

Introducing Regional Clusters: A Three Clusters Framework for Regional Economies

REMI 41st Annual Users' Conference, Oct 7th, 2026

Indraneel Kumar, PhD, AICP

Disclaimer: This presentation is prepared by Purdue Center for Regional Development using Federal funds under award #ED23RNAOG0174 from the Economic Development Administration, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of Economic Development Administration or the U.S. Department of Commerce.



Center for Regional Development



Regional Clusters

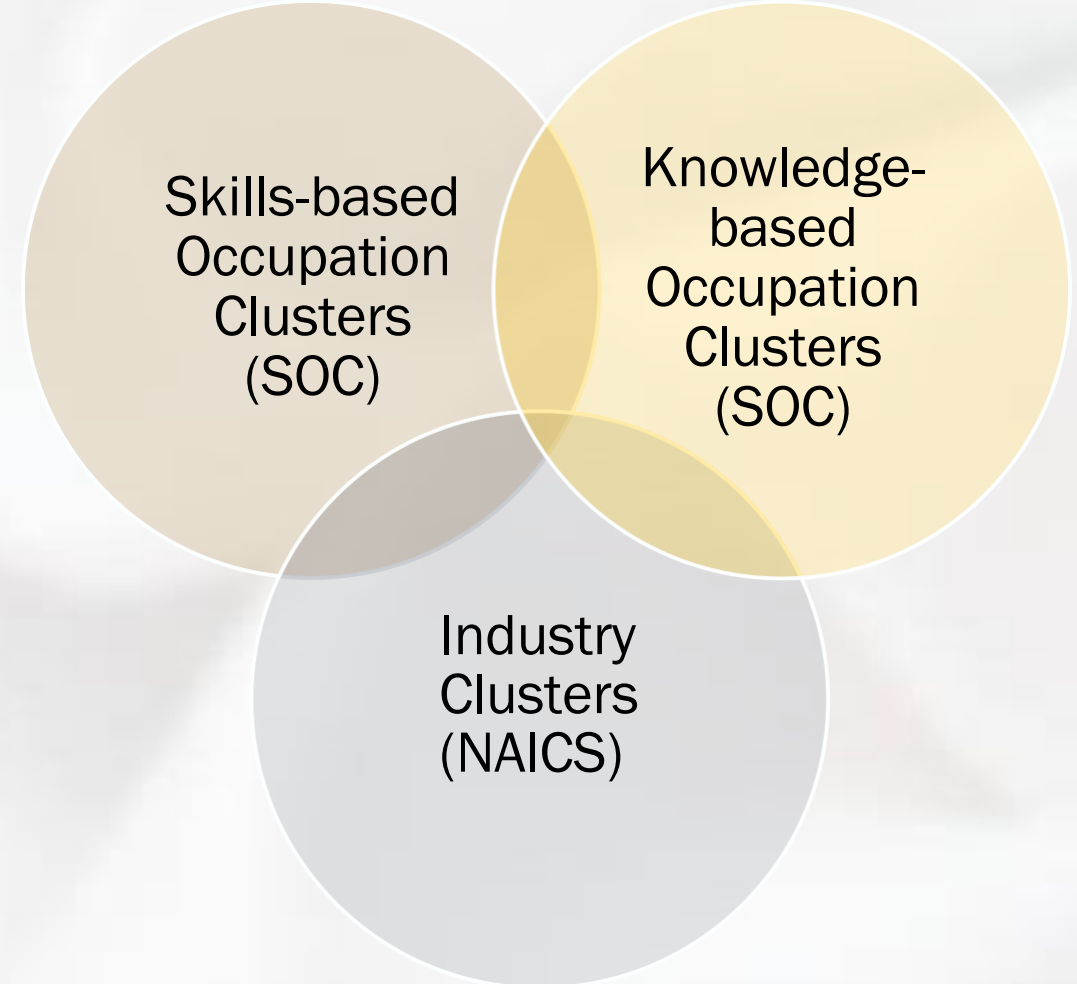
Why economic clusters?

- Rules of engagement for regional economic development are evolving.
- Not only the regions need to know about their competitive industries, but also competitiveness in the regional labor force and human capital.
- Industry clusters can reveal competitive industry sectors or economic drivers for the regions and help align the strategy development.
- Skilled labor force, low, middle to top skills, and knowledge workers can complement clusters of competitive industries.
- The project duration was from late 2023 to early 2026.
- Mixed methods approach- Qualitative + Quantitative

Economic clusters

Project overview:

- 38 Skills-based occupation clusters, covering all 857 occupations in the U.S. labor market.
- 21 Knowledge-based occupation clusters, covering 64% (557 out of 873) of total occupations requiring medium, considerable and extensive preparation through education and training.
- 21 primary industry-based clusters with 68 subclusters. Focus on basic or export-oriented industries.



What We Do

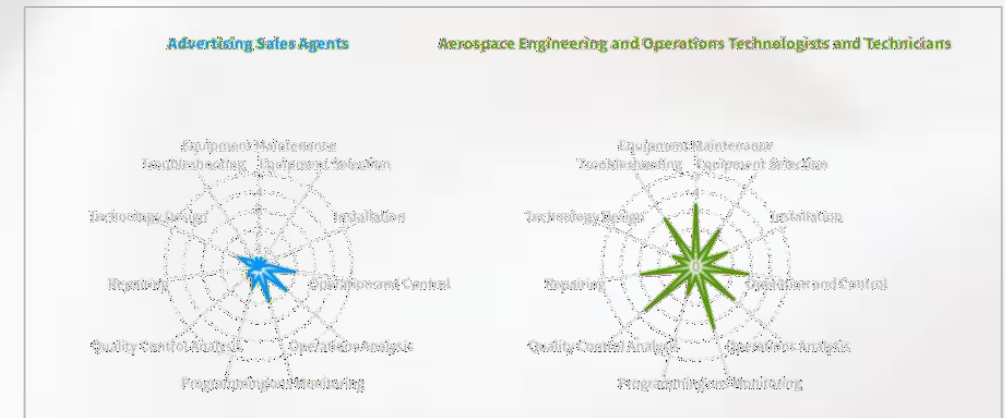
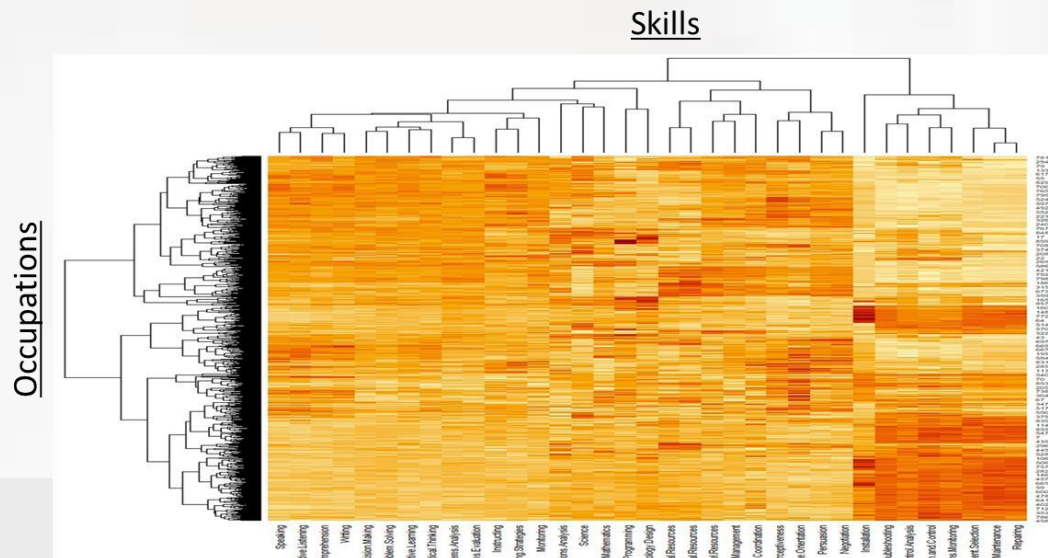
What We Produce



How are skills-based occupation clusters defined?

- Occupational groups based on similarity of skill levels. Cover the entire labor force, all 857 occupations in the labor market delineated by O*Net.
- Career ladder, career pathways, compatible occupations, specialization in skills, etc.
- Unsupervised Machine Learning (ML) methods on matrices from O*Net.

Euclidean(distance) + Ward(linkage) + AGNES(clustering) + Gap Statistic (statistical specification)



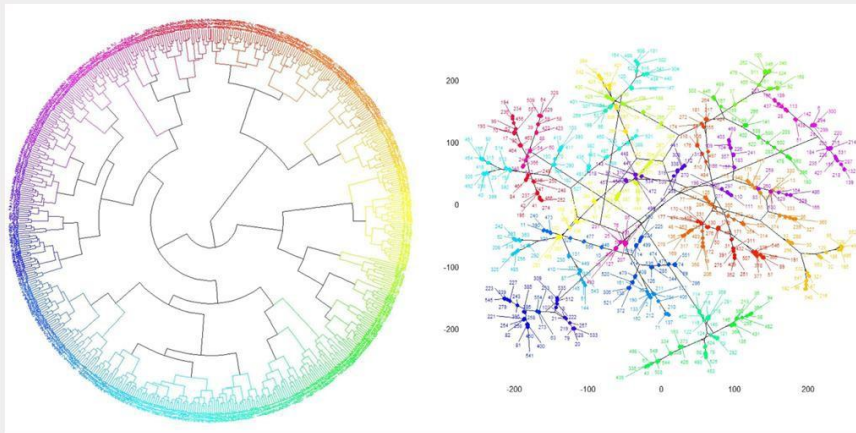


How are knowledge-based occupation clusters defined?

- Occupational groups are based on similarity of knowledge domains needed to perform the jobs.
- Knowledge clusters cover knowledge workers, around 64% of the total occupations available in the labor market. These occupations require medium, high-level, or extensive preparation.
- Unsupervised ML, but exploring both (1) Partitioning (2) Hierarchical methods

Euclidean(distance) + Ward(linkage) + AGNES(cluster) + Silhouette Score (statistical specification)

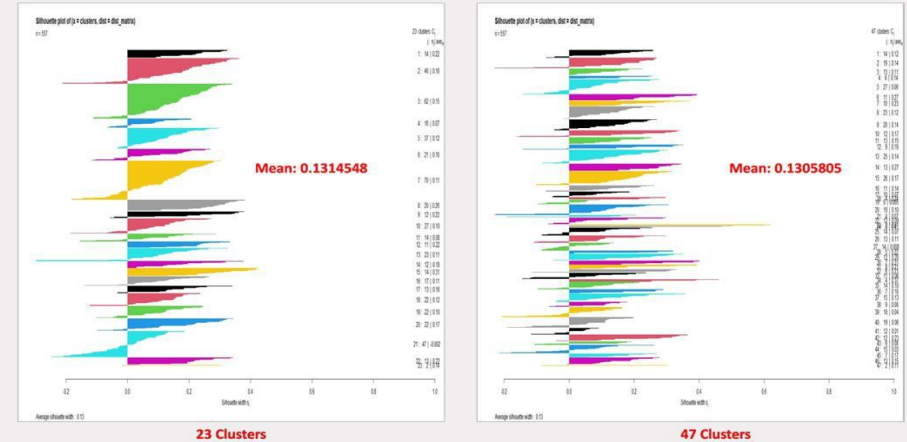
FIGURE 7. Circular and Tree Dendrograms of 47 Occupation Clusters for 557 Occupations



Note: Knowledge-levels squared; Job Zones 3, 4 and 5.

Source: Based on Gap Statistic Method. Processed by PCRD.

FIGURE 8. Silhouette Plots of Knowledge-levels Squared



Source: Based on Average Silhouette Method. Processed by PCRD.



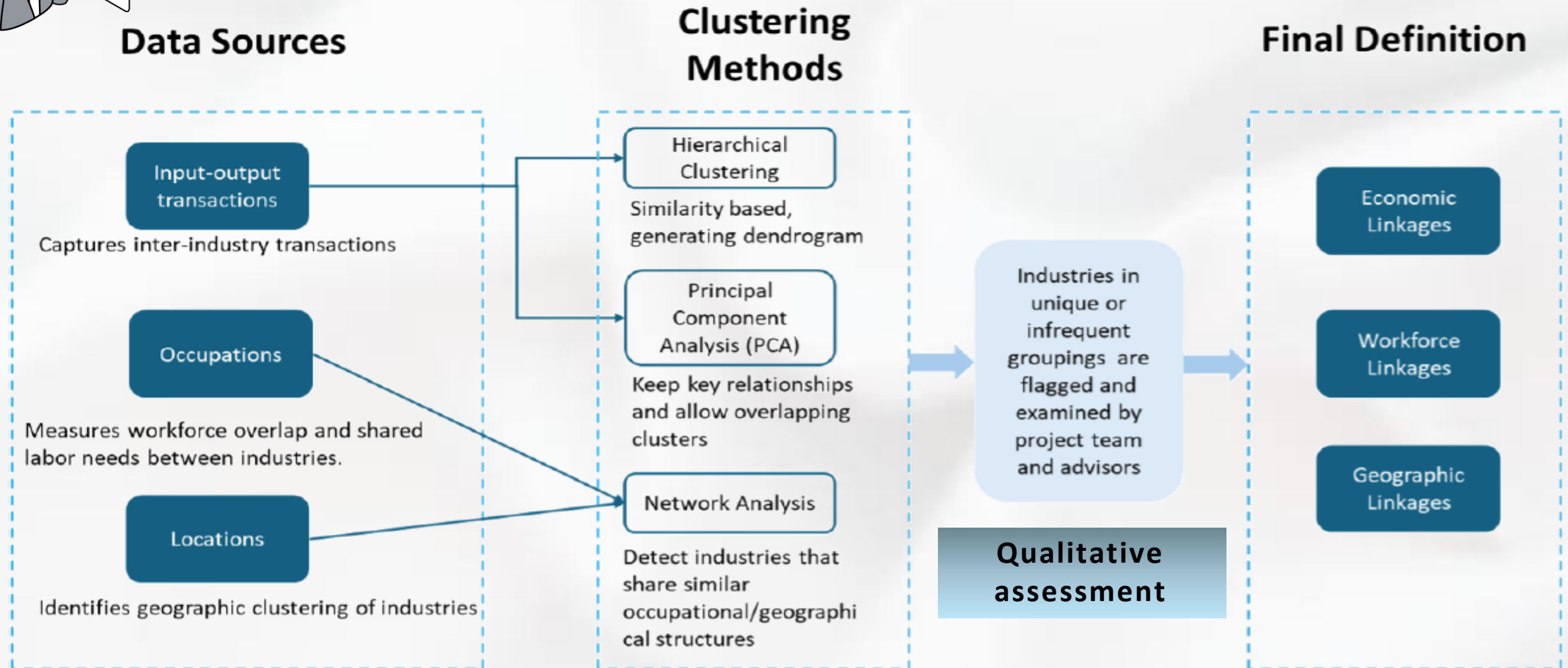
What are industry clusters?

Regional concentrations of interconnected firms, businesses, industries, suppliers, service providers, and institutions that enhance regional competitiveness:

- Buy and sell from each other (value chain)
- Use similar technologies and production processes
- Share a similar skilled labor pool (labor chains)
- Share supply chains
- Share, leverage and promote innovation
- Need supporting services and specialized infrastructure
- Include both high and low-value added employment
- Produce goods and services for exports beyond the region
- Drive the creation of employment, gross regional product and wealth in a region

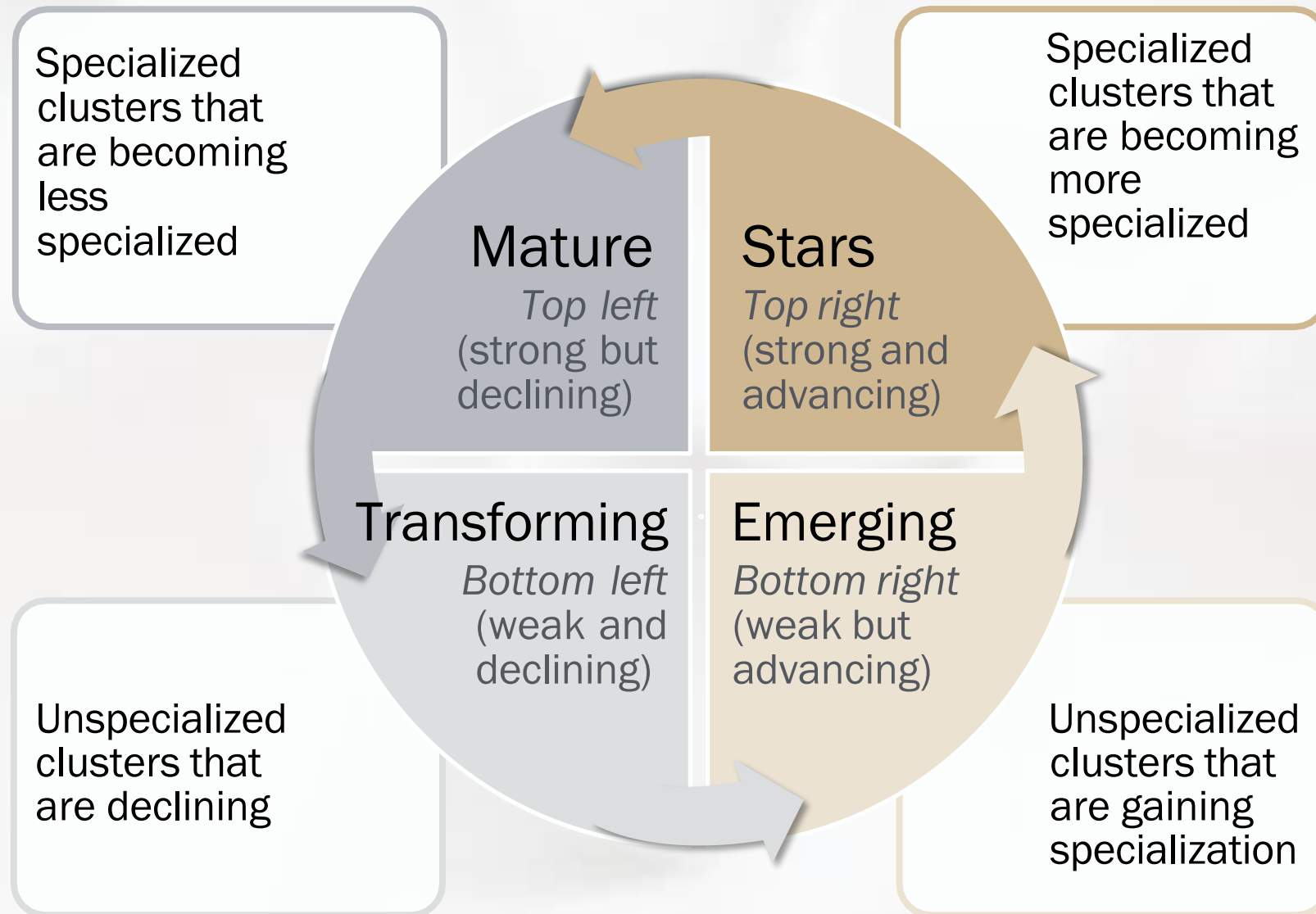


How are industry-based clusters defined?



- Statistical and ML methods and network analysis
- Quantitative + Qualitative assessment
- Overlapping cluster definitions

Industry/occupation clusters and regional economic competitiveness



How do clusters help?

- Industry, skills, and knowledge clusters reveal the region's competitive industries, workforce capabilities, human capital, and knowledge assets.
- Every region has a unique portfolio of industry, skills, and knowledge cluster strengths.
- Interactive cluster data dashboards and maps can help inform regional economic development strategies.



<https://pcrd.purdue.edu/regionalclusters/>

RegionalClusters.com

