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Stakeholder involvement in transport:

What, how, why and with what impact?

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CONFERENCE BOOK OF ABSTRACTS

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ABSTRACTS

1

Development of a systems-thinking based participatory process evaluation format for practitioners in the field of transport

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Austrian government set the objective to reduce carbon emissions in the transport sector close to zero to achieve carbon neutrality by 2040. As part of their strategy to achieve this goal, the implementation of pilot action and research into their effectiveness is strongly encouraged, regarding for example flexible on-demand mobility services by the Austrian Ministry [1].

An evaluation of the process of the implementation of local mobility services can help identify barriers and driving forces and give information about HOW and WHY the process of the implementation proceeded. However, process evaluation is rarely conducted in transport. It is often perceived as an additional task without any added value for those who perform it [2]. Even when it is conducted, e.g. in funded research, we observed that most often, standardised templates are used that only provide superficial results, and do not elicit in-depth knowledge about driving forces and barriers and does hardly contribute to a learning process among the practitioners, who are involved in the evaluation.

The motivation for our research is therefore grounded in the necessity to change process evaluation, so it gains more "value" for practitioners and provides in-depth insights for future implementations and thus leads to an increased application in practice. We developed and tested an alternative approach to process evaluation: a systems-thinking-based participatory process evaluation workshop. That addresses the inclusion of different stakeholder perspectives upon the implementation process and provides a learning environment for stakeholders to reflect upon their actions. Systems thinking acts as an umbrella term for holistic approaches [3] and is used by us to elicit causal connections and interconnections of driving forces and barriers due to the consideration that people often hold causal assumptions about effects of e.g. policy intervention, but think of them in simple causal chains rather than networks [4]. We applied the approach in process evaluation workshops for four different pilot projects as part of an Austrian flagship project on integrated mobility solutions.

The workshops provided rich visual results and understanding about driving forces, barriers and their interconnectedness among the participants. For example, a reinforcing feedback loop was reported between the political standing of decision-makers, their willingness to implement innovative mobility solutions and taking risks and the speed of successful implementation, again improving the political standing. Participants expressed high satisfaction with the results of the workshops although each workshop lasted about 4 hours. We therefore posit the systems-thinking based process evaluation to be a valuable approach to support learning for the implementation of local mobility projects in the future. Further analysis will be conducted based on upcoming qualitative interviews.

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2

Integrating scenario planning and policy packaging for urban mobility strategies

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Transport projects tend to be heavy both in terms of investments they require and the impacts they generate. Formal evaluation, aiming to help informed and logical decision making, is therefore an established part of the transport planning practice. Several methods exist, most notably cost-benefit analysis (CBA) and multi-criteria analysis (MCA). In this paper, we focus on two fundamental and often-occurring challenges that these methods do not address.
The first one is deep uncertainty. In longer-term projects, events beyond the control of the decision maker might be crucial for whether a project is successful or not. The second one is the lack of problem structure. Standard decision-making methods are appropriate for problems with set a of discrete, mutually exclusive solutions, 'waiting to be implemented'. However, such 'neat' problems are rare and the real difficulty often lies not in the choice between different solutions, but rather in the combination of measures, which can often be done in countless ways. For both challenges, specific approaches have been developed, respectively scenario planning, and policy packaging. In this paper we propose a formal, integrated approach addressing the above questions combing scenario planning and policy packaging.
For scenario planning, we build on Cross-Impact Balance Analysis (CIB). This technique is used to construct consistent scenarios out of multiple factors of uncertainty (e.g. the economy), which, in turn, can be in different 'states' (e.g. boom or crisis). Scenarios consist of different combinations of factors and states. CIB has been used either for assessing combinations of external variables (i.e., factors of uncertainty), over which the decision maker has no control, or for assessing combinations of internal (policy) variables. In this paper, we propose a new method based on CIB principles to incorporate the interactions of both external and internal variables. This requires a slightly different approach for indicating mutual relations between variables in the CIB matrix, compared to when only external variables are evaluated. For assessing the relationships between external and internal variables, we propose a scale in terms adequacy: In the case of event x, how adequate is measure y?
Through the combination of both external and internal variables, we are able to identify 1) what the most adequate set of measures is in a particular scenario (optimal strategy); 2) what the most adequate set of measures is in the face of the full spectrum of possible events (robust strategy)?
To demonstrate and test the method in a participatory manner, we develop scenario-strategies for the future of urban mobility in Brussels, Belgium, in 2050, with CIB. Next, we identify, together with stakeholders, which policy areas the city should prioritize. Then, we proceed with the adequacy assessment of the different policy variables by experts, and develop scenario-strategies that adequately respond to the four exploratory scenarios developed in the first stage of the research.
This novel approach can be a first step in bridging the gap that currently exists between transport planning and scenario building, by providing a structured methodology to develop policy packages after an exploratory scenario building exercise.

ABSTRACTS

3

Involving multiple views in the future of transport; challenges of opening up

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Transport planners and decision makers are continuously confronted with uncertain futures.
To effectively address this uncertainty, it is essential to incorporate multiple views on the future of transport and its infrastructure. Hence, planning and decision making in uncertain times requires an approach that facilitates learning across alternative framings of the problem and considers a diversity of stakeholder preferences. This resembles a wider trend of 'opening up' strategy processes; an emerging phenomenon in organizational responses to complex and fast changing environments which is becoming increasingly prevalent in organizational adaptions to dynamic and rapidly changing environments. In the Business Administration literature, the concept of "open strategizing" is expected to facilitate increased transparency and inclusion regarding strategic issues, involving both internal and external stakeholders. However, it is argued that bringing together multiple internal and external interests in strategic planning processes creates tensions and dilemmas that constrain strategy forming (Hautz et al., 2017). According to Hautz et al. (2017), these include that the process gets too lengthy and costly due to involving a wide range of participants, leading to a dilemma of process. Participants may also feel frustrated when their inputs are not acknowledged, contributing to a dilemma of commitment. Additionally, excessive information reduces understanding and decreases trust, creating a dilemma of disclosure. Furthermore, participating in strategy making puts pressure on participants, posing a dilemma of empowerment. Lastly, unmet expectations for increased openness may diminish the process's credibility, resulting in "cheap talk" or "open washing, representing a dilemma of escalation.
Although public planning literature advocates more focus on stakeholders and opening up strategy processes (Hansen et al., 2022), there remains a lack of understanding how these tensions and dilemmas are 'managed' (Hautz et al., 2017). These insights are particularly crucial for transport planners, as the "Action Plan for the Future of Mobility in Europe" (Mobility4EU) visions a future where 'co-creation and participative planning are common' (Mobility4E, D4.4, 2018) while in transport planning practices, little evidence is found of 'engaging a diversity of perspectives' (Linovski and Baker, 2023). Therefore, the aim of this paper is to explore how transport planners manage the dilemmas that occur during open planning processes. To that purpose, we will conduct an explorative nested case study analysis of the Dutch 2023 Multi-Year Program for Infrastructure, Spatial Planning, and Transport (MIRT). We will analyze 16 MIRT cases in their early strategizing process stage (i.e., the explorative study stage). Data are collected from project websites, public documents, and interviews.

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ABSTRACTS

4

Making Making sustainable mobility political risks escapable

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Context
The communication takes part in emerging academic debate that emanated among European scholars with interest in disciplines such as transition pathways, sustainable mobility or participative planning. They are reporting a myriad of local ideological wars and «transition backlashes» (Pel 2021) and are sharing a growing awareness concerning the rising of a contentious mobility politics and policies.

Hypothesis
I borrow to Aradau the notion of «mobility political grammar» (Aradau 2016) and her interest in security. I argue that local leaders, whatever political orientation, are much more cautious than before with the "local mobility question". It is now a very risky deal in terms of social and media exposure, impact reliability, budget and technical availability. Hence they connect the promising load of innovation that is intrinsic to mobilities (Van Wee et al. 2022) with a more prudential approach. I postulate that this "cognitive technology" of policy risk evaluation is presently changing the whole sustainable mobility system.

Method
I use CDA (Hickman and Hannigan 2022) to study formulation and legitimation processes (Sareen 2020) in a corpus made of of direct interviews and social networks extracts. The survey covers the 2023-2024 political alternance in Valencia and Barcelona core and suburban localities. Right and far-right coalitions cancel or delay the achievements of former "Municipalities of change" (Baron 2019). Socialist municipalities embrace other subtle ways to escape risk. I develop a grid including projects at various steps of development and addressed through their ideological corpus (15mn city Moreno et al. 2021), planning dimensions (mobility schemes, LEZ...) and infrastructural materiality (bike-lanes, etc).

Results of the research
The survey shows how south european leaders, whatever sensibility, the new political cycle as a "truth moment". They re-traduce, displace and reinsert mobility in a broader semiotical system, de-connecting and re-connecting it from signifiers such as democracy, freedom, diversity. This result is not only demonstrating the importance of discourse analysis in transport policies but it is in line with an ongoing effort to conceptualize the securisation of mobility pathways.

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5

Participatory appraisal in the face of uncertainty

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In large transport projects, decision making is traditionally aided by appraisal methods intended to assess the societal desirability of the project. However, there is growing awareness that in decision making, it is not only the desirability that counts, but also the extent to which the project is adequate in dealing with deep future uncertainties, which led to the increasing popularity of scenario methods. While combing scenario and appraisal methods seems an obvious step, combing existing methods has either moral-ethical or logical limitations. In this contribution we present an appraisal method, stakeholder-based impact scoring (SIS), that is intended to overcome these limitations.

The currently most used appraisal methods are cost-benefit analysis (CBA) and multi-criteria analysis (MCA). The moral-ethical limitation of CBA expressing societal desirability purely in terms of economic growth are increasingly acknowledged. As alternative, methods from the MCA family are typically proposed, which are more appropriate in participatory planning procedures when one assumes that appraisal is never fully neutral but always partly subjective and political. In MCA, the options are not valued with absolute metrics, but through comparing the options against one another, leading to a ranking of options prescribing a choice. The logical issue here is that scenarios cannot be 'chosen' as they consist of uncertainties which might or might not happen. Also, a ranking based on comparisons requires a complete and mutually exclusive set of options, which is rarely reflects the 'messiness' of real-world transport projects.

SIS, therefore, is not intended to find the 'best' option or scenario, but to elicit the most important trade-offs between positive and negative consequences for different stakeholders. Hereby, the intention is to keep the distinction transparent between on the one hand technical input, such as the performance of the options with regard to impact factors, and on the other hand subjective input, such as the selection and weight of these impact factors.

Algorithmically, SIS differs from MCA by not producing a ranking and not requiring a complete set of mutually exclusive options. Instead, it results in impact scores which can be both positive and negative, which can easily be broken down into stakeholder or factor-specific scores. This type of output is arguable helpful where the goal is not to select or prioritise options, but to anticipate or mitigate options or scenarios.

We demonstrate the algorithm, visualisations and its purpose-built software of SIS with a recent use case of defining a mobility-as-a-service strategy for the Belgian government, highlighting the positive and negative consequences of different options in a context of high uncertainty.

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Problematisation, discourse and scenarios

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The transport systems, the shape of the built environment and the use of street spaces in contemporary cities and urban areas are a manifestation of what is regarded as 'normal' in different contexts. This reflects what counts as 'true' for transport and travel behaviours in particular contexts. In many cities, it is normalised to consume ever increasing levels of individual mobility, with travel hugely dominated by car, yet for this to be highly problematic in environmental and social terms. Elsewhere, there may be more progressive approaches taken by institutions, or perhaps more critical debate and contestation by the public and other actors. Sometimes, there are great efforts to build extensive public transport systems, to provide inexpensive access to public transport, and to develop high quality public space, pedestrian and cycle networks. But, the current order, in transport planning, in terms of the procedures available, the projects developed, and the travel behaviours that result, is simply the sorting of priorities (Foucault, 1966) – and it is argued that this sorting of priorities in transport is misplaced.

Further, there is often no consensus over city strategies for transport planning, indeed many of the more effective possibilities for projects remain undiscussed in many contexts. Interaction between different groups is not always cooperative, and assumptions of shared values and aspirations are misplaced (Simmie, 1974). Very different interpretations are given even in understanding generally-accepted, but fuzzy, concepts such as sustainability and sustainable urban mobility. The same 'objective reality' is often interpreted in different ways and, particularly, issues of appropriation are poorly understood, e.g. who uses the transport system, or not, including how is it experienced. Markedly different strategies are followed and, ultimately, the great public policy challenges of climate change and social equity are not been achieved sufficiently in transport. This is also the case in scenario analysis in transport, where expert-led scenarios are developed, sometimes with very limited participatory mechanisms. Often there is very little relevance to projects that are actually implemented and the scenarios remain 'unused' in practice.

This paper seeks to develop an approach that combines discourse analysis with scenario analysis, to help understand the different possibilities that might be on offer for transport strategies and also the reaction to new projects by the public. There are two key stages (Hickman, 2024): first, using discourse analysis, there is assessment of concepts such as discursive practice, discursive formation, discursive meaning, history, truth, discontinuity, power and ethics, in relation to particular case studies. This is discussed using a city case study (Low Traffic Neighbourhood, LTN21, West London) to demonstrate the approach taken to transport planning, the procedures followed, and the resulting impacts. Second, this analysis of the current status of transport can be used as an input to the likely scenarios for future transport. This will lead to more robust strategies developed in transport planning practice.

7

Transit-Oriented Development: high frequency transit services and prior investment in transit versus Car-dependent development

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Modern rapid transit systems and services can play a critical role in shaping sustainable urban development. Transit-Oriented Development (TOD) is viewed in many countries as a way of improving the sustainability of urban regeneration and new urban development. Six criteria (Density; Diversity; Design; Distance; Destination Accessibility; Demand Management) have been previously identified as essential TOD attributes.
This research examines the role of rapid transit service frequency and the timing of transit capital investment in delivering successful TOD in a range of cities. High frequency transit services are identified as an essential seventh requirement for successful TOD, as they offer a realistic alternative choice to the private car to access a range of activity sites.
There is often a serious mismatch between spatial planning policies and the timing and scope of new investment in rapid transit. Private car use becomes embedded and is hard to shift unless transit investment occurs prior to urban regeneration and new urban development. Car-dependent development is environmentally unsustainable, but is often the norm.

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8

Urban roads: enablers or barriers to walking? Insights from Kigali, Rwanda

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Roads are an extremely versatile type of transport infrastructure as they cater for both people and freight transport and can accommodate a broad range of transport modes. This multi-purpose character makes roads a particularly important in the Global South (GS), as a single road investment can bring large benefits to society. While all countries in the Global North (GN) have extensive road systems, countries in the Global South and especially in Sub-Saharan Africa (SSA) tend to have a limited network of paved roads in both rural and urban areas. Governments are addressing this through large investments in upgrading existing and building new roads. When funds allow, these roads are designed to cater for the expected increase in motorized traffic, and when funds are limited road designs are tuned down by reducing or removing facilities for cyclists and pedestrians. This bias in road design, with a heavy focus on motorized traffic, is at odds with the modal split statistics for cities in SSA, where a large proportion of the population walk. It is against this backdrop that this study seeks to assess how distinct road designs affect walking and thus impacts the mobility, accessibility, livelihoods, and social interactions of urban residents living along roads. To attend this objective, we surveyed two carefully selected (arterial) roads (Gatsata-Nyabugogo and Rwandex-Sonatube) with distinct designs using a checklist and conducted 30 interviews with residents living in close proximity to these roads, selected using the snowball sampling technique in Kigali, Rwanda. We found that they exist both basic road designs with majority having basic walking facilities such as sidewalks, zebra crossings, and streetlights and a good number of modern roads in line with current design standards in Kigali, enhancing mode separation with sidewalks, bicycle lanes, and carriageways for motorised modes. Further findings revealed that walking is dominant in the city with most walking destinations between 5 – 30 minutes. While the existing road design elements on the one hand are seen as walking enablers, they are on the other hand seen as barriers to walking. However, most respondents are positive about mode separation of recent road design but call for enhance walking facilities. Yet, they also see motorisation as the future of transport. We therefore recommend more research on this topic in other African cities described as ‘unwalkable’ and a shift from the ‘stroads’ (right-of-way that tries to function both as a street and a road yet fails miserably in both functions) to more inclusive road designs.

9

Using a game-based approach to involve stakeholders to explore drones in logistics

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The UK Government is exploring the integration of drones into logistics. The public is disengaged and challenged to understand the potential implications of a technology that are not visible beyond a few trials. Existing research has focused on common themes such as privacy and safety, using polls or surveys, rather than exploring what people are comfortable with and how it may impact their local settings. There is a need to provide the public with some contextualisation about logistic drones and their operational parameters by developing tools that facilitate exposure to real-world logistic drone scenarios and a space to engage in more informed debate about a possible transport future.

Participatory approaches especially in simulated environments are useful to involve stakeholders in dialogue, and serious games have the advantage of engaging a diverse audience. Here a location-based board game has been developed and deployed, providing a platform for stakeholders to collectively explore the implications of the possible future use of delivery drones in their communities. The board game introduces participants to operational parameters such as ground risk and energy consumption through gameplay. Questions embedded within the game aim to spark dialogue and encourage social learning among players.

Ten game sessions with a total of 67 participants have been recorded. The findings demonstrate how gameplay can stimulate provocative discussion between participants. By plotting scenario-based routes participants were able to envisage drone flight paths and airspace control issues, whilst developing an awareness of the interrelationship between route, risk, and energy. Participants reflected on contentious issues and uncertainties related to drone regulations including discussion about landing and take-off sites, where drones might be permitted to fly, with some collective agreement around potential impacts on intrusion. Participants reflected on safety implications, raising concerns such as drone collisions revealing a willingness to compromise on risk if the flight was for medical deliveries or emergencies. Participants questioned the efficiency of delivery by drones by drawing comparisons to other modes of transport. Despite varying viewpoints, there was a consensus on the need to develop regulations with careful consideration of the societal impacts.

The gameplay provided a mechanism to engage a general audience in discussion, revealing diverse and more subjective views on this potential transport future. This deeper understanding can contribute to policy development whilst supporting a shift away from the deficit model where technical understandings of impacts and benefits dominate. This paper appraises the role of serious games in exploring a potential transport future with a general audience as, part of stakeholder engagement.

10

2050 Climate-friendly Mobility in Cities

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This paper gives an overview of major results and the work process in the Interreg Europe project "2050 Climate-friendly Mobility in Cities (2050 CliMobCity)". The project is about developing policies to reduce CO2e emissions emitted by motorised vehicles in the city. Many cities have ambitious climate goals, like achieving climate neutrality in 2050 or earlier. Many of the same cities, however, are uncertain about how the mobility should change in order to reduce CO2e emissions to the levels of their aims. As the spatial setting of a city affects the sustainability of mobility the question includes: how could the urban structure change to support climate-friendly mobility? These questions were found relevant by what became the project partners: the municipalities Bydgoszcz, Leipzig, Plymouth and Thessaloniki and the knowledge organisations Potsdam Institute for Climate Impact Research (PIK) and Delft University of Technology (TUD), the latter being the initiator of the project and the project leader. The project started in 1 August 2019 and ended 31 July 2023.
The "2050" in the project name is not a binding year, but to emphasize that the project focusses on the long term and big picture.

Interreg Europe projects are about interregional learning. The project's centre of interregional learning were the so-called demonstrations, one per partner city. Each city learned from its own demonstration and from those of the other partner cities.
In these demonstrations each city defined one or more explorative measure packages and forecasted the corresponding change of mobility. The forecast results served as input for PIK to analyse the expected CO2e reduction. In addition TUD conducted a brief literature review to see which additional CO2e reduction may be expected from novel concepts of mobility like shared mobility, micromobility, and the use of mobility hubs, and articulated promising directions for future measure packages.
Each partner city discussed the content of measure packages and their impacts with different municipal departments and with stakeholders in the region, and provided feedback to the project. This partly included evaluating lessons to be learned from the demonstrations for the city's future strategic mobility and city planning.
Some overarching findings of the demonstrations were that the mobility and powertrain measure packages do not sufficiently respond to the cities' reduction aims, neither in the business-as-usual scenarios, nor in the CliMobCity scenarios, even if all electricity production was green; in some cities the reduction is rather halfway.

Besides initiating policy change the project has some scientific contributions. Most important is adding four new cases to the knowledge building of (low carbon) mobility. Within this there were special findings, such as the mobility impact of the new metro system in Thessaloniki, or in Bydgoszcz the mobility effects of reurbanisation to the central city parts combined with substantial increases of public transport frequencies there, instead of facilitating the trend wise suburbanisation by extending networks. Furthermore there were some experiments and numerous small findings, typical for the patchwork of challenges and solutions in any transition trajectory, also valuable for science.

11

A decision-supportive framework for policies towards sustainable transport

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The paradigm of Sustainable Transport (ST) has emerged to address a multitude of critical challenges inherent in the development of the transport system that encompasses a network of elements related to transport such as travelers, transport infrastructure, and mobility services, that interact to produce the demand, supply, and accessibility within a given area. Despite its widespread adoption, the concept has faced limited success in its implementation. Previous research has proposed conceptual models and frameworks to support the operationalization of the concept. However, practical application remains challenging, particularly for practitioners, largely due to the abstraction and expansive nature of the concept.

Additionally, the slow progress in transitioning toward sustainable transport is influenced by factors, including the complexity of the transformation of the existing physical infrastructure and related mobility services, the dynamics nature of actor networks involved, and many uncertainties surrounding external developments and the way these developments and policies affect the transport system dynamics and outcomes.

In this presentation, we proposed a decision-making approach and process designed to address the complexity and uncertainty inherent in transitioning towards sustainable transport systems. We conceptualize the transport system as a system within systems and highlight the four challenges based on the existing literature, which include
• Challenge 1 Lack of clear policy orientation, absence of fixed goals, and complex trade-offs.
• Challenge 2 Complexity in considering sustainable transport system as a system within systems;
• Challenge 3 Involvement of heterogeneous actors leading to uncertainties on perspectives, priority toward issues faced, and preferred solutions;
• Challenge 4: Influence of external forces beyond the transport system on its dynamics and outcomes

To deal with these challenges, we propose an overarching approach that integrates System thinking and Decision Making under Deep Uncertainty. This approach aims to provide a systematic process for handling complexity and (deep) uncertainty in sustainable transport planning. We demonstrate the application of the process through a case study in Nijmegen City, the Netherlands, to illustrate its practicality. We discuss the process itself, its real-world applications, and potential avenues for future development and refinement. The comprehensive framework that addresses the multifaceted challenges associated with transitioning towards sustainable transport provides valuable contributions to the field of sustainable transport planning.

12

An Analysis of Groningen's Zero-Emission Zone and Stakeholder Impacts

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In the 2019 Dutch climate agreement, it was agreed that by 2025, there will be at least 30 cities where a zero-emission zone for urban logistics is implemented, an important step towards the goal of achieving completely emissions-free road traffic by 2050. One of the cities implementing such a zone is Groningen. The Dutch government estimated that implementing these zero-emission zones will reduce CO2 emissions by approximately 1 megaton per year by 2030.

Although the overall impact of establishing zero-emission zones nationwide is projected, the specific local implications remain uncertain. This uncertainty stems from variables such as the zone's dimensions, the geographical features of the urban area, the composition of the vehicle fleet, and the behaviors of actors within the urban freight transport network (i.e., retailers, shippers, carriers, transport service providers). As until now, few zero-emission zones have been implemented worldwide, there is little insight into how actors will respond to such a policy measure. Will actors change their vehicle fleet to electric vehicles, will they use consolidation facilities and avoid going into the city center, or start collaborating with other actors and share vehicles? There are several potential behavioral responses to a zero-emission zone, and understanding these is crucial to estimate the broader outcomes.

This research first examines the effect of Groningen’s zero-emission zone on the behavior of local actors involved in the delivery of goods and services, and then the succeeding impact on emission levels and distances driven in and around the city. First, we sought to identify and analyze the reactions of local actors through in-depth interviews with twenty diverse actors from various logistics segments (e.g., parcel delivery, construction, and food logistics) who will experience the impact of the zero-emission zone and will have to change their vehicle fleet or transportation process.

Initial findings from the interviews indicate that most actors intend to switch to electric vehicles, or have already done so. Few actors plan to start using a consolidation center. Some actors—in the construction sector—expect to outsource transport to their suppliers. A worrying outcome is that some actors—small companies and self-employed—due to financial constraints may avoid the zero-emission zone entirely. This reveals a paradox within the urban freight ecosystem, where the pursuit of environmental sustainability might inadvertently propagate social inequities.

The next step in our study is to use these insights as input into a multi-agent simulation model that was developed in a previous study for the city of Rotterdam. By applying the empirical insights from the interviews in this model, we aim to provide a more accurate estimation of the effect of a zero-emission zone on vehicle kilometers traveled and emission levels in- and outside the zone. Hereby, we aim to shed light on the challenges and outcomes of Groningen's journey towards zero-emission urban freight transport, providing a roadmap for other cities embarking on similar paths. In particular, we hope that this study will inform future policy decisions by unpacking the perspectives of different actors towards key policy changes.

13

Bicycle-Oriented Classification of Transit Stations: A Comprehensive Framework for the Development of TOD Typologies

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To support the implementation of transit-oriented development (TOD) in different cultural, political, and geographic contexts, researchers and planners increasingly use TOD typologies. This diagnostic planning tool clusters transit stations together based on their degree of similarity, by assessing the state of transport and land use, and accordingly, make targeted recommendations to enhance future stations and neighbourhood development. Since 2009, much methodological progress has been made to support the development of TOD typologies (e.g., development of new indicators, use of different clustering methods, proposition of different criteria for prioritizing interventions). While TOD typologies are meant to be transferable across contexts, authors typically develop TOD typologies as specific cases of study, without demonstrating how they could be transferred to another distinct geographic context.

This paper sets out to determine which factors need to be considered when applying a TOD typology tool to any given region. To do so, this study builds on a bicycle-oriented TOD typology tool developed for the Montreal region (Robillard, Boisjoly, & van Lierop, 2023). It then details the process of adapting this existing methodology to another context: Rotterdam (Netherlands). Montreal and Rotterdam were selected as case cities to assess the transferability of a TOD typology tool between two cities in an industrialized western context with completely distinct mobility contexts and cultures; specifically, Montreal's cycling infrastructure is much less developed compared to that of Rotterdam. The proposed TOD typology tool evaluates the bikeability around transit stations through a series of indicators related to the cycling environment and other traditional indicators related to land use, transportation, and walkability. The transfer results in two distinct typologies, clustering stations mainly according to their bikeability, within the context of their respective city.

The findings of the study result in a conceptual framework to guide the development of TOD typologies in diverse contexts, based on (i) a comprehensive review of the relevant literature, and (ii) a demonstration of an application of a bicycle-oriented TOD typology to various contexts. The framework is composed of five steps and can serve as a practitioner's guide to develop or adapt TOD typology tools to various contexts. First, the identification of the study area consists of: selecting the transit stations to be included in the classification (e.g., metro stations for a local scale, train stations for regional/national scale), and defining the research or planning objectives underlying the development of the typology (e.g., supporting bicycle as a feeder mode to transit, extending transit network and use, adjusting transit system to rapid growth of cities). Next, TOD indicators and catchment area are specified (e.g., circular or network buffer around stations, selection of distance based on the mode of transportation). This is followed by the selection of the classification methods (e.g., selection of the appropriate clustering method according to data format and size), the presentation of the clustering results, and a discussion on planning implications. The proposed framework enhances the accessibility of presented planning tool for planners and practitioners by fostering the development and application of TOD typology in practice.

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Citizens' ambition to reduce CO2 emissions in the passenger transport sector

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The aim of this study is to quantify the ambition of individual citizens to reduce greenhouse gas emissions in the transport (passenger) sector. We use a novel format of a policy choice experiment, in which participants were able to choose their preferred policy bundle with the aim to mitigate CO2 emissions. 57\% of respondents achieve CO2 emission reductions with their bundle of policies that would ensure compliance with the 2030 climate targets for the Austrian passenger transport sector. We further find that socio-demographic variables have a relatively small explanatory role in terms of CO2 emission reductions achieved. In contrast, current mobility behavior has a more substantial impact, with car usage being associated with lower ambition, and the use of alternative modes (in particular public transport) with higher ambition, thus underlining the role of egocentric considerations. The strongest group of explanatory variables are attitudes towards climate change and to some extent also political values, even after controlling for socioeconomic and mobility-related variables. Our findings on the determinants of climate ambition can generally be useful to policy makers, such as for providing more targeted information to increase the acceptability of the proposed policies. This paper is to our knowledge the first that shows how ambitious citizens are when choosing bundles of policies aimed at reducing CO2 emissions in the transport (passenger) sector. More generally, we are not aware of other studies that let citizens choose their own policy bundles among such a wide set of different policies and corresponding intensities (here: 32 million), while also being provided with information on the impacts of their policy choices (not only in terms of CO2 emissions, but also in terms of other societal and private impacts).

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Connectivity and Accessibility Approaches to Network Robustness: The Allocation of Mobility Hubs Through A Multicriteria Analysis

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Bike-sharing systems are attracting considerable interest in the literature for their potential key role in encouraging the transition from car-based private transport to more sustainable mobility, particularly in the urban context. The success rate of bike-sharing schemes depends on many factors, including demographics, morphology, and service design. When designing a bike-sharing service, one of the first issues that arise is where to locate the bike stations.

The objective of this paper is to propose a new location model for bike stations, based not only on spatial economic factors but also on factors related to the robustness of the urban public transport network. Such model can be applied to a set of feasible alternative sites (bike-less public transport stops) where to install bike-sharing docks. The hypothesis behind this choice is that, given the complementarity between public and shared transport, implementing bike-sharing stations near public transport stops would increase the integration between the two modes, and consequently the robustness of the entire network.

Our aim is to guide decisionmakers in ranking these alternative sites. Since this is an optimization problem, we use a mix of the Analytic Hierarchy Process (AHP) and multi-criteria analysis (MCA) to identify the most suitable locations for new bike-sharing stations. We perform our analysis: a) by considering the criteria derived from the literature, such as proximity to points of interest (school buildings, green areas, tourism areas, and entertainment/leisure facilities), socio-demographic characteristics (population density, employment rate, income distribution) and area pollution rates (Bahadori et al., 2021); and b) by adding a family of network-based criteria in order to explore the robustness of public transport networks.

In this framework, it should be noted that the novelty of this work is the inclusion – in the location choice process – of transport network robustness, a variable that has been rarely studied in the bike-sharing literature. Robustness, defined as the ability of a transport network to maintain its functionality under disruptions or failures, is a desirable feature for transport networks, which can be enhanced by bike sharing, as the latter provides an economical alternative to public transport when it presents unexpected disruptions. To include robustness in our analysis, we use metrics involving both structural characteristics (network properties and travel time) and user demand (Zhang et al., 2019).

To achieve our goal, we employ AHP, a method grounded in mathematical and psychological principles that offers a systematic approach to handling intricate decision-making scenarios through pairwise comparisons (Saaty, 2008). This process employs opinions from experts to establish hierarchies of importance, ensuring a comprehensive and balanced evaluation. In this paper, we develop a scenario for MCA based on the answers from a questionnaire addressed to a group of experts on sustainable mobility.

To illustrate our approach, we apply it to some suburban districts in the city of Munich, Germany. The emerging results are based on the data collection process from the questionnaire delivered to stakeholders. This case study represents a prototype for further applications to different cities.

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Corporate Social Responsibility Reporting: An Untapped Potential for Promoting Sustainable Employee Mobility?

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Every workplace has an explicit or implicit transportation policy with respect to its employee's mobility. Whether workplace transportation policies are officially managed or not, employer's policies regarding parking provision, travel allowances and other transport-related financial or non-financial benefits affect employee transport-related decisions, workforce selection, equality of opportunities, and the environment. Our study delves into the question of an employer's responsibility towards the environmental and social impacts of their employee mobility through the realm of corporate social responsibility (CSR).

For this purpose, we study both CSR reporting frameworks and company CSR reports.
To determine to what extent reporting frameworks expect employers to address employee mobility, we analyzed 29 leading sustainability reporting frameworks, using document analysis methods. Included in the selection are leading frameworks like Global Reporting Initiative (GRI), Carbon Disclosure Project (CDP), UN Global Compact, and proposed regulations in the EU and US. Our findings reveal that the majority of frameworks (66%) do not address employee mobility in their reporting requirements. Among those that do (34%), their focus is notably limited, primarily centered on GHG emissions calculations using the GHG protocol's methodology, a practice we criticize on both practical and normative grounds when it comes to business travel and commuting calculation. Only two sustainability reporting frameworks emphasize employer responsibility for preventing transport injuries as part of workforce health and safety management. None of the frameworks mandate reporting on efforts to create an accessible workplace for all potential employees, regardless of abilities or car ownership. The issue of equal opportunities for workforce appears in various reporting frameworks, including the proposed EU regulation (ESRS), so this finding is somewhat surprising.

We subsequently explored to what extent workplaces take up the employee mobility as part of their corporate social responsibility commitments. To answer this question, we selected a sample of 30 leading companies worldwide and examined to what extent they are committed to promote sustainable employee transportation, using companies' sustainability reports for the year 2022. Our findings suggest that most companies report on employee mobility according to accepted sustainability reporting frameworks, most notably the Global Reporting Initiative (GRI), Greenhouse Gas (GHG) Protocol and Science Based Target initiative (SBTi). In line with these frameworks, employee transportation is perceived primarily through an environmental lens, with a focus on GHG emissions calculation and reporting. Few employers report explicitly on their environmental goals or on efforts to actually reduce GHG emissions from employee transportation. Likewise, few companies report on transport-related injury, while social aspects are ignored.

We thus conclude that two key stakeholders - standard-setters and employers - do not tap the potential of (emerging) CSR practices in pushing for sustainable transportation practices of employees. We suggest expanding sustainability reporting frameworks to account for employee transportation. Such adjusted frameworks may help closing the gap between the extensive academic knowledge on ways to encourage sustainable employee transportation, and current management policies. By adopting such a broader approach for employee mobility, sustainability reporting frameworks can be used as a tool for behavioural change and leveraging of a less car-dependent society.

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Driving Decarbonization: Stakeholder Engagement Insights from an Alpine Case Study on Long-Distance Mobility as a Service (MaaS) along Motorways

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Mobility-as-a-Service (MaaS) integrates various transportation modes through a digital interface, customizing mobility to individual needs. MaaS is often associated with short distances and urban settings, but its potential applicability to long-distance travel is increasingly debated. Within this context, this paper explores the contribution of long-distance MaaS (LDM) to the decarbonization of motorways. It situates LDM within broader digital development strategies, thereby facilitating the realization of the long-contemplated shift from ownership to usership.

The study commences with a literature review, exploring user and market dynamics that influence the sustainability and efficacy of LDM. The review focuses on the structural nuances of stakeholders and delineates favorable policy conditions conducive to reducing private mobility. Emphasis is also placed on digital aspects, examining how Intelligent Transport Systems (ITS) and Connected Cooperative Automated Mobility (CCAM) alter travel behavior and, consequently, transport impacts.

Then, the study conducts a scenario analysis, projecting future travel demand within the framework of digital and governance innovation schemes. The analysis underscores the potential of LDM under different conditions, evaluating the impacts of policies that could be advocated by relevant authorities and stakeholders. Scenarios are designed to estimate the extent to which LDM can be promoted as an alternative to driving and to assess the consequent decarbonization potential.

A case study is presented for the Brenner Motorway in Italy. This contextualizes the scenarios within an ongoing digital transformation strategy of the corridor and explores the interplay between travel choices and stakeholders' action, as well as user inclinations toward shifting to shared and public alternatives. By integrating stakeholder efforts for decarbonization and implications for competitive infrastructures and services (i.e., railways, public transport, and conventional roads), the analysis is fine-tuned to the local context while maintaining transferability to analogous situations.

Transport digitalization is indeed expected to disrupt the status quo, while environmental and social sustainability become increasingly urgent. In this regard, this research contributes to a young body of literature on LDM, focusing on environmental goals and on the role of public and private mobility stakeholders, and providing a forward-looking perspective on digital innovations in transport. Within digital innovation trends anticipated to unfold on European roads in the coming decades, the scenario analysis sheds light on the policy conditions and extent to which effective stakeholder engagement and high-quality decision-making can yield carbon emissions reductions. Quantitative insights derived from the analysis delineate the determinants of decarbonization, focusing on the potential of LDM. Results offer guidance for policymakers, authorities, infrastructure managers, and transport service providers, aiding in strategic decisions to ensure system performance retention and the contextual attainment of decarbonization goals.

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Exploring the potential of demand responsive transport in Vienna City: the roles of driving experience and satisfaction with public transport services

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The car-dominant mobility behavior is still a big issue leading to a big list of externalities. Addressing car-dominant mobility proves challenging, particularly when public transport (PT) fails to meet passenger expectations. Unstable travel demand hinders PT providers from serving people efficiently through fixed routes in both time and space. In response to this challenge, demand-responsive transport (DRT) has been introduced to bridge the transportation service gap in communities with limited PT accessibility. DRT operates on the concept of flexible routes, allowing services to be tailored based on the spatial and temporal features of passengers' travels, bundling them efficiently. DRT can be broadly categorized into two main types: private car-based and PT-based. Whilst both types involve sharing a vehicle with a certain number of people PT-based DRT is considered as more relevant for improving sustainable aspect of the urban mobility (Vij et al., 2020). The readiness of the people to use PT-based DRT has been studied so far from the prospect of the trade-off conditions between cost, time and shared space-related attributes (Frei et al., 2017; Yan et al., 2019; Gerzinic et al., 2023). However, to date, the relationship of the driving experience, satisfaction with PT services and readiness to utilize DRT have not been addressed so far.

This study aims to explore the readiness of the urban dwellers to use the DRT services in the areas where PT service is relatively lower, compared to other part of the cities considering their driving experience and level of satisfaction with the existing PT service. Vienna is considered a key study with focus on two outskirt districts where the trial service of the DRT was deployed. The study employs the stated preference method and random utility maximization theory for exploring the roots of the readiness to utilize the DRT.

The survey has been conducted in collaboration with WienMobile group that launched the DRT service in Vienna. The final sample comprises 326 respondents from Vienna. The SP has been developed using AlgDesign R package which was optimized using Federov algorithm and formed from a full experimental plan of 30,233,088 choice games to 108 scenarios. The choice set includes bike, car, DRT and PT. To account for unobserved heterogeneity and panel dataset (9 scenarios per respondent), the mixed MNL model was estimated with 1000 Halton Normal draws.

The discrete choice modeling results allowed us to explore that the DRT service is perceived to have the closest utility value to a private car than other considered alternatives. Analyzing the average marginal probability effect suggests that raising parking fees by up to +1 Euro leads to a change in passenger preferences within sample. Specifically, there is a +0.48% increase in the probability of choosing DRT and a +0.43% increase for PT, indicating a shift from private car usage. Conversely, a 10% increase in DRT fares results in a -0.82% probability reduction in choosing DRT.

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Exploring walkability and parental safety perceptions of the school district: An application of a School Walkability Index Tool

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Children's commuting patterns and outdoor activities are becoming more restricted due to the continuous growth of motorised traffic and car-oriented urban environment conditions, with adverse health consequences, a lack of physical activity and children's autonomy. Understanding parents' daily lives and perceptions of safety and the built environment of the school district is essential to improving outdoor children's activities and facilitating travel behaviour change. In addition, by exploring the potential of tools for enhancing the well-being of children, we are also investing in other groups in society, such as older people and people with disabilities. We used a multi-method approach to assess a built environment index around primary schools and parents' perceptions and concerns. That included an online survey, a geographic information system (GIS), a street audit tool, semi-structured interviews, and workshops. The School Walkability Index Tool (SWIT) uses clear indicators, such as built environment factors (density, road infrastructure and connectivity), safety factors (traffic speed, road size, legible signs for children and safe crossings, among others), comfort factors (sidewalks availability, green areas, sports areas), among others. It also incorporates more specific indicators, such as children's ergonomic characteristics and parents' perceptions. The results show that most children do not use active modes when travelling to school, even at short distances. We found differences between parents' perceived safety in different school districts. The results emphasise the importance of previous cultural and personal experiences, parents' expectations, and their day-to-day lives. The research also indicates that children spend a significant amount of time indoors, often associated with using new social technologies. It highlights children's limited exposure to green spaces and their surrounding environment. Parents demonstrated a desire for their children to be able to move around more independently. Still, urban design, road insecurity, fear of muggings and social norms are current issues and do not allow parents to feel safe. Furthermore, the results suggest that the School Walkability Index Tool is an effective instrument for collecting data and quickly interpreting children's accessibility levels to their schools by active transport and for identifying target areas that need attention, enabling policymakers, planners and community members to make effective decisions in favour of active travel to school, facilitating the planning process of transport decarbonisation and community engagement on the process.

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Greening the last mile: learnings from the Oslo Living Lab

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Achieving sustainability in urban freight transport requires the development of integrated distribution channels linking the main stakeholders, a synchronization of public and private markets, and the development of sustainable logistics strategies. Urban logistics is a complex field with a wide range of stakeholders and must constantly evolve considering new shopping habits, the heterogeneity of activities, types of products delivered, vehicles used, laws and restrictions to reduce its impact on the environment. Urban planners, local public authorities and business stakeholders need new adaptive approach that meets this complex and shifting sector. This includes models and working methods that helps predicting possible consequences of market driven developments, adoption of innovative business model, to evaluate fast response of green strategies and stakeholder engagement.

Cities have already been evolving in this direction in the recent years by establishing an increasing number of logistics living labs (LL). This paper investigates strategies to greening the last mile focusing on the Oslo LL case. Oslo is one of Europe's fastest growing cities and is planning to cut CO2 emissions by 95 % by 2030. The City's forthcoming Climate Strategy identifies city logistics as an important policy area for reducing emissions. The Oslo LL aims at promoting within city logistics, the use of electric propelled vehicles and crowdshipping services with the intent of increasing urban delivery efficiency and reducing negative externalities (emissions and noise). The value case focus on the delivery of large items from commercial furniture stores, which is an underestimated segment in literature.

The LL partnered with a Local Carrier that was responsible for both picking up the items from furniture stores and delivering them to the final customers. Four "what-if" delivery scenarios were designed and tested based on the described LC current operations and market conditions. Additionally, stated and revealed preference surveys were used to formulate the scenarios based on consumers preferences. The paper discusses the main results obtained, based on solid empirical data collected locally withing the LL. As for the results show that a big reduction on CO2 emissions can be obtained with the use of electric vehicles, however there are many challenges in terms of obtaining land use approval for hubs and with the supply of crowdshippers for the segment, among others. This paper contributes to a new understanding of the use of a LL approach applied in a city with a strong and progressive environmental target. The conclusions are of value for both policy makers working with zero emission policies, as well as for academics working with LL design and applications.

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Implementing Digital Sovereignty to Accelerate Smarter Mobility Solutions in Local Communities

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Achieving a climate neutral economy by 2050 in Europe in line with the European Green Deal places a specific responsibility on the transportation sector, which contributes to the greenhouse gas (GHG) emissions. For the transportation domain to reduce its GHG emissions there is need to advance the urban mobility solutions in local communities via the use of data in all modes of transport, including passenger and freight sectors. To intelligently improve mobility solutions large amounts of data is needed. While data is being collected from different sources in smart cities to improve mobility services, the use of this data have often been restricted due to economic ethical, technical, risk governance, or legal reasons. Moreover, the access, availability, and exchange of data in the transportation sector continue to be hindered due issues ranging from standardization, interoperability, privacy, security, governance, digital and digital sovereignty concerns, among others. However, to improve the smarter mobility solutions there is need for clarification of digital sovereignty which today hinders data flow among different actors in the transportation sector. Therefore, there is need for an approach that enables digital sovereignty while providing innovative mobility services and applications to citizens. Accordingly, this article carryout a systematic review to explore how to maintain digital sovereignty, and also identify and assess existing techniques employed to maintain digital sovereignty towards improving urban mobility services in local communities. Based on grounded theory and qualitative literature review, this study explores the motivations and factors that influences data sharing from local communities' point of view. Evidence from this study provides technical and non-technical requirements and mobility use case that underline the potential on how to enable digital sovereignty in local communities. Additionally, the findings identify existing practical needs that enable the design of future digital sovereignty solutions for sustainable cities and communities. In addition, recommendations for the future development of digital sovereignty are presented to increase data autonomy and transparency, empowering citizens, and communities, and enabling new business opportunities.

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Improving interest in public, active, and shared travel modes through nudging interventions

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Nudging can change travel behavior through interventions encouraging sustainable or healthy actions without limiting choice, potentially providing governments with softer policy options reducing negative impacts of private vehicles to compliment 'hard' policy measures such as taxes or zoning. This research, conducted in Flanders, Belgium (n=292), investigates the efficacy of moral (highlighting individual and social benefits) and norm (using social pressure) nudging in the interest to use public, active, and shared transport modes across trip purposes and among those with differing travel attitudes and demographic characteristics. Survey design (5 November 2022 to 8 January 2023) included nudging interventions (moral and norm infographics) randomly allocated to two groups and research methodology employed independent- and paired-sample t-tests, ANOVA mean-comparisons, and multiple linear regression models.

Results indicate that moral nudging is effective, particularly for carsharing. Information about carsharing benefits may improve understanding and provide an option for individuals wanting to make environmentally- and socially-conscious choices without drastic lifestyle changes. Moral nudges might be effective toward carsharing in situations where private cars previously seemed like the only reasonable option (e.g. carrying heavy bags or alongside companions with limited mobility) and where individuals must access locations that are not served by public transport. Further, women might have greater concerns about making environmentally moral choices, resulting in susceptibility to moral nudging, particularly for active travel. Finally, younger individuals with time flexibility might be a target group for carsharing, especially when influenced by moral arguments, while older retired and full-time employed individuals may not be willing to give up their private cars.

Norm nudging was found to be effective for public transport and particularly for active travel, but not for carsharing. Mobility cultures and social acceptance might be important to active and public transport use, while norm nudges might be less effective for carsharing in its current first-adoption stage. Further, individuals might be more easily swayed to use active modes in trips taken with companions.

Attitudes toward public transport were important to norm-nudge susceptibility, indicating that though environmental benefits of public modes are well-known, individuals may not use them until others do. Attitudes toward active travel were not important to nudge susceptibility, indicating that those who prefer active travel already travel this way, at least in Flanders. Attitudes toward car sharing were important to both nudges, indicating that both more information and social acceptance is necessary to encourage carsharing use, though younger individuals might be more susceptible. However, carsharing may not be practical for families with children and may be a better option as a second or third vehicle.

Nudging might improve sustainable travel behavior, and should be considered as a policy tool to discourage personal car use and encourage active, public, and shared modes alongside harder measures. For example, municipalities in Flanders could implement Nudge Units to rigorously test nudge efficacy in real world situations. Carsharing policy could improve the density of carshare parking, especially in more remote areas, as a main barrier to carsharing in Europe is the long distances to the nearest available vehicle.

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Key Factors on Eco-driving with Electric and Combustion Passenger Cars

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The COP21 agreement set the goal of reducing GHG emissions. Most travels are made by car worldwide. Therefore, reducing car consumption is key to achieving the COP21 goal. Eco-driving can contribute to it, among many other measures.

Electric vehicles (EVs) are becoming increasingly popular nowadays. Their share in car market sales has increased from 4% in 2020 to 14% in 2022. They present two main features that help reduce consumption: single-speed transmission and regenerative braking. Most eco-driving research has focused exclusively on vehicles with internal combustion engines (ICEs). This study aims to compare the effectiveness of eco-driving with EVs and ICEs on various road types.

The investigation is based on a test field in Madrid and Cáceres (Spain) in November 2023. During a week, sixteen people drove electric and combustion vehicles for their commuting trips using local, collector, and arterial road types, classified according to the Federal Highway Capacity Manual guidelines. In the first part of the experiment, each driver performed the test behaving in their usual driving style. Then, they received guidance on how to do eco-driving, and afterward, they did the same trips applying eco-driving. Throughout the experiment, 2 400 car-km were monitored using four data sources: the on-board computer of each car through its OBD-II diagnostic connector, the dedicated app ‘GRETA’ -developed for this experiment as part of the EcoTraffic research project-, a logbook, and the vehicle's dashboard, that summarized the results. The data included speed, RPM, acceleration, fuel consumption, position, and energy consumption.

The study reveals that eco-driving can significantly reduce energy consumption in EVs by 8.6% and fuel consumption in ICEs by 11%. Also, practicing ecological driving is more effective on low-traffic local roads (16.6% in ICEs), followed by arterial and collector roads (4.5% and 3.5% in ICEs, respectively). This is because on local roads, drivers can more easily carry out ecological driving techniques if the traffic conditions allow.

These results have significant implications for promoting sustainable transportation practices, especially in urban areas where local roads are commonly used. Adopting ecological driving practices can significantly reduce EV's carbon footprint and encourage sustainable transportation.

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More Than Just Green Machines: User Preferences Shape Optimal Cargo Bike Operations

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The urban logistics landscape urgently demands a transformation, one that prioritises reclaiming city streets for its residents. Electric cargo bikes (CBs), wielding the power of green technology, emerge as a promising solution. These nimble vehicles expertly navigate congested arteries, alleviating air pollution and fostering safer spaces for pedestrians and cyclists. Their appeal is undeniable: studies suggest CBs can replace up to 50% of vans for short-distance urban deliveries, offering a compelling environmental and economic alternative. Local authorities and businesses are rightfully taking notice, recognising the potential for a more sustainable and efficient delivery system.

The selection of suitable CB for the operations requires caution. While the technical requirements of employing CB for last-mile delivery have been well established, the more qualitative requirements that stem from these bikes' users remain unknown. This change requires a fundamental shift in driving behaviour, logistics management, and customer expectations. Drivers accustomed to conventional vehicles will need to adapt to the unique characteristics of CBs, including their limited cargo capacity, manoeuvrability, and speed. Logistics managers will need to reconsider their routing and scheduling strategies to accommodate the constraints of CB usage. Customers will need to be willing to accept potential changes to service levels or longer delivery times. Hence, the behaviour and preferences of the pool of experts involved in the transportation process, like drivers and logistics managers require further examination. This paper aims to model CB selection by considering both technology and users.

This paper proposes a novel user-centric cargo bike selection model that considers both technology and users, aiming to enhance the sustainability and effectiveness of urban freight transportation. The study begins with a literature review highlighting the transition from traditional transportation methods to green alternatives, explicitly focusing on CBs for last-mile delivery. The review identifies key attributes for CB selection and emphasises the importance of considering stakeholders' behaviour and preferences in addition to technical specifications.

The methodology section outlines a comprehensive framework that includes data collection of network attributes, demand, CB characteristics, and expert opinions. The analysis integrates a Capacitated Vehicle Routing Problem (CVRP) simulation for technical efficiency assessment and a survey-based qualitative evaluation of stakeholders. The resulting integrated indicator of CB selection combines these dimensions to provide a holistic assessment of CB selection.

Our research unveils critical attributes for selecting CBs in urban logistics. Notably, we conducted the first comprehensive survey gauging stakeholder preferences for various CB features, offering valuable insights beyond technical specifications. By combining this user-centric data with objective performance measures, we bridge the gap between technology and human experience, advocating for an integrated approach to optimise urban efficiency and sustainability. These findings equip CB producers, local authorities, and logistics companies with the knowledge to prioritise user-centric designs, ultimately optimising urban logistics systems.

The conclusions drawn from the study advocate for a user-centric approach to CB selection, emphasising the need to align technological advancements with the preferences and behaviours of CB users. This paves the way for practical implementation of CBs, enhancing their appeal and effectiveness as a sustainable option for urban freight transportation, ultimately creating a more livable and environmentally friendly urban future.

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Navigating municipal dynamics: unraveling the political threads in Canadian transport decarbonization policies

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Recognizing the pivotal role of transportation systems in the decarbonization of urban areas, cities officials are progressively implementing policies to modulate travel behaviour and promote more sustainable modes of transportation. While previous research has shown that an individual's political identity may influence their likelihood to adopt electric vehicles (Sintov et al., 2020) and embrace sustainable transport policies such as congestion pricing (Harsman & Quigley, 2010), these analyses have largely focused on the political correlates of low-carbon transportation solutions at an individual level. What remains absent from this body of work is an examination of how the political affiliation of elected officials may also shape the provision of sustainable transport solutions. Historically, right-leaning parties have aligned themselves with pro-motorist positions, while left-leaning parties have occasionally adopted anti-motorist stances. The underlining rationale being that to expand their user base and enhance re-election prospects, political parties are motivated to encourage or discourage the use of automobiles among the populace. This study investigates the impact of elected officials' political affiliations on the adoption and scope of sustainable transport policies.

Using data derived from a survey encompassing over 140 Canadian municipalities to assess the current landscape of local climate change actions and policies, and overlaying this data with federal election results from the past two Canadian elections, this study examines the political correlates of sustainable transport policy adoption. We find that municipalities under right-leaning governance are less likely to raise the cost associated with using fossil-fuel vehicles, provide subsidies for zero-emission vehicles, and promote non-vehicle modes of transportation. Moreover, given the longitudinal nature (spanning two election cycles) of our election result data, we can discern a degree of path dependency. Municipalities that elected right-leaning parties in the earlier election may be less likely to introduce transport policies aimed at helping constituents' transition away from automobiles, as this constitutes their primary base of voters. Conversely, municipalities that elected left-leaning parties are more likely to have introduced transport policies geared at facilitating their constituents' transition away from automobiles. The extent to which the enactment – or lack of enactment – of these policies influences car usage and impacts subsequent elections is also examined.

As federal governments actively seek to mitigate their carbon footprint and enact sustainable transport policies, an understanding of how the political inclination of municipal elected bodies factor into this dynamic becomes indispensable. Not only will this research provide insight to implementing sustainable transport policies but will also shed light on the potential political considerations and alignments required to support policies aimed at facilitating citizens' transition away from automobiles.

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Once upon a freight: storytelling for participatory planning and co- creation in urban logistics

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Stakeholder engagement within a participatory planning process is crucial for balancing the conflicting interests of urban freight transport, ensuring both economic efficiency and environmental sustainability in city planning.
While there is widespread agreement on this issue, as outlined in the official Sustainable Urban Mobility Plan guidelines of the European Commission, there is still uncertainty regarding the practical implementation of participatory planning.
Sandercock (2005) underlines storytelling is a valuable tool for planning. Likewise, Passon (2019) recognizes its effectiveness in promoting behavioural change.
This paper, to the best of our knowledge, is the first to explore the use of storytelling as a tool for participatory planning in urban freight transport.
The presence of different stakeholders makes preference heterogeneity even more relevant and significant within the decision-making process (Marcucci et al., 2012).
Storytelling allows individuals to interpret the past and prepare for the future, offering a forward-thinking perspective, crucial for planning (Van Hulst, 2012). Utilizing storytelling as a tool often signifies a commitment to more inclusive, community-oriented planning approaches, avoiding using unilateral decision models that often dominate public planning procedures (ibidem).
Moreover, storytelling as a planning tool finds its ideal application within a Living Lab environment, aimed at promoting the participation of all relevant stakeholders, especially suited for dealing with the complexities of the urban freight system (Quak et al., 2016).
Following an analysis of storytelling use in planning, this investigation provides a comprehensive analysis of the outcomes storytelling use has produced within the Freight and Logistic Sustainable Plan of the Metropolitan City of Rome.
The paper describes the "L-3D - a new dimension of participation" project, coordinated by TRElab at the Department of Political Sciences of Roma Tre University. The project has been developed within the Logistic Living Lab of the City of Rome.
L-3D developed purpose-built software, divided into two modules: Choose and Visualise. Digital storytelling, as the one L-3D Visualise is capable of producing, enhances comprehension and engagement, presenting results in a user-friendly way. Identified stakeholder-preferred scenarios are visualized in video format, realistically simulating the anticipated impacts of new measures on the urban logistics.
In conclusions, the paper reports the significant level of stakeholder appreciation for employing storytelling to illustrate the potential impacts of adopting envisioned measures, considering various and potentially conflicting perspectives.

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Q methodology as a form of deliberative democracy for engagement on transport technologies yet to come

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Planning and policy making is an inherently contentious endeavour (Sprain 2017; Taylor and Tight 1997). This is accepted, albeit begrudgingly, by stakeholders as an intrinsic part of the participatory processes that are foundational to democratic ideals (Day 1997; Monno and Khakee 2012). But as the pace of change and intertwining of complex socio-environmental problems unfold, there is increased attention on the question of how stakeholders might better involve the public on planning and policy decisions (Burton and Mustelin 2013), particularly those pertaining transport decarbonisation. While there is ample material regarding different approaches to public engagement and consultation (eg OECD 2020) what remains less obvious is the process through which consensus regarding the key issues in need of public deliberation is reached. This is particularly true in the context of transport technologies and scenarios yet to come. Who are the stakeholders and how are the key issues identified? How should the public be brought in to deliberate on a transport future that does not yet exist?

In this paper we present an innovative way of using a Q methodology as a tool for deliberative democracy in the context of future transport technologies. Developed in the earlier part of the 20th century, Q methodology was designed to better understand and situate subjectivity through an intertwining of qualitative and quantitative process (Coogan and Herrington 2011). It is based on the sorting of a set of statements by an individual and the responses depict a relative agreement or disagreement from a self-reference perspective. It does not try to force people to agree to a statement on a common scale as traditionally found in tools such as surveys and questionnaires using Likert Scales (Ramlo 2016).

The Q sort process allows for a comparison regarding patterns of responses across different people and/or groups. What matters is the similarity or difference in the patterns which, in turn, creates greater understanding of different positionalities. For example, where there might be consensus on particular issues amongst an incredibly heterogenous audience. Similarly, the Q methodology allows for a filtration of “noise”, that is issues that may receive a lot of attention (eg in the media) but in practice hold little value or concern to people in the context of the bigger picture.

We contribute to the conference’s call for understanding subjectivity and contestation in transport and Cluster 2’s interest in the process of policy making in two important ways. First, we systematically present our empirical research so that it might be replicated by other transport researchers and practitioners and reflect upon some of the challenges and opportunities the approach presents. Second, we frame the methodology within the larger context of the recognised need for more participatory processes within the field of transport. Crucially, we argue that Q methodology’s grounding in subjectivity is complimentary to political theories of deliberative democracy and a Habermasian conception of consensus (Habermas 1962; 2023; Stewart and Hartmann 2020; Cooke 1993; Robert 2005) through a facilitation of the key tenants of communicative theory whereby opinions arising from personal and situated experience can be shared and deliberated upon in a safe and iterative manner such that opinions are made and remade to the point that more democratic process of issue identification and consensus can be formed, even in the context of a transport scenario yet to come.

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The Pursuit of Sustainable Urban Mobility: A Gap Between Policies and their Spatial Realities?

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In 2013, the European Commission introduced Sustainable Urban Mobility Plans (SUMPs) as a policy tool to accelerate the shift to sustainable mobility by inspiring municipalities to develop long-term sustainable visions for their cities. SUMPs should encompass all modes of mobility and function as a coordinating tool across various policy areas, to effectively address the mobility needs of people. The underlying assumption is that cities know what the needs of their citizens are. Verlinghieri and Schwanen (2020) argue that cities likely find it challenging to recognize groups that are already socially disadvantaged. Hederson (2020) speculates that specific social groups may disproportionately benefit from the plans, potentially exacerbating social inequalities.

The Dutch city of Utrecht claims to have a strong commitment to the inclusion of all its citizens in sustainable mobility. The city emphasizes the importance of recognizing and accommodating “local differences” and underscores the necessity of “addressing diverse needs of various social groups with the aim to make transport accessible for all citizens” (Gemeente Utrecht, 2020). Yet, it remains unclear how the city aims to do so and what existing local differences are. Utrecht's leading role in the shift to sustainable urban mobility and its commitment to developing SUMPs, make it an ideal case study to evaluate the inclusiveness of the SUMPs based on the claims of Verlinghieri & Schwanen (2020) and Henderson (2020). Therefore, this study critically and systematically assesses the inclusion of diverse social groups in policy documents of the municipality of Utrecht, with a focus on socially disadvantaged groups. Additionally, the outcomes of the policy analysis will be compared to the real-world spatial distribution to assess alignment with the initiatives in place.

This study employs a mixed-method approach, starting with the collection and analysis of relevant policy documents, including long-term visions, thematic policies, and area-specific strategies. The final set of documents encompasses 35 documents, spanning from 2005 to 2022. Nvivo is used to analyze the data and identify the inclusion of social groups in the sustainable urban mobility initiatives. Based on the identified social groups, mobility modes, and neighborhoods in the documents, the study then continues with the collection of relevant open data from the municipality.
This data includes demographic information, mobility statistics and land use data, and is used to map the real-world spatial distribution of the sustainable mobility initiatives using a spatial analysis tool.

Preliminary findings indicate that socially disadvantaged groups are recognized in the documents; they specifically refer to the needs of individuals with a disability, children, older adults, and low-income groups. While these groups are predominantly associated with active modes like walking and cycling, they are not connected to particular locations or places. There has been no significant change in the recognition of social groups over time. Moreover, while the municipality states that initiatives like “shared mobility can potentially play a role in reducing transport poverty among groups that have difficulty accessing mobility,” it remains unclear where this initiative should be implemented and which specific locations are prone to transport poverty. The lack of clarity is illustrated by the fact that only 28 of Utrecht’s 111 neighborhoods are mentioned, and most initiatives are targeted on the city center. This makes it challenging to assess whether the initiatives address diverse needs and to compare initiatives proposed in the documents with their real-world spatial distribution.

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To what extent can households' access to an e-cargobike change their daily mobility habits? Results from participations to one-month trials in peri-urban neighbourhoods in England

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Personal transport (mainly cars) account for 68% of UK transport domestic emissions [1]. Much research and policy attention are brought on technology improvements such as cleaner vehicles. However, a single technology shift won't be enough and there is also a need for behavioural change. The electrification of micromobility is seen as a solution to enhance the uptake of lighter vehicles and generate a shift towards lower carbon and more active mobility. A recent study showed that in the UK, while accounting for physical capabilities and the hilliness of roads, e-bikes have a strong potential to reduce car use and emissions. This potential is stronger than conventional bikes' potential, especially in rural areas [2]. E-bikes overtake some barriers of conventional bikes by easing rides on hilly terrains, on longer distances or for people having some health problems. Additional barriers are overtaken by e-cargobikes by allowing to carry more goods or other passengers.

In this research, we are looking at privately used electric cargobikes capabilities to reduce car usage and transport emissions. More specifically, within the project ELEVATE [3], we want to assess the potential that e-cargobikes have in suburban area where there is a need to travel longer distances. By lending e-cargobikes to households for a month, we evaluate how an access to this new mode of transport changed their daily mobility. In the summer 2023, we collected data from 49 households living around Brighton, Leeds, and Oxford. Collected data includes GPS tracking of all their trips with the e-cargobike, physical activity measurement, travel diaries, multiple surveys, and weekly interviews.

For a strong majority of participants, using an e-cargobike was easy, enjoyable, and meant they travelled less by car. Preliminary analysis shows that for over half of the distance travelled by e-cargobike, the alternative would have been to use a car. Participants could also see themselves as someone using an e-cargobike regularly in the future. Over half thought it would be worthwhile to buy one and a few households already got rid of one car by purchasing, after the trial, their own e-cargobike. Although further analysis is still on-going, this research helps understand what the potential is, through behavioural change, of e-cargobikes to decarbonise transport. By being directly involved with new e-cargobike users, our results also highlight barriers and benefits to e-cargobike use and give an indication on the type of trips we can expect to be made by e-cargobikes. It can support policies by indicating how and for who they can encourage these cycling behaviours, but also what the impact could be.

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Understanding the barriers and facilitators of designing and implementing active mobility intervention in Brussels and Malta

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The urgent transition to decarbonised, sustainable urban mobility stands as a pivotal challenge in policy agendas particularly within the European context. This paper undertakes a comprehensive exploration of the primary barriers that impede the effective design and implementation of active mobility interventions and presents potential measures to overcome these challenges through a stakeholder-focused lens. The research focuses on two EU case studies: Brussels, Belgium and Malta. Initially, a media content analysis was undertaken to identify key stakeholders and gain a broad understanding of the challenges and success factors associated with active mobility interventions. Subsequently, in-depth stakeholder interviews in both case study locations delved deeper into the intricacies of these challenges, uncovering multifaceted barriers across socio-cultural, organisational, political, and financial dimensions.

The comparative analysis of findings from the two case studies highlights nuanced variations in the type and intensity of barriers, also including the contextual complexities in sustainable mobility policy implementation. Drawing upon the insights from the stakeholder interviews, the case studies offer the opportunity for uncovering strategies and mutual learning to facilitate future strategies and overcome barriers. These success factors, contextualized to the specific landscapes of the case study locations, offer pertinent policy-oriented strategies that can address the identified challenges.

This research contributes to the discourse on sustainable mobility by employing a stakeholder-focused approach to understand the challenges and viable pathways to implementing active mobility intervention in the urban context. The insights serve as a valuable resource to facilitate informed decision-making and emphasize the pivotal role of stakeholders in catalysing transformative change towards sustainable and decarbonized urban mobility.

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Towards sustainable and inclusive transitions in urban parcel logistics -an assessment of delivery worker preferences

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At the crossroad of research and management, the Multi-Actor Multi Criteria Analysis (MAMCA) methodology is traditionally used to assess the acceptance of alternative logistics operations by comparing different stakeholders' views. Often, community members, e-commerce deliveries postmen and postwomen and online consumers have been excluded of this approach, despite recent literature highlighting the necessity of engaging those stakeholders for considerations related to equity and transportation justice. Indeed, since the MAMCA methodology is largely operationalized through interactive workshops, the main input considered in the past has been that of urban administrations and logistics companies. The present study aims to address this limitation by employing a mass-participation extension to the methodology, allowing us to diversify the type of stakeholders involved, to target hard to reach stakeholders and to involve a large number of participants within one stakeholder group. In the study, we apply this approach to assess different alternatives to organize zero-emission e-commerce deliveries on the metropolitan scale of the Brussels-Capital Region.

First, we establish different scenarios according to the past, present and future possibilities of a company's organization through the Brussels' region. Based on several criteria such as social acceptance, work environment or service satisfaction, e-consumers and postmen and postwomen assess to what extend those scenarios meet their criteria by completing a short survey in a second phase. While these results are processed by the mass-participation tool for MAMCA, company managers, public administrations and logistics experts assess the same scenarios during an interactive workshop. Third, the researcher analyzes the results provided by this combination of MAMCA methods.

The goal of this analysis is to provide a better understanding on how different communities perceive a postal operator's new organization for zero-emission e-commerce deliveries in the Brussels-Capital Region. This organization is based on a combination of electric vehicles, cargo bikes, micro-hubs, and both manned and unmanned collection points. Enabling a diverse panel to comment on different alternative scenarios allows us to assess the existing operations as well as the possibilities for scaling up.

Finally, we hope to contribute to equity and inclusivity within urban logistics management with this original participatory approach. By engaging diverse communities, this study contributes to our knowledge on recent transformations of the urban e-commerce deliveries landscape at the crossroads of e-commerce growth and sustainable transition. The targeted participants are under-studied by urban logistics research literature, although they are the first to experience the implications of these new operational organizations firsthand. This study is an opportunity to test the mass-participation tool through urban logistics management to raise potential social challenges of zero-emission e-commerce delivery solutions and, additionally, to help us to be critical and improve transition scenarios.

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Construction transport meets urban planning: improving decision-support by predicting urban construction site transport demand

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Densifying cities continuously call for new construction, renovation and demolition projects, which generate up to a third of a city's freight transports. However, construction transport volumes and consequently their effect on traffic flows, are currently missing in urban freight models. This leads to inaccuracies with regards to urban traffic networks' load, and rendering it difficult for urban planners to plan construction transport deliveries to spatiotemporally fluctuating construction sites. Recent studies argue that predictive modeling approaches could improve transport planning efficiency, which have so far been under-researched, due to a lack of knowledge on the construction site transport demand predictors. Simultaneously, spatiotemporal network impacts from construction transport can be assessed based on varying off-site construction site transport demands by leveraging traditional traffic and transport simulation. Subsequently, conceptual applications of the simulation model can show how construction logistic planning strategies mitigate congestion disturbances.

This research starts by showcasing simulations conducted in MATSim using detailed secondary datasets describing site-specific transport arrivals from a case of six projects in Norrköping, Sweden, where increasing transport demands were assessed on various time-window arrival scenarios against the baseline schedule. These highlight that rigorous construction transport planning, avoiding peak-traffic hours, can significantly alleviate traffic congestion, which can subsequently be used as decision support in urban planning. However, with more accurate predictions on construction site transport demand, the mitigation potential of solutions on a wider urban scale could be assessed more precisely. This research therefore aims to provide insight in accurate prediction of a city's construction transport demand. To this end, a multivariate exploratory data analysis digs deeper in the identification of how performant construction project-related variables (such as gross floor area, project duration and site certification) and context-related variables (such as population density or land use) are in predicting construction site transport demand. These analyses are based on primary and secondary data samples from Belgium and Sweden.

The results show that project-related variables, standalone, do not provide sufficient information to derive accurate construction site transport demand. However, by combining a series of common accessible project-related predictors (in particular, GFA, length, environmental certification and population density) for all urban construction sites in a given period and geography, transport demand prediction are very accurate, closely matching actual urban construction transport amounts. In contrast, transport demand predictions for individual construction sites do not render accurate results, either under- or overestimating individual site demands. This research suggests that the proposed statistical learning model should be utilized to predict a wider city region's construction transport demand, and that a combination of predictors should be considered to enhance the predictability performance.

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Exploring public and private stakeholder's perspectives in the integration of drones for urban Logistics

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The increasing pressure from the industry to introduce drones for city logistics purposes has triggered a growing research interest in this topic. While existing literature highlights the utility and value-added attributes of drones across diverse domains, a critical gap still exists in incorporating the citizen's perspective into the deployment of urban air mobility systems. This paper aims to contribute to the knowledge on this topic by elucidating the interaction between public knowledge, awareness, and engagement with drones vis-à-vis their application in city logistics. The insights come from a survey conducted in Portugal approaching citizens' attitudes toward the use of drones in urban logistics, under the scope of the project ASSURED-UAM. The findings emphasize a generally positive outlook toward drone integration, revealing specific insights into public perceptions and preferences. Notably, socio-demographic variables—such as gender, education level, occupation, age, and residential location—exhibit no direct correlation with citizens' attitudes, challenging conventional assumptions about demographic determinants. Furthermore, the survey reveals a preference among citizens for potential environmental benefits over faster delivery times, reflecting a willingness to invest in environmentally sustainable transportation solutions.
The policy implications emanating from these findings hold transformative potential in shaping public discourse and decision-making processes surrounding drone deployment in transport-related activities. By elucidating public perceptions and preferences, policymakers can gain insights to inform strategic interventions and regulatory frameworks conducive to fostering public trust and acceptance.
This paper underscores the imperative of integrating citizen perspectives into the topic of implementing drone-enabled city logistics.

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Stakeholder involvement in voluntary sustainability goals for freight transport

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Sustainability is an increasingly important area for freight transport. There are an increasing number of environmental regulations and legal requirements to meet. Despite this, many organisations choose to set even higher sustainability goals, making them important stakeholders in the transition towards a more sustainable transport system. This study aims to map the reasons for setting higher sustainability targets, the approaches used to reach those targets and how these important stakeholder activities are influenced by policy measures. A total of 19 interviews have been conducted with 13 companies in the retailing, manufacturing and transport industry in Sweden that have set sustainability goals. The study finds that the sustainability goals encompass the entire organisation, of which freight transport often is a small part. Most companies lack specific goals for freight transport as they are included in the overall goal for the company, often expressed in general terms like X% reduction in CO2 emission by 2030. The reasons for setting sustainability target are commercial but also a sense of that sustainability is necessary and something they must meet to be a relevant stakeholder in society and business. The interviews show a sincere commitment to really be more sustainable at all levels in the company. However, it is clear that the goals would not have been adapted if they would not have perceived them to be commercially viable. The initiative for the targets typically came from the top management.

Due to the close link between emissions and fuel, all companies focus mainly on alternative fuels and propulsion to reach their goals in transport. Biofuels, such as HVO, is mostly used although some companies have started using electric trucks to a small extent. Views are mixed as to electricity or biofuels are the best option for the future. However, actions are also taken regarding warehousing, such as putting solar panels or beehives on the roof, although some express that these and similar actions are more for show than actually making any significant input towards reaching the goals.

Customer demands for sustainable transports are increasing, in particular for industries close to the end consumer. A challenge is the network characteristic of freight transport where several shippers share the same truck and put different sustainability requirements on the transport. Mass balance systems are perceived by some scepticism, but could be one option to meet the different requirements. Several companies express that want it to show that they work with sustainability, for example by having their logo on electric trucks but, at the same time, a few companies have chosen to not market their sustainability actions as they do not want the be perceived as doing “green washing”. Similar statements are made by transport companies, highlighting that it is not always a link between the transport customers putting the highest sustainability requirements and the ones that want it to show the most. A challenge is also the lack of standards for reporting emissions and low quality data, where seemingly similar transport flow with different transport operators might report very different emission data. Policy measures are given little attention by the companies, with the exception of the recent decision in Sweden to reduce the mandatory mix-in of biofuels in diesel, which is perceived as negative and putting increasing demands on the companies to find alternative CO2 reduction measures.

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There is no catch-all solution: considering diversity in logistics and urban areas when addressing future challenges

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Urban logistics has paradox that it is essential to thriving and livable cities, but logistics vehicles contribute disproportionally to externalities in cities including emissions, nuisance, congestion and safety. Within this paradox, policy makers, transport companies and researchers are aiming for a catch-all solution. In this search, three aspects that remain underexposed are the diversity in logistics segments that have different requirements for conducting operations, the increasing diversity in the morphology of urban areas and the potential of long term spatial planning (Kin, Buldeo Rai, Dablanc & Quak, 2023).

In this study we develop an outlook for urban logistics towards 2035, distinguishing the specific character of different areas within a city. For five types of neighborhoods we make an estimation of the daily number of incoming logistics vehicles (trucks, vans and light electric freight vehicles) and the segments these belong to (temperature-controlled, general cargo and retail, parcels, waste, service-driven and construction logistics). With the specific logistics footprint per neighborhood, tailored solutions to different stakeholders are developed based on the neighborhood type in combination with the segment.

First, we develop a typology of urban neighborhoods with different characteristics (Kleerekoper, 2016); historical city center, old mixed-residential, high rise, car-free and suburbia. Next, a trend analysis is conducted through literature and two workshops with experts. These trends are used to determine how neighborhoods are shaped in different ways in 2035. Trends include digitization, demographic changes, the need for renovating housing, adaptations in the spatial domain including the ’15 minute city’ concept and policies towards zero emission mobility. Based on this input, together with statistics from the (Dutch) national database (CBS) and experts, the neighborhoods in 2035 are determined. The Decamod method that allows making a decomposition of urban logistics movements as elaborated in Rondaij et al. (2023) is used to determine the size (in vehicles) and composition (in type of vehicles and segments) based on the specific characteristics per neighborhood (e.g. population density, number of businesses). The neighborhoods are normalized in order to allow for comparison.

Results show that the specific functions of a neighborhood determine the type of segments. Accessibility shapes the way logistics service providers organize their operations, including the type of vehicles and spatial occupation within the area. For instance, the logistics footprint in a car-free neighborhood mostly consists of different types of vehicles conducting home deliveries (groceries, parcels, etc.) and service logistics with light electric freight vehicles. In the old-mixed residential one, a lot of construction logistics related traffic can be expected due to the need to renovate buildings and infrastructure in light of the energy transition. Vehicles are expected to be electric in the city centers due to the implementation of zero emission zones, leading to zero emissions. Overall, the number of vehicles in any neighborhood increases compared to today. To be able to secure future supply of the areas while also minimizing externalities, tailored approaches per neighborhoods are developed. Eventually, different policy domains have to work more integrally on the relation between logistics and (long term) spatial planning.

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Understanding uncertainties for the future of drone deliveries through stakeholder engagement and co-design

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Participation in policy and planning is crucial for a democratic and inclusive society. Co-designing of policies with stakeholders increases the impacts of policy interventions while enhancing their credibility. Stakeholder engagement and participation is key to dealing with complex policy and long-term planning, especially under uncertainty [1]. Participatory methods for policy-making engage stakeholders with different (sometimes conflicting) needs and expectations [2]. Effective policies should align with the stakeholders' perceptions of the underlying problem that the solutions aim to solve. Stakeholder engagement becomes particularly important when exploring potential implications for policy and planning, as well as regulations and operational requirements due to the introduction of disruptive technologies. Therefore, this paper identifies critical uncertainties for drone last-mile deliveries governance considering a multiple stakeholder perspective. The paper explores the following research questions:
(i) what are the critical uncertainties towards the future of drone deliveries?
(ii) who has the interest/power in shaping an appropriate governance?
(iii) how does a vision for drone deliveries respond and adapt to future uncertainty?
Using the UK air mobility ecosystem as a case study, the methodological approach integrates stakeholder engagement and co-design with Foresight methods [3], which allow stakeholders to think ahead and consider, model, create and respond to future possibilities [4]. These methods are particularly powerful and valuable for designing long-term strategies by considering various future scenarios, allowing for more informed decision-making [5]. The research follows these steps: (i)identification of critical uncertainties for the future of drone governance with stakeholders from public and private organisations [6]; (ii)design of a set of plausible scenarios to explore what the future might look like [5]; (iii)design of a vision for drone delivery governance for 2050 with national government stakeholders and regulators; (iv)design of a set of policy options using a back-casting exercise; (v)stress-test of results with key academics to understand potential gaps between research and practice. We engage with government stakeholders to bring them into the process from an early stage [7], allowing the future policies to reflect the needs and expectations of the stakeholders involved.
The research findings are expected to have a significant impact on the development of national regulations and local policies and planning related to drone technology in the UK. The project's focus is primarily on the UK, but the results will be potentially transferable to other countries.

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Data-Driven Solutions for Urban Transport Challenges in Developing Cities

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The swift expansion of urban areas in developing nations is well-recognized. This phenomenon triggers a growing need for adequate and sustainable resources and infrastructure in these regions. Among the crucial components contributing to the development and habitability of cities, transportation and its associated amenities stand out prominently. Nevertheless, the urban transportation has several common characteristics reflected in ineffective transport planning and regulatory bodies, insufficient and deteriorating transport infrastructure, inadequate provisions for pedestrian and cyclist mobility, a burgeoning reliance on private cars and limited options for travel modes, resulting in many residents being confined to certain transportation methods. These characteristics induce significant alterations in the travel behaviours and routines of citizens. Due to above-mentioned factors, there is a pronounced inclination among citizens towards owning and utilizing private vehicles. The incapability to meet the increasing demand for various modes of travel, particularly public transportation, has spurred the growth of an informal transport network and an escalating preference for car usage. Nonetheless, residing in cities reliant on cars, characterized by heavy traffic and pollution, poses numerous societal and environmental challenges.

With an aim to enhance urban mobility, accessibility, and overall quality of life, city planners and geographers have prioritized comprehending individuals' travel patterns and activities. Traditional methodologies prevalent in transportation planning, tailored for small-scale, expensive data collection, fall short in tackling contemporary challenges. Urban researchers are urged to explore innovative approaches to address issues such as traffic congestion, environmental degradation, heightened energy consumption, and greenhouse gas emissions. With the transformation brought about by wireless mobile connectivity in communication, work, and leisure, mobile phone data emerges as a valuable resource for analysing the spatiotemporal movements of anonymous users. Despite often being sparse, the extensive volume and prolonged observation period of mobile phone data allow for the inference of human behaviour on an unprecedented scale. Mobile signalling data accurately reflect the real-time distribution of urban populations, boasting attributes like robust timelines and broad coverage. The vast individual-level spatiotemporal information furnished by mobile phone data presents unprecedented research opportunities in geography, urban planning, and related fields reliant on spatial data.

This study showcases the utilization of big data analytics to translate ubiquitous mobile phone data into intelligible human mobility patterns, using Niš, Republic of Serbia, as a case study. By scrutinizing mobile phone data, the spatial travel patterns of residents across different city zones are outlined. The overarching objective is to assist planners in efficiently harnessing urban insights from big data to target specific areas for future infrastructure and service enhancements. Sustainable urban and transportation planning centres heavily on understanding human mobility patterns within urban areas.

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Development of sustainable mobility solutions for the people or together with the people –The living lab concept Mobility lab Stor Trondheim (MoST)

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Stakeholder participation is essential for the design and implementation of innovations, the planning and regulation of infrastructure, services, and transportation systems, as well as the assessment of transportation-related activities. But throughout the many transport domains and at various stages of transport planning, there are significant differences in the variety of stakeholders, their roles and duties, and their willingness to engage in research and planning. As a result, it is necessary to define new types of initiatives that can bridge the gap between research and practice. This approach will be beneficial in finding more creative and innovative solutions for improving city transportation and mobility systems, as well as providing a better overview and data collection for planners in the public and private sectors who work on designing and planning future transportation systems. Furthermore, new methodologies, approaches, tools, and insights are required to better understand why stakeholder involvement is necessary, who the main players should be, how they may be involved, and the implications of transportation on them. Based on the circumstances given above, a new project has been developed in Trøndelag county in Norway together with the Norwegian University of Science and Technology (NTNU), focusing on smart and sustainable mobility solutions for the extended region of Trondheim. This paper provides a brief overview of the stakeholder thinking for the “living lab concept called ” Mobility Lab Stor Trondheim (MoST) which is a collaboration between NTNU and several public stakeholders. The paper will address the stakeholder process used in the development of the “livinglabs”, goals, vision, activities, success factors and the values it brings for different stakeholders. This paper will use literature and document analysis to provide a theoretical background and demonstrate how this theory can be applied in actual work projects in the Norwegian public sector, bridging the gap between research and practice. Desk research and data from several ongoing research projects under the MoST umbrella will be combined to provide this theoretical background. The results will demonstrate how crucial it is to have a project of this kind in order to help develop and test cutting-edge technology that support sustainable transportation in urban areas and to modify behavior in ways that can be applied to other large cities. Furthermore, the project's emphasis the need for analyzing and understanding of societal behavioral during the planning and testing of new mobility solutions. The attitude changes will highlight how important it is to hear the opinions of variety of stakeholders in order to create a mobility solution that gives a more sustainable society. The findings of this study may have implications for the growth of sustainable urban transportation systems as well as for adaptable behavioral modifications.

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EXPLORING INFLUENTIAL FACTORS AFFECTING PUBLIC TRANSPORT APP USAGE IN MEDIUM-SIZED CITIES

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Across urban landscapes, the pervasive reliance on private vehicles poses a multifaceted challenge to mobility and sustainability. As cities grapple with congestion, emissions, and spatial constraints, fostering a shift towards public transportation emerges as a vital imperative for the future of urban mobility. This research seeks to explore the viability of a forthcoming U-MOVE mobility application geared towards promoting public transportation (PT) usage in medium-sized cities and underserved suburban areas, where car travel prevails and PT usage is minimal. The case study focuses on the city of Caceres in southwestern Spain. User inclinations towards adopting the mobile application to bolster PT are examined through a survey that garnered 643 valid responses. According to the literature, individual's motives for using travel apps are grouped into seven latent variables namely (1) Gain motives, (2) Technophilia, (3) Hedonic motives, (4) Normative motives, (5) Prospective use, (6) Apps current use and (7) Intention to use. To study these variables and their relationships, Structural Equation Modeling (SEM) methodology was employed, combining path analysis and confirmatory factor analysis. Partial Least Squares (PLS) approach was utilized for this estimation. This method consists of an iterative algorithm that first estimates the measurement model (i.e., the relationships between each latent variable and its observed indicators), and then estimates the structure model (i.e., the relationship between the latent variables). All analyses were conducted using Smart PLS 4 software (https://www.smartpls.com/). Measurement model assessment confirmed reliability with Cronbach's α and Composite Reliability under 0.7 and convergent validity with average variance extracted (AVE) over 0.5. The structural model tested causal relationships between latent variables, ensuring the absence of collinearity (Variance Inflation Factor values below 5). Discriminant validity is confirmed since correlation values between variables are lower than those on the diagonal of the correlation matrix. Structural model path coefficient estimation supported all research hypotheses, with statistical significance at 1%. Results from the SEM estimation indicate statistically significant relationships between latent variables, supporting all proposed hypotheses. The relationship between Normative/Hedonic motives (0.65) and Prospective/Intention of use (0.55) has the highest structural model path coefficient estimation, while the relationship between Apps/Prospective use (0.11) and Technophilia/Gain motives (0.14) has the lowest. The model's explanatory power is evaluated using the coefficient of determination (R2). Based on the assessment, it has been found that the variables "Normative motives" and "Apps current use" have weak explanatory capacity, while "Prospective use and Intention to use" show moderate explanatory capacity, and "Gain motives and Hedonic motives" have strong explanatory capacity. Overall, the study provides a robust analysis of the proposed model, confirming the relationships between latent variables and offering insights into their explanatory power.

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Hansen’s Accessibility Theory and Machine Learning: A Useful Merger or Just More of the Same?

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Accessibility is a central concept in transport geography, given its relationship with land development. Regarded as the pioneer of accessibility theory, Hansen (1959) introduced the concept, defining it as the ‘potential of opportunities for interaction’. More precisely, in Hansen's perspective: “accessibility is a measurement of the spatial distribution of activities about a point, adjusted for the ability and the desire of people or firms to overcome spatial separation”.
Accessibility can be computed based on mobility flows between areas/regions, and it has been the point of departure for multiple theoretical and empirical analyses. In the last decade, advances in Machine Learning (ML) techniques have made it possible to capture the complex dynamics of socio-economic variables and have opened new possibilities for developing innovative approaches to measure accessibility.
The objective of this work is twofold: on the one side to comprehend and test whether ML can replicate accessibility estimation results as those produced using Hansen's accessibility theory; on the other side to explore whether ML, merged with Hansen’s model, might open new theoretical developments, For this purpose, the empirical analysis – related to the complex network of urban transport in two Italian regions – will consist of three empirical steps: a) to extract Hansen accessibility by calibrating a (doubly constrained) spatial interaction model; b) to extrapolate Hansen accessibility by training an ML on employment, residents, and travel time data. In particular, this procedure allows for the measurement of accessibility when flow data is not available; c) to assess the impact of spatial (transport) networks on accessibility. This approach has been tested on data collected – at the urban level – in two Italian regions, Lombardia and Emilia Romagna.
We considered two ML methods and compared them to the original Hansen’s measure. The adopted ML techniques are based on Neural Network (NN) and Random Forest (RF), given their consolidated applications in several socio-economic and transport fields. The results show that, although NN and RF seem to well reproduce Hansen’s accessibility ranking in both spatial and temporal dimensions, RF performs slightly better.
To conclude, the emerging results highlight the relevance of the joint ’Hansen-ML’ approach and the related space-time transferability potential, but also that the opaqueness of ML approaches poses a challenge for theory development.
Future research directions contemplate the integration of the 'Hansen-ML' accessibility approach with other approaches, such as network analysis and shock propagation analysis, to explore the theoretical and methodological relationship between accessibility and network connectivity, which might be relevant to transportation planning strategies.

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Identifying complexity to reallocate street space: An open-source tool for Portugal

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Traditionally, urban road space allocation has relied on the hierarchical street classification, favoring traffic lanes in arterials and allocating more space to parking or sidewalks in local streets. However, a dilemma arises in more complex urban environments that face limitations in space and must accommodate both mobility and access functions. Consequently, deciding how much space to allocate in complex urban areas for these functions is not always evident and requires tradeoffs. Additionally, these zones tend to have high intensity and fluctuation of multimodal demands, leading to underutilized spaces at certain times of the day. There is a potential to reallocate space dynamically over time according to fluctuations of demand, having a more efficient and just space distribution. We define a complex space as facing the mobility vs access dilemma, having high connectivity, having dense and diverse land use and with high levels of traffic or/and public transport at least one hour of the day. Zones with these characteristics tend to have scarce urban space to fulfill the street's mobility and access functions. To address this issue, we propose a site selection methodology to identify complex zones within cities on a macro scale where diverse users and demands compete for space. These zones require a deeper understanding of urban dynamics to prioritize sustainable transportation policy. The proposed methodology uses open data such as road network, information on population, land use, and transit and traffic dynamics, provided by OpenStreetMaps, national census, Google Maps API and General Transit Feed Specification (GTFS) sources. We propose indicators to determine locations that we consider complex to reallocate road space. In previous work we demonstrated this application through a case study in Lisbon, offering planners a starting point to assess activities and temporal-spatial demands when reallocating road space. We developed an R package that can reproduce the proposed methodology in any location in Portugal. Adaptations from the initial methodology were needed due to the different contexts, and scale of analysis. This methodology could be expanded not only to other countries (as long as required data exists) but also for applications such as identifying 30km/h zones.

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Main mode or feeder mode: factors influencing the usage of shared micromobility options

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Background: The global proliferation of shared mobility schemes impacts individual travel choices by enriching residents' mode options. Shared bikes, e-bikes and moped are widely adopted for different mobility purposes, including commuting (for work or study) and non-commuting trips (leisure, grocery or personal errands). Moreover, shared micromobility services (SMS) are not only acting as an independent travel mode, but also can be integrated with public transport in multimodal trips. Despite the advantages and flexibility brought about by the SMSs, previous research shows that there are disparities in residents' access to these services and preferences for using shared modes, due to socioeconomics, digital capabilities, and spatial distribution of these services. However, there is still scarce research on the factors affecting the usage of SMSs for different purposes. To address this gap in the literature, we designed and implemented a combined revealed and stated preference survey in the Rotterdam-The Hague Metropolitan Area of the Netherlands.

Survey and experimental design: The survey comprises four main blocks: questions about individual characteristics (socio-economics and capabilities), revealed travel patterns, stated travel behavior and adaptive stated preference (SP) experiments. The experiment is structured with 3 alternatives, 4 attributes and 3 levels. Different travel mode options are considered in the attribute 'travel mode': private transport as alternative(Alt) 1, shared mode, public transport as Alt 2 and Alt 3. Additionally, attributes such as in-vehicle time, access/egress time and travel cost are also taken into account. Each respondent is assigned 6 choice tasks in which one random travel mode within each alternative will be displayed. Then adaptive customization of attribute levels (in-vehicle time and travel cost) are tailored based on individual revealed travel patterns. The experimental set-up are not completely hypothetical but based on individual's most frequent trips. The variation of in-vehicle time and travel cost are 30% and 20% respectively while it's fixed value for access/egress time (5, 10, 15min).

Result: The mixed logit model is utilized to examine the relationship between respondents' potential usage behavior on SMS and their individual characteristics. Coefficients of exploratory variables are calculated to reveal the differential impacts of the same factor on various shared modes. Determinants and barriers affecting different functionalities (independent mode for a trip or feeder mode integrated with public transport) of shared micromobility are also identified. Our findings indicate a preference for integrating shared micromobility with public transport over using it for the whole trip. Notably, in-vehicle time and travel cost exert significant impact on the potential usage of SMS. Implications from this study will provide references for municipalities and shared mobility operators about urban planning and mobility management strategies.

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Mobility at large. Will overweight vehicles be the future?

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Road transport causes around 20% of the total GHG emissions at the European level, accounting for about 70% of the transport sector ones. According to the European Environmental Agency, in 2021, 97% of the urban population was exposed to concentration of fine Particulate Matter (PM 2.5) above the level set by the World Health Organization [1].
Other than avoiding and shifting strategies, electrification of private vehicles (EVs) is emerging as a viable solution in the urban mobility transition towards sustainability. Vehicle downsizing and lightning, coupled with efficiency gains in material processing, can greatly reduce the production energy footprint of new vehicles [2]. Our analysis of private vehicle fleet market data characterizes the European mobility stock (EU27, Italy as focus) in terms of registration per year, segment (Small, Medium, Large-SUV), and mass trends.
We draw a parallel between the US and EU27. Historically, in the US car weight decreased between 1970 and the late 70s but has been increasing steadily since then. A cause can be found in the New Car Assessment Program and the crash test protection policies released in 1979. EU27 safety policies [3], [4] could have led to a similar weight increase. Other features like air conditioning and automatic transmissions added more weight than safety or anti-emissions technologies [5]. Considering vehicle dimensions, new cars in the EU are subject to the same maximum width, 255 cm, as buses and trucks, a limit set in 1996 [6] but never truly intended for cars [7].
Our analysis highlights how medium-segment vehicles are the most popular considering both European (EU27) and Italian geographic areas. Moreover, private car weight is steadily increasing, affecting the street design and the urban form. We found a +17% in weight for private vehicles in EU27 in 10 years, considering all vehicles, with an average of 1458kg. Instead, the average weight for EVs is 1804 kg, well above the average value. In Italy, the average weight has increased by +15% for all feeding systems between 2010 and 2021.
Oversized private cars result in resource-inefficient vehicles in terms of raw material use, energy consumption and road safety. Upcoming policies intended for private passenger use, should address this issue.

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Optimizing the fleet size of dynamic ride-sharing services in low density areas (Las Rozas as a case Study)

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Ride-sharing is a promising way to reduce car use, increasing car-occupancy ratios. However, it is difficult to match trips in daily mobility, and this problem is ever higher in suburban areas because of the O/D trip dispersion. A variety of strategies have been implemented to address this problem. One is a dynamic or real-time ride-sharing service that extends the matching (joint) trips by tracking the participants' location information. However, when the demand is low, fewer trip requests are generated. At the same time, offering a large ride-sharing fleet will not satisfy neither the user nor the operator of the service. Consequently, this study aims to calculate the optimal fleet size for dynamic ride-sharing systems in the context of urban outskirts. The case study is Las Rozas, 94,682 inhabitants in the suburbs of the Madrid Metropolitan Area.
A two-stage approach was followed to achieve this objective. Firstly, multivariate linear regression was employed to provide a demand model. The zone- and household-level data used for modelling was collected by the municipality of Las Rozas and a survey conducted there, respectively. The second stage was to optimize the supply according to the potential generated ride-sharing trip requests. This goal was achieved by simulating a dynamic ride-sharing system, followed by optimizing the fleet size of supply in that system. The origin-destination demand segment of ride-sharing was introduced to generate trips in the studied road networks modelled using PTV Visum 2024 platform. Afterwards, the Visum extension (Addin) DRT (Demand Requested Transit) was used to simulate a dynamic ride-sharing system consisting of (i) a huge number of active points of pick-up/drop-off (PUDO) to represent the dynamic request. The PUDOs were counted for the nodes of roads with walking accessibility (i.e., the nodes at highways and railways were not considered), (ii) trip request dispatcher to represent the matching service, and (iii) a tour planning step to provide evaluation indicators for the system.
Various scenarios of ride-sharing fleet sizes were tested for the demanded trip requests in this area. The results have shown that the ride-sharing demand in Las Rozas generated 108 trip requests, and 123 persons were served according to model outputs. Four indicators were selected as model variables: journey time, waiting time, maximum detour a passenger accepts to pick up other passengers on the way, and the total travelled distance. The optimal ride-sharing fleet size for both the user and operator was 75. This means that approximately the optimal supply corresponds to a system with a vehicle fleet of around 75% of the requested trips in this area. In addition, the supply of holding areas for waiting vehicles has not improved the system. This could be related to the small amount of trip requests due to the scattered demand in the suburbs. Practically, this study provides a hint to enhance the design and the expectations of dynamic ride-sharing systems in low-density areas from the user and the operator perspectives.

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The Modifiable Temporal Unit Problem in Accessibility Evaluations of Public Transport Projects

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The way the temporal structure of GTFS-based data is analytically structured can have a significant influence on the results in evaluations of the accessibility impact of new public transport projects (Boisjoly & El-Geneidy, 2016; Pereira, 2019). The problem is known as the modifiable temporal unit problem (MTUP) and is the temporal counterpart to the modifiable area unit problem (MAUP). The MTUP consists of three effects, notably the aggregation, the segmentation, and the boundary effect (Cheng & Adepeju, 2014). A few studies have investigated the boundary effect of the MTUP, such as Pereira (2019), but the aggregation and segmentation effect of the MTUP remains less investigated in the accessibility literature. One reason is that the computational requirements of re-running origin-destination matrices at high spatial and temporal resolutions for large metropolitan areas continues to be a challenge.

In this study we investigate the impact of the aggregation and segmentation effect of the MTUP by analyzing the job accessibility impact of a restructuring of the bus system in the Trondheim Metropolitan area, Norway, into a bus rapid transit system in 2019. In the study we run a gravity-based job accessibility calculation with a high spatial resolution at the 250-meter level with 1-minute re-run intervals for a 24-hour period with normal scheduling before and after the BRT-implementation. Next, we analyze the impact of the MTUP by segmenting the 24-hour periods before and after implementation into different time windows and by aggregating the mean job accessibility values based on coarser re-run intervals.

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The role of digital skills in the use of shared modes and mobility hubs

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The popularity of shared mobility services (such as bike or e-scooter sharing) and mobility hubs is increasing in cities worldwide, with the potential of improving accessibility for all. Digitalization is crucial for the use of shared mobility services, as planning, booking and payment often require mobile phone applications and a credit card. People who are not accustomed to digital technologies or have low levels of digital mobility skills (which is defined by their experience of using mobile mobility applications) cannot use these modes, leading to inequality issues. However, it is not clear what the exact impact of digital mobility skills is on the uptake of shared mobility. Therefore, this study focuses on identifying the determinants of digital mobility skills and its impacts on shared mobility and mobility hub use. The results of a large-scale survey (N=2515) across four different cities in Europe were analysed using statistical analyses, showing that lower digital mobility skills are related to other vulnerable-to-exclusion characteristics such as higher age, lower educational level, and unemployment. Furthermore, the uptake of shared modes and mobility hubs is much lower for people with low digital mobility skills, as they face additional barriers to use these services. These results reveal how the growth of app-driven shared mobility services can increase accessibility inequalities.

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Towards a resilient framework for passenger rights protection in the context of urban mobility: An analysis on existing EU policy goals on passenger rights

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With over 75% of the population living in cities, Europe is one of the most urbanized areas in the world. In order to fulfill the growing travel needs and at the same time reduce greenhouse gas emissions, the EU has introduced the new framework for urban mobility promoting "active, collective, and shared mobility" [1]. New mobility solutions that leverage on platform technology (hereinafter referred to as "platform-based mobility solutions"), such as mobility-as-a-service, sharing steps, car-pooling, or ride hailing, are being integrated in the mobility landscape in multiple cities in Europe to enable people to move more seamlessly with more comfort and transparency. However, the benefits generated from the platform-based mobility solutions should not come as a cost of passengers' safety.

Passengers in the EU enjoy a set of rights whether they travel by air, rail, ship, and road (for bus and coach) [2]. There are dedicated EU regulations to guarantee passengers a minimum level of protection when they embark on a journey using these four modes of transport. However, there are no legislations at the EU level to offer an equivalent protection to passengers when they travel in an urban context. Therefore, it is necessary to examine whether the existing EU policy goals on passenger rights protection are also applicable in the context of urban mobility.

Since 2011, after the release of the 2011 White Paper on passenger rights [3], the EU has acknowledged the need to develop a high-level passenger rights protection framework to enable passengers to engage in multimodal, seamless, and door-to-door trips [4]. In addition, there are various initiatives to promote integrated ticketing system [5] to promote multimodal journeys. Therefore, there are political intentions to promote passenger rights protection across all modes of transport, including the platform-based mobility solutions in the urban context. However, this intention has not been reflected in the current EU policies and legislation framework for passenger rights. In this paper, I examine whether the EU's existing policy and legislation on passenger rights protection should expand to cover platform-based mobility solutions. By analyzing the policy documents and conducting interviews with relevant stakeholders, including the passengers and the mobility services providers, the paper aims to provide an analysis on the gaps in the existing EU passenger rights acquis.

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Understanding the influence of socioeconomic characteristics on urban bus satisfaction in Oviedo and Tangier

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Bus services play a key role in the complex realm of urban transportation. Still, their use depends on user satisfaction, which is woven with each city's diverse demographic, social, and economic characteristics. This research presents a comparative exploration of the perceived quality of urban bus services, spotlighting the unique dynamics in Oviedo (Spain) and Tangier (Morocco), representing European and North African cities. Understanding passengers' preferences and expectations placed on public transit systems is the basis for tailored transportation solutions. This study unfolds distinct patterns in passenger satisfaction and how it is influenced by age, level of study, and employment situation in the rich context of the two contrasting cities.

The significant disparities in satisfaction levels across various service attributes underscore the importance of conducting an in-depth analysis of diverse urban contexts. This analysis encompasses demographic characteristics, built-up areas, and socioeconomic and cultural characteristics. Understanding these factors is crucial for comprehensively assessing the intricacies of passenger satisfaction and tailoring urban transportation strategies accordingly.

Methodologically, this study carefully selects representative bus lines, conducts surveys and data collection, and then analyses using appropriate statistical tests such as ANOVA tests to make robust comparisons. This comparative approach, which examines cities with disparate contexts, enriches our analysis and distinguishes this study from others, as it makes a distinctive contribution by delving into the specificities of two cities and highlighting the importance of context in understanding and enhancing passenger satisfaction in urban transport.

In conclusion, our comparative analysis reveals intriguing distinctions in passenger satisfaction influenced by diverse demographics and socioeconomic characteristics. In Oviedo, age is a significant factor shaping preferences, particularly regarding the bus network, ease of purchasing tickets/cards, and weekday frequency. Educational backgrounds impact satisfaction with service information, ticket prices, travel comfort, and smooth driving. Employment situations influence contentment with ticketing processes and weekday schedules. Conversely, in Tangier, age-related preferences centre around the importance of travel comfort and service start/end times. Educational backgrounds influence satisfaction with ticketing, travel comfort, and schedules, while employment situations impact contentment with ticket prices, travel comfort, and service hours. The results of the study offer nuanced insights for tailoring urban transportation strategies.

Understanding users' needs and preferences of urban bus networks and services among diverse demographic groups within various urban contexts is key to cities for achieving a more sustainable and efficient public transportation system. That involves recognizing factors such as age, socioeconomic status, cultural and educational background, and employment situations that influence individuals' transportation choices and experiences. By tailoring transportation services to meet the specific requirements of different population segments, cities can enhance accessibility, affordability, and convenience, thereby encouraging higher adoption of public transit options. This shift towards more sustainable modes of transportation aligns with the broader goal of mitigating environmental impacts associated with private vehicle use, including reducing greenhouse gas emissions, minimizing air pollution, and alleviating traffic congestion.

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What Affects Driving Behavior in Electric Vehicles? A Literature Review

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The increased use of electric vehicles presents a promising pathway for reducing greenhouse gas emissions, contingent upon the extent to which plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) are used as replacements for internal combustion engine vehicles (ICEVs). Accordingly, this comprehensive review of the literature assesses the factors influencing the driving patterns of BEVs and PHEVs, focusing on vehicle kilometers travelled (VKT). Based on a review of 30 papers mainly from European countries and the United States, the empirical findings suggest that BEVs and PHEVs tend to cover fewer VKT than ICEVs, indicating that there is no clear evidence of a rebound effect from their usage. The results of this review also suggest that the VKT of BEVs varies across different geographic contexts and increases over time. Specifically, BEVs are likely driven for longer daily distances in European countries, compared to those in the USA.

Sociodemographic factors and traditional built environment attributes also play an important role in determining the VKT of BEV and PHEV users. For instance, compared to one-person households, larger households tend to exhibit extended VKTs with BEVs and PHEVs. Also, as the degree of urbanization increases, the VKTs of BEVs generally decrease. Ownership status, though less explored, emerges as a significant factor, with leased and shared BEVs and PHEVs likely to have longer VKT than their owned counterparts.

Specific to BEVs and PHEVs, household car fleets, electric driving range, charging accessibility, and attitudinal factors also influence VKT. Generally, the size of household car fleets is negatively correlated with the VKT of BEVs and PHEVs. Furthermore, the composition and size of household car fleets play a central role in affecting the role of charging accessibility in VKT of BEVs and PHEVs. The charging accessibility includes availability of charging locations (i.e. home, workplaces, and other public spaces), associated type of chargers, electricity price for home charging, and fuel price associated with ICEVs.

Finally, several avenues for future research are proposed. One avenue involves examining the impact of vehicle ownership status on BEV and PHEV utilization. Another potential area for study is longitudinal analysis, aimed at assessing changes in driving behavior in response to the increased electrification of household car fleets. Additionally, repeated cross-sectional studies could be conducted to capture the evolution of BEV and PHEV usage over time. Finally, there is a need for studies investigating the effects of BEVs and PHEVs on major life events, notably residential relocation.

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Willingness to adopt Mobility as a Service (MaaS) in Madrid

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Mobility as a Service (MaaS) is an emerging innovation representing an intelligent mobility distribution model in which all mobility service providers (MSPs) offerings are aggregated by a sole mobility provider, the MaaS Operator (MO), and supplied to users through a single digital platform [1]. Based on survey data, the present study will look at the willingness to use a MaaS service in Madrid (Spain). The survey counts 1,000 respondents from Madrid and contains general socioeconomic and demographic information, users' mobility and activity patterns, and aspects related to MaaS adoption and willingness to pay.
Studies have addressed the potential impact of MaaS on individuals' daily travel behavior and choices, users' willingness to join a MaaS scheme, and the important factors for them [5-7]. Prior behavior [6], special travel needs [8], different mobility packages [9], or the type of user are determinants for MaaS success. Congestion alleviation, reduced emission levels, or increased accessibility [16;17] are also expected. However, some studies point to the risk that MaaS could lead to trips moving from sustainable transport modes (public transport, walking, and cycling) towards taxis or car-sharing [18]. While MaaS is potentially more attractive for young people living in urban areas, the existing literature lacks an inclusive approach to the needs of other groups of users potentially excluded from the system whether due to dissent, cost, or technology aversion. The outcomes of this study might help policymakers and transport service providers to understand the needs of transport users for MaaS systems and improve commercial strategies.

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Exploring residents' intention to provide shared mobility services in peripheral areas

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Sustainable tourism development is an important chance to balance economic growth with environmental protection, particularly in peripheral areas impacted by depopulation, aging, and limited earning opportunities. There, the lack of convenient transport services is a main obstacle to tourism. Building 'traditional' transport infrastructures is both economically unviable and unsustainable. Digitalization-based, on-demand, multimodal, green and innovative solutions have been experimented, but are not feasible where large public funding is unavailable. Shared mobility (SM) may be the ideal remedy. SM encompasses different forms of services providing short-term access to various transportation modes. Commercial SM is hardly profitable in peripheral areas, due to slow scalability, frequent vandalism and thefts. Non-commercial SM is less risky and requires no investment, just residents' participation, in exchange for supplemental income and lower environmental impact, compared to introducing further vehicles. However, such areas are typically inhabited by small, aged and closed communities, reluctant to innovation. Their willingness to participate in building a local SM system is not obvious, especially after COVID-19 introduced the fear of contagion. Most literature about SM investigates consumers' motivations, while the drivers of non-commercial providers are still under-researched.

This study brings empirical evidence about the residents' intention to provide tourist services on sharing basis, in twelve Croatian and Italian peripheral areas. From the Perceived Social Norms theory and Vroom's Expectancy framework, we explore if community perceptions influence residents' willingness to share transport with tourists, availability to engage in the sharing economy in general, and perception of their community's intention. We estimated a Bayesian multivariate logistic regression with correlated random intercepts, on 482 data points, collected through face-to-face interviews. Results indicate a very negative attitude towards participating as a provider in the sharing economy, that is milder in areas closer to main seaside destinations, marked in mountain areas. COVID-19 has likely exacerbated this reluctance. The least available to share transport are residents with the lowest education level, those with yearly income greater than €50,000, but also people aged 15-24. The latter look enthusiast to share other with tourists, so likely they just do not own any vehicle. Different socio-demographic characteristics are related to the intention to provide different services. Seniors and retirees are significantly less available than the average to share something, but not as much refractory to contribute to building a local shared mobility system. The same holds for self-employed, employees, people working in the tourism or the agriculture sector. Unexpectedly, the perceptions that the local community is hospitable, skilled and participative in tourism do not influence respondents' intentions, nor their expectations about their neighborhood. While trust in the suitability of their town as a tourism destination contributes to their expectations about their community, consistently with Vroom's Expectancy theory. Conversely, we have found no confirmation of the Perceived Social Norms theory. The main obstacle to the participation of residents as providers in sharing looks its character of innovativeness, interpreted negatively as strangeness from living habits. These results bear useful implications for policy-makers and tourism development agencies.

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Local stakeholders and sustainable tourism: how to shape bike-friendly accommodations?

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Sustainable tourism development is an important chance to balance economic growth with environmental protection, particularly in peripheral areas impacted by depopulation, aging, and limited earning opportunities. There, the lack of convenient transport services is a main obstacle to tourism. Building 'traditional' transport infrastructures is both economically unviable and unsustainable. Digitalization-based, on-demand, multimodal, green and innovative solutions have been experimented, but are not feasible where large public funding is unavailable. Shared mobility (SM) may be the ideal remedy. SM encompasses different forms of services providing short-term access to various transportation modes. Commercial SM is hardly profitable in peripheral areas, due to slow scalability, frequent vandalism and thefts. Non-commercial SM is less risky and requires no investment, just residents' participation, in exchange for supplemental income and lower environmental impact, compared to introducing further vehicles. However, such areas are typically inhabited by small, aged and closed communities, reluctant to innovation. Their willingness to participate in building a local SM system is not obvious, especially after COVID-19 introduced the fear of contagion. Most literature about SM investigates consumers' motivations, while the drivers of non-commercial providers are still under-researched.

This study brings empirical evidence about the residents' intention to provide tourist services on sharing basis, in twelve Croatian and Italian peripheral areas. From the Perceived Social Norms theory and Vroom's Expectancy framework, we explore if community perceptions influence residents' willingness to share transport with tourists, availability to engage in the sharing economy in general, and perception of their community's intention. We estimated a Bayesian multivariate logistic regression with correlated random intercepts, on 482 data points, collected through face-to-face interviews. Results indicate a very negative attitude towards participating as a provider in the sharing economy, that is milder in areas closer to main seaside destinations, marked in mountain areas. COVID-19 has likely exacerbated this reluctance. The least available to share transport are residents with the lowest education level, those with yearly income greater than €50,000, but also people aged 15-24. The latter look enthusiast to share other with tourists, so likely they just do not own any vehicle. Different socio-demographic characteristics are related to the intention to provide different services. Seniors and retirees are significantly less available than the average to share something, but not as much refractory to contribute to building a local shared mobility system. The same holds for self-employed, employees, people working in the tourism or the agriculture sector. Unexpectedly, the perceptions that the local community is hospitable, skilled and participative in tourism do not influence respondents' intentions, nor their expectations about their neighborhood. While trust in the suitability of their town as a tourism destination contributes to their expectations about their community, consistently with Vroom's Expectancy theory. Conversely, we have found no confirmation of the Perceived Social Norms theory. The main obstacle to the participation of residents as providers in sharing looks its character of innovativeness, interpreted negatively as strangeness from living habits. These results bear useful implications for policy-makers and tourism development agencies.

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Peak car the need for reassessing public transport communication. In the tourism context

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Dirk Zumkeller, and Bastian Chlond (2013) and (2014) report on a six-country study covering travel trends since the 1990s that the decrease in young adults' orientation towards the car as a means of getting around did indeed contribute significantly to the recent stagnation in car travel. Decreasing driving license ownership amongst youngsters and the growing awareness on the environmental impacts of travelling within the overall society generates growing demand for providing accessibility to tourism destinations with green transportation modes. Also, Konrad outlined in 2019: "the higher the personal ecological norm, the more frequently public transport and bicycles are used and the less frequently the car". Accessibility by public transport therefore becomes a growing competitive advantage for tourism service providers, especially in the rural context. This fact unfortunately goes still quite unrecognized amongst stakeholders. Especially accommodation providers still lack a better understanding on the importance of accessibility management in general and even more when it comes to the relevance of accessibility by green modes (Gronau 2016).
Instead of acknowledging the constantly growing funding gap for public transport services, public transport providers find themselves regularly in the role of supplicator to ensure at least a basic level of service. Instead of understanding the provision of public transport service as fundamental accessibility management for the economic development of a given area it is regularly seen by various stakeholders as unnecessary burden, especially in the periphery.
Therefore, the paper at hands calls for a fundamental paradigm-shift in the way stakeholder perceive and consequently communicate on the need for the provision of public transport services within the tourism context. New ways of active communication towards all involved stakeholders are key to change the public perception on green modes. Marketing is still often seen as unnecessary and, in many cases, not even fundable through public funds. The creation of target group orientated attractive campaigns addressing for example an environmental aware public transport friendly urban clientele like showcased by the National Park Authorities of the Eifel almost 15 years ago (Kagermeier et al 2015). In cooperation with the regional public transport authority of Cologne the National Park authorities launched a campaign based on adhesive foils covering the whole body of tramways to raise awareness among Cologne residents. This awareness campaign managed to double the proportion of visitors who reached the national park by public transport between 2005 and 2007 (Erdmann and Stolberg-Schloemer, 2007, p. 14). Unfortunately, such successful campaigns are still presented today as there is a clear lack of such initiatives. Considering the before mentioned change of attitude amongst the younger generation one has to hope for an necessary transition towards a more sustainable transport system in the future, essentially driven by young people as the 'new generation' (Kuhnimhof/ Buehler/Dargay 2011).

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Residents' perspective on sustainable tourism: the role of transportation issues

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In the tourism domain the interplay between visitors and residents interacts with the social and natural environment (UN, 2020). Despite economic benefits, negative impacts on residents may include pollution and road congestion. Many studies analysed residents' opinions about tourism (Chen et al., 2020; Ap, 1992), but a scarce attention is devoted to marketplaces, which integrate different stakeholders to develop local economies (Janssens & Sezer, 2013; Snepenger et al., 2003). In this paper we study the extent at what transportation features related to a local marketplace involving visitors, vendors and local institutions might affect the residents' perception about the social, economic and environmental sustainability of the shopping space.

As a case study, we consider the Mercato di Luino, a local marketplace in the province of Varese (Italy) and bordered with Switzerland, which attracts hundreds of local visitors, but also foreign tourists. Primary on-line survey data among residents are used to assess the sustainability aspects of the marketplace by focusing on transportation issues. Respondents are divided into four groups, based on the intersection of two dimensions. The first one concerns the transport modes to reach the town of Luino, as out-of-town people use private cars, while in-town ones tend to walk, ride a bicycle or catch local buses. The second one maps residents depending on their view of the marketplace as a source of negative transport-related externalities. The resulting groups are first profiled by the following descriptors: age, gender, attendance of the marketplace, and relationship with peers attending the shopping space. Then, specific responses to questions about the social, economic and environmental sustainability of the marketplace are analysed. ANOVA tests on scores for each group are applied, and robustness is checked by Fisher-Hayter and Tukey's Honestly Significant Differences, as post-hoc techniques. The preliminary analysis of the four segments provided insightful results. Overall, the residents' negative opinion in terms of transport issues has a downward effect on sustainability claims, especially when considering social dimensions, i.e., the ability of the shopping space to increase meeting chances among residents and visitors. Considering in-town residents, we found that road congestion and traffic can offset recognizable economic benefits generated by vendors. Finally, there exists a clear-cut linkage between transport issues and another key stakeholder, such as the local municipality. Actually, average scores related to the quality of local institutions are statistically lower when transportation issues induced by tourism flows are considered by residents as being relevant.

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Rural Footprints of Leisure Choice – Exploring Spatial Complementarities in ‘Happy Feet’ And ‘Green Beauty’ Tourism

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Happy Feet'–'Green Beauty' tourism nexus represents the functional spatial interplay between entertainment-centered tourism and nature-based visitors' choices. This paper focuses on rural (non-urban) tourism patterns emerging from the interaction between these two forms of tourism in the context of sustainable destination development, using Las Vegas and its nature hinterland, as a case study. The analysis addresses important key concepts, urban-rural tourism nexus, deconcentrated concentration of tourism, entertainment tourism, health tourism, nature/eco-tourism, tourism crowding, spatial substitution complementarity in tourism, outer-inner city tourism synergy, and intervening spatial opportunities in tourism. The study develops a novel methodological framework for identifying the drivers of rural (non-urban) tourism choices as spillover effects from tourism crowding in major attractions. Mapping out this transition in leisure behavior contributes to a comprehensive understanding of the 'Happy Feet'–'Green Beauty' tourism nexus for post-corona tourism development and informs future research and practical implications in tourism spillover studies. Tourism patterns are changing from mass centers to intimate hubs, aligning with the growing demand for nature getaways and distancing from crowded urban spots. By dispersing tourists, destinations can address overcrowding and boost long-term sustainability. Casino and gambling tourism, like in Las Vegas, must align with ‘Green Beauty’ tourism principles for sustainable development. The post-pandemic era emphasizes health and nature-based experiences, promoting open spaces, outdoor activities, and safety measures. This analysis informs sustainable tourism and resilience. Overcrowding in popular tourist spots is a concern, but ‘Green Beauty’ tourism offers less crowded alternatives. Redirecting tourists can manage tourism impacts and create a sustainable and enjoyable experience. Health tourism combines wellness and medical tourism with nature experiences. Understanding health tourism within green principles meets health-conscious traveler needs. Nature and eco-tourism emphasize sustainability, biodiversity, and responsible interactions. Spatial substitution in tourism reflects tourist redirection due to overcrowding, health concerns, or seeking diverse experiences. Tourists are shifting from urban entertainment to rural nature experiences, guiding destination choices. The urban-rural tourism synergy enhances the overall experience by offering both urban and natural attractions. It contributes to sustainable destination development and management. Intervening opportunities in tourism provide unique unplanned experiences during the transition from 'Happy Feet' tourism to ‘Green Beauty’. It enhances visitor experiences, destination loyalty, and understanding tourist behaviours. In conclusion, the 'Happy Feet' – 'Green Beauty' tourism nexus offers a holistic understanding of urban tourism's interaction with nature experiences. This knowledge equips tourism professionals to make informed decisions on sustainability, efficient management, and the preservation of natural and cultural resources that underpin these tourism experiences.

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STAKEHOLDER INVOLVEMENT IN PROMOTING CYCLING IN RURAL AREAS: AN EVALUATION OF THE “RADLUST” PROJECT IN THE BIRKENFELD MUNICIPALITY

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INTRODUCTION
Transportation significantly contributes to greenhouse gas emissions, a concern that Germany aims to address by reducing emissions, particularly in transport. Cycling, as a low-emission transport mode, has been identified as a key component in achieving these goals. The “RadLust” project in Birkenfeld is an initiative designed to enhance cycling infrastructure and promote cycling as a sustainable transport option in rural areas. This study focuses on evaluating the project's effectiveness, with a special emphasis on the involvement of various stakeholders in its planning and implementation.

OBJECTIVES
The objective of this study is to assess the role and impact of stakeholder involvement in the “RadLust” project. Specifically, the study seeks to understand who the key stakeholders are, why their involvement is crucial, how they contribute to the project, and the overall impact of their participation on the project's success. This evaluation aims to provide insights into optimizing rural transport policies and practices for sustainable mobility, particularly in promoting cycling.

METHODOLOGY
Data collection for evaluating the “RadLust” project encompassed various stakeholder perspectives, including residents, regional hosts, bike experts, and tourists. Tailored questionnaires for each group were developed and distributed through different channels, including email, online surveys, and physical distribution in tourist accommodations. The data analysis, conducted using SPSS, focused on understanding stakeholder perceptions of the cycling measures implemented, their effectiveness, and the overall impact on sustainable mobility in the region.

PRELIMINARY RESULTS
The study's preliminary findings indicate varied perceptions among different stakeholders. While the majority of hosts acknowledge the existence of cycling tourism businesses, there is a desire for more soft mobility offerings. Residents generally perceive the transport situation for bicycles as poor, compared to other modes of transport. Bike experts highlight the need for improvement in multimodal transport interfaces and suggest the implementation of regional bicycle rental systems and joint marketing efforts. Tourists express a preference for incentives promoting cycling and suggest improvements in infrastructure such as extended signposting and expanded cycle transport in public transport.

CONCLUSION
This study provides valuable insights into the effectiveness of stakeholder involvement in the “RadLust” project. The diverse perspectives gathered highlight the importance of inclusive stakeholder participation in the planning and implementation of sustainable transport initiatives in rural areas. The findings suggest that effective stakeholder engagement can significantly impact the success of projects aimed at promoting cycling and other forms of soft mobility, thereby contributing to the broader goals of sustainable and environmentally friendly transport.

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Stakeholder participation for sustainable tourism mobility through co-design

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Recent data suggests that the use of planes and cars among tourists continues to rise (Eurostat, 2024; UNWTO & International Transport Forum, 2019). This trend compels us to reassess the effectiveness of existing approaches to engaging tourists and other stakeholders in transport planning to increase the share of environmentally friendly modes of mobility (Romão & Bi, 2021; Tomej & Liburd, 2020). Even in participative, non-tokenistic frameworks for involving stakeholders, the extent of their participation is commonly predefined (Mitchell et al., 2016; Pappers et al., 2020). For instance, it is assumed that transport users are cognizant of the reasons guiding their choice of transport mode and that they can apply this awareness as input for designing new systems. However, this assumption contradicts the understanding that a mobility system, its infrastructures, and its users are "coupled" (Mitchell et al., 2016; Zardini et al., 2020). In tourism, the mode of mobility is further intertwined with related tourism activities, infrastructures, and travellers' identities (Hibbert et al., 2013).
Matching such complexity requires the participation of stakeholders as a non-linear, complex process of relating where "moment-to-moment negotiations [...] emerge as a result of the unpredictability of a response to one's own action" (Mosleh & Larsen, 2021, p. 465). Rather than aiming for a controlled outcome of someone's predefined agenda, it would be a generative and learning process for all involved (Heape & Liburd, 2018). The goal of such participation is sense-making, sense-giving and understanding of many people's intentions, and potentially a change in practices in the form of new meanings, new opportunities, new insights, and new doing (Larsen & Sproedt, 2013).
Tourism co-design offers a practical framework built on these premises. Activating pluralistic knowledge and addressing needs and understandings of diverse stakeholders, tourism co-design has been previously employed in the contexts of smart tourism (Liburd et al., 2017), destination management (Duedahl, 2021), and protected areas (Liburd et al., 2023). In the context of tourism transport, tourism co-design can facilitate the emergence of new meanings associated with specific transport modes through a carefully scaffolded and facilitated process that engages tourists, locals, representatives of the transport sector, accommodation sector, attractions, and other tourism businesses. Tourism co-design also extends to prototyping new tourist transport concepts, services, or strategies. Prototyping can be creatively organized as interactive installations at local museums or attractions, or as stand-alone attractions or experiences. Participatory initiatives can thus blend with existing activities at any given destination to overcome the obstacle of the temporal and spatial separation between tourists and destinations.

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Stakeholders contributing to the planning of tourism mobilities: a case study of the participatory process of the Mobility Plan of the Camp de Tarragona region

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Tourist destinations face the the challenge of simultaneously satisfying residents' and tourists' mobility needs, which are highly likely to differ. The scenario becomes more complex due to seasonality, as the arrivals of visitors during certain periods of the year, and the necessity of adopting a metropolitan perspective as attractions might be dispersed across the territory. From the point of view of the tourist sector, to meet the mobility needs of the visitors and the employees who work in the tourist industry emerges as a critical element to foster sustainability and competitiveness at the tourist destination.

Costa Daurada is a popular Mediterranean coastal destination located in the central area of Camp de Tarragona, a complex territory that juggles the operations of a strong chemical industry with the arrivals of more than 5M of tourists every year. This central dense area is surrounded by a vast territory characterized by its rural environments and low population densities. The diversity of the territory leads to a very diverse mobility, that requires a comprehensive approach. Within this context, the Public Transport Authority of Camp de Tarragona (PTA) is currently engaged in the elaboration of the mobility plan of its with the purpose of strategically planning mobility until 2030.

Given the diversity of agents which are involved and affected by the mobility of the area, the PTA launched a transversal participatory process during November of 2023 to collect the claims and proposals of a wide range of stakeholders. The participatory process was structured in 5 sessions which included the discussion of 3 different topics in each of them. The object was to promote the debate for each of the topics between stakeholders who felt the topic as theirs, but also to involve in the debate with stakeholders attached to other topics related to mobility to obtain a more transversal output from the debate. Tourism mobilities were discussed during the fourth session, along with public transport and consciousness about sustainable mobility. As pursued by the organizers, the 29 participants of this particular session had different backgrounds. Participants belonging to the tourism sector, public administration, and transport operators were dominant.

Regarding the results of the sessions, 5 propositions related to the promotion of the use of the bicycle and the public transport by tourists emerged from the discussions. These propositions will be integrated in the future mobility plan of the region. The organization of this transversal participatory process has enabled the technicians who are in charge of the elaboration of the mobility plan to gain insight into the needs and demands of those stakeholders who operate in the tourism industry of the area. Participants reported a high degree of satisfaction with the content of the session and the opportunity of taking part in it. The sessions also contributed to engage them in the elaboration of the future mobility plan.

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Tourists' attitude to climate change: from inconsistency to just-in-case behaviour. An analysis of tourists visiting the Alps.

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Tourist destinations, especially in pristine areas like the Alps, are becoming more aware of implementing policies to reduce the carbon footprint of tourist activity. Yet,tourists' awareness of climate change and their actual readiness for real mitigation measures are usually at odds with each other, reflecting the attitude-behavior gap. The main objectives of this paper are: (1) to analyse two important latent variables such as the importance given to tourism causing climate change, and the mitigation measures taken by tourists to minimize the potential effects; (2) to carry out a fuzzy clustering ECO-extended apostle model to characterise a sample of tourists visiting the Alps between incoherents, easy-goers, conscious and just-in-case tourists; and (3) to analyse whether some categories are positively or negatively associated with some covariates such as trip duration, summer or winter season, main transport mode, age, gender, education, and residence. The results show that the majority of the sample can be considered just-in-case tourists. The paper contributes substantially to this understudied strand of literature.

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Tourists' sustainable transport choices at destination: A case study in Madeira

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Promoting environmentally friendly mobility options (i.e., walking, cycling, and local public transport) for tourists is of paramount importance to achieve sustainable tourism at destinations. This topic has been raising the attention of scholars, of mobility practitioners, and of local public administrations. The reduction of individual motorized modal share allows the reduction of the negative environmental externalities. This may result in an enhanced attractiveness of a specific destination with respect to other, competing ones. Most of the literature that has analyzed this topic has considered samples related to a determined year or period. This paper builds on that literature and examines the development of mobility choices in the island of Madeira between 2012 and 2019, by taking into account six waves of surveys based on a specific questionnaire proposed to tourists leaving the vacation destination. The data are analyzed using a beta regression aimed at ascertaining the main characteristics of tourism demand that influence mobility options at destinations. The results are useful for public administrators, transport planners and mobility practitioners interested in driving tourists' modal shift towards sustainable transport options within their destinations.

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Can I walk there? Studying perceived walkability in a travel behaviour framework

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Walkability is a local accessibility measure that has been adopted in practice as a measure for density, land use mixture, and walking infrastructure. Objective walkability has been found to influence travel behaviour and well-being. However, the objective measures do not account for individuals' experiences and perceptions, which also play a role in impacting travel behaviour and well-being.

This research generates a conceptual framework linking objective and perceived measures of accessibility, individual characteristics, residential selection, travel experience, and attitudes to travel behaviour. To validate this framework, we use data from the fourth wave of the Montreal Mobility Survey (N=4,679). This bilingual longitudinal travel survey collects data on travel behavior, attitudes, and individual characteristics from a large sample of residents in Montreal, Canada. To account for objective local accessibility, we used Walk Score® data (walkscore.com), which represents the quantity and variety of activities accessible within walking distance. This measure is often used in the transport literature as a reliable walkability indicator. Using an API, we retrieved Walk Score® for each participant based on their home location. We conducted a weighted linear regression model using weekly walking mode share as the determinant of travel behaviour. The independent variables consist of five sets, each representing a component of the conceptual framework.

The findings from the statistical model confirm our hypothesis regarding the positive impact of perceived accessibility on weekly walking mode share for all purposes, namely work, school, leisure, healthcare, and shopping. We find that individuals who agree that walking is a suitable mode to reach their desired destinations perform about 15% more of their trips by walking compared to those who do not have the same positive perception of their local accessibility level. In our conceptual framework, the relationship between perceived accessibility and travel behaviour is hypothesized to be bidirectional. In this statistical model, we incorporate a binary variable based on the self-reported question "I consider myself a pedestrian" to represent travel experience and attitude. This variable serves to address this bidirectionality concern, increase our confidence in the causal relationship, and avoid overestimating the effect of perceived local accessibility on travel behaviour. Regarding objective walkability, our findings align with previous literature, indicating that an increase in Walk Score® correlates with an increase in the share of walking trips.

Comprehension of the factors influencing travel behaviour is essential for developing strategies aimed at promoting active travel behaviour and habits. Our conceptual model emphasizes the importance of enhancing perceptions of walkability, particularly in regions with high local accessibility levels. This validated framework can be of interest to transport professionals working towards increasing the use of sustainable modes as it provides a nuanced understanding of the link between local accessibility (perceived and objective) and travel behaviour.

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Closing the gap between perceived and objective accessibility measures

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Accessibility, understood as how easily individuals can reach a desired destination, can be measured in multiple ways. It's worth mentioning, however, that perceived accessible opportunities, which include those seen as viable alternatives and feasible within personal scheduling constraints, may vary from the analyst's assessment (Cascetta et al., 2016). From an objective standpoint, this can result in paradoxical situations, where individuals residing in either the same neighbourhood or different areas of a city yet possessing equivalent potential accessibility may perceive varying levels of accessibility for different services. Thus, analysing perceived accessibility, which refers to individuals' perceived potential to engage in opportunities spread across different locations (Pot et al., 2021), is highly valuable.

This research compares both perceived and potential accessibility measures, considering sociodemographic attributes' role in the perception of access to different services. To do so, we use a representative sample of 354 individuals living in a residential neighbourhood in Santiago de Chile in 2019. The study involved a survey applied during visits to people's homes in the neighbourhood. In addition to mobility diaries and sociodemographic characterisation, respondents had to indicate if services were accessible in the neighbourhood, and if so, if they made use of them. In total, eight services were involved, namely green areas, café & restaurants, pharmacies, public health facilities, ATM & banks, educational centres, public transport smartcard top-up places, and supermarkets.

An Ordinal Logit model was estimated to understand the interaction between sociodemographic attributes and potential accessibility indicators in the perception of accessibility of each service. We tested different distance thresholds, starting from 300m and up to a radius of 1 kilometre. In terms of sociodemographic characteristics, our results indicate that there are no significant gender differences in perception, but older people do perceive reduced accessibility. Overall, older population groups are between 35% and 55% more likely to respond that certain services are inaccessible in the neighbourhood, everything else equal. In addition, the final likelihood of the model decreases when the distance threshold increases for accessibility calculations, suggesting that the notion of 'neighbourhood' is better explained when considering a 300m distance from the household. Lastly, we identified three types of services in terms of the marginal effect on accessibility perception.

The study contributes to understanding the underlying dimensions affecting perceived accessibility in the Global South, providing evidence to decision makers on the complexities to be considered when designing effective and inclusive proximity-based policies. Further research is currently deployed to test more traditional accessibility indicators, additional systematic taste variation, and to incorporate latent perceptions of the built environment into the analysis. We are confident we will have a refined version of our work by the time of the conference.

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Dissonances Between Perceived and Calculated Accessibility in The Netherlands

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In common practice, accessibility measures rely on objective indicators that represent one or a combination of components to measure the extent to which destinations can be accessed using one or multiple transportation modes. However, there is a growing interest in the role of travellers' perceptions of accessibility and how these subjective measures differ from objective ones. This study focuses on identifying the determinants of perceived accessibility and exploring the differences between the objective and perceived accessibility of Dutch travellers. It also aims to develop a hybrid accessibility measure containing both perceived and objective accessibility indicators. Our approach involves a comparative analysis between self-reported accessibility measures from the Dutch National Travel Survey (ODiN) in combination with microdata from Statistics Netherlands (CBS) and the outputs of the national accessibility model from the Environmental Assessment Agency of The Netherlands (PBL). The selection of indicators for the hybrid accessibility measure is supported by a statistical analysis based on Polychoric correlations and Bayesian networks. This study contributes to the field by enhancing our understating of perceived accessibility and its correlation with objective measurements. Additionally, the proposed accessibility measure could be implemented to aid in accessibility-based decision- and policy-making.

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Examining the impact of ride-hailing on alleviating transport poverty in Yogyakarta, Indonesia

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This study provides a comprehensive examination of the impact of ride-hailing services on alleviating transport poverty across various income groups in Indonesia. Transport poverty has recently become of growing scientific interest, with most research being developed and conducted in the Global North, with limited exploration in the Global South context. To fill this gap, we collected data in Yogyakarta about ride-hailing services and experienced transport poverty from different income groups. For the non-poor group, we conducted a web-based online survey. For individuals living below the poverty line, we conducted in-person surveys. As a result, we obtained a total of 2,156 observations. We conducted a Confirmatory Factor Analysis to generate four transport poverty indicators, namely accessibility poverty, mobility poverty and safety, transport affordability, and exposure to transport externalities. We analyzed how these four transport poverty indicators are influenced by socioeconomic characteristics, including income and if people are living in poverty, using regression analyses.

Our results surprisingly indicate that users of ride-hailing services, especially motorcycle-based ride-haling (RH MC), have higher levels of transport poverty in all four indicators. Possibly, dependence on ride-hailing services may reflect limitations in accessibility to traditional transportation options or adequate public transportation services in the Indonesian context, leading to transport poverty. Interestingly, when we include interaction variables between RH MC and specific variables such as younger age and motorcycle ownership, the effect on transport poverty decreases, which leads to better conditions. This suggests that the combination of owning a motorcycle and utilizing RH MC services alleviates transport poverty. Overall, we find that motorcycle ownership reduces transport poverty stronger than car or bicycle ownership in the Indonesian context.

Furthermore, we find various socio-demographic factors that influence transport poverty. Individuals living in poverty face significant challenges with transport affordability, as expected. Surprisingly, they perceive fewer difficulties in terms of accessibility, which may be due to lower aspiration levels with respect to accessibility. Additionally, males are found to be more vulnerable to transport poverty than females, challenging previous assumptions and highlighting the need for nuanced gender perspectives in transportation planning. To test whether the motivations for joining a ride-hailing scheme influence the degree of transport poverty, we estimated separate regression models for ride-hailing users only. We found that if users use ride-hailing because it increases their accessibility, the results show lower levels of transport poverty than those who use it for other reasons.

In conclusion, our findings shed light on the complex relationship between ride-hailing services and transport poverty in Indonesia. The prevalence of RH MC among individuals facing transport poverty suggests that individuals with limited access to traditional and/or public transportation options opt for RH MC to compensate for this limitation. As policy recommendations, we emphasize integrating ride-hailing services into city planning efforts to enhance mobility equity. This involves partnerships with public transportation systems and affordability support programs that fulfill the specific needs of various demographic groups. As future research, there is room for further exploration of the bidirectional effects of transport poverty and ride-hailing use.

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Exploring basic levels of public transport provision as a means of providing a sufficient level of accessibility in sparsely populated areas

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The provision of public transport in sparsely populated areas has long been acknowledged as a difficult problem to solve. Lower levels of population and opportunity density, combined with largely car-based transport infrastructure, bring about longer, often motorised, trips. Public transport can as such constitute a crucial resource, particularly for those who do not have access to car-based travel.

Governments are increasingly recognising the need to plan for basic accessibility, an approach also proposed in the recent literature (Martens 2017; Pereira et al. 2017). Yet, for multiple reasons, (public transport) authorities are reluctant to employ standards for basic accessibility (Ryan and Martens 2023). Instead, they set provision standards, which, when compared to accessibility standards, are deemed to be easier to define, deliver, and to communicate to decision makers and to the public.

Several authorities have introduced some kind of minimum standard of public transport provision, often linked to population-based criteria (e.g. in Sweden, Belgium, Switzerland and Israel). At the same time, there is little knowledge regarding the extent to which provision standards provide access to opportunities in a meaningful way, and whether desired trips are forgone despite basic provision. There is also little knowledge regarding the experiences and expectations of rural inhabitants with respect to accessibility, with the notable exception of Pot et al. (2023).

The current study examines these issues through a survey conducted among inhabitants living in areas which, according to the regional public transport provision programme for Västra Götaland, Sweden, meet the criteria for basic levels of provision. The survey comprised two samples, one with adults aged 19 or older, and the other, young people aged 15-18, with the latter assumed not be subject to residential self-selection effects. The analysis comprised (1) a descriptive analysis of inhabitants' perceived possibility to reach places and their reasons for forgoing trips; (2) an exploratory regression analysis investigating the relationships between respondents' socio-economic and transport-related attributes and the likelihood of forgoing trips, and (3) a qualitative analysis of the public transport-related barriers.

The majority of the younger sample (55%) and a substantial share of adults (26%) indicated that they were not always able to reach the places they needed or wanted to reach. Holding a driving license was associated with a low likelihood of having forgone trips. The study found no clear links between the different levels of basic provision and forgoing trips.

We close with a discussion regarding low-density contexts and the extent to which, where resources are limited, transport could or should compensate for this lack of accessibility from a distributive justice perspective.

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From Objective to Perceived Accessibility: Unveiling the Determinants of Public EV Charger Use in London

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The UK's commitment to achieving net-zero emissions by 2050, coupled with the ambitious ban on petrol and diesel vehicles by 2035, highlights the critical importance of accessible electric vehicle (EV) charging infrastructure. While existing research predominantly focuses on the objective accessibility of EV chargers, few studies examined the perceived accessibility of public EV chargers with two exceptions. For instance, He et al. (2022) found that both perceived and prospective accessibility significantly affect non-EV owners' intentions to purchase EVs in Hong Kong, China. Similarly, Renaud-Blondeau et al. (2023) in Montreal, Canada, identified discrepancies between objective, perceived, and prospective accessibility, emphasising the need to integrate all accessibility dimensions into electrification strategies to accelerate EV adoption.
Despite these advancements, the determinants of perceived accessibility to public EV chargers remain largely unexplored. Given the substantial influence of both objective and perceived accessibility on EV adoption rates, it is imperative to investigate the factors affecting perceived accessibility.
To address this gap, we firstly measure the objective, perceived, and prospective accessibility of public EV chargers by analysing survey responses from London residents and data from the National Chargepoint Registry (NCR). Secondly, we examine the influence of socio-demographic variables, built environment characteristics, and travel behaviours on perceived accessibility using machine learning techniques.
Our findings reveal significant discrepancies between objective, perceived, and prospective accessibility in London, corroborating the need for a nuanced understanding of accessibility. Moreover, we identify key factors, such as road density and travel behaviour (e.g., travel and charging frequencies), that significantly impact perceived accessibility. These insights offer evidence-based recommendations for enhancing the perceived accessibility of EV chargers, contributing to the broader goal of facilitating EV adoption.

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Including equity in the evaluation of territorial accessibility generated by High-Speed Railways

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HSR projects belong to the category of megaprojects, which are characterised by common features: decision making, planning, and management are often weak, with numerous changes during the implementation phase; the overcommitment to certain concepts makes the analysis of alternatives weak or absent; and the complexity and unplanned changes make budget and time contingencies inadequate. Consequently, misinformation regarding costs, schedules, benefits, and risks is considered the norm throughout project development and decision-making. A relevant issue is how to make their planning and management process smooth and effective and how to assess their multiple impacts on the natural and anthropic environment, both in ex-ante and ex-post evaluations.
According to the EU directives, the cost-benefit analysis (CBA) is the institutional methodology adopted to assess the impacts of high-speed rail (HSR). CBA systematically measures the desirability of a transport policy option based on welfare economics. The method is based on weighting alternative economic outcomes and recommending the development of projects in which the sum of monetary gains outweighs the sum of monetary losses, following an efficiency criterion. However, this method fails to include equity issues, which are a key aspect in transport planning. One of the most common perspectives adopted by scholars to include equity implications in the appraisal of transport projects is the operationalisation of fairness issues as a matter of distribution effects, both spatially and socially. Thus, transport equity related to HSR may be interpreted in terms of territorial accessibility. In this presentation, some complementary methods to calculate the variation in accessibility and territorial equity are illustrated, distinguishing them by ex-ante and ex-post methods. Four of them (i.e. the potential accessibility index, spatial rail equity index, Gini index, and coefficient of variation) are compared to assess the equity impacts for an international case study, i.e. the Italian-French HSR between Turin and Lyon.
The results of the analysis reveal that despite a generalised increase in overall accessibility, equity implications are more contradictory, with main localities gaining further benefits compared to medium- and small-sized municipalities. In particular, the improvement in accessibility benefits is proportional to the size of the municipalities, with larger ones (>10,000 inhabitants) benefitting more than the others. Conversely, small-sized municipalities register a further increase in peripheralization. However, since they account for more than one third of the total surface but represent only approximately 1% of the total population, the overall balance for the population served by the infrastructure may be considered positive. These results are particularly useful in contexts where the acceptance of HSR is weak, as they allow policymakers to identify adequate compensation measures to reduce the gap and increase territorial cohesion.

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Measuring travel problems: towards a more robust measurement tool

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While mobility is essential to participation in many activities, people may be affected by a range of problems frustrating or hindering their ability to travel. In many cases the factors contributing to travel-related problems are multidimensional in character. Moreover, travel problems are always a result of the situation-specific interplay between the service provided by the transport system, the (societal and personal) expectations regarding travel, and a person's characteristics and circumstances. This makes the systematic measurement of travel problems a challenging issue.

Drawing on earlier work, notably by Currie and colleagues (Currie 2011), the team of one of the authors has developed a survey tool to measure travel problems among the general population (Pritchard and Martens 2023; Singer and Martens 2023). The aim was to design a short questionnaire to limit both researcher costs and respondent burden. The tool was employed in the Tel Aviv area in 2017 and 2020-2021. Despite delivering important insights into the frequency and severity of travel problems among the population, the analyses of the results also revealed various weaknesses in the survey design. Responses on some questions showed strong expectations bias, with people generally better served by the transport system reporting more travel problems than others. The questionnaire also failed to capture the importance of social safety as a barrier to travel, in spite of its known importance especially for women and elderly. Moreover, while much care was given to measure forgone trips, the tool was unsuitable to identify structural travel barriers that prevent people from considering a trip in the first place.

The current work seeks to address these issues and develop a more robust survey instrument, drawing amongst others on the recent work of Murphy and colleagues (Murphy, McDonald-Lopez et al. 2022), while maintaining the ambition to design a short questionnaire that is easy to administer. The tool, currently under development, will cover a broader range of travel problems, while relying on recent advances in questionnaire design (e.g., Schaeffer and Dykema 2020). The tool will be tested in a pilot study among 30 respondents from diverse backgrounds. A cognitive interview will be conducted with each respondent to diagnose issues in survey design.

At the conference, the newly developed tool will be presented and the results from the cognitive interviews shared, for discussion with the audience.

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Micromobility and urban mobility dynamics: Assessing the impact of e-scooter prohibition on intermodality, accessibility, and travel satisfaction in Barcelona

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In recent years, the popularization of micromobility devices such as electric scooters (e-scooters) has significantly boosted interest in understanding their potential as a first- and last-mile transit solution. Taking advantage of the recently introduced prohibition of e-scooters' on public transport within the Metropolitan Region of Barcelona (RMB), this study aims to investigate the relationship between intermodality, perceived accessibility and ease of travel (EoT) in the context of micromobility use. To do so, we employ a longitudinal approach utilizing a two-stage survey distributed before and after the implementation of the policy banning e-scooters onboard public transport. The initial data collection, which was conducted prior to the ban, revealed long and complex travel patterns for those combining public transport with e-scooter use. Preliminary results also show that, prior to the restriction, intermodal users mainly used e-scooters in combination with public transport for commuting (as opposed to other trip types), reporting long travel times and high degrees of overall trip satisfaction. The ongoing second phase of the study, set to conclude by the end of February, aims to capture how the policy preventing users from taking an e-scooter onboard affects their travel patterns in terms of time, comfort, and satisfaction. Such a policy change, which represents an important limitation for many intermodal e-scooter users, presents a unique opportunity to examine the influence of micromobility in perceived accessibility and EoT among different user segments. The outcomes of the study are expected to provide critical insights into the demographic disparities in adapting to these changes, thereby contributing to a more equitable and efficient approach in future urban mobility planning. Finally, our findings aim to inform policymakers and urban planners, offering evidence-based recommendations for future transportation strategies.

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Network availability generation based on mental maps and spatial cognition in route choice models.

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Understanding route choice is an important aspect of transportation planning because it serves as a core aspect of strategic simulation models, it enables transportation engineers to understand the traffic flows and their distribution across the network which serve as building blocks for LOS calculations and feasibility studies of new transportation projects. Representing route choice has two important challenges: The first is to understand the available choice set of the decision maker, the second is representing the decision rules to predict human behaviour with a probability. The first challenge has implications related to computational complexity as well as the ability to reconstruct the chosen route and a viable choice set.
In this study we improve choice set generation processes by focusing on mental maps as a resource for identifying viable links for choice set formation. We aim at generating a probability map for link selection that can channel the generated routes through links with higher choice probability, which increases route choice efficiency. While the notion of link availability is not new and has been addressed in various ways, we offer a new way of representing link availability by relating spatial syntax to link availability via the concept of mental maps.
People's perception and mental map inform their ability to navigate as each route, link and node are associated with perceived availability and accessibility. By uncovering people's mental maps and relating them to spatial syntax, we aim at a systematic representation of mental maps, to infer link availability. Data collection was conducted through a survey among 500 respondents in Tel-Aviv combining revealed and stated route preferences, which included a mapping and navigation experiment. The survey included three tasks. First the participants were shown a map and asked to list any landmarks, activity locations, street names, etc... in the area marked on the map. Then they were shown an OD pair and asked to navigate a route for that OD pair. Finally, they were asked questions about their demographics, familiarity with the study area, and navigation and spatial abilities. The participants were adults (over 21) working, studying, or residing in the study area, to capture habitual route choice behavior.
The data analysis includes three stages. First, the connectivity and completeness of the maps in terms of the main spatial anchors are evaluated to understand the relationship between the mental map and spatial syntax. Then, the compatibility of the mental map from the memory task with the considered choice sets from the navigation tasks is assessed to understand whether mental maps provide a solid ground for choice set formation. Then, link availability is inferred using the data from the whole sample. Using a binary choice model, we relate "link fluency" to the link's spatial characteristics (i.e., land-use, hierarchy, landmarks). Last, we use the "link fluency" map as a basis for availability–based choice set formation and route choice, using well-established choice set generation and route choice models.

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Perceived accessibility by public transport in Madrid Region: spatial distribution and characteristics of disagreeing groups

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Nowadays the use of public transport is promoted as an alternative to the car, being stimulated and supported in many metropolitan areas. To formulate strategies and policies that are successful in public transport promotion, analysis of end users' perceptions is crucial. The focus on perception is especially relevant due to a potential mismatch (Pot et al., 2021; Pot et al., 2023) between the real (objective) and perceived service levels.

In this study we focus on perceived accessibility by public transport in the Madrid Region. More precisely, we seek to find possible reasons as to why people living very close to each other have opposing views on public transport accessibility. Our study relies on survey data collected in Madrid Region from 5589 individuals who reported their current travel behavior, attitudes towards different transport modes, and socio-economic characteristics. Using a 7-point Likert scale, perceived accessibility by public transport was measured as the level of agreement with the following statements: "I am happy with the public transport functioning in Madrid" and "Public transport system satisfies all my needs". Overall, the respondents were rather positive about public transport service in the region, with 70% and 60% of the respondents agreeing with the first and the second statements, respectively.

Having detailed street-level information about the origin and the destination of each respondent's most frequent trip, it was possible to analyze the spatial distribution of perceived accessibility by public transport. Quite surprisingly, no apparent spatial clustering was observed. Higher values of perceived accessibility were spread rather evenly in the whole region and were always neighboring lower values. A similar situation was observed when analyzing the destinations of the respondents and origin-destination links. Essentially, these initial results suggest that individuals living the same neighborhood with a similar level of public transport supply can have rather different (even opposing) perceptions of the service. Same applies to the destinations and routes (origin-destination links): people working in the same area and making similar trips do not necessarily share the same opinion about accessibility by public transport. This means that perceived accessibility is quite subjective. Furthermore, we selected individuals that live within 800-meters from each other and have opposing views on perceived accessibility by public transport. Preliminary findings reveal statistically significant differences between individuals with high and low levels of perceived accessibility: the group that negatively evaluated public transport service is on average younger, has greater proportion of unemployed individuals, and smaller proportion of retired people.

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Qualitative analysis of sociospatial constraints perception in a mid-sized Functional Urban Area with a car-dependent culture

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The growth of distances and complex spatial relations has been studied for large metropolitan areas. However, car dependency is exacerbated in low-density territories, threatening resilience, sustainability, and quality of life. The analysis is conducted in Caceres, a shrinking border region in western Spain.

This research investigates how people perceive their daily commute experience in a mid-sized Functional Urban Area. The study consists of two focus groups; one group comprises participants under 30, while the other group will include participants up to 63 years old. These focus groups will be selected from the core city and surrounding villages, and the analysis consists of different modes of transportation used based on the local modal share.

The study reveals that individuals, such as drivers, bikers, and pedestrians, perceive the built environment as a place of conflict. The gap between imagined and real spaces is discussed to understand the social inequalities prevalent among the participants. We examine how the road network characteristics affect the social environment and hierarchies, leading to negotiation over public space as the primary factor influencing travel for the local population.

Car space occupancy and driver behaviour seem to be causing various issues affecting individual autonomy, accessibility, and safety perception. Given the high car modal share, this is primarily a problem for micro-mobility users and pedestrians.

Discussing social attitudes towards micro-mobility modes highlights how insufficient infrastructure affects safety perception, lack of riders, and infrastructure misuse, discouraging further use.

We analyse how pedestrians' perception of the street affects their social encounters with other people, the accessibility of car spaces, and the lack of pedestrian activity in certain areas. We also consider safety perception by examining how urban vitality is affected by depopulation and land use segregation and how the city is perceived as a fragmented space. Furthermore, we examine how public transit and overcrowding can lead to unpleasant social encounters for users. However, this does not necessarily impact their transportation choice since mobility alternatives may be lacking.

Overall, we are discussing the issue of relying on cars due to the absence of viable alternatives such as efficient and comprehensive public transportation, micro-mobility infrastructure, and convenient locations.

In conclusion, the study provides some policy recommendations. Individual autonomy and behavioural design approaches are suggested to improve users' coexistence in the short term. The need for separate infrastructure for micro-mobility, parking, and public transit fare management is addressed in the mid-term. Lastly, the authors recommend the implementation of regional transport authorities and proximity-based land-use strategies to address the structural problems identified in the study.

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“That’s not feasible without a car”: an exploration of car-dependent practices

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In this study, we adopted a Social Practice perspective to unpack which practices are strongly connected to car driving and why that is the case. Through focus group research with car owners in the city of Ghent (Belgium), we explored how strongly practices are locked into car driving and what interventions are required to reduce the car dependence of the observed practices. We found that car dependent-practices are still abundant even in a city that offers ample opportunities for non-car modes. Our study classified the car-dependent practices into five groups: cargo, caring, maintaining social relationships, leisure and commuting. However, some practices could not be placed under a single heading, illustrating that many trips are messy and unpredictable. Consequently, a continuum of car dependence will be necessarily multidimensional and varies along different axes. Not all identified practices were considered equally car-dependent. We distinguished between (1) practices that do not depend on the practice of car driving, (2) practices that do depend on car driving but not on private car ownership, and (3) practices that require strong reorganisation or risk disintegrating without car driving. For urban residents, car dependence of practices occurs mainly at the level of occasional practices and practices outside the urban area. But also for practices inside the city, we noticed a predisposition towards car use, driven by a desire towards flexibility, autonomy and comfort. Revealing how car-dependent practices bundle and exploring the elements that constitute them is imperative for identifying potential avenues for policy interventions.

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The effect of ease of travel on travel behaviour and perceived accessibility

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Travel behaviour and activity participation have important impacts on environmental sustainability and people's quality of life. Ease of Travel (EoT), referring to people's travel skills and motivations, and available travel options and quality can influence how people travel and how easily they can reach out-of-home activities. In this study, I explore the new concept of EoT and analyse its underlying structures using a sample of 2,593 students and staff members of University College London (UK). Subsequently, the determinants of EoT elements are examined, while I also analyse how EoT affects travel to campus and the perceived accessibility of the campus. A factor analysis indicates that EoT is effectively composed of the four elements motivation, skills, options and quality. Four regression analyses show that EoT elements are mainly affected by the residential location, travel disabilities, and the proximity of public transport and shared (e-)bikes. Finally, I found – using one-way ANOVAs – that EoT has significant impacts on travel mode choice, travel distance and duration when travelling to campus. Those with higher levels of EoT often travel on foot or by bicycle and mostly have relatively short trips, while those with low EoT levels seem forced to travel long distances and durations, often by train. EoT positively affects the perceived accessibility of the campus, suggesting that higher EoT levels will make it easier for people to participate in out-of-home activities. Improving EoT levels, and making it easier for people to travel around, can result in shorter and more active trips and can also increase accessibility to out-of-home activities (improving people's well-being). This could be realised by creating more compact, mixed-use neighbourhoods with easy access to public transport and shared (e-)bikes.

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Understanding people's ease of movement based on GPS-based travel behavior surveys

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This paper presents an approach to use GPS-based travel behavior surveys to determine who is being served well and who is being served poorly by the transport system. We draw on the extensive literature on transport disadvantage, which has shown that travel behavior patterns of disadvantaged population segments differ in multiple dimensions from more advantaged members of society.Drawing on this literature, we defined 13 travel parameters or indicator variables that may highlight relative ease of movement. These include, among others, trip frequency (overall, in evening hours, and in night hours), number of motorized trips, trips made as a car passenger, trip speeds (for all motorized trips and public transport trips only), trip detour ratio, and number of extensively long walking trips (over 2 km). None of these parameters by themselves is sufficient to determine whether someone is served well or poorly by the transport system, as behaviors may be the result of choice as well constraint. However, we argue that jointly the parameters are likely to differentiate well-served from poorly-served people.

We apply our approach to data from four GPS-based travel behavior surveys conducted in Israel's four main metropolitan areas (N = 27,571). We calculate z-scores for all travel parameters, with negative values potentially indicating mobility problems and positive values relative ease of movement compared to the entire sample. We subsequently conduct known-group analysis, comparing mean z-scores across four population segments differing in their level of access to private motorized vehicles (car or motorbike).

For all travel parameters, we find that z-scores systematically increase as access to private motorized vehicles improves. Carless respondents score poorest on all travel parameters on average. Among others, they conduct much more long walking trips, less overall trips and less trips at night, make more trips as a car passenger, and travel at lower speeds when using public transport. In further analysis combining car ownership with age, we find a significant decrease in mobility score at older age for all respondents irrespective of car-ownership level, but with a particularly strong decrease among elderly without access to a car. Combining car ownership level and urban density, we find an improvement in mobility score for all groups as density goes up, suggesting that living at higher density enhances people' ease of movement. Like in the case of age, the effect was strongest for people without access to a motor vehicle, with carless respondents living at the highest urban densities showing mobility scores comparable to respondents who share a car with two or more adults and are living in neighborhoods with substantially lower densities. Regression analysis confirms the importance of car ownership, population density and employment density in explaining mobility scores, along with household size.

Taken together, these findings provide some first evidence that revealed travel behavior patterns can indeed be used to identify population segments poorly served by the transport system. While more research is needed, the approach holds promise to determine the impacts of transport investments on people's ease of movement.

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Understanding Proximity-centred Accessibility – a worldwide survey of planning practitioners

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In recent year we have witnessed a growing interest for proximity-centred accessibility from both research and practice, although using a variety of terms and meanings. Proximity-centred accessibility translates the ability of people to reach activities or destinations at short distances, independent of speed enhancing vehicles. As such, it enables sustainable and inclusive accessibility for all by keeping travel time reasonable regardless of the transport mode, including (and most important) the slowest.
This research aims to explore the meaning of proximity-centred accessibility from the perspective of planning practitioners worldwide, from different regional and local contexts. For this we used an online survey, disseminated among more than 9000 practitioners from 22 countries (from 5 continents), collecting over 1300 responses. The survey explored the preferred terms for proximity-centred accessibility and their respective definitions. For the latter we focused specifically on time and distance thresholds, and on relevant activities.
Our findings affirm a relatively consistent interpretation of proximity among global planning practitioners, predominantly extending up to 1600 meters, in accordance with earlier results for accessibility researchers. Despite some relevant dissimilarities among practitioners from megacities compared to their smaller city counterparts, or in specific countries (most notably the Netherlands), the distance that is considered proximate is the attribute generating the most consistent results across different contexts. Also consistent was the relevance of short distances (up to 15 minutes walking) for activities such as primary and pre-primary schools, playgrounds, parks, food shopping, and pharmacies, reinforcing the importance of proximity to basic and caregiving activities. No term was found to be consistently meaningful across different contexts, although terms like local and neighbourhood accessibility and walking, pedestrian, or cycling accessibility, show higher preference in the global sample.

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What influences our perceptions? Two approaches to analyse perceived accessibility, its determinants, and the interaction with realised travel behaviour

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Quality of life in cities depends on how public space can be used by citizens. A low level of objective and perceived accessibility can lead to social exclusion and can have negative consequences for individuals. Hence, it is important to recognise accessibility as one of the basic prerequisites for participation in society and as one of the primary objectives of sustainable transport planning. In recent years, there have been significant research activities in order to recognise the multifaceted nature of accessibility. In addition to classical accessibility instruments that measure characteristics of the built environment, more attention should be paid to the individual components of accessibility.
Within our current research we aim for a holistic understanding of objective and perceived accessibility and the consequences for individual daily mobility. An essential objective of this research is the development of new methods for measuring perceived accessibility, the investigation of determinants of perceived accessibility and the interaction with the realised travel behaviour. Therefore, we want to improve existing accessibility modelling by taking the perceptions of different target groups regarding the built environment and accessibility into account.
In our presentation we would like to present two different methodological approaches and results for the assessment and analysis of perceived accessibility and walking.
We firstly present an instrument for measuring perceived accessibility and focus on a comprehensive understanding of perceived accessibility and influencing factors. Based on a household survey in Hamburg, Germany, we examine multiple relations of perceived accessibility by using regression models and structural equation modelling. The perception of the built environment, travel attitudes, the perception of safety as well as individual restrictions (such as mobility restrictions), have a considerable influence on perceived accessibility. Perceptions of accessibility also influence directly and indirectly the realised walking behaviour with resulting consequences for the individual health.
Secondly, we present results of the European research project WalkUrban. This approach combines quantitative (household survey, walking route assessment) and qualitative methods (walk-alongs) to gain a better understanding of the walkability in three European cities with a focus on perceived accessibility. We apply a multi-level scale for measuring perceived walkability within the different methods and generally aim for a better understanding of urban walkability. To probe the perceived walkability of different groups of people, we improved data collection and analysis methods to examine the interconnection between walking-related attitudes, travel satisfaction, local walking cultures and perceptions. First results indicate that perceived walkability is affected by walking attitudes and factors of the built environment. People with a higher level of perceived walkability walk more, have longer walk durations and distances, although there are differences according to the type of perceived accessibility and the purpose of travel. Increasing the perceived walkability can therefore promote walking and contribute to a modal shift towards active travel.

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Active Travel's Impact on Health – an empirical study for Coimbra, Portugal

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Regular physical activity (PA) is essential in preventing and managing non-communicable diseases such as type 2 diabetes, hypertension, stroke, and cardiovascular disease (WHO, 2022). Active travel (AT), including walking and cycling (as the only mode of transport or in combination with public transport), is recognised as a highly effective way of promoting healthier and less sedentary lifestyles (Hematian & Ranjbar, 2022).

The scientific articles dealing with these issues, which were identified as part of this study, focus either on the factors motivating the use of these modes, particularly urban form, or on their impact on health. Some studies have emphasised that people's preferences for active modes of transport and their awareness of the physical activity performed during their daily commute are also influenced by personal characteristics such as socioeconomic status (Aktürk et al., 2019; Notthoff et al., 2017), good infrastructural connectivity, attractive and safe public spaces, and easily accessible facilities (Yang et al., 2023).

Thus, the adoption of active modes in daily commuting depends not only on a good link between urban planning and transport planning but also on the personal characteristics of users and their awareness of the impact of using active modes on health.

The Sustainable Development Goals (SDGs) recommend establishing inclusive, safe, resilient, and sustainable communities and promoting social cohesion, physical activity, reducing environmental impact, and urban liveability (United Nations, 2015, 2019). As a result, experts and policymakers develop initiatives and plans to promote sustainable transport, namely active modes, and their role in building inclusive and resilient communities. In this framework, planning concepts such as "X-minute cities" are prioritised to ensure equitable access to daily needs, promote social cohesion, and create compact, connected urban areas where walking or cycling is safe and affordable (Graells-Garrido et al., 2021; Logan et al., 2022).

Few articles evaluate the infrastructural conditions for the use of active modes while reinforcing the importance of these conditions by demonstrating the impacts of the use of active modes on health. Kroesen and Van Wee's (2022) study is one of the few examples. They developed an empirical model based on a conceptual approach, which includes factors related to the territory that influence active travel and its health outcomes (physical and mental).

The present study aims to contribute to developing this type of model by integrating a literature review, surveys, and laboratory experiments to validate the hypothesis that active travel impacts health. Some surveys, combined with laboratory experiments conducted at the University of Coimbra (Faculty of Science and Technology and Faculty of Sports), have already demonstrated the impact of active travel. Research is ongoing, and new results will be available soon.

The results of a study like this can contribute to validating the most determining factors in the use of active modes and helping to validate the hypothesis of the impact of their use on health in general. The dissemination of these results is essential in countries where the use of active modes of transport, especially in daily commuting from home to work and home to school, is still low, as is the case in Portugal.

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European Citizens' Initiative: Connecting EU capitals through high-speed rail

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Transportation-related decision-making processes are frequently complicated, falling into the category of "wicked problems" in social studies. There are several examples of transportation planning "failures" in the literature and media, including decisions taken, delayed, or cancelled for no clear reason, public opposition, extra costs/implementation times and outright cancelation, and incorrect traffic/revenue estimates. Failures in planning can be attributed to a variety of factors, including technical errors in anticipating foreseeable impacts, a lack of consensus, new governance cycles, and an inability to grasp the inherent uncertainty affecting some crucial variables. The quality of the decision-making process is vitally dependent on how it is structured and managed.

Mega transportation infrastructure projects with uncertainty and complexity are being implemented all over the world. Because of their nature, these projects demonstrate political sensitivity and involve a wide range of stakeholders with competing interests. Decision-making becomes particularly challenging in such scenarios since the requisite knowledge basis for making good decisions is lacking due to both ambiguity and conflict of interests.

In this paper, a literature review, based on the software bibliometrics, on the role of Public Engagement (PE) in transport projects will be first provided; then, a case study will be described. Specifically, the PE initiative in support of the project connecting all the EU member countries by High-Speed Rail (HSR) will be described. HSR shortens travel times, enhances economic development, and replaces short-haul flights with sustainable high-speed trains. Only 6 of the 27 EU countries have such a HSR network, while international HSR connections hardly exist. Distances such as Amsterdam - Berlin (650 km), currently reachable in about 6 hours by train, can be reached in 2 hours and 30minutes once HSR has been deployed.

To give a democratic impulse to the development of HSR, a European Citizens' Initiative (ECI) was launched on the 18th April 2023 to connect all European capitals by HSR. The ECI is a democratic means by which EU citizens can ask the European Commission to act and legislate on a subject for which they have received 1,000,000 signatures. This 100th initiative marks a milestone in citizens' engagement in shaping European policy and the future of Europe. It aims at creating an integrated and sustainable network of high-speed trains connecting European capitals and its citizens, while making travel within Europe more efficient and environmentally friendly.

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Examining the factors leading to the submission of public complaints in public transportation: A case study of Jerusalem

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Public complaints serve as a crucial communication channel between service consumers and providers. Within the realm of public transportation, passengers' complaints provide that facilitates monitoring service reliability and negative events. Filing complaints through the digital media largely resolves complaint submission barriers. Nevertheless, the likelihood of filing a complaint remains influenced by passenger and trip characteristics leading to a partial understanding of the situation by the sector in charge.

This study aims to evaluate the influence of passenger-related and trip-related factors on the probability of filing passenger complains, with the aim of identifying systematic biases related to passenger and trip characteristics. Passenger complaint under-reporting may seriously affect the level of service by socially week and minority groups, because passenger complaints serve as beacon for identifying negative level-of-service events.

The case study is the city of Jerusalem, a 1.4 million inhabitant metropolitan area, built on a hilly terrain. Jerusalem is a diversified, segregated city, with a low-socio-economic status, large share of minority population, highly dependent on public transport, and with 14 public and private bus operators operating 1,104 bus lines. We rely on two databases collected and maintained by the National Public Transportation Authority (NPTA): a bus passenger complaints database and a national bus trip data. The passenger complaint database includes the complaint theme, line number and direction, and the passenger's boarding station. Due to privacy restrictions, passenger-related information was approximated using demographic obtained from the Israel Central Bureau of Statistics at the traffic zone level. Passenger characteristics include socio-economic status, ethnicity, and political empowerment. Trip-related factors, including route directness, headway regularity and time of day, were taken from official General Transit Feed Specification (GTFS) files published by the NPTA. The databases were integrated based on the trip identification data.

The probability of filing a complaint is very low (complaints cover only 3-5% of the electronically caught events in the case study area), the data analysis is conducted per line and daily period. A Tobit model is estimated for predicting the number of complaints per line and daily period as a function of line attributes and passenger characteristics approximately imputed from statistical zonal data. We hypothesize that empowered social groups, either politically or socio-economically, will have a higher tendency to complain, while ethnic minorities are less likely to complain than the general population. Line characteristics which may affect the tendency to complain are low route directness, low headway regularity, peak day periods and towards the end of operational service hours. Uncovering the biases enables to identify trips and passengers that are over or under-represented by existing public complaints, and steps can be taken to either encourage under-represented groups to communicate better their customer experience or to focus better the efforts to uncover such events by using digital data (GPS location, speed, validated tickets, etc.).

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Health issues in cycling tourism and the role of road safety: an application of the Protection Motivation Theory.

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Cycling has emerged in recent years as a way for tourism experiences with positive implications on economic growth, sustainability and health. However, the number of cyclist fatalities keeps on fluctuating between 1,800 and 2,100 cases every year since 2010, without any remission (EU Commission, 2023). Especially in Italy, where bike tourism gained a key role in the resurgence of urban and non-urban areas (Pantelaki et al., 2022), cyclists' safety and the need of infrastructure for biking have thus received an increasing attention by local communities and decision-makers (Salmon et al., 2022).

The paper aims at exploring cycling tourists' self-protection habits and choices against road safety risks, based on 2023 primary data drawn from an on-line national survey conducted in Italy. The cycling tourists were specifically asked about their own perception on road safety in urban and extra-urban destinations. In this research, an approach following the paradigm of the Protection Motivation Theory (PMT) is used to explain why people engage in health protective behaviours to reduce accident risks in cycling (Floyd et al., 2000). To estimate the key latent factors within the PMT paradigm, both exploratory and confirmatory factor analysis (EFA and CFA, respectively) are developed (Jomnonkwao and Ratanavaraha, 2016). Then, hypotheses derived from the findings are tested with a regression analysis. While PMT has been applied to tourism and travel (Law, 2006), this study is the first one concerning cycling tourism and related transport decision-making implications. Using the PMT modelling, the study results could help in understanding both the cycling tourists' health behaviour and the potential impact of decision-making processes on the development of tourism in Italy.

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Relations Matter, Social Equality in Transport Planning

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Urban inequality is a pressing challenge, spanning race, gender, class, and ability-based discrimination. Mobility plays an important role in tackling these issues and promoting just cities. It is therefore essential to reconsider the way that justice is conceptualized and operationalized in transport planning. While considerable attention has been directed toward this normative aspect of transport planning, prevailing studies primarily adopt a distributive lens, framing justice in terms of institutional allocation of transport resources and services (Martens 2016). Despite encouraging critical reflections on the core objectives of transport planning, such distributive approaches have often neglected a key aspect of justice: social relations.

The paper's first section analyses relational egalitarianism as a recent philosophical framework seeking to understand (in)justice at the structural level of social relations. For relational egalitarianism, inequality does not merely stem from an uneven distribution of resources and services, but rather from exclusionary and discriminatory social relations, restricting opportunities for marginalized groups. Central to this approach is the notion that individuals should relate as equals, as opposed to social inferiors and superiors.

The second section frames the aim of justice as the eradication of objectionable social hierarchies. Here, “social hierarchy” encompasses all instances of durable group inequality perpetuated by individual behaviors, societal norms, and institutional policies (Anderson 2010). Drawing from philosopher Elizabeth Anderson, social discrimination is analyzed along three dimensions: hierarchies of power, where the oppressed are subject to the arbitrary and unaccountable authority of social superiors; hierarchies of standing, where the interests of the marginalized are given lesser weight in institutional deliberations; hierarchies of esteem, where stigmatized groups are held in contempt and alienated (Anderson 2017).

The third section focuses on how social hierarchies give rise to various forms of discrimination in citizens' mobility and accessibility to services and opportunities. For what concerns hierarchies of power, structural disparities in the influence of various stakeholders over decision-making have historically translated into residential segregation and constrained mobility for marginalized groups (Enright 2019). Similarly, hierarchies of standing have favored able-bodied individuals, neglecting the needs of older individuals, children, and persons with disabilities. Additionally, a car-centric approach in transport planning has undermined the interests of pedestrians, cyclists, and public transit users, perpetuating social disparities. Finally, hierarchies of esteem have contributed to the diminished mobility of women, the profiling of racial minorities in traffic stops, and the stigmatization of urban ghettoes.

The concluding section underscores the implications for operationalizing relational equality in transport governance, calling for accountable and participatory frameworks reflecting community diversity. Additionally, planners must consider how standing and esteem hierarchies influence access to and use of transport resources.

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Sustainable Urban Mobility Plans (SUMPs) as political platforms for the alliance of conflicting antagonistic powers: the case of Istanbul

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This paper aims to understand whether Sustainable Urban Mobility Plans (SUMPs) perform as pluralistic political platforms that bring together different voices from conflicting identities under shared visions, objectives, policies and interventions. The key question addressed here is whether (and how) SUMPs are (can be) used as mechanisms, not to 'diversify' transport policy but to ensure the 'diversity' of voices within it (borrowing from Mouffe and Laclau, 2014).

Since the 1960s, urban studies have been influenced by developments in political science, law, international development, gender and poverty studies and have been intertwined with the notions of collaborative planning, plural democracy and participatory methods. However, there has been a relatively delayed engagement with participatory methods in transport research (Bickerstaff et al., 2002). In practice, the evolution of transport planning practices has led to the development of SUMPs as part of the European Commission's (EC) urban mobility policy. The EC has been encouraging the widespread uptake of SUMPs as a cornerstone of the European urban mobility policy since 2013. SUMP framework relies on systematic processes to ensure a maximum engagement of stakeholders (Lindenau and Böhler-Baedeker, 2014). Studies highlight the importance of SUMPs in bringing a more participatory approach to planning (Jordová and Brůhová-Foltýnová, 2021). In this sense, SUMPs have embarked upon a mission to make transport planning more participatory.

As part of the UK FCDO Global Future Cities Programme, in collaboration with UNHabitat, a SUMP was developed in Istanbul between 2019 and 2022. The Istanbul SUMP is the first in Turkey and the first global SUMP for a megacity with a population of almost 16 million. This paper uses Istanbul SUMP as a case study to analyse the promise of SUMPs as collaborative and participatory frameworks for developing city vision, objectives, and short-term projects. The methodology will be based on a critical review of stakeholders, their conflicting political identities and shared interests. The proposed policy measures will be reviewed for their capacity to meet the expectations of diverse groups in the city.

The paper ultimately aims to initiate a discussion on whether and how SUMPs become a collective exercise of democratic rights. It also seeks to explore how polyphonic SUMPs can be by bringing together diverse stakeholders, often with conflicting views, so that they do not aim to create an ideal city/transport system but establish an approach for reconstructing transport policy based on the alliances of different groups.

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The Community and Equity Advisory Table (CEAT): Creating meaningful community engagement within the Mobilizing Justice partnership

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Mobilizing Justice (MJ) is a 5-year Canada-wide research partnership that aims to understand and address transport inequalities in Canada and improve Canadians' well-being at risk of transport poverty. Our partnership includes academics, government agencies, transportation companies, and non-profit organizations. Within six months of establishing it, we recognized the lack of direct involvement of community voices in our work. Thus, MJ created a Community and Equity Advisory Table (CEAT) of individuals with lived experiences of transportation poverty and active work in communities experiencing it to bear on MJ's initiatives.

Our article has two main objectives. Firstly, we detail the CEAT's community engagement framework, including partnership background, the committee inception, implementation, and structure, and its role within MJ. Secondly, we evaluate the CEAT from 2022-2023 via a questionnaire to researchers and members, plus interviews from key partnership actors. From this assessment, we identify key milestones, areas for project enhancement, and lessons for national research partnerships.

The CEAT was launched with an orientation session in June 2022 and a first regular meeting in July 2022. The first call resulted in 15–20 individuals working with and/or belonging to equity-deserving communities (such as BIPOC, LGBTQ2S+, and disability communities) and other marginalized groups. Priority was also given to applicants who could ensure a balance of representation from all regions of Canada.

Bi-monthly two-hour Zoom meetings are held, given the national character of the partnership. MJ researchers share initiatives at different stages of research development (conception, design, implementation, analysis, follow-up and/or reporting). Members of the CEAT provide their insights and advice to guide research based on their lived experiences. Research leads return to the CEAT within six months to show how the CEAT input re-shaped the original research approach and discuss next steps.

The CEAT is led by two co-chairs: the MJ Project Director and a Community Co-Chair from among the CEAT's members. In recognition of their expertise and the time they are devoted to the CEAT, all members are paid for their participation. An external Facilitator chairs each meeting to ensure equitable participation.

After one year of CEAT's implementation, members highlighted how community voices have been pivotal in enhancing the research questions put forth by the MJ partnership, aligning them better with marginalized groups' real-life experiences. They also noted significant advancements in language clarity, the development of fully accessible visual materials, and enhanced reporting methods. Additionally, members highlighted how the CEAT has helped them to expand their networks and knowledge, empowering them to assume more relevant and leadership roles in their communities.

Looking ahead, the CEAT has several ways to improve further. Greater diversity is still an essential challenge, particularly in spatial terms, since 60% of the 2022–2023 members were in Ontario. Additionally, the duration of meetings and the two-month interval between them have also posed challenges in sustaining momentum and engagement. Finally, CEAT members raised challenges inherent to a national group like the CEAT and how to engage members effectively in projects tailored to specific local regions.

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What Makes Older Adults Concerned about their Ability to Age in Place?

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Driving cessation causes many life challenges for older adults in car-dependent North America (Newbold et al., 2005). These challenges can be amplified by the characteristics of older adults' residential environments, which may not facilitate car-free and age-friendly lifestyles (Aneshensel et al., 2016). However, growing older in the same neighbourhood reduces stress and impacts the quality of life of older adults (idem). Older adults' ability to age in place is dependent on the land use and transport systems in their neighbourhood and their personal preferences and capabilities. Based on the Aging in Place survey, disseminated among adults aged 65 and older in six cities across Canada, this research aims to understand what influences older adults' concern about their ability to remain in their neighbourhood considering their changing capabilities as they age.
The online survey included questions about older Canadians' travel behaviour and needs, residential considerations, and personal characteristics. The sample used in this study comprises 2,674 respondents. We developed a binomial logistic regression to better understand what factors into older adults' concern about remaining in their neighbourhood as they get older.
Across all regions, older adults who find that their daily travel positively impacts their quality of life are more concerned about remaining in their neighbourhood as they age. In terms of local accessibility, respondents living in areas with higher Walk Score® tend to be less concerned about the need to move out of their neighbourhood. Respondents' agreement with being able to comfortably walk to destinations or public transport in their neighbourhood is related to being less concerned about being able to stay in their neighbourhood. Older adults who selected a residential area that is easy to drive in are more concerned about their ability to remain in their current neighbourhood as they age. Moreover, the longer respondents have lived in their home, the more they tend to be concerned about leaving their neighbourhood. In terms of personal characteristics, older respondents and those who hold a valid driver's licence are less apprehensive about the need to leave their neighbourhoods. Women, those with a disability, and those in lower-income households were found to be more concerned about their changing transport needs and associated ability to remain in their neighbourhood as they age, which suggests an inequitable level of concern about the impact of age-related transport challenges. These results provide valuable insight into what professionals and policy makers need to provide to older adults so they can age in place across Canada, and avoid the stress associated with having to change neighbourhoods, which has a substantial impact on their quality of life.

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A Standardized Dataset for Comprehensive National Analysis of Public Transportation Accessibility in Belgium and The Netherlands

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Public transportation-based accessibility is frequently omitted in quantitative, spatial or mobility analyses, particularly on a national scale, primarily due to the data and computational challenges inherent in calculating these metrics for an entire country. This is exacerbated when historical transit accessibility data is required. To address these issues, this study introduces a standardized public transportation travel time dataset covering the entirety of Belgium and the Netherlands. Leveraging General Transit Feed Specification (GTFS) schedule data from all operators across these countries, the dataset spans yearly intervals from 2016 to 2024. The dataset encompasses origin-destination matrices of door-to-door transit trip times, including related statistics such as trip time variability, that are calculated at a finely grained 100-meter grid cell level as well as for statistical sectors or neighborhoods. Additionally, pre-calculated, aggregated place-level accessibility statistics offer a further layer of analysis. This dataset can serve as a foundational building block for spatial analyses at the scale of a country, facilitating investigations into socio-economic inequality and diverse applications reliant on precise public transport travel times and accessibility. Furthermore, it enables temporal analyses, such as assessing the socio-spatial implications of the substantial 2024 schedule redesign by De Lijn, the Flemish transit operator. By making quantitative, reliable data on public transport more accessible, the project hopes to contribute a valuable resource for policymakers, researchers, and urban planners seeking to address accessibility dynamics on a national scale, thereby fostering evidence-based decision-making and public discourse. In addition, the framework for the processing, enriching and archiving of raw GTFS data is released as open-source with the intention of eventually building out the effort at a larger EU-wide scale.

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Bridging data to knowledge: Hybrid System thinking Approach to Transportation Data-Driven Decision-Making

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The Big Data area in transportation added data scientists to the stakeholder's discussion table with the aspire to make data-driven decisions in operating the transportation system. One of the challenges of the mutual work among those stakeholders is the various levels of knowledge and skills. Data scientists are lacking transport knowledge while the transport experts may not understand the use of Machine Learning (ML) tools. Bridging this gap is important as the application of ML tools and algorithms in the context of mobility tend to rely on statistical associations rather than transport knowledge. To prevent a false representation of the relationship between variables, which is not necessarily a causal relationship, an ML model requires some sort of causality formalism; however, it is done implicitly without a formal framework.

To bridge these limitations and maximize the benefit from the data collected, this interdisciplinary research develops a Hybrid Dynamical Systems Thinking Approach (HDSTA), to formalize causality known in transport theory for ML models which support data-driven decisions in transportation. The outputs of using HDSTA are a graphical knowledge graph of the system and a text description that can serve: (1) Experts in choosing and defining the variables' cause-effect relationship; (2) ML modelers in defining a causal function within current ML models that lack such causality; (3) Stakeholders such as Transport Management Centers (TMC's) in making data-driven decisions made by for the benefit of the public. (4) Non-technical stakeholders and citizens / communities that by using the visualize model system can better understand the transport system and thus can be involved and support different policies.

HDSTA enables a holistic view of the transportation system, representing a "bird's eye view" of the system's different layers. Object Process Methodology (OPM) was selected to apply the Systems thinking approach as it can encode assumptions and domain knowledge about a problem and thereby enable the examination of interventions, without the need to build and run a full simulation.

We demonstrate the use of HDSTA using a case study of Road No. 2 in Israel where multiple data sources are available to analyze bus delays. This is an interesting case allowing the involvement of different experts from both transport and climate, as well as stakeholders of transport systems, services, and infrastructure. We created a conceptual causality model with HDSTA in the form of graphical description, and written protocol. Then we tested it with a collection of data, both passive and active mobility data, including data on speed and car counts from sensor networks; passengers counts, buses arrival times and accidents records that are available from both the transportation Ministry official sources and various apps (Moovit, and Waze); and climate data from Meteorological stations. It is then explained how HDSTA support a successful data-to-knowledge transformation regarding the cause-effect links between climate, infrastructure, accidents, and public transport by using the help of those different experts in an iterative process improving the model in accordance with their feedback for a better delay prediction model for the case study.

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Leveraging Strava Metro Data to Enhance Urban Cycling Infrastructure Development in Brussels: An Integrated Approach

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Cycling has known a rising popularity over the past decade, and has boomed even more since the COVID-19 pandemic. Worldwide, cycling levels have risen strongly since the pandemic: London, Paris, and Brussels, for example, respectively saw an 11%, 27%, and 44% increase in cycling levels since pre-pandemic times. Knowing traffic volumes is, of course, essential for evaluating transportation systems, which can sometimes be challenging in the case of active mobility. Knowing where users are can help direct policymakers when it comes to building appropriate infrastructure. For cycling, one way around this is through the use of automated or manual bike counters. However, these counts are often only performed at strategic locations, often characterized by high cycling volumes. An additional interesting source of information can come from crowdsourced data such as through the use of Strava Metro data. However, a downside of this type of data can be its representativity, as it is limited to the users of the app. In this paper, we therefore analyse whether Strava Metro data can be used to estimate/predict the number of cyclists in Brussels, Belgium. To do so, we combine Strava Metro data with manual and automated counts for the Brussels Capital Region between 2019 and 2023. We first combine these three data sets to provide an aggregate overview of the evolution of cycling in Brussels. We then train a neural network on this official data source to correlate with the crowdsourced Strava Metro data. This allows us to analyse whether Strava Metro data can be considered a good predictor for cycling levels across the city. Once trained, we use the network to predict counts at segments which do not possess official counting but still see high cycling levels. This can then be compared to a map of the current cycling infrastructure in the city to provide recommendations on appropriate locations where new infrastructure might be needed. Conversely, for segments which see low cycling levels, we analyse the features of the road (such as traffic speed, pollution, and parking) to extract problematic features, next to lack of infrastructure, that hinder cyclists. Finally, to better understand the flow of cyclists, we also analyse aggregated origin-destination Strava cycling data for Brussels to identify which areas of the city are most connected. This offers additional insight into the 'reachability', based on distance and time of trajectories, of key urban destinations such as commercial areas, leisure areas or workplaces.

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Socio-economic and residential differences in urban modality styles based on a long-term smartphone experiment

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This study focusses on urban mobility and travel mode differences in the city of Tallinn, Estonia. It contributes to a better understanding concerning socio-economic and residential factors affecting modality styles with a specific focus on sustainable travel modes. We examined residents living in the inner city (Kalamaja neighbourhood) and an inner suburb (Priisle neighbourhood). We conducted a modality styles analysis based on smartphone tracking data from 108 people over 14 months. Cluster analysis distinguished five urban modality styles, of which four were dominated by one travel mode (i.e., car, public transport, bike, or walk) while one displayed a multimodal style. Modality styles are fairly evenly distributed in Tallinn, with the walk dominant style representing 32% of all individuals, the car dominant style 27%, the multimodal 23%, the public transport dominant 13%, and the bike dominant 5%. The walk dominant style has the largest share for women, Estonian-speakers, inner city residents, and households that do not own a private car. The car dominant style has the largest share among men, Russian-speakers, inner suburban residents, and households that own a private car. The share of travel modes is more variable over time for active modality styles and more regular for motorized styles. Our discussion includes consideration of the implications of our results from a policy perspective. Broadly, two major categories of policies are recommended: 1) strengthen the relative competitiveness of sustainable travel for suburban residents, 2) provision of more vibrant, mixed-use character in suburban areas while simultaneously preserving housing affordability.

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A Cross-lagged SEM Approach to Study Logitudinal Effects of E-shopping on Travel Behavior

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Mobility patterns have persistently changed over time due to the occurrence of disruptive events, including the development and adoption of online activities (e-activities hereafter) such as online shopping. In this regard, the COVID-19 outbreak significantly boosted the use of e-shopping due to the stores' closures. In this context, the pandemic has led to publishing several studies on how the acceleration in digitalization might affect post-pandemic travel behavior. However, only few research addresses this issue based on panel data. Accordingly, it is not clear whether pre-pandemic habits and those acquired during the lockdown periods may produce significant changes on online and in-store shopping-related participation.

Based on these important issues, this paper explores how and to what extent the shopping behaviors (offline and online) pre and during the pandemic are associated with post-pandemic shopping-related travel behavior. The country of Luxembourg is taken as the geographical laboratory for empirical testing. At a methodological level, 274 people filled in a two-wave questionnaire disseminated in 2020 and 2021. Questions included in-store and e-shopping habits, socio-economic characteristics, and built environment attributes for three different periods: pre-, post-peak, and relaxed measures. The data is then analyzed in SPSS-Amos by implementing a random intercepts cross-lagged panel model (RI-CLPM). These models inform on two main effects: (i) autoregressive effects, which indicate the extent to which within-individuals' response vary between two consecutive assessments across time; (ii) Cross-lagged effects, indicating the influence of one variable at an earlier time point on another variable at later time point, while controlling for autoregressive effects. It is noted that due to the model's complexity, variables related with in-store and online shopping are uniquely included.

The RI-CLPM got an RMSEA of 0.000, CFI of 1, and chi-square of 0.391, indicating a good overall model's fit. It is seen that the autoregressive effects yielded statistically significant results for e-shopping behavior for the three periods under study. The coefficients are 0.236 from the pre-pandemic to the post-peak period, and 0.265 from the post-peak to the moment when social distancing measures are relaxed. It would indicate that the e-shopping behavior remains stable over the time. In other words, those who bought online more often before the pandemic was declared does not change their online shopping habits. In contrast, the autoregressive coefficients were not statistically significant for in-store shopping behavior. This could be due to the questionnaire asked for general shopping behavior without considering daily and non-daily retail typologies.

Related to the cross-lagged relationships, the results suggest a complementarity effect of e-shopping to in-store shopping between the pre-pandemic period and the post-peak point (coeff. of 0.207). Arguably, the closure of non-daily retail led to a shift to online shopping for non-daily products, while in-store shopping continues for e.g., groceries. Similarly, pre-COVI-19 e-shopping frequency promote in-store shopping during the pandemic. This might be in line with past research which found reciprocal relationships between in-store and e-shopping frequencies. The paper closes by reflecting on the long-term impacts of COVID-19 in shopping-related travel behavior.

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Can we interest you in picking up your delivery? Exploring e-shopping effects of on delivery services preferences in Belo Horizonte, Brazil

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The growth of e-shopping has spread deliveries across urban areas. E-shopping has vastly increased the number of delivery trips, with transport companies struggling to meet the desires of e-consumers. Research has focused on the use of unattended delivery services (e.g., pick-up points) as an alternative to cope with this rising demand. Meanwhile, a parallel strain of research has dealt with investigating e-shopping impacts on physical stores. Few studies analyse these factors jointly. This paper explores the interplay between e-shopping, in-store shopping, and parcel delivery service preference, using structural equation modelling (SEM) to address that potential gap.
We aim to capture shopping and delivery service preferences while accounting for socioeconomic and land use variables, travel behaviour patterns and telework frequency, based on the following considerations:
- Research has shown that shopping behaviour varies between workdays and weekends, which could also influence the preference for the delivery strategy. For example, individuals shopping more online on weekdays may opt to use unattended delivery services on weekends, especially if telecommuting, to get out of the house and combat “cabin fever”;
- Research has not explored the effects of telework on the frequency of e-shopping and the preference for parcel delivery services. For example, individuals working from home may be more prone to getting a parcel delivered home. As the frequency of telework increases, the preference for home delivery might also increase;
- Finally, age, educational level, and income have also been shown to influence the frequency of e-shopping. Moreover, people with different socioeconomic backgrounds tend to live in different places (different land use characteristics) and exhibit different travel behaviour patterns. Hence, the model also controls for these factors.

Based on the above considerations, a questionnaire was implemented through social media, in October 2023 to a sample of 467 residents in Belo Horizonte, Brazil. The questionnaire characterized (i) travel patterns, (ii) shopping patterns, (iii) purchasing attitudes and perception of the land use characteristics surrounding the residence of each respondent, and (iv) socioeconomic characteristics of the respondents.
From a managerial perspective, the analysis may help support the development of an unattended delivery network by identifying the potential for market penetration and the characteristics that make it attractive to shoppers. For example, determining whether land use characteristics (for example, areas with enhanced walkability) can attract more e-consumers to use pick-up points can help companies increase the number of unattended delivery points. Knowing how travel behaviour, land use, and telecommuting may influence the choice between attended or unattended deliveries can help develop more realistic transport policies to meet the needs of individuals while being sustainable and economically viable.

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Co-designing a future-oriented curriculum on sustainability and climate resilience in the transport, shipping and logistics sectors

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Engagement with diverse stakeholders, including students, faculty, and industry experts, plays a central role in co-designing a curriculum aligned with contemporary needs and advancements, particularly in sustainability and digitalisation. The use of Communities of practice (CoPs) enriches the process, ensuring relevance and alignment with real-world challenges, while continuous evaluation of teaching practices allows for ongoing enhancements to meet evolving educational landscapes and sectoral needs. CoPs may improve current practices in the transport, shipping and logistics fields, and constitute a powerful tool to build capacity on climate literacy among students, experts and education professionals in such fields.
CoPs are built upon the underlying idea that knowledge is built through social interaction. CoPs facilitate a creative process which implies sharing and exchanging with other participants to jointly build new ideas and behaviours (Wenger, McDermott, & Snyder, 2002) (Di Ciommo, et al., 2023). In the context of the REFOCUS ERASMUS + project (REthinking and FOstering Competence and skills for sUstainable transport, Shipping, and logistics, s.f.), CoPs have been organised in 4 European countries (Spain, Belgium, Greece and The Netherlands) to co-design a future-oriented curriculum and innovative training material on sustainability and climate resilience for transport, shipping and logistics sectors.
REFOCUS CoPs have engaged students from different age groups and education levels/stages, educators such as university teachers, organisations including business representatives, climate change experts and NGOs. As a result, REFOCUS CoPs have identified the knowledge needs in the transport, shipping and logistics sectors and provided the basis for developing a sustainable educational and training program, on which to base the next universities curricula. CoPs have acted as transdisciplinary learning spaces, to co-create knowledge for the challenging climate change issues and address how these issues can be reflected into educational programs, based on current needs, best teaching practices and existing programs in several EU countries. Based on existing teaching practices such as blended learning pedagogies, digital technologies, etc., REFOCUS is developing future-oriented curricula essential for fostering climate change awareness and skill development and will test them through real training schools in Belgium (University of Antwerp), Greece (University of the Aegean) and The Netherlands (Delft University of Technology).

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Equity in Parcel Deliveries: A Conceptual Model Based on the Capabilities Approach

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Globalisation and e-commerce have allowed people to expand their purchasing options. Currently, e-commerce is a growing retail sector and allows different groups to access goods consumption, including people affected by mobility restrictions. However, not everyone has the same access to e-commerce due to several factors. This work argues that there is an unequal distribution of e-commerce goods due to several factors inherent to the user (such as internet access, the existence of zip code, home accessibility, variety of delivery options, socioeconomic conditions, digital skills, availability to receipt of goods, among others).

Equity in transport is a topic that has gained notoriety in the literature in recent years. Equity refers to the morally appropriate distribution of benefits and burdens on members of society (MARTENS, BASTIAANSSEN and LUCAS, 2019). Therefore, transportation planning can significantly impact equity, as it affects the allocation of public resources, opportunities, and quality of life (LITMAN, 2023). However, research on socio-environmental equity and justice in urban freight transport is poorly explored, especially in comparison to discussions on people's mobility (FRIED et al., 2023).

This article proposes a conceptual model of called equity in urban deliveries based on consumers' capabilities MEUD-C. The model considers that personal resources are needed to enable people to buy goods, for example, e-commerce access devices such as smartphones, tablets, and computers; and public resources are needed to enable people to receive these goods, in this case transport infrastructure and logistics infrastructure.

Conversion factors influence how a person can convert resources into functioning. They are a combination of personal, social, and environmental factors. The purchasing experience can become a personal conversion factor, as the well-being achieved was relevant enough that whenever there is a new opportunity to choose, the person will consider opting for it.

In the MEUD-C, accessibility to goods is considered from two perspectives: the ability of a person to reach an opportunity (for example, to buy) and the ability of a person to be reached by a commodity.

Each choice among delivery options provides a type of achieved access as an achieved functioning. In this context, each available delivery option has specific characteristics, which during the choice process can provide a specific state of well-being. Based on the discussion of the constituent elements of this model, it is understood that, in the end, the main factors that are offered as options for consumers to decide whether or not to buy online are the motivational factors (price and variety of products, convenience and whether or not they have access to physical stores) and the delivery characteristics (cost, time, and place of delivery). Applying the MEUD-C will make it possible to identify which resources, conversion factors, and operations are obstacles in promoting equity in parcel deliveries.

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A hybrid pedestrian intensity model

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Pedestrians are an increasingly important mobility group in urban development. However, little is known about pedestrian flows. There are studies with estimates of how much walking is done, but these only concern a few central areas of large cities. For the Outdoor Advertising Research, we built a pedestrian model that estimates the pedestrian intensity for each road section in the Netherlands.
The intensity estimates consist of two parts. In the basic model, the number of walking trips per address is first estimated. These are then allocated to the network using a trip length distribution. The density of shops and entertainment venues is used to accurately reflect the distribution of walking trips through the city. The higher this density, the more walking takes place. The basic model is therefore already a good representation on average, but the level of detail of specific walking routes, especially in busy pedestrian areas, is still lacking. Compared to, for example, car traffic, the local environment is much more decisive for which walking routes there are. In order to properly represent this level of detail in the distribution of walking routes, the model flows are supplemented with actually observed pedestrian flows from approximately 15,000 panel members from the NVP (Dutch Travel Panel).
Concretely, in case more than 10 NVP participants have been observed at an intersection, turn fractions were updated to better represent the observed walking routes. This was done based on NVP intensities at the adjacent links. Furthermore, the walking trip generation is a combination of model and scaled NVP values. This combined estimate is a weighted average of the model and NVP. The weights are proportional to one over the estimated squared errors. In practice, this means that for small attraction points the model will be dominant, because the number of observed NVP trips is limited. In contrast, the NVP estimate becomes dominant for large important attraction locations due to the large number of observed NVP trip ends at these location.
The relation between the walk fraction (with respect to other modes) and density of shops and entertainment venues has also been calibrated and validated by NVP data. About half of the significant increase in walking intensities from residential areas to city centers can be attributed to an increase in walk fraction. The other half of the increase can be attributed to the fact that city centers attract many more trips than residential areas.
By combining a model and observed flows, accurate pedestrian flows are estimated in both quiet and busy areas. This not only provides insight into busy city center areas, but also into pedestrian areas outside city centers and even in residential areas. This enables policy makers for the first time to form a complete picture of pedestrian flows in their municipality or province in order to adapt policy measures accordingly.

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A Meta-Theory for Travel-related Choices

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In this paper we propose a meta-theory for travel-related choices. The meta-theory envisions that travel choices are based on five building blocks : (1) the Motivations for travel, (2) the Decision-making paradigm, (3) the Type of travel choice, (4) Personal characteristics, and (5) Context factors. Motivations for travel (1) are: travel is a derived demand (i.e. that it has instrumental utility), travel because of the positive (or intrinsic) utility of the trip, travel choices that can be motivated by positionality: individuals' choices are influenced by the choices of other people (Hirsch, 1977), and travel because people sometimes travel to escape from their family, work, or residential neighbourhood (Escape Theory, see Van Wee & Mokhtarian, 2023). Decision making paradigms (2) include Random Utility Theory, Regret Theory (Chorus, 2010), and Prospect Theory (Kahneman and Tversky, 1979). Travel choices (3) include mode choice, route choice, time-of-day choice, car ownership, car type choice, ownership of other vehicles and residential choice) and travel related choices include choices such the adoption of teleworking. Personal characteristics (4) include socio-demographics and attitudes. The impact of context factors (5) on travel (related) choices is explained by the Theory of Planned Behaviour (Ajzen, 1991), theory of Time Geography (Hägerstrand, 1970), and Social Practice Theory (Shove et al., 2012; Spotswood, 2016). After explaining each of these building blocks, the paper offers a conceptual model that links

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Affordable accessibility? An overview of transport expenses and an indication of affordability problems among Dutch households

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The recent surge in energy prices and subsequently living expenses has drawn increased attention from both the media and politicians, particularly for households currently facing or at risk of financial distress. This is the case all over Europe, including in the Netherlands. There, amidst the broader discourse on costs of living, affordability of transport is attracting heightened scrutiny. A rise in public transport fares and an increase in excise duties on fuel are topics of public and political debate. This raises questions on what Dutch households spend on transport, and how many of them are at risk of having affordability problems. KiM, the Netherlands Institute for Transport Policy Analysis, has been asked to investigate these questions.

Existing literature offers various indicators for gauging affordability problems (e.g., Alonso-Epelde et al., 2023; Mattioli et al., 2018), each with its own set of limitations and advantages. Many of these indicators originate from the energy poverty literature, and their applicability to transportation demands careful consideration. We can distinguish between three approaches. A first approach consists of setting a standard (how many trips are needed over a given period, etc.) and then calculating a minimum budget to achieve these standards. However, this budget approach faces criticism in the transportation field due to the complexity of defining norms for activity participation, which heavily depends on the diverse needs and resources of each household. A second approach entails mapping actual expenditure and/or disposable income, using indicators such as the double median quote (2M). The 2M indicator identifies households disproportionately burdened in a specific domain based on their economic situation. Yet, it overlooks the fact that some households already spend less on transportation due to financial constraints. Moreover, it includes households with high disposable incomes that engage in frequent travel, complicating the accuracy of the indicator. Alternative indicators not only assess the relative share of the household budget spent on transport but also consider this in relation to residual income. A third approach involves studying affordability problems through questionnaire surveys or interviews, referred to as the consensual approach. This approach has the disadvantage to be more subjective than the other approaches.
We start by providing an analysis of the costs of various transport modes over the years. We also examine household expenses related to both transport and the combined costs of transport and housing, using comprehensive data from a national household budget survey. Subsequently, the various indicators described in literature are applied to the Dutch context to shed light on the number of households facing affordability challenges. We also reflect on the ins and outs as well as the usefulness of these indicators. Finally, we present an overview of potential policy interventions to alleviate the financial burden of transportation on Dutch households.

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Are You (Still) Being Served? A longitudinal analysis of public transport job accessibility changes in the Netherlands

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Public transport is an essential service for many people, connecting them to opportunities that are otherwise difficult to reach. Various studies have examined spatiotemporal variations in public transport job accessibility, mainly in metropolitan areas, utilizing the increased availability of standardized timetable data (GTFS). We improve on these existing studies through a longitudinal analysis of public transport job accessibility change for different educational groups and geographical area types at the national level of the Netherlands. In a departure from most standard accessibility methodologies, we combine historic GTFS datasets of all scheduled public transport services in the Netherlands in 2012 and 2022 with national employment and population micro datasets for both years, segmented by educational level. This allows us to examine and decompose changes in public transport job accessibility over time for different educational groups, and to assess whether similar patterns hold in different urban and rural areas.

The study finds substantial job accessibility changes over time, but with clear differential effects for different groups and areas. Job accessibility among all educational groups, both in urban and rural areas, has been reduced by public transport service cuts, but with lower educated being affected most. A reduction in low-educated job opportunities in combination with increased job competition further added to their reduced job accessibility. Yet, middle educated groups have seen the largest reduction in job accessibility, due to increased job competition. Higher educated groups, on the other hand, have seen a significant job growth in this period, which effectively offset the negative effects of public transport service cuts and increased job competition. These adverse job accessibility effects among lower and middle educated groups thus supports the need for more progressive planning and transport policies targeted at improving their job accessibility.

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Assessing the intention to adopt mobility management apps: a comparison between the metropolitan areas of Madrid (Spain) and Lisbon (Portugal)

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Urban transport systems are undergoing disruptive changes, driven by global mega-trends such as population growth, ageing, urbanisation, economic development, digitalization, connectivity, and servitisation. Within this context of "liquid societies", a wide variety of mobility strategies have already been deployed to encourage people to travel more sustainable.

Mobility as a Service (MaaS) emerged in 2014 as a promising model to instigate a paradigm shift in the transport sector. Its ultimate goal – and most attractive proposition – is the promotion of a behavioural transition towards more sustainable and less car-oriented lifestyles, while increasing individuals' satisfaction.

To date, several MaaS pilots have been implemented worldwide. However, it remains unclear whether the "general population" is disposed (and ready) to uptake these innovative solutions and modify their habits. The main objective of this paper is to explore individuals' willingness to adopt mobility management apps, as well as the key drivers behind their intention. The analytical approach relies on recent research frameworks, in which the motivations for using these apps are grouped in four overarching factors: (1) gainful, (2) hedonic, (3) normative and (4) technophilic attitudes. Two European metropolitan areas are selected as case studies: Madrid (Spain) and Lisbon (Portugal). Despite similarities in terms of cultural and economic importance within their respective countries, these regions differ notably in their territorial configuration and mobility patterns.

Based on the individual-level dataset from a survey campaign conducted in 2021 in the two metropolitan areas under study, we applied a Structural Equation Model to simultaneously assess the influence of a set of socioeconomic characteristics, mobility-related aspects, and latent psychological attributes on individuals' intention to use MaaS. Specifically, we developed two models (i.e., one per case study) with the same structure and specifications to compare coefficients, magnitudes, directions, and significance levels. After data cleaning, a total of 738 valid response were retained for each region.

Overall, we detected strong positive attitudes towards mobility management apps. The results emphasize the relevance of the different types of explanatory variables for each metropolitan area, allowing for meaningful associations. Specifically, the following motives appear crucial for the adoption of these apps in both case studies: (i) improving the efficiency and information level of the trip; (ii) enhancing personal enjoyment during the travel experience; (iii) promoting environmentally friendly travel; and (iv) the level of technophilia.

Our findings can assist transport planners and urban authorities in identifying key factors that might be taken into account when defining MaaS strategies aimed at promoting sustainable cities and societies in the coming years. Establishing an appropriate policy framework is essential for the success of these innovative solutions.

This scientific work has been developed within the framework of the national R&D project named U-MOVE (acronym of "smart strategies for Urban sustainable MObility: role of traVEl apps"), funded by the Spanish Ministry of Science and Innovation.

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Augmented Accessibility: A Theory-practice Framework to Bring E-activities Into Accessibility Planning

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Spatial accessibility planning is facing challenging times. The high penetration of e-activities (e-working, e-shopping, e-leisure) has empowered people to overcome space-time constraints in daily routines, and this trend is growing. New knowledge is sorely needed to incorporate e-activities into accessibility planning and to define new conceptualizations, methods, and quantifiers that recognize digital and in-person accessibility in real life. This paper proposes a new framework, "augmented accessibility", to identify space-time thresholds in which e-activities are more competitive than in-person activities. From a policymaking perspective, these space-time thresholds would indicate the points where substituting in-person activities with e-activities can become significant for maintaining and increasing spatial accessibility levels, as the saved time can be used to engage in other in-person activities.
Methodologically, space-time thresholds are identified by implementing elasticity analysis. Elasticity estimates the responsiveness of spatial accessibility levels to variations in travel distances between origins and destinations. Space-time thresholds will be established when elasticity equals 1, indicating that when the normalized travel distance between origins and destinations is increased by 1%, the loss of spatial accessibility exhibits a non-linear decay. To operationalize elasticity, the individual's feasible opportunity set will be considered as a measure of spatial accessibility. Likewise, the feasible opportunity set results from combining the potential path area and a function that simulates how the location and concentration of opportunities vary for different spatial contexts. Totally, six simulated spatial settings were established ranging from polycentric and compact cases to sprawled and monocentric cases. Elasticity results are finally translated into specific critical distances assuming a one-hour travel budget and the following average travel speed for each transport mode: (i) 50 km/h for cars, (ii) 35 km/h for public transport, (iii) 10 km/h for bicycles, and (iv) 4 km/h for walking.

Overall, the results suggest that the critical distances are higher in compact settings than in sprawled settings. For example, the space-time threshold for public transport travelling in compact polycentric settings is identified at 25.33km. It means that when the origin–destination distance is above that distance; the individual's spatial accessibility experiences a non-linear decay as their travel distance increases by 1%. However, that distance decrease down to 7.47km in the sprawled polycentric simulated setting. The same applies when compared cycling in compact monocentric and sprawled monocentric simulated settings. While the critical distance for the compact settings is established in 3.57km, that distance decreases down to 1.92 for their sprawled peer.

The paper closes by discussing the social and spatial effects of the space-time accessibility thresholds, as well as the implications for transport policymaking. In particular it is highlighted how the current institutional barriers to implement accessibility planning approaches could be exacerbated when incorporating e-activities. By considering the digital realm, augmented accessibility ignores additional local administration actors involved in digitalization, which could limit the dialogue spaces for discussion even more.

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Beyond demographics: understanding the key determinants of car-sharing use

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Car dependency leads to a wide array of urban, societal, and environmental problems, to which shared car use is seen as a potential part of the solution. Users of these services tend to be younger, have higher incomes, or are those with reduced car availability (Von Behren et al., 2019), as well as frequent users of public transportation (Zijlstra et al., 2020). However, the psychological and attitudinal components of shared mobility usage have not yet been sufficiently explored (Soza-Parra & Cats, 2023). This study will attempt to explain the frequency of car-sharing use through general and specific mobility attitudes within the Netherlands.
We have conducted a cross-sectional survey with 1,329 cases on people's mobility behaviour and their attitudes on (specific kinds of) mobility, as well as attitudes on environmental and mobility policy options. The sample offers a varied response group, with ages ranging between 18 and 90 years old, balanced gender participation, and similarly varied in terms of education and income level.
Using an exploratory factor analysis, 17 factors have been extracted from the attitudinal Likert-type scale questions. These include attitudes concerning transportation modes (walking, public transit, mopeds, cycling, cars and general attitudes); shared mobility (lifestyle and convenience); mobility-related themes and different intentions for sustainable mobility behaviour (reducing car use, EV purchasing); and perceived policy effectiveness for a variety of ways of reducing car use and reducing CO2 emissions, as well as the acceptability for these measures.
An ordered logit model on car-sharing frequency over the last year was estimated with EFA scores used as explanatory variables in addition to sociodemographic characteristics. This exploration uncovered some interesting indications. Demographic aspects seem to be at play, confirming that shared car use is more frequent among people under 35, men, and people with a higher education degree. In terms of attitudes towards shared mobility, convenience seems to be the major driver of the frequency of shared car use. The way shared mobility fits one's lifestyle, however, is not a significant predictor of car-sharing frequency. Lastly, commute length does not seem to make a difference in the frequency of car-sharing use.
These findings currently suggest that car-sharing use is highest for people with commutes and who find this mode of travel convenient, but these people do not necessarily hold any lifestyle attachments to the practice. Further exploring this relationship in a more sophisticated hybrid logit model with more statistical power would be a fruitful practice in uncovering factors in car-sharing use beyond demographics.

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Can anonymous GPS movement data provide insight into people's mobility problems? A first exploration

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This paper presents an approach to using anonymous GPS movement data to identify people who are likely to experience mobility problems, with mobility problems understood here as any difficulty people might experience in reaching needed or desired destinations. The link between people's observed movement patterns and mobility problems has been highlighted in numerous studies into transport disadvantage, which has revealed that the travel patterns of groups with less access to means of transport (e.g. low-income, elderly, women, disabled) systematically differ from those of people who have continuous access to private motorized transport.

Research into transport disadvantage typically relies on qualitative methods or small-scale surveys. As a result, these studies are expensive to administer and often only cover a small share of the population. Hence, in the paper we seek to explore whether GPS movement data can provide relevant insights, as these data are increasingly available at a large scale.

We rely on GPS signal data covering a two-month period, obtained from third-party apps through a data aggregator by cooperation partner Habidatum. We limit the analyses to users for whom at least a certain minimal number of data points are available during the two-month period, while realizing that this user sample might not be representative for the population in the study area. While the patchiness of users' GPS signal data restricts available information to a user's home location, activity locations, rough estimates of activity duration, and in limited instances travel mode use and travel speed, this still allows for the extraction of multiple travel risk parameters travel, i.e. parameters that may highlight relative ease or difficulty of movement. This includes frequency of out-of-home activity, diversity of activity locations visited, action space as derived from activity locations, trip chaining as reflected in the number of visited activity locations between two stays at the home location, and mode use (where data enable determination of mode use). By calculating these travel risk parameters for different time periods (e.g., weekdays versus weekend days, daytime versus evening and nighttime), a rich set of parameters can be calculated for each user. While no single parameter is sufficient to determine whether someone is served well or poorly by the transport system, as behaviors may be the result of choice as well as constraint, we argue that jointly the parameters are likely to differentiate well-served from poorly-served people. We use a range of (machine learning) algorithms to merge the travel risk parameters and to distinguish distinct user clusters. We test the results against available socio-economic data at the neighborhood level as a first test of the validity of the approach. Preliminary analyses show promising results, with distinct user clusters emerging. Further analyses and extensive tests are currently under way, with results to be presented at the Nectar conference.

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Climate Assemblies to engage citizens in mobility and transport policies

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The rise of Climate Assemblies (CAs) in Europe offers citizens a platform to influence climate policies through informed discussions. Classified as 'deliberative mini-publics' (Boswell, Dean, & Smith, 2023), these assemblies bring together randomly-selected citizens to deliberate and make recommendations on aspects related to the climate crisis. While traditionally focused on mitigation, the CLIMAS Horizon Europe Research and Innovation project seeks to apply the CA model to adaptation strategies (CLIMAte change citizens engagement toolbox for dealing with Societal resilience, s.f.). CLIMAS aims to test inclusive tools in Catalunya (Spain), Riga (Latvia), and Edermünde (Germany), exploring stakeholder practices and needs using design-thinking methods (Carlgren, Rauth, & Elmquist, 2016). Stakeholders identified key drivers for successful deliberation, such as clear communication and incentives for participation, but also highlighted barriers like politicians' fear of losing control and underrepresentation of vulnerable groups. The potential of CAs extends beyond climate to areas like transport, hinting at their broader citizen engagement role. For instance, the CA concept could be applied to the development of Sustainable Urban Mobility Plans (SUMPs) by engaging citizens in the identification of more effective and responsive solutions.

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Cost-benefit analysis outcomes for transport projects in the Netherlands and Flanders

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Cost-benefit analysis (CBA) is often used in practice for the ex-ante evaluation of transport projects, but the method is also criticized for not adequately including environmental and social concerns. This paper provides an analysis of ex-ante CBA for transport projects in The Netherlands and Flanders between 2010 and 2024. We investigate the contribution of different criteria from a sustainability perspective. We compare CBA outcomes for different modes of transport, look at differences between the two regions, and explore the association between CBA outcomes and the decision taken by policy makers.

Net-present value (NPV) of alternatives and scenarios are negative in 61% of the cases, and positive in the remaining 39%. Results show that the economic criteria account on average for 80% of total monetized project effects, social criteria for 15%, and ecological criteria for only 5% of the total. Travel time improvements remain the most important economic effect, safety the most important social effect and emissions the most important ecological effect.
Of all reports, 90% of cases show positive economic effects. Total social effects are positive in 64% of the cases, negative in 18% , and are valued at 0 in the remaining 18% of cases. With respect to total ecological effects, 40% of cases are positive, 33% negative and in 27% of the cases the effect is estimated at 0. Remarkable differences between modes are observed. For example, airport CBA's exhibit more negative social and ecological effects than CBAs that deal with other modes of transport.

Finally, the analysis also shows that there is only a weak or even nonexistent association between CBA outcomes and project decisions. This implies that decision makers take other concerns into account than what is covered by the CBA. These results suggest that CBA as an evaluation method for transport projects does not adequately reflect societal concerns around transport. The results do not necessarily invalidate CBA but do show that CBA remains incomplete as an appraisal device. Improvements in CBA and the inclusion of additional criteria could increase its usefulness as a decision support device and might improve transparency of the decisions taken.

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Do visitors' archetypes influence travel behaviour in natural protected areas?

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Large environmentally protected areas have been facing a continuous increase in visitor numbers. They must look for ways to minimise the negative impacts of tourism on nature protection and support environmentally sensitive activities. It is therefore necessary to understand visitors' behaviour and their potential for a shift to sustainable transport modes.
In this paper, we use survey data from three case study areas in Czechia to analyse the types of visitors according to the purpose of their visits. The case study areas – the Czech Switzerland, Jizera Mountains, and Moravian Karst – represent very attractive protected areas dealing with different transport problems, various activities of tourists and different attractions. We then ask whether the different types of visitors significantly vary in their actual travel mode use, information required about transport services and their potential willingness to replace their actual travel mode with a more environmentally friendly one. We use the archetype analysis to isolate "pure" visitor types. We then ask whether and to what extent the individuals corresponding to these pure types differ in the characteristics of interest from the population mean.
The results of our archetype analysis suggest three main archetypes among the visitors. The intensive archetype is characterised by frequent visits to protected areas, a strong preference to see the most attractive places and to avoid crowds. They prefer longer trips (more than 15 km) and frequently use facilities for sports activities. Intensive tourists use the car less often, but public transport, cycling and walking more often than the sample average. The tough archetype often visits protected areas and has a willingness to visit less attractive places to avoid crowds. They make longer trips and use the car less often. The relaxed archetype is described by a low frequency of visits to protected areas, a strong preference for the most attractive places and no concern about possible crowds. They do not cycle and prefer short walking distances (up to 5 km) and use the car more often.
Archetype analysis can reveal interesting information about visitors and distinguish among different types of behaviour, identify the intention to change the transport behaviour under certain conditions, and provide a better supply of sustainable transport modes distinguishing the needs and requirements of each archetype.

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Does physical distance have intrinsic value for tourists?

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The use of airplanes for tourist travel has steadily increased over the years and is anticipated to continue growing, leading to a considerable adverse impact on the environment caused by the tourism sector. Given that emissions increase with distance, this impact could be reduced if tourists chose holiday destinations closer to their homes. However, it is unclear to what extent this can be achieved, as surprisingly limited research has been conducted on the importance of distance in holiday destination choice. With increasing distance more attractive holiday destinations can be reached which contributes positively to utility, but travel time and travel costs also increase, which affects utility negatively. So how is physical distance traded off against travel time, travel costs, and attractiveness of the destination? And has distance an intrinsic value once we control for the other attributes that correlate with distance?

These questions are examined in this paper by reporting on a stated choice experiment, in which a convenience sample of 254 Dutch tourists made choices among hypothetical long-distance holiday alternatives. These were varied in the attributes of distance, travel time, travel costs, holiday expenditures, and attractiveness of the destination. Since we expected that the added value of distance would be limited once controlled for travel time and costs, we conducted a second variant of this experiment in which we removed travel time while we added travel costs to the holiday expenditures.

The paper presents and compares the results of the two logit models estimated from these two variants. In the variant including travel time and costs, the distance parameter is positive suggesting that utility increases with distance if destination attractiveness, travel time, and costs do not change at the same time. However, the parameter has a very small value, and it is not statistically significant. In the variant without travel time and travel costs the distance parameter is negative and statistically significant but also has a small value. On the other hand, the attribute attractiveness of the destination, which only varied in levels 6, 7, and 8 of a 10-point rating scale, was found to be very important.

The paper additionally presents two other models. A three-class latent class choice model that provides insight into the heterogeneity among travel-destination preferences of tourists, and a regression model estimated from an additional experiment. In that experiment, respondents rated the attractiveness of holiday destination profiles varied in the attributes of holiday type, weather, temperature, familiarity with the location, food, and cultural differences on a 10-point rating scale. The paper discusses the results and the implications of all models in detail.

Overall, the results of this study suggest that the often-suggested positive value of physical distance is mainly caused by attributes that correlate with distance and that the intrinsic value of physical distance is very limited. This opens up possibilities to entice tourists to choose holiday destinations closer to their homes, but only under the condition that these destinations are attractive.

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Empowering Inclusive Decision-Making in Transport and Land Use Planning: Unveiling the Potential of the “SIM4PLAN” Prototype for Long-Term Scenario Simulation

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Information and Communication Technologies (ICTs) have become pivotal in reshaping public governance, steering it towards more democratic and inclusive decision-making processes. In this evolving landscape, an array of technology-driven platforms, applications, and tools has emerged, aiming to foster informed citizenry and facilitate crowdsourced decisions. However, challenges persist, especially when dealing with policy actions that have spatial implications, such as those concerning transport and urban systems. Existing participatory technologies often fall short in addressing the complexities of spatial interactions and fail to handle the continuous disruptions in today's dynamic cities and territories.

The SIM4PLAN web app prototype, accessible at https://sim4plan.uah.es/, seeks to bridge this gap by designing and validating a multi-user, web-based software. This innovative tool focuses on simulating and mapping the spatial impact of long-term future transport and land use scenarios. Notably, the prototype introduces a common visual language for discussion and decision-making among various stakeholders, making it adaptable to different user profiles, including citizens, urban and transport planners, and policymakers. A key feature of SIM4PLAN is its use of cadastral urban parcels as spatial units to represent urban changes. This choice enhances the comprehensibility of simulated urban land use maps for a diverse range of users. Additionally, the prototype employs foresight techniques, grounded in the design of disruptive scenarios, using a vector cellular automata simulation model. This enables users to envision future scenarios resulting from low-probability, high-impact events like demographic shifts and lifestyle changes through an intuitive graphical user interface (GUI).

To validate the functionality of the prototype, three workshops were conducted with different target participants, including the general public and policymakers. The initial series engaged citizens from the Henares Corridor in Madrid, Spain, allowing them to utilize the prototype to form opinions on a real project, the ALMA industrial development. Subsequent workshops involved professional profiles such as urban planners, transport planners, and policymakers, who used the prototype to develop informed judgments on the same industrial development.

The workshops revealed promising results, showcasing the potential of the SIM4PLAN prototype in integrated participatory and collaborative decision-making processes related to land use and transport projects. Participants acknowledged the prototype's contribution to spatial visualization, raising awareness of the significance of considering disruptive futures. The prototype was perceived as a valuable tool that could enhance participants' ability to express opinions and make decisions regarding urban and transport developments. However, certain shortcomings were identified, primarily related to transparency and comprehensiveness in simulation processes. The study concludes by recommending further refinement and expansion of the prototype, emphasizing the importance of continued engagement with users to optimize its utility and effectiveness in real-world applications. The ongoing evolution of ICTs in public governance presents exciting opportunities, and the SIM4PLAN prototype stands as a promising step towards more inclusive, informed, and democratic decision-making in the realm of urban planning and transportation.

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E-Scooter Traffic Effects on Pedestrians' Stress

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A shift toward sustainable, inclusive, and accessible transportation is transforming urban mobility and travel behavior (Keseru and Randhahn, 2023). Micromobility is a key feature in evolving urban mobility (Sundqvist-Andberg, et al., 2021; WEF, 2022) and can be viewed through the lens of a range of disciplines, from sociology, psychology, and economics to urban planning (EIT, 2020). By utilizing an interdisciplinary methodological approach, this study aims to improve our understanding of pedestrian stress in the environment of e-scooters. Inspired by Specktor et al. (2023), this study shifts the focus from cognitive aspects of urban well-being and travel investigation to examine the impact of e-scooter traffic on pedestrian stress. We examined how pedestrian preferences and perceptions of stress are influenced by spatial contexts and potential stressors in mixed micromobility urban environments.
Our research utilizes both quantitative and qualitative methods to measure urban stress (Pykett et al., 2020) experienced by pedestrians due to e-scooter traffic. We employ online surveys, spatial analysis, thematic analysis, and observational studies (Specktor et al., 2023). By using mixed methods, we can capture both emotional experiences and cognitive measurements such as sidewalk width, lane separation, and e-scooter traffic direction preferences. Results were derived using descriptive data analysis, involving content analysis, thematic analysis, and statistical analysis.
Findings suggest a complex interplay between e-scooter traffic and pedestrian stress, influenced by various subjective and environmental factors. Participants indicated that the most impactful factors on route choice were a well-lit environment, shade, air, noise pollution, and smell pollution. Older pedestrians reported that sidewalk width, architecture, micromobility paths, and vegetation were most important. A significant correlation was found between stress, gender, and traffic density, highlighting that women experience more stress in areas with heavy traffic. A systematic assessment of stressors in urban environments revealed sidewalk hazards, e-scooter traffic in front of bus stations, and walking in the same direction as e-scooter traffic are the most stressful factors.
Analysing pedestrian stress in urban settings offers implications for future research and provides guidelines for urban planning and strategy. For pedestrian-friendly integration of e-scooters into urban transportation systems, sidewalk width, traffic directions for e-scooters, and urban spatial design, such as shared areas, need to be considered.

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Exploring public transport scenarios and their impact on job accessibility and equity in Montevideo, Uruguay

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Accessibility to job opportunities is a key condition to participate in the job market. Public transport plays a crucial role in providing accessibility to jobs, particularly for the urban poor in the global south. Empirical assessments of individual accessibility generally entail considering location of activities and transport system, capturing its performance under a given urban form. While several studies in Latin America have addressed the level and distribution of accessibility to job opportunities among different social groups, few have studied how changes in transport policy may impact accessibility for different socioeconomic groups.

This paper analyzes how different public transport service and policy scenarios in Montevideo, the capital city of Uruguay, impact accessibility in terms of cumulative opportunities, minimal time and basic connectivity. It also assesses whether these policy changes increase or decrease equity in terms of accessibility to job opportunities. Specifically, we simulate scenarios defined by changes in two dimensions of public transport: improvements in the operational speed of specific corridors in the network and fare scheme restrictions on the number of transfers allowed per trip.

To conduct this analysis, we generated public transport travel time matrices between census tracts (known as 'segmentos censales') in the city. Four primary data inputs were utilized for calculating travel times: i) the geographical location of census segments, ii) the geographical location of bus stops, iii) a list of bus lines, and iv) a list of bus line variants along with their theoretical frequency timetables. It was assumed that any travel to or from a census tract commenced or concluded at these centroids. The resulting matrices consist of 1063*1063 tables with high spatial granularity. Each travel time matrix's inputs, including allowed transfers and speeds, correspond to a specific policy scenario for which we computed the accessibility indicators.

Our results indicate that both improving operational speed and allowing passengers to make more transfers result in increasing accessibility to job opportunities by public transport. Nevertheless, effects' magnitudes differ: increasing operational speed on specific corridors has a much greater impact compared to allowing free transfers. Meanwhile, allowing at least one free transfer has a modest impact on job accessibility, but a more significant impact on basic connectivity. We reached the same conclusions regarding the analysis of equity results. Improving operational speed has a positive impact on equity levels of accessibility to job opportunities.

From a policy perspective, this paper shows the need to focus on the service quality of the public transport system in Montevideo. The fare scheme currently in place, which allows for one transfer, seems to be already successful in assuring basic connectivity to citizens. However, there is room -and need- for improvement regarding speed, calling for the implementation of measures that promote public transport such as dedicated lanes and operational devices that allow for increasing bus speed.

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Exploring the potential use of shared mobility services in Brazil

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Shared mobility services have emerged as potential contributors to a sustainable transportation future [1], as they can increase user accessibility, support multimodal connections, and improve transport system resilience by supplying the demand affected by disruptive events. However, the expansion of these services has raised concerns, particularly in developing country contexts. Their benefits have been overstated, given their reliance on factors such as infrastructure, integration with existing transport systems, and users' capabilities, with access often limited to specific demographic groups [2]. These conditions lead us to question how local systems can meet user demands and whether users are willing and capable of transitioning to these modes. Furthermore, there is a need to identify the actual potential of shared mobility to enhance users' mobility, particularly in Brazilian cities (such as Rio de Janeiro), where there is high dependence on public transport, and the distribution of opportunities and access to public transport services is unequal [3]. This research seeks to address this gap by investigating the utilization patterns and perceptions of current and potential users of shared mobility services in Rio de Janeiro. We aim to explore users' willingness and capability to use these services and switch to shared modes when faced with an interruption in public transport. A survey conducted between May and June 2023 collected data on users' revealed and stated preferences, opinions about shared mobility, experiences with public transport disruptions, and socioeconomic information. Based on 852 observations, the preliminary analyses revealed a higher level of awareness regarding ridesourcing, with respondents showing agreement on aspects such as availability, comfort, and safety. In contrast, responses regarding bike sharing often indicated unfamiliarity. We also found significant associations between demographic variables such as gender and age and the shared mobility usage. Mixed logit models will be developed to identify factors influencing shared mobility choice in the context of disruptions in public transportation. Including the user's perspective in this assessment is crucial, especially in contexts like Brazil, where app-based urban mobility is socially unequal and spatially concentrated [4].

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Estimation of the effect of a new competitor's entry on railways on ticket availability for customers using survival models

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Railway competition emerged after liberalising the railway market in Sweden in 1989. Although competition was established in Europe in 2001, its scope is still limited due to various reasons such as high track access charges and investments in rolling stock and labour. Italy's HSR market is peculiar. It was controlled by Trenitalia until Italo entered the market in 2012. The competition resulted in lower prices, better services, and greater consumer benefits.
In general, the two companies have kept their services similar, but Trenitalia maintains a relative advantage in terms of time slots and seats availability. As a result, the HSR competition affected the structure of prices (Beria et al., 2022).
The companies' pricing strategies center around two fare types: economy, offering limited refunds, and base tickets, providing full rescheduling options. This, combined with inherent asymmetries between competitors, sheds light on their revenue management strategies. Notably, the supply share of economy tickets, while cheaper, offers less flexibility for passengers.

Research aims and methodology

Previous studies have focused on factors like departure times, capacity, and service quality, but have neglected the potential impact of usage flexibility and differentiated pricing. This paper addresses this gap by examining revenue management strategies based on ticket flexibility (economy/base fares) and availability (the time that each type of ticket is available) and their effects on competition and social welfare. To study the implications of vertical differentiation based on flexibility, we use the Italian case and develop a theoretical model in which asymmetrical Hotelling duopolistic operators compete in ticket fares. We assume an incumbent company with capacity and departure time advantages over a newcomer, and economy tickets impose a disutility due to their inflexibility compared to base tickets. We analyze equilibrium fares, revenues, and social welfare implications. To calibrate the model on ticket availability with real data on the competition between the operators, we develop and estimate survival models. We use relevant information on fares, departure times, peak days, duration and distances, and ODs to validate the outcomes of the theoretical modelling and display the effect of usage flexibility (and related pricing consequences) on companies' strategies. Finally, we discuss the results with revenue management implications for operators.

Findings
This study confirms the key role of vertical differentiation based on flexibility usage in the Italian HSR market. It explains the pricing strategies followed by two operators in an asymmetrical duopoly.

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From Vision to Reality: A Mapping of 15-Minute City Strategies and Practices Worldwide

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The 15-minute City (15mC) has emerged as a transformative urban planning paradigm, envisioning cities that are not only sustainable but also socially just (Moreno et al., 2021). This concept has gained global attention, with numerous cities adopting or contemplating related strategies. The academic discourse surrounding the 15mC has predominantly focused on assessing cities' adherence to its principles (Papadopoulos et al., 2023) and exploring conceptual foundations (Lu & Diab, 2023). However, limited attention has been devoted to understanding the practical policies and measures and the involvement of stakeholders required to actualize this vision.

This study, conducted as part of the Driving Urban Transition's (DUT) 15mC Mapping and funded by DUT, systematically gathered worldwide case studies of 15mC concepts and their associated policies and measures. Employing the Diffusion of Innovations (DoI) theory (Rogers, 2003), we classified cities from innovators to laggards based on their implementation status. In an examination of six selected cities, we analysed planning documents and interviewed key stakeholders from public administration, consultancies, and academia.

Our comprehensive dataset comprises 98 case studies, focusing predominantly on Europe (58) and North America (22). Among the 94 cities examined, three pioneers—Paris, Barcelona, and Melbourne—stood out, demonstrating advanced implementation of 15mC principles. In accordance with the DoI theory, most cities fall within the early majority (34%) and late majority (41%) categories. Pioneering cities distinguished themselves by adopting diverse practices, including sustainable mobility, urban logistics, and innovative citizen engagement strategies.

For the in-depth examination, our focus centred on Paris, Edinburgh, Lisbon, Vienna, Ghent, and Bologna, chosen for their representative diversity from the DoI perspective. Paris, as an innovator, showcased multifaceted strategies for the engagement of the local communities such as funding the local districts through the Pact parisien de la proximité, and giving residents a say in the neighbourhood enhancement initiative Embellir votre quartier. In contrast, cities like Vienna and Lisbon were observed to be in the adaptive phase, incorporating and tailoring pioneer strategies to their urban contexts.

This research contributes valuable insights into the practical realisation of the 15-Minute City, offering a nuanced understanding of its adoption across different urban contexts and how stakeholders and residents can be involved in this process.

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Going the distance? - A meta-analysis of the deterring effect of distance in tourism

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There is a large and growing body of literature modeling tourism flows using gravity models. This meta-analysis summarizes and explains the variation in the deterring effect of distance on tourism flows by analysing 762 estimates from 119 primary studies utilising data covering the last two decades. We find substantial heterogeneity amongst studies that mostly correlates with (unobserved) study characteristics, estimation methods, and locations of origin and destination. We make the following five contributions to the literature. First, we confirm previous findings that the mean distance-decay effect is close to unit elasticity in absolute value (-0.92). Second, we argue that this is a total effect as we find that, controlling for mediator variables, the direct effect between distance and tourism flows is substantially lower (-0.68). Third, we document a wide range of mediator variables yielding significant associations with the total effect of distance, such as adjacency, world heritage sites, exchange rates and island destinations. Fourth, we do not find changes in the distance-decay effect over the last two decades. And, finally, we point out that our findings indicate a positive relation between distance and the total amount of tourists.

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Initial Approach to Measuring the Social Effects of Warehouse Development in Cities, The Case of New York City

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E-commerce, the growth of cities, and quality of life improvements are some factors impacting the rise of residential deliveries and freight movement in urban areas. With customers expecting near-immediate deliveries, companies are seeking to have their logistics activity closer to the final customers, resulting in the growth of a heterogeneous network of proximity logistics facilities close to urban centers. Although this trend results in higher operational efficiency, proximity logistics challenge traditional urban and transportation planning paradigms and may generate both negative and positive externalities in local communities. This research aims to contribute to this study, by providing an initial approach to analyzing the effects of facility development in surrounding communities, using New York City as a case study location.

This study utilizes a number of publicly available federal, state, and local data sources, including NYC Department of City Planning tax lot land uses, NY State Retail and Food Store locations, U.S. Census Bureau American Community Survey data and Quarterly Workforce Indicators, and published address information for private distribution facilities that need to come together to analyze warehouse zoning and location trends, to identify the vulnerability of people living nearby warehouse-permitting zones, and to measure labor trends linked to the warehousing industry.

Results from this study show that in New York City logistics facilities tend to be in areas where the population is more vulnerable. However, new warehouse trends (i.e., dark stores) are in areas where there is less prove of vulnerability and tend to escape zoning codes, with the sole aim to serve the existing demand in a very fast pace. Furthermore, the impacts of proximity logistics on the net number of jobs and their quality are complex and depend heavily on the studied location. Finally, further demographic analysis show interesting results on proximty logistics workforce.

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Living in the city or leaving town? Analyzing the impacts of telework adoption on residential relocation

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The social distancing measures associated with the COVID-19 pandemic seem to have broken all pre-existing barriers to telecommuting adoption, with the percentage of people regularly working from home spiking from 6.5% of the Portuguese working population in 2019 to 11.3% in 2023 (INE, 2023). Such a shift is bound to amount to changes in travel and location patterns for firms and households. While the COVID-19 in-migration and "rural revival" were a consequence of the need for social isolation, which has ceased, the search for more spacious homes with outdoor areas may persist, particularly among larger households and families with children (González-Leonardo et al., 2022). Telework's continued adoption may enhance their opportunities to adjust their residential location to their needs (Ory & Mokhtarian, 2006), especially considering that teleworkers have revealed a preference for living in suburban environments (de Abreu e Silva, 2022).
This research aims to assess the role of telework adoption on residential location preferences, with potential impacts on travel and land use. Research materials come from a survey implemented to a web panel of 1900 workers residing in the Lisbon Metropolitan Area. The survey was implemented between October and November 2023 and was divided into three parts: (1) overall characteristics of the respondent (socioeconomic, commuting and residence characteristics; residential satisfaction and preferences; general and previous telework engagement (including the spouse's); attitudes, perceptions, and preferences towards telework and e-shopping; (2) a 7-day travel diary; (3) a stated preference (SP) of residential location considering 4 potential locations (apartment in the city centre, apartment in the suburbs, house in the suburbs, house in a smaller city or village). The SP includes house area, including the backyard for the relevant typologies, price, commuting distance, proximity to public transport, amenities, commerce, and proximity to the respondent's close social network.
A discrete choice model is implemented considering the 4 aforementioned alternatives while controlling for the respondents' socioeconomic characteristics, attitudes, the built environment, and past and present telework experiences. Model results are expected to lead to a better understanding of the interplay between telework adoption and residential location, helping assess the implications for travel and land use of teleworker's potential relocation processes.

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Modal shift from car to the combination of bicycle and public transport

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In 2022 the “Bicycle vision for the future” for the Netherlands was published. It states that the bicycle is an indispensable part of the integrated mobility system and that the bicycle in combination with the train is an excellent alternative for relatively long car trips. Therefore the Dutch Ministry of Transport and Water Management needs knowledge on (1) the potential scale of a shift from car to the combination of bicycle and public transport (pt) and (2) the group of car drivers and car trips that might shift. The aim of this study is to meet this knowledge need and to formulate policy focal points.

We break down the bicycle-pt combination into two chains: bicycle-train, and bicycle-btm, where btm stands for bus, tram, and metro. For the definition of a bicycle-pt trip, we adhere to (Kager et al., 2016): a bicycle-train trip is a trip in which the train is the main mode of transport and either in access-transport, or in egress-transport, or in both the traveler cycles. 'Train' we replace with 'pt'. A bicycle-pt trip is thus a trip where public transport is the main mode of transport and either cycling is used in access transport, or in egress transport, or both. In access and egress transport the bicycle can be combined with btm.

Using data from the Netherlands Mobility Panel (NMP) 2016-2018 and the Google Maps directions API (Google API) we analyse the Modal Shift Potential (MSP) from car to bike-pt. A set of 51.575 car trips is assessed against six criteria (for example: only car trips longer than 10 km), after which the Google API calculates three bike-pt alternatives for the remaining car trips. At least one of those bike-pt trips must meet three additional criteria (for example a travel time ratio car : bicycle-pt of maximally 1 : 1,5). We then find a MSP of 0,2%-3,4% (measured in trips) and 0,4%-7,8% (measured in distance). It is likely that the upper-bounds are overestimations because we were not able to take into account all criteria that limit a shift from car to bicycle-pt.

The car trips that can potentially shift are commuting trips that are relatively long and mostly take place during peak-hour. The majority of those trips shifts to bicycle-train, a small proportion to bicycle-btm. Most car drivers that can potentially shift have a middle-income, are higher educated, is relatively young, and the share of men is relatively high.

Several important policy focal points are:
• Cycling in access and egress transport has added value for the attractiveness of public transport compared to the car.
• Policy measures that increase comfort and decrease travel time of bicycle-pt trips may increase the relative attractiveness of the bicycle-pt alternative.
• Better facilitating the e-bike in access and egress transport of public transport trips may increase the ‘catchment area’ of pt-stations, increasing the size of the MSP.

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Overcoming transition failures in urban transport?

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In recent decades, it's clear that the shift toward sustainable transportation is not happening quickly enough to combat climate change and mitigate its societal impacts (1). This could be attributed to a failure in global and local coordination for climate action or, within the transport sector, a failure to transition away from the limitations of the existing automobility paradigm (2) Yet, in energy, transport and low-carbon transitions the main focus of policy research has been on successful policies, "best practices, promising initiatives and ambitious targets" (2: 1) as well as barriers impeding their implementation. Within transitions studies there also seems to be a preference for novelty, both manifest in the theoretical frameworks used (e.g. SNM, TIS, MLP) and empirical work often focusing on bottom-up dynamics and niche-level studies (3). Thus, according to Turnheim and Sovacool (4: 267) the field has "put too much emphasis on the positive aspects of socio-technical change and 'successful' transitions", thereby neglecting failures which risks introducing a selection bias which over-emphasizes deterministic logics and fails to show the plurality of possible pathways and explore ´paths not taken´ (4).

In this paper we acknowledge the importance of understanding such failures and ´paths not taken´ to develop and implement innovation and transitions policies in the transport and mobility sector. We use failure as a source to understand resistance to change, how transitions unfold, and as a means to detect how system weaknesses might disable the progress of transport and mobility transitions. We aim to explore how controversy and policy failure can inform the challenges of implementing necessary changes for sustaining radical transport innovations and promoting sustainable mobility transitions. We contend that controversies and policy failures in transport may be turned into opportunities for policy paradigm shifts or more transformational approaches, provided there is willingness, preparedness and ability to operate such shifts. However, to do so we need to make sure such innovative policy processes draw lessons from historical experiences rather than replicating previous policy failures. Thus, the paper analyzes mobility policy transition failures, produce a typology of transition failures and strives to identify why these transitions failed by reviewing international literature and expert knowledge (through qualitative interviews) in order to build knowledge on important factors that may bring about change. The focus is on examples that could lead to energy consumption reduction in the transport sector (avoid and shift' strategies).

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Perception and willingness to pay for smart technologies enhancing cycling safety. Stated preference survey in Europe

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There is blooming in bicycling worldwide, and the rapid increase in cycling is manifest (Buehler & Pucher, 2023). Many countries with low as well as with high cycling rates (e.g., the Netherlands) are building new cycling infrastructure or improving the existing one to promote cycling with a common target to reduce CO2 emissions and improve city sustainability (Buehler & Pucher, 2023). However, in parallel to the increase in cycling, the number of bicycle crashes also increases, especially those involving e-bikes, although there is an ongoing reducing trend in the number of motor-vehicle crashes (European Transport Safety Council, 2020; Schepers et al., 2020). In an attempt to increase cycling safety, comfort and reliability, a growing stream of research focuses on emerging technologies consisting of sensors and advanced information and communication technologies (ICT) embedded in bicycles, mainly on e-bikes (Kapousizis et al., 2022). These technologies vary in functionalities and technology readiness levels. This research paper is the first paper to examine user preferences and estimate willingness to pay for smart bicycle technologies enhancing safety, based on a survey in five European countries (Austria, Belgium, Germany, Greece, and the Netherlands). A stated preference survey was launched between November 2022 and January 2023, including 1235 e-bike users. To account for random heterogeneity of the estimations, a latent class choice model (LCM) was used, and explanatory variables were applied, such as sociodemographic characteristics, safety-related factors, and geographic areas, during the estimation of the class allocation. Two distinct classes (technology cautious and technology prone) emerged from the LCM. Results indicate that there is a significant heterogeneity in preferences among people, which a number of variables can partially explain. Participants living in areas lacking cycling infrastructure, who are technologically savvy and have an above-average monthly income, have higher preferences for smart bicycle technologies and are more likely to use advanced bicycle technologies. They are less sensitive to cost and have a higher willingness to pay. Finally, the marginal rate of substitution reveals that participants of this study are willing to pay an additional price of up to 200 € for advanced bicycle technologies to increase their safety. Governments and policymakers can consider these results and promote such systems in the interest of cyclists to reduce the number of bicycle crashes. Lastly, bicycle manufacturers and the industry can benefit from the results of this study and develop bicycle technologies aligning with cyclist preferences and willingness to pay.

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Process justice in Transit-oriented Development (TOD) in Hong Kong: the case of Kai Tak station development

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While still a popular planning approach, Transit-oriented development ('TOD') has recently received increasing scholarly attention on its social equity and justice implications, from worsening housing affordability and gentrification, to unequal accessibility and unsuitable designs for disadvantaged people (He et al., 2021; Li et al., 2016; Matsuyuki et al., 2020). A key emerging research themes is to evaluate TOD's success in creating its original vision of equitable and sustainable communities (Jamme et al., 2019). However, the bulk of existing equity- and sustainability-related TOD research focuses on outcomes and results, but less on equity in the planning processes (Ibraeva et al., 2020).

In view of this, the paper aims to adopt an analytical framework developed by the authors to conduct an analysis of process justice in the case of Kai Tak station development in Hong Kong ('HK'). The focus on process justice of the TOD is because it is less addressed in existing empirical literature, while the framework proposed by the authors highlights the importance of the process and how it can in turn affects the outcome.

The framework adopts the Institution Assessment and Development ('IAD') model to analyse the TOD's process justice. The core element is the 'Rules-in-use', which are implicit rules that guide the interaction and dynamics between the participants in the planning process (McGinnis, 2011). These Rules-in-Use, covering aspects from participation and role of those involved, to decision-making and information flow, enable a structured analysis of process justice.

Kai Tak TOD is built on land formerly occupied by an airport (Hong Kong Planning Department, 2006). To collect data, 16 semi-structured interviews were conducted with stakeholders involved in its planning, including numerous government departments, parliament members, consultants, property developers, the metro operator ('MTR') and various organisations. Guided by the IAD model, the interview asked about TOD in HK in general, Kai Tak's planning process, and its built environment. The interview transcripts are coded for thematic analysis, identifying recurrent topics and patterns, which we attempted to connect to process justice to formulate our findings.

Currently, data analysis is ongoing, though we have formulated some key issues on macro (TOD as a whole in HK) and micro (more specific on Kai Tak) levels. On the macro level, the first issue is that TOD in HK is universally implemented under a single mode, MTR's 'Railway+Property', which transforms many societal benefits of TOD into financial returns of MTR and developers. Secondly, aggressive housing development targets have led to TOD prioritising 'development' over 'transit'. Thirdly, stakeholders found a lack of overarching strategy to guide the planning process, which affected their participation. On the micro level, government actors dominated the whole planning process of Kai Tak, from setting boundaries, making decisions, to ruling on conflicting wants and controlling information. Secondly, the visions and targets of many stakeholders were fragmented with little reconciliation in the planning process. Thirdly, stakeholder participation and collective decision-making mechanisms, though existent, were limited in their actual effectiveness.

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Promoting utility cycling: Investigating the impact of the "Health Project", an initiative by a local organization on shifting individual travel behavior from cars to cycling

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Transportation is one of the most critical challenges in modern cities. In Europe, road transport is responsible for 82 % of the transport GHG emissions and a significant contribution, i.e., about half of it is due to private car use (EEA, 2020). Statistics from Norway also suggest that the energy consumption for transportation needs has grown by 32% from 1990 until 2020 (SSB, 2020).

Despite continuous improvements in the efficiency of transport vehicles, this trend has been seen increasing since 2014. The main reason is increased dependency on personal car use over time (EEA, 2020). Therefore, there is an urgent need for sustainable transport options provided for urban citizens, enabling them to reach their destination on time and cost-efficiently and with less environmental impact (Houbing, Ravi, Tamim, & Jeschke, 2017).

Cycling as a transportation mode has many benefits for cyclists and society; It is cheap, low-polluting, and improves personal health (Handy, van Wee, & Kroesen, 2014). Compared to walking, it enables the users to travel to farther destinations and can be used as a means for the everyday commute. Therefore, many cities worldwide are developing strategies to promote cycling, though they struggle to identify the most effective ways to encourage people to bike. (Handy et al., 2014)

So in this study, in collaboration with HJH (the local transport company) a health-oriented travel intervention called “Health Project” ran for three months, where participants were asked to leave their cars at home and use the bike to work. 146 employees from Stavanger University Hospital (SUS) and Five municipalities in Nord Jæren region were recruited, and their health status was monitored before and after the intervention. In addition, limited monetary incentives were offered to encourage engagement.

We have followed their mode of travel to and from work during the project for three month and as well as one year after the end of the project to see if they continued with the change or get back to using their car.

Our findings shows that a significant number of participants kept the change both during the trial period and one year after the project ends. So, these findings can suggest that a health-oriented intervention can not only initiate but also sustain individual travel behavior change from using motorized transportation to cycling in a Nordic city.

Keywords: Travel behavior change, utility cycling, Health, initiative

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Self-reported and GPS-based mobility panels; what can they learn from each other?

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To monitor and study travel behaviour, many travel surveys are conducted worldwide. Many of these surveys rely on self-reported data. In recent years, surveys that utilize GPS technology to automatically track respondents are emerging. In this study, we compare the results of two travel behaviour panels; one that includes a self-reported trip diary and one that utilizes GPS technology to automatically track respondents.

In the Netherlands, besides the Dutch national travel survey (ODiN) which has been running continuously since 1978, the Netherlands Mobility Panel (MPN) was introduced in 2013 and the Dutch Mobility Panel (NVP) followed in 2019. This paper focuses on the latter two. The MPN is a longitudinal household panel in which all household members (aged 12 years and above) of the approximately 2,000 households complete an extensive questionnaire annually and report three days of travel behaviour in an online travel diary (Hoogendoorn-Lanser et al., 2015). The NVP is a panel in which outdoor (mobility) behaviour of approximately 10,000 panel members is continuously monitored with GPS technology through an app on smartphones (e.g. Thomas et al. (2018)). To limit the response burden, the NVP opted for passive data collection. Trip mode and motive are determined automatically by the system without the need for respondents to provide this information themselves.

Although both panels collect longitudinal data on travel behaviour on a national level, they both serve a different goal. The NVP's main goal is to provide real-time statistics on national mobility and monitor changes in mobility while the MPN primarily aims to study underlying mechanisms of travel behaviour change at the individual and household levels. As a result, both panels have their own strengths and weaknesses. For example, the MPN collects three-days of travel behaviour each year, limiting the possibility to study variation in travel behaviour that is not on a day-to-day or year-to-year level. Because the NVP continuously collects data for a longer period of time, this limitation is overcome. On the other hand, unlike the MPN, the NVP does not collect extensive information from respondents to explain changes in travel behaviour, such as attitudes towards modes or life events.

Combining both panels allows us to study to what extent the collected travel behaviour is similar and assess in which situations gaps exist in the data (e.g., missing trips in the MPN due to underreporting or in the NVP due to not carrying the smartphone). Furthermore, from a scientific perspective, the combination of MPN- and NVP-data offers unique chances for future research, allowing exploration of the impact of both small (e.g., public transport strike, weather alarm) and large (e.g., COVID-19, economic crisis) disruptive events.

To explore the possibilities of combining both panels, a pilot study will be conducted in March 2024. Approximately 500 respondents are invited to participate in both the NVP and the MPN. In the full paper, we present the results of this pilot study. We describe the differences in outcome variables (e.g., number of trips, distances, trip modes), discuss possible explanations for these differences and explore other possibilities that the combination of these types of panels offer.

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The effects of ICT on spatiotemporal accessibility perceptions of vulnerable populations

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Perceived accessibility is seen as a complementary approach to traditional objective accessibility measures to explore accessibility-related inequalities. Perceived accessibility is based on the individuals' preferences and abilities rather than objective preferences. Perceptions and skills are especially relevant when accessibility is measured for vulnerable population groups. While access-related inequalities can be faced by individuals regardless of their socio-economic status, it has been evidenced that problems of low accessibility levels are more keenly felt by the most vulnerable population groups. In addition, reduced accessibility can also exacerbate other dimensions of social exclusion (e.g., economic) for already vulnerable population groups. At the same time, the technological landscape of everyday life is changing rapidly based on the always-online comprehensive mobile platforms (e.g., smartphones, tablets, etc.). The Internet allows people to continue participating in daily activities anywhere and at any time by overcoming space-time barriers. Therefore, ICT use is expected to affect perceptions in the two dimensions of accessibility: space and time.

In this context, this study explores the following research question: Do vulnerable population groups perceive they can overcome space-time barriers thanks to ICT use? Luxembourg serves as the spatial laboratory for empirical analyses, where a questionnaire was filled in by 160 people in a vulnerable situation. Although this sample size may seem small, it should be borne in mind that this is about a very specific population group that is often underrepresented in survey-based research.

Methodologically, two ordinal regressions are conducted. The first model analyses whether vulnerable people perceive that ICT enables them to overcome time barriers to access desired destinations. The second model explores whether ICT enables participants to overcome spatial barriers to access their preferred destinations. These two independent variables are codified with a 3-point scale indicating "Disagree", "Neutral", and "Agree". The independent variables include the individual and household's socio-economic characteristics, current mobility routines, and habits and perceptions towards ICT.

The regression models yield a McFadden pseudo-R2 of 0.28 and 0.30 for time and space barriers, respectively. It is noted that both models met the parallel lines assumption, showing similar results. Overall, it is seen that the same independent variables explain the perception that ICT helped to overcome space and time barriers. Specifically, it was seen that older people were more likely to perceive ICT as a tool to overcome space-time barriers. Moreover, those who traveled larger distances to buy daily products were more likely to have positive perceptions. Related to ICT habits, those who think the internet makes their life easy and e-shop at least once a week tend to perceive that ICT is useful to suppress space-time constraints to access their daily destinations.

The paper closes by reflecting on new ways of measuring perceived accessibility and its role in accessibility planning approaches.

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The impact of Germany's nine-euro ticket on public transport and car use

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In spring 2022, the German federal government introduced a cheap nationwide public transport. The ticket was available three months (June-August 2022) and enabled individuals to use local public transport all over Germany for just 9€ per month. The ticket aimed to provide economic relief, and to encourage the use of public transport over private cars to decrease CO2 emissions.
Existing research on the nine-euro ticket (e.g., Gaus et al., 2023; Loder et al., 2023) and similar pricing schemes (e.g., Cats et al., 2014; Cools et al., 2016) offer partially inconclusive results about the impact of such measures. Therefore, this longitudinal study aimed to investigate the influence of the nine-euro ticket on changes in public transport and car use within individuals.
We conducted a two-wave panel survey with a sample of 767 participants in five spatially varying districts in the agglomeration area of Dortmund, Germany. The waves took place during and after the ticket period and participants self-reported their travel behavior before, during, and after the period. Additionally, respondents were asked about their place of residence, transport preferences, satisfaction with mobility costs, self-evaluation of (public transport) accessibility, and socio-economic characteristics. Our analysis pursued a two-fold analytical approach. First, we analysed the correlates of the nine-euro ticket purchase with binary regression models to understand the likelihood of ticket distribution within the population. Second, we examined the impact of having a nine-euro ticket on changes in public transport and car use with multinomial logistic regression models.
Our results show that ticket purchase was significantly associated with increased public transport and decreased car use. In our maximally adjusted model, ticket purchasers were approximately ten times more likely to increase their train use (five times for bus use), and more than three times more likely to reduce their car use compared to before this ticket was available. Moreover, several other factors influenced ticket purchase and changes in travel behavior: A higher preference for public transport and lower satisfaction with the financial and time costs of individual mobility were associated with a higher likelihood of buying the ticket and increasing public transport use. The positive influence of public transport preference also applied to increasing bus use. Individuals with a public transport ticket in April/May were less likely to increase their public transport and decrease their car use during the ticket period.
Our findings suggest that the nine-euro ticket, as a cheap nationwide public transport ticket, increased public transport and decreased car use within our cohort. We further found that preferences, satisfaction with mobility costs, and individual characteristics contributed to this effect by influencing both ticket purchases and changes in transport mode use. This result implies that the changes in mode use during the ticket period were more prevalent within specific population groups. Knowledge of the groups that are not reached by the ticket could help policymakers to adjust future pricing schemes to the needs of these groups in order to increase the fairness and effectiveness of such policies.

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The travel behaviour of migrants and children of migrants in the Netherlands

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Around 1 in 4 residents of the Netherlands has a migration background: 2.5 million migrants and 2 million children of migrants in 2021 on a total population of 17.5 million (Statistics Netherlands, 2022). This share is expected to increase further to one third around 2045. At the same time, previous studies demonstrate that the travel behaviour of people with a recent migration background differs from that of people without a migration background (see e.g., Harms (2006)). Given the growth of the share, there is a need for up-to-date knowledge on the travel behaviour of first- and second-generation Dutch residents.

To investigate the travel behaviour of migrants and their children, we used a mixed methods approach (Durand et al., 2023). We relied on data from the Dutch national travel survey coupled with microdata to obtain attributes like country of origin. This allowed us to quantitatively examine the travel behaviour of first- and second-generation Dutch residents, compare both generations and contrast their travel patterns with that of people without a recent migration background. Additionally, we interviewed 46 individuals with a recent migration background, either through one-on-one interviews or mini focus groups, to get insights into influences and motivations underlying their travel behaviour.
One of the main conclusions of our study is that migration background does contribute to explain travel behaviour, in line with the conclusion from other international studies (Delbosc & Shafi, 2023). First-generation Dutch residents are particularly less mobile than those without a migration background. They are less likely to leave home on any given day and when they do, they make fewer trips and cover a shorter total distance.

At the same time, the commuting distance and travel time for first- and second-generation Dutch individuals is longer than for other working individuals. Our data does not allow us to provide clear-cut explanations for this phenomenon, but a spatial mismatch and discrimination issues are not to exclude.

Our analyses hint at the existence of a cycling paradox. Cycling skills are seen as a valuable asset to develop, yet the cycling frequency of second-generation Dutch individuals remains significantly under that of people without a recent migration background.

Differences between and within groups are large though; this makes it difficult to draw conclusions on "the" travel behaviour of people with a recent migration background. Differences tend to be less pronounced among second-generation Dutch individuals, the children of migrants. In fact, their travel behaviour is closer to that of people without a migration background than to first-generation Dutch individuals on many aspects.

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Towards inclusive social innovation arenas? Building capacity for decision - and policy making to curb transport demand

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The mobility sector represents the second-largest energy consumer in Norway and one of the largest emitters of climate gases. So far, Norwegian transport policies have focused on efficiency and technological substitution strategies like electrification. However, for the next phase, there is a need to shift focus towards strategies and policies that curb transport demand (Creutzig et al (2022) (so-called 'avoid and shift' strategies) Such strategies have been widely ignored by policymakers, partly due to their often-controversial nature. Thus, there is a need to build capacity for real transformative action in energy and mobility transitions among decision-makers and public authorities (Hölscher, 2019). A key question is: How can public authorities develop new avoid and shift strategies in an inclusive way?
This paper explores how public authorities can prepare for implementing more radical strategies and solutions in the next phase of the energy and mobility transition by creating new ways of including stakeholders and citizens. By developing participatory, deliberative processes, and methods that encourage actor interaction and create social innovation, we seek to increase the knowledge about governance capacities in the face of controversy and opposition. We explore methods for building capacity for more transformative action in the transport sector. Building on co-creation, inclusive action research, and transition management approaches, we explore ways of establishing social innovation processes that may lead to the establishment of new and more transformative governance practices. A novel approach, called system constellations, will also be applied, and tested. In this approach the participants can experience the interactions within the system and the way it can be unblocked.
The main function of creating such social innovation arenas is to contribute knowledge for developing strategies and agendas that may incorporate justice and acceptability issues, help us overcome controversies, and create acceptability associated with radical innovations in transport. The processes will be designed with reference to three specific local use cases and contexts and based on situational mapping. The social innovation arena process takes a broad participatory approach, inviting representatives for political and administrative decision-making in public authorities, citizens, local businesses, landowners, and representatives from transport service providers and buyers. Stakeholders from both the private and public sectors, including a wide range of citizens and social groups, will all be involved. The outcome will be new ´avoid and shift´ strategies that define new pathways for realizing sustainable mobility and transport systems. Experiences with social innovation arenas will inspire innovative decision- and policy-making that promote transformative governance to curb transport demand.

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Travelling in the Margins: Long-term Lived Experiences of Transport Poverty in Rexdale, Toronto

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Existing longitudinal research offers evidence that transport poverty can have significant adverse impacts on education and employment (Ralph, 2018; Smart & Klein, 2015). However, they do not adequately capture the role of intersectional identities (e.g., income and race), significant life events (except for ephemeral car ownership [Smart & Klein, 2015]) in creating unique barriers to travel, and psychological response and adaptive mechanisms to navigate those barriers. To fill this research gap, drawing on the concept of intersectionality (Crenshaw, 1991), this study aims to understand people's lived experiences of transport poverty over several years and its impact on their education, employment and social activity participation. This research was conducted in the Rexdale neighborhood of Toronto, characterized by a high concentration of transportation and social disadvantages as well as visible minority population.

Four focus group discussions and 20 semi-structured interviews were conducted with participants living in Rexdale for at least five years and experiencing precarious financial situations at the time of the data collection or in the recent past. Through a Reflexive Thematic Analysis (Braun & Clarke, 2006) of the transcribed data, three major themes were identified from this study:

First, contrary to previous research suggesting that mobility or travel behavior is habitualized or pre-determined behavior formed by routine or planning (Ton et al., 2019; Middleton, 2011), we found that mobility (or a lack thereof) is dynamically adapted in contexts of socio-economic and transportation disadvantages. Transit-dependent participants living on low income continuously and almost instantaneously plan and re-plan their day-to-day travel due to lack of transit reliability and affordability, overcrowding and racial harassment in transit. The experiences of transport poverty are often transient, moment-to-moment and heavily dependent on the immediate and sometimes subconscious adaptive mechanism available to them, for example, walking the entire route instead of waiting for the bus, reliance on social network or ridesharing services, trying an alternative bus route, etc. This high and random variability creates some fuzzy areas of defining the transport poor as well as difficulties in reliably capturing the actual travel behavior of marginalized populations through traditional travel surveys.

Second, the intersection of economic disadvantage and race creates continual vulnerability for visible minority populations living on low incomes. Public transit is often the only affordable mode of transportation for them, and they need to continue using it despite being subjected to continuous racial harassment and discrimination in transit.

Third, similar to previous research (Ralph, 2018; Smart & Klein, 2015), transport poverty has affected the participants' employment opportunities, income, academic activities and social life over the long run. Participants mentioned missing job interviews, getting late to work or school, having to forego work or social trips due to transit delays, or being unable to pay for transit fare.

Our research indicates the importance of transit reliability, affordability and safety in improving the long-term social outcomes of marginalized population groups. Researchers and practitioners should attempt to incorporate metrics that better reflect transit service frequency, reliability, safety and affordability in future transportation equity research.

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Using X-sheds to connect accessibility measures, outcomes and policy goals

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Travel impedance are the basis of accessibility measures: they reflect the "friction" of the distance separating populations at the origin and opportunities at the destinations. Travel impedance functions are used to formalize this principle and hold assumptions about how travelers interact with destinations.

The explicit distinction between normative (prescribed) and positive (described) assumptions about the travel behavior captured by impedance functions has been discussed in the literature (Paez et al. 2012). Analysts must choose how to use impedance functions, either to represent travel behaviour as observed, or contrariwise prescriptively to match transportation/land-use goals based on desired outcomes. As an example, a normative goal for grocery store access could state that no person should have to walk more than 15 minutes to find a grocery store. In this case, an analyst can prescriptively set a binary impedance function that takes the value of 1 for any destination within 15 min walk of a given origin. This way, locations (and those residing within) that do and don't comply with the policy can be evaluated. It is possible to use the product of an accessibility analysis, the "walk-shed", to evaluate an outcome.

In this research, we generalize the idea of mapping accessibility to outcomes by means of "X-sheds". An X-shed maps a prescriptive outcome to its equivalent level of accessibility or vice-versa, a level of accessibility to an outcome. An X-shed is obtained from a monotonic transformation of an impedance function to map the cost of travel on some non-transportation-but-related outcome.

We illustrate the concept of X-sheds by means of two empirical examples in Toronto, Canada. First, we examine the accessibility of publicly available defibrillators. We use travel time on a network and map it to the chances of survival of a patient to estimate "survivability-sheds". Survivability-sheds can help public health authorities to evaluate the provision of publicly available defibrillators based on the chances of a patient surviving cardiac arrest. This example illustrates how to characterise an opportunity and convert accessibility into an outcome that is easier to interpret alongside policy goals.

In the second example, we examine the spatial availability of jobs (Soukhov et al. 2023) and how its mapped onto a transport-sector GHG reduction goal ("GHG-sheds"). Numerous jurisdictions have set ambitious targets to reduce GHG emissions. Against the backdrop of widespread automobility, we demonstrate how the spatial availability to employment could change for the jurisdiction to achieve the target. In this example, GHG-sheds illustrate a desired outcome and are used to explore accessibility implications. The results can help determine the places more or least likely to comply with the goals, and where additional policy intervention may be warranted.

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When there's no way left to go: a qualitative examination of public transport use cessation among older adults

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Background:
Mobility is a hallmark of functional aging and is a major health determinant in older adults. Mobility is known to decline with the aging process, yet, except for research on driving cessation, little is known about the role of other transport modalities' use in this decline. This exploratory research focuses on public transport use, and aims to examine older adults' transit experiences, triggers leading to public transport use cessation, and impacts of public transport use and disuse on mobility and participation.

Methods:
22 semi-structured interviews with older adults living in urban centres in Israel, aged 67-88, pre-, during, and post-cessation have been conducted. Thematic analysis was used to identify dimensions of public transport use cessation.

Results:
Interviewees expressed different levels of concern regarding possible public transport use cessation. Bus drivers' attitudes, fear of falling and actual falls in public transport were described as the main factors affecting the decision to avoid public transport. Participants without other personal transport modes to rely on describe a decline in mobility, independence and quality of life.

Conclusions:
Public transport use cessation is an important yet understudied process in older adults' age-related mobility decline. Further studies are required to determine its epidemiology and to identify interventions to allow older adults to maintain independence and mobility beyond driving.

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Measuring the multifaceted impacts of a new LRT system on residents in Montreal Canada using a longitudinal data approach

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Large-scale public-transport projects have several positive long-term benefits, including reductions in air pollutants (Chester & Cano, 2016), increases in physical activity levels among users (Miller et al., 2015), and increases in property values (Tian, 2006; Xu et al., 2016). However, they can generate long-term negative externalities such as residential displacement (Delmelle & Nilsson, 2020). In the short term, the construction work associated with these projects can lead to increased traffic congestion due to rerouting (Alshalalfah et al., 2018; An et al., 2022), and spikes in air and noise pollution (Chester & Cano, 2016; Ng, 2000; Xue et al., 2015). The Réseau express métropolitain (REM), an $8 billion new light-rail (LRT) system that began partial service in summer 2023, has impacted travel and land-use patterns in Montreal, QC, Canada at different scales. This presentation will highlight the findings from our Collaborative Health Research Project (CHRP) evaluating built environment changes as well as behavioural and health outcomes. Three main methods were used for data collection: built environment monitoring, street audits, and a multi wave longitudinal survey (2019, 2021, 2022, & 2023). Through reviewing zoning bylaws changes around the stations our built environment monitoring has shown that few municipalities took advantage of the new LRT by increasing density and encouraging mixed use development, reducing the expected benefits from such a large-scale project. Meanwhile, land values around the REM station has been on the rise at a faster pace compared to the rest of the region, yet such impact declined in the section around the branch that recently opened due to the noise impacts from the LRT after it started operations. Whilst our street audits of more than 2000 street segments have shown major disparities in the quality of the built environment around the stations. Our bilingual online survey collects data from more than 11,000 individuals including 3,000 who responded to at least two waves. The survey findings show that those who intend to use the REM for leisure comprise the biggest group, while those who intend to use it to commute to work or school have been on the decline over the 4 waves. We noticed a disparity in gender preferences where men were more likely to intend to use the REM more than women. This disparity disappeared when observing the use of the first opened branch in 2023. Most REM users were satisfied with the service regardless of how frequently they used it. In areas where the REM is still under construction, around 20% of our respondents reported negative impacts from the construction on their mood and had concerns about air quality and noise pollution. Women reported higher discomfort than men concerning the impacts of the REM construction on their daily life. The lessons learned from this research are particularly timely as cities around the world are pledging to support similar projects as part of their efforts to combat climate change, improve access to health-promoting amenities, and address disparities in mobility.

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Elements of perceived walkability – an analysis of walking experiences using citizen science techniques

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Past efforts to improve walkability have mainly focused on identifying the determinants that encourage and discourage people to walk and then propose specific interventions that potentially increase walking activity amongst the population. As walkability gradually became a relevant research topic, the most common method to assess "the extent to which the built environment supports and encourages walking" was through a walkability composite index that combined objective observations and measurements of urban density, land use diversity and street network design (Frank et al., 2005; Cervero & Kockelman, 1997). The approach assessed walking proximity to destinations, assuming that places with access to a wide range of destinations on foot were considered places with "good walkability". The relatively easy access to data about land use, residential density and street network maps, and the development of Geographic Information Systems to combine them, facilitated the surge of walkability assessments (Schlossberg et al., 2015). However, this approach overlooked aspects such as the provision for comfort, safety and visual interest. The walkable environment cannot thus be abstracted from its social setting and should be assessed through the citizens who experience it. This is based on the premise that pedestrian needs, perceptions and feelings towards the walkable environment should play an integral part in studying, planning and designing public space.

Pedestrian-centred walkability assessments based on subjective experiences require new ways of observing, measuring, analysing and interpreting the walkable environment. This study used an innovative pedestrian-centred walkability assessment, in which participants simultaneously collect georeferenced subjective experiences and objective observations on the walkable environment as part of their daily routine. Using citizen science principles, this study asked pedestrians to rate their experiences using four dichotomous variables: safe or unsafe, comfortable or uncomfortable, pleasant or unpleasant, and vibrant or dull. Participants included objective observations (with text and images) identifying any elements of the walkable environment considered relevant for their experience. An analysis of these objective observations identified the most relevant elements that influence pedestrian experiences, both in a positive and negative way.

This approach is empirically tested in Malta where the statistical and spatial data analysis allowed for a better understanding of the underlying relationships between the walkable environment and pedestrian experiences in the islands. Among the research outputs are the most relevant environmental determinants influencing experiences. The aim is to guide policy and planning towards a more pedestrian-friendly design and encourage further research on specific aspects of the Maltese walkable environment.

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Reinforcing the fractality of cities: an approach that is more pragmatic than dogmatic

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Since the late 1980s, geographers have been analysing the shape of cities (Batty et al., 1989), and have shown that they exhibit a rather fractal behaviour. Various hypotheses have been put forward to explain this phenomenon (Batty & Xie, 1996; Frankhausser, 1998), with the idea that this way of filling space could meet the objectives of optimizing certain criteria. These hypotheses remain speculative, however, because historically cities and networks were not built to satisfy fractal properties. The fractality of cities, if it exists, is therefore an emergent property. We can therefore ask ourselves whether it is a good property in today's context, where the reduction of energy consumption is becoming one of the predominant objectives of public urban planning policies.

Indeed, the energy consumption of cities (Haffner et al., 2023) is largely linked to the thermal performance of buildings, and to the kilometres travelled by residents. Mobility logically depends on the spatial distribution of the population, the spatial distribution of amenities, and the performance of transport networks. The design of cities is therefore a more central issue than ever.

The purpose of this presentation is to show that a city can benefit from a configuration close to fractality if we consider that its objective is the satisfaction of multiple constraints. In particular, we show that trying to increase the fractality of a city (Frankhauser, 2008) does not necessarily lead to a better average functioning, but can allow for more equity in access to resources and amenities. Finally, we emphasize that a development scheme inspired by fractality makes it possible to reconcile the imperatives of market places (Christaller, 1933) with a hierarchical organization of centralities and to ensure diversity in housing density and amenities at different scales.

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Electric Mobility: Implications for Equity and Inclusive Access

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The need to reduce transport-related GHG emissions has led many governments to stimulate a shift from the use of traditional combustion engine vehicles to the adoption of electric vehicles (EVs). While private and shared electric mobility (EM) options may have positive environmental outcomes, equity concerns regarding the adoption transition to EM are receiving increasing attention. This paper examines a number of theoretical concepts that describe the underlying processes that lead to transportation inequalities and identifies empirical evidence on EM adoption mechanisms with justice implications that sustain inequalities and potentially prevent a desired social-inclusive transition to EM. The empirical findings from the literature reviewed revealed how factors such as unequal distribution of economic incentives, charging and access to EM, power configuration of the space, and differences in personal characteristics and capabilities all play a role in EM adoption. Accordingly, the acceleration of EM diffusion without a critical evaluation might lead to undesired societal outcomes regarding social exclusion and transportation burdens. The results make evident the necessity to set social inclusion as both a goal and as a process, as one of the main strategic targets, along with the urgency for decarbonisation, in the current early stage of the transition to EM.

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Optimizing Automated Mobility on-Demand Operation with Markovian Model : A Case Study of the Tel Aviv Metropolis in 2040

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Autonomous Mobility on Demand (AMoD) services offers numerous benefits, such as lower operating costs, due to reduced fuel and insurance costs and have no driver (Howard and Dai, 2014; Fraedrich and Lenz, 2014), which makes it extremely attractive for future development, thus, attracted a lot of attention in the literature. The AmoD services are becoming a reality and in the near future, in metropolitan cities like Tel Aviv, it is expected that such a service will attract more than 10% of daily trips demand (Nahmias-Biran et al., 2023). However, only a few studies successfully tested and evaluated a full AMoD service on a large and realistic network simulating real-world conditions.

AMoD services fulfill four main tasks: dispatching, routing, ridesharing, and rebalancing. Dispatching assigns vehicles to customers based on availability, proximity, and battery level. Routing optimizes routes for profitability, while ridesharing serves multiple riders with one vehicle, reducing energy use but complicating trip planning with multiple route calculations (Zardini et al., 2021). The rebalancing task involves repositioning empty vehicles to optimize responsiveness and serve future demand (Dai et al., 2021). It is especially important because AMoD systems experience imbalance when some areas have more demand than others (Pavone et al., 2012).

In this study we utilize a combined trio of simulation tools: (1) SimMobility demand prediction simulator, (2) Aimsun Next road network simulator, and (3) Aimsun Ride operator tool. The predicted demand for private vehicles and AmoD requests was done using SimMobility simulator for Tel Aviv futuristic metropolis in 2040, while this demand is executed using the Aimsun Next simulator. Demand-supply feedback is taking place so that travel times in the network are being updated and feed the demand repeatedly until convergence. Simulation outputs countian 1.2M routes of private cars on the large-scale network with an emphasis on their energy consumption. To create an efficient service framework for AMOD operation, we adopt a mathematical model of a Markov decision process (MDP). MDP allows us to optimize tasks such as pickup, rebalancing and charging under demand and energy consumption constraints.

The output of the MDP model is function which suggests the optimal action of a single vehicle in the AmoD fleet needs to perform (charging, pick-up, rebalancing) at a certain point in time. Finally, we design and execute an operator using the Ride tool that simulates the vehicles in the urban environment of Tel Aviv metropolis, along with other road users, performing battery and charging monitoring and sends the AMoD's to tasks according to the optimal policy proposed by the MDP model. We compared this operator to two policy scenarios: (1) Rebalancing to the highest demand area after drop-offs , and (2) Self-decision rebalancing of the AMoD vehicle after drop-offs.

The model demonstrates energy savings, ranging from 80 to 132 kwh, equivalent to an additional travel distance of 615 to 1015 kilometers for a fleet of 100 AMoD's. This work provides valuable insights for operators policymakers, and urban planners seeking sustainable and optimized solutions for the integration of AMoD services in metropolitan environments

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Two studies to evaluate the social impacts of (sustainable) transport projects

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The Transport Authority Amsterdam (TAA) changed their appraisal approach for transport policies to establish a stronger role for sustainability and inclusiveness in decision-making. Specifically, the TAA decided to assess all proposed projects on five dimensions: accessibility, safety, sustainability, health and inclusiveness.

However, the assessment of projects on these dimensions was not operationalized yet. Hence, the goal of this study is to operationalize the five dimensions through conducting a discrete choice experiment (DCE) and a Participatory Value Evaluation (PVE) with both 1,000 participants. The data is collected in March.

The DCE consists of 10 attributes: increase in number of people that can reach their work within 45 minutes (accessibility), increase in number of people that can reach important facilities (e.g. a supermarket, a primary school) within 15 minutes (accessibility), decrease in number of people that arrives 15 minutes later than expected at their destination (accessibility), decrease in traffic deaths (safety), decrease in severe traffic accidents (safety), increase in number of people that is not afraid to cycle independently in traffic (safety), increase in number of trips made by public transport, bicycle, or walking instead of by car (sustainability), decrease in number of people who experience negative health effects from traffic in their neighbourhood (health), increase in number of people that can reach, understand or use public transport (inclusiveness), additional tax per household (cost).
To limit the cognitive burden each choice task in the DCE consists of 4 attributes (cost and 3 other attributes). The DCE allows us to derive the collective willingness to pay for a change in each of the attributes.

Participatory Value Evaluation is a participatory planning tool that is used in the Netherlands and Austria to involve large groups of citizens in transport decision-making (Mouter et al., 2021; Hossinger et al., 2023). The essence of a PVE is that participants are placed in the seat of a decision-maker. In an online environment, they (a) see which options the decision-maker is considering, (b) the impacts of the options, and (c) they have to make choices within given constraint(s). Subsequently, citizens are asked to provide a recommendation subject to the constraint(s). In the PVE for the TAA citizens are presented with 14 sustainable transport projects and related societal impacts. The total costs of the projects is 150 million euros but with only 50 million euros to spend, it is not possible for the respondents to include all projects in their preferred portfolio. Based on the choices of the respondents we can compute the social desirability of the sustainable transport projects as well as the social impacts such as decarbonisation.

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ABSTRACTS

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Are logistically sprawled cities unfair? Unpacking urban form and racial disparities in home delivery

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Populations of color (POC) are disproportionately exposed to ecommerce-related truck and cargo van traffic pollution despite ordering fewer packages than white populations (Fried et al., 2024). It is not the neighborhoods with the most frequent online shoppers that receive the lion-share of delivery traffic, but those in proximity to warehousing and distribution centers (W&Ds) and highways that respectively generate and channel the resulting delivery trips. In other words, racial disparities in exposure to home delivery traffic is intrinsically linked to the spatial organization of people, logistical facilities and infrastructure—i.e, urban form. The consequence is an accumulation of adverse health costs and years of life lost borne by historically marginalized communities.

This study inspects relevant spatial and economic factors to determine which ones shape racial disparities in home delivery costs and benefits. Of interest is the phenomenon of "logistics sprawl," which concerns the geographic dispersion of W&Ds away from urban centers. Researchers link sprawling urban form to the uneven distribution of external costs, social deprivation, and accessible opportunities (Wei & Ewing, 2018). This linkage has not been made in urban logistics research, despite the relevance of W&D location in generating unequal exposure to freight trips (Fried et al., 2023). More plainly stated, this study examines if logistically compact cities are more racially equitable than logistically sprawled cities.

This study employs a generalized structural equation model (SEM) that cross-sectionally examines racial disparities between online ordering and delivery traffic exposure in 39 U.S. metropolitan statistical areas (MSAs). We find that racial disparities become more pronounced when last-mile delivery stations are farther away from consumer doorsteps. However, this effect is mediated by existing residential segregation, low-levels of neighborhood social capital, and weaker economic agglomeration. In other words, logistically sprawled cities are less equitable than logistically compact cities when the populations served by their closest delivery station are racially segregated and/or socio-economically disenfranchised. With prominent federal funding programs now dedicated to redressing historical transport and land use injustices (e.g., Justice40), cities are increasingly incorporating environmental and social equity goals into their broader scope of work. This work includes a long-time move toward compact, mixed-use, and "Smart Growth" development. The analysis confirms that logistics and freight-efficient land uses are an important component to realizing more equitable urban development, but "solutions" require a broader purview on social and economic justice.

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Does being satisfied with accessibility mean there are sufficient opportunities?

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The explicit formulation and widespread adoption of accessibility goals face significant challenges in the measurement and evaluation of accessibility (Handy, 2020). It is elusive to conceive a calculated indicator based on spatial data that encompasses all factors affecting the 'capability' to access various opportunities with different transport modes and at different times (Vecchio & Martens, 2021). Aggregation is unavoidable but risks overlooking individual heterogeneity in needs, desires, and abilities (Pot et al., 2021; Van Wee, 2022), prompting calls to complement spatial data analysis with empirical evaluations to inform transport policy (Lättman et al., 2016).

Measuring disaggregated personal evaluations of accessibility avoids the need to make assumptions about how individuals prioritize and assess various factors contributing to accessibility. However, assessing perceived accessibility also presents challenges. According to the 'Capabilities Approach,' self-reported satisfaction may be influenced by adaptive preferences and tend to focus on past experiences, potentially diverging from assessments of the sufficiency of capabilities to pursue valued life goals (Van Ootegem & Verhofstadt, 2015).

This study examines differences between satisfaction with accessibility and perceived sufficiency of capabilities regarding access to opportunities. Data from a self-administered survey in the Netherlands (N = 3,378) cover activity patterns, mobility, preferences, satisfaction with accessibility, and individual characteristics. Satisfaction is measured using the 'Perceived Accessibility Scale' (PAC) by Lättman et al. (2018), while perceived sufficiency is assessed through statements on the availability of opportunities like schools, healthcare, shopping, sports facilities, supermarkets, and leisure options.

The findings reveal weak correlations between satisfaction and perceived sufficiency, with regression analyses highlighting significantly distinct correlates. This suggests that while some groups express satisfaction with activity access, they still perceive that there are insufficient opportunities in their living environment. These disparities indicate differing connotations between perceived sufficiency and satisfaction with accessibility. In evaluating the adequacy of accessibility, this paper contends that the decision to employ certain subjective accessibility measures in social policy hinges upon the underlying mechanisms influencing satisfaction and perceived sufficiency.

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Can mobile phone data replace Census commuting data when defining official labour market areas?

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Labour market areas (LMAs) are the appropriate geographical framework for sub-regional economic statistics. National Statistics Institutes (NSIs) have for decades delineated LMAs with commuting data from a Census, but the latest Census round saw fewer countries' Censuses collecting commuting data. One development has been using mobile phone positioning data to extract daily mobility flows (MPF). This alternative data source creates interesting new opportunities, but also poses many analytical and methodological challenges. There are very many differences between MPF data and commuting data from a Census. In particular the scale of base areas, the time and frequency of data sampling, the sources of error, the available information on individuals and the population represented. All of these differences have to be taken into account when assessing the potential use of MPF data in the definition of LMAs. In combination, these differences present significant challenges to NSIs in seeking to 'update' their definition of LMAs.

This paper explores how far these challenges can be overcome by the transformation of the MPF data to better represent the commuting data previously available from a Census, and compares the results to register-based commuting data, which is the main alternative to MPF in several European countries nowadays. Some empirical examples are presented from relevant research in Spain. Our analyses indicate that commuting flows from transformed MPF better represent the mobility patterns from previous censuses than register-based commuting flows, including the post-pandemic changes in mobility patterns after COVID19 lockdowns in Spain.

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The potential of VR street experiments for effective planning

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Transforming mobility systems for a sustainable future requires the implementation of mobility interventions in public space. This touches the interests of several stakeholders. However, usually only certain groups actively participate in such planning processes which may cause problems regarding the acceptance of changes. In our research, we discuss the potential of stakeholder-based Virtual Reality (VR) street experiments for making planning processes more effective in terms of different stakeholders, such as the public, accepting the interventions thereby making them more sustainable. Achieving this requires an approach that uses appropriate means of communication among and between professional stakeholders, but also with the local public. As compared to conventional media such as plans, maps and printed 3D visualizations, VR allows users to experience planned interventions in an immersive way. This way, people may more easily understand changes which may enhance attention and activation and enable discussions about advantages and disadvantages.
For testing this approach, we investigated how to increase the attractiveness of a public transport station and its forecourt in Berlin, Germany. By involving different stakeholders, we explored which simple measures could be implemented to entice people to reach the station using active or shared transport modes. Combining a stakeholder workshop, a field survey, and a VR street experiment, we were able to reach local citizens and different professional stakeholders. The first workshop involved experts from the district municipal administration for climate protection, and for impaired people, mobility providers, an architect, and lobby groups for pedestrians and public transport. Applying SWOT analysis, the stakeholders identified areas and ideas for improving the station surroundings targeted at increasing the attractiveness of public transport. Next, a field survey addressing local public transport users and residents (n = 250) showed which characteristics in the station and in its surrounding are considered important, e.g., cleanliness and safety, greenery, seating, aesthetics, and short and safe access to the station. These characteristics were used to create realistic 3D visualizations of e.g. greenery, street furniture and signs which were then integrated into scenes of four 360°-photos taken in the station's surroundings. Subsequently, we invited local people to take part in a VR street experiment. Participants wore VR-glasses to experience different visions of the forecourt, i.e. scenes without and with the 3D-interventions and gave their opinions on the redesign ideas in 'digital walking interviews'.
As a result, participants said they 'enjoyed' it to experience the redesign through VR and it helped them to better understand possible changes showing the method's potential to activate citizens. However, we also found VR to be costly to implement. Following this, we plan to further explore VR's potential for communicating planned interventions in another stakeholder workshop where planners from the district administration will be shown the VR street experiment and discuss the eligibility of VR as an instrument for enhancing participation. We expect to learn advantages and also barriers to employing VR compared to conventional planning communication methods. In the session, we will discuss conditions under which the application of VR can make planning processes more effective.

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Exploring the influence of Crowdsourcing on People, Profit and environment in South African

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The basic problem in the current transport and logistics systems is balancing the triple bottom line of people, profit, and the environment. In particular, supply and distribution of goods and services are characterised by multiple stops and slowdowns in traffic which has a serious impact on fuel consumption and CO2 emissions per vehicle kilometre, and congestion which impacts on-time deliveries of goods and services. The paper uses unstructured interviews to solicits the views of 49 participating stakeholders from industry and government departments to explores how the use of a digital conceptual prototype innovation designed to alleviate some of the development challenges can contribute towards the reduction of road CO2 emission, noise, and road congestion, whilst championing a green crowdsourcing model for communities and businesses. Findings reveals profit opportunities and trade insurance concerns for last mile distributions, whilst raising security and privacy concerns vis-a-vis economic opportunities for community stakeholders. The study highlights conflicting priorities and trade-offs that necessary for contract logistics.

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The community-based services business at the SA/PA on expressway: From viewpoint of stakeholder involvement and tourism destinations management

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The Japan Highway Public Corporation (JH) was privatized and reorganized into the Japan Expressway and Debt Repayment Agency (JEDRA) and 6 regional Expressway Companies in 2005. The main purposes of this change were to ensure the repayment of the massive road debt and to provide various services for road users by utilizing experience from the private sector. Since then, the total amount of road debt decreased from 40 trillion yen to 26 trillion yen (at the year-end of 2023) and the total length of national expressways reached 9,185 km (in January 2024). Judging from the fact that it already reached out more than 8,000 km in 2001, the expressway development has been slowing down since Japan entered an age of declining birthrates and an aging population (the national population has been declining since it peaked in 2008).
These social changes in Japan in the decade of the 2010s brought about a shift of the paradigm in road transportation development plan from the Link-Centric Era to the Link x Node x Management Era: The new paradigm will promote efforts to strengthen the functions of nodes such as transportation and space in addition to those of links in transportation network, in response to introducing diverse mobility with ICT and AI technologies and to providing the community-based services to revitalize the local economy and community. The following nodes are the representative target for such a community-based services business: Michi-no-Eki (Roadside rest area near the local community), Bus-TA (the Integrated Bus Terminals to enhance connections between various modes of transportation and to create road spaces), and SA/PA (Service Area / Parking Area on national expressways). The Node (Hub)-Centric Management aims to create 'new value', such as improving logistics productivity, creation of liveliness and peace of mind, revitalization of local community, advanced technology showcases, new lifestyles and tourism destination branding.
This paper discusses a basic scheme of the community-based services business at the SA/PA on expressway from the viewpoint of stakeholder involvement in tourism destinations management. The community-based services include the provision of information about tourism destinations at the nearest IC, local food/shops promotion, and interaction between tourists and local community. While such a business at the SA/PA intends to connect people and regions, it is featured with various interests of the expressway company, tourists, and the service-operators and local governments surrounding the targeted expressway. Of a particular concern is here how preconditions we need to identify to involve them in taking part in building up their newly developed tourism destinations management organization (DMO).

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The community-based services business at the SA/PA on expressway: From viewpoint of stakeholder involvement and tourism destinations management

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First, after briefly introducing the current situation of the SA/PAs on expressway in Japan and their manageable policy on enhancement of function of the hub of community and town activities, we review the existing scheme of the SA/PA management, comparing with other general types of management schemes such as, Michi-no-Eki, DMO, and the Area-Management in urban redevelopment. Second, as the empirical case study targeted at Fukuyama SA on the Sanyo Expressway, a questionnaire survey for about 400 drivers (tourists) who stopped at the SA is conducted. We analyze the data to explore the needs for the community-based services focusing on the causal relationship between such need and their activities at the SA and their satisfaction as well as individual attributes. Third, the WEB-based survey targeted at 200 individuals who live in Fukuyama city and the surrounding area is also conducted to mainly analyze the concern and intention of the community-based services business at the SA and the recognition and understanding of the Area Management scheme in general.
Finally, based on the results from two survey data, two basic challenges of the community-based services business at the SA/PA on expressway are found: One is how we can efficiently promote to provide the information about attractiveness of tourism destinations and specific local food and area-branding goods. It is because that these kinds of information services are common to both tourist's need and service-provider's concern. One of the preconditions for the proper and profitable information services offered by the provider is to timely match them with the content of the tourist's need. The community-based services business should be therefore equipped with the function simultaneously interfacing tourists with local marketers through the on/off line. The other is concerned with the challenge how we can recommend these stakeholders to properly understand necessity of the partnership and coproduction among local governments, private business persons, and residents in a newly developed scheme of tourism destinations management.

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Beyond Infrastructure: Unraveling the Interplay between Individual Characteristics and Perceived Accessibility in Urban Environments

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The subjective perceptions of accessibility profoundly influence mobility and travel decisions and represent the lived reality regarding travel experiences. Thus, it is essential to understand the factors that shape these perceptions.

According to the literature, personal characteristics and socio-economic factors such as age, gender, socio-economic status, and perceived safety are among the main determinants of perceived accessibility and the way individuals interact with their built environment. Research in this area has collectively called for examining perceived accessibility across the broader population, in different geographic contexts, and among different travel modes to gain a deeper understanding of this subjective measure of accessibility. In response, the study central in this paper makes use of a comprehensive community survey (n=4262) that incorporates the Perceived Accessibility Scale (PAC) (Lättman, Olsson, & Friman, 2015) alongside a wide range of individual characteristics. This instrument allows for the testing of individual characteristic variables previously reported in the literature as well as the analysis of new variable options.

The variables chosen for analysis in this paper are primarily informed by previous research and guided by Pot et al.'s (2021) conceptual framework, which depicts a set of individual characteristics that shape people's perceived accessibility. These variables are selected from a large community survey which is primarily intended to measure several domains of the quality of life in Canadian communities - the Canadian Index of Wellbeing (CIW, 2023). This paper examines both traditional and less-explored variables in relation to perceived accessibility; for example, the latter including self-reported mental health, self-reported physical health, and the period of residence in host communities. Incorporating these additional factors potentially provides a more comprehensive understanding of the link between individual characteristics and perceived accessibility. Both descriptive analysis and statistical modelling are employed to understand how this large array of individual factors relates to perceived accessibility across various population groups.

Our findings include that income below a $30,000 threshold, having a college diploma, trade/apprenticeship, using public transit as a main mode of transportation, and being in the middle-aged cohort (35-44) are all factors associated with significantly lower perceived accessibility. Additionally, lower perceived accessibility is also significantly associated with low self-reported mental and physical health, as well as a lower scores on sense of safety. Intriguingly, perceived accessibility is shown to be positively associated with numbers of years lived in Canada, particularly among individuals who have lived in Canada between 2 to 5 years and those with 35 years or more of Canadian residency. In terms of gender, although the statistical model shows no significant differences between men and women, Anova analysis shows that younger female cohorts typically have higher levels of perceived accessibility than younger male cohorts, while the opposite is true in older cohorts. These nuanced findings about the relationship between individual characteristics and accessibility perceptions enrich the already established understanding about the relationship between individual characteristics and perceived accessibility and provide insightful information that may be used to develop more inclusive and effective transportation planning policy and strategies.