The value of using mixed methods for evaluating use of car sharing vs own car

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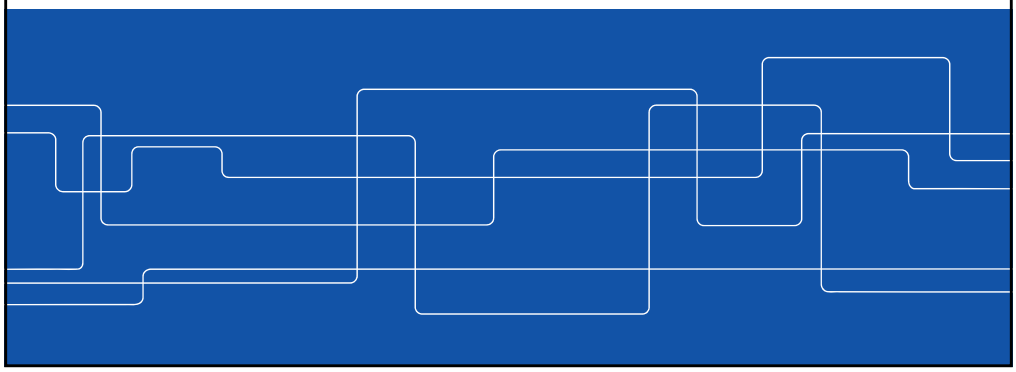


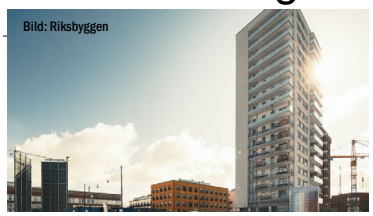
Abstract

Traffic experts and policy-makers have not reached consensus on the relative importance of local regulations and interventions in a transition towards sustainable mobility. Maybe this is because transport researchers have not yet demonstrated a sufficient amount of reliable studies of such local scale interventions. One type of studies that seem to be particularly lacking are longitudinal studies that assess resulting travel patterns quantitatively, as well as investigate qualitatively how possible changes actually come about. Therefore, the aim of this paper is to apply, evaluate and develop a mixed method designed for such a combined purpose. A main question is what results or insights that included methods give in combination, rather than each one by themselves. To give a brief background to the area of research, there is an increasing number of evaluations of car free/restrained and mobility served areas (see e.g. Selzer and Lanzendorf, 2022; Baehler and Rérat, 2020). Selzer and Lanzendorf (2022) use semi-structured interviews (with a mobility bibliography approach) and a Social Practice Theory framework to evaluate mobility practices in two new car-reduced neighbourhoods in Germany. Baehler and Rérat (2020) evaluate nine car-reduced and “mobility augmented” case studies in Switzerland and Germany with a mixed-method approach (using questionnaires and semi-structured interviews. These studies tend to focus on a snap shot image at one point of time and mostly focus on residents in the houses. In the light of this case studies are needed that 1) study interventions/inhabitants over at least a few years time, with several waves of data collection and that 2) combine a selection of qualitative and quantitative data collection methods.

We applied the mixed method to cases in which municipalities granted building permits to housing companies for new residential blocks, on the condition that they provided vehicle pools to the residents for at least five years. On this conditions the housing companies were allowed to build (as few as) 0,1 - 0,5 parking spaces per apartment.* These interventions in specific neighbourhoods, could be argued to have a goal of substituting private motoring with shared mobility. The specific method we tested combined car share trip statistics, parking occupancy counting, vehicle ownership data, a questionnaire to residents and qualitative interviews. The interviews concerned choices made, and trips, and/or actions, carried out, in relation to the available mobility options, and we held them mainly with residents, but also with other involved stakeholders.

Our result and analysis is mainly that by applying the mixed method we could show whether changes in the modal split, vehicle ownership, use of parking and use of shared mobility actually seemed to take place or not, and also how (fast) the development of these factors were over time. The combination of methods was useful since each type of data collection provided clues about interesting aspects that could be followed up with one of the other methods. For example, interviews showed specific and partly unexpected events and decisions that contributed to the premature closure of certain vehicle sharing schemes. This made it easier to interpret booking statistics for these sharing schemes, etc. The study's nature of long-term follow-up, e.g. repeated interviews and questionnaires, showed how processes around changes in car ownership are often long-term, i.e. take place through circumstances and decisions in households over a couple of years. This could then be triangulated with the help vehicle ownership data. Finally, the method development that could be seen is to build on these effects of one method giving clues of what to look for with the help of another method, and make a research design that might optimise changes to get such valuable clues.

Housing with interventions



Haninge, 85 HOA apartments 22 km from Stockholm C

Bäcklösa 486 apartments, 5 km from Uppsala C

Ö. Mälarstrand, 30 apartments 2 km from Västerås C

Lindholmen, 133 HOA apartments 4 km from Göteborg C

Five combined methods

- Questionnaires to residents
- Trip data from car sharing providers
- Car ownership data (Swedish Transport Agency)
- Interviews with residents
- Interviews with real estate owners

Our questions

Added quality of results by the combination of methods?

Potential drawbacks?

We first present **Use of car sharing**, then **Private car ownership**

	Data on car share trips and private cars	**Interviews & surveys** Ca 50 interviews & 200 survey replies
Haninge	2018-2021 (1200 trips)	2017-2021
Bäcklösa	2021-2022 (1100 trips)	2022
Ö Mälarstrand	2021-2022 (800 trips)	2022
Lindholmen	2019-2022 (8 000 trips)	2021-2022

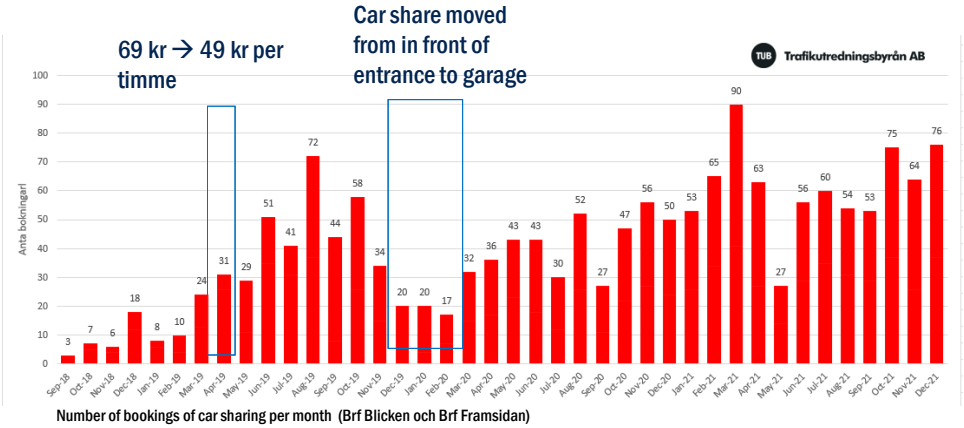
Data from car share providers & survey

Used car sharing (at least once)

	3 month	6 month	9 month	12 month	15 month	18 month	21 mont	24 month
Haninge HOA 49 kr/h, 0,5kr/km	5%	9%	12%	15%	18%	18%	20%	20% 24%
Bäcklösa 49 kr,/h 0,5kr/km	6%	9%	12% 14%	13%				
Ö Mälarstrand Free - 2h/booking	70%	123% 81%	130%					
Lindholmen HOA Free 10 h/month	36%	48%	55%	59% 53%	61%	65%	65%	69%

Data from car share providers

Number of trips of car sharing per months affected by other events (Haninge)



Number of bookings of car sharing per month (Brf Blicken och Brf Framsidan)

Learning to car share - from interview

Family moved from villa to apartment and sold one of their cars, and Sofie* later started to use car sharing

"The best thing with car sharing is that one does not need two cars, as it is not that often one need two cars, not in our case anyway. Then it is convenient too, it is an electric car. It is quiet when you drive it."

* Fictive name

Interviews with stakeholders – car sharing

Factors that seem to affect level of use:
Visibility of cars – e g lower if parked in garages that residents don't regularly vist for other purposes

Open vs in-house car club

- Some HOA:s with open car club open to everyone (e g M) do not see themselves as responsible for providing car sharing – "we only rent out parking lots to car share provider"

Reorganized providers and increased prices

The 5-year contracts soon expire – renegotiations?

What can we learn from interviews

“Det, det är ett sätt att leva också, och det är en liten annan planering. Men när man väl kommer in i det så tycket jag faktiskt att det fungerar bra. Jag har ju liksom **inga små barn och passa tider** och sådana här saker. Och jag **storhandlar ju inte som förr”.** (Kvinna, 50 år Blicken)

” Det var min kompis också, han frågade mig hur skulle han ladda den här information, (om hur bilpoolen fungerar.) Så jag hjälper han att bara downloada och visa första gången”. (Man 43 år, Bäcklösa)

”Och sedan så … sedan så hade jag ju ingen parkering här för den (bilen). Så jag gav bort den till morsan. (Man 41 år Lindholmspiren.)

Att man **får tillgång till bil utan att äga** en bil, och dessutom **gratis**, fördelarna är väl rätt självklara, eller? (Man 33 år, Lindholmspiren)

(FARHÅGA) ”Nej, men så står man där på någon **isolerad parkering mitt i ingenstans, och så har bilen laddat ut** på grund av kylan, typ. Det är den bilden jag har fått”. (Man, Bäcklösa, 28 år som ej använt BP.)

Car ownership in survey vs registry data

Haninge HOA	Number of cars per huousehold		
	2017	2018	2020
All respondents		0,8	0,70
Panel	1,0	0,8	
Registry data			0,55

In and out of car ownership - from interview

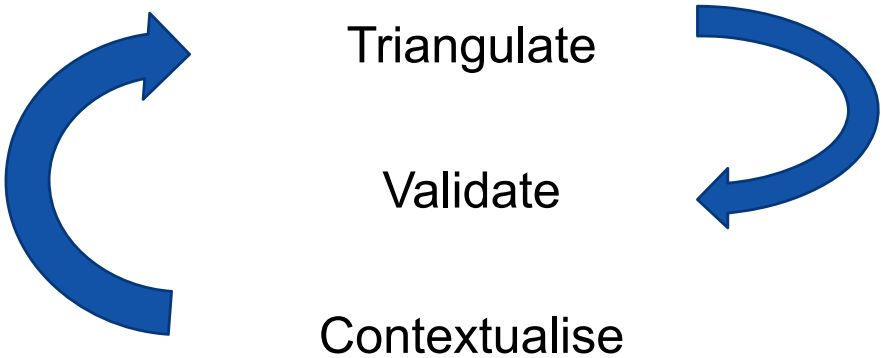
- Marianne, 55 years old moved to Haninge HOA when seperated from her partner.
- In the beginning she parked her car on street (due to high parking fees on estate) and once a week haed to find other free P lot
- Sold her car and sometimes rented one at petrol station
- Hesitated touse the car share due to high deductives (12 000 sek) and because of)perceived) short range of electric cars

"It's a way of life too, and a little different planning. But once you get into it, it works well. I don't have children at home any more, I only have myself, so my needs have changed … And I don't shop like I used to, either. So I think it works fine."

Interviews with other stakeholders – issues with car sharing

- The bikes in the bike share were stolen (first observed through interviews with residents)
- Bikes were not insured and unclear division of responsibility between developer and HOA
- Bikes not replaced
- New administrative agreement with insurance for following phases
- Trade-off between visibility and securuty (and possibility to insure)

Benefits with mixed method research



Drawbacks with mixed method?

Time consuming way to do research

Is validity or uncertainty increased by triangulating (measuring the same thing in two or more ways)?

Should interviews come first to guide what to measure, or later (to contextualise and explain the measurements)?