Cluster Mapping:
Creating the Knowledge Infrastructure for Accelerating Innovation and Entrepreneurship

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March 13/14, 2017
Research About Clusters

**Case Studies**

- Show nature of clusters
- Establish types of linkages that exist within clusters
- Identify patterns of cluster dynamics and their drivers
- Develop hypotheses on the impact of clusters on firms and regions

**Cross-sectoral quantitative Studies**

- Systematic comparison of clusters across sectors and locations
- Measurement of the overall importance of clusters
- Tracking cluster evolution
- Empirical tests of the impact of cluster presence on regional and firm-level economic performance

“Cluster Mapping”
The Evolution of Cluster Mapping

• Reflects circumstances in individual cases, not general patterns
• Often interest-driven, i.e. trying to show individual clusters to be large

ISC US Cluster Mapping Project (2005-)

• Ad-hoc Definitions
• First systematic, data-driven cluster definitions covering the entire economy
• Limited replicability due to the need to use expert opinion to minimize data noise

EU Cluster Mapping (2012-16)

• Enhances systematic, data-driven approach; fully transparent
• Based on input-output, co-location, and occupation data
• Delgado et al. (2016), JEG

EDA US Cluster Mapping Project

• Implements cluster definitions derived in the US, incl. 2016 update
• Adds data on cluster initiatives and regional business environments

Related and emerging clusters

• Capturing weaker relationships across cluster categories
Cluster Mapping: The Method

1. Classify industries by their geographic footprint
   – Traded – geographically concentrated
   – Local – present everywhere

2. Group traded industries into cluster categories
   – Co-location of employment and establishments
   – Similarities in skill use (national)
   – Input-Output linkages (national)

3. Group clusters
   – Data on weaker linkages to track relationships across clusters

   • Unique allocation of all narrow industries to one cluster category
   • Aggregation of data into indicators by cluster category and location (establishments, employment, wages, patents, skills, …)
   • Can be linked to location-specific outcome data

   • Reflect fundamentally different competitive dynamics that matter for policy

   • Are more informative on actual economic linkages and similarities than traditional groupings by technology, policy priority

   • Critical for development paths, while clusters are key for current performance
### 51 Traded Clusters

- Aerospace & Defense
- Agriculture
- Apparel
- Automotive
- Biopharma
- Business Services
- Coal Mining
- Communications
- Construction
- Distribution & eCommerce
- Downstream Chemicals
- Downstream Metals
- Education
- Electric Power
- Environmental Services
- Financial Services
- Fishing
- Food Processing
- Footwear
- Forestry
- Furniture
- Hospitality
- IT
- Insurance
- Jewelry
- Leather Products
- Lighting
- Livestock
- Marketing
- Medical Devices
- Metal Mining
- Metalworking
- Music
- Nonmetal Mining
- Oil & Gas
- Paper & Packaging
- Performing Arts
- Plastics
- Printing
- Production Technology
- Recreational Goods
- Textiles
- Tobacco
- Trailers & Appliances
- Transportation
- Upstream Chemicals
- Upstream Metals
- Video Production
- Vulcanized Materials
- Water Transport
- Wood Products

### 16 Local Clusters

- Commercial Services
- Community Organizations
- Education
- Entertainment
- Financial Services
- Food & Beverage
- Health Services
- Hospitality
- Household Goods
- Industrial Products
- Logistics
- Motor Vehicles
- Personal Services
- Real Estate
- Retail
- Utilities

Source: Delgado et al. (2016)
What data is now available?
Production Technology Clusters in Europe
Relative Employment Specialization

- Who are our peers and rivals?
- How does our performance stack up?
- What is our specific cluster profile?
- What competitive advantages do we offer as a location?

Source: European Cluster Portal
• What are the current anchors of our economy?
• What related fields might offer opportunities?
Europe’s Hotspots of Emerging Industries

• Where are new industries most likely to emerge?
• Where does cluster strength coincide with emerging industries, and where not?

Source: European Cluster Observatory 2016

Regional Hotspots
- 20 or more stars
- 15 - 19 stars
- 10 - 14 stars
- 5 - 9 stars
- 0 - 4 stars
Combining Core Cluster Data with Other Indicators

- Patents by clusters
- Gazelles by cluster
- Occupational profiles of clusters
- Profile of cluster portfolios in specific types of regions
- ...

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What do we learn from the data?
3000 Strong Clusters Across Europe

NUMBER OF STRONG CLUSTERS BY PERFORMANCE STARS

- **46%** of traded industry jobs...
- **50%** of traded industry payroll...

Stars for:
- Specialization
- Size
- Wage/productivity
- Growth/Entrepreneurship

Source: European Cluster Panorama, 2016
Cluster Churn
Share of clusters keeping/changing performance group, 2008-2014

Source: European Cluster Panorama, 2016
Clusters and Economic Performance

Presence of Strong Clusters

Prosperity
- Wages
- Productivity
- Job growth
- Resilience
- Patenting

Entrepreneurship
- New business formation
- Survival of new firms
- Job growth in new firms

Structural Change
- Path of structural change (emergence of new clusters)

Clusters and Entrepreneurship

• **67 700 gazelles** in traded industries in Europe employ 1.9 million workers or 1.6% of all employees

• 25 000 or **38% of all trade industry gazelles** are located in strong clusters; gazelles are as concentrated geographically as overall employment

• **Gazelles in strong clusters** account for 46% of all gazelle employment; they employ 35 employees on average compared to 24 in gazelles elsewhere

Source: European Cluster Panorama, 2016
Profile of Regions by Emerging Industry Strength

- Average Wage, PPP / Employee
- GDP per capita, PPP
- Patents per Million People

Source: European Cluster Panorama, 2016
How does it matter for policy?
• Clusters **emerge naturally**

• Clusters emerge and develop in a **context deeply affected by policy choices**

• **Collaboration** within clusters provides benefits but requires purposeful collective action

• Policies for **upgrading business environment conditions** can be more effective if they are cluster-specific but require information sharing and collective action

• **Cluster-based policies** enable informed decision making and collective action
From Cluster Mapping to Cluster-Based Policies

• Cluster mapping data provides **critical intelligence** to guide policy action

• How does **industrial composition** (what) and **performance within specific industries** (how) contribute to a location’s overall economic performance?

• What **clusters can specific policy programs**, for example on entrepreneurship, **leverage in a given location** to enhance impact

• What **opportunities for industrial upgrading do specific locations have** given their unique cluster portfolio and neighboring locations?

• Where are the hotspots of specific industries, clusters, or groups of related clusters that make them **the most suitable locations for cluster-specific programs**?
Two Opposing Approaches to Cluster Policy

BETTER (Competitiveness)

- Long-term impact
- New model of public-private collaboration

MORE (Agglomeration)

- High risk
- Traditional ‘industrial policy’
Types of Government Interventions in Clusters

• Direct intervention at the firm level
  – Attraction of firms
  – Subsidies, directed credit

• Intervention into the market
  – Provision of monopoly rights; Entry/trade barriers
  – Demand subsidies

• Investments in the cluster-specific business environment
  – Specific to the cluster
  – Benefiting the cluster but part of a general upgrading strategy

• Enable collaboration with and within the cluster
  – Support for cluster initiatives
  – Active engagement with the cluster in setting and implementing policies

High short-term impact/High distortion/low productivity impact
Long-term impact/Low distortion/high productivity impact

CREATE CLUSTERS? LEVERAGE CLUSTERS!
Modes of Cluster Policy

Create/task backbone organizations to mobilize clusters

Deploy policy funds through cluster initiatives/networks

Use cluster initiatives/networks as organizational infrastructure for policy action

Integration with other policies

LOW

HIGH

Fund operation of cluster initiatives/sectoral plans

Policy for Clusters

Sporadic:
Create stronger linkages

Tactical:
Deliver programs more effectively

Strategic:
Choose & design better policies

Clusters-based Policy

Sweden
Austria
Denmark
France
Germany
US
Basque

Colombia
Korea
Mexico
Sweden
Austria
Denmark
France
Germany
US
Basque

Integration with other policies

LOW

HIGH
Clusters and Entrepreneurship

- Encourage upgrading within clusters by introducing new approaches and ideas
- Push the emergence of related new clusters

- Enabling entry, and help start-ups to scale-up
- Critical for new knowledge to turn into innovation and economic value
Policies for Entrepreneurship and Innovation: What Role for Clusters?

• Cluster data as a key part of the **diagnostics** to identify locations and fields of economic activities that promise the highest returns for policy action

• Clusters as an **organizing principle** to bundle traditional entrepreneurship and innovation programs with other complementary policy tools for strengthening firm level performance

• Cluster organizations as **key partners** in designing and delivering entrepreneurship and innovation programs