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# Traffic Demand Management Tools in Small and Medium-Sized Cities

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*Received: August 26, 2020*

*Accepted: October 26, 2020*

**Abstract:** The function of the public urban and suburban passenger transport (PUPT) system as a transport activity is to provide transportation services in a certain urban area. By using new solutions in traffic demand management in small and medium-sized cities, which do not have an efficient PUPT system, in combination with paratransit systems, we can significantly increase the combined mobility of the population, reduce the use of passenger cars, reduce the need to build new roads, and take full advantage of the PUPT system. This paper presents the traffic demand management tools by which these effects can be achieved.

**Keywords:** Public urban passenger transport system, tools, management, transportation demands.

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## INTRODUCTION

Traffic demand management (DTM) tools are tools that focus on enabling local governments to use transportation demand management strategies and techniques in order to encourage individuals to change their behavior in small and medium-sized urban environments. The term 'traffic demand management' (TDM) describes a wide range of policies, programs, and services designed to reduce the demand for the use of passenger cars (vehicles) by influencing the behavior of individual passengers. Innovative TDM programs strive for reduced transportation and improved mobility at the same time. TDM examines the demand for transportation in order to determine how car use can be reduced, especially during peak hours. It seeks to improve options, such as walking, cycling, carpooling, and telecommunications.

TDM is developing strategies to fill empty car seats to increase capacity on roads (streets) without increasing the number of cars. It is also looking for ways to reduce the total number of drivers by redirecting travelling to other modes of transportation (e.g. cycling, etc.) so that traffic can flow more smoothly (1). An additional TDM strategy is to move travel times beyond peak periods (e.g. by allowing flexible working hours to employees) to make better use of existing road capacity. Local governments understand that TDM can avoid future road congestion, save money on road construction, increase social welfare, and reduce greenhouse gas emissions.

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## ADVANTAGES OF TRAFFIC DEMAND MANAGEMENT

Traffic demand management was originally designed to address the problem of congestion on city roads during peak hours. Many local governments want TDM to help them manage their transportation systems, ensure a balance between travel modes, and achieve the most cost-effective and strategic infrastructure improvements. Local governments can use TDM to support businesses in urban areas by developing optimal travel patterns and concentrating development around the city center. TDM can also offer residents more comfortable travelling by bike, walking, or hitchhiking. Perhaps the biggest impact of TDM is through the promotion of greater personal health and fitness. Residents may want to participate in active transportation programs as a way to integrate physical activity into their daily journeys. For many local governments, TDM is a way to resolve environmental issues by increasing sustainable transportation opportunities (2).

Reports on energy and emissions in the community include an estimate of energy consumption and greenhouse gas emissions that have a high level of greenhouse effect in transport, buildings, solid waste, and land use change. By dealing with problems before they become insurmountable, TDM also serves as a prevention. In the long run, it promotes the development of denser, more compact, and sustainable communities with less land space intended for car travel and parking.

## TDM OPPORTUNITIES

TDM provides a range of options applicable to small and medium-sized cities, such as: active transportation, public health and smart growth, more walking, support of multimodal transportation, more cycling, carpooling, public transport services, and parking management. The term 'active transportation' refers to any human-powered form physical activity, such as walking, cycling, running, rollerblading, and skateboarding. The health and well-being aspects of active transportation are clear and can be used to attract new walkers and cyclists. Walking and cycling are the most common modes of active transportation, and skateboarding is the choice of an increasing number of people, especially young people (5). Basically, these modes include sharing the right to travel with other users, whether on the sidewalk, road, bike lanes, or pedestrian lanes. Municipalities can design communities, especially roads, in order to increase the safety of those using active transportation. For example, marked bike lanes can be added to roads. Increased walking means addressing the following issues:

- Is there a network of sidewalks, paths, and lanes in the community?
- Are there sidewalk ramps, especially in the city center, for people using wheelchairs or other mobility aids?
- Are there signposts showing walking time to different community destinations?
- Are paths and lanes mixed for cyclists, walkers, joggers, etc.?
- Are there sidewalks along the main roads to the city?
- Are financial resources for pedestrian facilities identified and secured?

Multimodal transportation describes several modes of transportation used in a single journey. For example, walking is usually part of travelling by public urban passenger transport (PUPT), as public transport users have to walk to the bus station (in small and medium-sized cities, there is mostly only bus transport) and then again from the bus station to their final destination. Residents can take a bus to work and walk home, or if the buses are equipped with bicycle stands, they can cycle home.

Increasing bicycle traffic includes addressing the following issues (3):

- Are there specific bike paths or bike lanes in the community?
- Are bike paths or trails clearly marked?
- Do bike paths have street lighting? Are there benches where cyclists can rest?
- Are there mixed-use off-road trails that allow bicycles?
- Is there a map that clearly indicates bike paths, routes, and facilities?

- Are there bicycle stands in the city center or elsewhere?
- Are there other facilities to complete the cyclist's journey, such as showers or safe areas to lock the bike?
- Are buses equipped with bicycle racks?
- Is the community seeking funding for bicycle facilities?
- Is there a bicycle master plan that promotes cycling?
- Is there a local cycling advocacy group?
- Is cycling supported and promoted in district schools? Are cycling safety classes available in the community?

Car sharing and van sharing are two forms of sharing a journey. When sharing a car, a private vehicle is used, while when sharing a van, a vehicle rented specifically for that purpose is usually used. Ridesharing programs may be of particular interest to scattered rural communities where population density is too low for public transportation and the distance is too great for active modes of transportation.

The conventional public urban passenger transport (PUPT) system serves the general population and uses fixed-line buses. Most buses are wheelchair accessible and door ramps are lowered, and PUPT offers in rural and suburban areas flexible lines and schedules for passengers in minibuses, taxis, and vans. Many paratransit services as subsystems of PUPT (which are quite common in small and medium-sized cities) offer excursions outside their immediate community one or more days a week. The customized PUPT serves those who cannot use conventional PUPT due to disability and involves the arrival of vans and minibuses by phone call, a practical door-to-door service. The service is also offered through contracted programs for additional payment of taxis and taxi savers (discount coupons). If the community does not have a PUPT, it may explore carpooling or vanpooling and consider accessing paratransit services of a nearby community for inter-community travel (7).

Parking management is a TDM strategy that local governments can use to increase the demand for different modes of transportation and reduce the use of land intended for parking. Parking management refers to policies and programs that result in more efficient use of parking resources. Local governments are now able to raise money from parking because parking is prohibited on the street, even if there is no available parking space nearby. The money can instead be channeled into a sustainable transport infrastructure fund and used to fund future projects. Marking street parking spaces for smart cars, bicycles, and outdoor vehicles is one way to visibly support different modes of transportation. Determining the best parking spaces at a field station for bicycles and parking has a similar effect. People walking or driving

by will notice these marked areas. Another parking management technique is to determine the price of a parking space in the city center higher than the price of a monthly bus ticket (4).

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## TDM TOOLS

TDM tools include:

### A. Plans and rules

They include official community plans, regional growth strategies, transportation plans, local plans, and bylaws affecting land use and transportation. Such plans and policies can support TDM policies to improve infrastructure and social marketing programs, as well as set goals for changing behavior in transportation (6).

### B. Smart growth planning

Smart growth planning aims to promote lush, more compact development with a combination of land use, enabling residents to access services within the walking space. It seeks to reduce the number of vehicle journeys needed for community residents to meet their daily lives and access the goods and services they need. Having more people living closer to these goods and services is essential for the sustainable development of transport. As such, smart growth planning is an important tool for developing an effective TDM strategy.

### C. Transportation plans

They set future targets for modes of transportation and seek to increase the market share of other modes of transportation. The plans differ only in the way of how aggressively they promote change and prioritize different modes of transportation.

### D. Local plans

Local plans can address specific transport-related locations, barriers, desired infrastructure change, priorities, and weather. Such plans usually advocate connecting and extending of sidewalks, paths and bicycle paths, improving of other pedestrian facilities (wider sidewalks, benches, sidewalk ramps), and dealing with specific parking problems (parking only for residents, stop zones, bus stations, signaling).

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## NEW TDM OPPORTUNITIES

The TDM tool contains significant successful TDM initiatives and encourages local governments to follow concrete initiatives that can increase the sustainability of their community. The following areas in which local governments could be leaders in new TDM initiatives - especially for their adaptation to small and medium-sized cities are:

### A. Program Areas

There are direct benefits if people try alternative modes of transportation during big events. For example, local governments may partner with ticket providers for special events (exhibitions, fairs, etc.) in order to charge a ticket fee, thus allowing people to use their ticket as a PUPT ticket (for an event located in an area for which there is already a PUPT line). Through an additional fee, local governments reimburse revenues in the PUPT system on these special tickets.

### B. Community Buses

Community bus transportation allows a large, defined group of people to purchase highly discounted annual season tickets. The next target "community" for special access to the PUPT system could be all high school students in a given municipality. Students would benefit from a community bus ticket by gaining access to the PUPT both after school and at weekends.

### C. Specialized Pupt Programs

Many specialized PUPT programs exist in larger communities; they are often underused or do not even exist in small or medium-sized communities.

- **Time tickets:** Many systems accept this "open transfer" policy, which allows users of the PUPT system to use the ticket within 90 minutes of the original boarding time.
- **Bicycle and bus:** Buses equipped with a bicycle carrier can transport twice as many bicycles. This program has proven to be very popular in a number of cities around the world and supports bimodal transportation.

### A. Services for Youth and Families

- **Family travel:** Local governments can introduce a family ticket in the PUPT, which allows parents to use buses at the same time with their children (even at weekends).
- **Summer tickets in PUPT:** Local governments can introduce bus season tickets intended for young people for the summer period at attractive prices, even two months for the price of one.

### A. Services for the Elderly and Persons With Disabilities

- **Travel training assistance especially for the elderly:** who may need door-to-door service (a small bus that can be ordered ahead of time to pick up and drop off passengers at certain locations).
- **Taxi service program:** a program that allows users to purchase an affordable subsidized taxi ticket in order to compensate for their travel options. This program is especially useful for the elderly and in those hours or days when there is no PUPT service (night hours).

### A. Parking Subsidization Programs

Residents who shop in the city's business centers can get reduced parking prices with the purchase of goods or services. This subsidy does not support sustainable use of PUPT.

### B. Personalized Transportation Planning

Personalized transportation planning can provide individualized advice in person, over the phone, or online to help residents develop travel plans that reduce car use.

### C. Ride Home Programs

Guaranteed ride home programs offer a cheap solution for individuals who want to leave their vehicles at home. These programs offer a free ride home, usually by taxi, in emergencies for employees who regularly use sustainable means of transportation to work.

### D. Telecommunications

Telecommunications includes programs that allow employees to reduce the number of their weekly trips by working from home one day a week or more. Providing high-speed Internet service to communities is perhaps the most practical way to allow some people to work from home. This allows them to reduce the number of trips to work.

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## CONCLUSION

TDM aims to solve the problem of city congestion. Achieving these goals requires individuals to change the way they travel, meaning that people should drive less

frequently. This is where traffic demand management comes into play. It is important to fill the free car seats in order to increase the capacity on the road without increasing the number of cars. TDM is exploring ways to reduce the total number of drivers by redirecting traveling to other modes of transportation, such as walking, cycling, public urban transportation, or carpooling, so that traffic can flow better. Efficient public transportation can be achieved only if the main requirements of passengers in transport are met. This means that the passenger needs to be offered reliable transportation, with a satisfactory frequency, and with comfort at an enviable level of quality.

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