Background Comment on Methodologies, Methods, and Techniques to Support Decisions to Identify, Adopt, or Implement Sustainable Urban Transport Practices

INTERIM REPORT 2

Transport Canada Project

Methodologies for Identifying and Ranking Sustainable Transport Practices in Urban Regions

Principal Investigator:
Dr. Barry Wellar, MCIP
Professor Emeritus, University of Ottawa
Principal, Wellar Consulting Inc.
wellarb@uottawa.ca
http://wellarconsulting.com/

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1. Methodology-Method Connection

The terms “methodologies” and “methods”, and the associated terms “techniques”, and “tools” have been the subjects of lengthy discussions in numerous research texts. In addition to the major contribution by Ackoff (1953), other notable contributions include those by Ackerman (1958); Bailey (1987); Babbie (1986); Goode and Hatt (1952); Kaplan (1964); Miller (1970); Miller (1987); Nachmias and Nachmias (1987); Northrop (1959); Simon (1978); Walizer and Wiener (1978); Wellar (1995, 1998); and Whitehead (1948).

As a result of the extensive coverage already given to there terms, there is no need to examine their ontological, epistemological, or praxis features here. However, it is necessary to briefly clarify how the terms are used in the project reports and other materials to ensure that readers from different backgrounds are “reading from the same page” when examining this statement, reviewing the survey forms, completing the survey forms, and examining project documents.

In scientific inquiry, “methodology” refers to the philosophy of the research process in both the physical and social sciences, and in both curiosity-driven and client-driven research projects (Ackerman (1958); Ackoff (1953); Doby (1967); Wellar, 1998, 2005).

Primary elements of a research process philosophy include the values, principles, and assumptions that serve to justify or provide a rationale for undertaking a piece of pure or applied research. And, in the same vein, values, principles, and assumptions also serve as a rationale or explanation for the criteria, standards, guidelines, etc., that the researcher uses at each stage or phase throughout the research process (Bailey (1987); Leedy, 1989; Kaplan (1964); Simon (1978); Walizer and Wiener (1978).

In brief, then, methodology is essentially the body of whys behind the hows of a research project (Mitroff and Turoff, 1973). And, by extension, methodology is also the body of whys behind the hows of identifying, adopting, and implementing sustainable urban transport practices. For both cases the better (or more robust) the methodologies, the better we can explain and justify decisions about how to undertake a research project, or how to make decisions in regard to identifying, adopting or implementing sustainable urban transport practices. And, conversely, the weaker the methodologies in either situation the more difficult it is to credibly explain or justify how decisions are made.

As for the hows of a research project, they are generally referred to as “methods”, that is, the techniques and tools which first are used to identify or define or examine a research problem, question or issue, and are then used to undertake the research that addresses the research problem, question, or issue.

Regarding the research process itself, choices about how to conduct the research include making decisions with respect to the way or ways that variables are specified, the way or ways that data are collected, organized, processed, and analyzed or interpreted, and the way or ways that data are transformed into information and knowledge (Rosenberg, 1968; Wellar

and Harris, 1992). And, as indicated above, decisions about which methods to choose to undertake the research are directed by the values, principles and assumptions resident in the methodology which encompasses the research process.

The final remark on the significance of the methodology-methods connection to the project comes from a recent paper on measures of transportation system performance (Wellar, 2008a). The item of particular importance to Interim Report 2 is the comment made in regard to Task 5 of the Synopsis Report (Wellar, 2008b):

> *Task 5* – Prepare an interim report on findings about the state of the art/science of measuring sustainable transport practices in urban regions, and the variables representing worst-to-best sustainable transport practices in urban regions. *Variables too often appear 'out of thin air', and there is no scientific and often no logical way to assess the merits of the variables, the measures in which the variables are used, or the ways that the measures are calculated. The emphasis in this project on ascertaining the art/science, that is, the rationale behind selecting, adopting, and implementing sustainable transport practices, makes an explicit connection between the why's and how's of decisions, and the results of those decisions. It is intended that the research on methodologies contribute to a much-improved understanding of the differences between practices in all the worst-to-best categories, which in turn contributes to understanding the relationship between practices and measures (*Wellar, 2008b, 21-22).

The interpretive comment about Task 5 illustrates the importance of having a strong methodology-methods connection in order to properly specify variables and relationships. To paraphrase, if the variables which are the bases of practices cannot be logically justified, then the specification of relationships between dependent and independent variables becomes very "iffy", and decisions about identifying, adopting, and implementing practices are likely to be difficult to explain and validate.

The purpose of Interim Report 2, therefore, is to emphasize the importance of the methodology-methods connection to the outcome of the project, and to provide some suggestions to survey respondents and to non-government experts that may assist them in contributing evidence and expert opinions to the surveys.

2. Scope

The primary focus of this project is on documenting the reasons behind decisions by a selection of municipal governments to identify, adopt and implement sustainable transport practices. The decision to design the survey of municipal governments around a selection of localities may be summarized as follows.

This is an exploratory study with a number of unknowns. One of the critical unknowns is lack of information on the capability of municipal governments to respond to a survey about the methodologies, methods and techniques used to assist in making decisions about identifying, adopting, and implementing sustainable transport practices. Using a selection of municipalities may provide insights into whether a more formal study is in fact appropriate, and whether that study should be based on a sample or the population of municipal governments.

As for the matter of taking a more formal methodological approach and basing the survey on a sample or the population of municipal governments, that is a design issue which could take considerable time and resources to resolve. Moreover, due to the relative 'newness' of research in this domain, it could be very difficult to "manage" the participants in either a sample or a population survey so that the project could be completed in a rigorous and timely manner.

Since it is possible to draw valid conclusions from a survey of a selection of municipal governments, and this way of proceeding is "doable" with the resources available, the invitation to participate will be sent to as many municipal governments as is practicable given available resources and prior experience in conducting surveys of municipal governments.

Finally, several provincial agencies participated in the previous survey that was done to gather information for a presentation at the 2007 National TravelWise Association Conference in Belfast (Wellar, 2007a, 2007b). If time and resources permit, the research scope will be expanded to make preliminary inquiries into the methodologies, and methods and techniques that are used by a selection of provincial and territorial governments to support decisions about identifying, adopting, and implementing sustainable transport practices.

3. Research Design

The research design chosen for this project is to contact potential respondents and ask them to provide information about the methodologies, methods, techniques, tools, or other means used to assist in making decisions about identifying, adopting and implementing sustainable transport practices.

The primary respondents include an international group of research experts with experience in the field of sustainable urban transport practices, and a selection of municipal governments in Canada. The survey approach is a central design decision, and three aspects need to be made explicit for evaluation purposes.

First, in terms of the rationale for this research design, it was previously used to prepare a presentation for the 2007 TravelWise Conference (Wellar, 2007b.). The similarity of the TravelWise assignment to this project, in combination with the favourable responses accorded the survey work by municipal and provincial contact persons in Canada, as well as

the positive feedback from TravelWise conference organizers and attendees in Europe, point to re-using the tested approach.

Second, the TravelWise assignment confirmed the value of using the terms **identify**, **adopt**, and **implement** as the three primary categories for documenting the evolution of sustainable urban transport practices over time. As reported by participants in the preceding survey, as well as TravelWise conference participants, these categories are very effective for two reasons in particular:

- They can be used for both inventory and accountability purposes;

- Each term makes a fundamental contribution to tracking the progress of a municipal, provincial or territorial government in achieving sustainable urban transport practices.

Third, the TravelWise assignment as well as other assignments involving governments in Canada and elsewhere point to an apparent, general lack of what might be called “applied methodological expertise” in the field of sustainable urban transport practices.

The overall sense of concern, if I have captured it properly, is that a number of planners, public health researchers GIS professionals, accountants, alternative transport specialists, civil engineers, and other professionals on staff may have applied their expertise to various initiatives involving sustainable urban transport practices. However, the problem from a research perspective, or from an evaluation or forecasting perspective for that matter, is that the initiatives are not generally supported by thorough, organized, and easily accessible data or database documentation that names the specific methodologies and methods (techniques and tools) used in decisions about identifying, adopting, or implementing sustainable urban transport practices. There are exceptions to the rule, of course, but not enough of them to eliminate the need for a survey of the kind devised for this project.

As a result, therefore, of being aware that detailed, specific information about methodologies and methods may be available in part from some municipal (and provincial/territorial) governments and less so from others, the research design is modified accordingly. That is, some or many respondents may know or can ascertain the matches between methodologies and methods with the phasing of practices, and they can enter that information on the survey forms. However, in the case of respondents who do not know or cannot readily ascertain the specific methodological reasons behind choices about methods, an exception needs to be made in order to obtain as much useful information as real-world conditions permit.

For the latter situation, the design exception or default procedure is to ask respondents to give the reasons behind the decisions to identify, adopt, or implement a sustainable urban transport practice without being concerned whether the reasons involve methodologies or methods. The advantage of blurring the distinction between methodologies and methods is that respondents can focus on stating why or how things happened, and the methodology-

methods connection can be addressed by the Principal Investigator and his associates when analyzing the responses.

While this is not an idealized research design framework for conducting the survey, it is a pragmatic way to proceed since it means obtaining information that might otherwise not be available. Further, there is always the option, time and resources permitting, of asking respondents to consider re-visiting their responses and give further thought to assigning the decision reasons to the methodology and method categories.

Further, and as numerous research texts emphasize, care must be taken during research design to avoid introducing bias in any of the survey materials, which could introduce bias in responses and hence in findings (Babbie, 1986; Bailey, 1978; Doby, 1967;Leedy, 1989; Simon, 1978).

On the other hand, however, it is important to ensure that sufficient information is provided to respondents so that they have a clear understanding of the body of information that the survey is intended to elicit (Nachmias and Nachmias, 1987).

One of the bias-informing issues to be resolved before administering the survey is to determine whether it is appropriate to name elements of methodologies and methods (techniques and tools) which *could be used* in responses. In the case of the municipal survey, the plus side of providing lists of methodologies and methods, or research procedures and decision procedures as they are labeled in the municipal government survey forms is that access to materials to work from at the start of the survey response could facilitate responses. And, on the minus side, providing even an indicative list could possibly invite bias.

Fortunately for this project, the bias-informing issue can be logically resolved. That is, the lists are illustrative of methodologies and methods that *could be used,* and survey responses are factual statements about the methodologies and methods that *are used.*

It seems fair to say, therefore, that while the provision of lists is likely to assist respondents in thinking about how to frame their responses, there is no reason to believe that the provision of illustrative lists of phrases and terms will affect the contents of replies.

In other words, municipal governments use the means they use to make decisions about identifying, adopting, and implementing sustainable transport practices, and those means will no doubt already be a matter of public record in one hardcopy document or online posting or another. Under the circumstances, providing a list of phrases and terms might assist respondents in describing the research procedures and the decision procedures that are employed in a municipal government, but there is no reason to believe that the contents of the lists would bias the contents of the survey response, or would supplant the means that are already a matter of public record..

Finally, the overall research design for the project must address the overriding interest of documenting the methodologies, methods, and techniques that *are used, could be used, and*

should be used in making decisions about identifying, adopting, and implementing sustainable transport practices. The study design does so via the following elements of the project's body of work:

- The survey of municipal governments will ascertain the methodologies and methods that *are used*;
- Research Report 1 will provide a background discussion about research methods and techniques that *could be used*;
- A research report will include commentaries by government and non-government officials on a selection of the research methods and techniques that *could be used*;
- And, by the end of the project the mix of methods and techniques that are *used* and *could be used* will be combined in a discussion about those that *should be used* in the decision-making process.

4. Sampler of Research Methodologies

The topic of research methodologies is discussed in numerous academic texts, and in university courses in such fields as geography, planning, operations research, sociology, economics, physics, chemistry, biology, psychology, geology, astronomy, statistics, econometrics, political science, engineering, education, and environmental studies. In my experience, all the texts and courses discuss values, principles and assumptions that are pertinent to the philosophy of the research process, although there are frequently differences in the particular values, principles, and assumptions that are presented.

Further in that vein, municipal (and provincial and territorial) governments also exhibit differences in the values, principles, and assumptions used to guide or direct the research process. Cases in point include the different values, principles, and assumptions that are found in such formal documents as Official Plans, General Plans, Comprehensive Plans, Transportation Master Plans, Development Plans, council declarations, committee reports, and operations manuals, as well as in such informal communications as news releases, media conferences, media interviews, mayors' and councillors' newsletters or householders, newspaper columns, and, more recently, blogs.

This study takes those philosophical differences as a given, and anticipates receiving information about various values, principles, and assumptions being used by municipal governments. Simply put by way of context, there are no hard-and-fast rules about which methodologies *must be used* in either curiosity-driven or client-driven research in the physical, social, health or other sciences, or in the humanities. It follows, therefore, that there is no reason to expect hard-and-fast research rules in governments. The message for this project, therefore, is to not form or entertain any foregone expectations about statements explaining

why, or describing how, a particular method, technique, or tool is used to assist in making decisions about identifying, adopting, or implementing a sustainable urban transport practice.

The purpose of Table 1, therefore, is to provide a 'heads up' as to the kinds of values, principles, and assumptions that could appear in responses to the survey of experts and the survey of municipal (and perhaps provincial and territorial) government officials.

Table 1. Preliminary Selection of Values, Principles, and Assumptions that Could Be Used in a Philosophical Framework to Guide Research on How to Identify, Adopt or Implement Sustainable Urban Transport Practices

- Quantifiable procedures are more rigorous than qualitative procedures
- Qualitative procedures are more informative than quantitative procedures
- Public policy choices can be objectively explored and examined scientifically
- Public policy choices are more a matter of common sense than science
- Quantitative measurements of variables is a necessary condition of numerically-based ranking systems
- Qualitative procedures can produce satisfactory explanations of social relationships
- Value judgements are an acceptable means for making choices between alternatives
- Quantitative measures dehumanize social relationships
- Predictions are best based on the shortest time series data set in a model
- Human behaviour is rational
- Human behaviour is not rational
- Environmental factors take precedence over economic factors
- Geographic considerations must be explicitly factored into sustainable transport best practices
- Measures representing the safety, comfort, and convenience of pedestrians and cyclists take priority over measures representing the level of service provided to private motor vehicle operators
- Ordinary citizens are experts in setting transportation priorities
- Trial-and-error is the wrong way to make infrastructure decisions
- User pay practices must be strictly applied to achieve transportation equity
- Increasing fossil fuel prices will increase the demand for alternative transport
- Moving data (text and graphics) is more efficient than moving people
- Integrated land use and transportation systems are a requisite condition of sustainable transport
- Analytical performance measures are the basis of sound transportation system programs
- Transportation system expenditures are not necessarily transportation system investments
- The application of life-cycle analysis is required in order to understand the full, time-adjusted costs and benefits of transportation choices
- The complexity of urban regions requires the use of high-level geographic information systems to identify sustainable transport opportunities.

As the reader will note in examining Table1, sometimes statements are used to express a value, principle, or standard, and sometimes just several words are used. This distinction is consistent with the research methodology literature which attaches a high priority to efficiency, but not at the expense of clarity and explicitness. Hence, if several words are deemed sufficient nothing more is said, but if that is not the case then more detail is provided.

Finally, it is emphasized that Table 1 is labeled “Preliminary” advisedly. That is, Table 1 is designed to serve as an indicative list of values, principles, and assumptions to guide research on achieving sustainable transport practices. No attempt is made to create a representative or comprehensive selection.

5. Sampler of Research Methods, Techniques, Tools

The term “research procedures” is used in the municipal government survey form to refer to the different ways, that is, the hows of research that could be included in the responses. At this time the primary interest is in learning how the research to identify sustainable transport practices was done and is being done, and if labels about methods, techniques, or tools are included then so much the better. However, if they are not, and there is reason to want to know which particular method or technique is involved, then a follow-on query can be made to obtain that information.

Similarly, the term “decision procedure” covers decision methods, decision techniques, and decision tools, and it does not a critical matter at this stage whether any or all off the latter terms can knowingly be applied by respondents. Again, the primary interest is receiving replies that are based on solid descriptions about how decisions were made and are made to adopt, and to implement, sustainable transport practices. If need be, respondents can be re-contacted and asked to put a label in the decision procedure.

Table 2 consists of a sampler of the research procedures and decision procedures that could be used to assist in making decisions about identifying, adopting, or implementing sustainable transport practices. This list is also indicative, and is in alphabetical order for convenience.

Further, no attempt is made to ensure that all the entries are different, or that some of them are not variations on the same theme. Indeed, it is entirely possible that municipal governments may have some ‘terminology of their own’ to contribute to the language of the project, so there does not seem to be any value at this time to narrowing the vocabulary of titles or labels given to procedures. We can do that later if necessary.

To reiterate a comment made above, presenting a list such as this one at this point in the project serves to illustrate the options which are available in terms of research procedures and decision procedures. Once the survey responses are received from municipal governments, it will be possible to continue to move towards the next and most critical stage of research:

Combining information about the procedures that *are used* with information about the ones that *could be used*, and deriving the research procedures and decision procedures that *should be used*.

Table 2. A Preliminary Selection of Research and Decision Procedures that Could Be Used to Support Decisions to Identify, Adopt or Implement Sustainable Urban Transport Practices

Advocacy group advisories
Brainstorming
Case studies
Classification studies
Committee approach
Comparative analyses/studies
Conferencing
Consultation with experts
Consultant reports/recommendations
Content analysis
Cross-impact analysis
Delphi panels
Elected official directions
Experimentation
Expert opinion
Field research
Focus groups
Indexing
Input-output analysis
Interest group advisories
Interviews
Literature searches and reviews
- Academic journals
- Conference proceedings
- Dissertations and theses
- Government documents
- Interest group documents
- Public interest reports
- Vested interest reports
- Internet
- Legal documents
- Newspapers
- Radio stories
- Television stories

Numerical taxonomy
Opinion polls
Pilot studies
Plebiscites
Pretests
Professional association advisories
Public consultations
Public hearings
Public meetings
Questionnaires
Ranking
Roundtables
Scaling
Simulations
Structure mapping
Surveys
Technical association advisories
Trial runs
Workshops

Again, this is an indicative list of the kinds of research procedures and decision procedures that seemingly *could be used* to assist in making decisions about identifying, adopting, and implementing sustainable transport practices. Future reports will re-visit some of these entries if they are included in the lists of procedures that *are used* by municipal governments; if they are high-ranking procedures that *could be used* according to non-government experts; or if they are procedures that survive the evaluation process and are named to the *should be used* list of research procedures or decision support procedures.

6. Conclusion

There is a large, diverse body of research literature that separately and collectively discusses the terms "methodologies"," methods", "techniques", and "tools". Knowing that many of the non-government experts come from different backgrounds and disciplines, and that the same situation may hold for the municipal government respondents, this brief, explanatory report is intended to assist survey respondents draft their replies without getting bogged down by terminology.

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