
Business

AN EIGHTH DISTRICT PERSPECTIVE

FALL 1988

What Does High-Tech Mean to St. Louis?

The success of high-tech industries during the second half of the 1970s and early 1980s in areas such as the Silicon Valley and Boston led many communities to target high-tech industries as their most likely source of growth in a time when many traditional manufacturing jobs were eliminated. As the nation's economic growth is increasingly fueled by the expansion of manufacturing, the development of high-tech activity continues to be an important goal for many states and cities, including St. Louis. This article examines the nature of high-tech activity in the St. Louis metropolitan area.

What is High-Tech?

The concept of high-tech industry conjures up images of robots building computers and white-coated genetic engineers peering through microscopes. High-tech must be more precisely defined, however, to evaluate its size and growth. High-tech industries, according to one definition developed by the U.S. Bureau of Labor Statistics, are those 26 manufacturing industries with a proportion of technology-oriented workers (scientists, engineers, computer specialists and technicians) greater than the average for all manufacturing industries and having an above-average ratio of research and development expenditures to sales.

An Overview of High-Tech in St. Louis

In 1987, high-tech industries accounted for approximately 84,000 workers or 7.5 percent of the 1.1 million nonagricultural workers in the St. Louis area. In comparison, 5.4 percent of the nation's workers were employed by high-tech industries. Thus, despite their well-publicized expansion, high-tech industries employ a rather narrow slice of the employment pie.

The table on the next page shows that high-tech industries employed a substantial portion (37.9 percent) of St. Louis' manufacturing workers in 1987. In comparison, high-tech industries employed just 29.2 percent of

manufacturing workers nationally. St. Louis' higher proportion stems from its heavy concentration in the aerospace industry, which includes aircraft, guided missiles and space vehicles. This category alone includes 17.4 percent of the area's 221.7 thousand manufacturing workers and almost half of the high-tech workers found in St. Louis. Nationally, aerospace accounts for just 6 percent of the 19 million manufacturing workers. McDonnell Douglas Corporation, which employs the vast majority of these workers, primarily produces military aircraft and missiles in its St. Louis plants.

Besides aerospace, the table lists St. Louis' nine largest high-tech industries. Notably, computers and office machinery—which many think of when high-tech is mentioned—are absent from this list. Although employing almost a half a million people nationally, this high-tech industry is virtually nonexistent in St. Louis.

The importance of biotechnology in St. Louis is reflected in the inclusion of industrial organic chemicals, drugs and medical instruments among the list of the largest high-tech sectors. Monsanto Corporation, the largest local producer of chemicals, is a leader in biotechnical research. Monsanto researchers have successfully developed genetically engineered crops designed to withstand certain diseases, insects and pesticides. Biotechnical research in St. Louis' universities, although not necessarily reflected in the employment data, represents a major feature of the area's high-tech activity and includes a variety of biomedical and biochemical research. Washington University medical researchers, for example, are refining technology to map the human brain.

Despite differences in composition, St. Louis and national job growth in high-tech sectors has been similar (see table). Since 1979, when both St. Louis and national manufacturing jobs reached a cyclical peak, employment in high-tech industries rose at a 0.1 percent annual rate in St. Louis and at a 0.2 percent annual rate nationally. Although



	Percent of St. Louis manufacturing employment	Compounded annual growth rate 1979-87	
	1987	St. Louis	U.S.
Total nonagricultural employment	—	1.1%	1.6%
Total manufacturing	100.0%	-1.9	-1.2
Non-high-tech manufacturing	62.1	-3.0	-1.8
High-tech manufacturing	37.9	0.1	0.2
Selected high-tech industries			
Aerospace	17.4	2.2	1.8
Industrial organic chemicals	3.8	-2.5	-1.6
Engineering, scientific and miscellaneous instruments	2.2	-0.8	-1.7
Communication equipment	1.9	5.2	1.9
Soaps, cleaners and toilet preparations	1.3	-0.6	1.2
Drugs	1.3	0.2	1.4
Electrical industrial apparatus	1.2	3.7	-3.9
Petroleum refining	1.1	-2.6	-3.3
Surgical, medical and dental instruments	1.1	7.0	3.3
Electronic components and accessories	1.1	-0.2	2.2

Note: Percentages and growth rates are based on data from the Missouri Division of Employment Security. Data are adjusted for changes in industrial categories.

modest, this performance is quite strong relative to the decline of the rest of the manufacturing sector: non-high-tech manufacturing declined at a 3 percent rate in St. Louis; 1.8 percent rate nationally.

During manufacturing's last major cyclical downturn, between 1979 and 1983, the stability of high-tech employment contrasted sharply with the decline in the rest of the manufacturing sector. St. Louis' high-tech employment declined at a mild 0.3 percent rate during the period, while jobs in non-high-tech manufacturing plummeted 6.8 percent per year. A similar contrast is evident in the national figures: employment in high-tech industries declined at a 0.6 percent rate while non-high-tech manufacturing jobs fell at a 4.2 percent rate. During manufacturing's upturn since 1983, however, there has been little difference between growth in high-tech and non-high-tech manufacturing either in St. Louis or the nation.

High-tech's stability in St. Louis has stemmed from specialization in aerospace. McDonnell Douglas Corporation, which employs the vast majority of these workers in the research and production of defense-related goods, benefited from the rapid defense build-up of the 1980s. While employment in high-tech industries outpaced the rest of the manufacturing sector, the table shows that nonmanufacturing sectors have been the main source of St. Louis' job growth.

Looking Ahead

The recent establishment of two institutions in St. Louis attest to the area's commitment to high-tech development. The St. Louis Technology Center, supported by Missouri assists new high-tech firms by providing managerial support, developing strategic plans, obtaining financing and generally lowering operating costs. The center has helped form 16 new firms, with 170 employees, since its start three years ago.

The Missouri Research Park, sponsored by Missouri and the University of Missouri, is currently under construction. It will offer research-intensive firms a campus-like environment for their operations and access to University resources. Ideally, the park will attract governmental and private enterprises from outside the region as well as high-tech activities of indigenous firms. The feasibility of establishing a research institute in the Research park, affiliated with the region's universities, is currently being investigated. While the early successes of the Technology Center and the establishment of the Research Park are encouraging, it is still too early to know whether these institutions will be successful in facilitating widespread high-tech growth in the St. Louis area.

—Thomas B. Mandelbaum

Business—An Eighth District Perspective is a quarterly summary of business conditions in the area served by the Federal Reserve Bank of St. Louis. Single subscriptions are available free of charge by writing: Research and Public Information Department, Federal Reserve Bank of St. Louis, P.O. Box 442, St. Louis, Missouri 63166. Views expressed are not necessarily official positions of the Federal Reserve System.

EIGHTH DISTRICT BUSINESS DATA

	Rates of Change ¹			
	Current Quarter	1987	1986	1985
General Business Indexes²	II/1988			
Arkansas	2.3%	4.4%	-0.2%	1.5%
Kentucky	-1.8	3.0	2.7	0.7
Missouri	1.6	3.0	2.4	3.0
Tennessee	1.3	4.0	4.8	3.5
Payroll Employment	II/1988			
United States	3.6%	3.3%	2.0%	2.7%
District	-1.1	3.4	2.5	2.4
Arkansas	-0.4	3.6	2.2	1.6
Little Rock	1.2	2.6	1.1	2.9
Kentucky	-1.2	3.6	1.8	2.2
Louisville	0.5	4.4	2.7	2.3
Missouri	-0.7	2.1	2.4	2.1
St. Louis	-0.3	1.8	2.7	2.2
Tennessee	-1.7	4.4	3.3	3.2
Memphis	-2.5	5.2	3.6	3.1
Manufacturing Employment	II/1988			
United States	2.3%	2.1%	-1.2%	-1.8%
District	-2.7	2.3	-0.2	-1.7
Arkansas	-2.3	5.5	2.1	-1.8
Kentucky	1.3	3.5	0.2	-2.1
Missouri	-3.9	0.3	-2.3	-1.4
Tennessee	-4.1	2.2	0.4	-1.7
Retail Sales³	II/1988			
United States	7.1%	4.2%	5.9%	6.2%
Arkansas	-13.3	3.8	2.0	2.1
Kentucky	-16.3	3.5	-2.2	12.9
Missouri	-13.0	4.0	2.1	3.3
Tennessee	2.0	8.5	6.2	9.2
Personal Income	II/1988			
United States	3.1%	7.4%	5.6%	6.9%
District	3.6	7.2	5.5	6.1
Arkansas	4.4	4.3	5.4	6.4
Kentucky	4.0	7.8	4.4	4.3
Missouri	1.8	6.5	5.3	6.3
Tennessee	5.1	8.8	6.5	7.1
	District Employment¹		Prices¹	
	Current Quarter	Current Year	Current Quarter	Current Year
Key Industries	II/1988	II/1987 - II/1988	II/1988	II/1987 - II/1988
Fabricated Metal Products	3.7%	2.9%	11.7%	9.0%
Electrical and Electronic Equipment	2.1	2.5	2.1	2.0
Nonelectrical Machinery	6.4	3.3	2.9	2.5
Transportation Equipment	3.9	-2.1	1.8	1.0
Food and Kindred Products	2.4	1.1	9.9	3.2
Textile and Apparel	-4.4	0.7	3.8	4.3
Printing and Publishing	2.7	1.3	3.4	4.9
Chemicals and Allied Products	3.9	1.3	10.4	7.9
Construction	39.2	4.3	3.9	6.2

EIGHTH DISTRICT BUSINESS DATA

	<u>Current Quarter</u>	<u>Previous Quarter</u>	<u>Average 1987</u>	<u>Average 1986</u>
Unemployment Rate	II/1988	I/1988		
United States	5.4%	5.7%	6.2%	7.0%
District	6.3	6.5	7.2	7.8
Arkansas	7.9	7.6	8.1	8.8
Little Rock	6.5	6.8	7.1	6.9
Kentucky	8.3	8.3	8.8	9.3
Louisville	6.1	6.2	6.9	7.1
Missouri	5.0	5.4	6.3	6.1
St. Louis	5.9	6.3	7.0	7.0
Tennessee	5.4	5.9	6.6	8.0
Memphis	4.7	5.0	5.7	6.8
	<u>Current Quarter</u>	<u>Previous Quarter</u>	<u>Same Period 1987</u>	<u>Same Period 1986</u>
Construction Contracts⁴ (millions of dollars)	II/1988	I/1988	II/1987	II/1986
Residential Construction				
District	\$502.1	\$512.8	\$533.2	\$496.0
Arkansas	47.0	38.5	53.8	56.1
Kentucky	102.1	113.7	113.9	105.2
Missouri	153.0	185.9	165.2	148.8
Tennessee	199.9	174.8	200.3	185.9
Nonresidential Construction				
District	\$381.9	\$385.3	\$457.2	\$333.1
Arkansas	31.5	42.6	56.8	35.1
Kentucky	75.3	83.2	102.1	70.8
Missouri	124.1	125.6	156.2	109.8
Tennessee	151.0	133.8	142.1	117.4

NOTE: With the exception of employment and prices in key industries, all data are seasonally adjusted. Data for Arkansas, Kentucky, Missouri and Tennessee are used to represent the District.

¹ All growth rates are compounded annual rates of change. The 1985 through 1987 growth rates compare the fourth quarter of the year listed with the fourth quarter of the previous year.

² Although each index is a comprehensive measure of economic activity, the Arkansas and Missouri indexes, computed by Southwestern Bell, are not strictly comparable to the Kentucky and Tennessee indexes, which are computed by South Central Bell.

³ Sources: Arkansas from Southwestern Bell, Kentucky from the Kentucky Revenue Department, Missouri and Tennessee from the U.S. Department of Commerce.

⁴ Excludes nonbuilding construction. Source: F. W. Dodge **Construction Potentials**, proprietary data provided by special permission.