VIENNA 2018 TRA TRANSPORT RESEARCH ARENA

A digital era for transport

solutions for society, economy and environment

What makes and breaks active travel?

A statistical model for evidence-based decision-making in transport policy for non-motorized modes

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What everybody knows…

- Positive effects of higher non-motorized modal shares
  - Reduction of pollution (air, noise, etc.)
  - Health improvement
  - Cheap infrastructure, less land consumption, etc.
- Actual active modal shares decrease /stagnate on national level (1995 – 2013/14):

Mode	1995	2013/14	diff
Walking	26.9%	17.4%	**-9.5%**
Cycling	5.3%	6.5%	**+1.2%***

Source: BMVIT (2016): Österreich Unterwegs

* well inside statistical fluctuation range

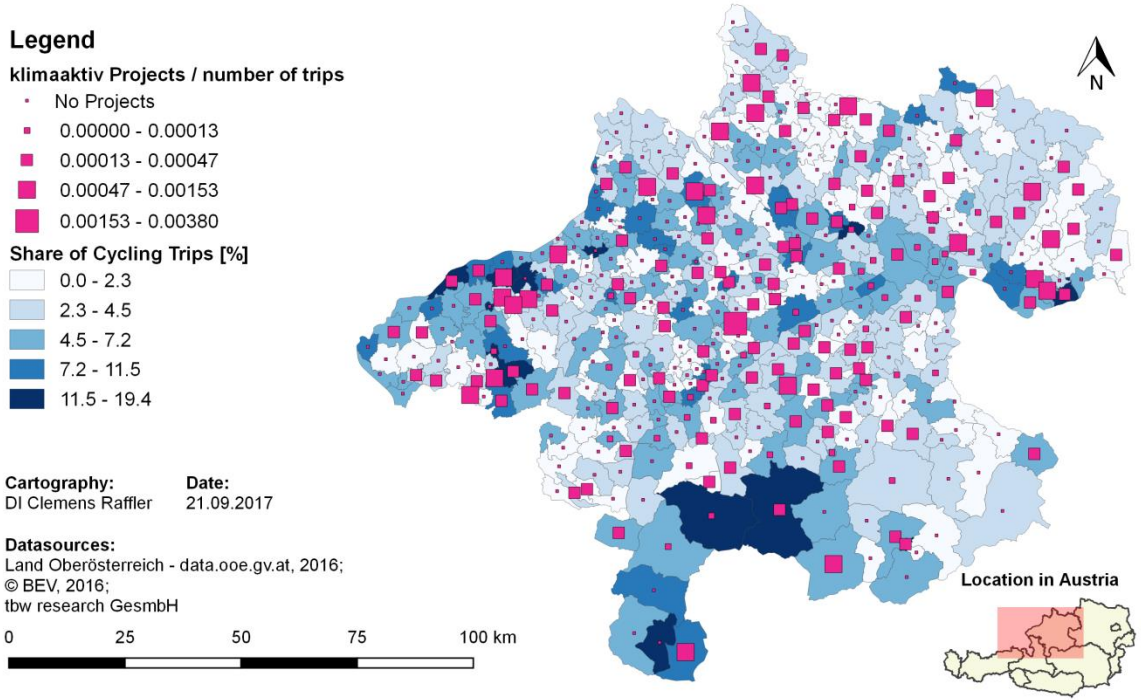
What everybody wants…

- Policy papers setting agendas and goals:
  - Masterplan for walking:
    - No quantitative goal
    - Proposes actions to prioritize walking
  - Masterplan for cycling:
    - Goal for cycling shares: 13% (2025)
  - Mobility Masterplan Carinthia:
    - 40% active modal shares in 2035

BMLFUW (2

Carinthian Government (2016)

…how planning actually performs…



Example from **bicycle traffic** in **Upper Austria**:

- **Investment** into cycling does **not reflect cycling shares**
- Planning **lacks to account** for the **complexity** behind modal choice

...and how to improve planning efficiency

- Evidence based planning as a scientific framework (Faludi, 2006):

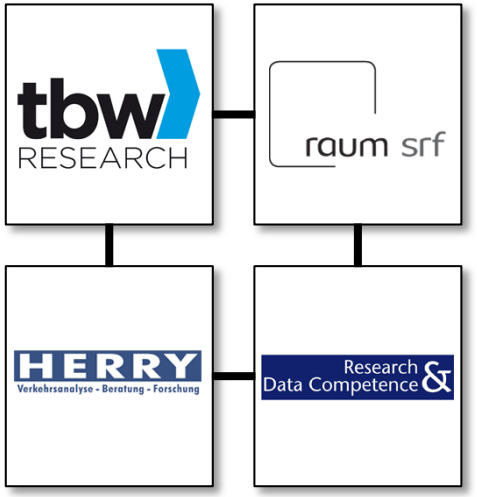
„In order to be able to develop sound policies that encourage cycling, ***it is essential that we understand what determines bicycle use“***

(Heinen et al, 2010, p. 60)

What makes and breaks active travel?

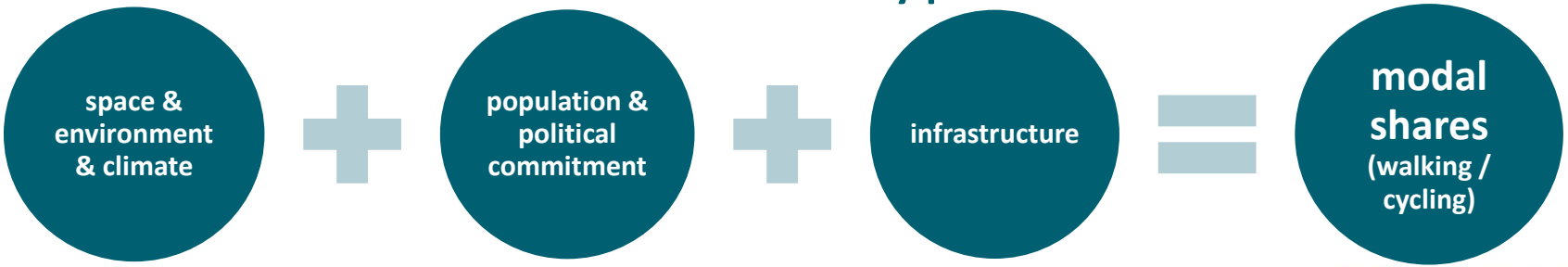
Our Solution approach: ACTIV8

- Cooperative R&D Project ***ACTIV8!***
  - Call: Mobilität der Zukunft (4th call)
  - Funding Stakeholder: BMVIT
  - Partners:
    - tbw research GesmbH (lead)
    - University of Technology Vienna (Centre of Regional Science)
    - Research&Data Competence OG
    - HERRY Consult GmbH
  - Project duration: 30 months (05/2015 – 11/2017)



The ACTIV8! Approach

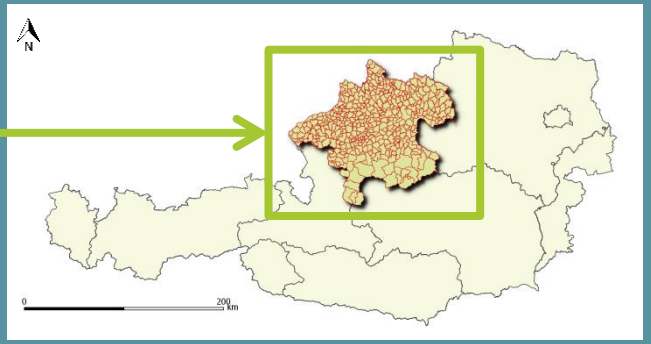
- An integrated, holistic approach to **quantitatively estimate the impacts of all relevant determinants on active mobility**.
- Methodological basis:
  - **aggregated statistical models**
  - one **model for each active mode** at the level of **municipalities**
- Focus on applicability of results:
  - Include **variables that can be altered by planners**



How do the models work?

Multivariate statistical Models:
- Multiple Linear Regression

Outcome Variables:
- Upper Austrian active modal shares
- N = 444 municipalities



Predictor Variables:
- Operationalization of local attributes as (candidate) predictor variables.
  - Methods: transport economy, GIS, socio-economic data analysis
- **Data sources:** GIP, OSM, ZAMG, OGD Upper Austria, …

Examples from our 700+ predictors pool

space & environment & climate

- Number of Days with snow cover
- Hilliness of settlement area
- Target-group specific and mode-specific accessibilities of amenities

population & political commitment

- Population share of social milieus (eg. Bourgeois middle-class)
- Quota of part time employment
- Proxies for political commitment

infrastructure

- Meshing of the road network
- Coverage by public transport
- Topological Measures of road network

Results – Models

Model	R^2	Adj. R^2
Pedestrian Model	0.775	0.775
Bicycle Model	0.731	0.711

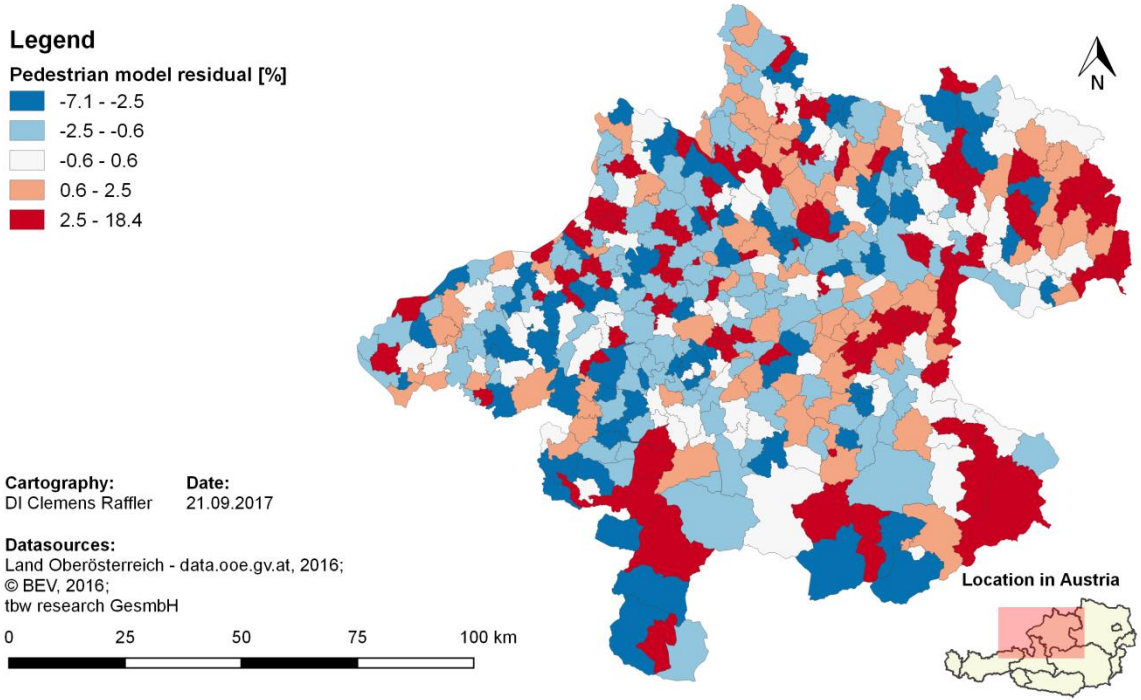
p for all predictor variables < 0.001

→ **77%** of the observed variance in **pedestrian modal split and 73%** of the **cycling shares** can be explained, respectively.

→ All predictor variables are significant at the 0.001 level

How can we apply these results in planning support?

Results – Strategic planning support



Map of **investment potential**:

- **Blue**: decrease disparities (underachiever)
- **Red**: high return on investment (overachiever)

Results – Simulation examples

- *‚What's the impact of individual measures on active mobility shares in the respective environment?'*
  - Other things being equal we estimate the isolated incremental effect of…
    - … **one year membership with fahrradberatung.at** (Upper Austrian bicycle planning program) to be **0.11%** increase in cycling shares.
    - … a **one percent growth in post-materialist milieu population share** results in a **1.4%** increase in walking shares.

Conclusion & Follow-up Project

ACTIV8II

- ACTIV8! has laid the basis for a comprehensive model for planning support by evidence-based methods.
- **Pinpoint solutions instead of rigid panaceas**
- **ACTIV8II:**
  - Model optimization (new and pooled predictor variables)
  - Tool-Set and expert system for planning practitioners (Upper Austria and Styria as Labs)
  - proof-of-concept and experts' feedback

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