

TARGETED ECONOMIC DEVELOPMENT
OPPORTUNITIES FOR NORTH TULSA

By

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TARGETED ECONOMIC DEVELOPMENT
OPPORTUNITIES FOR NORTH TULSA

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GLOSSARY

Cluster Analysis. Industrial clusters are defined as interconnected sets of firms in a region that have national or global competitive advantage because they share common infrastructure including university research, labor market, specialized suppliers, and collective marketing.

Community Assessment and Planning. An organized process to follow through community assessment, development of a strategic plan, community involvement, implementation of the plan, and evaluation of results.

Economic Development. Process of enhancing the factors of productive capacity - land, labor, capital, and technology - with respect to a national, state or community economy

Sustainable Development. A form of economic development that takes into consideration issues of fairness in the community and environmental protection, as well as economic factors.

Targeted Economic Development. A systemized approach to analyzing a community or regional economy to identify potential options for creation, attraction, retention, or expansion of job/income opportunities and economic growth. This method incorporates both analytical tools and community planning tools and utilized to enhance community decision-making and incorporate local desires and ideas. Targeted Economic Development (TED) includes several methodologies: Target Industry Analysis, Cluster Analysis, Community Assessment and Planning.

Target Industry Analysis. A method of local community economic analysis which produces a list of business sectors which have a moderate-to-strong likelihood of containing companies that might be interested in expanding and/or locating in the community under study.

Chapter 1

INTRODUCTION

Economic development is essentially discussed with reference to enhancing the factors of productive capacity - land, labor, capital, and technology - with respect to a national, state or community economy. Utilizing the community's resources and powers in order to reduce the risks and costs, which could prohibit investment, the public sector often has been able to set the stage for the private sector to generate new employment and investment (Economic Development Administration, 2000).

Economic development is very important to the United States. Many contend that economic development is essential for maintaining the competitiveness of the United States economy and increasing output and incomes. Another point is that added development can help preserve a high level of employment and job quality for all Americans. It can also help create the jobs, providing middle-class employment opportunities for the jobless and working poor. Finally, it provides the income required to make additional investments in education, government services, amenities, infrastructure, and quality of life (Economic Development Administration, 2000).

In addition, economic development policy matters. According to the Economic Development Administration, federal, state, and local governments spend billions of dollars each year to promote economic development. Development policy choices influence

taxpayers' wallets. Furthermore, evidence suggests that development programs work and achieve the goals of economic development.

Economic development issues dominate many policy debates in state and federal legislatures and city councils. This is due in part to citizens' tendency to evaluate public officials' success by the current state of affairs in their state or local community. When jobs are being generated, incomes are growing, and high profile companies are being attracted or retained, then a politician's tenure is likely to be extended. If not, he or she may become history (Economic Development Administration, 2000).

The 1990 census establish Tulsa's population at 367,302. This is an increase of 1.77 percent from a decade earlier. Tulsa accounts for 72.97% of the population of Tulsa County. Figure 1-1 shows changes in population for Tulsa, Tulsa County and the state from 1980 to 1990.

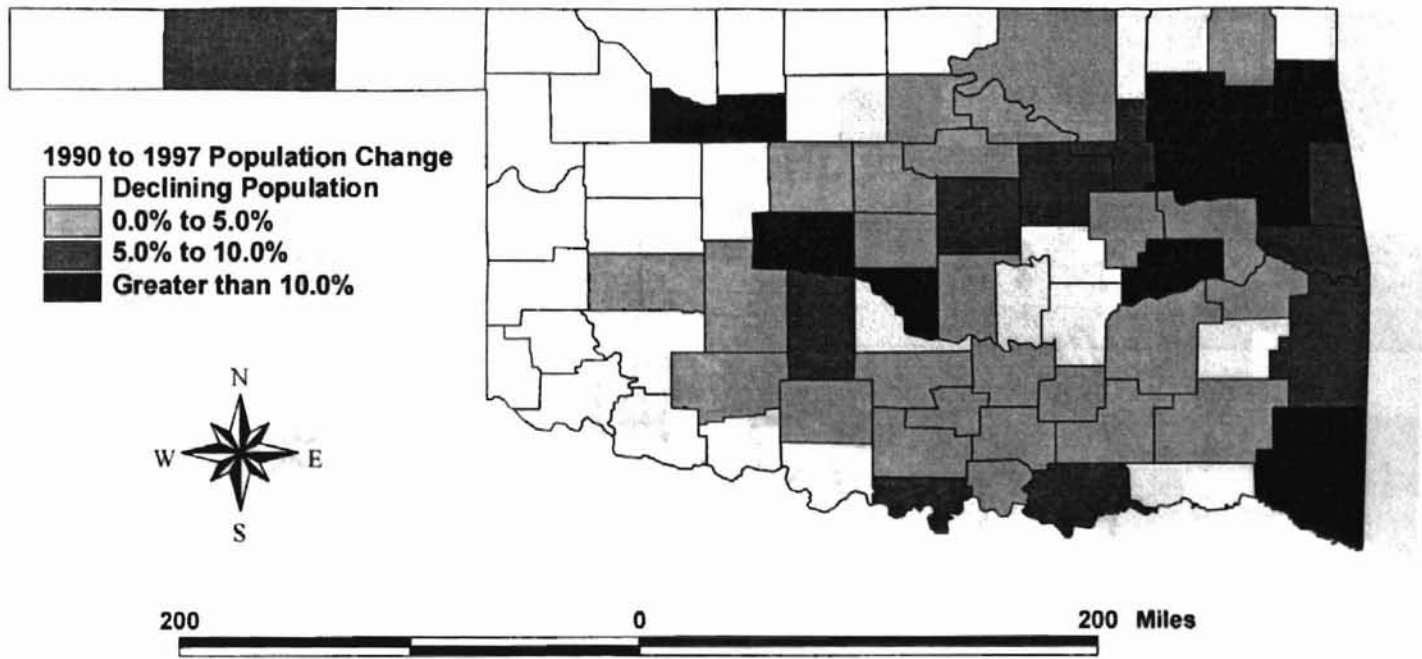
Table 1-1. Comparison of Population.

| Area | 1970 | 1980 | 1990 | 1999 Est.* |
|----------------|-----------|-----------|-----------|------------|
| North Tulsa | 126,541 | 106,174 | 84,389 | NA |
| City | 330,350 | 360,919 | 367,302 | 381,580 |
| County | 399,982 | 470,593 | 503,341 | 548,300 |
| 30 Mile Radius | 525,863 | 657,773 | 708,954 | 739,600 |
| Oklahoma | 2,519,457 | 2,980,646 | 3,145,585 | 3,358,044 |

U.S. Census Bureau

There are disparities between Tulsa County and the State of Oklahoma in per capita income. Tulsa County was ranked second in per capita income in 1990 with \$14,613. (Figure 1-2) Tulsa's per capita income is 127% of the state. Oklahoma's per capita

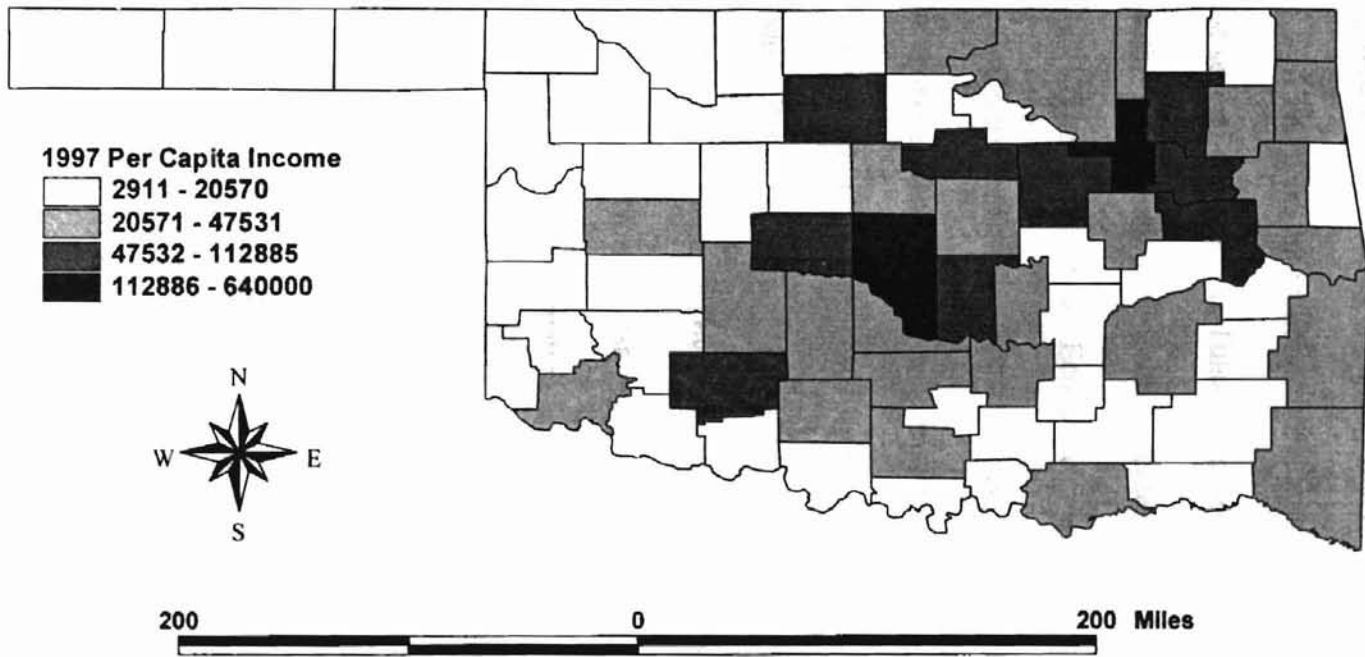
Figure 1-1. Oklahoma Population Growth, 1990 - 1997.



3

SOURCE: FreeDemographics.com

Figure 1-2. Oklahoma Per Capita Income, 1997



SOURCE: FreeDemographics.com

income was \$11,720, ranking 38th out of the 50 states. The level of per capita income enjoyed in Tulsa County is partially due to the highly developed urban economy.

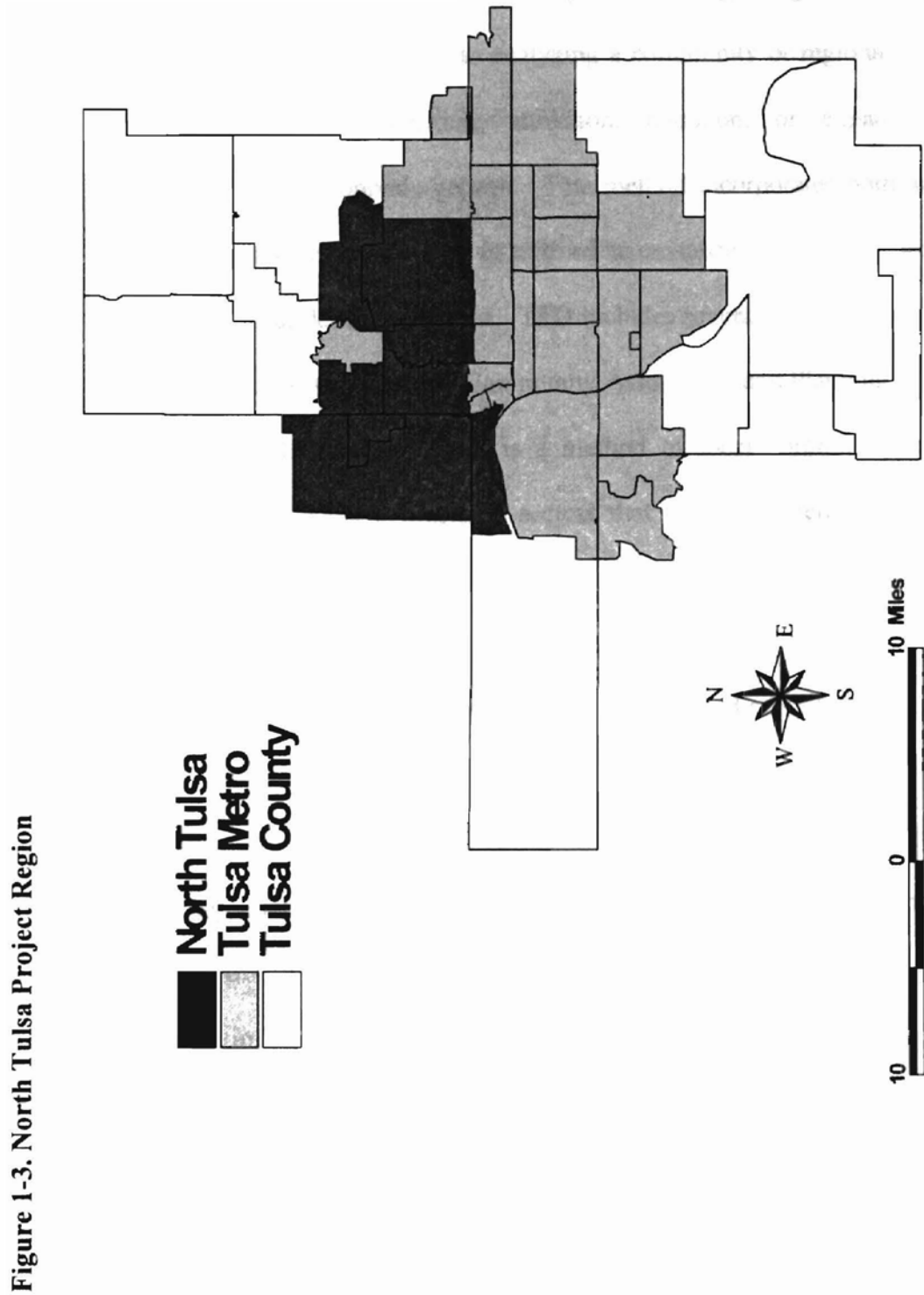
The need for economic development in North Tulsa has become evident of over the last several decades. As Tulsa has grown, the main thrust of development has been to the south. This has left north Tulsa underdeveloped in relation to the rest of the city.

The North Star Economic Development Coalition, a regional coalition of communities in northern Tulsa County and north of Tulsa County, was formed to address the economic development concerns of the region. The North Star Economic Development Coalition includes representatives from Skiatook, Collinsville, Owasso, Sperry, Hominy, Avant, Ramona, Vera, The Osage Nation (Native American Tribal Government), and North Tulsa (represented by the Greenwood Chamber of Commerce).

As the North Tulsa representative, the Greenwood Chamber of Commerce has requested research information to direct future development efforts. The region defined by Greenwood Chamber of Commerce is shown in Figure 1-3. The question is, "How can the Greenwood Chamber of Commerce focus limited economic development funds and identify potential economic development opportunities for North Tulsa and communities in Northeastern Oklahoma?"

Thus the primary objective of this study is to provide the North Tulsa community with useful, timely information to help reach their developmental goals and in doing so, create a transferable methodology for use in other communities. Secondly, in order for this methodology to be useful it must comply with the concept of sustainable development in that equity, environment and economy are all vital and interlinked. The

formal or informal that can be changed to reflect community attitudes and preferences; objectives of the economic development program to be accomplished through targeted economic development



data must be presented in a format that can be changed to reflect community attitudes and preferences toward the alternative choices of the economic development program.

These objectives will be accomplished through targeted economic development (TED), a systemized approach to analyzing a community or regional economy to identify potential options for creation, attraction, retention, or expansion of job/income opportunities and economic growth. This method incorporates both analytical tools and community planning tools and is utilized to enhance community decision-making and incorporate local desires and ideas. TED includes several methodologies: Target Industry Analysis, Cluster Analysis, and Community Assessment and Planning.

Target Industry Analysis is a method of local community economic analysis, which produces a list of business sectors that have a moderate-to-strong likelihood of containing companies that might be interested in expanding and/or locating in the community under study (Doescher, 1989). Cluster analysis involves the identification of industrial clusters, which are defined as interconnected sets of firms in a region that have national or global competitive advantage because they share common infrastructure including university research, labor market, specialized suppliers, and collective marketing (Ashcroft, 2000). Community assessment and planning is an organized process to follow through the community's development of a strategic plan, implementing the plan, and evaluating results.

Economic theory shows that future economic development opportunities for the North Tulsa area will develop from industry clusters present in Tulsa County. The hypothesis developed through this conceptual framework asserts that data and analytical procedures available will allow identification of the clusters.

Chapter two will discuss relevant literature topics including theory, target industry analysis, cluster analysis, community assessment and planning and targeted economic development. Chapter three contains a detailed analysis of the study area consisting of historical significance and demographic profile. A discussion of the methodology, chapter four, follows with consideration to ground truthing, desirability criterion, further analysis and weighting system. Results for the North Tulsa region ensue in chapter five. Finally, chapter six covers the summary and conclusions.

Chapter 2

REVIEW OF LITERATURE

The purpose of the literature review is to examine theories of economic growth, as well as current methodologies in the area of community economic development. This process will lay the groundwork for developing a methodology for targeted economic development. Another important consideration of this chapter is the availability of data for analyzing groups of potential industries.

Defining Economic Development

In its most basic form, economic development is concerned with enhancing the factors of productive capacity – land, labor, capital, and technology. Public sector goals for economic development include increasing incomes, number of jobs, and level of productive resources. Tools and strategies for economic development tend to build on a community's:

- Labor force (workforce preparation, accessibility, skills, cost);
- Infrastructure (accessibility, capacity, and service of basic utilities, as well as transportation and telecommunications);

- Business and community facilities (access, capacity, and services to business incubators, industrial/ technology/ science parks, schools/ community colleges/ universities, sport/ tourist facilities);
- Environment (physical, psychological, cultural, and entrepreneurial);
- Economic structure (composition); and
- Institutional capacity (leadership, knowledge, skills) to support economic development and growth.

There are however, trade-offs between economic development's goals of job creation and wealth generation. Debates continue about differing goals for place-based development strategies and whether place-based or people-based strategies are best (Economic Development Administration, 2000).

Theories of Economic Growth

Economic development takes in a wide range of issues. Economists are concerned with issues of economic growth. Business leaders focus on wise use of public policy that lead to an increase competitiveness. Environmentalists contend that economic development should center on sustainable development that harmonizes the natural and social systems. Labor leaders want to increase wages, benefits, basic education, and worker training. Community-based leaders may wish to strengthen inner city and rural economies to ultimately reduce poverty and inequality. Public officials at state or local levels strive to increase the number of jobs created.

Theories of economic development are abundant. These theories vary in basic, fundamental ways. They use different behavioral assumptions as well as different concepts and categories to explain the development process.

Economic Base Theory

The fundamental characteristic of economic base theory is that all industrial sectors of the community are assigned to either the basic sector or the non-basic sector. The first is the basic sector, which includes the portion of the economy that trades with other areas through exports. Export sectors bring dollars into the community because they sell goods and services outside the region. Secondly, the nonbasic sector sells its products within the community. The primary purpose of the nonbasic sectors is to support the export sector. According to base theory, economic development depends largely on the vigor of the communities' export industries (Shaffer, 1989). The response of the basic sector to external demand for local exports, which stimulates local growth, is critical. Economic base multipliers transfer change in output, income and employment from the basic sector to the entire regional economy. The most common application of economic base theory is in support of attracting industry through recruitment and place marketing.

Economic base theory has several notable strengths. First, it has become popular as a method of understanding economic development in North America. Secondly, it is a simple tool for economic prediction. However, it is inadequate for understanding long-term economic development (Economic Development Administration, 2000).

The basic form of export base theory can be expressed through the following set of equations:

$$Y_d = E + X - M \quad (2.1)$$

$$E = a + e \cdot Y_d \quad (2.2)$$

$$M = b + m \cdot Y_d \quad (2.3)$$

$$X = x' \quad (2.4)$$

where

- Y_d = Net area product or income
 E = Expenditures on net investment, consumption, and government
 X = Exports
 M = Imports
 a = Value of E when $Y_d = 0$
 b = Value of M when $Y_d = 0$
 e = Proportion of incremental income allocated to E , also called the marginal propensity to spend
 m = Proportion of incremental income allocated to M , also called the marginal propensity to import
 x' = Exports, determined for the most part by forces outside the area.

Substituting (2.2), (2.3), and (2.4) into (2.1) the result is an equilibrium income Y in (2.5).

In equilibrium, the aggregate area supply, Y_θ , must be equal to demand, Y_d . In the case where Y_d is less than Y_θ , producers will not be able to cover costs and reduce production.

On the other hand, if Y_d is greater than Y_θ producer's income will exceed costs and they will expand production.

$$Y = \frac{a - b + x'}{1 - (e - m)} \quad (2.5)$$

(Shaffer, 1989)

Staple Theory

Staple theory defines economic development as sustained growth over the long term. The essential dynamic is the external investment in, and demand for, the export staple. This external force leads to production and marketing of the export staple in world markets. Historically, this theory has been relevant to North American economic development and provided an understanding of the region's economic history. The major weakness of export staple theory is that it describes, rather than explains, the development process. Staple theory provides a general strategy of development by recognizing the links

of the economic base to the political superstructure. Economic development continues to build on and improve the export staple as long as it remains competitive in the world economy. Since strength exists in specialization, promotion of the export staple may be more reasonable than attempting to diversify. Footloose industries, those not tied to a specific resource, input or market, would ultimately be attracted to the area once the market achieves sufficient size to offer urbanization economies (Economic Development Administration, 2000).

Sector Theory

Sector theory uses three aggregate sectors. The level of development depends on sectorial diversity, emphasizing a prominent tertiary sector, and labor productivity. The key variable that drives the logic of sector theory involves the income elasticity of demand and labor productivity of primary and secondary sectors. As incomes rise, the demand for income-elastic products grows; output increases as labor released from primary and secondary sectors is employed in tertiary sectors. Sector theory is attractive because it can be applied and tested empirically, however, the primary, secondary, and tertiary categories are too crude for useful real world analysis. The prevailing use for sector theory is to emphasize the need to pay attention to industries producing income-elastic commodities to realize sustained growth (Economic Development Administration, 2000).

Growth Pole Theory

Growth pole theory focuses on industries existing in an abstract economic space as the basic unit of analysis. A growth pole is often described as an urban place characterized by a set of expanding industries that induce further economic development beyond the borders of the city (Tweeten and Brinkman, 1976). Under the growth pole theory,

economic development is the structural change from the growth of new propulsive, driving force, industries. Propulsive industries are the “poles of growth,” which guide the logic of the theory. Growth pole industries first initiate, then diffuse, and develop. The theory endeavors to be an all-purpose theory of industrial start and spread of development. Although insights from the theory are often useful, it has been unsuccessful as a general theory of development. Growth center approaches are founded on the growth pole theory (Economic Development Administration, 2000).

Neoclassical Growth Theory

Neoclassic theory stresses the role of comparative advantage in location. Economic activity will gravitate towards locations with a comparative advantage (Tweeten and Brinkman, 1976). Using the neoclassical growth theory, economic development can be defined in terms of an increase in the rate of economic growth. This can be calculated with respect to an increase in output or income per capita. Neoclassical growth theory has two essential dynamics: (1) in aggregate models, the rate of saving that supports investment and capital formation drives the growth process, (2) in regional models, factor prices – specifically, the relative returns on investment and relative wage rates – stimulate factor flows that result in regional growth. It suggests that economic developers esteem the free market system and do what is required to support efficient allocation of resources and the process of the price mechanism. The simplest growth models imply that economic developers are unnecessary, but more complex formulations would support various economic development activities (Economic Development Administration, 2000).

Interregional Trade Theory

The fundamental classifications of interregional trade theory are similar to those of microeconomics in that they are based on prices and quantities of commodities and factors of production. Development in this theory can be implicitly defined as economic growth that leads to greater consumer welfare. The key variable driving the interregional trade theory is that the price mechanism (price-quantity effects) is operating to eradicate price disparity and establish equilibrium prices (the terms of trade). The theory has two unique strengths: (1) consumer welfare (increases in aggregate consumption benefits), not sheer job creation, is the goal of development, (2) as a price/cost-based theory it is extremely precise, yet its precision is achieved with many restrictive assumptions and by disregarding the dynamics of economic development. Growth theory and trade theory are commonly used to advocate less government involvement and fewer restrictions on international trade, more open regions and more competitive markets. The theories provide powerful support for development of local infrastructure, improvement in government efficiency, and other measures to increase productivity and lower input costs for all producers. Local developers often ignore the implications of growth and trade theory in support of protectionist strategies and growth strategies. These may not always improve the economic well being of local consumers (Economic Development Administration, 2000).

Product-Cycle Theory

Product-cycle theory discusses the developmental epoch of the product as its basis. All products are grouped into new, mature, or standardized. The space/time economy can be divided into regions based on where new products historically arise and regions dedicated to the production of standardized commodities. It is essential to the product-

cycle theory that innovation occurs in the form of new product development. Locations where new product innovation occurs eventually standardized and diffused the new technology to other locations in the economy. This process stimulates economic growth and development in both locations. The main characteristic of development is different in both innovation regions and diffusion regions. These differences help explain the levels of development which vary from place to place, and why differences persist. Economic developers applying the product-cycle theory in the most literal form must try to identify and work with manufacturing companies that can create new products. The developer may also be able to assemble the resources necessary to improve local business infrastructure in order to support new product development (Economic Development Administration, 2000).

Entrepreneurship Theories

Entrepreneurship is key to community economic development. Entrepreneurs organize resources, take required risks, generate ideas, supply the economy with ingenuity and energy to create new goods and services and seek new markets (Shaffer, 1989). Development based on entrepreneurial changes in firms and industries result in more elastic, diverse local economies. Innovation is conceptualized by a variety of different theories as new combinations, improvisation, or creative risk taking. The entrepreneurship theory is strengthened by the theory that people make development happen. This strength is tempered by the weakness that entrepreneurship theory is not easy to apply consistently in most communities. The most generic application of this theory is to support an industrial environment or ecology in order to make conditions favorable to entrepreneurs (Economic Development Administration, 2000).

Target Industry Analysis and technological change

Industry targeting identifies industries with a competitive advantage in terms of labor, location and public services. This allows community leaders to focus their development programs on specific industries.

Targeting programs provide several advantages to community developers. It permits clearer identification of specific industry requirements. Targeting enables the community to provide fewer but more highly valued programs. A targeting program also helps reduce the amount of financial incentives needed to encourage the industry to locate in the region (Barkley, 1998).

According to Doescher (1989), the primary objective of a target industry study is "to develop a list of *industries*, which have a moderate-to-strong likelihood of containing *companies*, which might be interested in locating in the community under study." Successful targeting depends on the quality of the target industries and the way in which communities use target industry analysis in their economic development.

Doescher outlines several generalized steps to begin the targeted economic development process. One step is the identification of industries, which are likely to include companies interested in relocating or setting up new branch plants. The formation of the industry list begins with the consideration of regional and national industry growth rates. These include past and projected national growth trends in employment, output, and number of establishments by industry. This helps to focus on industries that "should contain a disproportionately high number of companies which are likely to be establishing new branch plants. However, these growth rates are based on past behavior. The consideration of other factors may be incorporated. Some of these

include capacity utilization, international competition, and technological change. Companies interested in relocation may have a variety of motives, specific to the company. For example, the company may have outgrown the existing plant or facing competition from abroad or existing facilities may require costly technological renovations.

The second step is to match industry location requirements with community characteristics. When companies consider relocation sites, they generally contemplate a number of factors. Industries vary with respect to the importance placed on each factor. This can be accomplished by eliminating all unsuitable industries from consideration, based on knowledge of location requirements, focusing on the features of a community and determine which industries fit that characteristics or simultaneously matching potential industries in terms of how well their requirements match the community's characteristics (Doescher, 1989).

Conventionally, factors that influenced industrial locations were access to markets, labor, raw materials and transportation. Blair and Premus (1987) established that although these are still important, productivity, education, taxes, community attitudes toward business and other factors have grown in importance. More recently, Area Development (1999) published a list of site selection factors that were found to be “very important” or “important” to company CEOs in making location decisions from either business or life style. According to Area Development, the most important site selection factors are availability of skilled labor (95.8), highway accessibility (94.6), and labor costs (93.8). Quality of life factors influencing site selection decisions include low crime rate (79.9), ratings of public schools (72.4) and health facilities (70.4). See Tables 2-1 and 2-2.

Table 2-1. Site Selection Factors.

| Ranking | Site Selection Factors | 1999 |
|---------|---|------|
| 1 | Availability of skilled labor | 95.8 |
| 2 | Highway accessibility | 94.6 |
| 3 | Labor costs | 93.8 |
| 4 | State and local incentives | 90.3 |
| 5 | Occupancy or construction costs | 87.5 |
| 6 | Tax exemptions | 85.9 |
| 7 | Energy availability and costs | 85.2 |
| 8 | Availability of telecommunications services | 85.1 |
| 9 | Availability of land | 85.0 |
| 10 | Cost of land | 80.9 |
| 11 | Low union profile | 79.5 |
| 12 | Environmental regulations | 79.0 |
| 13 | Availability of unskilled labor | 77.5 |
| 14 | Nearness to major markets | 75.6 |
| 15 | Right-to-work state | 67.7 |
| 16 | Availability of long-term financing | 64.2 |
| 17 | Worker/technical programs | 63.7 |
| 18 | Nearness to suppliers | 59.3 |
| 19 | Raw materials availability | 58.7 |
| 20 | Accessibility to major airport | 57.2 |
| 21 | Near technical university | 31.1 |
| 22 | Railroad service | 31.0 |
| 23 | Waterway or ocean port accessibility | 13.2 |

Table 2-2. Quality of Life Factors Influencing Site Selection.

| Ranking | Quality-of-Life Factors | 1999 |
|---------|-----------------------------------|------|
| 1 | Low crime rate | 79.9 |
| 2 | Ratings of public schools | 72.4 |
| 3 | Health facilities | 70.4 |
| 4 | Housing availability | 70.1 |
| 5 | Housing costs | 69.1 |
| 6 | Recreational opportunities | 59.6 |
| 7 | Climate | 58.8 |
| 8 | Cultural opportunities | 52.5 |
| 9 | Colleges and universities in area | 52.4 |

SOURCE: Area Development, 1999

There are several specific approaches used to conduct target industry analysis studies. Two authors, Johnson (1996) and Holland (1997), have added considerable to the body of knowledge in conducting target industry studies using IMPLAN Pro software and data. Both authors suggest a progressive series of screening procedures for targeting the "best" industries for a region.

In Johnson's approach, the first screening of potential sectors is on the basis of export base and import substitution strategies. Total exports are calculated by adding domestic and foreign exports. Export base of a regional economy consists of those goods and service sectors that sell a large portion of their products outside the region. Expansion of export base industries leads to expansion of non-basic industries through the "multiplier" or ripple effect. "Import Substitution" refers to replacing imported goods and services with goods and services produced in the local community. When this can occur, economic leakages are plugged and the ripple effects from a given export base are strengthened. Imports are calculated using total gross commodity demand minus net commodity supply. Commodities produced in one region often use goods and services (inputs) imported from outside the region. This is called economic leakage (Johnson, 1996). Holland uses a similar approach, sorting data based on export base and import substitution of a regional economy. He also incorporates a process called "ground truthing" to verify IMPLAN data through community visits and acquisition of additional data (Holland, 1997).

The second layer of screening is based on desirability criteria, it provides analysis of quality of jobs, income potential, employment potential, as well as revenue potential and demand for steam, electricity, and transportation services. All businesses create

indirect jobs in addition to the employees they employ themselves. Local suppliers and those that are generated by the purchases of goods and services of employees create these indirect jobs. The quality of jobs created directly and the degree of linkages with other high quality local employers is measured by calculating the direct plus indirect plus induced wage income per employee. Businesses create property income (to owners and investors, and owners of property) in addition to wage income. Property income is an indicator of the sectors profitability. Total income is a good indicator of the value of the sector to the region. Again strong linkages to other sectors (multipliers) mean that the sector creates indirect as well as direct benefits. This variable measures the direct plus indirect wage and property income per dollar output. High employment sectors are often low wage sectors, which is not an indicator of quality jobs. However, the number of jobs created should be a consideration and by including both number and quality of jobs as criteria, those sectors that do both will be favored and those that do neither are eliminated. Again by including direct and indirect employment, sectors with strong linkages to good sectors are favored. As an indicator of revenue generating capacity, the proprietor's income per employee was calculated (Johnson, 1996). Holland also used quality factors in determining optimal industries. Quality factors he suggested are employee compensation, indirect business taxes, property income, other property income, total value added, and employment (Holland, 1997). Finally, Johnson uses an overall ranking scheme incorporating a weighted rank. This system provides an optimal solution with consideration to all desirability criteria for imports and exports (Johnson, 1996).

Cluster Analysis

One approach to targeted economic development is the growth of industry clusters. Cluster analysis focuses on a geographic concentration of industries that share technical, skill, and financial or distributional advantages. Industry clusters develop a competitive advantage in the marketplace. Clusters are important to regions because they generate wealth, exports, jobs and sources of information. Firms prefer clusters because of agglomeration economics. A great deal of research has proven clusters to benefit regional productivity. Policy should therefore create, develop, and support clusters (Steiner, 1996).

There are many definitions of economic clusters. Ashcroft, Coppedge and Lopez (2000) describe an economic cluster as a group of firms with related products, inputs, or customers. A cluster will also utilize similar skills in many of its employees, and depend upon specialized inputs. Steiner describes clusters as “regional specialization on interlinked activities of complementary firms (in production and service sectors) and their cooperation with public, semipublic, and private research and development institutions creates synergies, increases productivity, and leads to economic advantages.” Steiner continues to outline five types of clusters: 1) knowledge clusters, 2) progressive production clusters, 3) sectorial clusters, 4) technology clusters, and 5) eco-clusters.

Despite a wide variety of definitions of clusters, most share several key elements:

- Specialization;
- Proximity;
- Cooperation (Steiner, 1996).

Building on existing clusters provides the following benefits:

- The location has already proven attractive to these types of manufacturers;
- Multiplier effects of new firms generally are greater than those from noncluster firms;
- Firms within industry clusters have stronger growth than firms that are not in clusters; and
- Firms within clusters have greater potential for new spin-off firms than groupings of unrelated firms (Barkley, 1998).

There are four stages to cluster-based economic development: 1) Mobilization; 2) Diagnostic; 3) Collaborative Strategy; and 4) Implementation. The mobilization stage requires that a community generate local interest. During the diagnostic stage, communities collect information about the attributes of the region's cluster and economic infrastructure. This is accomplished by analyzing past growth and economic development infrastructure. The collaborative stage allows the community to form solutions based on shared views of the community marketplace. Finally, the cluster based economic development is implemented by developing organizations that fit the characteristics of the community (Lamie et al, 1996).

Community Assessment and Planning

When developing a comprehensive planning policy for a community it is important to consider existing analytical tools and research methodologies. Local economic development options depend on the unique characteristics and economic linkages of a region. The community economy is composed of inter-linkages between the households, industries, and businesses within the common space defined by researchers. There are many relationships and economic linkages within the community, as well as ties to other

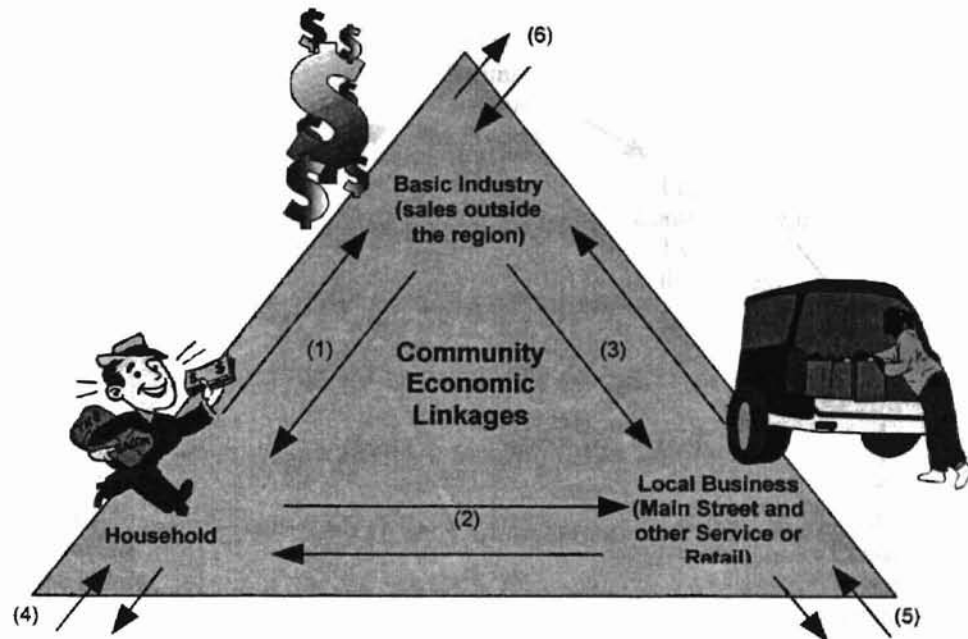
communities, including international markets. By understanding how the community works (Figure 2-1) it is possible to develop a consistent, beneficial community development cycle (Figure 2-2) and reach community economic goals.

In general, there are four approaches to economic development:

- Creation - New businesses are developed within the community through entrepreneurial activities;
- Attraction - New industries come into the community, either through the relocation of existing plants or the establishment of new branch plants;
- Retention - Companies, which are already established in the community, remain in the community and do not shut their doors or move elsewhere;
- Expansion - Existing business establishments actually expand and increase their production or services offered. This leads to enlarging the physical plant size, hiring new employees, and purchasing additional raw materials and supplies.

All four of these activities are vital to the economic development process and valid in their own right. Together they promote the idea that to be successful in development efforts, you must CARE for you community (Woods et al, 1999).

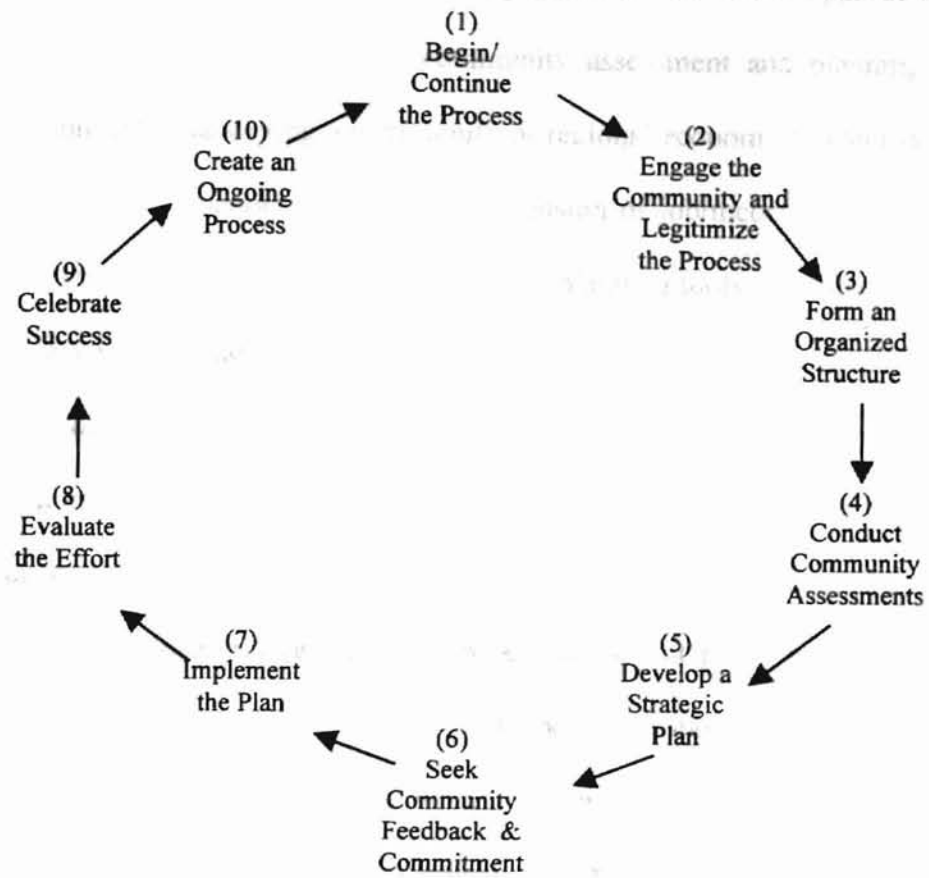
Figure 2-1. Community Economic Linkages.



- (1) A household earns a paycheck through employment in one of the basic industries. Basic industries are those who produce goods or services for sale outside the community.
- (2) The household then uses its income to purchase goods and services in the local economy.
- (3) Basic Industry may also purchase goods and services from local businesses, or vice versa.
- (4) Households may seek employment outside the community. Households may also choose to purchase goods and services outside the community. Consumers may have many motives for these decisions: availability, selection or price.
- (5) Local businesses also purchase items outside the community. When a community has a strong retail sector, they may actually draw consumer purchases from a larger area.
- (6) Basic industry purchases production inputs outside the community. Production inputs may include raw materials, labor or specialized services. They sell their production outside the community and thus bring money into the community.

SOURCE: Homm, et al. 2000

Figure 2-2. Community Development Cycle.



SOURCE: Woods, et al., 1999

Targeted Economic Development

Targeted economic development is a synthesis of the above approaches: target industry analysis, cluster analysis, and community assessment and planning. It is a systemized approach to analyzing a community or regional economy to identify potential options for creation, attraction, retention, or expansion of job/income opportunities and economic growth. Analytical tools and community planning tools are utilized to enhance community decision-making and incorporate local desires and ideas.

Definitions of targeted economic development vary widely. Barkley describes targeted economic development as tailoring of industrialization through an analytical process that focuses efforts on specific industries or clusters of related industries. The process identifies industries that exhibit competitive advantage in labor, location and public services. By narrowing the scope of potential industrial recruitments, the community can more efficiently consider industrial recruitment options (Barkley, 1998).

The key to sustainable development is improving the economy without undermining the society or the environment. It requires the understanding that a healthy environment and a healthy economy are both essential for a health society. The three components of a sustainable community are linked in a complex mix of economy, environment, and society. Economic development solutions that target only one area, such as economy, often cause problems in other areas because these links are neglected.

Environment

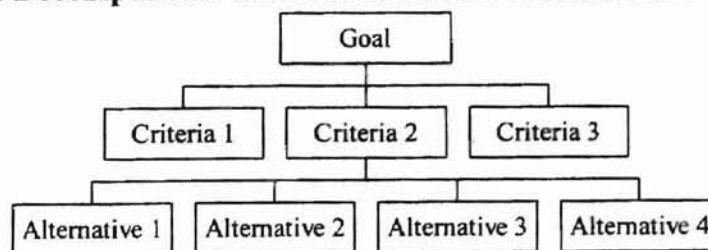
Giving consideration to environmental factors in economic development is vital to creating sustainable economic development. To address this concern, "Industry Reporting to the Toxic Release Inventory" by the Environmental Protection Agency (EPA) may be

incorporated into the database. This study provides communities with important information concerning the release of toxins into the local environment. Data are provided, by SIC code, for manufacturing industries based on emissions into water, air, surface and underground pollutants (Environmental Protection Agency, 1997). Similarly, water quality data are also available.

Equity

In order to include equity in the sustainable development model, it is vital to gauge the community's preferences toward economic development. One method of calibrating the model according to community preferences is a three-step procedure outlined by Cox (1997). In step one, local decision makers are interviewed. Using the analytical hierarchy process (AHP), outlined by Cox, weights are created for different local impacts of development outcomes. This is accomplished by decomposing the problem into a dominance hierarchy as shown in Figure 2-3. The top level represents the community's goals. The intermediate levels contain criteria on which lower levels depend. The lowest level lists choices available to the community.

Figure 2-3. Generic Decomposition of a Problem into Dominance Hierarchy.



Source: Cox, 1997

Each element must then be compared to other elements at that level, with respect to the level directly above. This is accomplished through “pairwise comparison.” For example, community leaders may be asked “When comparing A and B, ‘Which is more

preferred?" (Cox, 1997). These judgments are then entered into a $K \times K$ matrix, with each criterion representing a row and a column. This information will be used to solve for preference weights. In step two, the critical development impacts of industry locations are identified and quantified for each of several industries that survived the initial screening. Each industry must receive a final score for each impact. The score is a measure of how much location of the industry in the community will contribute to each impact. The industry score is multiplied by the priority vector (from AHP) the weighted industry score is obtained. The final step involves applying the weights to the measured attributes of each industry to derive a community-specific ordering of preferred industries (Cox, 1997).

In summary, targeted economic development utilizes economic base theory, and staple theory. Economic base theory postulates that local economic growth is driven by external demand for local exports. Staple theory stresses the importance of economic development as sustained growth over the long term by focusing economic development on production and marketing of an export staple in world markets. Targeted economic development uses these theories as a basis for selecting export enhancement and import substitution strategies. Targeted economic development also incorporates three methodological approaches: target industry analysis, cluster analysis and community assessment and planning.

Data Sources

The Greenwood Chamber of Commerce defined their service area to encompass the following zip codes: 74106, 74110, 74115, 74117, 74126, and 74127. The primary data source used for this project is IMPLAN. IMPLAN Pro is a computer-based software

program and regional database, which was originally developed by U.S. Forest Service. The program is used with the IMPLAN regional database to construct regional economic accounts. IMPLAN data are available for every county in the United States and by custom zip code regions. The IMPLAN software and database is available from the Minnesota IMPLAN Group, Inc. (1940 South Greeley St., Suite 201, Stillwater, MN 55082, [www. implan.com](http://www.implan.com)). MIG was contacted to acquire a custom data set, which reflected the necessary zip codes to model North Tulsa (Minnesota IMPLAN Group, Inc., 1997).

A non-aggregated IMPLAN model (potentially 528 sectors) was constructed using this data (See Appendix 1). Reports are extracted from the model to construct a new model for further manipulations in Excel spreadsheets. The spreadsheet contained total exports, total imports, industry output, all employment multipliers (direct, indirect and induced), and all employee compensation multipliers for all 168 sectors.

For verification purposes as well as expanded industry data, many other data sources were used in analysis (Table 2-3). The primary source used in correcting the IMPLAN model was the online Oklahoma Manufacturer's Directory. This directory was accessed from the Oklahoma Department of Commerce. The Oklahoma Directory of Manufacturers and Processors lists manufacturing and processing plants throughout Oklahoma by name, city, county, product and Standard Industrial Classification Code (SIC). This directory is a joint publication of the Oklahoma Department of Commerce and Harris InfoSource, Twinsburg, Ohio. The Directory was searched based on zip codes and a spreadsheet of all manufacturing business compiled (Oklahoma Department of Commerce, 2001).

Table 2-3. Data Sources.

| Source | Report Path | Description | Available On-line at |
|-------------------|---|---|--|
| Free Demographics | Select report by geographic region | FreeDemographics.com provides free, unlimited access to 1970, 1980, and 1990 U.S. Census Data. | FreeDemographics.com |
| iMarket, Inc | Market size statistics | Number of companies in the entire U.S. in this 4-digit SIC code, the total number of people employed in this industry, the total annual sales in this industry, the average number of employees per establishment, and the average sales per establishment. | Industry Report at www.ZapData.com |
| iMarket, Inc | Market analysis by company size | By company size range, the number of companies in this 4-digit SIC code, their total and average number of employees, and their total and average annual sales. | Industry Report at www.ZapData.com |
| iMarket, Inc | Market analysis by state | By state that has companies in this 4-digit SIC code, the number of companies in this 4-digit SIC code, their total and average number of employees, and their total and average annual sales. | Industry Report at www.ZapData.com |
| IMPLAN Pro | Study Area: "Output, Value Added, Employment" | Output based on IMPLAN model for output, employment, employee compensation | Software and data available from MIG at www.IMPLAN.com |
| IMPLAN Pro | Social Accounts: "Commodity Trade" | Output based on IMPLAN model for exports and imports | Software and data available from MIG at www.IMPLAN.com |
| IMPLAN Pro | Multipliers Report: Employee Compensation | Output based on IMPLAN model for SAM multipliers for direct, indirect and induced employee compensation | Software and data available from MIG at www.IMPLAN.com |
| IMPLAN Pro | Multipliers Report: Employment" | Output based on IMPLAN model for SAM multipliers for direct, indirect and induced employment | Software and data available from MIG at www.IMPLAN.com |

| Source | Report Path | Description | Available On-line at |
|---|--|---|---|
| International Trade Administration | Export statistics | General and industry-specific trade statistics for potential markets worldwide. | http://www.ita.doc.gov/ |
| International Trade Administration | U.S. Industry & Trade Outlook® 1999 | Industry-by-industry overview of the U.S. economy with forecasts. Available for purchase. | http://www.ita.doc.gov/ |
| International Trade Administration | U.S. Industry Sector Data | Statistics for more than 100 major manufacturing groups and products, including employment, wages, capital expenditures and trade. | http://www.ita.doc.gov/ |
| International Trade Administration | State Export Data | Exports by state to the world and selected markets. | http://www.ita.doc.gov/ |
| International Trade Administration | Reports on U.S. Trade | Monthly Trade Update, U.S. Trade in Perspective, State Development Agencies For Trade And Investment | http://www.ita.doc.gov/ |
| Occupational Safety and Health Administration | Standard Industrial Classification Search | This page allows the user to search the 1987 version SIC manual by keyword, to access descriptive information for a specified 4-digit SIC, and to examine the manual structure. | http://www.osha.gov |
| Oklahoma Department of Commerce | Manufacturers Directory - 2000 Edition | The Oklahoma Directory of Manufacturers and Processors lists manufacturing and processing plants throughout Oklahoma by name, city, county, product and Standard Industrial Classification Code (SIC). | http://www.odoc.state.ok.us/index.html |
| Oregon State Government Information Sharing Project | Electronic clearinghouse for all population and demographic data | The Government Information Sharing Project was initiated with funding from the U.S. Department of Education and is administered at Oregon State University Libraries to demonstrate improved access to electronic government information, especially for remote users and the general public. | http://govinfo.kerr.orst.edu |

Chapter 3

STUDY AREA

Analysis of the North Tulsa region has been prompted by disparities between North Tulsa and South Tulsa. Therefore, an analysis of the region must consider smaller geographic elements than county level data. This region has a distinctive set of attributes. It is truly unique in both history and demographic makeup.

History

Black Wallstreet

Wallace (1992) describes Black Wallstreet in Tulsa, Oklahoma as a Mini-Beverly Hills and one of the most affluent all-black communities in America. It was the gateway to the "Promised Land" for the Black community during the early 1900s. Black Wallstreet, or Little Africa as it came to be known, showed that African Americans had created successful infrastructure within their community. Many Blacks owned farmland when they received their promised '40 acres and a Mule,' including any future oil found on the properties. Therefore, many of them had gone into the oil business. The community was close knit and prosperous because they traded dollars hand-to-hand. Jim Crow laws forced residents of Little Africa to become heavily dependent upon one another.

The main road was Greenwood Avenue; the heart of Little Africa was the area that was intersected by Archer and Pine Streets. Little Africa boasted over 600 businesses and 36 square blocks with a population of 15,000 African Americans. There were educated professionals residing in Little Africa, including Black attorneys and doctors. There were also pawnshops, brothels, jewelry stores, 21 churches, 21 restaurants and two movie theaters.

The community focused on providing each and every child with a quality education. When the average student went to school on Black Wallstreet, he wore a suit and tie. Morals and respect were taught at a young age. The community had strong ties to each other and believed in helping each other (Wallace, 1992). For example, if a resident's home accidentally burned down, it could be rebuilt within a few weeks by neighbors.

It was a very fascinating community. Global business was conducted on Black Wallstreet. In the 1920s, the entire state of Oklahoma had only two airports, yet six blacks owned their own planes. One doctor, Dr. Berry, owned the bus system and earned an average of \$500 a day. A banker in a neighboring town had a wife named California Taylor. Her father owned the largest cotton gin west of the Mississippi River. California took a cruise to Paris every three months to have her clothes custom made. Mr. Mason, in nearby Wagner County, had the largest potato farm west of the Mississippi. When he harvested, he filled 100 boxcars a day.

The community flourished from the early 1900s until June 1, 1921. According to Wallace, that's when one of the largest massacres of non-military Americans in the history of this country took place, and it was lead by the Ku Klux Klan (Wallace, 1992).

Race Riots

them off and refused to let

On May 31, 1921, Tulsa's position as a modern, booming, and sophisticated city came to a tragic end when a bitter race riot erupted. The riot began with a rumor involving a young black man and a white female elevator operator in the Drexel Building at the corner of Third and Main Street. The woman charged that the man grabbed her by the arm in the elevator. She hit him in the head with her purse and he ran away. City police arrested him later that afternoon.

By nightfall, rumors began flying in the downtown area. Many whites gathered at the courthouse to form a lynching party to get the young man. Some report that shots were fired when an open touring car occupied by several black men drove up to the courthouse. That was the spark that ignited the city into a mass confusion with people turning against each other with the full force of laden racial hatred (Ellsworth, 1992).

Rumors flew into the white community that blacks made an armed attack against the downtown district. Whites retaliated by breaking into every store in the downtown area. They robbed sporting goods and hardware stores, taking rifles, pistols, shotguns and ammunition. The riot shifted to the southern fringe of north Tulsa in the area of the Frisco tracks and Greenwood Avenue. Gunfire poured into the black community until midnight.

It became evident that the small, fledgling police force was unable to stop the rioters, prompting Mayor T.D. Evans to request the aid of the National Guard. After midnight, Guard units from Oklahoma City were dispatched to Tulsa by special train. While the Guard was still in route; mobs were running wild on the streets of North Tulsa and soon turned to arson. First fires were started near Archer Street and Boston Avenue.

Fire departments responded to the alarm, but rioters drove them off and refused to let them stop the fire.

At dawn on June 1, smoke loomed heavy over the entire north end of Tulsa. Since midnight, rioters had burned a total of 35 blocks of north Tulsa to the ground. Piles of bricks and rubble with a few chimneys and columns standing here and there in the ruins were all that remained of the black community.

Aftermath

In the aftermath, knowledgeable estimates ran as high as 300 dead. Over the days that followed, 184 negroes and 48 whites were hospitalized for surgical care and 531 more were treated for other various injuries. The total does not include wounded refugees who were treated at Muskogee, Sapulpa, Bartlesville and as far north as Kansas City. The death totals did not include those who died later of their wounds or were buried in unmarked graves. Many others fled into the Osage Hills and to the surrounding towns to escape the riot. During the riot, thirty-five city blocks were completely looted and burned to the ground. Property losses far exceeded the initial estimate of \$4 million (Ellsworth, 1992).

It cost the Black community everything. According to Wallace's book, *Black Wallstreet: A Lost Dream Chronicles a Little Known Chapter of African-American History in Oklahoma* (1992), not a single dime of restitution or insurance claims was ever awarded to the victims. Insurance companies holding policies on property in the stricken area informed the community "unless they wish to prove that either the city or state was negligent in the protection of that property, they would suffer total loss since the policies provided that destruction by fire caused by rioting or civil insurrection, renders the company writing the policy." The Mount Zion Baptist Church, which had been built at a

cost of \$84,000 and dedicated to serve the negro community less than six weeks before, lay devastated. The parishioners who had borrowed \$50,000 to help pay for the church and had signed the note a few weeks before, suddenly found themselves in debt with nothing to show for it. The congregation voted to pay back the money, a process that would take 21 years. Nonetheless, they rebuilt (Parrish, 1998). After the riot, the negro population was confined to a ghetto (e.g.: "a quarter of a city in which members of a minority group live because of economic, legal or social pressure").

Demographic Trends in North Tulsa

At present, North Tulsa continues to experience stagnant growth. This section discusses the current situation and progress since the race riots. Many activities in the community are greatly impacted by the numbers, characteristics, and location of its people.

Population

The population of Tulsa has continued to increase at a pace that outstrips the remainder of the state. During the 1990s, Tulsa County population grew 8.9% while Oklahoma grew at 6.8% for the same time period. However, population growth is not always evenly distributed within the Tulsa County. Which direction has growth moved over the last several decades? What are the trends for the future?

Examining population density maps (Figures 3-1, 3-2, 3-3, and 3-4) shows population growth patterns in Tulsa County. Growth has moved the population of Tulsa primarily to the south, away from the Greenwood district. Therefore, even though the county has strong positive growth trends, the Greenwood District is actually trending

Figure 3-1. Population Density in 1970.

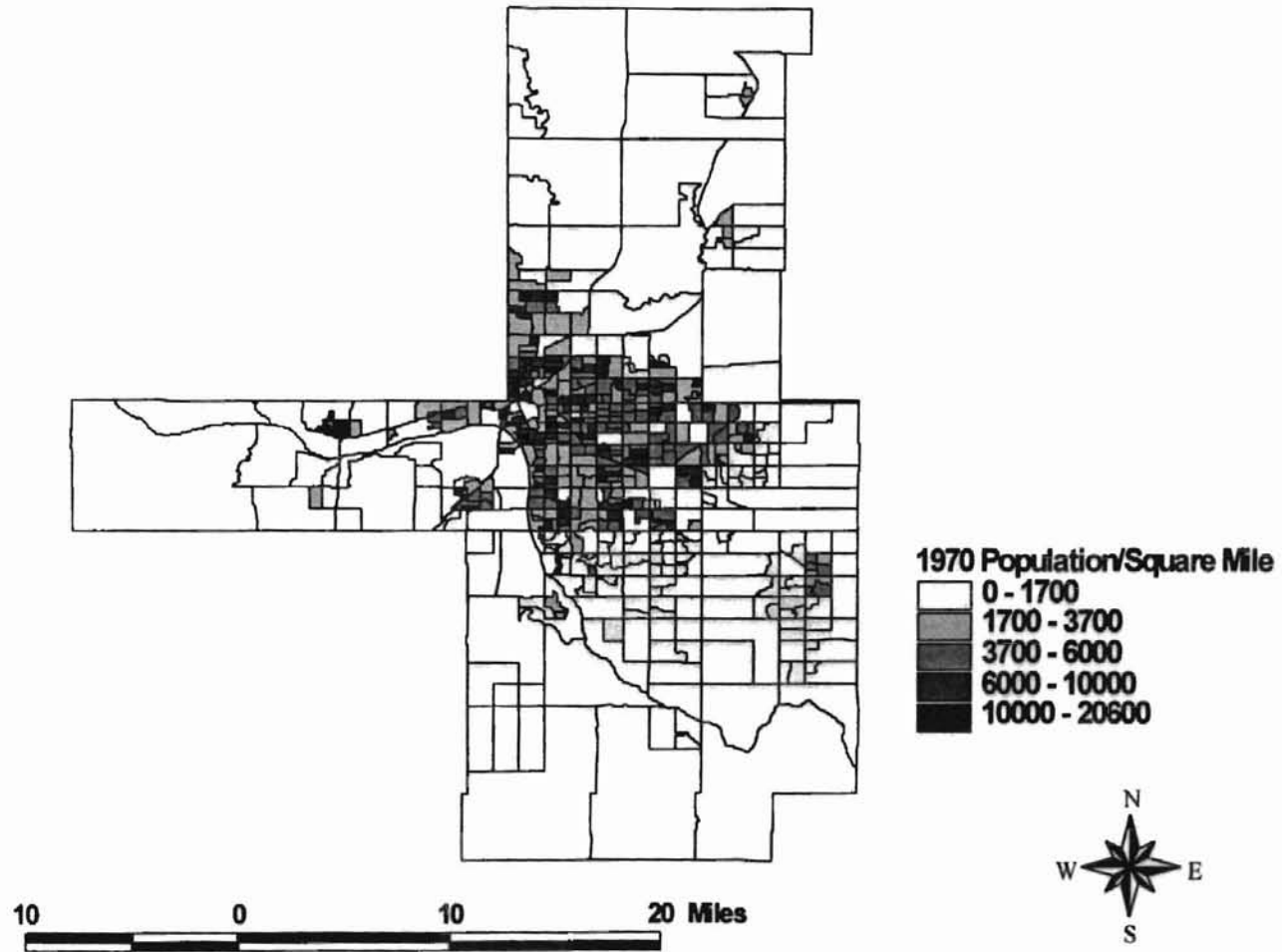
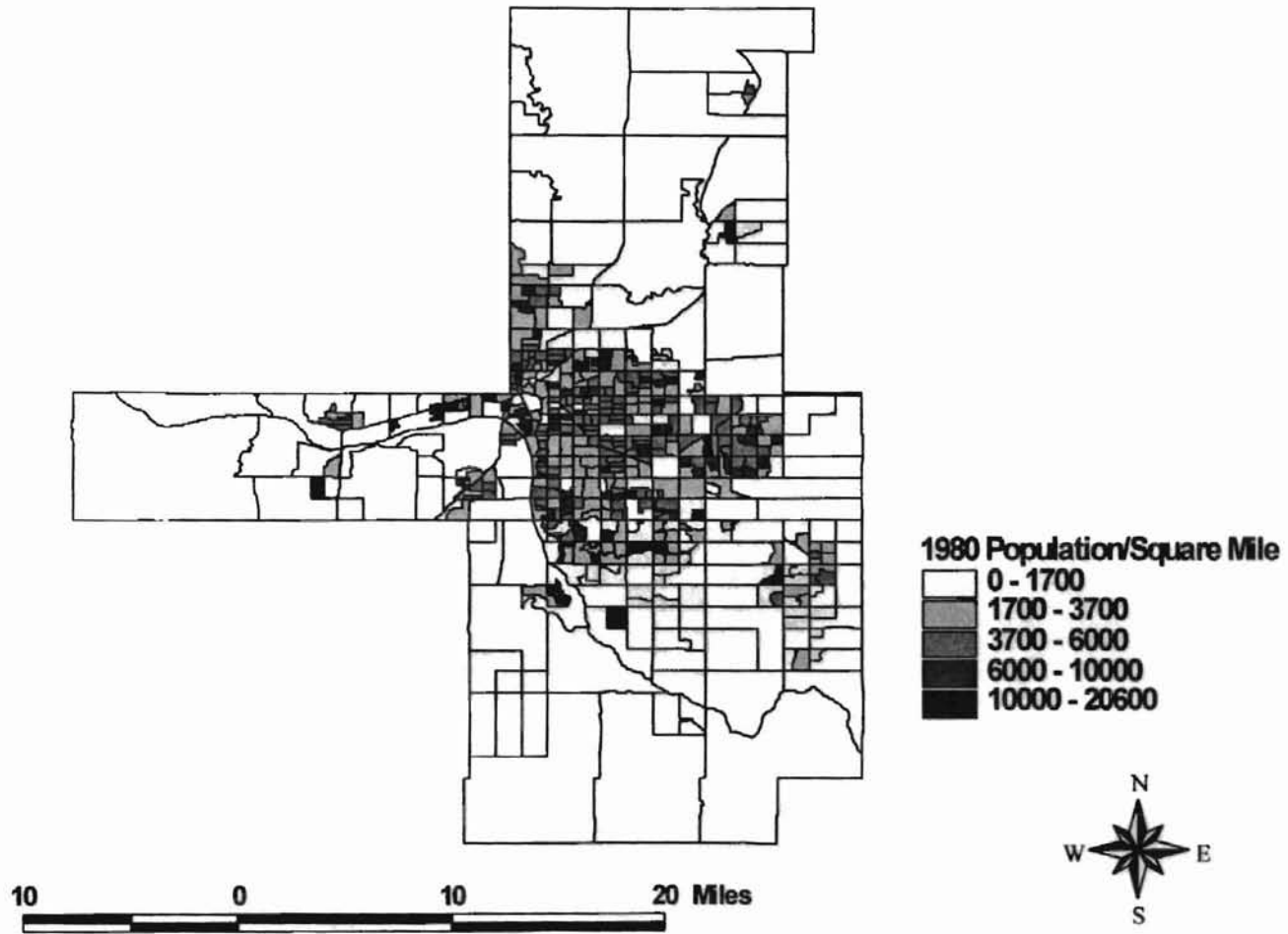
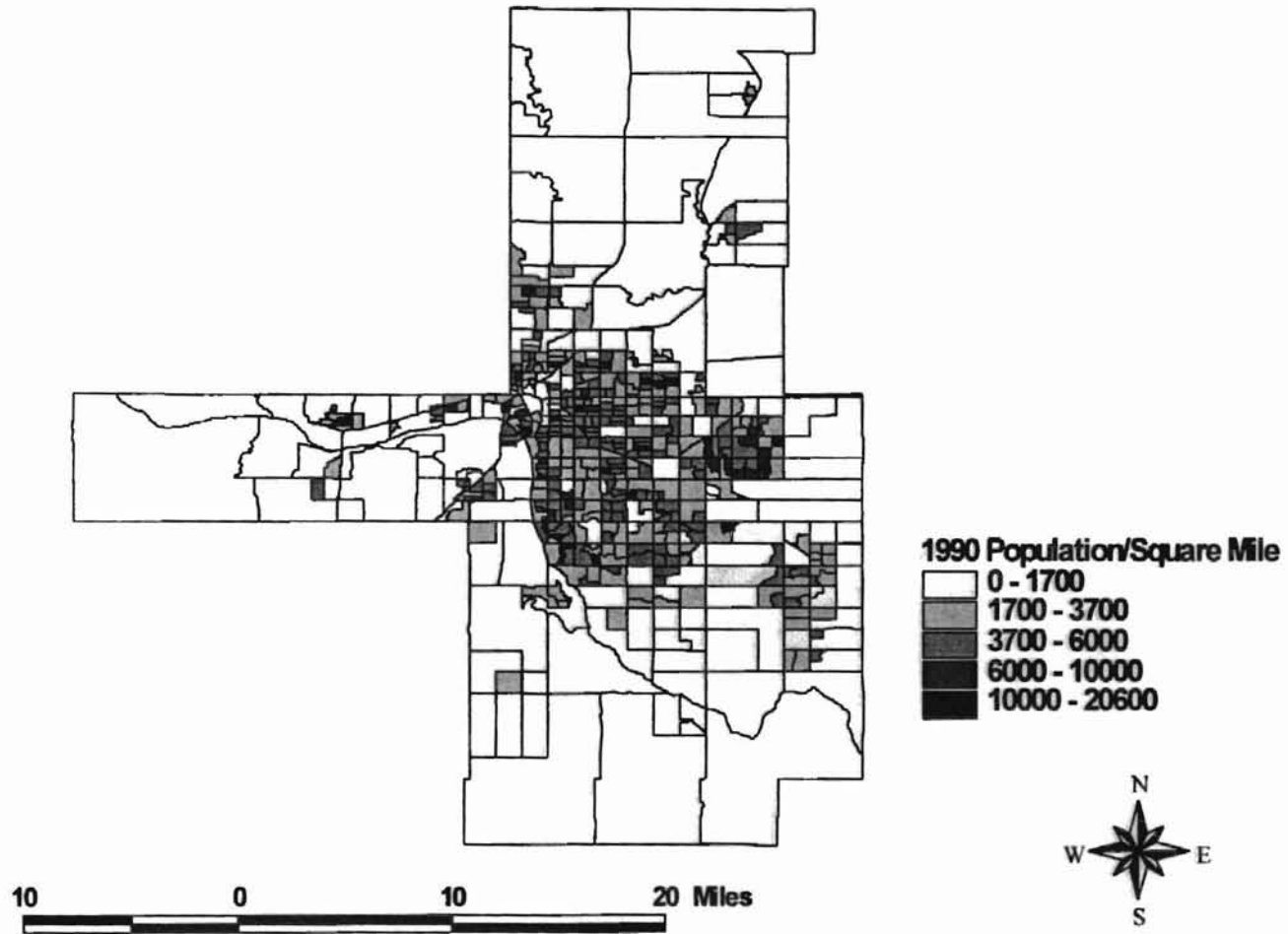


Figure 3-2. Population Density in 1980.



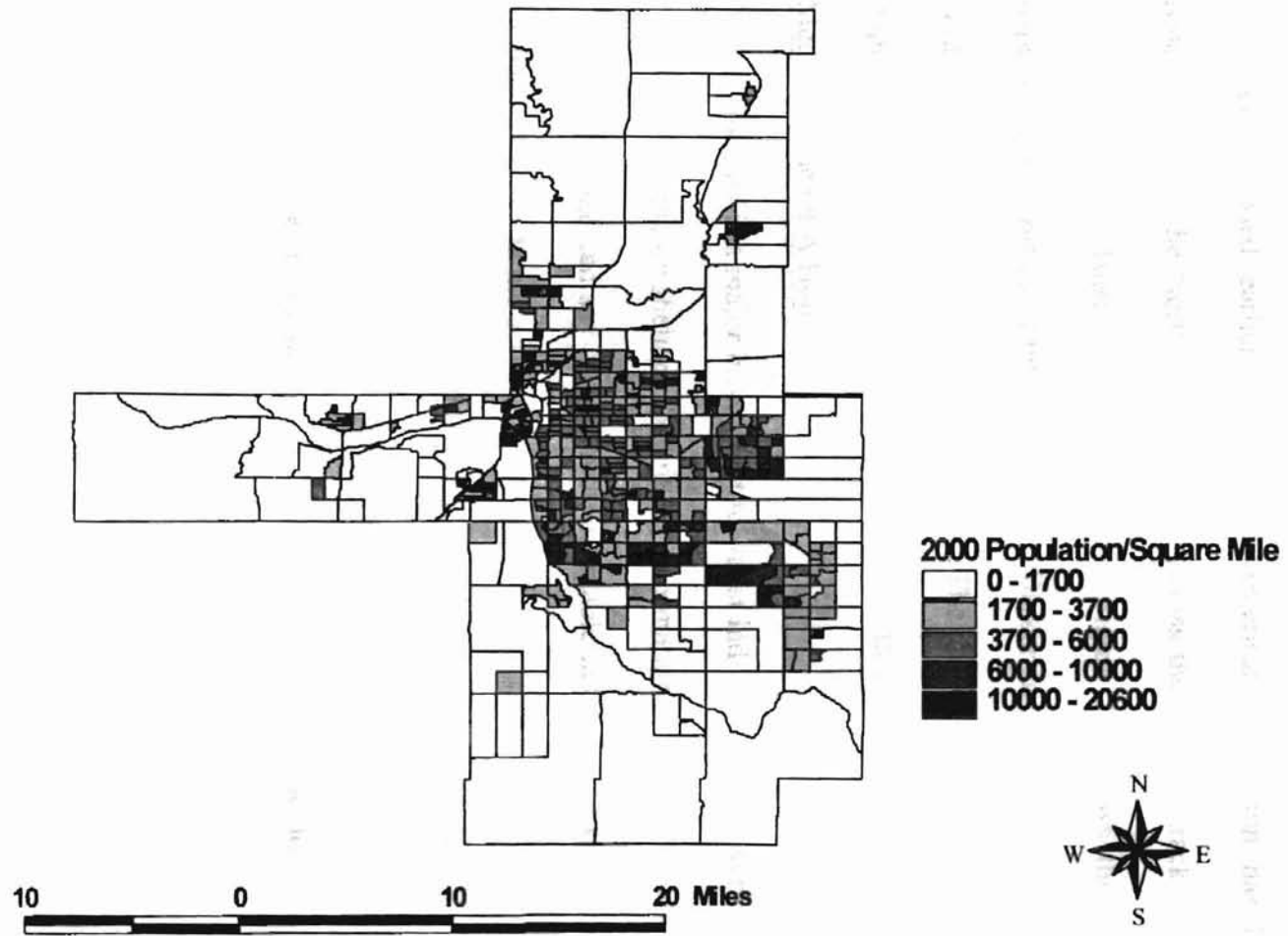
SOURCE: www.FreeDemographics.com

Figure 3-3. Population Density in 1990.



SOURCE: www.FreeDemographics.com

Figure 3-4. Projected Population Density in 2000.



SOURCE: Calculated based on data from www.FreeDemographics.com

down. North Tulsa's population has actually decreased over the last several decades showing strong trends toward out migration.

African American Population

As discussed earlier, the African American population has historically been concentrated on the North side of Tulsa, across the railroad tracks. Where are racial concentrations in Tulsa County in 1990? Figure 3-5 shows the African American population as a portion of total population. Darker areas denote regions where nearly the entire population is African American. The map illustrates the African American population is still heavily concentrated in the North Tulsa area.

Median Value Of A Home

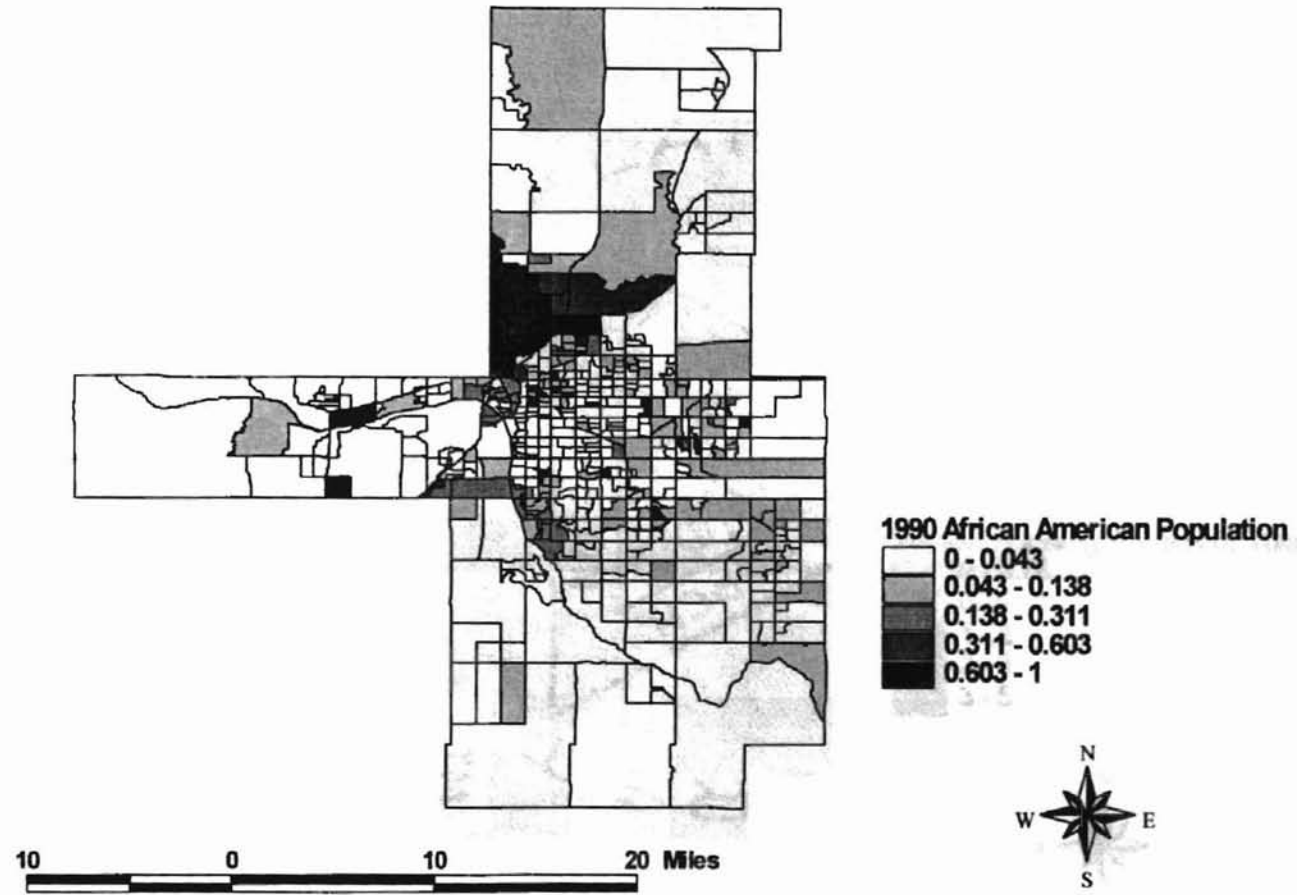
Housing is a major investment for most individuals. On average, a family spends 21% of its income on shelter. Examining information on the cost of housing and types of housing available can say much about affordable housing in a community. What is the median value of a home across Tulsa County?

The median for all of Tulsa County is relatively high \$66,527. Many parts of the county are lower. Figure 3-6 shows median value of a home as a portion of the median value of all homes in Tulsa County. Many of the lower value homes are concentrated in North Tulsa.

Employment

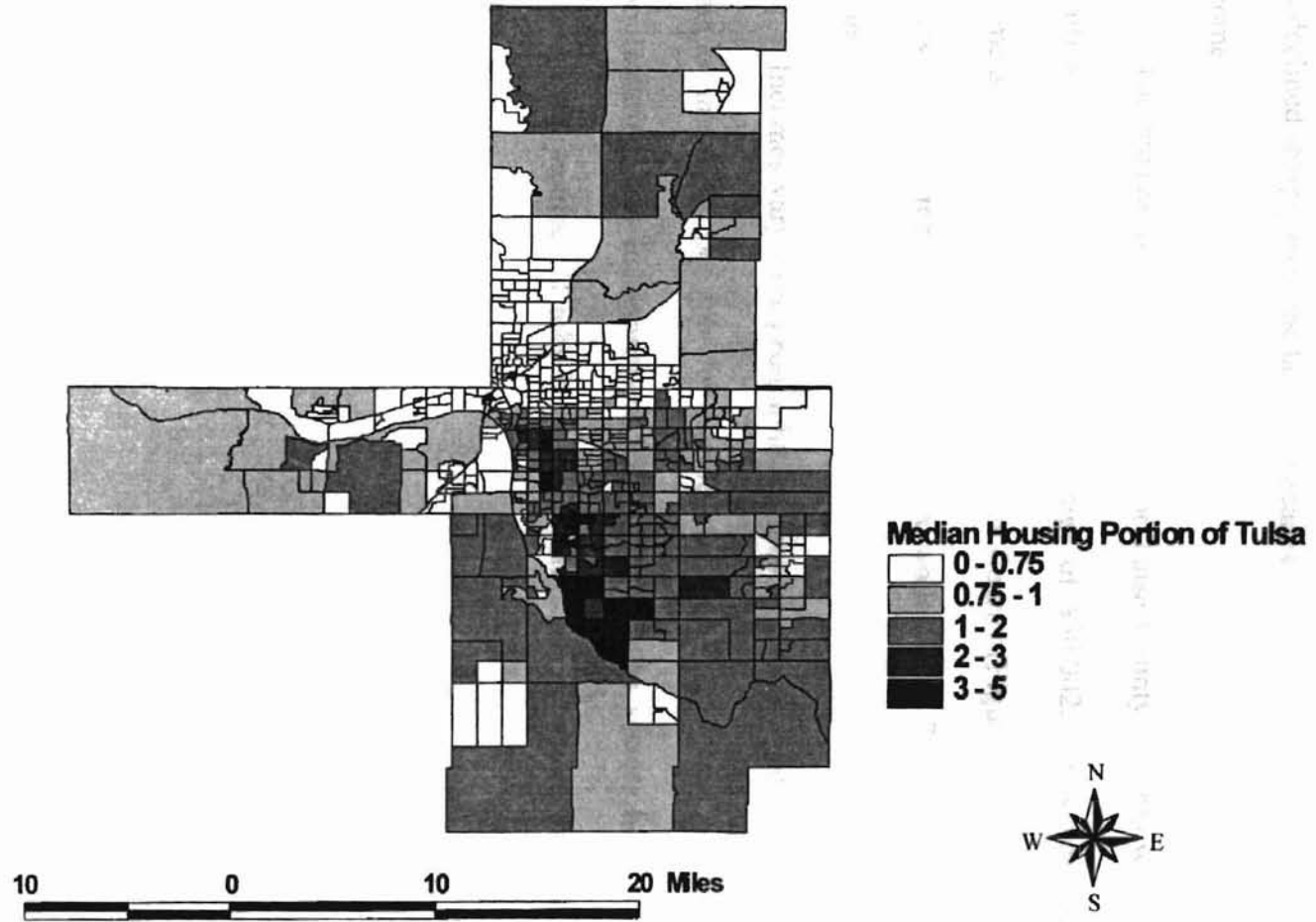
Many industries in the diverse community of Tulsa have risen and fallen over the years. Which industries have added new jobs over the last 20 years? Which industries have lost jobs?

Figure 3-5. African American Population, 1990.



SOURCE: www.FreeDemographics.com

Figure 3-6. Median Value of a Home, 1990.



SOURCE: www.FreeDemographics.com

As illustrated by Figure 3-7, the largest gains in employment have been made in the service sector. Manufacturing and retail trade have also shown modest growth. Mining has declined sharply over the last two decades.

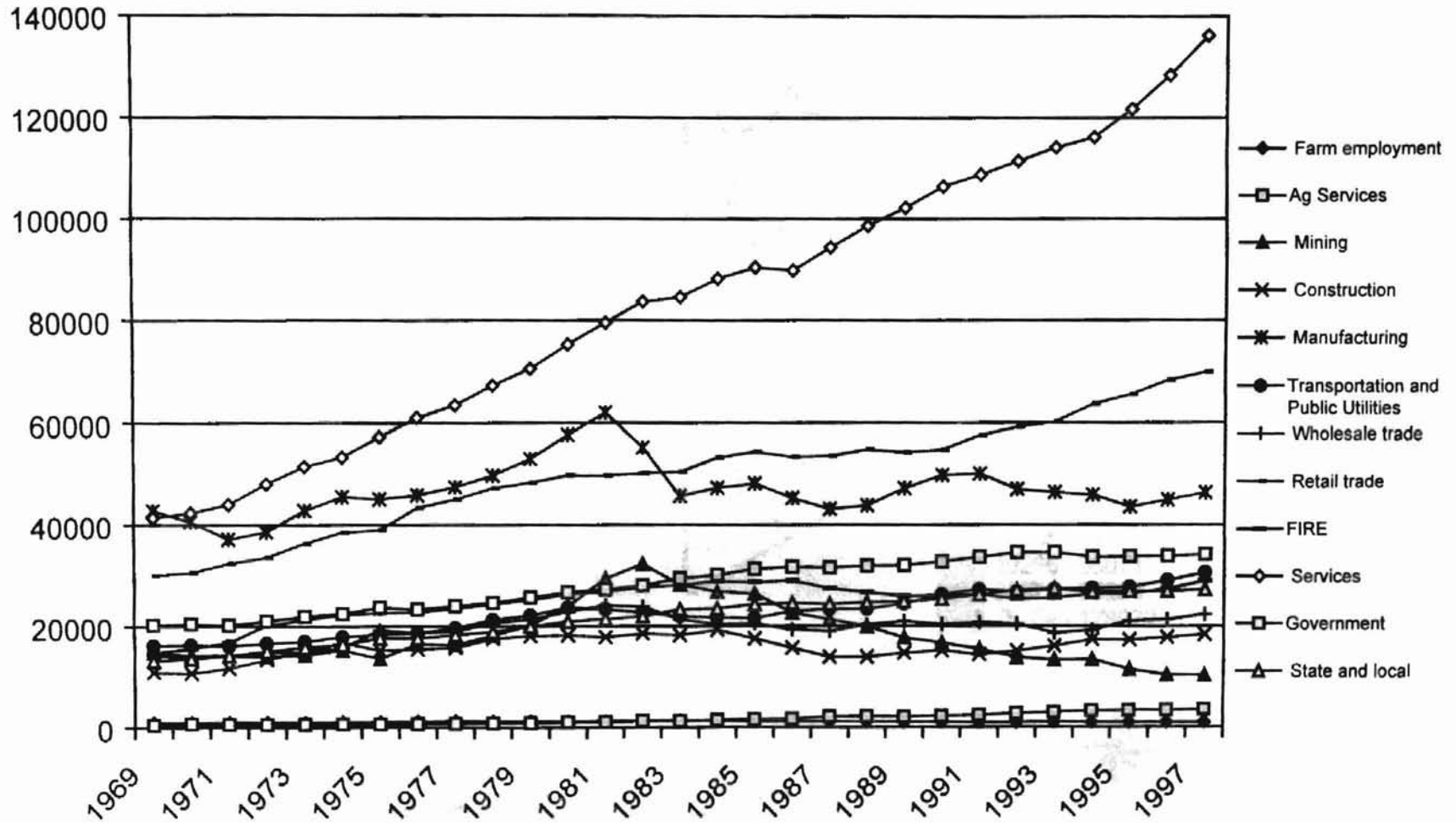
Income

The median household income for Tulsa County in 1990 was \$35,280. This is significantly higher than the state average of \$30,002. However, median household income also varies widely throughout Tulsa County (Figure 3-8). Again we see the trend of low incomes reported in North Tulsa while South Tulsa exhibits high per capita income.

Incomes vary over geographic regions as well as type of job. Figure 3-9 shows changes in wages per job for various industries over time. Jobs in the mining, manufacturing, and transportation and public utilities sectors have the highest wages. Although the number of jobs in service sectors has increased, the wages remain fairly low.

Figure 3-7. Tulsa County Total Employment.

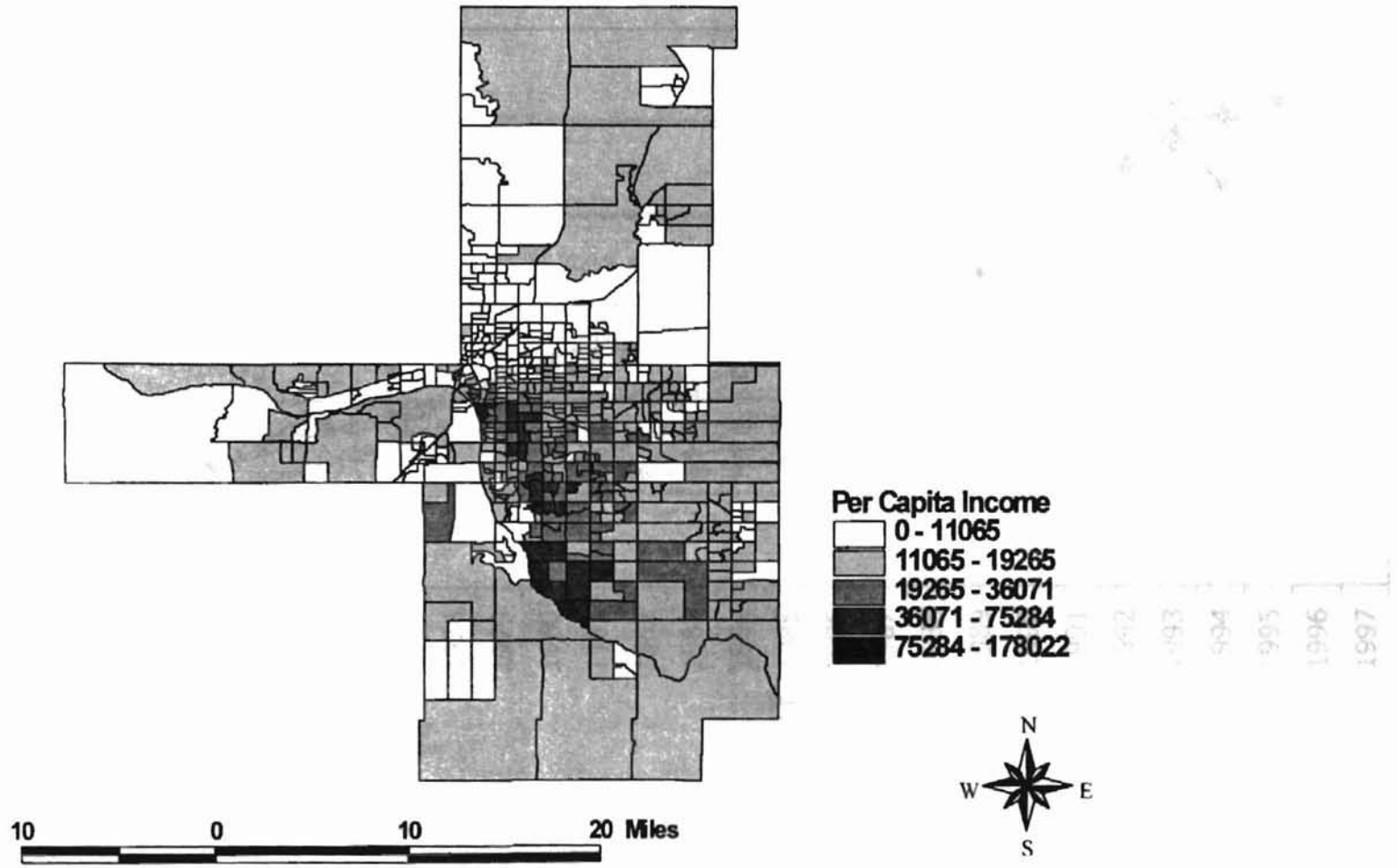
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SOURCE: Regional Economic Information from Government Information Sharing Project

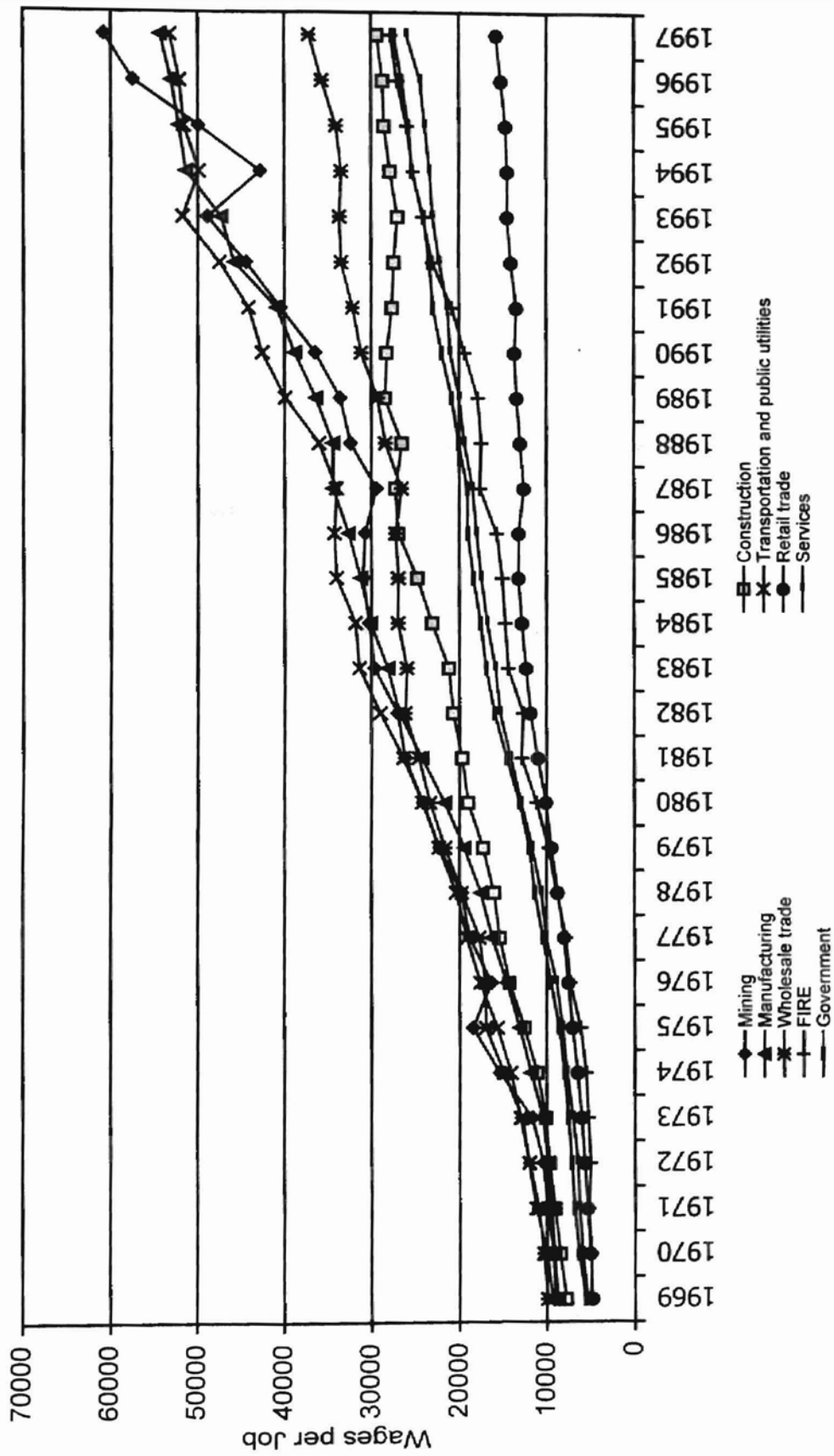
Figure 3-8. 1990 Per Capita Income.

47



SOURCE: www.FreeDemographics.com

Figure 3-9. Tulsa County Wages per Job.



SOURCE: Regional Economic Information from Government Information Sharing Project

Chapter 4

METHODS

Initial screening of potential sectors is based on export base and import substitution strategies. The export base of a regional economy consists of those goods and service sectors that sell a large portion of their products outside the region. Export base was selected as a primary selection criterion because the expansion of export base industries leads to expansion of non-basic industries through the “multiplier” or ripple effect.

Commodities produced in one region often use goods and services (inputs) imported from outside the region. This is called economic leakage. “Import Substitution” refers to replacing imported goods and services with goods and services produced in the local community. When this can occur, economic leakages are plugged and the ripple effects from a given export base are strengthened (Johnson, 1996).

Procedure 1

The first procedure focuses on utilizing multiple procedures to provide community leaders with useful, timely information in order to help them reach their developmental goals and simultaneously create a template for future projects in other communities. Using IMPLAN data, an initial input-output model is constructed, for the Greenwood Chamber of Commerce defined region North Tulsa. The model must then be

modified to reflect current reality of the region. From the corrected model, spreadsheets are built to show various economic desirability criteria, such as total employment, total employee compensation, compensation per employee and employment growth that would be useful to community leaders.

Ground Truthing

Holland (1996) described ground truthing as the continual process of double-checking the model against reality. This process can take on many forms depending on what is appropriate for the community.

First consider the common sense approach. Reconsider the list of top imports and exports for the region and ask, "Do these make sense?" If you are not directly familiar with the region, it would be helpful to consult community leaders. Sometimes it is necessary to correct the model for errors in calculation of the input-output model. This is especially the case with agricultural data. Consider swine data reported for specific counties. When considering the initial model, it was observed that swine production was a substantial export for selected counties. This was not consistent with the known economy and agricultural production. After contacting several community leaders and extension staff, it was determined that the model was in error. As the mystery unraveled, it was discovered that agricultural data are constructed based on 1992's distribution of production across the counties in Oklahoma and 1997 value of total production. Therefore, total production is distributed according to past production levels. In industries similar to the Oklahoma swine industry, an industry that has undergone dramatic changes in production levels over the past five years, the model may not

accurately reflect current production. Adjustments to the model and data can be made if problem sectors are identified.

Community leaders are also helpful in providing first-hand knowledge of the economy as it stands today. Since the IMPLAN model is based on 1997 data, the community may have gone through many changes. Businesses that were once flourishing may have gone out of business or moved. On the other hand, new businesses may have opened. For example, in a recent project with Lincoln County it was known that recent tornadoes had destroyed an outlet mall. With the destruction of the mall, Lincoln County lost the majority of the area's retail trade. The model was corrected to reflect the current economy.

Another method that may be used to ground truth a model is a "windshield survey" of the community. This method was used in North Tulsa as Chamber Director for the Greenwood Chamber of Commerce, Ernest Tiger, identified businesses in the region. Road trip results were then crosschecked with the model to verify that the observed results were consistent with the model and, when necessary, sectors were added.

Comparing outside data of community to the community model also serves to check the accuracy of the model. Employment data from the Bureau of Labor Statistics, Oklahoma Employment Security Commission or other sources may be used to check and correct the model.

North Tulsa Project Ground Truthing

Visual inspection showed that the region contained several major manufacturing plants that were absent from the original model. Results of the "windshield survey" are

presented in Table 4-1. The Oklahoma Department of Commerce's 2000 Manufacturing Directory was searched on-line to create a secondary source of data (Table 4-2). This confirmed the missing sectors and allow for employment data for each firm to be aggregated into IMPLAN sectors. Information from both the visual inspection and the Oklahoma Manufacturer's Directory allowed corrections to be made to the IMPLAN model. These corrections adjusted the model to reflect the community economy, as well as to update the model with 2000 data. (See Appendix 2, Correcting IMPLAN model).

Desirability Criterion

This procedure addresses the issue of how well the industry meets the community's goals for economic development. Community leaders will provide input and discussion concerning their perception of the community's goals and values. They may be concerned with the economic effect, environmental impact, increases in school enrollment, loss of existing businesses or other factors not yet discussed. Concerns are discussed with the local groups during the targeted economic development process in order to provide the best possible data.

Once the export and import industries have been identified from the corrected IMPLAN model, a second model is constructed. The second model is built in Excel using data from the IMPLAN model and other data sources to better analyze desirability criteria for industrial candidates and community compatibility.

Communities must consider the impact each industry could have on their economy. Understanding potential economic impacts of an industry helps community leaders to prioritize their efforts for recruitment. One consideration is income per

Table 4-1 Tulsa Road Trip: Results of "windshield survey" of North Tulsa.

| | Number of employees | Zip Code |
|--|---------------------|---|
| BAMA | | |
| Cherokee Industrial Park | | |
| <ul style="list-style-type: none"> • Laufer Intl (floor tile) • BAMA (pies) • Ryerson • Hyspan (wire mesh for hose insulation) • World Com (telecommunications) • Honeywell (various instruments thermostats for H/AC controls) • Lori, Inc • Nordam Gro (aerospace building jet engines) • Currently building (lasers) • Whirlpool (stoves) | | |
| N. Tulsa BIDC Industrial Park | | |
| <ul style="list-style-type: none"> • J.W. Van • PSO • Eagle/Bravo (manufacturing) • Wedlake Precision (metal fabrications) • American Crating • Packlight system • Williams • All Wheel Drive Equipment manufacturing | | |
| Zoo (city owned) | | |
| North Police Training Center | | |
| Matrix Steel (oil field construction) | | |
| Tulsa Airport (nonprofit) | | |
| Spartan School for Astronaut | | |
| Boeing (aerospace manufacturing) | | |
| Jorgenson's Steel | | |
| Crane Carriers Company (trash trucks) | | |
| Biz Jet | | |
| | | Williams |
| | | Davis Frost Paint Manufacturing |
| | | TCC Tulsa Community College |
| | | Budweiser |
| | | First Process Steel |
| | | Baldwin Steel Division |
| | | Ok. Fixtures Co |
| | | Action Spring |
| | | G&G Manufacturing |
| | | Persision Surfaces |
| | | Central OK Freightliners |
| | | Dolphin |
| | | Interstate Steel |
| | | Shopping Center |
| | | <ul style="list-style-type: none"> • Springdale • N Land • N Ridge |
| | | Bank Notes (print checks) |
| | | Salvage yards |
| | | Shopping mall to come |
| | | Gear Utility |
| | | Raven Lining |
| | | Midtown Industrial Center |
| | | Lee Supply |
| | | Aircraft cylinder |

Table 4-2. Oklahoma Department of Commerce Manufacturer's Directory 2000 for selected North Tulsa Zip Codes.

| Company | Items Produced | Number of Employees | Zip Code |
|--------------------------------|---------------------|---------------------|----------|
| Accurate Printing Co | 2752 2759 2789 2791 | 3 | 74110 |
| Adorn Counter Tops | 2541 | 3 | 74115 |
| Advantage Building & Exteriors | 2435 2426 | 50 | 74117 |
| Advertising Anything | 2396 2399 | 15 | 74110 |
| AEROARC Inc | 3728 | 103 | 74115 |
| Air Liquide America Corp | 3548 | 17 | 74106 |
| Aircraft Cylinders of America | 3599 | 30 | 74106 |
| Airico Inc | 3599 | 5 | 74115 |
| Alpha Investment Casting Corp | 3325 | 20 | 74110 |
| American Camper | 3949 | 25 | 74115 |
| American Pipe Bending Co | 3498 | 25 | 74110 |
| Ann's Bakery Inc | 2051 | 23 | 74115 |
| Apache Machine Co Inc | 3541 | 5 | 74115 |
| Arnold Ink Printing | 2752 2759 2791 | 6 | 74127 |
| Arrow Specialty | 3714 | 55 | 74110 |
| Axle Transmission & Transfers | 3599 | 5 | 74110 |
| B & H Rag Inc | 2299 | 38 | 74110 |
| B T Machine Inc | 3599 | 3 | 74115 |
| Bama Foods Ltd | 2051 | 175 | 74117 |
| Bama Frozen Dough | 2045 2038 | 125 | 74110 |
| Banknote Printing Co | 2791 2789 | 38 | 74106 |
| Barrett Performance Aircraft | 3728 3829 7692 | 7 | 74115 |
| Base Inc | 2046 | 12 | 74115 |
| Beattie's Hitch Center | 3799 | 5 | 74115 |
| Benton Clock Works Inc | 3369 3322 | 8 | 74115 |
| Biles Concrete Products | 3272 | 1 | 74115 |
| Bodycote Thermal Processing | 3398 | 65 | 74115 |
| Booster Feed Mill | 2048 | 10 | 74115 |
| Boyle Services Inc | 3443 | 25 | 74127 |
| Brite Machine & Manufacturing | 3599 7692 | 2 | 74127 |
| Brittain Industries Inc | 3812 | 5 | 74115 |
| C & F Custom Chrome | 3471 | 5 | 74110 |
| Car Parts Machine Shop | 3599 7389 7699 | 2 | 74115 |
| CASCO Manufacturing Inc | 3443 3713 | 9 | 74115 |
| Cement Test Equipment Inc | 3829 | 10 | 74115 |
| Century Automatic Screw Mch | 3451 | 1 | 74126 |
| Century Geophysical Corp | 3829 | 55 | 74115 |
| Century Plating Inc | 3471 | 4 | 74115 |
| Chemproof Polyments Inc | 2851 2842 | 4 | 74127 |
| Cline Machine Inc | 3599 7389 | 12 | 74127 |

Table 4-2. Oklahoma Department of Commerce Manufacturer's Directory 2000 for selected North Tulsa Zip Codes, Continued.

| Company | Items Produced | Number of Employees | Zip Code |
|--------------------------------|--------------------------|---------------------|----------|
| Cline, Mike Inc | 3494 | 8 | 74127 |
| CNC Patterns & Tooling | 3544 | 4 | 74115 |
| Cooley Customized Sportswear | 2329 2339 | 10 | 74110 |
| Crackshot Corp | 2326 2386 2389 | 3 | 74115 |
| Crain Dispsals & Exhibits Inc | 3993 | 15 | 74110 |
| Crane Manufacturing Inc | 3829 | 20 | 74115 |
| Creative Quilting | 2392 | 1 | 74127 |
| Cronkhite Automatic Products | 3494 | 2 | 74127 |
| Curley Electric | 3599 3613 3621 | 4 | 74106 |
| Custom Airmotive Inc | 3724 | 15 | 74115 |
| Custom Buckle Manufacturers | 3369 | 7 | 74106 |
| Customer's Choice Printing | 2752 2761 2789 2791 | 4 | 74127 |
| Davis International | 3069 | 2 | 74115 |
| Dean's Grinding Service | 3599 | 2 | 74115 |
| Dolphin Manufacturing Co | 2599 2499 3429 | 57 | 74110 |
| Empire Castings | 3322 | 100 | 74127 |
| Ernie & Son Printing | 2752 2759 2789 | 2 | 74106 |
| E-Z Spuds | 2099 | 3 | 74110 |
| FADCO | 2431 | 18 | 74110 |
| Fil Tec Inc | 3564 | 30 | 74115 |
| First Process Steel Inc | 3441 3312 7389 | 30 | 74115 |
| Frizz-O Water Co Inc | 3999 | 20 | 74110 |
| G & G Manufacturing Co Inc | 3599 | 5 | 74110 |
| Gardner Springs Inc | 3493 3452 3495 3496 3469 | 10 | 74110 |
| Graphics International Inc | 3555 | 5 | 74127 |
| Gunnebo-Johnson Corp | 3536 3462 3545 | 165 | 74115 |
| H & H Manufacturing Co | 3544 | 5 | 74110 |
| H & H Manufacturing Co | 3599 | 6 | 74115 |
| H & L Forge Co | 3599 3531 | 75 | 74117 |
| Handi-Printing Inc | 2752 2789 2791 2796 | 2 | 74127 |
| Harlas Printing Co | 2752 2759 2789 | 2 | 74106 |
| Heater Specialists Inc | 3255 3443 3559 | 135 | 74115 |
| Holbrook Printing | 2752 2759 2789 2791 | 8 | 74115 |
| Homestead Press | 2752 2789 2791 | 3 | 74110 |
| Hughes-Anderson Heat Exchanger | 3443 | 125 | 74115 |
| Hyspan Precision Products Inc | 3568 3496 3599 3643 3561 | 40 | 74117 |
| Ideal Specialty Co Inc | 3599 7389 7692 | 15 | 74110 |
| Industrial Pallet & Lumber Co | 2448 7389 | 7 | 74115 |
| Industrial Structures Inc | 3448 | 25 | 74127 |
| Irv's Sporting Goods Inc | 2326 | 10 | 74115 |
| J & D Machine Inc | 3533 | 3 | 74126 |

Table 4-2. Oklahoma Department of Commerce Manufacturer's Directory 2000 for selected North Tulsa Zip Codes, Continued.

| Company | Items Produced | Number of Employees | Zip Code |
|---------------------------------|----------------|---------------------|----------|
| J B Machining Inc | 3599 7389 | 10 | 74126 |
| J C Industries Inc | 3441 | 5 | 74110 |
| JMK Inc | 3443 | 90 | 74110 |
| John Crane Inc | 3443 3625 | 60 | 74110 |
| Keller Williams Furniture Mfg | 2511 2512 2522 | 13 | 74127 |
| Kirkwood Tank Co | 3443 | 19 | 74110 |
| Knight Automatics Co Inc | 3599 3533 | 5 | 74115 |
| L & D Machines Inc | 3599 7389 | 2 | 74117 |
| Ladders Of Tulsa | 3444 | 5 | 74115 |
| Lafayette Manufacturing | 3599 | 3 | 74110 |
| Larkin Products Inc | 3533 | 30 | 74127 |
| Laser Manufacturing & Design | 2599 3089 3444 | 2 | 74106 |
| Latimer's Famous Bar-B-Que | 2035 | 1 | 74106 |
| Lawrence Monument Co | 3281 | 7 | 74115 |
| Lester's Gear & Automatic Parts | 3599 | 8 | 74110 |
| Lith-A-Print Co | 2752 2789 2791 | 8 | 74127 |
| Litho-Graphics Inc | 2752 2789 2791 | 1 | 74110 |
| M & M Mattress Co | 2515 | 3 | 74115 |
| Machining Specialists Inc | 3599 | 2 | 74115 |
| Machining Unlimited | 3599 | 2 | 74115 |
| Magic Fashions & Screen Print | 2396 | 5 | 74126 |
| Maro Dunlap Manufacturing Co | 3442 3354 | 11 | 74115 |
| Maro Intl Corp | 3441 3442 | 11 | 74115 |
| Marvel Photo Inc | 3559 3554 | 8 | 74115 |
| Massey's Trim Shop | 3714 | 4 | 74115 |
| Mayco Fixture Co Inc | 2541 | 8 | 74110 |
| Metal Dynamics Corp | 3325 3369 | 45 | 74106 |
| Metalform Inc | 3444 | 50 | 74106 |
| Midwest Portable Buildings | 3448 2452 | 5 | 74127 |
| Minuteman Printing | 2759 2675 | 2 | 74127 |
| Modern Sheet Metal By Ed | 3444 | 4 | 74115 |
| Modern Steel Fabricators Inc | 3441 | 15 | 74106 |
| Modern Upholstery | 2512 | 3 | 74110 |
| Mohawk Steel Co | 3443 3433 3444 | 11 | 74110 |
| Morco Manufacturing Corp | 3599 7692 | 1 | 74110 |
| Moritz Machine Shop Inc | 3599 | 18 | 74115 |
| Multi-Color Co | 2759 2791 | 20 | 74117 |
| Muncie Power Products Inc | 3713 | 200 | 74115 |
| Neal Heat Treating Inc | 3398 | 2 | 74115 |
| Neilson Steel Co | 3441 | 8 | 74127 |
| Nonni's Food Co | 2052 | 150 | 74115 |

Table 4-2. Oklahoma Department of Commerce Manufacturer's Directory 2000 for selected North Tulsa Zip Codes, Continued.

| Company | Items Produced | Number of Employees | Zip Code |
|-------------------------------|--------------------------|---------------------|----------|
| Norman, R J Co | 3089 3494 3541 3544 3599 | 6 | 74115 |
| Oil Capitol Neon Inc | 3993 | 5 | 74127 |
| Oklahoma Neon Inc | 3993 | 50 | 74115 |
| Oklahoma Stone Design Inc | 2599 | 5 | 74110 |
| Oklahoma Fixture Co | 2431 2541 | 1,000 | 74110 |
| Osage Neon | 3993 | 1 | 74127 |
| Owen Tool & Cutter Grinding | 3599 | 10 | 74115 |
| Plastic Fabricators Inc | 3089 | 7 | 74115 |
| Port City Plate Inc | 3443 | 48 | 74127 |
| Porter Mattress Co | 2515 | 4 | 74115 |
| Precision Hose Technology Inc | 3069 3052 | 5 | 74115 |
| Precision Surfaces | 3599 7699 | 5 | 74110 |
| Printed Circuit Services | 3672 | 1 | 74106 |
| Printing Impression | 2791 | 1 | 74127 |
| Pryer Machine & Tool Co Inc | 3728 | 97 | 74115 |
| Pump Shop | 7699 | 3 | 74110 |
| Quality Plating Co Of Tulsa | 3471 | 50 | 74115 |
| QuickService Steel Co | 7389 | 17 | 74106 |
| R & R Machine | 3599 7389 7699 | 7 | 74115 |
| Raven Linng Systems Inc | 2891 2851 | 10 | 74106 |
| Reddy Ice | 2097 | 30 | 74115 |
| Reed's Printing Co | 2752 2789 2791 | 2 | 74106 |
| Roberts Automatic Machining | 3599 3541 | 5 | 74115 |
| S & H Printing | 2752 2759 2789 2791 | 3 | 74115 |
| S & K Plating Inc | 3471 | 7 | 74115 |
| Saco Painting Inc | 3471 2851 | 8 | 74110 |
| Sawyer Manufacturing Co | 3521 | 18 | 74110 |
| Sign Design of Tulsa | 3993 | 3 | 74106 |
| Skyworthy Interiors Inc | 2531 | 3 | 74115 |
| Southern Rubber Stamp Co | 3953 3069 | 4 | 74110 |
| Southwest American Mfg Co | 2844 2842 | 25 | 74106 |
| Spectra Press Inc | 2752 2759 2789 | 7 | 74115 |
| Speedprint # 10 | 2752 2759 2789 | 4 | 74115 |
| Starlite Aluminum Products | 3443 3444 | 1 | 74115 |
| Starr Weld-ElI Service | 3599 | 2 | 74110 |
| Sure-Bite Inc | 3843 | 4 | 74115 |
| Tabko Aluminum Products Inc | 3442 3089 | 5 | 74115 |
| Temco | 3829 3821 | 12 | 74117 |
| Thompson Manufacturing Co Inc | 3554 3535 | 1 | 74127 |
| Tomco Chemicals | 2842 | 5 | 74110 |
| Topog -E Gasket Co | 3053 3061 | 18 | 74110 |

Table 4-2. Oklahoma Department of Commerce Manufacturer's Directory 2000 for selected North Tulsa Zip Codes, Continued.

| Company | Items Produced | Number of Employees | Zip Code |
|------------------------------|----------------|---------------------|----------|
| Tripower Steel LLC | 3441 | 6 | 74110 |
| Tru-Jo Co | 3444 | 1 | 74127 |
| Tulsa Aircraft Engines Inc | 3599 3724 | 20 | 74115 |
| Tulsa Bindery Inc | 2789 | 3 | 74126 |
| Tulsa Instruments & Controls | 3825 | 3 | 74110 |
| Tulsa Machine Works Inc | 3599 | 19 | 74110 |
| Tulsa Power Products Inc | 3549 | 30 | 74110 |
| Veale Brothers Concrete | 3271 | 10 | 74127 |
| W R Machine Shop Inc | 3599 | 6 | 74115 |
| Walden's Machine Inc | 3599 3429 | 160 | 74115 |
| Weir Machine Inc | 3599 7692 | 3 | 74115 |
| Westco Intl | 3296 | 40 | 74115 |
| Whirlpool Corp | 3631 | 1,300 | 74117 |
| Wood Concepts Inc | 3993 | 7 | 74115 |
| Yaffe Metals | 7389 | 35 | 74127 |
| Total Employment | | 6,013 | |

employee. Direct plus indirect plus induced wage income per employee is a measure of the quality of jobs created directly and the degree of linkages with other high quality local employers. Another factor may be total income per dollar of output. Businesses create property income (to owners and investors, and owners of property) in addition to wage income. Property income is an indicator of the sectors profitability. Total income is a good indicator of the value of the sector to the region. This variable measures the direct plus indirect wage and property income per dollar output. Since high employment sectors are often low wage sectors, which are not an indicator of quality jobs, another variable may be employment per million dollars of output. However, the number of jobs created should be a consideration and by including both number and quality of jobs as criteria, those sectors that do both will be favored and those that do neither are eliminated.

The consideration of regional and national industry growth rates, including past and projected national growth trends in employment, output, and number of establishments by industry, helps to focus on industries that "should contain a disproportionately high number of companies which are likely to be establishing new branch plants.

Further Evaluation of Selected Industries

Communities may also wish to consider a variety of other factors specific to industries that show promise in earlier analysis. One factor that may affect how well suited the industry is for recruitment efforts, i.e., the relative difficulty of attracting potential industries. Companies interested in relocation may have a variety of motives, specific to the company. For example, the company may have outgrown the existing

plant or facing competition from abroad or existing facilities may require costly technological renovations.

Another important consideration is current trends within the industry. Current or upcoming regulations such as energy efficiency standards or safety regulations may impact future industry growth. Relative health of export markets and other global industry trends may also play a role in future growth. This type of analysis must be done based on individual industry profiles. Environmental issues should also be addressed as a portion of further research.

It is important to also consider how well the community fits the requirements of the industry. When companies consider relocation sites, they generally contemplate a number of factors. Industries vary with respect to the importance placed on each factor. Conventionally, factors that influenced industrial locations are access to markets, labor, raw materials and transportation. Blair and Premus (1987) note that although these are still important, productivity, education, taxes, community attitudes toward business and other factors have grown in importance. The consideration of regional and national industry growth rates, including past and projected national growth trends in employment, output, and number of establishments by industry, helps to focus on industries that should contain a disproportionately high number of companies which are likely to be establishing new branch plants.

Procedure 2

As discussed earlier, sustainable economic development is composed of three equally vital components: economy, environment and equity. The issue of equity was addressed by determining the community's preferences toward economic development.

This step is important, as the effects of economic development will impact the local community. For example, a firm will create jobs and income but it will also affect public services, traffic flows, school enrollment, property values, etc.

The final model allows local leaders to change the emphasis, or weight, placed on each of the criterion based on community preferences to produce an overall weighted rank of each industry as an industrial candidate and community compatibility. This system is designed so that community groups may be surveyed using the attached “North Tulsa Community Economic Development Desirability Criterion” form (Figure 4-1). Each respondent is asked to assign the four desirability criteria a numeric weight based on how important that criterion is to them and to the future of their community. They assign the weight of “0” if a criterion has no value to their development objectives, “1” if a criterion will contribute only a small amount to achieving the community objectives, “2” if experience and judgment slightly favor this criterion over the others, and “3” if experience and judgment strongly favor this criterion over the others. Each value may be used more than once if necessary.

Responses are then tallied using a simplified analytical hierarchy process (Cox, 1997) and each of the desirability criteria is a weight. For example, ten ($n = 10$) people in a community development meeting completed the ranking system survey and reported the following results.

Table 4-3. Example Results of Weighting System for a Hypothetical Survey.

| <i>n</i> | Total Employment | Total Employee Compensation | Compensation per Employee | Employment Growth |
|----------|------------------|-----------------------------|---------------------------|-------------------|
| 1 | 0 | 2 | 3 | 1 |
| 2 | 2 | 3 | 2 | 1 |
| 3 | 1 | 2 | 3 | 1 |
| 4 | 2 | 2 | 1 | 1 |
| 5 | 3 | 3 | 3 | 3 |
| 6 | 1 | 2 | 2 | 0 |
| 7 | 1 | 2 | 3 | 2 |
| 8 | 3 | 3 | 3 | 0 |
| 9 | 1 | 3 | 2 | 1 |
| 10 | 1 | 2 | 3 | 1 |
| Total | 15 | 24 | 25 | 11 |
| Weight | 0.200 | 0.320 | 0.333 | 0.147 |

The weights assigned by all *n* participants would be summed for each criterion to calculate the total weight assessed to each criterion from all participants. Total weight values are then divided by the total points assigned to all in order to establish the correct weight to assign each criterion. In this example, the weights would be:

- 0.200 = Total Employment
- 0.320 = Total Employee Compensation
- 0.333 = Compensation per Employee
- 0.147 = Employment Growth

Figure 4-1. North Tulsa Community Economic Development Desirability Criterion

Directions: Assign each criterion a value based on the following scale. You may use each value more than once.

_____ **Total Employment: Direct, indirect and induced employment.**

_____ **Total Employee Compensation: Direct, indirect, and induced total employee compensation.**

_____ **Direct Employee Compensation per Employee: Only direct compensation per direct employee.**

_____ **Employment Growth Rate: 1996-1997 change in employment based on U.S. model.**

0 = Unimportant- A criterion that the community feels has no value to their development objectives.

1 = Some Importance- A criterion that the community feels will contribute only a small amount to achieving the community objectives.

2 = Moderate Importance- Experience and judgment slightly favor this criterion over the others.

3 = Essential or Strong Importance- Experience and judgment strongly favor this criterion over the others.

Chapter 5

RESULTS OF ANALYSIS

Regional economics suggest some general approaches to community economic development: (1) retention and expansion of the existing export base, (2) substitution of local product for imports.

Export Base Enhancement

The export base of a regional economy includes all goods and service sectors that sell their products outside the region. These industries are known as “basic” industries thus dividing the economy into two parts: basic and nonbasic. Nonbasic industries serve local demand including consumption by households and basic industry.

Export base theory states that a region will specialize in production of export sectors in which the region has a comparative advantage. Economic growth requires that community leaders identify those industries that have a comparative advantage and pursue public policy to support and expand of those industries. Expansion of export base industries brings about expansion of nonbasic industries through the “multiplier” or ripple effect.

Identifying a region’s export base is difficult because there is no publicly available data reporting trade flows for sub-State regions. However, these data are available in

regional input-output accounts created by IMPLAN. The top exports are shown in table 5-1. The number one export for the region was reported in IMPLAN sector 361 Household Cooking Equipment with a total export value of \$244.12 million.

Table 5-1. Top 10 Exports from North Tulsa.

| | IMPLAN Sector | Export Value \$M | Rank |
|-----|--------------------------------------|---------------------|------|
| 361 | Household Cooking Equipment | \$ 244.12 | 1 |
| 79 | Bread, Cake, and Related Products | \$ 76.27 | 2 |
| 80 | Cookies and Crackers | \$ 58.35 | 3 |
| 259 | Iron and Steel Foundries | \$ 55.96 | 4 |
| 284 | Fabricated Plate Work (Boiler Shops) | \$ 55.95 | 5 |
| 391 | Aircraft and Missile Equipment, | \$ 44.25 | 6 |
| 137 | Millwork | \$ 33.57 | 7 |
| 143 | Mobile Homes | \$ 33.47 | 8 |
| 386 | Motor Vehicle Parts and Accessories | \$ 30.87 | 9 |
| 75 | Blended and Prepared Flour | \$ 28.47 | 10 |

Import Substitution

As discussed earlier, economies are interconnected on many levels. Commodities produced in one region may use goods and services as inputs that were purchased outside the region. This is known as economic leakage, because money from sales must be sent out of the region to pay for imported goods and services. Therefore, import substitution refers to replacing imports with local production of necessary goods and services. By plugging economic leakages strengthens the ripple effects from a given export base industry.

Table 5-2 shows the top 10 imports for the North Tulsa region. The number one import is recorded in the Wholesale Trade sector (IMPLAN 447) with a total import value of \$79.58 million.

Table 5-2. Top 10 Imports to North Tulsa.

| | IMPLAN Sector | Import Value \$M | Rank |
|-----|---|---------------------|------|
| 447 | Wholesale Trade | \$ 79.58 | 1 |
| 254 | Blast Furnaces and Steel Mills | \$ 41.51 | 2 |
| 220 | Miscellaneous Plastics Products | \$ 34.67 | 3 |
| 469 | Advertising | \$ 24.59 | 4 |
| 443 | Electric Services | \$ 19.65 | 5 |
| 435 | Motor Freight Transport and Warehousing | \$ 18.81 | 6 |
| 456 | Banking | \$ 18.42 | 7 |
| 164 | Paperboard Containers and Boxes | \$ 17.82 | 8 |
| 72 | Flour and Other Grain Mill Products | \$ 13.81 | 9 |
| 134 | Sawmills and Planing Mills, General | \$ 13.23 | 10 |

Results of Further Analysis of Exports and Imports

Once top import and export sectors were identified, total employment, total employee compensation, compensation per direct employee and employment growth were calculated. Total employment is the total number of people employed directly by the initial industry, as well as those employed indirectly due to the multiplier effect. Total employee compensation is the total payroll for all persons employed directly by the initial industry, as well as those employed indirectly due to the multiplier effect. Direct compensation per employee is the average wage paid to each direct employee. Employment growth is the percentage change in the number of people employed in the United States from 1996 to 1997. A U.S. model was selected in order to insure that data would exist for all sectors.

The completed export and import models are shown in Table 5-3 and 5-4. Reading the tables across the first row, the first and second column identifies the IMPLAN sector by number and descriptive name. Column 3 displays the total value of exports or imports for each sector; likewise column 4 shows the numeric rank of the sector with respect to exports or imports. Columns 5, 6 and 7 discuss Total Employment. Column 5 shows the value of total employment. Column 6 shows the numeric rank (1 – 50). Column 7 calculates the weighted rank for total employment in each sector.

Table 5-3. Export Expansion Analysis Table.

| IMPLAN Description | Total Exports, \$M | | Total Employment | | | Total Employee Compensation, \$M | | | Compensation per Employee | | | Employment Growth | | | Overall Weighted Rank | |
|--|--------------------|------|------------------|------|----------|----------------------------------|------|----------|---------------------------|------|----------|-------------------|------|----------|-----------------------|----|
| | Value | Rank | Value | Rank | Weight 1 | Value | Rank | Weight 1 | Value | Rank | Weight 1 | Value | Rank | Weight 1 | | |
| 361 Household Cooking Equipment | \$ 244.12 | 1 | 1506 | 1 | 1 | \$ 71.77 | 1 | 1 | \$ 51,301.54 | 13 | 13 | 0.48% | 39 | 39 | 54 | 6 |
| 79 Bread, Cake, and Related Products | \$ 76.27 | 2 | 259 | 8 | 8 | \$ 11.69 | 8 | 8 | \$ 52,969.70 | 10 | 10 | 0.14% | 42 | 42 | 68 | 10 |
| 80 Cookies and Crackers | \$ 58.35 | 3 | 214 | 10 | 10 | \$ 6.92 | 10 | 10 | \$ 38,580.00 | 35 | 35 | -0.28% | 50 | 50 | 105 | 27 |
| 259 Iron and Steel Foundries | \$ 55.96 | 4 | 219 | 9 | 9 | \$ 10.13 | 9 | 9 | \$ 56,387.76 | 7 | 7 | 1.94% | 26 | 26 | 51 | 4 |
| 284 Fabricated Plate Work (Boiler Shops) | \$ 55.95 | 5 | 442 | 4 | 4 | \$ 17.11 | 3 | 3 | \$ 40,800.51 | 31 | 31 | 0.80% | 35 | 35 | 73 | 14 |
| 391 Aircraft and Missile Equipment, | \$ 44.25 | 6 | 271 | 7 | 7 | \$ 15.47 | 4 | 4 | \$ 69,158.42 | 4 | 4 | 14.62% | 2 | 2 | 17 | 1 |
| 137 Millwork | \$ 33.57 | 7 | 559 | 3 | 3 | \$ 13.09 | 6 | 6 | \$ 23,648.65 | 49 | 49 | 5.55% | 10 | 10 | 68 | 9 |
| 143 Mobile Homes | \$ 33.47 | 8 | 591 | 2 | 2 | \$ 13.67 | 5 | 5 | \$ 23,118.00 | 50 | 50 | 4.57% | 12 | 12 | 69 | 12 |
| 386 Motor Vehicle Parts and Accessories | \$ 30.87 | 9 | 91 | 13 | 13 | \$ 5.65 | 11 | 11 | \$ 78,305.08 | 1 | 1 | 1.78% | 28 | 28 | 53 | 5 |
| 75 Blended and Prepared Flour | \$ 28.47 | 10 | 80 | 16 | 16 | \$ 4.88 | 13 | 13 | \$ 73,174.60 | 3 | 3 | 0.55% | 37 | 37 | 69 | 13 |
| 354 Industrial Machines N.E.C. | \$ 25.09 | 11 | 367 | 5 | 5 | \$ 19.03 | 2 | 2 | \$ 54,744.12 | 8 | 8 | 7.35% | 3 | 3 | 18 | 2 |
| 385 Truck and Bus Bodies | \$ 24.02 | 12 | 284 | 6 | 6 | \$ 11.81 | 7 | 7 | \$ 45,000.00 | 23 | 23 | 5.71% | 7 | 7 | 43 | 3 |
| 290 Iron and Steel Forgings | \$ 19.29 | 13 | 76 | 18 | 18 | \$ 2.87 | 17 | 17 | \$ 41,563.64 | 28 | 28 | 2.63% | 21 | 21 | 84 | 20 |
| 101 Manufactured Ice | \$ 18.51 | 14 | 62 | 23 | 23 | \$ 2.08 | 24 | 24 | \$ 48,933.33 | 16 | 16 | 1.09% | 32 | 32 | 95 | 22 |
| 71 Frozen Specialties | \$ 18.34 | 15 | 73 | 19 | 19 | \$ 2.74 | 19 | 19 | \$ 40,571.43 | 32 | 32 | 0.54% | 38 | 38 | 108 | 29 |
| 403 Mechanical Measuring Devices | \$ 14.86 | 16 | 121 | 11 | 11 | \$ 5.09 | 12 | 12 | \$ 46,397.85 | 21 | 21 | 0.85% | 33 | 33 | 77 | 16 |
| 278 Hardware, N.E.C. | \$ 13.39 | 17 | 110 | 12 | 12 | \$ 4.21 | 14 | 14 | \$ 39,727.27 | 33 | 33 | 0.55% | 36 | 36 | 95 | 23 |
| 295 Plating and Polishing | \$ 11.56 | 18 | 81 | 15 | 15 | \$ 3.57 | 15 | 15 | \$ 47,728.57 | 19 | 19 | 3.04% | 18 | 18 | 67 | 8 |
| 123 Textile Goods, N.E.C. | \$ 10.07 | 19 | 50 | 25 | 25 | \$ 2.07 | 25 | 25 | \$ 49,289.47 | 15 | 15 | 6.17% | 4 | 4 | 69 | 11 |
| 282 Fabricated Structural Metal | \$ 8.95 | 20 | 63 | 22 | 22 | \$ 2.31 | 21 | 21 | \$ 42,760.00 | 26 | 26 | 3.89% | 15 | 15 | 84 | 19 |
| 78 Prepared Feeds, N.E.C. | \$ 8.80 | 21 | 13 | 47 | 47 | \$ 0.68 | 44 | 44 | \$ 62,500.00 | 5 | 5 | -0.70% | 50 | 50 | 146 | 44 |
| 313 Oil Field Machinery | \$ 8.07 | 22 | 44 | 28 | 28 | \$ 2.10 | 23 | 23 | \$ 51,972.22 | 12 | 12 | 15.39% | 1 | 1 | 64 | 7 |
| 285 Sheet Metal Work | \$ 7.45 | 23 | 70 | 21 | 21 | \$ 2.23 | 22 | 22 | \$ 32,953.85 | 42 | 42 | 4.15% | 13 | 13 | 98 | 25 |
| 200 Paints and Allied Products | \$ 7.37 | 24 | 15 | 45 | 45 | \$ 0.76 | 41 | 41 | \$ 59,636.36 | 6 | 6 | -0.37% | 50 | 50 | 142 | 39 |
| Construction Machinery and | | | | | | | | | | | | | | | | |
| 311 Equipment | \$ 7.34 | 25 | 45 | 27 | 27 | \$ 1.99 | 26 | 26 | \$ 47,789.47 | 18 | 18 | 1.59% | 31 | 31 | 102 | 26 |
| Special Dies and Tools and | | | | | | | | | | | | | | | | |
| 321 Accessories | \$ 6.75 | 26 | 78 | 17 | 17 | \$ 3.46 | 16 | 16 | \$ 47,723.08 | 20 | 20 | 1.95% | 25 | 25 | 78 | 17 |
| 334 Blowers and Fans | \$ 6.64 | 27 | 35 | 35 | 35 | \$ 1.63 | 30 | 30 | \$ 50,233.33 | 14 | 14 | 1.89% | 27 | 27 | 106 | 28 |
| 183 Bookbinding & Related | \$ 5.71 | 28 | 44 | 30 | 30 | \$ 1.42 | 35 | 35 | \$ 34,162.16 | 39 | 39 | 0.82% | 34 | 34 | 138 | 38 |

Table 5-3. Export Expansion Analysis Table.

| IMPLAN Description | Total Exports, \$M | | Total Employment | | | Total Employee Compensation, \$M | | | Compensation per Employee | | | Employment Growth | | | Overall Weighted Rank | |
|---|--------------------|------|------------------|------|--------|----------------------------------|------|--------|---------------------------|------|--------|-------------------|------|--------|-----------------------|------|
| | Value | Rank | Value | Rank | Weight | Value | Rank | Weight | Value | Rank | Weight | Value | Rank | Weight | Rank | Rank |
| 76 Wet Corn Milling | \$ 5.22 | 29 | 17 | 43 | 43 | \$ 0.55 | 47 | 47 | \$ 39,416.67 | 34 | 34 | 0.16% | 41 | 41 | 165 | 48 |
| Aircraft and Missile Engines and 390 Parts | \$ 5.19 | 30 | 36 | 34 | 34 | \$ 1.26 | 36 | 36 | \$ 36,200.00 | 37 | 37 | 3.99% | 14 | 14 | 121 | 33 |
| 197 Polishes and Sanitation Goods | \$ 4.80 | 31 | 25 | 40 | 40 | \$ 1.61 | 32 | 32 | \$ 76,050.00 | 2 | 2 | -2.65% | 50 | 50 | 124 | 36 |
| 147 Wood Products, N.E.C | \$ 4.75 | 32 | 25 | 39 | 39 | \$ 0.72 | 43 | 43 | \$ 30,210.53 | 46 | 46 | 1.65% | 30 | 30 | 158 | 47 |
| 184 Typesetting | \$ 4.59 | 33 | 48 | 26 | 26 | \$ 1.53 | 33 | 33 | \$ 33,261.90 | 41 | 41 | -2.97% | 50 | 50 | 150 | 46 |
| 235 Clay Refractories | \$ 4.04 | 34 | 51 | 24 | 24 | \$ 1.62 | 31 | 31 | \$ 33,422.22 | 40 | 40 | -2.80% | 50 | 50 | 145 | 42 |
| 429 Signs and Advertising Displays Hardwood Dimension and Flooring | \$ 3.79 | 35 | 88 | 14 | 14 | \$ 2.73 | 20 | 20 | \$ 32,024.69 | 43 | 43 | 3.77% | 16 | 16 | 93 | 21 |
| 135 Mills | \$ 3.73 | 36 | 29 | 38 | 38 | \$ 0.74 | 42 | 42 | \$ 26,720.00 | 48 | 48 | 2.46% | 22 | 22 | 150 | 45 |
| 199 Toilet Preparations | \$ 3.60 | 37 | 16 | 44 | 44 | \$ 0.77 | 40 | 40 | \$ 54,384.62 | 9 | 9 | 3.57% | 17 | 17 | 110 | 30 |
| 287 Prefabricated Metal Buildings | \$ 3.25 | 38 | 30 | 36 | 36 | \$ 1.12 | 37 | 37 | \$ 38,428.57 | 36 | 36 | 5.59% | 9 | 9 | 118 | 32 |
| 325 Metalworking Machinery, N.E.C. | \$ 3.07 | 39 | 37 | 33 | 33 | \$ 1.77 | 28 | 28 | \$ 52,066.67 | 11 | 11 | 5.32% | 11 | 11 | 83 | 18 |
| 271 Metal Heat Treating | \$ 3.02 | 40 | 72 | 20 | 20 | \$ 2.85 | 18 | 18 | \$ 40,835.82 | 30 | 30 | 5.71% | 8 | 8 | 76 | 15 |
| 103 Food Preparations, N.E.C | \$ 2.90 | 41 | 3 | 50 | 50 | \$ 0.08 | 50 | 50 | \$ 27,000.00 | 47 | 47 | -0.89% | 50 | 50 | 197 | 50 |
| 303 Pipe, Valves, and Pipe Fittings | \$ 2.82 | 42 | 44 | 29 | 29 | \$ 1.93 | 27 | 27 | \$ 48,361.11 | 17 | 17 | 2.20% | 24 | 24 | 97 | 24 |
| 179 Commercial Printing Apparel Made From Purchased | \$ 2.82 | 43 | 42 | 32 | 32 | \$ 1.43 | 34 | 34 | \$ 35,657.89 | 38 | 38 | 2.81% | 20 | 20 | 124 | 35 |
| 124 Materials | \$ 2.58 | 44 | 30 | 37 | 37 | \$ 0.81 | 38 | 38 | \$ 30,565.22 | 45 | 45 | -6.20% | 50 | 50 | 170 | 49 |
| 324 Welding Apparatus | \$ 2.52 | 45 | 20 | 42 | 42 | \$ 0.80 | 39 | 39 | \$ 42,882.35 | 25 | 25 | 0.46% | 40 | 40 | 146 | 43 |
| 157 Wood Partitions and Fixtures | \$ 2.40 | 46 | 15 | 46 | 46 | \$ 0.57 | 46 | 46 | \$ 44,818.18 | 24 | 24 | 5.93% | 6 | 6 | 122 | 34 |
| 432 Manufacturing Industries, N.E.C. | \$ 2.35 | 47 | 22 | 41 | 41 | \$ 0.67 | 45 | 45 | \$ 31,850.00 | 44 | 44 | 6.03% | 5 | 5 | 135 | 37 |
| 265 Aluminum Rolling and Drawing | \$ 2.19 | 48 | 8 | 49 | 49 | \$ 0.32 | 49 | 49 | \$ 45,500.00 | 22 | 22 | 2.38% | 23 | 23 | 143 | 40 |
| 220 Miscellaneous Plastics Products | \$ 2.09 | 49 | 13 | 48 | 48 | \$ 0.49 | 48 | 48 | \$ 41,363.64 | 29 | 29 | 2.96% | 19 | 19 | 144 | 41 |
| 251 Mineral Wool | \$ 2.00 | 50 | 42 | 31 | 31 | \$ 1.72 | 29 | 29 | \$ 42,150.00 | 27 | 27 | 1.71% | 29 | 29 | 116 | 31 |

Table 5-4. Import Substitution Analysis Table.

| IMPLAN Description | Total Imports, \$M | | Total Employment | | | Total Employee Compensation, \$M | | | Compensation per Employee | | | Employment Growth | | | Overall Weighted Rank | |
|---|--------------------|------|------------------|------|--------|----------------------------------|------|--------|---------------------------|------|--------|-------------------|------|--------|-----------------------|----|
| | Value | Rank | Value | Rank | Weight | Value | Rank | Weight | Value | Rank | Weight | Value | Rank | Weight | | |
| 447 Wholesale Trade | \$ 79.58 | 1 | 48 | 9 | 9 | \$ 1.03 | 6 | 6 | \$ 21,844.44 | 18 | 18 | 3.00% | 19 | 19 | 52 | 7 |
| 254 Blast Furnaces and Steel Mills | \$ 41.51 | 2 | 11 | 17 | 17 | \$ 0.49 | 12 | 12 | \$ 46,000.00 | 7 | 7 | -2.01% | 50 | 50 | 86 | 24 |
| 220 Miscellaneous Plastics Products | \$ 34.67 | 3 | 13 | 16 | 16 | \$ 0.49 | 13 | 13 | \$ 41,363.64 | 9 | 9 | 2.96% | 20 | 20 | 58 | 10 |
| 469 Advertising | \$ 24.59 | 4 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 5.14% | 12 | 12 | 162 | 34 |
| 443 Electric Services | \$ 19.65 | 5 | 0 | 28 | 28 | \$ 0.00 | 28 | 28 | \$ - | 50 | 50 | 0.52% | 40 | 40 | 146 | 29 |
| 435 Motor Freight Transport and Warehousing | \$ 18.81 | 6 | 23 | 11 | 11 | \$ 0.60 | 11 | 11 | \$ 26,952.38 | 14 | 14 | 6.68% | 9 | 9 | 45 | 4 |
| 456 Banking | \$ 18.42 | 7 | 14 | 14 | 14 | \$ 0.44 | 15 | 15 | \$ 32,076.92 | 13 | 13 | 1.54% | 36 | 36 | 78 | 20 |
| 164 Paperboard Containers and Boxes | \$ 17.82 | 8 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 1.72% | 34 | 34 | 184 | 41 |
| 72 Flour and Other Grain Mill Products | \$ 13.81 | 9 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | -3.76% | 50 | 50 | 200 | 50 |
| 134 Sawmills and Planing Mills, General | \$ 13.23 | 10 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 2.03% | 29 | 29 | 179 | 40 |
| 462 Real Estate | \$ 11.39 | 11 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 2.44% | 25 | 25 | 175 | 39 |
| 492 Hospitals | \$ 10.63 | 12 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 1.38% | 37 | 37 | 187 | 42 |
| 454 Eating & Drinking | \$ 10.24 | 13 | 54 | 7 | 7 | \$ 0.40 | 16 | 16 | \$ 7,250.00 | 25 | 25 | 2.46% | 24 | 24 | 72 | 14 |
| 294 Metal Stampings, N.E.C. | \$ 10.02 | 14 | 3 | 25 | 25 | \$ 0.12 | 24 | 24 | \$ 55,000.00 | 5 | 5 | 2.42% | 26 | 26 | 80 | 23 |
| 459 Insurance Carriers | \$ 9.84 | 15 | 0 | 29 | 29 | \$ 0.00 | 29 | 29 | \$ - | 50 | 50 | 1.99% | 31 | 31 | 139 | 28 |
| 490 Doctors and Dentists | \$ 9.55 | 16 | 6 | 22 | 22 | \$ 0.14 | 22 | 22 | \$ 25,400.00 | 15 | 15 | 3.88% | 15 | 15 | 74 | 17 |
| 391 Aircraft and Missile Equipment, | \$ 9.32 | 17 | 271 | 2 | 2 | \$ 15.47 | 2 | 2 | \$ 69,158.42 | 2 | 2 | 14.62% | 2 | 2 | 8 | 1 |
| 463 Hotels and Lodging Places | \$ 9.03 | 18 | 11 | 18 | 18 | \$ 0.19 | 19 | 19 | \$ 17,500.00 | 19 | 19 | 1.96% | 32 | 32 | 88 | 26 |
| 268 Aluminum Foundries | \$ 8.85 | 19 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 4.14% | 14 | 14 | 164 | 35 |
| 441 Communications, Except Radio and TV | \$ 8.69 | 20 | 10 | 19 | 19 | \$ 0.31 | 18 | 18 | \$ 36,125.00 | 12 | 12 | 11.88% | 4 | 4 | 53 | 8 |
| 444 Gas Production and Distribution | \$ 8.55 | 21 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | -13.00% | 50 | 50 | 200 | 50 |
| 210 Petroleum Refining | \$ 8.30 | 22 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | -2.83% | 50 | 50 | 200 | 50 |
| 56 Maintenance and Repair Other Facilities | \$ 8.05 | 23 | 83 | 5 | 5 | \$ 0.95 | 7 | 7 | \$ 10,818.18 | 22 | 22 | 3.40% | 17 | 17 | 51 | 6 |
| 475 Computer and Data Processing Services | \$ 7.73 | 24 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 14.82% | 1 | 1 | 151 | 30 |
| 81 Sugar | \$ 7.47 | 25 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | -1.57% | 50 | 50 | 200 | 50 |

Table 5-4. Import Substitution Analysis Table.

| IMPLAN Description | Total Imports, \$M | | Total Employment | | | Total Employee Compensation, \$M | | | Compensation per Employee | | | Employment Growth | | | Overall Weighted Rank | |
|--|--------------------|------|------------------|------|--------|----------------------------------|------|--------|---------------------------|------|--------|-------------------|------|--------|-----------------------|--------|
| | Value | Rank | Value | Rank | Weight | Value | Rank | Weight | Value | Rank | Weight | Value | Rank | Weight | Rank | Weight |
| 354 Industrial Machines N.E.C. | \$ 7.28 | 26 | 367 | 1 | 1 | \$ 19.03 | 1 | 1 | \$ 54,744.12 | 6 | 6 | 7.35% | 7 | 7 | 15 | 2 |
| 377 Semiconductors and Related Devices | \$ 6.89 | 27 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 8.31% | 5 | 5 | 155 | 32 |
| 267 Nonferrous Wire Drawing and Insulating | \$ 6.26 | 28 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 0.07% | 42 | 42 | 192 | 44 |
| 259 Iron and Steel Foundries | \$ 5.82 | 29 | 219 | 3 | 3 | \$ 10.13 | 3 | 3 | \$ 56,387.76 | 4 | 4 | 1.94% | 33 | 33 | 43 | 3 |
| 433 Railroads and Related Services | \$ 5.67 | 30 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | -1.14% | 50 | 50 | 200 | 50 |
| 265 Aluminum Rolling and Drawing | \$ 5.64 | 31 | 8 | 21 | 21 | \$ 0.32 | 17 | 17 | \$ 45,500.00 | 8 | 8 | 2.38% | 27 | 27 | 73 | 15 |
| 90 Shortening and Cooking Oils | \$ 5.63 | 32 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 3.34% | 18 | 18 | 168 | 37 |
| 378 Electronic Components, N.E.C. | \$ 5.51 | 33 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 5.15% | 11 | 11 | 161 | 33 |
| 384 Motor Vehicles | \$ 5.44 | 34 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 2.70% | 22 | 22 | 172 | 38 |
| 437 Air Transportation | \$ 5.38 | 35 | 30 | 10 | 10 | \$ 0.70 | 9 | 9 | \$ 23,857.14 | 16 | 16 | 2.10% | 28 | 28 | 63 | 11 |
| 494 Legal Services | \$ 5.35 | 36 | 2 | 26 | 26 | \$ 0.02 | 25 | 25 | \$ 7,000.00 | 26 | 26 | 2.01% | 30 | 30 | 107 | 27 |
| 474 Personnel Supply Services | \$ 5.28 | 37 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 12.56% | 3 | 3 | 153 | 31 |
| 167 Bags, Plastic | \$ 4.85 | 38 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 3.65% | 16 | 16 | 166 | 36 |
| 200 Paints and Allied Products | \$ 4.69 | 39 | 15 | 13 | 13 | \$ 0.76 | 8 | 8 | \$ 59,636.36 | 3 | 3 | -0.37% | 50 | 50 | 74 | 18 |
| 289 Screw Machine Products and Bolts, Etc. | \$ 4.59 | 40 | 4 | 23 | 23 | \$ 0.13 | 23 | 23 | \$ 37,666.67 | 11 | 11 | 2.71% | 21 | 21 | 78 | 19 |
| 414 Watches, Clocks, and Parts | \$ 4.48 | 41 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | -0.66% | 50 | 50 | 200 | 50 |
| 508 Management and Consulting Services | \$ 4.32 | 42 | 1 | 27 | 27 | \$ 0.02 | 26 | 26 | \$ 15,000.00 | 20 | 20 | 8.10% | 6 | 6 | 79 | 21 |
| 219 Fabricated Rubber Products, N.E.C. | \$ 4.30 | 43 | 18 | 12 | 12 | \$ 0.64 | 10 | 10 | \$ 38,312.50 | 10 | 10 | 0.38% | 41 | 41 | 73 | 16 |
| 507 Accounting, Auditing and Bookkeeping | \$ 4.29 | 44 | 3 | 24 | 24 | \$ 0.01 | 27 | 27 | \$ 3,666.67 | 27 | 27 | 5.50% | 10 | 10 | 88 | 25 |
| 166 Paper Coated & Laminated N.E.C. | \$ 4.25 | 45 | 0 | 50 | 50 | \$ - | 50 | 50 | \$ - | 50 | 50 | 0.56% | 38 | 38 | 188 | 43 |
| 455 Miscellaneous Retail | \$ 4.23 | 46 | 53 | 8 | 8 | \$ 0.48 | 14 | 14 | \$ 9,117.65 | 24 | 24 | 7.18% | 8 | 8 | 54 | 9 |
| 451 Automotive Dealers & Service Stations | \$ 4.22 | 47 | 13 | 15 | 15 | \$ 0.14 | 21 | 21 | \$ 11,083.33 | 21 | 21 | 2.69% | 23 | 23 | 80 | 22 |
| 479 Automobile Repair and Services | \$ 3.99 | 48 | 8 | 20 | 20 | \$ 0.18 | 20 | 20 | \$ 22,714.29 | 17 | 17 | 4.61% | 13 | 13 | 70 | 13 |
| 75 Blended and Prepared Flour | \$ 3.91 | 49 | 80 | 6 | 6 | \$ 4.88 | 4 | 4 | \$ 73,174.60 | 1 | 1 | 0.55% | 39 | 39 | 50 | 5 |
| 450 Food Stores | \$ 3.85 | 50 | 107 | 4 | 4 | \$ 1.13 | 5 | 5 | \$ 10,548.08 | 23 | 23 | 1.56% | 35 | 35 | 67 | 12 |

(1 to 50) rank of each sector within the top fifty sectors. The numeric rank is a number from 1 to 50 assigned to each sector based on total employment. The “weight” column is calculated by multiplying the rank for total employment by the weight factor (in this case weight = 1) for all sectors. For example, the number one sector based on total employment in the export table is Household Cooking Equipment with 1,506 total employees. Subsequent columns show “value”, “rank” and “weight” for “Total Employee Compensation, \$M”, “Compensation per Employee”, and “Employment Growth.” The final two columns discuss the overall weighted rank. Weighting factors are calculated by taking the sum of weighted rank for total employment, total employee compensation, compensation per employee, and employment growth. The spreadsheet is then sorted based on total weighted rank to put sectors in ascending order. Sectors are then numbered, 1 to 50, to show the overall numeric weighted rank for each sector in the final column. Since the spreadsheet is sorted in ascending order, the more desirable sectors will have lower weighted rank, indicating that they have more desirability. As an example, Household Cooking Equipment sector, IMPLAN 361, is ranked 6th overall based on a total weighted rank of 54 ($1+1+13+39=54$).

Based on the equally weighted ranking system, the number one export expansion sector is the Aircraft and Missile Equipment sector with a total weighted rank of 17. This is based on total employment rank of 7, total employee compensation rank of 4, compensation per employee rank of 4 and employment growth rank of 2. For the import substitution sectors, the number one sector is also Aircraft and Missile Equipment with a weighted rank of 8. The overall weighted rank is based on a total employment rank of 2,

total employee compensation rank of 2, compensation per employee rank of 2 and employment growth rank of 2.

Evaluation of Selected Sectors

There are many factors affecting growth of specific industries. Communities may wish to consider some of the specific data relative to each industry. It is important to also consider how well the community fits the requirements of the industry. The following market analysis discusses four selected industry groups: Household Cooking Equipment (IMPLAN 361); Mechanical Measuring Devices (IMPLAN 403); Processed Flour Products (IMPLAN 75, 79, and 80); and Aircraft and Missile Equipment (IMPLAN 391). Household cooking equipment was selected for further analysis because as the largest export sector, it has the largest total employment, 1506 persons, and the largest total employee compensation, \$71.77 M. Mechanical measuring devices were chosen based on the industry relationship to the oil industry and the presence of a new Honeywell plant in the region. Honeywell is one of the top six companies in this sector according to U.S. Industry & Trade Outlook (1999). The processed flour product industry, comprised of three related sectors, was selected because all three sectors are in the top ten for exports and account for a total of \$163 M in exports. Aircraft and Missile Equipment was chosen for further analysis primarily because it has the second largest growth rate for sectors in North Tulsa and is listed as one of the Oklahoma Department of Commerce's Targeted Industries for Oklahoma (2000).

The first step in understanding the potential of a sector for economic development efforts is to establish a complete definition of the sector. It is also important to analyze domestic production conditions. Finally consider the sector's potential in foreign markets.

This discussion is based on data available from iMarket, Inc., U.S. Industry and Trade Outlook and the International Trade Administration.

Results for Household Cooking Equipment

According to the Oklahoma Manufacturer's Directory (2000), Whirlpool directly employs 1,300 people at its Tulsa manufacturing plant. This plant produces free standing electric & gas ranges (IMPLAN 361, SIC 3631).

There is an estimated 226 establishments involved in this type of manufacturing in the U.S. On the aggregate, these firms employ a total of 27,475 people and report annual sales of \$9,521.7 million. Table 5-5 shows total sales of firms in the household cooking equipment sector based on company size. The highest annual sales are attributed to companies with 50 to 99 employees with \$8,311.60 M annual sales. On average each firm employs 124 people and produces \$55.7 million in annual sales. Firms are concentrated in Texas (14.6% of the firms) and California (12.4%) (Figure 5-1). Oklahoma has two firms producing within this sector (iMarket, Inc., 2000).

Figure 5-2 illustrates the gross inputs of the household cooking equipment sector in North Tulsa. Gross inputs for this sector include miscellaneous plastic products (\$21.02 M), fabricated metal (\$15.35 M), electrical equipment (\$15.26 M), and blast furnaces and steel mills (\$11.43 M).

Industry Definition

Household appliances (SIC 363) include household cooking equipment (SIC 3631; household electric and non-electric cooking equipment such as stoves, ranges, and ovens, including microwave and convection ovens); household refrigerators and home and farm freezers (SIC 3632); household laundry equipment (SIC 3633; laundry equipment such as

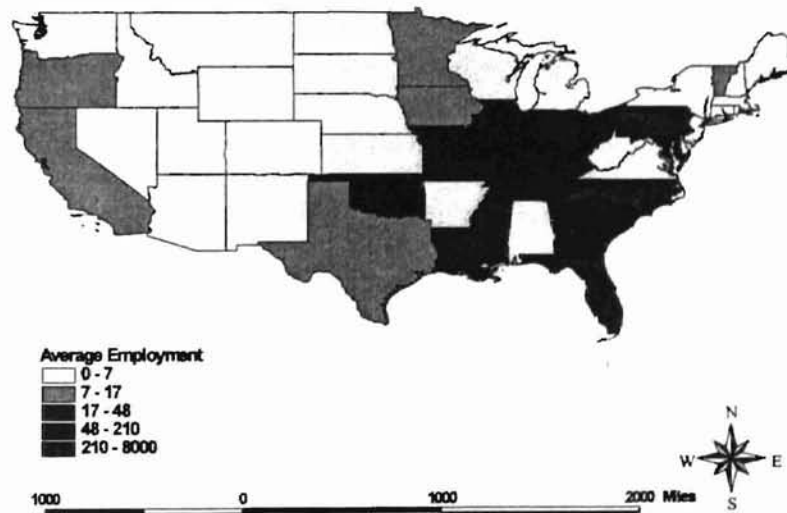
Table 5-5. Market Analysis by Company Size for Household Cooking Equipment.

| Num. of Employees | Num. of Bus. | % of Bus. | Total Emp. | Total Sales | Avg. Emp. | Avg. Sales |
|-------------------|--------------|------------|---------------|-----------------|------------|-------------|
| unknown | 5 | 2.2 | N/A | N/A | N/A | N/A |
| 1 | 34 | 15 | 34 | 3.3 | 1 | 0.1 |
| 2 to 4 | 76 | 33.6 | 205 | 466.2 | 3 | 6.6 |
| 5 to 9 | 29 | 12.8 | 168 | 23.8 | 6 | 1 |
| 10 to 24 | 25 | 11.1 | 399 | 61.6 | 16 | 2.8 |
| 25 to 49 | 12 | 5.3 | 386 | 43.8 | 32 | 4.9 |
| 50 to 99 | 15 | 6.6 | 997 | 8,311.60 | 66 | 1,038.90 |
| 100 to 249 | 13 | 5.8 | 1,813 | 82.8 | 139 | 16.6 |
| 250 to 499 | 6 | 2.7 | 2,115 | 78.6 | 353 | 39.3 |
| 500 to 999 | 4 | 1.8 | 2,670 | N/A | 668 | N/A |
| 1,000 to 2,499 | 6 | 2.7 | 10,688 | 450 | 1781 | 450 |
| 5,000 to 9,999 | 1 | 0.4 | 8,000 | N/A | 8000 | N/A |
| Total/Avg | 226 | 100 | 27,475 | 9,521.70 | 124 | 55.7 |

Note: Sales figures are in millions.

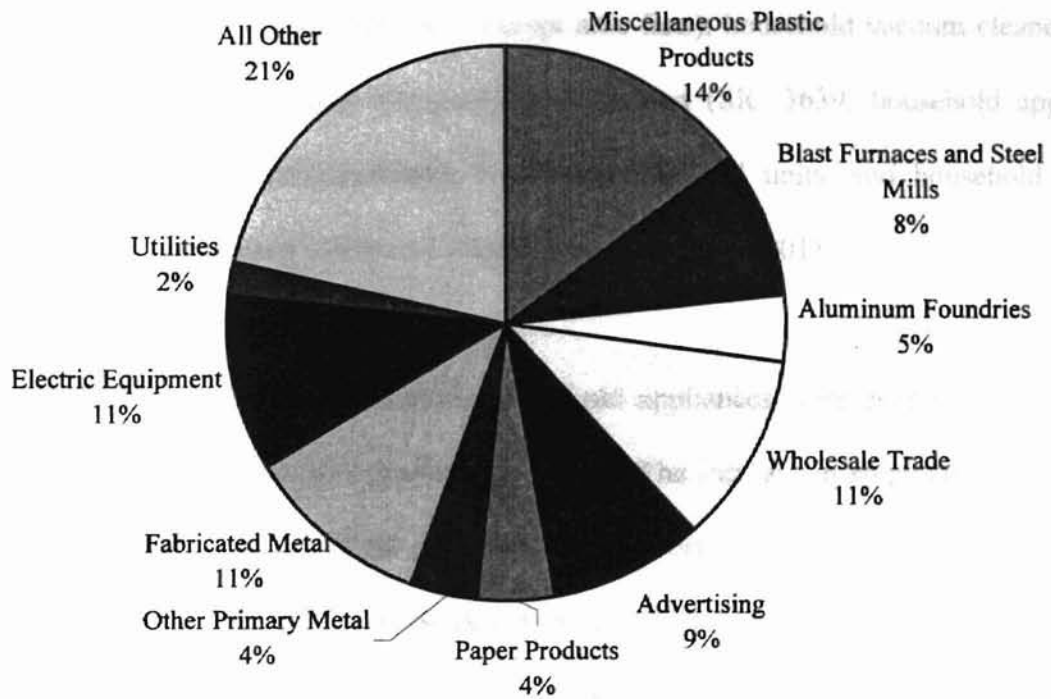
SOURCE: IMarket, Inc.

Figure 5-1. Household Cooking Equipment Sector by Average Employees.



SOURCE: IMarket, Inc.

Figure 5-2. Gross Inputs for Household Cooking Equipment (IMPLAN 361) based on an IMPLAN Model for North Tulsa.



SOURCE: IMPLAN

washing machines, dryers, and ironers, for household use, including coin-operated); electric housewares and fans (SIC 3634; electric housewares for heating, cooking, and other purposes, and electric household fans, except attic fans); household vacuum cleaners (SIC 3635); household appliances not elsewhere classified (SIC 3639; household appliances such as water heaters, dishwashers, food waste disposal units, and household sewing machines) (Occupational Safety and Health Administration, 2001).

Factors Affecting Future Industry Growth

In 2000, product shipments of household appliances were estimated to be \$2.77 billion, an increase of 0.14% percent from 1999. The increase in shipments reflected the continued strong economy of the past few years. Favorable factors included a high rate of housing starts, very low unemployment levels, and increased consumer confidence. Housing starts remained at high levels, declining slightly from 1.47 million in 1997 to an estimated 1.45 million in 1998. The housing industry benefited from low mortgage rates during 1998. During the first half of the year, mortgage rates were generally below 7.5 percent. Also favorable was the unemployment rate, which dropped to 4.3 percent early in the year, a 28-year low. Consumer confidence, as measured by the Conference Board, soared to a 30-year high in February 1998 when it reached 138.3. This was near the historical high of 142.3 hit in October 1968. The consumer confidence index remained near the February peak into the summer months.

Rapid globalization has characterized the appliance industry over the past decade. Appliance markets in developed countries are generally saturated and increasingly price competitive. As a result, there have been a number of acquisitions and mergers as companies try to increase in size in order to obtain a greater market share and a competitive

advantage through increased economies of scale. There has also been increase in international trade, as many countries have lowered their tariffs in recent years. While small appliances may be shipped economically over long distances, trade in the major appliances tends to be more regional. However, high-end major appliances often can also be profitably shipped longer distances.

In addition to increased foreign trade, there have been substantial increases in capital investments by appliance companies in foreign countries through many acquisitions and joint ventures. Investing companies are seeking low-cost sources of appliances or market share in rapidly expanding markets. A large portion of this investment has occurred in the former communist countries as well as in rapidly industrializing countries in Asia and Latin America.

U.S. appliance market has experienced pressure on prices. This has resulted from a sharp increase in imports led by soaring imports from the two largest foreign suppliers, China and Mexico. In addition, the Asian economic crisis fostered imports from several other Asian countries, such as South Korea and Japan, because of the weakness of their currencies in foreign exchange markets. Appliance producers in the United States saw their prices decline during the year due to pressure from increased imports (see Tables 5-6).

Severe competition has persuaded several companies to restructure, often resulting in major layoffs and plant closings. Black & Decker, a leading small appliance producer, exited the household appliance industry, selling its household products division to Windmere-Durable Holdings, Inc., in early 1998. Sunbeam Corporation, which had had sizeable layoffs to trim down costs, acquired Mr. Coffee, Coleman, and First Alert brands during the year and then continued to press costs from those operations.

TABLE 5-6: Household Appliances (SIC 363) Trends and Forecasts.
(millions of dollars except as noted)

| | 1996 | 1997 ¹ | 1998 ² | 1999 ³ | Percent Change | | | |
|-----------------------------------|--------|-------------------|-------------------|-------------------|----------------|-------|-------|--------------------|
| | | | | | 96-97 | 97-98 | 98-99 | 92-96 ⁴ |
| Industry data | | | | | | | | |
| Value of shipments | 22,157 | 22,108 | 22,086 | 22,288 | -0.2 | -0.1 | 0.9 | 4.4 |
| 3631 Household cooking equipment | 3,565 | 3,631 | 3,649 | 3,684 | 1.9 | 0.5 | 1.0 | 4.8 |
| 3632 Household refrigerators | 5,605 | 5,414 | 5,385 | 5,465 | -3.4 | -0.5 | 1.5 | 7.3 |
| 3633 Household laundry equipment | 4,233 | 4,269 | 4,290 | 4,351 | 0.9 | 0.5 | 1.4 | 6.2 |
| 3634 Electric housewares and fans | 3,032 | 2,898 | 2,760 | 2,707 | -4.4 | -4.8 | -1.9 | 1.1 |
| 3635 Household vacuums | 2,425 | 2,316 | 2,277 | 2,300 | -4.5 | -1.7 | 1.0 | 6.2 |
| 3639 Home appliances nec | 3,297 | 3,580 | 3,725 | 3,781 | 8.6 | 4.1 | 1.5 | -0.2 |
| Value of shipments (1992\$) | 21,717 | 22,000 | 22,437 | 22,640 | 1.3 | 2.0 | 0.9 | 3.9 |
| 3631 Household cooking equipment | 3,481 | 3,580 | 3,690 | 3,725 | 2.8 | 3.1 | 0.9 | 4.2 |
| 3632 Household refrigerators | 5,538 | 5,530 | 5,730 | 5,815 | -0.1 | 3.6 | 1.5 | 7.0 |
| 3633 Household laundry equipment | 4,258 | 4,430 | 4,585 | 4,650 | 4.0 | 3.5 | 1.4 | 6.3 |
| 3634 Electric housewares and fans | 3,066 | 3,000 | 2,875 | 2,820 | -2.2 | -4.2 | -1.9 | 1.4 |
| 3635 Household vacuums | 2,303 | 2,235 | 2,257 | 2,280 | -3.0 | 1.0 | 1.0 | 4.9 |
| 3639 Home appliances nec | 3,070 | 3,225 | 3,300 | 3,350 | 5.0 | 2.3 | 1.5 | -1.9 |
| Total employment (thousands) | 108 | 104 | | | -3.7 | | | 1.2 |
| Production workers (thousands) | 87 | 82.2 | | | -5.5 | | | 1.1 |
| Average hourly earnings (\$) | 12.81 | 13.02 | | | 1.6 | | | 3.1 |
| Capital expenditures | 721 | | | | | | | 6.7 |
| Product data | | | | | | | | |
| Value of shipments ⁵ | 20,581 | 20,532 | 20,492 | 20,676 | -0.2 | -0.2 | 0.9 | 5.2 |
| 3631 Household cooking equipment | 3,766 | 3,834 | 3,832 | 3,872 | 1.8 | -0.1 | 1.0 | 5.8 |
| 3632 Household refrigerators | 5,356 | 5,174 | 5,141 | 5,216 | -3.4 | -0.6 | 1.5 | 7.3 |
| 3633 Household laundry equipment | 3,699 | 3,729 | 3,747 | 3,803 | 0.8 | 0.5 | 1.5 | 5.4 |
| 3634 Electric housewares and fans | 2,501 | 2,391 | 2,280 | 2,232 | -4.4 | -4.6 | -2.1 | -1.5 |
| 3635 Household vacuums | 2,341 | 2,233 | 2,194 | 2,204 | -4.6 | -1.7 | 0.5 | 6.7 |
| 3639 Home appliances nec | 2,919 | 3,171 | 3,298 | 3,349 | 8.6 | 4.0 | 1.5 | 6.4 |
| Value of shipments (1992\$) | 20,160 | 20,420 | 20,820 | 21,005 | 1.3 | 2.0 | 0.9 | 4.7 |
| 3631 Household cooking equipment | 3,677 | 3,780 | 3,875 | 3,915 | 2.8 | 2.5 | 1.0 | 5.2 |
| 3632 Household refrigerators | 5,292 | 5,285 | 5,470 | 5,550 | -0.1 | 3.5 | 1.5 | 6.9 |
| 3633 Household laundry equipment | 3,721 | 3,870 | 4,005 | 4,065 | 4.0 | 3.5 | 1.5 | 5.6 |
| 3634 Electric housewares and fans | 2,529 | 2,475 | 2,375 | 2,325 | -2.1 | -4.0 | -2.1 | -1.2 |
| 3635 Household vacuums | 2,223 | 2,155 | 2,175 | 2,185 | -3.1 | 0.9 | 0.5 | 5.3 |
| 3639 Home appliances nec | 2,717 | 2,855 | 2,920 | 2,965 | 5.1 | 2.3 | 1.5 | 4.5 |
| Trade data | | | | | | | | |
| Value of imports | 5,444 | 5,764 | 7,138 | | 5.9 | 23.8 | | 5.9 |
| Value of exports | 2,791 | 2,958 | 3,150 | | 6.0 | 6.5 | | 4.9 |

1 Estimate except imports and exports.

2 Estimate.

3 Forecast.

4 Compound annual rate.

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration.

Small appliance producers were not the only companies to go through restructuring. In mid-1997, Raytheon commenced leaving the business when it sold its Amana home appliance business to Goodman Holding Company. This was followed by the sale of its Speed Queen laundry equipment company to Bain Capital Inc. Meanwhile, A.B. Electrolux of Sweden was closing its Frigidaire headquarters in Dublin, Ohio, after that division was combined with the lawn products divisions. Augusta, Georgia is the combined headquarters. This was part of a continuing global restructuring by Electrolux which will eliminate 12,000 jobs. Whirlpool is also going through a restructuring, they will cut 7,900 positions worldwide and terminate two of its four joint ventures in China. However, Whirlpool was moving ahead with expansion in Brazil as it completed the purchase of a majority voting interest in Brasmotor S.A., a holding company that controls Multibras S.A., the largest appliance company in Latin America. Whirlpool has had an interest in these two Brazilian companies for a number of years.

Global Market Prospects

Appliance imports and exports increased approximately 6 percent from 1996 to 1997. Imports increased to \$5.8 billion and appliance exports to \$3.0 billion. Leading foreign appliance suppliers to the United States were, in descending order, China, Mexico, Canada, Taiwan, and South Korea (Table 5-7). The top five suppliers accounted for 66 percent of total imports. The three leaders have significantly enlarged their share of imports in recent years. Mexico and Canada are benefiting from the persistent shift of their appliance industries with that of the United States because of NAFTA and the U.S.-Canada Free Trade Agreement. They also take advantage of their proximity to the United States. China is also quite competitive because of its low labor rates.

Table 5-7. Top 25 U.S. Import Sources of Household Appliances *Canada, Mexico, the SIC 363, Customs Value, U.S. Imports For Consumption, \$1,000*

| Country | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 1999 YTD | 2000 YTD | Percent Change |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|-------------------|
| China | 1,360,318 | 1,529,164 | 1,709,515 | 1,865,219 | 2,313,958 | 2,853,768 | 2,313,958 | 2,853,768 | 23.30% |
| Mexico | 958,746 | 1,093,012 | 1,193,790 | 1,333,550 | 1,454,015 | 1,652,300 | 1,454,015 | 1,652,300 | 13.60% |
| Canada | 386,182 | 439,339 | 496,678 | 574,395 | 670,196 | 728,196 | 670,196 | 728,196 | 8.70% |
| Korea | 474,397 | 442,751 | 420,750 | 521,332 | 612,712 | 636,537 | 612,712 | 636,537 | 3.90% |
| Taiwan | 464,379 | 430,808 | 433,060 | 438,699 | 453,720 | 395,135 | 453,720 | 395,135 | -12.90% |
| Thailand | 176,227 | 210,087 | 183,701 | 228,893 | 222,687 | 285,781 | 222,687 | 285,781 | 28.30% |
| Germany | 223,538 | 240,710 | 271,619 | 312,425 | 285,730 | 260,365 | 285,730 | 260,365 | -8.90% |
| Sweden | 120,181 | 135,336 | 140,063 | 152,922 | 184,808 | 181,390 | 184,808 | 181,390 | -1.80% |
| Italy | 84,178 | 87,859 | 95,399 | 114,428 | 131,622 | 155,612 | 131,622 | 155,612 | 18.20% |
| Netherlands | 98,605 | 114,049 | 109,444 | 120,906 | 135,595 | 143,600 | 135,595 | 143,600 | 5.90% |
| Japan | 184,064 | 156,213 | 149,832 | 142,925 | 136,132 | 141,244 | 136,132 | 141,244 | 3.80% |
| Malaysia | 82,890 | 100,718 | 90,983 | 92,738 | 72,974 | 96,960 | 72,974 | 96,960 | 32.90% |
| Switzerland | 55,764 | 51,477 | 52,965 | 60,562 | 49,232 | 62,960 | 49,232 | 62,960 | 27.90% |
| France | 43,381 | 50,014 | 43,125 | 41,436 | 49,696 | 58,280 | 49,696 | 58,280 | 17.30% |
| Hong Kong | 54,126 | 47,072 | 45,469 | 58,742 | 74,156 | 57,917 | 74,156 | 57,917 | -21.90% |
| United Kingdom | 75,060 | 68,507 | 65,331 | 59,473 | 59,352 | 55,996 | 59,352 | 55,996 | -5.70% |
| Singapore | 71,486 | 74,283 | 61,632 | 81,021 | 68,550 | 52,857 | 68,550 | 52,857 | -22.90% |
| Costa Rica | 52,341 | 50,317 | 54,602 | 53,641 | 60,458 | 52,240 | 60,458 | 52,240 | -13.60% |
| Spain | 21,534 | 14,328 | 11,700 | 17,748 | 13,097 | 38,326 | 13,097 | 38,326 | 192.60% |
| Indonesia | 33,385 | 28,107 | 38,562 | 45,316 | 36,398 | 31,216 | 36,398 | 31,216 | -14.20% |
| Brazil | 37,907 | 31,606 | 26,747 | 21,966 | 20,979 | 30,496 | 20,979 | 30,496 | 45.40% |
| Slovenia | 11,968 | 11,755 | 11,575 | 14,362 | 15,048 | 16,270 | 15,048 | 16,270 | 8.10% |
| New Zealand | 379 | 445 | 767 | 5,172 | 14,359 | 16,054 | 14,359 | 16,054 | 11.80% |
| Australia | 7,666 | 7,219 | 10,857 | 9,684 | 12,759 | 14,583 | 12,759 | 14,583 | 14.30% |
| Portugal | 12,671 | 14,017 | 10,528 | 10,110 | 7,159 | 12,963 | 7,159 | 12,963 | 81.10% |
| Subtotal : | 5,091,373 | 5,429,192 | 5,728,692 | 6,377,669 | 7,155,392 | 8,031,046 | 7,155,392 | 8,031,046 | 12.20% |
| All Other: | 81,071 | 75,007 | 76,014 | 82,885 | 83,403 | 66,664 | 83,403 | 66,664 | -20.10% |
| Total | 5,172,444 | 5,504,199 | 5,804,706 | 6,460,554 | 7,238,794 | 8,097,710 | 7,238,794 | 8,097,710 | 11.90% |

Source: U.S. Department of Commerce, Bureau of the Census.

Leading export markets for U.S. appliances in 1997 were Canada, Mexico, the United Kingdom, Japan, and South Korea. These countries accounted for more than half of all U.S. exports. In 1998, exports were expected to increase at approximately 6.5 percent, as in 1997. However, imports were expected to increase at a much faster rate, over 23 percent; a major cause was the strength of the U.S. dollar on foreign exchange markets. Most of this strength was in comparison to certain Asian currencies following the economic crises in several countries that began when Thailand devalued its currency in 1997. While several Asian countries whose currencies were substantially affected by the crisis were expected to record sharp increases in appliance shipments to the United States during the year, so were China and Mexico. Although the currencies of China and Mexico were relatively strong during the year, both countries were expected to record 1998 appliance shipments to the United States increasing at a much higher rate than they had in recent years (United States Industry & Trade Outlook, 1999).

Results for Mechanical Measuring Devices

Over 100 people are employed in the manufacturing of measuring and controlling instruments in Tulsa. These five firms produce equipment for use in oil field work.

Table 5-8. Tulsa Companies producing Mechanical Measuring Devices.

| Company | Number of Employees | Products |
|------------------------------|---------------------|--|
| Century Geophysical Corp | 55 | Scientific & surveying instruments |
| Cement Test Equipment Inc | 10 | Oil well cement testing instruments |
| Crane Manufacturing Inc | 20 | Oil & gas measuring equipment |
| Barrett Performance Aircraft | 7 | Aircraft parts & equipment, welding & engineering test cells |
| Temco | 12 | Laboratory test equipment for oil industry |

These establishments are primarily engaged in manufacturing measuring and controlling devices, not elsewhere classified, including meteorological instruments. This sector also

Table 5-9. Market Analysis by Company Size for Mechanical Measuring Devices.

| Num. of Employees | Num. of Bus. | % of Bus. | Total Emp. | Total Sales | Avg. Emp. | Avg. Sales |
|-------------------|--------------|-----------|------------|-------------|-----------|------------|
| unknown | 331 | 12.1 | N/A | 9.6 | N/A | 0.2 |
| 1 | 432 | 15.8 | 432 | 202.5 | 1 | 0.7 |
| 2 to 4 | 634 | 23.2 | 1,733 | 200.4 | 3 | 0.4 |
| 5 to 9 | 459 | 16.8 | 2,912 | 5,447.50 | 6 | 14.1 |
| 10 to 24 | 433 | 15.9 | 6,468 | 891.8 | 15 | 2.5 |
| 25 to 49 | 195 | 7.2 | 6,553 | 778.8 | 34 | 5 |
| 50 to 99 | 120 | 4.4 | 8,237 | 1,321.30 | 69 | 12.6 |
| 100 to 249 | 85 | 3.1 | 12,634 | 1,946.20 | 149 | 32.4 |
| 250 to 499 | 23 | 0.8 | 8,025 | 1,263.00 | 349 | 114.8 |
| 500 to 999 | 11 | 0.4 | 7,354 | 887.6 | 669 | 147.9 |
| 1,000 to 2,499 | 4 | 0.1 | 4,882 | 643.9 | 1221 | 214.6 |
| Total/Avg | 2,727 | 100 | 59,230 | 13,592.70 | 25 | 7.1 |

Note: Sales figures are in millions.

SOURCE: IMarket, Inc.

includes physical properties testing equipment, nuclear radiation detection and monitoring instrumentation, aircraft engine instruments (except flight), and liquid-in-glass and bimetal thermometers and surveying and drafting instruments.

There is an estimated 2,727 establishments involved in this type of manufacturing in the U.S. On average each firm employs 25 people and produces \$7.1 million in annual sales. On the aggregate, these firms employ a total of 59,230 people and report total annual sales of \$13,592.7 million. Table 5-9 shows a breakdown of firms by company size. Firms with 5 to 9 employees account for 40% of the total sales, \$5,447.50 M.

Firms are concentrated in California (14.8%). Oklahoma has 23 firms producing within this sector. Geographic distribution by average number of employees per firm is shown in Figure 5-3. Figure 5-4 displays the gross inputs for the mechanical measuring devices sectors in North Tulsa.

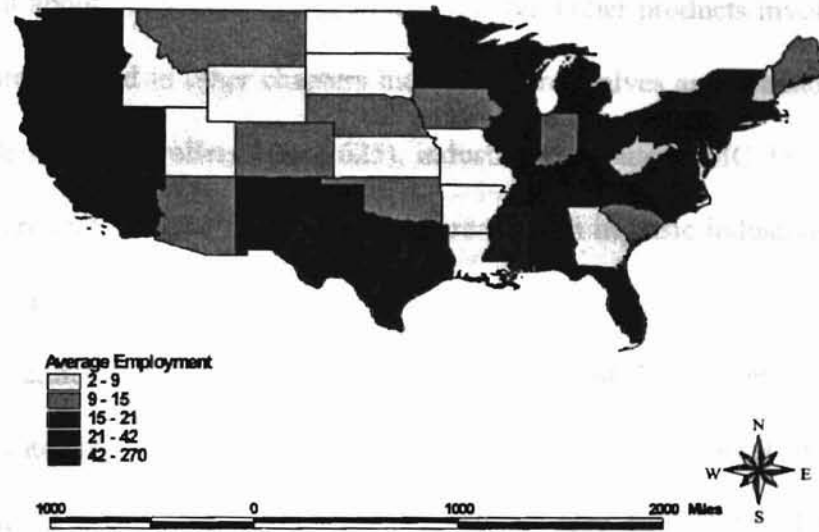
Industry Definition

The measuring and controlling instruments (SIC 3822, 3823, 3824, 3829) industry includes the process control instruments, building and appliance controls, motor vehicle instruments, integrating and fluid meters and counters, commercial and meteorological instruments, physical properties testing instruments, aircraft engine instruments, nuclear radiation instruments, and surveying and drafting instruments markets. (Occupational Safety and Health Administration, 2001)

Factors Affecting Future Industry Growth

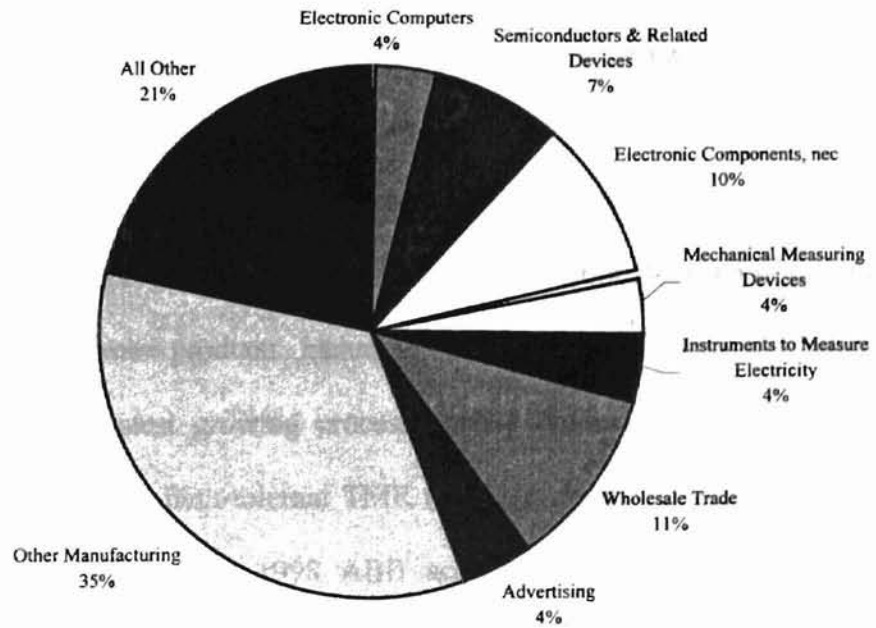
In 1999 exports are expected to account for 33 percent of total product shipments. The process control instrument (PCI) market accounted for over 17 percent of total I&AI product shipments in 1998. The primary economic driver of this market is industrial capital

Figure 5-3. Mechanical Measuring Devices Sector by Average Number of Employees.



SOURCE: IMarket, Inc.

Figure 5-4. Gross Inputs for Mechanical Measuring Devices (IMPLAN 403) based on an IMPLAN Model for North Tulsa.



spending on plant and equipment, particularly in the nondurable goods and electric and gas utilities sectors. The worldwide PCI market in 1999 is projected to reach over \$32 billion. PCIs represent about 70 percent of this overall market. Other products involved in process control that are covered in other chapters include control valves and actuators (SIC 3491), programmable logic controllers (SIC 3625), industrial computers (SIC 3571), and process control software (SIC 7372). This geographic area is rich in basic industrial development, the principal market for these products.

The chemical process industries account for almost 70 percent of these markets. The United States represents about 33 percent of the worldwide market, with Europe and Japan at about 31 percent and 11 percent, respectively (see Table 5-8). The predominant specific products within the PCI total include: distributed control systems, multifunction process computers, process analytical instruments, differential pressure transmitters, temperature sensors and mass flowmeters.

By function, PCI products can be broken down into measurement and display systems (60 percent) and controllers and control systems (40 percent). Industrial process controllers are making significant inroads into process control systems markets, replacing the distributed control systems and programmable logic controllers traditionally used in those applications. Process control software products, including basic operating systems and advanced control packages, are the fastest growing process control product sector. Industrial safety and shutdown systems with fault-tolerant TMR (triple modular redundant) architecture are an important related market. In 1998 ABB acquired August Systems (Crawley, United Kingdom), a leading industrial safety system manufacturer, for \$16 million. Siebe Control

Table 5-10: U.S. Trade Patterns in Measuring and Controlling Instruments¹ in 1997.

(millions of dollars; percent)

| Exports | | | Imports | | |
|-----------------------------|--------------------|----------|-----------------------------|--------------------|----------|
| Region | Value ² | Share, % | Region | Value ² | Share, % |
| NAFTA | 2,583 | 40.5 | NAFTA | 1,829 | 42.4 |
| Latin America | 358 | 5.6 | Latin America | 73 | 1.7 |
| Western Europe | 1,461 | 22.9 | Western Europe | 1,158 | 26.9 |
| Japan/Chinese Economic Area | 808 | 12.7 | Japan/Chinese Economic Area | 968 | 22.5 |
| Other Asia | 692 | 10.8 | Other Asia | 223 | 5.2 |
| Rest of world | 481 | 7.5 | Rest of world | 58 | 1.3 |
| World | 6,383 | 100.0 | World | 4,309 | 100.0 |
| Top Five Countries | | | Top Five Countries | | |
| | Value | Share, % | | Value | Share, % |
| Canada | 1,840 | 28.8 | Mexico | 1,387 | 32.2 |
| Mexico | 743 | 11.6 | Japan | 686 | 15.9 |
| Japan | 452 | 7.1 | Canada | 442 | 10.3 |
| United Kingdom | 354 | 5.5 | United Kingdom | 344 | 8.0 |
| Germany | 352 | 5.5 | Germany | 302 | 7.0 |

1 SIC 3822, 3823, 3824, 3829.

2 Values may not sum to total due to rounding.

Source: U.S. Department of Commerce, Bureau of the Census.

Systems, Honeywell, and other PCI manufacturers already have units that are active in this specialty (United States Industry & Trade Outlook, 1999).

Global Market Prospects

The top six PCI suppliers worldwide according to *Control Magazine* (December 1997) are ABB (Switzerland), Honeywell (United States), Emerson Electric (United States), Siebe (United Kingdom), Elsag Bailey (the Netherlands), and Yokogawa (Japan), with a combined share of about 45 percent of the worldwide market. The top 12 suppliers (worldwide PCI revenues of \$0.5 billion or higher) account for about 60 percent of the market. At least 300 firms worldwide produce PCI products, and about half those firms are active in the United States.

In mid-1998, Elsag Bailey's controlling shareholder (Finmeccanica- Italy) announced its intention to divest. Eurotherm plc is an important industrial instrumentation firm with a strong position in temperature controls. Net exports of PCI products in 1997 accounted for about 17 percent of overall net exports of I&AI products (United States Industry & Trade Outlook, 1999).

Results for Processed Flour Products

North Tulsa has four firms engaged in producing in either blended and prepared flour, bread, cake, and related products or cookies and crackers. These firms employ 473 people.

Table 5-11. Tulsa Companies Producing Processed Flour Products.

| Company Name | Number of Employees | Product Description |
|-------------------|---------------------|---------------------|
| Bama Foods Ltd | 175 | Biscuits |
| Nonni's Food Co | 150 | Cookies |
| Bama Frozen Dough | 125 | Frozen dough |
| Ann's Bakery Inc | 23 | Bakery products |

Industry Definition

The blended and prepared flour sector (IMPLAN 75) includes establishments primarily engaged in preparing flour mixes or doughs from purchased flour. There are 208 firms in the U.S. producing prepared flour mixes and doughs (Occupational Safety and Health Administration, 2001). On average, each firm employs 60 people. The industry as a whole, employs 12,145 people and reports annual sales of \$3,031.1 million (iMarket, Inc., 2001).

IMPLAN classifies bread, cake, and related products (IMPLAN 79) as establishments primarily engaged in manufacturing fresh or frozen bread and bread-type rolls and fresh cakes, pies, pastries and other similar “perishable” bakery products, as well as, establishments primarily engaged in manufacturing fresh cookies, crackers, pretzels, and similar “dry” bakery products (Occupational Safety and Health Administration, 2001). There are 5,140 establishments producing bread, cake, and related products in the U.S. Each establishment employs 38 people and sells \$9.0 million worth of product. Overall, the bread, cake and related products industry employs 158,489 people and produces \$26,985.1 million in product sales (iMarket, Inc., 2001).

The “Cookies and Crackers (IMPLAN 80)” represents establishments primarily engaged in manufacturing frozen bakery products, except bread and bread-type rolls (Occupational Safety and Health Administration, 2001). There are 1,151 companies involved in the production of cookies and crackers in the United States. On average each establishment employs 46 people and records \$39.1 million in annual sales. Total number of people employed in this industry is 42,364 and total sales amount to \$27,354.1 million (iMarket, Inc., 2001).

Table 5-12, 5-13 and 5-14 compare company size for the three processed flour products sectors in North Tulsa: Blended and Prepared Flour (IMPLAN 75); Bread, Cake, and Related Products (IMPLAN 79); & Cookies and Crackers (IMPLAN 80). IMPLAN Sector 79 is the largest of the three with 5,140 firms producing \$26,985.10 M in annual sales and employing 158,489 people in the U.S.

Figures 5-5, 5-7 and 5-9 shows the geographic distribution of firms in the three processed flour products industries by average size, larger firms are located in the fertile Corn Belt region and toward the south. Oklahoma has several large firms producing cookies and crackers with an average employment of 174 people.

Figures 5-6, 5-8 and 5-10 illustrate the production function of firms in each sector in North Tulsa. Major input purchases include: wholesale trade, paper products, grains, flour, sugar and oils.

Results for Aerospace

There are 1,929 U.S. establishments producing aircraft parts and equipment. Each plant employs an average of 81 people and sells \$15.6 million worth of product. Industry wide there is 145,174 employees and sales of \$22,823.9 million. The largest firms are located in Colorado, North Dakota, Kansas, Pennsylvania, Oregon and Maryland. Oklahoma has 45 businesses involved in the aerospace industry with total sales \$297.4 M of and total employment of 3,609 (See Figure 5-11).

Table 5-15. Tulsa Companies Producing Aircraft and Missile Equipment (IMPLAN 391).

| Company Name | Number of Employees | Product Description |
|------------------------------|---------------------|--|
| AEROARC Inc | 103 | Aircraft parts |
| Pryer Machine & Tool Co Inc | 97 | Custom aircraft parts |
| Barrett Performance Aircraft | 7 | Aircraft parts & equipment, welding & engineering test cells |

Table 5-12. Market Analysis by Company Size for Blended and Prepared Flour (IMPLAN 75).

| Num. of Employees | Num. of Bus. | % of Bus. | Total Emp. | Total Sales | Avg. Emp. | Avg. Sales |
|-------------------|--------------|------------|---------------|-----------------|-----------|-------------|
| unknown | 5 | 2.4 | N/A | N/A | N/A | N/A |
| 1 | 14 | 6.7 | 14 | 2 | 1 | 0.2 |
| 2 to 4 | 47 | 22.6 | 128 | 662.8 | 3 | 14.1 |
| 5 to 9 | 29 | 13.9 | 193 | 23 | 7 | 0.9 |
| 10 to 24 | 38 | 18.3 | 599 | 101.1 | 16 | 3.1 |
| 25 to 49 | 24 | 11.5 | 771 | 65 | 32 | 4.6 |
| 50 to 99 | 12 | 5.8 | 867 | 44.2 | 72 | 11.1 |
| 100 to 249 | 32 | 15.4 | 4,695 | 2,127.00 | 147 | 132.9 |
| 250 to 499 | 4 | 1.9 | 1,278 | N/A | 320 | N/A |
| 500 to 999 | 1 | 0.5 | 500 | N/A | 500 | N/A |
| 1,000 to 2,499 | 2 | 1 | 3,100 | 6 | 1550 | 6 |
| Total/Avg | 208 | 100 | 12,145 | 3,031.10 | 60 | 20.2 |

Note: Sales figures are in millions.

SOURCE: IMarket, Inc.

Table 5-13. Market Analysis by Company Size for Bread, Cake and Related Products (IMPLAN 79).

| Num. of Employees | Num. of Bus. | % of Bus. | Total Emp. | Total Sales | Avg. Emp. | Avg. Sales |
|-------------------|--------------|------------|----------------|------------------|-----------|------------|
| unknown | 956 | 18.6 | N/A | 36.8 | N/A | 0.3 |
| 1 | 447 | 8.7 | 447 | 93.1 | 1 | 0.3 |
| 2 to 4 | 1,025 | 19.9 | 2,897 | 3,172.00 | 3 | 4.1 |
| 5 to 9 | 771 | 15 | 4,960 | 1,161.80 | 6 | 2.1 |
| 10 to 24 | 934 | 18.2 | 13,605 | 696.6 | 15 | 1.1 |
| 25 to 49 | 403 | 7.8 | 13,499 | 1,145.80 | 33 | 4.2 |
| 50 to 99 | 209 | 4.1 | 13,849 | 1,009.80 | 66 | 8 |
| 100 to 249 | 243 | 4.7 | 35,553 | 13,122.00 | 146 | 116.1 |
| 250 to 499 | 97 | 1.9 | 32,497 | 3,602.10 | 335 | 112.6 |
| 500 to 999 | 47 | 0.9 | 29,740 | 1,702.20 | 633 | 154.7 |
| 1,000 to 2,499 | 7 | 0.1 | 8,050 | 383 | 1150 | 191.5 |
| 2,500 to 4,999 | 1 | 0 | 3,392 | 860 | 3392 | 860 |
| Total/Avg | 5,140 | 100 | 158,489 | 26,985.10 | 38 | 9 |

SOURCE: IMarket, Inc.

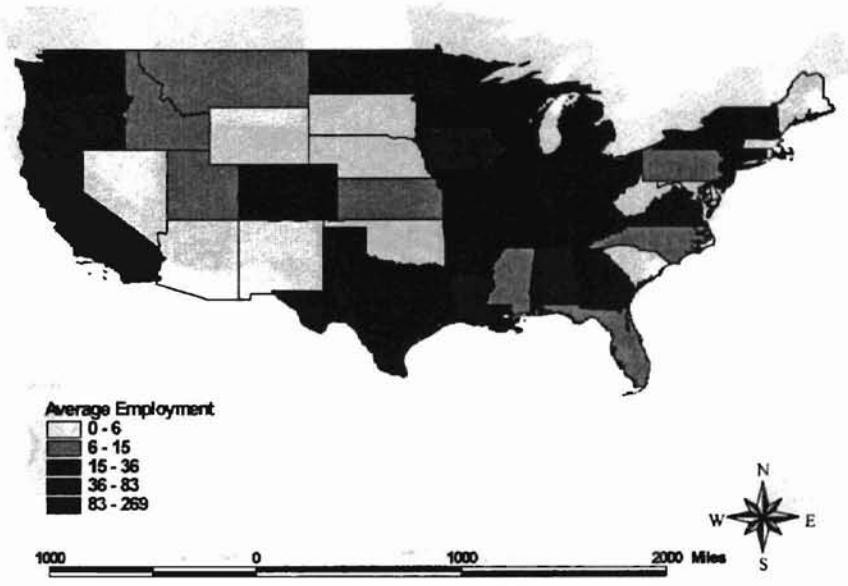
Table 5-14. Market Analysis by Company Size for Cookies and Crackers (IMPLAN 80).

| Num. of Employees | Num. of Bus. | % of Bus. | Total Emp. | Total Sales | Avg. Emp. | Avg. Sales |
|-------------------|--------------|------------|---------------|-----------------|-----------|-------------|
| Unknown | 6 | 4.4 | N/A | N/A | N/A | N/A |
| 1 | 8 | 5.8 | 8 | 0.8 | 1 | 0.1 |
| 2 to 4 | 19 | 13.9 | 51 | 16.4 | 3 | 1 |
| 5 to 9 | 24 | 17.5 | 167 | 22.6 | 7 | 1.4 |
| 10 to 24 | 25 | 18.2 | 396 | 18.9 | 16 | 1.2 |
| 25 to 49 | 12 | 8.8 | 433 | 90.5 | 36 | 8.2 |
| 50 to 99 | 16 | 11.7 | 1,108 | 467.3 | 69 | 42.5 |
| 100 to 249 | 15 | 10.9 | 2,344 | 412.6 | 156 | 45.8 |
| 250 to 499 | 6 | 4.4 | 2,263 | 176.3 | 377 | 44.1 |
| 500 to 999 | 5 | 3.6 | 3,563 | 1,380.80 | 713 | 690.4 |
| 1,000 to 2,499 | 1 | 0.7 | 1,000 | N/A | 1000 | N/A |
| Total/Avg | 137 | 100 | 11,333 | 2,586.20 | 87 | 27.5 |

Note: Sales figures are in millions.

SOURCE: IMarket, Inc.

Figure 5-5. Average Number of Employees per Firm in Blended and Prepared Flour (IMPLAN 75).



SOURCE: IMarket, Inc.

Figure 5-6. Gross Inputs for Blended and Prepared Flour (IMPLAN 75) based on an IMPLAN Model for North Tulsa.

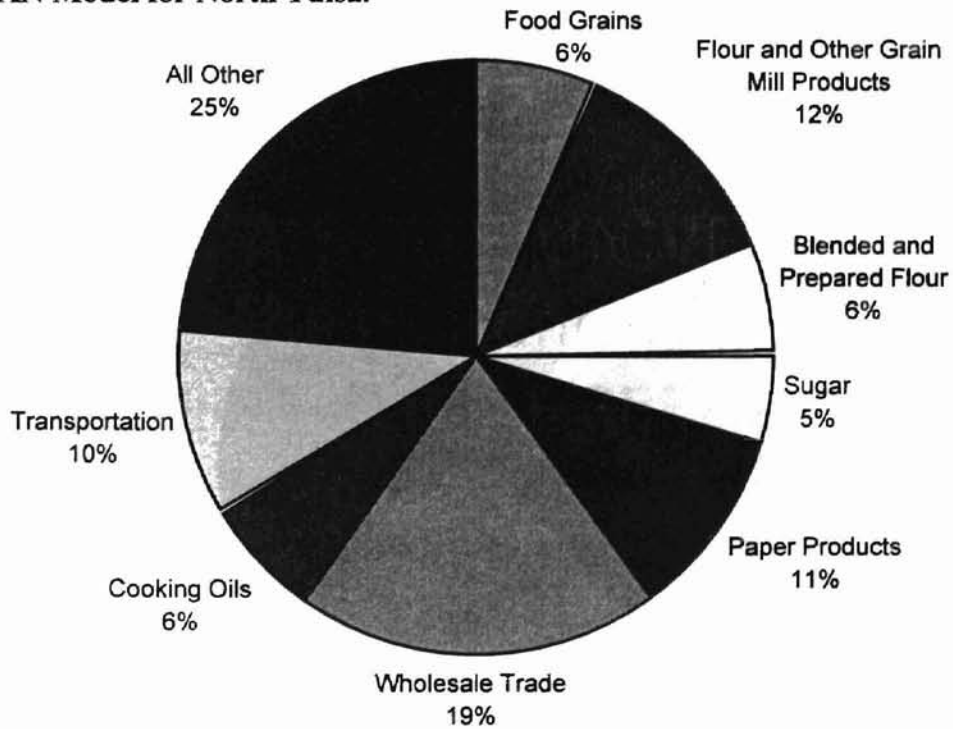
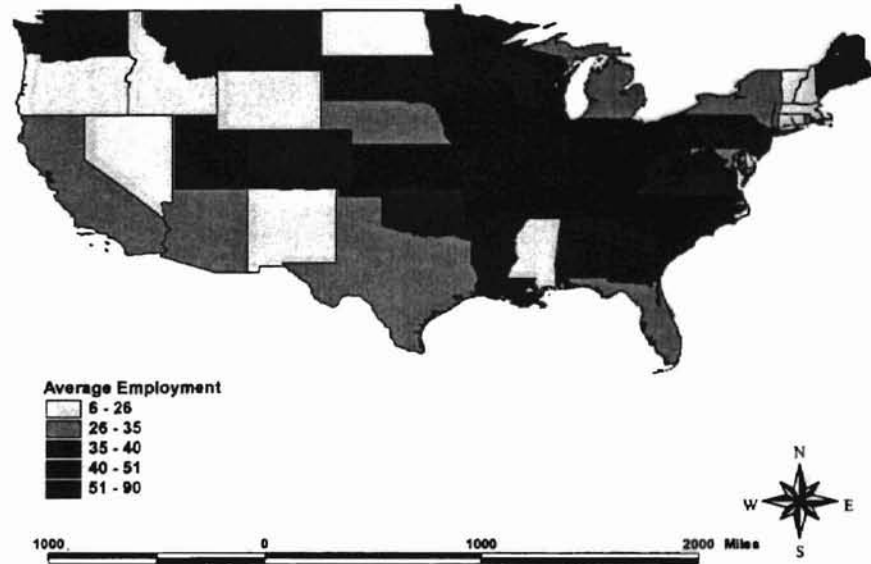


Figure 5-7. Average Number of Employees per Firm in Bread, Cake, and Related Products (IMPLAN 79).



SOURCE: IMarket, Inc.

Figure 5-8. Gross Inputs for Bread, Cake, and Related Products (IMPLAN 79) based on an IMPLAN Model for North Tulsa.

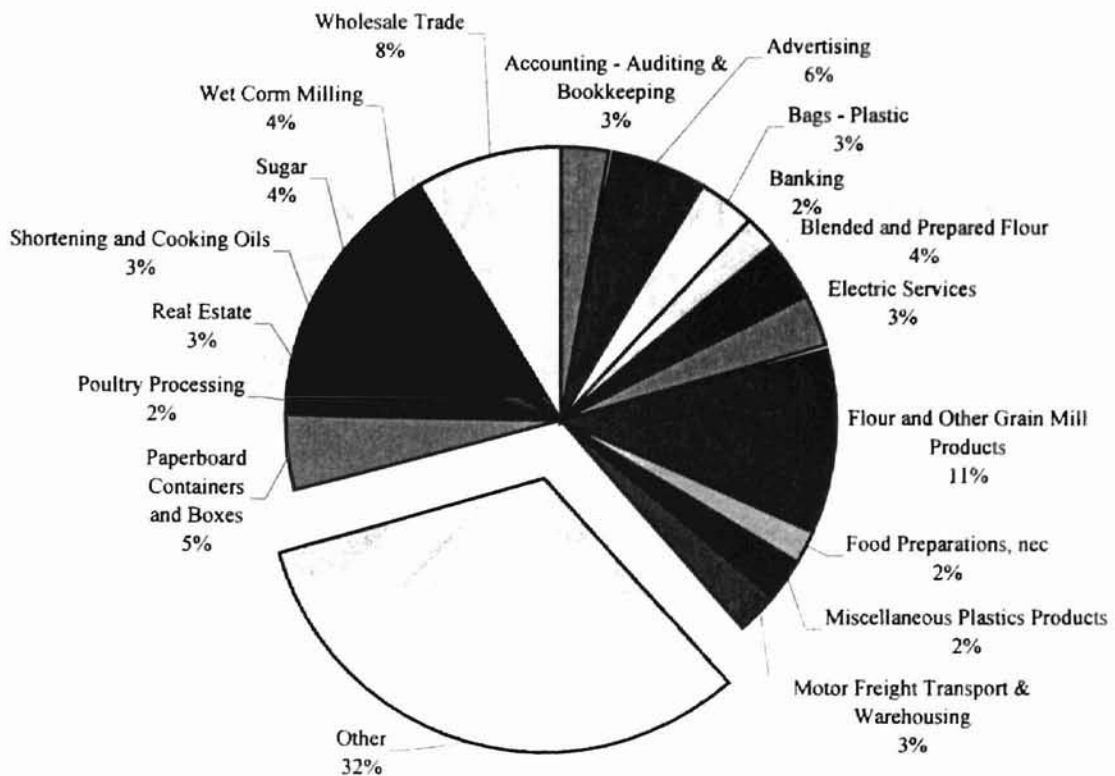
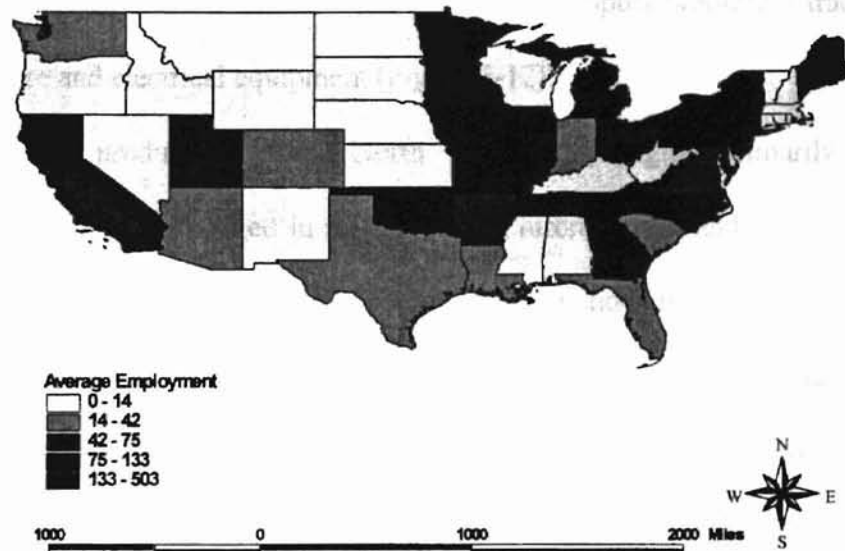
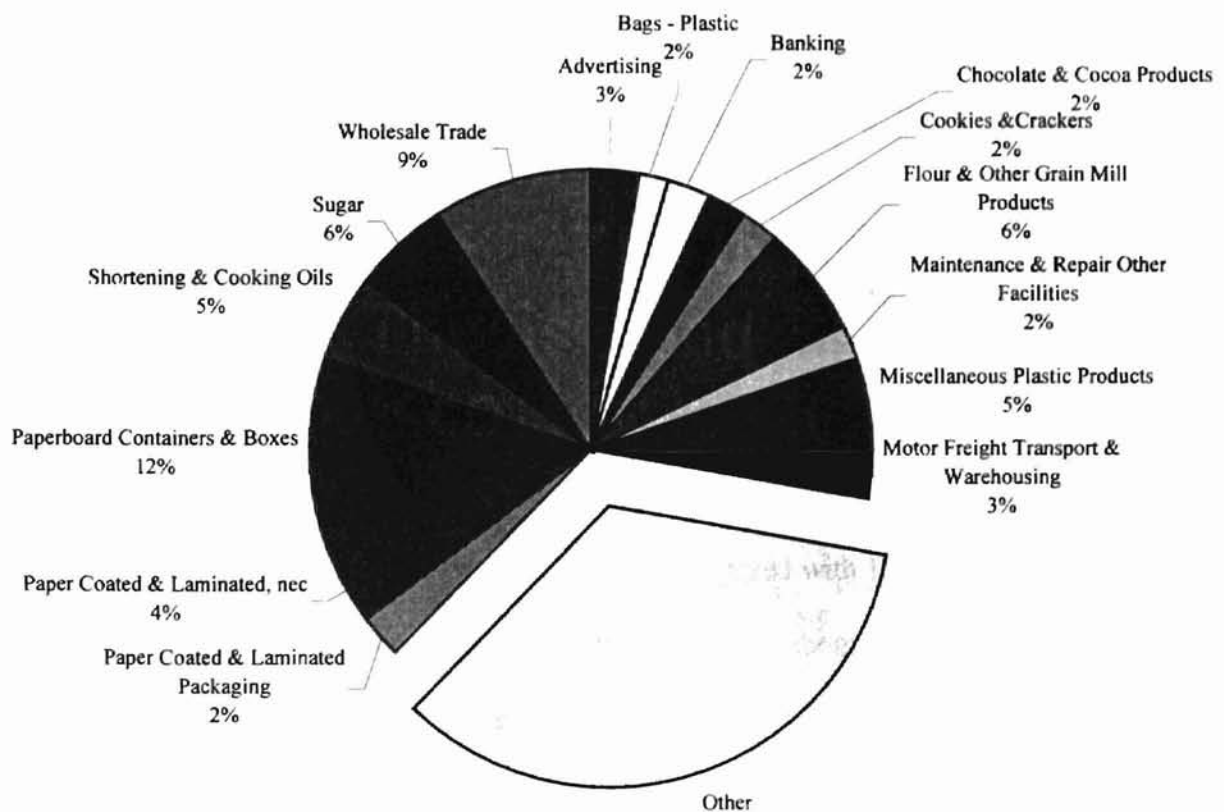


Figure 5-9. Average Number of Employees per Firm in Cookies and Crackers (IMPLAN 80).



SOURCE: IMarket, Inc.

Figure 5-10. Gross Inputs for Cookies and Crackers (IMPLAN 80) based on an IMPLAN Model for North Tulsa.



The Tulsa Aerospace community is comprised of several firms offering high productivity, competitive pricing and technical excellence (Tulsa Aerospace Supplier Directory, 2001). Companies in North Tulsa utilize the following gross inputs wholesale trade, fabricated metal, hardware and electrical equipment (Figure 5-12).

Aerospace production in the North Tulsa study region primarily comes from establishments primarily engaged in manufacturing aircraft parts and auxiliary equipment, not elsewhere classified (IMPLAN 391, SIC 3728). Includes manufacturers' research and development on aircraft parts, whether from enterprise funds or on a contract or fee basis. Establishments primarily engaged in manufacturing guided missile and space vehicle parts and auxiliary equipment, not elsewhere classified. Includes manufacturers' research and development, whether from enterprise funds or on a contract or fee basis.

Industry Definition

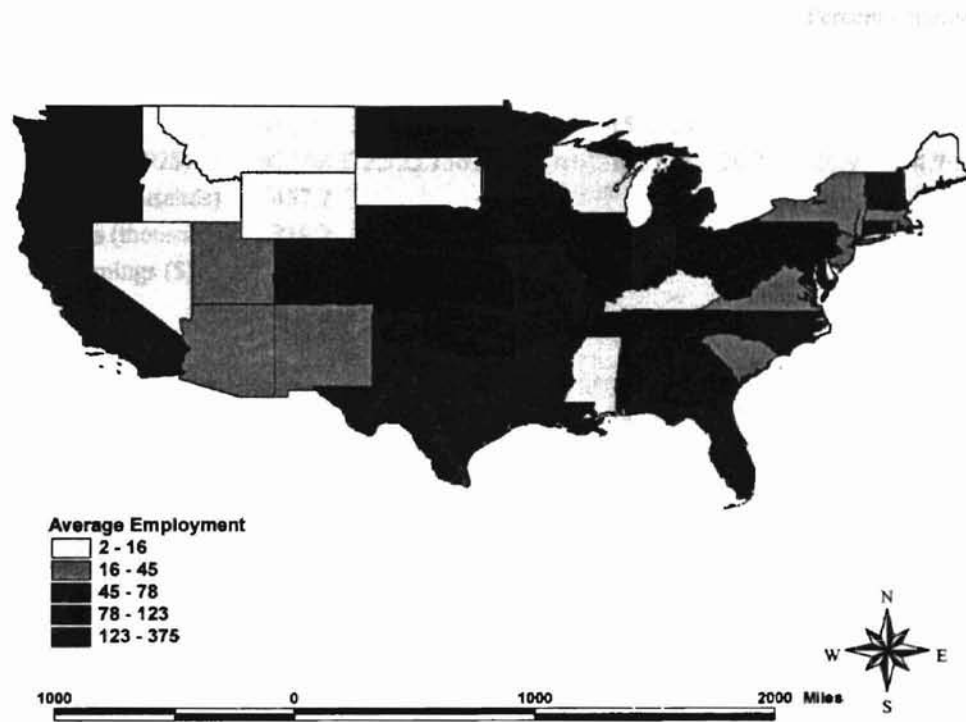
The aerospace industry includes aircraft, aircraft engines and their parts, and aircraft equipment and other parts (SIC 372) and guided missiles and space vehicles, propulsion units and parts, and other parts and auxiliary equipment (SIC 376) (Occupational Safety and Health Administration, 2001).

Factors Affecting Future Industry Growth

The value of total shipments by the U.S. aerospace industry in 1997 was \$124 billion, a 23 percent increase over 1996. Shipments are expected to increase in value 21 percent in 1998 over 1997 and about 5 percent in 1999 compared with 1998. U.S. aerospace exports increased 25 percent in 1997 compared with 1996 (see Table 5-16).

Aerospace shipments are estimated to increase about three percent per year from 2000 through 2003. Growth in the U.S. aerospace industry is influenced by several factors,

Figure 5-11. Average Number of Employees per Firm in the Aerospace Industry.



SOURCE: IMarket, Inc.

Figure 5-12. Gross Inputs for Aircraft and Missile Equipment (IMPLAN) based on an IMPLAN Model for North Tulsa.

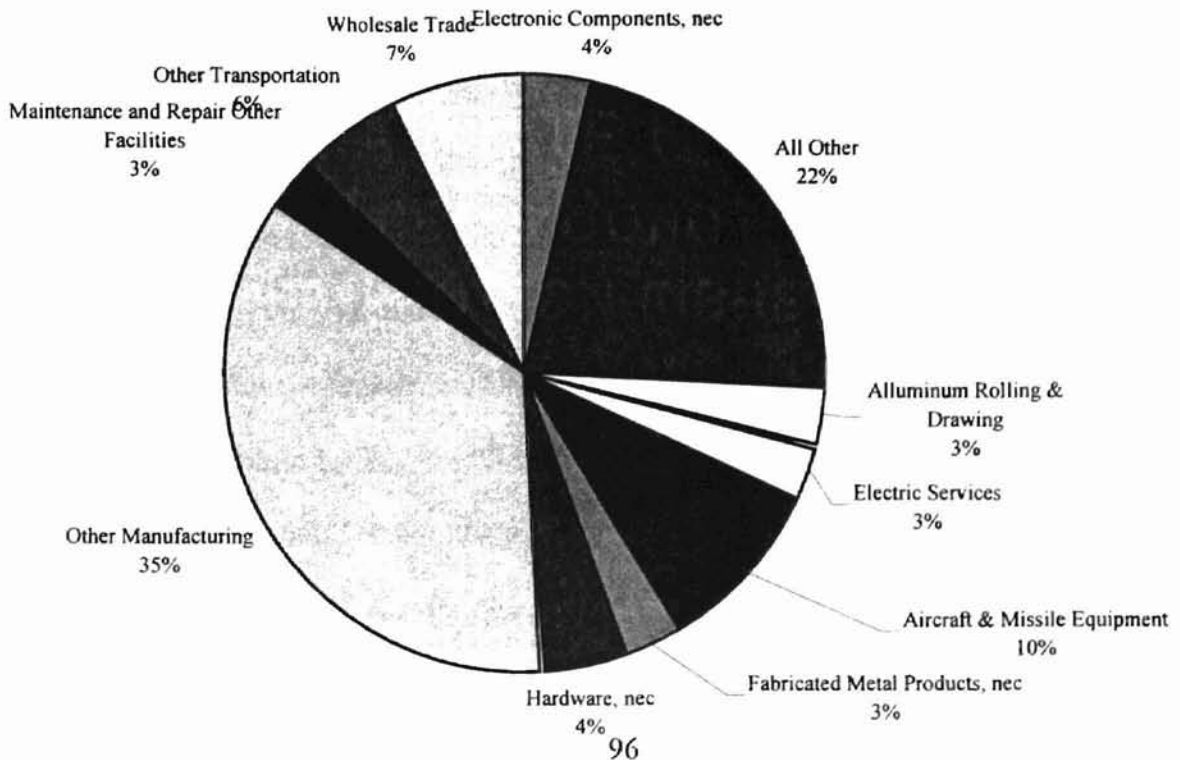


Table 5-16: Aerospace (SIC 372, 376) Trends and Forecasts. (millions of dollars except as noted)

| | 1996 | 1997 ¹ | 1998 ² | 1999 ³ | Percent Change | | | |
|---------------------------------|---------|-------------------|-------------------|-------------------|----------------|-------|-------|--------------------|
| | | | | | 96-97 | 97-98 | 98-99 | 92-96 ⁴ |
| Industry data | | | | | | | | |
| Value of shipments ⁵ | 101,322 | 124,309 | 150,443 | 157,314 | 22.7 | 21.0 | 4.6 | -6.3 |
| Value of shipments (1992\$) | 93,798 | 112,725 | 136,254 | 142,635 | 20.2 | 20.9 | 4.7 | -8.1 |
| Total employment (thousands) | 457.7 | | | | | | | -9.9 |
| Production workers (thousands) | 219.2 | | | | | | | -9.8 |
| Average hourly earnings (\$) | 42.75 | | | | | | | -3.3 |
| Capital expenditures | 2,513 | | | | | | | -10.0 |
| Product data | | | | | | | | |
| Value of shipments ⁵ | 96,223 | 117,750 | 141,965 | 147,053 | 22.4 | 20.6 | 3.6 | -5.9 |
| Value of shipments (1992\$) | 88,974 | 106,641 | 128,368 | 133,001 | 19.9 | 20.4 | 3.6 | -7.7 |
| Trade data | | | | | | | | |
| Value of imports | 13,250 | 17,054 | 20,545 | 21,209 | 28.7 | 20.5 | 3.2 | 0.9 |
| Value of exports | 38,586 | 48,175 | 59,170 | 61,109 | 24.9 | 22.8 | 3.3 | -2.9 |

1 Estimate except imports and exports.

2 Estimate.

3 Forecast.

4 Compound annual rate.

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration.

including continuing expansion—although at a slower rate—of the global economy. Consolidation of manufacturing facilities, changes in defense spending by U.S. and foreign governments, increased productivity and application of technological innovation, changes in products and processes in order to reduce environmental impacts, foreign competition, increased capital investment in research and development, and foreign governments support of aerospace industries.

After previous mergers and acquisitions, in August 1997 there were three major players: the Boeing Company, Lockheed Martin Corporation, and Raytheon Company (in descending order). Consolidation of the aerospace industries in Europe has progressed fits and starts. In December 1997 the governments of France, Germany, and the United Kingdom agreed that there was an urgent need to restructure Europe's aerospace defense industries. The report was issued by British Aerospace PLC (BAe); Aerospatiale SA of France; Daimler-Benz Aerospace AG (DASA), a unit of Daimler-Benz AG in Germany; and Construcciones Aeronauticas SA (CASA) of Spain—the four major partners. There are deep divisions among the partners on how to proceed toward an integrated European defense company. Aerospatiale will be privatized with the French government holding a “golden” share.

With the reduction of military spending over the past few years in the United States and western Europe, the eastern Asian countries became a growing market for aerospace and defense industries. After the financial crisis began in the summer of 1997, those countries began to delay, reduce, or cancel programs in this industry. The reduction in orders from the United States, western Europe, and eastern Asia is now shifting attention to other regions, such as Latin America.

There has been much research on this process with the aim of reducing the environmental damage from use of paints and chemical paint removers. Makers of aircraft engines are also studying ways to reduce or eliminate dangerous emissions, including lead from piston aircraft engines and nitrogen oxides, which could contribute to the “greenhouse effect” (United States Industry & Trade Outlook, 1999).

Global Market Prospects

As of October 1998, the International Monetary Fund (IMF) expected the world economy to grow approximately 2 percent in 1998, taking into account the financial crisis in eastern Asia, especially Indonesia, South Korea, Malaysia, the Philippines, and Thailand. Japan was expected to show an economic decline of 2.5 percent in 1998 and a 0.5 percent gain in 1999. As a result, IATA revised its 1997–2001 forecast for passenger traffic downward: average international growth to 5.5 percent (from 6.6 percent). During the period 1988–1997 Japanese banks provided some 25 percent of the new equipment financing raised by the world’s airlines. In February 1998 Japanese banks made almost no new funding commitments (United States Industry & Trade Outlook, 1999). Table 5-17 describes U.S. trade patterns in the Aerospace industry.

Table 5-17: U.S. Trade Patterns in Aerospace¹ in 1997

(millions of dollars; percent)

| Exports | | | Imports | | |
|-----------------------------|--------------------|----------|-----------------------------|--------------------|----------|
| Regions | Value ² | Share, % | Regions | Value ² | Share, % |
| NAFTA | 2,820 | 5.8 | NAFTA | 3,774 | 21.7 |
| Latin America | 1,890 | 3.9 | Latin America | 386 | 2.2 |
| Western Europe | 18,074 | 37.5 | Western Europe | 10,357 | 59.5 |
| Japan/Chinese Economic Area | 9,647 | 20.0 | Japan/Chinese Economic Area | 1,726 | 9.9 |
| Other Asia | 8,241 | 17.1 | Other Asia | 504 | 2.9 |
| Rest of world | 7,564 | 15.7 | Rest of world | 654 | 3.8 |
| World | 48,236 | 100.0 | World | 17,402 | 100.0 |
| Top Five Countries | Value | Share, % | Top Five Countries | Value | Share, % |
| United Kingdom | 6,260 | 13.0 | France | 3,987 | 22.9 |
| Japan | 4,906 | 10.2 | United Kingdom | 3,770 | 21.7 |
| Saudi Arabia | 2,619 | 5.4 | Canada | 3,697 | 21.2 |
| France | 2,509 | 5.2 | Japan | 1,648 | 9.5 |
| Canada | 2,507 | 5.2 | Germany | 1,111 | 6.4 |

1 SIC 372, 376.

2 Values may not sum to total due to rounding.

Source: U.S. Department of Commerce, Bureau of the Census.

Chapter 6

SUMMARY AND CONCLUSION

Summary

The need for economic development in North Tulsa has been established based on the unique demographic makeup and historical significance, as well as recent economic growth trends the region as well as surrounding areas.

Primary focus of this project has been on providing North Tulsa community leaders with practical, timely information to aid them in reach their developmental goals. The development of the targeted economic development methodology has been designed as a transferable methodology for use in other communities. Secondly, in order for this methodology to be useful it must comply with the concept of sustainable development in that equity, environment and economy are all vital and interlinked. Therefore, the data must be returned to the community in a format that can be altered to reflect community attitudes and preferences toward alternative choices of the economic development program and provide resources for further evaluation of environmental concerns.

These objectives were achieved by implementation of targeted economic development (TED), a systematic method of evaluating an economy for the purpose of identifying potential sectors for creation, attraction, retention, or expansion of job/income

opportunities. This method incorporates both analytical tools and community planning tools and is utilized to enhance community decision-making and incorporate local desires and ideas. TED is a synthesis of target industry analysis, cluster analysis, community assessment and planning.

Target Industry Analysis is a method of local community economic analysis, which produces a list of business sectors that have a moderate-to-strong likelihood of containing companies that might be interested in expanding and/or locating in the community under study (Doescher, 1989). Cluster analysis involves the identification of industrial clusters. These are defined as interconnected sets of firms in a region that have national or global competitive advantage because they share common infrastructure including university research, labor market, specialized suppliers, and collective marketing (Ashcroft, 2000). Community assessment and planning is an organized process to follow through community assessment, development of a strategic plan, community involvement, implementation of the plan, and evaluation of results.

Methodologies for this study centered around two procedures. The first procedure concentrates on utilizing the wide variety of data that are available through government, internet and library sources in order to augment the IMPLAN model and provide the community the most current and relevant data possible. The process of ground truthing the IMPLAN model is vital to providing accurate data to community leaders. For this project, an initial “windshield survey” was conducted and identified large gaps in the data. Use of the Oklahoma Department of Commerce’s Manufacturer’s Directory allowed the missing data to be quantified and the model was corrected. Once an accurate, up-to-date model had been constructed, the desirability criteria were used to provide community leaders with

more information about each industry. The four desirability criteria selected for this project were total employment, total employee compensation, direct compensation per employee and employment growth rate. Community leaders, however, needed more information about several industries.

The results of the Tulsa analysis showed that major exports include Household Cooking Equipment (\$244.12 M); Bread, Cake, and Related Products (\$76.27 M); Cookies and Crackers (\$58.35 M); and Iron and Steel Foundries (\$55.96 M), Fabricated Plate Work (Boiler Shops) (\$55.95 M). The major imports include Wholesale Trade (\$79.58 M); Blast Furnaces and Steel Mills (\$41.51 M); Miscellaneous Plastics Products (\$34.67 M); Advertising (\$24.59 M); and Electric Services (\$19.65).

Based on the desirability criterion and weighting system, the following were the top ten export sectors: 1) Aircraft and Missile Equipment; 2) Industrial Machines N.E.C.; 3) Truck and Bus Bodies; 4) Iron and Steel Foundries; 5) Motor Vehicle Parts and Accessories; 6) Household Cooking Equipment; 7) Oil Field Machinery; 8) Plating and Polishing; 9) Bread, Cake, and Related Products; and 10) Millwork. Considering the import substitution table, 1) Aircraft and Missile Equipment; 2) Industrial Machines N.E.C.; 3) Iron and Steel Foundries; 4) Motor Freight Transport and Warehousing; 5) Blended and Prepared Flour; 6) Maintenance and Repair Other Facilities; 7) Wholesale Trade; 8) Communications, Except Radio and TV; 9) Miscellaneous Retail; and 10) Miscellaneous Plastics Products. The four industries selected for further discussion were household cooking equipment, mechanical measuring devices, processed flour products, and aerospace.

Conclusions

Targeted Economic Development is an important tool for community leaders to narrow their economic development goals and strategies. Methodologies utilized in this project have been a synthesis of three economic development procedures: target industry analysis, cluster analysis and community economic assessment. Using this combination of approaches has allowed for development of sustainable economic development. This theory builds on current industries in the local economy and allows for community opinions to be integrated into the decision making process in an orderly and quantifiable manner. Further analysis of selected sectors incorporates issues of future industry growth and environmental effects.

Using community input provides several advantages. First, it manifests community involvement in the economic development process. This is vital for economic development to move forward. Researchers may analyze data and pontificate about community development options in a selected community but, the inhabitants of the community need to agree with the direction of community growth and the vision of the future. Therefore, the preferential weighting system is vital to the final output of this project. The survey allows researchers to quantify community leader's feelings and attitudes and use them to change the model accordingly.

Another conclusion resulting from the methodology employed in this project was the need for ground truthing. Ground truthing is vital in providing accurate information to community leaders. It is also important to use several sources of information in order to paint a truthful portrait of the community. In this project, visual inspection, knowledgeable community leaders and manufacturing data from Oklahoma Department of Commerce by

zip codes was combined in order to correct the IMPLAN model and produce results.

Future growth potential for North Tulsa is centered on creation, attraction and expansion within existing industry sectors. By considering the exports, established that the following sectors are logical candidates for export expansion

- Further processing of wheat products including breads, cake crackers and other products related to Bama Pies and other located in the region;
- Industry expansion related to aerospace industries; and
- Oil Field Machinery and Mechanical Measuring Devices related industry.

Import substitution strategies suggest the following candidates:

- Household Cooking Equipment centered around Whirlpool plant
- Motor Freight Transport and Warehousing;
- Miscellaneous Plastics Products;
- Aerospace industries; and
- Imported items related to processed flour products produced in Flour and Other Grain Mill Products, Sugar, and Shortening and Oils for example.

It is important to note that community economic development is a process. As more information and new data becomes available, the community continue to make the best use of their resources.

A future research option is to change the desirability criterion used for export enhancement or import substitution strategies. For export enhancement, it may

sense to consider issues of employment and employee compensation. However, since many of the imports do not exist in the region, there is no employment or employee compensation. Import substitution may be better described in terms of employment per dollar of output for a U.S. model.

Selection of different regions for export enhancement and import substitution strategies may produce useful information. Since export enhancement is used for retention and expansion efforts, the export region should be confined to the region being studied in order to reflect the businesses that community leaders wish to keep. The import substitution strategy allows for a wider region to be considered because the aim is to build on existing industries and infrastructure in the nearby area not only within the community. For example, if a company in south Tulsa were currently purchasing inputs from outside the county, they would certainly prefer (due to lower transportation costs, etc.) to purchase an item from a closer North Tulsa plant (excluding quality differences). Therefore, imports in South Tulsa may prove to be viable options for North Tulsa import substitution strategies.

Another consideration for future research and projects with the Greenwood Chamber of Commerce and North Star Economic Development Council is to address the question of who gets available jobs with existing firms. As a community based organization they are concerned not only with the growth prosperity of the region as a whole, but also with employment and income of the current population. There are several prospective strategies by which to consider this question. One method may involve contacting export firms and fostering dedicated supplier relationships with small black-owned business. Support of entrepreneurial undertakings would allow people to take the

initiative and explore possible business opportunities. This process could begin with the expanded market analysis of potential sectors including consideration of regional imports or with the gross inputs of selected sectors. Another strategy would be to organize the community labor force by offering services to prepare individuals for employment in existing firms. Some of the services, which could be offered, may include: resume development, job referrals, and training or education assistance.

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Appendix 1

CONSTRUCTING THE TARGETED ECONOMIC ANALYSIS TABLE

The purpose of this discussion is to provide further detail on the process of generating an IMPLAN model for the purpose of conducting Targeted Economic Development Analysis. Information presented here is based on experience using the IMPLAN Pro software and on the IMPLAN Pro User's Guide.

Building an IMPLAN Model

Open IMPLAN Pro and initiate a new model by going to "File" and "New Model." Assign the model a unique name and location when prompted. Once the model has been named the "Select Region" screen appears, this allows you to choose the county or group of counties for your analysis. You must locate the data using the file schematic in the lower left hand corner. When you select a file containing IMPLAN data, which is recognized by the program, the county list will appear in the upper right of the screen. Using the mouse, highlight the county you wish to model and select it by clicking the "> >" icon. Click "Continue" and wait for the model to construct the study area.

Next select the level of aggregation necessary for your study. This is accomplished by selecting "Model" and "Aggregate." The "Aggregation for: ..." screen appears. By clicking on the "Library" icon in the lower center of the screen you may select one of the standard aggregation schemes of "one-digit SIC" or "two-digit SIC." You may also create your own aggregation scheme or leave the model unaggregated.

Once the model has been aggregated, you may construct the model by clicking on the "Construct Model" icon from the Study Area Screen. Select the appropriate "Social Accounts" and "Multipliers" boxes by clicking on them. Click continue and allow the model to generate, this process may take a few minutes.

Determining Import and Export Sectors

Output - Dec 1 19900000
Outp. - Dec

Once the model is constructed, you can begin to extract necessary information. To determine the import and export industries, print the commodity trade report from the social account tab to a tab delimited file. The tab-delimited file can then be opened in Excel[®]. Locate the total imports and total exports column and sort the sheet based on each column, recording the rank of each. When sorting the sheet, be sure to highlight the entire table and select Data then Sort. Mark the sort by box for the appropriate column and descending. Sort the sheet by IMPLAN code to return values to their original position.

Construct the Basic Model

Save the “Output,VA, Employment” (from the Study Area tab), “Employee Compensation” and “Employment” (from the Multipliers tab). Open each file and paste necessary information into the sheet.

Using the raw data provided by the IMPLAN model the following calculations were made for each sector: total employment, total employee compensation and compensation per employee. Since employment and employee compensation are reported in the raw data as only direct. Total employment and total employee compensation must be calculated as follows:

$$EmployeeComp_i = Output_i \cdot (DEC_i + IEC_i + NEC_i)$$

$$Employment_i = Output_i \cdot (DE_i + IE_i + NE_i)$$

| | | |
|---------------|---|---|
| <i>Output</i> | = | Industry Output |
| <i>DEC</i> | = | Direct Employee Compensation Multiplier |
| <i>IEC</i> | = | Indirect Employee Compensation Multiplier |
| <i>NEC</i> | = | Induced Employee Compensation Multiplier |
| <i>DE</i> | = | Direct Employment Multiplier |
| <i>IE</i> | = | Indirect Employment Multiplier |
| <i>NE</i> | = | Induced Employment Multiplier |
| <i>i</i> | = | Sector Number |

Calculations for compensation per employee are slightly different.

$$\left(\frac{\text{Compensation}}{\text{Employee}} \right)_i = \frac{\text{Output}_i \cdot \text{DEC}_i \cdot 1000000}{\text{Output}_i \cdot \text{DE}_i}$$

DEC_i = Direct Employee Compensation Multiplier

DE_i = Direct Employment Multiplier

i = Sector Number

ADJUSTING THE IMPLAN MODEL TO COMPENSATE FOR IRREGULAR SECTORS

IMPLAN models may need to be corrected to accurately reflect recent changes in the community since the data was originally collected, to remove sectors that are confusing or not legitimate choices, or to add a prospective sector to the community and identify community impacts. Whatever the purpose of the necessary changes, first determine what needs to be adjusted for the model to correctly portray the observed community economy. For example, if a large export is reported in a sector that is not significantly present in the economy, you may need to adjust modeled production down to reflect reality.

The first step in making any changes to the IMPLAN model is to thoroughly research the troubling sector and the community to determine if the perceived error is in fact just a misinterpretation of the data. The following information is useful in understanding IMPLAN data:

1. Full definition of the sector
2. Other outside data in terms of employment or output. With manufacturing sectors this may come in the form of the Manufacturer's Directory (Oklahoma Department of Commerce). Agriculture may be obtained from the USDA.

If it is determined that the error is in fact in the model calculations then it must be corrected.

Correcting the IMPLAN model based on employment data

In order to edit the Study Area Data in an IMPLAN model the following information must be entered:

1. Employment
2. Output
3. Employee Compensation
4. Proprietary Income
5. Other Property Income
6. Indirect Business Taxes

Using a model based on the United States, a ratio was calculated between each of the above factors and employment (for example, output per employee). The ratios were then multiplied by the Oklahoma employment data to calculate the necessary output, etc. for the level of employment noted on the Manufacturer's Directory. The calculated values were then entered to change the Study Area Data.

2.

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