


Lessons from an overview of national transport surveys, from working group 3 of COST 355

Changing behavior toward a more sustainable transport system

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SYNTHESIS OF THE WORKING GROUP EUROPEAN TRANSPORT SURVEYS OF THE EUROPEAN ACTION “CHANGING BEHAVIOR TOWARDS A MORE SUSTAINABLE TRANSPORT SYSTEM”

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ABSTRACT

This chapter summarizes some of the results from the Working Group "National Travel Surveys" in COST Action 355, but all the 50 presentations could not be taken into account. Thus, we focus on three crucial topics :

- the periodicity of data collection, but also its longitudinal aspects (advantages of continuous surveying, repeated cross-sections versus panel surveys, etc.),
- new technologies for improving the efficiency and accuracy of mobility surveys (computer assisted phone, web,... interviews ; GPS, GSM, RDS, etc.),
- innovative approaches, with the examples of qualitative surveys combined with conventional quantitative ones, and of Biographical approaches.

Keywords: Continuous survey, Panel Survey, New technologies GPS, WEB

1. INTRODUCTION

Changes in behavior are necessary to reverse worrying long-term trends of growing mobility, with increasing oil consumption and Greenhouse gases (GHG) emissions. Most data on mobility are collected through conventional instruments. The analysis of changes in behavior presupposes the comparability of these instruments over time, but also between countries and urban areas across Europe. Travel survey data are needed, both to portray the existing situations and to help identifying problems related to the operation of transport systems, and to estimate/validate the

models, which are quintessential for planning activities. In fact, the most typical (and more difficult) need is for data to allow calibrating the strategic transport-planning models used to forecast the effect of medium to long-term policies for project evaluation and environmental assessment.

A first issue is whether these surveys are conducted from time to time (generally with increasing time intervals) or on a continuous basis (e.g. in the U.K., the Netherlands or Denmark). New technologies may have a large potential to improve their quality. Since all data needed for a comprehensive analysis of changes in behavior cannot be collected in the same survey, pairing different data sources (e.g. trip based surveys with time use or family expenditure surveys) is an important issue.

We will focus our attention in this synthesis mainly on 3 topics:

- The periodicity of mobility surveys (section 2), for the description and analysis of trends, as well as of changes in behavior, conventional travel surveys (only one week day in winter out of school holiday periods, i.e. when traffic flows are maximal) are not enough: for environmental issues, mobility has to be described for the whole year;
- The use of new technologies may decrease the survey cost and have also a positive impact on data quality, for example Web based surveys (section 3.1) might help to contact persons difficult to reach by conventional modes, with automated coding and editing of data, and new devices like mobile phone (GSM), GPS and Galileo (section 3.2) may help at improving the accuracy of the timing information (departure, arrival, trip duration) and of the locations (origin, destination, trip distance and route choice);
- Innovative methods, such as qualitative approaches (section 4.1) or biographies (section 4.2) may help improve data quality and suggest original quantitative analyses of mobility surveys.

2. PERIODICITY OF MOBILITY SURVEYS

In most countries and urban areas, personal travel surveys, are conducted infrequently (e.g. every decade) and using evolving methodologies which often make the comparison difficult between subsequent surveys for the assessment of trends (e.g. when the American NPTS shifted from a trip-based to an activity-based approach (Stopher, 1992)). These one-off surveys are subject to unpredictable events (e.g. strikes or extreme weather conditions) and do not allow a clear distinction between long-term trends and short-term events (economic boom or recession).

Although there are many advantages associated to collecting mobility data on a continuous basis, managing to do so in practice is not easy. We have considered advantages and drawbacks of the respective methodologies with respect to survey administration (e.g. training and fatigue of interviewers). Budgetary implications are also an important consideration in deciding to move to a continuous survey. Indeed, it seems easier to obtain funds when up and running (each year almost the same budget), than for one "big bang" survey. With a periodic survey there is an uneven requirement for funds, so large amounts have to be found at the time of the survey. If the political climate is not conducive to providing this funding, the survey could be delayed or not undertaken at all. It is acknowledged that a withdrawal of funding could occur at any time during a continuous survey, however it is anticipated that if the survey is progressing successfully and producing relevant results, its prospects of continued financing would be enhanced. It is also expected that there might be significant economies of scale from undertaking the survey on a continuous basis. Even more importantly, there will be gains from the continuous learning, which allows to improve the survey nearly continuously.

Sampling issue is also an important question:

- Either a new sample each year (section 2.1), but drawn with a strong geographical (e.g. in the same post-code sector in Great Britain or the same block in Sydney or New Zealand) and temporal specification (a pre-allocated day is essential, contrary to what is done in France, or
- A true panel survey (section 2.2), which allows measuring changes at an individual level if the reporting period each year is long enough (seven days are better than two days); the drawbacks from selection bias and attrition are lower with a rotating panel (e.g. each household withdrawn after a small number of years).

2.1 Subsequent Cross-sections (a new sample each year)

Most of ongoing continuous mobility surveys data are conducted in Europe or in the southern hemisphere but very few of them are at national level (Great Britain, Denmark, The Netherlands and New Zealand). Indeed there are a large number of regional level surveys (Melbourne, Sydney, Perth, Santiago, Halle, Leipzig, Nürnberg, Burgenland / Niederösterreich, Wien and Wiesbaden) probably because it is easier for a region to fund a survey when the budget is spread over many years than for a country. Regional continuous surveys have to be conducted in wide enough areas to enable analysis of urban sprawl, which is a major determinant of changes in travel behavior.

The specificity due to unpredictable events can be checked by comparing it with other periods. Surveying across the year allows controlling for seasonal effects (e.g. long distance trips for

holidays, bicycle use, walking, etc.). Moreover, subsequent years can be aggregated for the analysis of sub-groups (e.g. regions). A critical deficiency of discontinuous surveys is that there is an unavoidable loss of staff and knowledge in the inter-survey period which has to be re-established for the next survey. This applies to both project management staff in the government organization conducting the survey, and staff in the market research organization conducting the fieldwork. According to British experience, the team has to remain the same at the sponsor level, especially if the field organization changes after a new tender, and it is worth to highlight a recommendation from Sweden to avoid loss of motivation once the contract is obtained. However in Denmark, the main reason for the substantial increase in the zero trip rate can only be related to interviewer performance: an increasing number of interviews was conducted by a small number of interviewers with much higher zero trip rates than the rest (Christensen, 2005).

2.2 Panel surveys

Their main advantage is, that they allow the measurement of effects of any changes in external factors for individuals and households (Stopher et al. 2006; Stopher and Swann, 2008). In contrast, the repetition of cross sections only allows the comparison of aggregate values or marginal distributions (net-changes). The gross changes are caught within the transition matrix and using the temporal and intrapersonal aspects. Thus the building of models about the dynamics of change is more promising with panel data. There are also some drawbacks:

- Panel conditioning: people are adapting their behavior to the topic of the survey; that is a problem, when attitudes or opinions are asked; it can be assumed that this is not critical for surveys about transport behavior and activities;
- Attrition, mortality and fatigue effects: for panel surveys it is primary to have volunteers to respond for many waves, thus it is not easy to have a purely random sample;
- Selectivity phenomena: as a consequence of these biases it becomes likely that a multi-stage recruitment process and repetition within a panel certainly creates selectivity related to the characteristics of participating households;
- Refreshment of the sample: for a “running” panel can always be kept representative. It makes sense to replace the drop outs by new households (rotating panel). A simple replacement of drop-outs by households with the same (socio-economic or demographic) characteristics would be a solution, but it would be better to distinguish between “new units” (e.g. young individuals who have just left the household of their parents) and “rotating units” who replace drop-outs.

The selective impacts on data quality have been studied for the German Mobility Panel. The middle class is over-represented (good education, good income, middle aged); there is a mobility

interest bias: drop out of non-trippers (particularly elderly, with permanent disability). Considering the heterogeneity between its members, surveying households counter-balances selectivity. From a larger perspective, one can conclude that balanced recruitment of different mobility styles is vital. It is important not to trade data quality for a high response rate, especially in the case of a panel survey, where the quality of data is crucial for the measurement of changes.

2.3 Measurement of change and survey instruments

With regards to intrapersonal behavior variability and length of reporting period Axhausen et al. (2007) have shown with the 2003 Thurgau six-week diary the strong intrapersonal variance in choices, modes used and other aspects of travel behavior. These long duration surveys also allow us to gain an understanding of the activity space of the travelers. Still, the analysis showed that the four interviewers employed in this survey had a substantial effect on the number of reported trips. Stopher et al. (2008) have shown the benefits of using multiday data for modeling travel behavior.

It is obvious that the measurement of change is more accurate with a Panel (Zumkeller et al. 2006). But it seems difficult to measure exactly the same indicators with these two (cross-section and panel) different survey instruments in a large scale survey. In Panel survey we should take care of repetitive burdensome questions, for example in the Netherlands as well as in the German urban areas where the New Kontiv design is used, it consists in:

- Asking respondent as little as possible (e.g. pre-coded items + an open answer);
- Letting respondent to choose the survey instrument (face-to-face, phone or preferably mail back), and thus obtain a lower non-response rate for households only accessible by mail;
- Proposing optional follow-up surveys to obtain additional data for specific subgroups (e.g. disabled people, children under six) or research topics (e.g. public transport, road accidents);
- Decentralizing the organization: everybody involved in the interview process has to know as much as possible about the survey.

The German statistical system for measuring mobility seems to be the most complete with: a cross section survey every 6 to 13 years, an ongoing panel survey including regional add-on surveys measuring local mobility (Kuhnimhof, 2007) and the INVERMO a long distance panel survey (Last, 2005).

A sample scheme chronologically and geographically balanced (even if not a panel) can improve the accuracy of time-series. It is important to choose a survey design giving a high and non-decreasing response rate (e.g. the New Kontiv) and a permanent and motivated staff is essential. In

the future, new technologies (e.g. follow-up by GPS or GALILEO) could help surveying for longer periods, providing more accurate data on the spatial and temporal framework of mobility, with a relative low burden for interviewees.

3. USE OF NEW TECHNOLOGIES TO GATHER MOBILITY

New technologies such as automatic satellite localization and mobile phone may improve the accuracy of the temporal detail (departure and arrival times, trip duration,...) and of the geographical detail (location of activities, origin and destination, trip distance, itinerary...) of each trip. In addition, computer assisted interview systems allow the detection of errors during the interview. Geo-coding encounters problems, on which there are experiences to share. Beside these improvements, the utilization of new technologies may reduce respondent burden and the survey cost which should have a mayor impact on data accuracy and quality.

3.1 Web based surveys

The development of web-surveys in many domains is very fast. It is therefore important to analyze if web-based surveys could be helpful for collecting travel data.

There are some obvious advantages to collect data using a Computer Assisted Web Interview (CAWI), such as:

- Interactivity, this advantage is shared by all computer-assisted survey. Web-based surveys allow real-time entry of data which improves the data consistency and quality;
- Availability of the interviewees for responding when they have time for this task;
- Able to reach individuals who do not respond to other survey modes.
- People who travel the most are often more difficult to contact by administered surveys, in particular because they are less often at home. Web-based surveys, like postal surveys, allow respondents to respond when they wish to.

Thus, the cost of this type of survey is low, because there is no need to have interviewers, no need to enter data. There are also some drawbacks:

- no sampling data base is an exhaustive list of the whole population;
- More so than for other self-administered survey the response rates are low;
- Measurement errors may cause serious bias as definitions of mobility concepts are not so trivial;

- Technical problem such as unavailability of the server, browser incompatibilities (presentation of the survey on the screen), excessively long data loading times (high speed/low speed internet), ...

The use of the Web for transport surveys is likely to increase, in the same way as its use by the population. In view of the problems of coverage and Internet skills, its application as a single survey instrument is for the time being mainly restricted to the study of specific populations for which the construction of the sample can be controlled. Its use as a survey mode in combination with others is very promising in view of the steady rise in non-responses for other survey modes in many countries. To reduce the bias from non-response Bayart & al. (2008) have tested a web-based survey in parallel with a household travel survey in the Lyon area. The idea is to propose a web survey to those households who refuse to respond through conventional instruments or are not reachable after a certain number of attempts. The two main objectives of this research are to test the feasibility of a web survey for non-respondents and compare mobility results of both survey modes.

The importance of the Web for marketing surveys is increasing considerably and seems particularly suitable for SP surveys involving controlled samples. Even in countries where access to the Internet remains quite limited, the Web appears to be quite useful for surveying a targeted population in the context of SP surveys (Hojman et al., 2004). The authors give the example of two Web-based surveys conducted in Chile to determine willingness-to-pay to reduce accident risks which have given results very consistent with those from other studies. However, beyond these applications, it is necessary to specify the domains and conditions, in which Web-based surveys are applicable, both when it is the only survey mode used and when it is combined with other media.

3.2 GPS based survey

Data accuracy is a combination of sampling errors and non-sampling errors. Therefore it is not obvious how to compute confidence intervals due to the non-sampling errors such as non response errors and measurement errors. Because respondents are often not able to describe exhaustively their travel behavior and have a vague or even biased perception of main characteristics of their trips (for instance the distance traveled). Interviewees are generally unable to describe their mobility with the accuracy suggested in the questionnaire (e.g. in the 1993-94 NTS, 1 min for departure and arrival time, 1 km for car annual mileage and daily mobility, even 100 m for trips under 2 km). For most analysis we do not need so much accuracy, but we have to be aware that

rounding modifies variables' distributions. Summarising the main findings obtained by comparing different instruments used in previous NTSs, it appears that:

- Time variables are less rounded when reported in diaries than when collected by interview;
- Fortunately, memory effects affect time (of departure or arrival) more than duration, which needs to be known more accurately especially for modeling;
- The deterioration due to memory obviously increases when the facts reported have occurred a long time before the interview (during the last weekend or three months ago);
- The car-diary is more accurate than the other methods, probably because of the clock which is displayed on most car dashboards.

The measurement of trip distances is also an important issue. Controlled by the odometer, trip distance is well estimated through car diaries. If we compare trips by class of crow-flight distance between origin and destination, we notice a substantial underestimation of trip distance for trips with their origin and destination in the same municipality (about 25%); this underestimation is also observed for travel time, but it is less important. For longer trips (between municipalities within 15 km) the underestimation has dropped from 10% in the weekly stage-diary of 1981-82 to 5% in the 1993-94 interviews. This improvement is probably due to the local maps which were given to interviewers. On the other hand, long distance trip length seems a little overestimated.

Indeed in the field of travel behavior, since the mid 1990s, attention has focused on the potential of location-aware systems such as GPS (Global Positioning Systems), RDS (triangulation on FM radio stations) or GSM (Global System for Mobile communications). RDS is interesting for freight transport or long distance travel, but does not provide accurate enough data for the analysis of daily mobility. Initially, the use of GPS was mostly limited to travel in private motor vehicles, because the power requirements of equipment in continuous use could easily be met with a connection to vehicle electrics, the problems of reception were minimized, and the linking of movement to ground features was simplified by staying on road networks. Nevertheless, even in the 1990s, some experiments took place to use GPS to survey personal mobility in all modes of transport and off road networks. These successful experiences in the US, in Canada, in Japan, in Australia or in Europe have been conducted on relatively small samples, generally at a local/regional level. Very positive technical improvements (smaller units, better precision, greater storage capacity, less power-hungry units) and decrease in prices allow its application to large scale surveys like National Travel Surveys. A first nationwide experience has been embedded in the 2007-2008 French National Travel Survey, which is an opportunity to compare measurement tools before a larger use of new technology, while keeping the ability to measure long term trends.

A GPS datalogger allows the measurement of some details that are never given by respondents in conventional surveys:

- Description of very short trips, which are often forgotten;
- Route choice;
- Precise information on access/egress time and waiting time;
- The description of short trips made from an unusual place of residence (e.g. during holidays or long professional trips).

Moreover, the relatively low burden for the respondent (once she/he is trained) allows substantially extended survey duration: at least one week with GPS, compared to two days with the conventional questionnaire. The gain in accuracy is less because of cluster effect (travel patterns are quite similar on weekdays for the same person), but the gain is still important (Stopher, Kockleman, Greaves and Clifford 2008).

We should point out, that there are some drawbacks such as:

- Energy supply (battery last only about 15-20 hours);
- Signal reception problems in tunnels or urban canyons;
- The interviewee may forget to take the GPS receiver with him (for some trips; some days ...);
or
- Loan the device to another person;
- The interviewee may want to “play” with the device and therefore we record more trips than it should be; but it may happen also in “conventional” surveys, especially in face to face interview, where the selected individuals want to appear socially well integrated and therefore may not describe what they think it is not acceptable and may invent some other records.

GPS is certainly a promising technology for surveying travel behavior, because it provides much more accurate spatial and temporal data than conventional methods. But raw data are not directly usable:

- Traces are not allocated to stage, trips etc yet;
- There are missing segments;
- There is information neither on transport means nor on trip purposes.

Thus, for post-processing these data, more or less sophisticated software packages have to be written depending on the accuracy needed by the users (e.g. much more spatial accuracy for the assessment of advertisement posters watching than for other users of travel survey results). In order to reduce the burden of interviewees, further research should focus on:

- Imputation of modes and transfer places from average speed and its variability, route, etc.;

- Imputation of purpose from destination location, arrival time, etc.; and
- On longer term, the question of missing data: automated reconstitution of continuous sequences in space as well as in time (omitted parts, technical problems).

The comparability with data collected in the other countries is also important. EUROSTAT harmonizes several surveys in most of Member States in Europe (e.g. on time use or family expenditure), but nothing seems to be planned for surveys on daily mobility. The generalization of GPS-based survey may introduce some data harmonization. But, In the near future it should be useful to have an assessment of such methods in term of feasibility at a large scale, the non-response due to GPS-based survey (see the chapter on “ *Non-response Challenges in GPS-Based Surveys*” and its discussion), and other sources of bias.

4. INNOVATIVE SURVEY APPROACH TO UNDERSTAND TRAVEL BEHAVIOUR

4.1 Qualitative approaches

The qualitative method has the advantage of being able to identify information that could not be captured through a closed-form questionnaire, from the speech and story of individual's perception and experience. This approach emphasizes the individual circumstances and highlights the complexity of the systems and of the actors, which is hardly observable by quantitative approaches. By highlighting the diversity of choices and trade-offs and the different systems of constraints related to it, this approach makes it possible to understand individual choice in greater detail. The main drawbacks of such techniques are that their samples are generally not representative of the population (the sample size is very low compared with more quantitative approaches) and that it is burdensome (an interview may last for hours).

Qualitative approaches have their strengths and weaknesses, as well as the quantitative approaches, we must try to exploit and maximize the benefits of both. In the case of a mixed methodology, sample size can be reduced because it has no ambition of representativity or completeness. Interpretation of results is made easier, while crossing qualitative and quantitative information.

If we have no a priori insights on the subject of study, it is clear that a qualitative phase is essential before drafting a quantitative survey. A return to qualitative approach after a quantitative phase could clarify the meaning of the results and explain them. Therefore, qualitative approaches can be used to complement the quantitative approach at different levels:

- When we have to produce the questionnaire for a quantitative survey, the qualitative approach should help to ask adequate questions and also to propose good choices for answers;
- When we are analyzing a quantitative survey, a qualitative approach should aim to enrich, and provide insight and meaning to the results;

However, it is difficult with the qualitative approach to generalize the results; we only can show a typology of behaviour. Complexity and diversity make it difficult to produce correlations: statements of individuals surveyed are complementing and contradicting each other at the same time. While the qualitative approach has a clear interest in terms of thorough understanding of the behaviour, it is not enough by itself to allow political decision-making. Indeed political action based on a few instances would certainly be doomed to failure without an aggregate representation. The qualitative studies offer essential insights to understand the behaviour, but quantification is necessary for policy makers.

4.2 Biographical approaches

Mobility trends over the long run have raised growing concerns about sustainability issues. The knowledge of mobility partly relies on household transport surveys. In France, such surveys have been conducted nationally four times since 1966, giving four cross-section points about the nation's travel behavior. But the derivation of change over time from comparing these four points lacks insight in two respects: the monitoring of individual change in behaviour, and the narrative of a history of mobility. For both of these aspects, biographic surveys can bring new data to the field (Papon & al 2007).

While historical sources describe the past of transport technology and the economic and social changes involved, asking people which mode they travelled in years as early as 1930 can record enough data from the persons' memories to enable the description of a history of mobility, with the following details:

- Studying the development of motorization, both two and four wheelers, from 1920 onwards by social category and geographical area;
- Re-constituting modal share and mileage since 1940 for home to work travel, and since 1930 for home to school travel, or from 1940 for all purpose, by using existing household travel surveys conducted in 1966-1974-1982-1994 to adjust the fitting of the results, and stratifying by type of place, occupation, age-gender, taking into account the structural turn-over of population: migrations, births and deaths (differential survival laws by categories);

- Focusing on the transition of mobility from walking to car use, that occurred in France during the 1950's (thus before any transport survey), especially its geographical, social and generational diffusion;
- Understanding the stakes of this evolution for sustainable development during the 21st century, inertias and possible reduction in car use for the future.

In France, this kind of survey has been conducted on other topics, such as "family, work and migration biography survey" by INED in 1981 (Riandey, 1985), "biographies and relatives" by INED in 2000-2001 (Lelièvre et al. 2002), or "history of life" by INSEE in 2003. Lelièvre (1999) supervised a review of 14 previous biographical surveys.

Transport biographical surveys have been conducted in the UK (Pooley and Turnbull, 2000) and Switzerland (Axhausen, 2006; Beige, 2008). For the 2007-2008 French National Travel Survey, a new biographical section has been introduced. The survey is based on a chronological grid, where all events are recorded concerning:

- the place of residence at municipality level,
- the number of motor vehicles (two- and four-wheelers) available in the household,
- the main activity (school or work) and place of activity (municipality),
- the usual transport mode for commuting, or overall if no commuting occurred.

The main expected outputs of these additions are the following:

- a better understanding of personal travel behaviour through the individual's personal history, making it possible to assess the likelihood of future changes, with far greater appropriateness than the usual cross-sectional elasticity estimates and
- a sketch of the general history of mobility in France from 1930's, with adjusted vehicle ownership, modal share and mileage for commuting.

5. CONCLUSIONS

The transport sector is one of the major sources of global warming, from individual travel behaviour (especially car dependency) and from freight delivery (mainly by trucks). Travel and freight surveys, as well as behavioural data collection, are essential to elaborate transportation policies that encourage more environment-friendly transport modes, and various data collection methodologies have been proposed in recent decades. Within the four years of this COST action about 50 papers have been presented.

We had many presentations of mobility surveys at local and national level. Unfortunately these surveys are not harmonized which complicate international comparisons. It is impossible up to now to study the impact on mobility of a policy at European level.

Transportation policies are becoming more sophisticated. Thus more detailed attributes of travel behaviour are required for travel demand analysis and modelling. For a description and analysis of trends, as well as of changes in behaviour, conventional travel surveys (only one week day in winter out of school holiday periods, i.e. when traffic flows are maximal) are not enough: for environmental issues, mobility has to be described all along the year (e.g. 24 hours of the day, seven days of the week, and even possibly all seasons of the year, i.e. 365 days). Moreover travel surveys are burdensome (mainly due to the large number of items and the repetition of the same questions such as location, mode, purpose, etc.). Mobile communication technologies including GPS, GSM and Radio Data System (RDS) have advanced rapidly and their prices are decreasing. They demonstrate great potential as survey instruments for tracking individual travel behaviour as well as freight movement, by surveying during longer period, providing more accurate data on the spatial and temporal framework of travel, with a relative low burden for interviewees.

Hence we are at the turning point, where aiming at producing guidelines towards European harmonized travel surveys (either for passenger and freight) should take advantage of the development of new technologies. For a period when behaviours are changing, due to rapid increase of fuel price and other factors, an important issue is continuous data collection. According to the keynote presentation by Pasi at Annecy Conference, it is already the case for Continuing Survey of Road Goods Transport harmonized by EUROSTAT (but data on energy consumption do not exist in all countries, thus are not centralized). On daily mobility, continuous surveys exist in few countries (the Netherlands since 1978, the U.K. since 1988, the German Mobility Panel since 1994, Denmark and Sweden).

Since there does not seem to be a perspective in the European Framework research Program (FP7) for implementing any harmonized surveys on transport, our approach is bottom-up: based on COST 355 experience (especially in WG3 on National Travel Surveys), a new COST Action has been launched: SHANTI (Survey HARmonization with New Technologies Improvement). It will allow researchers from different countries to harmonize their point of view by networking. Indeed in addition to countries maintaining a continuous effort, several National Travel Surveys have been conducted in 2008 (e.g. USA, Spain, Germany, France) or are planned for the near future (e.g. Luxembourg, Belgium).

Elaboration and analysis of surveys are funded in each country, as well as research projects (e.g. "Behaviour and mobility within the week" in Belgium, 6 week diaries in Switzerland and Germany about the rhythm of activities). It will also be an opportunity to tackle serious challenges at conceptual and technical levels (e.g. testing instruments for a comprehensive analysis of attitudes to social networking or the connection between participation to physical and virtual activities).

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