



# Missouri Economic Impact Brief HIGH-TECH INDUSTRIES

## What is High-Tech?

**High-Tech** can be defined by an industry or an occupation. It can describe the product, the process, or the people. These distinctions highlight the changing influences of technology and make analysis of industry impacts an enduring challenge. This impact brief examines the American Electronics Association (AeA) description of **High-Tech Industries** while acknowledging that research in this area will be an on-going endeavor (see **Notes**).

The AeA defines 49 sectors as creators of technology and therefore leading companies driving technology change. Those industries are listed in the back of this brief.

The High-Tech industry employs four percent of Missouri's workforce and influences jobs all across the state. It is heavily tilted towards the service sector, which accounts for 9 out of every 10 jobs.

### High-Tech Industry:

A maker/creator of technology, whether in the form of products, communications, or services.

## Missouri Industry Facts

High-Tech Employment

91,139

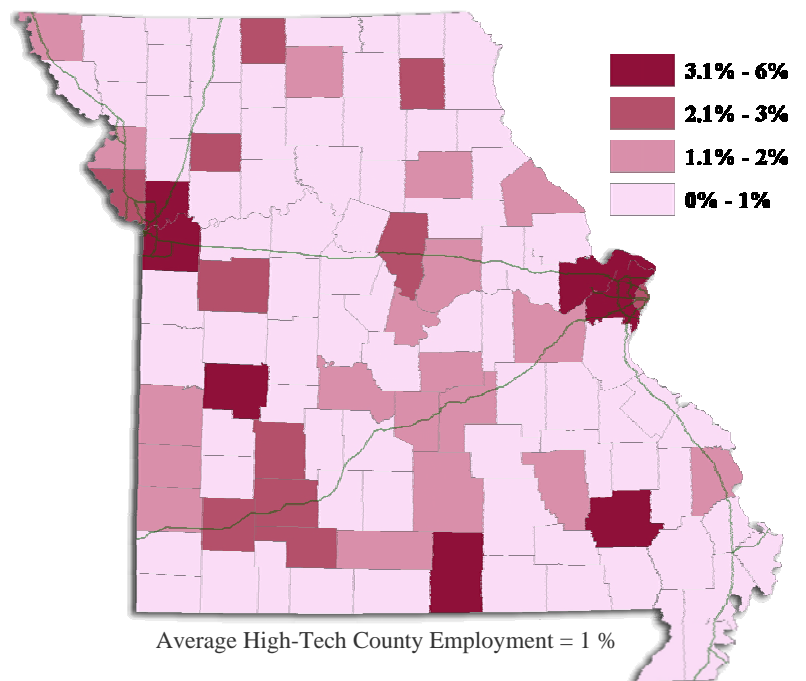
Percent Employment

4.0 Percent

Average Wage

\$65,512

## 2006 High-Tech Employment Percentage



# HIGH-TECH INDUSTRIES

## Economic Impacts

The High-Tech industry has a large influence on Missouri's economy. That influence includes jobs and sales generated by the industry itself (direct effects) along with spin-off impacts that ripple throughout the state's economy (indirect effects). When combined those impacts account for over \$17 Billion in Gross State Product.

	DIRECT	INDIRECT	TOTAL
Employment	91,139	118,532	<b>209,670</b>
Labor Income*	\$6.9	\$4.1	<b>\$10.9</b>
Gross State Product*	\$10.4	\$6.9	<b>\$17.3</b>

\*2006 Dollar Figures in Billions. Numbers may not sum correctly due to rounding.

### Employment

High-Tech companies pay high wages which helps spur a large number of additional, indirect jobs. Indirect employment includes intermediate firms that supply the High-Tech sector. Employees at high-tech and supplier firms spend money on groceries, housing, retail, and other goods and services which produce further positive impacts. The High-Tech industry accounted for 91,139 direct jobs and 118,532 indirect jobs in 2006. This resulted in a total employment impact of 209,670.

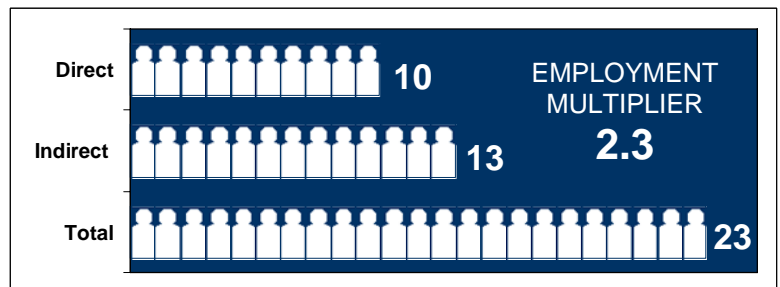
### Gross State Product

Gross State Product (GSP) is the most widely used indicator of economic impacts as it takes into account all the value-added incomes that flow through an economy.

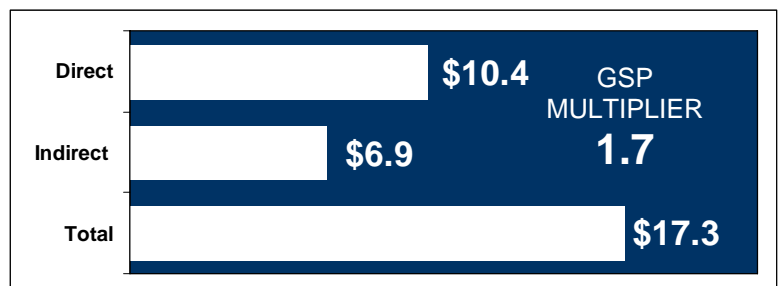
The High-Tech industry in Missouri had a direct impact of over \$10 Billion in GSP for 2006. This represents 4.6 percent of total GSP in the state. When combined with indirect impacts, the total rises to just over \$17 Billion, or 7.7 percent of total GSP.

This impact means that for every \$1.00 in GSP created by a High-Tech firm, 70 additional cents is added to Missouri's overall economy.

### EMPLOYMENT IMPACTS (10 Direct Jobs Example)



### GROSS STATE PRODUCT IMPACTS (Billions 2006\$)



## Industry Trends

Missouri High-Tech companies followed national trends toward lower employment between 2001 and 2006. Jobs losses totaled over 4,700 in this time period, representing a 5.0 percent decrease.

### *Manufacturing Sector*

Manufacturing accounted for 8,284 jobs in 2006, representing nine percent of the High-Tech sector. Three industries accounted for 93 percent of manufacturing employment:

- Semiconductor & Other Electronic Components - NAICS 3344
- Navigational, Measuring, Electromedical, & Control Instruments - NAICS 3345
- Communications Equipment - NAICS 3342

Manufacturing sector employment declined throughout the nation from 2001 to 2006. Missouri lost over 2,600 jobs in high-tech manufacturing during this time period. Those losses were broadly spread over 63 percent of the industry while some sectors, such as Printed Circuit Assembly, defied the trend.

### *Manufacturing* **Printed Circuit Assembly**

Bucking a national decline in this sector, Missouri has grown substantially in this industry over the past five years. Missouri employment grew by over 300 percent compared to an overall U.S. decline of nearly 15 percent from 2001 to 2006.

### *Services* **Data Processing**

This Missouri industry has seen employment increase by almost 25 percent in five years. That compares to a U.S. decline of nearly 18 percent. State employment is twice as concentrated in this sector relative to the national average.

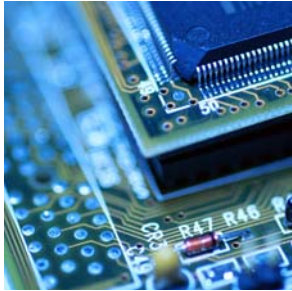
### *Service Sector*

The High-Tech industry is primarily service based. Recently 2006 employment in the service sector was 82,855, accounting for 91 percent of all High-Tech jobs. Three industries made up 61 percent of service sector employment:

- Computer Systems Design & Related Services - NAICS 5415
- Wired Telecommunications Carriers - NAICS 5171
- Architectural, Engineering, & Related Services - NAICS 5413

Although High-Tech services lost over 2,100 jobs from 2001 to 2006, most of those declines were concentrated in a few sectors. The majority of high-tech service firms posted job gains during the five-year period.

## Top Manufacturing Employers



### *Semiconductor & Other Electronic Components - NAICS 3344*

**MEMC Electronic Materials**

*Semiconductor-grade Silicon Wafers*

**Northrop Grumman Interconnect Technologies Division**

*Printed and Etched Circuit Boards*

**3M**

*Electronics, Electrical, and Communications Equipment*



### *Navigational, Measuring, Electromedical, & Control Instruments - NAICS 3345*

**Boeing Integrated Defense Systems**

*Search, Detection, Navigation, and Aeronautical Systems and Instruments*

**bioMérieux**

*Biological Laboratory Analytical Instruments*

**United Technologies Corporation**

*Mobile Communications and Surveillance Hardware and Software*



### *Communications Equipment - NAICS 3342*

**Potter Electric Signal**

*Alarm, Security, and Fire Safety Communications Equipment*

**Charles Industries**

*Indoor/Outdoor Telecommunications and Power Components*

**Milbank Enclosure**

*Outdoor Electrical/Telecommunications Enclosures*

*Source: ReferenceUSA, InfoUSA, Inc.*

## Manufacturing Company Profile

### bioMérieux



This company highlights the fact that many firms within the **High-Tech** sector are also key players in other targeted industries. Located near the St. Louis airport, bioMérieux is a privately-owned global firm specializing in biological diagnostics, a **Life Science** technology. The company reported a net income of 90 million euro (112 million U.S. dollars) in a 2005 annual report. Sales in the U.S. represented 26 percent of that income.

BioMérieux focuses on biological analysis through the development of diagnostic instruments and software. Clinical applications include the diagnosis of infectious diseases such as hepatitis, HIV, tuberculosis and respiratory illnesses, as well as pathologies such as cardiovascular diseases and cancer. Industrial applications include the microbiological analysis of food, environments, surfaces and pharmaceutical and cosmetic products.

[www.biomerieux-usa.com](http://www.biomerieux-usa.com)

## Top Service Employers



### *Computer Systems Design & Related Services - NAICS 5415*

**Jack Henry and Associates**

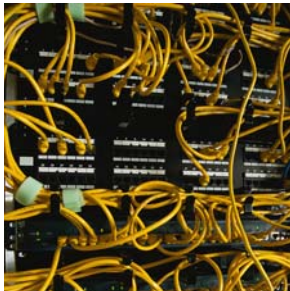
*Integrated Technology Solutions and Data Processing for Financial Institutions*

**Amdocs**

*Modular Customer Management Software and Service Solutions*

**Quilogy**

*Business Information, Process, and Database Development Solutions*



### *Wired Telecommunications Carriers - NAICS 5171*

**AT&T**

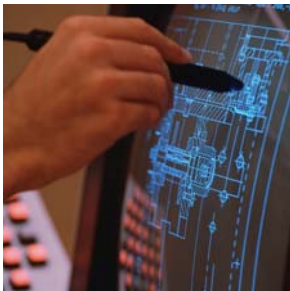
*Communications Provider*

**XO Communications**

*Business Communication Services*

**Birch**

*Business Communication Services*



### *Architectural, Engineering, & Related Services - NAICS 5413*

**Burns & McDonnell**

*Engineering, Architecture, Construction, Environmental & Consulting Solutions*

**Jacobs Engineering Group**

*Engineering, Planning, Design, and Construction Services*

**HNTB**

*Engineering, Planning, Design, and Construction Services*

*Source: ReferenceUSA, InfoUSA, Inc.*

## Service Company Profile



### HNTB

HNTB is a leader in developing service solutions that integrate technologies for better decision-making. The company employs over 3,400 people nationwide and has several offices in Missouri. HNTB reported revenues of \$623 Million in 2006.

HNTB unites the technologies of engineering, planning, and architecture with innovative communication tools, such as 3-D visualization and multimedia web presentations, to better educate clients and the public. The company's three primary markets include transportation, architecture, and federal contracts. The multimedia project [www.kctriangle.org](http://www.kctriangle.org), developed for the Missouri Department of Transportation, illustrates a recent HNTB product in Kansas City.

[www.hntb.com](http://www.hntb.com)

## Missouri Focus

Location Quotient (LQ) analysis illustrates which sectors are more specialized in Missouri relative to the rest of the nation. An LQ greater than 1.0 means there is a higher industry concentration in the state than exists nationally.

### Location Quotient Formula

$$\left( \frac{\text{State Employment}_{\text{INDUSTRY}}}{\text{State Employment}_{\text{TOTAL}}} \right) \div \left( \frac{\text{National Employment}_{\text{INDUSTRY}}}{\text{National Employment}_{\text{TOTAL}}} \right)$$

### Highest Manufacturing Sector LQ

**Electronic Connector Mfg. – LQ 2.5**

**Automatic Environmental Control Mfg. – LQ 1.9**

### Highest Service Sector LQ

**Data Processing & Related Services – LQ 2.1**

**Wired Telecommunications Carriers – LQ 1.5**

## Sources

American Electronics Association. *Cybersates 2007*. ISBN: 0-928391-22-1. Washington, D.C. 2007.

Employment figures from the Quarterly Census of Employment and Wages (QCEW), Bureau of Labor Statistics. 2<sup>nd</sup> Qtr 2001 and 2<sup>nd</sup> Qtr 2006 average employment.

Employers by four-digit NAICS from ReferenceUSA, InfoUSA, Inc.

Impact analysis conducted using IMPLAN (Minnesota IMPLAN Group, Inc.). Regional purchasing coefficients and by-products adjusted to avoid double-counting. Indirect effects include intermediate and induced impacts.

Location Quotients generated using the Regional Data Analysis Tool, Bureau of Labor Statistics.

## High-Tech Manufacturing

### NAICS

333295	Semiconductor Machinery Mfg.
333314	Optical Instrument and Lens Mfg.
333315	Photographic and Photocopying Equipment Mfg.
334111	Electronic Computer Mfg.
334112	Computer Storage Device Mfg.
334113	Computer Terminal Mfg.
334119	Other Computer Peripheral Equipment Mfg.
334210	Telephone Apparatus Mfg.
334220	Radio and TV and Wireless Communications Equip. Mfg.
334290	Other Communications Equipment Mfg.
334310	Audio and Video Equipment Mfg.
334411	Electron Tube Mfg.
334412	Bare Printed Circuit Board Mfg.
334413	Semiconductor and Related Device Mfg.
334414	Electronic Capacitor Mfg.
334415	Electronic Resistor Mfg.
334416	Electronic Coil, Transformer, and Other Inductor Mfg.
334417	Electronic Connector Mfg.
334418	Printed Circuit Assembly Mfg.
334419	Other Electronic Component Mfg.
334510	Electromedical and Electrotherapeutic Apparatus Mfg.
334511	Search, Navigation, Aeronautical, and Nautical Instrument Mfg.
334512	Automatic Environmental Control Mfg.
334513	Industrial Process Control Instrument Mfg.
334514	Totalizing Fluid Meter and Counting Device Mfg.
334515	Electric Measuring and Testing Instruments Mfg.
334516	Analytical Laboratory Instrument Mfg.
334517	Irradiation Apparatus Mfg.
334519	Other Measuring and Controlling Device Mfg.
335921	Fiber Optic Cable Mfg.

## Notes

Aside from the difficulties defining technology, two other items are worth consideration:

- *The determination of which NAICS to include in the analysis*

The North American Industry Classification System (NAICS) codes industries based on common characteristics. Like any classification method, it will not suit all research needs, such as clearly defining “high technology” sectors. Therefore, categories are often defined by trade groups or through the analysis of research institutions.

Furthermore, new industries may not easily fit into an existing NAICS code. This may result in newly emerging companies being placed into “best fit” categories that may or may not be considered high-tech at the time. Ultimately emerging firms become established in sufficient numbers that NAICS codes are adjusted. However, this time lag will always be a challenge as researchers attempt to study an industry over time.

- *The understanding of high-tech employment characteristics.*

Another complexity is that many high-tech firms and employees fly under the radar of government statistics. Start-up companies, often sole proprietors, are not required to report employment figures which are the basis for the Quarterly Census of Employment and Wages (QCEW), the government’s primary source of business data. Many high-tech companies likely get started this way and represent an important, yet largely invisible, sector of the economy.

AeA identifies temporary technology workers as an important workforce within the high-tech sector. These workers are most likely hired to handle short-term programming tasks and would be tracked within the Employment Services sector (NAICS 5613). However, employment numbers in this industry are not distinguished by work type making the inclusion of it as a high-tech sector very problematic.

Although Employment Services are not considered a direct employer in the high-tech sector, the economic impact analysis conducted by MERIC shows that this sector was the largest indirect supplier. High-tech companies largest input to the production process is the purchase of services from temporary help agencies.

## High-Tech Services

### NAICS

511210	Software Publishers
517110	Wired Telecommunications Carriers
517211	Paging
517212	Cellular and Other Wireless Telecommunications
517310	Telecommunications Resellers
517410	Satellite Telecommunications
517510	Cable and Other Program Distribution
517910	Other Telecommunications
518111	Internet Service Providers
518112	Web Search Portals
518210	Data Processing, Hosting, and Related Services
541330	Engineering Services
541380	Testing Laboratories
541511	Custom Computer Programming Services
541512	Computer Systems Design Services
541513	Computer Facilities Management Services
541519	Other Computer Related Services
541710	R & D in Physical, Engineering, and Life Sciences
611420	Computer Training



[www.MissouriEconomy.org](http://www.MissouriEconomy.org)

