Confidential

SuMoCoS
Sustainability and Mobility in the Context of Smart Cities

Toward Human Smart Cities in the framework of Transportation

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Toward Human Smart Cities in the framework of Transportation

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?**

Planning Mobility

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?**

Sustainable Mobility

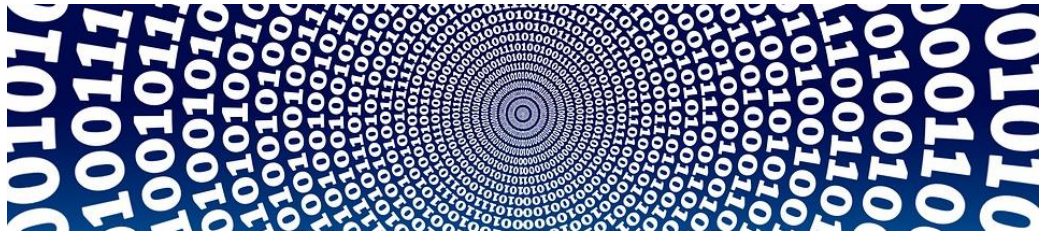
1) Cities and infrastructure management

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?**

Human-centered Mobility

1) Cities and infrastructure management



Services Layer

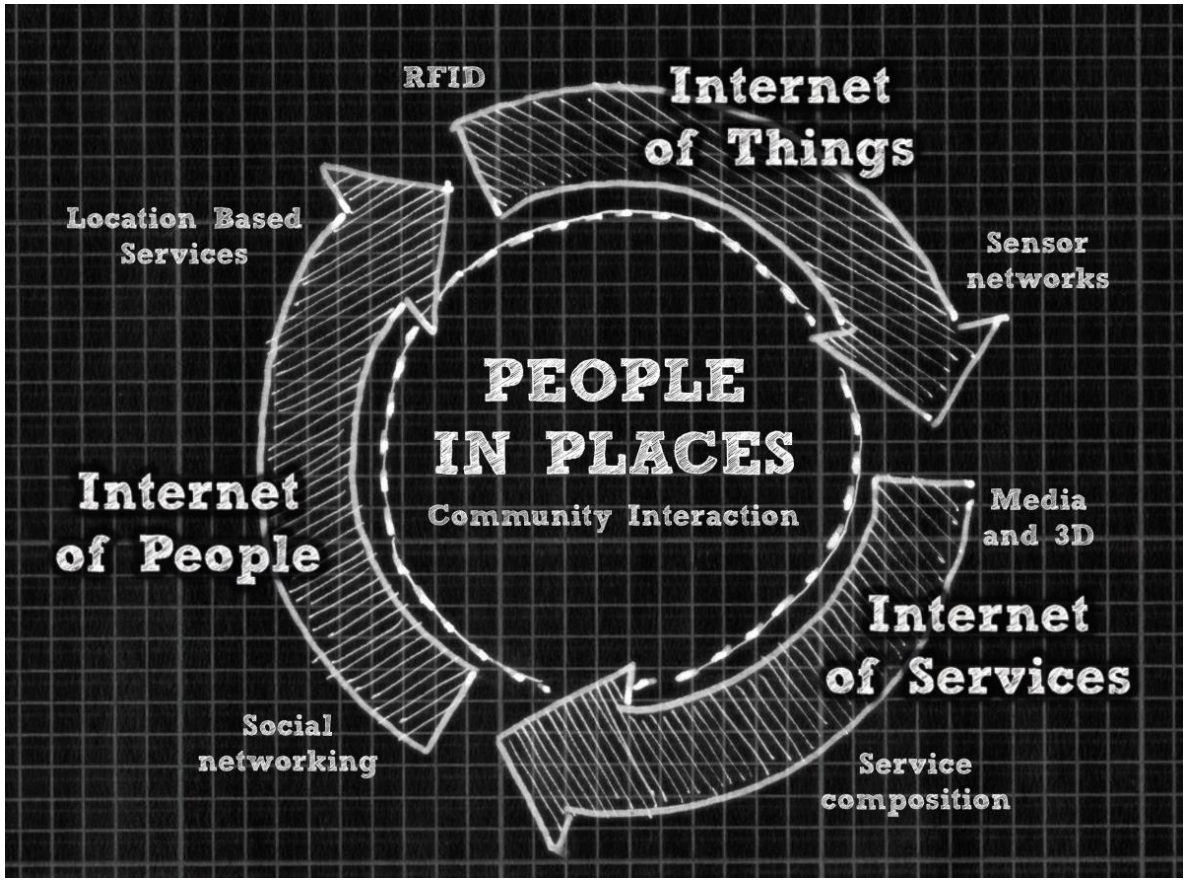
Data / Digital Layer

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

ULTRA-MOBILITY

ALTER-MOBILITY

QUALI-MOBILITY

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

ULTRAMOBILITY

ALTERMOBILITY

QUALIMOBILITY

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

ULTRAMOBILITY

ALTERMOBILITY

QUALIMOBILITY

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

A new way of traveling

3) The potential of human-centered cities

ULTRAMOBILITY

ALTERMOBILITY

QUALIMOBILITY

Main trends

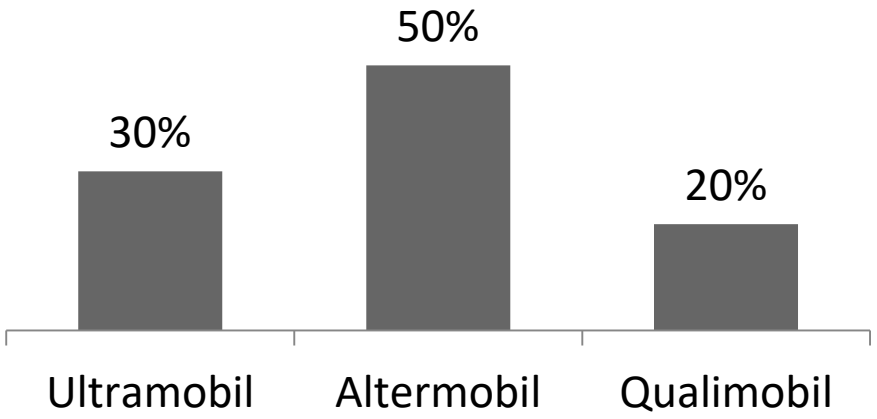
- Efforts to improve the quality of life
- Appreciation of proximity and reinvestment in local life

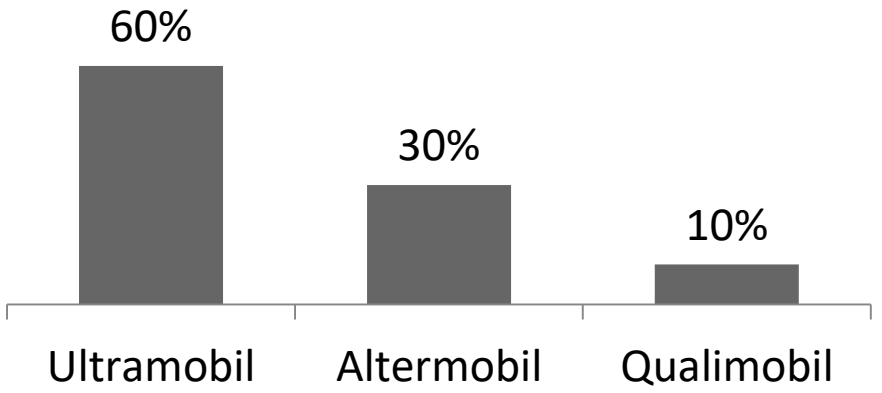
Impacts on mobility

- 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

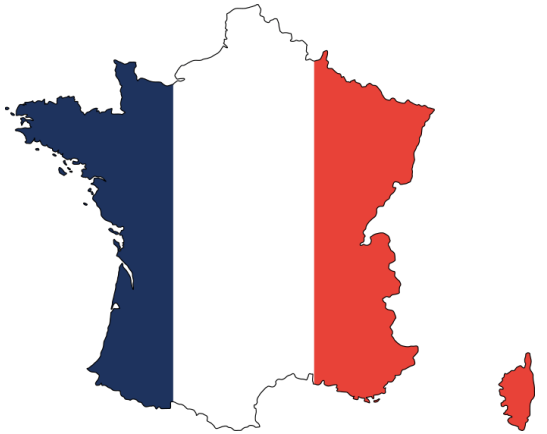
The quality of local life

Projection of the modal split in Switzerland and in France



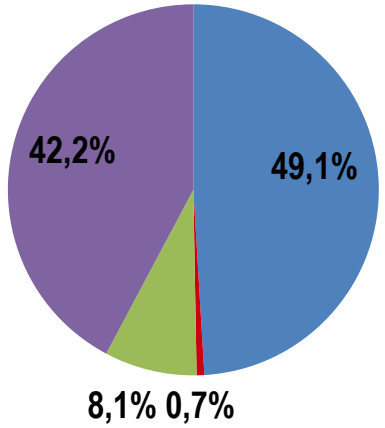


Horizon 2030

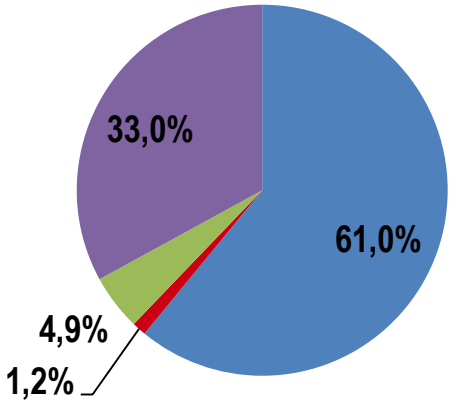


Projection of the modal split between Switzerland and France

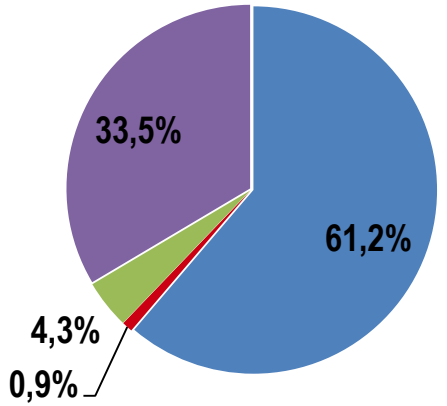
ULTRAMOBILITY 2030



ALTERMOBILITY 2030



QUALIMOBILITY 2030



Horizon 2030

Trains in % | Autos & Car-sharing in %
Busses in % | Planes in %

Development potential of the transportation industry

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)

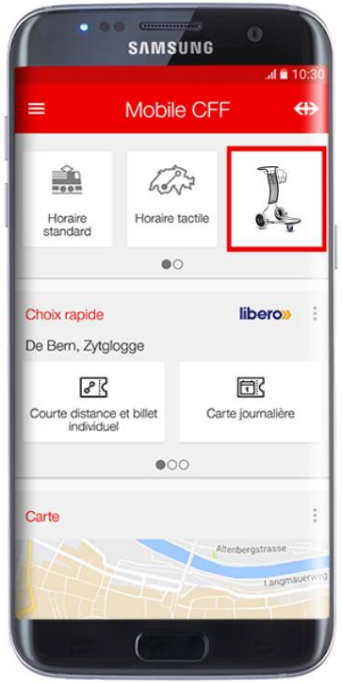
Modelling and Optimization of Pedestrians Flows

Understanding pedestrian traffic and strategies:

- Route selection
- Stopovers
- Speed
- Density, etc.

Smart Trolleys for Intermodal Transit Hubs

Book



Meet & Match

Follow

Support travelers along the mobility chain

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

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

DriveNow

UBER

BlaBlaCar

emmy

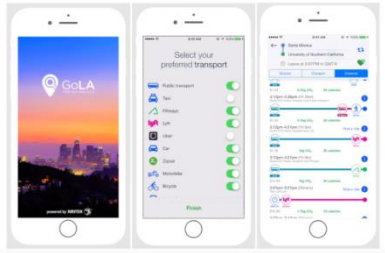
DB

BVG

Smart Mobility Services

Personal advice

Physical Internet



Users preferences

Image Processing

Sensing

Mobile Signals

Data

Demand

Toward adaptive Transport Systems @ DLR

Offer

SUMO

Traffic Simulation

BDV

Automated Driving

SYA

Inter modality

BDV

Network of Vehicles Systems

FZE

Smart Mobility Services

Offer Planning

BDV

Travelers Assistance

SYS

FORSCHUNG

Data Management

DAT

Artificial Intelligence

Sensors Systems

DAT

Data

Demand

Users State

HUF

Activity Analysis

HUF

Mobility Behaviors

VF Institute

Transport Demand

VF Institute

SuMoCoS

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Thank you for your attention

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