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Globalization, Urban Competitiveness, and Human Capital: Davidson County, Tennessee's Place in the Equation

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GLOBALIZATION, URBAN COMPETITIVENESS, AND HUMAN CAPITAL: DAVIDSON COUNTY, TENNESSEE'S PLACE IN THE EQUATION

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GLOBALIZATION, URBAN COMPETITIVENESS, AND HUMAN CAPITAL: DAVIDSON COUNTY, TENNESSEE'S PLACE IN THE EQUATION

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Profound changes in the structure of the global economy since the end of World War II have drastically affected the way governments, businesses, and individuals interact with one another. The development of regional trading alliances (European Union, NAFTA, APEC), the end of the Cold War, and the rapid development of information technologies have contributed to new global economic theories that are being adopted by places large and small. Simply put, economic paradigms have changed. Local concerns have become more prevalent in the public debate over economic, political, and societal changes as a whole.

The goal of my research is to determine the most relevant factors in attracting human capital and to examine the effectiveness of public policy decisions aimed at attracting and retaining quality human capital. Since the types of data needed to analyze trends within cities themselves are not readily available for analysis, this work was conducted at the county level.

In this study, I argue that analyses of specific demographic variables using descriptive statistics and cluster analyses should indicate that Nashville-Davidson County has a distinct advantage in stocks of human capital over other similarly sized counties, and that this advantage in quality human capital can be linked to job growth in the high-technology sector.

This study's results indicate that Davidson County, Tennessee, has an advantage over other similarly sized counties in the amount and quality of its human capital. This advantage in human capital and the balance of Davidson County's high-tech economic sector (for the variables studied) suggests that Nashville is poised to make great strides economically in the global high-tech economy.

Introduction

Profound changes in the structure of the global economy since the end of World War II have drastically affected the way governments, businesses, and individuals interact with one another. The development of regional trading alliances (European Union, NAFTA, APEC), the end of the Cold War, and the rapid development of information technologies have contributed to new global economic theories that are being adopted by places large and small. Simply put, economic paradigms have changed. Local concerns have become more prevalent in the public debate over economic, political, and societal changes as a whole. But how did we get to this point?

Several concepts, beginning with the emergence of the global economy and ending with the economic viability of small-town America, must be understood before one can begin to comprehend fully the situation currently facing even the smallest communities in the U.S. Along the way, it should become obvious that there is no one solution for all economic situations. Every community is different, often with complex social, economic, and geographic circumstances that limit its options for economic development.

Generally, there are three theories on the development of the global economy. The first, the world system theory, is based on the development of a collection of militarily powerful countries that impose their will on weaker countries to open new markets and extract resources for use in the home country (Lechner and Boli, 2003). This theory is closely associated with imperialism and the ensuing struggle for hegemony among the more powerful actors in the system. Conversely, the world polity theory of globalization centers on the concepts of progress, sovereignty, and rights to provide a framework for

countries to use in global disputes (Lechner and Boli, 2003). Organizations like the United Nations and the International Court of Justice represent the world polity theory ideal. The third and most recent entry into the discussion is the world culture theory of globalization. It relates to the way that individuals view themselves and the role of others in the global economy (Lechner and Boli, 2003). Recognition of global interdependence and consciousness of the world as a whole are hallmarks of the world culture theory.

However one perceives the development of the global economy, there is no mistaking that business models must now take into account competition from companies both locally and globally.

For instance, the United States has experienced dramatic change in the structure of its economy over the past few decades. Once an industrial powerhouse, the U.S. has been shifting towards a services-oriented economy since the 1970s. Companies can more cheaply obtain manufactured goods from overseas, where labor costs are often much lower than those in the industrialized West. Automation of repetitive tasks in manufacturing processes, the creation of just-in-time delivery methods, lower wages for skilled workers overseas, and fewer environmental restrictions in the developing world have all contributed to the decline of manufacturing jobs in the U.S. The services sector is now encountering a similar situation.

Information technologies, such as the Internet, allow back-office functions like accounting, routine computer programming, and technology support to be carried out in overseas locations. This outsourcing leaves one pondering whether the "giant sucking sound" of U.S. jobs going overseas (Perot's reference to NAFTA (Blustein, 1996)) is a reality. Although some may raise concerns over the outsourcing of U.S. jobs to countries

like China and India, others believe that by specializing in what they do best, workers in all countries can be winners (Kohn, 2004).

Existing theories on the role of countries in the global economy are being supplemented by theories in which cities and their relationship to other places in the world take precedence over regional and national alliances (Sassen, 1991; Friedmann, 1986; Kresl and Singh, 1999). Among these theorists are Friedman (1986) and Sassen (2000) who both use the term "world cities" to describe the spatial organization of the new international division of labor. Cities, in the new economic geography of places, especially "world cities," (a) become much more important as sites for the agglomeration of specific industries, (b) are places where "knowledge spillover" among individuals in similar industries leads to innovation, and (c) serve as headquarters for multinational corporations that owe their allegiance to the corporation, not any one country or place.

Not all cities are considered "world cities." Only those that meet specific criteria involving capital flows and international business transactions meet the definition set out by Friedmann (1986) and Sassen (1991). However, that does not mean that other places do not perform critical functions necessary to maintaining the global economic machine.

Recognizing the fact that, like it or not, we are all part of the global economy is crucial for economic survival in the twenty-first century. Focusing on what a country, region, or community does best, in the most efficient manner, is the mantra of many proponents of the global economic theory. But determining how a place can best utilize its resources to obtain the highest return on its investment is often a challenge. Focusing too heavily in one sector of the economy for too long, especially after one has lost competitive advantage, can lead to disastrous results—consider the "rust belt" of the

northeastern U.S. Kohn (2004: 5) describes the apprehension that many leaders and public policy "wonks" experience in making these decisions:

> Successful adaptation to changing circumstances will require flexibility on several fronts. No one can anticipate how events will unfold—the evolving geography and technology of the production of goods and services, the shifting balances between spending and producing as current accounts change. My fear is that poorly formed diagnoses and incorrect policy prescriptions will have unintended adverse consequences for our economy.

As a result of these shifting paradigms of economic thought, many places have begun to examine their strengths and weaknesses to determine the best course of action to help ensure economic vitality in the future. Numerous strategies for business attraction and retention involving human capital, quality of life, tax abatements, public-private partnership, and infrastructure development have been touted in recent years (Florida, 2002b, 2002c; Markussen, 1996; Malecki, 2002; Glaeser, 2000; Thornley, 1999; Donald, 2001; Porter, 1990, 1998, 2001), but only time will tell which ones are best suited to particular places experiencing a specific set of economic circumstances.

Competition among cities for resources and markets has become more prevalent as companies seek to increase their comparative advantage over business rivals. This competition has led cities, most noticeably in North America and Europe, to act more like businesses themselves as they strive to make themselves more attractive to the business community. As Porter (1998:142) describes in his widely acclaimed work on competitive advantage, "the roots of a high and rising standard of living lie in the productivity with which a given economic area can utilize its human, capital and physical resources." Many mid-sized cities have taken to heart the call to closely examine their available resources as they attempt to position themselves for success in the unforgiving, technology-oriented global economy of the twenty-first century. The critical component of any economic

development strategy is quality human capital—the skilled work force that enables companies to produce quality products and services as efficiently as possible.

A series of studies has been conducted on the human capital characteristics of MSAs (metropolitan statistical areas) over the years (Kresl and Singh, 1999; Madden, 2003; Florida, 2002a, 2002b). MSAs are groups of counties designated by the federal government's Office of Management and Budget (OMB) and are periodically updated to reflect changes in regional economic patterns. Although studies conducted at the MSA level are well suited to analyzing regional economic patterns, they do little to assist in determining what trends are occurring within the central cities of MSAs.

Measurement of sprawl within MSAs over the past few decades has shown a tendency for sprawl to occur at a faster rate in the southern U.S. than in any other part of the country (Lopez and Hynes, 2003). This statistic could mean that urban areas in the South are in decline or that southern cities are growing at such a rapid pace that available housing stocks are limited, forcing new construction in the suburbs.

There is little debate that sprawling suburbs have contributed to the decline of America's central cities and the rise of a generic monoculture of strip malls and fast-food restaurants. Aside from the landscape, it is often difficult to tell one suburban community from another. After all, how different can a McDonalds or a WalMart in Nashville be from one in Pittsburgh or Denver? So what would make a person choose to live in the city rather than the suburbs? And why would they choose one city over another?

In a recent study, Florida (2002b) determined that without cultural amenities such as museums, parks, live music venues, and quality restaurants, it is difficult to attract the highly prized human capital that drives the technology-oriented economy of today.

Taking into consideration that young, high-technology professionals are more likely to relocate for jobs than others if economic and quality of life conditions are unfavorable (Reisinger, 2003), should places make themselves more attractive to young professionals? Others argue that too much emphasis has been placed on attracting young professionals to drive economic development (Kotkin, 2003; Malanga, 2004). Do policies designed to nurture cultural activities and enhance quality of life actually have an impact on economic development? Or is it location factors (tax incentives, transportation networks, industry agglomerations, and climate) that should dominate discussions on economic development? No matter which side of the argument a person takes, the central city is the heart of a MSA and is an integral part of most well-planned regional economic development strategies.

In the past, many economic development policies have, in reality, led to the decline of American cities. Urban redevelopment after WWII removed many slums in the city center, but also broke up the social connectivity of the city (Jacobs, 1961). Many housing projects that were originally created to provide housing for middle-class workers have become magnets for crime. Correctly identifying successful public policy decisions that enhance the development of human capital is vital in the current economic environment, where many municipalities are struggling to provide basic services to their residents without also increasing their tax burden.

Purpose of Study

The goal of this study is to determine the most relevant factors in attracting human capital and to examine the effectiveness of public policy decisions aimed at attracting and retaining quality human capital. Since the types of data needed to analyze

trends within central cities themselves are not readily available for analysis, my analyses are conducted at the county level (Fig. 1).

Figure 1: Nashville, Tennessee, Skyline

Source: By the Author (2004)

Comparing Nashville, Tennessee (Fig. 1), to other similarly sized places provides insight into the effectiveness of economic development strategies adopted by Nashville's leaders, past and present, and should shed light on what steps local government entities should take to help ensure that Nashville further strengthens its place in the global economy.

Nashville is well suited for a study of urban competitiveness among mid-sized cities in the U.S. because of its location, urban regime, and business culture. Nashville is located in the "sun belt," the region of the U.S. that experienced tremendous growth in the 1980s and 1990s, is one of the few with a metropolitan form of government, and has global ties in several industries. Added to the mix of variables to be considered when analyzing Nashville's role in the global economy is the presence of a recognized university research center (Carnegie, 2000), the presence of a mushrooming immigrant

population from Central America (Conway, 2001), and the existence of a thriving bohemian population (Florida, 2002a) (Fig. 2).

Figure 2: Chet Atkins Monument, Nashville, Tennessee

Source: By the Author (2004)

Therefore, in this study I argue that analyses of specific demographic variables using descriptive statistics and cluster analyses should indicate that Nashville-Davidson County has a distinct advantage in stocks of human capital over other similarly sized counties, and that this advantage in quality human capital can be linked to job growth in the high-technology sector.

Literature Review

The amount of literature generated on urban competitiveness and human capital is astonishing when one realizes the relatively short period these theories have existed. Some theories [like those of Alfred Marshall (1920) whose seminal work on industrial districts and agglomeration has been acknowledged as the basis for much of the current work in business cluster analysis and Jane Jacobs (1961) who was an early proponent of "New Urbanism"] have been recycled and put into a more modern context. Other theories, like those of Sassen (1991, 2000) and Florida (2002b, 2002c), represent a completely new line of thinking. Still, it is important to review the foundations of earlier theories to help put new, developing theories into their proper context.

Marshall's work (1920) has long been praised for its insights into the role that location plays in determining the success of industry and the cities in which those industries are located. Marshall's (1920:24) thoughts on the agglomeration effects of industrial clustering are, in some instances, products of a bygone era when manufacturing drove the economies of most Western nations:

> When an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously. Good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organization of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas.

Jacobs' (1961:146) writing reaffirms some of Marshall's insights into the economic advantages of cities:

> Another reason why such enterprises have stayed in cities, along with small firms, is that many of their employees, especially executives, need to be in close, face-to-face touch and communication with people outside of the firm—including people from small firms.

But Marshall's ideas on agglomeration should be appreciated for the era in which they were developed. The Fordist economic era of the early to mid-twentieth century was characterized by large manufacturing plants that were concentrated in a relatively small number of locations—those that offered easy access to transportation networks and raw materials. The workforce of the Fordist era was not required to be highly educated since many manufacturing jobs involved repetitive tasks that could be learned in the work place in a relatively short time. Also, the Fordist era experienced a rapid influx of human capital from rural America to its urban areas for a variety of social and economic reasons. The flow of workers to the urban areas, where manufacturing plants were located, made finding available human capital relatively simple.

The post-Fordist era of the late twentieth century developed more flexible manufacturing processes to account for changes in production, communications, and transportation technologies that enabled smaller-scale production of specialized products to take place farther away from their primary markets. Manufacturers became free to look for the best sites of production for their products—places that offered limited government regulation, tax incentives, and a somewhat skilled work force became highly prized. Many companies chose to relocate overseas. This fundamental shift in the manufacturing theory opened the door for the change to a more services oriented U.S. economy. Mollenkopf (1993:1) describes this shift in economic paradigms:

> Since the early 1970s, the collapse of the Bretton Woods system of more insulated national economies, the oil shocks, and the end of American hegemony in world politics have marked the increasing integration of national economies into a new international division of labor. This process

> has led to the deindustrialization of large, old manufacturing cities of the advanced societies, the rise of new landscapes of high-technology industry and "edge-city" office complexes, the concentration of advanced corporate-service activities in a relatively small number of large cities, and the economic displacement of the unskilled urban poor.

The changes in the global economy that Mollenkopf describes are the catalyst for an entirely new line of economic thought. Cities, especially those with global linkages through transportation, business, and communications networks, are now viewed as the driving force behind economic expansion. Sassen (2000:4), one of the first to seize upon this idea, developed the concept of the "global city" to help describe the changing perspectives on the role that cities play in the new global economy:

> ...the last two decades have seen transformations in the composition of the world economy, accompanied by the shift to services and finance, that have renewed the importance of major cities as sites for certain types of activities and functions. In the current phase of the world economy, it is precisely the combination of the global dispersal of economic activities and global integration—under conditions of continued concentration of economic ownership and control—that has contributed to a strategic role for certain major cities. These I call global cities.
>
> Not all cities are global cities. But all cities play a role in the global economy,

some on a grander scale than others. The desire to have a larger piece of the pie—to reap the benefits of an interconnected world economy—has been the focal point of many economic development schemes in cities large and small around the globe. Often governments make "sweetheart" deals to lure companies into an area, hoping that prosperity will ensue, without examining other costs relating to infrastructure, the environment, and society. The dichotomy in benefits received by cities for the incentives they offer businesses to relocate, and the rising social and environmental costs incurred by these cities over time, is partly responsible for the debate among academics over the correctness of the urban competitiveness theory.

Not all academics agree that a crisis exists in which places must race to develop solutions to make themselves more attractive to businesses seeking to maximize profit. Jessop (1998:81) addresses this concern from the geographic perspective:

> Economic competitiveness is an essentially contested, inherently relational and politically controversial concept. There are many ways to define it, many modalities of competition and many sites of competition. The key question for present purposes, however, is whether nations and cities can be 'units' and/or 'subjects' of competition.

Krugman (1994:30) approaches the matter from a purely economic perspective when he proclaims:

> Thinking in terms of competitiveness leads, directly and indirectly, to bad economic policies on a wide range of issues, domestic and foreign, whether it be in health care or trade.

Although it may be difficult to quantify exactly what makes a city competitive, it is less difficult to see how the lack of competitiveness, exacerbated by specialization in old, industrially centered economic activities, has had disastrous results for some urban economies. For cities, competitiveness in the global economy entails integrating various strategies involving investment in infrastructure and human capital, the development of positive working relationships between business and government, and the ability to appeal to a wide range of individuals from diverse cultural backgrounds. It is not only that "[f]inding a way through the competitiveness maze to arrive at optimal policy structures and sensible policy choices for the economic development of cities will, consequently, take imagination and leadership at all levels of governance" (Begg, 1999:507) but also the support of business elites and the general population. "Cities are an immense laboratory of trial and error, failure and success, in city building and city design" (Jacobs, 1961:6), but cities are also home to large populations that place their

trust in policy makers to make choices that lead to long-term sustainable growth, not just short-term economic gains (Hall, 1998).

These changes, along with the willingness of skilled workers to relocate for career advancement and increased quality of life, have led to renewed interest in the role of geography in economic development. Of particular interest has been the role that human capital—practical knowledge, acquired skills and learned abilities of an individual that make him or her potentially productive—plays in determining the economic future of a particular place. It has been widely accepted that "people's learning capacities are comparable to other natural resources involved in the production process" (Livingstone, 1997:9), and it has been equally accepted that the ability to attract and retain high quality human capital needs to be a key link in any local economic development policy.

Recently, numerous studies have taken a quantitative approach to examining the constantly changing dynamics that shape the economies of urban areas in the U.S. (Kresl and Singh, 1999; Resinger, 2003; Madden, 2003; Testa, 2001). Such research attempts to explain the differences between places (cities, MSAs) by closely examining economic inputs/outputs and job growth.

The most relevant of the studies to this particular project is that of Testa (2001). In his study, Testa focuses on a selected number of MSAs to look for evidence of a rebound in economic growth in central cities of the Midwest. His analysis uses population density, per capita income, and unemployment data in a variety of statistical models to look for differences between urban and suburban growth. Testa (2001:12) concludes that, compared to the hard economic times of the 1970s and early 1980s, Midwest central cities are now

> ...enjoying very strong rates of work force participation, a slowing of population loss, and rising real household incomes. Nonetheless, when we look beneath these statistics for signs of a structural change that would indicate that cities may regain their former prominence, there is less to cheer about.

Although analyses of unemployment rates, population density, and productivity are all important in understanding the economy on various levels, determining what attracts human capital to particular places is equally important. A number of studies have examined the human capital aspect of urban competitiveness (Florida, 2002b, 2002c; Glaeser and Saiz, 2003; Glaeser and Shapiro, 2003). All have raised interesting points, but that of Glaeser and Saiz (2003) appears to have the most relevance to this particular study.

In his study, Florida (2002b) uses data at the MSA level to look for relationships between amenities, human capital, and high-tech job growth. Florida's use of correlation and regression analyses to look for spatial patterns in the location of young professionals employed in the high-technology sector yielded some surprising results. After analyzing data on such variables as the proportion of the population aged 22 to 29, the number of restaurants and museums in a particular place, the concentration of high-tech jobs, and the proportion of gay couples in the community, Florida pronounced that there is a correlation between the number of college graduates employed in the high-tech sector and the proportion of the population that is gay. Therefore, Florida concludes, places with a higher percentage gay population will have a better chance of attracting highly skilled human capital because of a more relaxed and tolerant social environment.

Glaeser and Shapiro's (2001) comprehensive study of growth trends in U.S. cities during the 1990s analyzed the relationship between variables such as population density, climate, education, government spending, foreign born population, and race to determine

those factors that mirror population growth. An important aspect of Glaeser and Shapiro's (2001:8) study is their insistence that there are good reasons for focusing analysis on central cities of MSAs:

> They are closer to representing traditional downtowns. While a firmer geographic construct—such as the population within 10 miles of the central business district—might actually be more attractive, in general data on such entities are not available. Thus, if we want to know the determinants of growth of downtown areas—true cities, as distinguished from suburbs, we are generally left to look at cities.
>
> Moreover, we may be particularly interested in factors such as human capital spillovers that are generally thought to operate at a fairly local level. As such, sprawling geographic regions, such CMSAs, will be far from the appropriate unit of analysis. Because we are interested in the impact of local amenities, we are attracted to smaller units of observation and hence to cities.

The concept, touched on by Glaeser and Shapiro, that small-unit analysis must be conducted within MSAs to understand the processes at work within individual counties and cities is fundamental to the study proposed for Nashville, Tennessee. Furthermore, the fact that Nashville has a metropolitan form of government allows for analysis at the county level to test the importance of urban governance in setting the stage for economic development.

The Glaeser and Saiz (2003:43) study followed much the same methodology of the Glaeser and Shapiro study, but, more importantly, it concluded that

> ...city growth can be promoted with strategies that increase the level of local human capital. At the regional or metropolitan level, attracting high human capital workers may require provision of basic services, amenities and quality public schools that will lure the most skilled.

Previous studies, both qualitative and quantitative, have a common thread running through them—people are the driving force behind economic growth. Without qualified

individuals to operate machinery, originate innovative ideas, or develop production strategies, the economy would be at a stand still.

Few studies on human capital development have been conducted at the county level. Fewer still have been conducted specifically to test the relationship between human capital and high tech economic development of mid-sized counties. Studying Nashville's standing among other similarly sized counties fills a gap in the literature on human capital development. Understanding the importance of human capital to second- and third-tier cities, and the cause and effect of public policy decisions on workforce development, is crucial to the economic survival of mid-sized American cities.

Methodology

The intent of the analysis is to examine the relationship between the quality of human capital in mid-sized urban counties and the degree to which the high-technology sector is a part of the local economy. If previous studies on the topic are accurate, there should be a strong correlation between stocks of desirable human capital (those with college degrees) and the high-technology sector. This study is not an extension of any one study previously mentioned, but, in general, is a corollary to all of them.

The analysis will take place in four stages.

1. Select counties to be used in the study
2. Review the broad categories of the economic makeup of selected counties
3. Examine variables for selected counties specifically related to the high-technology sector
4. Examine relationships between demographic variables and the high-technology sector in selected counties

The scope of this study is limited to counties within a population of 100,000 (based on the 2000 census) of Nashville, Tennessee, for two reasons: (1) to keep the study at a manageable scale and (2) to discover the positioning of Davidson County, Tennessee, relative to other similarly sized counties.

Most economic geography studies of local economies have been conducted at the MSA level. Although MSA boundaries are often used in regional economic analysis, an accepted practice to gain an accurate picture of the processes taking place within the central counties of MSAs—the urban core—is to begin with a more refined set of data (Glaeser and Shapiro, 2001). Much like Glaeser and Shapiro's study, the intent of this

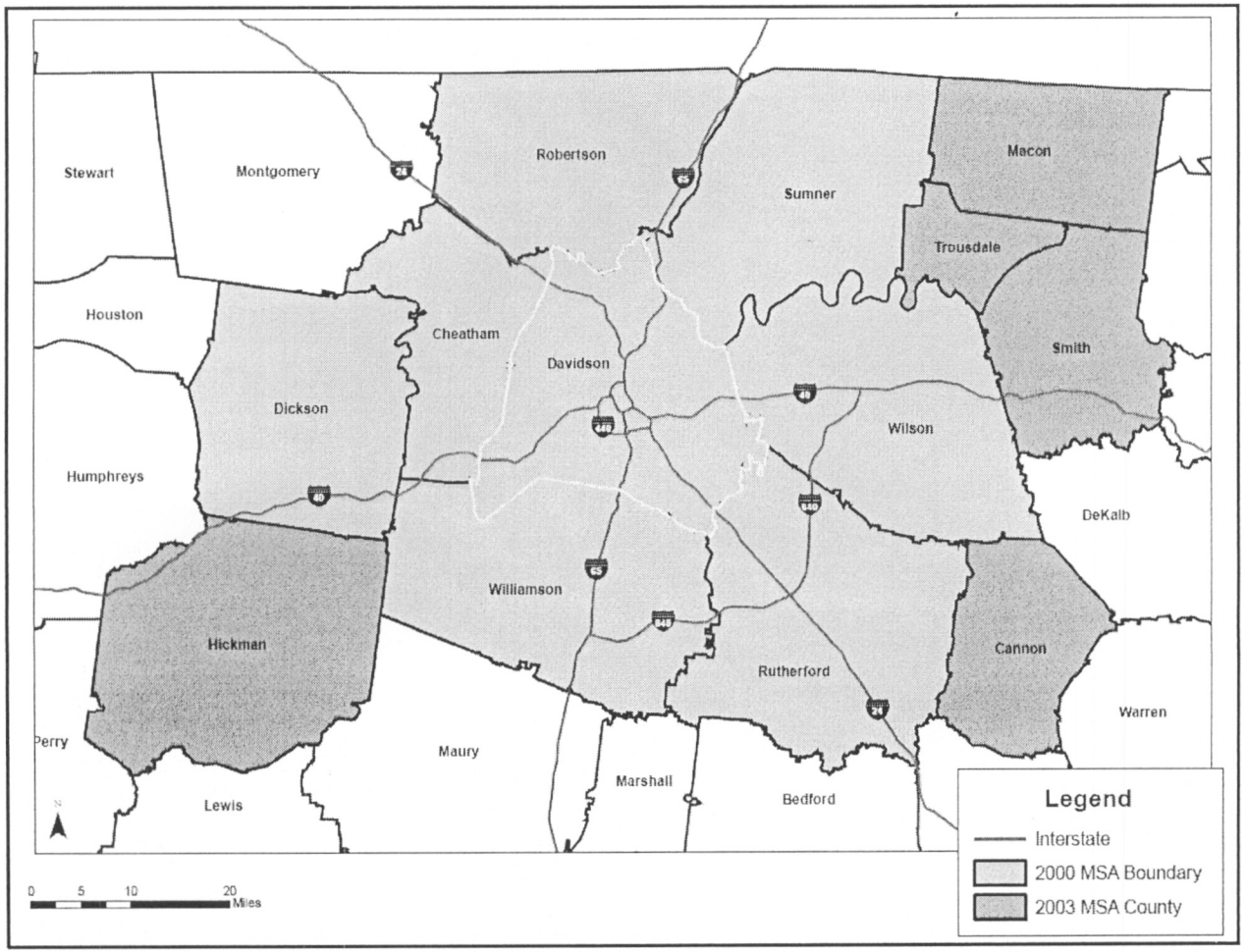
study is to determine the potential for economic growth of the urban core, not the region as a whole.

However, unlike Glaeser and Shapiro's study (2001), this study does not directly examine the relationships between housing costs, climate, government expenditures, and unemployment rates relative to human capital development. Instead, the primary focus of this study is the current level of human capital in selected locations and the degree to which the high-technology sector is present in those locations.

The Office of Management and Budget (OMB) periodically updates MSAs, based on the latest census data relating to commuting patterns and population growth provided by the Census Bureau. Although MSAs are ideally suited for many types of research, especially regional transportation and economic analysis, they are not particularly well suited for use in urban analysis because of their tendency to grow in accordance with the degree of suburban sprawl present in individual regions. These constantly changing boundaries are evident when one compares the 1999 Nashville MSA boundary with the 2003 Nashville-Davidson-Murfreesboro MSA (see Fig. 3). The first obvious difference is the inclusion of Murfreesboro as a central city in the determination of the MSA's 2003 boundary. The other obvious change is the area encompassed—the thirteen counties that constitute the 2003 MSA (five more than the 1999 MSA) reflect the dramatic growth and change in economic conditions in the region.

To assist in eliminating periphery counties from MSAs, it is necessary to utilize computer software to analyze demographic variables and geographic boundaries simultaneously.

Figure3: Nashville-Davidson-Murfreesboro MSA Boundary



Source: By the Author (2005)

Arcview GIS (geographic information systems) software, along with the 2000 Census Bureau data available on the accompanying data CD, is used to analyze counties for possible inclusion in the study. A serious concern in the development of the methodology for this study is the possibility of skewing the results by comparing counties from multiple tiers (based on population) with one another. To eliminate that possibility, the study will not analyze the central counties of all the more than 300 MSAs currently delineated. Instead, the study will utilize only central counties of MSAs that are within a population of 100,000 of Nashville (569,891 based on the 2000 census).

Two other criteria are used in limiting the selection process. Only counties with a city with a population over 200,000 will be included in the study. By limiting the study to only those places with large cities, it is less likely that the study will be complicated by the inclusion of heavily populated counties that are not urban in nature. To help ensure that places where small cities have become conglomerated to form a continuous urban area (like Chicago and the New York City metropolitan area) are not eliminated from the study, those counties that are within a population of 100,000 of Nashville and have at least 25 percent of their land mass designated urban by the ESRI urban areas layer file will be included in the study.

Counties analyzed in the study will be determined in the following manner:

1. Use Arcview GIS to select cities over 200,000 in population from the ESRI data CD.
2. Use the Select by Location feature of Arcview to select counties that contain at least one city over 200,000 in population.

3. Sort the 2000 population field of the counties attribute table, and select those counties within 100,000 of Nashville's population (569,891).
4. Overlay the selected counties with the 2000 MSA boundaries.
5. Compare the counties chosen through GIS analysis against the list of core 2000 MSA counties supplied by the Census Bureau via the Internet.
6. Select only one county per MSA. (In addition to the criteria for selection described above, counties must also either have a city over 200,000 population or have at least 25 percent of its land mass comprised of urban area as delineated by the 2000 ESRI urban areas regional layer file.)

Those counties that have been selected through GIS analysis and are listed as core counties by the OMB will be used in the study.

In total, an estimated forty counties will be selected for utilization in the study using the method described.

The second stage of the study will use data from the Bureau of Economic Analysis (BEA) tables for income by economic sector [detailed income and employment tables by NAICS industry, 2001-2002 (CA05)]. The 2002 tables are based on the North American Industry Classification System (NAICS) that allows for a much more comprehensive analysis of the service sector than the earlier data tables based on the standard industry classification (SIC) codes. SIC codes were developed when manufacturing was the primary focus of the U.S. economy. The shift in the 1990s to a more service oriented economy led to the development of the NAICS for economic analysis. NAICS data allow for a much more accurate accounting of the services sector of the U.S. economy than the older SIC data.

Data will be extracted for variables at the general level for the construction, manufacturing, information, professional and technical, and finance and insurance sectors for analysis to develop a broad picture of spatial patterns within the data. The NAICS descriptions of these general economic sector variables can be found in appendix 1. Data tables for each county are merged together in MS Access, where an additional field for calculating per capita income for each individual sector is created. The per capita income for each sector in each county is calculated by dividing the total income in each sector in the county by its total population (Census Bureau midyear population estimates for 2002). Counties are then ranked by per capita income in each sector, and the data table is imported into both S-Plus and Arcview to look for noticeable trends.

Exploratory data analysis of the variables in S-Plus should aid in identifying similarities in economic makeup among the locations studied. S-Plus offers several methods for grouping data—cluster analysis is used in this study. Once data are assigned to a particular group, or cluster, they can be graphically displayed in numerous ways to indicate patterns in the data. As patterns develop, a general theory on the relationship between human capital and high-tech development in the study areas should emerge. Care should be taken to emphasize that conclusions drawn from the analysis relate only to the locations studied; for specific variables; over a specific period of time.

To gain reasonably accurate groupings of the study locations, based on the economic data examined in this study, it is critical that an appropriate method of cluster analysis is utilized. The fuzzy partitioning method is selected for this study since it allows locations to be assigned fractional membership in multiple clusters, resembling the degree to which a location is involved in a particular economic sector. Fuzzy cluster

analysis is a valuable tool in this analysis due to the fact that no county can belong entirely to one cluster because its economy encompasses numerous sectors.

Fuzzy clustering is a fuzzy set version of k-cluster analysis. Fuzzy cluster analysis and k-cluster analysis differ in that k-cluster analysis seeks to assign variables entirely to one cluster. Results from strict, or "crisp," partitioning could lead to erroneous assignment of locations to individual clusters. Therefore, fuzzy cluster analysis is best suited for this study since each county can be assigned to a cluster based on the percentage of its per capita income in selected sectors.

The N x P data matrix for cluster analysis is used in this study. *N* represents counties in the data matrix, and *P* represents the variables analyzed.

$$\begin{bmatrix} x_{11} & \cdots & x_{1p} \\ \vdots & & \vdots \\ x_{n1} & \cdots & x_{np} \end{bmatrix}$$

Source: S-Plus help guide (Insightful, 2001)

In this particular method of cluster analysis, certain criteria are followed:

> For each object i and each cluster v there will be a *membership* u_{iv} which indicates how strongly object i belongs to cluster v.

And before membership in a particular cluster can be assigned the following must be true:

1. $u_{iv} \geq 0$ for all $i = 1, \ldots, n$ and all $v = 1, \ldots, k$.
2. $\sum_{v=1}^{k} u_{iv} = 1 = 100\%$ for all $i = 1, \ldots, n$.

Source: S-Plus help guide (Insightful, 2001)

Membership in specific clusters is defined by the algorithm:

$$\text{objective function} = \sum_{v=1}^{k} \frac{\sum_{i,j=1}^{n} u_{iv}^{2} u_{jv}^{2} d(i,j)}{2\sum_{j=1}^{n} u_{jv}^{2}}$$

Source: S-Plus help guide (Insightful, 2001)

The third stage of the analysis involves a separate examination of high-technology industries following the same method as outlined for the general sector data. The relative newness of the NAIC standardized nomenclature, and the lack of published articles involving the study of the high-technology sector in relation to human capital development, makes selecting appropriate variables for this portion of the study a challenge. However, after closely examining available data, the following sectors were chosen for analysis:

1. ISP and data processing
2. Telecommunications
3. Computer and electronic product manufacturing

The rational behind using the ISP and data processing and telecommunications variables follows Moss and Townsend's (2000) research into the relationship between Internet/telecommunications connectivity and prosperity in the global economy. The NAICS descriptions of these high-tech sector variables can be found in appendix 2. Selection of the computer and electronic manufacturing variable should assist in indicating the degree to which a county has shifted away from older low-tech industries to industries more closely oriented with the information age of today.

By using both a generalized data set and a more specific technology oriented data set, I should be able to more clearly identify those counties most closely linked to the high-tech services economy.

The fourth stage of the analysis examines human capital factors relating to the groupings of the counties from the analysis of per capita income data by economic sector. Specifically, it will focus on the percentage of the population that are college graduates and the percentage of the population between 22 and 29 for each county.

All human capital variables are derived from the 2000 census. The percentage of the population that are college graduates by county is derived from the SF3 table (P37 sex by educational attainment for population 25 years and older) and measures the total population with bachelor's, master's, professional, and doctorate degrees. Data for the percentage of individuals aged 22 to 29 are drawn from the SF3 table (P8 sex by age) and are aimed at identifying those places attractive to younger individuals. The percentage of young adults in a city is considered an indicator of the strength of the local economy and the quality of life. Younger individuals, especially those with college degrees, are more likely to relocate for jobs than others if economic and quality of life conditions are unfavorable (Reisinger, 2003).

Correlation analysis using S-Plus is used to see how closely the human capital variables mirror the portion of the local high-technology economy. It is expected that there will be a strong correlation between education and high technology.

The final stage of analysis ranks counties based on their overall rankings of per capita income by sector and briefly looks at how public policy decisions have affected the quality of human capital. This ranking is achieved by creating a new field in S-Plus and

summing all rankings for each individual high technology sector. The counties with the lowest overall score have the highest degree of involvement in the high-tech sector.

Results should indicate that counties in the Northeast and Midwest are more closely associated with the manufacturing sector than their counterparts in the South and West. With the advantages of knowledge "spillover" described in Marshall's (1920) agglomeration theory, counties with research universities (Carnegie, 2000) located in the vicinity should be near the top in the high-technology rankings.

Geography, especially the location of highly desirable human capital, should play a significant role in the location of the high-technology sector. Even though advances in technology have rendered distance irrelevant in the transformation of information, the critical component in advances in the high-technology sector is human capital. Taking the relationship between technology and geography a step further, Kotkin (2000:6-7) expounds:

> The importance of geography is not dwindling to nothing in the digital era; quite the opposite. In reality, place --geography --matters now more than ever before. If people, companies, or industries can truly live anywhere, or at least choose from a multiplicity of places, the question of where to locate becomes increasingly contingent on the peculiar attributes of any given location. What has changed, and profoundly, are the rules governing geography, and making of successful and unsuccessful places. Perhaps the key rule grows from the realization that where information-processing companies, related services, and skilled professionals choose to locate will increasingly shape the geographic importance of future cities and communities.

Results

Initially, 24 counties were selected for analysis in the study. However, according to the U.S. Census Bureau's statistics for the 2000 decennial census, 39.1% of the population in the District of Columbia had obtained a bachelor's degree or higher, but the average for the rest of the country was only 24.4% (American Fact Finder, 2005). Further examination of the data showed that percentage of the population with a college degree in Washington, D.C. is more than three standard deviations (3.6 standard deviations) away from the sum average of the other 23 study locations (17%). To help remove the possibility of skewing the results of the analysis, Washington D.C. was removed from the study. A list of the 23 counties included in the study, their populations, and associated urban areas are shown in Table1.

The average population for the remaining 23 counties is 517,194. The two counties with the largest population are Jefferson County, Alabama, and Multnomah County, Oregon. The two counties with the smallest population are Lake County, Indiana, and Orleans Parish, Louisiana.

As Figure 4 illustrates, the study includes a fairly wide geographic distribution of counties. The distribution of counties selected for use in the study can, in part, be explained by early settlement patterns and city-planning decisions.

The Eastern U.S. was the first region of the country to be settled by Europeans. Most settlements developed along rivers and other transportation networks to allow better access for trade.

Figure4: Counties Included in the Study

Source: By the Author (2005)

Accordingly, these places, with their easy access to transportation networks and large stocks of available human capital, became centers of production during the industrial age. Over time, places began to expand. By the late nineteenth and early twentieth century, many places had developed in noticeably similar patterns. In attempts to manage development, and its effects on the socioeconomic makeup of communities, many places began to develop city-planning strategies. Some of these strategies led to the development of suburbs.

A prime example is Chicago's pattern of smaller communities on the periphery of the urban core. Another example is the relatively modern Los Angeles pattern of communities linked by an extensive roadway network. In some instances, places grew into large interconnected cities (much like the megalopolis of the Northeast), and others like Portland, Oregon, have placed severe constraints on the way development occurs. These development patterns, and the policies instituted by local governments to manage growth, have had a lasting impact on the spatial patterns we see in cities today. Therefore, since the selection process involved overlay analysis in the GIS of urban areas in relation to county boundaries, it should be no surprise that the sprawling urban areas of the East are better represented than the urban areas in the West.

Two regions where urban density, not the population of an individual city, was used as a determining factor in the selection process were the Chicago and New York City metropolitan areas. Both have a pattern of satellite cities—many rich in the cultural heritage of immigrant communities—developed prior to the introduction of the automobile. Many of these cities are now overwhelmed by suburban growth. Although many of these periphery cities are relatively small, their importance can often

dramatically influence regional economic development. Problems associated with achieving a consensus among multiple governmental entities, each with their own best interests in mind, can sometimes lead to the cancellation of an economic development project before it starts. The need to understand the relationships between local communities and economies on various scales is paramount when considering the implementation of long-term economic development strategies.

Before reviewing the results of this study it is important to understand its limitations. This study is limited to locations that are within a specified population range—within 100,000 of Davidson County, Tennessee. It is also limited to specific economic sectors for a specific time frame. While the ultimate goal of this study is to better understand the relationship between human capital and high-tech industry in Davidson County, Tennessee; it is also focused on determining Davidson County's positioning relative to other similarly sized counties in the study for the variables examined. The conclusions reached in this study are primarily based on analysis at the county level. While it is critical to understand that economies do not begin and end within arbitrarily imposed political boundaries, it is at the county level that the most detailed information for this study is available.

Examination of the general economic sectors data in Table 2 sheds light on the economic makeup of counties in the study. Data for per capita income for selected economic sectors are ranked by county to assist in identifying each county's strength and weaknesses relative to other counties in the study. While there are limitations to the conclusions that can be drawn at this stage of the analysis from this particular table, it is useful in helping to understand the economic structure of selected counties.

Some interesting trends appear in the data shown in Table 2.

- Counties in the Midwest appear to have a significant portion of their economies committed to manufacturing. The two counties with the highest per capita income derived from manufacturing are Tulsa County, Oklahoma, with $8, 097 and Kent County, Michigan, with $6, 873. These numbers are significant when compared to the average per capita income derived from manufacturing ($3,532) for the entire study group.
- Places that perform well in the professional and technical and information sectors also rank highly in the construction sector. Generally, places in the south and west rank highly in the construction sector, with one noticeable exception—Orleans Parish, Louisiana. While a sluggish local economy is likely the cause for the struggling construction sector in Orleans Parish, the limited amount of developable land and restrictions placed on development by historic preservation ordinances could also be contributing factors.
- Per capita income for the finance, insurance and real estate sector appears to be evenly distributed with one noticeable exception—Hudson County, New Jersey. Hudson County's prominence in this sector can largely be explained by its location. Manhattan Island, with its strong ties to the global financial markets; limited space; and highly priced real estate, lies directly across the Hudson River from Hudson County, New Jersey. Many companies and individuals involved in the finance, insurance and real estate sector are located in Hudson County in order to maintain close-ties with their counterparts in Manhattan.

- Davidson County, Tennessee, and Multnomah County, Oregon, are closely matched in per capita income for all generalized sectors except manufacturing.

To facilitate a better understanding of patterns within the data, cluster analysis was conducted using S-Plus. The fuzzy portioning method of cluster analysis was used to assign counties to individual clusters based on the proportion of their fractional membership within the set of six clusters. After several iterations of cluster analyses were conducted on the general economic sectors data, it was determined that a six-cluster grouping was the most appropriate.

Examination of the cluster analysis results in Table 2 indicates the following:

- Cluster 1 consists of counties that can generally be thought of as underperformers in all general economic categories within the study group.
- Cluster 2 consists of counties that rank slightly higher than their counterparts in cluster 1. Counties in this cluster appear to perform reasonably well in the manufacturing sector.
- Cluster 3 consists of counties with a strong manufacturing presence.
- Cluster 4 consists of one county—Hudson County, New Jersey. Its proximity to Manhattan can explain its exceptional performance in per capita income for finance, insurance and real estate.
- Cluster 5 consists of counties that perform reasonably well when compared to other counties in the study. Although there is not a strong manufacturing presence in these counties, manufacturing is more prominent in these counties than those in cluster 1.

- Cluster 6 consists of counties that generally outperform all other counties in the study group. These counties are well balanced in all sectors.

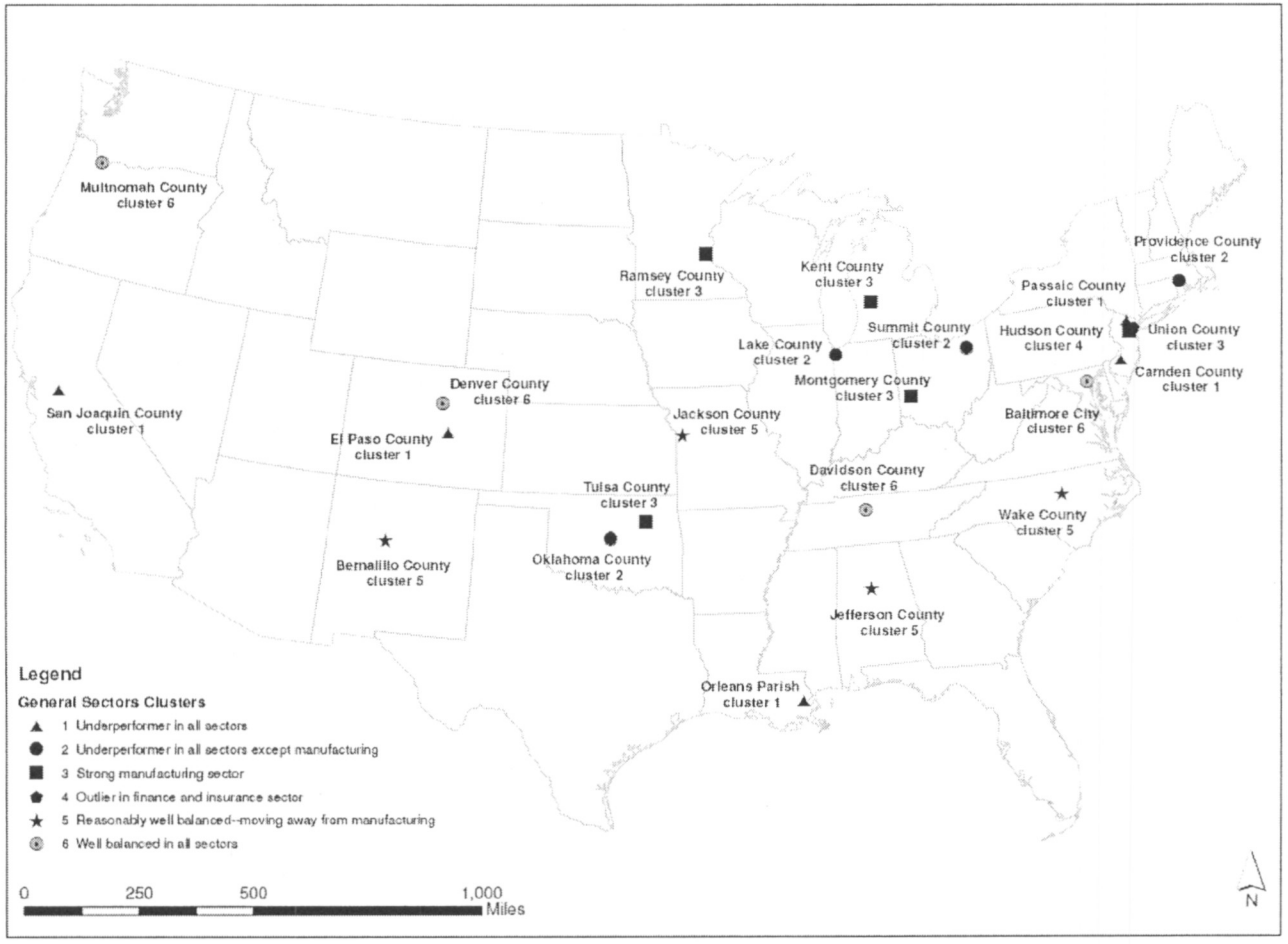
Figure 5 shows the spatial distribution of the results from the general sectors cluster analysis. Clusters one, two, and three (those that indicate either a slow economy or a heavy dependence upon manufacturing) are prominent in the Northeast and Upper Midwest. Clusters five and six are found in all regions, except the Northeast.

It is not surprising that Davidson County, Tennessee, and Multnomah County, Oregon, are assigned to the same cluster; since at this stage of analysis data for the two counties show that they have very similar economies.

Analysis of per capita income data for the three high-tech sector variables (ISPs, electronic manufacturing, and telecommunications) sharpens the focus of the study by identifying those counties that have developed high-tech economies. From examining the data in Table 3, it is apparent that the following are true:

- El Paso County, Colorado, and Ramsey County, Minnesota, have a much stronger electronics manufacturing sector than other counties in the study.
- Denver County, Colorado, has a strong presence in the telecommunications sector.
- Davidson County, Tennessee, and Multnomah County, Oregon, closely resemble one another in the structure of their high-tech sectors.

Figure5: Map of General Economic Sectors Clustering



Source: By the Author (2005)

As with the general economic sectors data, cluster analysis using the fuzzy partitioning method is used to look for patterns in the data. After several iterations of cluster analyses were conducted on the high-tech economic sectors data, it was determined that a five-cluster grouping was the most appropriate.

Results from the cluster analysis indicate the following:

- Cluster 1 consists of counties with a strong high-tech presence; especially in telecommunications.
- Cluster 2 consists of counties with a strong electronics manufacturing presence.
- Cluster 3 is an outlier of the electronics manufacturing sector and consists of one county (El Paso County, Colorado).
- Cluster 4 consists of counties with a balanced presence in all high-tech sectors examined. Davidson County, Tennessee, and Multnomah County, Oregon, are both in this cluster.
- Cluster 5 consists of counties that are underperformers in all three high-tech sectors.

Spatial distribution of the results from the cluster analysis (Fig. 6) indicates that those counties in the study group underperforming in the high-tech sector are generally located in the Northeast and Upper Midwest. Some places, however, in the Northeast rust belt (Camden and Passaic counties in New Jersey) have emphasized electronics manufacturing over other forms of manufacturing.

Unlike the Fordist period when places were left to fade into obscurity after their resources had been depleted, the high-tech economy of today enables even the most

unlikely places to reinvent themselves as technological powerhouses. For instance, Ireland's transformation from an agrarian economy to a high-tech economy in the 1980s shows how public-private partnership can succeed in changing the economic outlook of a place through well-planned development strategies.

Not surprisingly, the high-tech industry appears to be healthy in most of the study locations. This can, in part, be explained by the adaptability of most high-tech industries. Many require limited space and few employees to manage their operations. Often, the two most critical components to the success of high-tech industry in a given area are access to high-speed communications networks and an educated workforce.

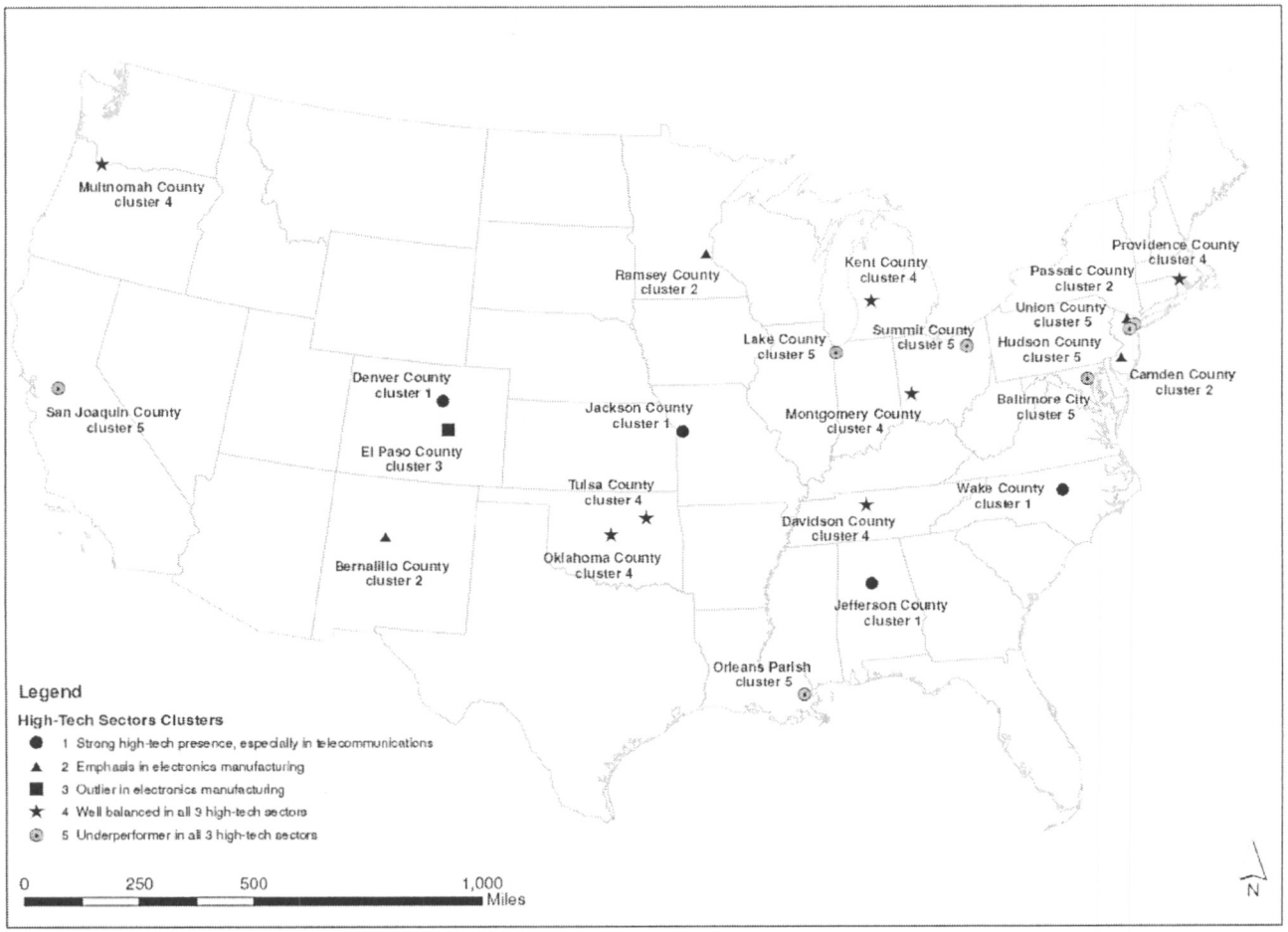
Results of correlation analysis between the percent of the population with a college degree and selected high-tech sectors indicate that there is a significant relationship between the electronic manufacturing and telecommunications variables to the percentage of the population with a college degree in a given place (Table 4).

Correlations between education and high-tech presence

Per Capita Telecommunications	0.5513** (P-value .006)
Per Capita Electronic Manufacturing	0.4850* (P-value .019)
Per Capita ISP	0.2942 (P-value .173)

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Figure6: Map of High-Tech Economic Sector Clustering



Source: By the Author (2005)

Therefore, it should be no surprise that Wake County, North Carolina, and Denver County, Colorado, are at the top of the rankings for percentage of the population with a college degree and fall into the cluster 1 grouping for high-tech sectors variables. The remaining three counties in the top five for college graduates (Ramsey County, Minnesota; Multnomah County, Oregon; and Davidson County, Tennessee) fall within clusters 2 and 4 in the high-tech sectors cluster analysis. Examination of those counties with less educated human capital should reinforce the trends uncovered thus far.

Interestingly, not all the counties at the other end of the spectrum for percentage of population with college degrees fall within the underperformer cluster for the high-tech sector (cluster 5). San Joaquin County, California; Baltimore City, Maryland; and Lake County, Indiana, rank at the bottom of the list for the percentage of the population with college degrees and are grouped into cluster 5, but Passaic County, New Jersey, and Providence County, Rhode Island, are not.

- Passaic County falls within the electronics manufacturing cluster (cluster 2).
- Providence County falls within the balanced high-tech economy cluster (cluster 4).

Passaic County is placed within the electronics manufacturing cluster since its per capita income for that sector is relatively high ($531)—the average is $305. Providence County's placement in cluster 4 is due in large part to its exceptional ranking in per capita income for the ISP sector. However, as the results from the correlation analysis between college education and the high-tech sectors variables show, the ISP sector is not significantly associated with college graduates.

Since it has been established that there is a significant relationship between the percentage of the population with a college degree and the high-tech presence in a particular place, one might also expect to find places with a healthy high-tech economy populated by a high percentage of young adults. Also, if a place is prospering economically, there should be a fairly high percentage of young adults in the population.

Results from the correlation analysis of the percentage of the population between 22 and 29 years old and the high-tech presence indicate that only the telecommunications and ISP sectors are closely associated with young adults in their twenties for the places studied. The P-value for the electronics manufacturing correlation suggests that the null hypothesis should be accepted, there is no significant relationship between the portion of the population between 22 and 29 and the electronics manufacturing sector.

Correlations between youth and high-tech presence

Per Capita Telecommunications	0.5829** (P-value .004)
Per Capita Electronic Manufacturing	0.0753 (P-value .733)
Per Capita ISP	0.3331 (P-value .120)

** Correlation is significant at the 0.01 level (2-tailed)

As expected, the top five counties with the highest percentage of young adults between 22 and 29 years old typically fall within those clusters that are associated with a healthy high-tech economy. A noticeable exception is Hudson County, New Jersey. Hudson County's relatively large portion of the population in its twenties can probably be explained by its proximity to New York City and the significantly lower rents found in Jersey City, New Jersey, relative to Manhattan (Lawless, 2002). The counties with the highest percentage of the population between the ages of 22 and 29 are:

1. Denver County, Colorado (high-tech cluster 1)
2. Hudson County, New Jersey (high-tech cluster 5)
3. Davidson County, Tennessee (high-tech cluster 4)
4. Multnomah County, Oregon (high-tech cluster 4)
5. Wake County, North Carolina (high-tech cluster 1)

It should be no surprise that all of the counties in the top five for the 22 to 29 demographic also have research universities located nearby (Carnegie, 2000). As the results from the study have indicated, there tends to be a relationship between the percentage of the population with college degrees, the percentage of the population in its twenties, and the degree to which a place is involved in the high-tech sector. It would stand to reason that high-tech companies would want to take advantage of this agglomeration of young, talented human capital. Development of facilities near universities, especially research universities, is one way that companies are able to take advantage of knowledge spillover, develop public-private partnerships, and recruit the most qualified individuals.

Ranking the per capita income from the three high-tech sectors examined supports the argument that high-tech industries are often clustered near research universities. The top seven counties (there is a tie for two of the positions) most closely associated with the high-tech sector also have a research university nearby:

1. Wake, NC (RTP)—NC State University/Duke University/UNC-Chapel Hill
2. Davidson, TN—Vanderbilt University
2. Ramsey, MN—University of Minnesota (Twin Cities)/University of St. Thomas

3. Jackson, MO—University of Missouri (Kansas City)
4. El Paso, CO
4. Denver, CO—University of Denver
5. Multnomah, OR—Portland State University

The only county in the top seven that does not have a research university nearby is El Paso County, Colorado. However, El Paso County's proximity to Denver and the U.S. Air Force Academy should be taken into consideration. Wake County, North Carolina, should be considered an anomaly since it is a part of the Research Triangle Park (RTP) that was developed by government entities in the 1970s to encourage scientific inquiry and high-tech growth within North Carolina. The results of the study show that there is a close relationship between education and high-tech per capita income. That is not to say that places with highly-educated human capital will have a significant presence in the high-tech economy, but that places with well-educated individuals are more likely to attract high-tech industries.

As predicted, Nashville-Davidson County ranks highly against other similarly sized counties that constitute the urban core of MSAs. Davidson County consistently ranks in the top ten for all variables studied. More important, Davidson County ranks fifth in the percentage of the population who are college graduates and third in the percentage of the population between the ages of 22 and 29.

According to the variables analyzed in this study, it would appear that Davidson County, Tennessee, is in an excellent position to benefit from its highly prized human capital. But the availability of human capital alone is not enough to ensure economic growth. Local governments, and their public policy decisions, dramatically influence the

long-term economic viability of a place. Therefore, it is crucial that governments be meticulous in their research before instituting changes in public policy.

Conclusion

Profound changes in the structure of the global economy since the end of World War II have drastically affected the way governments, businesses, and individuals interact with one another. The steps that nations, regions, and cities take now to enhance their position in the global economy will determine their economic outlook for years to come. By closely examining their strengths and weaknesses, places can accurately determine the best strategies to encourage economic development without incurring unwanted social, economic, and environmental costs. Difficult choices involving the selection of appropriate economic development strategies for a particular place, the allocation of funding for programs, and the determination of a program's benefits over time weigh heavily on the minds of concerned public policy officials seeking to enhance the economic outlook of a particular place. Wise policy decisions come from careful study of the problem before acting.

Much research has been conducted on the competitiveness of urban regions, but to a lesser extent on cities and counties. This difference can partially be explained by the relative ease in which data for regions (MSAs) can be obtained, but also by the fact that economic influences do not stop at artificial political boundaries. Since widespread transportation networks enable individuals to commute long distances for work, analysts are often interested in the economic health of the entire region. However, by conducting analysis at the MSA level, it is difficult to observe local economic patterns for selected places within MSAs. Even when the smaller component units of MSAs are examined, they are often lumped together with places of varying populations—sometimes yielding misleading results. Comparing like-sized urban counties (based on population) in

economic analysis creates a much clearer picture of economic forces at work within a group of similar places.

Identifying the types of businesses present in a place, and their relationships to one another, through cluster analysis of economic inputs and outputs has been widely used as an economic development tool in determining urban competitiveness. But as companies and individuals become more mobile, understanding how human capital is attracted and retained by communities has become a prominent aspect of economic development strategies. Although manufacturing companies may look abroad for cheaper land, labor, and materials to lower production costs, the service economy of North America requires a variety of specialized skills that can often only be acquired through years of training. Well-educated individuals in specific industries often have a number of opportunities available to them at any one time. Both the companies that employ these individuals and the cities in which these companies are located look for ways to retain highly skilled human capital.

Mid-sized U.S. cities may not play as prominent a role in the global economy as places like New York City and San Francisco, but they often provide much needed support functions for their better-connected brethren. For instance, Nashville, Tennessee, is connected to Los Angeles, New York City, and London through its connections in the music publishing and entertainment industries. Granted, it is not difficult to imagine Nashville's linkages to the entertainment industry, but the point is that often the ways places are economically dependent upon one another may not be readily apparent. Only through close examination of carefully selected variables can one correctly identify those places that are truly competitive.

Examining the distribution of human capital and high-tech employment provides a starting point for further analysis into the relationship between public policy decisions and economic development. With the data provided in this study, certain spatial patterns are apparent in the distribution of human capital in mid-sized U.S. cities.

Glaeser and Saiz (2003:43) associate climate and education with growth:

> Human capital predicts population and productivity growth at the city and metropolitan area level as surely as it predicts income growth at the country level. High skill areas have been getting more populous, better paid and more expensive. Indeed, aside from climate, skill composition may be the most powerful predictor of urban growth.

Indeed, as data from this study indicate, climate appears to have an impact on the distribution of human capital and high-technology jobs. Many counties in the Northeast and Midwest appear to be experiencing a shortage of both skilled workers and jobs in new growth technology sectors. But there are also places (Ramsey County, Minnesota; Denver County, Colorado; El Dorado County, Colorado; and Multnomah County, Oregon) where climate does not appear to be hindering the agglomeration of skilled human capital. These places, with the exception of El Dorado County, Colorado, can lay claim to at least one research university. These trends lend credence to Glaeser and Saiz's (2003) observation that climate and education are both strong predictors of urban growth.

An interesting trend observed in the study was the uncanny resemblance between the demographic makeup of Davidson County, Tennessee, and that of Multnomah County, Oregon.

Although Multnomah County has a much larger population (nearly 100,000 more than Davidson County), the two counties have a nearly identical percentage of college graduates—20.72% and 20.20%, respectively. Further research should be conducted to look for similarities and differences in public policy decisions that influence economic

development in Multnomah and Davidson counties. Clearly understanding what makes a place attractive to human capital will become increasingly important as technology alters the cultural and business landscapes.

Analysis of demographic trends, economic inputs and outputs, and other variables give researchers a glimpse of the forces at work for a particular place at one point in time.

But it is necessary to study trends over an extended period of time to gain a clear understanding of the economic forces at work within a particular area. Analyzing the relationship of government structure, climate, housing costs and other externalities to economic development is necessary to put a study into context. Places are inherently different. Without understanding the physical, social, and cultural aspects of a place, it is difficult to design an appropriate plan for economic development. A fundamental component of any economic development program is developing a close working relationship with public policy makers.

Public policy decisions instituted at different levels of government shape the long-term economic viability of a place. The embargo on the export of certain agricultural products to the Soviet Union after the invasion of Afghanistan was a contributing factor to the foreclosure of many family-owned farms in the United States during the 1980s. The modification of usury laws in Maryland and South Dakota led to their development as powerhouses in the credit industry. A focus on crime reduction and redevelopment changed the cultural, economic, and physical landscape of Times Square in New York City from a seedy red-light district to a bustling retail center. While public policy decisions at the national and regional level are not easily influenced by local

governments, it is usually decisions made at the local level that have the greatest impact on economic development.

Davidson County, Tennessee, has experienced significant changes over the last ten years. Its physical landscape has changed with the construction of a downtown sports arena, a football stadium, and several high-rise office towers. Davidson County's cultural landscape has changed with an influx of immigrants from Central and South America. The cultural landscape has also been changed with the construction of a new main public library, a new center for the visual arts, and a new symphony hall in the heart of downtown. It is apparent that public policy makers in Davidson County are interested in creating a more sophisticated image of the city than what has previously been marketed. Selling the city as the "home of country music" is not going to lure a multi-national corporation from another part of the country to Nashville. On the other hand, promoting the relatively mild climate, quality of life, local amenities, and business advantages has proven reasonably successful in attracting major companies to the region in recent years.

As this study indicates, quality human capital can attract high-tech industry. High-tech industry is dramatically influencing the way other industries operate. Attracting quality human capital and developing a balanced high-tech sector is becoming more prevalent in local economic development strategies as public officials begin to realize the far reaching effects of the global economy.

A few human capital development strategies that Davidson County, Tennessee, has already implemented include:

- The development of a strategic plan for long-term downtown development (The Plan of Nashville). A well planned city can improve the quality of life of

its citizens by reducing traffic congestion, ensuring land uses are appropriate for a given area, and improving the overall aesthetic of the urban environment.

- Encouraging the construction of downtown mixed-use developments to attract young professionals to the urban core. A nighttime population of residential homeowners keeps a place from appearing deserted at the end of the business day.
- The construction of parks, greenways, and other amenities. The more activities a place has to offer, the more attractive it appears to those considering relocating to the area.
- Offering subsidies for companies that offer internships in selected career fields. Developing relationships with local companies through co-operative education and internships helps individuals transition more easily into the workforce.

Other human capital development strategies that Davidson County can implement to improve its economic outlook include:

- Recognizing that the county's rapidly growing immigrant population plays a vital role in the local economy. Low skill jobs that employ large portions of the immigrant population are often overlooked in economic development strategies, but without these people many of the services we take for granted would not be available.
- Develop stronger public-private partnerships between businesses and universities. Communication among individuals in the same field is crucial to the creation of new ideas.

- Promote a business environment where individuals are encouraged to take risks in developing new companies and technologies. This type of business environment has been partially credited with the success of the high-tech Silicon Valley in California.

The important thing that public policy makers in places like Davidson County, Tennessee, need to be aware of is the constantly changing nature of the economy. What is sound policy for one place at a particular point in time may not be appropriate for another place at some other time.

This study's results indicate that Davidson County, Tennessee, has an advantage over other similarly sized counties in the amount and quality of its human capital. This advantage in human capital and the balance of Davidson County's high-tech economic sector (for the variables studied) suggests that Nashville is poised to make great strides economically in the global high-tech economy. One key component of this study that should not be overlooked is the fact that geography matters. Geography plays an important role in shaping the social, physical, and economic landscape of a place. Failure to understand the geographic component of a particular research problem can lead one to draw incorrect conclusions.

Appendix 1: General Economic Sectors Descriptions

Finance and Insurance

The Finance and Insurance NAICS sector comprises establishments primarily engaged in financial transactions (transactions involving the creation, liquidation, or change in ownership of financial assets) and/or in facilitating financial transactions. Three principal types of activities are identified:

1. Raising funds by taking deposits and/or issuing securities and, in the process, incurring liabilities. Establishments engaged in this activity use raised funds to acquire financial assets by making loans and/or purchasing securities. Putting themselves at risk, they channel funds from lenders to borrowers and transform or repackage the funds with respect to maturity, scale and risk. This activity is known as financial intermediation.
2. Pooling of risk by underwriting insurance and annuities. Establishments engaged in this activity collect fees, insurance premiums, or annuity considerations; build up reserves; invest those reserves; and make contractual payments. Fees are based on the expected incidence of the insured risk and the expected return on investment.
3. Providing specialized services facilitating or supporting financial intermediation, insurance, and employee benefit programs.

In addition, monetary authorities charged with monetary control are included in this sector.

The subsectors, industry groups, and industries within the NAICS Finance and Insurance sector are defined on the basis of their unique production processes. As with all

industries, the production processes are distinguished by their use of specialized human resources and specialized physical capital. In addition, the way in which these establishments acquire and allocate financial capital, their source of funds, and the use of those funds provides a third basis for distinguishing characteristics of the production process. For instance, the production process in raising funds through deposit-taking is different from the process of raising funds in bond or money markets. The process of making loans to individuals also requires different production processes than does the creation of investment pools or the underwriting of securities.

Most of the Finance and Insurance subsectors contain one or more industry groups of (1) intermediaries with similar patterns of raising and using funds and (2) establishments engaged in activities that facilitate, or are otherwise related to, that type of financial or insurance intermediation.

Industries within this sector are defined in terms of activities for which a production process can be specified, and many of these activities are not exclusive to a particular type of financial institution. To deal with the varied activities taking place within existing financial institutions, the approach is to split these institutions into components performing specialized services. This requires defining the units engaged in providing those services and developing procedures that allow for their delineation. These units are the equivalents for finance and insurance of the establishments defined for other industries.

The output of many financial services, as well as the inputs and the processes by which they are combined, cannot be observed at a single location and can only be defined at a higher level of the organizational structure of the enterprise. Additionally, a number

of independent activities that represent separate and distinct production processes may take place at a single location belonging to a multilocation financial firm. Activities are more likely to be homogeneous with respect to production characteristics than are locations, at least in financial services. The classification defines activities broadly enough that it can be used both by those classifying by location and by those employing a more top-down approach to the delineation of the establishment.

Establishments engaged in activities that facilitate, or are otherwise related to, the various types of intermediation have been included in individual subsectors, rather than in a separate subsector dedicated to services alone because these services are performed by intermediaries as well as by specialist establishments and the extent to which the activity of the intermediaries can be separately identified is not clear.

The Finance and Insurance sector has been defined to encompass establishments primarily engaged in financial transactions; that is, transactions involving the creation, liquidation, or change in ownership of financial assets or in facilitating financial transactions. Financial industries are extensive users of electronic means for facilitating the verification of financial balances, authorizing transactions, transferring funds to and from transactors' accounts, notifying banks (or credit card issuers) of the individual transactions, and providing daily summaries. Since these transaction processing activities are integral to the production of finance and insurance services, establishments that principally provide a financial transaction processing service are classified to this sector, rather than to the data processing industry in the Information sector.

Legal entities that hold portfolios of assets on behalf of others are significant and data on them are required for a variety of purposes. Thus for NAICS, these funds, trusts,

and other financial vehicles are the fifth subsector of the Finance and Insurance sector. These entities earn interest, dividends, and other property income, but have little or no employment and no revenue from the sale of services. Separate establishments and employees devoted to the management of funds are classified in Industry Group 5239, Other Financial Investment Activities.

Professional and Technical Services

The Professional, Scientific, and Technical Services NAICS sector comprises establishments that specialize in performing professional, scientific, and technical activities for others. These activities require a high degree of expertise and training. The establishments in this sector specialize according to expertise and provide these services to clients in a variety of industries and, in some cases, to households. Activities performed include: legal advice and representation; accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer services; consulting services; research services; advertising services; photographic services; translation and interpretation services; veterinary services; and other professional, scientific, and technical services.

This sector excludes establishments primarily engaged in providing a range of day-to-day office administrative services, such as financial planning, billing and recordkeeping, personnel, and physical distribution and logistics. These establishments are classified in Sector 56, Administrative and Support and Waste Management and Remediation Services.

Construction

The term "Construction" is used in both the SIC system and in NAICS, but it does not have the same definition in both systems.

SIC Definition

This SIC division includes establishments primarily engaged in construction. The term construction includes new work, additions, alterations, reconstruction, installations, and repairs. Construction activities are generally administered or managed from a relatively fixed place of business, but the actual construction work is performed at one or more different sites. If a company has more than one relatively fixed place of business from which it undertakes or manages construction activities and for which separate data on the number of employees, payroll, receipts, and other establishment-type records are maintained, each such place of business is considered a separate construction establishment.

Three broad types of construction activity are covered: (1) building construction by general contractors or by operative builders; (2) heavy construction other than building by general contractors and special trade contractors; and (3) construction activity by other special trade contractors.

NAICS Definition

The Construction (NAICS) sector comprises establishments primarily engaged in the construction of buildings and other structures, heavy construction (except buildings), additions, alterations, reconstruction, installation, and maintenance and repairs. Establishments engaged in demolition or wrecking of buildings and other structures, clearing of building sites, and sale of materials from demolished structures are also included. This sector also includes those establishments engaged in blasting, test drilling,

landfill, leveling, earthmoving, excavating, land drainage, and other land preparation. The industries within this sector have been defined on the basis of their unique production processes. As with all industries, the production processes are distinguished by their use of specialized human resources and specialized physical capital. Construction activities are generally administered or managed at a relatively fixed place of business, but the actual construction work is performed at one or more different project sites.

This sector is divided into three subsectors of construction activities: (1) building construction and land subdivision and land development; (2) heavy construction (except buildings), such as highways, power plants, and pipelines; and (3) construction activity by special trade contractors.

Manufacturing

The term "Manufacturing" is used in both the SIC system and in NAICS, but it does not have the same definition in both systems.

SIC Definition

The manufacturing SIC division includes establishments engaged in the mechanical or chemical transformation of materials or substances into new products. These establishments are usually described as plants, factories, or mills and characteristically use power driven machines and materials handling equipment. Establishments engaged in assembling component parts of manufactured products are also considered manufacturing if the new product is neither a structure nor other fixed improvement. Also included is the blending of materials, such as lubricating oils, plastics resins, or liquors.

NAICS Definition

The Manufacturing NAICS sector comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. The assembling of component parts of manufactured products is considered manufacturing, except in cases where the activity is appropriately classified in Sector 23, Construction.

Establishments in the Manufacturing sector are often described as plants, factories, or mills and characteristically use power-driven machines and materials-handling equipment. However, establishments that transform materials or substances into new products by hand or in the worker's home and those engaged in selling to the general public products made on the same premises from which they are sold, such as bakeries, candy stores, and custom tailors, may also be included in this sector. Manufacturing establishments may process materials or may contract with other establishments to process their materials for them. Both types of establishments are included in manufacturing.

Information

The Information NAICS sector comprises establishments engaged in the following processes: (a) producing and distributing information and cultural products, (b) providing the means to transmit or distribute these products as well as data or communications, and (c) processing data.

The main components of this sector are the publishing industries, including software publishing, and both traditional publishing and publishing exclusively on the Internet; the motion picture and sound recording industries; the broadcasting industries, including traditional broadcasting and those broadcasting exclusively over the Internet;

the telecommunications industries; the industries known as Internet service providers and Web search portals; data processing industries; and the information services industries.

Appendix 2: Technology Sector Descriptions

ISPs, Search Portals, and Data Processing

Industries in the Internet Service Providers, Web Search Portals, and Data Processing Services NAICS subsector group establishments that provide: (1) access to the Internet; (2) search facilities for the Internet; and (3) data processing, hosting, and related services.

Telecommunications

Industries in the Telecommunications NAICS subsector include establishments providing telecommunications and the services related to that activity. The Telecommunications subsector is primarily engaged in operating, maintaining, and/or providing access to facilities for the transmission of voice, data, text, sound, and video. A transmission facility may be based on a single technology or a combination of technologies.

Credit intermediation and related activities

Industries in the Credit Intermediation and Related Activities NAICS subsector group establishments that (1) lend funds raised from depositors; (2) lend funds raised from credit market borrowing; or (3) facilitate the lending of funds or issuance of credit by engaging in such activities as mortgage and loan brokerage, clearinghouse and reserve services, and check cashing services.

Computer and Electronic Product Manufacturing

Industries in the Computer and Electronic Product Manufacturing NAICS subsector group establishments that manufacture computers, computer peripherals,

communications equipment, and similar electronic products, and establishments that manufacture components for such products.

The Computer and Electronic Product Manufacturing industries have been combined in the hierarchy of NAICS because of the economic significance they have attained. Their rapid growth suggests that they will become even more important to the economies of all three North American countries in the future, and in addition their manufacturing processes are fundamentally different from the manufacturing processes of other machinery and equipment. The design and use of integrated circuits and the application of highly specialized miniaturization technologies are common elements in the production technologies of the computer and electronic subsector.

Convergence of technology motivates this NAICS subsector. Digitalization of sound recording, for example, causes both the medium (the compact disc) and the equipment to resemble the technologies for recording, storing, transmitting, and manipulating data. Communications technology and equipment have been converging with computer technology. When technologically-related components are in the same sector, it makes it easier to adjust the classification for future changes, without needing to redefine its basic structure.

The creation of the Computer and Electronic Product Manufacturing subsector will assist in delineating new and emerging industries because the activities that will serve as the probable sources of new industries, such as computer manufacturing and communications equipment manufacturing, or computers and audio equipment are brought together. As new activities emerge, they are less likely therefore, to cross the subsector boundaries of the classification.

Table 1 Selected Counties: Their Populations and Associated Urban Areas

County	Population	Urban Area
Lake County, Indiana	484,564	Hammond
Orleans Parish, Louisiana	484,674	New Orleans
Passaic County, New Jersey	489,049	New York City Metro Area
Camden County, New Jersey	508,932	Camden
Ramsey County, Minnesota	511,035	Minneapolis-Saint Paul Metro Area
El Paso County, Colorado	516,929	Colorado Springs
Union County, New Jersey	522,541	New York City Metro Area
Summit County, Ohio	542,899	Akron
Denver County, Colorado	554,636	Denver
Bernalillo County, New Mexico	556,678	Albuquerque
Montgomery County, Ohio	559,062	Dayton
Tulsa County, Oklahoma	563,299	Tulsa
San Joaquin County, California	563,598	Stockton
Davidson County, Tennessee	569,891	Nashville
Kent County, Michigan	574,335	Grand Rapids
Hudson County, New Jersey	608,975	New York City Metro Area
Providence County, Rhode Island	621,602	Providence
Wake County, North Carolina	627,846	Raleigh
Baltimore City, Maryland	651,154	Baltimore
Jackson County, Missouri	654,880	Kansas City
Oklahoma County, Oklahoma	660,448	Oklahoma City
Multnomah County, Oregon	660,486	Portland
Jefferson County, Alabama	662,047	Birmingham

Source: Compiled from the ESRI data CD (2002)

Table 2: General Economic Sectors Data

COUNTY	FINANCE INSURANCE PER CAPITA	FINANCE INSURANCE RANK	PROF & TECH PER CAPITA	PROF & TECH RANK	CONSTR. PER CAPITA	CONSTR. RANK	MANUF PER CAPITA	MANUF RANK	INFO PER CAPITA	INFO RANK	6 CLUSTER ANALYSIS
BALT CITY, MD	$ 4,239	3	$ 4,253	6	$ 1,730	11	$ 2,565	17	$ 922	13	6
BERNALILLO, NM	$ 1,609	13	$ 4,449	5	$ 2,068	7	$ 1,862	20	$ 911	14	5
CAMDEN, NJ	$ 887	21	$ 1,836	19	$ 1,052	21	$ 2,051	18	$ 498	18	1
DAVIDSON, TN	$ 3,219	5	$ 4,576	4	$ 2,232	6	$ 3,831	9	$ 1,650	6	6
DENVER, CO	$ 5,672	2	$ 6,858	1	$ 2,956	1	$ 2,633	16	$ 4,624	1	6
EL PASO, CO	$ 945	20	$ 2,098	13	$ 1,314	17	$ 2,033	19	$ 1,017	12	1
HUDSON, NJ	$ 8,385	1	$ 2,016	15	$ 824	22	$ 1,584	21	$ 1,318	9	4
JACKSON, MO	$ 3,070	6	$ 3,934	7	$ 2,374	5	$ 2,637	15	$ 2,563	2	5
JEFFERSON, AL	$ 2,857	7	$ 3,439	9	$ 2,429	4	$ 2,803	13	$ 1,460	8	5
KENT, MI	$ 1,516	14	$ 1,952	17	$ 1,585	13	$ 6,873	2	$ 495	19	3
LAKE, IN	$ 569	23	$ 674	22	$ 1,493	14	$ 3,714	11	$ 179	23	2
MONTGOMERY, OH	$ 1,110	17	$ 2,029	14	$ 1,085	20	$ 5,304	4	$ 1,039	11	3
MULTNOMAH, OR	$ 3,652	4	$ 4,787	2	$ 2,752	3	$ 4,387	6	$ 1,669	5	6
OAKLAHOMA, OK	$ 1,404	15	$ 1,897	18	$ 1,178	19	$ 4,156	7	$ 885	15	2
ORLEANS, LA	$ 1,071	18	$ 2,245	12	$ 525	23	$ 757	23	$ 448	20	1
PASSAIC, NJ	$ 974	19	$ 1,253	21	$ 1,383	16	$ 2,722	14	$ 382	21	1
PROVIDENCE, RI	$ 2,769	8	$ 2,015	16	$ 1,633	12	$ 3,769	10	$ 1,124	10	2
RAMSEY, MN	$ 2,720	9	$ 2,595	11	$ 1,993	8	$ 5,110	5	$ 1,546	7	3
SAN LOAQUIN, CA	$ 610	22	$ 626	23	$ 1,440	15	$ 1,501	22	$ 251	22	1
SUMMIT, OH	$ 1,209	16	$ 1,459	20	$ 1,248	18	$ 4,022	8	$ 516	17	2
TULSA, OK	$ 1,798	11	$ 3,042	10	$ 1,946	9	$ 8,097	1	$ 2,051	4	3
UNION, NJ	$ 1,666	12	$ 3,481	8	$ 1,845	10	$ 5,730	3	$ 802	16	3
WAKE, NC	$ 2,033	10	$ 4,655	3	$ 2,774	2	$ 3,104	12	$ 2,409	3	5

Source: Compiled from the Bureau of Economic Analysis (2005)

Table 3: High-Tech Economic Sectors Data

COUNTY	ISP PER CAPITA	ISP RANK	ELECTMANUF PER CAPITA	ELECT MANUF RANK	TELECOM PER CAPITA	TELECOM RANK	TOTAL SCORE HIGH TECH	TOTAL HIGH TECH RANK	5 CLUSTER ANALYSIS
BALT CITY, MD	$ 64	17	$ 44	18	$ 321	11	36	12	5
BERNALILLO, NM	$ 106	13	$ 594	4	$ 358	9	26	8	2
CAMDEN, NJ	$ 71	16	$ 432	6	$ 211	16	38	15	2
DAVIDSON, TN	$ 225	4	$ 279	8	$ 476	7	19	2	4
DENVER, CO	$ 156	6	$ 120	14	$ 1,607	1	21	5	1
EL PASO, CO	$ 91	15	$ 1,546	1	$ 723	5	21	5	3
HUDSON, NJ	$ 155	7	$ 25	20	$ 257	14	41	16	5
JACKSON, MO	$ 438	1	$ 100	15	$ 796	4	20	4	1
JEFFERSON, AL	$ 113	12	$ 11	22	$ 935	2	36	12	1
KENT, MI	$ 28	21	$ 278	9	$ 201	19	49	19	4
LAKE, IN	$ 5	23	$ 5	23	$ 85	23	69	23	5
MONTGOMERY, OH	$ 124	9	$ 227	10	$ 202	18	37	14	4
MULTNOMAH, OR	$ 187	5	$ 302	7	$ 352	10	22	7	4
OAKLAHOMA, OK	$ 119	11	$ 185	11	$ 398	8	30	10	4
ORLEANS, LA	$ 94	14	$ 23	21	$ 142	22	57	21	5
PASSAIC, NJ	$ 45	18	$ 531	5	$ 194	20	43	17	2
PROVIDENCE, RI	$ 288	3	$ 131	13	$ 203	17	33	11	4
RAMSEY, MN	$ 397	2	$ 1,076	2	$ 252	15	19	2	2
SAN JOAQUIN, CA	$ 20	22	$ 26	19	$ 152	21	62	22	5
SUMMIT, OH	$ 35	19	$ 94	16	$ 258	13	48	18	5
TULSA, OK	$ 120	10	$ 170	12	$ 610	6	28	9	4
UNION, NJ	$ 31	20	$ 92	17	$ 318	12	49	19	5
WAKE, NC	$ 126	8	$ 744	3	$ 826	3	14	1	1

Source: Compiled from the Bureau of Economic Analysis (2005)

Table 4: College and 22-29 Statistics

County	PERCENTAGE AGED 22-29	RANK PERCENTAGE AGED 22-29	PERCENTAGE OF POPULATION COLLEGE GRADUATES	RANK PERCENTAGE COLLEGE GRADUATES
Baltimore City, Maryland	11.36%	14	12.34%	21
Bernalillo County, New Mexico	11.39%	13	19.66%	7
Camden County, New Jersey	9.82%	22	15.66%	16
Davidson County, Tennessee	14.18%	3	20.20%	5
Denver County, Colorado	16.33%	1	23.27%	2
El Paso County, Colorado	11.67%	11	19.69%	6
Hudson County, New Jersey	15.02%	2	16.97%	10
Jackson County, Missouri	11.53%	12	15.29%	17
Jefferson County, Alabama	11.23%	15	16.14%	13
Kent County, Michigan	11.81%	9	15.82%	15
Lake County, Indiana	10.01%	20	10.38%	22
Montgomery County, Ohio	10.39%	18	14.99%	18
Multnomah County, Oregon	13.71%	4	20.72%	4
Oklahoma County, Oklahoma	12.38%	6	16.17%	12
Orleans Parish, Louisiana	11.96%	8	15.97%	14
Passaic County, New Jersey	10.84%	16	13.72%	20
Providence County, Rhode Island	10.60%	17	13.81%	19
Ramsey County, Minnesota	12.37%	7	21.72%	3
San Joaquin County, California	10.05%	19	8.60%	23
Summit County, Ohio	9.77%	23	16.78%	11
Tulsa County, Oklahoma	11.76%	10	17.17%	9
Union County, New Jersey	9.99%	21	19.18%	8
Wake County, North Carolina	13.70%	5	28.20%	1

Source: Compiled from the U.S. Census Bureau's American FactFinder (2005)

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