

ECONOMIC DEVELOPMENT STRATEGY IN ST. LOUIS: An Assessment of Key Industry Clusters

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February 2004



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RegionWise

RegionWise envisions a vital St. Louis metropolitan area where the possibilities for all people are maximized through the power of knowledge sharing, partnership, and monitoring the state of the region. To realize this vision, RegionWise applies evidence-based approaches to promote positive regional change.

RegionWise complements the renewal that St. Louis 2004 began. As St. Louis 2004 heralded innovation and the inspiration of civic commitment, RegionWise developed the structure to focus innovation and support a continuous improvement process. Its work is framed by the five goals originally defined by the St. Louis 2004 civic forums:

- People Safe and Healthy
- Children Prepared for Life
- Economic Security and Opportunity
- Social Justice and Racial Equality
- Enriched and Vital Lives

RegionWise produces an annual document, *One Region*, which explores the region's progress in meeting these five quality of life goals. Throughout the year, RegionWise releases reports that track local issues in their regional context. To facilitate access to the region's existing knowledge repositories, the initiative also maintains *RegionWise.org*. Web tools include annotated data links to statistical information, Interest Groups, *People Taking Action* stories, and periodic news articles to illuminate regional issues.

The initiative is funded by the Danforth Foundation and housed at the United Way of Greater St. Louis.

Acknowledgments

The authors of this report thank Bryan Bezold with the St. Louis Regional Chamber and Growth Association, Bob Lewis with Development Strategies, Inc., and Russell Signorino with the United Way of Greater St. Louis for their helpful comments. Thanks also to Emily Beck with RegionWise for editorial assistance.

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EXECUTIVE SUMMARY

This paper presents an assessment of the key industry clusters that have been the focus of the Regional Chamber and Growth Association's economic development strategy for the St. Louis region.

The Regional Chamber and Growth Association (RCGA) coordinates an innovation approach to economic development that emphasizes technological development. They have organized their strategies around the concept of "clusters" introduced by Michael Porter at the Harvard Business School's Institute for Strategy and Competitiveness. He describes local economic activity in terms of the interconnections and commercial relationships of local companies across industry sectors. This broader approach provides information that can be used to target scarce economic development resources, and, ultimately, produce a higher return in terms of employment, labor income, and output.

RCGA has formulated their strategic promotion and resource support efforts in St. Louis around clusters found to be significant in terms of employment, labor income, and output to the local economy. These clusters include advanced manufacturing, financial services, information technology (IT), life and plant science, and transportation and distribution.

RegionWise commissioned the Public Policy Research Center (PPRC) at the University of Missouri – St. Louis to analyze the economic impact of these clusters. The purpose of the study is to assess the current size and importance of these clusters to the local economy and to provide baseline data for future assessments that will track cluster performance over time. IMPLAN, an input-output modeling software, was used to conduct the analysis using 2000 data, the most recent data available. For purposes of this report, the St. Louis Metropolitan Statistical Area (MSA) is defined as including the following counties: Clinton, Jersey, Madison, Monroe, and St. Clair in Illinois; and Franklin, Jefferson, Lincoln, St. Charles, St. Louis, St. Louis City, and Warren in Missouri.

Key findings regarding the relative size and strength of the five clusters are:

- Of the five clusters, the transportation and distribution cluster employed the most workers (147,000), which accounted for 9% of all jobs in the St. Louis region (1,636,000). It was followed by the advanced manufacturing and financial services clusters, each of which employed nearly 6% of the region's workforce.
- Of the five clusters, the transportation and distribution cluster contributed most to the region's total labor income (12.2%). The advanced manufacturing and financial services clusters contributed 9.5% and 7.3%, respectively.
- As identified significant sectors in the local economy, the clusters' average labor incomes were appropriately above the average of \$38,000 for all workers in the region. Average labor incomes for the five clusters ranged from \$71,000 in the IT cluster to \$50,000 in the financial services cluster.

- The output of the advanced manufacturing cluster had the highest dollar value in the year 2000, generating nearly 15% of the total output for the St. Louis region. The transportation and distribution cluster ranked second, producing 10.5% of the total regional output. At the low end of the five clusters was the life and plant science cluster, at 3.9%.

Key findings regarding the economic impact of the five clusters are:

- The advanced manufacturing cluster ranked first among the five clusters in terms of indirect and induced employment impacts, with a factor of 2.38 (or 1.38 jobs in other industries for every one job in advanced manufacturing). This was followed closely by the life and plant science (2.20) and IT (2.04) clusters. Financial services had the highest direct employment, but the lowest impact on indirect and induced employment, with a factor of 1.68.
- The advanced manufacturing cluster also ranked first in labor income impacts, having a factor of 1.80, i.e., For every dollar of labor income paid in the advanced manufacturing cluster, an additional \$0.80 of labor income was generated in other regional industries. The plant and life science cluster ranked second, with \$0.75 of additional labor income, with financial services generating the least, at \$0.46.
- In terms of output, the life and plant science and transportation and distribution clusters generated the most indirect and induced output. An additional \$0.53 and \$0.52 was generated in other industries for every \$1 of output in these clusters, respectively. This was followed by indirect and induced impacts of advanced manufacturing (\$0.48), information technology (\$0.44), and financial services (\$0.38).

The [appendices](#) present detailed information about each of the five clusters, including a definition of industries that make up the cluster, an overview of the cluster relative to the total regional economy, an assessment of the performance of the cluster's subsectors, and the largest regional employers (in 2000) in each of the clusters. The appendices are available in a separate document.

This report documents the economic contribution and significance of the five clusters that are the focus of RCGA's economic development strategy for the St. Louis region. They are the focus of this strategy because they are collections of industry sectors that bring significant economic benefits to the region, primarily in the form of new income. As a result, this income has been translated into higher than average wages for its workers (29.5% to 85.6% above the region's average) and a better standard of living. This also means that they possess higher levels of productivity than other industry sectors, and are likely centers of innovation in terms of the products they produce, the services they provide, or the processes they employ.

INTRODUCTION

In recent years, economic development strategies in the St. Louis region have focused on the creation of new employment and labor income as the primary keys to local economic prosperity and a higher standard of living. These strategic efforts assist industries and companies to build sustainable, long-term profitability through product and service innovation. The focus on the role of innovation in products, services, or processes is essential to competitiveness in the rapidly changing business environment that characterizes the 21st century.¹

The focus on the role of innovation in products, services, or processes is essential to competitiveness in the rapidly changing business environment that characterizes the 21st century.

The innovation approach to economic development coordinated by the Regional Chamber and Growth Association (RCGA) emphasizes technological development. This approach is premised in the notion that to remain competitive in today's global economy, it is crucial that both emerging and mature industries create and adopt changes in technology. The development, transfer, and application of technology to the production process and to service provision are viewed as essential to maintaining or acquiring new market share and long-term profitability. It is this type of innovation within local industries and companies that will ultimately provide for long-term economic growth for the region and a higher standard of living for St. Louis workers.

Depicting local economic activity in terms of the interconnections and commercial relationships of local companies across industry sectors is a more accurate description of a how local economic activity is organized than focusing on a single industry or sector. This broader approach provides more information that can be used to effectively target scarce economic development resources, and, ultimately, produce a higher return in terms of employment, labor income, and output.

RCGA's economic development strategies have been organized around the concepts of business competitiveness developed by Harvard Business School professor Michael Porter.² Through his work at the Institute for Strategy and Competitiveness, he introduced the notion of industry "clusters" as a means for better understanding the commercial relationships of individual companies and industry sectors. A cluster is a geographic concentration of firms that have close commercial relationships with other industries in the region, use common

technologies, and/or share a specialized labor pool. Depicting local economic activity in terms of the interconnections and commercial relationships of local companies across industry sectors is a more accurate description of a how local economic activity is organized than focusing on a single industry or sector. This broader approach provides more information that can be used to

¹ Innovation is the result of primarily technological, large and small discoveries that create more value from a fixed set of resources. For example, today's Pentium 4 computer has about the same quantities of plastic, fiberglass, silicon, and other materials as did a 1982 IBM PC, but it is a hundred times faster and capable of far more functions, because all of these materials have been rearranged into an improved form. This kind of product and service innovation tends to capture the interest of markets outside of the region, including the global market, and produces growth in jobs, new business enterprises, and, typically, higher than average wages.

² Porter, M.E. (1990). *The Competitive Advantage of Nations*. New York: The Free Press.

effectively target scarce economic development resources, and, ultimately, produce a higher return in terms of employment, labor income, and output.

RCGA has targeted their strategic promotion and resource support efforts around clusters found to be significant in terms of employment, labor income, and output to the local economy. These clusters include advanced manufacturing, financial services, information technology (IT), life and plant science, and transportation and distribution.

RegionWise commissioned the staff of the Public Policy Research Center at University of Missouri – St. Louis to assess the relative strength of the five clusters in the St. Louis regional economy. The report that follows presents data and information regarding the current size and importance of these clusters to the local economy and serves as baseline data for future assessments that will track cluster performance over time.

METHODOLOGY

The report presents a comparative analysis of the five clusters that are the focus of RCGA's long-term economic development strategy. The clusters are advanced manufacturing, financial services, information technology (IT), life and plant science, and transportation and distribution. The IMPLAN System (modeling software and data) was used to complete the analysis. The definition of industries to include in each cluster was agreed upon by representatives of RCGA and the Public Policy Research Center. The analysis takes into consideration the following dimensions: employment, labor income, average labor income, output, total value added, and tax impact. Due to a time lag in data availability, the data used in this study are from the year 2000, the most recent year available.

For purposes of this report, the St. Louis Metropolitan Statistical Area (MSA) is defined as including the following counties: Clinton, Jersey, Madison, Monroe, and St. Clair in Illinois; and Franklin, Jefferson, Lincoln, St. Charles, St. Louis, St. Louis City, and Warren in Missouri.

Detailed information about the individual clusters is contained in Appendices A-E. The following information regarding each cluster is presented:

- The definition of the industries included in the cluster.
- An overview of the cluster's place within the economy of the St. Louis region.
- An assessment of the cluster's ripple effects by subsectors, using the following measures:
 - ◆ Employment
 - ◆ Labor Income
 - ◆ Output
 - ◆ Total Value Added
 - ◆ Taxes
- The cluster's ten largest employers in 2000.

Appendix F presents definitions of terms and sources used in this report.

OVERVIEW OF THE FIVE CLUSTERS

Table 1 summarizes the economic contribution of each of the five clusters in terms of employment, labor income, average labor income, output, and total value added. For each of these measures, the table contains each cluster's nominal value, as well as the cluster's share of the regional total. See Appendix F for a Guide to Interpreting Economic Impact Analysis.

Table 1: Year 2000 St. Louis MSA Economy – Cluster Comparison

| Cluster | | Employment | Labor Income Billions | Average Labor Income | Output Billions | Total Value Added Billions |
|--|---------------------|------------|-----------------------|----------------------|-----------------|----------------------------|
| St. Louis MSA – All Industries | Regional Total | 1,636,000 | \$62.6 billion | \$38,000 | \$173.0 billion | \$91.4 billion |
| | % of Regional Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Advanced Manufacturing Cluster | Cluster Total | 96,000 | \$5.9 billion | \$62,000 | \$25.1 billion | \$8.6 billion |
| | % of Regional Total | 5.9% | 9.5% | 161.3% | 14.5% | 9.4% |
| Financial Services Cluster | Cluster Total | 92,000 | \$4.6 billion | \$50,000 | \$12.7 billion | \$7.7 billion |
| | % of Regional Total | 5.6% | 7.3% | 129.5% | 7.4% | 8.5% |
| IT Cluster | Cluster Total | 51,000 | \$3.6 billion | \$71,000 | \$9.4 billion | \$5.8 billion |
| | % of Regional Total | 3.1% | 5.8% | 185.6% | 5.5% | 6.3% |
| Life & Plant Science Cluster | Cluster Total | 33,000 | \$1.9 billion | \$58,000 | \$6.7 billion | \$3.2 billion |
| | % of Regional Total | 2.0% | 3.0% | 150.6% | 3.9% | 3.5% |
| Transportation & Distribution Cluster | Cluster Total | 147,000 | \$7.7 billion | \$52,000 | \$18.1 billion | \$11.5 billion |
| | % of Regional Total | 9.0% | 12.2% | 135.5% | 10.5% | 12.5% |

Among the five clusters, there is a wide range in the amount of output produced (and in total value added, which is closely linked to output). The advanced manufacturing cluster was the largest output producer in the year 2000. That year, it generated nearly 15% of the total output for the St. Louis region. The transportation and distribution cluster was also a large producer within the region, generating 10.5% of total regional output. The financial services, IT, and life and plant science clusters were smaller producers, with respective shares of 7.4%, 5.5%, and 3.9% of the region's output.

Employment Impact

Employment refers to the number of full and part-time jobs in an industry, regardless of occupational function. A comparison of the employment impacts of the five clusters reveals that employment in each cluster affected the economy in different ways. The last column in Table 2 shows the employment factor for each cluster. This number represents the total number of jobs that were supported by one job in the respective cluster. For example, the advanced manufacturing cluster has a factor of 2.38, which means that every job in that cluster supported a total of 2.38 jobs within the region (one job in the advanced manufacturing cluster and 1.38 jobs among the region's remaining industries). The advanced manufacturing sector supported a large number of jobs in the wholesale trade industry. Other industries that were reliant on the

advanced manufacturing cluster included eating and drinking establishments, personnel supply services, hospitals, and motor freight transport and warehousing.³

Table 2: Year 2000 Employment Impact – Cluster Comparison

| Cluster | Direct | Indirect | Induced | TOTAL | Factor* |
|--|---------|----------|---------|---------|---------|
| Advanced Manufacturing Cluster | 96,000 | 56,000 | 76,000 | 228,000 | 2.38 |
| Financial Services Cluster | 92,000 | 17,000 | 46,000 | 155,000 | 1.68 |
| IT Cluster | 51,000 | 15,000 | 38,000 | 105,000 | 2.04 |
| Life & Plant Science Cluster | 33,000 | 17,000 | 23,000 | 72,000 | 2.20 |
| Transportation & Distribution Cluster | 147,000 | 38,000 | 76,000 | 261,000 | 1.77 |
| Five Cluster Total | 420,000 | 143,000 | 259,000 | 821,000 | 1.96 |

* The value of this factor has not been validated at other levels of direct employment.

Labor Income

Labor income includes all forms of employment compensation, including wages and benefits. According to the analysis, although the transportation and distribution cluster generated more labor income than the other clusters in 2000, the advanced manufacturing cluster actually had the greatest dollar-for-dollar impact in the region. The factor score is an indicator of the ripple effect. It shows that for every dollar of labor income paid in the transportation and distribution cluster, an additional \$0.49 was generated in the region's labor income. In comparison, as a dollar of advanced manufacturing labor income resonated through the economy, an additional \$0.80 was gained. Examples of industries positively affected by the labor income earned in the advanced manufacturing cluster are wholesale trade, doctors and dentists, computer and data processing services, hospitals, and legal services.

Of the five clusters, the life and plant science cluster generated the lowest labor income. However, it has a very strong ripple effect in the economy; for every dollar paid in the life and plant science cluster, an additional \$0.75 was paid in other sectors of the economy.

It shows that for every dollar of labor income paid in the transportation and distribution cluster, an additional \$0.49 was generated in the region's labor income. In comparison, as a dollar of advanced manufacturing labor income resonated through the economy, an additional \$0.80 was gained. Examples of industries positively affected by the labor income earned in the advanced manufacturing cluster are wholesale trade, doctors and dentists, computer and data processing services, hospitals, and legal services.

Of the five clusters, the life and plant science cluster generated the lowest labor income. However, it has a very strong ripple effect in the economy; for every dollar paid in the life and plant science cluster, an additional \$0.75 was paid in other sectors of the economy. The financial services cluster had the lowest labor income factor. For every dollar of labor income paid in this cluster, the regional economy gained an additional \$0.46.

Table 3: Year 2000 Labor Income Impact – Cluster Comparison

| Cluster | Direct Billions | Indirect Billions | Induced Billions | TOTAL Billions | Factor* |
|--|-----------------|-------------------|------------------|----------------|---------|
| Advanced Manufacturing Cluster | \$5.9 billion | \$2.4 billion | \$2.3 billion | \$10.7 billion | 1.80 |
| Financial Services Cluster | \$4.6 billion | \$0.7 billion | \$1.4 billion | \$6.7 billion | 1.46 |
| IT Cluster | \$3.6 billion | \$0.6 billion | \$1.2 billion | \$5.4 billion | 1.47 |
| Life & Plant Science Cluster | \$1.9 billion | \$0.7 billion | \$0.7 billion | \$3.3 billion | 1.75 |
| Transportation & Distribution Cluster | \$7.7 billion | \$1.5 billion | \$2.3 billion | \$11.4 billion | 1.49 |
| Five Cluster Total | \$23.7 billion | \$5.9 billion | \$7.8 billion | \$37.4 billion | 1.58 |

* The value of this factor has not been validated at other levels of direct labor income.

³ Refer to Appendices A-E for additional detail about the ripple effects of each cluster on the regional economy.

Output

Output refers to the market value of the goods and services produced by industries. As illustrated in Table 4, the life and plant science cluster had the highest return of the five clusters in 2000. This means that for every dollar of life and plant science output, an additional \$0.53 was generated in the output of other industries through the ripple effect of indirect and induced impacts. The lowest output factor belongs to the financial services cluster, which stimulated an additional \$0.38 in the output of other industries for every dollar of financial services output.

Table 4: Year 2000 Output Impact – Cluster Comparison

| Cluster | Direct Billions | Indirect Billions | Induced Billions | TOTAL Billions | Factor* |
|--|-----------------|-------------------|------------------|-----------------|---------|
| Advanced Manufacturing Cluster | \$25.1 billion | \$6.4 billion | \$5.5 billion | \$37.0 billion | 1.48 |
| Financial Services Cluster | \$12.7 billion | \$1.5 billion | \$3.3 billion | \$17.5 billion | 1.38 |
| IT Cluster | \$9.4 billion | \$1.3 billion | \$2.8 billion | \$13.6 billion | 1.44 |
| Life & Plant Science Cluster | \$6.7 billion | \$1.9 billion | \$1.7 billion | \$10.4 billion | 1.53 |
| Transportation & Distribution Cluster | \$18.1 billion | \$4.0 billion | \$5.5 billion | \$27.6 billion | 1.52 |
| Five Cluster Total | \$72.1 billion | \$15.1 billion | \$18.8 billion | \$106.1 billion | 1.47 |

* The value of this factor has not been validated at other levels of direct output.

Total Value Added

Total value added refers to the monetary value added to intermediate goods and services by industry. It includes labor income, property income from rents, royalties, dividends, interest, etc., and indirect business taxes. The year 2000 total value added factors of advanced manufacturing and life and plant science clusters are among the highest, with 1.82 and 1.65, respectively. The financial services cluster, which had the lowest year 2000 output factor, also had the lowest total value added factor.

Table 5: Year 2000 Total Value Added Impact – Cluster Comparison

| Cluster | Direct Billions | Indirect Billions | Induced Billions | TOTAL Billions | Factor* |
|--|-----------------|-------------------|------------------|----------------|---------|
| Advanced Manufacturing Cluster | \$8.6 billion | \$3.6 billion | \$3.4 billion | \$15.7 billion | 1.82 |
| Financial Services Cluster | \$7.7 billion | \$1.0 billion | \$2.0 billion | \$10.7 billion | 1.38 |
| IT Cluster | \$5.8 billion | \$0.8 billion | \$1.7 billion | \$8.3 billion | 1.43 |
| Life & Plant Science Cluster | \$3.2 billion | \$1.0 billion | \$1.0 billion | \$5.3 billion | 1.65 |
| Transportation & Distribution Cluster | \$11.5 billion | \$2.1 billion | \$3.3 billion | \$16.9 billion | 1.48 |
| Five Cluster Total | \$36.8 billion | \$8.6 billion | \$11.5 billion | \$56.9 billion | 1.55 |

* The value of this factor has not been validated at other levels of direct total value added.

Tax Impact

The tax impact reflects taxes obtained from multiple sources, including personal income, social security, estates, property, corporate income, and indirect business taxes such as fees, sales taxes, property taxes, etc.⁴ Each of the five clusters studied in this report are different in terms of operations, goods and services provided, skills and education of their workforces, etc. As a result of these differences, each cluster is subject to different types of taxes, as well as differing tax rates. Therefore, it is difficult, if not impossible, to compare the tax revenue generated by the clusters. For example, although the advanced manufacturing cluster generated a large amount of taxes in 2000, \$4 billion, its tax generation as a percent of output (15.9%) was the lowest of all the clusters. It should also be noted that the “per cluster worker” amount includes all the various tax sources (e.g., corporate taxes, indirect business taxes, as well as taxes paid by individuals (e.g., personal income tax, social security, etc.) When using the type of tax revenue information contained in Table 6, it is important to note these dynamics and exercise caution in comparison. The tax impact tables in Appendices A-E provide tax source detail for each of the clusters.

Table 6: Year 2000 Tax Impact – Cluster Comparison

| Cluster | Output | Employment | Taxes | | |
|---------------------------------------|-----------------------|----------------|-----------------------|---------------------|--------------------|
| | | | Amount | % of Cluster Output | Per Cluster Worker |
| Advanced Manufacturing Cluster | \$25.1 billion | 96,000 | \$4.0 billion | 15.9% | \$42,000 |
| Financial Services Cluster | \$12.7 billion | 92,000 | \$2.6 billion | 20.7% | \$29,000 |
| IT Cluster | \$9.4 billion | 51,000 | \$2.1 billion | 22.3% | \$41,000 |
| Life & Plant Science Cluster | \$6.7 billion | 33,000 | \$1.3 billion | 18.8% | \$39,000 |
| Transportation & Distribution Cluster | \$18.1 billion | 148,000 | \$5.3 billion | 29.3% | \$36,000 |
| Five Cluster Total | \$72.1 billion | 420,000 | \$15.3 billion | 21.2% | \$37,000 |

⁴ For a complete description of taxes, refer to Appendix F.

CONCLUSION

The five clusters that are the focus of RCGA's economic development strategy had considerable impact on the overall economy in 2000. Together, these five clusters accounted for nearly 26% of the region's employment, but when including the ripple effect, both indirect and induced, these clusters influenced about 50% of the region's jobs. The employment multiplier (factor) for all five clusters was 1.96, i.e., For every job in these clusters, another job was created in other industries.

Together, these five clusters accounted for nearly 26% of the region's employment, but when including the ripple effect, both indirect and induced, these clusters influenced about 50% of the region's jobs.

The average labor incomes of these five clusters were 29.5% to 85.6% above the average for all workers in the region. The aggregate labor incomes for these five clusters account for 38% of the region's income; however, when including the indirect and induced labor income, the clusters influenced about 60% of the region's total labor income. The clusters' labor income multiplier was 1.58, signifying that for every dollar of labor income paid in the clusters, an additional \$0.58 was generated in the region's labor income.

The five clusters were also highly productive and contributed to the total value added of the economy. The clusters held relatively small percentages of the region's total workforce (26%), but they produced 42% of the region's total output. When taking into account the impact of indirect and induced output, the total output influenced 61% of the region's total. Similarly, the commercial activities of the five clusters directly generated 40% of the region's total value added, while indirect and induced commercial activities accounted for another 22%, or 62% in total. The value added multiplier was 1.55; the induced and indirect value added activities increased the clusters' contribution by nearly 55%.

Overall, the data presented in this report validate the emphasis that has been placed on them by local economic development organizations. These highly productive and higher-paying sectors of the regional economy represent a source of significant regional prosperity. By adopting a strategy that builds on the region's strengths, the prospect for greater innovation, productivity, and competitiveness will position the region for long-term growth. It is strength in these important sectors that will provide an improving standard of living for St. Louis workers and their families in the decades ahead.