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The potential of smartphone data for national travel surveys

STRC, 18.05.2017



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MTMC: A brief history

- 1974: First edition (since then, every 5 years)
- 1994: First CATI data collection procedure
- 2015: Last data collection
- 2017: 2015 data published (<http://www.are.admin.ch/mtmc>)
- 2020: Next data collection



MTMC: Questions are about...

- socioeconomic characteristics,
- mobility tools (number of vehicles, driving license, ...),
- **trips and activities for a reference day**,
- occasional trips,
- political opinions about transportation and mobility.



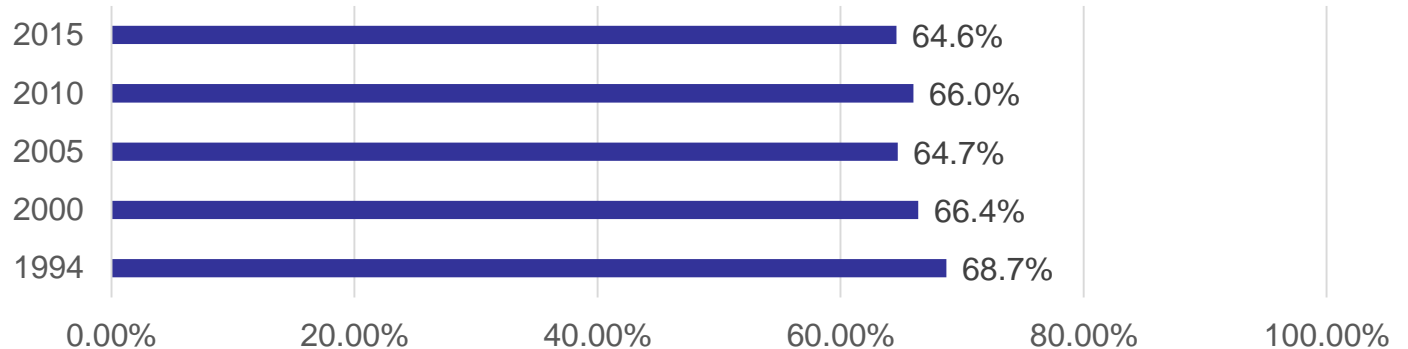
MTMC: Goals

- **Past:** Evaluating past decisions
- **Present:** Understanding behavior
- **Future:** Providing input data for decision-aid tools
- **Over time:** Detecting trends → Continuity needed!



MTMC 2015

- Conducted by the Federal Statistical Office and by ARE
- Sample: 57'090 successful interviews
- Participation rates difficult to compare:
 - Based on land lines: households are selected



- Based on registers: individuals are selected
 - 2015: 53.4%



Critics about CATI surveys

- Non-response rate
- Missing trips
- Low precision of reported trips
- Non-panel nature
- High costs



Tool: What technology?

- Data from an App on the smartphone of the user
- Interactions with the user are required:
 - For the semantics
 - For the missing data
 - For the right to correct or delete data
- Existing Apps
 - Used in research
 - For commercial purposes



Interactions with the user

- Prompted recall
 - Functionalities:
 - Delete a trip, add one, group trips, divide a trip
 - Deleting a stop is easier than adding one
 - User interface
 - As text or map
 - Zooming level is important
 - On the web and on the smartphone
- Detection algorithms: Goals
 - Minimize respondent fatigue
 - Provide usable data for the modeling of behavior



Existing Apps

Used in research

- Future Mobility Survey
- GoEco !
- Modalyzer
- PEACOX
- MoveSmarter
- UbiActive
- MEILI

For commercial purposes

- Mobile Market Monitor
- rMove (RSG)
- Move
- SBB DailyTracks (MotionTag)



Sample: Who participates?

- Proportion of the population with a smartphone

Country	Smartphone adoption	Year	Source	Sample
Switzerland	81%	2020	Statista.com via Marija	
USA	77%	2016	Pew Internet Project	~2000
Switzerland	73%	2014	Becker et al., 2015	594
Sweden	36%	2013	Geurs et al., 2015	8000
USA	46%	2012	Pew Internet Project	~2000

- Participation rates and samples are small in the literature



Outcome: What quality of the data?

- Quality of the trip data using an App
 - Number of trips per day: more frequent
 - 20% more trips per day than traditional surveys
 - People with a high value of time answer more
 - Trip durations and distances: similar
- Cost
 - 30% more than traditional surveys (cleaning work)
 - Cost per collected day was 50% lower



Open questions

- How to assure privacy?
- What are the effort needed for analyzing such datasets?
- What is the representativity of the sample?
- How long should it be?



Conclusion: How to use such tools at the national level?

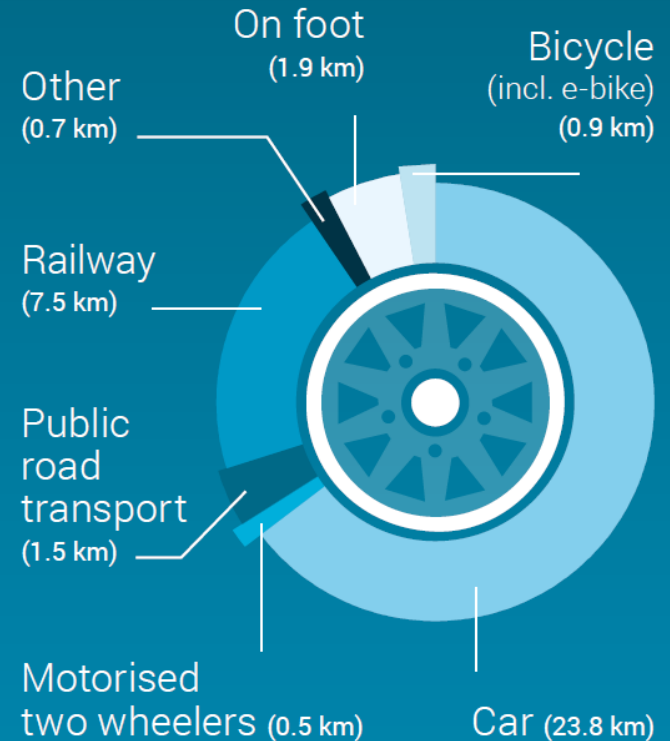
- First data collection using mobile phone with GPS: 2001
- Opportunities
 - Survey running in Singapore, California, Florida, Seoul, Stockholm, New Zealand and North Carolina
 - More players in the market
- Risks
 - Battery use
 - Low participation rates
- Recommendations
 - Socioeconomic questions not on the smartphone
 - Not collecting CATI + smartphone data on the same day



Discussion

36.8 km

Daily distance per person,
in Switzerland



- Contact: antonin.danalet@are.admin.ch
- More about the MTMC: <http://www.are.admin.ch/mtmc>