Developing the Social Dimension of Sustainable Urban Mobility: The ECCENTRIC Project in Madrid

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Abstract

This paper explores the difficulties of properly developing the social dimension of the sustainable mobility paradigm in urban mobility. It analyses the experience and results of one of the threes implementing actions funded by the CIVITAS initiative in the 2016-2020 period: the ECCENTRIC project implemented in 5 cities, including Madrid. As in the other participating cities, in Madrid most of the planned measures were successfully implemented and achieved their self-defined sustainability targets. However. the project struggled to address the social challenges in its living labs. This experience suggests that innovation in urban mobility may be responding more to the expectations of European "mobile elites" than to bridging the growing social gap in cities. It also sends a strong message to benefit more from the social potential of sustainable mobility measures, by embedding them within wider social and urban regeneration strategies. Finally, it calls for a social turn in the EU urban mobility initiatives to better address the social dimension of sustainability in future.

1. Introduction

The social dimension of the sustainable mobility paradigm has received comparatively less attention than its environmental and economic counterparts. This paper explores the reasons for such a biased understanding of sustainable mobility, taking as an example the experience and results of ECCENTRIC, a Horizon2020-funded project within the CIVITAS initiative started in September 2016 and running for four years in Madrid, Munich, Ruse, Stockholm, and Turku. The project intended to deploy 50 sustainable urban mobility measures in these cities, 11 of them in Madrid, with a focus on high-density urban neighbourhoods located outside, but close to the city centre.

The early and sustained contribution of the EU research and innovation policy in the consolidation of the sustainable urban mobility (SUM) concept (EC, 1992; EC, 2001; EC, 2013) has probably been one reason explaining the strong role played by new technological solutions in many sustainable urban mobility (SUM) flagship projects, including those within the CIVITAS Initiative. It can also explain the strong role played by utilitarian concepts- from time savings to marginal emission mitigation costs- in the design and assessment of plans and measures (Ricci, 2006) and the focus on the mobility challenges in city centres and suburbia. Generally, the deployment of SUM in European cities has been widely recognized as an EU success story by many stakeholders (Rupprecht Consult, 2019).

The difficulties in accommodating the social dimension of sustainability with mainstream SUM practice is evident when a project targets socially-excluded high-density neighbourhoods but it is not exclusive of them. Grieco (2015) states the lack of an adequate definition of social sustainability in urban transport; she highlights the oversimplification made in the consideration of the social dimension of sustainability in urban mobility as an issue of affordability and availability. Grieco continues, arguing that there is a need for a methodological change in transport planning regarding social issues, which should be supported by an effort to gather adequate and more detailed data.

The social dimension of SUM should not be reduced to the functional characteristics of the transport system. As in the case of any other public policy, there is a need to consider the mobility regimes and control systems that create a measurable situation of uneven mobilities (Sheller, 2018, p.18) among individuals. Building upon the thesis of Sheller (and also Sheller & Urry, 2006, p.213) that "time spent travelling is not dead time that people always seek to minimise", Miciukiewicz (2013) adds one additional level of complexity to the social dimension of SUM, the quality of the time spent travelling, its capacity to facilitate or jeopardise social interaction, and to contribute to self-realisation.

2. The ECCENTRIC project in Madrid (2016-2020)

ECCENTRIC (an acronym standing for 'innovative solutions for sustainable mobility of people in suburban city districts and emission free freight logistics in urban centres') is one of the three demonstration projects funded by CIVITAS within the EU research programme Horizon 2020, running between September 2016 and October 2020. It involves the cities of Madrid, Munich, Ruse, Stockholm, and Turku. These cities have in common a growing interest in implementing high quality and viable SUM measures in neighbourhoods outside the city centre. The challenge is to implement innovative SUM solutions in peripheral districts called living-labs (Aparicio, 2020). The living lab in Madrid is Vallecas, a district at the south-east of the municipality, with 328,000 inhabitants. Following the description of social sustainability proposed by Sheller (2018), two main challenges can be identified in Vallecas, regarding the differences in mobility associated to both, social class differences (significantly lower income levels and educational attainment levels compared to the city average), and differences in the quality of the built environment (public and private).

The project team approached Vallecas looking for "insight into the social practices and material agencies of contemporary mobile lives" (Sheller, 2018, p.20). They were particularly interested in understanding how motility (i.e, the capital or potential of mobility, as defined by Kaufmann, 2004) is severely restrained for some social groups (children and the elderly) or for some residents (those relying on walking and cycling), compared to other citizens and particularly to the mobile elite usually favoured by mainstream SUM policies targeting the central districts and more affluent suburbs. Following the categories suggested by Sheller (2018, p.24), the team focused on two scales: the body scale (the physical differences, in this case those due to age, influencing the ability of children and the elderly to move) and the street scale (the shaping of built environments in Vallecas hostile to some sustainable mobility practices). Initially, the project was not paying much attention to the quality of the transport experience or, in Miciukiewicz's (2013) words, to transport as an end-in-itself. However, this dimension of social sustainability soon became relevant, during the interaction with senior citizens in the context of measure 2.8, for example.

The project in Madrid included 11 measures of very different nature, as presented in Table 1. The code in the table is used throughout the paper to refer to each measure.

Table 1: Code of various measures used in the study

CODE	Measure Name	Measure Description
2.3	Adaptive parking management based on energy efficiency and occupancy	A smart parking management scheme was tested in the municipal bus (EMT) headquarters, located in the demonstration area. The system surveyed vehicle occupancy, so that parking priority was given to HOVs and low-emission vehicles in the context of the EMT's Company Mobility Plan-
2.8	Mobility management strategies for vulnerable groups with a gender approach	A focus on vulnerable groups (children and elderly), identifying actions through a collaborative process and building upon inputs from recent psychology research. For children's mobility, the methodology builds upon the successful results of the previous project STARS. The actions focused on the elderly were based on the projects implemented in Madrid regarding health and active life.
3.3	Open platform for multimodal mobility information and services	An open mobility data portal with multimodal information from different sources (public and private transport, traffic, public bicycles, air quality, etc.) was created as a basis for the development of new mobility information services and products by interested companies, institutions, and individuals.
4.1	Innovative and participative approach to traffic safety at neighborhood level	A comprehensive road safety study, supported by the analysis of key urban parameters, served as a basis for the development of a GIS-based application collecting road safety incidents. Residents' safety perception is also analyzed through a systematic review of social media and other sources of information.
4.6	Pedestrian friendly public space outside the city Centre	Improving walking conditions in one area in Vallecas. Inter alia, a high-quality pedestrian itinerary (Paseo Miradores) is created, improving the quality of the public space.
4.7	Enabling cycling outside the city Centre	Prioritizing the shared use of road space in the demonstration area. Bike use was fostered through the implementation of bike lanes and other initiatives.
5.1	High-level public transport service corridors in peripheral districts	The objective is to improve the quality of the bus service and increase the bus patronage on a tangential corridor linking the eastern periphery. The study assessed different solutions; completing the design of a 3-km pilot section, but it was dismissed by the municipality.
5.8	Electric and hybrid buses for public transport	Service needs were analyzed to select the best hybrid bus solution. The new buses were assigned to server a tangential bus line in the eastern periphery, partially overlapping the PT corridor analysed in measure 5.1. Buses' performance served to design future renewal plans of the city's bus fleet.
6.2	Test fleets, policy incentives and campaigns for the uptake of electric vehicles	The municipality fostered the use of electric vehicles within its own services as well as by local private companies and expanded the electric charging network in the city. Based on the monitored vehicle performance of in the pilot, new strategies were designed to promote the uptake of electric vehicles.
7.1	Consolidation Centre with EVs and local regulations for clean urban freight logistics	Based on a detailed analysis of the urban logistics sector in Madrid, a pilot urban consolidation Centre for last mile distribution was implemented. The pilot included the use of low-emission delivery vehicles.
7.6	Prototype for an ultra-low emission cargo vehicle	Development and demonstration of a 5.5-ton electric truck prototype, adapted to the specific needs of Madrid's urban delivery sector. It was expected to be tested under real conditions, but the COVID-19 pandemic delayed the completion of this measure.

The project combined three measures (2.3, 4.1, 5.8) that were implemented in the living lab, but not tailored specifically to it, four measures (3.3, 6.2, 7.1 and 7.6) of a city-wide nature, and four measures (2.8, 4.6, 4.7 and 5.1) specifically designed for Vallecas. These three clusters of measures mirror the three structures of governance defined

within New Institutional Economics (NIE) and applied by Mercier (2009) to the analysis of equity in urban mobility policies: market, contract, and hierarchy. In NIE, these categories apply to the adequate degree of externalisation of activities by one enterprise: activities under the market category are easily externalised and do not require any permanent contracts; activities under the second category require some kind of long-term commitment with the provider; activities under the third category are better carried out within the enterprise itself. In accordance with Mercier, experience shows that social issues need hierarchical governance, as they are complex problems linked with many other sectors; or in his words "a bundle of tangled elements sensitive to design", where action from transport policy is not necessarily more efficient than action from other sectoral policies. This is the case of the third ECCENTRIC cluster in Madrid. The second cluster needs medium to long-term commitments between the local government and the private sector to achieve the desired results. As for the first cluster, the local government typically expects that the external contractor will provide the requested products in the short term, ready to be operated. As the NIE denominations are not too illustrative when applied to this case in particular, the clusters are renamed as "policy" (instead of hierarchy), "partnership" (instead of contract) and "means" (instead of market).

During the project, it became obvious that market or means measures are the professionals' favourites. They deliver instrumental advantages, provided that institutions are sufficiently prepared and staffed to manage the new tools. They are neutral from a context and a policy perspective, although there are some claims regarding their ability to provide better information that empowers the authorities to better justify and implement future SUM initiatives.

Contract or partnership measures are technologically disruptive. They do not make sense economically in the short term and need significant public resources. There is little or no interest in tailoring them to local conditions as they have the ambition of being implemented in multiple cities and contexts; they are the preferred approach of mainstream SUM approaches. While most of them never reach full deployment, and the initial pilots usually disappear after a few months or years of operation, a few of them manage to be consolidated and widely replicated, becoming competitive in open markets.

As for hierarchical or policy measures, they have the potential to make a significant local impact, including from a social sustainability perspective, but need strong involvement of decision-makers, and are carefully tailored to fit local conditions. Under the conventional understanding and practice of SUM, these measures face significant challenges and hurdles, as was illustrated in the measures implemented by ECCENTRIC in Vallecas: For example, in the case of working with children to change their mobility behaviour (measure 2.8), despite the high acceptance of SUM concepts among school pupils, the social framework conditions were hostile to modal change. That is, many families (and low-income ones in particular) make their mobility decisions in an unfriendly urban environment under overstressed conditions. In the case of seniors attending Elderly Community Centres, their actual priorities were related to the quality of the travel experience, including respectful social interaction in public transport and availability of friendly public spaces for pedestrians.

Measure 4.6 focused on improving walking conditions in key sections of the street network. Contrary to the usual practice, the project team in this case was careful not to impose aggressive on-street parking restrictions on residents, particularly at night. This was consistent with the social conditions in the area where many residents were unable to afford the cost of off-street parking, and the built environment featured many narrow streets well suited to coexistence solutions in which the car loses its traditional priority, even when parking is authorised.

As for measure 4.7 (supporting bike use in the living lab), the project team's approach was to integrate the more densely populated parts of the living lab within the municipal effort to expand cycling infrastructure; regrettably, this effort did not result in any improvement in the general level of satisfaction of bikers in the area, suggesting the need for actions much bolder than those that could be implemented in the context of this project.

Finally, the high-quality bus corridor envisaged in measure 5.1 was not implemented. Although the estimated budget was just € 4-to-5 million, the municipality decided that it was not an investment deserving priority, on the grounds that the benefits for residents were unclear and that there were other investment priorities in the area outside the transport sector. Whereas the measure would have provided operational improvements benefiting bus users, decision-makers felt that residents at large were hardly getting any benefits.

3. Lessons learnt

The ECCENTRIC team in Madrid was somehow frustrated by the unexpected difficulties in developing the social dimension of sustainable mobility in an innovation project. The team realized that there are some traits in transport innovation which can, in fact, have a regressive social character, inter alia because most of the sustainable mobility measures promoted in CIVITAS and other innovation initiatives involve the use of expensive technology. Early adopters (able to overpay for the services provided by these technologies until they are mature enough to become cheaper and more accessible to others) are essential for innovations to survive, and public institutions are often requested to play this necessary but expensive role. Public subsidies and incentives compete with social programs for the limited resources available in public budgets. Furthermore, since innovative services tend to target and be used primarily by a mobile elite characterized by higher education, income, and quality of life, public financial support offered to them often results in regressive income transfers.

To cope with the requirements of social sustainability, mobility measures need to be consistent with and ideally, embedded within broader social policies that address residents and their urban environment. In cities where basic mobility needs are reasonably covered, residents may have difficulties in understanding the need for additional transport investments, usually based on environmental targets, when these resources could be dedicated to many pressing social priorities in their neighbourhood. This position is consistent with the results

achieved in Vallecas by measure 4.6 (pedestrians) compared with measure 4.7 (cycling) and, especially, with measure 5.1 (high-quality bus corridor). Furthermore, and contrary to aggressive car-reduction measures in central districts, the evidence showed that a more cautious and better tailored approach is necessary in socially stressed neighbourhoods where car use is critical for many low-income residents relying on short-term contracts and who look for low-paid jobs popping up in different places around the metropolitan region, particularly at a time when the population is increasingly reliant on such jobs: From a social sustainability perspective, it appears more relevant to dedicate resources to the regulation of the job market than to the use of cars by these workers. Accordingly, the improvement of pedestrian and cycling infrastructure in Vallecas followed a coexistence approach among modes, privileging residents by avoiding any reduction to on-street parking, whilst reducing car speeds and the space dedicated to traffic.

The project team realized that the social dimension of sustainability was not properly covered by the existing CIVITAS framework for project evaluation (as described, for example, in Dziekan et al, 2013), which privileges the use of quantitative key performance indicators usually linked to functional performance and environmental objectives. In this approach, the social dimension is mainly considered within the qualitative assessment of participation during the measure implementation process. This weakness is consistent with the general lack of data, information, and methodological tools in what refers to social sustainability in transport (Grieco, 2015) and cannot be solved at the project level. Rather, it calls for a specific research and innovation effort to produce the adequate tools for mobility researchers and policy makers.

One controversial and frequently discussed issue within the research team was the large size of the living lab in Madrid. The main advantages of this choice were the possibility to look for alternative locations within the living lab, should any unexpected difficulties make it impossible to implement some actions in the originally envisaged location. On the downside, participation and monitoring became more challenging, both requiring virtually tailor-made approaches for each measure, which revealed limitations in terms of the representativeness of the information collected for stakeholders, users, and residents. Therefore, it can be stated that reducing the size of the living lab allows for more meaningful participatory and assessment processes at a lower cost, but that this requires extensive preparatory and exploratory work to guarantee the feasibility and actual implementation of the planned measures.

4. Conclusion

The ECCENTRIC experience in Madrid generally confirmed that the European SUM concept is not adequately addressing the social dimension of sustainability, and that this bias results in the dominance of a socially-blind approach, in which policies and their associated resources (particularly in research and innovation) are disproportionately dedicated to the most central locations in cities and the development of measures targeting a mobile elite who are eager to test new mobility solutions and to increase their "motility" or mobility potential.

This bias can be addressed by dedicating more attention to the adaptation and implementation of SUM in socially stressed neighbourhoods. Significantly, this requires painful changes in the approach, moving from the current autonomy of urban policy (particularly with regards to innovation) towards its integration within social and urban regeneration strategies and plans. Otherwise, the mere transfer of SUM measures from city centres and suburbia to these neighbourhoods is likely to result in additional burdens placed upon the already troubled daily lives of residents. Moreover, it will likely lead to the waste of unnecessary public resources in transport that could be better used in other public policies targeting these neighbourhoods. To actually contribute to better living conditions, SUM measures and policies need to be implemented in an urban framework in which minimum social conditions are met; an approach that can be achieved by embedding these measures within social policies. In the current European context of growing inequalities and increasingly flexible and uncertain (that is, casualized and precarious) employment, these framework conditions are less and less likely to be taken for granted.

SUM policies need to go beyond the oversimplification of the urban context (in both physical and social terms), made in many of the existing sustainable urban mobility plans (SUMP), where social complexity and tensions are erased, and a utilitarian discourse to improve the mobility of all citizens prevails. Moreover, since SUMP involves micro-planning, in which poorly coordinated services produce a multiplicity of largely overlapping plans (on mobility, air quality, energy efficiency, climate change…), it fails to address the social dimension of sustainability. Hence, even though SUMPs have provided a dramatic step forward compared to previous traffic planning practice, it is high time to keep moving forward. Specifically, the social dimension of sustainable mobility can better be served the other way round: making transport more explicit within urban regeneration and social inclusion policies that aim at reaching better and more equitable living conditions. Simply put: SUM principles are better implemented by embedding them in social and urban regeneration actions to gain real support from vulnerable social groups and developing measures and actions based on that support.

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