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10th International Conference on Transport Survey Methods

Workshop synthesis: Caring for the environment

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Abstract

This paper summarizes the discussion of the “caring for the environment workshop”, including the following research challenges in dealing with environmental concerns and preferences related to transportation decisions: adoption of multidisciplinary survey methods that account for dynamics in a broad sense, sensor-based and crowd-sourced energy and environmental inventories for active data collection, and design of effective behavioural interventions where data collection and information provision are integrated aiming at the goal of reducing environmental footprints. In particular, non-traditional tools such as gamification should be explored further as part of the design of the behavioural interventions.

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1. Introduction

The goal of this workshop was to discuss different approaches for dealing with environmental concerns and preferences related to transportation and travel decisions. The discussed approaches included survey methodologies designed to capture awareness and attitudes toward travel/environmental issues as well as analytical approaches and modeling techniques to measure energy costs as well as the influence of perceptions and attitudinal factors on behavioural change to benefit the environment.

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The motivation to study travel decisions that are guided by energy and environmental concerns is clear. The growing demand for mobility and the resulting growth of energy consumption have made the transportation sector the main worldwide contributor to the increase of greenhouse gas emissions (IEA, 2014). Moreover, an almost complete dependence on oil products renders mobility sensitive to changes in fuel prices and vulnerable to the depletion of fossil energy resources.

The necessary adaptation of the transportation system to reduce both emission production and reliance on non-renewable energy imposes multiple challenges to not only policymakers but also researchers. Besides the necessity of guaranteeing accessibility to everyone (equity), there is also the need of diminishing motorized traffic (notably by car) and encouraging those active transportation practices with a low environmental footprint. Technological change is another dimension for a shift toward a cleaner and energy-efficient transportation system, including development of ultra-low-emission vehicles (such as electric, hybrid, hydrogen cars). Due to the presence of various externalities, the socio-technical transition toward sustainable transportation needs to be shaped by means of a series of regulatory, demand-side management measures (such as area-specific road pricing, low emission zones, environmental tax on fossil fuels, energy efficiency and renewable fuel standards, and feebates for the purchase of new cars).

Beyond their technical and financial feasibility, the success of green transportation solutions requires a level of behavioural change that presupposes broad acceptance and adoption of sustainable alternatives by society. For instance, noticeable emission abatement needs an important increase in the share of transit, active transportation, and energy-efficient private transportation alternatives. However, competing with incumbent vehicle technologies is not trivial. A wide-scale switch to alternative-fuelled vehicles depends on consumers’ willingness to pay in view of the (perceived) technical characteristics and performance, the purchase and usage costs, as well as the practical conditions of use (e.g. availability of a dense enough network of refuelling/charging stations) of the vehicles under consideration. Likewise, a constraining policy measure needs to earn sufficient approval among users, which presupposes a conviction of the soundness of the measure and of its fairness, as well as acceptance to the distribution of the implied burden (in terms of monetary costs as well as loss of “comfort” by renouncing to established lifestyles). Therefore, understanding the influence of people’s perceptions of and attitudes toward environmental issues should constitute a key element in the understanding of travel and environmental behaviour.

The rest of this chapter is structured as follows. Section 2 lists the key emerging topics that were discussed in the workshop. Among the identified issues, two major challenges were discussed in depth drawing from the three contributed papers and three posters in this workshop, namely information and pro-environmental attitudes. Section 3 summarises the workshop contributions and discussion with regards to information and measurement. Section 4 summarizes the discussion about the role of attitudes and perceptions in the specific context of pro-environmental travel behaviour. Finally, section 5 concludes and sets priorities for the next conference.

2. Emerging topics to address the environmental impacts of transportation

In light of the contributed papers and posters, the conversations focused on the following key emerging issues:

1. Calculation and measurement of energy and environmental costs of transportation activities.
2. Survey methods using new technologies (Internet surveys, GPS-tracking, Smartphone, iPad, passive data using static and mobile sensors).
3. How to best frame environmental information to optimise behavioural impacts.
4. Knowledge about the reaction of transportation users to technological change. This includes electric, hybrid, and hydrogen vehicles, and the use of fuels other than gasoline and diesel.
5. Measuring the influence of attitudes and perceptions on behavior.
6. Investigation of the extent to which attitudes towards the environment and user-knowledge about cause-effect interdependencies between the transport system and its environmental impacts have an influence on travel behaviour.
The first three topics are related to the problem of information provision and how measurement can become a tool to actually inform users of the consequences of their behaviour. This relationship is especially relevant when considering the new technologies that are now available to plan and schedule trips.

The last two topics are related to the role of pro-environmental preferences and attitudes in explaining actual behaviour. In the last few years there has been increasing interest in the integration of attitudinal data into established models of travel behaviour in general.

Other topics that were mentioned in the workshop conversations included:

1- Derivation of welfare measures for improvements in transportation externalities (either positive or negative), including willingness to pay for non-marketed goods
2- Knowledge about travel behaviour in reaction to environmental regulatory measures for modes using fossil fuels (e.g. introduction of low-emission zones).
3- Data about attitudes and acceptance of constraining measures/regulations by users and the population as a whole - role of reliable and factual information: specific survey methods to adapt the information frames to different target groups.
4- Impacts on travel behaviour of real-time environmental information, such as emission exposure measures coming from sensor networks.
5- The role of media in climate change awareness and pro-environmental communication
6- Investigation of the problem of disengagement from questionnaire tasks, likely to distort the data collected: possible reasons, methods of identification...
7- Need for interdisciplinary research in travel behaviour, in the design and conduction of travel behaviour and attitudinal surveys as well as in the analysis of the influence of attitudes and perceptions on behaviour (by means of more comprehensive methods combining qualitative and quantitative approaches).

3. The role of information and measurement

Transportation researchers are used to obtain information from travelers, but if one aims at promoting sustainable behaviour then it becomes necessary to inform people about the environmental consequences of their behaviour. In addition to these new communication requirements, technology is bringing new possibilities not only for dynamic data collection but also for information provision and exchange.

Measurement and visualization of information are both essential to convey effective messages that will encourage behavioural change and avoid rebound effects. In this context, one needs to use the correct units and appropriate language to frame the information in a way that is understandable and most effective. In addition, communication needs to happen at a larger scale, as individual change is less effective than collective change. Customization and personalization of the information are also critical to achieve structural change. An additional dimension is to revisit how we measure changes in behaviour, as we need to identify what signals triggered the change and make sure the change is sustained in the future.

3.1. Calculation and measurement of energy and environmental costs of transportation activities

In the context of estimating transportation energy use and emission production, new passive data collection methods (GPS, sensors, smartphones) are becoming not only a precise information source for more reliable energy use estimates, but also a tool to inform people about their energy consumption. A related dimension is the need for direct questions in more traditional travel surveys to better assess energy consumption and emission production. In his paper, Lovelace reviews current and expected novel methods for estimating the energy costs of travel. His paper “explores methods for using travel surveys as an input into energy use calculations, the deficiencies in current...
practice, and the innovations in travel survey design that hold most promise for improvement from the perspective of energy analysis.’’ In his review of new technology and improvements in survey design, Lovelace shows that information about energy costs can be captured without adding much effort in terms of time or cost. For example, the rich spatial and temporal data collected by GPS can be combined with emission inventories informed by sensors to produce an accurate estimate of emission production and exposure. The use of appropriate metrics for actual energy efficiency was also mentioned by the participants of the workshop.

When discussing measurement of environmental costs, participants of the workshop agreed that we expect to see change in our own sustainable behaviours: as a quick exercise, we determined that the 137 delegates of the conference contributed about 352,912 kg-CO$_2$ from air travel (the equivalent to 8,365 trees being cut, see Fig. 1)!

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**3.2. Raising environmental awareness in transportation with information provision**

Collected information is not only valuable for measuring energy and environmental impacts but also to provide feedback to the users of the transportation system. In their paper, Sanjust di Teulada and Meloni discuss the benefits of using Voluntary Travel Behaviour Change (VTBC) programs to raise awareness about personal contributions to the adverse effects produced by the indiscriminate use of private cars. VTBC provide quantitative feedback to the participating individuals with a focus on generalized costs of travel including emission levels. The provided information also focuses on existing alternatives to private cars with their associated environmental and societal benefits. Sanjust di Teulada and Meloni also propose and implement a VTBC technology platform that enhances the efficacy of persuasion strategies to promote behavioural change. The authors developed a novel mobile application called Individual Persuasive Eco-Travel Technology (I-Pet). I-Pet provides customizable, informational support to car users to enact their travel plans in a more sustainable way. The application allows travellers not only to monitor their activities and trips in real time but also to compare the footprint of cars with sustainable alternatives. A new element of the mobile application is the use of gamification and networking to encourage achievement of sustainability improvement targets. I-Pet has been tested on a sample of 60 car users living in Cagliari (Italy) who work at the University of Cagliari.
To convey the information, I-Pet uses a combination of frames from text and numbers to images, icons, and graphs. The objective is to exploit this informational framing pool to optimize behavioural change, which is precisely the problem addressed below.

3.3. How to best frame environmental information to optimize behavioural impacts

One of the problems of environmental attributes is familiarity with the terms and units being used to convey the information. In engineering environmental benefits and costs are measured in units such as tons of CO$_2$-equivalent (CO$_2$e). Whereas this unit makes sense for engineering calculations and has been used to derive consumer-response metrics such as willingness to pay for emission reductions, in his paper Daziano argues that it may not be the best unit to frame the information. Choosing the right unit and information frame is key for the specific problem of quantifying the individuals’ willingness to adopt more sustainable transportation options. This type of willingness to pay for sustainable transportation (or ‘value of green’ as named by some authors) is a key input for the calculation of total costs of travel behaviour.

The author proposes to use qualitative analyses based on structured interviews and should address potential users’ inattentiveness about or misinterpretations of emissions in general, including CO$_2$, CO$_2$e, and particulate matter. This series of structured interviews should also explore reactions to emission calculators (such as those online that provide, for example, the amount of CO$_2$ emitted in a year of driving based on actual mobility patterns), and to differing treatments on how the information about emissions is presented in these calculators. For example, emission calculators usually present the information using different framing, such as direct mass units, mass units per time period, and number of trees needed to offset the emissions. Graphic scales are often used as well. To identify those frames with a highest impact on behaviour, Daziano proposes to implement discrete choice experiments with random treatments in how emission information is provided. The idea is that respondents will randomly see emission information in a specific equivalent unit, either in a positive context (pounds saved, trees planted, cars off the road, dollars of electricity saved) or a negative frame (pounds produced, trees cut, cars added to the road, dollars of electricity spent). The researcher will know which equivalent unit was actually presented to each respondent, allowing for the estimation of unit-specific parameters. In addition, due to the fact that individuals may experience problems in processing emission information regarding in absolute units, discrete choice experiments should explore whether relative information – such as percentage emission savings – is easier to interpret. The actual discrete-choice treatments should be defined according to the findings of the series of focus groups that should be performed before the design of the survey.

Also within the context of discrete choice experiments in stated preference surveys, Sottile, Cherchi, and Meloni discuss in their paper the role of measuring soft measures. Soft measures are related to information packages that aim at re-educating travellers about the environmental impacts of their travel decisions. The objective is to encourage voluntary change in behaviour. A clear problem of these information packages is their multi-dimensionality. An additional problem is linking awareness and behaviour. In this paper, the specific problem of quantifying the effect of information about pollution and individual stress has on the choice to shift from private car to Park and Ride. To try and disentangle the effect of two components a Stated Preference experiment was built where the reduction of CO$_2$ and the reduction of stress are attributes included in the experimental design. The results from the estimation of a hybrid choice model showed that 1) the utility to Park and Ride increases with the level of awareness reached thanks to information related to the light metro alternative, 2) the more individuals consider receiving information about stress useful, the more they tend to behave sustainably choosing Park and Ride, 3) those aspects associated with stress would appear to have a greater influence on travel choice than environmental aspects.
4. Pro-environmental preferences, attitudes, and behavior

4.1. Influence of knowledge about transport environmental impacts on travel behaviour

The paper by Ryley (2014) considered individuals’ perceptions and attitudes with regard to the relationship between transport and climate change. It explored responses to several surveys conducted in the United Kingdom and USA. These covered general attitudes towards climate change (e.g. agreement that climate change is due to human activity), attitudes towards more environmentally-friendly travel, and responses concerning climate change mitigation (e.g. willingness to change for behavior that will reduce carbon emissions) as well as adaptation to manifestations of climate change (e.g. how individuals react to inclement weather).

Most of the 2,027 respondents to an Internet-based travel behavior survey in London and Glasgow (Sep. 2011-Feb. 2012) were “either fairly or very concerned about climate change” (67%), and an important proportion (39%) considered that climate change was caused by human activity, either mainly or entirely. When asked about traveling under weather uncertainty, a majority stated that they check information before starting a journey. Most of the respondents mind traveling during bad weather, especially in snowy and icy conditions. But, about one fifth would still attempt to travel in spite of an official warning of “not to travel unless absolutely necessary”. Also, car travelers are less likely to cancel their trip in face of weather uncertainty than users of other modes of transport.

From four air travel surveys, of which three were carried out in the East Midlands region of the UK between 2006 and 2008 and one in the East Coast region of the USA in 2008, most of the respondents involved (over 2000) agreed in that “air travel is essential to the national economy”. Most of them also agreed in that “air travel is a significant contributor to climate change”. But, only a minority considered that “passengers should pay more to fly” given the negative environmental impacts of aviation. Though reducing the number of air travels was not considered explicitly, more expensive flights could imply for some people renouncing to some trips. Thus, while people recognize the high impact of transportation on climate change, they have low willingness to change their travel behavior.

4.2. Knowledge about the reaction of transportation users to technological change

Berri (2014) presented a survey of French residents' preferences regarding alternative fuel vehicles. 12 binary choice experiments asked respondents to compare five types of vehicles: conventional (gasoline or diesel), bio-fuel, hydrogen, electric, and hybrid. Attributes included purchase price, the cost of fuel/energy per 100 km, the density of service stations allowing refuelling or recharging a battery, the range, the engine power, the level of CO₂ emissions (g/km), and the amount of ecological bonus or penalty. For electric vehicles, two additional characteristics were given: the duration of a complete recharging of the battery at home, and whether the car was equipped with a range extender (of 50 km or 100 km). The survey was carried out by means of an Internet-based questionnaire. The main survey allowed collecting more than 5,200 interviews, of which more than 4,300 were completed.

The presentation put particular emphasis on some issues related to Internet-based questionnaires that can be extended to on-line surveys in general. First, the response rate, which is generally low in comparison to other types of surveys, is difficult to influence, all the more when the possibilities of making “reminding” contacts are limited. In such a case, it is of primary importance to convince the maximum number of persons contacted that the survey is worth the effort and time they would devote to it. In addition to the risk of collecting an insufficient number of responses, the sample of respondents may severely lack representativeness. Indeed, some groups may be more prone to participate than others: the response rate in this study was higher among buyers of “non-conventional” cars. This population, which is probably more sensitive to environmental problems, was more attentive to the objectives of the survey and more willing to respond. Unequal access to the Internet is an additional factor of risk both for the response rate and the representativeness of the respondents. Another issue evidenced by the survey is an insufficient Internet literacy, most likely among the less educated and the oldest. For instance, part of the selected persons failed to reach the questionnaire page, using a search engine (e.g. Google) instead of typing the address indicated in the letter. Also, other indications/instructions provided in the invitation letter or online were not always understood. These difficulties may give rise to errors and also lengthen the questionnaire duration and thus increase the risk of abandonment, though it was possible to connect as many times as needed to complete the questionnaire. Besides
difficulties linked to poor Internet skills, there are also signs of insufficient implication/concentration with instructions not (strictly) followed (e.g. taking data from the registration certificate) or some information provided online overlooked (e.g. descriptions of car technologies). This increases the risk of errors, which may be particularly serious if the information is used online later in the course of the questionnaire for the generation of attribute levels in the SP scenarios. Finally, a most important issue is disengagement with questionnaire tasks. Manifest symptoms of the problem can be seen in the too short time spent by some respondents to complete the questionnaire (e.g. 7.4 min while it was expected a duration of 20 min) and in some obviously unrealistic responses. However, lack of engagement may take several forms and can occur at different stages of the questionnaire (see, e.g., Bonsall, 2013). Thus, it poses great challenges as to the detection of its manifestations and extent so as to assess the reliability of the data from the corresponding respondents.

The data itself showed evidence of the gap between claimed positive opinions and attitudes with regard to the environment and actual behaviours. Thus, whereas the vast majority of the respondents declared that environment-friendliness was an important factor in the final choice of their new car, two thirds of them stated that they never (38%) or only rarely (28%) buy ‘new generation’ fuels (such as Excellium by Total or BP Ultimate), presumed to be less polluting than other oil fuels. Those using them systematically barely represent 6% of the total. Also, the consistent use of air conditioning in the car by 67% of the respondents (often starting from rather low temperature levels; the air conditioner is even always on for 13% of the respondents!), which implies more energy consumption, is not in agreement with the widely claimed concern for the environment. The survey also evidenced the influence of perceptions on the stated car choices. For example, insufficient reliability and insufficient safety were among the reasons frequently mentioned to motivate a systematic rejection of an electric vehicle (EV) in face of another vehicle type. Also, when an EV was systematically chosen instead of a conventional vehicle (7.9% of cases), the main reason put forward was the perception of the EV as ‘the best for the environment, the other characteristics (being) less important’ (61%).

5. Conclusions

Measuring, modeling, and forecasting sustainable transportation preferences require dealing with complex behaviors in complex regimes. Whereas the goal of reducing the environmental footprint of travel is clear, achieving the structural change that is necessary for making an actual environmental improvement is difficult. Data collection and modeling methods in transportation are rather fixed. We thus need to work to identify, create, and implement new methodologies that are dynamic and that focus on better understanding the space-time and energy-environmental systems interactions that characterize travel behaviour. Capturing and following sustained behavioural change requires panels with well planned before and after intervention observations. Incorporating the role of dynamic networks, both at the infrastructure and social dimensions, is also fundamental. Because individual change is less effective than collective change, we need to switch from measuring individual responses to capturing collective behaviour that accounts for peer effects in producing motivational change.

Another trend in how we do research and practice in transportation is our almost exclusive attention to collecting data versus providing information: we observe and model behaviour to inform policymakers, but not inform the actual users (Fig. 2a). In fact, we traditionally avoid providing feedback to the travellers to reduce bias in the behaviour we seek to observe. However, in the case of achieving a sustainable future the goal is to actually produce changes in the way people behave. As a result, we discussed the necessity of producing continuous feedback among all stakeholders: people, researchers, and policymakers (Fig. 2b).

To effectively produce change we need to address what metrics we use to measure and to provide information about energy use and environmental footprint: actual emission levels (CO₂) versus behavioural impacts, creating attributes that give the correct signal, tradeoffs that people use in real life, illustrating why certain behaviours are not positive, etc.
Important issues with Internet-based questionnaires were also highlighted in the discussions: risk of a too low willingness to participate and of lack of representativeness; unequal access to the Internet and poor Internet literacy; insufficient implication/concentration; and disengagement with questionnaire tasks. Although these are not specific to Internet-based questionnaires, they are probably more severe than with other types of surveys.

The contributed works showed evidence of the influence of perceptions on behaviour. They also underlined the gap between people’s favourable opinions and attitudes toward the environment and their low willingness to change their behaviours towards a more sustainable transport system. People are more sensitive to out-of-pocket cost and time constraints than they are preoccupied about caring for the environment. Identifying the hindrances to and favourable factors for change is essential to determine the relevant incentives to make people adopt a sustainable behaviour.

The discussions also emphasized the need for multidisciplinary research to learn from other fields (such as social marketing and psychology) and industries, giving greater attention to active transportation (cycling, walking) and health policy aspects, and accounting for attitudinal and perception factors in modeling to measure their effects.

In sum, research challenges that set priorities for our work (and for expected discussions in the next conference) are:

1. Adoption of multidisciplinary survey methods that account for dynamics in a broad sense (including temporal dimension of behaviour, and choice dynamics that incorporate attitudinal responses)
2. Sensor-based and crowd-sourced energy and environmental inventories for active data collection
3. Design of effective behavioural interventions where data collection and information provision are integrated aiming at the goal of reducing environmental footprints. Non-traditional tools such as gamification should be explored as part of the design of the interventions.

Finally, all participants agreed that caring for the environment in transportation research is the perfect case study for implementing the new methods that were being discussed in the parallel sessions. In fact, we believe that energy and environmental aspects of travel behavior should go from the margin to a central aspect of our field.
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The workshop participants, in alphabetical order, were: Akli Berri (FR), Ricardo Daziano (US), Robin Lovelace (UK), Karen Lucas (UK), Italo Meloni (IT), Marcela Munizaga (CL), Mvikeli Ngcamu (ZA), Françoise Potier (FR), Tim Ryley (UK), Benedetta Sanjust (IT), Moeketsi Sikhudo (ZA), Eleonora Sottile (IT), Amleset Tewodros (TZ), Jason Whatley (AU), Virginia Wheway (AU).

Appendix A. Papers presented during the workshop

I-Pet Individual Persuasive Eco-travel Technology: A tool for VTBC program implementation. Authors: Italo Meloni, Benedetta Sanjust Di Teulada and Giuseppe Delogu.
Survey-based evidence on the relationship between transport and climate change. Authors: Tim Riley
Measuring soft measures within a stated preference survey: the effect of pollution and stress from traffic in the mode choice. Authors: Eleonora Sottile, Elisabetta Cherchi and Italo Meloni.

Appendix B. Posters associated with the workshop

Measuring willingness to pay for environmental benefits of sustainable transportation technologies and policies. Authors: Ricardo Daziano.
Estimating energy use in transport from travel surveys: current techniques and future prospects. Authors: Robin Lovelace. – Linked to 2 workshops.
Stated Preferences of French residents on alternative fuel vehicles: an Internet-based survey. Authors: Akli Berri.
Promoting carbon aware travel behaviour: The use of GPS and GPS-enabled cell phones to encourage sustainable travel behaviour. Authors: Stephan Krygsman and Tom de Jong.

References

Berri, A., 2014. Stated Preferences of French residents on alternative fuel vehicles: an Internet-based survey. Poster presented at the 10th International Conference on Transport Survey Methods, Leura, Australia, 16-21 November.
Bonsall, P., 2013. Workshop synthesis: cognitive and decision processes underlying engagement in stated response surveys, in “Transport survey methods: best practices for decision making”. In: Zmud, J., Lee-Gosselin, M., Munizaga, M., Carrasco, J.A. (Eds.). Emerald, Bingley, UK, pp. 591-602.
Daziano, R., 2014. Measuring willingness to pay for environmental benefits of sustainable transportation technologies and policies. Poster presented at the 10th International Conference on Transport Survey Methods, Leura, Australia, 16-21 November.
IEA, 2014. CO2 emissions from fuel combustion – Highlights, International Energy Agency (IEA), Paris, France.
Lovelace, R., 2014. Estimating energy use in transport from travel surveys: current techniques and future prospects. Poster presented at the 10th International Conference on Transport Survey Methods, Leura, Australia, 16-21 November.
Meloni, I., Sanjust Di Teulada, B., Delogu, G., 2014. I-Pet Individual Persuasive Eco-travel Technology: A tool for VTBC program implementation. Paper presented at the 10th International Conference on Transport Survey Methods, Leura, Australia, 16-21 November.
Ryley, T., 2014. Survey-based evidence on the relationship between transport and climate change. Paper presented at the 10th International Conference on Transport Survey Methods, Leura, Australia, 16-21 November.
Sottile, E., Cherchi, E., Meloni, I., 2014. Measuring soft measures within a stated preference survey: the effect of pollution and stress from traffic in the mode choice. Paper presented at the 10th International Conference on Transport Survey Methods, Leura, Australia, 16-21 November.