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What drives mobility trends: results from case studies in Paris, Santiago de Chile, Singapore and Vienna

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Abstract

This paper discusses recent mobility trends in four cities: Paris, Santiago de Chile, Singapore and Vienna. It follows a case-study approach and relies on quantitative and qualitative analysis of selected trends, with specific focus on users. First, we set up a simplified model differentiating between social-emotional and rational motives to explain user behavior. The trends are then identified by travel-survey analysis, subsequently discussed with experts and finally described from a user perspective using in-depth and focus-group interviews. The study examines a range of modes from cars and bikes to public transport in a spatially and socially differentiated form. It shows that the identification of user motives is highly important to understand demand-side mobility trends, and discusses how this is relevant for policy.

1. Introduction

Urban mobility of today is becoming more and more diverse. Economic prosperity and growing car use, long inextricably intertwined, are not necessarily linked together like they were till a decade ago (Newman and Kenworthy 2011): Public transport trips are expected to increase, though they still might not keep pace with growing car use (UN Habitat 2013, 6). Cycling and walking are visibly expanding in many developed cities (Pucher 2010).

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These developments are supported by substantial supply-side interventions and policies (Santos, Teytelboym and Behrendt 2010). While road tolls and parking restrictions challenge car attractiveness, the alternatives are being improved. Public transport coverage is increasing (UN Habitat 2013, 6), cycle lanes and pedestrian areas have been expanded. New mobility options such as bike- and car-sharing schemes complement these changes. Their use and combination greatly benefits from information and communication technologies and digitalization (Dacko and Spalteholz 2014).

While focusing on regulation, new infrastructure and new mobility concepts can explain trends somewhat, it may overlook that mobility and mode choices are heavily influenced by personal and social factors, habits and social expectations. It has frequently been discussed, for example, that car ownership cannot be purely understood through rational factors (Steg 2005), and recent research indicates that the same accounts for other modes of transport like cycling (Heinen, Maat and van Wee 2011). Moreover, mobility decisions may further be influenced to some extent by attributes of the built environment. Compact, dense and mixed-use structures generally enable people to choose car-free mobility. However, some evidence suggests car-owning households also seek central urban locations (Jarass and Heinrichs 2014).

In this paper, we aim to explain recent mobility trends by exploring individual motives and drivers for these trends. By mobility trends, we mean recent developments producing visible changes in the assessed case's modal split. We take on psychological and sociological viewpoints and expand the search for motives beyond rational ones.

We follow a case-study approach – an appropriate method for our explorative approach. The case-study selection follows an information-based approach suggested by Flyvbjerg (2009). To initially define trends, the study employs quantitative data analysis, while the in-depth exploration of motives is mainly qualitative.

The main questions addressed are:

- What are the causes of recent mobility trends in the selected cities?
- What are the drivers of these trends from an individual perspective?
- What patterns, if any, can be found in those trends, and can our findings be scaled up to a broader context?

The remainder of this paper is as follows: Section 2 covers the theoretical aspects of our research. We present a framework to understand how mobility trends arise, describe our chosen research approach, and list the criteria that guided our selection of case studies. Furthermore, we list the mobility trends chosen for in-depth analysis. Subsequently, section 3 presents the case studies case by case, describing each city's context and our qualitative findings. In section four, we conclude our paper with a discussion of our findings and their limitations, and discuss their policy relevance.

2. Methodology: Framework, Case Study Selection and Research Approach

2.1. Framework

The project seeks to explain mobility trends, their causes and their drivers. Therefore we adopt an explicit user perspective. Our main interest is in explaining trends from this perspective and generating new findings in the qualitative phase, also from a user perspective. However, the conditions found in each environment – such as recent changes in transport supply, or general societal values – cannot be ignored, as these influence, and are influenced by, the user-related trends, making it necessary to embed the analysis of user motives alongside contextual findings. To assess these factors within an appropriate methodological framework, we have defined the following criteria that the framework should be able to capture:

- Surrounding conditions of each case study and their changes affecting the transport system (e.g. infrastructure, usage cost or land use).
- User-reactions to those changes (mainly visible from modal-split analysis with data from household surveys or other transport statistics).
- Explanation of intrinsic motives to explain user behavior.

These criteria are expected to form an interrelated set of factors. While the surrounding conditions influence the user behavior and the user's motives, understanding them both is crucial to understand mobility trends. The following graphic representation shows these relationships:
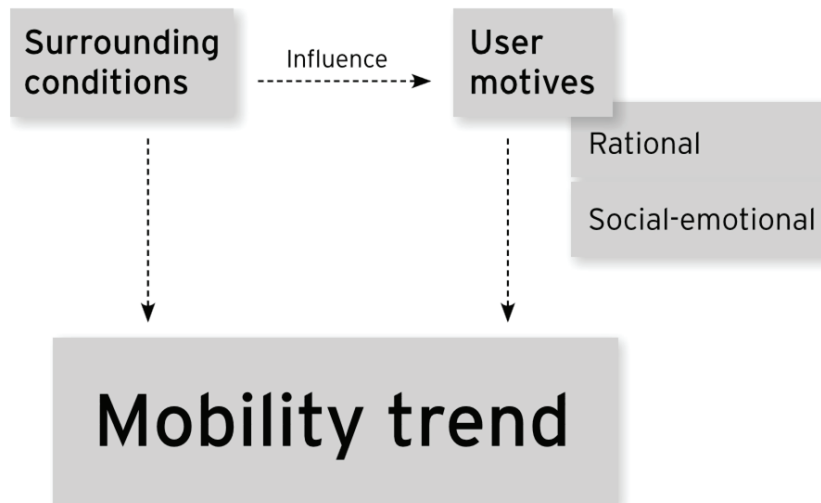

Fig. 1. Framework to explain mobility trends (Source: the authors, drawing on Steg, 2005, and Noppers et.al.,2014)

This approach is somewhat similar to that of Steg (2005), although we use only two instead of Steg's three categories ('instrumental', 'symbolic' and 'affective'[†]). Further, we also assess modes of which users cannot obtain personal ownership. We will use the framework outlined here to structure and explain our findings. The division of the user motives into the rational and the social–emotional has used the following definitions:

- Rational motives: all motives where a user considers factors affecting the instrumental (practical) use of transport – speed, cost, reliability etc. – in their mode choice. These factors are very likely to be influenced at least partially by the surrounding conditions.
- Social–emotional motives: include all motives whereby a user is influenced, in choosing a mode of transport, either by their personal desires or by social norms. An example of the latter could be the use or ownership of a certain mode of transport owing to social expectations, or perhaps peer pressure.

2.2. Case-study selection

The cases selected for the study are the cities of Paris, Santiago (de Chile), Singapore, and Vienna. As our main objective was to describe a variety of trends, we used the following selection criteria to ensure diversity: visible changes, both in the surrounding context (shifts in regulation, infrastructure, planning initiatives, and/or transport supply) and in mobility patterns, plus some geographical distribution. In addition, the cities had to fulfill practical considerations, especially availability of quantitative data (household data, statistics on the transport infrastructure).

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† These terms are derived from the work of social psychologist Helga Dittmar. According to Steg (2005), Dittmar contends that the use of material goods fulfils three functions: 'instrumental', 'symbolic', and 'affective'. This implies that car use may have an instrumental function (i.e. a practical one: it enables activities), a symbolic function (i.e. the car is a means to express oneself or one's social position), and an affective function in connection with deeper, non-instrumental needs and desires.

2.3. Research Approach and Data Collection

Our research approach within the case studies followed three main steps:

Step 1: Identification of city-specific trends through data analysis

We conducted extensive data-based research on recent mobility trends in each city. Therefore we relied on secondary data and statistics. We mainly focused on transportation indicators such as trip data with respect to users and spatial structures. We furthermore analyzed each city's context (infrastructure, economic development and social structure) to interpret our findings. All sources used are named in the case specific descriptions.

Step 2: Expert interviews to validate identified trends and prepare qualitative analysis

After identifying trends, we conducted three to five expert interviews in each city during September and December 2014. For our experts we chose people with in-depth knowledge about each city's transportation system and developments. They came from various backgrounds, for the most part from research, or belonging to transport-related institutions. The interviews were conducted using semi-structured interview guidelines with mainly open ended questions; guidelines varied depending on the city.

Step 3: In-depth user analysis to detect motivations and understand drivers

The last stage focused on the user, aiming to understand the drivers of the mobility changes detected in steps 1 and 2. The explicit adoption of a user perspective led us to choose various qualitative methodologies. This required considering each case-specific context in terms of mobility trends, but also in terms of the surroundings conditions and cultural specifics that favored different methodologies in each city. Selection of methodologies and the person groups for the qualitative phase was based on the results of the previous step's data analysis and expert interviews. In total, we selected in-depth interviews in three cases and focus groups in one case, as described below:

- Paris: Two in-depth interviews lasting up to three hours each were carried out with two persons: One person, a mid-twenty male Parisian, was selected as a representative for a young generation that grew up with many mobility options, living a multimodal lifestyle. The other was a female person at the end of her fifties, who had acquired her driving license only a few years ago, and lives in a suburban satellite district. She was selected to represent the growing group of elderly people that started driving cars in recent years.

- Santiago: Three rounds of focus-group interviews were conducted, with five to eight participants each, in January 2015, focusing on cyclists, car users and people who live in the central area of the city, lasting about 90 minutes. This report builds mainly on the results of the focus group of cyclists, who were selected to understand how the growing share of cyclists in Santiago can be explained.

- Singapore: 13 in-depth interviews lasting about one hour were carried out during December 2014. Participants owned a car or were about to buy one in the near future. The aim was to understand the reasons of car ownership and use in Singapore.

- Vienna: A total of 11 in-depth interviews were carried out in December 2014. Participants were young professionals who lived centrally and do not own a car, and people that changed their mobility behavior from cars to public transport recently after having changed residential location. Interviewees were selected to derive an understanding of the steadily growing share of public transport users.

3. Assessing mobility trends

We now present the results from the user analysis, city-by-city. The descriptions are extensive in order to allow the reader to understand the key findings and how we derived them. To select trends, we relied on data analysis and findings from the expert interviews, as described in section 2.3.

3.1. Paris and Non-Motorized Transport: "Cycling is faster for everything. […] And also makes me discover Paris"

Between 2001 and 2010, the count of trips made on foot in Paris grew significantly, leading to an increase of more than 4 percentage points (34.9 to 39.2%). As a result, walking became the main mode of transport in terms of daily trips. But the cycling share also increased, although it is still relatively small in numbers (2% overall, 3% in Paris center). Paris' modal split is characterized by huge spatial differences: walking is the main mode amongst those living

in the center while the car only accounts for 10% of all trips, but the opposite accounts for the outer suburbs (see STIF/DRIEA (2010) for further statistics).

According to the experts interviewed for Paris, this trend towards non-motorized transport (NMT) has several reasons, out of which the following stand out:

- A trend towards local lifestyles, where daily activities take place in the vicinities of the residential place. This also accounts for the suburbs, which are more and more becoming full-scale cities with all necessary facilities.
- The cycling revival due to practical advantages and users' aspiration for freedom: the ability to move easily, to choose an itinerary, to adapt quickly and to park without too many constraints. Cycling has benefits in terms of efficiency and speed in the context of a dense urban environment and in comparison to walking (slower) and public transit (less adaptable).
- The recent advances in information and communication technologies, especially because they allow for a better and seamless integration of different modes during one trip. One expert summarized that *"[…] to the logic of multimodality was added the logic of intermodality."*

Our user analysis relies on an in-depth interview carried out in December 2014 with a person matching the data-analysis profiling of multimodal users. The interviewee, Alexandre (24), had just finished his studies and is living in central Paris. He represents a typical character of a growing group of people associated with the ongoing changes, using different modes of transport depending on the use case.

Alexandre mostly travels within Paris and the inner suburbs. He mainly chooses walking, cycling and public transport for his daily activities. He mainly travels on foot for short trips. When he wants to travel further – several hundred meters or more – he often takes a bike. Alexandre frequently travels by bike, almost exclusively using the bicycle sharing system Vélib'. He does not own a bike, for which he states various reasons.

Financial reasons: the purchase price and the regular maintenance costs would exceed the price of a service such as Vélib'. Besides having to worry about these constraints, he fears the risk of theft or degradation, which does not apply to a rental bike.

> *"It is much more expensive, as soon as there is a problem, a veiled wheel, you have to make repairs, even if it is €10 here and there it's still more than the €27 for the annual Vélib' subscription"*

Bike ownership also requires **a place to store it,** and is also **more binding**: riding a bike to a destination and then use a different mode for a second journey is easy when using Velib'.

> *"I'll drop it off nearby and follow my friends because they don't want to take a bike. I don't have a bike somewhere that I have to look after."*

To overcome the constraints of using Vélib', such as the availability of bikes at the starting point and parking spots at the destination, smartphone apps help him to avoid wasting time looking around for bikes. He furthermore developed knowledge how the service operates and takes advantage of the credit offered by Vélib' for drop off at some stations at certain times, which allowed him to accumulate hundreds of hours of free rental. This sometimes allows him to keep a bike for several hours.

> *"I even left the bike in the park once when I went to Vincennes to see a play that lasted three hours. Sometimes I go to university for a short time and attach it to a tree."*

Asked about what he likes about cycling, he spontaneously lists a large number of reasons to justify this choice:

- Speed, efficiency. According to him, Vélib' is faster than alternative modes for many journeys, including when integrating the time spent looking for an available bike or a parking spot at a station.
- Low cost. He considers the annual subscription price very affordable, almost derisory given his use, and with his knowledge of the service he never pays anything regardless of how long he rents the bike for. In a way he considers that he travels 'free of charge '.
- Freedom. Spatial freedom: he can choose his itinerary; temporal freedom: there is no time limit for the service, it is always possible to use a Vélib' bike; and freedom of rhythm: he can adapt his speed to the situation, go fast if he is late or to take his time instead and transform the journey into a pleasant ride.

- The discovery. Travelling on a Vélib' bike allowed him to learn more about Paris and enjoy it more than when travelling in the underground network.

The trend of rising NMT in general and cycling in particular involves a mixture of social-emotional and rational motives, from users' desire to be independent to rational advantages such as speed, efficiency and cost. Furthermore, many social-emotional motives like freedom and flexibility are also related to practical considerations (such as leaving the bike at remote locations) and hence also exhibit strong rational considerations.

3.2. Santiago de Chile and the Cycling Boom: "We see this is happening in high income groups only. It is an elitist trend."

In Santiago, cycling saw a boom in the last years: While in 2001 it only accounted for 2% of all trips, it doubled its share in 11 years, reaching about 4% in 2012 (SECTRA n.d.). Though not spectacular in itself, it is remarkable that in some communes the number of trips increased (almost) eightfold from 2001 to 2012, and that the strongest growth occurred in the higher-income, eastern parts of Santiago.

Santiago's cycling infrastructure is still undergoing heavy development, but the political structure hinders the development of a connected cycling infrastructure, leading to numerous disconnected cycling lanes (see GRM (2012) for a map showing this).

The expert interviews furnished three main reasons for the enormous increase in cycling in the central *communas*:

- Cycling's positive, status-providing amongst high-income people image, described by one expert thus:

    "We see this is happening in high income groups only. It is an elitist trend. The low-income group has always been riding bicycles."

- An initial trigger to start cycling via the imitation of other cyclists, some of whom had learned urban cycling abroad.
- Environmental concerns and growing health consciousness, especially amongst higher-income groups with a strong formal educational.

To assess the cycling boom in Santiago, we carried out a focus group discussion in December 2014 in Santiago. Participants where frequent cyclists living in central communes. The focus group concentrated on the motivations to cycle, or begin cycling, and the question if lifestyle, symbolic factors or health play a role in opting for bike use.

The discussions revealed several **motivating** factors**,** including **relocation to a more central residential area**. The **imitation** of practices from elsewhere, as assumed by the experts, played another important role:

    "Santiago is not a friendly place for cyclists, but seeing more people on the streets provided a different sensation… it didn't seem so crazy to use a bicycle this time." (Emanuel, 41, architect)

Added to this aspect, one participant named the recent development of a **cycling culture** together with the increase in cycling-oriented infrastructure as an influence:

    "I lived in Milan until 2012; I always moved by bicycle there. When I first came to Chile in 2008, 2009 and 2010 I didn´t use the bicycle because the infrastructure was poor and you didn't see anyone cycling on the streets. When I came back in 2012 to stay, I saw a lot more people cycling and a little bit more infrastructure, so I bought a bicycle" (Emanuel, 41, architect).

Beside these imitational motives, **health issues** were frequently mentioned, because of a positive effect on physical shape, but also on mood:

    "When I started cycling the distance was short… but then I changed my job and it was far and uphill. Despite that I continued going by bike because I felt good, I arrived more awake… the mood in the metro was a disaster, everyone was so negative… I preferred to go by myself, relaxed, even if it was cold or raining." (Sofía, 32, economist)

The discussion revolved around the question of who cycles and if they can be categorized. Participants identified two large types of cyclists in terms of lifestyle. One is a relatively low-income group that is somehow "captive" of

bicycles and has traditionally cycled in Santiago because it is the most cost-effective transport mode; they mostly live in suburban districts. The other, new, higher-income group, consists of young professionals living in relatively central areas in Santiago. One participant characterized them as follows:

> *"The group of urban cyclists is very homogenous, young professionals with no children... there is an important number that have children and change the bicycle for a car." (Ignacio, 26, engineer)*

Participants were asked about their emotions towards their bicycles. Even though cycling had an emotional component for them, they (mostly) showed little emotional attachment to the bike itself. Controversially, the statement that riding a bicycle tells something about the user's personality was widely agreed:

> *"I do believe it says a lot about the person... it's not the same to see someone riding a Brompton, than someone on a mountain bike... the clothing also tells you something." (Emanuel, 41, architect)*

> *"Riding a bicycle provides status, although not an economic one but that of someone who is intelligent, who voluntarily took a smart decision and is delivering a socio-political message." (Alfredo, 44, engineer).*

> *"When I see someone riding a bicycle I see someone who is not lazy... I associate it to young professionals, but I don't think it gives me status, although when I see someone riding one of those colorful track bikes I think 'ok, that's an expensive one'..." (Michelle, 29, historian)*

In summary, the trend of (central) urban cycling in Santiago is highly driven by social symbolism and the willingness to belong to a certain group of people. The hypothesis of the experts, that imitation of other cyclists plays an important role, can generally be confirmed. However, the importance of the rational motives of cycling should be researched in more detail, for example the influence of good infrastructure as a necessary precondition.

3.3. Viennese Public Transport's Steady Rise: "Easy, it simply carries you and you don't have to concentrate on anything."

The continuous growth of public transport use is the major transportation trend in Vienna. Between 2001 and 2013, the modal share of public transport increased by 5% from 34% to 39%. Jointly, figures indicate a doubling of annual public transport card holders between 2005 and 2014 (+111% from 303,000 to 640,000 people), with a sharp increase by about 76% from 2011 to 2014. While in 2005 only 18.6% of the population owned an annual public transport card, this number almost doubled by 2014 (36.2%). Similarly, the number of passengers using modes of public transport rose from 747 million p.a. in 2005 to 900 million in 2013, an increase of 20% (MSW a n.d. & MSW 2014).

The experts consider the following as the main drivers of the increasing importance of public transport:[‡]

- The **reduction of the annual public transport** ticket price to €365 p.a., (representing symbolic €1 per day), established by the Green Party in 2012. It is seen as the main cause of the growth in public transport card holders from 2011 to 2014
- Parking-space management reduced the possibilities for parking private vehicles in the inner city.
- The experts interpret the general shift towards "green modes" as an expression of a shift in personal values and mobility patterns that can be observed in Central and Northern Europe. They state that slow shifts in behavior patterns are mainly caused by the young generation with new attitudes and basic values: Rather than having changed their behavior, they already grew up with the new behavior patterns.

In addition, the experts point towards particular negative side effects which were not intended but may also have been caused by successful policy strategies. In particular, the cheaper annual ticket for public transport has motivated many people to buy and use it, causing transport to reach capacity more often during peak hours and making the travel experience unsatisfying.

[‡] The experts take into consideration that the figures reported for the modal split in Vienna include only trips of Viennese citizens. However, there is a significant amount of commuter trips of people who work in Vienna but live outside the city. The experts state that if these trips were also counted the share of car trips would be dramatically higher. Lack of data did not allow for such an analysis in our study.

Based on socio-demographic characteristics, our interviewed persons belonged to two different status groups:

Target Group 1, composed of mainly young people (aged below 30) living in an urban environment and belonging to a better educated middle or upper class. They grew up with new mobility options and had not previously been accustomed to car ownership. Target Group 2 consisted of people who recently altered their mobility behavior following a life-changing situation. They mainly switched from cars to public transport after changing residential location.

Interviewees of Target Group 1 like using public transportation because of the well-developed network and low barriers, especially when owning an annual ticket.

> *"It is really convenient. You can always board if a bus, tram or train arrives. Everything happens quite spontaneously without much thinking about it."*

> *"Easy, it simply carries you and you don't have to concentrate on anything."*

For Target Group 1, **reliability** is one of the most important factors when using public transport. This statement is in line with their rational behavior concerning mobility choices. They frequently use **smartphone apps** such as "Qando" to get real-time information on schedules and departure times.

> *"The punctuality in Vienna is very good and there was never a problem with connections between means of transport. Everything works out as announced in the Qando app."*

The **time** factor appears to be very important, because **frequency**, **fast transport**, **punctuality**, **a minimum number of vehicle changes** and the **relation of travel time to transfers** were mentioned. The interviewees also do not want to change vehicles more than twice per trip to avoid waiting times.

> *"Routes with two interchanges are the limit."*

Negative aspects refer to the crowding during daily peak periods and vehicles' cleanliness:

> *"Peak hours in public transport are exhausting because of the crowds of people.[...] In Vienna, the U6 subway line is not great at all regarding cleanliness (especially in the evening)."*

Respondents from Target Group 2 had switched from cars to public transport as their main mode after moving from one residential area to another. As reasons they state that public transport is well established in Vienna and that parking fee and congestion make public transportation **faster and cheaper than cars**.

> *"Reasons for switching from car use to public transport are first the well-developed public transport network and second the parking fees and congestion etc. in consequence of which the public transport is faster and cheaper and the car does not pay off."*

Respondents further mention that Viennese public transport's **cost-performance** ratio is very good and its **network extensive**. Being able to **concentrate on other things** such as reading, phoning or listening to music while traveling is perceived favorably compared to driving.

Regularity, **cleanliness** and **time efficiency** are especially important for several participants. The interviewees agreed that cars are unnecessary in Vienna because of the other options to get around. City bikes and car-sharing were also mentioned as alternatives in areas where the public transport is unsatisfactory.

Summarized, Target Groups 1 and 2 identified some very similar motives and aspects influencing their mobility behavior. They agreed on regularity and time-related aspects as important factors. Additionally to the common factors such as frequency, cycle times, short waiting times, and a minimum of vehicle changes, 24-hour public transportation was a relevant criterion for the acceptance of the offered services. Only slight differences between the two groups exist regarding motivations. Both groups, despite their heterogeneous social composition, value the same positive things about Viennese public transport: good quality from an rational perspective.

3.4. Singapore's Costly Car Ownership – "If you want to date, owning a car makes it easier."

In Singapore, car use only slightly changed from 2004 to 2012 (41% to 43%); the infrastructure also saw no big changes in that period, while public transport (excluding taxis) slightly increased from 47% to 50% (LTA a n.d.).

Because the car-population growth rates are determined by the Vehicle Quota Scheme (VQS), the Certificate of Entitlement (COE) price serves as an indicator for the attractiveness of cars. After having dropped to (almost) zero during the economic crisis in 2009, the COE price for vehicles with a capacity of more than 1600cc climbed up to S$96,000 in January 2013. Consequently, car ownership has risen only slightly over recent years, whereas vehicle kilometers travelled has, by contrast, decreased by about 10% in the same period (VKT and Car Ownership: LTA b (n.d.), COE price: LTA c (n.d.)). The experts explain the rising car ownership and its relation to the high ownership cost as follows:

- Practical advantages of car ownership in terms of speed and accessibility. People consider cars superior to all other modes of transport because of their high average speed, even during peak hours.
- All experts generally confirm the symbolic value of cars, as well as their important role in the motorization of Singapore. Cars' high price tag makes car ownership even more desirable as it is considered a symbol of success.

> *"If you want to date, owning a car makes it easier."*

- Influence of car-based western life style: With incomes reaching the level of western countries, people want to try out that lifestyle.

> *"Owning a car shows you can afford it."*

Beside the motives explaining the high level of car-owning aspiration, the most important factors for car ownership and car usage in Singapore include income level, life cycle and residential location. Owning a car is mainly a question of financial capabilities, where those who can afford it try to get their hands on a license plate.

The experts also offered possible explanations why car ownership and usage are diverging: Cars' symbolic value may encourage individuals without sufficient need and resources to buy cars but only drive a little. Individuals, especially those who purchased cars mainly for their symbolic value, may use public transport for commuting, but private cars for other activities.

The in-depth interviews asked respondents for their main reasons to own a car, (trigger) events that influenced them to buy a car, and whether they see any symbolic value in cars.

All respondents shared the common view of owning a car mainly for **real life needs** (though the interviews were not always consistent with this). They named **family commitments** such as looking after aged parents, visiting them and ferrying them between home and clinics/hospitals, and, even more commonly, taking care of children and household needs.

> *"Currently, I have two children, and this means 2 strollers and a heavy baby bag. A typical family outing means my car is fully occupied with my wife, maid, two children on two car seats and myself. I cannot imagine taking a taxi with all these." (manager, male, 32)*

> *"You can say that the reason for getting a car was to take care of the elderly. […] you cannot expect them to stand under the hot sun and wait for a taxi." (technician, male, 48)*

Besides emphasizing cars' rational value, the respondents acknowledged the **symbolic value** attached to owning a car. For example, one interviewee mentioned the importance of **status**.

> *"I have a different 'status' and I definitely have to match up to my status. As a business man you are judged based on such assets that people can see. Like what car you drive and where you live." (businessman, male, 53)*

Cars' symbolic value may encourage people to own a car – without using it too much – when they have no real need or sufficient financial resources. One respondent talked about a low-income individual who bought a special "off-peak" car that has a lower price, but can only be driven on weekends.

> *"I admit that the 'envy factor' of owning a car is definitely present. After I got a car, I realized friends around me also wanted one. There was a friend that was only earning S$3,000 but ended up with a S$600-per-month loan for a red plate car [cars allowed to be driven only during 'off peak' period]. He lives very near his workplace and does not even drive to work. It was the status of having a car on weekends to drive around." (engineer, male, 30)*

The aspiration to own cars is also apparent in the view of a young professional considering owning a car in future. He sees driving as the most ideal transport mode, despite living near a MRT station and the high COE prices.

> *"But I will still get a weekend car, since during the weekends I will not be in the CBD area. It is not the top priority – like, if I were to choose between spending my pay on rent in the CBD area or getting a weekend car, it would definitely be the latter. With a car, everywhere is near but staying in the CBD does not mean that I would be near to all my destinations." (lawyer, male, 26)*

Overall, the study reveals cars' practical advantages that influence people to buying and use them over the alternatives. However, social-emotional motives also appear to be of high importance. Car ownership in Singapore appears highly status-driven, and this may increase even further with the rising ownership cost. Examples of people owning cars, but only driving them occasionally, are indications that ownership is the major factor in Singapore, although further investigation is needed here.

4. Summary, Discussion & Policy Relevance

4.1. Summary

This paper has discussed four case studies in light of mobility trends and their origins. Unsurprisingly, there is no general formula to describe why trends arise, but similarities exist and findings can be transferred if the context is considered. Our findings can be summarized as follows:

- In central Paris, non-motorized transport has become the main mode for trips; cycling forms one aspect of this trend. Cyclists heavily rely on the bicycle rental scheme Velib', appreciating its low cost and flexibility without the disadvantages of ownership.
- For Santiago, we researched the cycling boom in the city center and concluded that this trend is fostered by an urban elite that likewise wants to express themselves.
- For Singapore, we discussed the growing aspirations towards car ownership. We found out that this unbroken trend is highly driven by status and the willingness to show social class affiliation.
- For Vienna, we analyzed the constant rise of public transport. Our interpretation is that this trend is the result of a long-term process during which the car is continuously losing its attractiveness and people are choosing public transport based on rational decisions.

4.2. Discussion: Social-emotional and Rational motives

To cluster our analysis, we distinguished between social-emotional and rational motives in order to explain the reasons for behavior change. We found out that similarities arose across modes and cities at unexpected points, such as between cyclists in Santiago and car users in Singapore, or public transport users in Vienna and users relying on bike-sharing and NMT in Paris.

For Santiago's cyclists and Singapore's car users, social-emotional motives outweighed rational ones. For both groups, their mode of transport is a symbol of expression and even class connotation. For Singaporeans, the car symbolizes affiliation to a social class that can afford having a car, whilst in Santiago urban cyclists are perceived (or at least perceive themselves) as a new urban upper class. Both groups also choose the car or bike due to positive functional qualities like speed and flexibility, but these arguments appeared to be less strong then the social-emotional motives. Costs were of only minor importance in both cases, which is especially surprising for Singapore, considering the high costs for cars. Cars' high-price tag even makes them more desirable, confirming Dittmar's (1992) theory of material possession.

Looking at rational motives, they outweighed the social-emotional motives for public transport users in Vienna and Parisians relying on Velib' bike-sharing (and NMT for shorter distances), with Velib' essentially being a public mode. In Vienna, public transport users were driven by a rational choice, and named time-efficiency, reliability, punctuality, flexibility, comfort and cost-efficiency. In fact, the spectrum of motives proves they consider their choice the most reasonable one. In Paris, motives for using Velib' are similar: speed, cost, (spatial) freedom, flexibility, enhanced by

the ability to discover and experience the city by bike. Furthermore, the bike-sharing scheme was described as offering major advantages for users such as a low price and universal and flexible availability of public transport, while avoiding disadvantages private bike ownership would impose, like regular maintenance costs and the risk of theft or degradation.

Summed up, ownership appears to be key in explaining the presence of symbolic values. Rather than absolute cost, it is about relative value, like having a stylish bike or exclusive car. For users, the modes underlying such social-emotional trends are more than just a transportation mode with functional qualities: they are ends in themselves and a tool to communicate one's status. This also explains the pragmatic attitudes of public mode users in Vienna and Paris. Velib' exemplifies this particularly: using the same vehicle type as cyclists in Santiago, the pragmatic attitude of being on a public mode dominates. Consequently, ownership is an important factor in explaining why certain trends can be social-emotionally rooted while others tend to be more rational.

4.3. Policy Relevance

Although our focus has been on the case studies and without the intention to compare the cases, general findings can be derived that may be useful for policy makers.

The results clearly emphasize the utility of understanding personal reasons of mode choice, where our distinction between social-emotional and rational motives proved useful. Policies aimed at promoting certain modes should consider users' motives, to understand whether they might actually lead to the desired effect. A good example for this is Singapore, where policies trying to lessen car use by making them more expensive create a social counter-effect, raising the attractiveness of cars even further and the willingness to spend money on them. Although raising costs initially addresses the rational side, it goes on to motivate ownership and use in a much more social-emotional manner, one highly driven by status. In short, making cars become a luxury good makes them more desirable.

Taking this thought further, policies aiming to make cars less attractive should also place an emphasis on making people less emotionally involved, by restricting visible street parking or regulating access for bigger, more prestigious cars, for example. Conversely, campaigns addressing social-emotional motives in public transport could assist in making it a more attractive choice for status-seeking users.

Transferability is also limited with regards to the social-demographic situation and spatial context, as it for example turns out for Santiago. There, the cycling trend is visible in a particular area with a specific user composition. Expanding this trend to other areas may need to rely on other measures and tackle other motives.

4.4. Limitations

The explorative design of this study provides an overview of specific developments for selected case studies. The identified trends highlight changes in mobility behavior and the selected cities are excellent examples of notable developments. Our case-study approach allows for a detailed discussion of each case's specific developments and the underlying causes and drivers. The results are, however, only comparable to a certain degree, mainly due to being so highly context-dependent. They provide insights into selected developments inside a city, but may not stand for the city as a whole. Further research into the specific case studies is needed, especially to quantify our findings.

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