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Sustainable Mobility Research

Institute for Regional Development

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Trasporti sostenibili per un turismo sostenibile

nelle Dolomiti e nelle Alpi

con il sostegno di

9 novembre 2022 | ore 08:30 – 12:30

Eurac Research, Conference Hall

Viale Druso 1 - Bolzano/Bozen

Rural Accessibility

TSU TRANSPORT STUDIES UNIT

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The sustainable mobility paradigm

David Banister

Transport Studies Unit, Oxford University Centre for the Environment, Oxford, UK

Available online 19 November 2007

Abstract

This paper has two main parts. The first questions two of the underlying principles of conventional transport planning on travel as a derived demand and on travel cost minimisation. It suggests that the existing paradigm ought to be more flexible, particularly if the sustainable mobility agenda is to become a reality. The second part argues that policy measures are available to improve urban sustainability in transport terms but that the main challenges relate to the necessary conditions for change. These conditions are dependent upon high-quality implementation of innovative schemes, and the need to gain public confidence and acceptability to support these measures through active involvement and action. Seven key elements of sustainable mobility are outlined, so that public acceptability can be more effectively promoted.

Keywords: Behaviour; Acceptability; Engagement; Participation

1. The problem

It has often been said that transport planning is at a crisis point and that it underestimates the key challenges facing urban planners (Banister, 2005; Balaker and Staley, 2006; Wickham, 2006). Yet it has also been remarkably robust and it has "survived" all these crises to emerge almost intact, perhaps with some minor alterations. Two fundamental principles are embedded in the approach used, namely that travel is a derived demand and not an activity that people wish to undertake for its own sake. It is only the value of the activity at the destination that results in travel. The second principle is that people minimise their generalised costs of travel, mainly operationalised through a combination of the costs of travel and the time taken for travel. These two underlying principles have important consequences, as they are embedded in most analysis and evaluation studies. They help explain the predominance of transport solutions to urban problems, and the huge growth in faster and longer distance travel, as the increased speed of travel has outweighed the increased costs of travel. Even though travel time may have remained constant as cities have spread, both distances and speeds have increased substantially (Banister, 2006; Deakin, 2006; Duranton, 2006; Kahn, 2006). Local public transport, cycle and walking have become less attractive, and this in turn has resulted in the greater use of the car. Car dependence and the increased decentralisation of cities are difficult processes to reverse—this is the transport-led future.

Sustainable mobility provides an alternative paradigm within which to investigate the complexity of cities, and to strengthen the links between land use and transport. The city is the most sustainable urban form and it has to provide the location where most (70–80%) of the world's population will live. Empirical research has concluded that the key parameters of the sustainable city are that it should be over 25,000 population (preferably over 50,000), with medium densities (over 40 persons per hectare), with mixed use developments, and with preference given to developments in public transport accessible corridors and near to highly public transport accessible interchanges (Banister, 2005, 2006). Such developments conform to the requirements of service and information-based economies. Settlements of this scale would also be linked together to form agglomerations of polycentric cities, with clear hierarchies that would allow a close proximity of everyday facilities and high levels of accessibility to higher order activities (Hall and Pain, 2006).

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Table 1
Contrasting approaches to transport planning

The conventional approach—transport planning and engineering	An alternative approach—sustainable mobility
Physical dimensions	Social dimensions
Mobility	Accessibility
Traffic focus, particularly on the car	People focus, either in (or on) a vehicle or on foot
Large in scale	Local in scale
Street as a road	Street as a space
Motorised transport	All modes of transport often in a hierarchy with pedestrian and cyclist at the top and car users at the bottom
Forecasting traffic	Visioning on cities
Modelling approaches	Scenario development and modelling
Economic evaluation	Multicriteria analysis to take account of environmental and social concerns
Travel as a derived demand	Travel as a valued activity as well as a derived demand
Demand based	Management based
Speeding up traffic	Slowing movement down
Travel time minimisation	Reasonable travel times and travel time reliability
Segregation of people and traffic	Integration of people and traffic

Source: Adapted from Marshall (2001) (Table 9.2).

Mobility

Increase the ability to move around

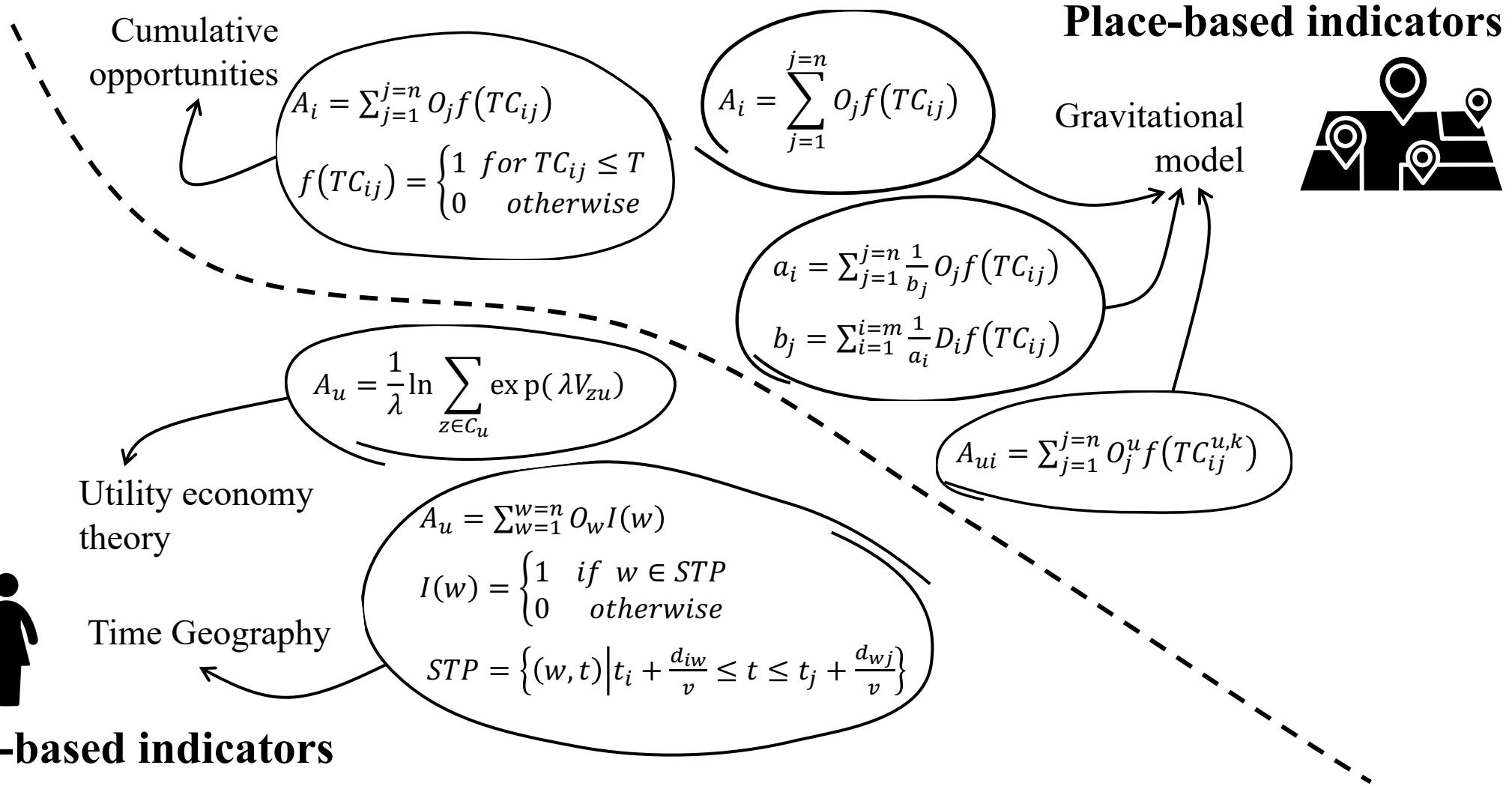
New infrastructures, increased capacity of infrastructures,…

Accessibility

Increase the ability to get what needed

Nearby services, digital services, synergy transportation/land use, active mobility,…

Measuring accessibility



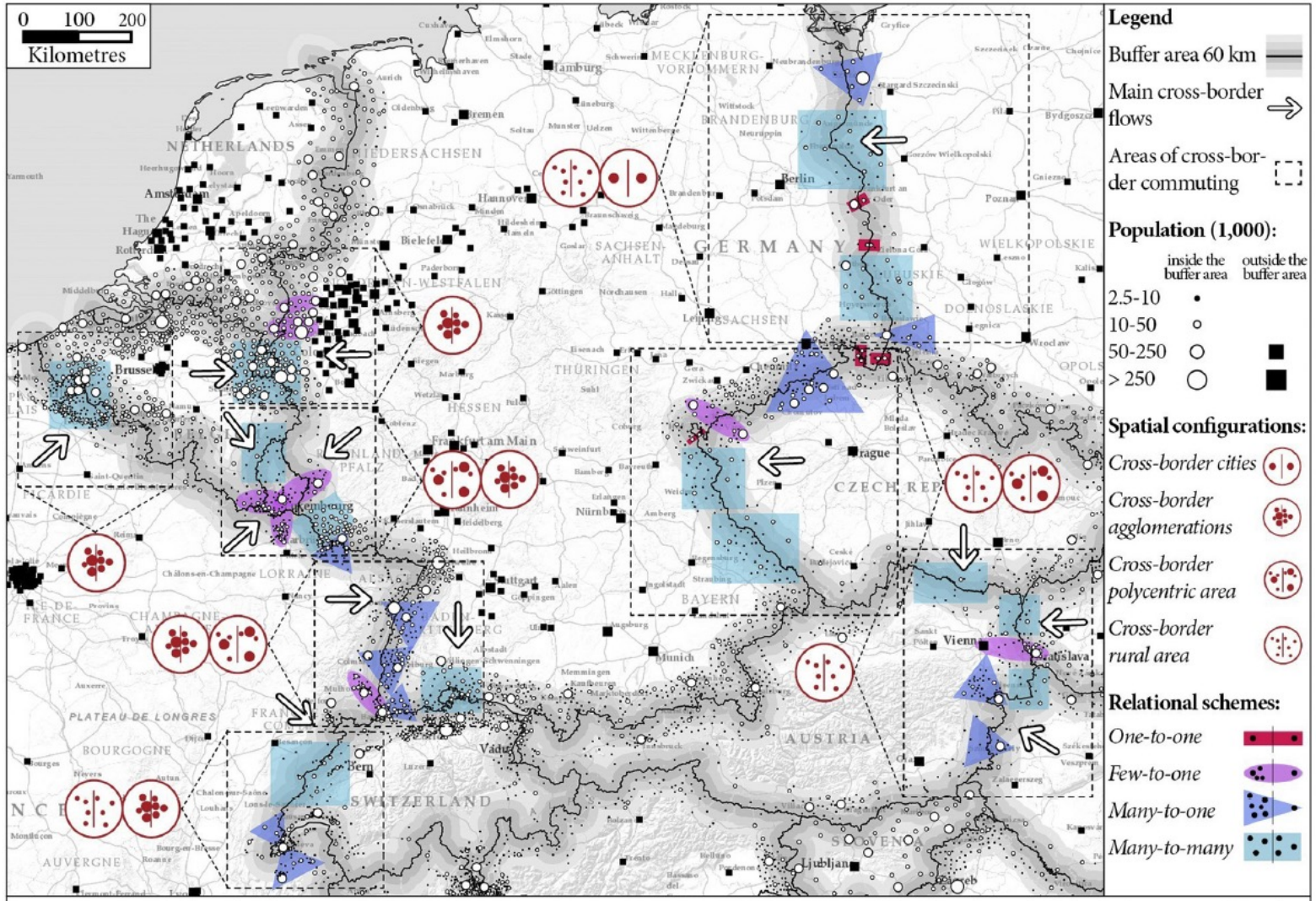
Rural Accessibility

Cross-border public transport accessibility

Autonomous vehicles and rural accessibility

Utilitarian & recreational cycling accessibility

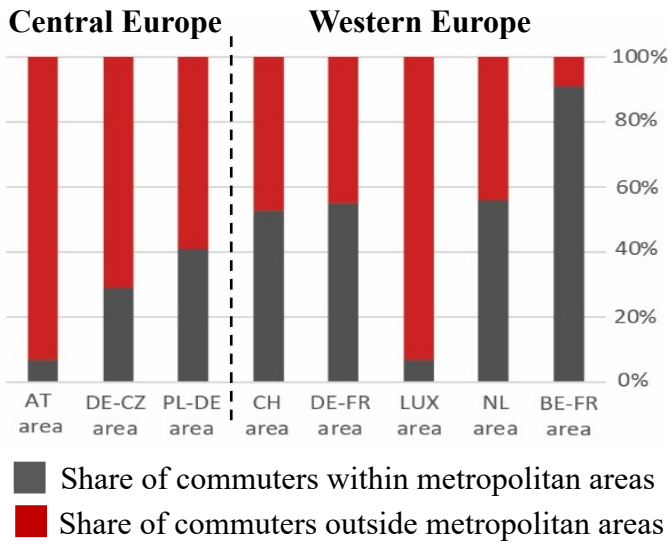
Cross-border public transport accessibility



Sources: Base-map, border and settlements: Esri; USGS; NOAA. Commuting areas: Eurostat, 2018, MOT, 2015. Spatial configurations and relational schemes: own elaboration

Facts and figures:

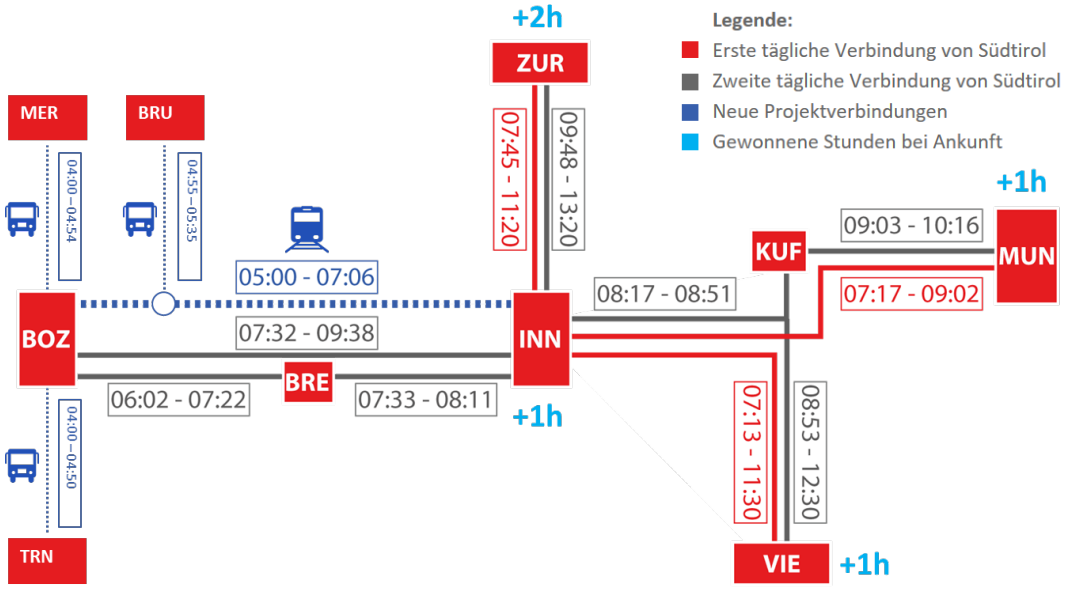
- Between 2000 and 2015 the number of cross-border commuters in EU has **increased by ca 350%**
- Central Europe **hosts about 20%** of EU cross-border commuting flows
- In Central Europe, cross-border flows mostly affect **rural areas**, with a dispersed demand and **lacking public transport network**



Cross-border public transport accessibility

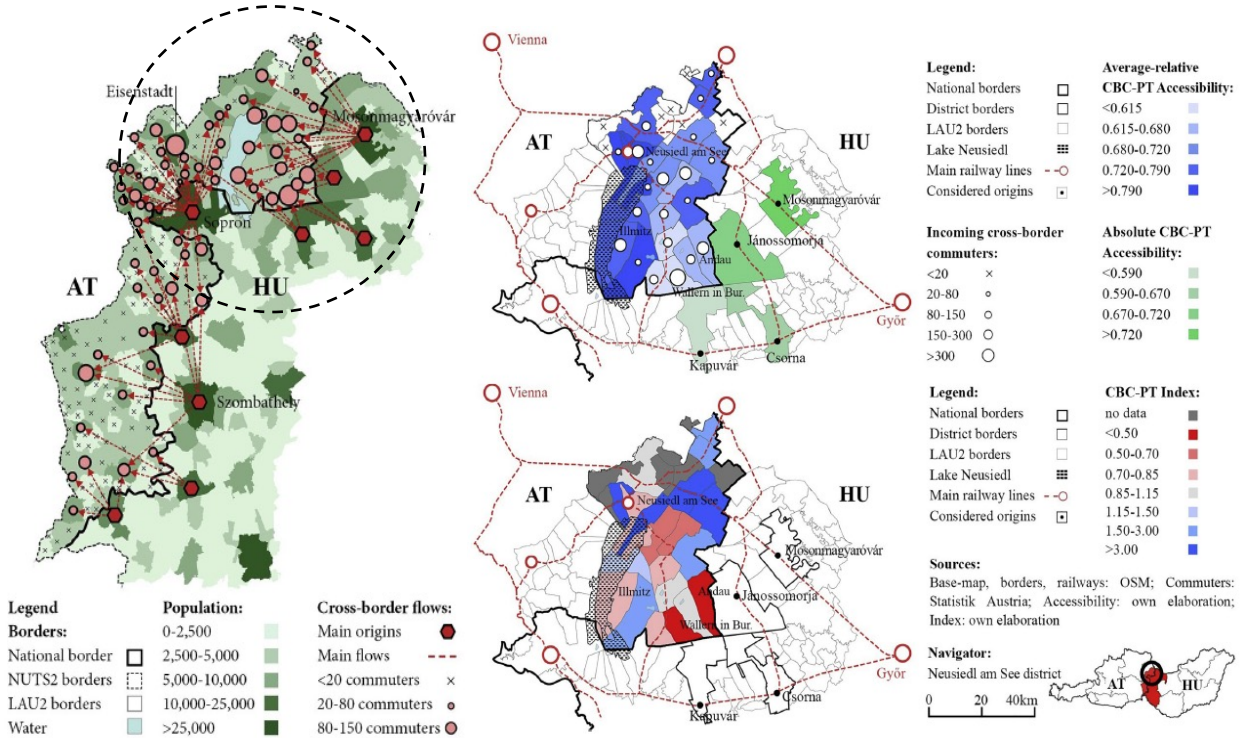
Applied-research work:

- We developed policy solutions related to three main domains: **connectivity, tariff and ticketing, info-mobility**
- We elaborated a **cross-border accessibility strategy for the Province of South Tyrol** (endorsed by local stakeholders and politicians)



Basic-research work:

- We developed **cross-border accessibility models** to evaluate the efficiency of public transport (different kinds of gravity-based models)
- We extended the reflection on cross-border public transport to the alpine arch and the **tourism mobility**



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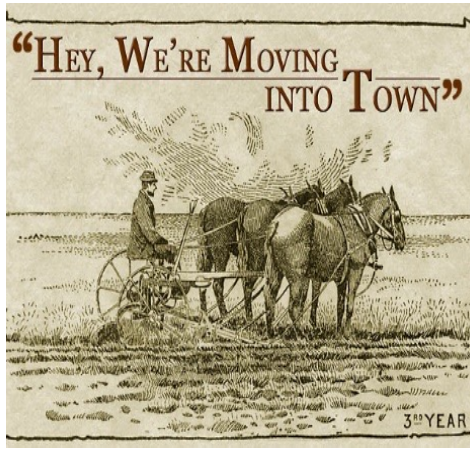
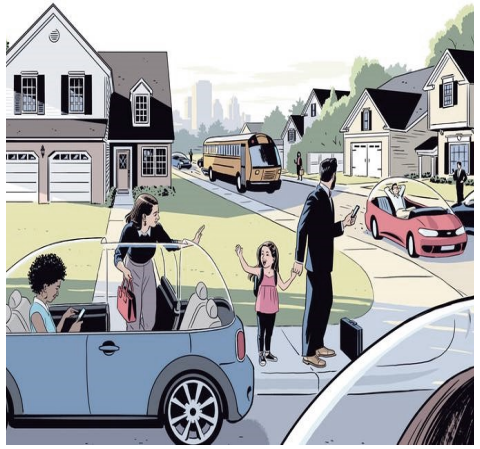
Autonomous vehicles and rural accessibility

Rural Accessibility:



Transport Automation:



Facts and figures:

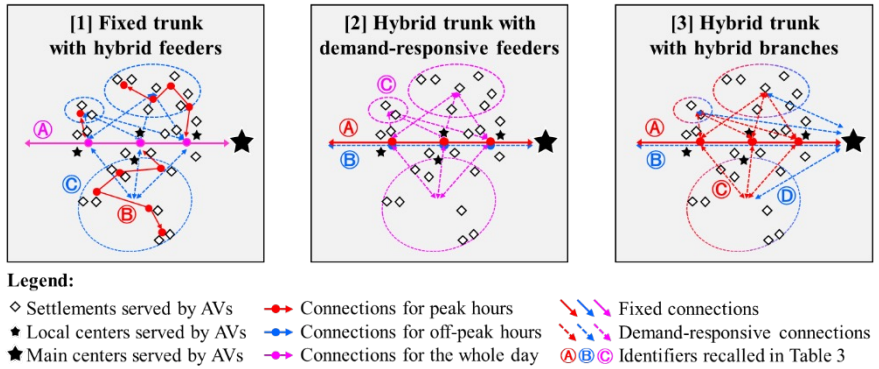
- Many rural areas suffer from **low accessibility**, with negative effects on their attractive as places to live
- The **rural public transport provision** is often limited by the low demand and the related poor financial sustainability
- This generates relevant issues especially for the **population groups** that rely on public transport (as elderly or pupils)
- The **transport automation process** may greatly support the improvement of rural transport service, but even increase the attractiveness of private mobility

Autonomous vehicles and rural accessibility

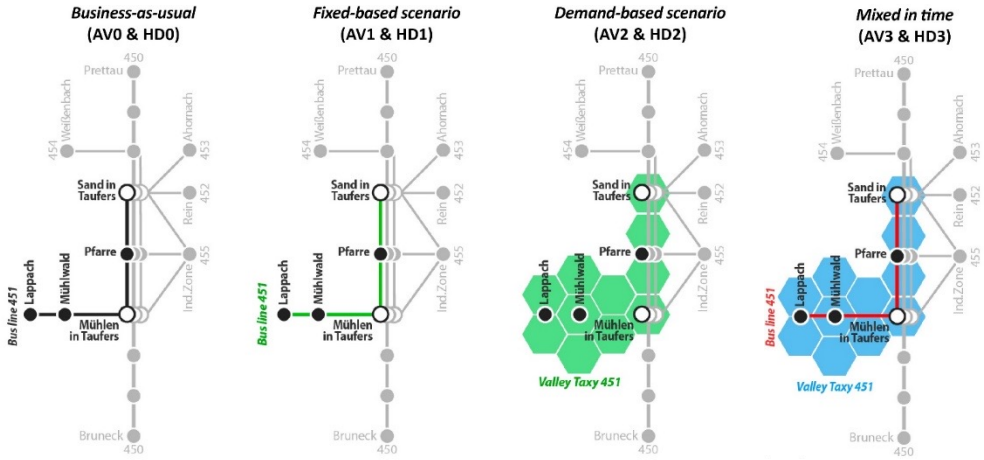
Basic-research work:

- We investigate the **current space-time constraints and mobility habits** of the rural population
- We **develop scenarios of rural public transport automation** in study areas located
- We **estimate the impacts** of these scenarios on the accessibility of different population groups living in the study areas

Conceptual use cases

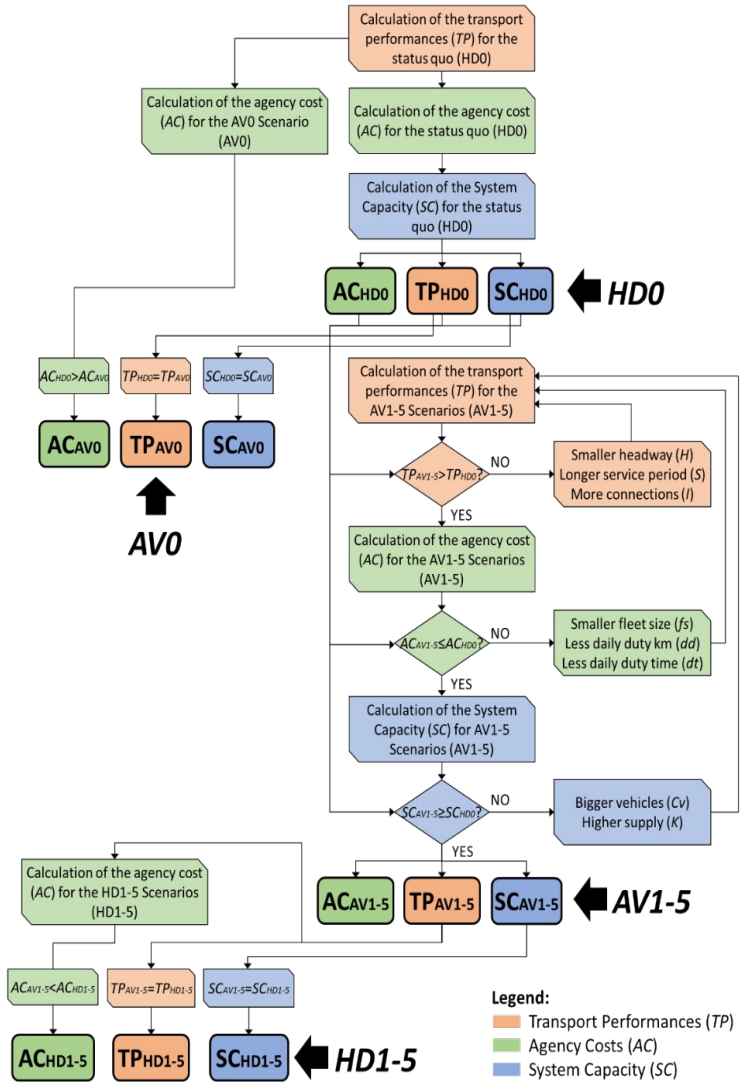


Concrete scenarios in South Tyrol

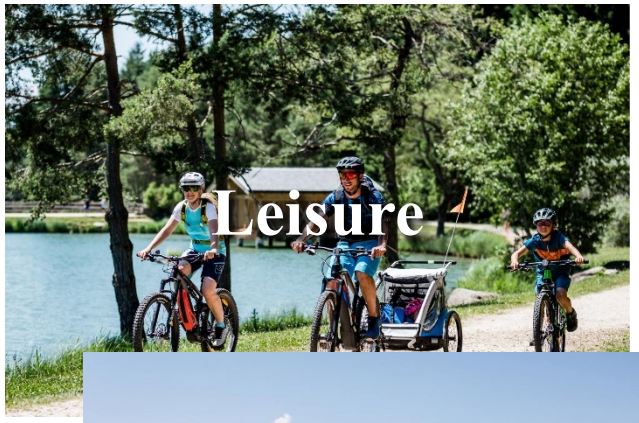


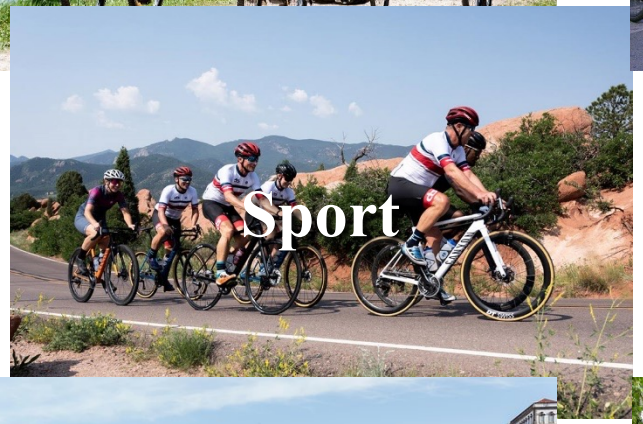
Performance, cost and capacity design

Scenario design flow chart



Utilitarian & recreational cycling accessibility





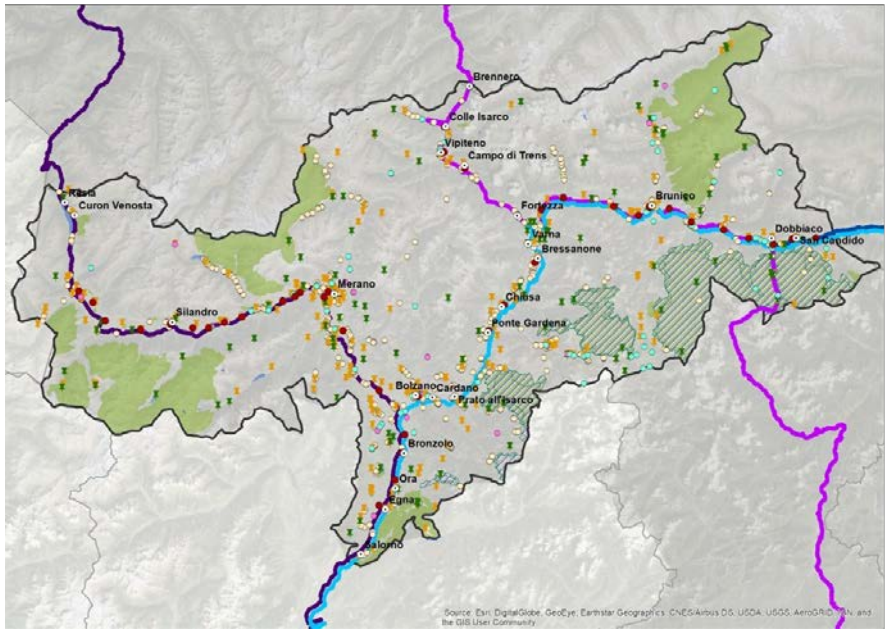
Facts and figures:

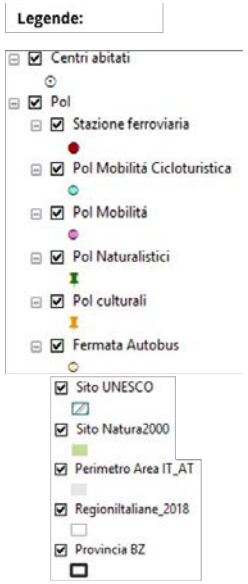
- It is widely recognized that bicycling has positive impacts **environment, health, societal and transport costs**
- Cities like Munich, Amsterdam and Copenhagen have registered an increase of their **utilitarian bicyclers** by over 50% between the 90´ and 2010
- In tourism destinations as Germany, Ireland and France cycle tourism and **recreational cycling** has become a key attraction
- The widespread of the **e-bike** is hugely extending the range of recreational (and even utilitarian) bike users

Utilitarian & recreational cycling accessibility

Applied-research work:

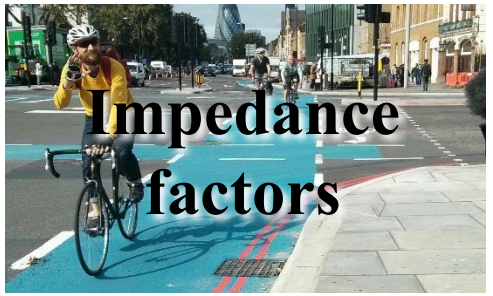
- We map the **opportunities** relevant for cycle tourists in the eastern Alps and the **cycling infrastructures** leading to them
- We develop **cycle-tourism concepts and business models** for different destinations in the Italian Alps (e.g. Valbelluna and Val Camonica)

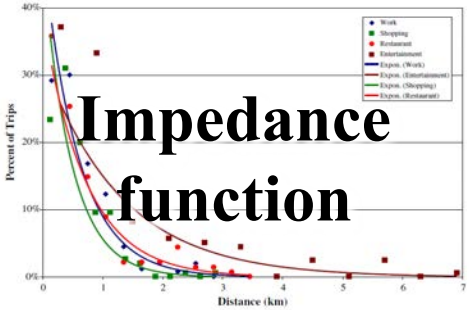




Basic-research work:

- We currently attempt to develop a **person-based accessibility model for cycling**, which deploys the gravity-based approach
- We attempt to address the four key criticalities of non-motorized accessibility models in new basic-research proposals





Main projects related to this presentation

Running and recent projects:	Contact person:
1. **CONNECT2CE** – (Interreg Central Europe 2017-2020)	→ Alberto Dianin
2. **RAAV** – (Joint Project South Tyrol / Austria 2022-2024)	→ Alberto Dianin
3. **E-BIKE** – (Interreg Italy / Switzerland 2019-2022)	→ Isidoro De Bortoli
4. **EMOTIONWAY** – (Interreg Italy / Austria 2018-2022)	→ Philipp Corradini
5. **Ciclovia del Cielo** – (Auftrag vom Comunità Montana Val Camonica 2021-2022)	→ Isidoro De Bortoli
6. **Valbelluna** – (Auftrag vom Consorzio BIM Piave 2016-2017)	→ Isidoro De Bortoli
7. **iMONITRAF!** – (Auftrag vom Land Tirol 2017-2023)	→ Alberto Dianin
8. **BBT: Update of the CO2 balance for the Brenner Base Tunnel** – (Direct mandate 2022)	→ Federica Maino
Projects under evaluation/submission:	Contact person:
1. **SUSTANCE** – (Interreg Central Europe call 2021-2027)	→ Alberto Dianin
2. **URCA** – (Joint Projects South Tyrol / Germany – current call)	→ Alberto Dianin

Main publications related to this presentation

1. Dianin, A., Gidam, M., Hauger, G., 2022. ***Isolating the Role of the Transport System in Individual Accessibility Differences: A Space-Time Transport Performance Measure.*** Applied Sciences 12, 3309. https://doi.org/10.3390/app12073309
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3. Cavallaro, F., Dianin, A., 2022. ***Combining transport and digital accessibilities in the evaluation of regional work opportunities.*** Journal of Transport Geography 98, 103224. https://doi.org/10.1016/j.jtrangeo.2021.103224
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6. Cavallaro, F., Dianin, A., 2020. ***An innovative model to estimate the accessibility of a destination by public transport.*** Transportation Research Part D 80, 102256. https://doi.org/10.1016/j.trd.2020.102256
7. Cavallaro, F., Dianin, A., 2020. ***Cross-border public transport as a driver for tourism in the Alps.*** Transportation Research Procedia, Recent Advances and Emerging Issues in Transport Research – An Editorial Note for the Selected Proceedings of WCTR 2019 Mumbai 48, 2446–2461. https://doi.org/10.1016/j.trpro.2020.08.262
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Thank you for your attention!

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