Roads and Innovation

Future-proofing roads
in the wake of smart mobility
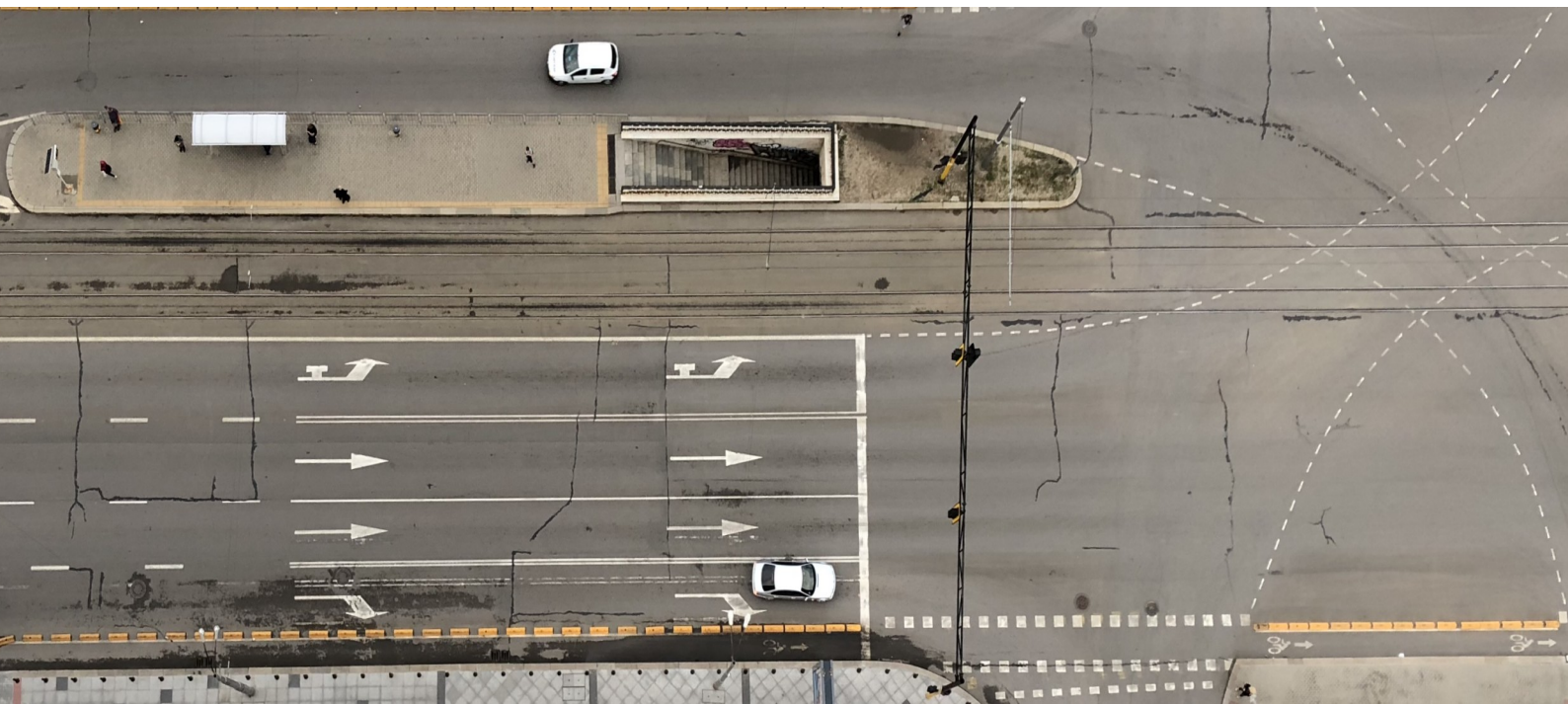
A road is a road is a road …. or not?

Autonomous cars, mobility as a service (MaaS), intelligent transport systems (ITS), alternative fuels, electric vehicles… Things are evolving fast in road transport and visions can be fascinating.

Some of the new technologies bear potential to improve traffic flows and alleviate the pressure to build and expand roads in increasingly restricted and restrictive environments. Some may trigger the need to adapt road infrastructure and suprastructure in order to create the enabling environment.

How to deal with the ever more rapid emergence of new technologies in a sector whose assets are designed for long lifetimes of 30 plus years, and how to harness such technologies to contribute to common transport policy objectives are questions that more and more road authorities are seeking answers to.

Through its international contacts, networking, as well as targeted research, JASPERS endeavours to keep abreast with the latest trends and developments regarding innovative transport solutions and their impact on roads development and operation, with a view to support beneficiaries in developing sound practices and projects.

Big brother where art thou?

Data are key in transport planning and infrastructure management. Historical data is essential for analytical traffic models and forecasts. Real time data helps managing current traffic flows. Accident data is essential for decision making on road safety issues. Climate change data is a prerequisite for suitable road network adaptation. Up-to date information on infrastructure integrity can underpin predictive maintenance.

Digitalisation is one of the pillars of the current EU road sector strategy. It aims at furthering common standards and platforms, to achieve an array of objectives, including enhanced efficiency and safety.
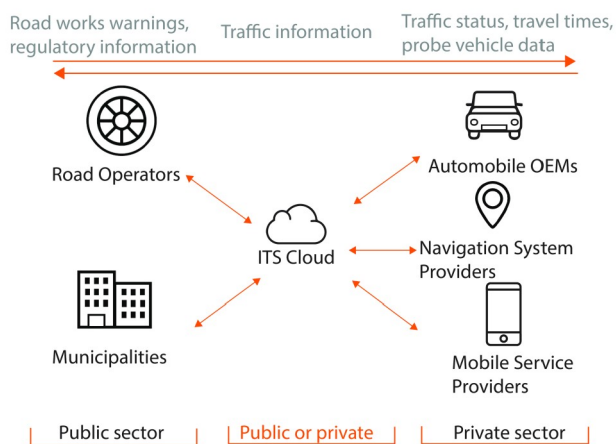
To facilitate access, exchange and reuse of transport related data for the benefit of the end users, the EU ITS Directive (2010/40/EU) requires member states to set up National Access Points (NAP). These can take various forms, such as a data warehouse or a web portal. Whilst many member states have made steady progress in that regard, there is still a lot of work in progress.

Road authorities can avail themselves of an arsenal of data collection tools, including sensors, inductive loops, cameras, as well as surveys. More and more, however, private companies are entering the market to collect data for sale with innovative methods (for example GPS or mobile phone signal based traffic data). Road authorities, therefore, face make-or-buy decisions.

In parallel, traffic modelling software is gradually emerging with modules allowing the inclusion of innovative phenomena, whilst empirical data to underpin model parameters is hard to get.

Science or fiction?

Autonomous vehicles are commonly classified from "no automation" (L0) to "full automation under all conditions manageable by human drivers" (L5). Many partial features of vehicle automation, such as Cruise Control or Park Assist (L2) are already available. Full automation, known as L5, though, is harder to achieve. The Danish Ministry of Transport expects that L3-4 cars will drive on public roads from around 2022 and make up 100% of the fleet by 2054. L5 cars are expected to be gradually introduced from around 2034, reaching full market coverage by 2066.

The impacts of autonomous vehicles and associated phenomena, such as mobility as a service (MaaS), on road traffic and infrastructure are difficult to predict. Researchers currently focus on exploring cause-effect chains, but there is not much empirical data available yet. Car ownership will be an important variable in the equation, as MaaS will find acceptance.
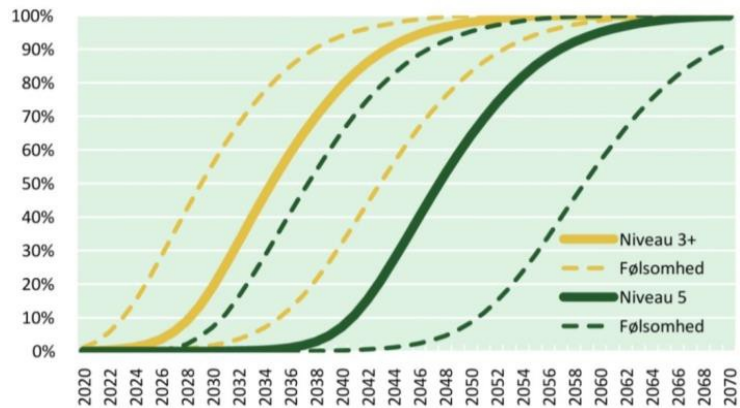

Source: Ministry of Transport, Building and Housing of Denmark (2018)

There seems to be a consensus that this could reduce the need for parking space. The impacts on traffic flows are more complex and countervailing: for instance, better lane keeping and headway control can smoothen traffic flows, but the individualisation of public transport can increase the number of smaller vehicle trips. It seems clear that the full benefits of autonomous vehicles on traffic flows are only achievable when complete market coverage is reached, whereas such benefits could be very limited at times of mixed fleets.

Alternative fuels

At present, only some 3% of all road vehicles in the EU run on alternative fuels. However, there can be no doubt that the fuel mix is shifting and that electric vehicles are on the rise, promoted through policy schemes notably aiming at the reduction of local emissions in urban areas. Major efforts are put into extending electric vehicle operating ranges through increased storage capacity, as well as into developing rapid charging facilities. From the perspective of road authorities, developments on fuels are less disruptive than other elements of innovative transport. Deployment of the charging infrastructure may require adaptations of concessions for rest and service areas and the provision of enhanced power supply.
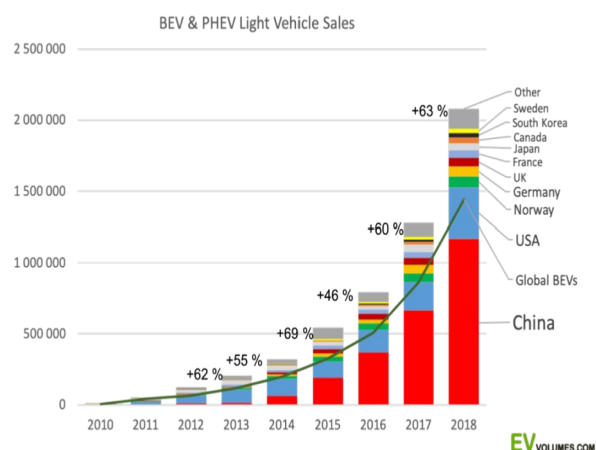
How JASPERS can help

JASPERS/Roads can support its beneficiaries in a number of ways:

- Support to structured objectives-setting processes.
- Moderating discussions between stakeholders.
- Advice on organisational development.
- Terms of reference for as well as review of strategies and master plans.
- Review of planning and design guidelines.
- Pathfinder support through international fora.
- Organising knowledge exchange between road authorities and other bodies.
- Decision support for the introduction of novel schemes.
- Support to the preparation of application for grants related to innovative transport schemes (including test and demonstration schemes).

Contact us

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