

Urban Development and Public Transportation: Improved Understanding of the Interdependencies

A Statement by the International Council of Academies
of Engineering and Technological Sciences (CAETS)

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More than 50 percent of today's world population is living in urban regions, making the planning of liveable future cities critically important. The topical Symposium of the 2012 CAETS Annual Meeting, organized by the Swiss Academy of Engineering Sciences (SATW) and held in Zurich August 30, addressed this concern, focusing on the impediments and potential solutions to controlled sustainable urban development. This requires efficient intermodal public transportation and effective use of motorized individual transport (specifically cars and motorcycles), integrated into one optimized transportation system. Based on expert presentations and deliberations of the CAETS delegates, the findings and recommendations below were formulated and approved by the CAETS Council on August 31, 2012.

Introduction

Future cities have to fulfill the following basic criteria: sustainability; good quality of life (e.g., low noise, plentiful daylight and space, "coziness," a sense of identity, etc.); a variety of local shops in each district to satisfy daily consumer needs; and an efficient, integrated transportation system. This should consist of firstly, a reliable and highly frequent public transportation between suburbs and inner city with a high modality; and secondly, measures to optimize motorized individual transport, such as traffic control systems, traffic management centers, and information systems for drivers. Transportation makes its greatest contribution if it is integrated so that switches between different modes are seamless for the users, enabling them to choose the optimal solution for each leg.

Such integrated and optimized transport systems reduce the requirement for roads and parking; reduce congestion, air pollution and greenhouse gas emissions; support the optimization of resources used for transportation in general; and increase the quality of life. Suitable urban development, such as mixed land use, where work opportunities and residential units are closer to each other, can reduce the need to travel. Flexible working time models together with public transport incentives can reduce excessive peak period travel and encourage off-peak travel, and so make public transport more effective and affordable.

It is intuitively clear that urban development and transportation are highly interdependent. On one hand, change or growth of existing or new commercial or private living settlements creates needs for new transportation or increased capacity, more frequent services, and/or shorter travel times. Alternatively, better access to public transportation and more frequent and faster services create a new demand for settlement space nearby, be it for commercial or private purposes, and can

completely change the character of an entire neighborhood or area. Hence, a feedback loop exists between urban development and public transportation, but the detailed mechanisms of this loop are not understood well enough to ensure efficient developments of space, transportation and living environments for humans.

The Symposium

The 2012 CAETS Symposium examined these various issues at the macro and micro scales under the headings of Urbanization, Land Use and Transport; Planning and Implementation of Public Transport Systems; Innovation in Transport Systems; and Intermodality and Integration in Transport Systems. Under these broad categories, discussion focused on holistic urban planning and future city models as well as specific issues, such as the unhealthily noisy environments that are caused by urban traffic, Personal Rapid Transit as a lower-cost yet high-quality solution, intelligent buses in Helsinki, and the development of a harmonized European Train Control System. It was noted that achieving the economic and social benefits of limiting cars is as much a political challenge as a technological challenge; and that the cost of mobility disruption during construction of new or revamped transportation systems should be included in the socio-economic model and specific mitigation actions included in the execution plan. Through consideration of the interdependencies of an integrated transport system, the Symposium also identified gaps where more research is needed. On the basis of the presentations and discussion at the Symposium, CAETS has identified the following main findings and recommendations for consideration by governments, national transport and urban planning authorities, and other public and private sector organizations involved in the planning and implementation of urban development and transportation systems for the next 50 years.

Findings and Recommendations

1. To avoid spread of anonymous suburbs into green land along new traffic links or into areas poorly served by public transportation, forcing use of private vehicles and creating air pollution and noise, designs of public transportation and urban developments should be considered as integrated, interdisciplinary projects, both structurally and spatially. The structure of public transport should be understood as part of urban development for an ideal access, and the transportation infrastructures, especially tracks, bridges, power systems, overhead cables and stations, should be designed as part of the landscape and urban space. Suitable densification of land use in both nodes and corridors is necessary to ensure viable, effective and affordable public transport. Authorities should recognize this interconnection – agree to, promote, and plan for it and ensure that it is enforced.

2. Consistent enforcement and management is necessary. People's behavior is a key factor in the considerations of how future mobility problems should be resolved or improved, and influencing appropriate behavior will require both carrot and stick approaches from the side of the authorities. This not only applies to the regulatory standards (e.g., less parking for higher density developments close to public transport interchanges), but can also be achieved by providing assistance through bodies such as “City Improvement Districts.” Bodies such as Transport Authorities can ensure uniformity among independent adjacent local authorities.

3. Emerging technologies such as Automatic People Movers and Personal Rapid Transit combine the positive attributes of private transport with those of public transport. They offer on-demand, secure, low-energy and swift service, which is proven in closed environments such as airports or new developments and will soon be integrated into dense urban environments. Governments and local authorities should consider where these specialized modes can be "retrofitted" to complement existing rail, tram and bus service.

4. In concert with modern city planning and provision of efficient public transportation, motorized individual transport systems will not disappear and thus they must be optimized for maximum efficiency – that is, minimum congestion and pollution – using, possibly, Mobility Pricing as a replacement for existing fuel duties (equal to polluter pays principle), pricing signals (e.g., congestion fee) and a reliable and ubiquitous e-Mobility charging system to promote use of low-pollution electric vehicles.

5. Further research and development is required to ensure that the relationship between land use and transportation is well understood and the regulations laid down will indeed achieve their aims. Such guidelines and regulations should also take into account the relationship between and respective responsibilities of the public and private sectors, recognizing the value of public private partnerships in developing and financing modern, sustainable, integrated urban environments.