Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 20, Issue 2, 2020
PRINT ISSN 2284-7995, E-ISSN 2285-3952

THE ROLE OF POPULATION TRAVEL BEHAVIOUR IN ENSURING SUSTAINABLE URBAN MOBILITY. CASE STUDY

Radu Andrei IOVA, Daniela CREȚU, Oana Roberta CREȚU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania. E-mails: andrei_anglia@yahoo.com, danielacretu5@yahoo.com, oanaroberta.cretu@gmail.com

Corresponding author: andrei_anglia@yahoo.com

Abstract

The sustainable development of towns is the most important driver of economic and social development and the continuous increase in the number of vehicles has more and more powerful influences on the environment and on the health status of inhabitants in the urban area, due to the polluting matters emissions, noise and road accidents. The lack of integrated planning of transport systems can lead to disruptions in the urban structure of the communities and to strengthening of social exclusion. Starting from these considerations, we initiated the present study in Călărași municipality by which we surveyed the population's opinion on the general problems related to mobility, using the survey - interview and a questionnaire with a number of 15 items, to which a number of 314 persons answered, obtaining information on the number of travels, the problems perceived by the citizens regarding mobility, optimal solutions for improving the situation, the preferred means of transport, if this option would have a sufficient quality, appreciations on public transport, etc., the conclusion being the preference of the citizens for a transport model in which travel behaviour, travel patterns and demands react in time to all socio-economic changes.

Key words**:** *sustainable development, urban mobility, transport model, public opinion, strategy*

INTRODUCTION

In Romania, as a member of the European Union, it is necessary to comply with the norms required by the Union and the application of the characteristics of the systems considered viable within the EU and the quality of the public service is an important problem in the process of modernizing and reforming the administration [5]. Te sustainable development of towns is the most important motor of economic and social development and can be achieved by an integrated approach which aims all dimensions of the urban sustainability, as well as new trends in the area [10].

Due to the continuous trend of increasing the number of vehicles, both globally and in Romania, the transport sector has increasing strong influences on the environment and the health status of the inhabitants of the urban area, due to the polluting matters emissions, noise and road accidents [3]. The lack of integrated planning of transport systems can lead to disruptions in the urban structure of the communities and to strengthen the social exclusion [6].

Urban mobility defines all the travels of persons for daily activities related to work, activities and/or social needs (health, education, etc.), shopping and leisure activities registered in an urban or metropolitan area [7]. In order to ensure sustainable urban mobility, a territorial strategic planning is necessary in order to correlate the territorial development of the localities in the peri-urban/metropolitan area with the needs of mobility and transport of persons, goods and commodities [9].

At present, the public sector must borrow private practice, thus leading to a result-oriented administration - measuring the achievement of the proposed objectives - and the citizen whose needs and requirements should be considered as priorities when ensuring the sustainable development of the town area [8]. In this context, starting from the general objective of the strategy at the level of Calarasi county, respectively: "Sustainable development of the local economy and society, by capitalizing and preserving the natural resources, reducing disparities (between urban and rural areas), creating an attractive environment for investors and tourism,

supported by modern infrastructure, human resources training and social inclusion promotion provided in "Călărași County Development Plan for the period 2014 – 2020", [1] in which the strategic directions for Călărași county are established, of which the first is: Călărași - an easily accessible county, with a modern infrastructure, we initiated the present study to contribute with the obtained results, in establishing the directions of action of the Plan of Sustainable Urban Mobility of Călărași Municipality for the period 2020-2030 [12].

MATERIALS AND METHODS

To survey the population's opinion on the general problems related to mobility, the survey – interview was used and a questionnaire with a number of 15 items, to which a number of 314 persons responded. The questionnaire was applied in gas stations, supermarkets and the two major agri-food markets of the municipality, between November and December 2019. By the methodology used, the citizens were asked to provide information on the travels made the previous day, for a period of 24 hours. By using the questionnaire, information was obtained on the number of travels, the problems perceived by the citizens regarding mobility, optimal solutions for improving the situation, the preferred transport means, if this option would have a sufficient quality, appreciation on public transport and other. This information was used to complete the data obtained from the survey, during the data collecting process. The questions addressed by the questionnaire and the survey-interview also pursued information regarding the main parameters of the mobility of persons and goods, regarding: the structure of the persons movements according to the purpose of the travel; the means of transport frequently used for travel; the main problem occurred during travels in town; the average duration of the travels made by the citizens of Călărași municipality; the average distances travelled by pedestrians and cyclists; the main types of infrastructure and facilities that should be created/upgraded/developed; preferred travel mode; the main problems related to the traffic of vehicles, at the town level; the main problems related to mobility; evaluation of the public transport system; are the citizens of Călărași municipality willing to give up their personal car? If yes, under what conditions and in favour of which alternative means of transport? [11]. From the information obtained by processing the completed forms, data were obtained to ensure the necessary connection between the socio-economic characteristics of the population in the study area and the citizens' travel behaviour [4].

RESULTS AND DISCUSSIONS

Călărași municipality is the capital of Călărași county, part of South Muntenia Region, representing the largest town in the county and one of the largest municipalities in the region [2]. The strategy of urban development of Călărași municipality has the role, through the proposed vision, through the assumed strategic objectives and the portfolio of projects, to continue the development process, the final result being the increase of the life quality for all inhabitants [1].
The main socio-economic indicators at the level of Călărași municipality, for 2018 are shown in Table 1.

Table 1. Main socio-economic indicators, Călărași municipality 2018

Population (no of inhabitants)	Total surface (km^2)	Population density (inhabitants/km^2)
76,483	133.22	574.11

Source: Călărași County Department of Statistics, 2019 [2].

According to the National Institute of Statistics Tempo online database (data from July 2019), the demographic evolution of Călărași municipality registered a continuous decrease between 2007 and 2018, these demographic trends corresponding to the county and regional context of the number of inhabitants [2]. The population of Călărași municipality presents the general trend of the negative natural increase, leading to a predominantly adult population, growing especially in the segment over 65 years old [2].The

characteristics of the group of respondents are presented below (Figs. 1, 2 and 3).

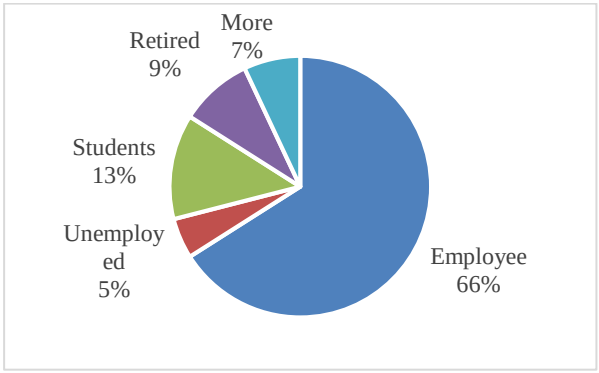

Fig. 1. Structure of the group of respondents, according to occupation
Source: Own calculation and design.

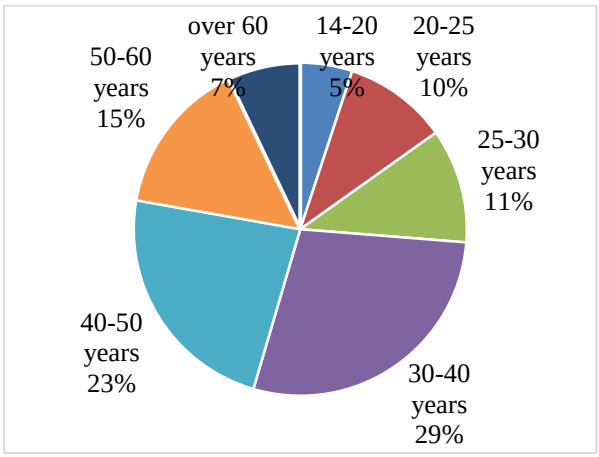

Fig. 2. Structure of the group of respondents, on categories of age
Source: Own calculation and design.

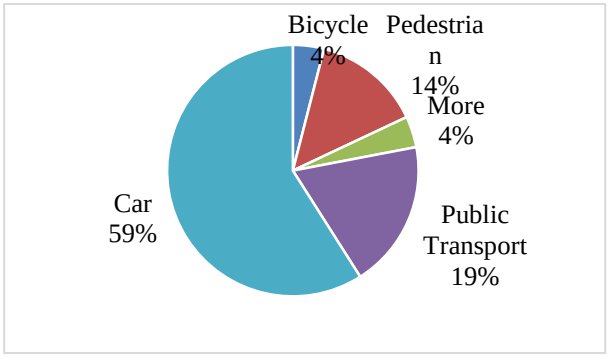

Fig. 3. Structure of the group, according to the main means of travel
Source: Own calculation and design.

The answers to the questions addressed in the questionnaire are following:

(1). How many travels do you do on an average, on a travelling day (a travel is considered a travel from the starting point to the point of arrival - not return)?

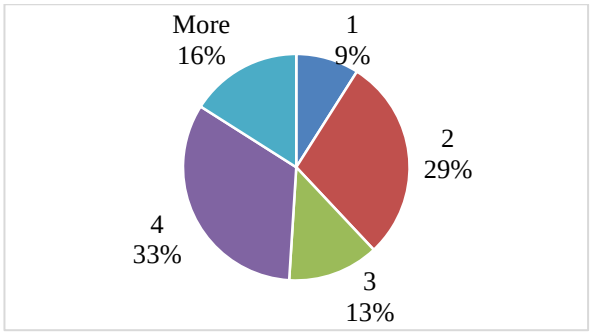

Fig. 4. Distribution according to the number of travels/day
Source: Own calculation and design.

(2).If the infrastructure and facilities would allow, which means of travel would you prefer?

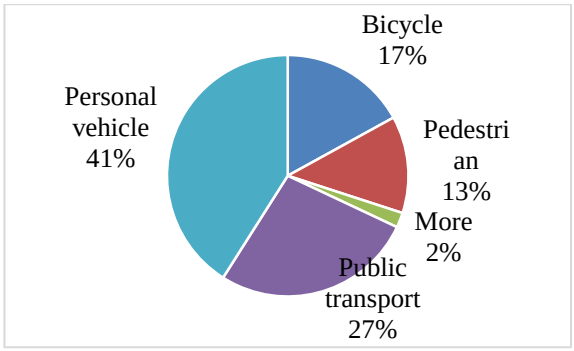

Fig. 5. Preferred means of travel
Source: Own calculation and design.

(3) How do you appreciate the road traffic in Călărași municipality?

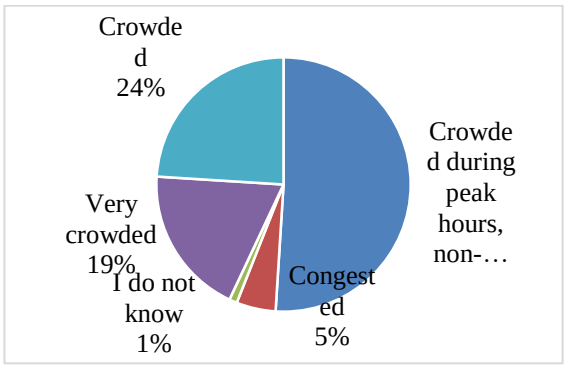

Fig. 6. Citizens' appreciation on the traffic density
Source: Own calculation and design.

(4). According to your opinion, in the mobility field, what types of infrastructure/facilities should be created/upgraded/developed? (you can check maximum 2 options). The answers are shown in Fig. 7.

(5). What do you consider to be the main traffic problems in Călărași municipality? (*You can check maximum 3 options)* The answers are shown in Fig. 8.

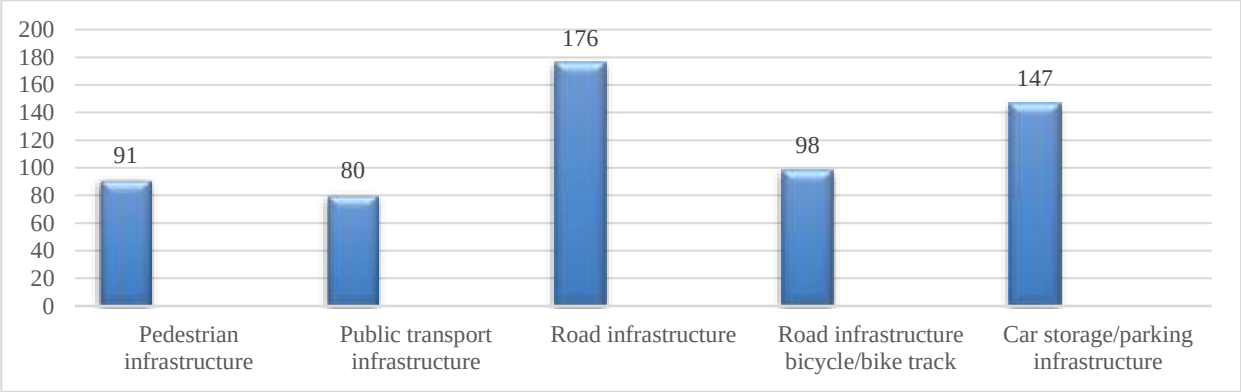

Fig. 7. Type of infrastructure that must be developed – number of respondents
Source: Own calculation and design.

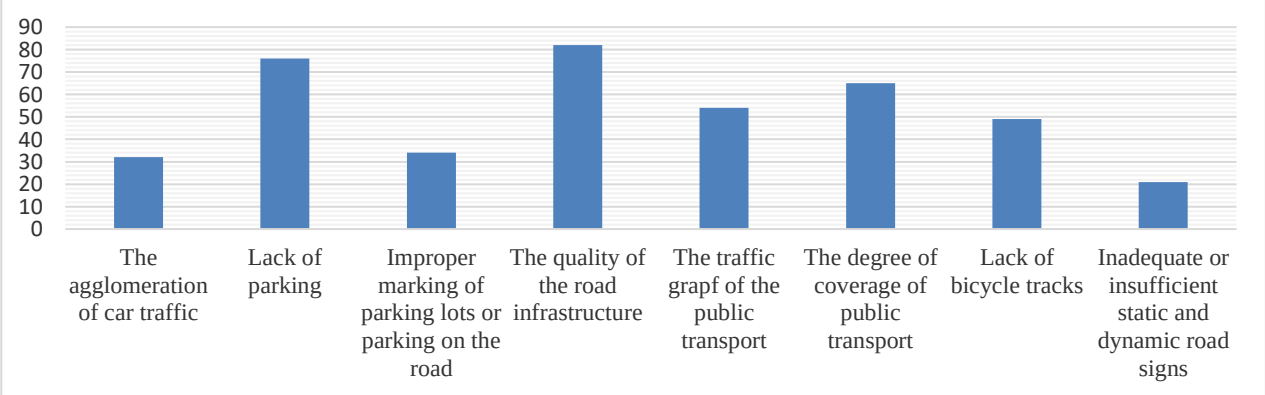

Fig. 8. Main problems of traffic in Călărași municipality -% respondents
Source: Own calculation and design.

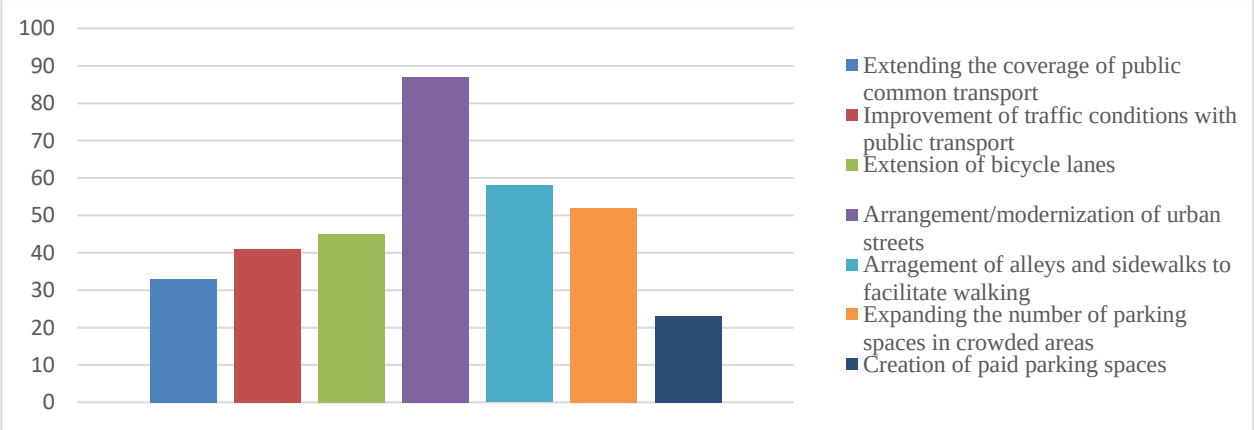

Fig. 9. Solutions for improving the travels inside Călărași municipality -% respondents
Source: Own calculation and design.

(6).In your opinion, which are the most adequate solutions for improving the travels inside Călărași municipality? (you can check maximum 3 options). The answers are shown in Fig. 9.

For items 7-17, the interviewed persons were asked to answer yes or no to the question asked by the operator. These questions referred to the preference for own vehicle travel, bicycle travel/public transportation; citizens' appreciation of the problem of traffic congestion in the central area; on the problem of noise associated with the road traffic; the problem of pollution associated with the road traffic; the possibility to change the means of transport; on the problem of heavy traffic; on the frequency of public transport; on public transport stations; on access to information on public transport; on the cost of public transport.

From the analysis of the answers, the following main aspects result: the sample is representative for the population of Călărași municipality; as expected, the questionnaire was answered by persons who are very interested in mobility issues, namely: people with a large number of daily travels (33% make 4 travels/day) and persons who use the personal vehicle as the main means of traveling (58%).

The main types of infrastructure identified as requiring expansion/modernization are: road infrastructure (82% of respondents); pedestrian infrastructure (38% of respondents); car storage /parking infrastructure (29% of respondents).

Preferred means of travel, if conditions were improved: personal vehicle (42%); public transport (26%); bicycle (17%); pedestrian (13%).

It should be noted that of the 58% respondents who currently use their personal vehicle as their primary means of travel, 16% would prefer to give up this means of transport.

The main problems of traffic: the quality of the road infrastructure; lack of parking; lack of bicycle tracks and rakes; car traffic jam.

Appreciations on the character of traffic: crowded, during rush hours: 51%. The most suitable solutions for improved travel: urban streets arrangement/modernization; the arrangement of alleys and sidewalks to facilitate walking; expanding the number of parking areas. And from these answers it results the preference for walking. 43% of the citizens who completed the questionnaire would prefer to travel by bicycle/public transport. A very large proportion of citizens would prefer less polluting and cheaper means of transport instead of using their personal vehicle. Only 43% of the citizens who completed the questionnaire consider the car jam in the town center as one of the main problems. Noise associated with the road traffic is not considered to be one of the significant problems of the city (52% of respondents). In contrast, more than half of the citizens who completed the questionnaire (59%) consider pollution due to the road traffic to be a significant problem of the city. 79% of the citizens who completed the questionnaire consider that heavy traffic is not a problem, which reflects the usefulness of ring roads; 44% of the citizens who completed the questionnaire are willing to change the means of transport used at present.

The problems related to urban public transport are clear from the opinions expressed by the respondents to the questionnaire: 69% of the citizens who completed the questionnaire are not satisfied with the frequency of public transport; 76% of the citizens who completed the questionnaire consider that the bus stations destined for public transport are not sufficient and do not allow a comfortable waiting; 87% of the citizens who completed the questionnaire consider insufficient access to information on public transport. 73% of the citizens who completed the questionnaire consider that the price of public transport is not appropriate to the quality of the service.

CONCLUSIONS

The main conclusions on the existing dysfunctions, according to the citizens, are the following: the quality of the road infrastructure is not high enough; insufficient parking areas; traffic congestion, especially during rush hours and in the central area; pollution due to road traffic; the quality of the public transport service; frequency, bus station status, access to information and price.

It is worth noting the preference of the respondents for the bicycle transport, and the achievement of an appropriate infrastructure for this means of transport, the creation of the safety conditions and the provision of additional services for the users of this means of travel will lead to a significant increase in the weight of the bicycle in the modal distribution of travels.

We should mention that the dimensions of the town and the relief, which do not have deep slopes on the territory of the town, favor the outline of a network of bicycle tracks, which will ensure the connections between the main areas of attraction/generation of trips (Center, parks, commercial areas, schools etc.). One problem, however, is the low road profiles. In this regard, for the creation of bicycle tracks solutions must be found that will lead to the

least possible damage of the space allocated to the traffic of the road vehicles, as well as the correlation with the parking policies on the side of the road. In the secondary streets, the arrangement of bicycle tracks can be achieved, in most cases, only by creating unique sides.

Also, another way to increase the proportion of using this healthy and unpolluted means of transport is to create a bike-sharing system, which will increase the population's access to cycling. Bicycle pick-up and drop-off stations must cover the entire area of the town and be accessible to all categories of citizens. The alternative mobility system must be integrated with the public transport system, so that you can find a bicycle station near a main bus station, in the proximity of pedestrian areas, in public park-and-ride parks, in intermodal terminals, in parks and areas of maximum interest to citizens. Providing citizens with a system of urban mobility - bike-sharing - will generate real benefits, both for the life of the community and for the environment.

In conclusion, it is considered necessary to carry out studies of reorganization of the traffic, by introducing methods to increase the safety and fluency of the traffic on the road network of Călărași municipality, such as: strengthening the horizontal and vertical static road signaling, to regulate the traffic, heavy vehicles; extending the dynamic road signaling system and including traffic light locations in a dynamic traffic management system; introducing roundabouts, one-way directions and other measures that will lead to increased fluency and reduce the number of conflicts at crossroads; establishing optimal positions for pedestrian crossings so that no crossings jam occur.

From the results of this survey, the citizens' preference is obvious for a transport model in which the travel behaviour, the travel models and the requests will react in time to changes in transport policies, infrastructure or services, to changes in population level or to changes in its spatial distributions, to socio-economic changes.

REFERENCES

[1]Calarasi City Hall, 2019, Integrated Urban Development Strategy of Călărași Municipality, 2014-2020, http://www.primariacalarasi.ro/index.php/directiile-primariei/directia-programe-si-dezvoltare-locala/strategia-integrata-de-dezvoltare-urbana-2014-2020, Accessed on 13.12.2019.

[2]Calarasi County Department of Statistics, 2019.

[3]EU, 2020a, Regional Policy, Urban development projects in EU, http://ec.europa.eu/regional_policy, Accessed on 09. 01. 2020.

[4]EU, 2020b, Urban development projects in Romania – www.europa-ue.ro, Accessed on 09. 01. 2020.

[5]EUKN, European Urban Knowledge Network, 2020, www.eukn.org, Accessed on 07.01.2020.

[6]Faehnle, M., Bäcklund, P., Tyrväinen, L., Niemelä, J., Yli-Pelkonen, V., 2014, How can residents' experiences inform planning of urban green infrastructure? Case Finland. Landscape and Urban Planning, pg.130.

[7]Govindarajulu, D., 2014, Urban green space planning for climate adaptation in Indian cities. Urban Climate, pg. 10.

[8]Newell, J. P., Seymour, M., Yee, T., Renteria, J., Longcore, T., Wolch, J. R., Shishkovsky, A., 2013, Green Alley Programs: Planning for a sustainable urban infrastructure? pg, 31.

[9]Norton, B. A., Coutts, A. M., Livesley, S. J., Harris, R. J., Hunter, A. M., Williams, N. S. G., 2015, Planning for cooler cities: A framework to prioritise green infrastructure to mitigate high temperatures in urban landscapes. Landscape and Urban Planning, pg. 13.

[10]RFSC-Community, Reference Framework for Sustainable Cities, 2019, European reference framework for sustainable towns, http://www.rfsc-community.eu/, Accessed on 21.12, 2019.

[11]URBACT, 2020, Programme URBACT, http://urbact.eu, Accessed on 07.01.2020.

[12]Vandermeulen, V., Verspecht, A., Vermeire, B., Van Huylenbroeck, G., Gellynck, X., 2011, The use of economic valuation to create public support for green infrastructure investments in urban areas. Landscape and Urban Planning, 103(2), pg.198