
Targeting Industry Clusters
For Regional Economic Development

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I. Introduction

Industry targeting is the process of focusing industrial development programs and efforts at specific industries or clusters of related industries. The principal objectives of a Clemson University Regional Economic Development Research Laboratory (REDRL) industry targeting program is to identify industry clusters with (1) a high potential for locating in the study area and (2) significant positive economic impacts on the local economy. For the purpose of our analysis, industry clusters are defined as geographic concentrations of establishments in the same industry.

The targeting of industrial development programs at specific industry clusters generally will provide greater economic development benefits than those associated with a more unfocused industrialization efforts. The concentration of an industry at a particular location may result in significant cost savings to firms in the cluster, as a result of a greater availability of specialized input suppliers and business services; a larger pool of trained, specialized workers; public infrastructure investments geared to the needs of a particular industry; financial markets familiar with the industry; and an enhanced likelihood of interfirm technology and information transfers. In addition, clustering encourages networking or cooperation among firms and industry clusters facilitate new firm start-ups and growth.

The principal shortcoming with an industry targeting approach is the difficulty of “picking winners.” Industries identified through a targeting study may choose not

to locate in the region, or firms in a targeted industry may be attracted to the region but not provide the anticipated employment and income effects. However, industry targeting does increase the probability that the region will be successful in developing an industrial base that provides characteristics desired by the community. The remainder of this paper provides an overview of the methods used in our industry clusters targeting approach.

II. Criteria for Selecting Industry Clusters

The REDRL approach to cluster identification and targeting follows three principal steps.

- Step 1. Identify industry concentrations for which the region has experienced recent employment growth.
- Step 2. Construct value chains for the industry clusters selected in Step 1. Identify industries in the value chains with the greatest linkages to the local industry concentrations.
- Step 3. Rank the selected industries from Steps 1 and 2 by expected economic and fiscal impacts on the local economy.

The industry cluster targeting approach will be demonstrated using the findings of the 1998 study of Anderson County, SC; a small, single county metropolitan area. Clusters of manufacturing establishments in Anderson County were targeted at the four-digit SIC level.

Step 1: To identify expanding industry clusters in Anderson County, five screening criteria were used:

1. Three or more establishments in Anderson County in 1996.
2. County industry employment was greater than 200 in 1996.
3. Industry employment in Anderson County increased from 1988 to 1996.

4. An industry specialization index--the Location Quotient (LQ)--for Anderson County exceeded 1.00 in 1996.
5. An industry competitiveness index-- the Competitiveness Differential (CD) component of Shift-Share Analysis-- for Anderson County was positive for the period 1988 to 1996.

Screening criteria 1, 2, and 3 identify manufacturing industries that had a significant and growing presence in the County in 1996. A location quotient greater than one indicates that the region has been, over time, relatively successful in attracting or nurturing employment in a specific industry. A positive competitiveness differential indicates that industry employment in the area grew at a more rapid rate than for the nation, or area industry employment declined at a less rapid rate than for the nation.

Large and expanding industry clusters in contiguous counties (Oconee, Pickens, Greenville, Laurens, Spartanburg, and Cherokee) may also be promising manufacturing industries for Anderson County. Industry clusters in the neighboring counties were targeted at the four-digit SIC level using five screening criteria.

1. Five or more establishments in the counties in 1996.
2. Counties' industry employment was greater than 1000 in 1996.
3. Industry employment in the counties increased from 1988 to 1996.
4. Industry Location Quotient (LQ) for the counties exceeded 1.00 in 1996.
5. Industry Competitiveness Differential (CD) of Shift-Share Analysis for the counties was positive for the period 1988 to 1996.

The screening methodology for Anderson and neighboring counties identified 22 industry clusters with high potentials for employment growth in the area - - four industry clusters that Anderson and nearby counties have in common, four clusters

unique to Anderson County, and 14 clusters unique to the neighboring counties (table 1).

Step 2: Value Chains for Clusters.

Manufacturing industries supplying inputs to or purchasing outputs from the 22 cluster industries may be good candidates for industry targeting and recruiting. Industries linked to the cluster industries may find Anderson County a competitive location if proximity to input suppliers and product markets is desired. The IMPLAN database was used to identify the top five inputs suppliers and top five product markets for the 22 industry clusters. Manufacturing industries with numerous input or product market linkages to the 22 cluster industries were identified as industries that will find Anderson County an attractive location if the 22 cluster industries continue to develop in the Upstate. The manufacturers with the strongest buy-sell relationships to cluster industries include broadwoven fabric mills (SIC 221, 222, 223, and 226); paper mills (SIC 262); plastic products (SIC 308); plastic materials (SIC 282); and industrial organic chemicals (SIC 286).

The recruitment of manufacturers with strong buy-sell linkages to the industry clusters may be a second phase of a targeted industrial development strategy. Additional development of the identified industry clusters should be the initial focus of the county's industrial development program. Expansion of existing industry clusters will make the area a more attractive location for linked manufacturers, and thus, reduce the efforts/incentives required to attract establishments in the linked industries.

III. Ranking Industry Clusters (Step 3)

The industry clusters selected for Anderson County are good prospects for industrial recruitment since the area provides a competitive advantage for these manufacturers. All industries are not, however, equally attractive prospects based on the expected economic and fiscal impacts on Anderson County. Insights into the potential county-level impacts associated with successfully recruiting an additional establishment were provided by comparing four characteristics for the cluster industries.

U. S. Employment Growth Rate. Establishments in industries with rapid national employment growth are more likely to expand and create new jobs than establishments in slow growth or declining industries.

Average Establishment Size. Industries with large average establishment employment provide greater potential for immediate job generation than industries whose operations require, on average, fewer employees.

Average Production Worker Wages. A manufacturing plant paying high wages provides more attractive employment opportunities than an establishment offering primarily low wage jobs.

Fixed Assets Per Employee. The local fiscal impacts of a new manufacturing establishment are related to (1) the establishment's contribution to public revenues through property taxes paid and (2) public expenditures through increased services required by the establishment's employees. Establishments that contribute much to public revenues relative to public expenditures will be preferred.

Summary Index of Industry Characteristics. Comparisons among industry

characteristics are complicated since an industry may “rate” high on one characteristic and “rate” low on another. For example, establishments in the yarn spinning mills industry (SIC 2281) have large average plant sizes but pay relatively low wages to production workers. To assist in the inter-industry comparisons, a summary index is calculated as follows.

- (1) The national averages for the industry establishment characteristics are standardized. That is, the 22 values for each characteristic are treated as observations from a standard normal distribution (a distribution with a mean of 0.0 and standard deviation of 1.0). Standardization of characteristic data permits comparisons across characteristics that have different measures (for example, employment vs. wages vs. assets).
- (2) The actual value for the characteristic is replaced by its corresponding standardized value. This standardized value is the number of standard deviations above (+) or below (-) the mean for the 22 industries. Standardized values near 0.0 reflect actual values near the average for the 22 industries. Negative standardized values reflect below average actual values and positive standardized values represent above average actual values.
- (3) The standardized values for the industry characteristics are summed for each industry (table 2). This sum represents an unweighted total, that is, each of the industry characteristics is given equal weight in construction of the index. The community may select weights for each of the industry characteristics based on the relative importance of the industry attribute to the community’s economic

development goals.

In summary, twenty-two 4-digit SIC manufacturing industries were selected as promising targets for industrial recruitment based on recent local employment growth and the attractiveness of the area as a location for their production activities. Establishments in the 22 target industries provide different economic and fiscal impacts for the area, thus, county leaders should compare community needs with industry characteristics to determine which target industries provide the best fit and most desired impacts.

IV. Conclusion

The REDRL approach to industry targeting focuses on identifying industry clusters for which the study area exhibits promise for attracting and growing. Our focus on growing industry clusters takes advantage of the roles of historical path dependencies and external economies of scale in determining the attractiveness of a region to manufacturers. The REDRL approach has been applied to local and state industrial development efforts. The interested reader may refer to the following publications for examples of the industry clusters targeting methodology.

Barkley, D. L., M. S. Henry, and M. Warner. 2002. "Targeting Growth Opportunities in Lancaster County, 2002." REDRL Research Report 10-2002-04, Regional Economic Development Research Laboratory,

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Barkley, D. L., M. S. Henry, and S. Wright. 1998. "Industry Targeting for Economic Development, Anderson County, 1998." EER 170, Clemson University, Department of Applied Economics and Statistics, Clemson University.

Lamie, R. D., D. L. Barkley, M. S. Henry, and J. H. Syme. 1997. "Targeting Secondary Wood Products Manufacturing: Identifying High Impact, High Potential Sectors." RR97-1, Department of Agricultural and Applied Economics, January.

Wright, S., M. S. Henry, D. L. Barkley. 1998. "Targeting Food, Fiber, and Forestry Industries for Development of Rural South Carolina." Research Report 98-2, Department of Agricultural and Applied Economics, Clemson University, July.

Table 1. Industry Clusters Identified for Anderson County and Neighboring Counties

SIC	Industry	Anderson County		Neighboring Counties	
		Establishments	Employment	Establishments	Employment
2821	Plastics Materials and Resins	9	259	7	1195
3714	Motor Vehicle Parts and Accessories	7	2312	12	1630
2834	Pharmaceutical Preparations			3	1788
2297	Nonwoven Fabrics			11	1334
3511	Turbines and Turbine Generator Sets			4	1808
3562	Ball and Roller Bearings			5	3637
2843	Surface Active Agents			15	1038
3566	Speed Changers, Drives, and Gears			7	1161
2653	Corrugated and Solid Fiber Boxes			14	1065
2673	Bags: Plastics, Laminated, and Coated			6	1680
2261	Finishing Plants, Cotton			25	3033
3599	Industrial Machinery	19	205	119	1492
3089	Plastics Products, NEC			34	2623
3675	Electronic Capacitors			5	3548
2273	Carpets and Rugs	3	525		
2281	Yarn Spinning Mills	5	287		
2752	Commercial Printing, Lithographic			102	1684
3545	Machine Tool Accessories			18	2233
2392	House Furnishings, NEC	3	308		
2759	Commercial Printing, NEC	3	228		
2299	Textile Good, NEC			16	1178
2399	Fabricated Textile Products, NEC	3	340		

Source: ES202 Data Files and 1992 Census of Manufacturers

**Table 2. Standardized Distributions of the Industry Growth Rate,
Mean Plant Size, Assets Per Employee, And Mean Wage Rate.**

SIC	Industry	Growth Rate 1988-1996	Mean Plant Size	Assets Per Employee	Mean Wage Rate	Sum
2821	Plastics Materials and Resins	-0.83	0.22	3.99	2.12	5.49
3714	Motor Vehicle Parts and Accessories	1.49	0.76	0.11	1.25	3.61
2834	Pharmaceutical Preparations	0.16	1.84	0.63	0.90	3.53
2297	Nonwoven Fabrics	2.03	0.65	0.44	-0.03	3.10
3511	Turbines and Turbine Generator Sets	-0.42	0.94	0.12	2.02	2.66
3562	Ball and Roller Bearings	-0.78	1.81	0.23	0.79	2.05
2843	Surface Active Agents	0.26	-0.59	1.01	0.97	1.65
3566	Speed Changers, Drives, and Gears	0.32	-0.51	-0.20	0.62	0.22
2653	Corrugated and Solid Fiber Boxes	0.46	-0.22	-0.18	-0.11	-0.06
2673	Bags: Plastics, Laminated, and Coated	0.63	-0.13	-0.15	-0.41	-0.07
2261	Finishing Plants, Cotton	1.72	-0.64	-0.42	-0.83	-0.17
3599	Industrial Machinery	0.90	-1.25	-0.53	-0.01	-0.89
3089	Plastics Products, NEC	0.82	-0.63	-0.42	-0.68	-0.92
3675	Electronic Capacitors	-1.35	1.53	-0.48	-0.70	-1.01
2273	Carpets and Rugs	-0.19	0.41	-0.48	-0.89	-1.15
2281	Yarn Spinning Mills	-1.76	1.26	-0.19	-0.99	-1.69
2752	Commercial Printing, Lithographic	-0.24	-1.20	-0.47	0.00	-1.91
3545	Machine Tool Accessories	-0.80	-0.96	-0.46	0.08	-2.14
2392	House Furnishings, NEC	-0.02	-0.54	-0.79	-1.34	-2.70
2759	Commercial Printing, NEC	-0.38	-1.17	-0.64	-0.69	-2.88
2299	Textile Good, NEC	-1.25	-0.67	-0.33	-0.80	-3.05
2399	Fabricated Textile Products, NEC	-0.75	-0.90	-0.77	-1.27	-3.69

Source: ES202 Data Files and 1992 Census of Manufacturers