

KANSAS BIOSCIENCE

INDEX 2008



Workforce Capacity
Education Capacity
Innovation Capacity

Industrial Output

Research & Development Capacity

Prepared by:



KANSAS BIOSCIENCE
AUTHORITY



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PREFACE

Kansas is a preeminent national bioscience center, serving healthcare, energy, agricultural, animal health, biomaterial, and national-security needs by virtue of its excellent research, education, and vibrant industry clusters.

— Vision Statement, Kansas Bioscience Authority

In Kansas, scientists, researchers, and businesses have found tremendous success in bioscience. In doing so, they have created areas of expertise in sectors as diverse as animal health; bioenergy; biomaterials; drug discovery and delivery; and plant biology.

The Kansas Economic Growth Act of 2004 demonstrates the state's deep commitment to continued bioscience growth in these areas. The act created the Kansas Bioscience Authority (KBA) with \$581 million to invest in the expansion of the state's bioscience clusters and research capacity, the growth of bioscience startups, and bioscience business expansion and attraction.

To monitor the growth of the bioscience industry, the KBA contracted the Docking Institute of Public Affairs at Fort Hays State University to produce a Kansas Bioscience Index. The index is designed to give a complete description of the bioscience industry growth in

the state of Kansas as compared to five peer states and the nation since 2004. To construct the index, a set of indicators are finalized and grouped in five categories: industrial output, research and development capacity, innovation capacity, education capacity, and workforce capacity. Text, charts, and graphs are used to describe changes in the indicators.

The KBA plans to commission annual longitudinal reports showing changes in those indicators and providing executive summaries of changing trends. This report serves as an inaugural report. Wherever possible, secondary data for those indicators from 2004 to the present are collected from public sources and analyzed. The pages that follow present the earliest changes in the bioscience industry in Kansas, the nation, and five peer states since 2004. When 2004 information is not available, this report uses data from a previous year that was closest to 2004.



“The KBA has a comprehensive strategy of investing in bioscience growth throughout the business cycle, from R&D to commercialization to business expansion and attraction.

“It is an investment approach that recognizes the symbiotic nature of research, commercialization, and industrial growth in the biosciences. In business terms, it’s the smart, diversified way to go.”

— Sandra Lawrence, KBA chairwoman

EXECUTIVE SUMMARY

The Kansas Bioscience Authority (KBA) contracted the Docking Institute of Public Affairs to produce the Kansas Bioscience Index. The index is constructed around 23 indicators, which are grouped into five categories: industrial output, research and development capacity, innovation capacity, education capacity, and workforce capacity. The indicators describe bioscience industry change in Kansas since 2004 as compared with the nation and five peer states: Arkansas, Nebraska, North Dakota, Oklahoma, and South Dakota.

This report serves as an inaugural report, and it finds:

- Kansas' gross state product (GSP) was \$99.1 billion in 2004. It grew by about 6.2% annually from 2004 to 2006, about the same as the national average.
- Kansas' per capita GSP had a 5.46% increase from 2004 to 2006, higher than nation's 4.39% increase. The five peer states had a 5.96% increase on average in the same time period.
- Kansas' per capita income in 2007 was \$36,768, an 18.6% increase since 2004. The nation's 2007 per capita income was \$38,611. The five peer states' 2007 per capita income was \$33,887 on average.
- Kansas had 981 private bioscience companies in 2004. The number rose to 1,075 in 2006, a 9.6% increase in two years.
- The employment in the private bioscience industry in Kansas was 14,889 in 2004 (1.08% of its workforce), and 16,135 in 2006 (1.15% of its workforce). The U.S. had 1.8% of its workforce working in the private bioscience industry in 2006.
- Kansas' average wage in the private bioscience industry was \$41,592 in 2006, a 7.68% increase from 2004. The nation's average wage in the private bioscience industry was \$71,255 in 2006, an 8.88% increase from 2004.
- In 2004, the research and development (R&D) spending in Kansas was \$2.2 billion, accounting for 2.19% of its GSP. More than 80 percent (83.2%) of the R&D spending was performed by the industry sector in Kansas in 2004.
- R&D spending at universities and colleges in Kansas was \$333 million in 2004, \$349 million in 2005, and \$354 million in 2006. About 62% of Kansas' academic R&D spending was on life sciences for all three years. About 52% of Kansas' R&D spending came from the federal government from 2004 to 2006.
- Academic R&D spending at the University of Kansas and Kansas State University accounted for 90% of the total academic spending in Kansas from 2004 to 2006.
- Academic R&D spending in bioscience was \$220 million in Kansas in 2006, which accounted for 62% of total academic R&D spending in the state.
- From 2004 to 2007, the U.S. Patent and Trademark Office granted 1,744 patents from Kansas.

- For every 1,000 individuals in science and engineering occupations, Kansas had 8.6 patents awarded in 2004, and 10.1 patents awarded in 2006. The national figures in those two years were 16.6 and 16.7 respectively.
- For every 1,000 science and engineering doctorate holders at universities and colleges, Kansas had 7.9 academic patents awarded in 2001, and 2.3 academic patents awarded in 2005. The national averages were 12.3 and 9.2 respectively in those two years.
- Bioscience venture capital investment in Kansas amounted to \$101.4 million from 2004 to 2007.
- Kansas received \$5.58 million Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding combined in 2004.
- For every 1,000 individuals 18-24 years old, Kansas had about nine people with a bachelor's degree in natural sciences and engineering in both 2001 and 2005.
- In 2004, 31% of all the science and engineering doctorates awarded in Kansas were life science doctorates, 26% in 2005.
- There were 340 science, engineering, and health postdoctorates in doctorate-granting institutions in Kansas in 2003 and 317 postdoctorates in the same fields in 2005.
- In Kansas, about 0.3% of its employed workforce was science and engineering doctorate holders in both 2001 and 2006.
- Only 0.34% of Kansas' workforce was life and physical scientists in 2004, which was lower than the national average and the levels of most of the peer states.

INDICATOR CATEGORIES

“Bioscience” means the use of compositions, methods and organisms in cellular and molecular research, development and manufacturing processes for such diverse areas as pharmaceuticals, medical therapeutics, medical diagnostics, medical devices, medical instruments, biochemistry, microbiology, veterinary medicine, plant biology, agriculture and industrial, environmental, and homeland security applications of bioscience, and future developments in the biosciences. Bioscience includes biotechnology and life sciences.

– Kansas Economic Growth Act

The bioscience index is built around a set of 23 indicators, representing key components of the bioscience industry. They are organized into five categories: industrial output, research and development capacity, innovation capacity, education capacity, and workforce capacity. This report has five sections to present the analysis results for those categories.

Industrial Output: A robust bioscience industry base provides a strong base for future growth. This section contains measures of ultimate economic outcomes (including gross state product and per capita income) and outputs in the bioscience industry (including private bioscience establishments, employment, and average wage).

Research and Development (R&D) Capacity: Research and development accumulates knowledge, and use of the knowledge is crucial to successfully devise new applications. This section provides the measures of dollar amount of R&D performance as a percent of gross state product. The measures examine the total R&D performance (as measured by spending) and the performance of industry and academic institutions. The performance of the academic R&D is further differentiated by source and destination of R&D funding. R&D performance in bioscience is also examined.

Innovation Capacity: Innovation could be either radical or incremental. The positive changes in thinking, processes, and services lead to increases in productivity and wealth in an

economy. This section examines the number of patents issued, venture capital activities in bioscience, and the Federal Small Business Innovation Research Program.

Education Capacity: Today’s education capacity serves as the foundation for the future employment capacity, and the education quality ultimately determines the future economic performance. This section examines bachelor’s and advanced degrees conferred in such fields as life science and natural science, and the number of science, engineering, and health post-doctorates in doctorate-granting institutions.

Workforce Capacity: A highly skilled and educated workforce in the bioscience industry is very important to grow and sustain the bio-industry. This section examines the number of science and engineering doctorate holders in the workforce and the number of life and physical scientists in the workforce.

Wherever the data is available, Kansas is compared with the nation and five peer states: Arkansas, Nebraska, North Dakota, Oklahoma, and South Dakota. Kansas and the peer states are all included in the Experimental Program to Stimulate Competitive Research (EPSCoR). These five EPSCoR states are in the same region as Kansas, and they provide an analytically sound benchmark for comparing states similar in ruralness, historical performance on R&D indicators, and lack of high concentration of industry and related innovation resources.

INDUSTRIAL OUTPUT

Table 1: Current Dollar Gross State Product (million \$)

	2004	2005	2006
Arkansas	81,752	87,004	91,837
Kansas	99,125	105,228	111,699
Nebraska	67,976	72,242	75,700
North Dakota	22,715	24,935	26,385
Oklahoma	111,400	121,558	134,651
South Dakota	29,519	30,541	32,330
United States	11,633,572	12,372,850	13,149,033

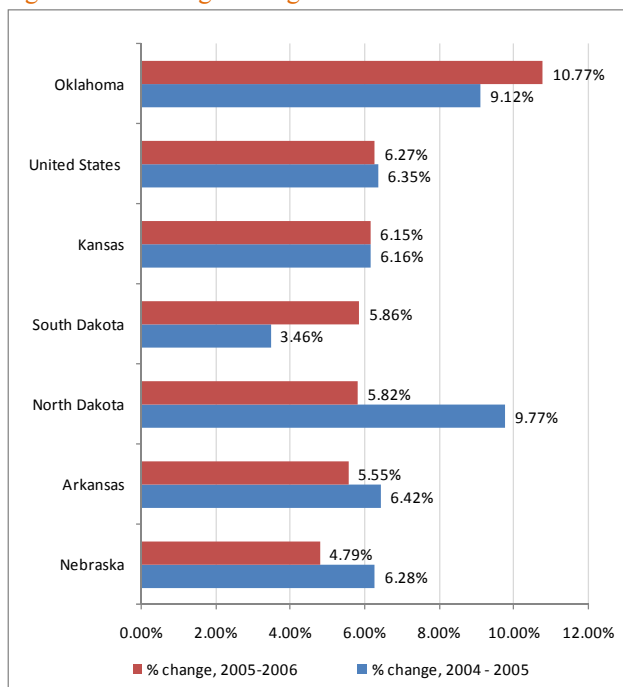
Source: U.S. Bureau of Economic Analysis

GROSS STATE PRODUCT

Why is this indicator important?

Gross state product (GSP) measures the total market value of all final goods and services produced by a state during a given time period. It indicates the overall economic strength of a state.

Figure 1: Percentage Change of Gross State Product



Source: U.S. Bureau of Economic Analysis

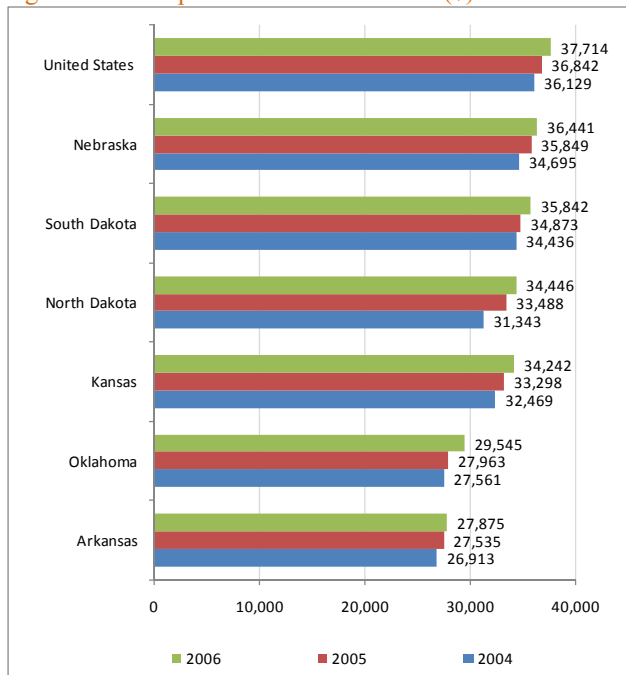
What does it mean for Kansas?

Kansas' overall economy is strong. Its GSP in 2006 was \$111.7 billion, which ranked the second highest (behind Oklahoma) among all the states under study. Kansas' GSP was also the second highest among the study states in 2004 and 2005 (Table 1).

The growth rates of Kansas' GSP were stable since 2004. Kansas' GSP grew by 6.16% from 2004 to 2005 and by 6.15% from 2005 to 2006, echoing the national trend. The GSP growth rates in Kansas fell behind the national averages in both years. Kansas' GSP growth rate from 2005 to 2006 ranked second among the study states (after Oklahoma), and its growth rate from 2004 to 2005 fell behind Oklahoma, North Dakota, Arkansas, and Nebraska.



Figure 2: Per Capita Gross State Product (\$)



Source: U.S. Bureau of Economic Analysis

PER CAPITA GROSS STATE PRODUCT

Why is this indicator important?

Per capita gross state product is the value of GSP in a given year divided by the population in that year.

What does it mean for Kansas?

Kansas' per capita GSPs in 2004, 2005 and 2006 all fell behind the national averages. Among the study states, Kansas' per capita GSP ranked third in 2004 and fourth in 2005 and 2006. In 2006, Kansas' per capita GSP was \$34,242, a 5.46% increase since 2004. The nation had a 4.39% increase from 2004 to 2006. The five peer states had a 5.96% increase on average (Figure 2).

PER CAPITA INCOME

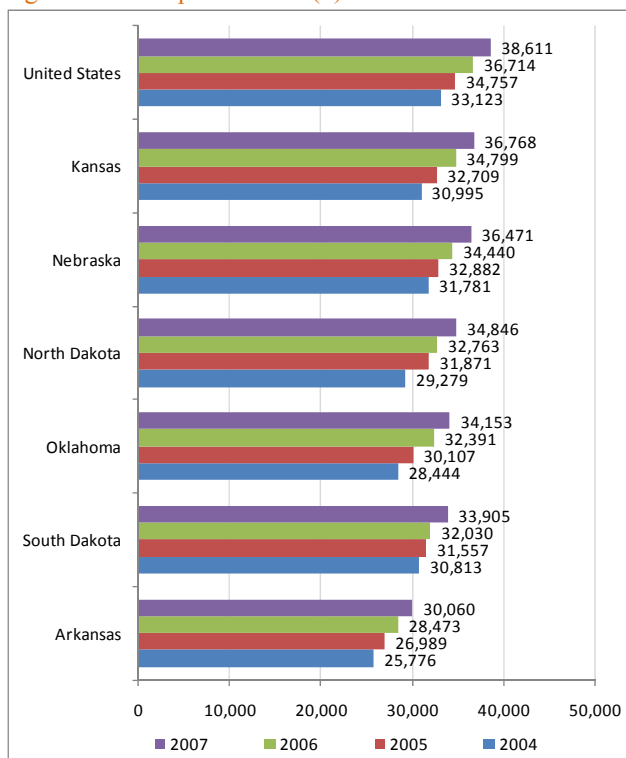
Why is this indicator important?

Just as GSP measures the overall wealth of a state, per capita income indicates individual wealth. It measures the ultimate outcome of economic development: increase of personal wealth and improvement of quality of life.

What does it mean for Kansas?

Kansas' per capita income was lower than the national average all the time since 2004. Kansas ranked second in 2004 and 2005 among the study states (after Nebraska) but jumped to first in 2006 and 2007. In 2007, Kansas' per capita income was \$36,768, an 18.6% increase since 2004. The nation had a 16.6% increase from 2004 to 2006. The five peer states had a 16.1% increase on average (Figure 3).

Figure 3: Per Capita Income (\$)



Source: U.S. Bureau of Economic Analysis

“Bioscience company” means a corporation, limited liability company, S-corporation, partnership, registered limited liability partnership, foundation, association, nonprofit entity, sole proprietorship, business trust, person, group, or other entity that is engaged in the business of bioscience in the state and has business operations in the state, including, without limitation, research, development, sales, services, distribution or production directed towards developing or providing bioscience products or processes for specific commercial or public purposes but shall not include entities engaged in the distribution or retail sale of pharmaceuticals or other bioscience products... One of the factors that shall be considered is whether a company has been identified by the department of labor by one of the following NAICS codes: 325411, 325412, 325413, 325414, 325193, 325199, 325311, 325320, 334516, 339111, 339112, 339113, 334510, 334517, 339115, 621511, 621512, 541710, 541380, 541940, and 622110.

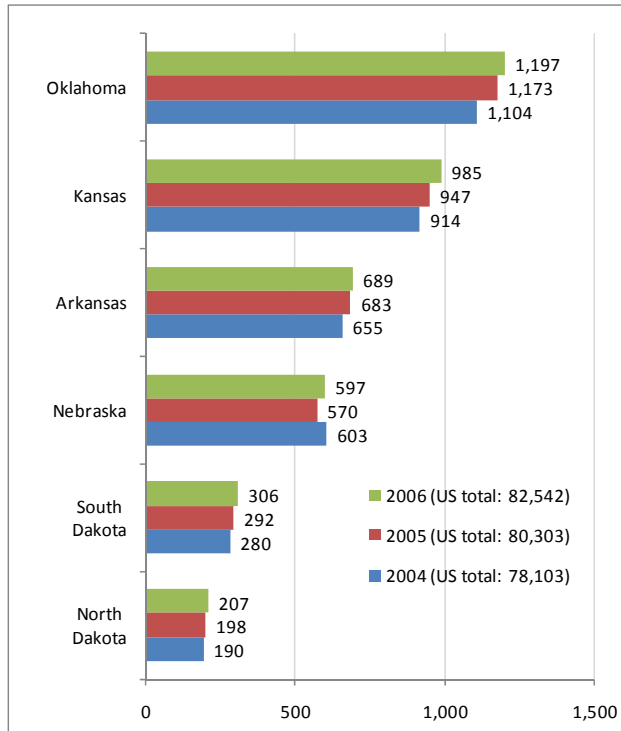
– *Kansas Economic Growth Act*

Table 2: NAICS Codes for Bioscience Companies as Defined by the Kansas Economic Growth Act

NAICS Code	NAICS Title
325411	Medicinal and Botanical Manufacturing
325412	Pharmaceutical Preparation Manufacturing
325413	In-Vitro Diagnostic Substance Manufacturing
325414	Biological Product (except Diagnostic) Manufacturing
325193	Ethyl Alcohol Manufacturing
325199	All Other Basic Organic Chemical Manufacturing
325311	Nitrogenous Fertilizer Manufacturing
325320	Pesticide and Other Agricultural Chemical Manufacturing
334516	Analytical Laboratory Instrument Manufacturing
339111	Laboratory Apparatus and Furniture Manufacturing
339112	Surgical and Medical Instrument Manufacturing
339113	Surgical Appliance and Supplies Manufacturing
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing
334517	Irradiation Apparatus Manufacturing
339115	Ophthalmic Goods Manufacturing
621511	Medical Laboratories
621512	Diagnostic Imaging Centers
541710	Research and Development in the Physical, Engineering, and Life Sciences
541380	Testing Laboratories
541940	Veterinary Services
622110	General Medical and Surgical Hospitals

Source: U.S. Census Bureau

Figure 4: Establishment in Private Bioscience Industry as Defined by Kansas Bioscience Statute



Source: U.S. Bureau of Labor Statistics

ESTABLISHMENT IN PRIVATE BIOSCIENCE INDUSTRY AS DEFINED BY KANSAS BIOSCIENCE STATUTE

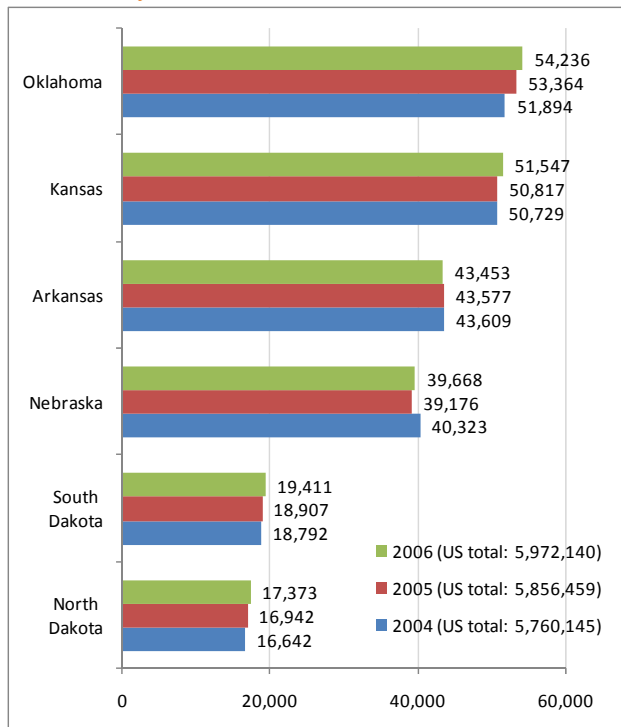
Why is this indicator important?

The number of establishments in the private bioscience industry (see Table 2) indicates the size of the bio-industry. Size not only suggests the robustness of the industry, but also indicates the potential for expansion.

What does it mean for Kansas?

Kansas' private bioscience establishment ranked the second highest among the study states. Kansas had 914 private bioscience companies in 2004, and 985 in 2006, a 7.77% increase in two years. Oklahoma, which had the highest rank since 2004, had an 8.42% increase in the same time period. The nation had a 5.68% increase from 2004 to 2006 (Figure 4).

Figure 5: Employment in Private Bioscience Industry as Defined by Kansas Bioscience Statute



Source: U.S. Bureau of Labor Statistics

EMPLOYMENT IN PRIVATE BIOSCIENCE INDUSTRY AS DEFINED BY KANSAS BIOSCIENCE STATUTE

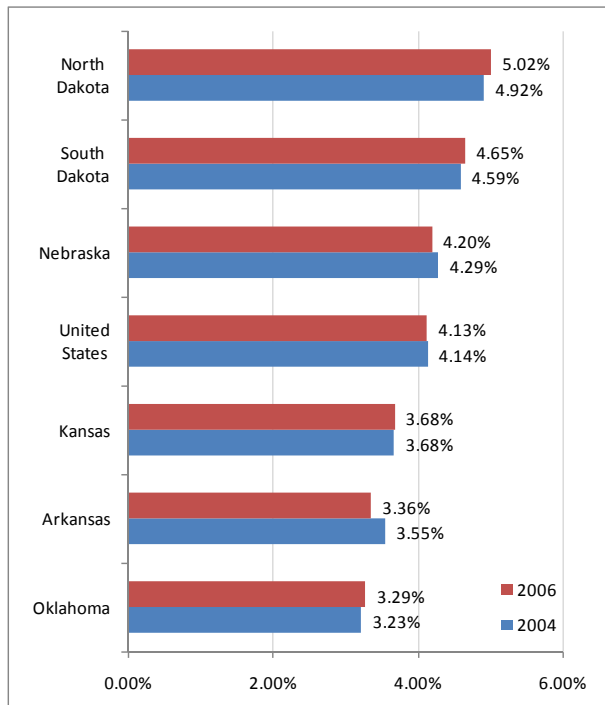
Why is this indicator important?

Employment in the private bioscience industry is another indicator of the size of the industry.

What does it mean for Kansas?

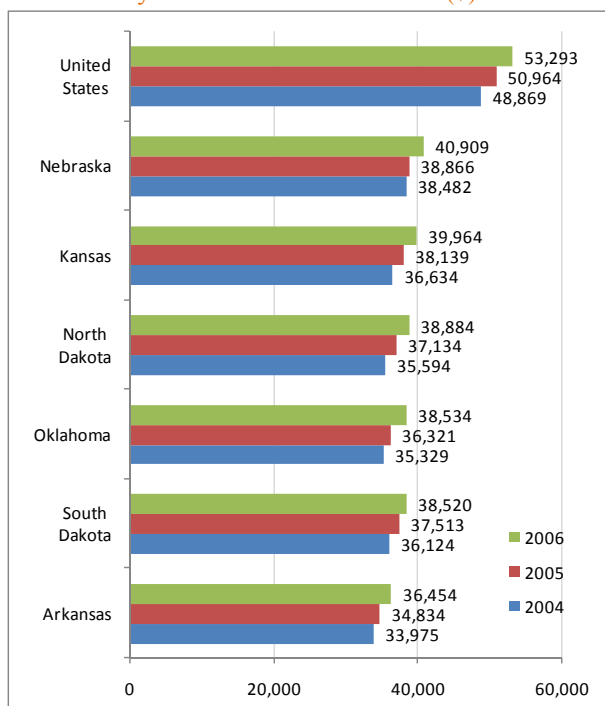
Kansas' employment in the private bioscience industry also ranked second among the study states. The employment in private bioscience industry in Kansas was 50,792 in 2004, and 51,547 in 2006, a 1.61% increase in two years. The top state, Oklahoma, had a 4.51% increase from 2004 to 2006. The nation had a 3.68% increase in those two years (Figure 5).

Figure 6: Employment in Private Bioscience Industry as a Percent of Workforce



Source: U.S. Bureau of Labor Statistics; National Science Foundation

Figure 7: Average Wage in Private Bioscience Industry as Defined by Kansas Bioscience Statute (\$)



Source: U.S. Bureau of Labor Statistics

EMPLOYMENT IN PRIVATE BIOSCIENCE INDUSTRY AS A PERCENT OF WORKFORCE

Why is this indicator important?

This indicator shows the relative scale of the bioscience industry of a state as compared to its total economic size.

What does it mean for Kansas?

In Kansas, people who work in the private bioscience industry accounted for 3.68% of the workforce in both 2004 and 2006. Both percentages were below the national average (Figure 6).

AVERAGE WAGE IN PRIVATE BIOSCIENCE INDUSTRY AS DEFINED BY KANSAS BIOSCIENCE STATUTE

Why is this indicator important?

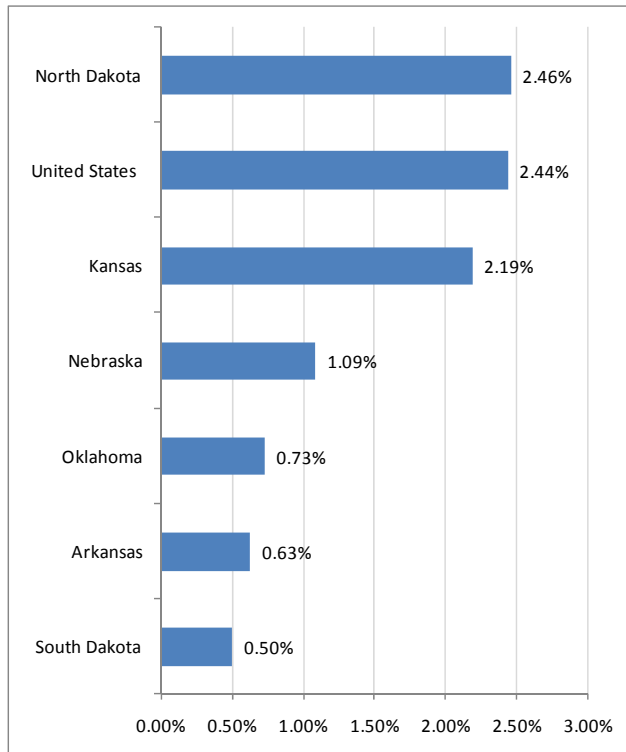
The wage in the bioscience industry is crucial for a state to attract and retain professionals and workers in the bioscience industry. The Bureau of Labor Statistics collects average annual wage information for different industry sectors. It is computed by dividing total annual wage by annual average employment in an industry sector. Total wage includes bonuses, stock options, severance pay, the cash value of meals and lodging, tips and other gratuities, and – in some states – employer contributions to certain deferred compensation plans, such as 401(k) plans.

What does it mean for Kansas?

Kansas' average wage in the private bioscience industry was much lower than the national average, and ranked second among the study states in 2006. Kansas had a 9.09% increase in the average wage in the bioscience industry from 2004 to 2006. Nebraska had a 6.31% increase, and the nation on average had a 9.05% increase in the same time period (Figure 7).

RESEARCH & DEVELOPMENT CAPACITY

Figure 8: Research & Development Spending as a Percent of Gross State Product, 2004



Source: National Science Foundation

RESEARCH & DEVELOPMENT SPENDING AS A PERCENT OF GROSS STATE PRODUCT

Why is this indicator important?

This indicator measures the impact of research and development (R&D) on the economy and also the intensity of R&D that is occurring.

What does it mean for Kansas?

In 2004, the R&D spending in Kansas accounted for 2.19% of its GSP, which was lower than North Dakota and the national average (Figure 8).

RESEARCH & DEVELOPMENT SPENDING BY PERFORMING SECTOR

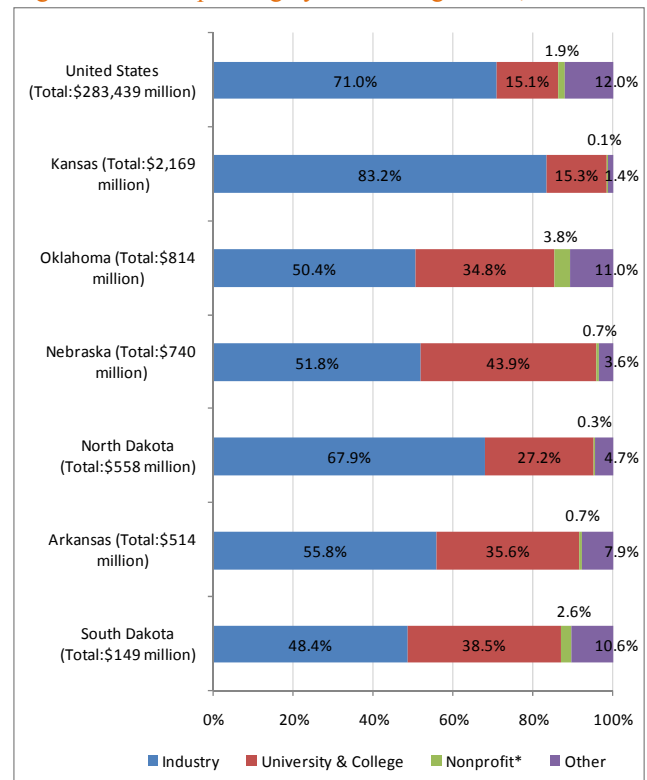
Why is this indicator important?

This indicator shows the contribution to the total R&D spending from different performing sectors (industry, academia, and nonprofit institutions).

What does it mean for Kansas?

In 2004, the R&D spending in Kansas was \$2.2 billion, highest among the study states. Kansas had a higher percentage of R&D performed by the industry sector than other reference states (Figure 9).

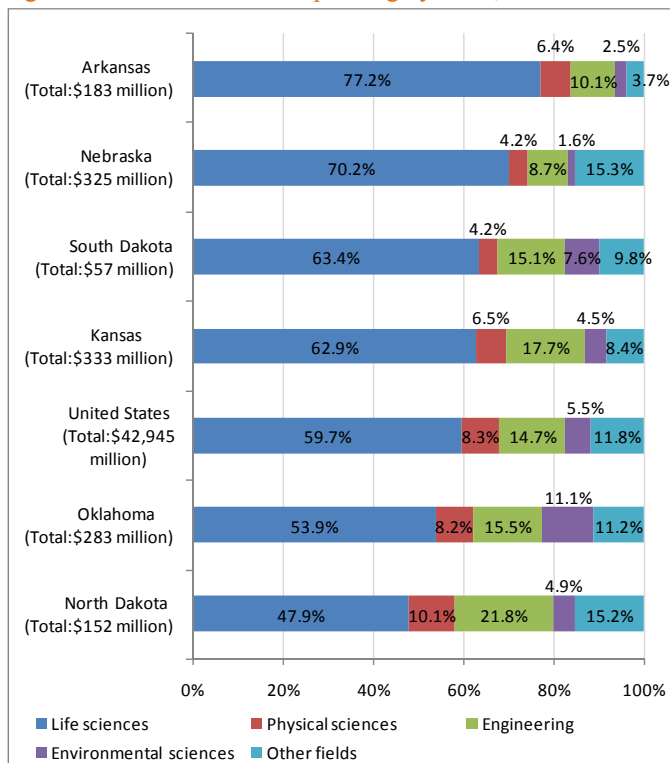
Figure 9: R&D Spending by Performing Sector, 2004



* Nonprofit includes only that which is federally funded and therefore the contribution by this sector is understated

Source: National Science Foundation

Figure 10: Academic R&D Spending by Field, 2004



Source: National Science Foundation

ACADEMIC RESEARCH & DEVELOPMENT SPENDING BY FIELD

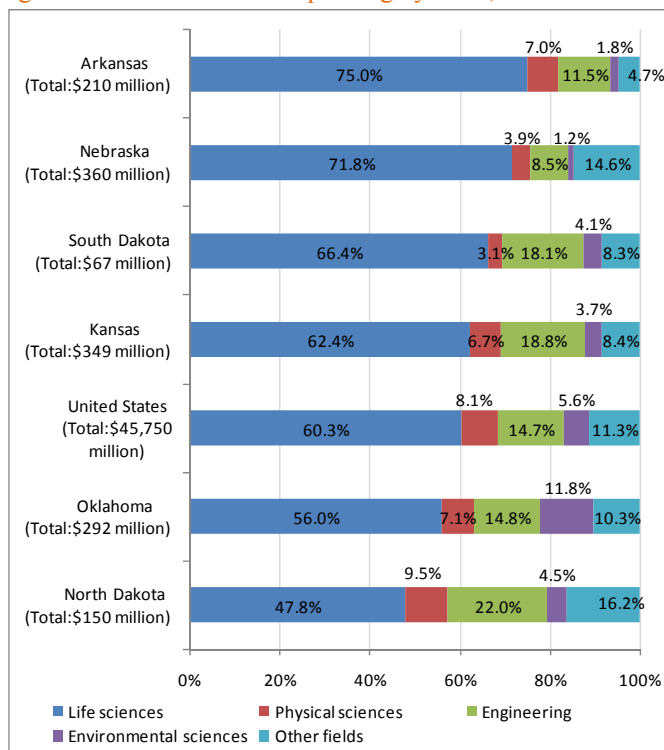
Why is this indicator important?

Universities and colleges are one of the major sources for knowledge and innovation. Their R&D spending on such academic fields as life science, physical sciences, and engineering is crucial for bioscience development.

What does it mean for Kansas?

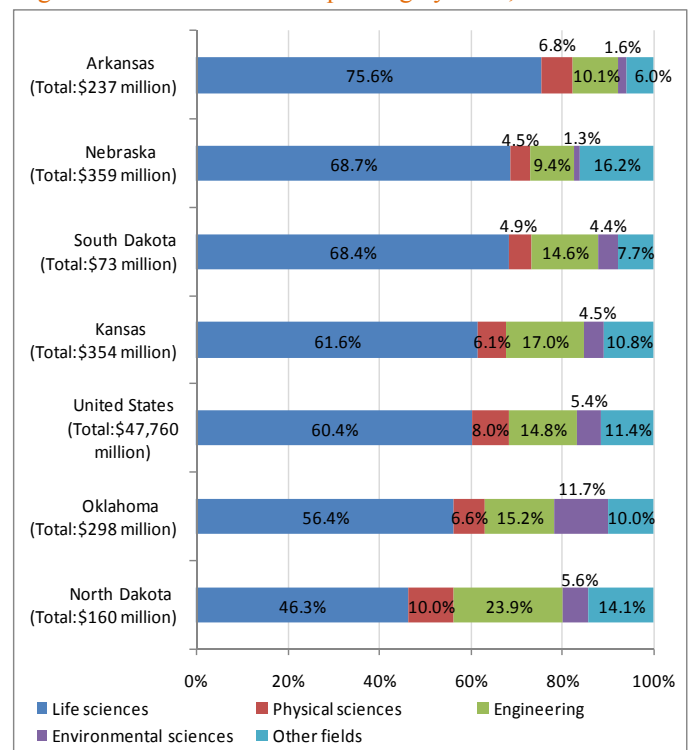
Kansas' academic R&D spending ranked first in 2004 (\$333 million) among the study states, second in 2005 (\$349 million) and 2006 (\$354 million). From 2004 to 2006, about 62% of Kansas' academic R&D spending was on life sciences, one of the important fields for bioscience development.

Figure 11: Academic R&D Spending by Field, 2005



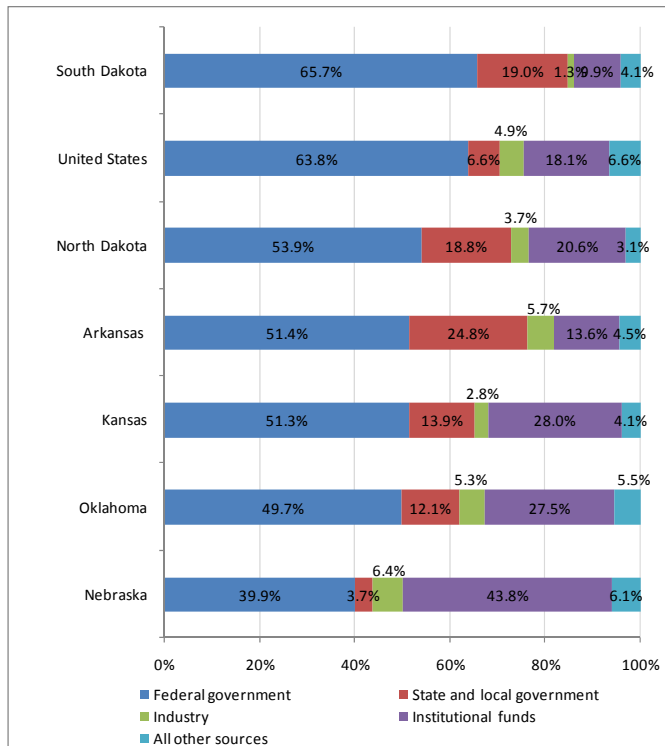
Source: National Science Foundation

Figure 12: Academic R&D Spending by Field, 2006



Source: National Science Foundation

Figure 13: Academic R&D Spending by Fund Source, 2004



Source: National Science Foundation

ACADEMIC RESEARCH & DEVELOPMENT SPENDING BY FUND SOURCE

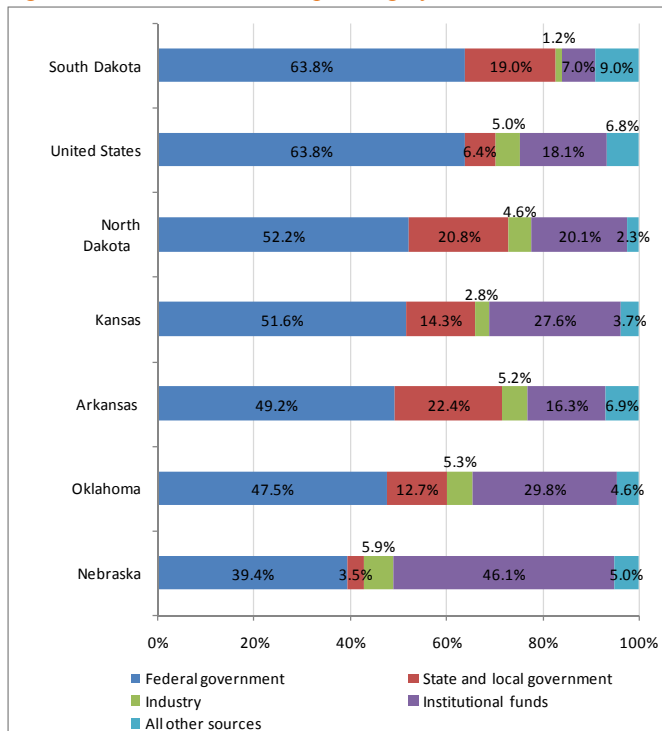
Why is this indicator important?

Today's economy is knowledge based. A healthy economy requires investment in R&D at universities and colleges from a variety of sources. Government and private businesses play an important role.

What does it mean for Kansas?

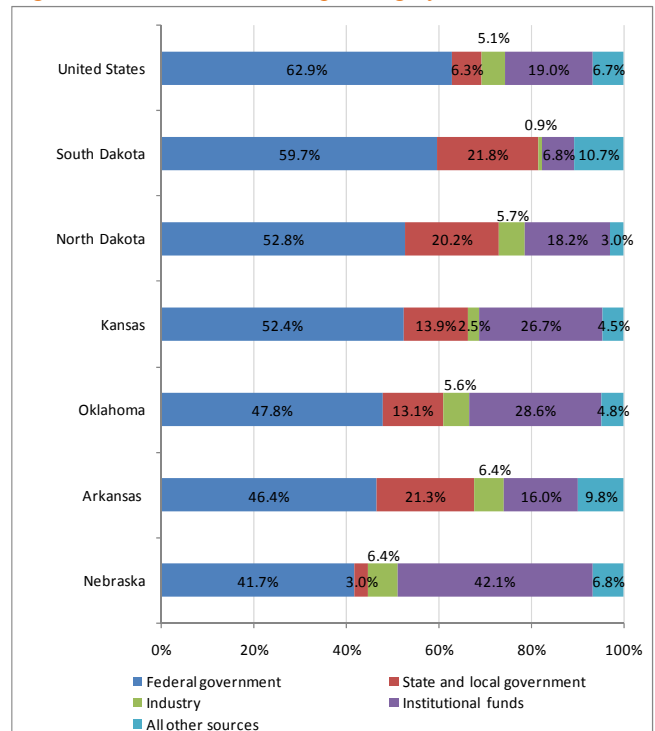
A little more than half of Kansas academic R&D spending came from the federal government. The share of federal funding in Kansas' total academic R&D spending was lower than the national average from 2004 to 2006. Institutional funds comprised the second largest source of funds for academic R&D spending in Kansas (Figures 13, 14, 15).

Figure 14: Academic R&D Spending by Fund Source, 2005



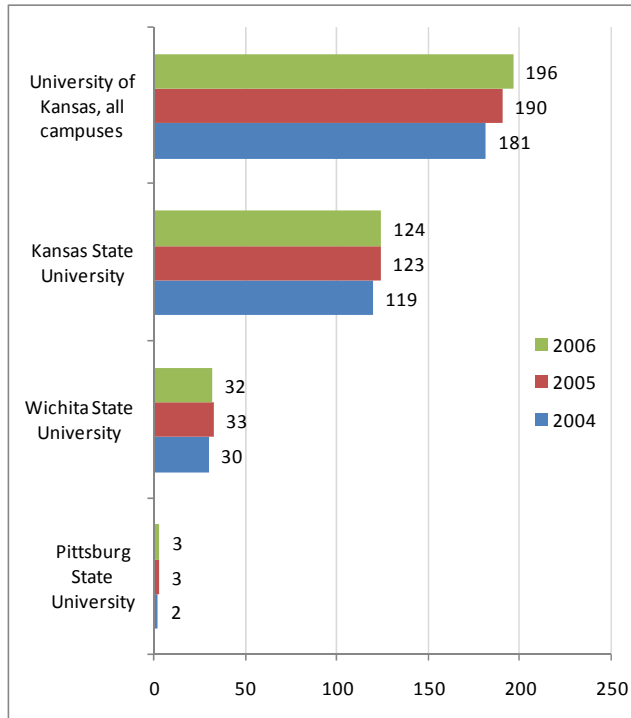
Source: National Science Foundation

Figure 15: Academic R&D Spending by Fund Source, 2006



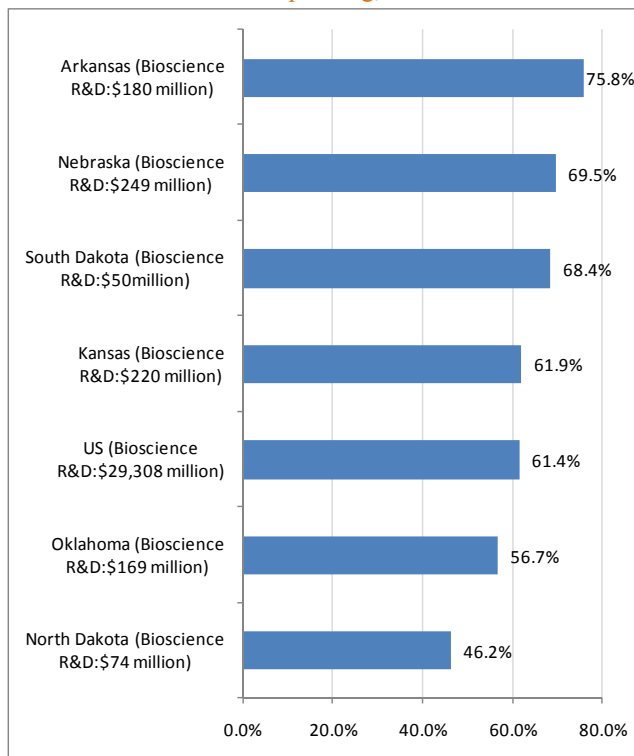
Source: National Science Foundation

Figure 16: Kansas Academic R&D Spending by University (million \$)



Source: National Science Foundation

Figure 17: Academic R&D Spending in Bioscience as a Percent of Total Academic R&D Spending, 2006



Source: Battelle Memorial Institute

KANSAS ACADEMIC RESEARCH & DEVELOPMENT SPENDING BY UNIVERSITY

Why is this indicator important?

This indicator shows how R&D funding is distributed among the state universities. To some extent, it demonstrates the R&D strength of a university.

What does it mean for Kansas?

The University of Kansas and Kansas State University are top two research universities in Kansas. Their R&D spending accounted for about 90% of the total academic spending in the state in 2004, 2005, and 2006 (Figure 16).

ACADEMIC RESEARCH & DEVELOPMENT SPENDING IN BIOSCIENCE AS A PERCENT OF TOTAL ACADEMIC RESEARCH & DEVELOPMENT SPENDING

Why is this indicator important?

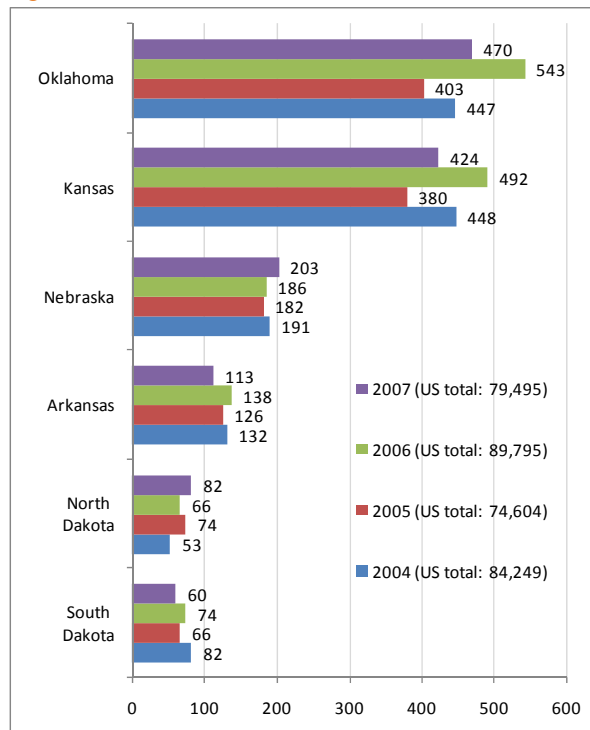
This indicator measures the R&D efforts the universities and colleges exert in bioscience.

What does it mean for Kansas?

Universities and colleges in Kansas spent \$220 million in bioscience research and development in 2006, which accounted for 62% of total academic R&D spending in the state. The percentage is close to the US average, but behind Arkansas, Nebraska, and South Dakota (Figure 17).

INNOVATION CAPACITY

Figure 18: Patents Awarded



Source: U.S. Patent and Trademark Office

PATENTS AWARDED

Why is this indicator important?

The number of patents indicates the level of innovative thinking and research which has the potential to be commercialized into products and services.

What does it mean for Kansas?

From 2004 to 2007, 1,744 patents from Kansas were granted by the U.S. Patent and Trademark Office. Kansas' patent number ranked the second among all the study states (Figure 18).



PATENTS AWARDED PER 1,000 INDIVIDUALS IN SCIENCE AND ENGINEERING OCCUPATIONS

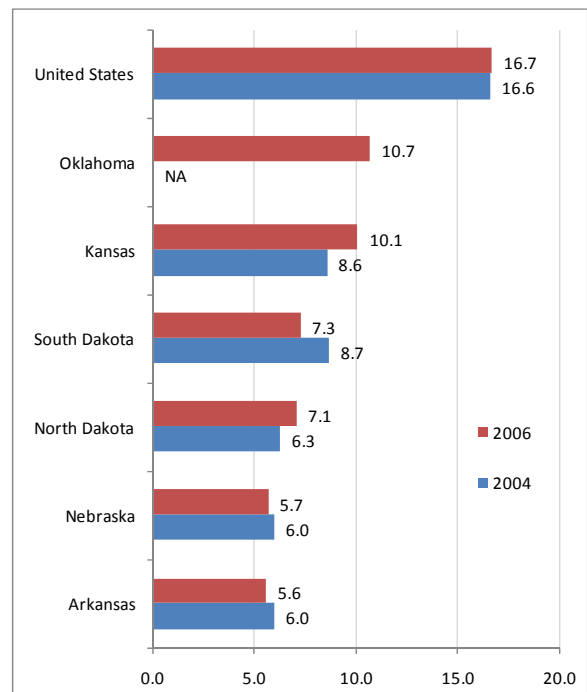
Why is this indicator important?

This indicator measures the innovation capacity of a state's science and engineering workforce.

What does it mean for Kansas?

For every 1,000 individuals in science and engineering occupations, Kansas had 8.6 patents awarded in 2004, and 10.1 patents awarded in 2006. The numbers were lower than the national averages (Figure 19).

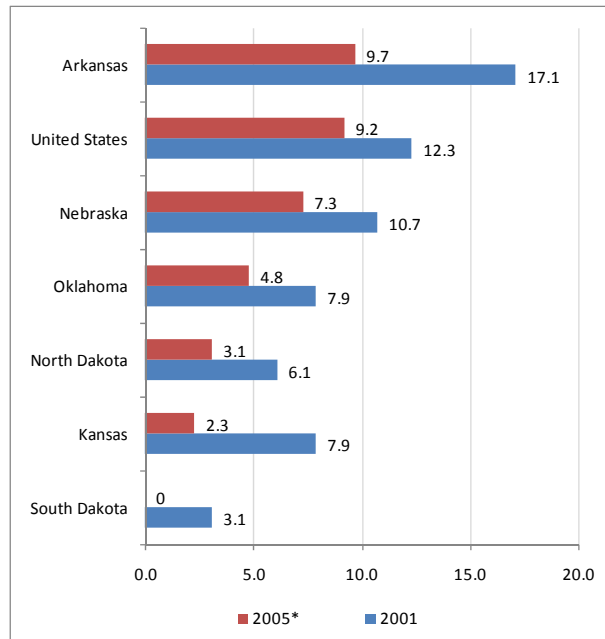
Figure 19: Patents Awarded per 1,000 Individuals in Science and Engineering Occupations



NA= not available

Source: National Science Foundation

Figure 20: Academic Patents Awarded per 1,000 Science and Engineering Doctorate Holders in Academia



* Number of science and engineering doctorate holders in academia is 2006 data

Source: National Science Foundation

ACADEMIC PATENTS AWARDED PER 1,000 SCIENCE AND ENGINEERING DOCTORATE HOLDERS IN ACADEMIA

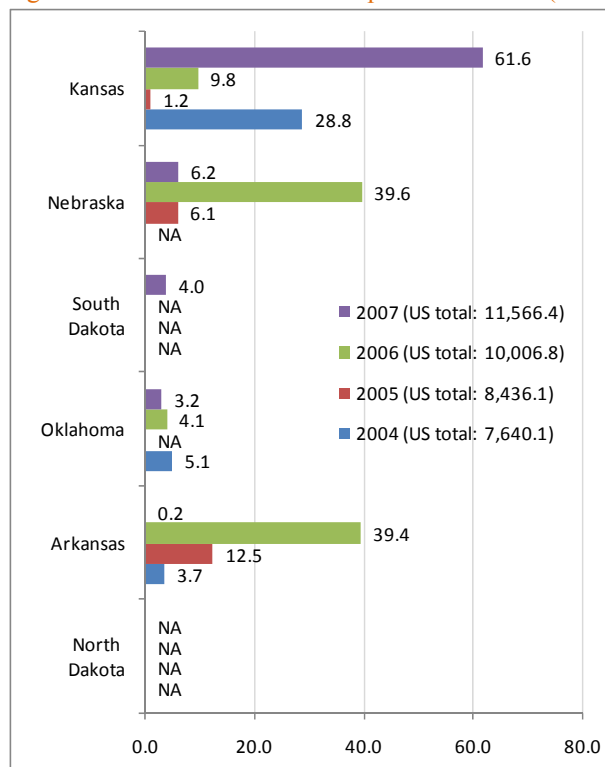
Why is this indicator important?

This indicator measures the innovation capacity of the science and engineering researchers at universities and colleges.

What does it mean for Kansas?

For every 1,000 science and engineering doctorate holders at universities and colleges, Kansas had 7.9 academic patents awarded in 2001, and 2.3 academic patents awarded in 2005. The national averages were 12.3 and 9.2 respectively in 2001 and 2005. Kansas ranked fifth among the study states (Figure 20).

Figure 21: Bioscience Venture Capital Investment (million \$)



NA= not available

Source: Source: Battelle Memorial Institute

BIOSCIENCE VENTURE CAPITAL INVESTMENT

Why is this indicator important?

Bioscience venture capital provides critical funding for bioscience new startups and companies with high growth potential.

What does it mean for Kansas?

Kansas has very high bioscience venture capital investment. Bioscience venture capital investment in Kansas amounted to \$101.4 million from 2004 to 2007, which is the highest among all the study states (Figure 21).

Table 3: Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Award Number and Amount, 2004

	SBIR		STTR	
	Awards	Amount (million \$)	Awards	Amount (million \$)
Arkansas	21	5.55	21	0.86
Kansas	21	5.31	21	0.27
Nebraska	9	5.87	9	0.20
North Dakota	8	1.77	8	1.35
Oklahoma	42	11.66	42	0.10
South Dakota	1	0.11	1	0.60
United States	6,348	2,014.59	842	208.72

Source: U.S. Small Business Administration

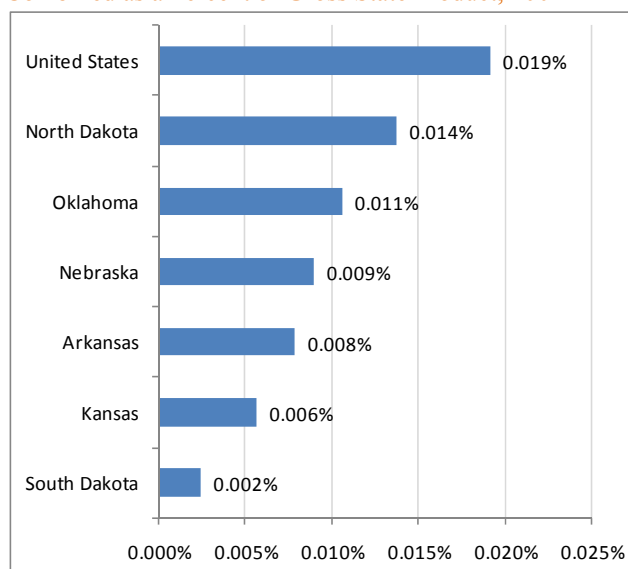
SBIR is a highly competitive program that encourages small business to explore their technological potential and provides the incentive to profit from its commercialization...The risk and expense of conducting serious R&D efforts are often beyond the means of many small businesses. By reserving a specific percentage of federal R&D funds for small business, SBIR protects the small business and enables it to compete on the same level as larger businesses.

STTR is a highly competitive program that reserves a specific percentage of federal R&D funding for award to small business and nonprofit research institution partners. Small business has long been where innovation and innovators thrive. But the risk and expense of conducting serious R&D efforts can be beyond the means of many small businesses.

Conversely, nonprofit research laboratories are instrumental in developing high-tech innovations. But frequently, innovation is confined to the theoretical, not the practical. STTR combines the strengths of both entities by introducing entrepreneurial skills to high-tech research efforts. The technologies and products are transferred from the laboratory to the marketplace. The small business profits from the commercialization, which, in turn, stimulates the U.S. economy.

– U.S. Small Business Administration

Figure 22: Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Funding Combined as a Percent of Gross State Product, 2004



Source: U.S. Small Business Administration; U.S. Bureau of Economic Analysis

SMALL BUSINESS INNOVATION RESEARCH (SBIR) AND SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) FUNDING

Why is this indicator important?

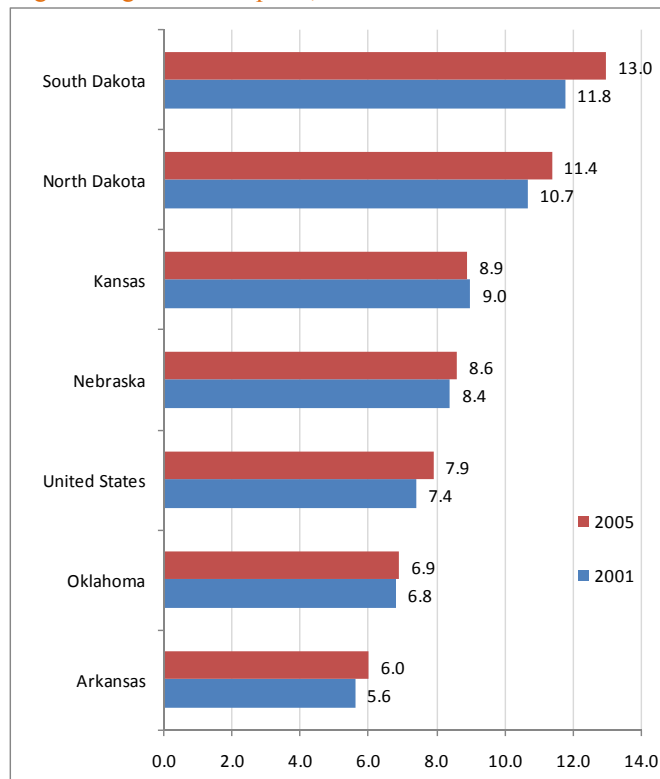
The SBIR and STTR programs promote scientific and technical leadership in small businesses, and facilitate private and public partnership. They are important for the commercialization of research and innovation.

What does it mean for Kansas?

Kansas received \$5.58 million SBIR and STTR funding combined in 2004. The funding was only 0.006% of Kansas' gross state product in 2004. The percentage was lower than the national average and most of the peer states (Table 3, Figure 22).



Figure 23: Bachelor's Degrees in Natural Sciences and Engineering Conferred per 1,000 Individuals 18–24 Years Old



Source: National Science Foundation

BACHELOR'S DEGREES IN NATURAL SCIENCE AND ENGINEERING CONFERRED PER 1,000 INDIVIDUALS 18–24 YEARS OLD

Why is this indicator important?

Bioscience industry is technology-intensive. Its development requires workers with higher education in natural science and engineering. Many people enter the job market at 18-24 years old. This indicator measures how many of those young people have the science and technical potentials.

What does it mean for Kansas?

For every 1,000 individuals 18-24 years old, Kansas had about 9 people with a bachelor degree in natural sciences and engineering in both 2001 and 2005. Kansas ranked higher than the national average, but lower than South Dakota and North Dakota (Figure 23).

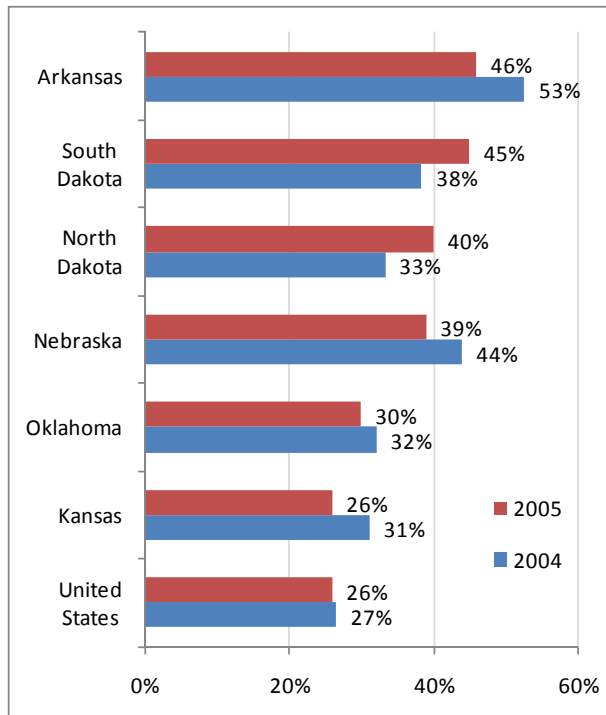
Table 4: Life Science Doctorates Awarded

	2004	2005
Arkansas	49	53
Kansas	81	64
Nebraska	66	65
North Dakota	14	18
Oklahoma	71	70
South Dakota	15	17
United States	6,983	7,262

Source: National Science Foundation

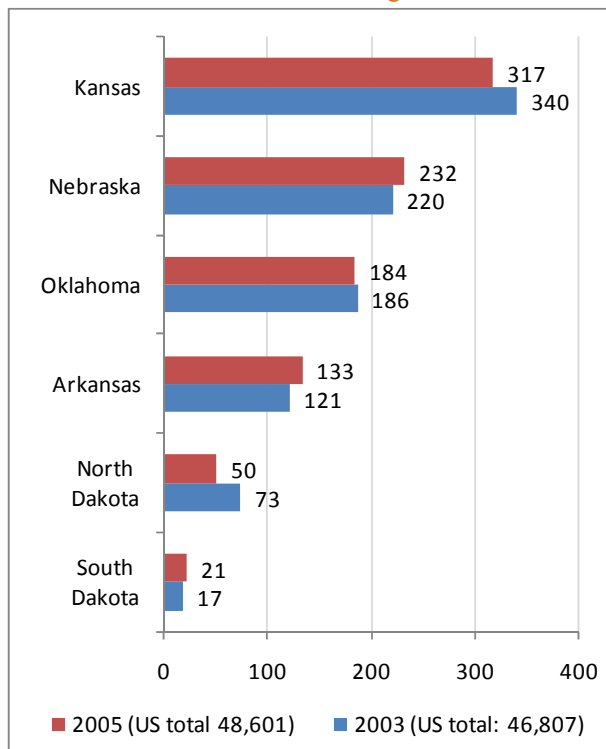


Figure 24: Life Science Doctorates Awarded as Share of Science and Engineering Doctorates Awarded



Source: National Science Foundation

Figure 25: Science, Engineering, and Health Postdoctorates in Doctorate-Granting Institution



Source: National Science Foundation

LIFE SCIENCE DOCTORATES AWARDED AS SHARE OF SCIENCE AND ENGINEERING DOCTORATES AWARDED

Why is this indicator important?

As defined in the Kansas Economic Growth Act, bioscience “includes biotechnology and life sciences.” This indicator demonstrates the research capacity in bioscience of a state’s universities and colleges, and also the research potentials of a state’s workforce in bioscience.

What does it mean for Kansas?

Kansas awarded 64 doctorates in life science in 2005, which accounted for 26% of all the science and engineering doctorates awarded that year. In 2004, 31% of all the science and engineering doctorates awarded in Kansas were life science doctorates. Although Kansas’ levels on this indicator were above the national levels in both 2004 and 2005, Kansas ranked the lowest among the study states on this indicator in both years (Table 4, Figure 24).

SCIENCE, ENGINEERING, AND HEALTH POSTDOCTORATES IN DOCTORATE-GRANTING INSTITUTIONS

Why is this indicator important?

Postdoctorates likely remain connected to the chosen field and continue in the related employment or research. This indicator also shows the research capacity of a state in science, engineering, and health.

What does it mean for Kansas?

Kansas ranked first among all the study states on this indicator. There were 340 science, engineering, and health postdoctorates in doctorate-granting institutions in Kansas in 2003 and 317 postdoctorates in the same fields in 2005 (Figure 25).

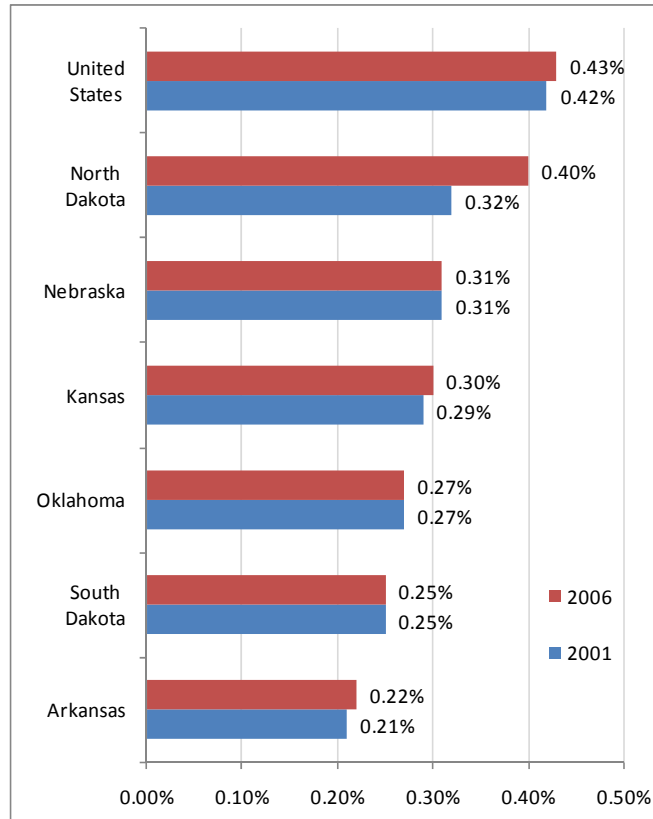
WORKFORCE CAPACITY

Table 5: Workforce

	2001	2004	2006
Arkansas	1,194,024	1,228,163	1,292,886
Kansas	1,347,715	1,378,713	1,400,169
Nebraska	925,783	940,047	945,270
North Dakota	336,228	338,221	346,359
Oklahoma	1,614,627	1,608,849	1,650,877
South Dakota	400,352	409,263	417,100
United States	137,115,199	139,213,523	144,581,912

Source: U. S. Bureau of Labor Statistics

Figure 26: Employed Science and Engineering Doctorate Holders as Share of Workforce



Source: National Science Foundation



EMPLOYED SCIENCE AND ENGINEERING DOCTORATE HOLDERS AS SHARE OF WORKFORCE

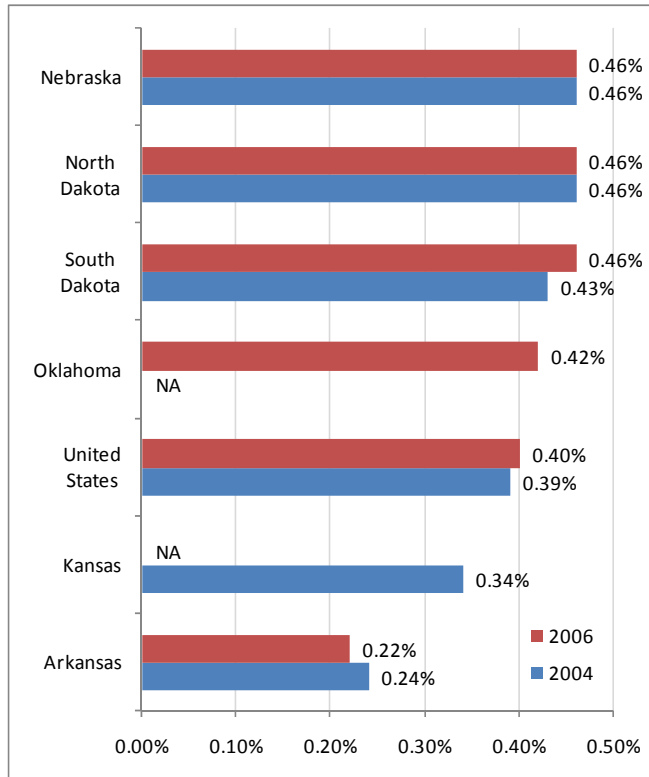
Why is this indicator important?

Doctorate holders are most likely to assume a higher proportion of research responsibilities than people with lower-level degrees. This indicator measures the research capacity of a state's workforce in science and engineering.

What does it mean for Kansas?

In Kansas, about 0.3% of its employed workforce was comprised of science and engineering doctorate holders in both 2001 and 2006. Kansas' levels on this indicator were lower than the national levels, the levels of North Dakota and Nebraska in both 2001 and 2006 (Figure 26).

Figure 27: Employed Life and Physical Scientists as Share of Workforce



NA= not available

Source: National Science Foundation

EMPLOYED LIFE AND PHYSICAL SCIENTIST AS SHARE OF WORKFORCE

Why is this indicator important?

Life and physical scientists are a crucial research force in bioscience. This indicator measures the research capacity of a state's workforce in bioscience.

What does it mean for Kansas?

Only 0.34% of Kansas' workforce was life and physical scientists in 2004, which was lower than the national average and the levels of most of the peer states (Figure 27).



About the Docking Institute of Public Affairs

This inaugural report is produced by the Docking Institute of Public Affairs at Fort Hays State University. The Docking Institute of Public Affairs began as the Fort Hays State University Institute of Public Affairs in 1980. In October 1989, The Kansas Board of Regents changed the name to the Docking Institute of Public Affairs, in honor of Kansas Governors George Docking and Robert B. Docking and Lieutenant Governor Thomas R. Docking.

Since its inception, the Docking Institute has worked with hundreds of local, state and regional organizations, agencies and communities to assist them in charting their future success. The mission of the institute is to facilitate effective decision-making among governmental and non-profit leaders. The Institute's six primary programs are: 1) Survey research, program evaluation research, public policy research, and community and economic development research; 2) Strategic planning and consulting; 3) Grants facilitation; 4) Economic and community development consulting; 5) Public administration training programs; and 6) Public affairs programming through conferences, speakers, forums, television and radio programming, newspaper columns and scholarly publications.



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