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METHODOLOGY FOR THE NATIONAL HOUSEHOLD TRAVEL SURVEY IN THE REPUBLIC OF SERBIA

Key Words

NTS;
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Abstract

The National Household Travel Survey (NHTS or NTS) provides monitoring of changes in travel characteristics, differences between categories of road users, as well as between different territories of one country. In addition, it represents a base for forecasting future traffic indicators, like traffic safety indicators and the environmental impact of traffic etc. The paper presents the methodology for NHTS in Serbia which relies on the experiences of similar surveys in developed countries, and with strong restraints introduced in local conditions. At the end, some improvements in the proposed methodology are presented, based on a pilot survey conducted in 27 (out of 174) local self-governments in Serbia.

1. INTRODUCTION

National Household Travel Survey or National Travel Survey represents a survey dealing with trip characteristics of people on public road network of a whole country. It is a whole country scale survey relying on a data collected on household level, or on the level of each individual member of the household.

The information is collected through an interview that usually contains a daily, multi-day or weekly travel log. The National Household Survey is the main source of data on the population travel characteristics. The survey contains detailed questions about the household, car ownership, as well as the trips of all household members or only members older than a certain age (usually older than 6 years).

Considering its spatial scope, this type of survey always contains questions about “long journeys” in relation to the total spatial scale of the particular country.

2. METHODOLOGY OF NTS IN SERBIA

The methodology is developed in accordance with the recommendations on NTS harmonization, i.e. harmonization of traffic indicators in Europe as a result of a project "OPTIMISM WP2: Harmonization of national travel statistics in Europe, Analysis of national travel statistics in Europe" [1] and guidelines on data collection on trip characteristics of “EU Transport Statistics, Eurostat guidelines on Passenger Mobility Statistics” [2]. Local experiences in conducting similar travel survey were also taken into account.

The methodology for planning and conducting the NTS in Serbia covered the following elements: (1) spatial coverage, (2) time span and calendar of the survey, (3) survey frequency, (4) sample size, (5) survey method, (6) questionnaires and survey forms, (7) research testing – pilot survey, (8) required number of interviewers, (9) selection, training and control of interviewers, (10) data collection using the selected method, (11) control and encryption of collected data, (12) data processing and (13) data analysis. The focus of this paper will be on the spatial and temporal domain, sample size, survey method, pilot survey and main conclusions after conducted pilot survey.

2.1. Spatial, temporal and survey frequency domain

The survey will be conducted in local self-governments in Serbia, taking into account the number of residents in urban and suburban areas (urban and rural). Methodologically, depending on the size of the sample, a research minimum will be established for each local self-government, since indicators derived for the whole of Serbia should also include differences at the local level.

The survey will be conducted in April, May, September and October, which are relevant periods for conducting traffic research. In the first survey (test or pilot survey), the periods of summer and winter holidays and vacations will be avoided. Respondents will be asked about their trips on an average working day (Tuesday/Wednesday/Thursday). As the data will serve to express indicators on an annual basis, the data on trips for the previous weekend (only one day - Sunday) and data on long trips and vacation periods will also be collected.

These information allow determining travel patterns during the week. The proposed approach avoids a seven-day survey, which would fall harder on the respondents, resulting in a greater likelihood of achieving the required sample. Research activities in other periods are planned in the future in order to define differences and irregularities over the period when standard travel patterns are recorded. These surveys would be done on specific households, which will be predefined and their consent secured for further research.

Survey frequency varies in the countries of the European Union. Only four EU countries collect travel data annually, while in some countries surveys are conducted every ten, six or five years, while in some countries it is not regular.

2.2. Sample size

In the countries of the EU, households are the most common observation unit in NTS and stratified random sample is the most commonly used sampling method [2]. Key feature for the classification of households in this methodology will be a geographical distribution (by local self-governments) and household size (number of members). In each household layer (stratum), households will be randomly selected. The number of households included in the survey follows the distribution of the households in the latest available statistical Census data. The economic activity of the population will be used to expand the collected data to the entire population in local self-government.

The recommendations for stratification of the Eurostat [2], mainly relate to geographical distribution, gender and age groups. In this case, the number of household members and economic activity were chosen, since the number of members is related to the number of trips at the household level and the economic activity of the inhabitants is related to travel characteristics and also the number of trips. It is certain that these data will be available in the coming years through the official reports of the Republic Bureau of Statistics. Spatial stratification will ensure that the sample is distributed into all parts or districts of the country. Consequently, the major cities of the district, as well as smaller urban and rural areas will be included in the sample, thus avoiding concentration of the sample in the largest cities.

Since this is the first National Household Travel Survey, the required sample size would be determined according to foreign experience. Countries with a smaller population (up to 10 million) conducted survey on a larger sample. The average sample size was 0.16% of the population size.

The target sample size in the first National Household Survey in Serbia was set at 0.1% of the population/households. The methodology implies that at least 10 households should be interviewed, even in the cases of small self-governments. In addition, the methodology implies that at least one household belonging to each household stratum should be interviewed, which increases the target sample to 0.12% of households in Serbia.

Recommendations given by the Eurostat on the harmonization of data suggest providing indicators by age groups, covering respondents from 15 to 84 years. In some countries, only one or two household members are included in the survey, but in accordance with research practices in Serbia, all household members will be included and only ones older than 6 interviewed.

2.3. Survey method

Telephone interviewing is nowadays the most commonly used research method relying on Computer Assisted Telephone Interview (CATI). It is also common for households/respondents to be contacted by mail explaining the purpose of the survey. A computer-assisted telephone survey has many advantages over other research methods (like direct face-to-face interview, direct computer-assisted interview CAPI, CAWI online survey): research costs are lower, interviewers are trained to clarify the questions to respondents and quickly enter the answers received, the highest response rates for residents over 60 years of age are recorded in this type of survey, easier and cheaper data collection in remote areas of the country. The main disadvantages of this method are: the duration of the interview (not recommended longer than 15 minutes and the best is about 10 minutes) and the potential lack of the phone number data base [2,3].

Experience has shown that the response rate for the computer-assisted telephone interview method is less than or equal to 60%. Higher response rates (of about 80%) are recorded in a face-to-face interview, but this method is twice as expensive [3].

So, the chosen method is a telephone survey. Telephone survey is supposed to be combined with a direct interview or internet survey, in case of sample shortage.

Table1. Proposed survey phases

Phase 1	Households will be recruited by phone and instructed to memorize future trips (next day trips) for all household members. On this occasion, the interviewer records the general household data and data on individual members in order to keep track on the proposed sample size. Additionally, it is possible to reduce the duration of the next telephone call when travel diary data should be collected.
Phase 2	Second call after two days to record data on travel characteristics of household members and possible consent to participate in the future survey activities. Based on suggestions given in the Phase 1 (where household members record their trips during the day) one household member could be able to answer for all household members.
Phase 3	Repeated call to those who did not answer the first time.
Phase 4	Household members who have accepted to be contacted again are examined for differences in other survey periods (months of the year).
Phase 5	Additional interviews to be conducted if there is a need to achieve the designed stratified sample.

The households willing to be included in subsequent surveys (travel characteristics for other periods of the year in order to determine seasonal variability), could be awarded with modest reimbursement. Experience shows that repeated cross-sectional household surveys are most commonly used for repeated surveys, with the use of a permanent, longitudinal panel and a rotating panel [4].

A team of permanent interviewers could be created, preferably from the local area of survey. Hiring local researchers can have a positive impact on the quality of research [5]. Such selection should improve the reliability of the data obtained and ensure easier organization of research in the future.

2.4. Pilot survey and results

Pilot research was conducted in order to test defined survey forms, improve the interview process, as well as all other research elements. Pilot survey helps interviewers refine their communication skills with interviewees. It is far smaller in the extent than the comprehensive household survey, and serves to identify any shortcomings in the survey process. The recommendations indicate not less than 30 households as a sample in a pilot survey, while 100 to 200 households are considered sufficient [6]. Pilot research also serves to check the estimated degree of response to a survey in order to increase the reliability of sample completion [5].

Pilot survey enables improvement of the main survey on several levels [7]:

- revision of the questionnaire - formulation and order of questions,
- improvement of interviewer procedures,
- identifying possible unexpected reactions and behavior of the respondents,
- an estimate of the time required to conduct an individual survey and
- correcting preliminary estimates of the final sample size.

Pilot survey was conducted in 27 local self-governments in Serbia with a sample not less than 0.1% per local self-government. The entire territory of Serbia is divided into 27 police departments. One local government was selected as the representative of each police department. In this way, the geographical coverage of the whole country was also complied in the pilot survey. Travel characteristics were collected for one standard weekday, for Sunday and for long-distance trips (longer than 50 kilometers). Control and encryption process was performed, all elements of the questionnaire have been checked in the sense of missing data and the logics of the set of trip purposes, modes and travel times.

Based on the collected travel data, standard processing is performed to generate the travel characteristics on a standard workday (mileage and travel times related to modal distribution are in focus). The same processing is performed on the weekend (Sunday). Based on the previous data, the movement characteristics for the second day of the weekend (Saturday) are estimated. In this way, the travel characteristics for a one-week period are estimated. Data on long trips and vacation periods are also processed.

The data collected on the sample were expanded to the level of the local self-government based on the economic activity of the population and the number of registered motor vehicles. Estimates of average annual travel characteristics were generated by assessing seven-day travel behavior and long journeys. The basic parameter for the calibration of the estimated values was the reported value of annual mileage by passenger car.

3. DISCUSSION AND CONCLUSIONS

The NHTS is the only survey that provides monitoring of changes in travel characteristics, differences between categories of road users, as well as between different territories of one country. It represents a base for forecasting future traffic indicators, like traffic safety indicators and the environmental impact of traffic etc. At the same time it is very important data source for transport planning process.

Implementation of NTS in Serbia is of great importance, but it should be noted that survey activities at national level with the focus on local self-governments needs significant funds. Given the cost and scope of the survey it is proposed to be conducted every three years.

The questionnaire (mainly relying on a classic household interview) could be revised in a few details, mainly related to long trips, for easier reconstruction of annual behavior. The wording and layout of the household survey questions proved to be appropriate.

Improving interviewer workflows: the recommendation is to create a team of permanent interviewers, preferably residents of the research area. Such selection should improve the reliability of the obtained data and should ensure easier organization of the survey in the future.

The estimated time needed to complete the interview proved to be useful and justified. It was shown that informing the respondents about the purpose and scope of the survey significantly contributed to the quality of the data.

Households' interest in participating in future surveys is very low. Pilot research has shown that some reimbursement or rewards for participation should be introduced. It would be useful to conduct the survey in the shape of panel (repeated) survey so that changes in the travel behavior over time can be identified.

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