

CHAPTER THREE CLUSTERS

An Industry Cluster Analysis was completed using the US Cluster Mapping data developed by EDA that included the eight counties of the First Tennessee Development District.

Prioritizing target clusters and existing industries: Tennessee will focus its recruitment efforts on target clusters in which the state has a clear competitive advantage:

- automotive;
- chemicals plastics and rubber;
- aerospace & defense;
- transportation, logistics and distribution services;
- business services;
- healthcare and medical devices;
- energy technologies;
- food and agribusiness;
- entertainment & media;

The Northeast Tennessee Valley Regional Industrial Development Association targeted clusters are very similar and add:

- Food and Beverage Products
- Data Centers and Information Technology
- Non-electrical and Electrical Machinery
- Metal and Metal Fabrication

Expansion of existing business have accounted for about 85 percent of new jobs created in Tennessee in recent years. The state will focus on helping existing businesses expand and remain competitive through a targeted outreach program.

The regional cluster study matches well to the State cluster analysis using U.S. Cluster Mapping data.

Comparison of Tennessee to the U.S. The US Cluster Mapping Data was analyzed for Tennessee. The State of Tennessee ranked 34th out of 50 states in gross state product per capita at \$41,852 in 2014. While the ranking of 34th was not high, it represented an improvement from a ranking of 41st in 2009. Tennessee's share of employment in strong clusters such as distribution and electronic commerce, business services, education, and automotive ranked 16th in 2014 and the growth rate of employment in these sectors of 44.84% from 1998-2014 ranked 3rd out of fifty states.

DEFINITION OF A CLUSTER

According to the Cluster Analysis, the literature on industry clusters includes five main themes that define the concept:

1. A cluster is an interdependent concentration of companies, suppliers, and associated institutions such as trade associations, educational institutions, and governments.
2. Although there is no uniform definition for the geographic scope of clusters, they do form in some spatial context. The geographic scope of clusters ranges from a single city, to a state, or larger region.
3. A cluster is more than an individual industry. It is important to view firms in a cluster in the context of a larger industrial system. This system includes both horizontal and vertical relationships, along with direct and indirect linkages. Specifically, a cluster includes firms and industries that may be connected through their dependence on similar labor skills, use of similar technologies, or that produce common or similar goods and services.

RECOMMENDED TARGET CLUSTERS

The FTDD Cluster Analysis divided employment into twenty-six clusters that represented employment of 66,102 in the region. The employment in these twenty-six clusters represented 36.2 percent of the employment in the region. When cluster data was not available, the closest employment sector data was used.

The twenty-six clusters represent traded clusters that add value to existing resources and have a strong multiplier effect (discussed in detail in the Analysis of Data section). Local clusters, that are proportional to the population and have less of a multiplier effect, are not included (e.g. retail & government). In reviewing Table Three A, the following definitions are useful.

Total Employees – The current number of cluster employees included in the 8-county FTDD region. The second column of Table Three A includes the share of total employment.

Average Annual Wage – Shows the Tennessee average annual wage based on 2015 data for the employment sector that matches closest to the cluster. Wage data by cluster/sector on a regional level was not available in enough sectors to be useful. When data was available, there were local sectors that had a wage below the State level.

Employment Change – The absolute change in cluster employment in the 10-county TCEDA region between 1998 and 2014.

Projected National Growth – Shows projected national job growth by cluster/sector between 2004 and 2014

Location Quotient (LQ) – Clusters with LQ's greater than 1.0 have regional shares of employment that are greater than the Tennessee share, suggesting that the region has a comparative advantage in these clusters/sectors.

ANALYSIS OF DATA

Several key points came out in analyzing the data in Table Three A:

- The chemical products cluster was the highest employment cluster in the region with an estimated 8,005 employees in 2014 (5.0% of total employment). The region also had an employment concentration in the industry 5.6 higher than the nation (location quotient). Most of this employment is related in Eastman Chemical Company having its headquarters and several production facilities in Kingsport.
- Other sectors in which the region has a high location quotient were Heavy Machinery and Production Technology (2.1), Paper & Packaging (3.0), Automotive (2.6), and Transportation and Logistics (3.0). Large employers in these sectors include DTR, Hutchinson Sealing, Cooper Standard Domtar, John Deere, Parker Hannifin, HUF, Worthington Industries and Landair. As this region has a competitive advantage in these clusters, focusing on creating more businesses in these sectors presents an opportunity.
- The region's largest cluster, Chemical Products, is also one of the highest paying clusters with an average salary in Tennessee of \$78,278. Other high paying clusters include Paper & Packaging (\$86,160), Financial Intermediation Services (\$68,450) and Metal Products and Ammunition (\$64,810).
- Employment growth from 1998 to 2014 was strongest in Communication Services (1045 jobs), Education – Primarily Colleges & Universities (1,010), Paper & Packaging (569), and Business Support Services (201).
- Many of the employment clusters were in manufacturing where employment declined from 1998 to 2014 as technology and equipment allowed for higher production levels with fewer employees. The data is misleading in that while employment declined in many of these clusters, production increased significantly from 1998 to 2014. For example, Eastman Chemical Company saw sales increase from \$5.8 billion to \$9.0 billion from 2003 to 2016 while its employment decreased. A better measure would be sales increase by cluster, which unfortunately is not available. Wages also tend to be higher in traded clusters as output per employee is higher and more and more manufacturing jobs are requiring more skills.
- Manufacturing clusters are an example of a traded clusters which are groups of industries that are located in a region with a competitive

advantage (e.g. location of natural resources, transportation network, workforce, etc.). Traded clusters take a product and add value to it and generate wealth. A high percentage of the sales and profits of traded clusters are generated outside the region resulting in income coming into the region. Traded clusters are the engines of regional economies; without strong traded clusters it is virtually impossible for a region to reach high levels of overall economic performance. Other examples of traded clusters include financial services serving in and outside the region (e.g. CitiGroup) and information technology companies (Tele-Optics) serving more than the region.

- Local clusters, in contrast, consist of businesses that serve the local market. Local clusters are prevalent in every region of the country and employment in these sectors is proportional to the population of the region. The wealth creation and multiplier effects tend to be lower in local clusters. A lot of retail, personal services and business services have characteristics of a local cluster. If a local cluster can draw from an area larger than the region, it can bring in more dollars and build wealth. Several health care businesses in the region draw patients from outside the eight county region.
- The U.S. employment projection column of Table Three A are for 2014-24. Many manufacturing sectors are projected to lose employment, albeit at a slower rate. Sectors such as Distribution (46.5%), Business Support Services (26.5%), Education – Primarily Colleges & Universities (12.9%), and Hospitality & Tourism Attractions (8.5%) are projected to see solid growth rates from 2014-24.

STRATEGIC FINDINGS

- **Strategic Finding 4. Development of Health Services.**
Opportunities to further develop health services include a continued emphasis on providing an environment for the health services sector to succeed in the region. A threat to the health services sector is the cost containment difficulty being experienced in the health insurance industry. While improving the health of area residents is the main emphasis, a benefit of the health services sector is that it creates jobs that are above the current average wage for the region. Efforts to develop a healthy lifestyle to prevent health issues are gaining momentum in companies, schools, and government.

The **health services** sector has experienced solid employment growth and a demographic of baby boomers need more health services. The Tri-Cities has become a regional medical center that draws patients from a fifty-mile radius of the Tri-Cities Regional Airport, an area with a population of over 1 million.

Two major healthcare providers, Mountain States Health Alliance and Wellmont Health Systems have expanded their facilities significantly in the last twenty

years. These entities are in the process of merging dependent on regulatory approval. A potential merger presents an opportunity to have a large enough health care system to have economies of scale in an industry facing a lot of uncertainty. A merger will also keep a lot of the administrative jobs in the region compared to an outside health care provider taking over. However, a merger will result in less competition and the potential for patients and insurers to pay a higher cost compared to other markets for a service.

The cooperative effort of the ETSU College of Medicine, School of Pharmacy and the Veterans Administration Hospital is a public sector initiative that has assisted with the development of the medical sector. Another public/private sector development is the Med Tech Corridor in Johnson City that has provided available land and telecommunications infrastructure for medical and technology based businesses.

**Table Three A
Cluster Analysis Table**

#	Cluster	2014 FTDD Employment	Share of Total FTDD Employment	TN Avg. Annual Wage 2015	FTDD Employment Growth 1998-2014	U. S. Employment Growth Projection 2014-24	Location Quotient *
1	Chemical Products (Mfg)**	8,005	5.0%	\$78,278	-416 (-5.2%)	-10.2%	5.6
2	Distribution	6,715	3.7	\$51,376	-177 (-2.6%)	46.5%	0.6
3	Business Support Services	6,457	3.5	\$54,126	201 (3.2%)	26.5%	0.7
4	Heavy Machinery & Production Tech. (Mfg.)	3,530	1.9	\$56,035	-375 (-9.6%)	-8.1%	2.1
5	Financial Intermediation Services	3,118	1.7	\$68,450	-2,190 (-41.3%)	8.2%	0.8
6	Paper & Packaging (Mfg.)	2,804	1.5	\$86,160	569 (25.5%)	-7.8%	3.0
7	Education (Primarily Colleges & Universities)	2,725	1.5	\$43,947	1,010 (58.9%)	12.9%	0.9
8	Rubber, Glass & Clay (Mfg.)	2,450	1.3	\$47,756	-615 (-20.1%)	-16.0%	1.7
9	Automotive (Mfg.)	2,379	1.3	\$58,064	-2,160 (-47.7%)	2.6%	2.6
10	Transportation Logistics	2,211	1.2	\$51,376	-537 (-19.5%)	8.3%	3.0
11	Hospitality & Tourism Attractions	1,982	1.1	\$21,103	-213 (-9.7%)	8.6%	1.0
12	Metal Products & Ammunition (Mfg.)	1,980	1.1	\$64,810	-87 (-4.2%)	-1.1%	1.6
13	Metal Processing, Forging, Wires & Springs (Mfg.)	1,645	0.9	\$57,882	-440 (-26.7%)	-5.2%	1.6

#	Cluster	2014 FTDD Employment	Share of Total FTDD Employment	TN Avg. Annual Wage 2015	FTDD Employment Growth 1998-2014	U. S. Employment Growth Projection 2014-24	Location Quotient *
14	Construction Products & Services	1,275	0.7	\$52,912	-884 (-41.7%)	13.9%	1.2
15	Communication Services ***	1,215	0.7	\$61,197	1,045 (86.0%)	-25.7%	N/A
16	Plastics (Mfg.)	1,137	0.6	\$47,756	57 (5.3%)	-11.7%	2.5
17	Marketing, Design & Publishing	1,003	0.6	\$61,629	33 (3.3%)	2.3%	N/A
18	Textile Manufacturing	985	0.5	\$48,468	-2,833 (-74.2%)	-22.1%	5.0
19	Metal Processing & Machine Tools (Mfg.)	940	0.5	\$57,882	-250 (-21.0%)	-8.5%	-8.5
20	Printing Services	914	0.5	\$47,714	-3,885 (-81.0%)	N/A	N/A
21	Wood Products (Mfg.)	887	0.5	\$36,949	-663 (-42.8%)	1.3%	1.3
22	Household Appliances (Mfg.)	810	0.4	\$54,489	-940 (-53.7%)	-2.9%	N/A
23	Furniture (Mfg.)	615	0.3	\$37,953	-1,933 (-75.9%)	-12.1%	1.0
24	Electrical Equipment (Mfg.)	515	0.3	\$54,489	-490 (-48.8%)	-14.6%	N/A
25	Medical Devices (Mfg.)	400	0.2	\$66,157	185 (86.0%)	1.4%	N/A
26	Aircraft & Related (Mfg.)	375	0.2	\$66,157	-140 (-27.2%)	-5.0%	N/A
	TOTAL	66,102	36.2%				

Source: U.S. Cluster Mapping Data for 2014 Employment and Employment Growth 1998-2014. Total Non-Agricultural Employment in 2014 for FTDD = 182,635.

Wage Data is from the Quarterly Census of Employment & Wages from the U.S. Census Bureau and found on the Tennessee Department of Labor Website.

Projection Data is the U.S. Bureau of Census, Employment Projection data for the United States.

TN Avg. Wage Data from Tennessee Dept. of Employment Security, 2015 Quarterly Census of Employment & Wages. Employment and wage categories did not always fully match and the closet employment category was used in those cases.

* Location Quotient. Clusters with a location quotient greater than 1.0 have regional shares of employment that are greater than the Tennessee share, suggesting that the region has a comparative advantage in these clusters.

** Employment in the chemical cluster was significantly higher than normal in 2014 due to several large construction projects at Eastman Chemical Company in Kingsport. The numbers have been adjusted to reflect more of a base line number.

*** Since 1998, companies such as AT&T and Century Link have added major facilities in the region. The number is likely to go down as Century Link closed a facility in Blountville in 2015. Alero, a non-communications company has since located in the facility.