Transport Trends and Opportunities
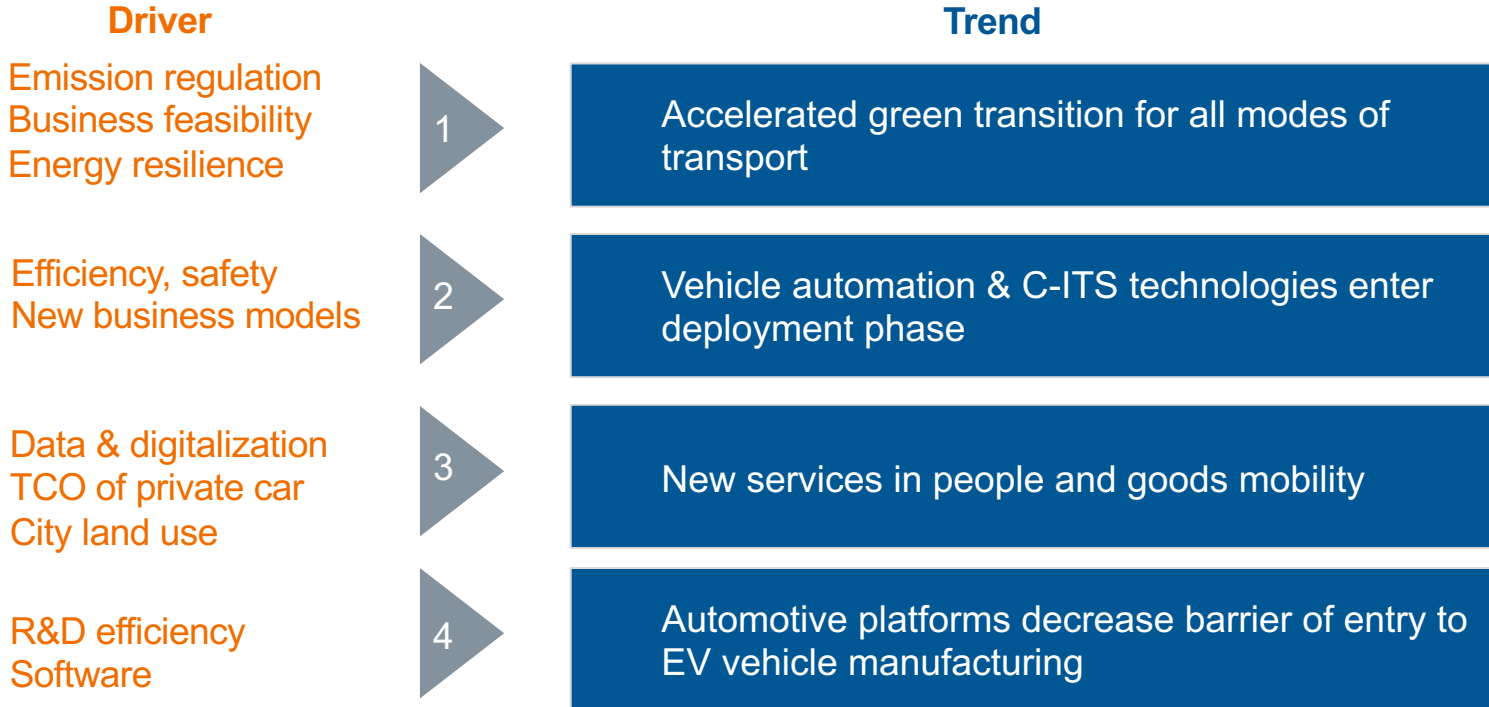
Ari Aalto, VP Mobility and Transport Research
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12/05/2022   VTT – beyond the obvious

We are going through the biggest transformation in mobility of people and goods since the advent of automobile.

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Accelerated green transition, automation, data and digitalization based services and vehicle platformization are changing the transport sector

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Driver		Trend
Emission regulation Business feasibility Energy resilience	1	Accelerated green transition for all modes of transport
Efficiency, safety New business models	2	Vehicle automation & C-ITS technologies enter deployment phase
Data & digitalization TCO of private car City land use	3	New services in people and goods mobility
R&D efficiency Software	4	Automotive platforms decrease barrier of entry to EV vehicle manufacturing

Trend #1: Accelerated green transition for all modes of transport

- Need for **sustainable, resilient, self-sufficient and secure** supply of energy for transport.
- **Passenger cars** will go gradually electric, pace depending on EV cost, availability and charging coverage development.
- **Heavy duty vehicles, commercial vehicles and non-road mobile machinery** will have a mix of electrification, hybrid, hydrogen, biomethane, bio and e-fuel based energy solutions. Cost, availability and distribution the key challenges
- **Maritime** transformation based on renewable fuels (hydrogen, ammonia, biomethane). Drop-in solutions important.
- **Light electric aviation** will disrupt short-haul air travel during the next 10-15 years

Trend #2: Automation and C-ITS enter deployment phase

- Remote control and autonomous operations deployed **first in restricted environments:** agriculture, ports, logistics, industrial
- L3+ level automated driving gradually introduced in passenger cars - need for AD algorithms and sensing for **arctic climate conditions**.
- **Robotaxi** public transport driven by cities. Light rail associated feeder traffic automation an important use case.
- Automated urban **delivery robots** trialed extensively.
- **Maritime** automation driven by increased navigation safety and energy efficiency and ship design optimization. **Retrofit digitalization** solutions needed due to long lifecycle of vessels.

Trend #3: New services in people and goods mobility

- Increasing TCO of private car expected to revive **multi-modal MaaS, ride-hailing and vehicle sharing** services in urban environments after COVID-19 slowdown. Integration of mobility and other digital services into **'Beyond MaaS'** services will increase in importance.

- Transport and traffic **data sharing**, common data models, APIs and cyber security essential for new services creation.

- **Micromobility** increasingly attracts people in urban environment, driven by e-bike boom, but dependent on biking lanes availability.

- **Automated drones** entering transport systems for inspection, surveillance and critical material delivery purposes.

- **eVTOL Air taxis** will open up new mobility era. Need to address low altitude air traffic management and coexistence of drones and other aircrafts, regulatory issues and public acceptance.

Trend #4: Automotive platforms decrease barrier of entry to EV vehicle manufacturing

- Automotive cloud **platforms**, in-vehicle software **platforms**, and E/E "skateboard" **platforms** enable companies without automotive legacy to create electric vehicles fast and economically

- Increased competition as also new players entering automotive, (Sony, Huawei, Xiaomi, Foxconn, Apple,..) – and even startups (TOGG, Volta Trucks, Rivian, NIO, Arrival,..) can realistically develop new electric vehicles and speed up innovation.

- **OTA software updates** and **automotive "app stores"** will enable new features introduction throughout the vehicle lifecycle

- The traditional OEM-Tier(s) value chain less valid

The green & digital transformation opens up new business opportunities in Finland and globally

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Transport revolution opens up doors for Finland

- Electrification and hydrogen transport value chain
  - Green energy, minerals, materials, batteries, fuel cells, charging equipment, components, electric powertrain & engines
- Smart and automated transport
  - Sophisticated software with sensors, LiDARs, radars, cameras for harsh conditions
  - Data and AI applications for autonomous operations in restricted environments
  - New mobility services and interplay with traffic management (C-ITS)
- New generation (electric) vehicles
  - Automotive software applications and platforms
  - Non-road mobile machines, heavy duty vehicles, micromobility vehicles, drones, electric aircrafts subsystems
- Finland as an experimentation based participatory development environment (living labs) for smart mobility services

Success calls for collaboration

- Collaboration in Scandinavia and Europe - ITS Finland plays a key role
- Collaboration to utilize the EU and Business Finland funding instruments, e.g. RRF – VTT willing to play key role
- Attracting foreign companies and investments – real service environment Living Labs, sovereign data sharing practises and functioning PPPP-models play an important role
- Combination of experimental research, scientific research and digital modelling and simulation helps to understand phenomena and to integrate successful systemic solutions. VTT investing 18 M€ into Transport Clean Energy Piloting Centre in Bioruukki, Espoo.
- Link between transport and other domains (energy system, built environment, tourism etc.) is important for innovations
- Cities and their innovative investments form an important development platform for innovative smart & sustainable solutions

Finland is the Living Lab for world class digi-green mobility solutions