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Benchmarking East Tennessee's Economic Capacity

By:

DRI/McGraw-Hill

Economic Competitiveness Group

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MASTER

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Economic Capacity: Key Foundations of an Economy

INDUSTRIAL CLUSTERS

ECONOMIC INFRASTRUCTURE

The economic vital cycle of a region is based on the responsiveness of public and private suppliers of inputs such as technology, skills, and financing to the evolving needs of the region's industries. These suppliers are the region's *economic infrastructure*.

Economic Infrastructure Can be Classified in Six Categories

Human Resources: *Systems to prepare, advance, and renew skills to meet changing industry needs.*

Technology: *Systems to discover, develop, and deploy technology into the marketplace.*

Financial Resources: *Systems to fund the initiation, expansion, and modernization of industry.*

Economic Infrastructure Can be Classified in Six Categories

Physical Infrastructure: *Transportation, communication, energy, and environmental systems*

Quality of Life: *Sources of affordable housing, health and social services, public safety, culture and recreation to attract and retain work force.*

Tax & Regulation: *Business, property, and income taxes; work force, production and transaction regulations; and administrative systems that enable or inhibit business operations.*

Economic infrastructure is particularly crucial to the development of a region's economic strategy for two major reasons:

1. Unlike businesses which come and go, the elements of the economic infrastructure are the region's geographic assets. People, technology, and capital may appear to be fluid, but if they don't exist they must be brought in for business to succeed.
2. Improving the economic infrastructure improves the outlook for all. Sometimes called "the policy space," the economic infrastructure are the areas in which collaboration pays off.

Three Questions of Economic Infrastructure Analysis

1. **Disparities, concerns, and resources within the region**
 - Can the 15 counties act as an economic unit?
2. **Comparative advantage**
 - How does East Tennessee's economic infrastructure compare with that of a competitive reference group?
3. **Competitive advantage**
 - How can East Tennessee translate its economic infrastructure into economic performance -- how can it grow its clusters?

Three Questions of Economic Infrastructure Analysis

1. Can the 15 counties act as an economic unit?

- are there equal educational opportunities?
- are there disparities in financial and technological resources?
- how well does technology and the physical infrastructure serve to link the counties?

Human Resources

Percent of workforce with less than 9th grade education

Source: Corporation for Enterprise Development
Analysis by County

DRI/McGraw-Hill

Human Resources

Percent of workforce with
4+ years of college education

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Source: Corporation for Enterprise Development
Analysis by County

Human Resources: Entrepreneurship

Growth rate in number of proprietors

Source: Corporation for Enterprise Development
Analysis by County

DRI/McGraw-Hill

Technology

Percentage of technicians in workforce

Source: Corporation for Enterprise Development
Analysis by County

DRI/McGraw-Hill

Capital

Bank deposits per capita

Source: Corporation for Enterprise Development
Analysis by County

DRI/McGraw-Hill

Physical Infrastructure

Change in non-residential construction (\$000), 1985-1989

Source: Corporation for Enterprise Development
Analysis by County

DRI/McGraw-Hill

Three Questions of Economic Infrastructure Analysis

2. *How does East Tennessee's economic infrastructure compare with that of a competitive reference group?*

East Tennessee's Comparative Advantages: Benchmarking a Reference Group

East Tennessee's Challenge and Vision:

- Respond to the dual threat of slowing growth in manufacturing and reduced government spending
- Take advantage of the region's technology resources to both manage the transition and become one of the few highly flexible, technology-intensive emerging economies

It was with this challenge and vision in mind that East Tennessee's Reference Group was chosen.

East Tennessee's Reference Group

15 Mid-Sized Technology Intensive Economies

DRI/McGraw-Hill

The Knoxville area is not large or fast growing compared to this reference group

☆ Orlando

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Nor is it an Economic Performance Leader

Overall Economic Performance

Region	Rank
Raleigh/Durham	1
San Jose	2
Orlando	3
Portland	4
Denver	5
Jacksonville	6
Memphis	7
Austin	8
Knoxville	9
Chattanooga	10
Salt Lake City	11
Colorado Springs	12
Albuquerque	13
Tucson	14
San Antonio	15

Region	Employment Growth	% Change in Employment	Unemployment Rate	Labor Force Participation Rate	Average Earnings per Job	Growth in Average Earnings	Per Capita Income	Growth in per Capita Income	Net Migration	% Pop. 18-64
Albuquerque	48,148	15.5	5.7	60.3	21360	18.5	15579	26.2	24,932	61.5
Austin	23,859	4.9	4.6	66.3	22736	23.3	16903	19.5	172,182	66.1
Chattanooga	30,938	14.2	4.8	59.0	22001	24.7	16022	38.1	-15,847	62.1
Colorado	13,127	6.0	6.3	64.1	20815	23.3	16754	21.1	-40,094	64.4
Denver	44,197	3.7	4.5	69.0	25239	21.0	20887	26.2	39,132	65.3
Jacksonville	80,626	16.9	5.5	63.3	22752	24.4	17330	30.5	125,610	63.1
Knoxville	49,621	16.0	5.1	58.8	21822	24.7	16053	39.9	14,703	63.5
Memphis	90,372	16.5	5.0	60.7	22769	23.7	17161	41.1	-22,691	61.4
Orlando	170,511	32.9	5.3	67.2	22697	25.6	17737	31.7	304,688	64.7
Portland	154,430	20.9	4.3	65.0	23838	25.0	18910	34.7	82,181	62.4
Raleigh/Durham	103,062	19.4	2.9	67.5	23398	29.4	18424	38.3	147,458	67.0
Salt Lake	70,793	12.9	4.2	66.7	21374	17.7	15101	28.4	-9,738	56.0
San Antonio	26,238	3.9	6.8	58.6	21515	21.4	15384	21.2	97,538	60.4
San Jose	181,486	11.6	4.6	67.2	31056	28.8	24924	32.3	110,867	66.0
Tucson	31,146	9.2	4.7	55.8	20266	18.9	14763	22.1	90,593	60.8

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But these cities are not East Tennessee's competition; rather, they represent a yardstick for measuring the region's performance in its economic infrastructure.

Human Resources: The Critical Foundation

Human Resources are arguably the critical foundation for the success of any region in today's economy:

- Most industries spend more on labor than on any other input to production.
- The capacity to supply the right mix of work skills at the right time enables regions to attract new industries, and increase productivity and market share of existing industries.
- The economy of the 1990s is becoming increasingly knowledge-intensive, emphasizing specialized technical and professional skills.
- As industry restructuring becomes a continual part of global competition, the ability to redirect and retrain the work force becomes increasingly important.

Human Resources: The Critical Foundation

Human resources are a product of the educational system and recruitment by industry over time. This foundation is increasingly fluid but essentially local in nature.

Human Resources: Key Indicators

***Three sub-indices:**

- Workforce Characteristics
- Entrepreneurship
- Educational Capacity

Human Resources: Key Indicators

Workforce Characteristics

- Percentages of workforce with less than 9th grade education, high school only, partial advanced, and college degree.
- Percentage of managers and professionals in workforce
- Percentage of professional specialists in workforce
- Percentage of precision craft and repair workers in workforce

Source: Bureau of Labor Statistics, compiled by Corp. for Enterprise Development
Analysis by Commute Zone

DRI/McGraw-Hill

Human Resources: Key Indicators

Entrepreneurship

Knoxville (1) --

- ⊙ Proprietor employment to wage and salary employment ratio
- ⊙ Ratio of proprietor income to wage and salary income
- ⊙ Growth in proprietor income
- ⊙ Average proprietor income
- ⊙ Percentage change in proprietor income

Source: Bureau of Labor Statistics, compiled by Corp. for Enterprise Development
Analysis by Commute Zone

DRI/McGraw-Hill

Human Resources: Key Indicators

- Size and variety of public K-12
- Private school options for K-12
- Number and size of colleges and universities

Source: Index created by Places Rated Almanac
Analysis by Metropolitan Statistical Area

DRI/McGraw-Hill

Human Resources: Sound Bites

Strengths

- ➡ The region has the highest percentage of precision craft and repair workers among reference group—other technology/manufacturing centers often lack technician-level skills.
- ➡ The self-employed in East Tennessee are plentiful and doing well for themselves—ranking 5th in Avg. salary only \$700 less than the reference group leader San Jose

Weaknesses

- ➡ A dangerously high 16.9% of the East Tennessee workforce has less than a 9th grade education—the U.S. average is 12.1%

Technology

Access to technology is growing in importance for several reasons:

- ➡ Technology historically has been a central contributor to productivity gains and economic growth.
- ➡ Most industries nationwide are spending an increasing share of their input costs on technology.
- ➡ The pace of technological change is accelerating, particularly in industries such as computers, communications, and medicine.
- ➡ New technologies are redefining work relationships and replacing many production and clerical jobs.

Technology

Sources of technology include local equipment suppliers, corporate R&D units, and public and private R&D institutions and programs. A key part of the foundation is mechanisms that enable interaction with other researchers and innovators. Technology is increasingly the most global of resources, as new ideas are rapidly diffused across boundaries.

Technology: Key Indicators

***Two sub-indices:**

- ☐ Manufacturing Modernization
- ☐ Technology Resources

Technology: Key Indicators

Manufacturing Modernization

- Value added per worker hour, 1987
- New capital expenditures per worker, 1987
- Value of shipments per worker, 1987
- Change (\$) in new industrial buildings, 1985-89
- Percent of technicians in workforce, 1990
- Percent of precision production workers in labor force, 1990
- Ratio of precision production workers to operators and assemblers, 1990
- Percent change in value added per worker, 1982-1987

Source: Bureau of Labor Statistics, compiled by Corp. for Enterprise Development
Analysis by Commute Zone

DRI/McGraw-Hill

Technology: Key Indicators

- Small Business Innovation Research Grants per capita, 1990-91
- Federal Research & Development dollars per capita, 1991
- University Research & Development dollars per capita, 1992
- Science & Engineering Graduate Students per capita 1992
- Patents granted per capita, 1992
- PhD Scientists & Engineers per 1,000 workers, 1991

Source: Corporation for Enterprise Development
Analysis by State

DRI/McGraw-Hill

Technology: Sound Bites

Strengths

- ➡ Knoxville ranks 7th among the cities in science and technology PhDs per 100,000 workers—and this indicator is taken from the state level. It can be assumed that with comparable MSA information, the region would perform even better.
- ➡ Also not surprisingly, Knoxville has historically done well in federal R&D investment—building a technology capacity

Weaknesses

- ➡ There is dramatic disparity among these technology cities in value added per worker—a good indicator of ability to turn technology capacity into economic performance:
 - San Jose = 92.74
 - Albuquerque = 27.27
- Knoxville comes in near the bottom at 40.57, short of the national average 47.97.

Technology: Key Indicators

Technology Resources

Denver, Colorado Springs--

Orlando, Jacksonville--

-- Knoxville (10)

- ⊙ Small Business Innovation Research Grants per capita, 1990-91
- ⊙ Federal Research & Development dollars per capita, 1991
- ⊙ University Research & Development dollars per capita, 1992
- ⊙ Science & Engineering Graduate Students per capita 1992
- ⊙ Patents granted per capita, 1992
- ⊙ PhD Scientists & Engineers per 1,000 workers, 1991

Source: Corporation for Enterprise Development
Analysis by State

DRI/McGraw-Hill

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Capital: The Enabling Factor

Regions with a fast pace enterprise formation and healthy industrial clusters usually are surrounded by financial institutions that understand the specific needs of its each industrial sector and make available the financial instruments needed at each stage of development:

- ➡ Finance is an important vehicle for conducting business transactions in all clusters.
- ➡ Finance is the fuel that powers real estate development, banking, insurance, investment advising, and other activities in the Business, Professional & Financial Services cluster.
- ➡ Investment in new technologies, improved physical infrastructure, or the creation and expansion of new business cannot take place without access to sufficient capital.

Capital: The Enabling Factor

Most sources of financial resources are private: banks, savings institutions, equity markets, venture capital funds, and similar sources. However, the government plays a role in development and infrastructure financing and small business lending. The availability of capital in an area is more important than the mere amount.

Capital: Key Indicators

Overall Capital

- ⊖ Commercial and Industrial loans per worker, 1993
- ⊖ Ratio of Loans to Deposits, 1993
- ⊖ Total bank deposits per capita, 1989

Capital: Key Indicators

Analysis by State

Analysis by State

Analysis by Commute Zone

Capital: Sound Bites

Strengths/Weaknesses

- ➡ Knoxville's "middle of the road" rankings in capital availability drive down its composite score when compared to cities which might excel in one or two areas. It could be that the banking community and the resources they have to work with are a strong foundation for growth.

How has local banking behavior changed in the last five years?

Physical Infrastructure: Local Transactions and Global Connections

Physical infrastructure includes systems that provide on-site support to businesses, as well as connections with outside markets, suppliers and investors, including:

- ➡ Transportation (highways, bridges, railroads, airports);.
- ➡ Communications (telephones, television, data transmission);
- ➡ Energy (electricity, natural gas, petroleum, other sources);
- ➡ Environmental systems (water, waste disposal)

Physical Infrastructure: Local Transactions and Global Connections

Physical infrastructure is inherently the most local of all foundations, and is the product of a variety of public and private sources.

Physical Infrastructure: Key Indicators

***Sub-indices:**

- Transportation
- Housing
- Sewage Treatment Needs
- Energy Costs

Physical Infrastructure: Key Indicators

- ⊖ Average daily commute time
- ⊖ Access to national highways
- ⊖ Public transportation availability
- ⊖ Scheduled domestic air service
- ⊖ Passenger rail

Source: Places Rated Almanac
Analysis by MSA

DRI/McGraw-Hill

Physical Infrastructure: Key Indicators

Analysis by State

Analysis by State

Physical Infrastructure: Sound Bites

Strengths

- ➡ Access to housing and low energy costs are physical infrastructure plusses for Knoxville. In the reference group, energy costs range from \$0.0964/kWh in San Jose to \$0.043/kWh in Portland. Knoxville's cost is at about \$0.053/kWh

Weaknesses

- ➡ Perhaps because of size, Knoxville ranks last, 15th, when it comes to transportation. Most of the reference group have more transportation amenities. For instance, Knoxville ranks 13th with 54 city buses—Raleigh Durham at 12th has 88 and Denver has the most at 540. Likewise, Knoxville hosts an average of 215 flight per day—more flights than only Chattanooga (80).
- ➡ Although it does not have big city amenities Knoxville seems still to have a big city commute. In commute time, Knoxville ranks 6th at 45.8 minutes

Quality of Life: A Region's Unique Features

Quality of life includes both basic and distinctive attributes that make a place safe, physically attractive, and intellectually challenging, including:

- ➡ Climate and natural resources;
- ➡ Public safety and welfare systems;
- ➡ Housing quality, availability and cost;
- ➡ Health care quality, accessibility, and cost;
- ➡ Recreational and cultural amenities;
- ➡ Cost-of-living

Quality of Life Is Growing in Importance in Economic Development

Quality of life is difficult to measure and highly subjective, but it is nonetheless an important contributor to economic growth and an increasing focus of development efforts:

- ➡ **Housing, health care, and other amenities are important factors in attracting and retaining skilled workers**
- ➡ **Climate, scenery, and recreational and cultural assets help lure business and personal travelers**
- ➡ **A robust cultural environment helps stimulate creative thinking, design, and research work**

Quality of Life Is Growing in Importance in Economic Development

Quality of life issues are usually local in scope, and frequently difficult to address. Many aspects of quality of life are unchangeable (climate, geography), and solutions to other problems such as crime or living costs are often linked to issues facing other foundations. Yet, a strategic focus on quality of life can help attract and retain new businesses and workers alike.

Quality of Life Issues Are Important in Business Location Decisions

Criteria %

Highway Accessibility	96
Labor Costs	95
Energy Availability and Costs	89
Occupancy/Construction Costs	88
Low Crime Rate	85
State and Local Incentives	81
Availability of Skilled Labor	81
Availability of Land	80
Tax Exemptions	79
Environmental Regulation	79
Telecommunications Services	78
Health Facilities	78
Cost of Land	77
Rating of Public Schools	75

Criteria %

Availability of Long-term Financing	75
Low Union Profile	74
Housing Availability and Costs	71
Nearness to Major Markets	69
Right-to-work State	67
Nearness to Suppliers	63
Availability of Unskilled Labor	61
Recreational Opportunities	61
Raw Materials Availability	59
Access to Major Airports	57
Weather	55
Cultural Opportunities	54
Worker/Technical Training Programs	53
Colleges and Universities	51

Source: Area Development Magazine, December 1991.
Percent of respondents rating each category as "important" or "very important"

DRI/McGraw-Hill

Quality of Life: Key Indicators

Quality of Life Overall*

***Includes sub-indices:**

- ⊖ Crime
- ⊖ Health care
- ⊖ Climate
- ⊖ Arts
- ⊖ Recreation
- ⊖ Cost of Living

Quality of Life: Key Indicators

Crime

Jacksonville--

-- Knoxville (1)

- ⊖ Violent Crime Rate
- ⊖ Property Crime Rate
(weighted to VCR)

Quality of Life: Key Indicators

Health Care

Number and size of health care assets:

- ⊖ Office-based physicians
 - general practitioners
 - medical specialists
 - surgical specialists
- ⊖ General hospitals

Quality of Life: Key Indicators

Climate

- Average daily temperature
- Weather conditions (favors mildness)

Quality of Life: Key Indicators

The Arts

- ⊖ Number of concert radio stations
- ⊖ Total number of touring artists bookings at local campus and civic auditoriums
- ⊖ Number of resident symphony orchestras, opera companies, professional theatres, and ballet companies
- ⊖ Number of nonprofit institutions whose main function is exhibiting art to the public
- ⊖ Number of public libraries

Quality of Life: Key Indicators

- Number and quality of recreation facilities: golf course, restaurants, movie theaters
- Number and quality of attractions: zoos, aquariums, theme parks, pari-mutual betting, professional sport teams, NCAA sport teams
- Size of outdoor recreation assets: miles of coastline, protected acreage

Quality of Life: Key Indicators

Cost of Living

- ⦿ Typical household income
- ⦿ Typical state and local taxes
- ⦿ Housing cost:
 - Average price
 - Utilities
 - Property taxes

Living cost:

- College tuition
- Groceries
- Health care
- Transportation

Quality of Life: Sound Bites

Strengths

- ➡ Climate and recreation surely go hand and hand. Knoxville not only ranks second in the reference group for recreation but also ranks 18th among national MSAs (Tuscon, the leader, ranks 10th)
- ➡ Knoxville is a big winner when it comes to crime. The average annual violent crime rate is 366 compared to the U.S./Canadian average of 408. Jacksonville's, the reference group trailer, is 1,064.

Weaknesses

- ➡ Of QoL indicators, Knoxville scores lowest on health care although the numbers seem to show that facilities and physicians can meet the population's needs.
But is the area attracting new medical talent? Is it remaining on the cutting edge of medical practice? Maybe not, for instance, only 1 of Knoxville's 10 hospitals is AMA residency accredited as compared to 6 of Raleigh-Durham's 10 hospitals.

Tax and Regulatory Environment: The Public-Private Interface

Tax and regulatory environment includes the impact of an assortment of public policies:

- ➡ Personal, business, and property tax rates.
- ➡ Tax incentives and economic development programs.
- ➡ Health, safety and workforce regulations.
- ➡ Zoning and building permit procedures.
- ➡ Other administrative systems.

Tax and Regulatory Environment: The Public-Private Interface

For most regions, East Tennessee's tax and regulatory environment is complex and the product of a myriad of decisions at every level of government. Stakeholders in East Tennessee's economy have heavy influence over local (city and county) tax and regulatory policy, but face the reality that many important decisions are made in Nashville, Washington, or (increasingly) in cities spanning the globe.

Tax and Regulatory Environment:

The Notion of a “Favorable” Tax and Regulatory Environment is Changing

A “pro-competitive” tax policy relies on more than just low tax rates:

- ➡ The overall burden should be in line with benefits received in the form of government services.
- ➡ The overall burden should not be significantly out of line with those of other regions.
- ➡ The tax system should create an environment of stability for business planning.
- ➡ Tax administration should be even-handed, efficient, and easy to understand.

Tax and Regulatory Environment:

The Notion of a “Favorable” Tax and Regulatory Environment is Changing

The quality of regulations is more important than the quantity:

- ➡ The regulatory system should foster stability and predictability.
- ➡ Regulatory processes such as permitting should be as simple and expedient as possible.
- ➡ The relationship between government and business should be professional and nonadversarial.

Tax & Regulatory: Key Indicators

- ⦿ Local tax levels per capita, 1987
- ⦿ Index of state tax stability and balance among taxes, 1993
- ⦿ Cost of worker's compensation insurance to employer per \$100 payroll, 1988
- ⦿ State's net worth of unemployment insurance fund, 1988

Three Questions of Economic Infrastructure Analysis

3. *How can East Tennessee
translate its economic
infrastructure into
economic performance—
how can it grow its clusters?*

The Next Step in Economic Infrastructure Analysis: Cluster Working Groups

Over the next few months, the 21st Century Jobs Initiative will be convening a series of meetings with each of the region's eight industry clusters. These groups will create action plans for improving the economic infrastructure for the region and their industry.

Key questions for the working groups:

- What are the specific needs of East Tennessee's clusters?
- How can the region be flexible to meet differing cluster needs?
- How can East Tennessee best build on its strengths?
- In what areas can collaborative action improve the region's overall competitiveness?