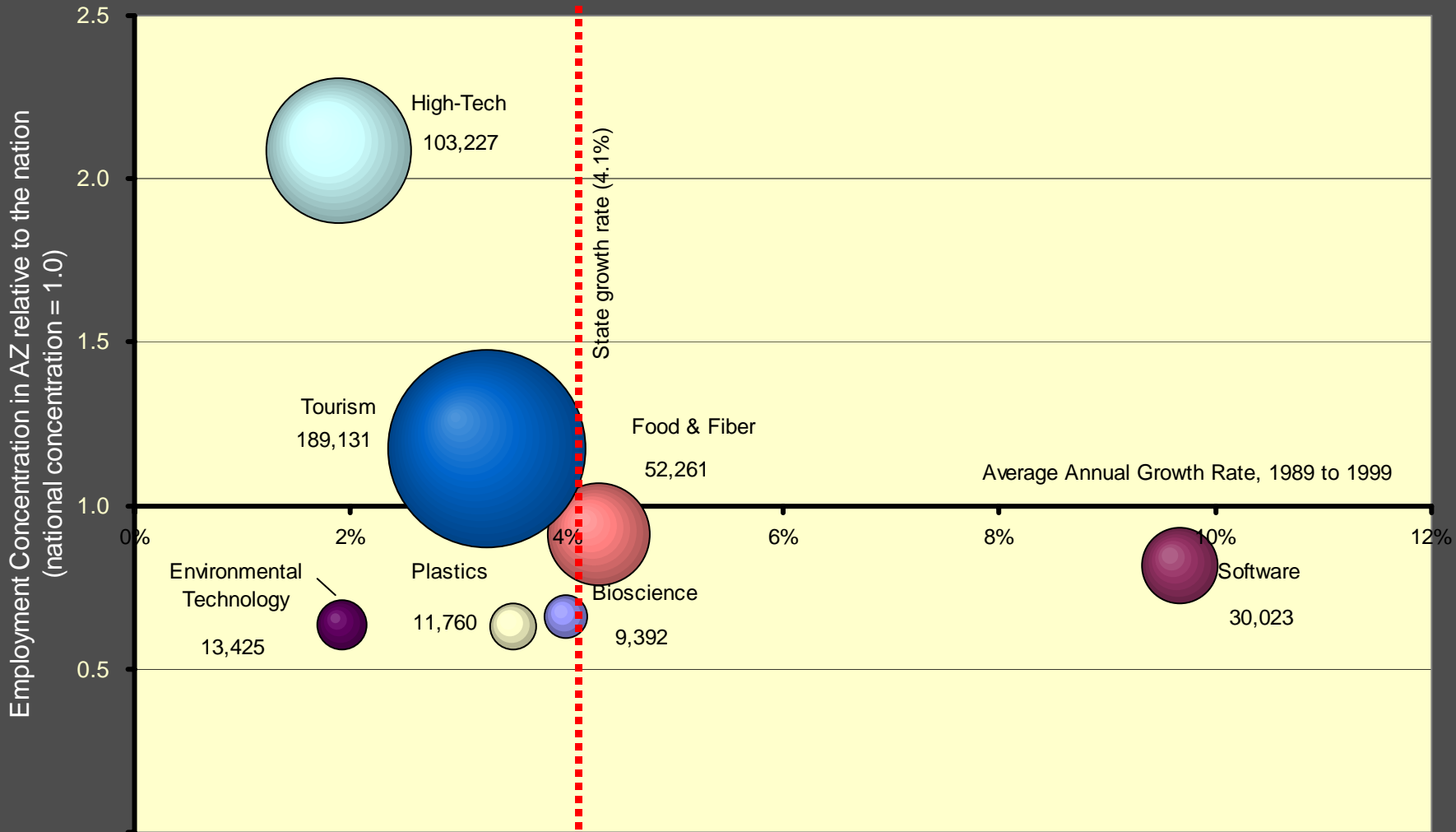


Knowledge Industry Employment Concentrations

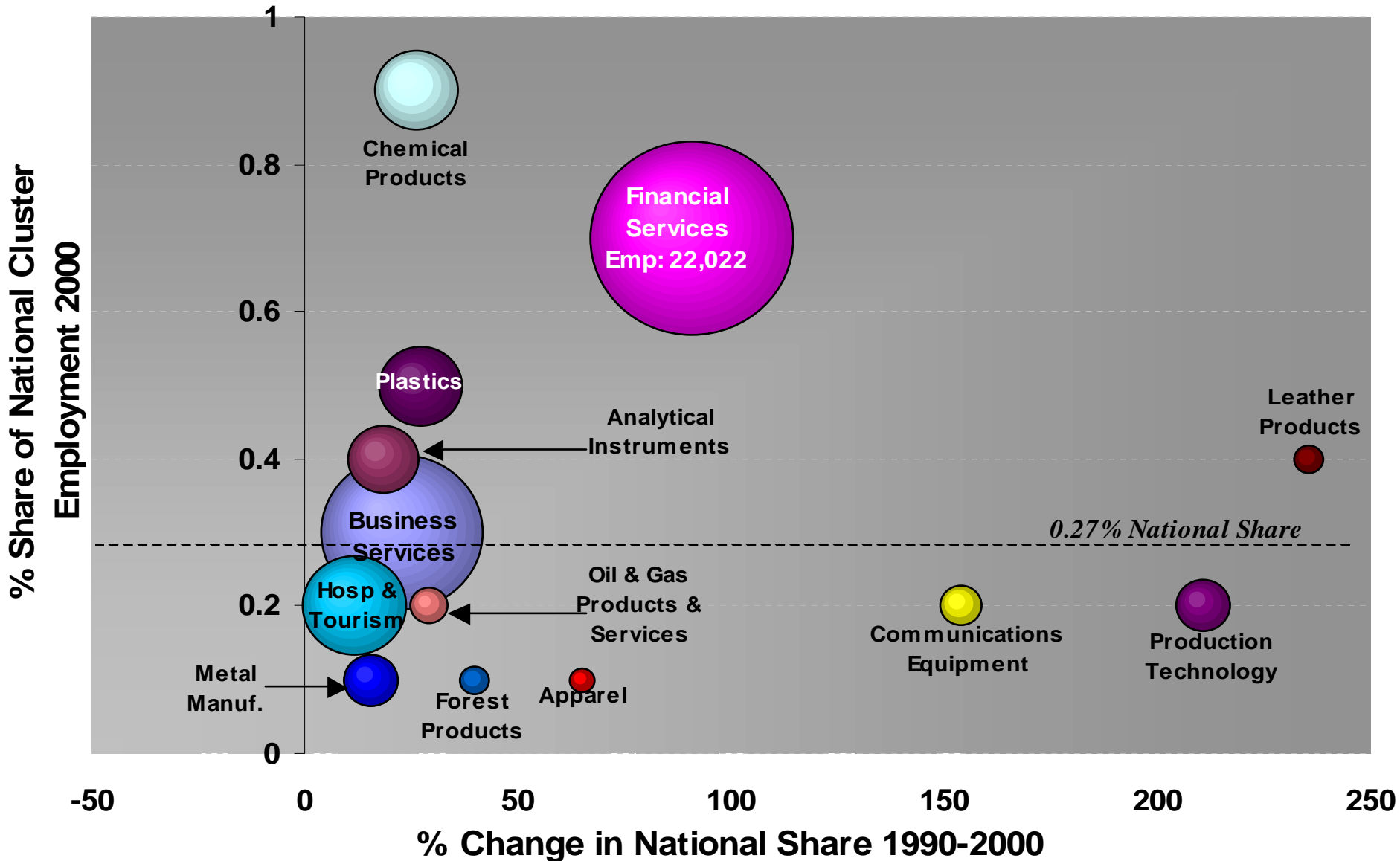
State	Software/ Communication Services	Computer/ Electronics	HealthCare Technology	Innovation Services	Financial Services	No. of Clusters above 1.1
AZ	0.87	1.96	0.59	0.97	0.79	1
CA	1.32	2.15	1.50	1.21	0.93	4
CO	1.84	1.90	1.22	1.39	0.99	4
FL	0.93	0.75	0.96	0.91	0.96	0
IL	0.89	0.94	1.02	1.01	1.23	1
MA	1.51	2.14	1.97	1.63	1.67	5
MI	0.73	0.24	0.78	1.06	0.74	0
MN	0.90	1.82	1.39	0.65	1.13	3
NC	0.67	0.66	0.99	0.59	0.58	0
NJ	1.61	0.64	2.25	1.13	1.39	4
NY	0.99	0.76	1.12	1.02	1.85	2
PA	0.80	0.65	1.07	1.24	1.10	2
TX	1.12	1.28	0.71	1.11	0.85	3
WA	1.04	0.89	0.76	1.09	0.83	0

Source: Index of the Massachusetts Innovation Economy, 1998.

Key Arizona clusters by employment size, concentration and growth, 1989-1999

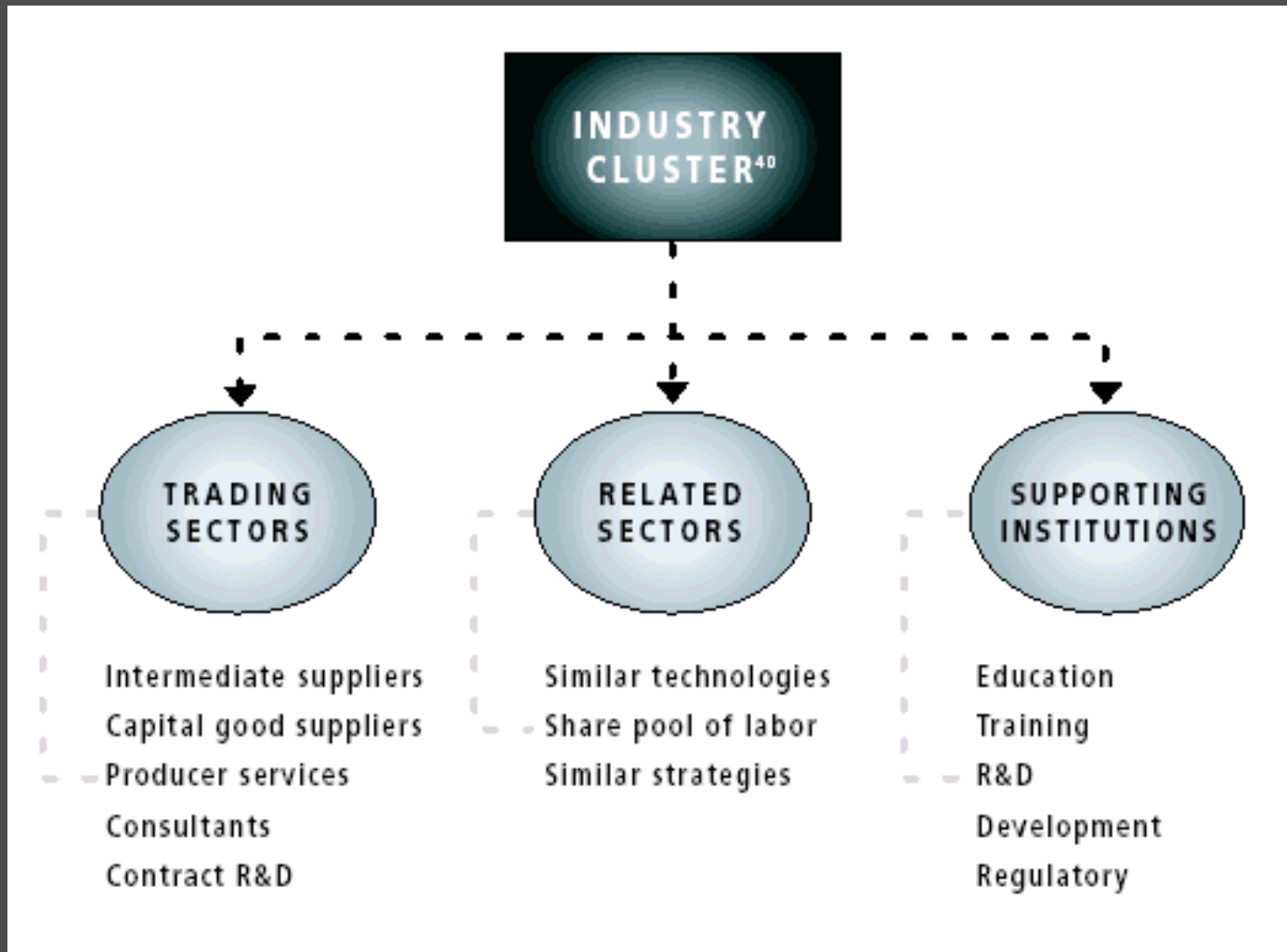


Wilmington MSA: Specialization by Traded Cluster



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

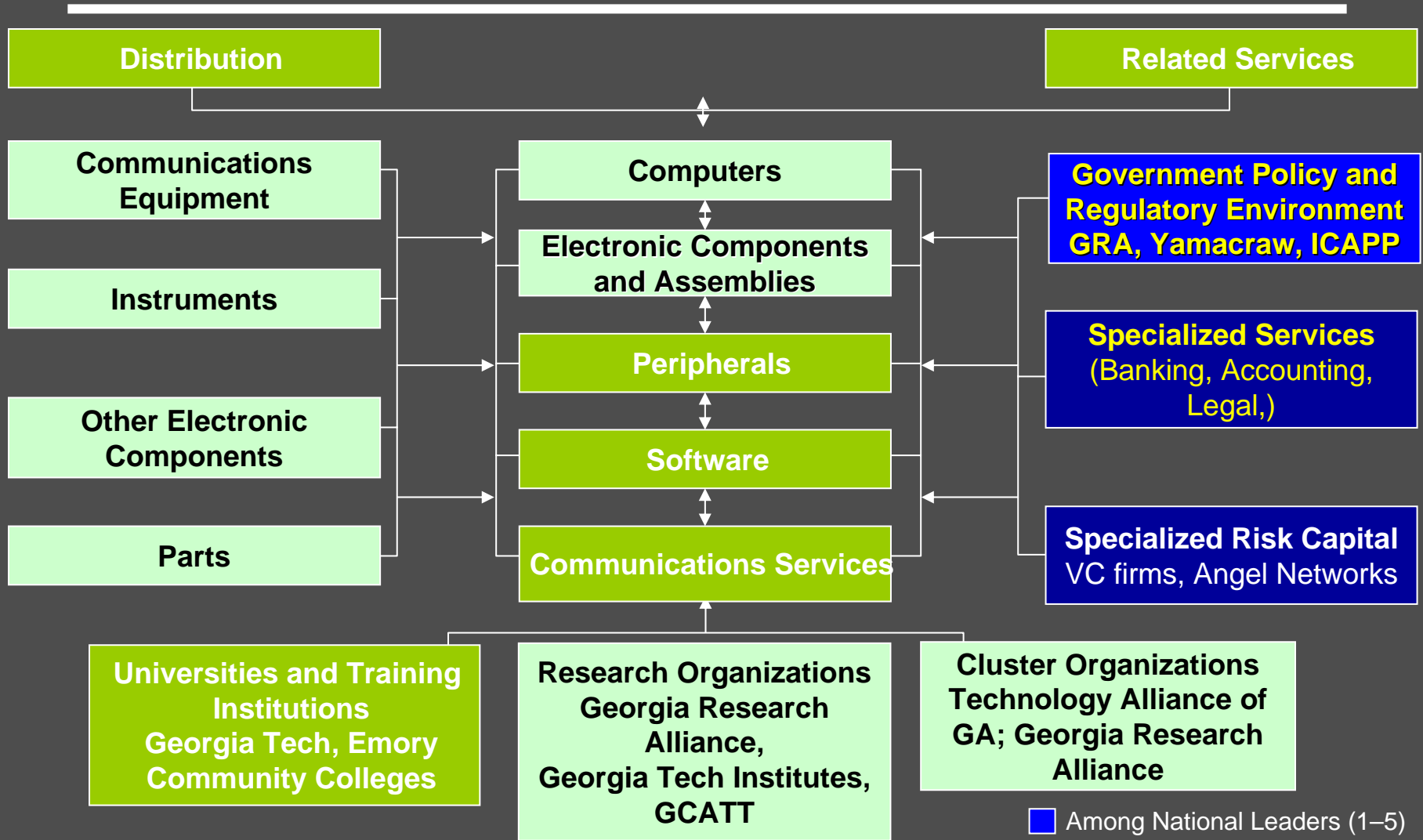
Cluster Membership: More Art than Science



Source: *Strategic Planning in the Technology-Driven World*

What Does a Cluster Look Like?

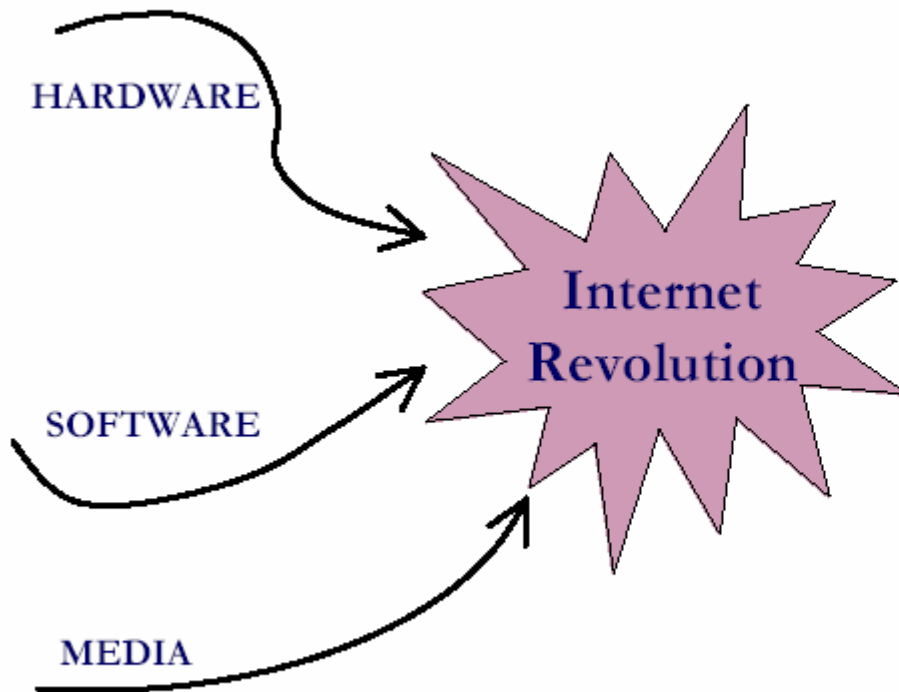
Atlanta Information Technology Cluster



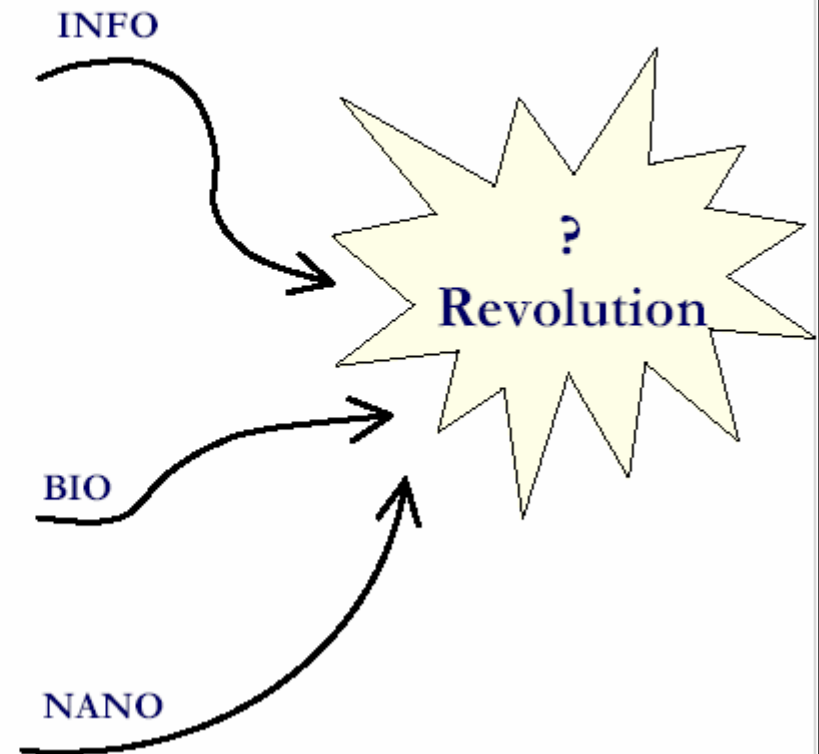
- Among National Leaders (1–5)
- Competitive (6–20)
- Position Established (21–40)
- Less Developed (41+)

Next Wave May Be A Convergence

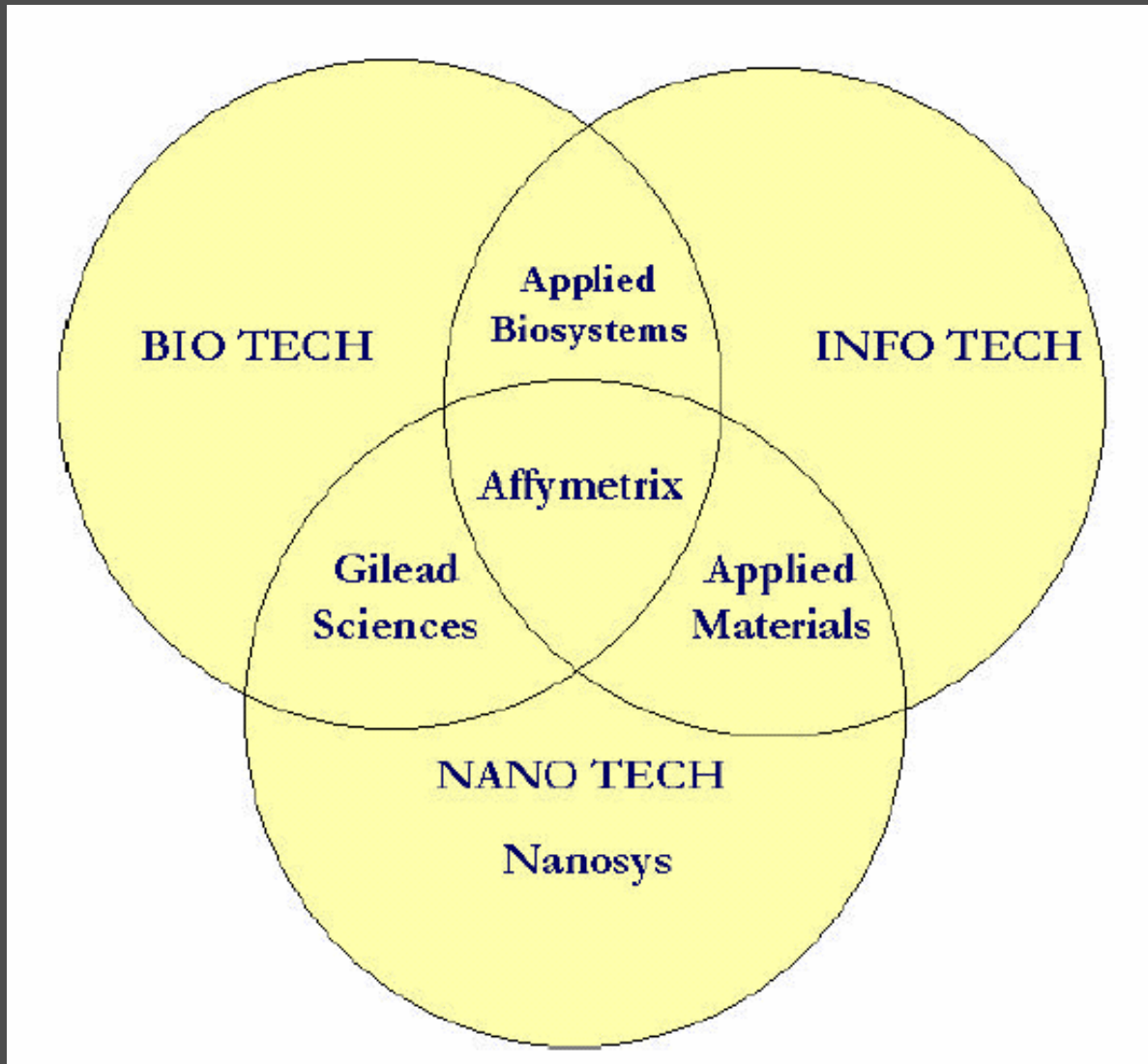
1990s Convergence



Next Convergence



Examples of Convergence

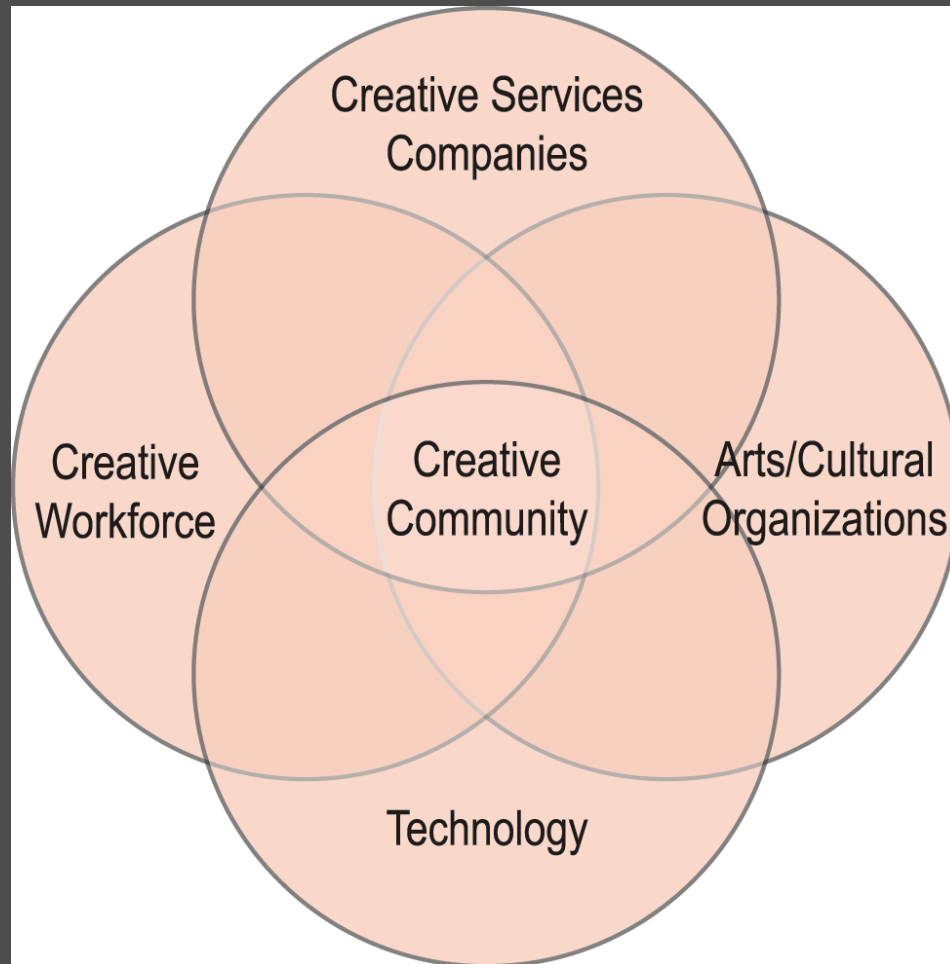


Creative/Innovation Services

Rely heavily on human capital, talent and creativity

- Advertising agencies
- Architectural services
- Business associations
- Colleges and universities
- Commercial art and graphic design
- Commercial nonphysical research
- Commercial photography
- Engineering services
- Software
- Legal services
- Management consulting services
- Management services
- Multimedia
- Outdoor advertising services
- Theatrical producers and services
- Professional membership organizations
- Public relations services

Creativity of all Sorts



Industry Clusters as an Organizational Tool

Mapping Clusters Helps Identify Key Stakeholders in a Cluster's Success

Cluster/Potential Cluster _____

Export-Oriented Sectors

--	--	--

Support Sectors

--	--	--	--

Community Infrastructure

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Charge to Each Cluster

- Catalogue the key components of the cluster
- Articulate an achievable vision of what the cluster can become over the next 10-20 years
- Identify opportunities for growing the cluster in the desired direction by expanding existing companies and attracting outside companies
- Identify opportunities for more synergy within the cluster
- Identify needs for specific economic foundations and proposed strategies

Continuum of collaborative activity

Jointly inform

newsletters, electronic links, cluster directories

Jointly learn

seminars, conferences, training

Jointly market

strategic plans for exports, cluster brochures

Jointly purchase

buyer-supplier linkages

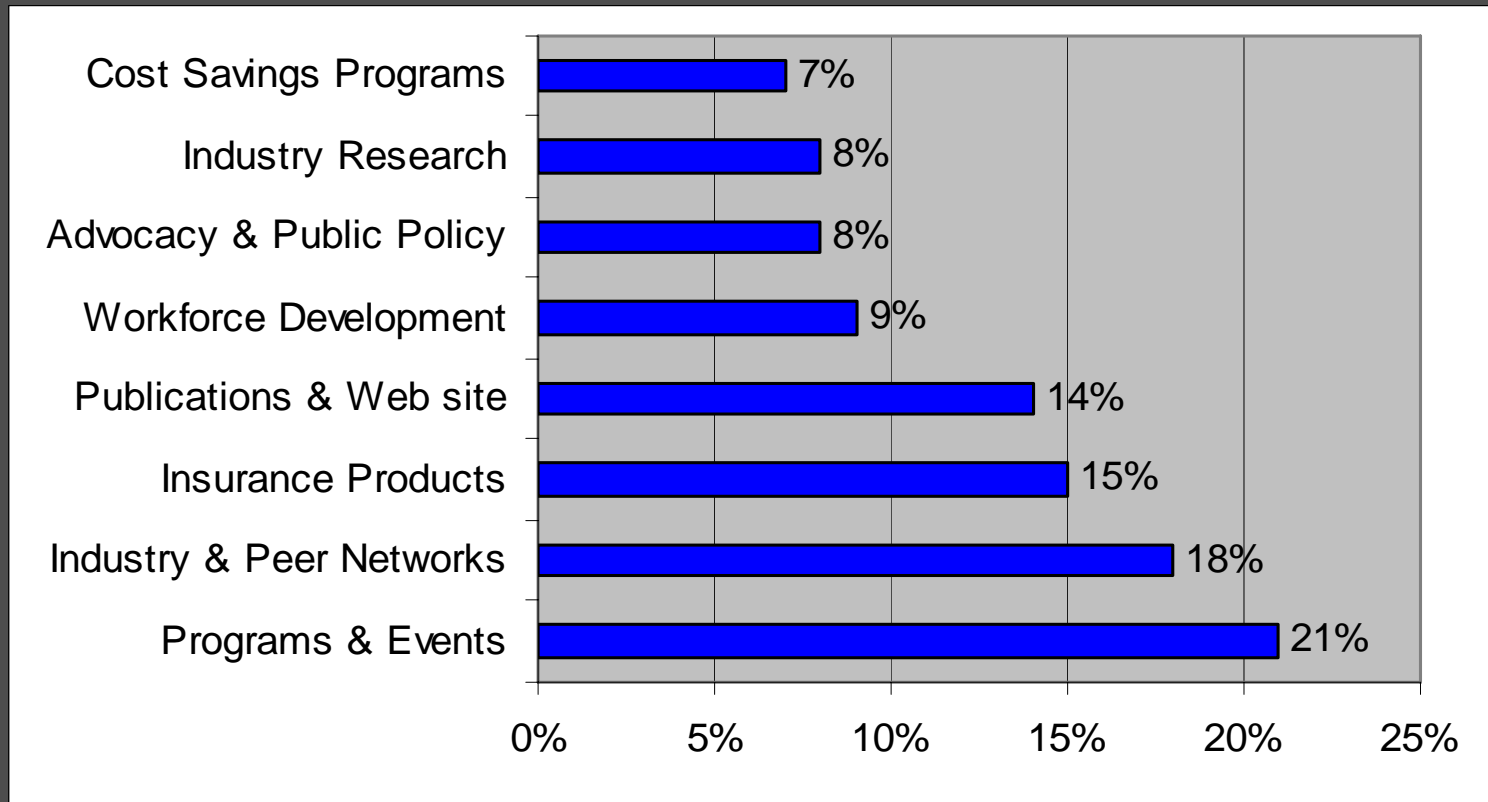
Jointly produce

bid on projects, joint ventures, federal labs

Jointly build economic foundations

centers of excellence, telecom, tech transfer,

Members Define Their Needs



*Percentage of survey respondents picking the service offerings listed above as “most important” to their business.

Power of Collaboration: Optics Cluster Example

- Identify critical mass

optical components; optical design software; lasers for medical, industrial and graphics application; optical telescopes; digital electronic camera; and U of A programs

- formed association-AZ Optics Industry Ass'n
- state and local recognition: “seat at the table”
- national recognition—*Business Week*: “Optics Valley”
- 4-year program to build exports
- joint ventures among optics firms
- joint ventures with other clusters
- workforce development: community colleges, school-to-work grant
- sales tax increase goes to U of A Optics research

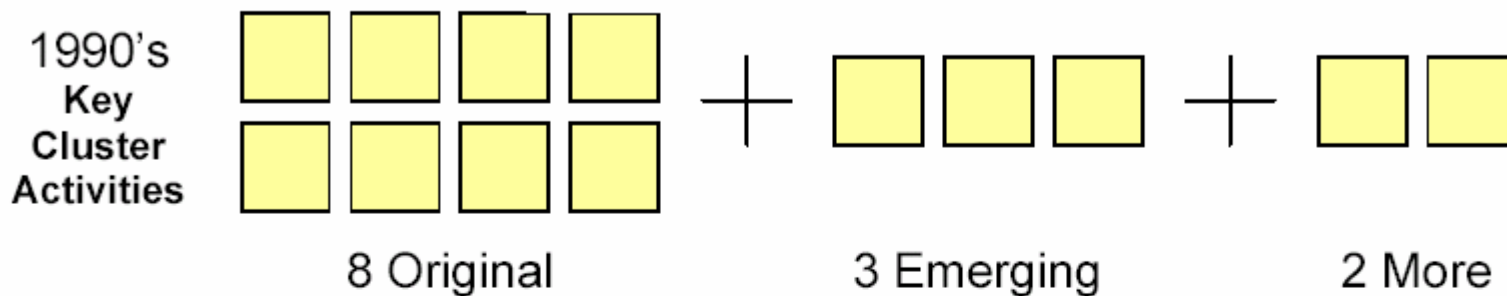
Power of Collaboration: High-Tech Clusters Example

- Major cities compete for “critical mass” identity
- Joint venture with Tempe to create “Tech Oasis” image
- Tech Tuesday- 500 to 700 young professionals
- ADOC, Greater Phoenix and Greater Tucson Councils assign staff by clusters
- Joint ventures to start Venture Capital Conference and Arizona Tech Incubator
- Joint ventures to change university patent policy
- Workforce development: community colleges, school-to-work grant
- Successful legislative agenda (IT training tax credit, cluster funds)
- Push for Governor’s Partnership for the New Economy
- Sales tax increase earmarked for university research & ed
- Two regional high-tech councils for cross-cluster initiatives

Evolving Organizations

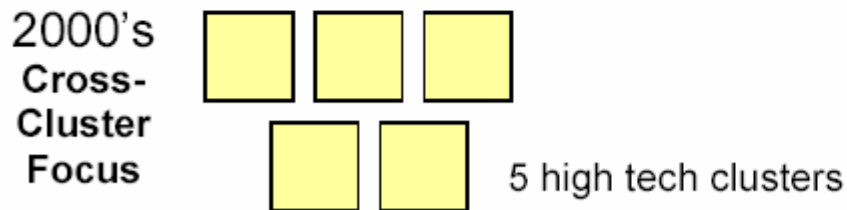
Governor's Strategic Partnership for
Economic Development

Cluster Organizations



Regional Councils

AZ Tech Industry Development Authority (ATIDA)



+
ED groups & Higher ED

Southern AZ Tech Council (SATC)



+
ED groups & Higher ED

Industry Clusters as a Service Delivery Tool

Traditional economic development

increasingly criticized for...

- not focusing on key goals
- not thinking strategically
- not being industry driven
- targeting individual firms
- not reaching enough firms to make a difference
- presenting a fragmented and confusing maze of programs and services
- not being accountable to private sector clients or public sector funders.

Shortcomings in current economic development system

- **One Shot**—with the top goals often being quantity over quality, program staff generally have only 1 or 2 interactions with a given company;
- **One Type**—most services are limited to relatively early-stage and generic assistance;
- **One-On-One**—staff deal with individual companies and assume that brochures and seminars are a way to achieve scale; and
- **One Sided**—programs often sustain only superficial relationships with business leaders, private organizations or other actors in the business development system.

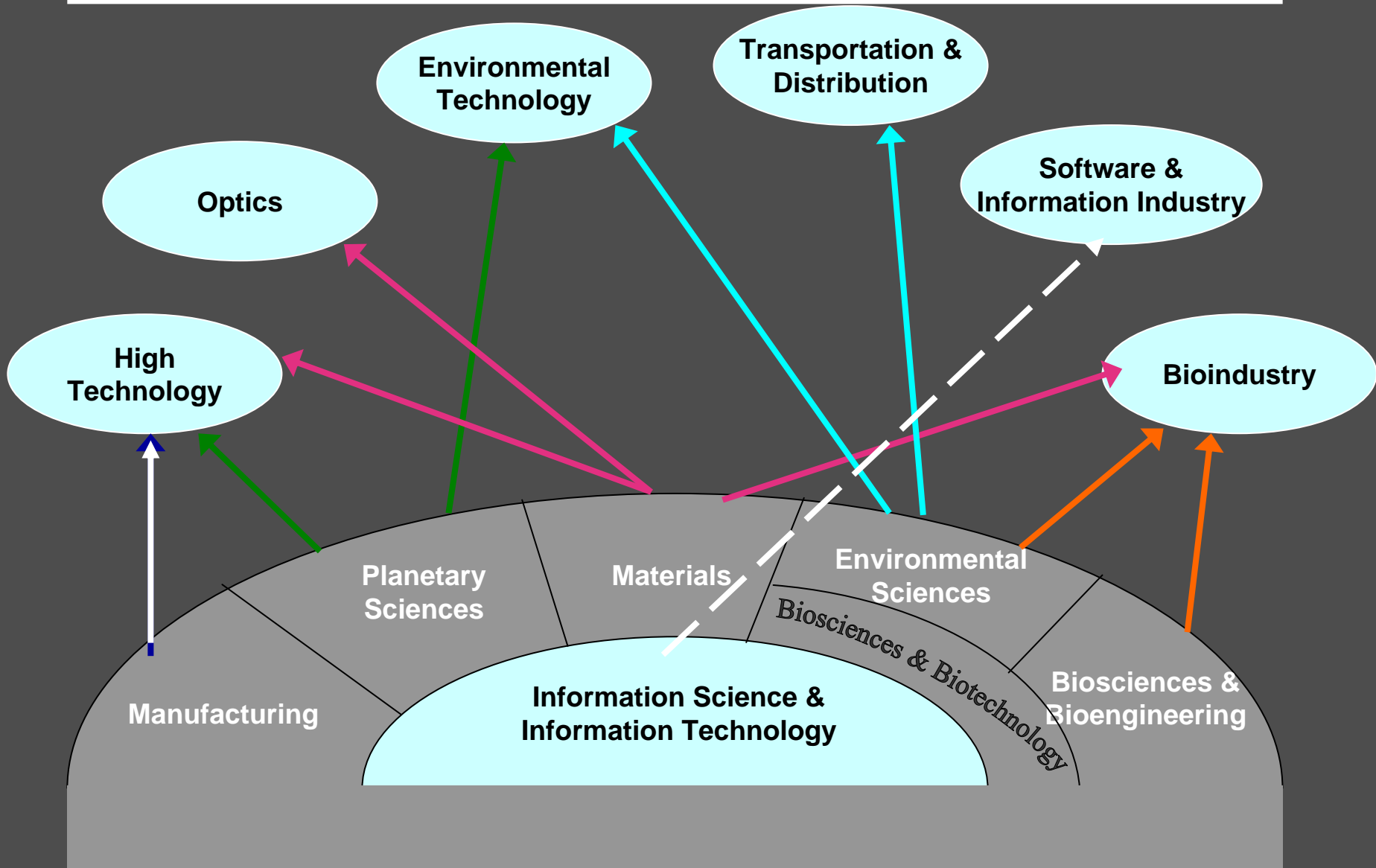
Clusters offer special opportunities to better provide assistance by:

- offering a “critical mass” of customers for consultants, education, and government
- formally incorporating businesses and trade associations in program design
- providing services tailored to industry
- facilitating firms collaborating to compete globally

Building Specialized Infrastructure

- **Georgia** creates Georgia Research Alliance, public/private partnership among the state, six public and private universities, and the business community, to build the state's knowledge base.
- **Michigan** uses tobacco settlement funds to boost 4 universities' capabilities in life sciences and create a "life sciences corridor."
- **California** creates 4 California Institutes for Science and Innovation .
- **Arizona** earmarks sales tax increase to provide \$ 1 billion over 20 years for 3 universities' research.

AZ's Industry Clusters and ASU Research



Priority Cluster Growth Targets

Greater Phoenix can join the top-tier in the identified clusters by striving toward the following targets:

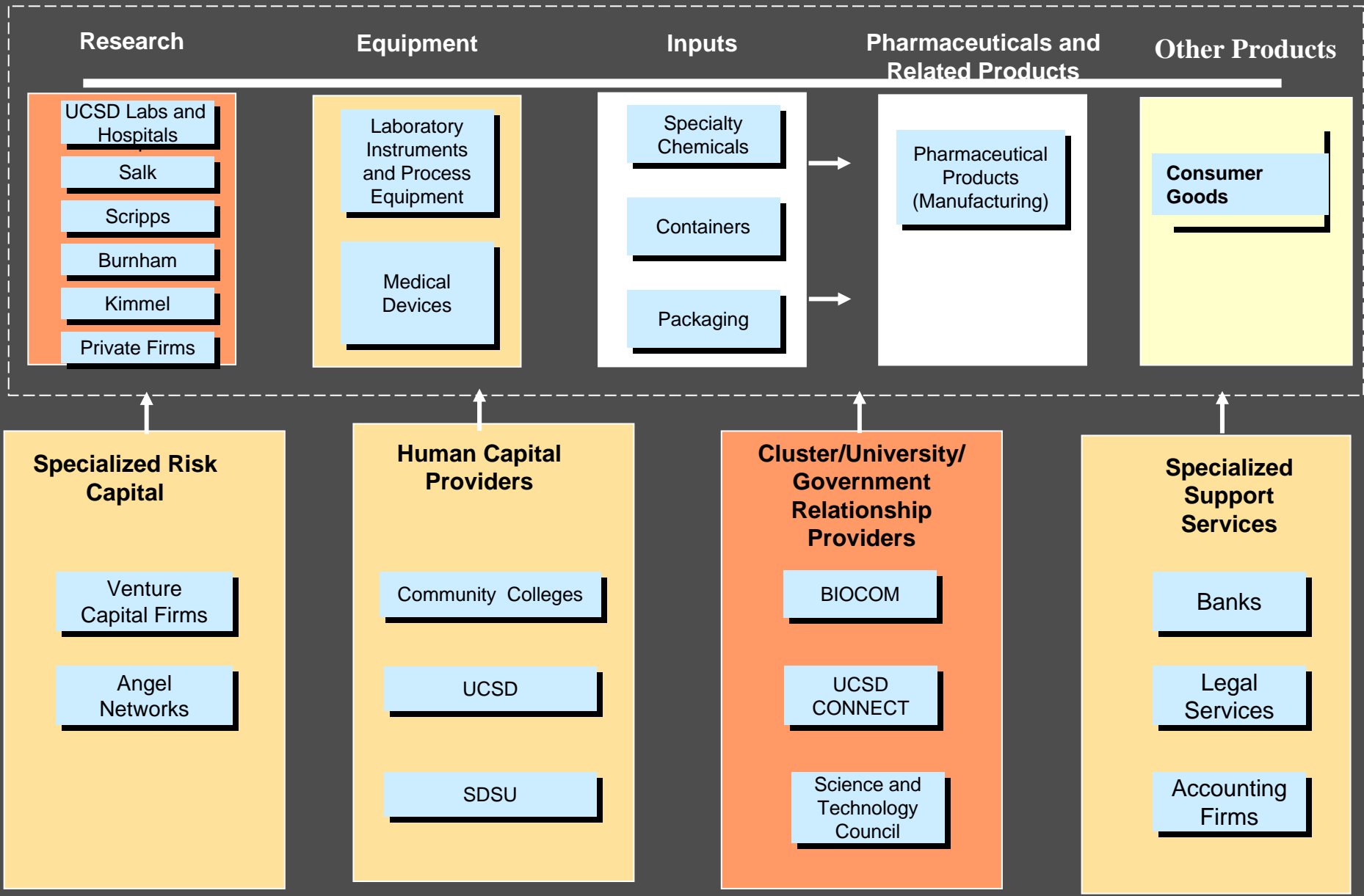
Aerospace	Maintain current employment concentration of 260% of national concentration.	12,300 net new jobs
Bio-industry	Grow to the current US level of concentration.	12,900 net new jobs
Advanced Financial & Business Services	Maintain concentration of 140% of the current US concentration in high wage segments.	27,700 net new jobs
High-technology	Return to 1990 concentration of 220% of the US level (increasing concentration in higher-wage sectors of the cluster)	20,500 net new jobs
Software	Build concentration to 120% of the current US concentration.	32,500 net new jobs

How Do Clusters Develop?

- Initial (Natural) Resource Base
 - Pittsburgh's Steel
- Historical Legacy (Large Local Markets)
 - Chicago's food processing
- Luck/Serendipity
 - Galveston's Insurance
- Supportive Business/Regulatory Environment
 - Wilmington's Credit Cards
- Consciously Designed Initiatives
 - Research Triangle's Information Technology

Now, usually a mix of reasons...

San Diego Pharmaceuticals / Biotech Cluster



Source: Harvard Institute on Strategy & Competitiveness, Cluster Mapping Project, U. S. County Business Pattern Data; ontheFRONTIER interviews

National Leader
 Nationally Competitive
 Less Developed

Recent Success Stories: Maryland and San Diego and Factors of their Success

- Maryland and San Diego represent successful state and region building a bioscience research base and a critical mass of firms over past 12 -14 years.
- In 1991 Maryland had 53 firms employing 3,600; today it has 258 firms employing nearly 16,000 bioscience personnel.
- In 1990 San Diego had 11,000 employees working in the biosciences; today it has nearly 23,000 bioscience employees.
- Key lessons:
 - Research anchors (universities and academic health centers)
 - Talent pool that attracts and grows firms
 - Capital gaps addressed
 - Networking to build a critical mass of firms
 - Federal funds leveraged
 - Champions and leadership
 - Access to wet lab space, equipment & instrumentation
 - Patience and long term perspective

What it Will Take

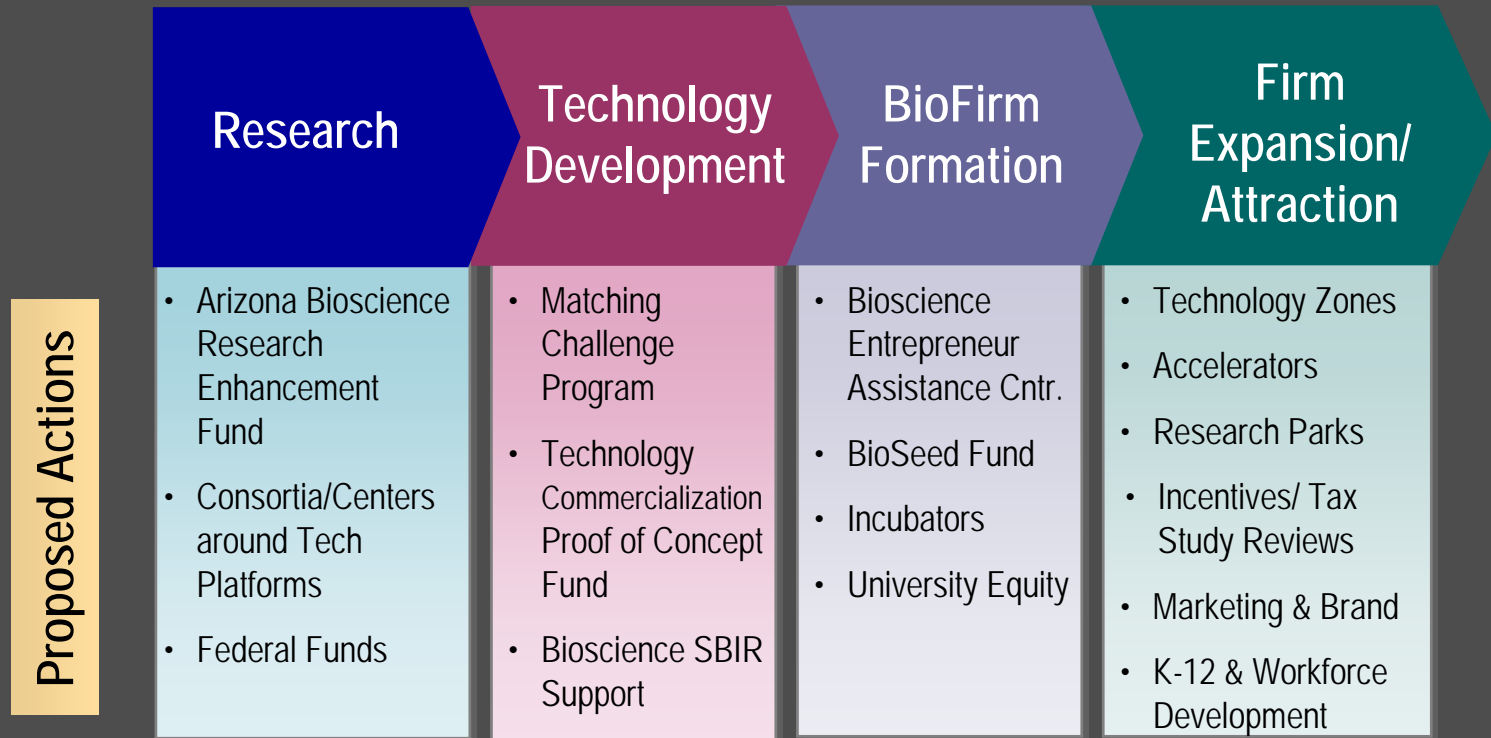
- Invest in higher education and medical research
- Foster clinical excellence
- Increase federal bioscience research awards
- Willingness by state's research organizations to collaborate and partner
- Develop technology commercialization tools
- Cultivate champions
- Strategic focus
- Mobilize strong private/public partnerships
- Ensure state and local government support
- Educate the general public
- Have patience and perseverance

Arizona's Place on the National Map:

Key Biosciences Challenges

- Arizona's growth in basic research has slowed as state support for higher education reduced.
- Biosciences research growth among Arizona's universities lags the national average.
- Arizona's technology research infrastructure is in need of modernization.
- Arizona's fiscal policies and tax base are not well designed for a technology-driven economy.
- Arizona lacks a sophisticated "tool kit" to attract, retain, and grow biosciences firms.

Strategic Continuum



Arizona's Bioscience Roadmap

- Big Bet on Genomics –
\$90 million raised in 2002 for key talent and specialized facilities.

New roadmap to develop 3 areas:

- Cancer therapeutics
- Neurological sciences
- Bioengineering

Biosciences: Putting it all together

- 3rd Cluster Analysis-Flinn Foundation
- 3 Core Competencies
- \$90 Million Investment IGC/TGen
- Phoenix Bioscience Center at Copper Square (3 Universities)
- Arizona Biodesign Institute (ASU)
- One-of-a-Kind Computer
- ASU Research Park Biocampus
- Arizona's Biosciences Roadmap (Battelle)

Biosciences: Putting it all together

- Maricopa Bioindustry Workforce Development Commission
- Phoenix Biosciences High School
- Phoenix Biotechnology Directory
- Biofunding Summit 2003
- New Market Tax Credit (\$ 30M)
- ASU's version of UC CONNECT
- Research Facilities Legislation (12 facilities)
- Legislation gives university equity position
- Real Estate sessions on wet lab space
- Urban BUZZ

Staying with It

- 1990-91 ASPED process
- 1992- GSPED; Clusters Incorporate
- 1992-93 regional ED, universities follow framework
- 1994 Senate asks for senior industry cluster
- ASU initiates USDOC & USAEP grants (5)
- Governor's race (1994)
- ADOC targets staff and programs to clusters (\$ 167 M workforce; \$500,000 CECD)

Staying with It

- GPEC targets staff & programs to clusters
- Several clusters hire ex. directors
- 5 high-tech clusters hire lobbyists
- ADOC updates cluster studies
- *New Economy: A Guide for Arizona (1999)*
- Phoenix & Tucson Chambers adopt clusters
- Governor's new economy task force
- BHAG: Proposition 301 sales tax increase for K-12 education & university research (2000)

Staying with It

- *Five Shoes Waiting to Drop on Arizona's Future (2001)*
- GPEC and ADOC emerge stronger on clusters (new studies 2001-2)
- Legislature keeps cluster funds & NE initiatives in 2002-03 budget (-\$ 800 M)
- BHAG: T Gen/IGC - 3 universities, state, 2 cities, 5 clusters, ED groups pursue Genomics Talent
- Feasibility study for Bioindustry research infrastructure (target \$ 100 M)

Benefits of Cluster Approach to Economic Development

- First time to mix entrepreneurs and traditional business (banks, utilities) in strategy process
- Cluster-based approach provided a more in-depth understanding of the state economy
- Produced an industry-driven strategy
- Recognized that industry does not speak with a single voice
- Created a broader constituency for economic development
- Changed the way we define the customer

Checklist for Developing Innovative Clusters

- Inventory your Regional Assets (Networks and Attitudes)
- Think Economically, Not Politically
- Identify Private Sector Champions

- Build on your Strengths
- Develop the Talent
- Invest in Research
- Provide Seed and Venture Capital
- Sustain your Infrastructure
- Create Connections
- Take the Long View

What Makes the Difference in Regions

- Build fundamental assets.
- Connect entrepreneurs to assets.
- Promote a culture of innovation.
- Make quality of life an innovation asset.

Assets

Cornerstones of Regional Innovation



- R&D/Technology (e.g., universities, research institutes)
- HR/Education
- Financial Capital
- Physical Infrastructure

Building Assets

- Austin
 - MCC, Sematech helped accelerate university investment in facilities, 32 \$1mill. endowed chairs
 - \$1 billion for basic infrastructure over 15 yrs (airport, electricity, water)
- Louisville
 - Targeted university investments in biomedicine, logistics, entrepreneurship
 - Investments in workforce skill development and physical infrastructure

Networks

Cornerstones of Regional Innovation



- Industry networks
- Technology commercialization networks
- Entrepreneurial support networks
- Professional networks

Strengthening Networks

- Austin
 - University promotes commercialization, partnerships
 - MCC, Sematech "teams" continue informal network
 - Chamber stimulates cluster networking
 - Business leaders drive entrepreneurial support and seed capital networks
- Louisville
 - Created single voice in Greater Louisville, Inc.
 - Launched Business Networks Program, which helps launch cluster groups, led by cluster executives, but with goal of spinning off as independent entities
 - Network of 14 groups supporting minority business development

Culture

Cornerstones of Regional Innovation



- Risk taking attitudes
- Openness to outsiders
- Commercialization bias
- Collaborative mindset

Changing Culture

- Austin
 - Laid-back, no growth, and oil devt. mindsets
 - MCC, Sematech transformed people
 - Adopted compelling, shared vision (“poised for greatness”)
 - People “learned by doing” specific projects to build a new Austin
 - Added newcomers to “the team,” which helped raise aspirations
- Louisville
 - Risk-averse, culture of isolation, tightly-knit community
 - Created a sharp break from the past with entrepreneurial vision
 - Leveraged strong personal relationships to focus on new goals
 - Proven entrepreneurs provide key catalyst
 - Initial successes spur further risk-taking

Community Quality of Life

Cornerstones of Regional Innovation



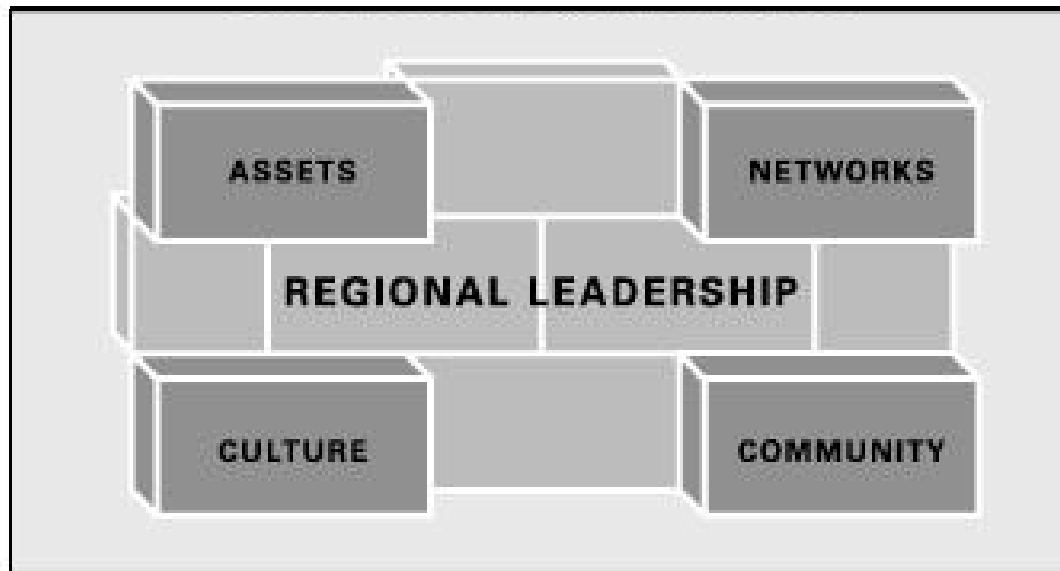
- Strong urban amenities/downtowns
- Cultural vitality
- Quality natural and build environments
- Good regional mobility (physical and social)
- Strong social fabric

Improving Community QOL

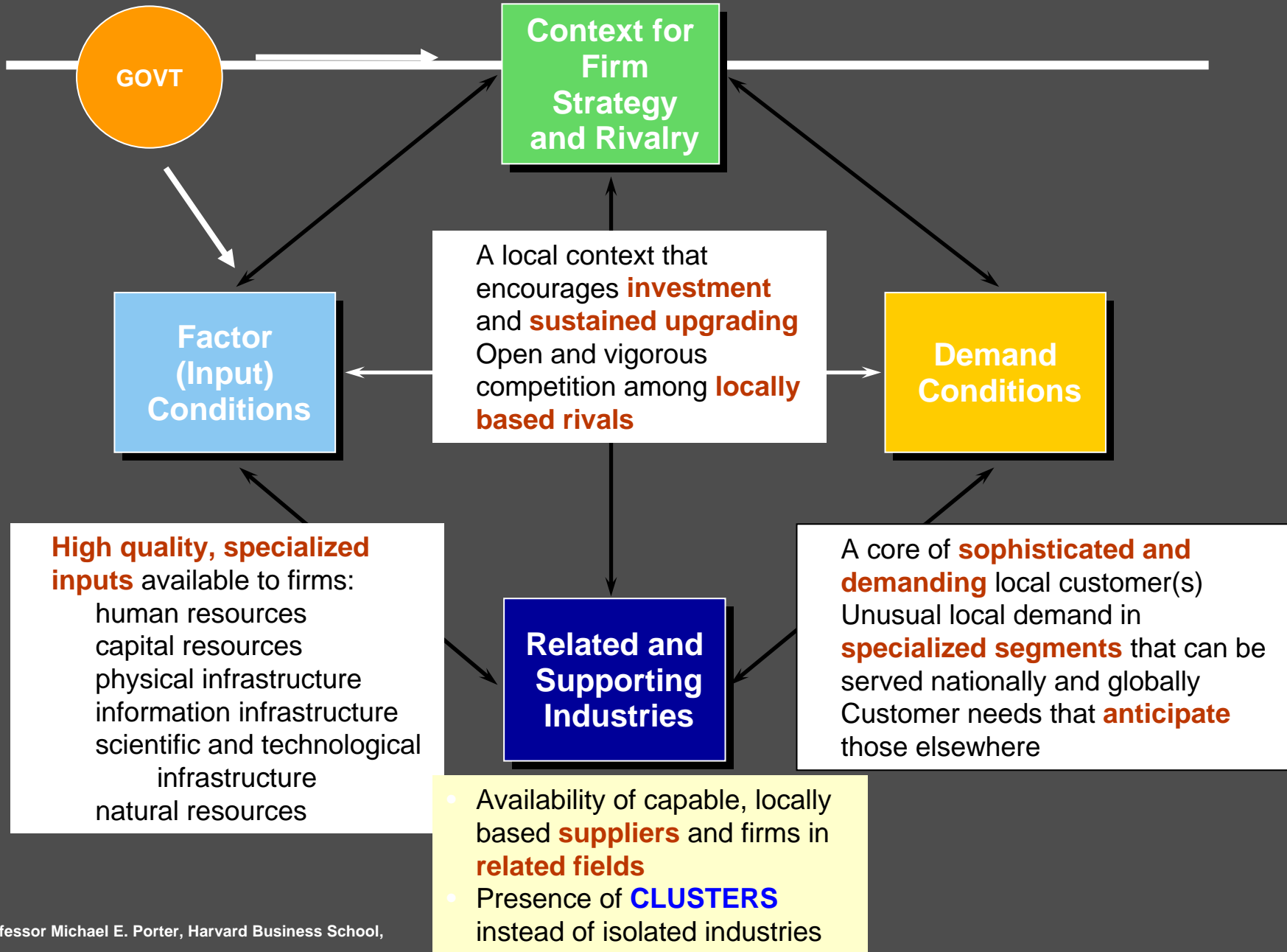
- Austin
 - QOL treated as central to economic success
 - P/P partnerships to improve urban schools, preserve environment, expand giving and volunteerism
 - Strong city commitment to downtown vitality, diverse cultural amenities
 - Actively fixing problems, like transportation
- Louisville
 - QOL treated as central to economic success
 - Implementing eMain USA, a comprehensive, mixed-use, high-tech development district downtown
 - \$40M waterfront park expansion (Louisville's "new front door")

Advantages and Barriers?

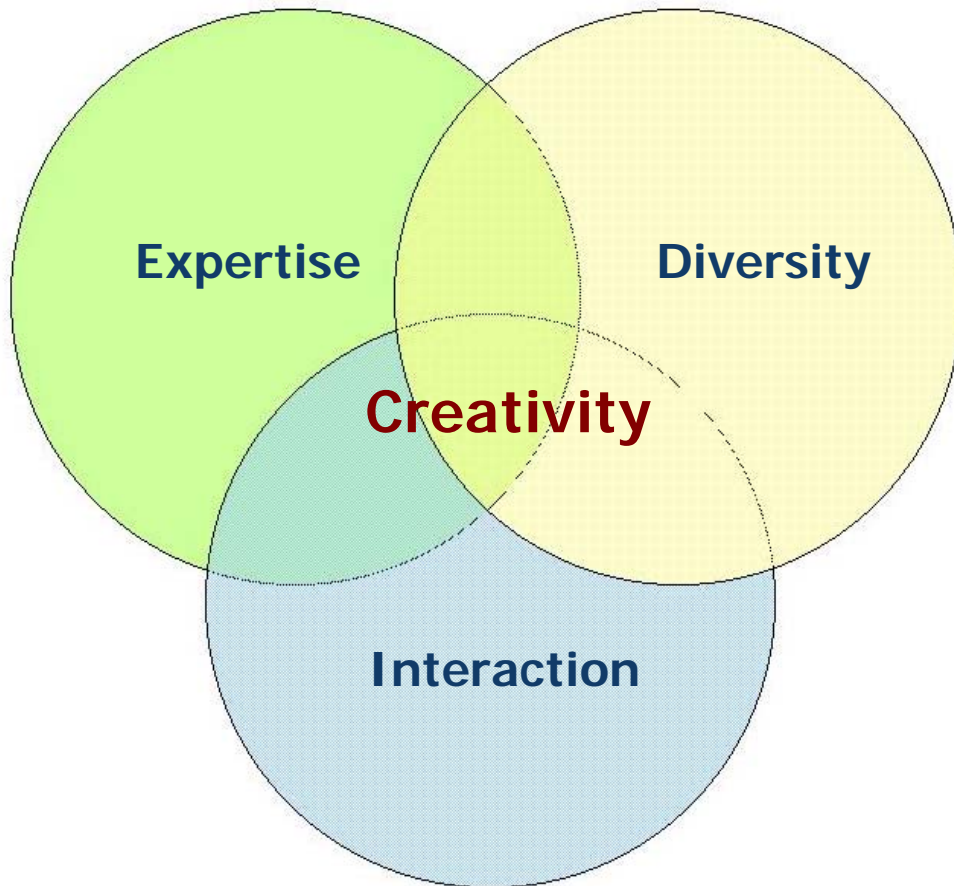
Cornerstones of Regional Innovation



Enabling Innovation: The Regional Competitive Environment



The EDI's of Innovation



- **EXPERTISE** means talented people
- **INTERACTION** when people come together, there's a better chance for the passionate exchange of ideas & synergies that create new business models, marketing plans or products
- **DIVERSITY** is important in generating the "Next Big Thing"; people learn most by interacting with people less like themselves.

A Rural Community Uses Cluster Strategies to Create \$536 million in Annual Economic Impact by 2007

CLUSTER

OPPORTUNITIES

AGRICULTURE



Create \$100 mm/year Alpaca Industry, Fiber Mills, Destination Farmers Market, expand high value acreage & annual crop revenue from \$6-50mm

TOURISM



Develop integrated destination packages, upgrade and expand lodging, Clallam Brand, Increase average daily travel expenditure by \$60=\$180mm

FOREST PRODUCTS



Grow alder plantations, build alder processing and products plants, artisan furniture coop and create EWPs with a LVL plant could generate \$70mm/year

MARINE



Shellfish farms and hatchery, cold storage, sustain top-side repair, create high end yacht industry & marinas could generate \$44 mm in annual revenues

TECHNOLOGY



Create wood composites R&D and manufacturing, B2B forestry software and gaming software firms could generate \$92 mm in annual revenues
