Planning for growth

What can Middle Tennessee expect in the next 15 years?
Jennings and Rebecca Jones are visionaries. They form a mental picture of the future they want to see and set about making that future a reality. The Jennings and Rebecca Jones Chair of Excellence in Urban and Regional Planning at MTSU is the result of their vision.

This issue of Tennessee's Business is a first step in using the resources the Joneses provided to impact the future of Middle Tennessee. We do not claim to have answers to all the issues addressed here. We simply hope to promote dialog on these critical subjects.

With the help of Earl Swensson, special consultant to the chair, we have accumulated articles from some very notable Middle Tennesseans. We hope and believe that what they have to say will stimulate interest in and conversation about these concerns. If so, the future the Joneses envisioned will be well on its way — a future where a well-informed citizenry is involved in creating growth plans that not only save money but improve the well-being of everyone in Middle Tennessee.

E.J. Burton, Ph.D.
Executive Director
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Cover: Downtown Nashville, courtesy/Tennessee Tourist Development
Planning Middle Tennessee

The Bicentennial Capitol Mall is one of many areas in Nashville beginning to see some development. Courtesy Tennessee Tourist Development
Middle Tennessee is undergoing tremendous growth, perhaps greater than at any time in its past. From 1970 to 1996, the population of the Metropolitan Statistical Area (MSA), the eight-county region including Davidson, increased by more than 418,000, or 61.3 percent, in comparison to a 35.6 percent increase for the state. The greatest population growth is taking place in the outlying counties — Rutherford, Williamson, Sumner, Montgomery, and Wilson — all of which had increases of 70 percent or greater. This so-called doughnut growth is typical of many rapidly growing metropolitan areas. The percentage increase in the regional population contributed by Davidson County actually declined in relationship to the outlying counties. The highest rate of increase took place in Williamson County, an amazing 209 percent.

There are many reasons Middle Tennessee is a popular place in which to live and work. With a favorable climate, good geographic location, stable work force, friendly business environment, and abundant opportunities for recreation, more and more businesses are choosing to locate here. Nashville’s cost of living is lower than that of many other cities its size. Being located within 650 miles of fifty percent of the country’s population is a plus.

But there is more to it than that; the people make Middle Tennessee the special and unique place it is. A genteel quality, a spirit, thrives among the people here and gives our community its personality. In planning for the future, we need to do whatever we can to promote this spirit.

Traditionally Nashville and the surrounding area were known primarily for a limited number of industries, including agriculture, education, insurance, tourism, and music. Many people outside the state may have thought of Middle Tennessee as primarily rural and unsophisticated, but this is rapidly changing. The advent of TVA transformed the character of the Tennessee Valley and made large-scale economic growth possible. While the traditional industries made important contributions to the regional economy, they didn’t take full advantage of the area’s resources.

We are seeing a tremendous increase in the types of businesses formed here. Our long history of entrepreneurship has resulted in much of our current prosperity. The economy is becoming more diverse. Opportunities abound to create new businesses. The region has become a home for many major corporations. Thriving industries include healthcare, publishing and other media, manufacturing, and construction.

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Since the mid-'80s, Middle Tennessee and the mid-South have become home to a growing automotive industry. Automotive-related jobs account for more than 95,000 jobs, 3.5 percent of all jobs in Tennessee.

Now we have a National Football League team, an arena football team, and a National Hockey League team. There are more opportunities than ever to experience the arts; theater, opera, and drama are increasingly popular.

In the MSA, there is diversity of employment. The major categories are: services (28%); wholesale and retail trade (24%); manufacturing (18%); government (13%); transportation, communication, and public utilities (5%); finance, insurance, and real estate (7%); and construction (5%). Middle Tennessee is internationally noted for its music industry, auto production, healthcare management, and publishing.

With the enormous benefits of the region’s growth come some negative consequences. In Nashville, we are experiencing many of the problems typically associated with the growth of urban areas — the results of unbridled growth and lack of planning. Landmarks are disappearing, to be replaced by new subdivisions and shopping centers. Highway congestion threatens the quality of our lives. Crime rates continue to be troublesome. Local schools have become so crowded it is necessary to use portable classrooms to provide additional space, and many people are concerned about the quality of education our schools provide. Pollution and environmental concerns are increasing. In some areas, aging water and sewer systems are severely overburdened and need to be modernized. Although the majority of our region is still rural, it is becoming increasingly urban and will face many of the same problems other cities experience. We need to begin long-term planning at the regional level to avoid the fate of some other communities that grew too fast, too soon.

One of the greatest needs of our area is the creation of a center for regional planning. Our current system of planning is inefficient and fragmented, based on outdated notions. We are so used to planning at one level only, whether city, county, or state, that we aren’t able to come up with a master plan to benefit the majority of inhabitants. Under the old system, we looked at each locality in isolation, not as part of a greater whole. In our new culture, we may live in one county, work in another, and shop in yet another. Life is much more complex than it was 20 or 30 years ago.

It might be beneficial to look at the consolidation of city and county government in Davidson County. When this occurred in the '60s, many people were skeptical and feared only the needs of the larger cities would be taken into account. As we look back, we see the advantages of this type of government. Much has been gained. The new culture recognizes there are no longer independent cities and counties, but we are truly interdependent and must find solutions to our common problems.

Throughout the region, we face many common problems and must come up with workable solutions. We need to turn these problems into opportunities for growth and prosperity. Some organizations exist that make valuable contributions to the planning process, particularly at the city and county level. There has been a resurgence of interest in master planning. Citizens are looking

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at examples of outstanding urban planning. Groups are studying economic trends and demographic characteristics of the region to formulate long-term regional planning strategies. Individual chambers of commerce in cities and counties make valuable contributions to the local planning process, but don’t always represent the interests of the region as a whole.

Partnership 2000, an economic development initiative of the Nashville Area Chamber of Commerce, is looking at the 21-county area of Middle Tennessee. The Greater Nashville Regional Council provides valuable information to planning groups. Researchers at MTSU’s Business and Economic Research Center and other local universities are studying the question. Study groups are being formed at MTSU to define our future course of action. All these are steps in the right direction.

Now that such efforts are under way, it is vital that this information be put to good use. The creation of a new chair at MTSU, the Jennings and Rebecca Jones Chair of Excellence, is the first step in planning for the future. Through the generosity of the Jones family, MTSU will establish a chair to study planning issues in Middle Tennessee. It seems especially appropriate that this should happen at MTSU, whose growth has paralleled the growth of the region. With so many possibilities before us, we will need to make important decisions; the next 15 years will be critical for our future. The Jones Chair could become the center of our master planning resources and focus all efforts to collect and study information on issues related to regional planning.

This chair, charged with the task of promoting multi-county actions throughout Middle Tennessee, can be a platform to introduce new concepts and ideas to benefit the region as a whole. In the past, there have been attempts to bring people together to solve such problems, but they were seldom successful. Many citizens felt their interests weren’t being taken into account. Smaller towns and cities feared their interests were not respected. Under the old system, things weren’t done in a way that benefited everyone, primarily due to a lack of leadership. Leadership will be a critical factor, and we will need a variety of leaders from many different disciplines. We have to look at our area from a totally new perspective.

Master planning has proven to be an effective tool in creating such environments. The rejuvenation of Lower Broadway is an outstanding example of a master plan that worked. It is no accident that downtown Nashville has become a popular destination for tourists and locals alike. As early as the ‘70s, civic leaders saw the need to implement a comprehensive master plan to address the decline of the downtown area.

Twelve key areas have been targeted: communications, transportation, the economy, health care, corrections, culture, government partnering, land use, the environment, historic preservation, education, and the media.

We are just now seeing the results of their vision, a host of new restaurants, clubs, businesses, and housing units downtown. A lesson we can learn from such a successful master planning project is that it was only achieved when people representing a variety of interests worked together to accomplish a well defined goal. Although it didn’t happen overnight, the results were worth the wait.

There are about 355 acres of usable, developable land in the area between I-440, the Cumberland River, and Jefferson Street. It is estimated that developments totaling more than $362 million in value could be built in this area, and more than 50,000 people could work and live here. Many areas throughout the downtown are ripe for development, which must be well conceived and fit into the proper framework of a comprehensive master plan. The Sulphur Dell area in the north, the Railroad Gulch to the west, the area south of Broadway, and the Bicentennial Capitol Mall are beginning to see growth and development, which could be the catalyst for more growth throughout the region. Efforts such as the 17-acre Gateway Master Plan by the Metro Development and Housing Authority (MDHA) have been undertaken and are waiting to be implemented. Much of the infrastructure is already in place, although improvements and upgrades of some utilities and means of transportation will inevitably be required. Such master plans, when implemented, will give us the opportunity to improve our surroundings and provide a pattern for controlled growth.

As the center of Middle Tennessee, Nashville is poised for tremendous expansion. The city itself will profit from growth, but the entire region will benefit. The Bicentennial Capitol Master Plan, a collaborative effort between Earl Swenson Associates, the University of Tennessee School of Architecture and Planning, the MDHA, and the Metro Planning Commission, is one example of a comprehensive master plan. It will provide a home for the arts and a sorely needed cultural mecca. Included are a new state museum and archives, a Native American Museum, a visitor center, and a crafts and cultural center, as well as new state office buildings and additional parking for state employees. Small park areas interspersed throughout the development will include retail shops, galleries, and housing. The potential cultural and economic benefits are enormous.

Growth without forethought is not the answer. Studying other successful master planning projects is one way to attack the problem. Much can be learned from the experiences of other cities and towns. In analyzing our situation, twelve key areas that merit attention have been targeted for investigation: communications, transportation, the economy, health care, corrections, culture, government partnering, land use, the environment, historic preservation, education, and the media. Each topic is relevant to our daily lives and needs to be a part of any comprehensive master plan. Study groups composed of local community leaders and visionaries will narrow our focus and define how to deal with these issues.

Education is the issue most critical to our long-term success. Middle Tennessee has more than 18 colleges and universities and four community colleges. Our master planning efforts should take full advantage of the educational opportunities available at all levels. Without education, the quality
of our lives declines. We need greater appreciation of culture and the arts, and we need to learn to communicate more effectively. We must put forth more effort into improving our school systems. Many other obstacles can only be overcome if we have strong education programs. Our long-term prospects depend on how we solve this problem. We must be innovative in our approach to education. Without a well educated work force, we will be unable to compete for new businesses and industries, especially those providing higher-paying, high-tech jobs, in the midstate region.

Transportation will be a critical issue. Our crowded highways are predicted to become more congested. By 2015, congestion is predicted to increase by about 100 percent, according to the Nashville Chamber. With so many more inhabitants, the demands on our highway system will be greater. Mass transit is being explored. Already, 30 to 40 percent of Nashville’s work force resides elsewhere and commutes to work. More than 90,000 workers commute to Davidson County from surrounding counties.

Employment will continue to be an issue. Regionally, there was an increase of 355,000 jobs between 1970 and 1993. We need to make sure we have competent workers to fill jobs emerging in the midstate region. The nature of jobs created in the current economy continues to change. In the period from 1990 to 1996, nonfarm employment increased by 21.2 percent. Manufacturing continues to be strong, rising 11.6 percent over the same period. Many traditional manufacturing jobs in apparel, textiles, and agriculture have disappeared. These lower-paying jobs have mostly moved out of the country and are being replaced by service industries. We see increases in finance, trade, and technology. The unemployment rate for the area is around three percent, making it increasingly difficult to find skilled workers.

One of our most successful industries is healthcare. Middle Tennessee has become the country’s center of the for-profit hospital and healthcare business. Annual revenues of publicly traded healthcare companies in Middle Tennessee have reached $22 billion. This began with the founding of the Hospital Corporation of America by a local group of entrepreneurs. Over 65 companies have been created by former HCA employees. Nashville has been the home of three major new industry segments in the healthcare field — hospital management, physician practice management, and freestanding ambulatory surgery centers.

The following articles were written by individuals chosen for their expertise in these subject areas. We think it is important to get the input of the most qualified individuals. The success of any master plan depends on successfully integrating the following areas into our future.

We are currently experiencing many of the problems typically associated with the growth of urban areas — the results of unbridled growth and lack of planning.

Now is the time for action, to ensure continued growth and prosperity. We need to establish priorities and plans for expansion. With the right vision and the proper steps, there is no limit to what we can achieve. Middle Tennessee has a resource base that will provide us with all the materials for success. We have the right people and environment for the job. Throughout our past, we have shown that we are capable of great things.

Endnotes

2. “Follow the Leader,” Expansion Management (July/August 1997).
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A hair-thin, highly polished glass filament called an optical fiber has led to whole new disciplines for handling the nation’s information-transport requirements.
by DeWitt Ezell, Jr.

Our society has faced the challenges of change in communications many times since the invention of the telephone in 1876. We didn’t think we could stand the change away from operator-assisted local calling, our friendly “Magnolia” exchange name, or three- and then five-digit phone numbers. Before long, we were dialing our own long-distance calls. Then suddenly our trusted “Ma Bell” System was broken into several pieces. Now we just expect things to continue changing. What’s next for the world of communications?

The Case for Change

What started as a small blip on the radar screen in the ’50s and ’60s in laboratories and universities developing new communications technologies has become a global upheaval. The convergence of computing and communications technologies is transforming the telecommunications landscape.

The changes we are confronting and integrating into our business strategies are the most compelling of our industry’s history. We must integrate these changes or face being left behind. The implications of these changes for businesses and consumers are dramatic.

Middle Tennessee has enjoyed unprecedented economic prosperity in recent years. We have been in the right place at the right time as the economy responded to stimuli from the global market. We’ve also benefited from bold policies designed to create economic stimulus. For example, in 1991 “FYI Tennessee” was adopted to extend a state-of-the-art telecommunications infrastructure to every county. This plan made Tennessee a leading state for telecommunications-intensive businesses, particularly those with large data-transmission components and call-center operations. Tennessee was ahead of the national trend by which digital platforms replaced analog platforms. The telecommunications infrastructure in this state provided digital connectivity in every county by the end of 1993, years ahead of other states.

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Data, the driver

The pursuit of increased bandwidth (a measure of the capacity of the transmission medium usually as a function of time, e.g., kilobits per second) is the major driver of the changes in telecommunications. Soon data usage will exceed voice usage over the public switched telephone network, commonly used by all telephone consumers. The data services market is large and growing fast. By the year 2002, we expect the regional data market to expand to four to six times its current size of $7 billion. To meet the needs of network users in the year 2015, telecommunications networks will have to be fundamentally data networks which just coincidentally carry voice traffic. This realization will drive investments in new data networks by new companies and companies who haven’t in the past been thought of as being in the telecommunications business.

These new networks will be very efficient, handling huge volumes of data over their infinitely large bandwidth at low cost. The capital investments necessary to deploy such networks nationwide are still extremely large. The larger incumbent voice network providers, BellSouth, AT&T, MCI, and others, will continue to play a major role in the provisioning of the nationwide public switched data network. BellSouth’s extensive Tennessee network will continue to be characterized by widespread deployment of leading-edge technology to support all applications desired in the marketplace. Every Tennessee county is connected by fiber optic wires, of which BellSouth has over 260,000 miles in place. That number will continue to grow, since fiber is the medium of choice for most applications. Nearly 200 digital switches provide call routing services for BellSouth customers. Every BellSouth Tennessee customer can obtain high-speed ISDN service at low rates, and deployment is under way of the next generation of digital subscriber line services. BellSouth has already deployed more fast packet switches than all other southeastern telecommunications companies combined.

The convergence phenomenon

The evolution of the public network to a data network reveals another significant issue facing the communications industry — the convergence of industries formerly clearly identified with their unique technologies. Distinctions among computing, cable television, telecommunications, entertainment, computer software, data processing, information services, on-line services, and other businesses are becoming less clear, as all embrace common technologies and platforms. The implications in the marketplace are numerous. It’s likely company names won’t clearly identify the company’s business as they once did. Mergers and acquisitions are taking place across traditional industry boundaries, as companies seek optimal positioning for future markets.

The Telecommunications Act of 1996 opened local telephone service markets to any company wanting to offer such service. Tennessee actually promoted local competition a year earlier, and there has been a significant level of competitive activity as a result. As this is written, nearly 60 companies have received government approval to provide local services in Tennessee. Most competitive services are offered only to business users; however, in the near future, residential users will see competing telephone service providers offering choices in local markets.

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BellSouth, serving approximately 80 percent of Tennesseans subscribing to phone services, will lose a significant share of business to competitors. At the same time, BellSouth will be allowed to offer services such as long distance, which previously it has been prevented from doing. As a result, a number of companies will offer a full range of communications services to consumers in every community. Furthermore, local governments, public and private utility companies, transportation companies, and other large businesses with national presence will offer telecommunications services in the open market, taking advantage of excess capacity in their internal telecommunications networks.

The role switch between wire and wireless

New names will play a larger role in communications, as new communications technologies spread across the marketplace. Wireless services have grown at a tremendous rate since cellular technology was first introduced. It’s estimated there are nearly 50 million domestic wireless phones in use today, and growth rates continue in double digits. Markets formerly served by two competing providers now have five or more companies offering wireless service. Prices are being pushed down to levels close to the cost of traditional wired phone service. We can expect wireless to become the medium of choice for voice applications as further price reductions occur.

The rapid growth of wireless communications, coupled with widespread use of pagers, fax machines, and modems, has led us to the brink of depletion of telephone numbers in their current format. Over the past five years, there has been an acceleration in the creation of new area codes. We are about to see the end of the seven-digit local telephone number. A few communities, Atlanta among them, have decided the least disruptive method of increasing the supply of local phone numbers is to make all local numbers ten digits. We can expect this to become standard in the next few years.

Even as this happens, the nation’s homes and businesses will be wired with wide-bandwidth facilities, transforming our daily lives by integrating the separate tools we use today. Multi-function devices will permit us to engage in occupational activities, electronic commerce such as banking, shopping, entertainment, education, and managing our home and workplace environments. Television, telephone, Internet access, telemetry, and computing can be combined into a single application utilizing common delivery systems as soon as bandwidth constraints of current systems are eliminated.

The power of new technologies and the global nature of their deployment are challenging traditional regulatory policies.

Here is one likely scenario. On the return trip from a family vacation, a simple phone call from the car will set into motion a series of actions in the home. The air temperature will be established at the family’s comfort level, lighting will be activated, and kitchen appliances may be turned on. E-mail will be sorted and prioritized. Planning calendars will be scanned, and a daily-minder memo produced. Draperies will be opened or shut, and the family entertainment unit will automatically select programming.

New network architecture

The medium making it possible to integrate these applications is a hair-thin, highly polished glass filament called an optical fiber. Fiber-optic technology has led to whole new disciplines for handling the nation’s information transport requirements. For all practical purposes this transport medium itself has infinite capacity. Limits to the leveraging of that capacity are the switching component and the end user’s sending and receiving devices. Work is well along to develop optical switching for more efficient transport of huge quantities of data. Furthermore, the infinite capacity of a fiber optic network leads to the possibility the switching component could be significantly reduced in the equation.

Modern telecommunications switches are the most expensive component of the public switched network, each representing multi-million dollar investments. In Tennessee, BellSouth operates 206 or so electronic switches which process and send millions of voice and data calls every day. There are network design concepts by which all traffic flowing over fiber-optic facilities passes all customers’ premises. Devices at each customer’s site identify and divert from the stream those messages intended for that particular address for reading, viewing, and listening by occupants at the site.

The new pricing paradigm

The explosive growth in use of the Internet and satellite-based networks for transporting information will alter traditional pricing principles. The distance component of pricing will disappear and be replaced by a usage component. Network providers will deliver ubiquitous local access and accommodate infinite demand; however, they will require payment by users on a pro-rata basis for the bandwidth consumed. Traditional long-distance calling will be transformed. There are estimates that anywhere from 25 to 50 percent of all long-distance services will migrate from the traditional telephone network to the Internet by year 2010.

Effects of regulatory policy

The power of new technologies and the global nature of their deployment are challenging traditional regulatory policies. Satellite technologies, for example, can be deployed from anywhere in the world and beyond the reach of any single nation’s regulatory oversight. Electronic commerce removes many artificial barriers established by governments and allows network operators and merchants to situate themselves where the most favorable climate exists.

While it’s said there is a deregulatory emphasis in government policy, in actual practice government continues to exercise extensive intervention. Political interests are still focusing on influencing market behavior, user behaviors, provider rights and responsibilities, taxation, and technology rationing. There are many indications overseas markets in telecommunications are advancing to higher states of achievement and efficiency than this country, as foreign governments remove themselves from intervention and oversight. It must also happen in this country, if we are to realize fully the benefits of the digital age.

It’s ironic that government policy allows foreign-owned telecommunications firms to
enter all American markets competing with domestic providers, but domestic providers are constrained from entering other domestic markets. Capital and income are siphoned out of the domestic economy into foreign hands, while domestic companies do not receive an equal opportunity to compete. A continuation of this sort of government policy could realistically lead to increased control of the domestic telecommunications infrastructure by foreign ownership, which in the long run will not be beneficial for domestic interests.

How, where we live and work

The unprecedented growth of the ’90s in Middle Tennessee will surely slow in years ahead, giving our work force time to catch up with the demands of employers for skilled people. How well and quickly we prepare the work force will determine how we compete with the rest of the world. Population growth in rural and suburban areas is facilitated by the so-called information superhighway, which opens the door for virtual workplaces, shops, and factories to be set up in individual homes or shared resource centers remote from industrialized cities.

Telecommunications technology available in rural Tennessee is just as advanced as that deployed in urban areas, but higher costs are associated with provisioning in remote locations because of lower scale and density. Historically, telecommunications services for high-cost areas and low-income users have been subsidized by users of large volume services in low-cost settings, such as central business districts in the largest cities. Prices for telephone services have been averaged across the state, so all users pay roughly the same.

As competition spreads, prices for service will be under pressure to move closer and closer to their cost. Overpriced services will become cheaper, while prices currently below cost will be under significant pressure to rise. Universal service funding and administration will be of increasing importance to Middle Tennessee and will receive attention from service providers and consumers in the years ahead. A funding mechanism will be established into which providers will pay a designated portion of their revenues and from which fees will be taken to provide explicit support for either or both high-cost and low-income customers.

The new communications technologies possess a liberating attribute, a function of their infinite bandwidth and what can be done with it. Individuals can develop more customized lifestyles integrating work, study, recreation, and family components of their own design, rather than as dictated by the traditional institutions of workplace, learning centers, and recreational venues.

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Providers in all sectors of the marketplace economy will increasingly capitalize on this state of “virtuality” to deliver highly personalized and targeted distribution of products and services. Intelligence residing in network components and end-user devices will allow for the development of extremely sharp intuition, speeding up the transaction process. An example is speech-recognition technology to allow users to issue voice commands to their machines.

Conclusion

The next few years will produce remarkable changes in telecommunications. Data growth is driving the development and deployment of new technology. Because data include pictures as well as numbers, the new technologies will alter our understanding of what a phone call is. The transformation of the public network from an analog to a digital platform provided error-free, noise-free, interference-free, efficient communications. The transformation from a voice-driven platform to one deployed for data will remove barriers of time, space, and distance, giving users the highest level of control of telecommunications resources for maximum productivity and efficiency. The future is bright with wonderful new options for telecommunications users. The future is also bright for providers willing and able to change quickly and listen closely to the customers they serve.

DeWitt Ezell, Jr., has been president of BellSouth in Tennessee since 1990. He has held a number of engineering regulatory, and public relations positions in Tennessee and Alabama. He is immediate past chairman of the Nashville Area Chamber of Commerce, chairman of the PENCIL Foundation, chairman of the Board of Leadership Nashville, and co-chairman of Tennessee Tomorrow. Tennessee Tech named Ezell 1994 Engineer of Distinction. He has received two economic development awards, the Arnold Engineering Development Corporation (AEDC) Leadership in Economic Development Award from the National Council and the Jim Spradley Award from the Tennessee Council.
Transportation

Supply, Demographics, and Public Policy Decisions
by Robert T. Babbitt

Why do cities need transit, and how much do they really need? Transit services are provided by every large city in the U.S., but the transit services in European or Asian cities are much more useful.

Most Americans, even among transit system users, live in households with one or more cars. Those without regular access to an automobile need transit services for the very basic mobility of modern life, to get to work, the doctor, the shopping center, or the grocery store. Transit supporters argue unemployment would be much more severe if not for the mobility afforded by the bus, streetcar, or subway. Even in families with a car, someone often needs a transit ride across town.

Thousands of cars stacked up on the freeway reminds us that too many autos can be too much of a good thing. Modern metropolitan areas have inherited the problems of earlier cities. As cities grow in population, they expand in area; each new development seems to be farther away and more sparsely populated. Resulting distances are too far for walking, yet thin densities preclude efficient transit services.

Energy and Air Quality

Automobiles use a large portion of the nation’s energy and are a major contributor to air quality problems. The politics of foreign oil consumption make dictators who rule large energy reserves far more wealthy and powerful than in the past. Although cleaner burning internal combustion engines have improved the waste gas stream in most tailpipes, the debate on energy consumption and climate change has only recently been taken seriously. No EPA regulation exists for any limitation on the quantity of carbon-based emissions which one city, one plant, or one family may release into the atmosphere in a year.

Is Transit a Public Function?

Even if transit serves a public purpose, why do cities become involved in the process? Operating subsidies city and state funds support are among the most frustrating U.S. public finance expenditures. Every taxpayer expects the electric utility to pay its way from user charges. No taxpayers expect the library or police to exist without general tax revenues. Transit falls in the ambiguous middle ground; it is expected to behave as a business, but no transit system in the U.S. has revenues from operations larger than costs from operations.

Why can’t transit be operated as it once was, as a private for-profit enterprise? The companies that did so went bankrupt, due to changes in the industries, the urban environment, and the competitive modes. From utility deregulation to inexpensive automobiles, to extensive public investment in highways, external forces began the demise of private transit lines beginning in 1925. The Great Depression and World War II slowed the eventual financial demise in most cities, due to income and resource problems for those using cars. By the end of World War II, automobiles mass produced at low prices, single family low-rate mortgages, inexpensive fuel, and rapid construction of new highways had forever changed the economic landscape of privately owned, for-profit transit lines.

There must be reasons why the public provision of city transit services has become the norm. Transit services are considered essential in the largest cities. It is difficult to imagine New York, Chicago, Boston, or Philadelphia functioning without transit, but even in medium-size cities, the economic externalities of mobility, energy conservation, and congestion reduction make transit a reasonable investment.

Predictors of Transit Investment

Assuming most, if not all, major urban areas provide some level of transit service, can we assume that in each city transit services are similar and decision makers follow the same set of criteria to determine the amount of service to provide?

The answer is no. Cities grow in different ways, and since there is no accepted formula to determine the appropriate transit service level, cities rely on the political decision-making process. Colcord observes, “... although transportation decisions are unquestionably political, there is strong doubt that the political process has been working well to make them. A perfectly functioning democratic system would be open to the inputs of all significant groups and individuals in the affected communities; it should provide for open debate of all policy alternatives and reach decisions in an open and credible manner....”

What factors are correlated with the amount of transit service a city provides?

Transit economics — Cities with large portions of population dependent on transit services offer more service.

Common destinations — Transit’s share of trips is highest in trips ending downtown. Auto disincentives and walking between errands are greatest there; transit services are most convenient there.

Common origins — The greater the number of persons who live near a transit route, the greater the chance the bus or railcar will arrive downtown with a full load. The greater the concentration of origins, the greater the frequency of transit service provided.

The author developed a multiple regression model for prediction of transit service supply behavior among urban areas between 3,000,000 and 500,000 population. The model, which explained 74% (R squared = .74) of the variation among these cities’ behavior, included in descending order of importance: population, downtown employment, net residential population density, central city age, freeway miles, and percent of households with no automobiles. In the case of each variable, except freeway miles, correlation was positive. Correlation with freeway miles was inverse.

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Political Factors in Transit Supply

Among cities which provide more transit than the socioeconomic population and density model predict, there are three tendencies among political variable correlations. Comparing cities with “high transit scores” to “low transit scores,” the variables — community power concentration, innovation proclivity, and formal power concentration — are each positively correlated with providing more transit than expected. Perhaps these tendencies are clearest when expressed in the negative form. Cities with low innovation tendencies, without formal power concentration (strong political leadership), or without powerful concentration of community power provide less transit than predicted by the socioeconomic population model.

What implications exist for a single urban metropolitan area? As each metropolitan area grows, pressure for transit increases. As population, downtown size, population density, and congestion grow, the need for transit increases dramatically. The typical urban area of 500,000 provides three to five million miles of transit service per year; the typical urban area of 1,000,000 provides 12 to 15 million miles.

This growth in transit service is not always smooth or popular. We have created an expectation that gasoline user fees pay for the highway infrastructure, and private auto owners pay all operating costs. If one discounts the costs of congestion, accidents, police, fire, emergency medical services, traffic control, and air quality, the gasoline user fees do pay the costs of freeways.

The growth in transit system need takes place in a manner easily misunderstood. As an urban area grows from 500,000 to 1,000,000, several other things occur. Middle Tennessee is home to two of the 50 fastest growing counties in the U.S. (Williamson and Rutherford), five of the top 10 per capita personal income counties in the state (Williamson-1, Davidson-2, Rutherford-7, Sumner-8, and Wilson-9), and the second largest university in the state, MTSU. In this metropolitan area, retail sales have grown from $7.9 billion in 1990 to $12.8 billion in 1998.

These growth indicators lead some to see a low-density urban growth pattern indicating lowered expectations for transit. But when Vanderbilt University and Mt. Olivet cemetery were built, they were beyond the city. For more than a century, developers of retail, residential, industry, educational facilities, or other commerce have sought large, inexpensive land parcels.

Growth Effects and Impacts

With the trend of larger cities needing more transit are three striking trends which change the urban site rent-vs.-distance economic bid gradient. First, a change in transportation technology or infrastructure shifts the development margins. If tomorrow, the time cost of traveling from Murfreesboro to Nashville were cut in half, the rapid growth of Murfreesboro would be pressured to adopt an even more rapid pace, whether the transportation improvement is a faster freeway or a faster rail line.

Large scale transit investment decisions do not often seem practical.

Second, an increase in the metropolitan area populations, other things held constant, leads to two effects: increased density in the core area and rapid growth in suburban areas. Since the more dense developments support higher rents, the employment growth tends to be more concentrated. The residential growth, at the same time, seems enormous at the fringe communities, due in part to the small base.

Third, increases in personal income per capita, other things held constant, increase demand and rent for expensive residences far from the urban core; rapidly rising disposable incomes make the transportation penalty costs of these long trips less important to overall disposable income.

In sum, transportation improvements tend to spread out a community. Population impact increases the core density and suburban growth rate. Income impact encourages the wealthy and high middle income to move farther from the core. These three impacts have confusing and contravening trends and create the potential for viewing new transportation solutions as win-lose propositions.

Consider that as urban areas grow, they need transportation growth at a rate which exceeds the rate of other infrastructure components. Policymakers must rely on 20- and 30-year projections of growth rates, which even the most objective viewers may find dubious. Hazardous as projections of new transit investment may be, they are essential to planning new systems critical to the urban economy. All viewers of freeway congestion in Nashville agree it is a worsening problem for which no clear single occupant vehicle solution exists.

Commuter Rail

The consultant team led by R.L. Banks and Associates prepared the Nashville Region Commuter Rail Evaluation. Their charge was to consider the Nashville metropolitan area over the next 20 years (1995-2015) and compare what other U.S. cities have done in terms of commuter rail investment in the last 25 years. Their conclusions are summarized in the table.

Five of the six rail corridors are practical compared to those in other U.S. cities. Only the Nashville-to-Clarksville corridor would not provide a time savings in the 20-year window, because the existing operable rail service would pass through Guthrie, Kentucky, on its indirect path to Clarksville. The corridors to Franklin, Kingston Springs, and Lebanon are practical, and the corridors to Murfreesboro and Hendersonville are exceptional.

These corridors will be developed for commuter rail as soon as a consensus exists that commuter rail creates sufficient value to the user in time savings for a few dollars per day fare and to the nonuser for a few pennies per day to ease congestion costs. The 20-minute train time from Hickory Hollow to downtown and the 23-minute train time from Rivergate to downtown are opening eyes. Today it is unlikely to travel these segments that quickly by car. By 2002 it will not be possible.

There are challenges to commuter rail. The low new development costs are, in part, a function of the efficiency of not creating a new corridor. To realize the advantage, railroads must allow shared use through cooperative track rights agreements. That, in turn, assumes three issues are solved. First, the railroads must not receive any marginal increment of liability costs. Other cities deal with this through tort liability legislation and extensive insurance coverage. Second, the railroads must be protected from decrement in their movement of freight. There is the issue over which debt is possible during the for-
Nashville Regional Commuter Rail Evaluation

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
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<tr>
<td>Corridor Length (miles)</td>
<td>27.9</td>
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<td>30.2</td>
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<td>Travel Time From End (minutes)</td>
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<td>55</td>
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<tr>
<td>Speed: Average Speed Over Entire Corridor (mph)</td>
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<td>Freight Use Intensity (Freight Traffic in million gross tons)</td>
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<td>37/1.5</td>
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### Projections for 2015

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<td>Ridership: One Way Per Day</td>
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<td>Congestion Relief</td>
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<td>(Peak Capacity Shortage From Long Range Plan)</td>
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<td>700</td>
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<td>Air Quality: Emission Reduction (Pounds Per Day)</td>
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### COST ESTIMATES

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<tr>
<td>Capital Cost — Full ($ million)</td>
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<td>Capital Cost — Low ($ million)</td>
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<td>Operating Cost ($ million)</td>
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<td>Operating Cost Per Passenger</td>
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<td>Operating Cost Per Passenger-Mile</td>
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<tr>
<td>Operating Profit (Deficit) Per Passenger</td>
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<tr>
<td>Operating Profit (Deficit) Per Passenger-Mile</td>
<td>($0.24)</td>
<td>($0.28)</td>
<td>($0.14)</td>
<td>($0.28)</td>
<td>($0.39)</td>
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Note: Based on $6 downtown parking cost.

Nashville has one corridor more dense than that of several new start light rail systems: the downtown-West End corridor to I-440. Some day light rail could service a more extensive network, but in the 20-year planning window, light rail will most likely be limited to this core. With over 83,000 jobs, this core has the largest employment concentration in Tennessee and the fourth largest in the Southeast, after Atlanta, Miami, and New Orleans.

The feasibility study of light rail is in progress, and a draft report will be available in late 1998. This corridor serves four 500+ bed hospitals, the region’s largest public and private employers, more than 2000 hotel rooms, 100 restaurants, two football stadiums, an arena, a convention center, Centennial Park, Bicentennial Mall, the State Capitol, and legislators’ offices. Tourist and conventioneer trips touching corridor origins or destinations add to ridership potential.

Light rail will be built in this corridor when it produces an economic value worth a few dollars per day to the user and a few pennies per day per guest to businesses in the corridor, and is viewed by a consensus of policy members as the most practical solution to the problem of congestion.

Large-scale transit investment decisions do not often seem practical, but cities from Seattle to Miami have invested extensively in commuter and light rail. Since commuter rail costs an average of $2 million per mile to build, and light rail, $20 million per mile, these are critical decisions. In each case, the public demanded expansion of the systems, after (in some cases) heated debates over whether to build the first component.

### Future Commuter Patterns

Nashville will look much different in 15 years. The following seven hypothetical commuter stories illustrate what trip patterns may look like, assuming telecommuting, auto ownership, and edge city developments have impacted our urban form but not eliminated peak-hour congestion.

Roger Marshall and his son hold season tickets for the Nashville Predators. On nights they just go to the hockey game, they park in Roger’s daytime parking garage. On nights they have dinner before the game, they park at a favorite West End restaurant and ride the light rail line down the middle lane of West...
End which turns and takes them to the door of the arena on Demonbreun.
Victoria Hernandez works at the new 60-story office building at the corner of Eighth and Commerce. Victoria visits clients in a new diesel electric Saturn, which seats four comfortably and gets 66 miles per gallon. At lunch she walks to Second Avenue, six blocks away on the Commerce Street Pedway — a moving sidewalk and a regular sidewalk in a climate-controlled shell one floor above the street — connecting to the Convention Center, two hotels, library, three condominiums, and six office buildings.
James Mason lives between Gallatin and Hendersonville. He works at the Tennessee Performing Arts Center (TPAC) at the northeast corner of downtown. James drives to work two days a week. Three mornings he takes the 7:15 a.m. northeast express commuter rail line, driving 2.5 miles to the station and reading The Wall Street Journal and The New York Times on his laptop computer on the 21-minute train ride. He walks two blocks from the capitol station to his office.
Jefferson Taylor, group events coordinator at Nashville Convention Center, moves large groups of visitors to different sites. Groups wanting to see the Parthenon and Centennial Park he escorts through the Convention Center; they walk one block by the arena to the light rail station at the arena landport. The ride to Centennial Park takes eight minutes at midday. Groups wanting an evening on their own are given prepaid evening passes to ride the light rail line and a nightlife guide showing hotels, restaurants, and nightclubs within two blocks of the rail line.
Jane Simpson lives in LaVergne, which has just reached a population of 45,000. Her husband drives his Nissan truck to the plant each day. Jane works as a paralegal in the Tennessee Tower in downtown Nashville. One day a week she works via modem from home. One day she drives in and attends an evening class at Vanderbilt. Three mornings a week she boards the southeast express commuter rail line at 7:10 a.m., gets off at Clement Landport at 7:38, and connects to the shuttle, which drops her at the main door at 7:45 a.m.

In 2013 trip patterns may differ from these, but 2013 patterns will differ dramatically from those we see today.

by E. Anthon Eff

In the last decade, Middle Tennessee has experienced unprecedented growth, with the number of workers ballooning from about 825,000 in 1990 to slightly more than one million in the first quarter of 1998.

That growth has had a spatial dimension: new factories and homes have been bulldozed into farm or forest lands, and existing structures have been retrofitted for new uses. Examples of the former include the huge shopping, office, and residential complex at Cool Springs, just south of Nashville. Perhaps the most prominent example of the latter is the rebirth of Second Avenue as a regional entertainment center.

The economic functions of a region are defined by its built environment. In some areas, most structures consist of homes; elsewhere offices, factories, or shops predominate. Tying the different specialized areas together is the transportation infrastructure. The ebb and flow of economic life pulsates along the concrete arteries of the region’s highways, at its airfields, and on its rail lines.

Of critical importance for Middle Tennessee are highways. Davidson County lies at the crossroads of three major interstates. Goods from the region are within one day’s truck drive from 70% of the U.S. population. This has helped foster the region’s importance as a manufacturing center for the rest of the nation, producing everything from bicycles to pencils to — most important — autos and auto parts. Modern manufacturing, with its emphasis on just-in-time deliveries, has in the last decade made Middle Tennessee’s location on the nation’s interstate highway system even more valuable.

The highways are equally important for tying together the various specialized economic areas of Middle Tennessee. Davidson County remains, as it has for years, the region’s main workplace. Highways daily funnel in thousands of commuters from outlying counties to jobs in Nashville.

The map on the next page presents the most important commuting flows in the midstate. The black arrows show the primary destination for commuters from each county; for example, the black arrow from Williamson to Davidson indicates Davidson is the largest single destination for Williamson County commuters.

These flows extend into rural counties. Many counties are linked via various degrees of separation with Davidson; for example, Lawrence’s primary commuting destination is Maury, whose primary destination is Williamson, whose primary destination is Davidson. Almost half the counties are linked, not to Davidson, but to either Christian and Warren counties in Kentucky or Putnam County in Tennessee.

Perhaps the most interesting fact about these primary commuting flows is that migration tends to flow in the opposite direction. The map shows, for each county, the major source of new residents. The blue arrow from Davidson to Williamson indicates that Davidson is the largest single source of new Williamson County residents. In most cases, the major source of new residents is the same county as the primary commuting destination. Nationally, over half of all intercounty migration is local (within 100 miles), and nearly 80% of all local net in-migration moves against prevailing commuting flows. The commuting stream provides a path along which workers look for a residence; migration is a flow up the commuting stream, swell the flow of workers who travel into the primary destination county.

Migrants tend to be relatively low income, since many are young persons just starting out in life. However, an important type of migration in metropolitan areas occurs when higher-income households migrate to a higher-income county. On the map, counties receiving mostly these flows are colored peach — it is noteworthy that such migration is mostly confined to the Davidson County suburban ring. The loss of high-income households, and the fact that in-migrants tend to be relatively low-income, causes Davidson County aggregate income to decline by about 0.4% per year. This is a problem plaguing many central metropolitan counties, where it has often led to lower tax collections, deteriorating public services, and accelerating high-income out-migration.

It is most common for lower-income households to migrate to a lower-income county. This can be interpreted as a search for affordable housing, and counties predominantly receiving these flows are colored green on the map. In the midstate, the spread of population out from the urbanized core into the surrounding rural coun-

continued on
Transportation costs would not be so low, were it not for the fact that costs of air pollution, congestion, and parking are not borne by the automobile driver.
ties is predominately a search for affordable housing. These migrants stimulate residential construction, as well as retail and other services, in counties such as Cannon or Smith.

While jobs are being created in the suburban counties — one need only think of Cool Springs or the industrial centers of LaVergne and Smyrna — the dependence of suburban residents on jobs in Davidson County has actually increased over time. In the late 1960s, Davidson County’s share of jobs in the eight-county MSA was about 1.14 times its share of the population; by the mid-1990s, the job share was about 1.33 times the population share. Clearly, commuting from the suburban ring became more prevalent over this period.

Planners have long been concerned about movement of population within commuting fields. If residences tend to concentrate in close proximity to work places, this brings certain efficiencies, such as lowered demand for transportation infrastructure. On the other hand, a dispersal of population into suburban and rural counties helps diffuse economic growth throughout the state. Often this dispersal is labeled urban “sprawl.”

Arguments for and against sprawl are both aesthetic and economic. The aesthetic opponents of sprawl find it undesirable that the distinguishing feature of the American city should be the parking lot; proponents embrace the notion of the leafy suburban street and the enclosed shopping mall. The economic debate — which fairly rages on the pages of usually civil publications such as the Journal of the American Planning Association — focuses on the degree to which sprawl is implicitly subsidized.

In favor of sprawl, Peter Gordon and Harry W. Richardson of the University of Southern California note that over the last half century, changes in technology have caused transportation and communications costs to fall, a trend which is likely to continue and which will favor even more dispersed development. It is also clear that the average American consumer prefers suburban living, and that when compact development does occur, it is invariably “a result of top-down command-and-control planning rather than an expression of individual preferences.” These efforts have failed to reverse sprawl, but have provided opportunities for well-connected insiders to enrich themselves.

Reid Ewing of Florida International University points out that transportation costs would not be so low, but for the fact that costs of air pollution, congestion, and parking are not borne by the automobile driver. This implicit subsidy to auto transportation amounts to about 22 cents per passenger mile — it would require an additional gasoline tax of $6.60 per gallon before automobile drivers fully paid the social costs of driving. Prices that high would surely discourage sprawl, but are extremely unlikely within the near future.

Arguments for and against sprawl are both aesthetic and economic.

Atlanta provides an example of extreme sprawl. As Atlanta expanded, the length of the average commute increased, until today it stretches about 36.5 miles, the highest level in the entire nation. With so many cars on the road, air quality has suffered, and with it the city’s reputation as a livable place. The Wall Street Journal reported recently that property values have begun to stagnate in the further suburbs as new residents shun the outskirts for central neighborhoods. The experience of Atlanta suggests that sprawl has its own limits — as commuting becomes too onerous, the average consumer will choose to live at higher densities closer to the workplace.

Nashville has far to grow before it experiences the problems of Atlanta. For now, sprawl helps to diffuse economic growth out from Davidson County, through the suburban ring, and into rural counties such as Cannon, Smith, and Hickman. With the creation of Highway 840, the spread of homes and businesses into the Middle Tennessee countryside can only increase. The opportunities for growth are matched only by the challenges to planners.

