Clusters in three words:

- Ideas
- Relationships
- Place
Roadmap

- **Definition**: What are Clusters? Why do firms cluster?
- **Analysis**: Finding clusters
- **Action**: Working with clusters
I. Why Cluster(s)?

What are they?  How do they work?
What Kind of Economy?

- While most jobs and businesses in every state area are the same
- Restaurants, grocery stores, hospitals, beauty salons,
- About a third differs: Traded sector
Traded Sector Drives Growth

Most jobs are here: schools, hospitals, grocery stores, restaurants

But firms in this sector drive the economy
Defining Industry Clusters

Clusters are geographic concentrations of interconnected companies and institutions in a particular field, including:

- suppliers of specialized inputs, machinery, services
- distribution channels and customers
- manufacturers of complementary products
- companies related by skills, technologies or common inputs
- related institutions such as research organizations, universities, standard-setting organizations, training entities, and others
Porter: Clusters

- Starts from the business strategy standpoint
- Says Economic success isn’t random
- Similar and related businesses draw advantages from proximity
- Clustering holds for most “traded” goods: autos, carpets, RVs, others
What makes Clusters Tick?

Rivalry & Cooperation

Inputs

Customers

Suppliers

Source: Michael Porter, Harvard Business School
Oregon’s Microbrew Cluster

Rivalry
- Competition & Brewer’s Guild

Inputs
- Hops, Water, Brewmasters

Customers
- Savvy Beer Drinkers, Homebrewers, Small Restaurants

Suppliers
- Equipment Makers, Creative Services
An Oregon Cluster

DESGUITE BREWERY

ROGUE

WIDMER BROTHERS

FULL SAIL BREWING COMPANY

PORTLAND BREWING

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Micro-foundations of Clusters

- Labor Market Pooling
- Supplier Specialization
- Knowledge Spillovers
- Entrepreneurship
- Path Dependence and Lock-In
- Culture
- Local Demand
Stages of Clustering

- Concentrations of firms and workers
- Awareness, Conscious Action & Communication
- Formal Organization
Many Different Kinds of Clusters

- Buyer-Supplier and Value Chain
- Inter-Firm Relationships
- Geographic Extent
- Level of Activation/Awareness
  - Working, Latent, Potential
- Cluster Life Cycle - Phase
  - Embryonic, Growing, Mature/Declining, Renewing
- Other Issues
II. Finding Clusters

- Applying our definition to the real world
- Quantitative and Qualitative Techniques are complementary
Cluster Mapping

- A few places are well explored
- Outlines are (mostly) clear
- Much detail is still unknown
Cluster Analysis Cycle

- Define Cluster
- Gather Data
- Convene Firms
Sectors are not Clusters

SECTORS
Most quantitative analysis relies on data organized according to the SIC or NAICS classification schemes to define industries

CLUSTERS
Qualitative analyses define clusters according to local relationships. Cluster theory maintains that clusters cut across sector lines; many clusters are highly specialized
Sectors
A Cluster can span sectors
Or be a small part of a larger sector
The California Wine Cluster

- **Growers / Vineyards**
  - State Government Agencies (e.g., Select Committee on Wine Production and Economy)
  - Grapeseed
  - Fertilizer, Pesticides, Herbicides
  - Grape Harvesting Equipment
  - Irrigation Technology

- **Winery / Processing Facilities**
  - Winemaking Equipment
  - Barrels
  - Bottles
  - Caps and Corks
  - Labels
  - Public Relations and Advertising
  - Specialized Publications (e.g., Wine Spectator, Trade Journal)

- **California Agricultural Cluster**

- **Educational, Research, and Trade Organizations** (e.g., Wine Institute, UC Davis, Culinary Institutes)

- **Tourism Cluster**

- **Food Cluster**

Source: Michael Porter

Source: 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
Metals Industry Value Added Chain

Estimated Inter-Industry Purchases, $ Millions, 1992

Primary Metals
- 343

Fabricated Metals
- 85
- 30

Machinery
- 120
- 192
- 141

Transportation Equipment

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Athletic Apparel & Footwear

- Nike, Adidas, Columbia
- Nearly 10,000 employees
- Leading center for design
- Attracting others, creating startups
Nursery Products

- $800 million annual sales
- 1,000 producers
- Economies of scope
Micro foundations

- Relatively little effort to characterize the different sources of cluster advantages across clusters, over time and among geographies
- The “Murder on the Orient Express” problem: All factors potentially contribute to clustering
Different Explanations for the Same Clusters

- Silicon Valley Explanations
  - Subsidies from defense spending (Markusen)
  - Local higher education spillovers (Rogers and Larsen)
  - Unique business culture and relationships (Saxenian)
  - Extraordinary academic leader (Krugman)
  - Long history of radio & television (Sturgeon)
# Top Down v. Bottom Up Approaches

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Top Down</th>
<th>Bottom-Up</th>
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<tbody>
<tr>
<td>Approach</td>
<td>Quantitative</td>
<td>Qualitative</td>
</tr>
<tr>
<td>Principal Data</td>
<td>Secondary Data</td>
<td>Primary Data</td>
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<tr>
<td>Methodology</td>
<td>Statistical Modeling</td>
<td>Case Studies</td>
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<tr>
<td>Industrial Proximity</td>
<td>Classification System</td>
<td>Descriptive</td>
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<tr>
<td>Scope</td>
<td>Nationwide, Multi-Industry</td>
<td>Local, Single-Cluster</td>
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<tr>
<td>Dominant Logic</td>
<td>Deductive</td>
<td>Inductive</td>
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<tr>
<td>Measures</td>
<td>Employment, Patents, Wages, Sales</td>
<td>Relationships, Institutions</td>
</tr>
<tr>
<td>Findings</td>
<td>Broadly Applicable</td>
<td>Narrowly Limited</td>
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</tbody>
</table>
The universe is expanding
III. Action

Working with clusters
Clusters as a Framework for Policy

- An organizing principle for engaging a region in a discussion of its economic strengths and weaknesses
- A flexible tool at the intersection of analysis and policy-making
- Best efforts integrate quantitative and qualitative methods
Policy Measures and Micro-Foundations

- **Labor Market Pooling**: Labor market information, specialized training
- **Supplier Specialization**: Brokering, recruiting, entrepreneurship, credit
- **Knowledge-spillovers**: Networking, public sector R&D support
- **Entrepreneurship**: Assistance for start-ups, spin-offs
- **Lock-In**: Work to extend and refine (and re-combine) existing distinctive specializations
- **Culture**: Acknowledge and support cluster Organization
- **Local Demand**: Aggregate and strengthen local demand
Wishful Thinking

- Generally not possible to create a cluster where none exists
- Policy should focus on conditions for cluster growth, revival, and creation
- Identifying emerging clusters should be a priority
Get Real

- Assess your cluster’s competitive strength
- Benchmark against leading clusters elsewhere
- How is your cluster different or better?
General Policy Approaches

- Improve the technical support services
- Invest in social capital and social infrastructure
- Empower and listen to cluster leaders
- Encourage cross-fertilization of ideas across clusters
- Recruit companies that fill gaps in cluster development
- Develop and organize supply chain associations
- Support employee/entrepreneurs

After Rosenfeld (2002)
Gaps remain in many cluster efforts

- Goals of economic development not aligned with clusters
- Programs still oriented to “one business at a time”
- Staff and management not recognized or rewarded for cluster work
- Cluster information is ad hoc, not systemic
Integrating clusters into economic development

- Make cluster success an economic goal
- Design programs that reward collaboration
- Reward and recognize managers and employees for cluster successes
- Provide ongoing information and training
- Create a cluster network to share ideas
IV. Biotechnology
Industry Segmentation

Pharmaceuticals
- Very large, global firms
  - Top ten average $15 billion sales
- Assets are products, distribution, manufacturing expertise
- Very Profitable

Biotechnology
- Small, mostly single establishment firms
  - Top ten average $700 million sales
- Principal assets are people, research and future potential
- Lose Money
Nine Metros Dominate

Why these nine?
Two Pillars of Biotech Development

Research

- NIH Grants
- Patents

Commercialization

- Venture Capital
- R&D Partnerships
- Startup Firms
- Established Firms
## Leaders vs. the Pack

### Average Levels of Activity

<table>
<thead>
<tr>
<th>Metric</th>
<th>Top 9 Centers</th>
<th>Bottom</th>
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</thead>
<tbody>
<tr>
<td>NIH$ (millions)</td>
<td>812</td>
<td>104</td>
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<tr>
<td>Patents</td>
<td>2,641</td>
<td>263</td>
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<tr>
<td>Venture Capital</td>
<td>957</td>
<td>27</td>
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<tr>
<td>R&amp;D Alliances</td>
<td>1,089</td>
<td>11</td>
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<tr>
<td>New Firms</td>
<td>35</td>
<td>2.3</td>
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<tr>
<td>Large Firms</td>
<td>24</td>
<td>1.5</td>
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<tr>
<td>Biotech VC Firms</td>
<td>47</td>
<td>4</td>
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Research Dispersing

<table>
<thead>
<tr>
<th>Center</th>
<th>1980s</th>
<th>1990s</th>
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<tbody>
<tr>
<td>NIH$</td>
<td>63%</td>
<td>59%</td>
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<tr>
<td>Patents</td>
<td>71%</td>
<td>68%</td>
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### Commercialization Concentrating

<table>
<thead>
<tr>
<th>Top 9 Centers Share</th>
<th>1980s</th>
<th>1990s</th>
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<tbody>
<tr>
<td>Venture Capital*</td>
<td>81%</td>
<td>86%</td>
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<tr>
<td>R&amp;D Alliances*</td>
<td>89%</td>
<td>96%</td>
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<tr>
<td>New Firms</td>
<td>61%</td>
<td>77%</td>
</tr>
</tbody>
</table>

*Base data from early to mid-1990s*
For More Information

www.ImpresaConsulting.com