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DOI: 10.2478/rjti-2022-0005

ROMANIAN JOURNAL
OF TRANSPORT INFRASTRUCTURE

MOBILITY STYLES AND AFFINITY FOR PUBLIC TRANSPORT SERVICES IN ROMANIAN URBAN AREAS

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Abstract

Attitudes and perceptions expressed by respondents in questionnaire surveys play an important role in creating informed policy decisions. Under a complex environment policy, within the European Union, that is aimed at tackling urban mobility challenges, member states such as Romania have recently been transposing and assimilating Sustainable Urban Mobility Plans into urban development regulations. The legacy of business-as-usual approaches are still dominating urban transport interventions, mainly addressing level-of-service for private motorized transport, while measures dedicated to public and active transport are either lacking consistency or are being delayed for years. With shallow and hastened public consultation procedures, and little consideration for the role of attitudes and perceptions in urban transport quality assessment, this paper aims at providing local administrations with exploratory tools to understand and segment the mobility styles of their citizens. The data used in this article is based on a research-based mobility survey in Cluj-Napoca, Romania, and the results will help decision-makers understand travel behavior and provide them with alternative information in shaping urban transport policy decisions.

Keywords: Sustainable transport, public transportation, cluster analysis, mobility patterns.

1. INTRODUCTION

Although walking and cycling exhibit relatively high levels within the European Union (EU), private motorized transport commonly remains the dominant means of transport in several European countries [1]. Nevertheless, negative transport externalities, such as congestion, air pollution, noise, which lead to a decreased quality of life, remain to be addressed more thoroughly. Nearly 50% of car trip distances in urban areas cover less than 8 km [2]. Moreover, in approximately 30% of cases, they cover less than 3 km, distances that could easily be covered by walking or by cycling. Nevertheless, to shift from car use towards more walking and cycling, targeted efforts to develop and to improve modal shares are still needed. Hence, promoting active transport requires an understanding of citizens' attitudes, their perceptions and their mobility patterns, which should be derived explicitly from their heterogeneity [3]. The dynamic of structural changes in and around Romanian urban areas, driven by the development of a competition-oriented market after the fall of communism in 1989, has led to increased growing car ownership and lifestyle changes [4]. The structural and functional characteristics of Central and Eastern European (CEE) countries have been widely documented [5, 6, 7, 8] and stand as descriptive studies on post-communist societies.

Romania has joined the EU in 2007 and benefited from a series of best-practice initiatives in the field of urban mobility and sustainable development strategies [9, 10]. The 2013 urban mobility package [11] foresaw procedures and financial support through the progress and implementation of Sustainable Urban Mobility Plans (SUMP). Such plans require long-term commitment and major investments from cities, with actions in city planning, interventions on urban roads, public transport extensions, Intelligent Transport Systems, and mobility behavior changes [12]. Since its adoption and implementation via national legislation, local administrations in Romania have embraced no less than 65 first generation SUMPs [13], thereby becoming a major contributor within the EU to the number of such studies produced in the period spanning from 2013 to 2017. This proves that there has been growing commitment on the part of Romanian local administrations and politicians to implement the SUMP model as stated, in agreement with experts' guide for their preparation and implementation [14]. Moreover, the transport planning framework that incorporates the SUMPs is merely a way of accessing infrastructure funds across CEE countries, including Romania [13]. The planning practice within the period of accession of Romania to the EU was dominated by business-as-usual interventions, such as traffic flow optimization and street widening [4]. Such measures are further perpetuated within the action plans indicated within the adopted SUMPs [15]. There seems to be no external assessment of the quality of adopted SUMPs within Europe, thereby making the adoption process nearly an administrative formality to get investment funds. This is unfortunate, especially when considering the fact that a strategic approach seems to be missing in the field, which leads to deficient coordination with other plans and policies [16].

Against the background, the role of SUMPs has been identified in several cities in Italy, with regards to their efficiency on active travel [17]. It concluded that a comprehensive package approach, such as data collection and citizen engagement is still lacking in the decision-making process. Also, even if control flow and monitoring activities were to be included, cities would have no certainty about their success in implementing SUMPs. In addition, the evaluation must be citizen oriented [12], to quantitatively assess the improvements in urban transport. Cities with SUMPs allow for greater administrators' legitimacy on local level, therefore making political consent crucial for the implementation of mobility measures [18]. Hence, even though Romania is adopting SUMPs to overcome transport problems on a large scale [39, 40], results are not always as expected, mostly due to urban governance and the involvement and consideration of all relevant stakeholders within the decision-making process [19, 20].

Planning concepts such as sustainable urban mobility are still novel, with expertise limited to consultants and a low level of awareness at the local level [13]. The SUMPs in Romania are publicly available on the website of the city administrators and are open for public consultation and free access for interested parties. Data collection process is detailed in the SUMP preparation guidelines [14] and include information on traffic flows, public transportation demand, as well as structural features of the transportation network. In addition, population and economic forecasts can also be included, but they are not compulsory, and the emphasis is put on the building and calibration of the transport model, which will in turn allow for the identification of transport network related problems.

The layout and the content of the SUMPs present a series of statistical data related to the structural and functional characteristics of the urban area, followed by detailed input and output data related to the transport model, for both base year and future scenarios. As the calibration and validation of the model is based solely on cost functions and traffic survey counts, no individual data regarding social, economic, or attitudinal features is considered. We are aware of the new mindset induced by the implementation of SUMPs in Romania, which contribute to shifting mobility planning practices from a traffic-centered toward people centered demand management; nevertheless, the decision-makers assume that citizens willingly adopt sustainable transport modes by solely intervening on private motorized level of service (LOS), rising parking fees, or by implementing dedicated bus and bicycle lanes, which is not quite true. Citizens are considered as being the source of transport externalities and thus, are expected to adopt rational behaviors, thus leading to the need of pedagogical communication policies from the administrators [21]. In addition, such measures are likely to be strengthened when combined with soft policy measures, or non-coercive measures [22, 23], which are an effective way of encouraging citizens to adopt more sustainable transport modes.

This paper comes to satisfy a set of good practices for public administrations and relevant stakeholders which participate in planning and transportation decision making while exploring individual data collected in metropolitan areas. Data processing is conducted for the assessment of public perception and attitudes towards urban transportation characteristics. Factor and cluster analysis procedures of a relatively large number of observed variables and individuals are approached to define mobility styles and likelihoods for adopting public transport alternatives under different ticketing conditions. This approach uses elementary statistical analysis and regression procedures to identify key factors that serve as determinants of public transportation ridership and to assist stakeholders in developing targeted, user-oriented strategies and policies, aimed at achieving a more equitable and sustainable urban transport system. This study attempts to fill the gap in Romanian planning practices, by providing an example on using attitudinal data from surveys to define mobility styles and emphasize the travelers' characteristics.

2. METHODOLOGICAL FRAMEWORK

This study consists of several components. At the outset, we briefly present the study area. We then describe the survey data, classifying and explaining the subset of individuals and variables used within this study. The third section covers the basics of factor analysis, followed by factor extraction and interpretation, while testing for the reliability and validity of the database. Next, the intention of adopting public transport under different ticketing scenarios are regressed on the resulted underlying factors that represent citizen attitudes on the transport system. The final sections of the paper consist of a cluster analysis of the surveyed individuals, based on the described variables by using k-means clustering procedures. This step is necessary to further describe the sampled individuals and to reveal the inter-cluster differences, while at the same time accounting for the intra-cluster features. In the final section, we report our conclusions and describe a series of further relevant actions to be considered by planners and policy makers.

2.1. The Transportation System within the Study Area

The city of Cluj-Napoca is one of the main economic, academic, and medical centers of Romania. It has consistently maintained its runner-up position behind the capital, Bucharest. The network for urban public transport, operated by Compania de Transport Public Cluj-Napoca (CTP) [The Cluj-Napoca Public Transportation Company], is the sole provider for public transport services within

CNMA and operates 3 tram routes, 6 trolleybus routes, and 43 urban bus routes. Inherited from the socialist period, the public transportation system satisfied a certain, and rather typical, spatial configuration of residential and workplaces (Figure 1).

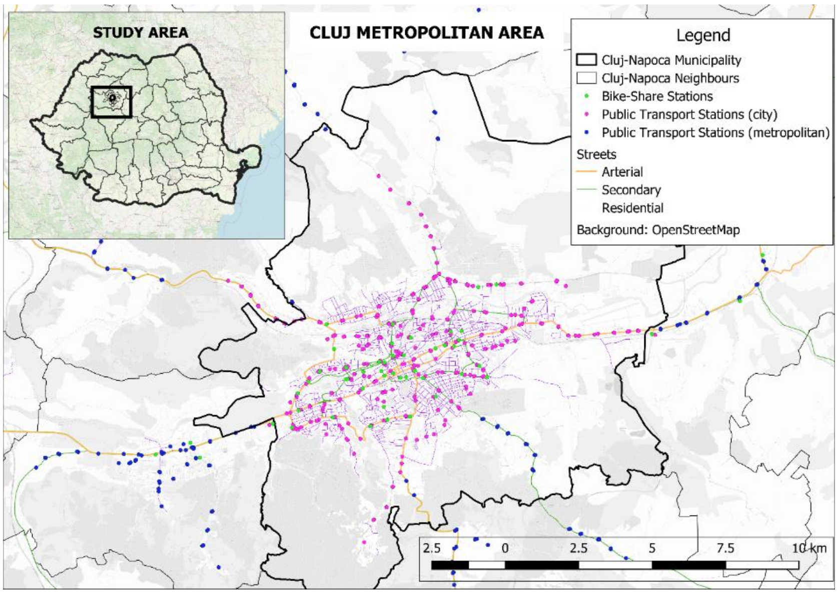

Figure 1. Cluj-Napoca and its surrounding municipalities

Within the urban core, routes have undergone insignificant changes and diversions, while remaining essentially unchanged since 1990. Since 2014, 24 metropolitan bus lines were gradually added to the public transportation network, serving the surrounding communes and sprawled areas across the hinterland. Since 2015, Cluj-Napoca has a network of self service for bicycle rental, consisting of 42 rental stations located in several points across the city and a few in the metropolitan area, and 540 bicycles. According to clujbike.eu, the system has reached a total of 25.000 users in 2020; due to the COVID-19 pandemic effect on urban mobility, roughly 75.000 trips were made, at an average trip time of 40 minutes. The operator mentions roughly 160.000 trips made in 2019, and 184.000 in 2018. Accounting for the 2-month lockdown in 2020, it is clear that ridership on public bike-sharing has declined during the COVID-19 pandemic.

2.2. The Transportation System within the Study Area

The motivation behind our data collection efforts was the progress of the SUMP for Cluj-Napoca Metropolitan Area (CNMA) in Romania, in June 2015. The data collection process for the SUMP was phased according to the JASPERS guidelines, but dealing mostly with aggregate data, whereby individual behavioral subtleties were lost. Therefore, we found it timely to design a travel behavior survey aimed at revealing insights for decision makers, and to collect data for performing advanced econometric regressions. The context, sampling procedures, survey design methodology and behavioral assessment is described by Toșa et al. [4], while data and modelling methodology for mode switching behavior are thoroughly detailed separately [24].

The whole sample consists of 1,079 individuals, and the data was obtained by means of a computer assisted telephonic interview deployed in June 2015 in the CNMA. We designed the questionnaire to allow for a revealed preferences and stated intentions mode choice modelling methodology and to assess the determinants of public transport mode shifting behavior. Hence, this paper deals with attitudinal responses to public transport characteristics and services, traffic conditions in the city, and environmental awareness on a four-level Likert scale (1 – not at all likely; 2 – not likely; 3 – likely; 4 – very likely). After a post conditional filtering of non-response items for all questions, the final sample size for this study comprised a satisfactory quota of 430 individuals, representing almost 40% of the total interviewed individuals. The satisfactory quota was assessed by validating the 430 individuals at the administrative level, i.e., comparing to the corresponding number of commuters in CNMA, resulting in a $\chi 2 = 0.03$.

We then grouped the questions concerning the respondents' attitudes in five sections: familiarity with public transport service, general statements on public transport, road traffic situation in the city, environmental awareness and behavior, and, finally, use of bike-sharing system. A total of 24 statements were read to the respondents; Table 1 synthetizes the groups and the topic of the statement to which the respondent answered. Mean and standard deviations are reported for each statement.

Table 1. User Attitude Statement Groups in Questionnaire

Code	Statement (group)	Mean (SD)
AT1	I have information about the structure of the transit route map (1)	3.13 (0.86)
AT2	I have information about the operating hours of public transport vehicles (1)	2.82 (0.98)
AT3	I have information about the frequency of the public transport vehicles (1)	2.80 (0.95)

AT4	I have information about the transfers needed to get to a destination (1)	3.04 (0.94)
AT5	I think that public transportation became a loss-making operation and bus routes are out of date, because more people	2.61 (1.00)
AT6	I think the public transport routes are not compatible with actual population needs and urban structure (2)	2.57 (0.98)
AT7	I think the public transport such as bus, trolley or tram is necessary in daily life (2)	3.79 (0.55)
AT8	I think that public transport fares are cheap (2)	2.40 (0.91)
AT9	I think that the walking time from home to the relevant station for my commuting by PT is short (2)	3.29 (0.96)
AT10	Waiting time spent in stations for the PT vehicles is long (2)	2.43 (0.97)
AT11	I think public transport vehicles at the time of commuting are crowded (2)	2.93 (0.98)
AT12	I think bus stations layout (shelter, seats, lights) is satisfactory (2)	2.75 (0.95)
AT13	The car is necessary in daily life for me (3)	2.80 (1.18)
AT14	I believe traffic is congested in my city (3)	3.76 (0.57)
AT15	I think that riding bicycle is dangerous through the city (3)	3.48 (0.80)
AT16	I think that walking is dangerous and hard through the city (3)	2.53 (0.96)
AT17	I think the current local government transport policy is correct (3)	2.76 (0.89)
AT18	I always take environmentally friendly actions (eco driving, garbage disposal, electricity use, etc.) (4)	3.10 (0.85)
AT19	I think that the car is a major cause of global warming (4)	3.24 (0.95)
AT20	I like driving (4)	3.01 (1.18)
AT21	I am informed on how the bike sharing system works (5)	2.13 (1.08)
AT22	I would use Bike-sharing system in Cluj for commuting (5)	2.50 (1.22)
AT23	I would use Bike-sharing system in Cluj for shopping (5)	2.11 (1.13)
AT24	I would use Bike-sharing system in Cluj for leisure (5)	3.08 (1.13)

2.2. Factor Analysis

This section deals with a common statistical technique used for achieving a variable reduction through defining a set of factors which are extracted from the variables populating the database. By performing a factor analysis (FA), factor loadings and their signs are obtained and used to explain user behavior. Although there is a debate on the number of variables analyzed and the model performance, factors with high loadings are usually kept, but such retention value depends on the percentage of the variance explained [25]. In short, when conducting exploratory research, relationships are described and the magnitude and cutoffs for factor loadings are arbitrary [26]. Against this background, we used factor extraction and interpretation for identifying the salient dimensions of attitudinal questions [27, 28]. In addition, we kept factors with loadings smaller than 0.3 within the analysis for illustrative purposes, and by marking the higher values in Table 2 in bold, we obtained a cluster of observed variables. Thereafter, we performed a regression analysis, to evaluate the effect of each underlying factor for explaining public transport ridership.

Data was processed in RStudio [29, 30] and we employed several procedures aimed at data suitability. For factor extraction we used Catell's Scree test [31], and for sample adequacy we used Kaiser-Meyer-Olkin (KMO) measure and Bartlett Test of Sphericity (BTS). The tests show that the the approach is feasible, and we chose 5 factors to describe our variables (KMO = 0.671; BTS = 1944, p-val = 2.2e-16). Factor loadings are clustered for 5 components in Table 2 for all variables in the questionnaire, with a cumulative variance of 31% explained.

Table 2. Factor Analysis for User Survey

Statement Code	Component				
	1	2	3	4	5
AT1	**0.45 ***	*0*	*0.15*	*0.03*	*-0.06*
AT2	**0.83 ***	*0.01*	*-0.06*	*0*	*0.05*
AT3	**0.81 ***	*0.07*	*0.03*	*-0.01*	*0.03*
AT4	**0.5 ***	*-0.01*	*0.12*	*0.01*	*-0.12*
AT5	*0.03*	*0.03*	**0.29 ***	*0.12*	*0.09*
AT6	*-0.01*	*0.06*	*-0.07*	*0.3*	*-0.01*
AT7	*-0.01*	*0.06*	*-0.07*	*0.3*	*-0.01*
AT8	*0.21*	*-0.06*	**0.23 ***	*-0.03*	*-0.02*
AT9	*0.19*	*-0.04*	**0.15 ***	*-0.03*	*0.01*
AT10	*-0.02*	*-0.04*	*-0.07*	**0.28 ***	*0.05*
AT11	*0.03*	*0.05*	*-0.12*	**0.26 ***	*-0.03*

AT12	*0.02*	*0*	**0.55 ***	*0.01*	*-0.02*
AT13	*-0.11*	*-0.07*	*0.1*	*0.06*	**0.77 ***
AT14	*0.08*	*-0.07*	*0.09*	**0.41 ***	*0.15*
AT15	*0*	*0.03*	*0.02*	**0.49 ***	*0.02*
AT16	*-0.03*	*-0.01*	*-0.01*	**0.61 ***	*0.01*
AT17	*0.04*	*0.02*	**0.67 ***	*-0.19*	*0.07*
AT18	*0.04*	*0.08*	**0.34 ***	*0.11*	*-0.04*
AT19	*-0.03*	*0.19*	*0.23*	**0.37 ***	*-0.12*
AT20	*0.02*	*0.03*	*0.02*	*-0.02*	**0.5 ***
AT21	*0.16*	*0.02*	**0.23 ***	*0.05*	*0.08*
AT22	*0.02*	**0.83 ***	*-0.04*	*-0.01*	*0.03*
AT23	*-0.1*	**0.73 ***	*0.04*	*0.08*	*-0.09*
AT24	*0.01*	**0.73 ***	*-0.03*	*-0.08*	*0.13*
Factor loading	1.928	1.79	1.172	1.217	0.875
Proportion of variance explained	0.27	0.25	0.17	0.17	0.13

The first component refers to the “familiarity with public transport system”, the second represents the “propensity to use bicycle in general”, the third represents “loyalty to local public transport system”, the fourth component stands for “environmental consciousness”, while the last embeds the “love for personal motorized mobility”. In table 2, some of the variables exert strong patterns (> 0.6), while others show moderate (0.3 – 0.6) and weak contributions to the components under scrutiny (< 0.3).

2.3. Logistic Regression Analysis

To obtain the odds of public transportation ridership, we developed a logistic regression model, in which the dependent variable is binary with two potential values (1 = PT ridership, 0 = no PT ridership). Table 3 shows the model that incorporates the five factors obtained previously. The odds ratio represents the constant effect of the independent variable on the dependent variable. A value greater than 1 indicates a positive effect, while a value less than 1 indicates a negative effect. A generalized linear model was used to find the coefficients for the factors included in the model, and the goodness of fit is reported.

Table 3. Logistic Regression Model for PT Ridership

Factor label	**Standardized coefficients**	**Unstandardized coefficients**	**Odds Ratio (standardized coef.)**
Intercept	-0.34 **	-0.34	0.71 **
Familiarity with public transport system	1.22 **	0.52	3.38 **
Active lifestyle	-0.08	0.12	0.92
Opinionated and knowledgeable	-0.11	0.59	0.89
Concern on safety and pollution	0.14	0.93	1.15
Love for personal motorized mobility	-1.36 ***	-1.37	0.26 ***
R^2 = 0.3232; Adjusted R^2= 0.3152	*** $p < .001$; ** $p < .05$		

Several studies have explored the determinants of ridership using a similar approach, i.e., by considering service qualities of public transport [27, 28, 32]. They found similar results and model fit. However, the diversity of factors established in this study covered other topics as well, such as affinity for alternative transport, environmental consciousness, and necessity of private motorized transport, allowing for a wide range of determinants that influence public transport ridership. While good knowledge of public transport system and concern on safety and pollution are decisive factors in choosing public transport for commuting, other factors, such as being opinionated and knowledgeable and affinity towards automobile, tend to decrease the probability of using transit. Although the combined insights gained from both the factor analysis and the logistic regression model are reinforcing the factor ranks and the behavioral reasoning, more insights on mobility styles will be detailed within the next section. In addition, we classify the social and economic characteristics of respondents, in accordance with the cluster analysis performed.

2.4. Cluster Analysis

The previous section used factor analysis to provide a reduced-form data. This section employs a method for classifying the respondents by engaging in a k-means cluster analysis. The cluster analysis identifies groups of respondents with similar concerns related to attitudes or perceptions regarding to transport system. Hence, the clustering process by attitudes and perceptions will identify the commuter type, while at the same time providing social and economic characteristics to clearly define mobility styles and gain an overall understanding of travel behavior [3, 33, 34].

Typically, cluster analyses can be classified in supervised and unsupervised methodologies. Supervised methodologies establish the number of clusters in advance based on a set of rules, while unsupervised methodologies allow for the free interaction among variables [35]. For this study, several methods have been tested to obtain the optimal number of clusters, i.e., the elbow method, the average silhouette method [36] and gap statistic method [37]. Given the liberty to develop and allocate individuals to a predefined number of clusters [38] and the results of gap statistic method, we chose two clusters and performed a K-means cluster analysis. Figure 2 reveals the graphs for determining the optimal cluster number and the cluster plot for the two assigned mobility groups.

3. RESULTS AND MOBILITY STYLES

This section defines the profile for the mobility styles as an outcome from the cluster analysis. Table 4 reveals descriptive statistics for each cluster, while classifying social and economic data. For simplification, we will call Cluster 1 as “PT users” and Cluster 2 as “Car lovers”.

The clusters identified by analyzing attitudes and perceptions distinguish themselves mainly through the mode of transport mode used for commuting. We may employ the components identified by the factor analysis conducted in the previous sections and we will assign PT users with familiarity and extensive use of public transport systems, while car lovers with propensity to use private motorized modes. PT users and car lovers distinguish themselves in gender distribution (48.89% and 54.67% males) and higher education share among the respondents (64.75 % and 72.90 %, respectively). Although the share of state and private employees is similar, the income distribution varies on average monthly value, with more than 20% more earnings for car lovers.

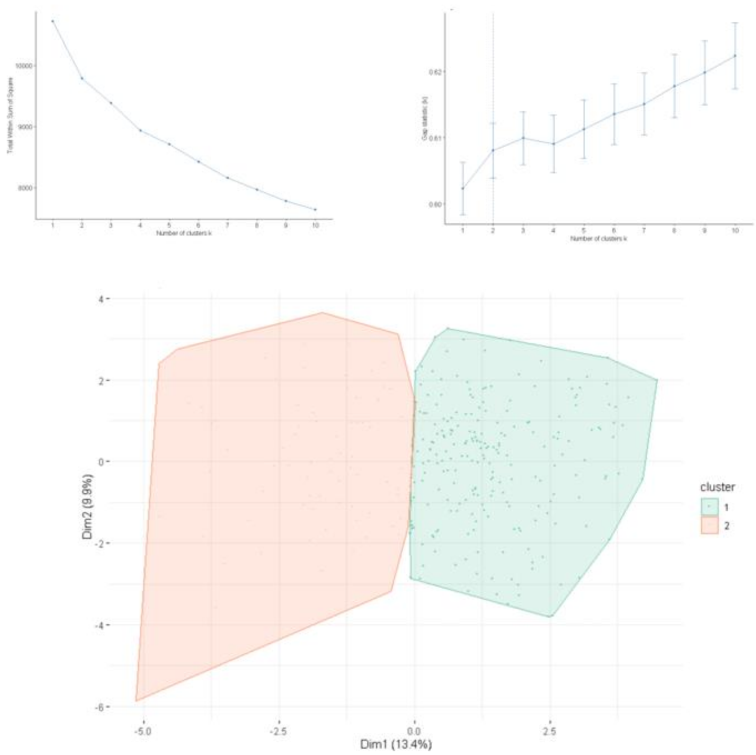

Figure 2. Optimal cluster number and cluster plot

Even if car lovers spend more than 50%, on average, for monthly commuting costs, the share of such expenses exerts less pressure on their household budget (5% compared to 7%). More than 88% of car lovers respondents own a driver's license, implying that around 77% of them regularly commute by car. The number of cars per household differs among the two groups. While the share of households with no automobiles is 20.70 % among PT users, the share drops significantly for car lovers (7.05 %). Surprisingly, 59% of PT users households own one automobile, while the corresponding share for car lovers is 47%. However, the difference is reversed when considering the share of households with 2 automobiles. On average, car lovers are younger, more of them are married, and live in households with more members, thereby exerting a visible effect on automobile use when taking into account daily activity patterns. Another factor for automobile use might be the type of household, which might have effect on the spatial configuration of neighborhoods and public transportation accessibility. Several attitudinal characteristics have been revealed to distinguish among the two clusters: public transport routes quality (AT6), walking time from home to public transport station (AT9), the congested traffic (AT14), local government transport policy (AT17), and the passion for driving (AT20). These have been known as determinants for choice of transport mode, and Table 4 reveals the difference among the two traveler groups.

Table 4. Descriptive statistics of the sample by clusters

	Cluster 1 **"*PT users*" (**N= 227)			**Cluster 2** **"Car lovers" (**N=203)		
Mode of transport (%)	**Auto**	**PT**	**Active**	**Auto**	**PT**	**Active**
	25.11	64.31	10.57	67.98	21.67	10.34
Gender (% male)	48.89 %			54.67 %		
Age (SD)	40.1 (10.6)			38.9 (10.6)		
Higher Education (%)	64.75 %			72.90 %		
Income /month RON (SD)	2761 (1607.3)			3357 (1927.5)		
Commuting Cost /month RON (SD)	191.2 (143.2)			290.3 (174.3)		
Employment (%)						
Private	69.60			69.95		
State	30.40			30.05		
License (%)	68.72			88.18		
Cars / household (SD)	1.1 (0.8)			1.4 (0.8)		
0	20.70 %			7.05 %		
1	59.03 %			47.58 %		
2	15.42 %			27.31 %		
3 or more	4.85 %			7.49 %		
Persons / household (SD)	2.9 (1.1)			3.1 (1.2)		
1	10.13 %			6.40 %		
2	24.67 %			27.09 %		
3	35.24 %			32.51 %		
4 or more	29.96 %			33.99 %		
Married (%)	66.96			68.47		
Type of Dwelling (%)						
Individual house	21.59			26.11		
Apartment	78.41			73.89		
Selected Attitudes						
AT6	2.8 (1)			2.4 (1)		
AT9	3.5 (0.8)			3 (1)		
AT14	3.8 (0.5)			3.7 (0.6)		
AT17	3.1 (0.8)			2.4 (0.8)		
AT20	2.8 (1.3)			3.3 (1)		

Some remarks concerning the public transportation ridership and differences among mobility styles clusters are here due. At the time of the survey, Cluj-Napoca had adopted only a few measures for prioritizing and assigning of dedicated lanes for transport, while at the same time inheriting and maintaining the decades-long transport routes. Nonetheless, the city developed some perspectives for improvement of PT among the priorities of the future SUMP. Intuitively, Table 4 reveals that car lovers exhibit lower trust in local transport plans as opposed to PT users. Furthermore, the structure of PT routes does not satisfy PT users completely, thereby allowing for improvements. As for the traffic congestion level, it seems to equally affect both groups, therefore suggesting the low level of service exerted by car traffic on public transportation vehicles riding in mixed traffic conditions. Public transportation station accessibility seems to be better perceived by PT users. Also, PT users are not attracted to driving.

Similar studies and results have been previously observed on Romanian and international contexts [41 – 45]. For example, Prillwitz and Barr [41] emphasized the usefulness of segmentation approaches in identifying travel patterns and attitudinal influences. Moreover, Ramos et al. [42] deepened the investigation on a European perspective and found psychological and behavioral subtleties between the North and the South. Finally, Haustein and Nielsen [44] confirm some of our findings, and with regards to the Central and Eastern European countries cluster with relatively high shares of price-oriented PT-users, reflecting economic developments and behavioral reasoning when choosing transport mode. Next section discusses and concludes the implications of this paper on urban and transport planning in the Romanian context.

4. CONCLUSIONS

Information about the travel behaviors of individuals and their underlying psychological factors are becoming essential for improving urban transport systems. The design and implementation of customer-oriented transportation solutions require operational knowledge about travelers’ requirements and attitudes.

This paper described the planning practice in Romania using SUMPs, and their transportation system assessment, which (still) employ a traditionally oriented approach, i.e., being inherently car oriented. The EU targets on transport greenhouse gas reductions have materialized in guidelines for public administrations, thereby ensuring a more sustainable transport system by reducing car use and improving active modes and public transportation. We have emphasized the prevalence of top-down approach in both transport policy and investments, even if public consultation and the role of civil society has been increasingly present among decision-makers. Even so, on a local level, there is still a gap in understanding users' needs, perceptions, and attitudes, as well as a pressing need to integrate the results of such studies into the design of urban space and transport services.

Firstly, the factor analysis removed anomalies and returned components of uncorrelated variables that served as determinants in explaining the public transport ridership. Among the relevant components, familiarity with public transport system and love for personal motorized mobility were found significant in influencing the commuting by public transport both in a positive and in a negative way. Secondly, to further assess the influence of traveler's attitudes on travel behavior, we employed a cluster analysis to identify groups of commuters. After completing the clustering process using the K-means routine, we referred to these groupings as mobility styles, which were based on social and economic data. Unsurprisingly, we have identified two groups of individuals with different travel behavior and related characteristics, and we named the groups as PT users and car lovers.

It is precisely these two groups that are highly relevant for current Romanian planning practices. Unfortunately, we are still very far away from having a complete and detailed psychological picture of Romanian travel behavior. Dedicated studies are rather scarce, and they have not reached the maturity required for inferring generally valid conclusions that can become operational. To prove this point, it suffices to note that the exceptionally high degrees of home ownership (when compared to other European states) and the rapidly increasing rates of car ownership seem to matter seem to be very relevant to Romanian planners, but it is very difficult to see exactly how much, especially when one peruses their output. In addition, effective (pedagogical) communication by the public administration is notoriously difficult to achieve, while soft policy or non-coercive measures remain poorly understood with respect to their efficacy.

Returning now to PT users and car lovers, it seems that travel behavior is intimately linked to income levels and spending behavior, and consequently, to residential mobility. This is a highly rewarding avenue for enquiry that puts travel behavior studies in a broader context, which has a broader planning and policy-making audience. If travel behavior is indeed closely linked to residential mobility patterns, then SUMPs require a very high degree of functional integration with legally binding land-use plans and housing policy. And this type of integration is absent in some CEE countries, Romania included, mainly due to the uneasy legal coexistence between the general urban plans and SUMPs, as well as to the lack of any coherent housing policy.

Hence, more effort should be directed towards the importance of attitudes in transport policy analysis. The role of attitudes in this study is, at least for the moment, limited in scope and application within the wide land-use and transport models and planning practice. Nevertheless, this study should serve as a basis for local administrations in mapping the satisfaction with transportation services, in a bid to adopt and implement such strategies in future studies dedicated to sustainable urban mobility plans and the quality of the built environment.

Acknowledgments

The author acknowledges financial support from the KAKENHI Grant-in-Aid for Scientific Research (number 2604707 and 15F14707) received from the Japan Society for the Promotion of Science (JSPS).

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