Introduction

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A metropolitan areas economic and social health depends to a large extent on the performance of its transportation system. Not only does the transportation system provide opportunities for mobility of people and goods, but also over a long term it influences the pattern of growth and level of economic activity through the accessibility to provide to land.

In recent years, changes to the urban transportation system have also been treated by many public officials as a measure of meeting an assortment of national and community objectives. Such changes have been motivated in some cases by the desire to:

- Improve air quality
- Enhanced the visibility of economic activity centers
- Provide services to those needing mobility (i.e. low income households, persons with disabilities, and elderly.
- Promote more sustainable community development.

Based on above, planning for development or maintenance of the urban transportation system is thus an important activity, both for promoting the efficient movement of people and goods in a metropolitan area and for providing supportive role in attaining other community objectives.

The approach towards urban transportation planning is envisions a comprehensive and complete plan as a final product of the process. Rather, this approach recognizes that, to be effective, planning must be an integral and ongoing part of the decision-making process. The product of planning can be any form of communication with decision makers that provides useful information for understanding problems facing a metropolitan area, identifying alternative action, selecting the best alternative, and developing successful implantation strategies.

What is the Transportation Planning Process?

Transportation planning is a cooperative, performance-driven process by which long and short-range transportation improvement priorities are determined. Metropolitan planning organizations (MPOs), States, and transit operators conduct transportation planning, with active involvement from the traveling public, the business community, community groups, environmental organizations, and freight operators.

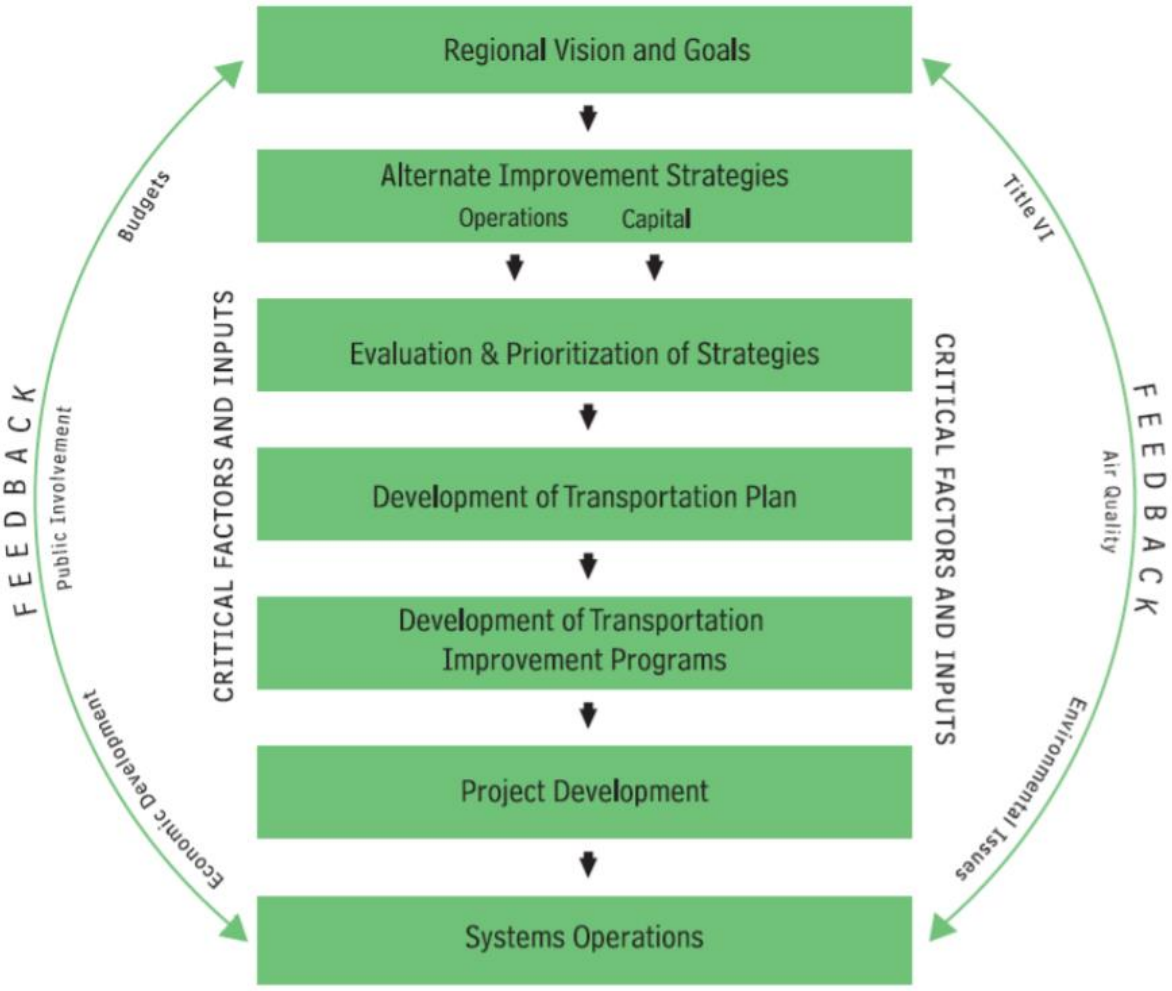

Figure 1. The Transportation Planning Process.

Transportation planning typically follows the following steps:

- Engaging the public and stakeholders to establish shared goals and visions for the community.
- Monitoring existing conditions and comparing them against transportation performance goals.
- Forecasting future population and employment growth, including assessing projected land uses in the region and identifying major corridors of growth or redevelopment.
- Identifying current and projected transportation needs by developing performance measures and targets.
- Analyzing various transportation improvement strategies and their related tradeoffs using detailed planning studies.

- Developing long-range plans and short-range programs of alternative capital improvement, management, and operational strategies for moving people and goods.
- Estimating how recommended improvements to the transportation system will impact achievement of performance goals, as well as impacts on the economy and environmental quality, including air quality.
- Developing a financial plan to secure sufficient revenues that cover the costs of implementing strategies and ensure ongoing maintenance and operation.

What is Performance-Based Planning?

Recent Federal legislation has established a close connection between performance measures and performance target levels. These measures and target levels are connected through transportation plans and programs developed at the metropolitan and statewide levels. As described in preceding sections, States and MPOs are responsible for setting performance targets for agreed upon performance measures for the Statewide and nonmetropolitan and metropolitan transportation planning processes respectively. In accordance with Federal law, USDOT is responsible for identifying performance measures related to national highway and transit performance goals that States and MPOs use in setting performance targets. With these national goals as a baseline, States and MPOs may identify additional performance measures and targets that address local community visions and goals.

For more on performance-based planning and programming (PBPP), please see Performance-Based Planning: Programming Measures and Targets.

What is a Metropolitan Planning Organization?

A Metropolitan Planning Organization (MPO) has authority and responsibility for transportation policy-making in metropolitan planning areas. 1 Federal legislation passed in the early 1970s requires that any urbanized area (UZA) [2] with a population greater than 50,000 have an MPO. MPOs ensure that existing and future expenditures for transportation projects and programs are based on a continuing, cooperative and comprehensive (3-C) planning process. MPOs also cooperate with State and public transportation operators to set spending levels for Federal funds that are meant for transportation projects. Note that some MPOs are found within agencies such as Regional Planning Organizations (RPOs), Councils of Governments (COGs), and others.

By law, an MPO is defined as a policy board comprised of local elected officials. Representatives from local governments and transportation agencies serve on MPOs and perform the six core functions that follow:

1) Establish a setting for effective decision-making
   Establish and manage a fair and impartial setting for effective regional decision-making in the metropolitan area.
2) Identify and evaluate transportation improvement options
   Develop transportation improvement options and use data and planning methods to evaluate whether those options support criteria and system performance targets. Planning studies and evaluations are included in the Unified Planning Work Program (UPWP).
3) Prepare and maintain a Metropolitan Transportation Plan
   Develop and update an LRTP for the metropolitan area covering a planning horizon of at least 20 years. MPOs prepare LRTPs using performance measures and targets.

These are the planning factors that MPOs and departments of transportation consider to guide their planning processes:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
- Increase the safety of the transportation system for motorized and no motorized users.
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- Increase accessibility and mobility for people and freight.
- Protect and enhance the environment.
- Promote energy conservation.
- Improve quality of life for the community.
- Promote consistency between transportation improvements and planned State and local growth and economic development patterns.
- Enhance the integration and connectivity of the transportation system for all modes.
- Promote efficient system management and operation.
- Emphasize the preservation of the existing transportation system.

4) Develop a Transportation Improvement Program (TIP)
   Develop a short-range, four-year program of priority transportation improvements drawn from the long-range transportation plan. The MPO creates the TIP with spending, regulating, operating, management, and financial tools. The TIP represents

immediate priority actions to achieve the area's goals and associated system performance targets.

5) Identify performance measure targets and monitor whether implemented projects are achieving targets

MPOs coordinate with State and public transportation operators to establish performance targets that address performance measures, as set forth in Federal law, related to surface transportation and public transportation. MPOs prepare plans that include performance targets addressing performance measures and standards. When updating the plan, MPOs also prepare a System Performance Report that tracks progress in meeting performance targets. In addition to federally required performance measures, MPOs may identify additional, locally significant performance indicators that support decision-making.

6) Involve the public

Involve the general public and other affected constituencies related to the essential decision-making elements listed above.

In accordance with Federal requirements, MPOs must cooperate with the State and providers of public transportation to create metropolitan transportation plans. The MPO approves the Metropolitan Transportation Plan (MTP), while the governor and the MPO approve the TIP. UZAs with populations exceeding 200,000 typically have more complex transportation systems and associated challenges than smaller regions.

Accordingly, these large UZAs have additional planning responsibilities and are designated as Transportation Management Areas (TMAs). MPOs within TMAs must include officials of public agencies that administer or operate major modes of transportation in the metropolitan area and providers of public transportation on their policy boards, as well as appropriate State officials. There is no required structure for the advisory bodies and staff that provide planning and analysis to MPOs. Technical and Citizen Advisory Committees and a staff of planners led by a director also support the metropolitan transportation planning process. MPO staff assist the MPO board by preparing documents, fostering interagency coordination, facilitating public input and feedback, and managing the planning process. MPO staff may also provide committees with technical assessments and evaluations of proposed transportation initiatives, and the MPO staff may engage consultants to produce data. A technical advisory committee may then recommend specific strategies or projects to the MPO policy board. An advisory committee may also provide technical analysis, specialized knowledge, and citizen input on specific issues.

It is common for an MPO to have a Technical Advisory Committee and Citizen Advisory Committee, and to have subcommittees on specific issues such as system performance, environmental justice, bicycle issues, and travel demand modeling. The metropolitan transportation planning process must engage the public and stakeholders on an ongoing basis in all facets of planning, to spur dialogue on critical issues facing regions and provide

opportunities for the public to contribute ideas. This is especially important in the early and middle stages of the process, when the plan and the TIP are developed. Special attention should be paid to groups that are underrepresented in the transportation planning decision making process or have been underserved in terms of the expenditure of transportation dollars (see Equity).

A Multimodal Perspective on Transportation Planning

Transportation planning has traditionally reflected the policy concerns and issues of the times in which it was concerning. Thus, the large –scale, regional transportation studies of the 1950s, which in many ways represent the early beginnings of today's metropolitan transportation planning process, focused almost exclusively on high way network expansion.
Elected officials of the time were anxious to accommodate the tremendous increase in automobile use and take advantages of federal aid that was available for highway construction.
The motor vehicle industry lobbied successful for dedicated gas taxes that could be used only for improvements to the road system, a legacy that still exists today.

Multimodal transportation planning is defined as:
The process of defining problems, identifying alternatives, evaluating potential solutions and selecting preferred actions that meet community goals in a manner that includes all feasible transportation modes.
Figure 2 shows one view of a multimodal transportation system. The system consists of different modal transportation networks (including the information/ communications network) that by themselves allow a traveler to move from one location to another.
Intermodal connections provide the ability to transfer from one modal network to another. In addition, metropolitan land use pattern and the institutional structure for providing transportation service affect the overall performance of the system.

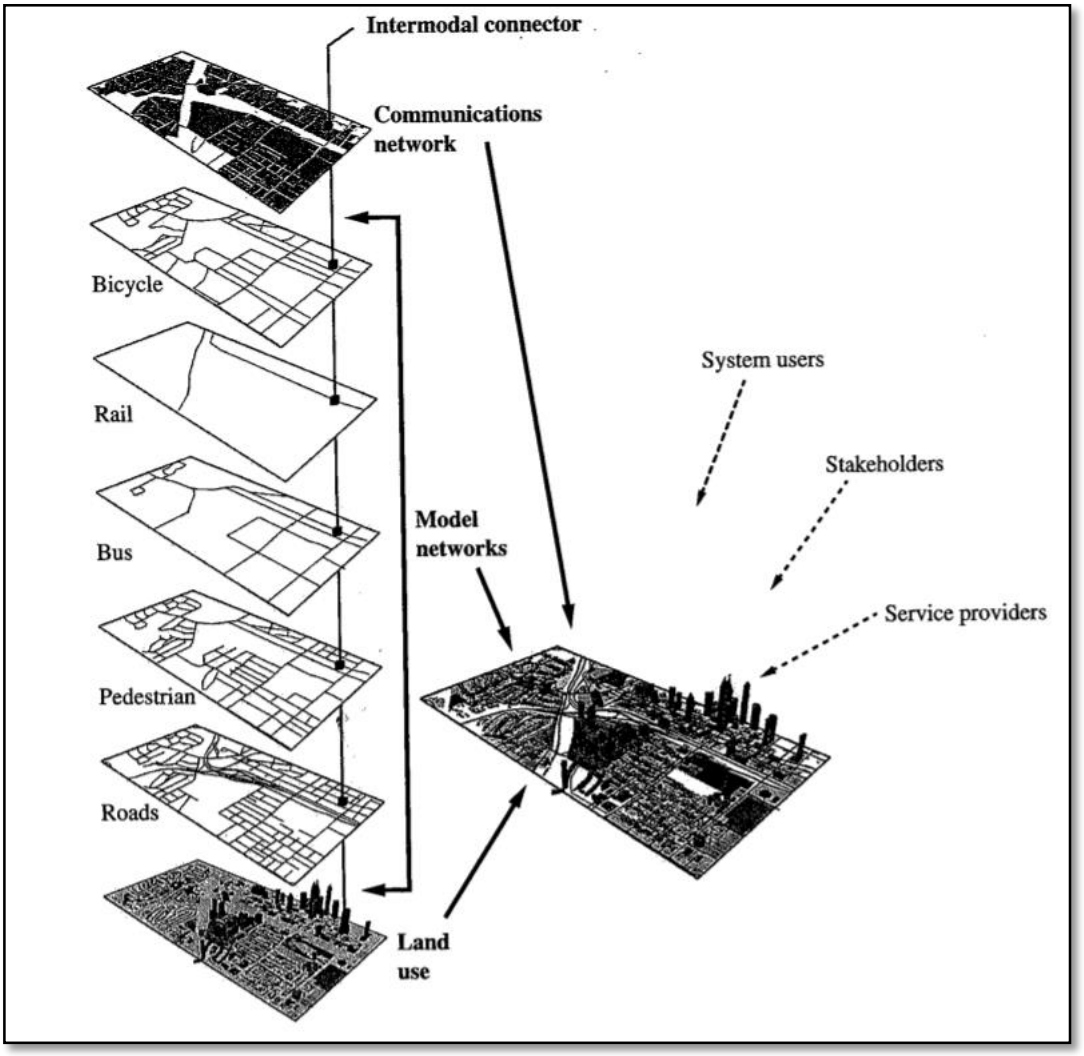

Fig. 2 Multimodal transportation system (including users, stockholders, and service providers), by William Bachman, center of Geographic Information Systems.

Figure 3 illustrates the concept of a coordinated strategy that includes three components-supply management, demand management, and land-use management. The decisions of what additional capacity to provide, what types of operation improvements to make, how to influence demand for the purpose of reducing the impact of traffic, how to develop compactible land use, and how to provide the institutional and funding structure that supports the program are all in essence system management decisions.

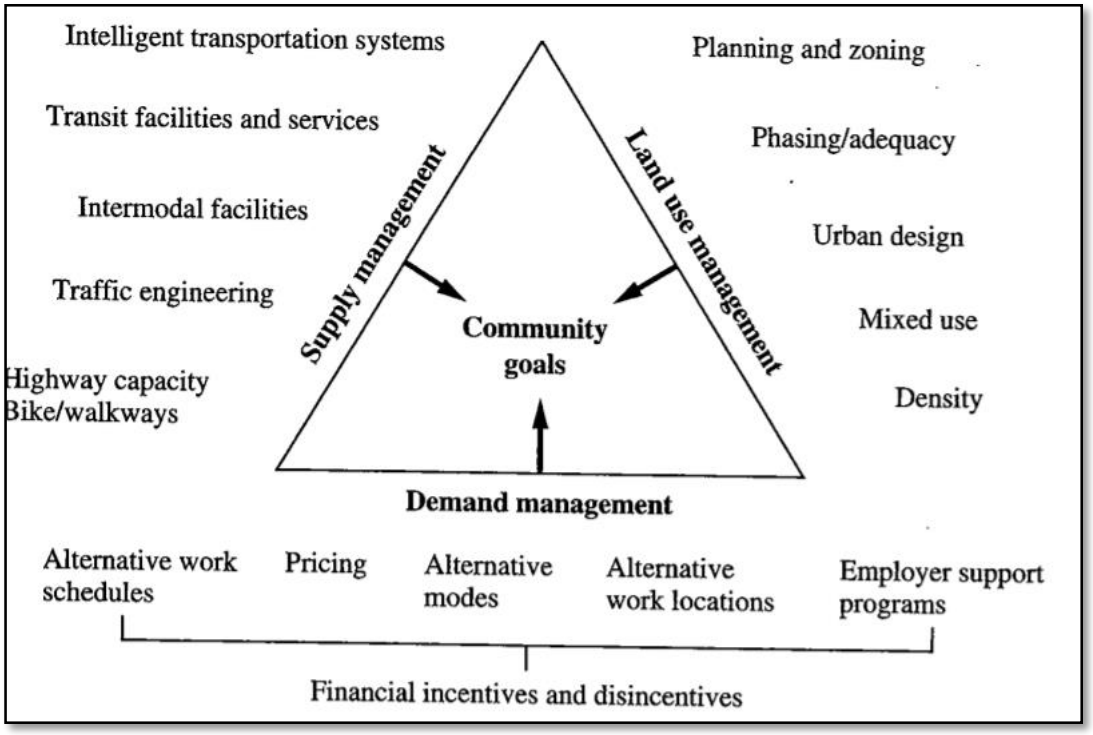

Fig. 3 Components of a multimodal transportation program, by Meyer, 1998.

Managing Transportation System Supply

Managing the transportation system by adding new facilities or by making operational changes to improve system performance has been the most common response to transportation problems for many years.

Typical actions includes;

- New highways
- Transit facilities
- Improved traffic signalized schemes
- Traffic engineering improvements such as turn lanes, one way streets, reversible lanes, turn prohibitions, treatment for multi-occupant vehicles.
- Minimize the effect of accidents and other nonrecurring incidents on traffic flow, including incidents programs, motorist's information systems, and towing/enforcement efforts.
- Advanced control strategies, and electronic known as intelligent transportation system ITS, to improve safety and efficiency of the transportation system.

Table 1 shows the types of transportation strategies that would have been considered historically for different types of problems, as compared to an operation- oriented approach with ITS.

Table 1. Transportation problems, conventional approaches, and operational approaches with ITS by Meyer, 2001.

Problem	Solutions	Conventional Approach	Operational Approach with ITS
Traffic congestion	• Increase roadway throughput	• New roads • New lanes	• Advanced traffic control • Incident management • Corridor management • Advanced vehicle systems
	• Increase passenger throughput	• HOV lanes • Carpooling • Fixed route transit	• Real-time ride matching • Integrate transit and feeder services • Flexible route transit • New personalized public transit
	• Reduce demand	• Flex time programs	• Telecommuting • Transportation pricing
Lack of mobility and accessibility	• Provide user-friendly access to quality transportation services	• Expand fixed route transit and paratransit services • Radio and TV traffic reports	• Multimodal pre-trip and en route traveler information services • Real-time response to changing demand • Personalized public transportation services • Enhanced fare card
Disconnected transportation modes	• Improve intermodality	• Construct intermodal connections	• Regional transportation management systems • Regional transportation information clearinghouse • Disseminate multimodal information pre-trip and en route
Budgetary constraints	• Use existing funding efficiently • Leverage new funding sources	• Existing funding authorizations and selection processes	• Public–private partnerships • Barter right–of–way • Advanced maintenance strategies • Restructure public support (subsidies of transportation modes) • Increased emphasis on fee-for-use services
Transportation following emergencies	• Improve disaster response plan	• Review and improve existing emergency plans	• Establish emergency response center • Internet with law enforcement, emergency units, traffic management, and transit
Crashes, injuries, and fatalities	• Improve safety	• Improve roadway geometry and sight distance • Grade-separate crossings • Driver training • Sobriety checkpoints • Install traffic signals • Reduce speed limits • Post warnings in problem areas	• Partially and fully automated vehicle control systems • Vehicle conditions monitoring • Driver condition monitoring • Advanced grade-crossing systems • Automated detection of adverse weather and road conditions, vehicle warning, and road view notification • Automated emergency notification

Managing Transportation Demand

In its broadest sense, demand management is any action or set of actions intended to influence the intensity, timing, and spatial distribution of transportation demand for the purpose of reducing the impact of traffic or enhancing mobility options.
Such actions can include offering commuters one or more alternatives transportation modes and or/ services, providing incentives to travel on these modes or at no congested hours, providing opportunities to better link or chain trips together, and or incorporating growth management or traffic impact policies into local development decisions.

Managing Land Use

One of the fundamental relationships in understanding transportation system performance is the linkage between land use and transportation. Put simply, trip making pattern, volumes, and modal distributions are largely a function of the spatial distribution and use of land.

Thus, at individual development sites, exercising control over the trip generating characteristics of the land use i.e. development density can make the resulting demand consistent with the existing transportation infrastructure and the level of service desired.

Over the long run, the spatial distribution of the land use can greatly influence regional travel patterns, and in turn this land use distribution can influenced by the level of accessibility provided by the transportation system.

Avoiding future transportation problems therefore requires careful attention to zoning and land- use plans in coordination with the strategy provision and pricing of transportation services to influence where development occurs.

A Changing Society and ITS Impact on Urban Transportation Planning

A decision- oriented planning implies a direct cause- effect relationship between transportation decisions and resulting system performance. In reality, travel behavior and travel patterns on transportation networks are affected by numerous factors outside the control of planners and government officials. For example, overall levels of travel reflect the state of the economy when the economy is good, more travel occurs. Knowing how these factors have changed over time becomes an important point of departure for understanding how the urban transportation planning process has evolved.

Many factors have influenced:

1. Population characteristics
2. The metropolitan economy
3. Societal concerns and issues
4. Transportation legislation/regulation
5. The technology of planning

Figure 4 illustrates the interaction key variables that help explain the dramatic increase in travel witnessed over the past several decades.

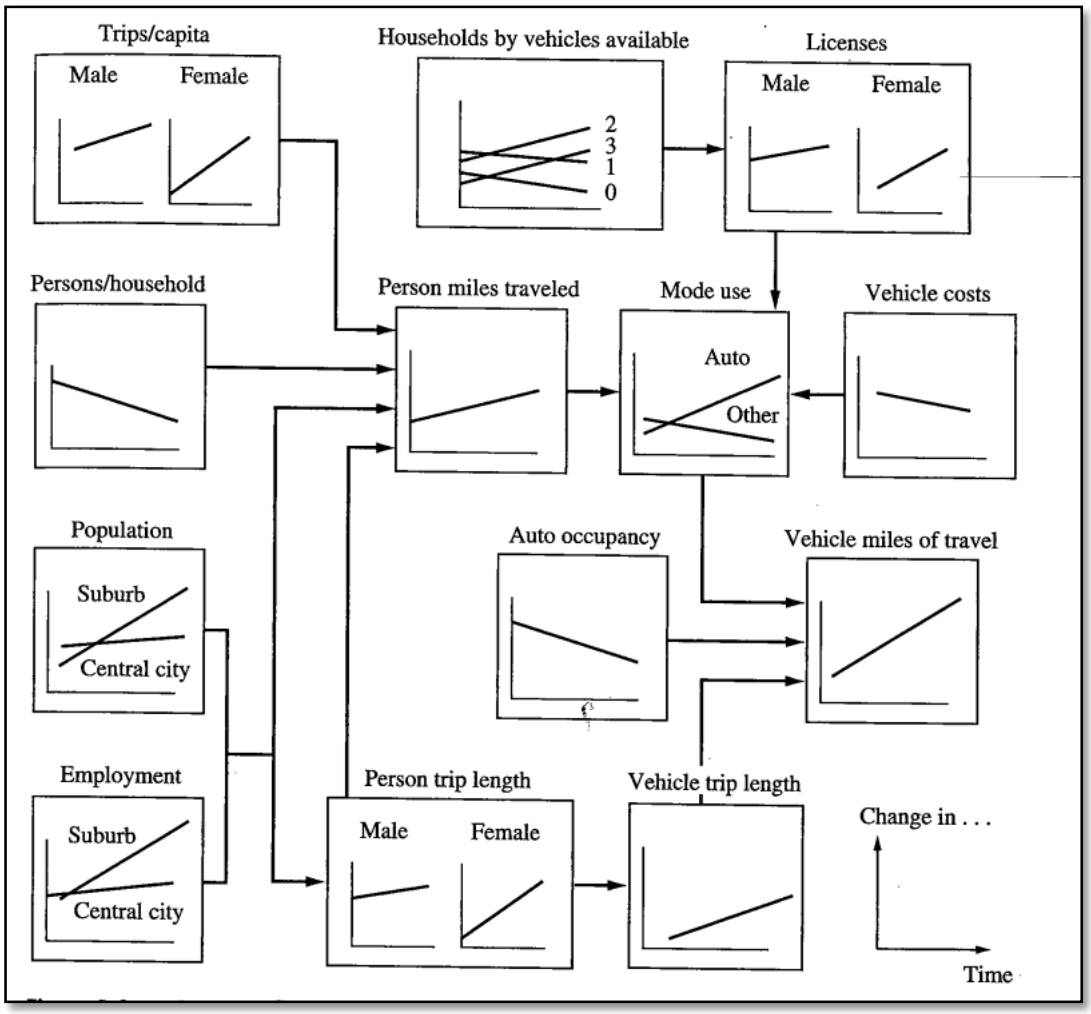

Fig. 4 Factors influencing urban travel behavior over time, Meyer, 1993.