

A report<sup>1</sup> on the  
9<sup>th</sup> International Conference on Transport Survey Methods  
“Scoping the Future While Staying on Track”  
14 - 18 November 2011, Termas de Puyehue, Chile,  
organized by the  
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This conference brought together survey experts, transport researchers, and practitioners of transport planning, policy, modeling, monitoring, and related issues for urban, regional, intercity, and international person, vehicle, and commodity movements from every continent of the world. The conference was held at Termas de Puyehue, Chile which provided an environment for shared discussions, intellectual exploration, testing of concepts and ideas, and networking. An added attraction was the eruption of the Puyehue volcano in the Andes mountains of southern Chile which scattered ash several mornings on the conference grounds and cancelled all flights out of the area at the close of the conference creating a “real time” transportation crises for the international conference attendees needing to catch their flights in Santiago, some 600 kilometers north.

The Chilean Transport Deputy Minister Gloria Hutt’s keynote identified the issue clearly. To achieve policy goals, including those for the transport sector, the questions of “What to do?” and “How to do it” are critical. The changes in Chili from 2002 to 2011 where the number of satellite TV connections in homes rose from 105,800 to 920,000, mobile phones increased from 39 per 100 citizens to 124 per 100 citizens, internet connections rose from 200,000 to 1,900,000, and the GDP per capita increased 50%.

The combination of increasing income which results in a higher value of time and the very big shift in communication technologies creates implications on collecting the data required. New methodologies and tools are required. New technologies also require new specialists and the strong need to recognize the shifting scenarios. She identified what was to be a recurring theme, the allocation of public (limited) resources requires focusing on the specific needs of travelers often requested by the funds of transport studies, to the point, and with limited expenditures.

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<sup>1</sup> The material in this report draws on materials found on the conference web site which are often used with minor changes, digital copies of each resource paper, and post conference materials. The book, Transport Survey Methods: Best Practice for Decision Making, Volume 0, edited by Johanna Zmud and Martin Lee-Gosselin is available on Amazon and Google Books. The book is not a proceedings volume but a workshop synthesis including a selection of peer reviewed papers developed from papers and presentations at the conference. The book does not include all of the papers listed in this report is not a resource for this report.

## **Workshops**

### **1. Bringing Location-Aware Technologies into the Travel Survey Mainstream: Complement or Stand-Alone? (A1)**

Location-aware technologies, suitable for the support of transport surveys, are maturing rapidly, both for custom-built survey devices and as a component of increasingly ubiquitous “smart” mobile telephony and portable computing. The most important developments in the past three years have been in person-based surveys, but at the same time vehicle-based surveys have also improved, especially those combining data on drivers and passengers with data streams from on-board systems that monitor vehicle performance, energy and emissions. In person travel surveys, the recent past has seen the first 100% GPS-based applications, alongside a growing variety of subsample strategies intended to cross-validate results with more conventional methods. There is also a new questioning of the role, in overall data collection strategies, for both passively monitored travel over extended periods, and actively validated trace data (through prompted recall). In part, this is about new combinations of sensor technologies (accelerometers, air quality sensors, ambient noise recorders, etc.). It is also about combining these technologies with interviews or questionnaires on the attributes of travelers, travel and activities that can be interpreted more meaningfully because of the duration and fidelity of automated observation.

#### **Resource Papers, Workshop A1:**

Peter R. Stopher, Christine Prasad, Laurie Wargelin, Jason Minser. Conducting a GPS only Household Travel Survey.

Jean Wolf and Jeremy Wilhelm. A Case Study: Multiple Data Collection Methods in NY/NJ/CT Regional Travel Survey.

Jane Gould. Cell Phone Enabled Travel Surveys: The Medium Moves the Message.

Dr H. Titheridge & D.J. Simpson. Travel Surveys: Measuring Compliance over an 8-Week GPS Survey.

### **2. Cognitive and Decision Processes Underlying Engagement in Stated Response Surveys (A2)**

Recent research into the ways travel and activity participation decisions are made has paid increasing attention to the degree to which respondents are engaged in the tasks and experiments that they are asked to undertake in Stated Response surveys, notably those using Stated Preference and Stated Adaptation methods. Much of the methodological debate focuses on the relevance of attributes and of associated information (whether supplied in the survey or not), and the nature of heuristics. This workshop explored these and other issues based on recent methodological experiments in a number of countries, including Australia, the United States and Switzerland.

#### **Resource Papers, Workshop A2:**

Peter Bonsall. Can we believe what they tell us? Factors affecting people`s engagement with survey tasks.

Marc Weiner, Orin Puniello and Robert Nolan. Stated response surveys: Gridlock at the intersection of computer technology, survey research and transportation studies.

Gerd Sammer and Reinhard Hoessinger. Contribution to identify and quantify the survey bias for stated response surveys caused by imminent knowledge and awareness raising information during the stated response interview.

Claude Weiss, Christopher Dobler, and Kay Axhausen. A stated adaptation approach to surveying and modeling household activity.

### **3. Measuring the Influence of Attitudes and Perceptions (B1)**

In developing methods to more accurately forecast activity and travel behaviors, transportation researchers have increased the study of attitudes and perceptions and their connections to travel behavior. Travel attitudes / perceptions and the relationship to behavior can be and have been studied in many ways, but generally the emphasis has been on the measurement of behavior (which is of greater interest to planners and more applicable for policymakers). Focusing on the measurement of perceptions, attitudes and intentions is still uncommon and presents unique challenges were explored in this workshop session. In addition this workshop expanded the exploration of the impact of attitudes and perceptions on behaviors to examine their influence on people's engagement in the survey task itself. Key questions explored were: How do we define attitudes? Perceptions? How do we measure them? How are attitudes and perceptions formed? How and when do they influence behavior?

#### **Resource Papers, Workshop B1:**

Pedro Donoso, Marcela A. Munizaga, and Jorge River. Measuring User Satisfaction In Transport Services: Methodology And Application.

Jan Willem Bolderdijk, Linda Steg, Ernst Noppers. Where's the fun in driving? Uncovering the influence of symbolic and affective determinants of driving behavior.

Alejandro Tudela, Khandker M. Nurul Habib, and Ahmed O. Osman. Semantic Approach to Capture Psychological Factors Affecting Mode Choice: Comparative Results from Two Countries in America.

### **4. Longitudinal Methods: Overcoming Challenges and Exploiting Benefits (B2)**

The phrase "longitudinal survey" covers many different types of designs – retrospective, continuous, panels, and multi-day surveys. While the transportation research community widely believes that longitudinal surveys provide much deeper insight into behavioral processes than do cross-sectional surveys, the designs have not been widely implemented. Longitudinal studies track the same people, events, or behaviors over time, which brings particular methodological challenges. Even with these challenges, longitudinal surveys provide unique benefits such as expanded opportunities for dynamic travel behavior analysis, providing more responsive survey information to support policy and planning information needs, and bringing potential statistical and cost efficiencies to future survey efforts. This workshop session explored the challenges and benefits of different types of longitudinal surveys in the light of recent experience.

#### **Resource Papers, Workshop B2:**

Bastian Chlond, Matthias Wirtz, Dirk Zumkeller. Do dropouts really hurt? – Considerations about data quality and completeness in combined multiday and panel surveys.

Makoto Chikaraishi, Akimasa Fujiwara, Junyi Zhang, Kay W. Axhausen, and Dirk Zumkeller. Optimal sampling designs for multi-day and multi-period panel survey: Empirical evidences from German Mobility Panel.

Toshiyuki Yamamoto. Attrition Bias in Before and After Survey for Personalized Travel Planning.

Dr. Tony Richardson, David Richardson, Steve Roddis. Integrative Software for Dataflows in Continuous Travel Surveys.

### **5. Methods for Capturing Multi-Horizon Choices (A3)**

Transportation researchers are being confronted by new questions about decisions that span multiple time horizons. These include: long-term strategic commitments such as residence location or mobility tools (e.g. vehicle ownership, public transport season tickets, or subscriptions to shared vehicle services); tactical short-term daily choices such as alternative destinations, travel timing, route, mode or accompanying persons; and en route choices such as spontaneous activity stops or re-routing. In the longer time frame of a year or several years, households may change in composition, acquire a vehicle, move to another house, or have a member join or depart from the labor force or change jobs. Travel surveys sometimes include the history of long-term choices, but the interdependence between short- and long-term choices is poorly understood and rarely addressed. While the importance of long-term choices in conditioning short-term activity and travel behavior is generally acknowledged, the possibility that short-term and long-term choices are mutually informed is commonly ignored. This workshop explored the complexities of measuring and analyzing these multi-horizon choices and their interdependencies.

#### **Resource Papers, Workshop A3:**

Scott Le Vine, Aruna Sivakumar, Martin Lee-Gosselin, and John Polak. Empirically-constrained efficiency in a strategic-tactical Stated Choice survey of the usage patterns of emerging carsharing services.

Eva Heinen and Kees Maat. Are longitudinal data unavoidable? Measuring variation in bicycle mode choice.

### **6. Designing New Survey Interfaces and Front-End Software (A4)**

Transportation survey methodologists are increasingly turning to information technologies and geomatics to enhance data quality, to decrease respondent burden, to lower costs and, eventually, to design continuous self-administered surveys that are predominantly passive. There is still a lot of work to do to understand the usability and relevance of these survey interfaces to gather complex spatial-temporal data on daily travels. Good designs depend on a strong understanding of web technologies and an excellent sense of graphic design, layout and style to build high performance front-end user-interface components that engage the users. The very growth in computing power and design options for the latest systems also means that there are more opportunities to get it wrong – to design systems that do not comprise an effectively integrated information system that works well as a whole. This workshop session presented models of recent integrated survey systems and the challenges and solutions that were a part of their development.

#### **Resource Papers, Workshop A4:**

Elizabeth Ampt, Daniel Paez, Cameron Munro. Protocol Analyses: A Low Cost Alternative to Understand Intersection Between Transport Modes.

Junyi Zhang, Yoshiyuki Tsuchiya, and Akimasa Fujiwara. Proposing A Participatory Self-Declaring Survey And Examining Its Public Acceptance Based On A Stated Preference Survey.

Pierre-Léo Bourbonnais and Catherine Morency. Web-based travel survey: a demo.

Marius Thériault, Martin Lee-Gosselin, Louis Alexandre, François Théberge, and Louis Dieumegarde. Web versus Pencil-and-Paper Surveys of Weekly Mobility: Conviviality, Technical and Privacy Issues.

#### **7. Post Processing of Spatio-Temporal Data (B3)**

With advances in remote sensors, sensor networks, and the proliferation of location sensing devices in daily use and survey practice, the generation of disaggregated, dynamic, and geographically distributed spatiotemporal data has exploded in recent years. The rate at which geospatial data are being generated challenges our ability to organize and analyze them to extract patterns critical for understanding in a timely manner dynamically-changing travel behavior patterns. More specifically, efficient and reliable data processing and mining techniques are needed for extracting useful geoinformation from large heterogeneous, often multi-modal spatiotemporal datasets. This workshop concentrated on the broad set of experiences available on methods and routines to capture spatial and temporal characteristics of travel behavior. Such methods include post-survey prompted-recall interviews as well as statistical, GIS, and expert based systems. Examples of key issues that were discussed included techniques to identify trip characteristics such as destination, modes, stage and types; as well as routines for data cleaning and validation.

#### **Resource Papers, Workshop B3:**

Nadine Schüssler, Kay W. Axhausen, Lara Montini. Improving Automatic Post-Processing Routines for GPS Observations using Prompted-Recall Data.

Kees Maat. Expert Systems to Classify Transport Modes and Trip Destinations by Using GPS-based Data.

Ana-Maria Olteanu, Thomas Couronné, Spatio-Temporal Data from Mobile Phones for Personal Mobility Assessment.

#### **8. Exploring and Merging Passive Public Transport Data Streams (A5)**

The availability of large data sets from passive public transport data streams such as smart cards, web-based services, and simplified count techniques, provides interesting opportunities to gather information about the demand and performance of public transport systems. The workshop concentrated on experiences on analyzing and merging this rich information as a way of collecting and analyzing key characteristics of public transport systems from around the world.

### **Resource Papers, Workshop A5:**

Ka Kee Alfred Chu and Daniel Bergeron. Smart Card Validation Data as a Transit Panel Survey to Investigate Individual and Aggregate Variation in Travel Behaviour.

Pablo Beltrán, Antonio Gschwender, Marcela Munizaga and Carolina Palma. Indirect Measurement of Level of Service Variables for the Public Transport System of Santiago Using Passive Data.

Marcela Munizaga, Carolina Palma, Flavio Devillaine, and Mauricio Zuniga. Obtaining a Reliable Origin Destination Matrix from Massive Smartcard and GPS Data: Application to Santiago.

### **9. Validating Shifts in the Total Design of Travel Surveys (A6)**

The process of trying to achieve an optimum balance in survey design decisions to achieve the best total quality is known as the “total survey design” approach. In this approach, major efforts are taken to better understand, and therefore, to control both sampling and non-sampling errors throughout the design, capture, processing, and analysis of survey data. New approaches available to design travel surveys promise the capability of collecting better quality data while accommodating increasing budget restrictions and expectations. But the implications of these shifts in total survey design have not been well researched or documented. This workshop focused on important issues in understanding the implications of implementing changes in survey design, such as improvements in telephone instruments, using GPS devices, or developing online survey systems. Discussion was focused on what are the implications in terms of the validity and reliability of the resulting information and for its utility for transportation planning and policy-making?

### **Resource Papers, Workshop A6:**

Abby Sneade, Using Accelerometer Equipped GPS Devices in Place of Paper Travel Diaries to Reduce Respondent Burden in a National Travel Survey.

Linda Christensen, Carsten Jensen and Hjalmar Christiansen. The Role of Web Interviews as Part of a National Travel Survey.

Kelly Clifton, T Keith Lawton, and Neba Noyan. The Complexities of Multi-Modal Trips: Recommendations for Practice.

Leda Pereyra and Mariela Nerome. Origin–Destination Household Surveys in Argentina Cities: Methodological and Practical Challenges.

### **10. Comparative Research into Survey Methods (B4)**

This workshop focused on research that was explicitly undertaken to compare different transport survey methods for collecting information in one or more specific contexts. In part, such research addresses shifts in the challenges faced by transport survey methodologists, such as the decline in importance of location-specific telephones or the increasing need to support multiple languages in some urban regions – but two of many relevant examples. This workshop reflected on the need for the comparative testing of recent developments in survey methods, including but not limited to biographical, CATI, CASI and web interviews, technological aids, and complementary data. The discussions centered on the pros and cons of each technique in different transport-related contexts.

#### **Resource Papers, Workshop B4:**

Francis Papon. Correcting Biographic Survey Data Biases to Compare with Cross Sectional Travel Surveys.

Martin Kagerbauer, Wildo Manz, Dirk Zumkeller. Methodological Analysis of Different Methods within One Multi Day Household Travel Survey – PAPI, CATI, and CAWI in Comparison.

Michael Meschik, Birgit Kohla, Rene Wally, Gerd Sammer. Comparing Trip Diaries with GPS Tracking – Results of a Comprehensive Austrian Study.

Edoardo Ma, Amanda Stathopoulos. A Stated Preference Experiment to Compare Single and Triadic Preferences: Implications for Household Residential Location Choices

#### **11. Survey Methods to inform Policy: Environment, Energy, Climate, and Natural Disasters (A7)**

Widespread contemporary awareness of environmental issues has raised important questions, such as how to achieve a clean, carbon-neutral and more secure energy future, or how to define evacuation policies and programs in case of natural disasters. Survey and analysis tools are needed to study the interaction of the transport system and the environment, especially regarding energy demand, atmospheric emissions, and impacts on ecosystems, as well as the disruption of transport systems by extreme natural events such as earthquakes, tsunamis, cyclones and floods. This workshop discussed the data collection methods and the variables required for modeling the environmental performance of the transport system, and the potential for improving performance through changes in technology, infrastructure, or regulation, with due regard to the behavioral response of users. A particular interest was the dynamics of user behavior when facing unexpected events.

#### **Resource Papers, Workshop A7:**

Chester Wilmot, Ravindra Gudishala. Collection of Time-Dependent Data Using Audio-Visual Stated Choice.

Ricardo Alvarez Daziano. Electric Vehicles Rising from the Dead: Data Needs for Forecasting Consumer Response toward Sustainable Energy Sources in Personal Transportation.

Kelly Clifton, Ransford McCourt, Chris Maciejewski, Mike Mauch, Alex Bigazzi. A Multi-Method Approach for Project Level Greenhouse Gas Estimation: Implications for Travel Data.

Julian A. Arellana, Juan De Dios Ortuzar, Luis Rizzi. Survey Data to Model Time of Day Choice.

#### **12. Multi method data collection to support integrated regional models (B5)**

Much has happened in the past decade to develop integrated regional models of land-use and transport systems, and their environmental impacts, as decision-support tools for urban regions. Used as a complement to well-established network-based travel demand forecasting models, they allow decision-makers to “try on for size” (in a sensitivity-testing sense) different scenarios for technology, markets and policy, and to compare different development paths for the region. Many sub-models covering different decision-making agents, including individuals, households, developers, employers and regulators, are designed to interact in

integrated modelling platforms using the best available agent-based and econometric methods. More than ever, behavioural mechanisms for all agents need to be founded in an understanding of the spatial and temporal patterns of the activities of transport users. What is the feasible best data-collection strategy to both specify and run this new generation of integrated regional models? Are the available survey toolsets adequate for the purpose, or is new survey methodological research required? This workshop focused on determining the state of these questions, and making recommendations for survey research in the shorter and longer terms.

**Resource Papers, Workshop B5:**

Mario Cools, Davy Janssens, Geert Wets. Moving from Household-Based Travel Surveys towards Person-Based Travel Surveys: Evidence from the Flemish Travel Behaviour Survey.

Peter Bonsall. So What is All this Data For?

Camila Garcia, João Abreu Silva, Maya Abou-Zeid, Moshe Ben-Akiva, Charisma Choudhury, Francisco Pereira, Marco Silva. Integrated Transportation and Energy Activity-Travel Web-Based Survey

Joao Abreu Silva and Luis Martinez. The Application of Internet-Based Surveys in the Lisbon Metropolitan Area.

**13. Alternative Approaches to Freight Surveys (B6)**

There are fundamental differences between passenger travel and freight travel that point to the need for alternative approaches for freight surveys. Such differences include that fact that the items being transported range from an urgent single parcel to non-urgent bulk shipments of thousands of tons, several actors influence the travel itinerary of freight items, and service frequency and transport costs for shipments are often undefined until a potential sender makes an enquiry. This workshop examined different methods, techniques, and results of current efforts to survey and collect data on freight transportation. This topic is of growing interest for urban and regional policy-makers, as evidenced by the increasing number of surveys being undertaken worldwide. This trend is likely to continue given pressures for improved air quality in urban areas, pressures to regulate and reduce the emissions of greenhouse gases, and pressures imposed on logistics chains by increasing fuel prices. Because primary data collection is expensive and often difficult to justify, the workshop included a focus on the feasibility and benefits of linking survey data with data from informatics such as roadway, on-board vehicle, and wide area sensors.

**Resource Papers, Workshop B6:**

Edoardo Marcucci, Amanda Stathopoulos, Eva Valeri, Gatta Valerio. Design of a Stated Ranking Experiment to Study Interactive Freight Behavior: An application to Rome's LTZ.

Ken Casavant, Eric Jessup, Catherine Lawson. Developing Success Methods for Collecting Truck Trip Data.

Calvacante, Rinaldo and Roorda, Matthew. Shipper/Carrier Interactions Data Collection: Web-based Respondent Customized Stated Preference Survey.

#### **14. Collecting Qualitative and Quantitative Data on the Social Context of Travel Behavior (B7)**

Recent interest in understanding the social context of travel behavior has been framed by an array of transport-related questions. While neglected in the past, these questions are associated with emerging policy concerns, such as inter-generational and transport-related social exclusion, as well as ways to promote pro-environment travel behavior. In this context, some examples of key research questions are the direct role of interpersonal interactions on transport related decisions, such as leisure travel, residential location, and auto ownership, as well as the relevance of social influence, cohesion and trust on travel decisions, such as mode choice. The scope of these questions requires innovative data collection methods that could incorporate and adapt a diversity of methods from social sciences, both qualitative and quantitative. This workshop reviewed recent practical experiences as well as explored opportunities for applying methods from social sciences and other related fields as we seek to capture the inherent complexity of the role of the social context in travel behavior.

#### **Resource Papers, Workshop B7:**

Matthias Kowald, Christoph Dobler, Kay Axhausen. Collecting Data on Connected Personal Leisure Networks.

Karen Lucas. Qualitative Methods in Transport Research: Is 'Action Research' a Methodology Too Far?

Juan Antonio Carrasco. Affective Personal Networks versus Daily Contacts: Analyzing Different Name Generators in an Activity-Travel Behaviour Context.