TRANSPORT SURVEY QUALITY AND INNOVATION

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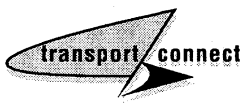

TRANSPORT SURVEY QUALITY AND INNOVATION

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INVESTOR IN PEOPLE

PREFACE

The primary goals of this book are to move the practice of transport surveys forward, by determining how to measure and assess transport survey quality, to identify emerging issues that may affect the relevance of quality and performance measures in the next decade, and to consider the suitability of performance measures largely developed in the USA/Europe for application in other cultural contexts. In part, a move towards higher quality requires greater comparability among surveys, and the adoption of a minimum level of what may be termed "good practice" in the conduct of transport surveys. What constitutes good practice in transport surveys has not been defined previously and is a key issue that this book attempts to address.

This book brings together a number of papers on the subject of transport survey quality and innovation, which are drawn from a conference held at Berg-en-Dal in the Kruger Park, South Africa, in August 2001. The conference in South Africa – "Transport Survey Quality and Innovation: How to Recognise It and How to Achieve It" – was the latest in a series of conferences on the topic of household travel surveys and related survey mechanisms, begun in the late 1970s by a small invitational conference in Eibsee, Germany. Conferences were held subsequently in Hungerford Hill, Australia in 1983 (Ampt, Richardson, and Brög, 1985), Washington, DC, in 1990 (Ampt, Richardson, and Meyburg, 1992), Steeple Aston, England in 1996 (Bonsall and Ampt, 1996), and Eibsee, Germany in 1997 (TRB, 2000).

The early conferences covered various aspects of travel survey methods and the application of emerging techniques in many contexts. At the Eibsee conference in 1997, the focus was changed to that of survey quality. The conference in South Africa has continued that focus, but has also broadened the view from a concentration on the household travel survey to all travel-related surveys. The South Africa conference also had a higher proportion of delegates from developing countries than previous conferences. This permitted the conference to explore in more depth the application of travel survey methods in a wider range of cultural contexts and to gain from the practical experiences of professionals in those countries.

While the issues and challenges faced in developing countries appear on the surface to be substantially different than those faced by developed countries, this is deceptive. What became apparent from the conference was the scope for "technology transfer" in both directions. As a result of the increasing ethnic diversity experienced by most developed countries, many of the same issues and challenges that are faced by developing countries are emerging in all countries – although they may often be ignored. It also became evident that a number of innovations in travel survey procedures and methods were occurring in countries outside North America and Western Europe, that would usually be overlooked by researchers in those parts of the world.

The goals of this conference were to go beyond conventional transport survey design and methodology, to look at future developments in transport surveys, and the methods by which

high standards of performance and quality could be achieved. The conference objectives were as follows:

- Determine how to measure and assure the quality of transport surveys from design through reporting;
- Develop an expert view of the predominant data needs of modellers, policy analysts and transport planners for the next decade, and consider the relevance of the proposed quality and performance measures to those needs;
- Establish the strengths and weaknesses, and roles of different survey instruments and methods;
- Develop strategies for the use of multi-instrument approaches to deal with difficult issues;
- Identify potential applications of new technology in personal interviews; and
- Define what is acceptable with respect to item nonresponse, data repair, and imputation of values on which there is item nonresponse.

The conference sought to explore the experiences of professionals in different countries with respect to these issues of quality, performance, and design of transport surveys. The conference also sought to determine the feasibility of establishing methods by which each country can develop consistent standards that take into account cultural differences between countries.

To achieve these goals and objectives, the conference was organised around fourteen workshops dealing with particular aspects of survey quality and innovation, shown in Table 1. Each workshop was structured around a resource paper, together with a varying number of offered papers that fitted within the workshop's purview. The workshops were organised in two blocks of seven, so that each delegate was able to participate in two workshops during the conference. Each workshop was provided with a one paragraph description of its focus.

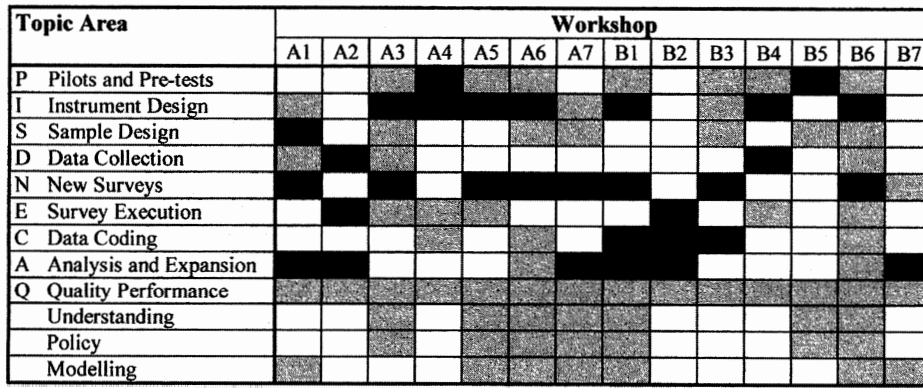
Table 1: Workshop Titles and Numbers for the South Africa Conference

Number	Workshop Title	Number	Workshop Title
A1	Mixed-mode Surveys	**B1**	Time-Use and Activity Surveys
A2	Unit Nonresponse	**B2**	Item Nonresponse
A3	Multi-cultural and Multi-language Surveys	**B3**	Impact of New Technologies
A4	Instrument Design	**B4**	Respondent Burden
A5	Stated Response Surveys	**B5**	Qualitative Methods
A6	Non-Household Surveys	**B-6**	Freight and Commercial Vehicle Surveys
A7	Multiday and Multiperiod Data	**B-7**	Data Interrogation and Data Management

The conference opened with keynote papers, that were intended to focus delegates on the issues of travel survey quality and the challenges faced by developing countries, subsequently to be picked up by the individual workshops. This was followed by a plenary session containing several papers that dealt with the processes involved in carrying out different types of travel surveys, which cut across many of the workshop themes.

The keynote paper by Stopher and Jones (2001) set out a framework for establishing quality at all stages of the travel survey process, by identifying the key elements of the process that lend themselves to the possible establishment of quality standards and guidelines. The final section of the paper suggested how the fourteen workshops might contribute to the framework, by offering guidelines or proposing standards for one or more of the specific elements, as shown in Figure 1. It was expected that all workshops would contribute to the section (Q) on Quality Performance Standards, to varying degrees. In addition, most workshops were asked to consider the relevance of advances in their area in terms of the purposes for which the survey data are used, in relation to one or more of: understanding travel behaviour, policy development, and modelling.

The figure distinguishes between stages where it was suggested that a workshop should make a major contribution (dark shading) and stages where some more limited input might be appropriate (lighter shading). However, workshops were invited to review all the stages and the individual elements discussed in the paper, and to contribute additionally to others where the members wished to do so.



KEY:

A1:	Mixed Mode Surveys	B1:	Time-Use and Activity Surveys
A2:	Unit Nonresponse	B2:	Item Nonresponse
A3:	Multi-Cultural and Multi-Language Surveys	B3:	Impact of New Technologies
A4:	Instrument Design	B4:	Respondent Burden
A5:	Stated Response Surveys	B5:	Qualitative Methods
A6:	Non-Household Surveys	B6:	Freight and Commercial Vehicle Surveys
A7:	Multiday and Multiperiod Data	B7:	Data Interrogation and Data Management

Figure 1: Suggested Areas Where Workshops Might Contribute to the Framework

After the conference, each workshop contributed a summary of its discussions, including the scope for developing quality standards or guidelines in its particular area, and any recommendations for issues to be addressed in the future. These summaries, together with the

resource papers, and a selection of the offered papers, plenary papers and keynote papers form the basis of this book. However, the reader should note that the order in which the material is presented in this book has been changed from the number order of the workshops, to group material to more closely reflect key stages in a survey.

Peter Jones *June, 2002*
Peter Stopher

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TRB (2000), *Transport Surveys: Raising the Standard,* Transportation Research Circular Number E-C008, Transportation Research Board, Washington, DC.

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The conference in South Africa was conceived and directed by the International Steering Committee on Transport Survey Conferences (ISCTSC), under the co-chairmanship of Peter Stopher and Peter Jones. The ISCTSC was set up in 1997 to "…organise periodic international conferences dealing with research subjects relevant to the conduct of transport surveys that support planning, policy, modelling, monitoring, and related issues for urban, rural, regional, intercity, and international person, vehicle, and commodity movements". The ISCTSC was assisted in organising the local arrangements and logistics by a Local Organising Committee in South Africa, under the chairmanship of Pat van der Reis. The conference co-chairs would like to acknowledge the hard work put in by these two committees, the members of which are shown in Tables 1 and 2.

Table 1: Members of the International Steering Committee for Transport Survey Conferences for the South Africa Conference

Name	Affiliation	Country
Kay Axhausen	ETH	Switzerland
Patrick Bonnel	ENTPE	France
Werner Brög	SOCIALDATA, GmbH	Germany
Peter Jones (co-chair)	University of Westminster	U.K.
Nelly Kalfs	Ministerie van Verkeer	The Netherlands
Martin Lee-Gosselin	University of Laval	Canada
Marina Lombard	TRC (Africa) Pty Ltd.	South Africa
Elaine Murakami	U.S. Department of Transportation, FHWA	U.S.A.
Juan de Dios Ortuzar	Pontificia Universidad Catholique de Chile	Chile
Tom Palmerlee	Transportation Research Board	U.S.A.
Alan Pisarski	Consultant	U.S.A.
Tony Richardson	The Urban Transport Institute	Australia
Gerd Sammer	Universitat fur Bodenkultur	Austria
Joy Sharp	Bureau of Transportation Statistics, USDOT	U.S.A.
Cheryl Stecher	The Franklin Hill Group	U.S.A.
Peter Stopher (co-chair)	The University of Sydney	Australia
Mary Lynn Tischer	Arizona Department of Transportation	U.S.A.
Pat van der Reis	TRC (Africa) Pty Ltd.	South Africa
Klaas van Zyl	Stewart Scott	South Africa
Jose Viegas	Instituto Superior Tecnico	Portugal
Manfred Wermuth	Technische Universitat Braunschweig	Germany

We would also like to acknowledge the workshop chairs and rapporteurs, who contributed substantially to the success of the conference; and Lyn Nurick and Shirlee Smit who assisted the LOC and also staffed the conference registration desk throughout the conference.

Table 2: Members of the Local Organising Committee for the South Africa Conference

Name	Affiliation	Country
Marina Lombard	TRC (Africa) Pty Ltd.	South Africa
Oliver Page	CSIR	South Africa
Ibrahim Seedat	South African National Department of Transport	South Africa
Ray Smith	University of Pretoria	South Africa
Pat van der Reis (chair)	TRC (Africa) Pty Ltd.	South Africa
Klaas van Zyl	Stewart Scott	South Africa

We are also grateful to the following organisations who provided sponsorships for the conference:

- The U.S. Department of Transportation, Federal Highway Administration
- NuStats, USA
- AVV Transport Research Centre, Dutch Ministry of Transport
- The Institute of Transport Studies, The University of Sydney
- Committee on Scientific and Industrial Research (CSIR), South Africa

The sponsorship of these organisations enabled a number of scholarships to be awarded to delegates, primarily from countries throughout sub-Saharan Africa, none of whom would have been able to attend without this assistance. Their presence greatly enriched the conference and has also contributed subsequently to dissemination of good practice in travel surveys in a number of countries.

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DEVELOPING STANDARDS OF TRANSPORT SURVEY QUALITY

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INTRODUCTION

Over the past 40 years, many millions of dollars have been spent to collect household or person based data for transport planning. For most metropolitan areas around the world, the largest routine expenditure made from planning budgets is for the conduct of household or person travel surveys. In 1996, it was reported (Stopher and Metcalf, 1996) that the average household travel survey cost in the U.S.A. was $400,000 for consultant services. Even though the cost of conducting surveys may be significantly lower in many other countries, a conservative estimate might be that somewhere in excess of $50 million is spent globally on household travel surveys each year. To this must be added the costs of other surveys that would typically be undertaken as part of metropolitan planning. These may include freight and commercial vehicle surveys, on-board public transport surveys, cordon and screen line surveys, workplace surveys, special generator surveys, etc. Nevertheless, the costs of data collection are very low compared to the magnitude of investments and operating costs involved in the transport sector.

In spite of this huge level of activity and expenditure, there is no agreement within the transport profession as to what constitutes a good survey, nor how one would recognise whether a survey is good or not. Nevertheless, even larger sums of money are subsequently spent on developing and using travel-demand models that are based on these data, and in investments into major capital projects, implementation of far-reaching policies, and other related decisions.

In many cases, the agencies that commission the data collection do not have staff with in-depth knowledge and experience in surveys. As a result, many of these agencies are unable to make informed selections of consultants to perform surveys, and are also unable to assess whether or not a useful product was obtained. Subsequent work in using the data for descriptions and modelling often reveals serious flaws in the data that could have been avoided if there were either a sufficient availability of expertise at the agencies, or a clear definition of what constitutes a good quality survey that could be followed by an agency in guiding the process, selecting consultants and assessing the work that was done.

Some transport survey consultants are unaware of the difficulties involved, and lack knowledge and expertise in various aspects of data collection and assessment, which are neither apparent to them, nor to the agencies that may select them. They, too, could benefit from an indication of the procedures and measures that are required to produce a quality survey. This would assist them in determining the type of survey to undertake, the methods to be implemented, and the means to assess whether or not the survey was being executed satisfactorily.

Because transport surveys are usually different from each other, it is also often difficult, if not impossible, to compare surveys to ascertain whether an appropriate level of quality has been attained. Differences in methodology, design, and protocols often obscure basic differences in quality among surveys. They also make it difficult to compare results between surveys.

The purpose of this chapter is to provide a general framework within which the assessment of survey quality can be progressed, and to set the stage for future research and analysis that will establish standards of survey quality in transport. This chapter raises more questions than it provides answers, but we feel that this is a necessary prerequisite to achieving improved travel survey quality and comparability. It also sets out some of the steps necessary to establish a definition of what constitutes good practice in transport surveys at the beginning of the 21st century. In short, the chapter seeks to illuminate how to recognise transport survey quality, and to begin the process of defining what is needed to be able to achieve quality. At the same time, we recognise that it is desirable to allow innovation to take place in the field of transport surveys, so that the definition of what constitutes good quality will advance and change as new techniques and technologies are applied.

Following this introduction, the chapter discusses some of the issues surrounding the definition of standards and the measurement of quality. The following section identifies ten key stages in the design and execution of transport surveys, that make up a framework for the assessment of survey quality. Each of these stages is outlined in greater detail in the final section.

DEFINING STANDARDS AND RECOGNISING QUALITY

If it is desired to establish some sort of benchmark of good practice, and to provide a means to assess quality, then some type of standard is implicitly required. Standards provide the means against which to assess a specific instance of the practice of a transport survey, thereby allowing one to determine if the survey has used current elements of good practice.

It is important to recognise the distinction between standards and standardisation. "Standards" are minimum thresholds of the properties of a product that must be attained for it to be acceptable. In the context of travel surveys, the properties would typically be the quality of the data, the ethics employed in collecting the data, and the procedures used to evaluate, document, archive, and disseminate the data. On the other hand, "standardised procedures" are stipulated methods of conducting an activity (e.g., using agreed terminology and classifications). By fixing a process, ambiguity is reduced, standards are indirectly achieved, and assessment is promoted by clarity of concept and the opportunity to compare values from different sources.

According to the dictionary definition, the word "quality" has many meanings. The one with most applicability to this context is "degree of excellence", "grade", or "superiority in kind". Implicit in these meanings of the word "quality" is the adjective "good", or "high", i.e., what is being sought here is a transport survey that is of good or high quality. From this, one could suggest that quality is a measure of suitability to purpose, or acceptability.

One of the main functions of standards is the assurance that a product a user or client plans to purchase carries the approval or certification of a reputable standards organisation, and is of reliable quality. In the manufacturing and service sectors, international standards agencies such as the International Standards Organisation (ISO) are increasingly being used to accredit organisations. ISO requires that suppliers structure and operate their company according to eight quality management principles and defines such a principle as (ISO, 1997):

> "... a comprehensive and fundamental rule or belief, for leading and operating an organisation, aimed at continually improving performance over the long term by focusing on customers while addressing the needs of all other stakeholders."

Richardson and Pisarski (1997) translated the ISO guidelines into requirements for a travel survey company. They argue that, while requiring considerable commitment from the company, the benefits of delivering a quality product in a consistent manner are substantial.

While there are no generally accepted standards for transport surveys, several organisations have produced useful guidelines. For example, the U.S. Department of Transportation has produced detailed guidelines for household travel surveys (TMIP, 1996). Statistics Canada has produced a comprehensive set of good practices in travel surveys in their document *Quality Guidelines* (Statistics Canada, 1998), which provide guidance on how to conduct each step in a survey and structure and operate a survey company to collect quality data. The Council of American Survey Research Organisations (CASRO) has produced similar guidelines on good practice in its *Survey Research Quality Guidelines* document (CASRO, 1998).

We suggest that there might be up to eight ways in which standards and standardisation might contribute to the improvement of surveys:

- Improvement in survey *quality*;
- Improvement in survey data *reliability*;