Supporting sustainable mobility in urban areas: Quantitative analysis of attitudes of key stakeholders

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Extended abstract

Problem statement

During the last decade, sustainable mobility discussion has been accelerated. Transport decision-making has been pushed to respond more to the issues of sustainability; the process has speeded up especially with modern concepts of urban transport mobility planning, strengthening transport demand management and Sustainable Urban Mobility Plans (SUMPs) as its main transport-related strategic documents.

Urban mobility is one of the principal factors influencing the quality of life in cities and urban sustainability. Above all, urban areas are confronted with air pollution, noise, congestion, occupation of public space by traffic, and increased morbidity and mortality rates as a consequence of traffic accidents and pollution. By using fossil fuels in internal combustion engines, the negative effects of urban transport extend far beyond city limits by contributing to the global climate change. Although some positive trends are traceable in terms of paths towards sustainability of some cities (Hickman and Banister, 2014; for the European level see EC, 2017), sustainable urban mobility remains one of the unresolved topical concerns, as stressed, e.g., in the EU Urban Mobility package adapted in 2013, which introduced Sustainable Urban Mobility Plans (SUMPs) as the main transport-related strategic documents. The strategy with the word "sustainable" in its name raises a question about what exactly sustainable mobility is and how it should be operated by cities.

These visions of sustainable mobility define the ultimate goals of urban transport policies but do not unequivocally identify sustainable mobility paths and policies for cities. Furthermore, the more focused concept of sustainable urban mobility, stressing the necessity of a change in travel behaviour, is too wide to capture all the nuances of possible understanding of its meaning. Individuals identifying themselves with this vision might come to different prescriptions for how to apply it.

To achieve sustainable urban mobility, local stakeholders including decision-makers and decision-influencers need to be convinced about the sustainable urban mobility vision. Within the context of governance, urban mobility decisions are influenced by many independent actors besides the political authority of a particular jurisdiction (cf. Kluvánková-Oravská et al., 2010) and include administrative officials of other government levels (regional, national, European), representatives of public transport authorities, non-governmental non-profit organisations, academics, business representatives, and journalists. Urban mobility decisions are inevitably dependent on the opinions of these actors and their view on the necessity or even desirability of the sustainable urban mobility paradigm. When identifying with the sustainable urban mobility concept, what do these stakeholders mean by it and

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which policies do they seek to implement to achieve it? These vital questions need to be answered to help understand ideas shaping the future of our cities.

Research objectives

The approaches of cities towards sustainable mobility planning differ, as do opinions of key stakeholders. Since no definition of sustainable urban mobility is able to capture all the nuances of possible understanding of its meaning, our research reveals distinct shared viewpoints (factors) of key stakeholders who can affect urban mobility decisions on what they mean by sustainable urban mobility and which approaches they would like to support to achieve it. We also analysed whether there are any "opinion coalitions" among key stakeholders who have a potential to influence further development of local mobility in the Czech Republic. This is the first study focusing on the segmentation of shared viewpoints of influential stakeholders in terms of urban mobility decision-making in transport research using qualitative analysis, although several studies have been undertaken to segment the viewpoints of transport users (see, e.g., van Exel, 2011; Anable, 2005; Budd et al., 2014; Cools et al., 2012; Rajé, 2007; Haustein and Hunecke, 2013; Cools et al., 2009).

Methodological approach

The mixed P-Q method statistical technique, combining qualitative and quantitative analysis, was used for identifying shared viewpoints of key stakeholders. The stakeholders entering our study include individuals who shape transport policies of the largest Czech cities with more than 50 thousand inhabitants, as well as those of smaller cities belonging among the leaders of sustainable urban mobility concept implementation in the Czech context. The stakeholders were identified using a combination of the focus group technique with the snowball sampling method; the data were collected using structured interviews with carefully defined stakeholders.

The Q methodology was introduced by Stephenson (1953) as a statistical method to study subjectivity. The aim of the Q method is to reveal typical shared viewpoints on a particular subject within a society. Because the Q method works with a relatively small sample of respondents (in the order of dozens of respondents) and without the necessity of a random selection of respondents (Smith, 2001), this method does not seek to quantify the occurrence of the shared viewpoints within the society, but focuses solely on their identification (Brown, 1980). A qualitative analysis of assessing subjective viewpoints is combined with the quantitative approach of a factor analysis of statements ranked by respondents (Brown, 1980). Thanks to its potential to reveal shared viewpoints on any social science subjects, the Q methodology has penetrated into various social science arenas (see, e.g., Durning, 1999; Steelman and Maguire, 1999).

We conducted 43 structured interviews between July and November 2018. Structured interviews with key players were the main source of data for our analyses. The data from the structured interviews were then transcribed into response forms for a qualitative evaluation. Each interview was divided into five parts. In the first part, the respondents were introduced to the research objective and process. The second part focused on identification of the state of transport planning in the respondent's city or in cities whose transport policy they can affect, on the main transport problems in these cities and a description of the respondent's main opinion partners and opponents. The next part dealt with the respondents' expectations and wishes regarding long-term urban mobility development; specifically, they were asked to formulate their own most desirable (and realistic) mobility vision for the city.

The fourth part of the interview focused on recognition of main barriers to measures in sustainable mobility throughout the planning cycle (i.e., planning and preparation of measures, implementation of measures, and evaluation of measures when implemented). Then respondents were asked to evaluate 42 statements regarding further development of urban mobility (covering various areas of urban

transport and development and all transport modes) according to how much they agreed/disagreed/were neutral to them (+4 = most agree, -4 = most disagree, 0 = neutral), the so called Q sorts. The final part recorded some basic data about the respondent and the interview progress (education, sex, age, job position, interview duration).

TABLE I
DIVISION OF RESPONDENTS BY THEIR AREA OF ACTIVITY

Characteristics	
City politicians	11
Municipal authority representatives	11
City-run public transport authority representatives	3
Ministry representatives	4
Consultants, transport experts, academia	5
Non-governmental organization representatives	4
Representatives of companies offering new mobility services for cities	6
Journalists	1

(Expected) results

The individual Q sorts were subjected to by-person factor analysis using the PQMethod freeware package. As the first step, each Q sort was correlated with every other Q sort. The intercorrelation matrix was then factor-analysed using Principal Component Analysis (PCA) to find associations among the different Q sorts. The PCA generated eight factors with eigenvalues ranking from 17.12 to 1.01. The eight obtained factors account for 78% of the variation in the Q sorts. Generally, our data show a high variability. There is one dominant factor explaining 48% of the data variability and another six factors which together explain 30% of the data variability.

According to Addams and Proops (2000, p. 27), only factors with eigenvalues above 1 should be selected for further analysis; all the factors are in compliance with this condition. Furthermore, it is generally considered in Q studies that an interpretable Q factor must have two or more Q sorts loaded significantly on it (Rajé, 2007) – this eliminates Factor 7 – and that the correlation between the factor and the Q sort shall exceed 0.50 and cross-loadings of the Q sort with other factors shall be smaller than 0.40 (Cools et al., 2012). By the latter principle, we had to eliminate Factors 4, 5, 6 and 8. The final three Q factors (1, 2, and 3) were interpreted.

The results show that there are significantly different approaches to achieving sustainable mobility in urban areas of Czechia. These results need to be embedded in general processes that promote change in transport behaviour and it is also necessary to see the differentiated results in the context of wider transportation trends in the Czech Republic.

In general, it is possible to emphasise the importance of massive car use in Czechia during transformation period. It is precisely the phenomenon that divides stakeholders' attitudes towards sustainable mobility and changing population transport behaviour. The degree of car use has a significant impact on the supply and use of public transport (see, for example, Currie, 2010; Eriksson et al., 2010). The intensity of automobile traffic growth is similar in all countries and can be expressed by the idealising model of the S-curve (Dargay and Gately, 1999). This corresponds to the situation in Czechia. Lower rates of car ownership prevailed especially during the period of the totalitarian regime, followed by a very dynamic increase during the transformation period. The growth intensity is likely to approach a certain saturation point, with a consequent slowdown in automobile traffic dynamics.

As a result of the growing car use in Czechia, there are different approaches and strategies to resolving the phenomenon (particularly in cities), which are unravelled in this paper. On the one hand, there are efforts to promote and make public transport more attractive (Factor 1), while other stakeholders prefer more intensive infrastructure investments, building more capacity parking, etc. (Factor 2), but there are also views that automobile regulation in cities is inappropriate (Factor 3). Clearly, there are

quite different efforts to improve spontaneous processes (buying cars and car use for commuting is a completely spontaneous process). The analysis has generally demonstrated that stakeholders identified various potential "push" and "pull" measures for sustainable mobility (based of prioritisation of statements). Eriksson et al. (2010) call implementation of such push and pull measures "travel demand management (TDM)". In this term, the pull strategies may include most of the Factor 3 statements, which generally motivate people not to use cars but without pushing them by regulation. Conversely, stakeholders supporting most of the Factor 1 claims support different forms of car use regulation. Proponents of Factor 2 assertions do not want to significantly regulate spontaneous processes such as buying and using cars, and rather want to motivate for alternative transport modes.

In international research, push factors, i.e., restrictive institutional measures, have been shown to be more important determinants in limiting individual car use than pull measures, i.e., stimulus measures (O'Fallon et al., 2004, citations in Eriksson et al., 2010). At the same time, it was also found that an effective change in transport behaviour occurs when the push and pull measures are combined. However, it is a question of what strategy the stakeholders and decision-makers in Czechia will choose.

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