



INTEND – Identify future Transport rEsearch NeedS

INTEND NEWSLETTER 3

PROJECT IN A NUTSHELL

The INTEND project is a Coordination and Support Action (CSA) funded by the H2020 programme. The main aim of the project is to deliver an elaborated study of research needs and priorities in the transport sector utilizing a systematic data collection method. Megatrends that will be affecting the future transport system will be identified using the Analytical Network Process to ensure validity of the results. Finally, INTEND will develop a transport agenda that would pave the way to an innovative and competitive European Transport sector.

IDENTIFICATION OF FUTURE CHALLENGES

The INTEND project will release D 3.2 “Report on Megatrends validation and impact assessment” which illustrates the findings regarding megatrend validation as well as impact assessment of megatrends on the transport concepts of the future that have been presented in past deliverables. The deliverable has been elaborated by the University of Belgrade, Faculty of transport and traffic Engineering.

The validation is carried out through the application of the Analytic network process (ANP). ANP method taking into account clusters of megatrends, political imperatives, technological advances and key transport concepts of the future (TCF). A sophisticated Lime survey and ANP questionnaires were used for systematic data collection. Experts, from academia, policy-makers, and industry, were invited to participate in a survey session and ninety responses were received. Finally the 13 key elements which are most likely to impact the future research needs and priorities per transport sectors were identified.

Forty-eight sets of judgments matrices were generated after the analyzing the relationships between key elements and selected TCF. Finally, the tailored ANP networks for megatrend validation for passenger and freight transport were developed.

The highest priority values of the TCFPs has *High-speed rail*. Looking ahead, the TCFP very close to the first one are *Automation and Personal air transportation*. The only significant difference in ranking is shown in the *Superfast ground*. Respondents from academia ranked *Superfast Ground* considerably higher than respondents from policy-makers and industry.

22/10/2018
INTEND Project
Newsletter No.3

Dear reader,

We would like to welcome you to the third INTEND newsletter containing the final update regarding the project. INTEND after its year duration, has reached its end

No	Passenger transport Sector		Freight transport sector	
	Cluster	Element	Cluster	Element
1	Megatrends	Environmental challenges – climate change	Megatrends	Environmental challenges – climate change
2	Megatrends	Urbanization and megacities	Megatrends	Urbanization and megacities
3	Megatrends	Ageing society	Political imperatives	Vehicle efficiency
4	Megatrends	Energy demand and sources	Megatrends	Bigger world economy
5	Political imperatives	Innovative research system	Megatrends	Energy demand and sources
6	Megatrends	Changing lifestyles	Megatrends	Ageing society
7	Technological advances	Infrastructure	Political imperatives	Innovative research system
8	Political imperatives	Vehicle efficiency	Technological advances	Infrastructure
9	Technological advances	Automation	Technological advances	Automation
10	Political imperatives	Increasing connectivity, intermodal access, and fit-for-purpose network standards	Megatrends	Changing lifestyles
11	Political imperatives	Closer public and private cooperation	Political imperatives	Raising investment in infrastructure development
12	Political imperatives	Supporting modal shift	Political imperatives	Digitisation strategy/regulations/markets
13	Technological advances	Electrified vehicles/vessels	Political imperatives	Closer public and private cooperation

INTEND PROJECT VIDEO

You may check the INTEND project video that is available on YouTube

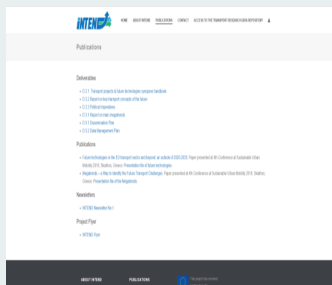
<https://youtu.be/KqvUzytZWus>



INTEND PUBLICATIONS SECTION

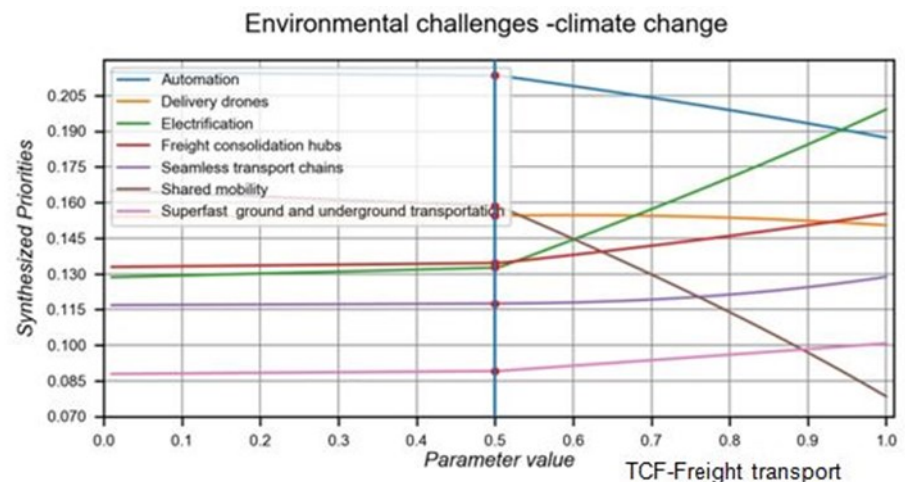
All intend project deliverables and articles are available in the project's website under the publications section

<https://intend-project.eu/publications/>



Such a ranking as a result of evaluating of respondents from academia, it can be interpreted that Superfast ground as an alternative to a conventional transport system, and as a technological solution, is a transport concept that needs to be further developed in the coming periods. Significantly stands out the influence of the *Changing lifestyle* and *Environmental Challenges* megatrends. These two megatrends according to the priorities can be considered as the leading megatrends that influence the determination for future research needs.

Focusing on the priorities of transport concept of the future for freight transport (TCFFs) it showed that the *Automation* is dominant. TCFFs *Delivery drones* and *Shared mobility* ranked second and third, are with a significant difference in priority value compared to *Automation*. Signifi-



cantly stands out the influence of the megatrends *Changing lifestyle*. The importance of this megatrend suggests that the change in the lifestyle generates new demands for transportation, or different supply and demand together.

The answer to the question of whether there are significant differences in the assessments of TCFFs among the groups of respondents is that the priorities does not differ significantly so that the priorities and ranking are the results of the concise and comprehensive validation of all groups respondents. The only significant difference is in ranking the transport concept of *Shared mobility*. *Shared mobility* is a concept that encompasses several service models and basically that is mostly presented in passenger transportation. When it comes to freight transport, it is a business model that focuses on the supply side of goods to customers, which is accessed through a single "window." Representatives of policy-makers and industry ranked this concept lower than academics, which could be interpreted by the fact that new technologies and procedures for collected freight transport are only in the implementation phase.

SKETCH OF THE FUTURE TRANSPORT SYSTEM

The mobility system is about to change in a fundamental way. Technological innovation, political decisions and new mobility concepts as well as social and economic trends lead to a system transformation. The overall aim of D4.1 "Sketch of the future transport system" was therefore, to develop a sketch of this new system. It is based on an analysis of trends with their impact on mobility, expert interviews and online surveys showing influencing factors:

Related to **Megatrends** of globalisation, urbanisation, demographic ageing and related scarcity of resources the main tendency of future development is growth, which will result in increasing mobility demand, resource consumption and related emissions.

Structural change of the **economy** (related to digitization) is transforming production, industrial sectors and retail as well as the organisation of the economy - reflected in social developments, the labour market and lifestyles.

Policies such as efforts in emission reduction and towards a circular economy from the political side can serve as game changer, shaping the effects of technological innovation.

Impact factors and trends in mobility indicate further systemic changes to be considered in research:

Many recent technological innovations have a potential to serve as future game changers.

Autonomous driving technologies can be expected to dominate the future transport system. Experts assume that autonomous driving systems will be first implemented in cargo/

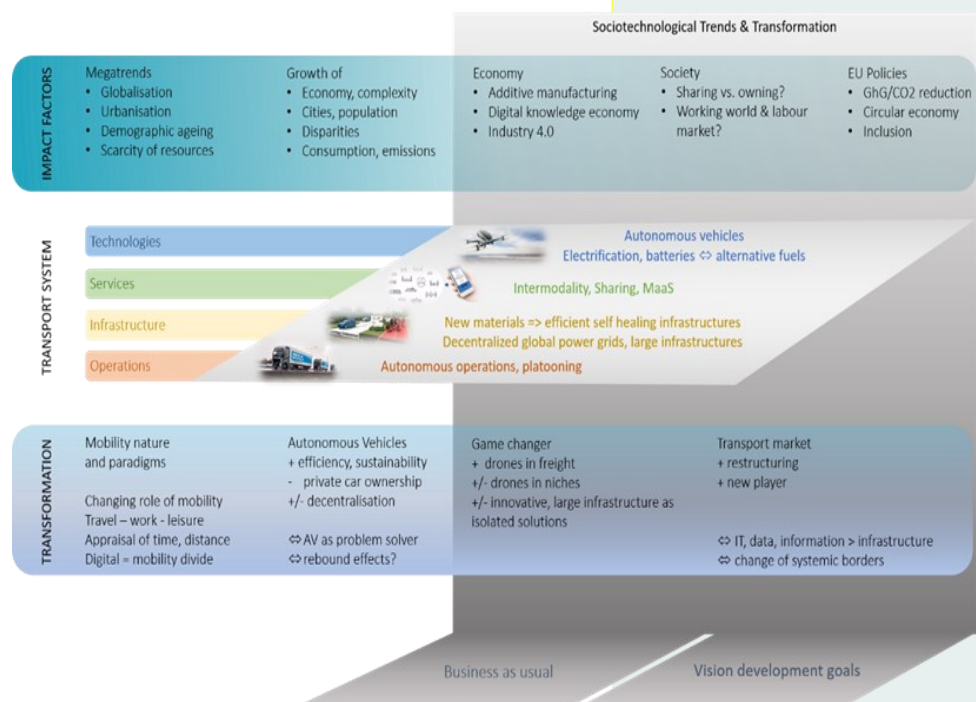
freight and in urban rather than in rural areas – and will have positive impacts.

Fundamental changes can be expected in engine technologies by electrification of conventional drivetrains, together with supply of alternative energies running in parallel. Experts expect that electrification of drivetrains (as well as lightweight construction) support sustainable transport.

IT-based solutions enable intermodality, shared mobility and MaaS services on a large-scale. Experts see a potential for large scale use of shared mobility – in opposition to revolutionary concepts such as Hyperloop One. Also, drones are considered as niche technology, which will rather be implemented in cargo/freight transportation than in passenger transportation.

Concerning mobility culture experts see a tendency of decreasing private car ownership due to newly emerging mobility products and services.

Experts state that adaption of regulatory frameworks for emerging technologies (e.g. autonomous vehicles) is missing, and that internalisation of negative externalities is crucial for a sustainable



transport system. You may find further information regarding D 4.1 as soon as it becomes available at the INTEND project website.

FUTURE TRANSPORT RESEARCH AGENDA

The INTEND project is expected to release its final deliverable D 4.2 “Transport Research Agenda” in December. Based on the sketch of the future transport system combined with trends analysis and expert assessment of developments, **research gaps** and potential **blind spots** in today’s perspective on what is relevant for the future mobility system are currently being identified. Addressing these blind spots is crucial for systemic transformation of the transport system towards sustainability as they indicate that broader perspectives – beyond transport and traffic – need to be developed and that the mobility system needs to be re-organized be-

yond technological innovation. Thus, bottom-up and problem-driven research needs to be enabled in order to induce a fundamental transformation of the prevailing system. In a final step, recommendations for future research priorities in EU transport research will be formulated, resulting in a new and future-oriented **transport research agenda** that aims to ensure long term competitiveness and sustainability within the European transport sector. You may find further information regarding D 4.2 as soon as it becomes available at the INTEND project website.

INTEND PROJECT WEBTOOLS

The INTEND website <https://intend-project.eu> is the main anchor point of most of the dissemination activities like for the publication of deliverables, creation and submission of newsletters, creation of news etc.

In order to present the project’s outcomes in a more interesting manner two interactive features have been implemented on the website. These are:

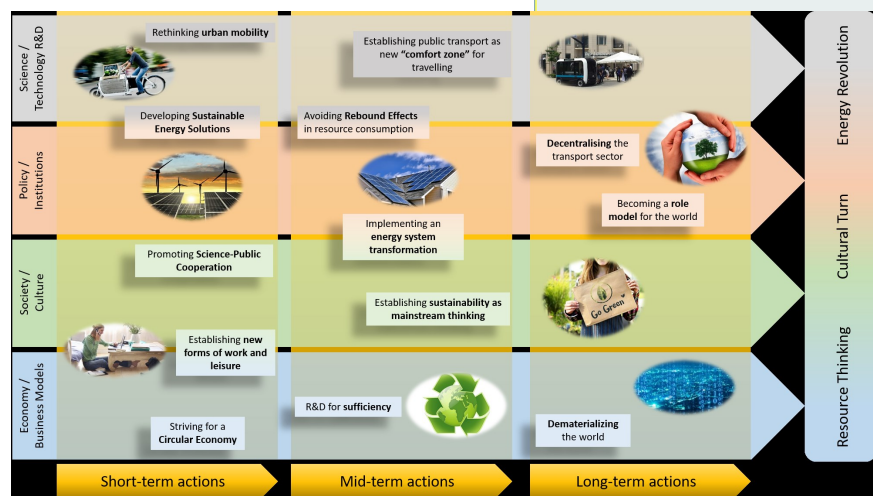
1. The Transport Project Synopsis tool which is an interactive feature that allows to shortlist, and export information related to within the project reviewed transport research pro-

jects based on predefined categories.

The Transport Project Synopsis tool has been created in form of a Transport Research Data Repository and is accessible via:

<https://intend-project.eu/access-to-the-transport-research-data-repository/>

It contains information on 388 European and international transport research projects that have been reviewed in INTEND’s D 2.1 “Transport projects & future technologies synopses handbook”



The data repository allows the user to shortlist the stored information according to different filters. This interactive feature enables the user to create synopses of current states of research by transport sector, mode, thematic area and funding programme. Thus, the information provided can be of use for other researchers/ technology developers to structure the existing knowledge, identify gaps or re-

cent trends in research related to transportation. The information that is displayed on the Synopsis tool is based on an *.xlsx file that is located at the INTEND's Word Press administration page.

Shortlists can be accessed via screen only but also printed or exported in *.xlsx or *.csv data formats for later use. The figure below shows the starting screen with the database table and categories.

Access to the Transport Research Data Repository

Transport projects & future technologies synopses

The following table contains information of projects that have been reviewed under the INTEND project D 2.1 "Transport projects & future technologies synopses handbook". It offers a brief review of the technologies that have been researched under each project and other relevant information categorised into thematic areas.

Transport Mode:

- ☐ Aviation
- ☐ Rail
- ☐ Road
- ☐ Waterborne

Thematic Area:

- ☐ Competitiveness
- ☐ Energy
- ☐ Environment
- ☐ Infrastructure
- ☐ Systems
- ☐ Systems & safety

Sector:

- ☐ Freight
- ☐ Passenger
- ☐ Passenger & Freight

Funding programme:



Print Excel CSV Copy + New Edit Delete

Show entries

Search:

TRANSPORT MODE ^	THEMATIC AREA ^	TECHNOLOGY THEME ^	SECTOR ^	TECHNOLOGY IDENTIFIED ^	ACRONYM ^	PROJECT NAME ^	PROJECT BRIEF RESULTS ^	FUNDING PROGRAMME ^
Road	Competitiveness	Vehicle design	Passenger & Freight	CAD of external modular bus and design of coupling-decoupling system	EBSF	European Bus System of the Future	The study considered an articulated bus with a modular structure in order to permit a complete flexibility. The whole vehicle system is composed by one tractor and two trailers with two axes and is provided with a steering system, acting on all the wheel	FP7
Road	Competitiveness	CAE and real life crash tests	Passenger	Design, crash simulations and real life simulation of an lightweight body designed for EV powertrain	WIDE-MOB	Building blocks concepts for efficient and safe multiuse urban electrical vehicles	WIDE-MOB designed building block concepts for future EVs based on lightweight architecture, distributed drivetrains and low aerodynamic drag. The design was tested by a prototype for crash worthiness	FP7
Road	Competitiveness	Electric vehicle design	Passenger	Design, simulation and crash test of lightweight EV	ALIVE	Advanced High Volume Affordable Lightweighting for Future Electric Vehicles	ALIVE designed and manufactured an vehicle frame in order to be lightweight and for high volume production	FP7
Road	Competitiveness	Electric vehicle design	Freight	Vehicle design using a modular structural architecture for electric light trucks or vans (ELTV's) focusing on the improvement of passive safety	OPTIBODY	Optimized Structural components and add-ons to improve passive safety in new Electric Light Trucks and Vans (ELTVs)	OPTIBODY developed new structural concept of ELTVs which is composed of a chassis, a cabin and a number of specific add-ons focusing on new market segments	FP7
Road	Competitiveness	Electric vehicle design	Passenger	1) Vehicle design and development of a 4 seater small lightweight hybrid metal composite chassis electric vehicle 2) Hybrid composite chassis using carbon fiber silbeams with steel hubular trusses and folded	AMBER-ULV	Automotive Mechatronic Baseline for Electric Resilient Ultra Light Vehicle	AMBER-ULV project aimed to close the gap between heavy quadricycles and M1 category vehicles in terms of safety and performances, while maintaining a convenient and affordable price to quality ratio by designing a prototype 4 WD EV	FP7

2. The INTEND Synopsis

Tool is an interactive feature of the website. It visualizes the outcomes of the pairwise assessment of the influence that selected parameters from the fields of megatrends, political imperatives, and technological advances might have on the future importance respectively on a future breakthrough of certain transport concepts of the future (TCF). Therefore, investigations of all latter mentioned influencing parameters have been conducted during different project tasks. The main task of WP 3 was then to bring all these parameters together and to elaborate closer on their interrelations. This has been done by creating a model applying the Analytical Network Process (ANP).

The input data has been generated during the INTEND survey session, in which 67 representatives from three different groups (academia, policy making, and industry) participated, helped to structure the ANP model, and to perform the pairwise assessment of elements while pointing out the megatrends, political imperatives, and technological advances impact on the priority of key transport concepts of the future. The pairwise comparison combined with an impartial attitude of the respondents from the different group implies that an estimation of megatrends impact on a TCFs is the equal treated or similar without any difference. For more information on ANP, please check the related Deliverables of WP 3 via <https://intend-project.eu/publications/>.

The idea behind INTEND's Synopsis tool is to show the main outcomes of the before mentioned process in a more easily understandable manner. Thus, the tool constitutes a dynamic knowledge base repository on the major developments in the transport sector.

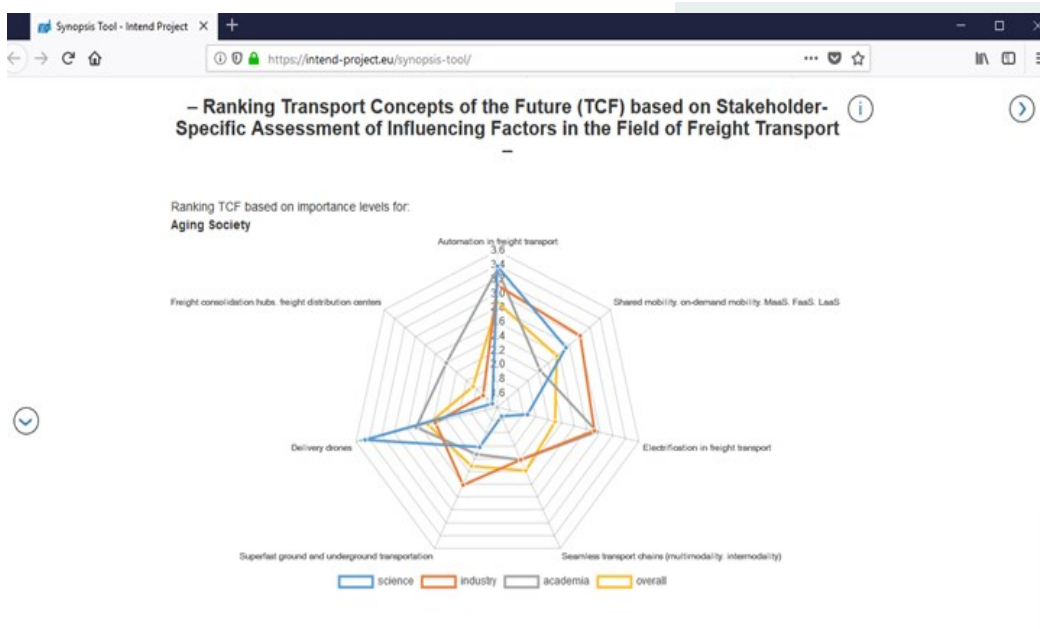


Figure : Ranking of TCF based on their assessment related to the Megatrend “Ageing Society” in the field of freight transport

The new tool has been integrated into the website and is accessible via: <https://intend-project.eu/synopsis-tool/>

Following the Analytical Network Process (ANP) approach it was thus, based on experts' assessment, possible to rank selected TCF according to the relevancy of each sub-category of Technological Advances, Political Imperatives and Megatrends. Figure 16 shows the ranking of TCFs in the sector of freight transport for the Megatrend “Ageing Society”.

Via the control panel, shown in the figure below, on the right side of the surface it is possible to enable the slider showing the spider graphs, ranking the TCF according to their relevancy, for a certain Megatrend, Political Imperative or Technological Advances by stakeholder. The info panel at the bottom of the page informs about the selectable Megatrends, Political Imperatives, Technological Advances and Transport Concepts of the Future for the respective sector.

The related info page, accessible via the website explains the purpose, functionality and data generation process.

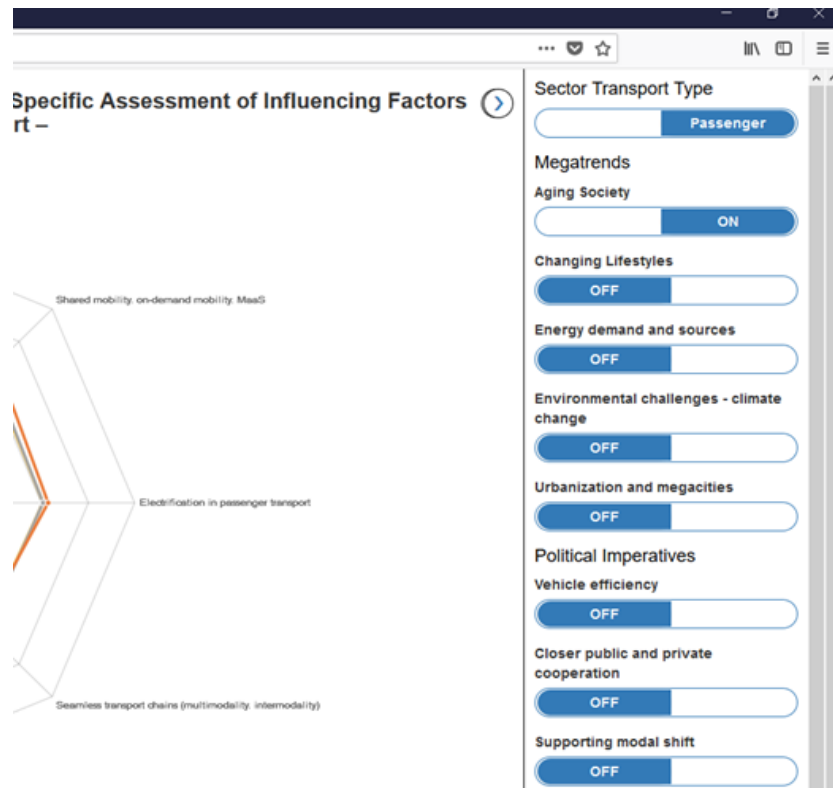


Figure: Control panel, allowing to change between transport sectors and allowing to activate TCF ranking for related Megatrends, Political Imperatives and Technological Advances

INTEND PROJECT FINAL CONFERENCE

The INTEND project after a year's duration has reached its completion. On the 27th September during the International Conference on Traffic and Transport Engineering (ICTTE) 2018 in Belgrade, the INTEND consortium presented part of its final results on its own parallel session "Paving the way to the future transport research". Project Coordinator Eleni Anoyrkati from CUE gave a summary of the INTEND project during the opening session of ICTTE.

The INTEND project session brought together researchers, scientists and transport engineers whose main field of interest was transport and gave participants the opportunity to discuss and exchange views. A series of research papers were presented to the audience by consortium members while key note speaker Professor George Giannopoulos (Academy of Athens) opened the session with his presentation "The need for a paradigm shift in the transport research agenda" where he highlighted future directions for the transport research agenda.

The INTEND consortium presented the following research papers that covered:

- Identifying the key trends regarding the transport concepts of the future (CERTH)
- Political Imperatives in transport a long-term vision for the decision making process (TUB)
- Evaluating Megatrend Impact On The Transport Concept Of The Future Using An Analytic Network Process (FTTE)
- A Gap Analysis For Transport Concepts Of The Future (FTTE)
- Future Transport Research Agenda (ZHAW)
- Emerging trends in transport technologies (ZHAW)

The aforementioned papers presented

how innovation, socioeconomic and political factors can affect the future of transport or technologies and transport systems; whether transport innovation will be driven by public or private initiatives; what transport technologies will dominate in the near future; the role that energy demand will play; blind spots in transport research.

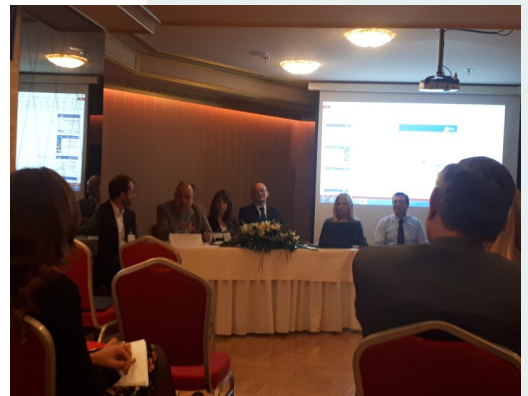
The session was followed by a discussion between the consortium panel and the audience. The discussion revolved around how automation, electrification, seamless transport chains, MaaS, Drones, Hyperloops or High Speed Rail which are some of the most dominant technology themes to come, will affect the future of transport. Questions were raised whether the innovation that is coming in the future will be based on public funds from research projects or whether true innovation will come from private companies and visionary individuals who will bring new out of the box ideas into the table. Due to fact that the private sector can bring innovation faster to the market, perhaps public funded research should rather focus on its impact instead. In addition questions were raised about the user acceptance of these new technologies such as automation. Although people are more tolerant towards human error, a few machine errors are enough to put off people from new technologies and the positive impact that they can bring.

Apart from technology innovation, research will have to also focus on other elements such as, how societies are expected to evolve in the future and what the peoples' needs will be, in order to design the future transport system accordingly.

CONFERENCE PROCEEDINGS

The conference proceeding of ICTTE 2018 are available at the following link

<http://ijtte.com/article/132/Conference-Proceedings.html>



WEBSITE INFORMATION

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