

# Report about field work and recommendations for a survey of intermodal long-distance travel in Europe

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a knowledge base for intermodal  
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Deliverable D7

**Report about field work and  
recommendations for a survey of  
intermodal long-distance travel in  
Europe**

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## 1 Abbreviations

MEST – Methods for European Surveys of Travel Behaviour

INVERMO - Intermodale Vernetzung

DATELINE – Design and Application of a Survey for European Long-Distance Trips Based on an International Network of Expertise

KITE - A Knowledge Base for Intermodal Passenger Travel in Europe

CATI - Computer Assisted Telephone Interview

SP - Stated Preference

IVT - Institut für Verkehrsplanung und Transportsysteme der ETH Zürich

## 2 Executive Summary

### *Introduction and fieldwork results*

The project, based on a review of current practice and the concurrent experiences of the long distance Surveys MEST/TEST, DATELINE and INVERMO, developed and conducted pilot surveys, which were performed in three countries (Portugal (P), Czech Republic (CZ) and Switzerland (CH)).

The survey sample size was equally distributed through the three states and was limited in its range by the available survey budget and the dependence on the survey firms contracted. Overall a sample size of approximately 1'250 survey persons was reached. This is enough to develop recommendations in four areas: general organization, protocol, design and sampling issues. While the general organization and sampling issue due to the budget limitations could not be part of the work here, only a short suggested structure is presented the experiences gained during the fieldwork. These will now be discussed in turn.

### *Possible organizational structures*

A multinational survey in all member states of the EU has to rely on the cooperation of a large number of organizations with their own preferences, skills and constraints. Therefore an organizational structure is needed, which is centred on a main contractor, whose main responsibility is the maintenance of the uniformity of the survey protocol and design, obviously within the respective legal and resource constraints. The main contractor organizes and coordinates the field work firms on the one hand and is the contact person for the sponsors and their speaker.

The main contractor provides the field work firms with a number of tools and services maintaining the uniformity (translation of forms and CATI-questions, production of forms and support materials, coding software, CATI-programmes, training materials) and verifies the data for their consistency and quality.

### *Recommendations for the protocol*

The work undertaken concentrated on mixed postal and telephonic protocols, face-to-face interviews or single telephonic interviews (CATI) as an affordable and successful approach for the task. For the stated preference part of the survey a written survey is

suggested. Full scale CATI surveys are the recommended protocol for the long-distance survey which can be switched to a face-to-face version in countries where the costs for such a methodology are relatively low. The recommended protocol, detailed below, is a telephone approach for the long-distance survey and a postal approach for the stated preference survey. The key points of the recommended protocol are:

- Person sample (oversampling of persons with more long-distance trips) and a screening which is only possible as a telephone interview to indicate persons with long distance journeys.
- Full CATI interviews with a relatively long duration were possible to conduct. An initial mixed approach for the long distance survey wasn't as useful as a full CATI because many questions from the CATI have to be asked again in the written part. No incentives are used.
- Complete documentation of the data files in their various phases and of the contact history for a permanent quality control
- Face-to-face interviews at least for a subset of the sample (here CZ) as a quality check
- Continuous administration of the whole survey period (1 year minimum, 3-5 years recommended), because of the possible temporal effects.

#### *Recommendations for the design*

The complexity of long-distance journeys limits the possibilities of the survey researcher. The key elements of the recommendations are:

- Retrospective eight week survey
- Minimum 75 km crow-fly distance from current base (home etc.)
- Relevant household, person and vehicle details and specialized items e.g. language knowledge
- The most recent journey (independent of reporting period) and all other journeys within the reporting period
- Stage-detail, which should be limited to the last month, because of memory effects and response burden
- Screening for regular long-distance travellers to reduce the level of details which they are asked, to reduce their response burden
- Screening for those people which do undertake long-distance journeys

This approach is a compromise, which minimizes the apparent complexity for the respondent, which limits the actual response burden, but provides both the relevant

information about the intensity of long-distance travel and about the details needed for intermodal precision.

### *Sampling issues*

This deliverable discusses only a subset of the relevant issues, but recommends to optimize the sample in such a way, as to optimize the precision of the total amount of travel in each region.

### *Conclusions and outlook*

The field work of such a survey as a benchmark survey for whole Europe is not considered as the best solution from the sampling method used. Many questions in such a survey are already part of other surveys about daily mobility and if possible an omnibus should be used or a stratification. Further work should be done in better computer assistance through the interview process to identify places named and assist the interviewees for the correct names. In addition further work on the flexibility of such tools should be made.

### 3 Introduction

The work package 3 of the KITE project, a Knowledge base for Intermodal passenger Travel in Europe, aims at developing a suitable survey methodology that intends to close remaining informational gaps about intermodal and long-distance travel behaviour. This work is funded by the European Union.

Long-distance travel is only in rare cases a part of daily mobility (e.g. salesmen or ambassadors). Therefore, such movements are reported with low frequencies in surveys of daily mobility. However national travel surveys (NTS) dedicated to daily mobility are the only source for long-distance travel in many European countries (e.g. in Denmark, Greece or Netherlands). The problem in these surveys is the difficulty of obtaining representative statistics of long-distance travel even with relatively big samples. Therefore in most national travel surveys modules are dedicated to long-distance travel with the exceptions mentioned above. The most common format in these surveys is that respondents are asked to report their long-distance journeys in addition to their mobility on a given day, but for a longer reporting period (e.g. Great Britain NTS (2002-2004), French NTS (1993-1994), Swiss Microcensus on Travel Behavior (2005), and Swedish RES (2005/2006)). A further, but less frequent source of data for long-distance travel are surveys exclusively dedicated to long-distance travel. But past surveys show very different amounts of long-distance travel demand for the same countries, which make that those numbers hard to trust (see Dateline dataset with its consistently lower value for the number of trips per person and year).

The development of the methodology includes pilot surveys that are carried out in Switzerland, the Czech Republic and Portugal.

Considering the results of previous survey work, especially the “INVERMO” project, the “MEST” project and the project “DATELINE”, a survey methodology has been developed and tested in all three countries. In addition, a stated preference survey was designed to gather information about the market potential.

During November 2008 and February 2009 3399 persons were surveyed with two different protocols. The first protocol was used in Switzerland and Portugal and consists of a full CATI for the long-distance travel survey and a written part for the SP questionnaire. In Czech Republic the same survey was carried out as face-to-face interviews.

First the fieldwork is described and then three sets of recommendations are supplemented by a discussion of the possible organisational structure for an European survey of long-distance travel. The organizational issues were not tested in any way because of the time and budget limitations, but will briefly discussed as well, because its importance.

The recommendations aim to implement a survey of long-distance travel in the most cost-effective way (units reported/unit expenditure from an unbiased sample). The aim of the survey is to provide a least-biased description of the number and characteristics of long-distance trips of the surveyed population.

## 4 KITE survey proposals and award for the fieldwork

### 4.1 Survey proposals

The deliverable D6 which contains the tender documents was provided to the firms in the three countries Portugal, Czech Republic and Switzerland to tender for a long-distance travel pilot survey.

The tender documents were sent out at the end of August 2008 and a reply on was awaited by mid September. In total 10 Survey companies received the call for tender in the three countries. 9 of those companies replied within the timeframe of which 7 companies made a proposal which were taken under consideration.

The companies were chosen to have experiences with large scale travel surveys for their country. The experts within the KITE project team were asked about those companies beforehand to make sure they reach a certain quality standard. The companies were free to offer incentives for the respondents in their proposal which affects their response rates and therefore the costs.

This survey consists originally of three parts: The first part is a CATI which has the goal to collect the relevant sociodemographic information; the second part is a CATI to screen the relevant respondents and get the basic statistics about long-distance travel in terms of a long-distance journey roster; and the third part will be a detailed travel diary as a CATI to carry out the relevant information on stage based level for intermodal long distance journeys. A follow up SP Questionnaire gathers more information about possible market potentials in the sector of intermodal passenger travel.

### 4.2 Award of the field work

The companies were asked to make a proposal with the costs for a first initial sample of 100 persons and the additional costs for each additional 50 respondents. Based on these prices and the budget available a maximum number of respondents was calculated which are equally distributed over the three countries. For Switzerland and Portugal the most cost-effective companies for the given budget were chosen and for the Czech Republic the second best offer, but which will be carried out as face-to-face interviews which can lead to higher quality information. With a budget of 220'000 EUR a total sample of 3'764 persons should be achieved which gives us the costs of 58 EUR per questioned person.

## 5 Fieldwork report

### 5.1 Pre-tests and redesign

In three pre-test stages two different kinds of survey methodologies were tested in Switzerland based on the prior work of the MEST/TEST, INVERMO and DATELINE projects.

The pre-test was carried out as a qualitative pre-test of 5-6 respondents to test for a suitable set of questions and mainly the protocol, as a diary is relatively complicated for a CATI, but written questionnaires are not suitable for some of the countries in the EU, because of low response rates.

First of all only a written questionnaire was developed and tested for 5 respondents. This small sample reached a response rate of 22% whereas only one person did undertake long-distance journeys to a destination further away than 100km during the last 8 weeks.

Because of the relatively small amount of respondents with such a journey during the reporting period and the recall problem of a longer reporting period, it was decided to conduct a second pre-test with a screening as a telephone based protocol, where people were screened based on the simple question if they have undertaken such journeys within the last 8 weeks. This telephone based survey was only supplemented in by pencil and paper without computer assistance because of the available resources. The first two parts of the survey (see introduction) were carried out on the telephone and the last part, the travel diary, was carried out a maximum of the last 3 previous journeys.

The third pre-test was conducted based on a small sample with the chosen survey firm in Switzerland, to test the possibilities of a single CATI version of the questionnaire, which makes it possible to not ask some of the questions twice. But because of the relative long questionnaire there were doubts about the feasibility of such a survey. In this pre-test the maximum length reached 36 minutes with a total of 85% of the possible questions asked in the questionnaire, which is relative long, but acceptable. On average the interviews were much shorter (18 minutes) due to the big differences in response burden between single respondents.

Based on this experience the questionnaire was adjusted slightly in comparison to the questionnaire which is available in Deliverable D6 as an appendix. These changes are more or less the wording of the questions which have to be adjusted for a telephone interview. The biggest change was to split up single questions into two questions to make it easier for the interviewees.

### 5.2 Structure and issues of the pilot survey

For simplicity the structure and issues of the pilot survey are summarized in the following paragraph (see Deliverable 6 for more details):

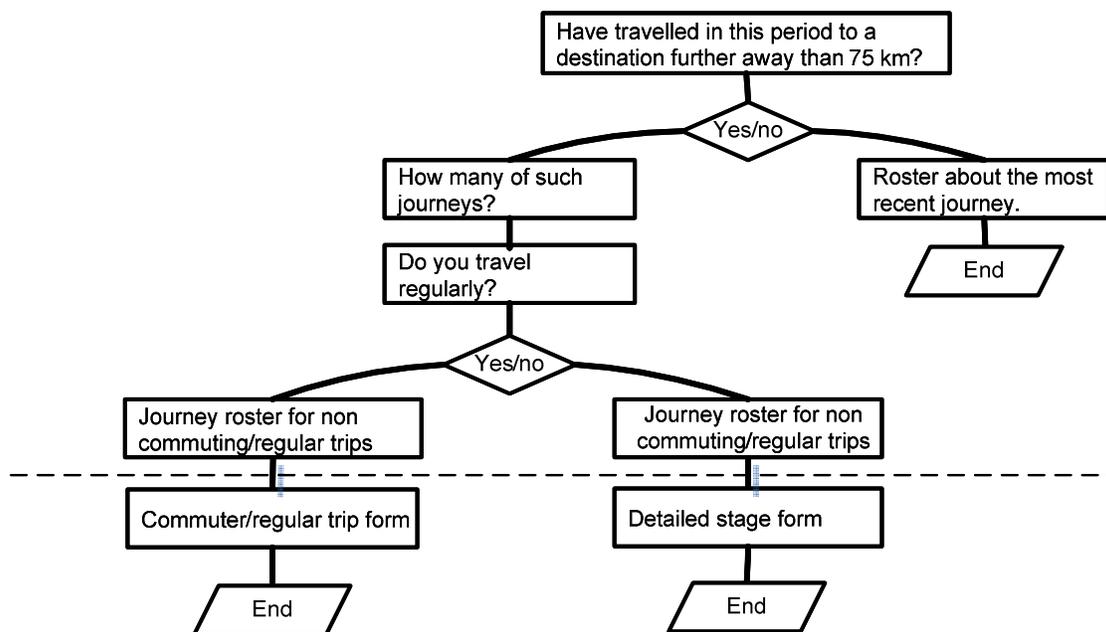
#### 5.2.1 The protocol

*Retrospective:*

*Oral element*

- Household-, person-and vehicle questionnaire
- Screening and journey roster (see the logic of the protocol in Figure 1)

Figure 1 Logic of the protocol



*Follow up oral elements according the logic of the protocol (see Figure 1)*

- Commuter/regular trip questions or detailed stage form (Stage based travel diary)

*Follow up written element*

- SP-forms
- Motivation/reminder call

### 5.3 Stated preference questionnaire

The stated preference questionnaire consists of two different parts, the first part is a mode choice experiment for undertaken journeys to destinations between 300km and 1000km away from the base location to make sure all the different modes are available (car, plane, train and bus) and the second part is a route choice experiment based on a undertaken journey. If there was no journey available which fits the requirements stated for the first part, one of four generic alternatives were used

according to the home location of the person, e.g. if the person lived in the area of Zurich, a trip from Zurich e.g. to Frankfurt was used; For a person who lived in the area of Geneva a trip from Geneva to Paris was used. For the route choice the journeys undertaken is the base to generate the choice sets.

The alternatives for both parts are described by following variables:

- Travel-time,
- Travel-costs,
- Access-/ Departure-time and
- Number of transfers.

The design used for the generation is an efficient experimental design (for a good and comprehensive explanation see Bliemer and Rose, 2006). An efficient design minimizes the standard errors of the parameters from the utility function which is underlying the decision. For the initial parameters the results from the study of Hackney (2006) were used. For generating an experimental design different aspects have to be taken into account. For the first part of the SP questionnaire (mode choice) a labeled design is used and the second one (route choice) is unlabeled. The attribute levels have to be balanced, which means that they have to appear equal number of times. To take non-linear effects into account 3 attribute levels have been used for the different variables. Because of those and the degrees of freedom of the initial utility functions for the efficient design, 12 situations were created which are divided between three blocks, so that every person had to answer four situations for each of the two parts (see Figure 2 for an example).

Figure 2 Example of a mode choice situation in Portuguese



## 5.4 Response rates

The response rates vary due to different factors mainly from country to country, but also due to the different survey protocols used in the Czech Republic (see above for the protocols). The response rate used here is the ratio between completed interviews and the base sample, expressed as a percentage.

The response rates are given in Table 1.

Table 1 Response rates long-distance travel survey

	Switzerland		Portugal		Czech Republic	
Methodology applied	CATI		CATI		Face-to-face interview	
	[%]	Sample	[%]	Sample	[%]	Sample
Base sample	100.0	4'160	100	5'333	100.0	1'933
Realized interviews	24.3	1'010	21.6	1'152	64.0	1'237
Non-response reasons						
Problem with the phone number	20.6	855	2.1	112		
Refusal	20.4	847	15.3	816		
Non-contact (maximum 15 call attempts)	1.3	56	50.5	2'693		
Age-problem (under 15 years old)	21.3	888	4.3	229		
Language-problem	10.9	454	0	0		
Other	1.2	50	6.2	331		
Mean interview length (min)		16.5		16.5		37.0

The response rates have to be analyzed against the background of a maximum of 15 calls over several weeks. The samples are random samples and representative for the population controlled for age, gender and income. Because of the relatively small sample size, the samples are not representative for different regions in the countries.

For the Czech sample a quota sample was used. An exact non-response statistic is therefore not available for the data. The high number of non-contacts in the Portuguese sample occurs because they stopped to try to reach a part of the sample after they reached the requested numbers of interviews. But the persons in the base sample had at least one call attempt. The high share of problems with the phone

number in the Swiss sample is caused by the change of an available official address and telephone number sample. This caused adjustments in the address-databases of the commercial survey companies, which has an effect on the sample quality and causes these phone-number problems. The relative high share of language problems in Switzerland is a problem, that the questions were only translated in German and French and not in Italian. The Italian speaking part in Switzerland is about 5%. In Portugal the language problem wasn't coded as a non-response reason, which might be the 6% other reasons. This would catch up with the 5% Italian speaking persons in Switzerland and the 11% of language problems.

The response rates are acceptable giving the relative long length of the interviews (16.5-37.0 minutes). Especially because the refusers have a share of only 20.4% respectively 15.3%, which is low if this is compared to other long-distance surveys, where refusal rates were e.g. 27 % in Norway (Denstadli, 1999).

The average interview length is for the telephone interviews remarkably shorter than for the face-to-face interviews. It is not directly comparable, because of the software used in a CATI, which makes the interview process much more efficient with the same question.

Based on the answers in the first part of the survey, in the second wave a customized stated preference survey was sent to self-identified respondents. Those respondents which had undertaken a long-distance journey during the last 8 weeks, which was not a regular journey (regular was defined: at least once per week; or journeys with the same destination during the last eight weeks), were asked if they are willing to participate in a written survey based on this telephone interview. For the response rates, see **Error! Reference source not found..** An ex-ante estimate for the SP-questionnaire's response rate in Switzerland, predicted a response rate of 54% (see Axhausen, 2007 for details about the ex-ante estimate of the response burden and the response rate derived from it). The lower actual response rate (45%) can be explained, that a commercial company conducted the interviews and the relative high response burden the respondents already had with the first parts of the survey. The low response rate in Portugal is something which is observed in many southern countries, e.g. in the MEST/TEST survey were the postal response rates in Portugal about 14.5% whereas in Sweden the response rates were 21% (MEST/TEST Consortium, 2003).

Table 2 Response rates follow-up SP-survey

Methodology applied	Switzerland		Portugal		Czech Republic	
	[%]	Sample	[%]	Sample	[%]	Sample
Interviews conducted		1'010		1'152		1'237
Agreed to participate	100.0	507	100.0	230	100.0	524

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Response	45.2	229	16.1	37	97.5	511
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In total 777 SP-questionnaires were returned with each two times four choice situations, which gives us overall 6'216 observed choices. In Portugal and Switzerland only a subset of the person was used for the SP-survey due to the time restrictions of the project, which was not followed because of longer implementation and testing times of the CATI software.

## 6 Recommendations for a survey of intermodal long-distance travel in Europe

### 6.1 Possible organisational structures

The experiences with the conducted KITE pilot surveys have highlighted the need for suitable organisational structures, because otherwise such an international survey will suffer strongly from a number of problems. The main problems are:

- Maintenance of a uniform protocol: It is very easy for local firms to drift towards their preferred practises, even if a clear written description of the protocol is available, due to local difficulties, lack of training, lack of commitment to the survey, further subcontracting with the associated information loss etc.
- Maintenance of a uniform question set: The translation requires a large amount of care due to differences between the design language and the respective local language. Cultural differences in understanding certain questions should be eliminated.
- Maintenance of uniform coding: Unless a uniform coding program is used, it is very difficult to maintain a uniform coding due to local drift and local decision making, even if clear instructions are available.
- Maintenance of a single reporting language: Even a single language is used, it is very difficult to maintain it through the whole survey. Specially local names for e.g. places etc. are very hard to recode afterwards.

These problems require an organisational structure, which allocates clear responsibility for the maintenance of the uniform protocol and design to a central contractor. The organisation of the field work is the task of this contractor and it should be irrelevant how many firms are actually involved. It is clear from experience though, that the field work firms should not be reduced to execution only, but that they should be involved within limits in the design process to increase their understanding. So for the whole process of the proposal to the award and the real start of the fieldwork is a very complex interaction between the contractor and the survey firms, which was underestimated by the work package 3 team within the KITE project. Misunderstandings and not exactly clear instructions led to substantial time loss and redesign processes which cause a longer brake during the field work.

In addition, the main contractor should be responsible for the following procedures:

- Translation: To maintain overall stability of the translation one single firm should be responsible for this.
- Writing of CATI software in all languages would be better, than having problems because some of the CATI requirements can not be implemented the same way for the software used by the different survey firms, e.g. pre-fill forms with previous answers during the telephone interview. Specially identical databases, or an online system like google maps for cities etc. should be used to maintain an overall quality of especially the spatial data.

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- The interviewers or at least the instructors for the interviewers should be trained by a single firm.

The quality control of the whole survey process should be contracted with a separate firm, which has the task to control the adherence to the contract, the implementation of the training schemes, the quality of the data capture and of the data coding.

## 6.2 Recommendations for the protocol

### 6.2.1 General constraints for the protocol of a long-distance survey

One of the main problems is that the protocol of a survey, i.e. the methods applied, influences the result through the selective inclusion or exclusion of possible respondents strongly. For example, conducting a survey exclusively by phone and choosing a small maximum number of contact attempts and a short period of time for them excludes highly mobile households and absent households. In both cases it is a problem that the exclusions are non-random and that the resulting bias is rather big.

This section will discuss qualitatively the most important constraints, which affect the sample specially for long-distance travel surveys. The second section includes the qualitative recommendations from the KITE pilot surveys.

#### Telephone: Availability

The telephone is widely available in most of the countries in Europe, and is still used by the most countries' federal bureau of statistics for conducting survey in different fields. But the range of availability becomes a little bit smaller especially, because of the wide use of mobile phones. At an European scale this implies, that in some countries or regions a survey based only on telephone will bias the results. Therefore it should be complemented or replaced by a different survey protocol.

#### Telephone: Duration

The experience in the KITE pilots with the telephone interviews was, that interviews can be long (20-30 min and more), but also the memory tasks of a long-distance survey requires some special preparations for the questioning, in particular the numbers of journeys during the period has to be asked in a way, that adjustments can be made during the interview, which means that the software should allow to correct information without messing up the structure of the interview, e.g. to have imposed questions after every completed journey to make sure the previous given information are correct.

#### Telephone: Complexity

The difficulty in designing is to avoid complex definitions especially in telephone interviews and to find a natural description (some persons are familiar with distances, others more with driving duration etc.), which invites the respondents to report all relevant movements, by minimizing the difference between the reported movements and those which should have been reported. Therefore at least a two step question for the regular and irregular travels and the definition of the base location has to be done. This means that for the base location first is asked for only the journeys home to home and in a second step for further journeys from a base location where the interviewees spent at least two consecutive nights. The same for the journeys, where

first has to be asked if the person has undertaken a certain journey (e.g. regular, non-regular) during the last weeks and then ask them for the number of journeys.

#### Telephone: Sample biases

The telephone is assumed to bias against highly mobile people or people frequently away for longer periods unless the number of contact attempts is high and spread over a long contact period and over the whole day within that period (recommendations at least 15 times during 4 weeks). It also biases against people who do not chose to have one, both due to lack of resources as well as to avoid uncontrolled contact. Especially there is a problem for very long telephone interviews like in this case as mobile phone batteries do not last long enough, or the interviewee is not willing to give that much of his remaining battery life for such an interview. Therefore a small sample should also be realized by contacting people on their mobile phone and if such a interview is not possible, to make an interview appointment on a regular phone.

#### Face-to-face

Face-to-face interviews are a high quality medium to administer a travel diary. Their high costs require extensive surveys to be economical, which means, only in regions, where their relative costs are low, they might still be considered.

In some countries and regions problems may arise with the use of face-to-face surveys due to the unwillingness of interviewers to interview in certain areas, e.g. in high income regions due to time restrictions.

#### Asking for income

Although often avoided, the KITE survey asked for income because the income and the constraints which arise from it have strong explanatory power. In this surveys this has created no documented response problems, but income items showed substantial item non-response in other surveys, like the Austrian Eurostat survey. It should be kept in mind, that the sensitivity depends on the level of detail of the question in terms of income sources and on the level of detail of the income classes offered. In KITE only 5 income classes were used and asked on the household level and the question was placed at the end of the interview.

#### Paper based long-distance surveys

Because of the lack of a screening possibility of paper-based surveys, they are not recommended for long-distance surveys.

### 6.2.2 KITE pilot experiences and recommendations for the protocol

The experiences in the field work of the KITE pilots were mixed. The total response of 60-70% was satisfactory for the telephone interviews, but the low response for the paper-based stated preference questionnaire in Portugal is worrying.

The response burden distribution in long-distance travel surveys is highly skewed in contrast to daily mobility surveys. To avoid the tedium of repeating the description of very similar movements for frequent travelers in a CATI/CAPI shortcuts can be offered, which was implied by the logic of the protocol, but still, specially because of a stage based travel diary, there are a lot of repetitive questions, which should have been more avoided, by giving the opportunity to just report changes in travel behaviour in

comparison to the last stage. But overall there was nearly no one who broke up the interview during the questioning; the refusals were refusing from the beginning. Also the worries about the recall effects on a telephone interview were not observed, whereas the level of details for long-distance journeys even on stage level are not that much of a problem, because in the most cases they are relatively rare events, and those doing such journeys on a regular basis had a lower level of detail in the questionnaire. A memory jogger should maybe tested, but was not in the pilots. But this could also have negative effects. In long-distance surveys the long reporting period reduces the advantage by asking the respondent to commit an unknown amount of time to the survey task, as the respondent cannot know exactly how much he/she will travel in advance. This uncertainty in comparison with a retrospective survey, for which the respondent can assess the workload, seems to reduce the response rate. Still, those who do respond with a memory jogger provide more and better quality data.

As in earlier survey studies about long-distance travel a full CATI approach was not realised, but as an option some full CATI interviews were tested in the MEST/TEST project. They had in their pilots nearly throughout positive experiences; in general these experiences can be confirmed. But the protocol used in these pilots has to be developed further to catch the problems mentioned above, specially the fatigue effects because of repetitive questions (that occur also in surveys about daily mobility). But also to intercept the memory effects, which get lower through the duration of the interview, when a person is asked about its journeys and then they remember further journeys. The protocol has to be flexible and adaptable to such situations.

The CATI protocol seems to be a suitable approach and should be considered in a possible tender. The Commission should in this case pay special attention to the treatment of:

- Sampling frame: completeness with respect to unlisted numbers and owners of mobile phones only; exclusion of office numbers
- Non-phone owners: provision of non-phone based methods of contact with non-phone owners
- Highly mobile: provision of sufficient contact attempts at all times of the day
- Longer absences: provision of a sufficient period for the contact attempts (4 weeks)

#### Recommended protocol

Sampling frame: Official telephone registers or official telephone lists of the postal offices

Sampling unit: Persons (suitable random selection with number-of-long-distance-journey-weighted probabilities, if only household addresses are available) from age six; for respondents between 6 and 14 years parents should report as proxies.

CATI replies: Extensive error-checking in the CATI routine, semi-automatic geocoding of place names with tools which allows to check for the information on an international level, like google maps; probing for suspected but not-reported trips or journeys.

This protocol provides an intensity of contact which allows achieving a sufficient response rate for the collection of enough journeys for the intended analysis.

#### *The income question*

All responding persons should be asked as part of the error correction and probing interview about the income of their household by income quintiles at the very end of the questionnaire.

## **6.3 Recommendations for the design**

### **6.3.1 General constraints for the design of a long-distance survey**

The design of a survey has two main aspects, the selection of the survey object and of the related items including their coding and the formulation of the respective questions for interviewing. Both interact through the specific constraints on the phone, the ability of language and signs to communicate ideas/instructions and the scale of the survey exercise.

#### *National languages differences*

A survey within Europe has to be written in at least the eleven official languages, but also their various national variants and maybe the languages of various other relevant language groups, such as Swiss German, Catalan and Basque in Spain, Turkish, or Lapp in Finland and Sweden. The project was able to test its design in just three languages, but even here it became clear that new words had to be created in some cases to convey the concepts intended. It will therefore be necessary to keep to the lowest common denominator of concepts to avoid complex explanation.

#### *Study object: Distance limitation*

Long-distance surveys in travel research left-censor their universe of movements by a minimum distance to be able to cover longer reporting periods. This reduction of the response burden requires a complex explanation of the relevant movements. The definition of the survey object is therefore constraint to a simple one to minimize the complexity of the explanation required.

#### *Study object: All movements*

The study object of a long-distance travel survey is in principle the sequence of all movements, of which one reaches a destination more than x kilometres from the current base of the respondent. The requirement to describe all movements is too onerous in this context in comparison with the daily mobility context, where this requirement is clear. In the long-distance context one concentrates on those movements leading to relevant activity locations, major stops at the end of a day's travel or the places to change modes or means of transport. Minor excursions at the destinations are excluded, unless they lead to the next major destination. The constraint is a definition which can still be communicated, while including all movements of interest.

#### *Frequent movements*

Frequent movements are those which repeat a general trip pattern with a high frequency, such as the daily long-distance commute or the weekly trip to the second home. Written forms find it very difficult to accommodate short cuts for such patterns, as frequent trips do not necessarily have to be identical in all respects (departure time, travel time, size of party, purpose, duration at destination etc.). A trade-off between response burden and accuracy has to be made and a typical journey of these types should be asked.

#### *Frequent travellers*

Highly mobile travellers have in principle a high response burden, which reduces their willingness to participate. Written forms find it very difficult to accommodate short cuts for those people and therefore the chance of not getting answers from them is relatively high and can lead to bias. To limit their work load a screening should be used, but it has to be accepted, that therefore also the response from other respondents could be limited, who might have been willing to respond more. The constraint is to obtain as much information as possible, while not losing too many respondents.

#### *Immobile persons*

People who do not make long distance journeys often do not answer in such surveys, because they think their participation is not of a value. Therefore these persons have also taken into account, otherwise the results will be biased.

### **6.3.2 KITE pilot experiences and recommendations for the design**

The KITE project tested only qualitatively the use of a written design, a combined written and telephone design and a telephone or face-to-face only design. In terms of design the conclusions are:

The experiences with a screening and a journey roster with a very limited set of items is positive and allow us to limit the request for detailed information without sacrificing the information about the overall level of movement and let us also have answers from frequent travellers without imposing a too high response burden on them. Such a design is only possible with at least a combined design, where a telephone interview makes it possible to screen the relevant persons and get also information about immobile people.

Based on the discussions above the following design and study object are recommended:

- *Study object:* All journeys during the reporting period to destinations over the minimum distance.
- *Resolution:* Stage-based requesting information about all movements between major activities and mode or vehicle changes.
- *Minimum distance:* 75 km crow-fly-distance from the current base of the respondent.

- *Minimum duration:* None
- *Current base of respondent:* Any location where the respondents spend two consecutive nights, as a rule the home, any second home or the holiday accommodation.
- *Resolution of destination area:* The municipality level or equivalent distinct place (holiday resort, name of firm etc) for prompting.
- *Geographical range of exclusion:* Journeys within the destination area and non-qualifying journeys from the current base.
- *Treatment of regular journeys:* Special questions to describe a typical journey of this type and the frequency of such journeys
- *Temporal orientation:* Retrospective
- *Duration of reporting period:* Eight weeks
  
- Screening and roster should cover the following items:
  - Most recent long-distance journey (roster style, see below)
  - Roster of all other long-distance journeys within the reporting period.
- Questions to report journeys in detail. The three most recent journeys are to be reported, if available, otherwise all the journeys mentioned should be described.



coaches, regular air service and charter service or between the different sorts of train service (e.g. local, interregio, intercity or high-speed rail).

It is recommended that items, which are very country-specific in their coding, for example income groups, education levels etc., should be country-specific and predeterminations should be adapted.

Table 3 Draft set of items: Household

Item	Categories offered	Coding
Location of residence	Open	Geocodes
Type of accommodation	House, High-rise flat, Terrace, Bedsit, Flat, Other	
Ownership of accommodation	Owned, Rented, Sublet	
Internet access	none Dial-Up / ISDN (TV Cable ADSL (W)LAN	
Number of cars and vans owned	0, 1, 2, 3, 4, 5+ 0, 1, 2, 3, 4, 5+	
Number of motorcycles	0, 1, 2, 3, 4, 5+	
Number of further vehicles	0, 1, 2, 3, 4, 5+	
Existence and locations of second residence	Open	Geocodes
Number of visits to other residences in the last 6 months	0, 1, 2, 3, 4, 5+	
Household Income	Country-specific	

Table 4 Draft set of items: Person

Item	Categories offered	Coding
Presence of a disability affecting travel	No, Yes	
Highest education level	Country-specific	

Employment status	Employed, self-employed, not employed, (not seeking work), in education, homemaker, retired, unemployed (less than a year), unemployed (more than a year), none of these
Number of paid working hours/week	Open
Ownership of frequent flyer card of an airline	No, Yes
Ownership of a railway discount card	No, Yes (Country-specific)
Languages able to speak	Open

Table 5 Draft set of items: Vehicles

Item	Categories offered	Coding
Type	Car/van, motorcycle, truck, other (Open)	
Make	Open	
Type of fuel	Petrol, diesel, other	
Current odometer reading	Open	
Year of production	Open	
Kilometrage of the last 12 months	Open	
Other household members driving the vehicle	Open	
Power of this vehicle	Open	
Cylindercapacity	Open	

Table 6 Draft set of items: Journey roster

Item	Categories offered	Coding
Date of departure	Open	
Date of return	Open	
Origin	Open	Geocode
Main destination	Open	Geocode
Main mode	Open	
Main purpose	Sport active, Sport passive, A celebration, Pick. up/drop of someone, Picking up/deliver sth., Accompanying someone, Work, Education, Visiting friends and relatives, Shopping, Leisure/ Holiday	
Size of party	Open	

Table 7 Draft set of items: regular trips

Item	Categories offered	Coding
Origin	Open	
Destination	Open	
Number of overnight stays	Open	
Kind of accommodation	N.A., private, commercial	
Size of party	Open	
Departure date and time	Open	
Arrival date and time	Open	
All modes used	Car, rental car, taxi, motorcycle, bus, train, airplane, ship, bicycle, other (open)	

Place of change of mode	Open
Role	Car driver, passenger, both
Handicaps	None, More than hand luggage, travelling with young children, physical disabilities, other (Open)
Payment of travel costs	Self, household member, employer, other (open)
Payment of accommodation costs	N.A., self, household member, employer, other (open)

Table 8 Draft set of items: non-regular journeys (per stage)

Item	Categories offered	Coding
Fixed appointment	Start date, end date	
Booking date	Date	
Travel expenses	Open	
Distance traveled	Open	
Number of overnight stays	Open	
Origin	Open	
Destination	Open	
Departure date and time	Open	
Mode used	Car, rental car, taxi, motorcycle, bus, train, airplane, ship, bicycle, other (open)	
Handicaps	None, More than hand luggage, travelling with young children, physical disabilities, other (Open)	

Payment of travel costs	Self, household member, employer, other (open)
Purpose	Changing mode, Break, Return home, Pick. up/drop of someone, Picking up/deliver sth., Accompanying someone, Work, Education, Visiting friends and relatives, Shopping, Leisure/ Holiday
Kind of accommodation	N.A., private, commercial
Payment of accommodation costs	N.A., self, household member, employer, other (open)

## 6.4 Recommendations for the sample structures

### 6.4.1 Stratification and Omnibus

A better sampling structure can improve the information given by the survey by drastically stratifying the sample. Due to a relatively small sample this method was not used in this case.

After choosing the number of households that should be in the survey in each region, each of the regional samples should be optimised by interviewing the most mobile households to improve the accuracy of the total number of trips. Most of the European countries do not use the census as a sample base, which allows to identify households, which are likely to be highly mobile. Thus if we want to select highly mobile households disproportionately, then the solution is a two-phase sampling scheme.

Two phase-sampling is a good methodology to improve the sample schemes for a long distance survey. Because in many European countries it is forbidden to use the census or any official register as the sampling frame, the stratification variable, that the survey statistician has available, is geography.

A common practice is to select a large population sample and screen it for its mobility habits and then take a smaller sample from the large one based on the screening information. For example a large sample from the population could be taken, ask it about the number of cars in the household or the number of long distance trips and then draw a disproportionate second-stage sample from those with high mobility indicators.

Alternatively, if such screening is not possible, we can use auxiliary variables that are proportional to long distance mobility and sample disproportionately from areas, which have higher average values of those variables. There is a number of variables that can be used for this purpose. For example:

- Number of cars in the household
- Annual income of the household
- Managerial status of the household's head
- Urban / rural zone of residence
- Age of the household's head

Or if available an Omnibus should be used to have the relevant information to chose the households/persons.

## 7 Conclusion and outlook

It is clear that an European survey of long-distance travel, especially in its intermodal complexity, is needed to fill the gaps in our knowledge of this important element in the European Transport Information System. This report has summarized the pilot work by formulating a benchmark long-distance survey. This recommendation cannot in all parts be supported by empirical evidence, as the literature is inconclusive in certain respects and as the project could not fill all the gaps due to its time and resource limitations. Still, the results are promising.

Especially the task of developing a more flexible structure in a CATI should be the task of future work and for the CATI more flexible tools should be used to help and assist the interviewees software to identify destinations of long-distance journeys, especially in foreign countries. But overall it seems to be a good solution to carry out a long-distance survey on the telephone, even the whole survey is very complex.

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