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PROBLEMS OF RANDOM SAMPLING IN THE SURVEY OF TRAVELLING BEHAVIOUR IN GERMANY

The companies GEOPLAN GmbH and AIXPLAN, Aachen, have carried out a survey of travelling behaviour of the German-speaking inhabitants for the years 1999 and 2000. This was commissioned of the Federal Statistical Office Germany and done in cooperation with the Department of Geography of the University of Göttingen.

According to the Council Directive 95/57/EC on the collection of statistical information in the field of tourism it is obligatory for every member state to carry out such a survey following given definitions and criteria. For example the enumeration unit has to be a person, not a household. Every quarter at least 2500 travellers have to be recorded. Only German-speaking persons with their permanent residence in Germany at the time of the survey are questioned. Short trips and business trips with a duration of 2-4 days (1-3 overnight stays) are categorized separately from longer journeys of more than 5 days.

To raise statistical data of the travelling behaviour for the years 1999 and 2000 field research was necessary. The type of telephone interview chosen for this survey has become more and more significant for demographic surveys in general. Annual sample size data were raised in a fully standardized manner and recorded with the aid of computers. 10 000 telephone numbers were chosen randomly from listings on CD-ROM.

A specific problem of the survey for the years 1999 and 2000 was the raising of a sufficient number of short trips and business trips. Due to the fact that people do not remember their travel behaviour further in the past the number of recorded short trips was rather small. Furthermore business people belong to the type of interview partners that are difficult to reach, maybe because of their restricted free time. To come up with a more representative data set it was decided to randomly chose the person within a household to be questioned (instead of questioning the person first on the phone). In practice this method turned out to be more difficult than the type of telephone interview used before. Although more representative results concerning age and sex were obtained and a slightly greater number of short trips and business trips was recorded, the overall results of the survey did not change. Therefore the much higher investment of personnell and financial resources cannot be justified.

1. SURVEY OF TRAVELLING BEHAVIOUR IN GERMANY

Since 1999 the companies GEOPLAN GmbH and AIXPLAN, Aachen, are carrying out surveys of travelling behaviour in Germany. This was commissioned by the Federal Statis-
tical Office of Germany and done in cooperation with the Department of Geography (Division of Social and Cultural Geography) of the University of Göttingen. According to the "Council Directive 95/57/EC on the collection of statistical information in the field of tourism" it is obligatory for every member state of the EU to carry out such a survey. The following article elucidates several methodological aspects of conducting this survey, especially some problems of random sampling.

2. Enumeration Method and Given Definitions and Criteria

It is the overall aim of the survey to get information of travelling behaviour that could be used for better decision making on national and European level. Methodologically it is necessary to raise all trips of a person during a year (quarter) and to collect specific informations characterizing these trips. For standardization reasons the survey has to follow definitions and criteria given by the EU. For example:

- the enumeration unit has to be a person, not a household,
- every quarter at least 2,500 travellers have to be recorded (altogether 10,000/a),
- only German-speaking (at least 15 year old) persons with their permanent residence in Germany at the time of the survey are questioned,
- short trips and business trips with a duration of 2-4 days (1-3 overnight stays) are categorized separately from longer journeys of more than 5 days.

To raise statistical data of the travelling behaviour for the years 1999 and 2000 field research was necessary. This was done by telephone interviews. The type of telephone interview chosen for this survey has become more and more significant for demographic surveys in general (Koch; 1997, S.60). There are several reasons for using this method either to meet the challenges given by the "Council Directive 95/57/EC on the collection of statistical information in the field of tourism", e.g.:

- the proportion of households, that have telephones in Germany is extremely high (>90%); that means, that it is expected to get representative results,
- using this method facilitates access to people in general,
- the situation on the phone makes it possible to give further information in cases of non-understanding.

Although this form of survey is often criticized, restrictions of the results’s validity are not expected. There are several methodological based reasons.

First of all, the questions are not complicated (Where did a person travel?, How long did the person travel? etc.). Every member with an age of at least 15 years of a household should be able to answer the questions. Only the questions concerning the expenditure of a trip causes some problems. This is the case, when younger members of a household are interviewed could not provide information or people cannot remember. In such cases the interviewers have been asked to give some hints to help the interview partner to remember
better. Furthermore the questions of the questionnaire do not allude to sensitive topics, which people would not like to answer. There is no danger, that interviews would be interrupted because of inconvenient questions.

The method of telephone interviewing is often criticized, because the use of additional devices e.g. maps or tables, is not possible (Koch; 1997). For carrying out the survey of travelling behaviour in Germany this was no problem since such devices were not necessary to get precise answers.

The annual sample size data were raised in a fully standardized manner and recorded with the aid of computers (Computer Assisted Telephone Interviewing – CATI). 10 000 telephone numbers were chosen randomly from listings on CD-ROM. About 66 692 telephone connections have been sampled in 1999 using fixed sample intervals. The number to start with was obtained by using random sampling numbers. For the second period of the survey (2001-2002) the total number of calls had to be increased to about 77 892, to get the wanted 10 000 travellers. In practice, the number of persons to be questioned per quarter was varying, because in periods of vacancies people are travelling more than in working time. That means, it was easier to get information in times when vacancies have finished.

Some design parameters of the survey

<table>
<thead>
<tr>
<th>Population</th>
<th>German-speaking persons with permanent residence in Germany (≥ 14 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>random sample, stratified by class size of communities, random digit dialing</td>
</tr>
<tr>
<td>Enumeration method</td>
<td>Computer aided telephone interviews</td>
</tr>
<tr>
<td>Trials</td>
<td>up to 6</td>
</tr>
<tr>
<td>Date of survey</td>
<td>the years 1999-2000; 2001-2002</td>
</tr>
<tr>
<td>Dialed telephone numbers</td>
<td>66 692 in 1999; 77 892 in 2001</td>
</tr>
<tr>
<td>Number of interviewers</td>
<td>20-25</td>
</tr>
</tbody>
</table>


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Figure 1. Screenshot of the programme “Touris-Watch 2000” of Geoplan GmbH
The interviews have been carried out with the aid of computers. Having elaborated a standardized questionnaire a running program ("Touris-Watch 2000") was developed by GEOPLAN, which could be used for better recording and analyzing. The complete system has been checked by an extensive pretest. The results have been used to adjust the questionnaire and to patch the system of "Touris-Watch-2000". In addition check handlers have been used to minimize insufficient or wrong data inputs (for details of "Touris-Watch-2000" see the features of Touris-Watch 2000). The interviewer could work with a menu-driven questionnaire, which appears on the screen of their PC. Up to six times the interviewers tried to get people on the phone. When a person wished to be called at another date, it was possible to store a hold-file.

![Screenshot of menu-driven questionnaire](Touris-Watch 2000, Geoplan GmbH)

The program saved the interviewers name, time and duration of each telephone connection. Comparing this data with the special unique proofs of the phone companies a simple controlling of the interviews was possible. In addition some of the telephone numbers have been dialed a second time by another person, in order to check the interview results.

Features of Touris-Watch 2000:

- input of data during the call,
- manage different sets of data including telephone numbers,
- view of telephone numbers to be dialed.
output of packages of telephone numbers from all over Germany by mixing the code,
- show the follow-up of appointments,
- log information for internal statistics (duration of calling, the date, time of beginning, time of ending etc.),
- validity checking.

The source of the features is Geoplan/Aixplan 2000.

3. THE SELECTION OF PERSONS WITHIN A HOUSEHOLD

A specific problem of the survey for the years 1999 and 2000 was the raising of short trips and business trips. Compared to other studies on the field of tourism statistic in Germany (e.g. the results of “Mobility”, a not published study of German tourism industry) there have been recorded fewer data. Due to the fact that people do not remember their travel behaviour further in the past the number of recorded short trips was rather small. Furthermore business people belong to the type of interview partners that are difficult to reach, maybe because of their restricted free time. Usually there is a higher percentage of persons of this group, that refuses to answer the questionnaire (Geoplan; 2002).

To come up with a more representative data set of short trips and business trips it was decided to randomly choose the person within a household to be questioned. Before this change of our method always the person first on the phone was questioned. It was supposed that this procedure causes some distortions of the results, because in a household very often the same persons put up the phone. To obtain more representative results, the person on the phone was asked to let the member of the household answer, that has celebrated his/her birthday last. If this person was not available at that time, a new date was arranged. This form of modified questioning was carried out in the second survey of 2001–2002.

3.1. EFFECTS ON THE QUESTIONING SITUATION

In practice this method turned out to be more difficult than the type of telephone interview used before. Much more time was needed to explain the person first on the phone, why it is necessary to ask another person of the household. There is some disappointment for the person first on the phone, when she or he is asked for a different person to be interviewed. This means for the interviewer to motivate two and not only one person to join the survey. Furthermore there are much more persons, who refuse to answer. There was an increase of 7% (from 22 to 29%) in the survey of the year 2001 compared to 1999-2000. This means, that it is necessary to call up more people than previously expected. The number of dialed telephone numbers had to be increased from 66 692 (year 1999) to 77 892 (2001). Nevertheless, the number of carried out questionnaires decreased by about 8%. At the end much more time is needed to get a new data set.

This method evokes another drawback: due to the fact that there are more persons who refuse to cooperate on the phone, the interviewers become frustrated. During the second survey period (since 2001) the staff members changed more often than during the first survey. There have been much more efforts taken for organizing and skilling interviewers than before.
3.2. EFFECTS ON THE ENUMERATION AND THE REPRESENTATIVITY OF THE RESULTS

The new method indicates that the number of persons, which refuse or interrupt the interviews increases, if those persons additionally are confronted with the explanation of the "anniversary" method. The effect is that the interviewers being interrupted work on and choose the next given number of their list. Under this number e.g. an interview partner is selected, who does not belong to the group of short or business travellers but demonstrates a higher readiness to be interviewed. By this way at the end more interviews of persons belonging to the group of "non-business travellers" enter the enumeration than for the period 1999-2000 whereas only few short and business trips travellers could be recorded. Therefore, the results of the method are disappointing. Although the number of short and business trips increased slightly, the overall results of the survey did not change. This is indicated by Figures 4, 5, 6.
The new method of randomly choosing the household member shows somewhat more positive effects on the representativity of the results in general. An analysis of the interviews according to age classes makes clear that in comparison to the total population in Germany less persons in the younger age groups, but more in the older are interviewed. For the enumeration with the new method the distribution has been slightly improved, however there still has to be carried out an estimation according to age and sex. Since persons of higher age groups relatively often live in one or two persons households a significant growth in the representativity of the data by using the random selection within the household was not to be expected.

On the other hand the spatial distribution of the interviews carried out shows no differences of the representativity between the old and the new method. Their share on the German “Bundesländer” did not change significantly.
Figure 7. Distribution of population and interviews according to "Bundesländer"

4. CONCLUSION

Although more representative results concerning age and sex were obtained and a slightly greater number of short trips and business trips was recorded, the overall results of the survey did not change. The number of short and business trips could not be exceeded essentially. Since the results which were obtained on the bases of the new method only slightly differ from the old method, the higher representativity of a random selection within a household does not justify the much higher investment of personell and financial resources.

REFERENCES


