Mobility and Transport in „Smart Cities“

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Necessity of a holistic view and of co-evolution

- **people**
  (attitudes, preferences, feelings, needs, behaviour, activities)

- **(smart) mobility**

- **(natural) resources, energy, environment**

- **society**

- **buildings, human settlements „cities“**

- **information, communication**
  (infrastructure, services, internet, smartphones, apps)

- **technical infrastructure**

- **economy, Industry, production**

- **education, …**

- **policy governance**

- **health … public safety**

- **social infrastructure**

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„smart cities“ and „smart mobility“ on the way

- **are not only** and are not primarily **technological** schemes, but they depend on technological innovations

- are based on strong **interactions** of
  - **people** with their attitudes, feelings, preferences, experiences, roles as well as their behaviour and activities
  - **society** and **economy**
  - **buildings** and **human settlements** („cities“)
  - **social** as well as **technical infrastructures**

- depend on **elaborated ICT-systems** and **informations** about **options** for every-day-life (activities, mobility …)
  - internet (mobile)
  - smartphones
  - apps

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„smart(er) cities“ and „smart(er) mobility“

are an important basis to overcome big challenges like

- social, economic, ecological and cultural sustainability

- mitigation and adaptation in the context of the change of climate

- innovative change of energy systems to post-fossil structures (regenerativ production of energy, decentralized systems, combining the roles of consumers and producers: „prosumers“)

- effects of the individualizing of behaviour, services, equipment, information, social-media

- (re-)urbanisation, demographic change

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Megatrends reshaping patterns and demands of mobility

- Sustainability & growing environmental awareness
- Increasing aims & goals of climate protection (regulations)
- New status symbols & new options for ICT-applications
- Stagnating income & rising costs
- Intermodal and multimodal pattern of mobility – using versus owning
- Demographic changes, urbanisation, behaviour modification

source: Dr. Peters/Prof. Knie (2012): InnoZ-Werkstattbericht: Mehrfach vernetzte Mobilität Sichtweise und Rolle der InnoZ GmbH.
Challenges towards urban logistics

- Infrastructure
- Opening hours
- Traffic load
- Supply restrictions
- Quality specifications

Conflict area of urban supply
„smart cities“ and „smart mobility“

help to organize urban growth (re-urbanization in Europe) with a higher quality of urban life, social stability and social justice, efficient use of resources, emission-free cities, participation in governance…

…the message is …:

“smart cities“ have to be sustainable, efficient, innovative, intelligent, integrative, environmental-friendly, emission-reduced, resource-efficient, post-fossil (carbon-free), resilient, climate-sensitive … good governed
„smart cities“ and „smart mobility“ incorporate

- smart homes, smart houses, smart buildings
- innovative production/industry („industry 4.0“)
- smart (decentralized) infrastructures
- innovative services for administration (4.0), education, healthcare, energy/warmth services, food supply
- intermodal, multimodal mobility, using sharing opportunities, integrated transport management, mobility management
- avoiding rebound effects
(“Smart”) Mobility and transport in the future will need...

- ... stronger integration of land use and transport development (“proximity”, “transit-oriented development”)
- ... networking between transport modes, carriers, people transport and commercial traffic
- ... preparing intra-sectoral and inter-sectoral networks (for example ICT, energy and transport)
- ... a variety of options to take part
- ... better information (apps, internet …)
- ... more decentralised offers, organisation, funding bodies
- ... demand-orientation
- ... elaborated traffic-management and – in a holistic sense – mobility-management
- ... elaborated concepts of city logistic with new measures for goods-storage and for services
Probably contra-productive effects

- ... more individualised lifestyles

- ... more individualised consumption ("teleshopping")
„smart city“ is a vision of „new urban systems“

with

- **decentralized** / semi-centralized inter-connected technical and social infrastructures (water, wastewater, garbage, energy, information, communication, transport, buildings, security, health ...)

- **decentralized** and participatory governance and organisations (high degree of participation)

- information-based networks (detection, steering, controlling, evaluation ...)

⇒ „smart society“, „smart economy“, „smart grids“, „smart mobility“ ... and „smart cities“ interact!
Innovative elements of „smart mobility“ are

- real-time mobility informations (Apps)
- demand-oriented offers of mobility options
- „mobility points“ for intermodal change (pt-stops; parking schemes (private cars, bicycles, car sharing …))
- electric and hybrid vehicles
- autonomous (driven) vehicles, smart cars
- sharing schemes (cars, bicycles, …)
- individualized public transport (small busses, automatic light rails, …)
- collective organized individual transport
- traffic management (smart traffic)
- mobility management

→ Mobility is a service!
„smart mobility“ is

- ... connected
- ... information-based („real-time“, „apps“)
- ... demand-oriented
- ... ressource-efficient
- ... emission-reduced (emission-free)

... the basis for
- spatial accessibility, safety, reliability
- taking part in social, economical and cultural activities (low time expends, low costs)
„smart mobility“

is based on

- intermodal and multimodal mobility, but also on electric and hybrid cars (regenerative energy)
- traffic management and mobility management

is not only

- „autonomous vehicles“, which are a - perhaps small – part of „smart mobility“ with a remarkable degree of secondary individual benefits by the ride (time, money, secondary benefits using a car (using TV, internet, mobil-phone …))
Car ownership rate of young men in Germany significantly decreasing

source: KBA, Bratzel 2011, additional translation.
Multimodal Transport Behaviour in Germany


1 Using car, bicycle and public transport in one week.
Source: German Mobility Panel.

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Multimodality – already reality for major parts of the population

Percent of persons using a transport mode within a week in Germany

classification of means of transport (bycicle, car, pt) within a week!

~ 60% monomodal
(always using one mode of transport)

~ 40% multimodal
(using different modes of transport on a regular base)

~ 60% ecomobility
(using bicycle, public transport, walking)

Scenario „technical mobility“ I

- offers of electric vehicles (cars, bicycles) and hybrid vehicles
- continued use of cars with “optimised” combustion engines; partial replacement by electric cars
- driverless cars, autonomous driving
- privileging of electric vehicles (parking, bus lanes, etc.)
- municipal financing of charging stations for electricity
- lack of integration between urban/land use planning and traffic/mobility planning
- reduced public transport offerings, car sharing, bike sharing
Scenario „technical mobility“ II

- **reduced decrease of private cars**
  (“rebound effects” by autonomous cars)
- **“rebound effects” for public transport**
  (reduction of mode-share)
- **stabilisation or increase of mono-mobility**
- **increase of long distance mobility**
Scenario „sustainable mobility“ I

- home-office for work, school/education, social contacts, booking, communication
- integrated options for mobility:
  - walking, biking, bike of a bike sharing fleet, pedelec, car of a car-sharing-fleet, public transport (light rail, express bus, bus rapid transit, neighborhood bus, e-taxi, rickshaw)
- intermodal services (physical connection, informational basis)
- mobility packages, flat-rates „mobility“
  (public transport, car-sharing, bike-sharing, delivery-services,…)
- info-packages, „mobility app’s“ (offers, costs, time, comparisons,…)
- information at every time (pre-, on-, post-trip), “real-time-information”
- principle I: integrated town-/regional planning and transport planning
- principle II: efficiency, consistency, sufficiency of mobility and transport
Scenario „sustainabel mobility“ II

- increased amount of (short-distance) local mobility (walking, biking)
- reduction of car ownership
- increase of car-sharing and bike-sharing
- increase of intermodality and multimodality
- reduction of emissions, energy-consumption
- in a narrow and broad sense people and firms becoming more and more “prosumers”
  (producing and consuming: energy, water, mobility …)
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- Plattform Elektromobilität: EUREF-Campus, Torower Str. 12–15, 10559 Berlin
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Führerschein und Personalausweis nicht vergessen!

Fotos: C. Albrecht / J. Thiemann-Linden
Extanded range of options for post-fossil mobility

- maintenance, upgrading and expanding social environment in the neighbourhood (local environment) with options of work, education, social infrastructure, utilities, services, leisure, recreation, etc.
- promoting pedestrian traffic and bicycle traffic as means of travel in the local environment
- enhancement of the expansion and usage areas for bicycles through electric bicycles (pedelecs, e-bikes, segways): accessibility, physical strain, vehicle payload
- car sharing, rental cars (“using instead of owning”)
- public bicycles, public pedelecs, public cars
- expansion of more differentiated offers in public transport
- intermodality
- multimodality
Digital infrastructure, electric infrastructure in synergetic combination with e-mobility

Three messages !!!

- We need a „new mobility culture“ in our cities – using and fostering the possibilities of changing values and mobility behaviour!
- For the future of our cities we need an intelligent and innovative adaption of new technologies for mobility!
- The present is characterised through „windows of opportunities“!

→ Mobility culture means an intelligent handling of mobility, including perspectives on efficiency, consistency and sufficiency (low-impacts of transport (cars and driving); modal shift; reduction of physical mobility)
Processes

need to develop and adopt ideas, concepts and measures

- intensively
- interactively and
- participatively

These processes will („must“) lead to

- a collective understanding of „new mobility culture“
- reduced barriers
- collective aims
Thank you for your interest!