

GoEco!

A community based eco-feedback approach to promote sustainable personal mobility styles

PI: Prof. Roman Rudel
University of Applied Sciences and
Arts of Southern Switzerland (SUPSI)

Co-PI: Prof. Martin Raubal
ETH Zürich

Background

- Private motorized transport still being perceived as positive and desirable.
- Mobility patterns are strongly embedded in everyday life.
- Changes in mobility behavior are hindered by social & psychological barriers
 - fear of sacrifices; returning to the past
 - fear of losing social prestige (car as a status symbol)



Even though effective alternative mobility options to reduce energy consumption are already available!



Research questions

Can eco-feedback information and social interaction (social comparison and peer pressure) be effective triggers to:

- foster changes in personal mobility behavior?
- facilitate the long-term challenge to reduce private motorized transport ?
- promote a transition to more energy efficient mobility options, such as vehicle-sharing, intermodal use of means of transport, public transportation and slow mobility?



We run a medium-to-large-scale Living lab experiment with a significant number of users sharing information about their mobility behavior and receiving feedback on their choices



GoEco! - Unique Features

	Meta Study on Gamification (Hamari et al.)	GoEco!
Sample Size	Small sizes (around N=20)	N = 600
Control Group	Some lacked control groups	N = 200
Timeframe	Often very short (Novelty effect: Skewed results)	½ year
Evaluation	Many used only descriptive statistics	Quantitative analysis of spatio-temporal data

=> Current studies lack rigorous methodologies

Source: Hamari et al. (2014). Does Gamification Work? In 47th Conf. on *System Sciences (HICSS)*

Approach

- Participants in the Living lab test a smartphone *app* developed on purpose, that:
 - tracks their trips
 - provides them with eco-feedback on their mobility performances
 - suggests alternative, low-impact modal options
 - lets them define personal reduction objectives and targets
 - sets up a social comparison rewarding scheme within the community of the users

- The Living lab is run both in Canton Ticino and in the City of Zürich => differences in the supply of mobility options and in the socio-cultural attitude of the population towards mobility.

- To get deeper insight into perceptions / attitudes, a selection of participants is closely followed with focus groups and interviews.



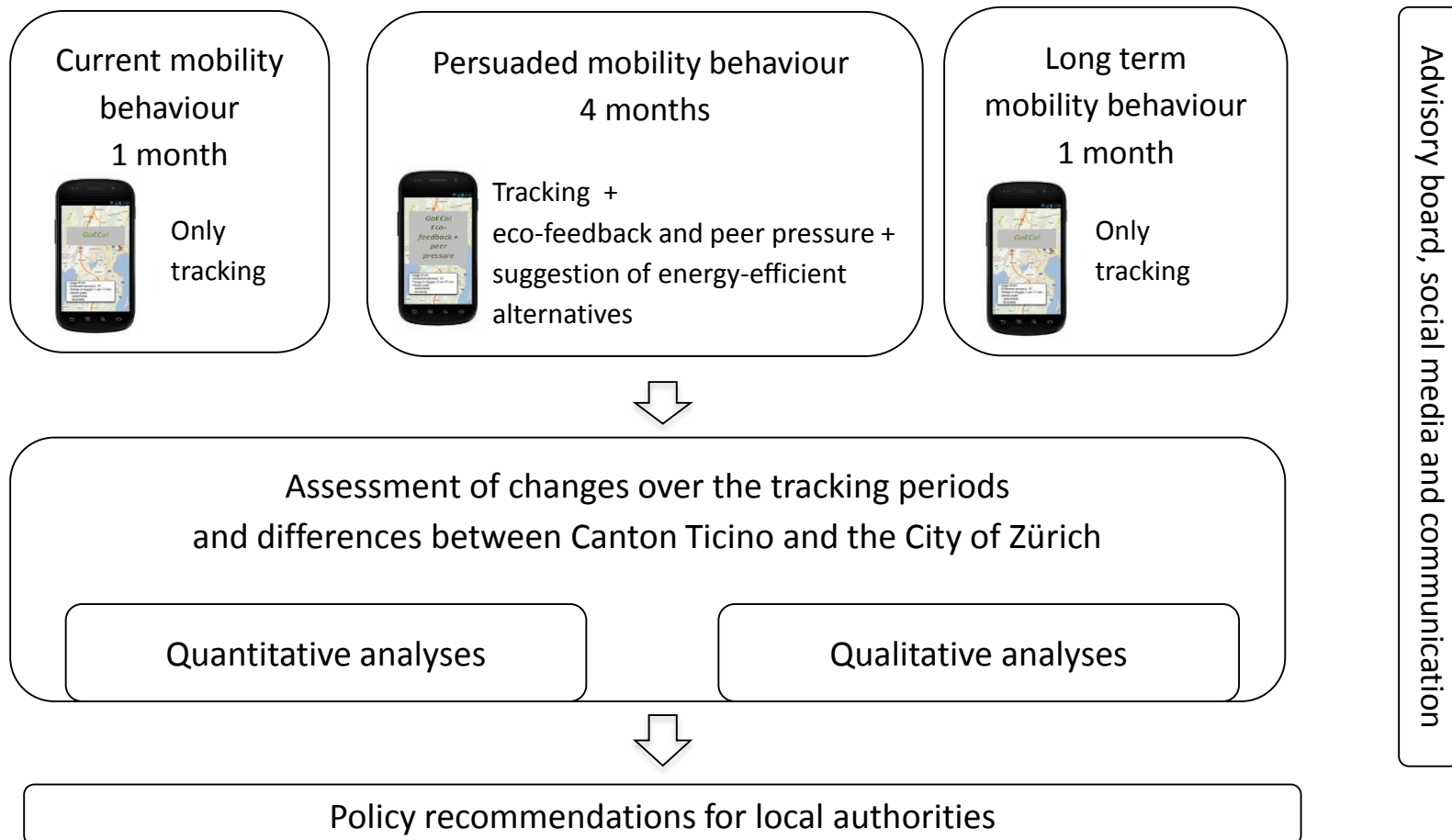
The *GoEco!* app is based on the existing *Moves* app

City of Zürich
↑
Canton Ticino



The GoEco! Living lab design

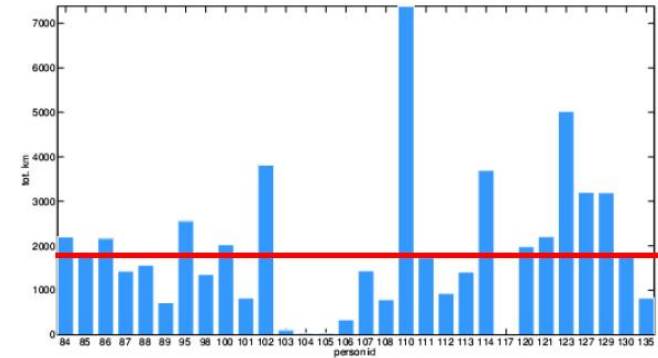
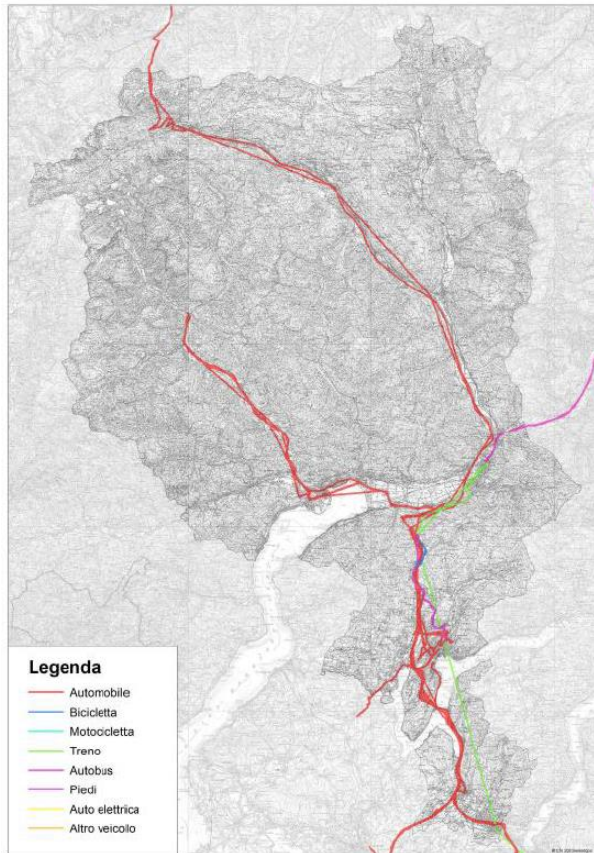
Overall 600 active participants (testers) + 200 passive participants (control group) in the City of Zürich and in Canton Ticino.



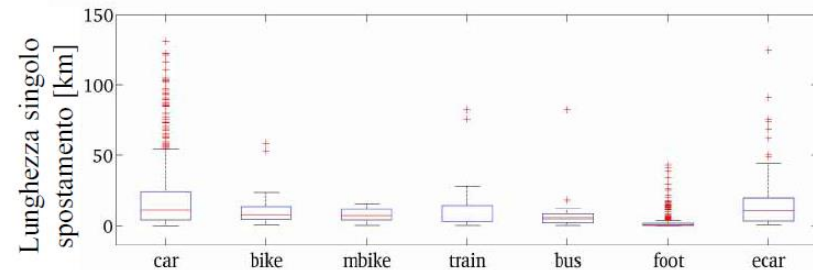
Previous app: e-mobiliTI



Quantitative analysis



	Tutti gli spostamenti			Spostamenti per lavoro			Tutti gli altri spostamenti		
	Distanza media percorsa [km]	Numero spostamenti [num]	Totale km percorsi [km]	Distanza media percorsa [km]	Numero spostamenti [num]	Totale km percorsi [km]	Distanza media percorsa [km]	Numero spostamenti [num]	Totale km percorsi [km]
Auto	56.9	45	2'559.6	7.9	22	174.2	103.7	23	2'385.5
Bici	6.3	6	37.9	6.3	6	37.9	0	0	0
Treno	511.2	1	511.2	0	0	0	511.2	1	511.2
Bus	106.9	1	106.9	0	0	0	106.9	1	106.9
Piedi	5.9	6	35.6	0	0	0	5.9	6	35.6



Key methods

- Inter-disciplinary, bottom-up approach, based on direct interaction with the end-users.
- At the intersection of different research areas
 - Energy sciences: going beyond the traditional awareness raising approach
 - Behavioral sciences & Sociology: assessing effectiveness of eco-feedback and competitive schemes in triggering collective behavioral change (persuasive technology approach)
 - “Gamification”: using game design elements in non-leisure contexts
 - Information & Communication Technologies: exploiting smart mobile devices for inexpensive sensing of mobility behavior (crowdsourcing) and to suggest energy-efficient alternative mobility options (intelligent transport systems ITS)
 - Geomatics and Artificial Intelligence: using machine learning and data-mining techniques to understand mobility patterns (trajectories and motivations)



Implementation and dissemination activities

- Advisory board follows the whole project – from the very beginning
 - Federal authorities in the mobility, energy and sustainability fields, including EnergieSchweiz
 - Experts from the academic world: SCCER “Efficient Technologies and Systems for Mobility”
 - Transport associations: Pro Velo, VCS Verkehrs-Club der Schweiz, TCS Touring Club Schweiz
- Periodic dialogue with local mass-media, starting with a communication campaign for the recruitment of the participants.
- Final project conference for the presentation of the „Policy recommendations for local authorities“ and release of the *GoEco!* smartphone *app* to the general public.
- Scientific publications and conference participation.



Expected results and benefits for the Energy strategy 2050

- Deeper understanding of the main opportunities & barriers for sustainable personal mobility and how feedback mechanisms work in the area of mobility.
- Concrete suggestions for local public authorities regarding land-use and transportation planning.
- Guidelines for addressing the long-term challenge of reducing private motorized transport.
- Comprehensive study of mobility behavior for 2 different types of Swiss environments: City of Zürich and Canton Ticino.

Meeting Mobility Demands of the Future

- Seamless integration of all forms of mobility, taking into account user context and preferences.
- Meeting user demands with options in close vicinity and by sharing goods and mobility infrastructure.
- Automated suggestions for meaningful rearrangement of daily schedules to optimize use of mobility offers and infrastructure.
- Online algorithms to maximize capacity utilization in fleets of (self-driving) taxis, carpooling, car sharing, and public transportation.

Challenges

- Ethics: How to weigh societal benefits against personal choice?
- Privacy: Meaningful sustainable mobility options rely on personal (spatio-temporal) data. How to avoid misuse?
- Scalability of Impact: From individual behavior to societal change.