International Transport Forum

Urban Mobility at the crossroads:

social megatrends, tech options, policy choices

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International Transport Forum

2014 KOTI- ITF/OECD Joint Seminar "Transport for a Changing World"

Seoul, March 27, 2014

OECD

MISSION:

"To foster a deeper understanding of the role of transport as a key to economic growth and of its impact on the environmental and social dimensions of sustainability."

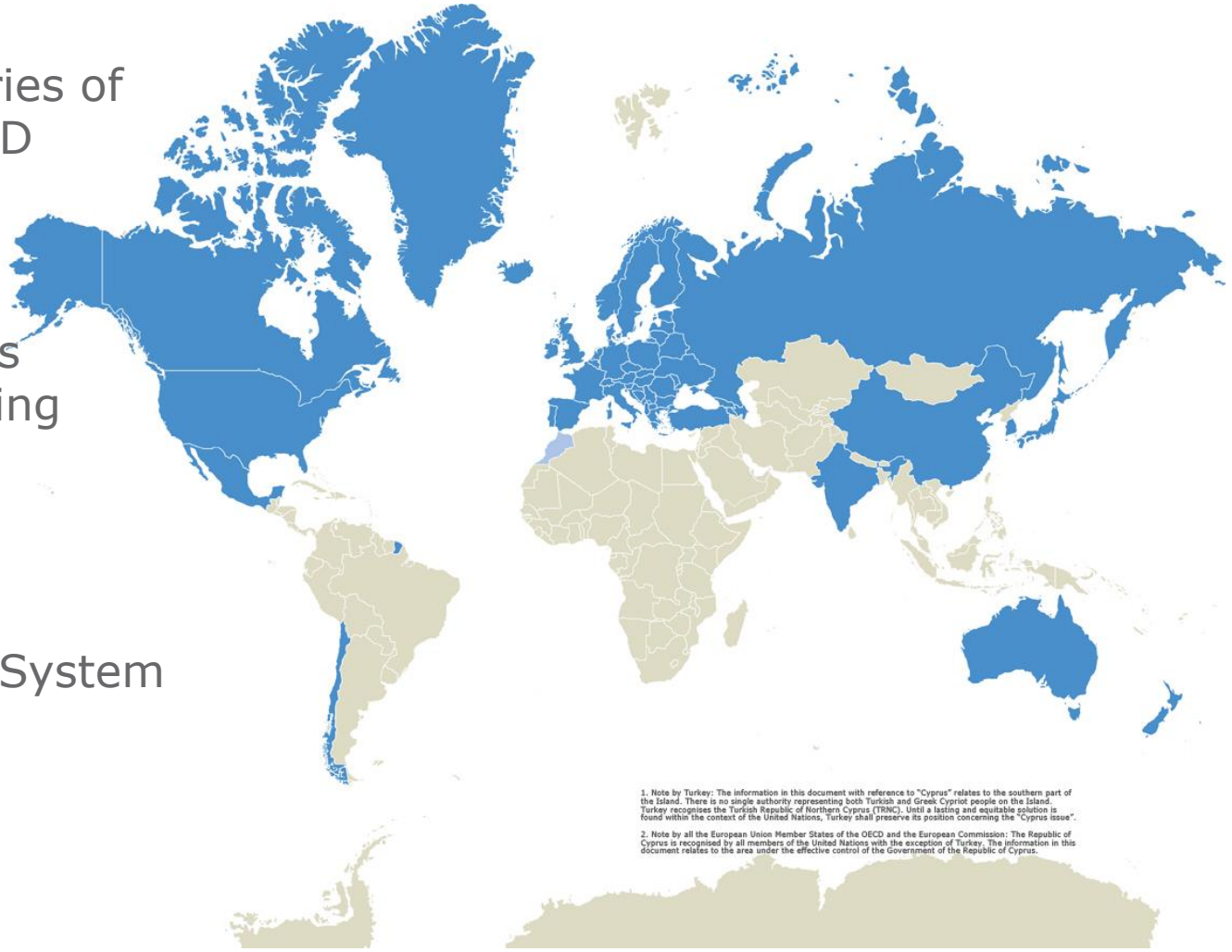
Intergovernmental Organisation

54 member countries of which 21 non-OECD

Housed by OECD

Council of Ministers of Transport, rotating Annual presidency

Legal instruments:
European
Multilateral Quota System (Road Freight)



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Think Tank

Evidence-based research and analysis

Data and statistics

Identification of best-practice policies

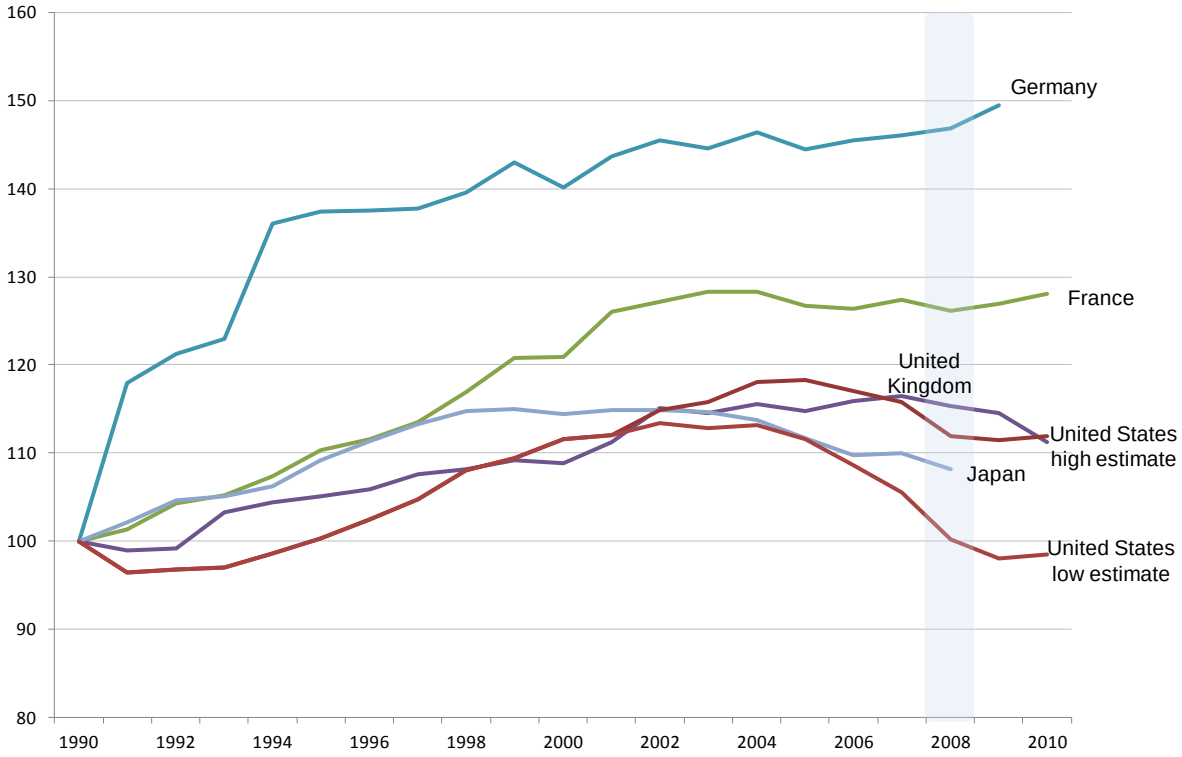
Institutionalised in OECD/ITF Joint Transport Research Centre (JTRC)

Social Mega-trends

- From 7 bn population, with 50% urbanized now to 9 bn population with 80% urbanized in 40 years, urban population goes from 3.5 to 7.2 bn (more than doubling, mostly in emerging countries)
  - What paradigm for this huge growth: mega-cities even bigger, medium-large cities going mega, new cities?) → key drivers should be access provision (physical and virtual) under cost and environmental constraints
  - What will mobility look like in crowded urban areas (mega-cities and medium-large cities?) Will the patterns broadly be the same as what we have seen in the past or will new patterns develop?
- Another big challenge possibly coming from the increasing income gap, with vanishing middle class in many countries
- Peak driving in developed countries: Is this stable, possibly associated with travel-time budget?

The evolution of car use in rich countries

Passenger-kilometres by private car and light trucks, 1990 – 2010
(index 1990=100)



The high estimate for the USA assumes car occupancy rates remain at the level measured in 2001, and the low one that they decline as of 2001 to the level observed in the most recent household travel survey

Technological evolutions

- Very positive trends in fuel economy and emissions reduction of internal combustion engines
  - Striking differences remain between tested and on-road performance
- Possibly for several decades a mix of energy vectors in the market
  - Increasing electrical component, via batteries and or fuel cells
- Deep penetration of mobile telecoms, high levels of connectedness, increasing integration of things and systems
  - IT uptake by workplace/households (virtual access to jobs, services, shopping)
- Increasing autonomy of vehicle movements
  - Initially for safety enhancement and comfort, later for efficiency, flexibility

Increasing Vehicle Autonomy

- Vehicle to infrastructure and (initially more likely) autonomous, self-sensing communicative vehicle.
  - Investment by road infrastructure managers (governments) vs. by telecoms and other service providers;
  - Main bottleneck seems to be limited wireless/telecom bandwidth availability (and competition for this bandwidth);
  - Key technological challenge is managing the vehicle to human hand-off in "hybrid" human/autonomous drive vehicles;
  - High regulatory hurdles due to requirements for fail-safe performance and liability issues, but they may be lessened by a stepped introduction of autonomous driving.
- Full blown autonomous driving strips out the "fun to drive" attribute of cars thus increasing the relative importance of the "mobility service" provided by the car.

Cars

- A "car" in the future will be quite different from today's "car".
  - Similar to change from the rotary, wire-linked phone one generation ago to the navigation/camera/communications device in our pockets today.
- For urban driving, at least in compact cities: constraints on available space and system efficiency (both in terms of speed and reliability of travel time), demands for reducing the presence of cars in favour of other uses of urban space.
- In urban areas, especially in dense urban areas and in what are now considered to be developing countries, the ultimate expression of individual driving is likely less to be something that we recognize as a "car" today, but rather something
  - Smaller in average;
  - more connected, shared and linked to other services;
    - a hybrid private/public vehicle of sorts.

Public Transport

- Well suited for dense urban cores and radial trips in regions between central cores and peripheral satellite developments
- But less suited for diffuse settlement patterns and low density flows in urban regions
- Rigid assets generate overcapacity outside of peaks and of trunk routes:
  - Funding difficulties of public transport may make this production model largely unsustainable;
  - Technology can help address this via demand-responsive, flexible routing and, ultimately, development of re-purposed, smaller, networked and autonomous vehicles:
    - Same trend towards autonomous driving as for private cars.
    - Technology can also better handle intra- and inter-modal hand-offs

New forms of motorized mobility (I)

- Private cars are one of the most under-used form of capital: 90% of the time inactive; in most cities no more than 25% of cars active at the same time
  - But flexibility and convenience can justify willingness to pay and high market share
  - IT can deliver that flexibility and convenience without ownership
- A possible and gradual shift from car ownership to
  - car-based mobility based on vehicle sharing and even ride-sharing (quasi-public-transport system), as instruments to
    - reduce costs,
    - increase adaptability of solution (car) to problem (access requirement),
    - massive release of public space (much lower parking needs) to pedestrians and bicycles, "slow areas" in neighbourhoods, decentralized services, etc.
    - possibly reduced congestion (higher average occupation of cars)
  - Higher utilisation of fewer cars (lower cost/pax.km) should allow higher (quicker) technology incorporation, leading to faster reduction of environmental aggression

New forms of motorized mobility (II)

- Implications of autonomous cars
  - On mobility of older citizens, no longer physically and mentally fit to drive, but still with good self-awareness and independent mobility
  - On taxi services: big cost reduction (in many cities drivers are active less than half of their duty time), single rides and shared rides
- Smaller size of middle class may push towards higher penetration of 2-wheelers (motorized, assisted, non-motorized), possibly also in time-sharing models (IT should make theft of connected vehicles more difficult)
- Traditional PT strong in dense corridors, intermediate solutions in other connections (real-time organized shared rides, in autonomous-driven vehicles, high load factor → reasonable price, no transfers)

Access, rather than Mobility

- The main focus of Transport planners and local politicians has been on improving mobility, mostly by increasing speed
  - But we should recognize that the real, social and political goal is providing good access of citizens to jobs, facilities, shopping and social interaction
  - This paradigm shift is all the more important as we face several big challenges:
    - Higher inequality across society → poorer people have greater difficulty of using motorized mobility means, even transit
    - Population growth and increasing urbanization
    - Possible execution of many activities online (work, shopping, education, health)
    - Ageing societies

Efficient provision of Urban Access

- When the goal is urban access, two elements of land-use become essential: density and functional diversity
  - This allows procurement of many functional needs to be done with active modes (walking, bike) → public health benefits
  - It also gives a significant contribution to reduce congestion and emissions (although emissions should be coming down with new vehicles)
- Many examples of high public adhesion to shared bike schemes play in this direction

Business models for vehicle manufacturers

- If this evolution holds, value is transferred from the object to the service: Vehicle manufacturers also as fleet managers, in direct or indirect contact with final clients
  - collecting, managing and monetizing trip-making, network performance and location data and developing the software and algorithms to exploit the data.
- Manufacturing costs for vehicles may drop in relative terms to the point where "brand owners" source most vehicle components from quasi-generic manufacturers while controlling the hardware design and having operating system loaded onto it (plug-and-play)
  - Parallel to the smart phone/tablet industry: hardware sourced from a few non-exclusive manufacturers in Asia and Apple/Google Android/ etc. operating systems generate the commercial revenue stream.
  - Urban vehicles will not be given away in return for subscriptions (permanent availability not required), but other forms of contracts similar to the mobile phone industry: pre-paid minutes (at a certain vehicle standard) is just an obvious parallel, possibly with an option for upgrade into other vehicle categories

Smarter modal integration

- Moving from vehicle ownership to service and the ongoing IT revolution, will allow a much more efficient organization of our personal agendas, thanks to the awareness of location and real time « level of service » in multiple facilities, shops, and transport means
  - Mobility chains possible to organize trip by trip (one-way rides, by car, transit, bike or walk), with guaranteed service (reservation) for the next ride
    - You don’t have to go back to pick up your car
  - Customer loyalty programs (possibly multimodal) will become critical for commercial success

Conclusions

- Surely, very marked differences ahead:
  - In the number and size of cities
  - In the traction technologies for road vehicles
  - In the road safety hazards and losses
  - In the connectedness of people and things
- On Urban Mobility, multiple options are open, the future is not determined, but the **policy choices** we make will have strong consequences
  - on the distribution of access to jobs and social facilities
  - on the evolution of lifestyles
  - on the evolution of the cities themselves
- We should consider these implications when making those policy choices!

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Thank you

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