Toward Human Smart Cities in the framework of Transportation

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1) Cities and infrastructure management

2) The key role of data for transportation managers

3) The potential of human-centered cities
1) Cities and infrastructure management

Technological Challenge

- How to age urban infrastructure?
- How to consider independency between urban infrastructure?
- How to retrofit a city that does not have the right infrastructure?
1) Cities and infrastructure management

Environmental and Climate Challenge

- How to make sure that urban infrastructure is robust?
- How to ensure that urban facilities remain resilient?
- How to develop efficient transportation systems?
1) Cities and infrastructure management

Human-centered Mobility

Socio-economic Challenge

- How to provide mobility for work and leisure activities?
- How to assess the evolutions of behaviors?
- How to favor equity and inclusion?
1) Cities and infrastructure management

Services Layer

Data / Digital Layer

Infrastructure Layer

Performance Improvement

New services & Shift
2) The key role of data for transportation managers

IoT refers to technologies that sense

IoS delivers customized services

IoP introduces the active role of people
2) The key role of data for transportation managers

- Mobility behaviors and demand prognostic
- Demand modeling und traveling evolution

- Life style and users expectations
- Willingness-to-pay for travelers
2) The key role of data for transportation managers

What we were interested in:

• Moving trains
• Origin-destination matrix (OD)
• The optimization of aggregated indicators (cost, travel time, etc.)

What we should be interested in:

• Moving people
• The individual activities chain
• The satisfaction of passengers
3) The potential of human-centered cities

7 factors whose importance varies over time and by customer segment:

1) Service coverage
2) Travel time
3) Availability
4) Ease of use
5) Comfort
6) Price
7) Environment
3) The potential of human-centered cities

Main trends
- Distances increase between home and work
- Development of weekly commuters and home office
- Changes of shopping behaviors

Impacts on mobility
- Single occupancy of cars and increase in aircraft usage
- Fewer train journeys for work reason
- Fewer trips for shopping purposes

Faster and further
3) The potential of human-centered cities

Main trends
- Less car use in everyday life and in public spaces
- Reduction of car ownership in urban households
- Openness for alternatives to single occupancy vehicles

Impacts on mobility
- Interest in „door to door“ alter mobility services
- Increased use of shared transportation modes
3) The potential of human-centered cities

Main trends
- Efforts to improve the quality of life
- Appreciation of proximity and reinvestment in local life

Impacts on mobility
- Shift from international travels to domestic travel
- Intensive use of activity modes (running, cycles, etc.)
- Use of train since the quality of travel time is crucial

The quality of local life
Projection of the modal split in Switzerland and in France

- Switzerland:
  - Ultramobil: 30%
  - Altermobil: 50%
  - Qualimobil: 20%

- France:
  - Ultramobil: 60%
  - Altermobil: 30%
  - Qualimobil: 10%

Horizon 2030
Projection of the modal split between Switzerland and France

**ULTRAMOBILITY 2030**
- 42.2%
- 49.1%
- 8.1%
- 0.7%

**ALTERMOBILITY 2030**
- 33.0%
- 61.0%
- 4.9%
- 1.2%

**QUALIMOBILITY 2030**
- 33.5%
- 61.2%
- 4.3%
- 0.9%

Legend:
- Trains in %
- Autos & Car-sharing in %
- Busses in %
- Planes in %

Horizon 2030
1) Meet customer expectations

- Door to door mobility & a better customer relationship
- Single ticketing system (1 Trip = 1 Ticket)
- Customer Information in case of service disruption
- WLAN Connection & Entertainment on Board

2) Reduce the global cost of transportation systems

- Timetable optimization
- Better reliability & punctuality
- Building of partnerships
- Involvement of policy makers
Cost reduction through passenger-centered scheduling

Design of a new timetable to improve both

- The offer (minimization of operating costs)
- The demand (maximizing passenger satisfaction)
Modelling and Optimization of Pedestrians Flows

Understanding pedestrian traffic and strategies:

- Route selection
- Stopovers
- Speed
- Density, etc.
Smart Trolleys for Intermodal Transit Hubs

- Implementation of smart trolleys
- Development of on-demand feature for picking-up travelers

Support travelers along the mobility chain
Confidential

Moving Walkways as Transport Route Systems in Urban Areas

Development of a new urban concept under consideration of

- the road network
- the demand
- the optimal speed
- the energy consumption
Toward adaptive Transport Systems

Offer

Smart Mobility Services

Demand

Personal advice

Physical Internet

Users preferences

Sensing

Image Processing

Mobile Signals

Data
Toward adaptive Transport Systems @ DLR

**Offer**
- SUMO
- Automated Driving
- Network of Vehicles Systems

**Demand**
- Users State
- Activity Analysis
- Mobility Behaviors
- Transport Demand

**Smart Mobility Services**
- Offer Planning
- Travelers Assistance

**Data**
- Data Management
- Artificial Intelligence
- Sensors Systems

**Forchung**
- BDV
- BDV
- SYS
- BDV
- SYA
- FZE
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Thank you for your attention

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