

Transport Research Arena (TRA) Conference

# Participation, acceptability and equity aspects of urban vehicle access regulations: who benefits and who needs to adapt?

Jente Versighe<sup>a</sup>, Koos Fransen<sup>a,b\*</sup>, Sidharta Gautama<sup>a</sup>,

<sup>a</sup>Intelligent System Engineering (Ghent University), Technologiepark 46, 9052 Zwijnaarde, Belgium

<sup>b</sup>Cosmopolis Centre for Urban Research (Vrije Universiteit Brussel), Pleinlaan 2 building F, 1050 Ixelles, Belgium

---

## Abstract

Cities are increasingly adopting urban vehicle access regulations (UVAR) to reduce the negative externalities of motorized traffic. Although UVAR schemes are introduced to create a more livable and attractive city, they also restrict access for certain road users, in this way creating unequitable situations. To enhance the effectiveness and acceptance of the scheme, it is therefore important to ensure that user needs are met. In this paper, we combine a literature review on user needs with a case study analysis of twelve Western-European cities, specifically focusing on participation, acceptability and equity aspects during the UVAR process. Resultantly, we show that involving a diversity of stakeholders and understanding the impact of the scheme throughout different stages of the process are important for a successful and equitable outcome of the scheme.

© 2023 The Authors. Published by ELSEVIER B.V.

This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0>)

Peer-review under responsibility of the scientific committee of the Transport Research Arena (TRA) Conference

*Keywords:* User mobility needs; urban vehicle access regulations (UVAR); participation; transport-related social exclusion; transition framework; public acceptance

---

## 1. Introduction

Since the rise of the automobile post-World-War-II, cities have embraced cars as a symbol of prosperity and have adapted their built environment accordingly: new car-oriented infrastructure and mobility policies have brought car drivers to the cities' centres (Dennis & Urry, 2009). This has resulted in an overall increase in mobility, but also in a wide range of externalities, such as decreased traffic safety (Parry & Walls, 2007), high levels of air and noise pollution (Heijman, 2007) and inefficient spatial planning (Kulmer et al., 2014). The negative impacts related to motorized traffic made cities aware of the need to regulate car access to their centres and, in this way, improve citizens' health, traffic safety and quality of life (Rye & Hrelja, 2020).

---

\* Corresponding author. Tel.: +032-494-937136

E-mail address: : [Koos.Fransen@UGent.be](mailto:Koos.Fransen@UGent.be)

**Nomenclature**

LEZ	Low-emission zone
LTZ	Limited traffic zone
TCP	Traffic circulation plan
ULEZ	Ultra-low-emission zone
UVAR	Urban vehicle access regulation
ZEZ	Zero-emission zone

Urban vehicle access regulations (UVAR) – or measures to regulate vehicular access to urban infrastructure (European Commission, 2013) – are tools that can help cities to become more liveable, healthier and more attractive for all. By prioritizing or restricting certain types of vehicles' access to the area, a UVAR scheme regulates the use of public space. The schemes define under what conditions certain vehicles are allowed to access (parts of) the city, for example, concerning vehicle emissions levels, time periods, resident status or vehicle size. However, for a UVAR to live up to its full potential, it is crucial for the population to understand the scheme and its aims. In addition, issues of inequitable distributions of benefits and burdens are often raised when implementing UVAR schemes (Fransen & Sadler, 2021).

In this paper, we illustrate part of the work done under the EU Horizon 2020 project ReVeAL, which aims to enable cities to optimize urban space and transport network usage through new and integrated packages of urban vehicle access policies and technologies. As such, the project aims to support cities to produce good practice in urban mobility transitions and to add UVAR to the standard range of urban mobility approaches across Europe and beyond. In this paper, we specifically focus on the user needs perspective, as ensuring that user needs are met is crucial in gaining public acceptance when implementing a UVAR scheme and, therefore, directly related to the degree of success. Moreover, involving citizens and mobility user communities in all their diversity into every step of the UVAR development process enables to acknowledge aspects of justice and to distribute the benefits and burdens of sustainable mobility strategies in a more equitable manner. With this research, we aim to complement existing academic as well as practical knowledge on urban mobility transitions and to support cities that are implementing UVAR schemes by providing recommendations and good practices.

The remainder of the paper is structured as follows: the following section continues with the general findings from the literature on participation, acceptability and equitability for sustainable urban mobility transitions, as such paving the background for the research. Next, the methodology is illustrated by explaining the research methods used and summarizing the twelve case studies examined. In the third section, we illustrate the primary findings on participation, acceptability and equitability for the case studies. In the final section, we highlight the main conclusions of as well as limitations to the research and briefly explore future research opportunities.

**2. Background**

Cities introduce UVARs to regulate access of motorized traffic in their urban areas with the aim of transforming urban mobility into a more efficient and sustainable way (European commission, 2013; Ricci et al., 2017). Most of the local governments implementing UVARs have a clear vision of the ambitions of the scheme and the goals they want to achieve by introducing the measures. However, the (long term) effectiveness of a UVAR scheme is dependent on various aspects, such as public acceptability – the demonstrable willingness within a group to use a system or measure for the task for which it was designed – and public understanding of the scheme.

There are various factors that can increase the likelihood of a successful implementation of a sustainable urban mobility scheme. First of all, involving, consulting and informing a broad range of people throughout the whole process can be crucial in gaining support for a scheme (Franceschini & Marletto, 2015; Morton et al., 2021). Collaborating with stakeholders and citizens can increase trust and reduce complexity and conflicts, therefore encouraging all parties to find a consensus (Lindenau & Bohler-Baedeker, 2014; Bjorgen et al., 2021). Integrating feedback, concerns and ideas from the participation process can result in an optimized decision making process and a scheme where user needs are (better) met (Lindenau & Bohler-Baedeker, 2014; Fernandez-Heredia, & Fernandez-

Sanchez, 2020). Secondly, transparency and openness are key factors in gaining support for a scheme (Morton et al., 2021). Clear communication of the policy makers about the costs, use of revenues, deficiencies and expected privacy and equity implications during the whole process, and a willingness to tackle those issues create trust and understanding (Hysing, 2015; Gu et al., 2018; Morton et al., 2021). Also, user-friendly and comprehensible (pricing) schemes, that are well understood by the public are preferred by most people over more complex ones (Gu et al., 2018). Furthermore, support for a scheme generally increases after implementation, as people get used to the changes and benefits of the scheme (Hysing, 2015). Making people aware of the benefits of the scheme through communication, sharing of best practices or introducing a trial stage can therefore increase support prior to implementation of the scheme (Gu et al., 2018; Morton et al., 2021). All these operations can influence the acceptability of UVAR measures, but they do not guarantee a successful implementation of a scheme. Many different factors may influence public acceptance, and organizing a participation process or achieving (political) acceptance does not automatically translate into a democratic process, better decision making or longlasting support for the scheme (Lindenau & Bohler-Baedeker, 2014; Hysing, 2015; Bjorgen et al., 2021).

Furthermore, UVAR schemes will regulate urban traffic by restricting (certain types of) motorized vehicles or prioritizing softer or more sustainable modes. As travel patterns of people differ according to many characteristics, such as income, sex, place of residence, (physical) fitness and workplace, UVAR schemes can lead to an uneven impact on different (sociodemographic groups of) people (Eliasson & Mattsson, 2006; Kristoffersson et al., 2017; Gu et al., 2018). In order to mitigate these issues, it is important to address and incorporate potential equity problems during the planning stage of the scheme (Taylor & Kalaskas, 2010; Gu et al., 2018; Morton et al., 2021). During the operation phase of the scheme, equity issues can be compensated for by reinvestment of revenues (e.g., using them to benefit low-income people), introducing exemptions (e.g., delivery exemptions) or other supportive measures (e.g., improving local public transport) (Kristoffersson et al., 2017; Gu et al., 2018).

### 3. Methodology

In this paper, we combine a literature review on user needs and transport-related social exclusion in UVAR implementations with experiences from our ReVeAL case study assessment. Fig. 1 shows the twelve case study cities (Ghent, Mechelen, Barcelona, Milan, Greater London, La Rochelle, Bologna, Amsterdam, Groningen, Rotterdam, Oslo and Stuttgart) that were examined, specifically focusing on the participation during the process, the acceptability of the scheme at different stages and possible equity issues that were highlighted or mitigated. The case studies are chosen to encompass a wide range of strategy types (spatial interventions, pricing aspects and other regulations), city sizes (small- or medium-sized as well as larger cities), implementation scales (city center, entire city or neighborhood level) and city maturity levels (early adopters and newcomers) (Table 1). Although some cities already have newer examples of UVAR implementations (e.g., Groningen or Bologna), the specific scheme examined was considered as an exemplary best practice for the analysis and therefore selected within the 12 case study examples.

The user needs and participation aspects of the UVAR development process of the 12 case studies were analyzed, using a combination of desk top research on policy documents, academic and non-academic literature (e.g., cities' website, the CLARS website on UVARS in Europe<sup>†</sup> or newspaper articles) and interviews with (city) policy makers. These interviews were limited to one interview per case, and were specifically aimed at providing information on key events that were not found online or clarifying uncertainties encountered in the literature review. In this way, we assessed the different schemes for the case studies on three main criteria: how did user participation take place (Section 4.1), how did public acceptance evolve throughout the whole process (Section 4.2) and what equity issues were encountered and, consequently, which complementary measures were taken to tackle these issues (Section 4.3).

---

<sup>†</sup> <https://urbanaccessregulations.eu>

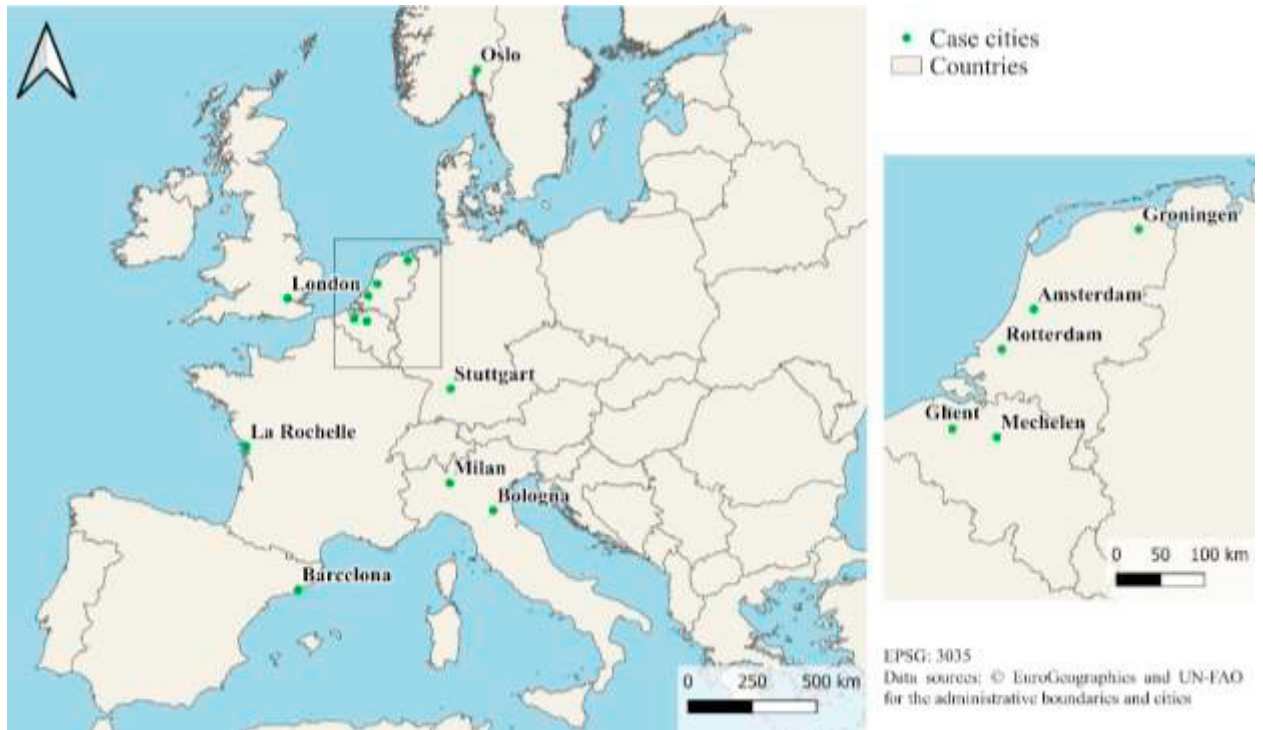


Fig. 1. Location of the twelve case cities

Table 1. Description for the twelve case studies

City	Implementation year	UVAR scheme
Barcelona, Spain	2014	Superblock scheme ‘Superilles’
Ghent, Belgium	2017	Traffic circulation plan (TCP) to limit through traffic in the inner city
Mechelen, Belgium	2019	City center turned into cycling zone
Groningen, The Netherlands	1977	TCP to limit through traffic in the inner city
Oslo, Norway	2017	Car-free livability program
Milan, Italy	2012	Area C - congestion charge
Greater London, UK	2019	Ultra-low-emission zone (ULEZ) - pollution charge
Rotterdam, The Netherlands	2011	Parking management
La Rochelle, France	2019	Delivery regulation based on time windows and emission level
Bologna, Italy	1974	Limited traffic zone (LTZ) with access enabled through permits and emission level
Amsterdam, The Netherlands	2008	Low-emission zone (LEZ) for freight traffic, evolving into a zero-emission zone (ZEZ)
Stuttgart, Germany	2019	Diesel-specific LEZ

## 4. Results

### 4.1 Participation

Public and stakeholder involvement was observed throughout the process of all of the UVAR schemes. However, there were large differences in the way that the cities have involved citizens and stakeholders. All of the cases have organized (a combination of) different types of participation, from informing people through information campaigns, over consultation of stakeholders and citizens, to intense collaboration with different parties. Involvement of people can take place at any moment during the process of the UVAR scheme (e.g., La Rochelle in the design phase or Bologna in the implementation phase). The case cities also informed the public about the scheme and its implications prior to the implementation. For example, Amsterdam notified residents whose car did not meet the (tightened) emission standards with a personal letter, and many cities, including Mechelen, London and Milan, held large communication campaigns to inform people about the scheme.

In addition, the majority of cities organized workshops, surveys, talks or hearings to consult or engage users and stakeholders during the planning phase of the program. In Mechelen, citizens were consulted at an early stage of the process. An early-stage brainstorm session with citizens was organized, during which various mobility-related topics were discussed, including the introduction of a cycling zone in the inner city. Public involvement can support the evaluation and optimization of a UVAR scheme that is already in place. For example, in the case of Ghent, a couple of meetings of the *'Burgerkabinet'* (a diverse group of citizens) were organized to evaluate the circulation plan, leading to small adjustments to the plan. The cities of Barcelona, Milan and Bologna considered citizens' opinions by organizing a public referendum on the introduction or continuation of a scheme. The referendum on the continuation of the Poblenou pilot project in Barcelona and the Bologna referendum on the expansion of the LTZ were both non-legally binding. The Milan referendum on a road pricing reform had a positive outcome and led to the replacement of the ECOPASS (emission charge) by Area C, a cordon congestion charge.

The type and impact of an intervention often influences the type of participation that takes place. It makes sense that a less impactful scheme requires a less extensive participation campaign, while a more radical one benefits from (or even needs) intensive public and stakeholder involvement to achieve acceptance. For example, public involvement during the planning of the cycling zone in Mechelen was limited to a general brainstorm on mobility and a large communication campaign. However, the introduction of the plan did not create much opposition, as access to the area by motorized traffic remained unchanged by the UVAR. The range of people involved is also dependent on the type of scheme, and in most cases involvement is focused on the groups that are most affected by the scheme. For example, in the case of La Rochelle, the city held a strong dialogue with delivery companies and shop owners, while in the case of Barcelona, mainly residents and local groups were approached.

### 4.2 Opposition and public acceptance

In all of the cases, people were in some way involved in or informed of the plans. However, this did not automatically result in a broad acceptance of the scheme. People have voiced criticism on the implementation of the UVAR scheme in multiple of the case study cities in several ways. A common way of expressing opposition was publishing open letters, organizing petitions or protests. This was the case in Ghent, London, Milan, Groningen and Stuttgart. In the case of Groningen and Stuttgart, the UVAR plan even led to an appeal to the crown and a request to the *Raad van State* (in Groningen) and court decisions (in Stuttgart). Moreover, the cases showed that a diverse group of people, from citizens, over businesses to opposition parties may oppose urban vehicle access regulating schemes for various reasons. Perceived or expected negative implications of the scheme, such as a limited accessibility by motorized traffic, fees and charges or a declining number of customers are often causes of concern. In the case of London, people also expressed worries about the limited mobility alternatives, if the ULEZ would further extend to the Greater London area.

In addition, the planning and implementation process of the scheme itself may be a cause of criticism. In the case of Amsterdam, some citizens have contested the unclear and even misleading communication on the LEZ plan. Public and stakeholders have criticized the lack of participation during the design and implementation of the traffic circulation plans in both Ghent and Groningen. There were some opportunities for public participation in Ghent, with a couple

of public participation meetings during the planning phase and an evaluation of the plan by the ‘*Burgerkabinet*’, and through means of a survey when the TCP was already in operation. Different stakeholder groups also participated in a solution-oriented dialogue during the planning phase to evaluate problems caused by the TCP and to discuss possible solutions. However, feedback from citizens and stakeholder groups only led to minor adjustments of the initial plan. In the case of Groningen, opportunities for public participation were very limited. Stakeholders were consulted during the design of the plan, but they felt like their input was not taken into account as the final draft was almost identical to the initial one. The announcement of the final plan gave rise to a wave of opposition, mainly from business owners, who were afraid to lose clients.

The same reaction was observed in Oslo, when the initial plans of the car-free livability program were announced. Business owners feared they would lose clients, as private vehicles would be banned from the inner city to free up public space. As a reaction to the criticism, the city started involving the shopkeepers in the planning process, and after one year the plan was updated. On-street parking spaces would be removed in the new scheme, but motorized traffic would still be able to enter the area and easy access and parking spaces for differently disabled, commercial activities and freight services would be guaranteed. In the case of Barcelona, the continuation of the Poblenou pilot project caused opposition. Several citizens had already criticized the pilot project and the majority of participant voted for a discontinuation of the pilot in a non-legally binding referendum. The referendum had a low turnout, which created doubts on the representativeness of the outcome. The city decided to continue the superblock without clearly informing the public, which led to opposition. Afterwards, the city started some intensive rounds of consultation with citizens and improved the infrastructure in and access to the superblock. Although some of the opposition still remained, the city also learned from its mistakes, and the process of the next superblocks became more participatory.

The examples of Oslo and Barcelona illustrate that involving people and looking for compromises are important for reaching consensus. Moreover, support for these schemes can increase through time, as people get used to the scheme and its benefits. In Milan, for example, the (rare) positive outcome of the road pricing reform referendum can be explained by the fact that the benefits of road pricing were already shown by the previous scheme (the ECOPASS). Resultantly, the new scheme was easier to understand, and additional efforts were made to minimize negative impacts and maximize user friendliness.

#### 4.3 Equity issues and supportive measures

The cases showed that implementing a UVAR scheme can create or worsen inequitable situations. These inequity issues also led to opposition from citizens and stakeholders in many of the case cities. In the case of Barcelona, some concern was raised about gentrification – the displacement of current residents by more affluent people moving in – potentially triggered by the superblock program. As a reaction, the city of Barcelona aimed to minimize the risk of gentrification by increasing the livability of the whole city, instead of only certain neighborhoods, in combination with planning social housing projects. The negative (perceived) impact of the UVAR scheme on the local economy was also an issue in a couple of the cases. Many shopkeepers perceived the TCP in Groningen as negative for the local economy. Studies on the economy of the inner city had inconclusive results, so it is however difficult to say to what extent the TCP has changed the inner city economy. In Oslo, multiple shop owners perceived the economic impact of the removal of on-street parking spaces as negative. The municipality contested these concerns, stating that the program was blamed for effects that could also be caused by multiple other external factors.

UVARs restrict access or prioritize certain types of road users, which can lead to an uneven accessibility or an unequal distribution of road space. As a result, all of the case cities, except for Mechelen, have introduced a combination of different supportive measures to minimize these inequitable effects. Many cities have adopted new or improved mobility options that people can use as an alternative to private motorized vehicles (e.g., the introduction of a bike rental system and e-scooters in Stuttgart, electrical shared vans in La Rochelle and improved public transport, P+Rs and water transport in Rotterdam). Some cities also provide financial incentives, such as scrappage schemes, lowering the costs of public transport or financial support to buy e-bikes, cargo bikes or electrical cars. A third group of measures that the case cities have introduced were exemptions for certain road users (e.g., out of necessity or because of specific user needs). Also, in some cases the implementation of the measure was phased (e.g., progressively adopting stronger measures over time, introducing a grace period or a pilot phase) to make sure that people have time to adapt to the UVAR measure (e.g., renew their car, look for alternative solutions). A last important measure is to

involve people in addressing possible inequity issues and feasible solutions during the planning phase. The case of Oslo showed that discussions with shopkeepers can lead to an adapted plan, where easy access of certain groups that would have been unequally affected by the initial plan (e.g., differently-abled, freight services) is assured.

## 5. Conclusion and discussion

Through a literature and case study review, we have examined 12 UVAR case studies in Western-European cities on aspects of participation, acceptability and equity, resulting in guidelines, possible pitfalls and best practices for future UVAR implementations. In the remainder of the paper, we will highlight the main findings for these three criteria and conclude with some critical reflections and pathways for future research.

Citizen and stakeholder involvement was organized in some way in all of the cases, but large differences can be observed. These differences can partially be explained by the variety of UVARs that were introduced in the cities, as the type and impact of the scheme influences the type of participation that will take place, as well as the groups of people that will be involved. However, in some of the impactful UVAR schemes, public and stakeholder participation were limited or the input of people was not translated into the design of the plan, as such exacerbating the risk of inequitable distributions of benefits and burdens. The literature review shows that participation is an important factor in finding a consensus on the scheme. This observation was confirmed by the case study. Moreover, the type and duration of participation, the people involved in the process, as well as the moment(s) when participation took place will influence the acceptance of the scheme. If people feel like their opinion is not heard or taken into account, those (that will be) negatively affected by the scheme will often oppose and criticize the implemented measures.

The case study analysis illustrates that implementing a UVAR scheme can lead to conflicts. Nevertheless, some of the case cities (Barcelona and Oslo) responded to this criticism by involving and collaborating more intensively with citizens and stakeholders throughout the different phases of the project. By integrating remarks and recommendations, and by addressing certain concerns in planning and decision making, cities aimed to minimize criticism and enable long-term acceptance of the scheme. Notwithstanding the benefits of participation and collaboration, general public engagement cannot ensure acceptance of a scheme. A diversity of factors, such as public understanding of the scheme, trust in policy makers, awareness of the benefits of the scheme or complementary measures, can also influence the scheme's long-term effectiveness and acceptance (Morton et al., 2021).

Another common cause of criticism and opposition are the inequitable effects caused or exacerbated by the introduction of a UVAR scheme. Inequity issues can be reduced by involving public and stakeholders during the planning phase, especially by incorporating the views and experiences of those vulnerable groups most likely affected (De Vrij & Vanoutrive, 2022). Identifying the expected equity issues prior to the introduction of the measures gives people and policy makers time to search for ways to reduce or counter them. Almost all of the case cities have also introduced supportive, complementary measures, such as financial incentives, alternative mobility options and exemptions to minimize equity issues related to the often restrictive nature of the UVARs.

The case study analysis provided many valuable insights on participation, acceptability and equitability. However, the large differences between the various cases in terms of the availability of information poses a strong limitation to the research. For example, information about participation, acceptance and equity issues of the UVAR development process in the cities of La Rochelle and Rotterdam were limited. It is difficult to say if this lack of information can be explained by the limited degree of participation, opposition or equity issues arisen during the process or due to the fact that information about these topics was never made available (publicly or online). Future research could add more stakeholder interviews to the analysis, to broaden our understanding of these topics in UVAR processes and provide additional perspectives to the ones policy makers and policy documents publicly share. Moreover, although the case studies examined are quite diverse, follow-up research on the criteria of participation, acceptability and equity for the UVAR implementation for other cities in Europe or even worldwide can provide valuable insights for completely different contexts. Finally, it would also be highly relevant to use the equity lens to assess the process of a UVAR scheme, from ideation to operation, instead of doing the analysis ex-post the implementation.

## Acknowledgements

The ReVeAL project (Regulating Vehicle Access for Improved Liveability) is a CIVITAS initiative funded by the European Union's Horizon 2020 research and innovation program under grant agreement No 815069. The project will help to add Urban Vehicle Access Regulations (UVAR) to the standard range of urban mobility transition approaches of cities across Europe. We would like to thank Julie Schack, Lucy Sadler, Cosimo Chiffi and Bonnie Fenton for their work in the ReVeAL project and their valuable insights for this paper.

## References

- Bjorgen, A., Fosshem, K., Macharis, C., 2021. How to build stakeholder participation in collaborative urban freight planning. *Cities* 112.
- Dennis, K., Urry, J., 2009. *After the car*. Polity Press, Cambridge.
- De Vrij, E. and Vanoutrive, T., 2022. 'No-one visits me anymore': Low Emission Zones and social exclusion via sustainable transport policy. *Journal of Environmental Policy & Planning*, 1-13.
- Eliasson, J., Mattsson, L. G., 2006. Equity effects of congestion pricing - Quantitative methodology and a case study for Stockholm. *Transportation Research Part A-Policy and Practice* 40.7, 602-620.
- European Commission, 2013. A call for smarter urban vehicle access regulations. European Commission, Brussels, Belgium: Commission Staff Working Document.
- Fernandez-Heredia, A., Fernandez-Sanchez, G., 2020. Processes of civic participation in the implementation of sustainable urban mobility systems. *Case Studies on Transport Policy* 8.2, 471-483.
- Franceschini, S., Marletto, G., 2015. Assessing the benefits and the shortcomings of participation - findings from a test in Bari (Italy). *Journal of Transport Geography* 44, 33-42.
- Fransen, K., Sadler, L., 2021. Brave new cities. *Polis Thinking Cities* 8.2.
- Gu, Z. Y., Liu, Z. Y., Cheng, Q. X., Saberi, M., 2018. Congestion pricing practices and public acceptance: A review of evidence. *Case Studies on Transport Policy* 6.1, 94-101.
- Heijman, W., 2007. Regional Externalities: an Introduction. In: *Regional Externalities*, Heijman, W. (Eds.). Springer, Berlin, Heidelberg, pp. 1-8.
- Hysing, E., 2015. Citizen participation or representative government - Building legitimacy for the Gothenburg congestion tax. *Transport Policy* 39, 1-8.
- Kristoffersson, I., Engelson, L., Borjesson, M., 2017. Efficiency vs equity: Conflicting objectives of congestion charges. *Transport Policy* 60, 99-107.
- Kulmer, V., Koland, O., Steininger, K. W., Fürst, B., Käfer, A., 2014. The interaction of spatial planning and transport policy: A regional perspective on sprawl. *Journal of Transport and Land Use* 7.1, 57-77.
- Lindenau, M., Bohler-Baedeker, S., 2014. Citizen and stakeholder involvement: a precondition for sustainable urban mobility, *International Scientific Conference on Mobility and Transport*. Munich, Germany.
- Morton, C., Mattioli, G., Anable, J., 2021. Public acceptability towards Low Emission Zones: The role of attitudes, norms, emotions, and trust. *Transportation Research Part A-Policy and Practice* 150, 256-270.
- Parry, I. W., Walls, M., & Harrington, W., 2007. Automobile externalities and policies. *Journal of economic literature* 45.2, 373-399.
- Ricci, A., Gaggi, S., Enei, R., Tomassini, M., Fioretto, M., Gargani, F., Di Stefano, A., Gaspari, E., Archer, G., Kearns, S., McDonald, M., Nussio, F., Trapuzzano, A., & Tretvik, T., 2017. Study on urban vehicle access regulations. Directorate-General for Mobility and Transport. EU Commission, Brussels.
- Rye, T., Hrelja, R., 2020. Policies for reducing car traffic and their problematisation. Lessons from the mobility strategies of British, Dutch, German and Swedish cities. *Sustainability* 12.19, 8170.
- Taylor, B. D., Kalauska, R., 2010. Addressing Equity in Political Debates over Road Pricing Lessons from Recent Projects. *Transportation Research Record* 2187, 44-52.