The Potential of Combining Established Household Survey Instruments in Order to Obtain Better Long-Distance Travel Data for Europe

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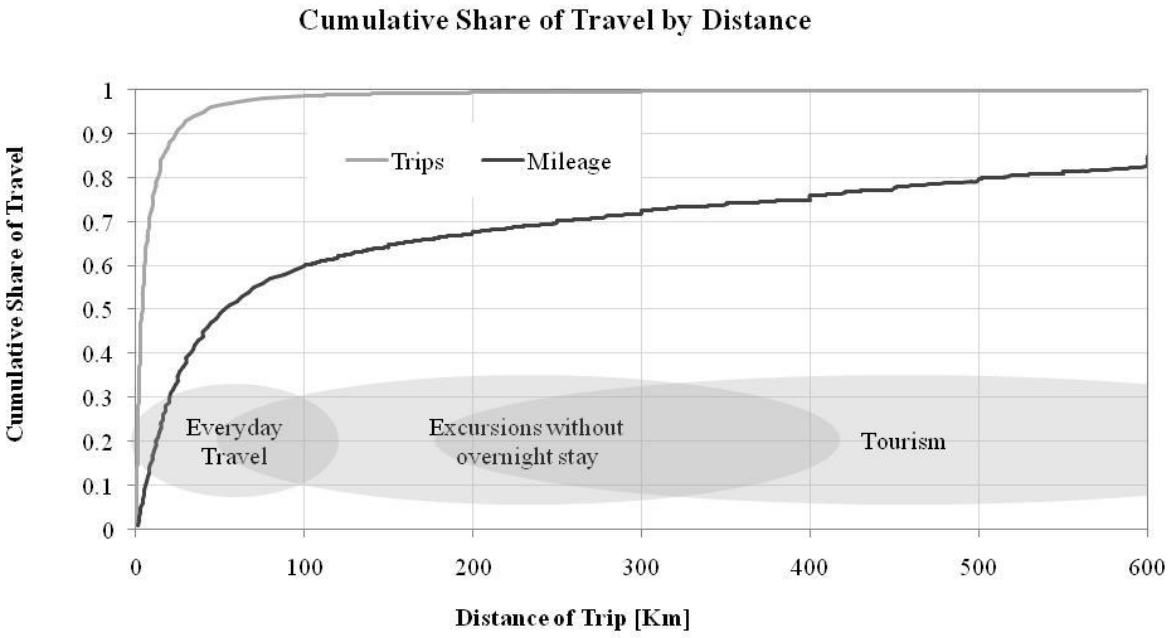
INTRODUCTION

Along with the dynamic development of long distance travel there is increasing demand for comprehensive and reliable data. Public bodies require data on travel demand for investment decisions (ILS 2004, Madre et al. 2007). The transportation infrastructure is one of the most important fields here. But also many other stakeholders need data on tourism and long distance travel: The tourism business relies on data about travel as a basis for commercial decisions. Data on travel is also an important measure of international economic and social integration (UNWTO 2007). In the context of the national balance of payments, suitable data is needed for measuring economic aspects of international travel and tourism.

Different stakeholders have come up with various definitions of long distance travel which reflect their perspective. They have often developed adequate tools to measure travel in order to fulfill their specific data needs. As a result, many travel surveys specialize in specific segments of travel.

In reality, however, travel represents a continuum and the segments of travel differentiated by different definitions overlap (FIGURE 1). While existing surveys do often not manage to capture the entire bandwidth of travel, there is an increasing need for comprehensive data on mobility across the whole spectrum of travel: From the perspective of the tourism industry or the balance of payment, excursions without overnight stay represent a segment of travel with significant importance. Likewise, large parts of growth in travel demand have occurred in the long distance travel segment. Therefore, long distance travel has moved into the focus of transportation planners.

FIGURE 1 Trips and mileage covered by travel in different distance ranges (Germany) [based on MOP and INVERMO data]



This paper discusses the potential of combining different existing data sources with multilateral benefits. This includes established as well as innovative approaches for capturing long distance travel. After setting the focus of the paper and presenting relevant definitions, we will briefly present the typical characteristics of the different surveys and the existing data situation. We will not exclusively focus on the technical properties of the surveys, but also discuss data availability and institutional background of the data. Based on this assessment, the paper finally discusses possibilities to combine different surveys in order to achieve a more comprehensive data situation on the European level.

PAPER FOCUS AND RELEVANT DEFINITIONS

Focus on Household Travel Surveys

There are several approaches to capture travel and tourism, reaching from mobile phone tracking over ticket sales figures to making use of credit card payments on highway toll booths (ISCTSC 2008). These different sources provide a very heterogeneous image of travel activity which in most cases sheds light on only one specific sector of travel. The discussion in this paper focuses on conventional household surveys as a source of information about travel activity. This has two main reasons:

First, household surveys provide the same type of data referring to the same units of analysis (individual travelers). Therefore, it is possible to generate comparable information about travel on the basis of different household travel surveys. Most other types of data are very heterogeneous with respect to data origin and quality.

Second, household travel data is the only data that can provide the backbone of information for understanding and modeling individual travel activity. Other sources of information such as cross border counts etc. provide data on particular facets of travel activity. Such data can be used to validate models but hardly to develop a conceptual model of travel and tourism activities.

Definitions of Long Distance Travel

In a broad range of contexts, tourism is defined as journeys with overnight stays (EU 1995). This definition is unambiguous and very useful for many applications. However, in the context of transportation planning, the load on the infrastructure is the key issue. Here, trips and traveled mileage and their spatial, temporal and modal distribution stand in the focus of the data needs. Evidently, a large share of travel demand is not long distance travel or tourism (FIGURE 1) but everyday travel. Nevertheless, because of its large and increasing share of mileage, there is rising interest by transportation planners in long distance travel. Reflecting the perspective of transportation planning, here long distance travel is usually defined by a distance threshold, e.g. 100 km crow-fly (Kuhnimhof et al. 2007).

OVERVIEW OVER EXISTING SURVEY INSTRUMENTS

Many countries including large parts of Europe have been conducting household travel surveys on the national level for several decades (hereafter: National Travel Surveys, NTS). Usually, the national departments of transportation are the key players in initiating, administrating and funding these surveys with the objective of obtaining data needed for transport policy and planning (Kunert 2002). Some NTS have been supplemented by specific components with focus on long distance travel.

Moreover, household surveys tailored for the needs of the tourism sector are being conducted in Europe. This includes surveys by the private industry (e.g. world tourism monitor, IPK 2009). In addition, surveys on the touristic demand are carried out in compliance with the EU directive on the collection of statistical information in the field of tourism from 1995 (hereafter: EU Tourism Surveys) (EU 1995). Usually, the national statistical office is in charge of conducting or coordinating these surveys and transmitting aggregate results to Eurostat.

In addition to these established instruments for surveying travel, innovative surveys have been developed and conducted on the national or the European level. These surveys – INVERMO, KITE, and DATELINE - have a focus on supplying data for transportation planning and have been sponsored by national stakeholders (INVERMO) or the European commission (KITE, DATELINE).

Regarding methodology, these existing surveys in Europe with information on long distance travel demand can be categorized in three groups:

- Mobility diary surveys
- Single-protocol long distance travel surveys (established survey concepts)
- Multi-protocol long distance travel surveys (innovative survey concepts)

The proposed categorization of long distance travel surveys is coarse and does not imply that surveys that fall into the same category use exactly identical approaches. The categorization assists in obtaining an overview over methodology and the general strengths and weaknesses of the different approaches. Specifically, this categorization helps in understanding the differences in outcome by the different surveys.

In the following, these different approaches will be discussed in detail. TABLE 1 lists selected European household travel surveys that the analysis presented in this paper is based upon.

TABLE 1 Analyzed household travel surveys with information on long distance travel (DTF 2008, Chlond et al. 2006, Kunert et al. 2003, MOP 2009, BFS & ARE 2007, Sika 2009, UK Data Archive 2007, Frei et al. 2010, French NTS 2007)

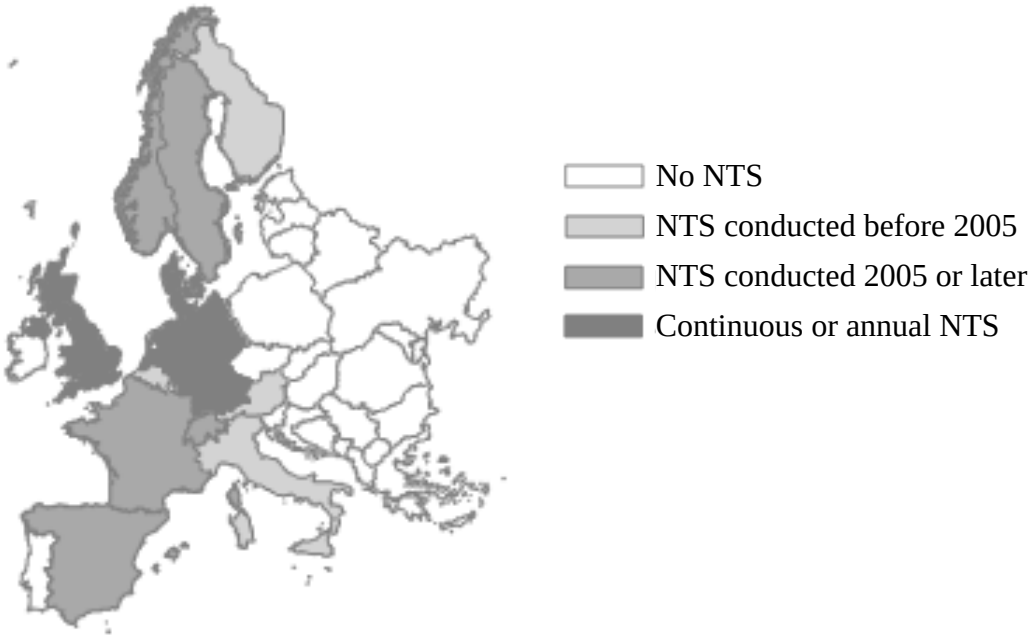
Survey	Spatial Coverage	Survey Year	Survey approach with information on long distance travel			Long distance Travel Definition	Long distance Travel Reporting Period
			Mobility Diary	Single-Protocol	Multi-Protocol		
TU	Denmark	06	✓			-	-
French NTS	France	93/94	✓	✓		>80 km crow-fly	12 weeks
INVERMO	Germany	99-02			✓	>100 km network	8 weeks
MiD	Germany	02	✓	✓		Overnight stay	12 weeks
MOP 2006	Germany	06	✓			-	-
Micro Census	Switzerland	05	✓	✓		Excursions > 3 h overnight stay	2 weeks 8 weeks
RES	Sweden	05/06	✓	✓		>100 km network >300 km network	4weeks 8weeks
UK NTS	Great Britain	05	✓	✓		>50 miles	4 weeks
DATELINE	EU 15 + CH	01/02			✓	>100 km crow-fly	12 months (holiday journeys) 3 months (other journeys)
KITE	Switzerland, Czech Republic, Portugal	08/09			✓	>75 km crow-fly	8 weeks

Mobility diary surveys

The core of a conventional trip or activity diary survey with focus on everyday travel revolves around the question: "What did you do yesterday?" With variations to this concept, e.g. reporting periods of multiple days, this survey format has quasi developed to an international standard for surveying everyday travel. FIGURE 2 shows that up-to-date NTS surveys are available for most of Western Europe.

Even though mobility diary surveys are not originally designed to capture long distance journeys, long distance travel is also covered by diary surveys because long distance travel also takes place on an average day. Moreover, as the discussion below illustrates, mobility diary surveys perform specifically well in capturing some segments of long distance travel.

FIGURE 2: Availability and timeliness of NTS mobility diary survey in Europe



Single-protocol long distance travel surveys

Established long distance travel or tourism surveys generally revolve around the question: "Tell me about your long distance travel in the last couple of weeks". Hence, these surveys focus on long distance travel and cover a longer period of time. Existing survey components following this format vary considerably with respect to the definition of long distance travel and the reporting period (TABLE 1). Single-protocol surveys differ from multi-protocol surveys in that there is a single type of questionnaire for all respondents ("one-size-fits-all"). In most single-protocol travel surveys this questionnaire is purely retrospective and presented to the respondents at the end of the reporting period.

Most tourisms surveys follow this concept as well. In their case, however, the definition of long distance travel or tourism respectively is not defined by a distance threshold but by overnight stays. This has some important implications which we will discuss below.

Multi-protocol long distance travel surveys

Different innovative approaches aiming at a higher quality of representation of long distance travel in all distance segments have been tested and applied in the recent years. Successful survey formats have in common that they use multiple sources of information in order to obtain a picture of long distance travel activity. The following arrangements have specifically proven of value:

Multi-stage survey approaches: A screening is conducted in the beginning in order to assign respondents into groups according to their long distance mobility. In the subsequent stages of the survey, details of travel behavior and journeys are captured with questionnaires that are

tailored to the specific situation of the traveler, e.g. long distance commuters. In addition, a stratification of the sample for the subsequent survey stages is possible.

Information on the most recent long distance journey: The share of travelers who do not report any long distance journey during the reporting period influences the outcome of the survey significantly. Specifically in the case of these travelers it is useful to ask for the last long distance journey they have undertaken.

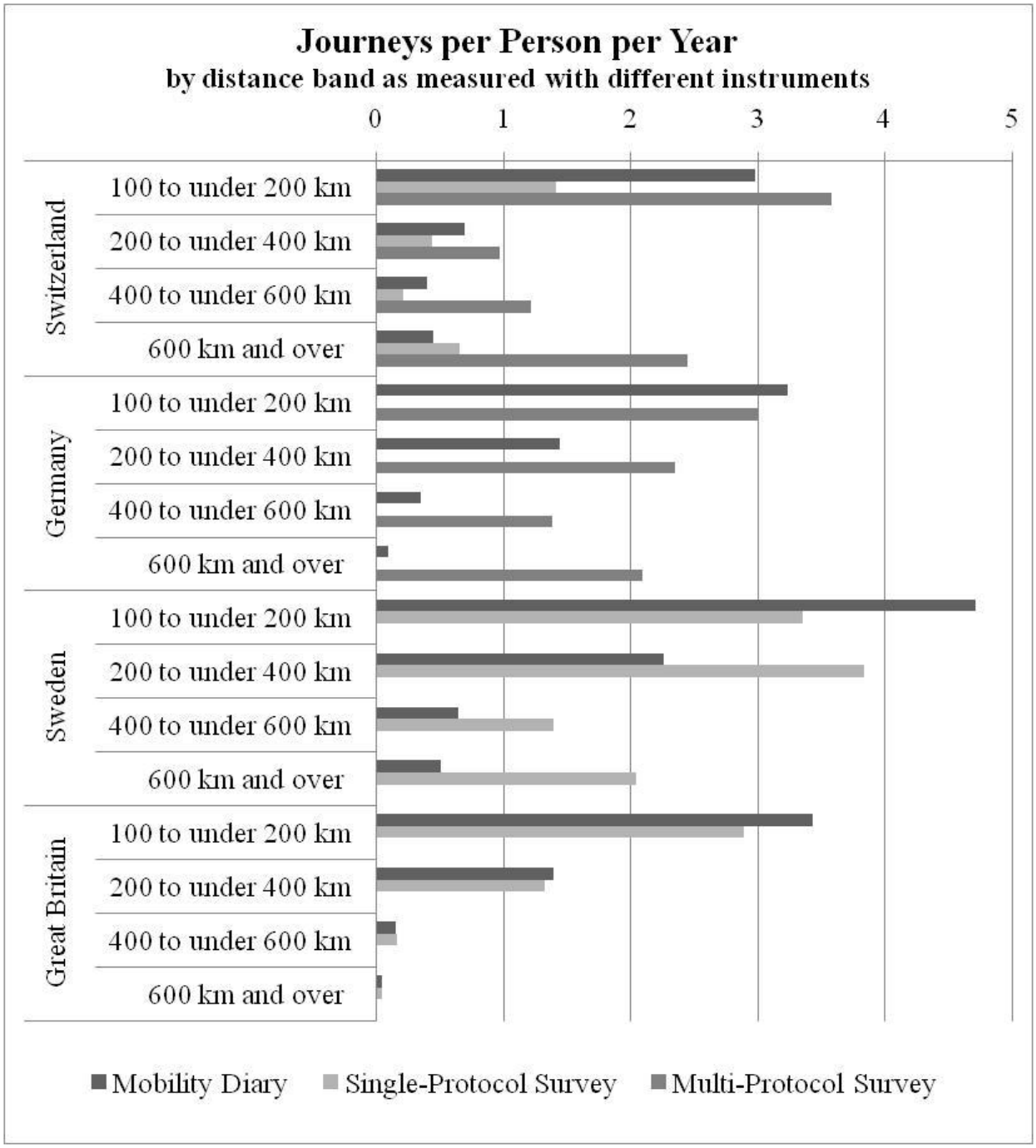
These arrangements have been successfully applied in the INVERMO survey in Germany (Chlond et al. 2006) and the KITE survey in Portugal, Switzerland, and the Czech Republic (Frei et al. 2010).

DISCUSSION OF SURVEY AND EXISTING DATA PROPERTIES

In the following we discuss relevant strengths and weaknesses of the different types of surveys as presented above and of the existing data situation in Europe. This discussion does not exclusively focus on the technical properties of the surveys. Instead we will also assess the existing situation in Europe regarding data availability and timeliness of surveys data.

FIGURE 3 presents long distance travel demand figures as measured with different instruments for selected European countries. The figure illustrates that there are considerable differences between the survey instruments which are likely to be caused by the survey methodology and not other reasons (e.g. year of the survey). It is likely that in each case the higher figures are closer to reality and do therefore represent a benchmark. This is because it is probable that item-non-response impacts more strongly on survey outcome than the effect of a selective sample of very active travelers. Segmentation by distance band has been chosen because this helps to illustrate the specific deficiencies of the different approaches which will be discussed in detail as the surveys are presented.

FIGURE 3: Long distance travel demand by distance band as measured with instruments in different European countries



Long distance journey sample sizes

Only a small share of all trips is long distance: Approximately one out of 100 trips is over 100 km. With 3.5 trips per person and day this results in roughly one long distance traveler out of 30 respondents in a 24h mobility diary survey. This illustrates that - if reporting periods are short as in mobility diary surveys - large traveler sample sizes are necessary in order to cover a number of long distance trips sufficient for sound statistical analysis. NTS mobility diary

surveys usually feature large sample sizes. In some cases (German MOP, British NTS) trip sample sizes are increased because the diaries cover multiple days. However, for multidimensional analyses or when analyzing geo-information such as destinations, the sample sizes of mobility diary surveys are usually not sufficient.

With longer reporting periods and a focus on long distance journeys both types of dedicated long distance travel surveys - single protocol as well as multi-protocol - manage to capture a large number of observations with reasonable respondent burden. Moreover, these surveys are tailored to the question of long distance travel. Hence, the sample sizes are usually adjusted to the problem in focus and there are sufficient observations for sound statistical analysis.

Bias and recall error

In addition to providing sufficient sample sizes, a fundamental objective of surveys is providing an adequate representation of the surveyed objects. That is, the data should not be biased, e.g. by selective item non-response. In mobility surveys, the recall error is the most relevant source for selective non-response. The travel demand figures produced by different types of surveys in different distance bands (FIGURE 3) allow for insight into the selectivity of the different surveys:

Compared to single protocol long distance travel surveys, mobility diaries produce relatively high figures for travel demand in the 100 to 200 km distance band. The following explanation is likely: Regarding long distance travel, the recall error is unlikely to be an issue in mobility diaries. Respondents do not forget a long distance trip if they have conducted such a trip the day before.

On the contrary, single-protocol surveys have the tendency to produce relatively low figures of travel demand. This applies specifically to journeys in the 100 to under 200 km distance band (FIGURE 3) and to journeys without overnight stays (Kuhnimhof et al. 2009). A probable explanation for this is that respondents are likely to forget such hard to remember long distance travel activities, especially if reporting periods are long and the activity has taken place weeks ago. The British NTS undertakes the biggest effort in capturing long distance travel, with three face to face interviews conducted throughout the survey. Moreover, it features a relatively short reporting period of four weeks. This minimizes selective recall on the one hand and attrition on the other. As a result, this single-protocol-survey performs best among its counterparts.

It can be concluded, that most single-protocol surveys seem to be an inadequate tool in order to obtain a representative image of less prominent long distance travel activities such as excursions without overnight stay. Mobility diaries on the other hand are a reliable instrument for measuring travel demand in this segment of long distance travel.

However, if long distance travel exceeds a certain distance range it is often associated with overnight stays. This in turn is a problem for surveys that cover only one or few reporting days. As consequence, mobility diary surveys tend to produce low figures for travel demand in distance bands beyond 400 km (FIGURE 3) because they are an inadequate instrument to survey such travel.

Multi-protocol long distance travel surveys have been developed with the objective to overcome these shortcomings of the established instruments for surveying long distance travel. Indeed, FIGURE 3 illustrates that the KITE and INVERMO surveys are likely to produce the most realistic figures on long distance travel demand throughout the entire distance spectrum of long distance travel.

Frequent traveler identification

Specifically in the field of long distance travel, travel demand by different travelers is very heterogeneous: Only 10% of travelers account for 50% of all long distance travel (Manz 2005). Such information can only be analyzed if the survey covers a sufficient reporting period for the individual traveler. This is the case with single- and multi-protocol long distance travel surveys which enable categorization of the population by travel activity. Since mobility diaries, on the other hand, cover only one or few days it is largely random if a single traveler exhibits long distance travel activities during the reporting period. Frequent travelers can not be identified with such data.

Flexibility and cost efficiency of survey instruments

Single-protocol long distance surveys that don't require multiple contacts with potential respondents and use the same survey-protocol in every case are comparably cost efficient and flexible in that they can be conducted as stand-alone surveys as well as part of other surveys (e.g. NTS mobility diary surveys, see TABLE 1).

Multi-stage approaches on the other hand entail some complexity regarding the survey set-up, e.g. the necessity to conduct a screening interview and subsequent stratification of the sample. These set-up and respondent burden considerations make it difficult to accommodate a multi-protocol long distance survey as part of an NTS survey in addition to the inevitable mobility diary. Moreover, the case of DATELINE, a European long distance travel survey project using some of these innovative elements illustrates that such a survey format is very sensitive. Shortcomings in single elements of the survey and possibly inadequate reflection of the cross-cultural context in an international survey have contributed to the failure of DATELINE (Hautzinger et al. 2004).

Data comparability

As presented above, mobility diary surveys are quite comparable throughout Europe. As a consequence, the outcome of these surveys – specifically with regard to long distance travel where the recall error is negligible – is rather comparable as well.

On the contrary, long distance travel surveys throughout Europe use different definitions and different reporting periods (TABLE 1). Moreover, methodologies differ (e.g. Face-to-face, CATI, postal). All of these characteristics are likely to impact on the recall effect and selective item non-response as the case of the British NTS illustrates. As a result, the outcome of these surveys is not comparable. This specifically applies to figures on journeys in the low distance segment (Kuhnimhof et al. 2009).

Data usability

Mobility diaries provide multipurpose data that does not generally exclude specific segments of travel, i.e. specific modes or distance segments (data set with all trips during the reporting period). This allows for flexibility and manifold data usages. However, since most travel is everyday travel, this specifically applies for urban transport planning.

The case of single-protocol long distance travel surveys is similar: As a result of the "one-size-fits-all"-approach the resulting data base of such surveys is easy to understand and easy to analyze for researchers and practitioners (data set with long distance journeys during the reporting period). Usually, only relatively straightforward and state-of-the-practice approaches of weighting are used to counterbalance socio-economic biases on the person or household level.

Multi-protocol surveys on the contrary lead to data which is far more complex: The multistage approach (possibly combined with stratification) and the multiple sources of information on travel frequency (number of journeys during reporting period and information on last journey) cause additional effort when analyzing the data set. Analysis may require a complex weighting scheme and / or the use of a hazard model or alike in order to produce representative figures on travel demand (Manz 2005, Frei et al. 2010).

Data availability and timeliness

The fact that mobility diary data is good for multipurpose use by transportation planners has incited many countries to keep NTS data bases up-to-date (FIGURE 2). Some countries have institutionalized administrative procedures for conducting NTS mobility diary surveys on a regular basis. Likewise, up-to-date data on touristic demand is being surveyed on a regular basis as consequence of the corresponding EU directive. Most countries apply a single protocol long distance survey for this purpose. Some of these surveys are connected to the national NTS surveys.

Multi-protocol long distance travel surveys on the other hand have been conducted successfully on a large scale only in Germany in 1999-2002 and in the experimental cross-cultural KITE survey in Switzerland, Portugal and the Czech Republic. This data availability is hence currently not sufficient to generate an up-to-date international picture of travel activity based on this survey type.

TABLE 2 Strengths and weaknesses of existing survey instruments and currently available data by these survey types

	Mobility Diary	Single-Protocol	Multi-Protocol
Survey Properties			
Efficient sampling of long distance journeys	-	+	+
Adequate representation of short long distance journeys	+	-	+
Adequate representation of long long distance journeys	-	+	+
Frequent traveler identification	-	+	+
Flexibility and cost efficiency	+	+	-
Data usability	+	+	-
Existing data properties			
International data comparability	+	-	-
Data availability and timeliness	+	+	-

PERSPECTIVES FOR BETTER STATISTICS ON LONG DISTANCE TRAVEL IN EUROPE

Bridging data availability and usability gaps by modeling

Travel surveys supply data that can be utilized for building models of travel demand. Manz (2005) has pioneered in the field of long distance travel modeling. He used data from the German INVERMO survey to create a longitudinal, full scale representative model for long distance travel in Germany which has been used in several applications.

It is possible to feed such models with data originating from different sources, e.g. with data from NTS surveys as well as with data from tourism surveys. With such an approach it is possible to overcome the deficiencies of a single data source, which does not adequately cover the entire spectrum of travel. With an appropriate combination of input data the model will reproduce a representative image of travel activity even if the single input data source does not.

In this context, an agent based modeling approach is most useful. This is, because agent based models produce a protocol of travel activity for each agent. Such an output data set can be analyzed with maximum flexibility for multiple purposes such as OD-matrices or user group analyses.

Moreover, such a modeling approach could help to overcome usability problems of multi-protocol surveys: While the original survey outcome is difficult to analyze and to interpret because of the multiple sources of information used in the survey, agent based modeling approaches can be used to produce synthetic, standardized lists of journeys that are easy to analyze.

Synergistic combinations of established survey instruments

Aside from making use of modeling approaches it is also possible to directly combine existing survey instruments in order to obtain a more comprehensive image of travel activity: The NTS surveys providing a representative image on everyday travel and excursions on the one hand and the EU tourism surveys providing information on journeys with overnight stays on the other. The resulting databases of these surveys can be joined using appropriate data fusion techniques to obtain a comprehensive image of travel overall.

However, the variables captured in the specific surveys might currently not be sufficient to serve the needs of the different data users. For example, the EU tourism survey does not contain sufficient information on mode use for transportation planners. These deficiencies could be overcome if surveying efforts were coordinated and the different surveys were supplemented with variables serving the needs of additional data users.

If EU tourism surveys are extended to also cover excursions without overnight stays it can be inferred from the experiences with other survey that such excursions will be not adequately be represented. In this case, detailed comparisons with NTS surveys can help to identify the type of surveys that are underrepresented and quantify this selective recall error. Appropriate weighting procedures can then be developed to correct this bias.

However, even without amending the actual content of the different surveys, significant improvements of the statistical representation of the entire spectrum of long distance travel in Europe is possible: With the survey instruments currently available it should be possible to create a general data skeleton on long distance travel covering excursions as well as tourism. Such a data skeleton would not include every desired variable but basic demand figures and probably even OD-matrices on a coarse geographical level.

CONCLUSIONS

There are established survey instruments that deliver representative images of different segments of long distance travel. In addition, this paper illustrated that multi-protocol survey techniques have been developed which manage to capture reliably the entire spectrum of long distance travel. Nevertheless, there are currently significant data gaps with respect to comprehensive statistical representation of long distance travel in Europe. However, there is increasing demand for data on the entire bandwidth of travel from transportation planners as well as from the tourism sector.

It would be desirable to establish multi-protocol long distance travel surveys on the European level in order to obtain a better image of long distance travel. However, the paper also presented that a lot could be achieved by using the different possibilities of combining

existing data sources: Synergies with benefits for both sides would arise if transportation and tourism joined forces and combined their existing instruments, i.e. National Travel Surveys and EU Tourism Surveys. Data fusion or modeling methods appear to be appropriate methodologies for achieving this.

The obstacles for such a data combination appear to be less of a principal technical or methodological nature. Instead, administrational barriers have to be overcome regarding the availability of micro data which will be necessary for the different techniques of combining the information. Hence, the envisioned beneficial combination of these instruments primarily renders necessary an effort of coordination and data compilation on the European level. Current developments, such as approaches for harmonization of European NTS surveys in the COST-action SHANTI open a good window of opportunity for such efforts in the next years.

REFERENCES

BFS (Bundesamt für Statistik BFS) and ARE (Bundesamt für Raumentwicklung) (2007). Mobilität in der Schweiz - Ergebnisse des Mikrozensus 2005 zum Verkehrsverhalten. Neuchatel.

Chlond, B., J. Last, W. Manz, and D. Zumkeller (2006). Long Distance Travel in a Longitudinal Perspective - the INVERMO Approach in Germany. Paper presented at the 85th Annual Meeting of the Transportation Research Board. Washington, January 2006.

DTF (Dansk Transport Forskning) (2008). Website of Dansk Transport Forskning. http://dtf.dk. Accessed 31.07.2008.

EU (THE COUNCIL OF THE EUROPEAN UNION) (1995). Council Directive 95/57/EC of 23 November 1995 on the collection of statistical information in the field of tourism. http://epp.eurostat.ec.europa.eu .

Frei, A., T. Kuhnimhof, and K.W. Axhausen (2010). Long distance travel in Europe today: Experiences with a new survey. Paper to be presented at the Transportation Research Board 89th Annual Meeting. Washington, January 2010.

French NTS (2007). Website of the French National Travel Survey. http://www.cmh.acsdm2.ens.fr/enquetes/XML/lil-0081.xml . Accessed 19.10.2009.

Hautzinger, H., J. Schmidt, and W. Stock (2004). Evaluierung der nationalen Fernverkehrserhebung im Rahmen der europaweiten Erhebung zum Fernverkehr (DATELINE). FE 96.0802/2004. Mannheim, Heilbronn.

ILS (Institut für Landes- und Stadtentwicklungsforschung und Bauwesen des Landes Nordrhein-Westfalen) (2004). Towards Passenger Intermodality in the EU. Final Report. Funded by the European Commission in the 5th Framework Programme.

IPK International (2009). Weltweite Reisetrends 2008. Pressemitteilung. http://www.ipkinternational.com/uploads/media/ITB_Pressemitteilung_IPK_09.pdf. Accessed 19.10.2009.

ISCTSC (2008). Report of the Workshop B8 "Surveys of Tourists and Transients in Urban Areas" at the International Conference on Travel Survey Methods, Annecy, France, May 25-31, 2008. www.isctsc.let.fr/2008Conf/workshops.html#B8.

Kuhnimhof, T., C. Schlosser, M. Wirtz, and J. Last (2007). Central Issues in Passenger Intermodality. Deliverable D1 of the KITE-Project, funded by the European Commission in the 6th Framework Programme.

Kuhnimhof, T., R. Collet, J. Armoogum, and J.-L. Madre (2009). Generating Internationally Comparable Figures on Long Distance Travel for Europe. Paper presented at the 88th Annual Meeting of the Transportation Research Board. Washington, January 2009.

Kunert, U., J. Kloas, and H. Kuhfeld (2002). Design characteristics of National Travel Surveys, an international comparison for ten countries. Paper presented at the Transportation Research Board 81th Annual Meeting. Washington, January 2002.

Kunert, U., J. Kloas, H. Kuhfeld, R. Follmer, K. Engelhardt, R. Gilberg, and M. Smid (2003). Mobilität in Deutschland- KONTIV 2002. Kontinuierliche Erhebung zum Verkehrsverhalten, Projektbericht. FE 70.0681/2001. Berlin, Deutsches Institut für Wirtschaftsforschung.

Madre, J.-L., T. Kuhnimhof, and J. Armoogum (2007). Existence and Comparability of Data Sources, Deliverable D3 of the KITE-Project, funded by the European Commission in the 6th Framework Programme.

Manz, W. (2005). Mikroskopische längsschnittorientierte Abbildung des Personenfernverkehrs. Heft 62/05. Karlsruhe, Institut für Verkehrswesen, Universität Karlsruhe.

MOP (Deutsches Mobilitätspanel) (2009). Homepage of the German Mobility Panel. http://mobilitaetspanel.ifv.uni-karlsruhe.de/ . Accessed 19.10.2009.

Sika (2009). Website of the SIKA Institute. http://www.sika-institute.se. Accessed 19.10.2009.

UK Data Archive (2007). Home Page of the UK Data Archive. http://www.data-archive.ac.uk/ . Accessed 19.10.2009.

UNWTO (2007). International Recommendations for Tourism Statistics 2008. Madrid, New York.