Oklahoma

Profile of the State Economy

Prepared for

Governor Frank Keating

By

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Introduction

This document includes data on the performance and composition of the Oklahoma economy. It is intended as an initial overview to motivate further discussions based on the full richness of the data. The data is based on the Cluster Mapping project, a multi-year effort to statistically define clusters and analyze regional economies in the United States. The Institute for Strategy and Competitiveness at Harvard Business School would be happy to support further work in this area in your state.

The work of the Council on Competitiveness, Monitor Company, and the Institute for Strategy and Competitiveness in the Clusters of Innovation project has indicated the importance of regional economies for prosperity. While some important elements of companies' business environments are set at the national level (e.g., federal taxes, rules and regulations governing international trade and investment, antitrust rules), many others are set at the regional state or local level (e.g., state universities, physical infrastructure). These regional differences matter, as the huge differences in economic performance across U.S. regions attest. The aim of our project, and of this short document, is to increase awareness of the specific regional conditions to inform political action at the state level.

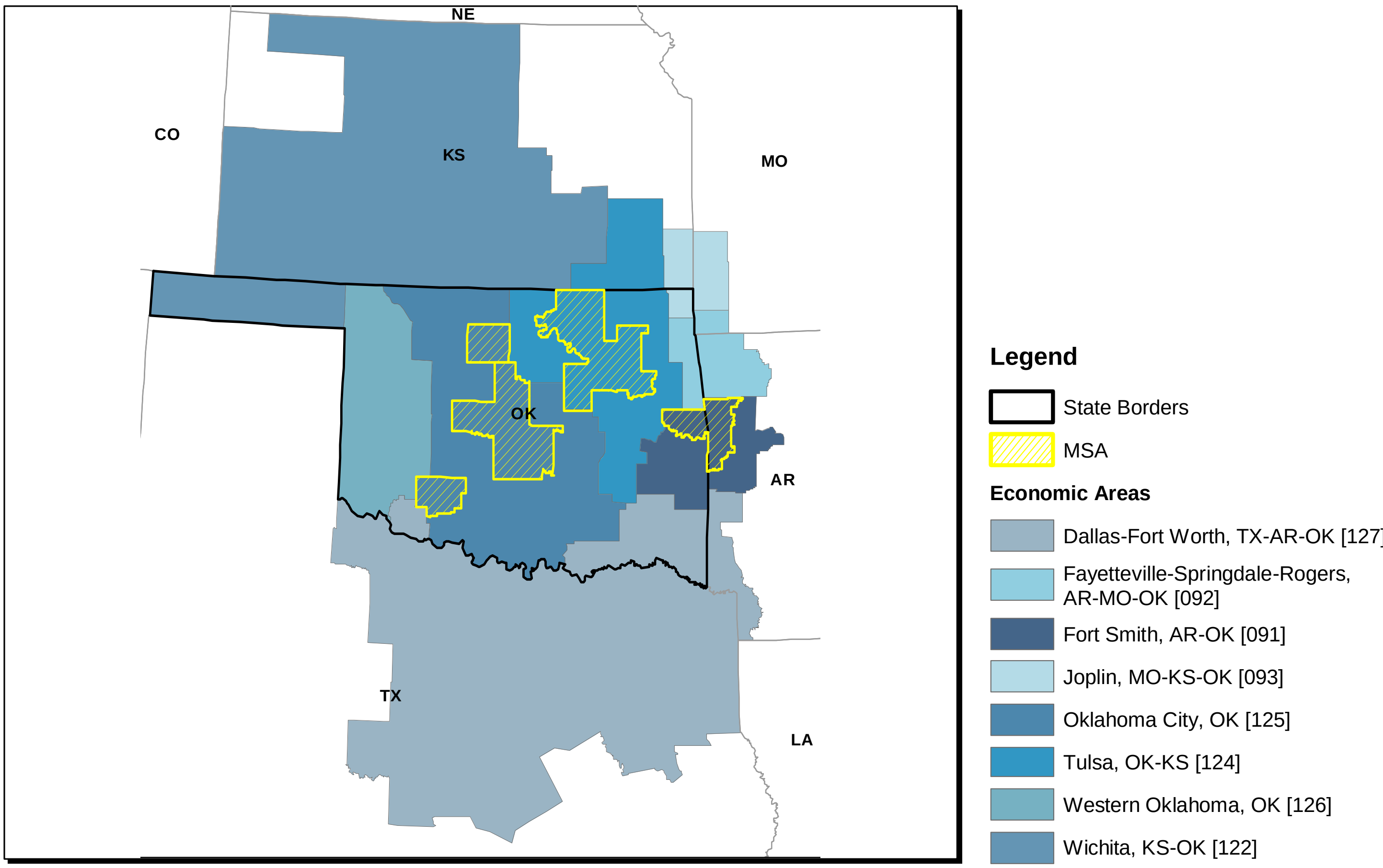
In many states, the relevant economic areas for companies are smaller than the state's boundaries. In others, relevant economic areas include parts of other states. We therefore list the economic areas and the metropolitan economic areas, both defined by the Bureau of Economic Analysis, on the opposite page. Economic performance data on these geographical units can be found at http://data.isc.hbs.edu/isc/index.jsp.

This document was prepared under the guidance of Professor Michael E. Porter by Elisabeth de Fontenay, Andrew Funderburk, Christian Ketels, Daniel Vasquez, and Weifeng Weng, all of the Institute for Strategy and Competitiveness.

Helpful links:

www.isc.hbs.edu	Institute for Strategy and Competitiveness
www.compete.org	Council on Competitiveness
www.monitor.com	Monitor Group

Oklahoma


NE
CO
KS
MO
OK
AR
TX
LA
Legend
State Borders
MSA
Economic Areas
Dallas-Fort Worth, TX-AR-OK [127]
Fayetteville-Springdale-Rogers, AR-MO-OK [092]
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Profile of the Oklahoma State Economy

Contents

1. Economic Performance and Innovation Output

Description:

This chart presents aggregate measures of the state's economic performance and innovative output. The state is compared to the average of the United States, and its rank among all states is indicated.

Establishment growth refers to growth in traded cluster establishments, which are in fields that compete with other states and countries. Growth in local cluster establishments (e.g. retail stores) is not included.

Interpretation:

These aggregate measures allow an overview of the state's performance relative to the U.S. average. The economic performance measures address current results, while the innovative output measures provide indicators of how prosperity might change in the future.

Economic performance. Comparison of employment growth and wages reveals the extent to which growth translates to higher prosperity. Gross state product per employee gives an indicator of the state's productivity. Export growth reveals the extent to which the state can meet the test of international markets.

Innovation output. Patenting measures the vitality of invention, while the other measures capture various aspects of commercialization. Mismatch of these indicators can signal flaws in the institutions linking those two stages of the innovation process.

State of Oklahoma

State Economic Performance and Innovation Output

Economic Performance

Employment growth per year, 1990 to 1999
- In Oklahoma: 2.47% (rank 22)
- in the US: 1.90%

Average wages in 1999
- in Oklahoma: $25,515 (rank 42)
- in the US: $32,109

Wage growth per year, 1990 to 1999
- in Oklahoma: 2.80% (rank 49)
- in the US: 4.03%

Gross state product per employee in 1999
- in Oklahoma: $ 43,406 (rank 46)
- in the US: $56,882

Annual growth in exports, 1995 to 1999
- in Oklahoma: -0.63% (rank 45)
- in the US: 4.41%

Innovation Output

Patents per 10,000 employees
- in Oklahoma: 4.1 (rank 30)
- in the US: 6.3

Patents growth per year, 1990 to 1998
- in Oklahoma: -4.39% (rank 51)
- in the US: 3.19%

New establishment formation*, 1990 to 1999
- in Oklahoma: 3.61% (rank 43)
- in the US: 4.60%

Fast growth firms (Inc 500), 1991 to 2000
- in Oklahoma: 51 (rank 29)

Venture capital investments, $ per worker
- in Oklahoma: $0 (rank 44)

Initial public offering proceeds per 1,000 firms, 1999
- in Oklahoma: $8428 (rank 7)

Note: Excludes government and agricultural employment. * This refers to the formation of establishments in traded industries, which trade with other regions and internationally.
Data Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu) ; Bureau of Labor Statistics; Bureau of Economic Analysis; International Trade Administration; U.S. Patent and Trademark Office; CHI Research, Price Waterhouse Cooper Money Tree; Hoover's IPO Central; Inc. Magazine; Fast Forward, Inc., Baker Thompson Associates

2. Patents by Organization, 1995-1998

Description:

This table lists the top 50 patentors in the state by organization name and type (corporation, government, university, or institute). Patents are assigned to regions according to the inventor's address of residence. In the case of multiple inventors from different locations, the patent is assigned fractionally to the various regions.

Interpretation:

Regions with a healthy level of innovation should have patents originating from a wide variety of corporations in a wide variety of fields. Healthy regions also tend to have significant patenting from universities and institutes. Concerns about innovative capacity arise when patents originate principally from a government agency, for instance, or when the vast majority of patents are generated by very few entities.

Top 50 Patent Holders in Oklahoma

Total of 1995-1998

Rank	Organization Title	Patentor Type	Total Patents, 1995-1998
1	PHILLIPS PETROLEUM COMPANY	Corporation	249
2	HALLIBURTON CO.	Corporation	119
3	SEAGATE TECHNOLOGY, INCORPORATED	Corporation	43
4	LUCAS NOVASENSOR INC.	Corporation	43
5	OKLAHOMA MEDICAL RESEARCH FOUNDATION	Institute	39
6	HALLIBURTON ENERGY SERVICES	Corporation	32
7	BRUNSWICK CORPORATION	Corporation	26
8	TDW DELAWARE, INC.	Corporation	22
9	BAKER HUGHES INCORPORATED	Corporation	22
10	CONOCO, INC.	Corporation	22
11	AMOCO CORPORATION	Corporation	20
12	KERR-MCGEE CHEMICAL CORPORATION	Corporation	18
13	COBURN OPTICAL INDUSTRIES, INC.	Corporation	18
14	CHARLES MACHINE WORKS, INC.	Corporation	16
15	ZEBCO DIVISION OF BRUNSWICK CORPORATION	Corporation	11
16	KERR-MCGEE CORPORATION	Corporation	10
17	RESEARCH CORPORATION TECHNOLOGIES, INC.	Corporation	9
18	B S & B SAFETY SYSTEMS, INC.	Corporation	8
19	CAMCO INTERNATIONAL INC.	Corporation	8
20	OKLAHOMA SAFETY EQUIPMENT CO.	Corporation	7
21	ROYCE MEDICAL COMPANY	Corporation	7
22	DOWELL, A DIVISION OF SCHLUMBERGER TECHNOLOGY CORPORATION	Corporation	7
23	DAIG CORPORATION	Corporation	7
24	ZEBCO CORPORATION	Corporation	7
25	ROCKWELL INTERNATIONAL CORPORATION	Corporation	6
26	MICROSOFT CORPORATION	Corporation	6
27	E. I. DU PONT DE NEMOURS AND COMPANY	Corporation	6
28	DANA CORPORATION	Corporation	6
29	OKLAHOMA STATE UNIVERSITY	University	5
30	HAROLD SIMPSON, INC.	Corporation	5
31	UNR INDUSTRIES, INC.	Corporation	5
32	ADVANCED WASTE REDUCTION, INC.	Corporation	5
33	WOUND HEALING OF OKLAHOMA	Corporation	5
34	UNARCO LLC	Corporation	5
35	GOODYEAR TIRE + RUBBER COMPANY	Corporation	5
36	DIAGNETICS, INC.	Corporation	5
37	NATIONAL TANK COMPANY	Corporation	5
38	BURFORD CORP.	Corporation	4
39	CMI CORPORATION	Corporation	4
40	CONTINENTAL INDUSTRIES, INC.	Corporation	4
41	CROSBY GROUP, INC.	Corporation	4
42	LOWRANCE ELECTRONICS, INC.	Corporation	4
43	PARHAM INDUSTRIES, INC.	Corporation	4
44	OKLAHOMA GAS & ELECTRIC CO.	Corporation	4
45	UNIVERSAL ENVIRONMENTAL TECHNOLOGIES, INC.	Corporation	4
46	SOUTHPAC TRUST INTERNATIONAL, INC.	Corporation	4
47	DURA-KOLD CORPORATION	Corporation	4
48	PREVUE NETWORKS, INC.	Corporation	4
49	PETROLITE CORPORATION	Corporation	4
50	XEROX CORPORATION	Corporation	4

Data Source: CHI Research, USPTO

Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

3. Overall Composition of Employment and Wages

Description:

A state's economy can be divided into traded clusters, local clusters, and natural resource industries. This table gives employment share and average wages for each of the three groups compared to national benchmarks.

Interpretation:

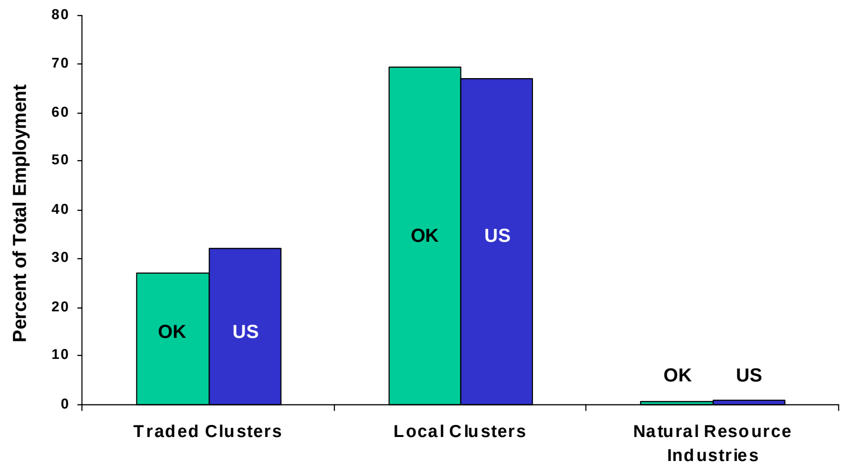
Traded clusters include those industries that compete across regions, and which tend to concentrate in a small number of locations. Traded clusters tend to be the engines of regional economic competitiveness, accounting for only about a third of employment but achieving much higher wages and productivity levels.

Local clusters involve activities serving almost exclusively local markets. These industries are present in every region in roughly the same proportions. Local clusters employ the majority of people in any regional economy, so their efficiency is critical for competitiveness in traded clusters to turn into regional prosperity. However, they cannot prosper over the long run without success in the traded clusters.

Natural-resource industries concentrate at natural resource sites. They account for a very small share of national employment.

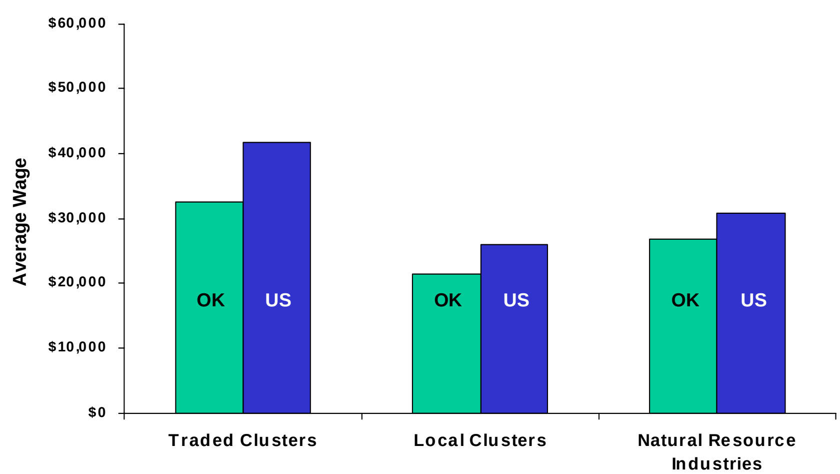
Overall state economic performance can be decomposed into the contributions of the three different types of activities. Traded clusters provide particular insight. Underperformance in traded clusters or lower traded cluster wages may be signs of competitiveness difficulties.

Oklahoma
Broad Composition of the Economy by Employment, 1999



Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

Oklahoma
Broad Composition of the Economy by Average Wage, 1999



Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

4. Employment by Cluster

Description:

Within the broad categories of traded and local clusters, a state's economy can be divided into the individual clusters. Clusters are geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. 41 traded clusters and 19 local clusters in the US economy, listed in the appendix, were defined in the Cluster Mapping Project at the Institute for Strategy and Competitiveness at HBS.

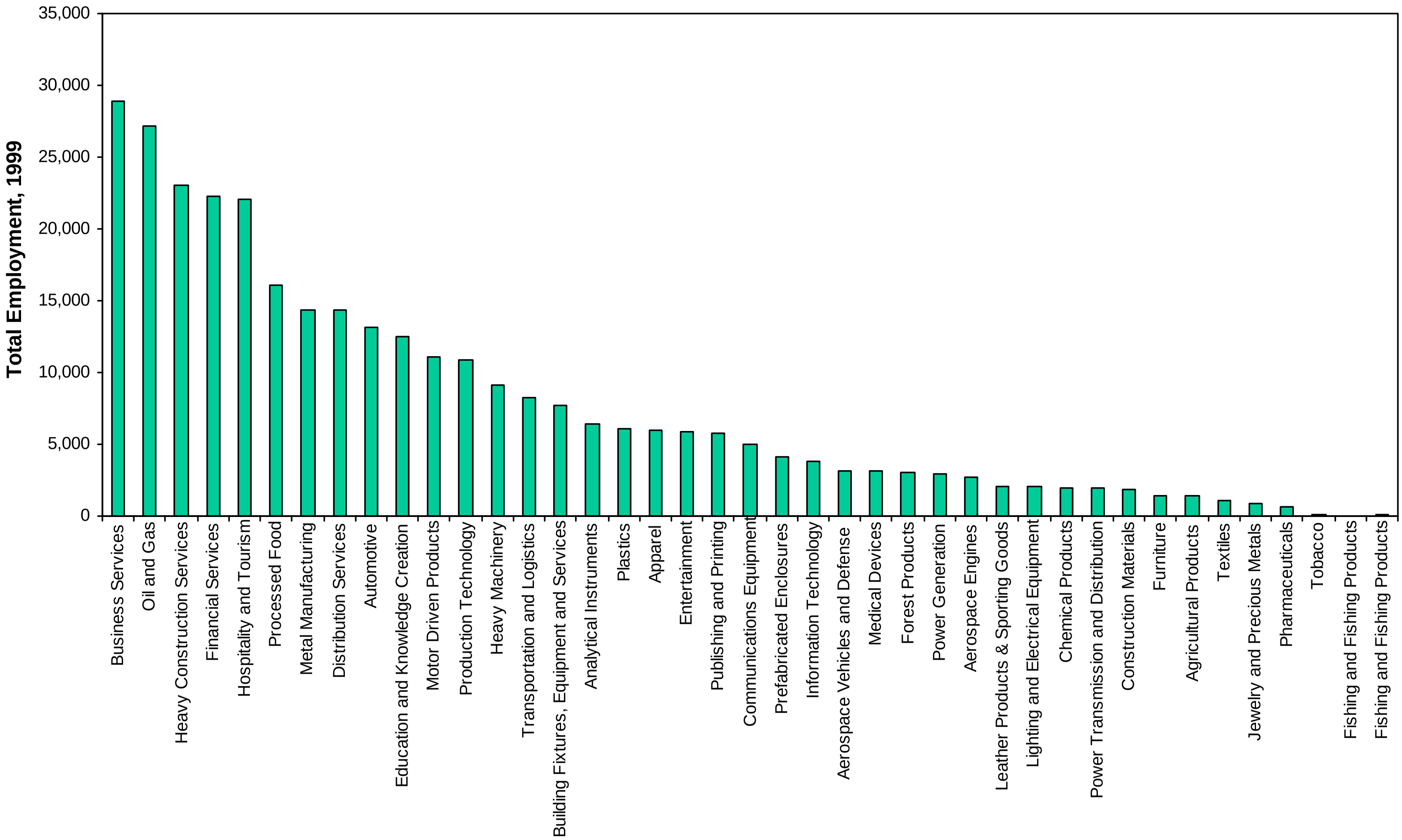
This table gives total employment in the state economy by each traded and local cluster.

Interpretation:

The employment by cluster gives a more detailed profile of the activities in the state economy contributing to overall prosperity. They can be used to test whether policies targeted at specific, for example so-called high tech, industries have a chance of creating a material impact on overall living conditions in the state.

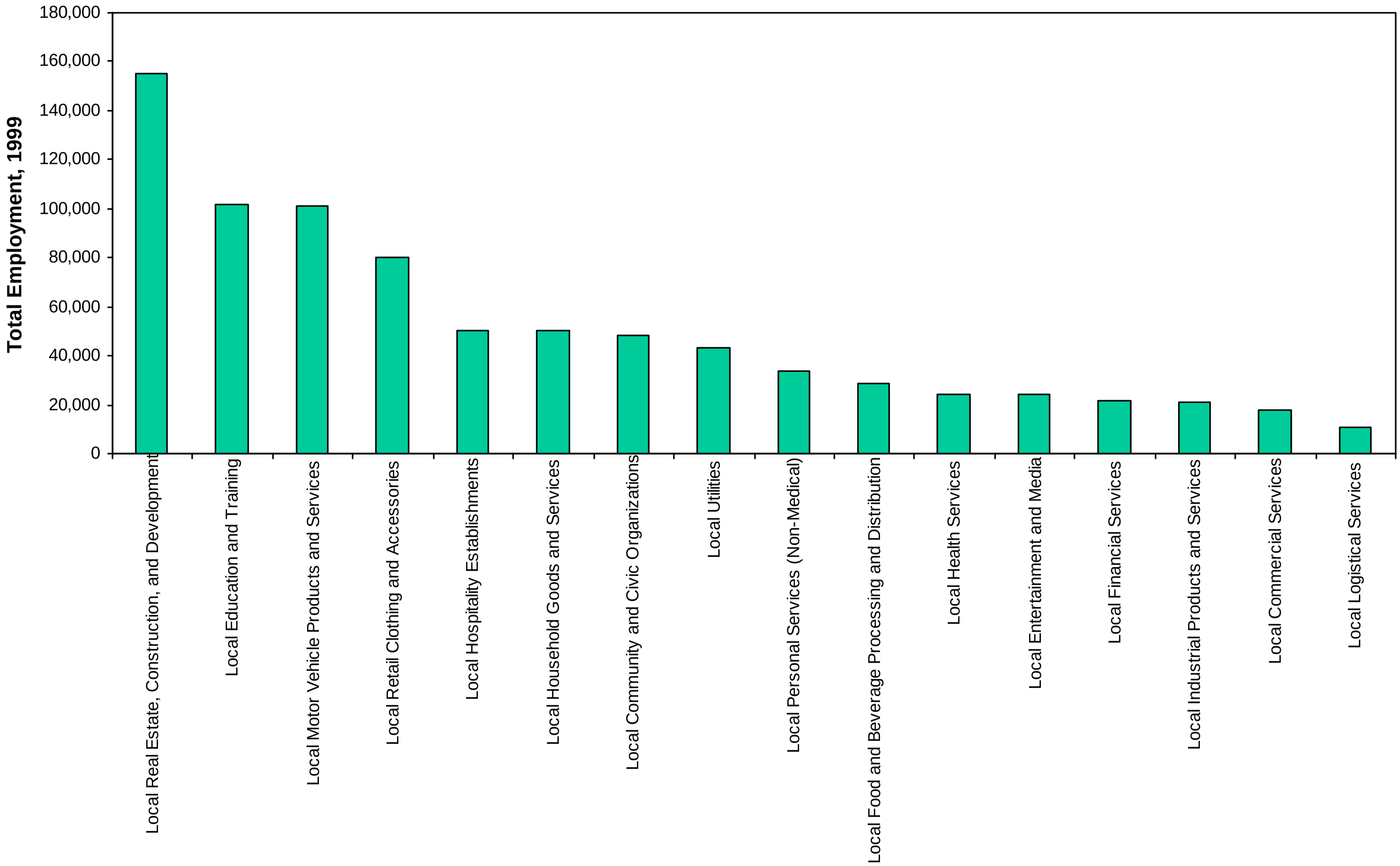
Oklahoma

Employment By Traded Cluster, 1999



Note: Chart utilizes narrow cluster definitions to eliminate overlapping employment across clusters.
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

Oklahoma
Employment By Local Cluster, 1999



Note: Chart utilizes narrow cluster definitions to eliminate overlapping employment across clusters.
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

5. Job Creation by Traded Cluster

Description:

This chart plots the net gain or loss in jobs by traded cluster from 1990 to 1999 using narrow, non-overlapping cluster definitions. The clusters are arranged in order of net jobs created. The chart also gives the overall net gain or loss in traded jobs (i.e. total for all 41 traded clusters). Data for the United States overall is given below.

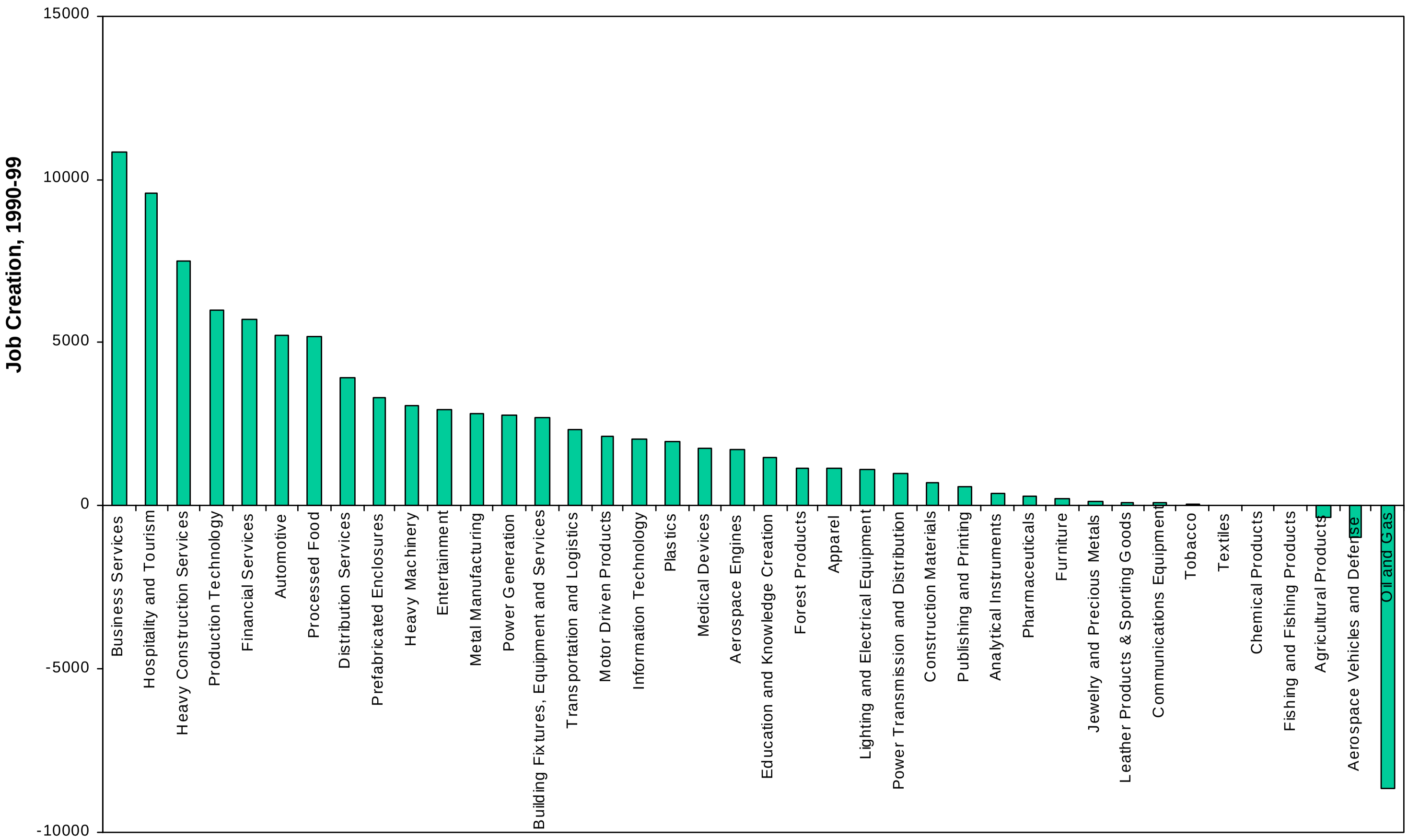
Interpretation:

This chart allows a region to identify its biggest job generators as well as job losers among traded clusters over the last decade. A few clusters often account for a large majority of the overall employment gain. It is helpful to compare these clusters with the priorities a state has set in its policies.

Comparison of job growth by cluster in the state relative to the U.S. can give insights into strengths and weaknesses in the state's economy. A state might be participating in a cluster which is surging nation-wide, or it might be gaining market position.

Oklahoma

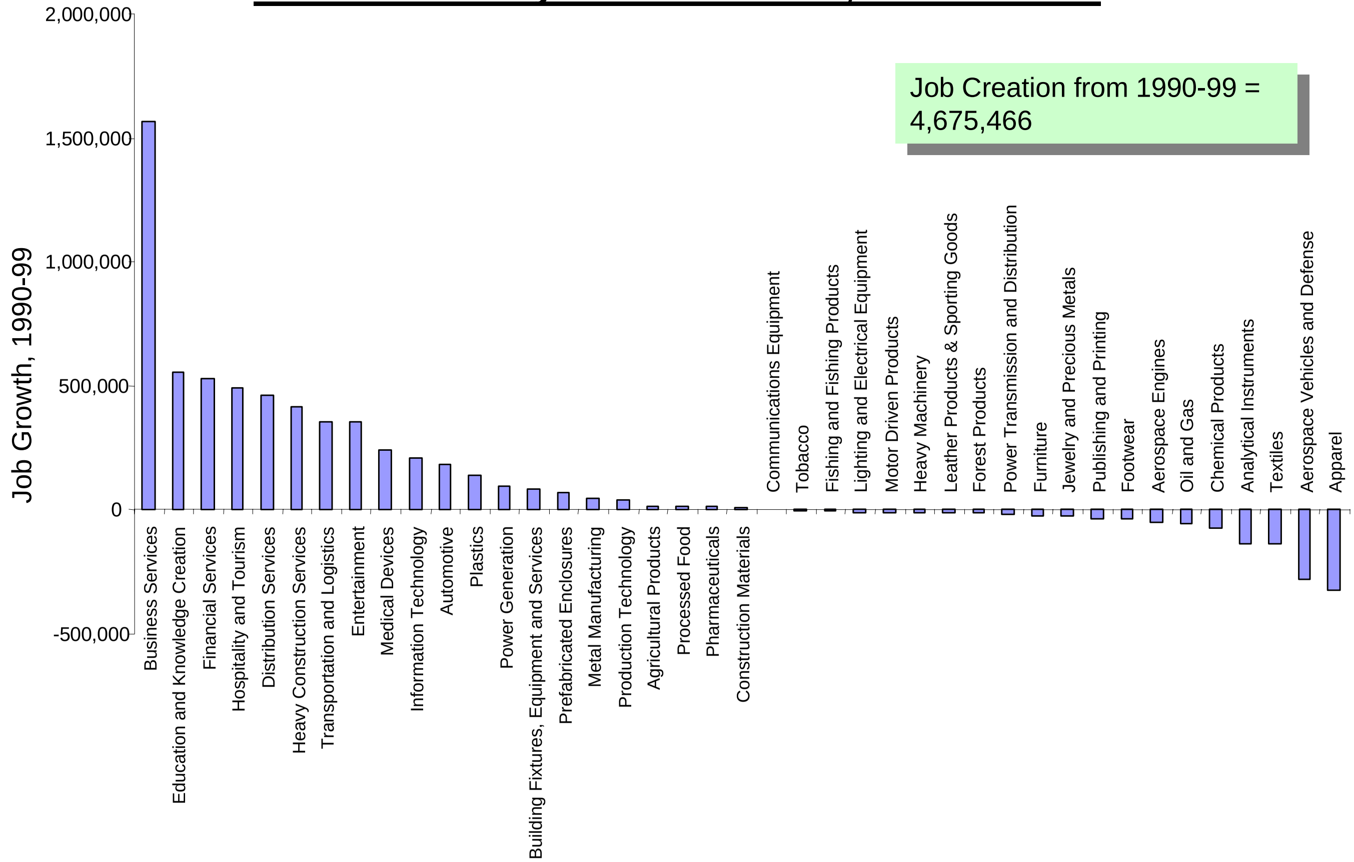
Job Creation By Traded Cluster, 1990 to 1999



Note: Chart utilizes narrow cluster definitions to eliminate overlapping Job Creation across clusters.
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

United States

Job Creation By Traded Cluster, 1990 to 1999



Note: Narrow cluster definitions
Source: Institute for Strategy and Competitiveness, Harvard Business School

6. Top 10 Highest Wage Traded Clusters, 1999

Description:

The ten highest wage traded clusters in the state are shown in decreasing order, with the width of the columns proportional to the number of workers in each cluster. The area of each cluster is thus equivalent to the overall wage sum the cluster generated in the state.

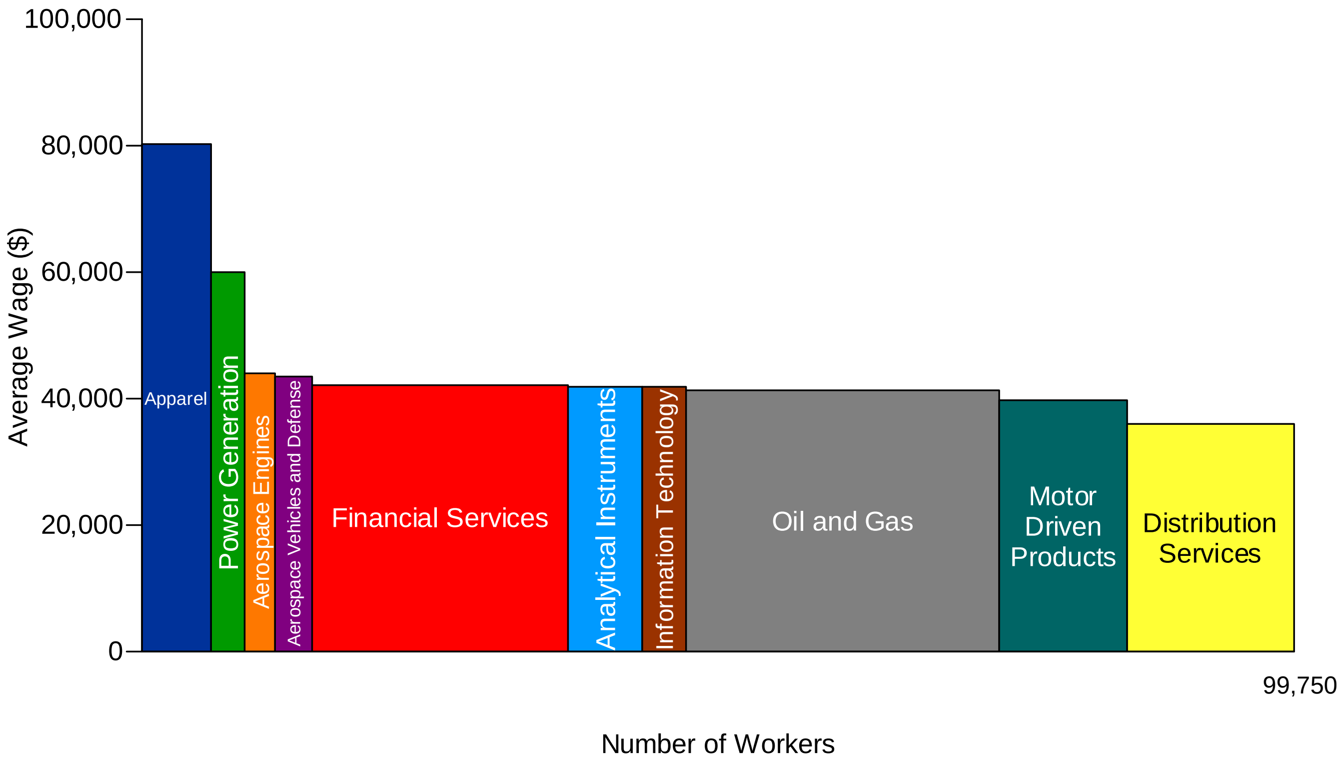
Interpretation:

The chart displays how the average wage in the state's traded clusters is built up by highest wage clusters. Some high wage clusters may have a small impact on overall wage levels because of their small size, the case in some high wage clusters. Some large, high wage clusters are often those in services.

The comparison to the U.S. average wages by cluster gives an initial benchmark to evaluate the composition of average wages in the state economy. States can increase wages in two different ways: (1) increase the employment in high wage clusters relative to low wage clusters and/or (2) increase the state's relative wages in given clusters. In practice, the second effect dominates as the explanation for why state wages differ.

Oklahoma

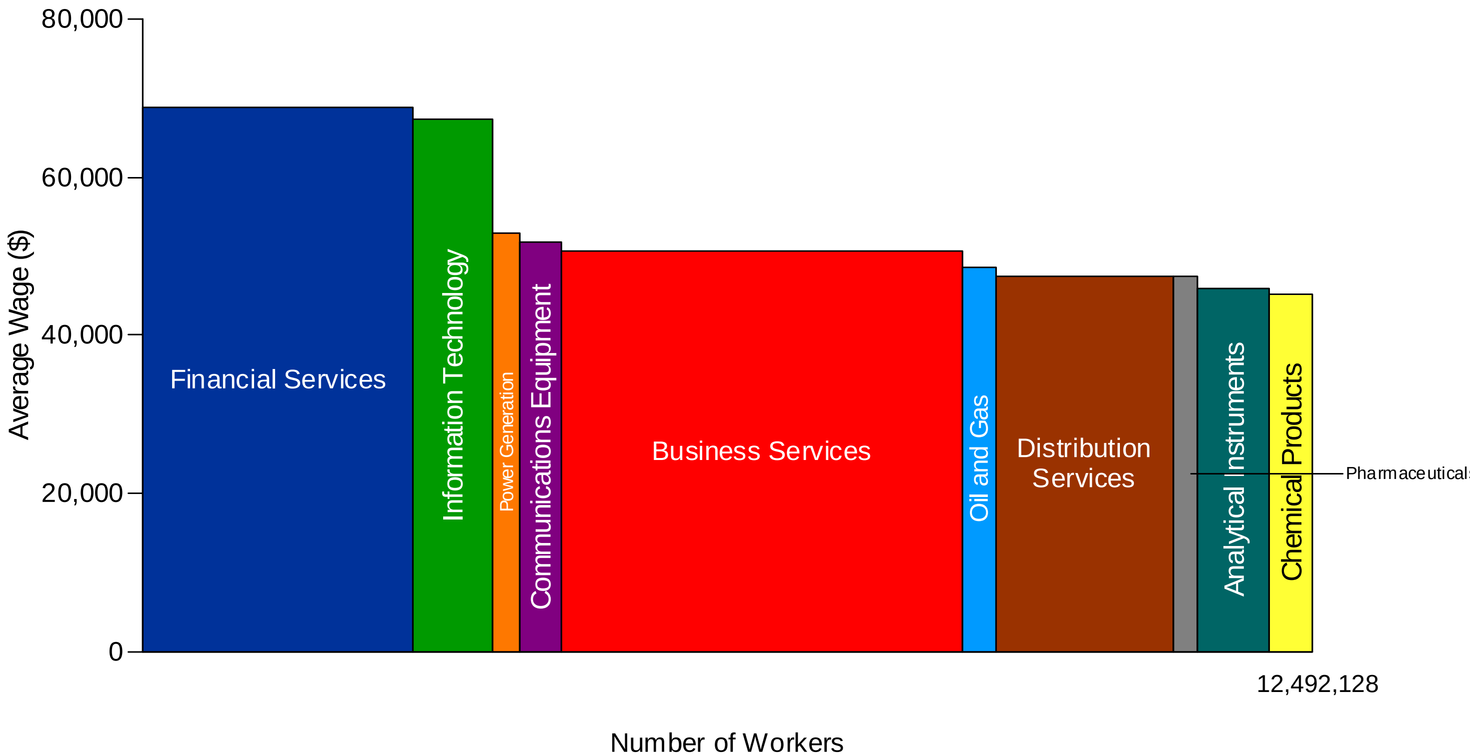
Top 10 Highest Wage Traded Clusters, 1999



Note: Graph utilizes narrow cluster definitions to eliminate overlapping employment across clusters

United States

Top 10 Highest Wage Traded Clusters, 1999



Note: Graph utilizes narrow cluster definitions to eliminate overlapping employment across clusters

7. Specialization of the State Economy by Traded Clusters

Description:

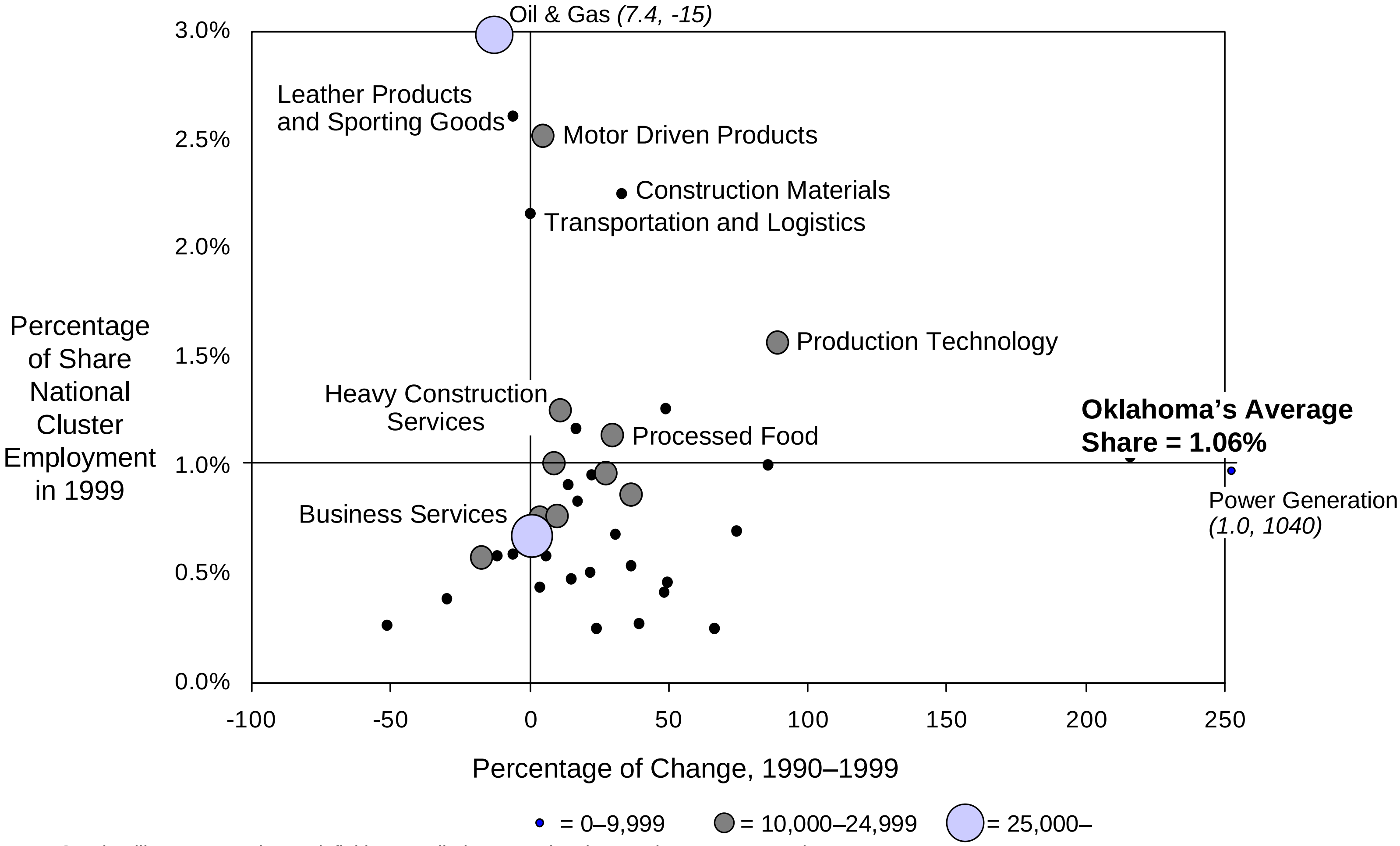
The slide plots all traded clusters in a state by regional employment share and change in share between 1990 and 1999. Narrow cluster definitions are utilized which eliminates cluster overlaps. The chart is divided into four quadrants, based on state's average share of traded employment, and whether the cluster is growing or losing share.

Interpretation:

This chart gives a snapshot of a region's competitive position by cluster. All 41 clusters are positioned according to current share and change in share over the last decade. The upper right-hand quadrant contains the region's strongest, most dynamic clusters, where the state has both a stronger than proportional share of national cluster employment and is adding share. Ideally, a number of significant clusters will appear in that quadrant. The lower right-hand quadrant contains clusters where the state is gaining employment share but which do not yet have a strong position. These clusters might present opportunities for the future. The upper-left hand quadrant indicates clusters that are strong but are loosing relative position. These clusters might be traditionally important pillars of the state economy that are in need of revitalization. Finally, the lower-left hand quadrant indicated clusters with apparently limited competitiveness in the state.

Oklahoma

Specialization By Traded Cluster



Note: Graph utilizes narrow cluster definitions to eliminate overlapping employment across clusters.
Data points too large to fit on the graph are placed on the borders and the values are given as: (y-axis, x-axis).
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

8. State Ranking by Leading Sub-Clusters

Description:

The slide gives the state's top 50 sub-clusters, or subunits within overall clusters, by national rank. Each cluster is divided into a number of subclusters which represent different subunits in which a region can be stronger or weaker.

Interpretation:

The slide provides additional information on areas of unique competitiveness in a state. Top ranking subclusters may signal the potential for a cluster to grow over time. Also, the pattern of subcluster strength may reveal opportunities at the intersection of clusters.

Oklahoma

Top 50 Sub-Clusters By National Rank

Cluster	Sub-Cluster	National Rank	State Share of National Sub-Cluster Employment
Oil and Gas	Oil and Gas Machinery	2	12.9
	Hydrocarbons	3	10.9
	Chemical Products	3.5	9.1
	Oil and Gas Exploration and Drilling	3	7.2
	Oil and Gas Trading	8	3.8
	Petroleum Processing	11	2.5
Building Fixtures, Equipment and Ser	Equipment	10.5	3.8
	Floor Coverings	8.5	3.1
	Building Products	14	2.5
	Plumbing	14	2.3
	Clay and Vitreous Products	13	1.6
Heavy Construction Services	Inputs	9	4.1
	Construction Materials	16	2.3
	Fabricated Metal	20	2.0
	Equipment Rental	26	1.4
Heavy Machinery	Construction Machinery	6	4.7
	Mining Machinery	13.5	2.3
	Equipment and Parts	18	2.0
	Farm Machinery	26	1.4
Automotive	Flat Glass	6	6.4
	Transportation Equipment	11	2.9
	Motor Vehicles	16	1.6
Motor Driven Products	Parts	3	10.0
	Motors and Generators	19	1.7
	Motorized Equipment	20	1.7

Cluster	Sub-Cluster	National Rank	State Share of National Sub-Cluster Employment
Processed Food	Containers	15	2.5
	Meat and Related Products	16	2.2
	Milling	21	1.9
Production Technology	Other Machinery	14	2.8
	Process Equipment	21	1.5
Apparel	Men's Clothing	15	2.4
	Accessories	19	1.4
Communications Equipment	Office Machines	13	2.0
	Communications Equipment	16	1.5
Hospitality and Tourism	Tour Services	10	2.7
	Specialized Inputs	22	1.7
Metal Manufacturing	Wire and Springs	13	2.7
	Metal Equipment	13	2.5
Transportation and Logistics	Airports	17	1.9
	Bus Terminals	17	1.9
Aerospace Engines	Aircraft Engines	9	2.9
Analytical Instruments	Process Instruments	19	1.4
Business Services	Facilities Support Services	20	1.5
Construction Materials	Tile, Brick and Glass	11.5	2.2
Distribution Services	Transportation Vehicle and Equipment D	9	2.8
Information Technology	Peripherals	16	1.4
Leather Products & Sporting Go	Leather products	15	1.8
Power Transmission and Distribu	Engines	12	3.0
Prefabricated Enclosures	Recreational Vehicles and Parts	9	3.8
Production Technology	Metalwork	6	5.6

Note: Using narrow cluster definitions to eliminate overlapping employment across clusters.

Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

Appendix a.

Clusters of Traded Industries

Upstream Sectors

Materials and Metals
- Construction Materials
- Metal Manufacturing

Forest Products
- Forest Products

Petroleum/Chemicals
- Oil and Gas
- Chemical Products
- Plastics

Semiconductors/Computers
- Information Technology

Industrial and Supporting Functions

Transportation and Logistics
- Automotive
- Motor Driven Products
- Transportation and Logistics

Power
- Power Generation
- Power Transmission and Distribution

Office
- Publishing and Printing

Telecommunications
- Communications

Defense
- Aerospace Engines
- Aerospace Vehicles and Defense

Multiple Businesses
- Education and Knowledge Creation
- Business Services
- Distribution Services
- Heavy Machinery
- Financial Services
- Prefabricated Enclosures
- Production Technology
- Analytical Instruments
- Heavy Construction Services

Final Consumption Goods and Services

Food/Beverages
- Agricultural Products
- Processed Foods
- Fishing and Fishing Products

Housing/Household
- Building Fixtures, Equipment and Services
- Lighting and Electrical Equipment
- Furniture

Textiles/Apparel
- Textiles
- Apparel
- Sporting and Leather Goods
- Footwear

Health Care
- Medical Devices
- Pharmaceuticals / Biotech

Personal
- Tobacco
- Jewelry and Precious Metals

Entertainment/Leisure
- Entertainment
- Hospitality and Tourism

Source: Institute for Strategy and Competitiveness, Harvard Business School

Clusters of Local Industries

Industrial and Supporting Functions

Multiple Businesses
- Local Industrial Products and Services
- Local Commercial Services
- Local Construction and Development
- Local Financial Services
- Local Insurance
- Local Packaging Materials
- Local Community and Civic Organizations
- Local Education and Training

Transportation and Logistics
- Local Logistical Services
- Local Personal Transportation

Power
- Local Utilities

Final Consumption Goods and Services

Food/Beverages
- Local Agriculture
- Local Food and Beverage Processing

Housing/Household
- Local Housing and Household Goods and Services

Textiles/Apparel
- Local Retail Clothing and Accessories

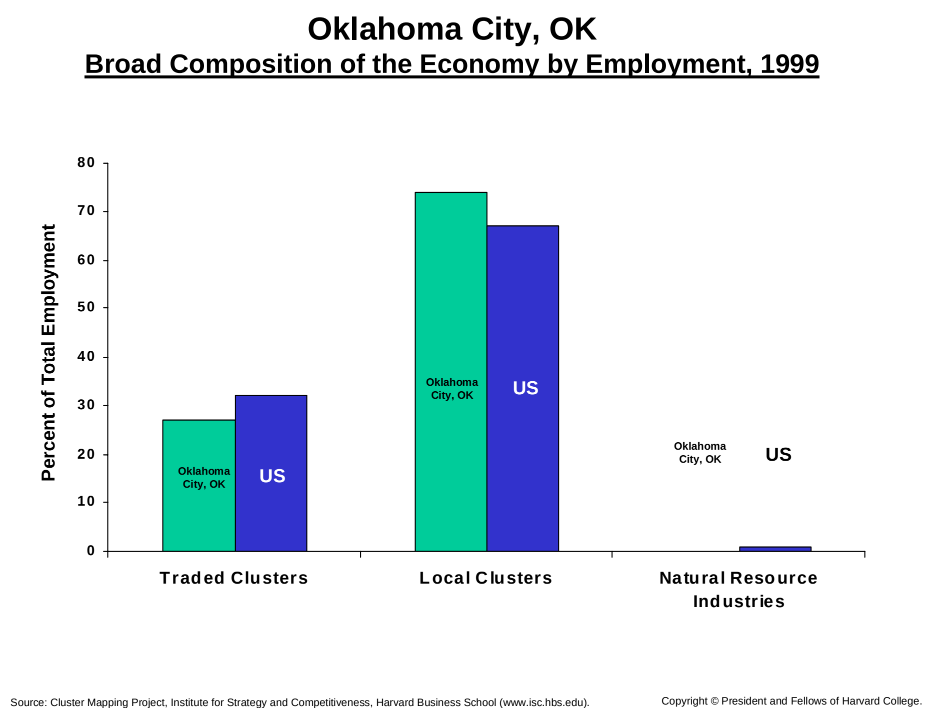
Health Care
- Local Health Services

Personal
- Local Personal Services (Non-medical)

Entertainment/Leisure
- Local Entertainment and Media
- Local Hospitality and Establishments

Source: Institute for Strategy and Competitiveness, Harvard Business School

Appendix b:



Oklahoma City, OK
Broad Composition of the Economy by Employment, 1999
Percent of Total Employment
80
70
60
50
40
30
20
10
0
Oklahoma City, OK
US
Oklahoma City, OK
US
Oklahoma City, OK
US
Traded Clusters
Local Clusters
Natural Resource Industries
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).
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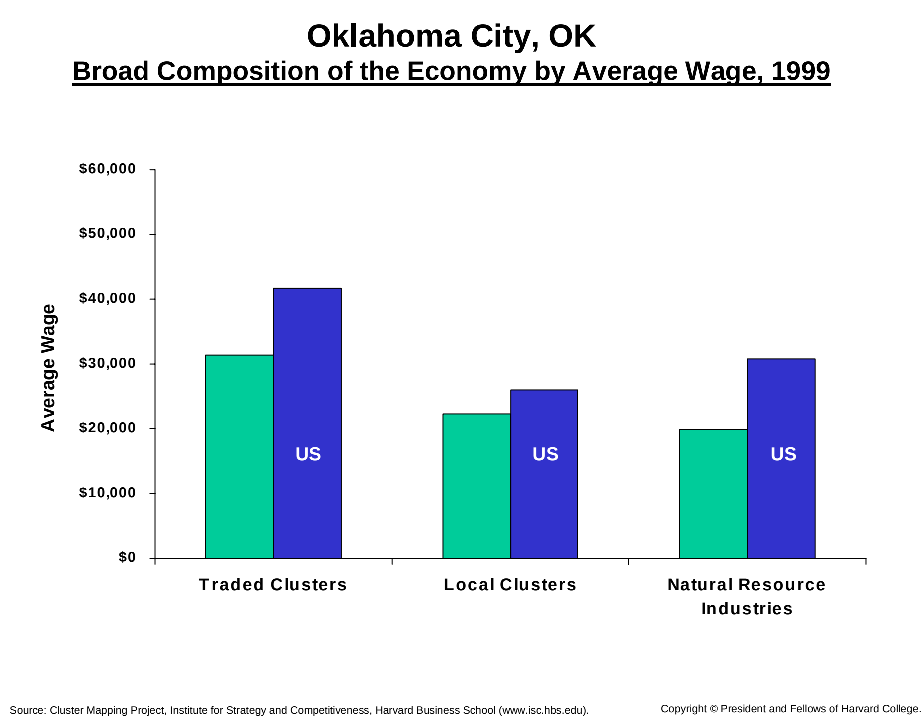

Oklahoma City, OK
Broad Composition of the Economy by Average Wage, 1999
Average Wage
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
US
US
US
Traded Clusters
Local Clusters
Natural Resource Industries
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).
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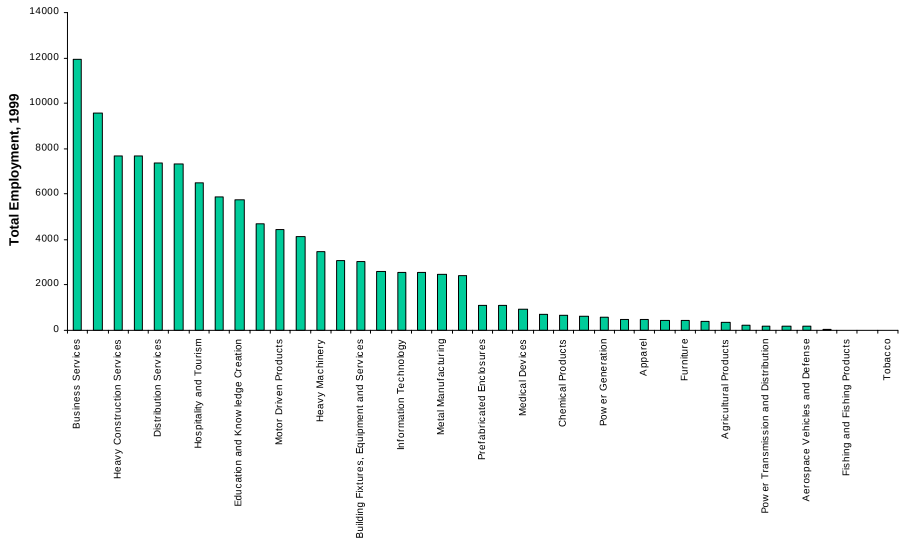
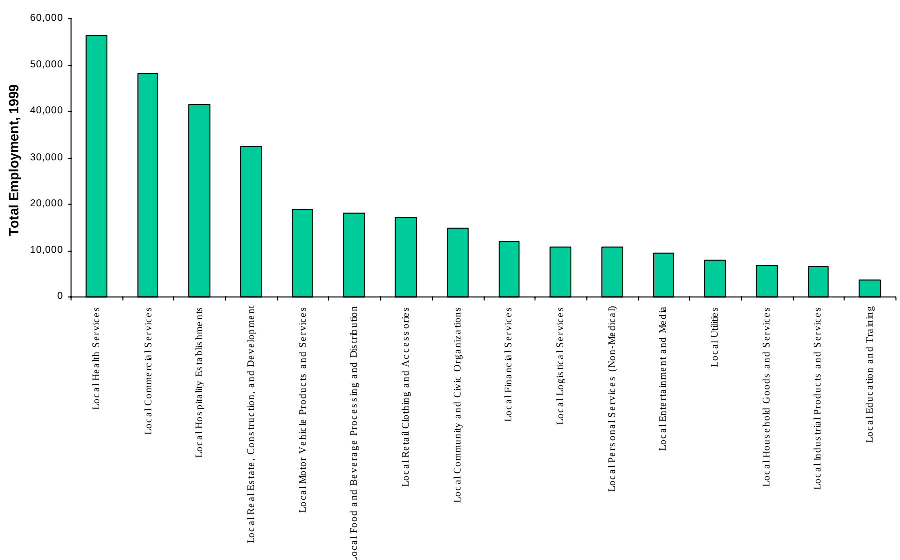
Oklahoma City, OK
Employment By Traded Cluster, 1999



Note: Chart utilizes narrow cluster definitions to eliminate overlapping employment across clusters.
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School (www.isc.hbs.edu).

Oklahoma City, OK
Employment By Local Cluster, 1999



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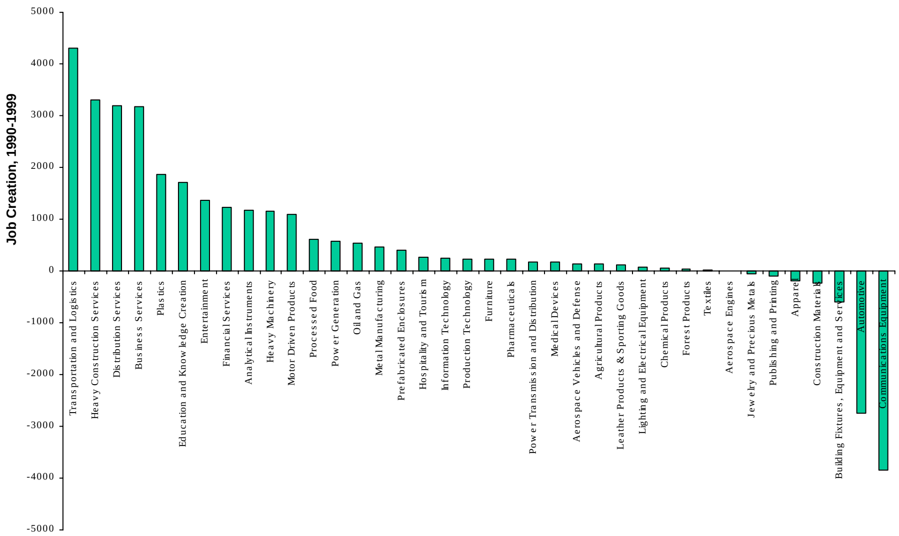
Oklahoma City, OK
Job Creation By Traded Cluster, 1990 to 1999



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