SUPPORTING SUSTAINABLE MOBILITY IN URBAN AREAS:
QUANTITATIVE ANALYSIS OF ATTITUDES OF KEY STAKEHOLDERS

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1 Problem statement

By 2020, each city in the Czech Republic with a population over 50 thousand has to have a Sustainable Urban Mobility Plan (SUMP) in place to be able to draw funds from EU Operational Programmes. However, SUMPs are also being developed by several smaller cities with between 10 and 50 thousand inhabitants. They mostly expect to attain a sophisticated and systemic approach to solving their chief transport problems.

The approaches of cities towards sustainable mobility planning differ, as do opinions of key stakeholders. **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.**

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).

2 Methodological approach

The mixed P-Q method statistical technique, combining qualitative and quantitative analysis, was used. The stakeholders entering our study include individuals who shape transport policies of the largest Czech cities.

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 analysis was done using the PQMethod freeware package.

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).

3 Data collection

45 structured interviews with identified key stakeholders were conducted between July and November 2018.

TABLE I: Socio-demographic characteristics of the respondents

| Gender	Men: 38	Women: 7
Age	Between 26 and 70 years	Average 44 years
Education	Secondary: 8	Tertiary: 37
Work experience in the field of expertise	Between 2 and 36 years	Average 14 years
Working at the current position	Between 2 and 25 years	Average 8 years
Municipality as the interview object	30 capital city (Prague), 10 district town, 5 municipalities in general	

TABLE II: 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

Structure of interviews:

1. Explanation of the research objective and process
2. Identification of the state of transport planning and the main transport problems in the respondent's city, and the respondent's main opinion partners and opponents
3. Respondents' expectations and wishes regarding long-term urban mobility development + formulation of their own most desirable (and realistic) long-term mobility vision for the city
4. Recognition of main barriers to sustainable mobility measures throughout the planning cycle (i.e., planning and preparation, implementation, and evaluation of measures)
5. Rating of 42 statements about further development of urban mobility according to how much they agreed/disagreed/were neutral to them (scale -4 to +4), the so called Q sorts
6. Basic data about the respondent and the interview progress (education, sex, age, job position, interview duration)

4 Analyses

Each Q sort was correlated with every other Q sort. The inter-correlation 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.

DISTRIBUTION OF FACTORS AMONG RESPONDENTS
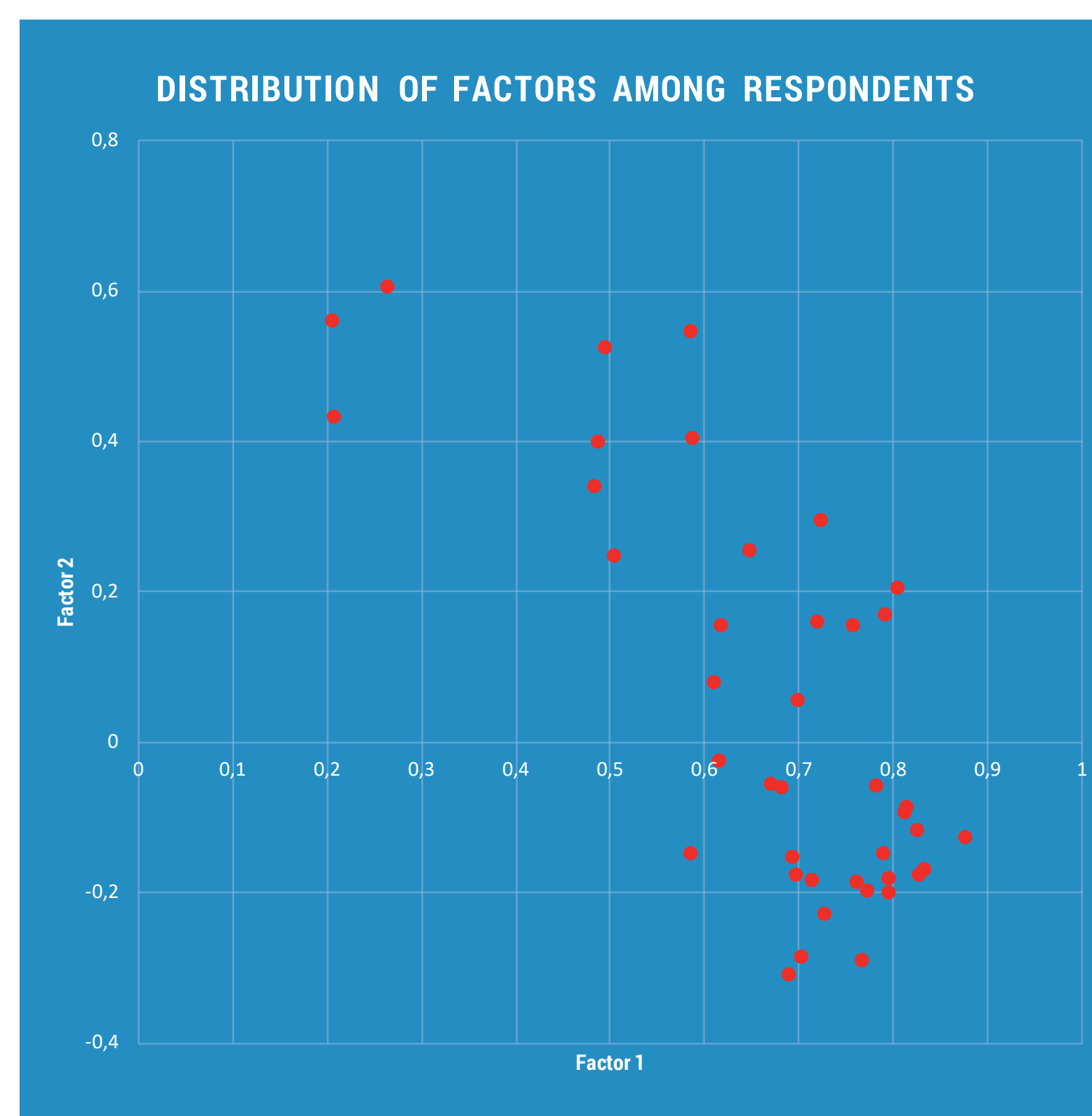
A high data variability: There is one dominant factor explaining 48%, while the remaining factors together explain 30% of the data variability. Factors 4, 5, 6, 7 and 8 were eliminated because of not confirming the Q-method statistical conditions (Stephenson, 1993; Cools et al., 2012). Factors 1, 2, and 3 were interpreted.

Consensus statements were identified = statements which do not distinguish between any pair of factors; they are less specific and usually generally accepted (because already well-adjusted by research or experience) or do not imply any limitation to private car traffic (for Z-scores and Q-statement values see in Table III).

TABLE III: Consensus statements

No.	Statements	Factors Q-SV	1 Z-SCR	Q-SV	2 Z-SCR	Q-SV	Z-SCR
1*	Let us take the path of public transport improvement, not price reduction.	0	0.45	1	0.78	0	0.00
9*	Goods vehicles should be restricted depending on their environmental impacts.	2	0.95	2	0.89	1	0.46
12	Modern technology will resolve the fundamental transport problems.	-1	-0.36	-3	-0.98	-2	-0.74
17	Urban deliveries are purely a matter of private hauliers. The public sector should not try to influence them.	-1	-0.84	-1	-0.41	-3	-1.30
19	Children under 12 years of age should not bicycle to school on their own, even if there is a safe cycling trail.	-1	-0.63	-3	-1.22	-2	-1.10
21*	The costs of a car trip should be higher than those of the same trip by PT.	2	0.89	3	1.29	2	0.82
29*	Cyclists should have their own infrastructure wherever possible instead of sharing it with cars.	0	0.37	0	0.11	2	0.65
40*	Everyone should start by themselves and use public transport more often.	1	0.84	1	0.78	2	1.02

Note: * indicates significance at P < 0.01.

The results show significantly different approaches to achieving sustainable mobility in urban areas of Czechia by key stakeholders.

Factor 1: "Public transport" (48% of the P set)

- Supporting high-quality public transport, which should be faster than cars in urban areas
- Communities in the region should cooperate to secure a good connection and accessibility (and measures against urban sprawl)
- Positive towards infrastructure such as P+R, regulation of car use and supporting car-free life in cities
- PT = the main transport mode competing with cars and the main pillar of sustainable mobility
- Cycling and walking = alternatives to cars, but not playing the main role as PT

Factor 2: "Transport infrastructure" (7% of P set)

- Expects that PT will never be a mode really competing with cars (it will never be faster or more comfortable than cars)
- Cars can be substituted by walking and cycling for shorter distances
- Solution lies in better transport infrastructure which can allow cars to run fluently, there should be enough parking spaces, etc
- It is good when people leave cars and use PT, but they should not be pushed to do this by car regulations in cities

Factor 3: "Motivate people, not push them" (5% of P set)

- Against any regulation (above all, against regulation of car ownership and use, but also freight traffic)
- Prefer motivation to regulation
- Do not see walking and cycling as alternative "full-fledged" modes of transport; cycling is perceived only as a leisure activity

5 Conclusions

- Opinions of key stakeholders and decision-makers substantially differ in terms of suitable strategies and approaches towards change in travel behaviour and sustainable mobility
- all the revealed distinct viewpoints agree on the unsustainability of extensive private car transport and share a positive attitude towards alternative modes – public transport, walking and cycling
- the main distinguishing aspects are the rate of regulation to be applied to decision-making on transport modes used by individuals and freight transport, faith in public participation in strategic decision-making in the transport agenda, the rate at which to also support car transport, and the rate of social feeling towards individuals with specific transport needs
- stakeholders who declare importance of sustainable mobility might hold views which researchers in sustainable urban mobility would not regard as sustainable
- Challenges for further research: better explain the concept of sustainable mobility and support decision-makers and other key stakeholders regarding appropriate steps towards more sustainable mobility in Czech cities
- After finishing the first wave of SUMP development in Czechia it is necessary to assess the plans according to the principles of sustainability and to compare them with the findings of our study

References

ANABLE, J. (2005): 'Complacent car addicts' or 'aspiring environmentalists'? Identifying travel behaviour segments using attitude theory. Transport policy, 12(1), pp. 65-78.
BANISTER, D. (2008): The sustainable mobility paradigm. Transport policy, 15(2), pp. 73-80.
BROWN, S.R. (1980): Political subjectivity: Application of Q-methodology in political science. New Haven, CT: Yale University Press.
BUDD, T., RYLEY, T., ISON, S. (2014): Airport ground access and private car use: a segmentation analysis. Journal of transport Geography, 36, pp. 106-115.
COOLS, M., MOONS, E., JANSSENS, B., WETS, G. (2009): Shifting towards environment-friendly modes: profiling travelers using Q-methodology. Transportation, 36(4), pp. 437-453.
COOLS, M., BRIJS, K., TORMANS, H., DE LAENDER, J., WETS, G. (2012): Optimizing the implementation of policy measures through social acceptance segmentation. Transport Policy, 22, pp. 80-87.
DURNING, D. (1999): The transition from traditional to postpositivist policy analysis: a role for Q-methodology. J. Policy Anal. Manag., 18, pp. 389–410.
DURNING, D., OSUNA, W. (1994): Policy analysts' roles and value orientations: An empirical investigation using Q methodology. Journal of policy analysis and management, 13(4), pp. 629-657.
EC (2017): European Urban Mobility: Policy Context, European Commission. [Online] https://ec.europa.eu/transport/ sites/transport/files/2017-sustainable-urban-mobility-policy-context.pdf.
HAUSTEIN, S., HUNECKE, M. (2013): Identifying target groups for environmentally sustainable transport: assessment of different segmentation approaches. Current Opinion in Environmental Sustainability, 5(2), pp. 197-204.
RAJÉ, F. (2007): Using Q methodology to develop more perceptive insights on transport and social inclusion. Transport Policy, 14(6), pp. 467-477.
SMITH, N.W. (2001): Current Systems in Psychology: History, Theory, Research and Applications. Wadsworth, Belmont.
STEELMAN, T. A., MAGUIRE, L. A. (1999): Understanding participant perspectives: Q methodology in national forest management. Journal of Policy Analysis and Management, 18(3), pp. 361-388.
STEPHENSON, W. (1953): The study of behavior: Q-technique and its methodology. Chicago: University of Chicago Press.
STEPHENSON, W. (1993): Introduction to Q-methodology. Operant Subjectivity, 17(1), pp. 1-13.
VAN EXEL, N.J.A., DE GRAAF, G., RIETVELD, P. (2011): I can perfectly well without a car! Transportation, 38(3), pp. 383-407.