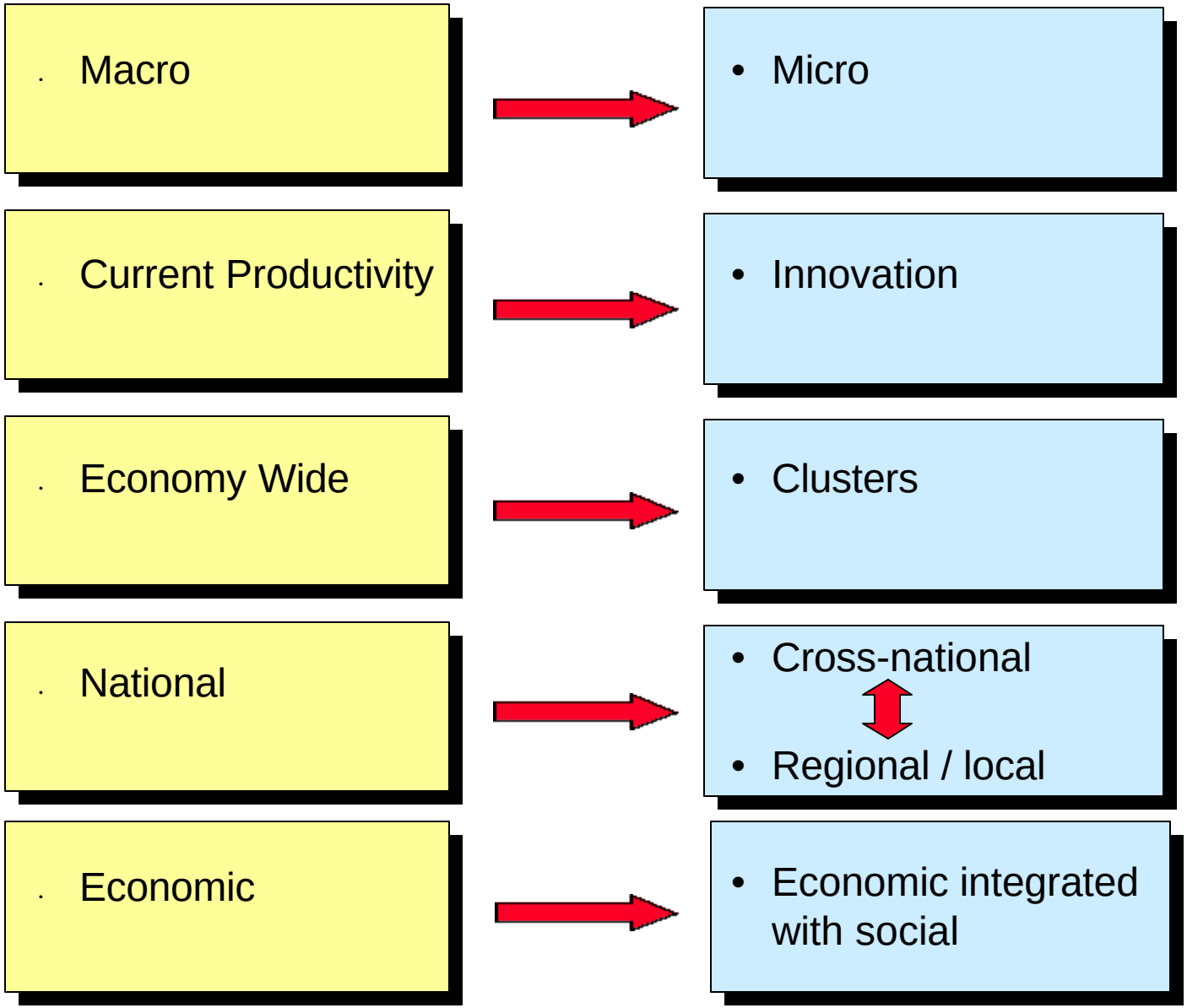
The Microeconomic Foundations of Competitiveness and the Role of Clusters

Professor Michael E. Porter
Harvard Business School

Mississippi
May, 2000

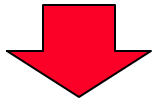
This presentation draws on ideas from Professor Porter's articles and books, in particular, The Competitive Advantage of Nations (The Free Press, 1990), "The Microeconomic Foundations of Economic Development," in The Global Competitiveness Report 1998, (World Economic Forum, 1998), "Clusters and the New Competitive Agenda for Companies and Governments" in On Competition (Harvard Business School Press, 1998) and ongoing statistical study of clusters, and "What is Strategy?" (Harvard Business Review, Nov/Dec 1996).

The Shifting Economic Policy Agenda



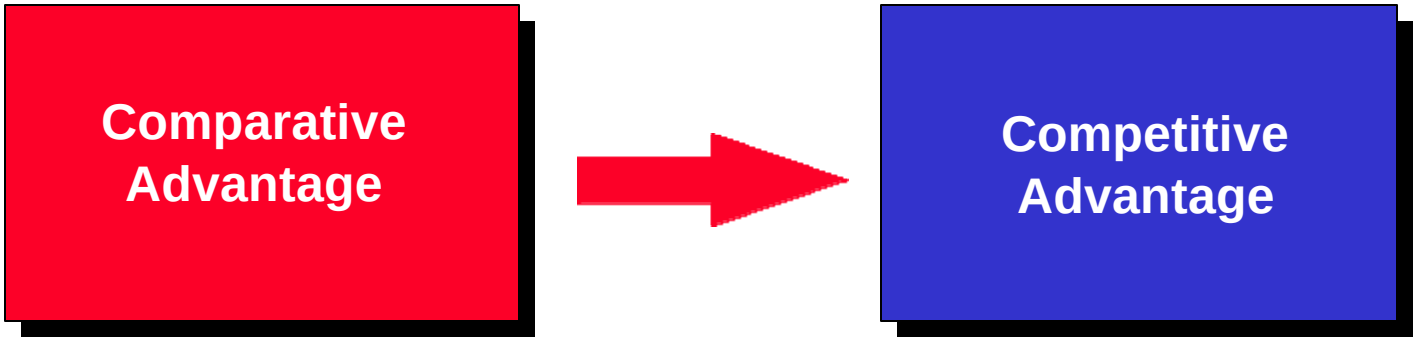
Sources of Rising Prosperity

- A nation or region's standard of living (wealth) is determined by the **productivity** with which it uses its human, capital, and natural resources. The appropriate definition of competitiveness is productivity.
  - Productivity depends both on the **value** of products and services (e.g. uniqueness, quality) as well as the **efficiency** with which they are produced. Productivity should be measured in terms of the value (revenue) produced per unit of labor or capital, not just the volume.
  - 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 national prosperity.
  - The productivity of **"local"** industries is of fundamental importance to competitiveness, not just that of traded industries



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

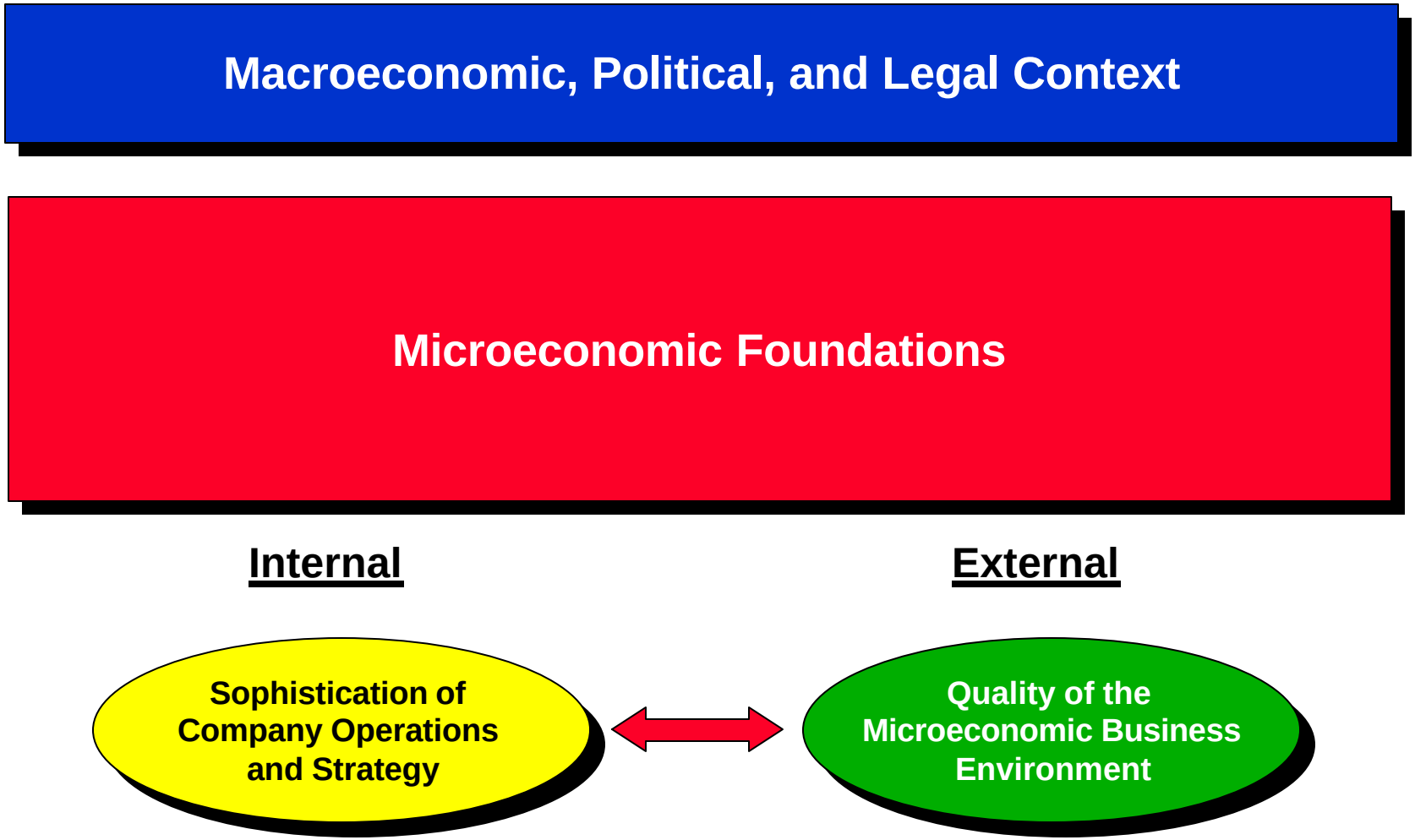
Shifting Sources of Prosperity



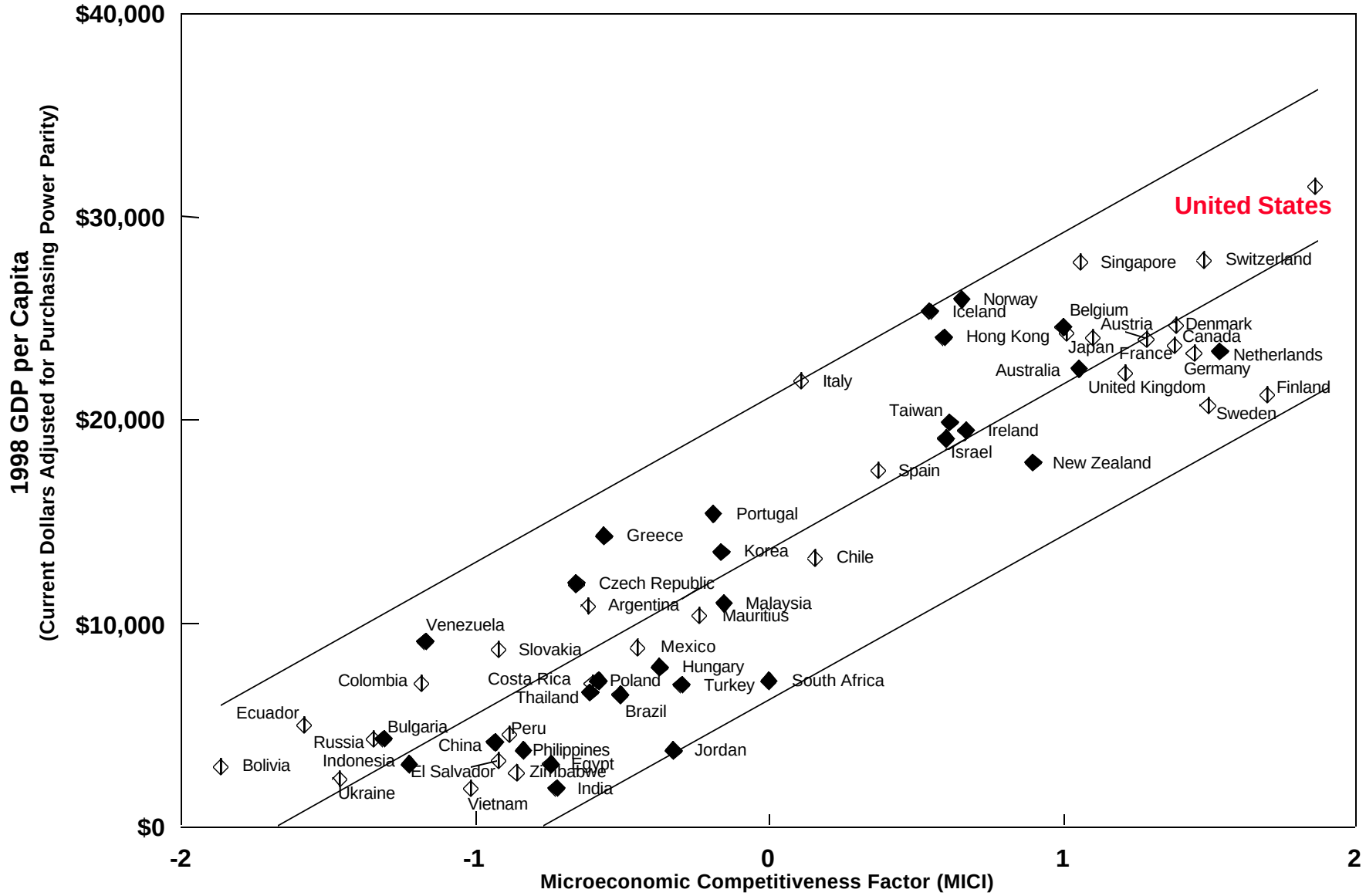
Wealth is set by endowments

Wealth is created by a nation or region's choices

Determinants of Productivity and Productivity Growth



The Relationship Between Microeconomic Foundations and GDP Per Capita



Source: M. Porter, "Microeconomic Competitiveness: Findings from the 1999 Executive Survey," Global Competitiveness Report, Geneva: World Economic Forum, 1999. Refer also to 1998 report.

Sources of Superior Performance

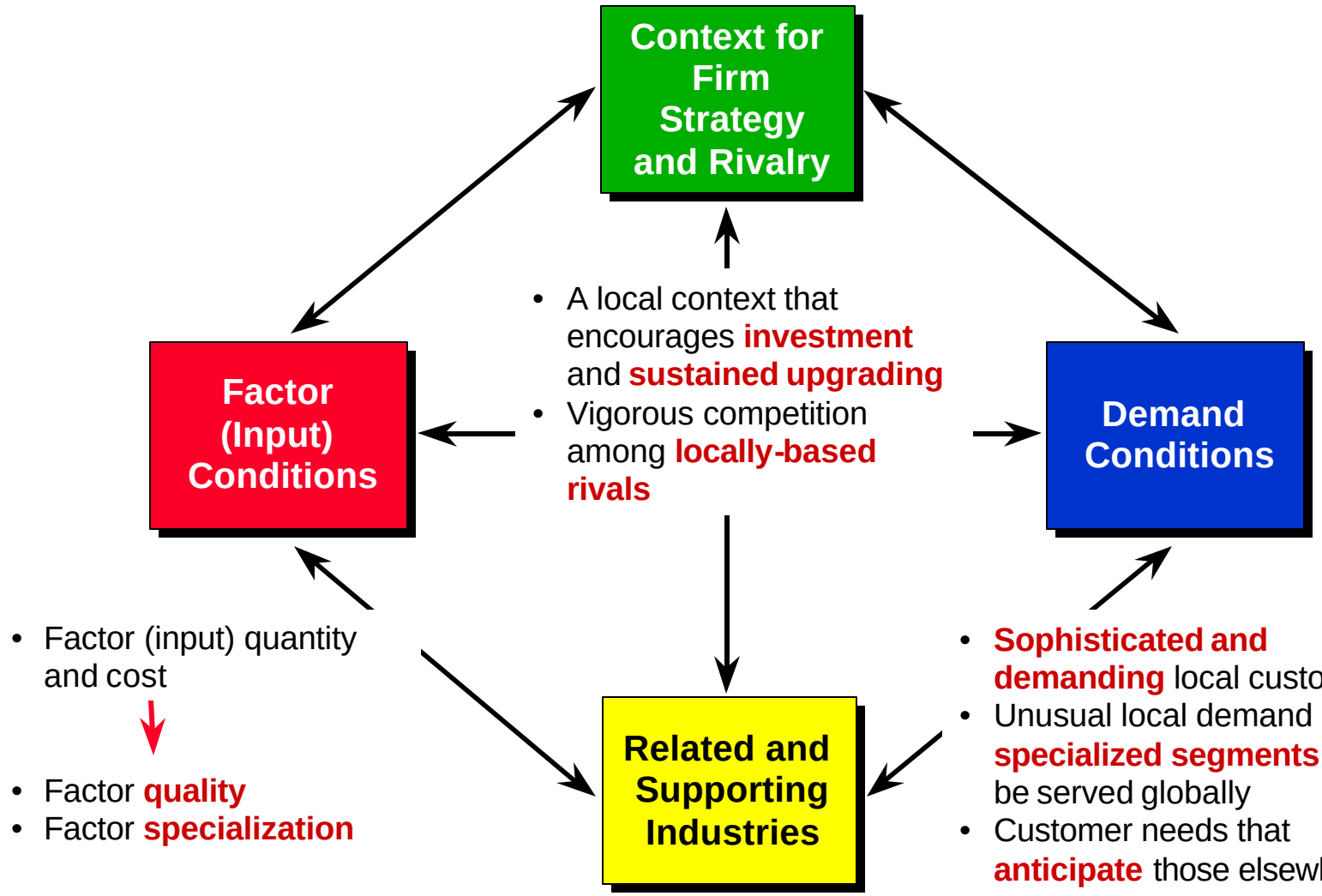
Operational Effectiveness

- Assimilating, attaining, and extending **best practice**

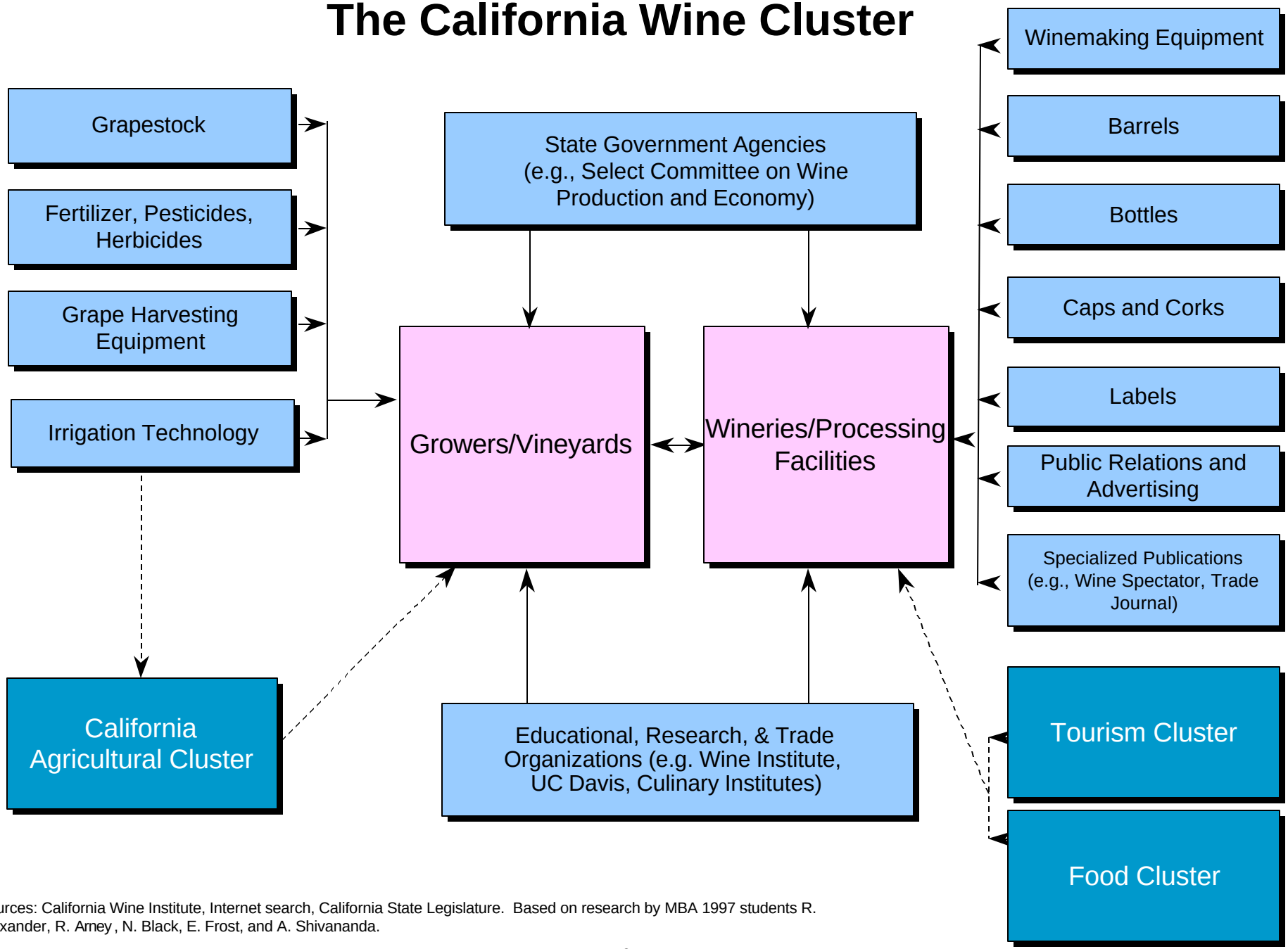
Strategic Positioning

- Creating a **unique** and **sustainable** competitive position

Productivity and the Microeconomic Business Environment



The California Wine Cluster



Sources: California Wine Institute, Internet search, California State Legislature. Based on research by MBA 1997 students R. Alexander, R. Arney, N. Black, E. Frost, and A. Shivananda.

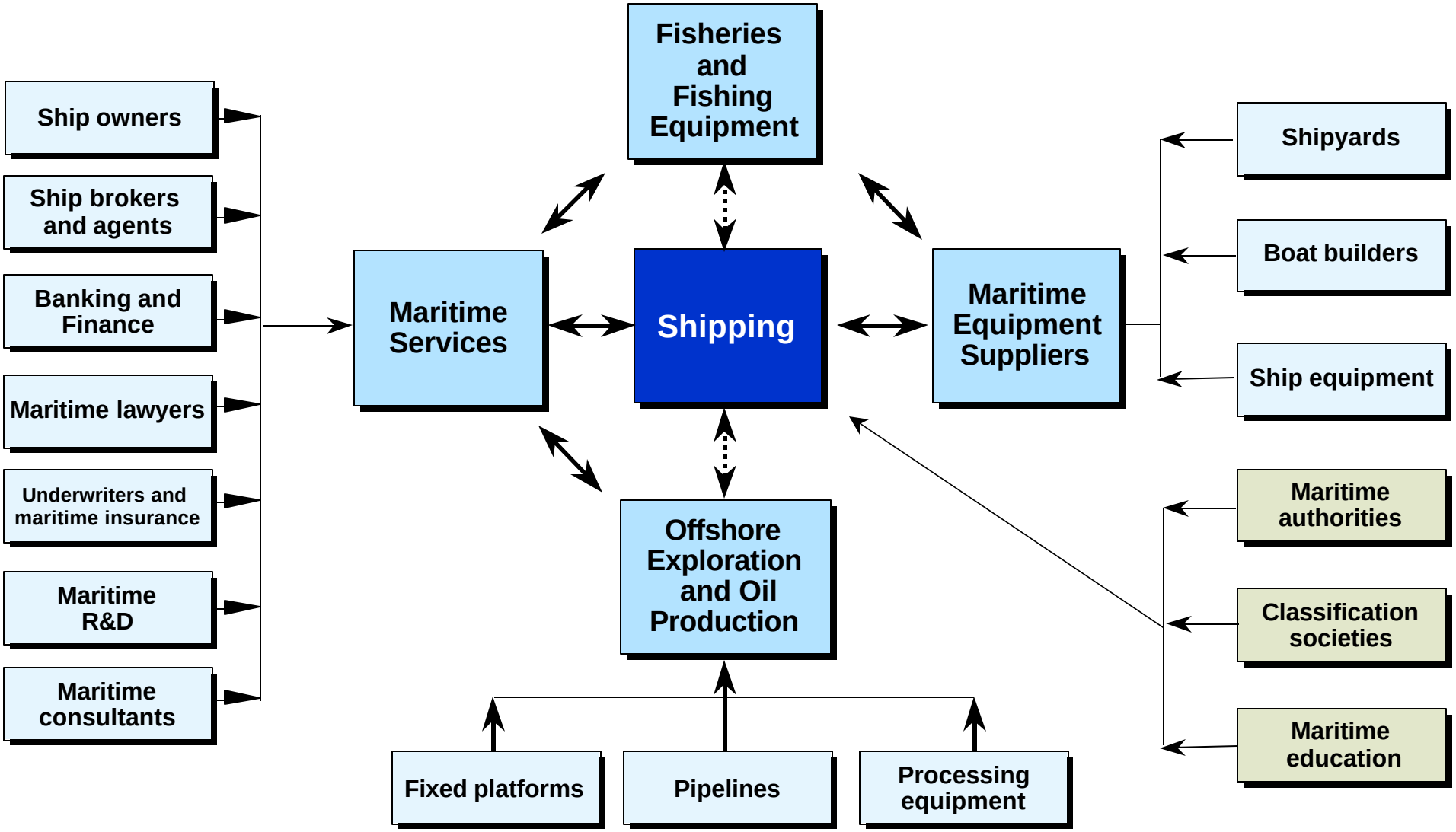
What is a Cluster?

A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities

- End-product or service companies
- Suppliers of specialized inputs, components, machinery, financing, and services
- Firms in related and downstream industries (i.e., channels or customers)
- Producers of complementary products
- Specialized infrastructure providers
- Government and other institutions providing specialized training, education, information, research, and technical support (e.g. universities, think tanks, vocational training providers)
- Standards-setting and influential government agencies
- Trade associations and other collective private sector bodies

Clusters go beyond a single industry

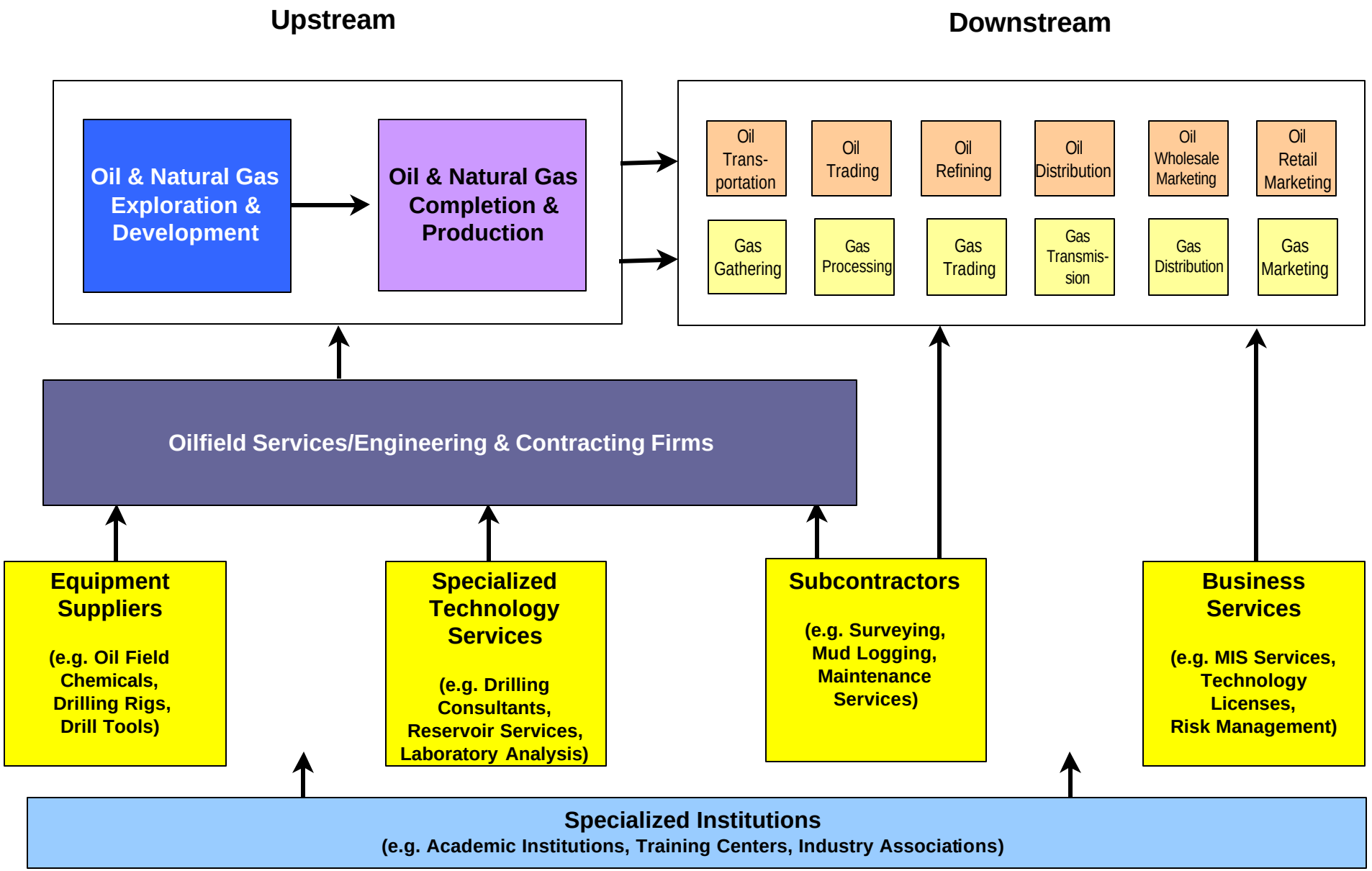
The Norwegian Maritime Cluster



- Norway has 0.1% of the world's population, represents 1.0% of the world's economy, yet accounts for 10% of world seaborne transportation

Source: Sven Ullring, presented to M.I.T.

The Houston Oil and Gas Cluster



Clusters and Competitive Advantage

Productivity

- Efficient access to information, specialized inputs and employees, institutions, and "public goods"
- Achieving complementarities across businesses
- Better incentives and performance measurement

Innovation

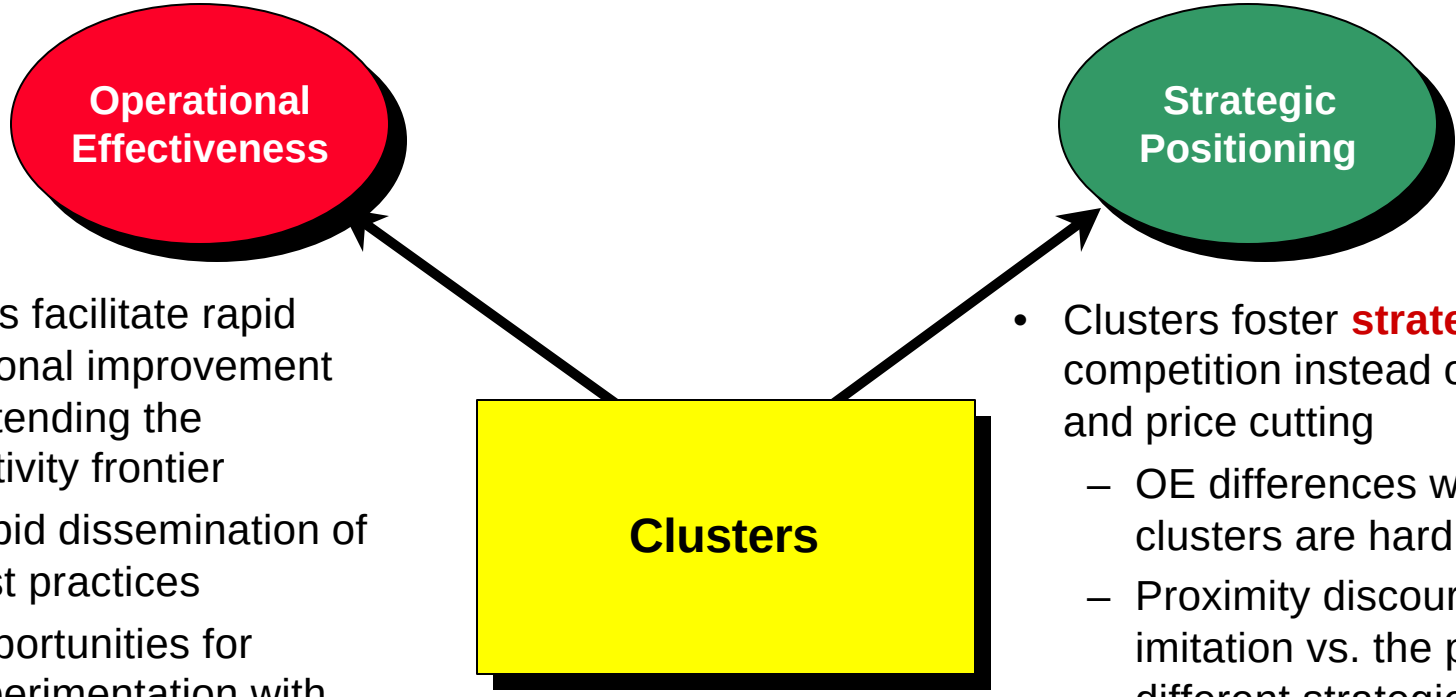
- Ability to perceive and respond to innovation opportunities
- Rapid diffusion of improvements

New Business Formation

- Perceiving opportunities for new businesses
- Lowering barriers to entry (including perceived risk)

- Competition is fundamentally affected by externalities / linkages across firms, industries, and associated institutions

The Influence of Clusters on the Nature of Local Competition

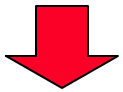


- Clusters facilitate rapid operational improvement and extending the productivity frontier
  - Rapid dissemination of best practices
  - Opportunities for experimentation with new activity configurations and approaches

- Clusters foster **strategic** competition instead of imitation and price cutting
  - OE differences within clusters are hard to sustain
  - Proximity discourages imitation vs. the pursuit of different strategies
  - Clusters can provide a better environment in which to perceive new needs and segments
  - The presence of local suppliers, related firms, and supporting institutions enables strategic differences

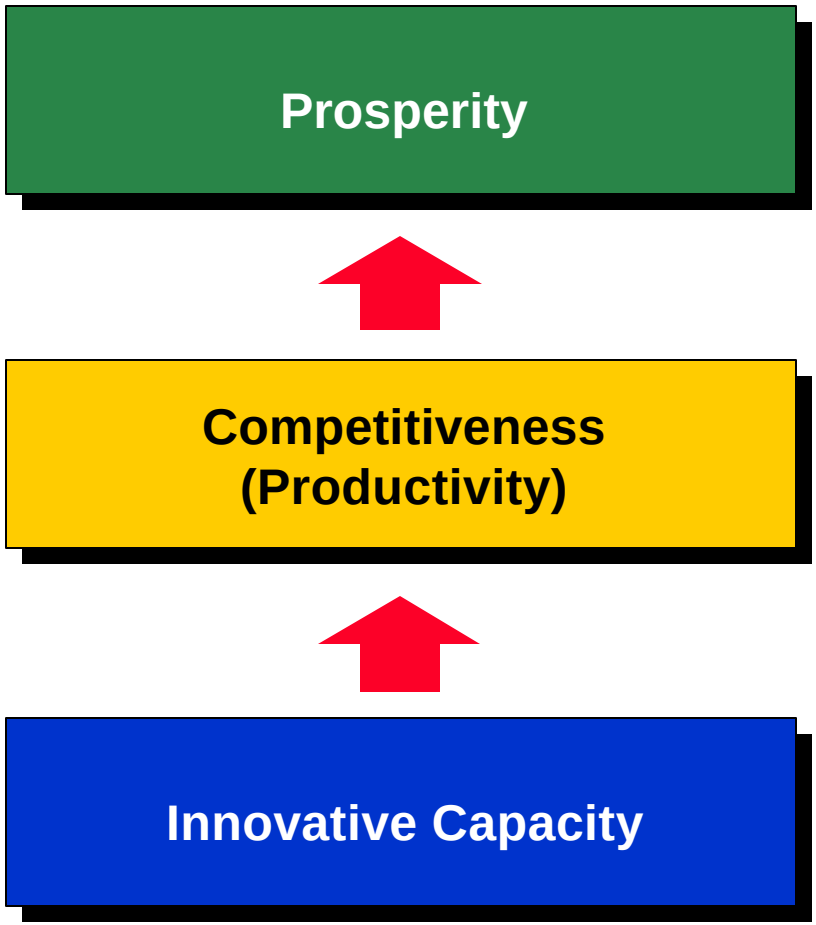
Why Innovation Matters

- Advanced nations cannot support high wages and profits through producing **standard** products or services made with **standard** methods
  - High wages can only be justified by **productivity differences**
  - Developing economies have far **lower wages** and **improving** skills and infrastructure
  - Developing nations can access **existing technology** via outsourcing and technology acquisition
  - A broader array of nations are **building innovative capability**
  - Multinational companies can choose to **locate activities anywhere**, including innovation-related activities

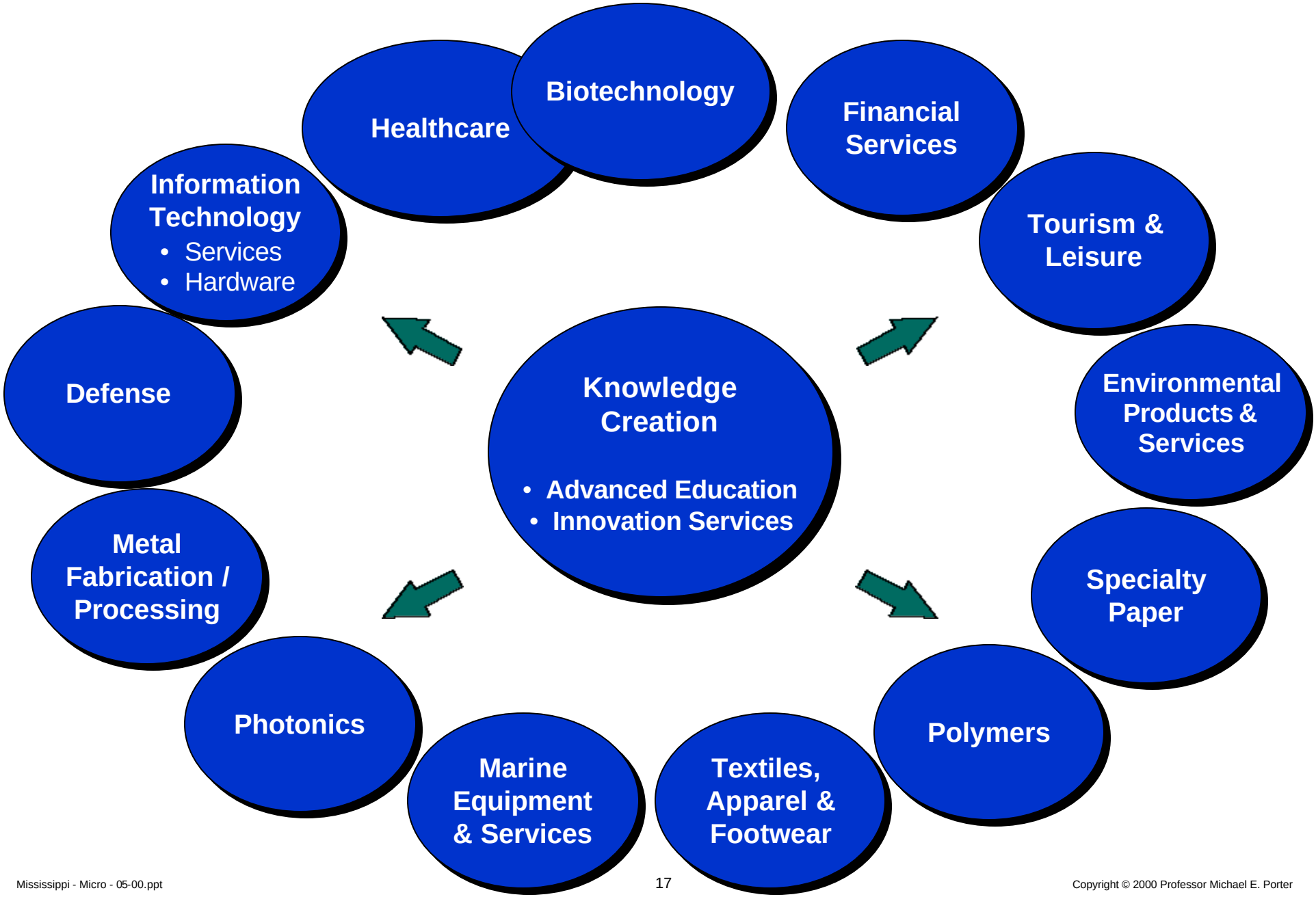


- The prosperity of advanced nations depends on **innovation**
- A faster rate of innovation is also fundamental to coping with **slow workforce growth** and to **expanding the world economic pie**
- Innovation holds the key to solving many of the world's most pressing **social challenges** (e.g., health care and the environment)

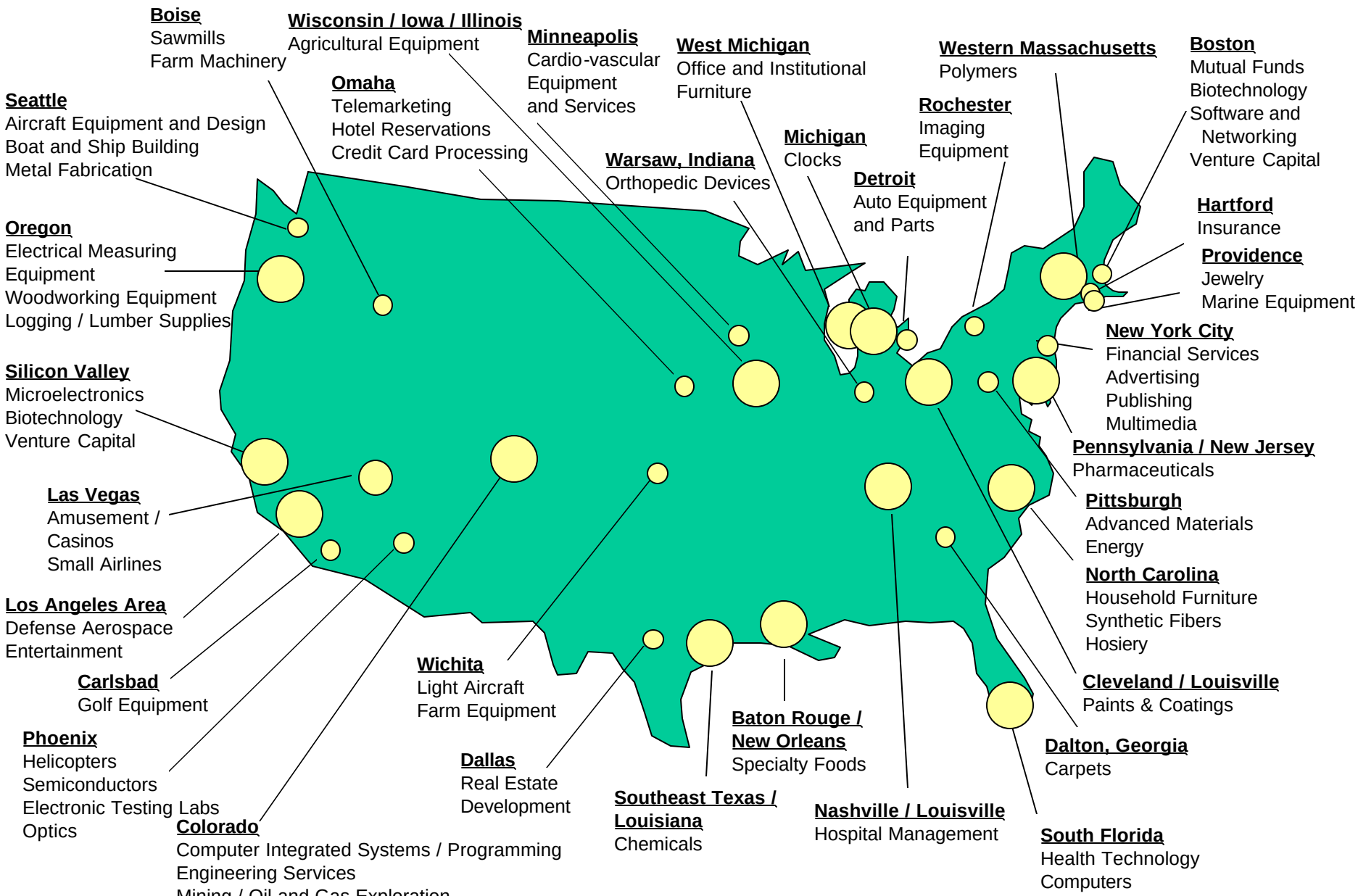
Innovation and the Standard of Living



Massachusetts Clusters



Selected Regional Clusters of Competitive U.S. Industries



The Composition of Regional Economies

50 “Traded” Clusters (35.7% of Total Employment)

e.g.
- Aerospace Engines
- Aerospace Vehicles and Defense
- Analytical Instruments
- Apparel...

Natural Resource Driven Industries

19 Local Clusters (64.2% of Total Employment)

e.g.
- Local Agriculture
- Local Commercial Services
- Local Community and Civic Organizations
- Local Construction Services...

The Information Technology Cluster

Services

Software and Programmer Services

- Computer programming services
- Prepackaged software
- Computer integrated systems design

Computer and Information Services

- Information Retrieval Services
- Data processing and preparation
- Computer facilities management
- Computer rental and leasing
- Computer maintenance and repair
- Computer related services N.E.C.

Hardware

Computers

- Electronic Computers

Peripherals

- Computer storage devices
- Computer terminals
- Computer peripheral equipment

Telecommunications Equipment

- Telephone and telegraph aparatus
- Radio and TV communications equipment
- Communications equipment N.E.C.

Components

Semiconductors

- Electron tubes
- Semiconductors and related

Optical Devices

- Magnetic and optical recording media
- Optical instruments and lenses

Electrical components, parts and processes

- Electronic connectors
- Electronic Components N.E.C.
- Plating and polishing
- Electrical industrial apparatus N.E.C.
- Printed circuit boards
- Electronic resistors
- Electronic coils and transformers

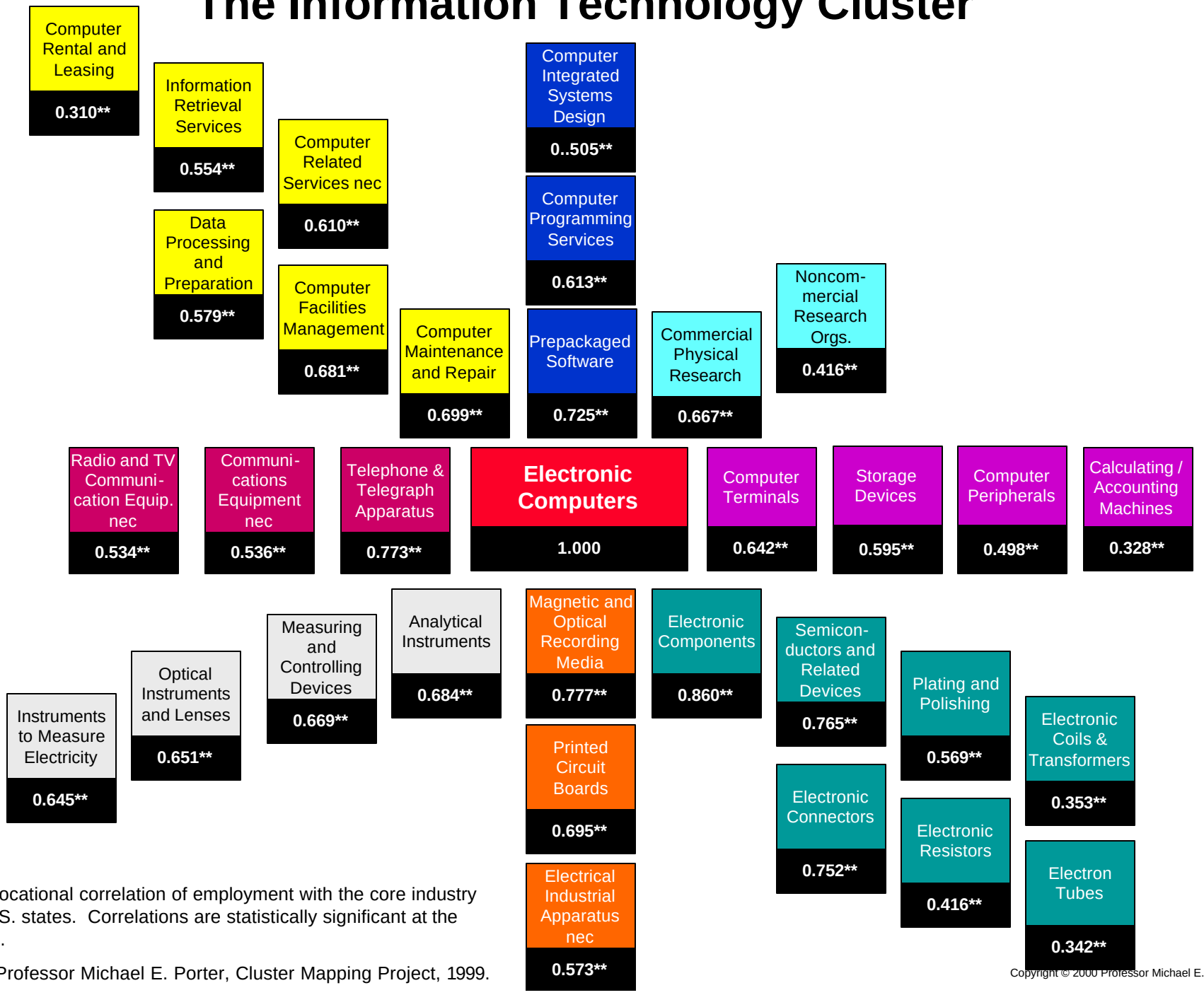
Research Organizations

- Commercial physical research
- Noncommercial research organizations

Instruments

- Instruments to measure electricity
- Analytical instruments
- Measuring and controlling devices

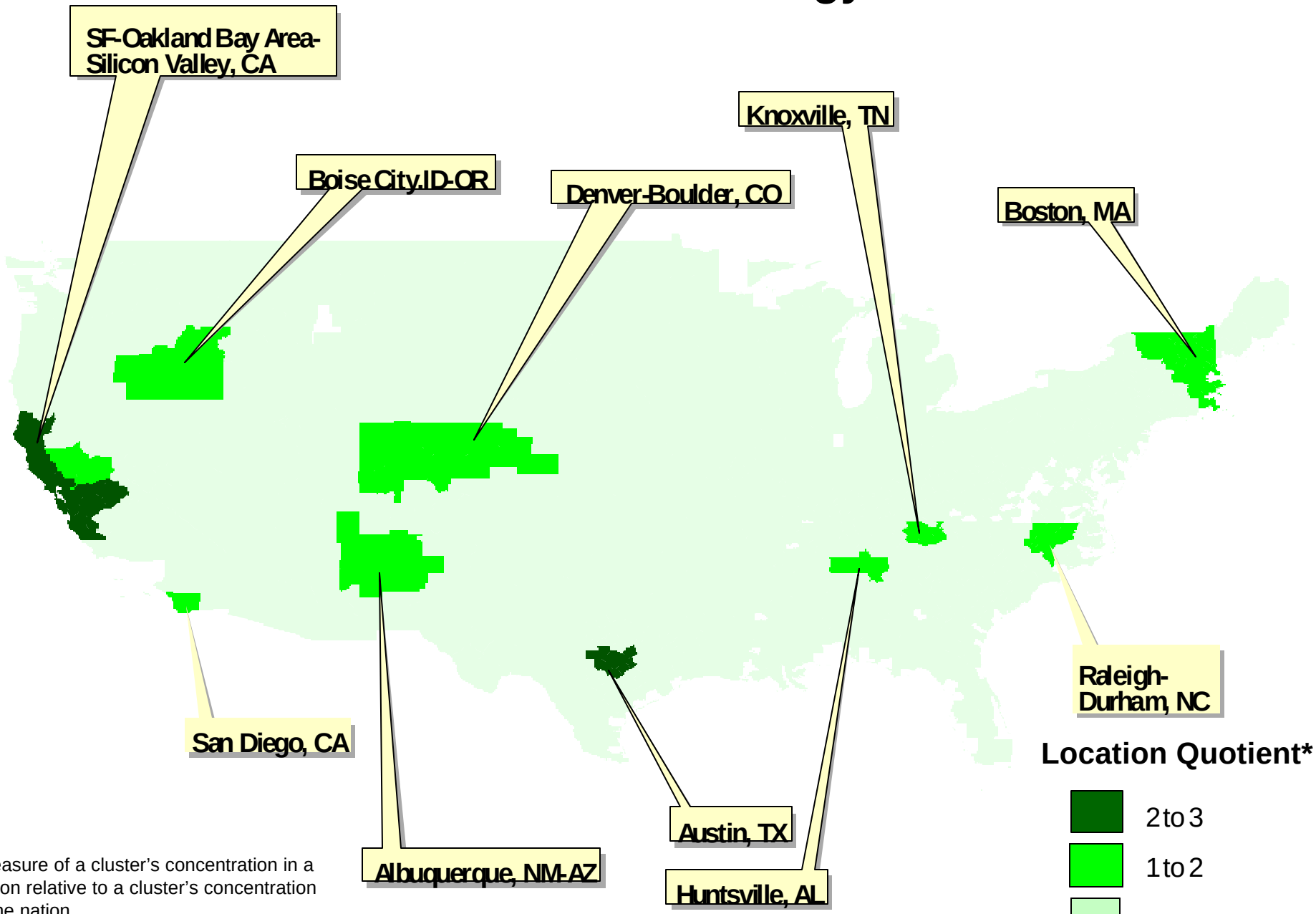
The Information Technology Cluster



Note: **Locational correlation of employment with the core industry across U.S. states. Correlations are statistically significant at the 95% level.

Source: Professor Michael E. Porter, Cluster Mapping Project, 1999.

The Information Technology Cluster

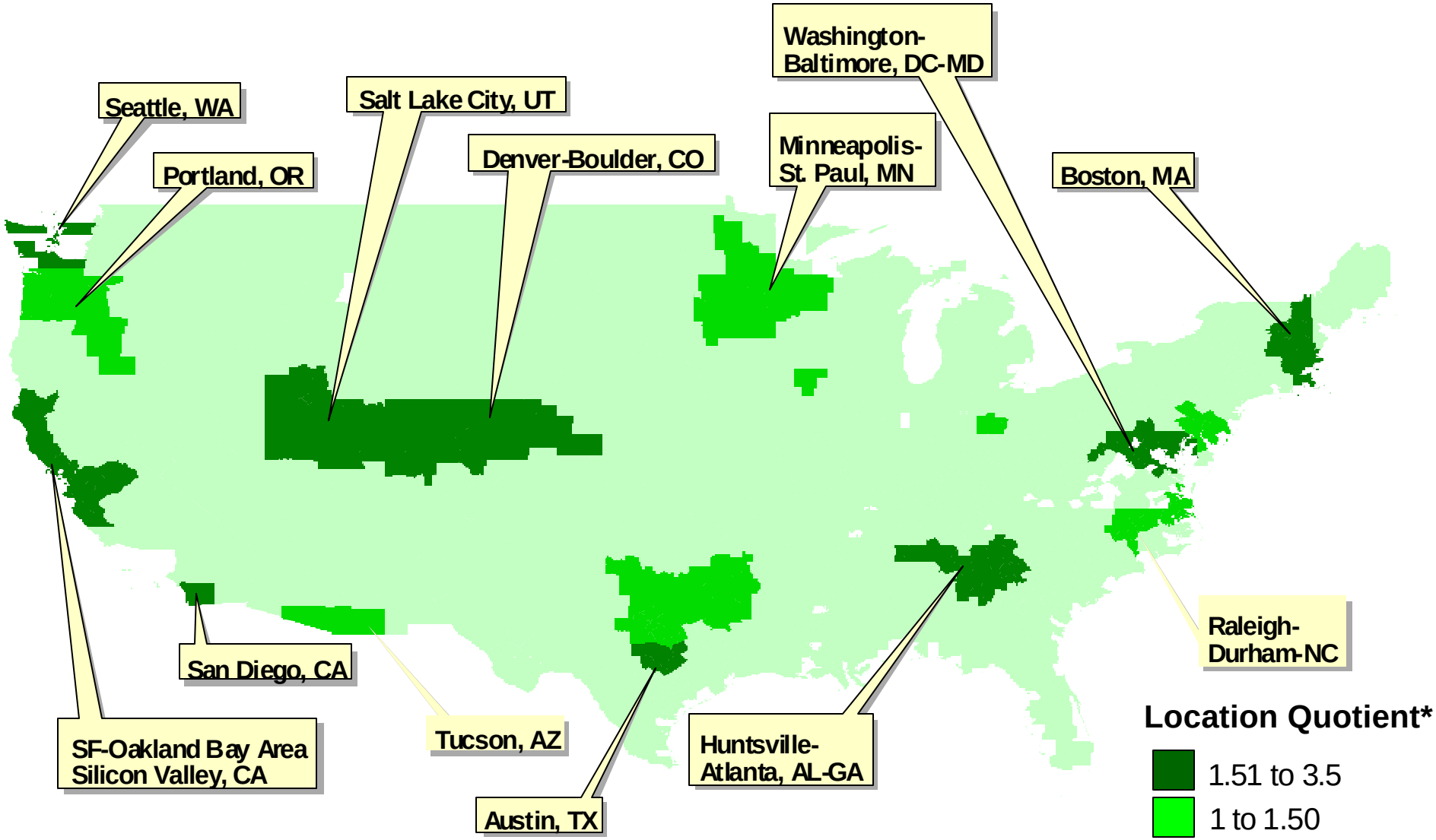


*Measure of a cluster's concentration in a region relative to a cluster's concentration in the nation

Source: Cluster Mapping Project

The Information Technology Cluster

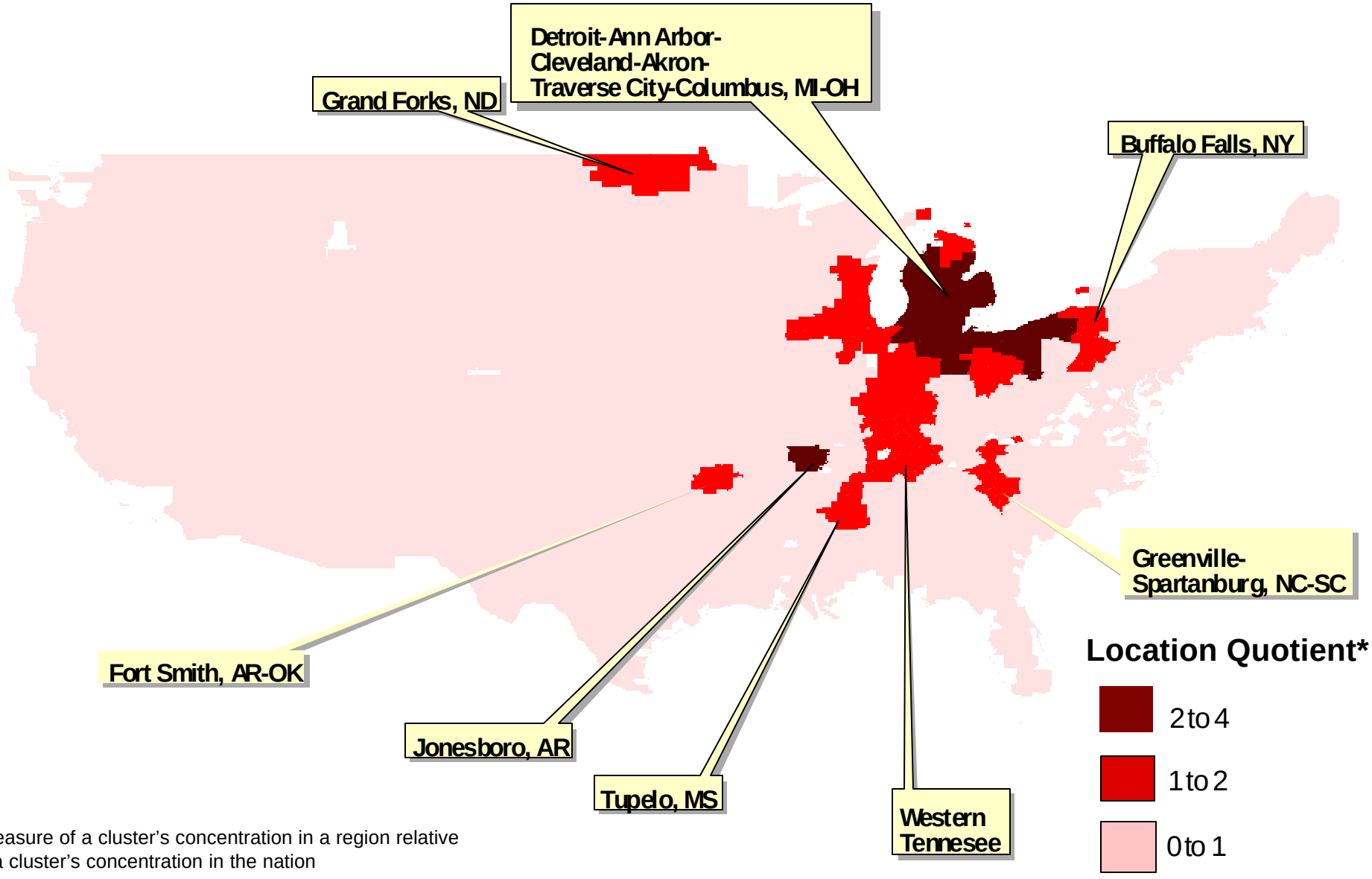
Software and Programmer Services



*Measure of a cluster's concentration in a region relative to a cluster's concentration in the nation

Mi Source: Cluster Mapping Project

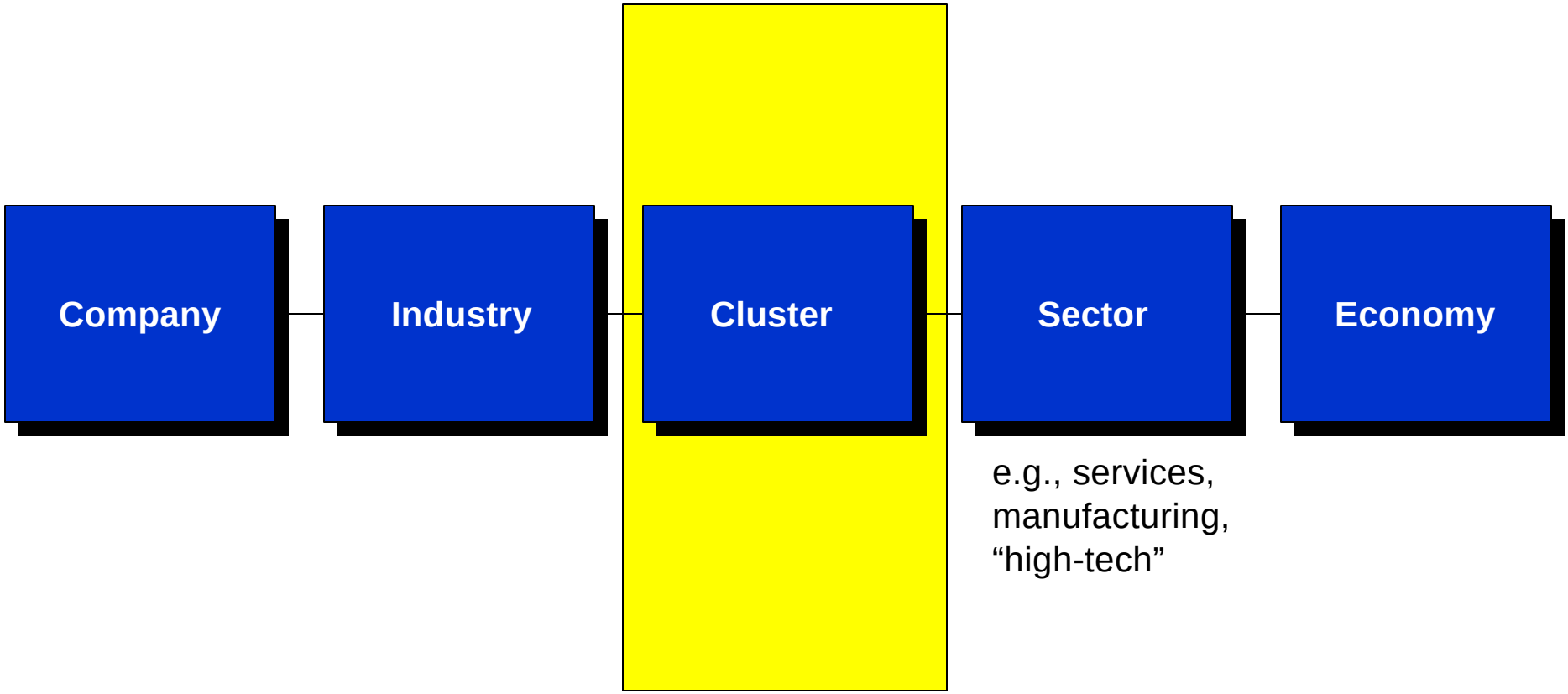
The Automotive Cluster



*Measure of a cluster's concentration in a region relative to a cluster's concentration in the nation

Source: Cluster Mapping Project

Level of Aggregation and Competitiveness



Appropriate Roles of Government in Economic Development

1. Establish a **stable and predictable** macroeconomic and political environment

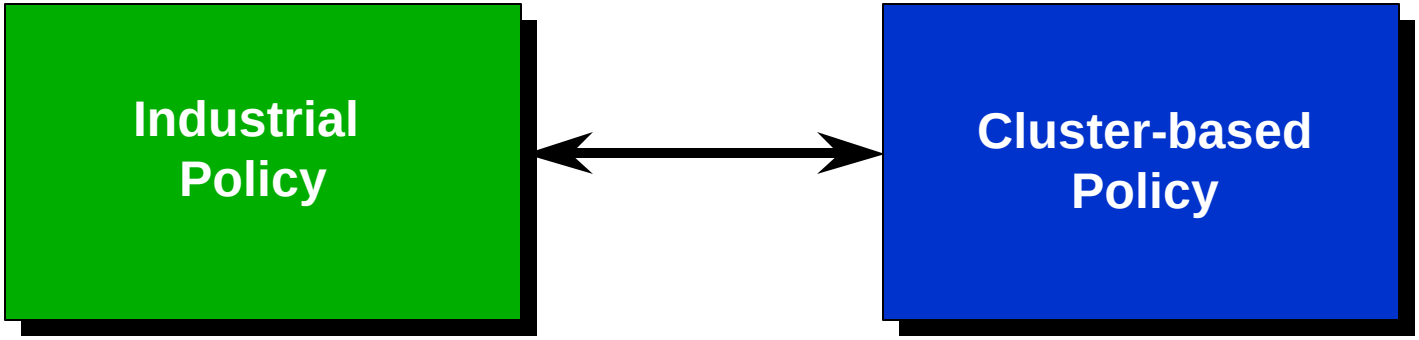
2. Improve the availability, quality, and efficiency of **general purpose inputs, infrastructure and institutions**

3. Establish overall **rules and incentives** governing competition that encourage productivity growth

4. Facilitate **cluster development and upgrading**

5. Develop and implement a positive and long-term **process for economic upgrading** which mobilizes national government, local government, business, institutions, and citizens

Cluster Policy versus Industrial Policy



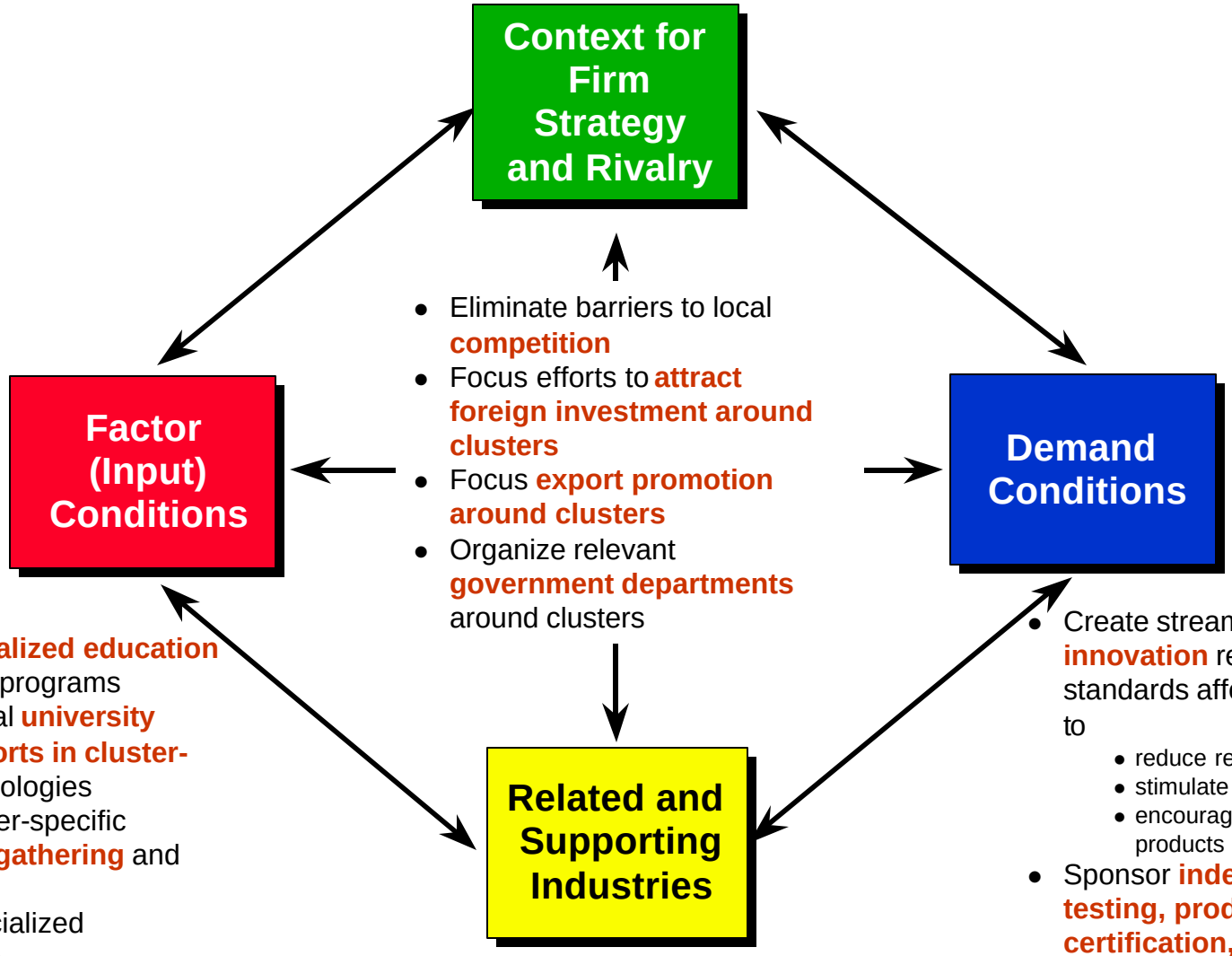
- Target desirable industries / sectors
- Focus on domestic companies
- Intervene in competition (e.g., protection, industry promotion, subsidies)
- Centralizes decisions at the national level

Distort competition

- **All** clusters can contribute to prosperity
- Domestic and foreign companies both enhance productivity
- Relax impediments and constraints to productivity
- Emphasize cross-industry linkages / complementarities
- Encourages initiative at the state and local level

Enhance competition

Illustrative Government Influences on Cluster Upgrading



- Eliminate barriers to local **competition**
- Focus efforts to **attract foreign investment around clusters**
- Focus **export promotion around clusters**
- Organize relevant **government departments** around clusters

- Create **specialized education and training** programs
- Establish local **university research efforts in cluster-related** technologies
- Support cluster-specific **information gathering** and compilation
- Improve specialized transportation, communications, and other **infrastructure** required by cluster

- Create streamlined, **pro-innovation** regulatory standards affecting the cluster to
  - reduce regulatory uncertainty
  - stimulate early adoption
  - encourage innovation or new products and processes
- Sponsor **independent testing, product certification, and rating services** for cluster products/services
- Act as **sophisticated buyer** of the cluster's products / services

- Sponsor **forums** to bring together cluster participants
- Cluster-specific efforts to attract **suppliers and service providers** from other locations
- Establish cluster-oriented **free trade zones, industrial parks, or supplier parks**

Government and Cluster Development
Principles

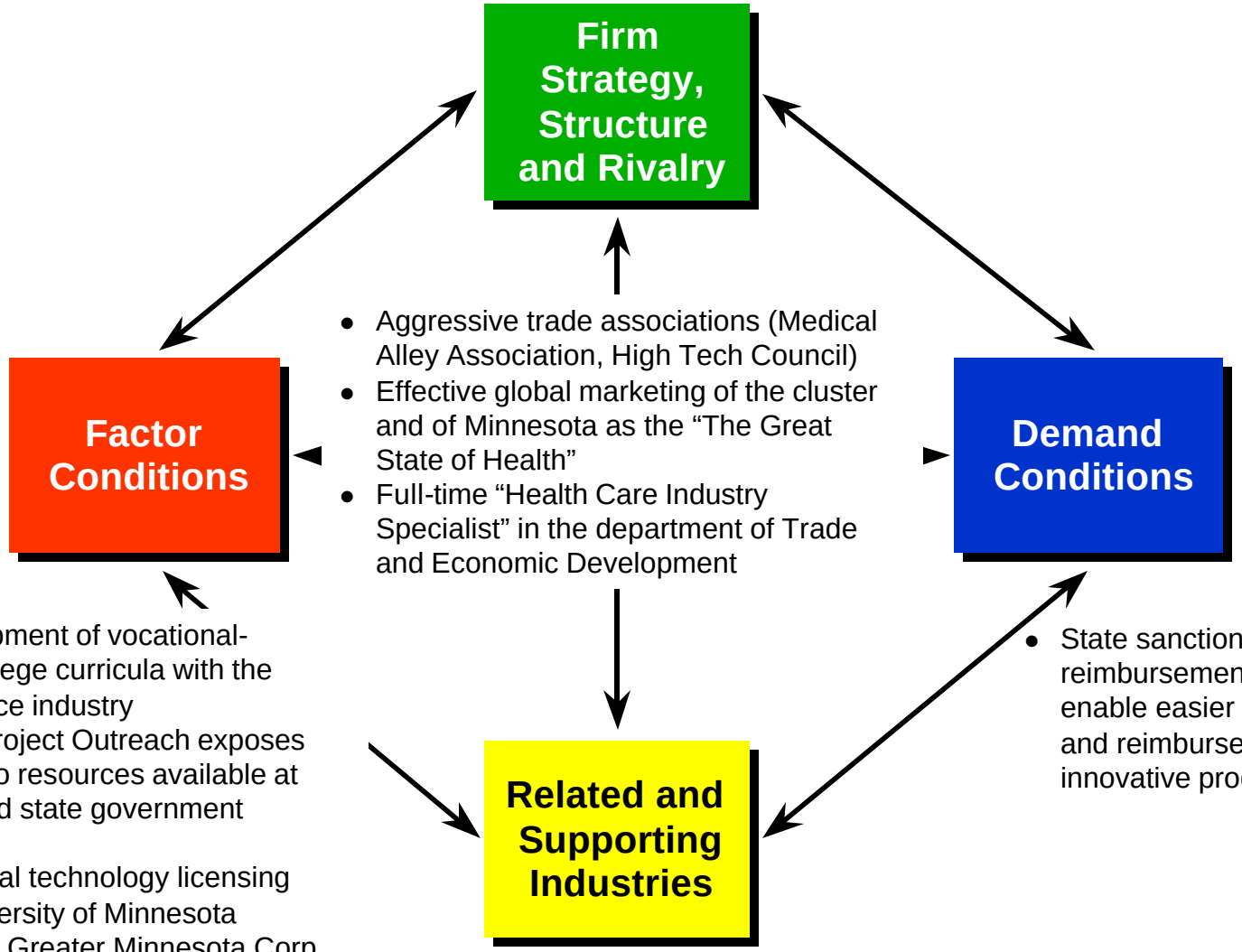
- Cluster policy does not substitute for the need to improve the general business environment
- Clusters offer a different way to view and understand the economy
- Clusters offer a mechanism to bring together government and the private sector
- Cluster policy seeks to upgrade all existing and emerging clusters, not choose amongst them
- Cluster policy is focused on removing impediments and obstacles to cluster development. It is not the same as “industrial policy”

Government Roles in Cluster Development

- Convening cluster participants
  - Involve institutions and multiple levels of government
- Acting on government induced / influenced weaknesses or obstacles to productivity
- Aligning government organizational structure, and other data collection, with clusters
- Encouraging other institutions to develop cluster-based strategies
  - e.g. universities, training providers

Public / Private Cooperation in Cluster Upgrading

Minnesota's Medical Device Cluster



- Aggressive trade associations (Medical Alley Association, High Tech Council)
- Effective global marketing of the cluster and of Minnesota as the "The Great State of Health"
- Full-time "Health Care Industry Specialist" in the department of Trade and Economic Development

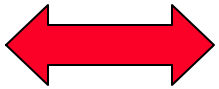
- Joint development of vocational-technical college curricula with the medical device industry
- Minnesota Project Outreach exposes businesses to resources available at university and state government agencies
- Active medical technology licensing through University of Minnesota
- State-formed Greater Minnesota Corp. to finance applied research, invest in new products, and assist in technology transfer

- State sanctioned reimbursement policies to enable easier adoption and reimbursement for innovative products

Company Attitudes Towards Clusters

First Reaction

- Create more competition
- Lose employees to spin-offs
- Drive up local costs

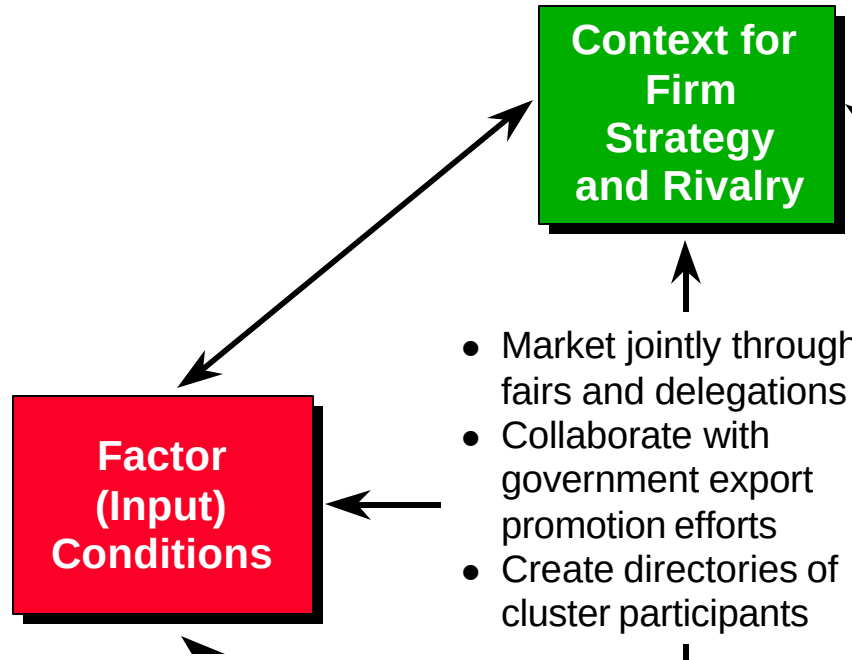


Upon Reflection

- Increase efficiency
- Expand the availability of inputs
- Increase flexibility
- Increase information
- Facilitate marketing
- Speed innovation

- Most cluster participants are **not** direct competitors

Illustrative Private Sector Influences on Cluster Upgrading



- Market jointly through trade fairs and delegations
- Collaborate with government export promotion efforts
- Create directories of cluster participants

- Jointly develop specialized vocational, technical, college and university curricula
- Sponsor specialized university research centers
- Collect cluster information through trade associations
- Maintain close liaison with infrastructure providers to address specialized cluster needs (e.g., data communications, logistics)
- Develop courses for managers on regulatory, quality, and managerial issues

- Work with government to streamline regulations and modify them to encourage innovation
- Establish local testing and standards organizations

- Establish a cluster-based trade association
- Encourage local supplier formation and attract local investments by suppliers based elsewhere through individual and collective efforts

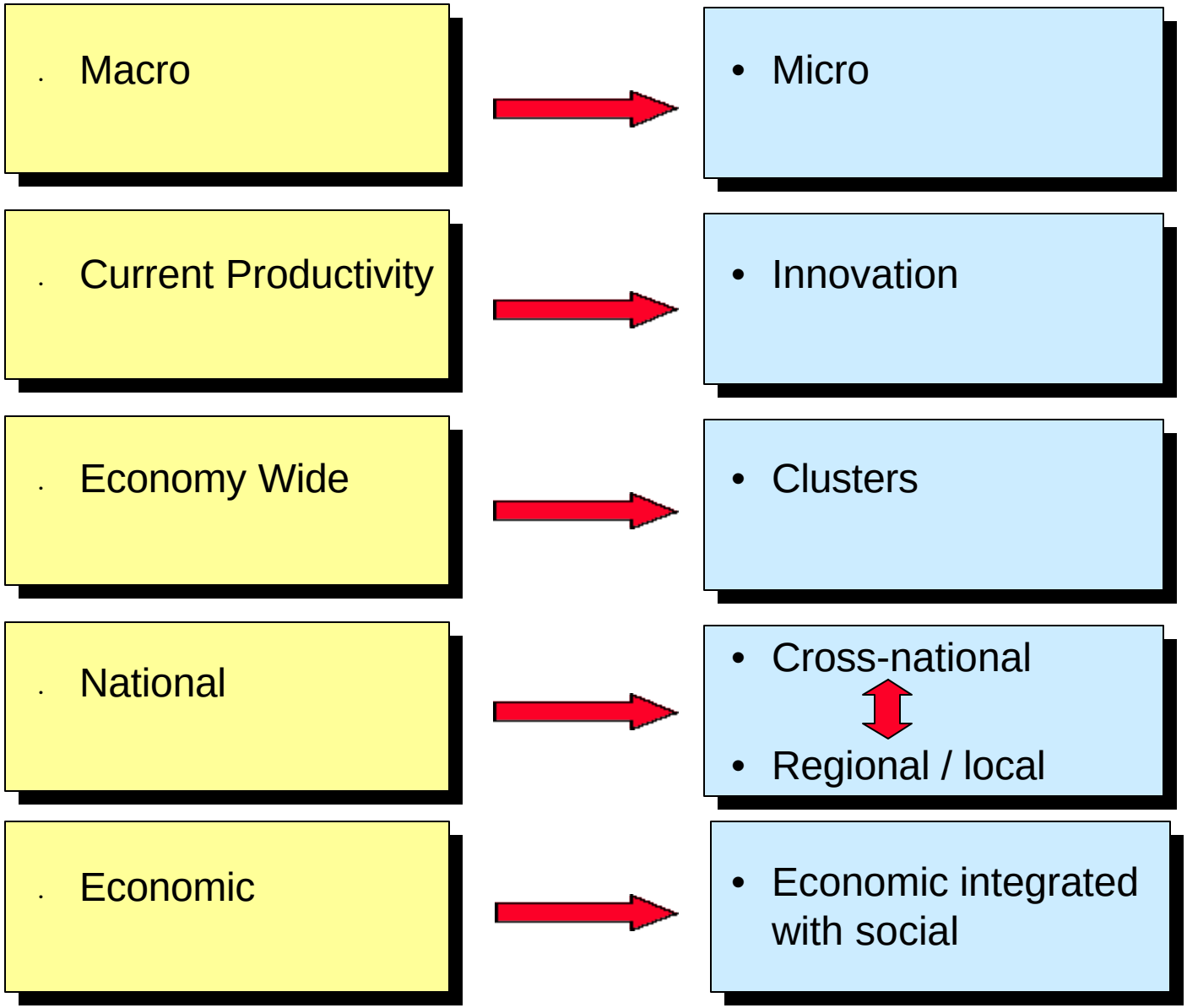
Guidelines for Organizing and Implementing a Successful Cluster Initiative

- Shared understanding of competitiveness and the role of clusters
- Private-sector led with active government participation, rather than organized and controlled by government
- Focus on removing obstacles and easing constraints to cluster upgrading rather than seeking subsidies or limiting competition
- Encompass (over time) all clusters in a region or nation
- Appropriate cluster boundaries
- Wide involvement of cluster participants as well as associated institutions
- Attention to personal relationships to facilitate linkages, foster open communications, and build trust
- A bias towards action
- Clusters are institutionalized by the private sector

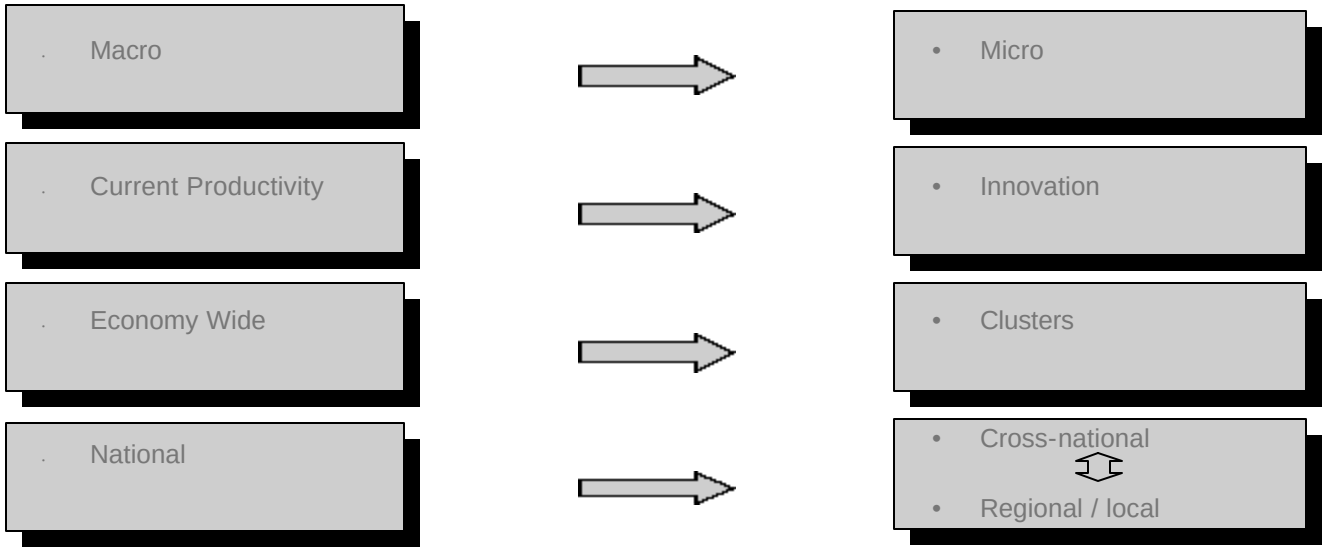
Common Pitfalls in Cluster Initiatives

- Prioritizing or “picking” clusters
- Government-driven
- Overly broad or overly narrow cluster definitions
- Using the cluster concept as a cover for industrial policy
- Orientation toward subsidies or limiting competition
- Ignoring small or emerging clusters
- Attempting to create clusters from “scratch”

The Shifting Economic Policy Agenda



The Shifting Economic Policy Agenda

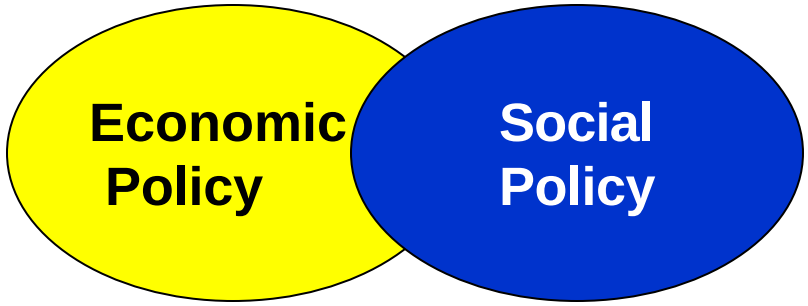


- Economic → Economic integrated with social

- From market intervention to help the poor to equipping disadvantaged citizens to succeed in the market
- From inequality as a failure of the market to inequality as a failure of government
- From inflicting environmental standards on business to fostering corporate environmental innovation
- From cutting health care cost to finding innovative health solutions

Integrating Economic and Social Policy

There is no inherent conflict between capitalism and social needs



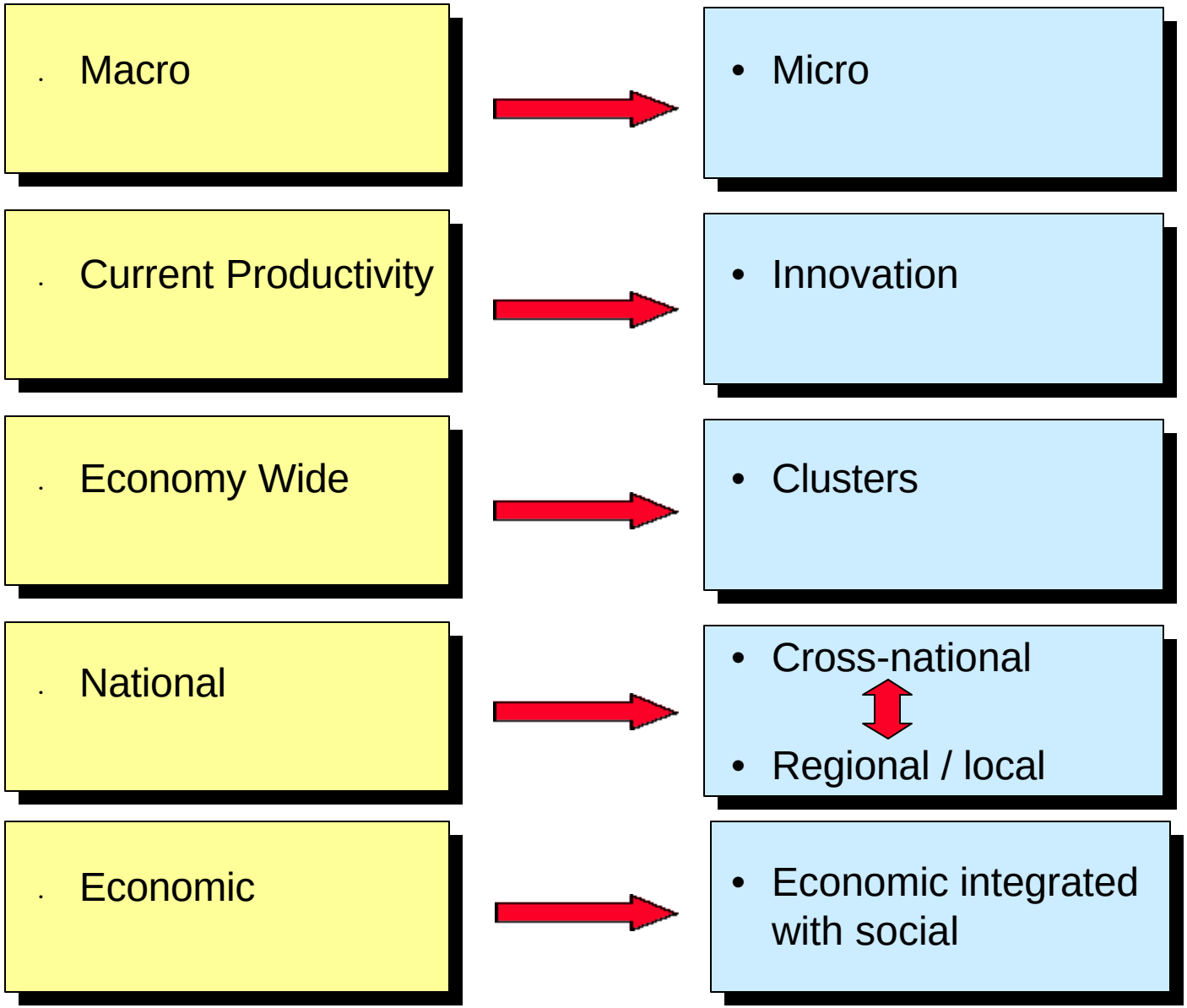
- A productive and growing economy requires:
  - Rising skill levels
  - Safe working conditions
  - Healthy workers who live in decent housing in safe neighborhoods
  - A sense of opportunity
  - Assimilation of underemployed citizens into the productive workforce
  - Low levels of pollution (pollution is a sign of unproductive use of physical resources)
- "Social" policies must be aligned with productivity in the economy and prepare and motivate citizens to succeed in the market system

Economic Development in Inner Cities
Premises of the New Model

- Inner-city distress is as much an economic as a social problem
  - Without viable jobs, social investments will be **insufficient**
- Economic development in inner cities must be approached from a **business strategy** perspective - businesses must be **genuinely profitable**, and the **private sector** must play the leading role
- There are existing and potential **competitive advantages** of inner cities that can support viable businesses and jobs
- The **disadvantages** of inner cities as business locations must be **addressed directly**, not offset by subsidies
- The inner city can only prosper if it is **integrated into the regional and national economy**
- The paradigm must shift from:
  - reducing poverty to **creating income, jobs, and wealth**
  - community deficiencies to **market opportunities**

Widen prosperity to all of our citizens

The Shifting Economic Policy Agenda



Selected References
Michael E. Porter

- "Microeconomic Competitiveness: Findings from the 1999 Executive Survey" in The Global Competitiveness Report 1999, (World Economic Forum, 1999)
- "The Determinants of National Innovative Capacity", with Scott Stern and Jeffrey Furman, (Harvard Business School Working Paper, 1999)
- "The Microeconomic Foundations of Economic Development," in The Global Competitiveness Report 1998, (World Economic Forum, 1998)
- "Clusters and the New Competitive Agenda for Companies and Govemments" in On Competition (Harvard Business School Press, 1998)
- "What is Strategy?" (Harvard Business Review, Nov-Dec 1996)
- "The Competitive Advantage of the Inner City," (Harvard Business Review, May-June 1995)
- "Toward a New Conception of the Environment-Competitiveness Relationship," with Claas van der Linde (The Journal of Economic Perspectives, Fall 1995).
- "Making Competition in Health Care Work," with Elizabeth O. Teisberg and Gregory B. Brown (Harvard Business Review, July-Aug 1994)
- The Competitive Advantage of Nations (The Free Press, 1990)