

Position Paper on:

Socio-economic assessment and sustainability of automated road transport



Summary

To make well-reasoned decisions - which technologies should be further evolved, how to develop the digital and physical infrastructure, how to enhance mobility and logistic transport service - a sound knowledge base is needed on how the desired impacts in the transport system can be reached with increased automation, and which development scenarios are not favourable? The goal of impact assessment is to provide the information required for the sustainable development paths, hence good understanding of impact mechanisms is needed. Furthermore, the cost-benefit analyses call for numerical estimates of the benefits.

Several challenges were identified related to assessing the socio-economic impacts of automated vehicles. Some of them are more generic related to impact assessment and field studies, some more specific to automated driving. The identified challenges were grouped in three groups: short-term, long-term and methodological ones.

It was understood that assessing impacts and sustainability of automation is challenging already in the short-term: trying to cover all possible impacts well and ensuring acceptance of automated driving and tests with the general public having imperative demand on safety and security in piloting phase. How to handle testing of technologies in lower TRLs? How to scale up and introduce preliminary results based on limited pilots; how to handle with the gradually evolving knowledge?

In the long-term, the picture may be even more complicated. The assessment must cover direct and indirect effects, related to each other, and other social trends besides automation influencing the working environment. Parallel with increased automation in road transport other changes in society will happen and should be anticipated; examples are electrification, shared mobility services and job creation.

Automation challenges the traditional approaches and methods used in the assessment of ITS. Impact mechanisms are complex, and to catch all relevant effects up-dates of models may be required on several levels. New research questions emerge and old ones are getting new content or becoming less important. How to organize pilots and field studies in the mixed transport system having significant power? Overall, high-level automation is going to mean fundamental change in the road transport system; the objects of research are changing as well as the evaluation approaches and methodologies.

Statements regarding some expected impacts of automated driving in road transport were defined. Examples of the statements for voting in CARTRE consortium are:

- Use of passenger cars (exposure) will increase due to L4 automation.
- Road network efficiency will decrease in the first phase of low penetration of automated vehicles (before critical penetration of L3/L4 vehicles).
- L3 automated driving will improve traffic safety.
- Car sharing will increase significantly by 2030 as a result of automation.
- Car drivers are willing to pay more for L4 automated cars than non-automated cars.
- Drivers of automated vehicles will make productive use of time on-board automated vehicles (L4 above) – new value of time for the cost-benefit
- Highly automated driving will increase equity in the society.

Examples of future research topics are focusing on long term impacts and well fare in the society:

- Evidence about socio economic benefits in terms of inclusiveness, more livable cities and user-centric activity based mobility solutions
- How are citizens and public authorities able to influence the direction AD will take, what tools and process could enable maximum influence and stimulate public debate?
- Long-term studies on how automation supports mobility; assess the long-term effects of automated vehicles on driver behaviour, road safety, future travel needs, and future mobility patterns
- Study and find design solutions for human factor challenges such as misuse, skill degradation, level of trust and acceptance, motion-sickness during non-driving activities in highly automated vehicles.
- Research on emerging new mobility patterns
- Research on how trust, acceptance and adoption of road automation develop over time and with more exposure and experience with automated systems.

Assessment should have strong emphasis on social effects, user requirements, user acceptance and user outreach. The outcomes of research and innovation will only come to rapid deployment, if further efforts are made to reaching out to users, analyzing their requirements and acceptance with the aim to overcoming market deployment barriers.

Socio-economic assessment is seen as a continuous activity taking place in parallel with the development of intelligent, connected and automated road transport system. Assessment goals and methods vary according to the technology readiness level (TRL). In an early phase, the assessment provides input directly to the design process whereas on the higher TRLs the focus is more on the evaluation of the benefits and drawbacks.

The assessment results are important for several stakeholders: road authorities and cities, OEMs, mobility service providers, fleet operators, transport and logistics owners, drivers/fleet organisations, medias, micro-electronics industry, telecom industry and finance sector. All parties need to be aware of user reactions and impacts in alternative deployment scenarios.