

Transportation and Land Development

A Look Forward

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Looking to the future is a central focus in land development. The following perspectives put into context the importance as well as the uncertainty of the task. These perspectives offer some insights into trends in real estate development and land use policy, supporting transportation services, and using analytical tools to understand future developments. The final section describes some likely future issues in transportation and land development.

PROPHETIC PERSPECTIVES

The following insights into the role of forecasting are offered from the perspectives of a transportation consultant and a professor of management and policy.

When the forecasts made by our 19th and early 20th century solons about 20th century events and inventions are compared with the subsequent reality, we are reminded of the folly of predicting megatrends based on visions of new forces that will shape our future. Too often, our imagination of the future is constrained by the limited set of responses we have to choose from today to solve future challenges. But Americans are intrigued by technology, and we race to embrace high-tech systems with the hope that they will cure our transportation ills.

The automobile will be viewed as an instrument of separation that allows for individual experiences and reduces human contact. But humans are social creatures and seek the company of others (most cyberrelationships will not be sustainable). Evidence includes the trend toward the return to urban dwellings by the young (for social interaction) and by the elderly (to minimize loneliness and isolation and to provide a certain minimum mobility for the nondriver). The commitment of the development community and civic leaders to aggressive redevelopment in the urban core and the resurgence of interest in locating entertainment and sports facilities downtown provide further evidence of a changing perspective on where to settle and carry on life's activities. What all this means is that there is not one "American dream" but several, and we require alternative transportation choices to serve them.

Sprawl is not inevitable. It is the result of homeowners' desire to escape urban areas with higher crime rates, poor schools and streets, and small yards. However, many homeowners discover the price is high—too high—in family disruption, road congestion, and a sensed loss of community. Hence, the longing for the traditional village and the search for sustainable environments.

The practice of raiding neighboring jurisdictions for jobs or high-income residents probably will not disappear, but it may diminish. Growing awareness of the full cost of moving from job to job and house to house will cause a shift in the mobility of labor, as citizens refuse to spend the long hours commuting to distant jobs. A concomitant challenge to our local jurisdictions is to provide the infrastructure for this changing urban–suburban pattern of jobs and housing. In the 21st century, a more diverse and ubiquitous transportation service will be essential for the survival of a culture that preserves the best of our “great experiment.”

—Bruce Douglas, *Parsons Brinckerhoff*

Perhaps the most humbling lesson of 20th century land use and transportation planning is how poorly we understand what it is exactly that we want to achieve. Concomitantly, we must also recognize the hubris of assuming that we could anticipate what we ourselves would want in future decades, and what our descendants would want in future generations.

To be sure, we have learned. We have learned that the axiom of separating commercial and residential land uses is often inappropriate for nonindustrial land uses. We have learned that the bourgeois utopian suburban ideal carried to extremes consumes considerable land, fosters traffic congestion, and blights scenic vistas. We have learned the limitations of zoning as a mechanism to induce or restrain development of a particular type in a particular place. And we have learned that 20-year predictions of highway traffic are usually too low, while those of transit demand are usually too high.

What we have not learned, however, is that our ability to anticipate what future generations will want is probably no better than that of previous generations of planners. Today's emphasis on neotraditional or new urbanist communities, sustainable transportation, and other matters of great social moment will ebb, replaced by new problems and priorities. The lesson is not to impose a social, environmental, or economic order on the land in perpetuity. Instead, it should be to strike a proper balance between serving our near-term wants and needs for comfort, security, and mobility while preserving maximal discretion for future generations to satisfy their wants and needs as they see fit. We are building the legacy systems of tomorrow. We should be making them as easy to upgrade and replace as we reasonably can.

—Jonathan L. Gifford, *George Mason University*

POSTWAR TRENDS IN LAND DEVELOPMENT AND URBAN TRANSPORTATION

To a newcomer, the field of land development—particularly as it relates to transportation—appears to evolve at a glacial pace compared with the more advanced communications and industrial technologies. Current urban development is a mix of subdivisions, malls, and office parks scattered around the suburbs, with an occasional infill project, supported by new suburban highways and possibly a new rail line or two. Neighboring communities rarely cooperate in managing growth and often compete for high-tax land uses. It is important to appreciate the extent of change over a longer period (e.g., 50 years) in development practices, planning tools and policies, and theories of land development as they relate to transportation.

Development and Transportation Technology

During the post-World War II period, the home-building industry achieved great efficiencies in the new Levittowns, producing affordable housing for returning veterans and their baby boom offspring. Shopping centers came next, followed by office parks, planned unit developments, and finally mixed-use projects that combined at least three of the major development types. Urban entertainment centers are one of the newest trends, with a special focus on downtowns. The basics of transportation have changed very little since the development of the freeway in the 1930s. It has been the funding emphasis, especially from the federal government, that has influenced the development of new facilities. This began with the widespread implementation of urban freeway systems as part of the Eisenhower Administration's Interstate Highway System, and continues with requirements to support new urban transit lines. The most significant evolution of transportation technology in recent years is the development of dedicated high-occupancy vehicle lanes that offer a high-speed facility for buses and usually allow carpools, defined by the number of passengers.

Land Use and Transportation Planning Policy

Planned unit developments, as discussed, are a planning and development technique that allows clustering of housing and preserves open space. It was not until the 1980s that the use of impact studies to assess the amount of traffic generated by a new development became widespread. At about the same time, the planning and development community recognized that a mixed-use development was able to share parking between uses, and many communities changed their codes to reflect this. Another phenomenon during the 1980s—the inability of the public sector in tax-limited states, such as California, to provide the infrastructure to support growth—caused significant shifts in responsibility to the private sector. These shifts were reflected in traffic mitigation and traffic impact fee requirements. The growth of large-scale suburban developments characterized by a mix of office and retail uses—although generally not in the same project—became a focus for the profession in the 1980s. (A special conference on this topic was held by the Committee on Transportation and Land Development in 1984.) Understanding of the trend also was popularized in Joel Garreau's book, *Edge Cities*, published in 1991.

Land Use and Travel Model Theory

In the 1950s, urban transportation studies in Detroit, Chicago, and Philadelphia recognized the connection between land use and transportation. This period coincided with the commercialization of large-scale computers, and transportation planning was one of the first applications. The first widely used set of computerized transportation models for forecasting travel on the basis of land use inputs was developed for the Federal Highway Administration in the 1960s, followed by some of the pioneering land use models. After a long gap in federal funding, a new program, the Transportation Model Improvement Program, is developing the next generation of models based on an entirely new approach to evaluating travel.

The research presented at the Transportation Research Board (TRB) annual meetings tends toward the state of the practice in the public arena. The adoption of innovative development and transportation practices in the public sector, however, is often far behind. For many communities, a planned unit development is considered cutting edge. The pace of innovation in this field makes it especially important not only to seek out the nation's leaders but also to keep in touch with the practitioners.

CURRENT STATE OF THE PRACTICE

The activities of this committee have focused on the elusive relationship between transportation (both highways and transit) and land use, made all the more challenging by the different scales at which this interaction can take place. Both in terms of policy making and research and analysis, transportation and land development meaningfully interact at three levels: regional, corridor-neighborhood, and local (highway interchange, transit station).

Methodological and substantive advances that this committee has monitored fall into two broad areas:

1. Urban development and land use/transportation modeling; and
2. A variety of other topics, including growth management, sustainable transportation, urban form alternatives, impact on land values, impacts of transportation pricing, and trip generation rates.

From a brief review of the current state of the practice, the committee has identified several expectations for the new millennium.

During the past 10 years, interest from the transportation research community in the complex interaction between transportation and land use has grown steadily, as indicated by the number of papers submitted for review, increases in attendance at TRB sessions and in the number of sessions sponsored, as well as by individual participation in committee activities. About one-third of the committee's efforts have focused on the subject of urban development modeling as part of the ongoing progress in testing and refining large-scale regional models of the interactions between land use and transportation. The remainder of committee interests and activities are spread broadly, varying by scale of application (from regional to transit-station area), subject matter, or point of departure (from policy options for growth management to transit-oriented development to land value impacts to the role of parking prices in influencing land use). All indications are that these will be topics of enduring interest in the new millennium.

EXPECTATIONS

The 1999 TRB-sponsored conference, “Refocusing Planning for the 21st Century: Transportation Technical Planning Research,” also identified several core issues that will continue to be important in the next decade. Many of these issues, briefly described below, stand a good chance of growing in importance, considering current and emerging policy issues.

Smart Growth Policies

To what extent have innovative state, regional, and local land development policies been successful in minimizing land consumption? Where and how have such policies been tried, and how has success been measured? In particular, what have been the highway and transit travel consequences? How can or should such policies be assessed? To what extent have the “new urbanism” types of community land development and land use arrangements reduced the need for travel?

Transit-Oriented Development

As our experience and understanding of light rail transit in urban areas grows, what have we learned about the pluses and minuses of joint development? What are the most successful ways to implement these projects? How have they reduced automobile travel? What efficiencies in land use interaction have resulted? And what has been the impact on rail station and system ridership? How have planners implemented the broader concepts of orienting neighborhood and corridor development patterns to “spines” of transit service? What have been the successes and failures of this broader planning for station areas?

Role of “Transit First” Policies

Does transit have a significant role in achieving compactness of development and cost-efficiencies in travel and public services? What policies are necessary to support this role—in housing, shopping center and major public facility siting, land taxation, incentives for transit–land use coordination, and so on?

Transit Station and Highway Interchange Area Planning and Development

What tools and policies encourage higher employment and residential densities close to stations and interchanges? What urban design features can facilitate pedestrian access to transit stations from the surrounding area? What is the role of strategic timing in station area and interchange area development when opening transportation facilities for service? What is the role of parking management, automobile-free zones, and collector–distributor local transit services in improving the efficient operation of such areas? What mixed land use configurations are best suited for higher-density development in station and interchange areas?

Transportation Access to Brownfield Redevelopment

Highway and transit access can play a key role in the redevelopment of aging, often obsolete, commercial and industrial districts in larger cities. Do case studies show that good transportation access can stimulate brownfield redevelopment? Which details of district-

level and local-area land redevelopment work best with which transportation options? How do the roles of street, highway, and transit access differ?

Multimodal Corridor Preservation Planning

Within a growth-management perspective, what are the most efficient ways to plan both highway–transit and multipurpose land development to achieve minimal, undesired impacts on natural areas? What land preservation actions work best with different highway, transit, and land use interactions? What are the policy options, and how have they been analyzed?

Impacts of Pricing on Land Use

As our experiences accumulate with pricing peak-hour tolls for highways and bridges and for high-occupancy vehicle and high-occupancy toll (HOV/HOT) expressway lanes, what are the impacts of these policies on adjacent land use? Can incremental growth in transit ridership be documented as a result of such pricing? Can changes in land use development and sprawl be determined? What about the impacts on land pricing and the private land development market?

Parking Prices and Land Use

Cities with downtown areas that charge fees for parking might experiment with policy options that increase parking prices to influence the choice of travel mode. These options also might include employers subsidizing transit and parking expenses for their employees. What impacts on travel behavior have been observed? How much pricing change is necessary to gain the intended effect? What are the political limitations on such pricing? What are the associated land use issues and land development implications?

Parking Development

One of the greatest influences on travel choice and urban design has been the privatization of parking, especially in the suburbs, requiring all parking to be provided on site. More efficient land use involves the provision of parking facilities to serve multiple parcels. What models are there for the planning, design, and financing of parking to support higher-density, mixed-use, and pedestrian- and transit-oriented places? What are the respective roles of public and private institutions in managing these facilities?

Land Use Impacts of Intelligent Transportation Systems

The potential for intelligent transportation systems (ITS) to increase the person-carrying capacity of transportation facilities could have major implications for associated land use patterns. As experience is gained with the implementation of ITS, what can be learned of its potential impacts? What research designs are necessary to document how increased transportation line capacity and average speed affect both adjacent land use and larger regional travel patterns?

Transportation and Urban Form

Although there has been progress recently in understanding the complex relationships among highway networks, transit networks, and the form or pattern of urban development (see, for example, *TCRP Report 16*), much remains to be learned and applied. What is the role of density or compactness, including density gradients with distance from the central

business district (CBD), and the dilution of densities caused by leapfrog development? How important is CBD size, and the size of major multiple suburban centers in influencing trip distribution, mode choice, and average trip length? What public policy tools are available to influence compactness of development, and what are the travel and interaction efficiencies associated with greater compactness? Do the classic urban form options of multicenters, linear cities, and wedges and corridors have a viable role in planning for transportation and land use? Are there international comparisons on the costs of sprawl that support certain patterns of urban form from a public finance perspective?

Transportation Land Use Forecast Validation Studies

Enough experience has been gained to address the reliability or accuracy of some of the earlier urban development models in making forecasts. These validations could involve simply comparing the forecasts of 5, 10, or 15 years ago with actual development patterns. What conclusions can be drawn about model fit and accuracy? Which models seem best for which policy analysis contexts, and why?

Application and Refinement of Urban Development Models

As work continues on the testing and development of a variety of significant urban development models, a systematic method of assessing the utility of each model is needed. How do the models compare on their input data difficulties and requirements, the complexity of their internal model structure, the richness and small-area detail of their forecast outputs, and the reasonableness and explainability of their results? In particular, what policy applications have been successful or unsuccessful in regional planning?