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Economic Development Report Number 1

The Economics of
Highly Technical Water-Intensive Firms
for Northwest Indiana:
Comparative Advantages and Competitive Strategies

Anthony Paul Andrews, Ph.D.

Research Fellow, PWI

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Acronyms and Definitions

Acronym	Description
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
CR	Concentration Ratio
EGR	Economic Growth Regions
FRBC	Federal Reserve Bank of Chicago
GDP	Gross Domestic Product
GPO	Gross Product Originating
GSP	Gross State Product
HHI Index	Herfindahl- Hirschman Index
JLQ	Job Location Quotient
LQ	Location Quotient
NAICS Code	North American Industry Classification System Codes
PMSA	Primary Metropolitan Statistical Area
	Southern Lake Michigan Regional Water Supply Consortium
SLMRWSCA	Area
SMSA	Standard Metropolitan Statistical Area

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Executive Summary

In 1990, Michael Porter of the Harvard Business School wrote, in his paper on *The Competitive Advantage of Nations*, “national prosperity is created, not inherited ... and ... a nation’s competitiveness does not grow out of [its] natural endowments, its labor pool [or other factors] ... but depends on the capacity of its industry to innovate and upgrade.”¹ The same can be said for sub-national regions such as a state or a region within a state. While factor inputs of land, labor, capital, and entrepreneurship are important, what is clearly more important, as Porter points out, is that a [region] succeeds because [its] home environment is forward thinking, dynamic, and challenging. These three elements are the basis for a comprehensive strategy that seeks to take an integrative planning approach in developing a methodology that results in “the creation of advantages ... as a long-run iterative process with ongoing demands for investment dollars.”² In other words, competitive sustainability and economic development are continuous moving targets which must be continuously addressed.

Concomitant with a continuous innovation and upgrading strategy is the importance of the structure of economic activity at a particular location, where it has long been the case that Regional Scientists point to the importance of agglomeration economies or clusters as a unifying framework in which to organize development strategies. A formal definition of agglomeration is a configuration of firms, households, and governmental agents in a spatially defined context of interregional and/or international integration whose synergistic interactions increase economic efficiency (Fujita and Thisse, p. 388). A more applicable definition of agglomeration is a localization of “clusters,” which offers a way of thinking about a regional economy in the context of a competitive environment. A cluster, in this context, consists of existing related firms, their activities, linkages and the spillover effects they produce in firm related and other agency activities.

The purpose of the research presented here was to identify agglomerative and/or cluster activities associated with water-intensive firms and to identify characteristics in Northwest Indiana that would allow further development to increase the attractiveness of the region for the relocation of such firms. The research questions were:

- Could water be used as a “gating” factor to induce firms with high valued output and wage structure to relocate to the region?
- What locational characteristics currently exist that are favourable and/or unfavourable for attracting firms that produced high valued output?
- What clusters currently exist that could enhance the locational attraction of high-value, specifically, water-intensive firm?
- What firms have the potential to take advantage of the present locational social, economic, and governmental characteristic and configurations?

To identify existing clusters, we utilized Location Quotient and Shift-Share Analysis. Location Quotient Analysis is a tool which measures the extent to which an area or region specializes in a particular industry. Shift-Share Analysis divides the growth of an industry into a region’s components

¹ Porter (2000), p. 155.

² Day and Reibstein (1997), p. 53.

or sectors that are useful in identifying agglomeration economies. While the two concepts are not without their critics, both can and have been quite useful as first-analysis methods to identify spatially interrelated industries and sectors. Both analyses are incorporated in the paper to verify the concept of a cluster and/or an agglomeration. A more detailed analysis of mapping a firm's cluster linkages, vis'a vis upstream and downstream input and output activities can crystallize the linkages and present cluster and agglomerative economies in a much more comprehensive fashion.

Rather than focusing specifically on water-intensive firms, it was decided to identify all of the competitive industries in Northwest Indiana, which is also geographically referred to in government nomenclature as Economic Growth Region 1 (EGR-1). The report provides an analysis of competitive sectors for the region as a whole and for each of the seven counties in particular. Thus, the report provides information on each county with respect to possible and potential sector clusters relative to the state and the state relative to the nation. This allows a topology of macro- and meso-firm activity levels from which to judge competitive performance.

This review takes an international perspective. Globalization has fundamentally changed the rules of the game in the sense that local and regional competitive markets are now being contested by international firms. It is important that local and regional development planners focus on two strategies: first, development planning in terms of the dynamic changes in conditions of input and product markets and, second, development planning in terms of the international competitive environment. In the long-run, since barriers to entry are diminishing, sector strategies must integrate geographic, market, and global environment information to compete.

The Identification of Sectoral Specializations by Location

This review identifies county sector specializations based on Location Quotient Analysis. The resulting county specializations are presented in Table 1 below. These sectors provide a look at each county's specialization sectors, which implies a greater concentration of employment relative to the State of Indiana.

The review also identifies county sector competitive positions, which also provide an indication of agglomerative and/or cluster activity. Tables 1 and 2 summarize this information, which was derived using Shift-Share Analysis. As can be seen, Tables 1 and 2 are presented in 2- and 3- digit sector levels, as defined by North American Industry Classification System (NAICS) Codes, which are an updated version of the former Standard Industrial Classification (SIC) System. Both tables provide information on existing locational activity but do not define potential activity. Potential activity involves starting with concentrations of major firm activity, examining up-stream and down-stream associations and complementary vertical and horizontal sub-sector industries and institutions among each sector, and determining which sectors can take advantage of existing and potential linkages. By moving from 2- and 3-digit analysis levels to 6-digit level and examining the critical firms, entities, and agents associated with a particular cluster, it is then possible to define the characteristics for the location of potential firms. Of course, the selection of sectors should be those with high valued output and/or those associated with highly technical production activities, which take advantage of the sectoral advantages in Tables 1 and 2.

This report provides detailed findings from the research, as well as a discussion of the methodology, data, and the academic literature on which the methods and models are based.

**Summary Table 1:
Specialization Sectors by County and NAICS Code**

Rank	County	Industry	LQ
1	Pulaski	112 Animal production	25.02
2	Newton	326 Plastics and rubber products manufacturing	13
3	Pulaski	333 Machinery manufacturing	10.83
4	Starke	111 Crop production	10.77
5	Newton	111 Crop production	10.01
6	Jasper	324 Petroleum and coal products manufacturing	7.9
7	Lake	324 Petroleum and coal products manufacturing	7.9
8	Pulaski	111 Crop production	7
9	Porter	331 Primary metal manufacturing	5.93
10	Jasper	331 Primary metal manufacturing	4.2
11	Lake	331 Primary metal manufacturing	4.2
12	LaPorte	713 Amusements, gambling, and recreation	3.25
13	Starke	623 Nursing and residential care facilities	3.15
15	Jasper	713 Amusements, gambling, and recreation	3.06
14	Lake	713 Amusements, gambling, and recreation	3.06
16	LaPorte	333 Machinery manufacturing	3.05
17	Porter	611 Educational services	2.82
19	Jasper	485 Transit and ground passenger transportation	2.69
18	Lake	485 Transit and ground passenger transportation	2.69
20	Starke	326 Plastics and rubber products manufacturing	2.44
21	Porter	425 Electronic markets and agents and brokers	2.39
22	Pulaski	623 Nursing and residential care facilities	2.38
23	Porter	236 Construction of buildings	2.21
24	Starke	446 Health and personal care stores	2.18
25	LaPorte	311 Food manufacturing	2.1
27	Jasper	562 Waste management and remediation services	2
26	Lake	562 Waste management and remediation services	2
28	LaPorte	331 Primary metal manufacturing	1.96

Source: PWI Calculations

Summary Table 1 provides 3-digit NAICS Code by rank (strength) of specialization and county. Location Quotients appreciably above 1 indicates a county is producing a good or service for export outside its area (McDonald, 2000, p. 65).

Table 2:
Sector Competitive Positions by County and NAICS Code

Sector	Description	Jasper	Lake	LaPorte	Newport	Porter	Pulaski	Starke
11	Forestry, fishing, hunting, and agriculture support			48.05	76.51			
21	Mining	87.87		80.91				
22	Utilities		8.44					
23	Construction			6.17	3.37	9.26		3.84
31	Manufacturing		9.68	9.15		7.45	5.93	6.43
42	Wholesale trade			8.87				14.64
44	Retail trade							
48	Transportation & warehousing	20.59					34.14	
51	Information	8.75	13.85	24.03	0.70	40.01		
52	Finance & insurance		22.14					
53	Real estate & rental & leasing						12.96	
54	Professional, scientific & technical services	27.84	15.65	46.37	13.57			
55	Management of companies & enterprises							
56	Admin, support, waste mgt, remediation services	75.69	15.72	40.22		32.66		8.37
61	Educational services	21.64	23.61	38.37		38.27		
62	Health care and social assistance	150.28		21.31	2.09			11.50
71	Arts, entertainment & recreation	20.37	10.15	69.00				
72	Accommodation & food services	1.00			41.05		9.29	

Source: PWI Shift-Share Calculations

Table 2 shows the Competitive Sectors by County and Sector. The larger the numerical value of a particular sector, the stronger the Competitive Position of that sector. Table 1 also shows the inter-country relationships with respect to Competitive Position. The table shows sectors, which are competitive in 4 and/or 5 counties. This information is summarized in Figure 1, which shows the inter-county relationships as sector related and provides potential linkages between sectors. Thus, Tables 1 and 2 and Figure 1 provide a look at existing and potential sector linkages that should be considered as candidates for agglomerative activity and regional competitive advantages.

The Review considers these sectors as possible competitive and locational sectors that should be enhanced and used as a basis to develop potential sector linkages Economic Growth Region 1 and each county in particular. To accomplish this, the following activities should be undertaken:

1. Identify 6-digit sub-sector firms and industries to isolate institutions that provide specialized skills, technologies, information, capital, infrastructure, and any collective bodies covering cluster participants.
2. Develop cluster schematic diagrams and profiles of the agents, institutions, and up- and down-stream activities that define specific clusters for each of the 9 sectors.
3. Select a portfolio of related and/or non-related high value added sectors to pursue for introduction and integration into the region. Based on the present analysis, possible recommendations are firms associated with the semiconductor and information sectors. Both sectors are water intensive at certain levels of production.
4. Develop a Technical Working Group (TWG) of interested agents in the public and private sectors to guide in the further definition of portfolio of industries for the region. An initial focus of the TWG should be to:
 - a. Introduce the concept of “Cluster” planning and disseminate information on case studies at regional and sub-regional levels.
 - b. Encourage further analysis at county and sub-county levels to identify sub-sector existing and potential firms’ development.
5. Each county should identify sectors and resources that can enhance existing activity and develop an agenda of new firm introductions that can feed into existing competitive advantage activities.

Public Policy Considerations

6. The approach to economic development should focus on cluster regional clusters and agglomeration economies, rather than on specific firms. The synergies associated with cluster and agglomerative activities produce production, administrative, and support systems which buoy specific sectors of the cluster and/or agglomeration economy over the business cycle. This creates spillover effects which produce systems-wide benefits
7. The role of government should be one which enhances the infrastructure, quality of the labor pool, quality of life and environment, venture capital, and regulations associated with specific clusters. Once a portfolio of clusters is identified legal and institutional arrangements should be examined for constraints to development.

8. Implementation of a cluster driven economic development strategy should be private sector led and based on profit-, social-, and environmental maximization of overall societal welfare.
 - a. An open and transparent integrated planning process should focus on high wage and ancillary jobs producing sectors.
 - b. The overall strategy should be promoted as a job-growth, skills-enhanced, and job-creation strategy. The engine(s) of growth should be tied directly to job development and manpower planning.
9. The region was found to have a labor market structure below competitive levels of the state and nation. Considerable attention should focus on examining the fit between educational programming and the skills levels needed for current and potential clusters and agglomerative economies. There should be a clear labor schema of educations links from all educational levels to skills requirements.
10. All educational institutions should be assessed regarding their core competencies to provide links to industry labor pools.
11. It is important that all levels of planning (local, county, regional, and state levels) adopt consistent policies and strategies and sector related strategies.

Additional Research

12. The Review focused on aggregated sectors and not firm-specific information. A more in-depth analysis of firm specific activities, especially with respect to labor and product markets would enhance the understanding of linkages to public policy issues.
13. An Impact Analysis of the current and potential effects of enhancing the identified portfolio of sectors should be developed to provide actual and estimated impact multipliers to guide in the selection of the locational and agglomeration economies.
14. Given the Impact Analysis, a cost benefit analysis should be developed to derive the most feasible projects to pursue.

Thus, we may summarize our findings:

- For a number of critical firms under consideration (Information and Semiconductor Sectors), water does not necessarily have to be a gating factor for location preferences, as these sectors have substantially increased their water reuse capabilities using technological innovations, thus, increasing EGR-1 as a potential location.
- The region has a number of comparable locational preferences resources; with secondary educational levels below comparable high-tech regions. However, the location of higher education institutions more than compensate for this deficiency and present the focus on higher wage firm classifications as excellent targets for consideration.
- We have identified seven (7) cluster sectors to target for economic development considerations: 23-Construction, 31-Manufacturing, 51-Information, 54 – Professional, Scientific, and Technical Services, 56-Administrative Support, Waste Management, and Remediation Services, 61-

Educational Services, and 72- Health Care and Social Assistance. We also include the Petroleum (324) and Chemical (325) Sectors, which link to the Semiconductor (334) sector.

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