

# Introduction to EMSI's Industry & Cluster Gap Analysis Reports

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Clusters are one of the hottest topics in economic and workforce development. The concept of industry cluster analysis, however, can be somewhat ambiguous. Depending on the context, an industry cluster can be defined according to any combination of the following characteristics: related resources and supply chains, indirectly related resources, common inputs and outputs, interlinked sales and growth numbers, and proximity. The cluster tools which EMSI has developed in **Strategic Advantage**—specifically the Economic Impact module—contain a selection of broad, built-in clusters, but are also designed to be flexible enough so that each user can define a “cluster” according to their regional circumstances.

One of the major factors in cluster growth is availability of resources within the region. Accordingly, the Economic Impact module's Input-Output tool includes both industry and industry cluster “gap analysis” reports, which show the user how much of each industry's or cluster's necessary resources or “input requirements” are being satisfied locally and how much are being imported from outside the region (the difference is the “gap”). The idea behind such an analysis is that when a region develops a strong cluster, it will attain a competitive advantage from having all the necessary resources readily available, and from the potential for collaboration and innovation between companies within the cluster. The archetypal example of this is California's Silicon Valley, which is home to a host of computer and software companies that benefit from the availability of locally produced hardware parts, human capital, and so on.

So the reports identify “gaps” in how well local industry/cluster supply satisfies local demand. Large “gaps” (i.e., where a low level of input requirements are met in the region) may highlight a need for the region to bring in producers of those specific goods and services in order to capture money that currently leaks out of the region. If it is feasible to do so, closing such gaps should strengthen the local industry or cluster and boost the whole regional economy.

## **EMSI Gap Analysis Report Contents**

EMSI provides gap analyses for both clusters and industries. The reports provide a list of associated industries required in the production of goods and services in a defined region, based on the total output of the specified industry and the direct inputs or support services it requires as part of the supply chain. The industry gap analysis uses the lowest available NAICS detail level for a specific industry. The cluster gap analysis works in much the same way for a set of specific inter-related industries (e.g., the automotive sector). However, aside from the built-in clusters, it is up to the analyst to define a set of industries that inter-related enough to make sense as a cluster.

EMSI's gap analysis reports provide two measurements industries or clusters: the total dollar value in requirements and the percentage of requirements fulfilled in the region. The total requirements column is based on the input requirements from the Bureau of Economic Analysis' national direct input technical requirements matrix (reduced down to the regional level). The matrix provides a set of production functions showing the goods, services, labor and other such requirements necessary to produce the economy's output. **Table 1** illustrates the example of the various industry input requirements for a single industry, “Automobile and light truck manufacturing” (NAICS 336110), in the state of Indiana. These

values represent the input requirements necessary to produce \$14 billion in sales for automobile and light truck manufacturing.<sup>1</sup>

**Table 1 – Top Input Requirements for Automobile and Light Truck Manufacturing in Indiana**

NAICS I-O Code	Description	Total Requirements (K)
336300	Motor vehicle parts manufacturing	\$6,446,943
420000	Wholesale trade	\$714,125
8111A0	Automotive repair and maintenance, except car washes	\$428,250
4A0000	Retail trade	\$325,088
333618	Other engine equipment manufacturing	\$214,195
550000	Management of companies and enterprises	\$188,194
484000	Truck transportation	\$187,913
326210	Tire manufacturing	\$166,831
533000	Lessors of nonfinancial intangible assets	\$160,365
32721A	Glass and glass products, except glass containers	\$153,479
334300	Audio and video equipment manufacturing	\$138,946
334413	Semiconductors and related device manufacturing	\$128,573
332500	Hardware manufacturing	\$116,318
332720	Turned product and screw, nut, and bolt manufacturing	\$106,212
334514	Totalizing fluid meters and counting devices	\$105,524
541400	Specialized design services	\$103,696
52A000	Monetary authorities and depository credit intermediation	\$100,141
336211	Motor vehicle body manufacturing	\$95,123

<sup>1</sup> Note: Only the largest input industries are included in this table

The next two columns in the industry gap analysis table represent how much of the total input requirements are satisfied within the region and how much must be imported. **Table 2** shows us these associated percentages. The values are calculated based on regional purchase coefficient (RPC) values for each industry. In some cases you may find that your actual regional export patterns differ significantly from the EMSI default averages, which are calculated using best-practice methods for regionalizing national patterns (due to the absence of complete regional data). If this is the case, you can modify your exports for each industry in the Advanced Section of the Economic Impact tool to achieve better results.

**Table 2 – Percent of Automobile and Light Truck Manufacturing Total Requirements Satisfied within Indiana**

NAICS I-O Code	Description	% Satisfied in Region	% Satisfied out of Region
336300	Motor vehicle parts manufacturing	87%	13%
420000	Wholesale trade	81%	19%
8111A0	Automotive repair and maintenance, except car washes	62%	38%
4A0000	Retail trade	81%	19%
333618	Other engine equipment manufacturing	91%	9%
550000	Management of companies and enterprises	33%	67%
484000	Truck transportation	95%	5%
326210	Tire manufacturing	47%	53%
533000	Lessors of nonfinancial intangible assets	46%	54%
32721A	Glass and glass products, except glass containers	74%	26%
334300	Audio and video equipment manufacturing	60%	40%
334413	Semiconductors and related device manufacturing	0%	100%
332500	Hardware manufacturing	73%	27%
332720	Turned product and screw, nut, and bolt manufacturing	53%	47%
334514	Totalizing fluid meters and counting devices	58%	42%
541400	Specialized design services	47%	53%
52A000	Monetary authorities and depository credit intermediation	38%	62%
336211	Motor vehicle body manufacturing	87%	13%

From **Table 1** and **Table 2**, we can immediately identify which input requirements are predominately “locally produced” and which input requirements are imported.<sup>2</sup> Motor vehicle parts manufacturing, which would include components such as engines and parts, belts and hoses, valves, etc., are mainly produced by local manufacturers, whereas semiconductors (i.e. electronic circuit boards and microprocessors) must be imported from outside the state of Indiana.

### ***Points of Caution for the Analyst***

When conducting an industry or cluster gap analysis using EMSI’s Economic Impact module, there are a few cautionary points to consider. First, the production functions in EMSI’s gap analyses are based on national patterns from the Bureau of Economic Analysis. This could make a difference in certain cases, for example, an industry with a specific NAICS code could have different input requirements from one region to another if the companies within each of these regions have significantly different production styles (e.g., pull vs. push production). An example of this in automobile and light truck manufacturing would be a comparison between a Ford plant in Michigan to a Toyota plant in Kentucky. Each company operates under different production styles, therefore altering the production function.

A second point of caution is that some industries are too highly aggregated to yield specific results. Sometimes this is due to the nature of the NAICS coding system, and sometimes due to aggregations within EMSI data. An example of the prior could be “crop and animal production”—all of the various agricultural businesses which fall under this category, from cattle ranches to sugar beet farms, will share a common production function because the NAICS coding system is not more detailed in this category. In other cases EMSI’s system of aggregation could lead to less specific results within certain industries. For example, currently one of the NAICS codes used in the Gap Analyses is “Construction.” In the NAICS system, there are twenty-eight different 5-digit NAICS industries in the Construction sector. Knowing how the production function for “HVAC contractors” differs from “Oil and gas pipeline construction” could be valuable in certain analyses; nonetheless the current system does not disaggregate the data at this level of specificity.<sup>3</sup>

A third recommendation for any analyst is to know the economy and the situation within the region, especially if industry purchases and production differ from the defined national averages. This will allow for smarter understanding and application of the gap analysis reports. As mentioned earlier, EMSI’s Economic Impact module does allow for customization in the “Advanced Section” that will allow an analyst to better define industry and industry spending within their region.

Finally, it may not always be feasible or cost-effective to close any given import gap by attracting a specific industry to the area. For example, the region’s location, transport links, regulatory environment, labor costs, or available natural resources may be unfavorable to the industry, meaning that it is more efficient to import the necessary inputs into the region. EMSI’s gap analysis reports must be used intelligently with knowledge of the region and in the industries involved.

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<sup>2</sup> In the Industry Gap and Cluster Gap Analysis tools, Tables 1 and 2 are combined allowing for easier evaluation of the data. In this paper, the data is broken into its major components for a more comprehensive explanation.

<sup>3</sup> As of October 1, 2007, EMSI will offer improved 6-digit NAICS data for 1,070 industries (previously was 462) throughout all of the modules in the Strategic Advantage tool, including the Industry and Cluster Gap Analysis section. Despite these improvements, data availability limitations prevent disaggregation of Construction and many Agriculture industries.



## About EMSI

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