Valuing and Improving
Transportation-Related Data Programs

Report From 2013 TRB Sessions
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Summary

This report summarizes the findings of 2013 Transportation Research Board Annual Meeting sessions on valuing and improving transportation-related data programs (programs that collect basic data used for transport policy, planning and research). It discusses the business case for expanding and improving data programs, puts data program costs into perspective with transport expenditures and economic impacts, describes examples of the data needed to address various transport planning issues, gives examples of existing transport data programs, describes problems and threats, discusses who should lead in data program strategic development, summarizes best practices, and provides conclusions and recommendations.
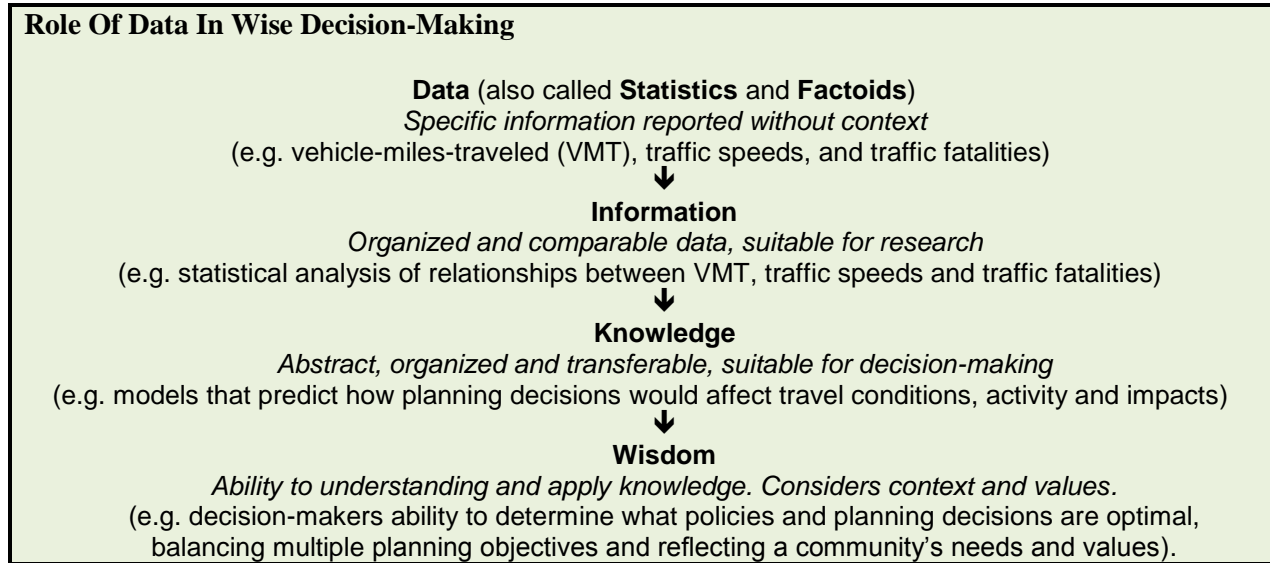
Key findings:

- Various data are necessary for effective transport policy making, planning, performance evaluation and research. New planning issues expand the scope of these data.

- Many types of transport-related data are collected, but most existing data programs are limited in their subject and geographic scope, consistency and quality. The resulting data are often incomparable or unsuited for research due to inconsistent definitions and collection methods.

- Strategic coordination can increase data program efficiency. Relatively simple actions, such as standardizing definitions and collection methods, and reducing duplication of data collection efforts by various organizations and agencies, could improve quality while reducing total costs.

- Some current data programs are under threat. In the future we may have less information on travel activity than we had in the past.

- There is a need for transportation professionals to better communicate the value of high quality data, and support more strategic data program planning and development.

- There is need for leadership by international professional organizations to support strategic data program development.

This paper is dedicated to the late Lee Schipper, whose appreciation of quality data was infectious.

Introduction

Properly organized data provides information suitable for research, which creates knowledge that supports wise decision-making, as described below. This is the key to effective planning.

Role Of Data In Wise Decision-Making
Data (also called **Statistics** and **Factoids**)   *Specific information reported without context*   (e.g. vehicle-miles-traveled (VMT), traffic speeds, and traffic fatalities)   ↓   **Information**   *Organized and comparable data, suitable for research*   (e.g. statistical analysis of relationships between VMT, traffic speeds and traffic fatalities)   ↓   **Knowledge**   *Abstract, organized and transferable, suitable for decision-making*   (e.g. models that predict how planning decisions would affect travel conditions, activity and impacts)   ↓   **Wisdom**   *Ability to understanding and apply knowledge. Considers context and values.*   (e.g. decision-makers ability to determine what policies and planning decisions are optimal,   balancing multiple planning objectives and reflecting a community's needs and values).

Effective transport planning requires diverse, quality data, such as those listed below. Quality data must be suitably comprehensive, accurate, consistent, transparent, frequent and available, as summarized on the following page. New planning issues are expanding the types of data needed.

Table 1   **Examples of Transport-Related Data**

Facilities and Services	Activities	Impacts	Land Use
Road and railroad supply and quality	Vehicle ownership (by type and user)	Transport facility and service expenditures	Density and mix
Parking supply and price	Vehicle travel (by type, purpose and location)	Household transport expenditures	Various measures of accessibility
Public transit service supply and quality	Freight transport	Traffic accidents and casualties by mode	Portion of land devoted to transport facilities
Walking and cycling facility supply and quality	Person travel (by mode, purpose and location)	Energy consumption	Land valuation (as impacted by transport facilities and services)
Port and airport size and condition	Mode share	Pollution emissions and exposure	Costs and market values
Transport system connectivity	Non-motorized travel	Traffic and aircraft noise	
Accessibility indicators	Travel speeds and delay (congestion)	Transport quality for disadvantaged groups	

This table lists various types of data needed for transport policy, planning and research.

This report discusses the roles such data play in efficient planning and policy making, data program needs and gaps, and ways to better communicate the value of such programs. It summarizes three 2013 Transportation Research Board Annual Meeting sessions on these issues.

Defining Data Quality
• **Comprehensive.** An adequate range of statistics should be collected to allow various types of analysis.
• **Accurate.** The methods used to collect statistics must be suitably accurate.
• **Consistent.** Definitions and collection methodologies should be consistent between different sets.
• **Transparent.** The methods used to collect statistics must be accessible for review.
• **Frequent.** Data should be collected regularly.
• **Available.** Statistics should be available to users.

2013 TRB Annual Meeting Sessions

Three sessions on transport data program valuation and optimization were held during the 2013 Transportation Research Board Annual Meeting, as summarized in the table below.

Table 2   **Data Program Valuation and Best Practices 2013 TRB Meeting Sessions**

Valuing Transportation-Related Data, Session 458	Transport Data Program, Development International Best Practices, Session 798	Transport Data Program Development International Best Practices, Session 824
Todd Litman, Victoria Transport Policy Institute. *Moderator.* Nancy McGuckin, Travel Behavior Analyst. Transport data, survey and trend analysis expert. Adie Tomer, Brookings Institute. Demographic trend analysis expert. Elizabeth Sall, Deputy Director for Technology Services, San Francisco County Transportation Authority Rolf Schmitt, Deputy Director of the Bureau of Transportation Statistics. Responsible for municipal and MPO transport planning, programming and design. Norm Steinman, Manager, Planning and Design, Charlotte DOT. Mike Wallace, Senior Associate, Travel Forecasting Leader, Fehr & Peers.	Sophie Punte, Clean Air Initiative For Asian Cities Center. *Transport & Energy In Asia: Air Pollution And GHG Indicators For Countries And Cities.* Jürgen Perschon, Executive Director, European Institute for Sustainable Transport (EURIST). *The TEST Project for Sub-Sahara Africa transport data.* Dr. Adnan Rahman, Director, International Division, Cambridge Systematics. *Data collection for transport policy making and planning in low and middle income countries.*	Jose Barbero, InterAmerican Development Bank Consultant. *South America transport data survey and development program.* Cornie Huizenga, Sustainable Low Carbon Transportation Partnership (SLoCaT). *The importance of better transport data for sustainable transport policy making at global, regional and national scale.* Sujith Kollamthodi, head of Ricardo-AEA Technology's Sustainable Transport practice. *European approaches to transport data collection and analysis for strategic policy and impact evaluation.* Francois Cuenot, Energy Analyst, International Energy Agency. *Overview of the IEA Mobility Model (MoMo) and its input data.*

Three sessions concerning transport data program valuation and best practices were held during the 2013 TRB Annual Meeting. This report summarizes those sessions' conclusions.

A Business Case For Expanded and Improved Data Programs

Transport data programs are often under pressure to reduce their scope to "essential" or "productive" data, for example to only collect the data needed to comply with current planning and performance evaluation requirements. However, there is a good case for expanded and improved data programs: We cannot predict which planning issues will become important, and what evaluation and research will be needed, for future policy and planning.

The older transport planning paradigm considered a relatively limited set of modes, impacts and transport system improvement options, and so only required relatively limited data set for evaluation and research. For example, conventional planning evaluates transport system performance primarily based on motor vehicle travel speed, operating costs, crash and pollution emission rates, but gives less consideration to other modes and accessibility factors, and other planning objectives and impacts. The newer planning paradigm considers a wider set of modes, accessibility factors, objectives and impacts, which require additional data for evaluation and research, as illustrated in Table 3.

Table 3   **Scope of Conventional Planning Accessibility Factors and Impacts**

		More Accessibility Factors ➔				
		Automobile	**Transit**	**Non-motorized**	**Road Connectivity**	**Geographic accessibility**
↓ More Impacts	Travel speed and delay	Yes	Yes	No	Sometimes	Sometimes
	Safety and security	Yes	Yes	Yes	No	No
	User costs and affordability	Yes	Yes	No	No	No
	Parking costs	No	No	No	No	No
	Accessibility for non-drivers	No	Yes	No	No	No
	User comfort	Yes	No	No	NA	NA
	Energy consumption	Yes	Yes	Sometimes	Not usually	Not Usually
	Pollution emissions	Yes	Yes	Sometimes	Not usually	Not Usually
	Land use impacts	No	No	No	No	No
	Public fitness and health	No	No	Sometimes	No	No

Conventional planning considers a limited scope of modes and impacts. More comprehensive and integrated planning considers additional modes, impacts and options, which requires additional data.
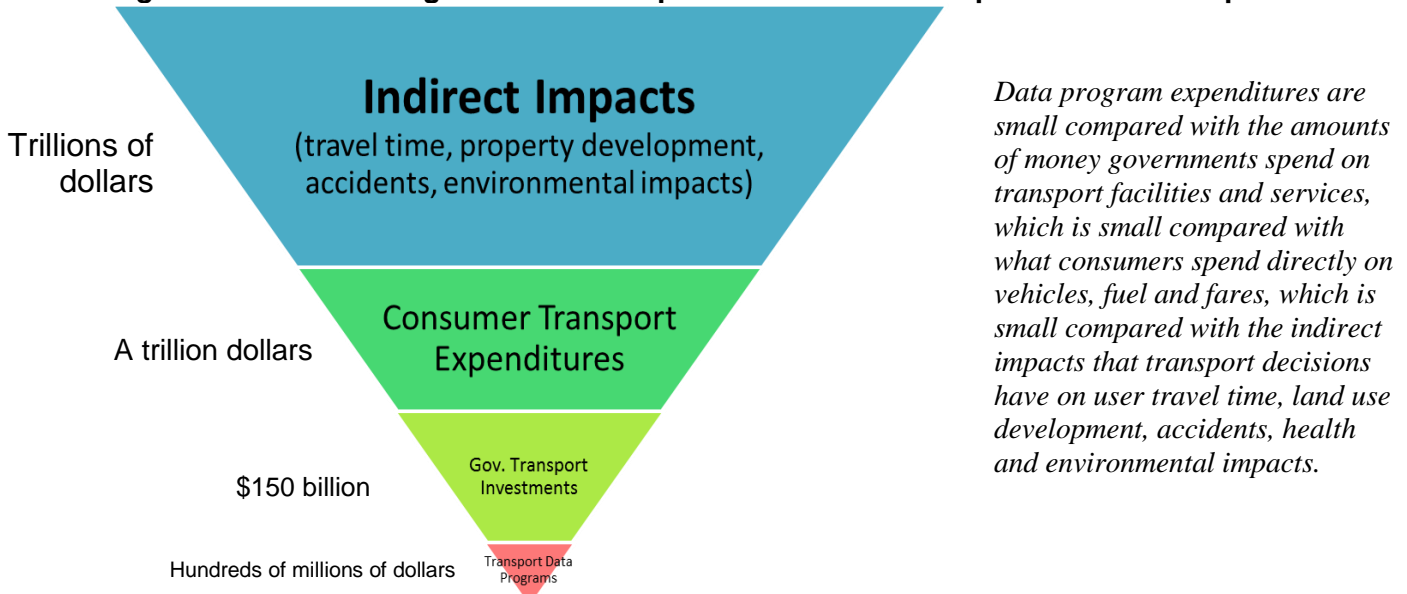
In many situations, this additional data can be provided with relatively modest incremental costs. With strategic development the necessary data can be collected with modest additional costs. For example, most cities regularly perform roadway condition and travel activity surveys; with modest additional cost these existing programs can collect more detailed data on non-motorized facility conditions and travel activities. By standardizing definitions and collection methods, multiple survey results can be integrated and compared.

Will "big data" save the day? In recent years some new information has become available through creative use of data sets, such as vehicle traffic flow information from vehicle GPS data, and personal travel activity from mobile telephone location data. This is useful but does not provide the full set of information needed for planning purposes, and is often costly to obtain.

Data Program Costs

Data programs are threatened by the perception that they are costly. However, their costs are small compared with total transport expenditures and economic impacts. Data program funding can provide large economic returns if they just modestly increase transport system efficiency. For example, U.S. transport data program expenditures probably total about a half-billion dollars annually (see box below) compared with approximately 150 billion dollars that governments spend on surface transport facilities and services, more than one trillion dollars consumers spend on vehicles and fuel, which influences several trillion dollars worth of travel time, property development, accidents and environmental impacts.

Figure 1   **Data Program Costs Compared With Total Transport Costs and Impacts**

Data program expenditures are small compared with the amounts of money governments spend on transport facilities and services, which is small compared with what consumers spend directly on vehicles, fuel and fares, which is small compared with the indirect impacts that transport decisions have on user travel time, land use development, accidents, health and environmental impacts.

This indicates that for each dollar spent on transport data programs, governments spend hundreds of dollars on transport facilities and services, consumers spend thousands of dollars on vehicles and fuels, and tens of thousands of dollars worth of economic impacts are influenced. If improved transport data can result in more efficient and responsive planning, the incremental savings and benefits can offset incremental program costs many times over.

Estimated U.S. Surface Transport Data Program Expenditures

- *Federal.* The Bureau of Transportation Statistics budget totaled $25 million in 2012 and $38 million in 2013 (USDOT 2012). Assuming this represents half of total U.S. agency spending on transport data, federal expenditures are probably less than $100 million.

- *State.* Assuming state departments of transportation spend on average $1 million annually on internal statistics programs and a similar amount on contracted services, they spend about $100 million.

- *Local and Regional.* Metropolitan Planning Organizations typically commission a travel survey every four or five years costing a few million dollars. Local governments also commission travel surveys, parking studies and GIS data collection programs that typically cost a tens or hundreds of thousands of dollars each. Assuming that 100 large metropolitan regions spend $1 million annually, and 500 smaller regions and cities spend $200,000 annually on average, this totals $200 million annually.

Planning Issue Examples

Below are examples of new transport planning issues and their analysis data needs.

Transportation Health Impacts

Issue

Public health professionals are increasingly concerned about the health problems that result from physical inactivity, and therefore the value of transport systems that encourage walking and cycling for both utilitarian and recreational travel. To integrate this objective into transport planning requires research to determine active transport demand (who, when and where people want to walk and bicycle), and how transport planning decisions affect non-motorized activity.

Data Requirements

This research requires detailed and integrated data on travel activity (how and how much people travel), demographic factors (age, employment status, income, physical ability), transport system (sidewalk, crosswalk, bikepaths/lanes, roadway connectivity, traffic speeds, fuel price, transit fares, etc.) and land use (density, mix, parking supply and price), health impacts (body weight, cardiovascular disease, diabetes, etc.).

Data Availability and Improvement Options

Many current travel surveys undercount non-motorized travel activity because they overlook or undercount short trips, off-peak and non-commute travel, recreational travel, and walking links of automobile and public transit trips. Most communities incorporate sidewalk, bike path and land use conditions into their geographic information system (GIS) databases, but these are often incomplete. Health data are available but seldom available at fine-grained geographic scales.

Transportation Affordability

Issue

Affordability refers to whether essential service costs are within lower-income household budgets, often defined as less than 16% for transport or less than 45% for transport and housing combined. This analysis requires understanding both current household expenditures and possible latent demand for affordable transport options (changes in travel activity and costs from improved walking, cycling, public transport, and more affordable housing in accessible areas).

Data Requirements

Integrated information on transport quality and prices measured relative to household expenditure budgets by income classes, such as walking and cycling conditions, transit fares, and vehicle ownership and operating costs, relative to lower-income household budgets, plus actual household expenditure data by income class.

Data Availability and Improvement Options

Most communities have some data on non-motorized travel conditions, but it is usually incomplete. Transit fare data are available. Some vehicle cost data are available, but widely-used data, such as the automobile association vehicle cost estimates, represent newish vehicles (the first six years of vehicles' operating costs) which has higher depreciation and insurance costs, and lower repair costs than the overall fleet average. Some countries perform household expenditure surveys which disaggregate by income class, but results are seldom reported by geographic area, such as by city or neighborhood. There is little information on latent demand for affordable modes, making it difficult to predict which policies will achieve real affordability.

Parking Planning

Issue

Most communities have parking congestion problems. The conventional solution is to impose minimum parking requirements on new development and to incorporate parking lanes on urban roads. These solutions are expensive (a typical urban parking space has a $500 to $1,500 annual costs) and encourages vehicle ownership and use, and sprawled development. Increasingly, communities are looking for more cost efficient and integrated parking management strategies.

Data Requirements

Efficient parking planning requires comprehensive data on parking supply (number of on- and off-street parking spaces in each area), price, utilization (when and where parking spaces are occupied) and demand (how much parking travelers would use at various regulations and prices).

Data Availability and Improvement Options

Most communities sponsor parking supply and utilization studies, either directly or requiring developers to commission such studies. However, few studies are comprehensive (most only measure a subset of total parking spaces in the study area, and they often have only limited price and utilization data), methodologies are inconsistent between studies, and the results are seldom conveniently available, so the data are unsuited for research purposes. Parking data quality could improve if professional organizations, such as the Institute of Transportation Institute or the American Planning Association established standard parking study methodologies.

Comprehensive, Accessibility-Based Planning

Issue

Conventional transport planning is *mobility-based*, it assumes that "transportation" primarily means motor vehicle travel and evaluates transport system performance based primarily on automobile travel conditions, such as average traffic speed, congestion delays and operating costs. This overlooks other modes and other accessibility factors, such as walking and cycling conditions, roadway connectivity, and land use density and mix. More comprehensive, *accessibility-based* planning expands the range of impacts and options considered in planning, which can lead to more efficient and equitable planning decisions.

Data Requirements

Comprehensive, accessibility-based planning requires data on the quality of travel by various modes (sometimes called *multi-modal level-of-service*), including supply and quality of sidewalks, crosswalks, bikelanes, vehicle traffic speeds, public transit supply, transit comfort and speed, road and path connectivity, plus land use density and mix. Research requires that all of these be available and integrated, for example, using the same geocoding and databases.

Data Availability and Improvement Options

Most communities have good data on roadway facilities and conditions (roadway conditions and motor vehicle level-of-service) and some transit service factors (coverage, frequency, speed, reliability, and sometimes crowding), but few have all the data needed for non-motorized transport service evaluation, or for efficiently evaluating roadway network connectivity and land use accessibility (for example, the increased number of services and jobs accessible to residents in an area from a change in pathway or roadway design, transit service supply, or land use development patterns). Comprehensive, accessibility-based planning requires an integrated set of transport and land use data; since some of this information is already collected, data quality can often be improved with incremental expansion and improvement to existing data programs.

Innovative Congestion Reduction Strategies

Issue
Traffic congestion is significant urban transport problem. The conventional solution is to expand roadways, but this is costly, and by creating barriers to pedestrian travel, inducing additional vehicle travel and stimulating urban sprawl, exacerbates other transport problems. Many communities are considering innovative congestion reduction strategies such as bus lanes, efficient road and parking pricing, and more connected road networks.

Data Requirements
Conventional planning tends to evaluate congestion based on the intensity of delay (the reduction in automobile traffic speeds). In contrast, accessibility-based planning evaluates congestion based on per capita congestion delays, which accounts for the delay reduction that occurs to people who shift from automobile to alternative modes, or from road network and land use changes that reduce trip distances.

Evaluating innovative congestion reduction strategies requires measuring existing traffic congestion problems and modeling the congestion reduction impacts of changes in the quality of alternative modes and mode shifts, pricing reforms, and changes in roadway connectivity. This includes data on vehicle traffic speeds and delays, per capita travel times and congestion delays, effects of pricing, and roadway network traffic.

Data Availability and Improvement Options
Most developed country cities have transport data and models that measure roadway travel speeds and congestion delays, and the impacts of transit service improvements, but few current models can effectively evaluate the full impacts of roadway expansion (they tend to underestimate generated and induced travel effects) and the incremental costs that result, or the full benefits of improving alternative modes, more efficient pricing, or increased roadway connectivity. This requires detailed data on traffic conditions (travel speeds and delays) and transport demand and activity (how and how much people will travel under various conditions and prices), including information on the mode shifting that will result from changes in the quality of alternative modes, prices and roadway networks.

Examples of Transport Data Programs

Various transport data programs exist. Most counties collect official statistics, which international organizations integrate into multi-country and multi-city data sets suitable for comparison and analysis. National data program quality varies, particularly in developing countries which often have limited resources and capacity, so some international organizations are helping governments improve their data programs. Many international organizations focus on a particular transport mode, impact, user group or geographic area.

Below are useful examples of existing transport data programs and their key lessons.

Air Quality Asia Emissions Database (www.cleanairinitiative.org)

The *Knowledge Partnership for measuring Air Pollution and Greenhouse Gas Emissions in Asia* aims to help policy makers, development agencies and other stakeholders have better access to air quality and climate change data for policy making and planning purposes. This initiative developed methodologies and guidelines for collecting air pollution and GHG emission data suitable for analysis and comparison. It covers road transport and electricity generation in 13 countries and 23 cities. This project included development of a 154-page technical document, *Guidelines for Development, Measurement, and Use*, which explains exactly how the various statistics should be collected and analyzed.

Lessons Learned. This indicates that non-government organizations can help create national data programs and improve data quality.

Australian Transportation Data Action Network (www.nss.gov.au/transportmetadata)

The ATDAN is an interagency network, managed by the Australian Standing Council on Transport and Infrastructure (SCOTI), which coordinates a national effort to organize and improve transport data. It began in 2008 with the establishment of a Strategic Research and Technology Working Group (SRTWG) with a mandate to enhance the delivery of evidence-based policy and support transportation efficiency and effectiveness improvements. The SRTWG identified the need to improve data collection scope, relevance and quality. Through a series of consultation sessions and a national workshop with transport data stakeholders, the SRTWG identified national strategic transportation data needs and priorities. This work informed the development of the Transportation Data Action Plan. ATDAN maintains a website, Transmet, which provides access to various meta-data sets. The goal is to progressively add more metadata sets to the website.
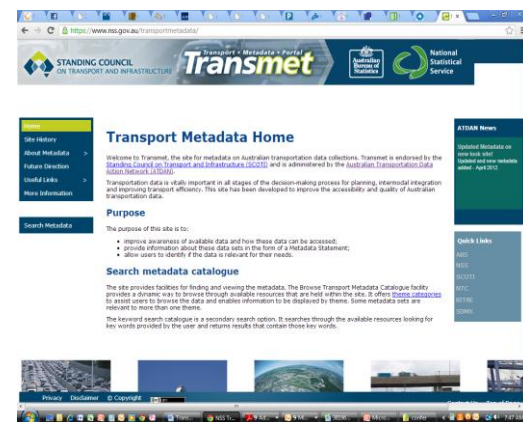
Lessons Learned. This is an example of strategic transport data program planning which can efficiently organize various data sets and improve data quality for one jurisdiction.

Cities ACT (www.CitiesACT.org)

Cities ACT is a website developed by Clean Air Asia that contains various data and indicators organized by location (country or city) and by topic (Air Quality and Climate Change, Transport and Energy). The data sets are organized to allow comparison and trend analysis, including user-generated tables, charts or graphs. However, it is currently poorly populated, there are limited resources for expansion, and it has no quality improvement component.

Lessons Learned. Non-government organizations can help create useful data sets. However, they need suitable resources and support.

Global Transport Intelligence Initiative (www.slocat.net/key-slocat-prog/466)

The Global Transport Intelligence (GTI) initiative is a coordinated program of international organizations involved in the collection, analysis and dissemination of data on transport in the developing countries. It currently consists of several dozen organizations including the Asian Development Bank, the International Energy Agency, the International Road Federation and the United Nations Department for Economic and Social Affairs. An initial planning meeting was conducted on May 2011 in Paris hosted by the International Energy Agency.

Lessons Learned. There is a need for international coordination of transport data programs. This will require strategic planning and sufficient resources.

### International Road Federation (IRF) World Road Statistics (www.irfnet.ch/world_road_statistics.php)

The International Road Federation (IRF) is a nongovernmental, not-for-profit organization with a mission to encourage better, safer and more sustainable road networks. Since 1964 it has published the *World Road Statistics* (WRS) report, the most comprehensive source of road and vehicle data. It is based on the IRF's extensive network of official sources including national ministries, road authorities, statistics offices, and other data sources. These are the original source data widely used by other international organizations and researchers.
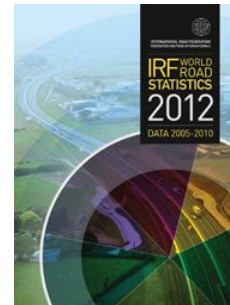
Lessons Learned. This is an example of an industry organization that integrate important statistics from multiple countries, and modestly supports data quality improvements.

International Energy Agency Mobility Model

The International Energy Agency (IEA) collects and reports detailed energy production and consumption data from dozens of countries, published in the annual *World Energy Outlook*. The IEA maintains a team of specialists that collects this data in an annual cycle and works with the appropriate agencies in each country to improve their energy data programs. Their *Mobility Model* (MoMo) requires information on vehicle fleet size and type, vehicle travel, and transport fuel consumption. The IEA has found that much of the initially provided data contains inconsistencies and errors, but these can be corrected and data programs improved through continual quality improvement activities.
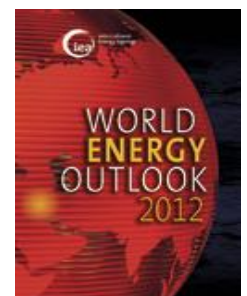
Lessons Learned. This is an example of a major international organization to integrate important statistics from multiple countries, and to support data quality improvements.

Mobility In Cities Database (www.uitp.org/knowledge/Statistics.cfm)
 The Mobility in Cities Database includes demographic, transport and land use statistics from 100 major cities around the world, including population, economic activity, urban structure, the number of road vehicles, taxis, the road network, parking, public transport networks (offer, usage and cost), individual mobility and choice of transport mode, transport system efficiency and environmental impact (duration and cost of transport, energy consumption, accidents, pollution, etc.). In total, 69 indicators (175 basic indicators) are compiled for each city. It includes analysis and discussion. This database builds on previous data collected for the *Millennium Cities Database*, published in 1995, which included data collected by academic researchers. These data sets have been widely used by researchers, but have been criticized for possible inconsistencies, and there is apparently no program to continue data collection for future updates.

Lessons Learned. This database demonstrates the utility of having comparable data, the value of municipal rather than national level analysis, and the difficulties of developing and maintaining such a resource without significant resources.

OECD Transport Statistics (www.oecd.org/sti/transport)
The Organization for Economic Cooperation and Development (OECD) collects a wide range of data sets, including statistics on container and other freight transport, passenger transport (vehicle ownership and use), fuel consumption and road accidents for various countries (31 members and 22 other countries). These can be downloaded in database format. However, definitions vary (for example, it reports "road vehicle" and "car" travel, which is inconsistent with the U.S. vehicle categories, and some countries count all traffic deaths within 30 days of an accident, while others use other definitions) and data quality is uncertain. There does not seem to be any effort to improve data quality.
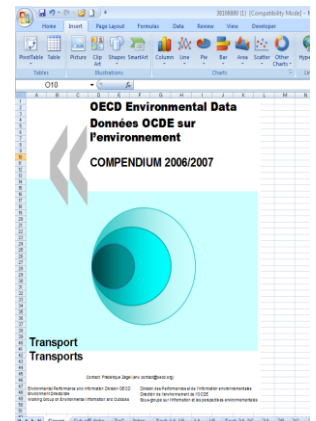
Lessons Learned. This is an example of a major international organization that provides abundant data of uncertain quality.

TRB Special Task Force on Data for Decisions and Performance Measures
This Task Force coordinates the activities of, and facilitates communication among, Transportation Research Board standing committees regarding the cross-cutting issues to address the necessary data resources and infrastructure to support decision making and performance measures. Although its mandate is not restricted, the Task Force is primarily concerned with the data needed for conventional transport planning, particularly for performance evaluation by U.S. federal, state and regional transportation agencies, as discussed later in this report.

Lessons Learned. This Task Force reflects a growing appreciation by U.S. transport professionals of the value of strategic data program planning, but it is not significantly expanding the scope of data collected or working with international organizations to improve data quality.

U.S. Highway Statistics Annual Report (www.fhwa.dot.gov/policyinformation/statistics.cfm)

For more than four decades the U.S. Department of Transportation has required state and regional transportation agencies to report standardized statistics on roadway supply, conditions, vehicle travel and expenditures. These are integrated with various other data sets (such as traffic crashes and fuel consumption) and published in the *U.S. Highway Statistics Annual Report*. These data are available free on the Internet in various forms, including spreadsheets.
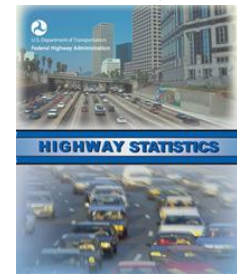
Lessons Learned. This is one of the most comprehensive, consistent and accessible sets of national transport-related data, but has some omissions and data quality problems.

Table 4 summarizes these programs' scope and future development. Some focus on particular subjects or geographic areas, and only a few have strategic plans which identify how they will develop in anticipation of future research needs, or quality control which continually improve the quality of data collected.

Table 4 **Example Data Program Scope**

Program	Subjects	Geographic Territory	Strategic Planning	Quality Control
Air Quality Asia Emissions Database	Air emissions, vehicle travel	Various Asian countries and cities	Yes	Yes
Australian Transportation Data Action Network	All transport-related data	Australia	Yes	Yes
Cities ACT	Air emissions, energy use, transport activity, and other city data	Asian cities	Yes	Uncertain
Global Transport Intelligence Initiative	All transport-related data	International	Yes	Yes
International Road Federation World Road Statistics	Roadway supply, vehicle ownership, vehicle travel, related data	All countries	Uncertain	Yes
International Energy Agency Mobility Model	Energy use, emissions and vehicle travel	All countries	Yes	Yes
Mobility In Cities Database	Demographic, economic, geographic and travel activity	100 major cities	No (does not seem to be continuing)	No
OECD Transport Statistics	Demographic, economic, geographic, travel activity, energy use, accidents	About 45 countries	Uncertain	Uncertain
TRB Task Force on Data for Decisions and Performance	Potentially all transport-related data	U.S.	Yes	Uncertain
U.S. Highway Statistics Annual Report	Highway supply, condition, vehicle travel, accidents	U.S. states and some urban regions	Uncertain	Some

Existing data programs vary in scope, strategic planning or quality control.

Problems and Threats

Transport-related data sets are often incomplete or inferior, and therefore unsuited for most planning or research purposes. Many existing data programs are designed for a specific purpose, such as traffic modeling, energy and emissions planning, or traffic risk analysis in a particular area. Definitions and collection methods often differ between different jurisdictions, agencies and times. Statistics that do exist are often unavailable to researchers. Table 5 summarizes rates the overall quality of various types of transport-related data. Even data rated "good" is often inferior or unavailable in some jurisdictions (particularly in developing countries) or at some scales (particularly at regional and local levels).

Table 5   **Transport-Related Data Quality Ratings**

Facilities and Services	Activities	Impacts	Land Use
Road and railroad supply and quality (1)	Vehicle ownership (by type and user) (1)	Transport facility and service expenditures (1)	Density and mix (2)
Parking supply and price (2)	Vehicle travel (by type, purpose and location) (1)	Household transport expenditures (2)	Land use accessibility (2)
Public transit supply and quality (2)	Freight transport (1)	Traffic accidents and casualties by mode (1)	Portion of land devoted to transport facilities (2)
Walking and cycling facility supply and quality (3)	Person travel (by mode, purpose and location) (2)	Energy consumption (1)	Land valuation (as impacted by transport facilities and services) (3)
Port and airport size and quality (1)	Mode share (1)	Pollution emissions and exposure (2)	Costs and market values (2)
Transport system connectivity (2)	Non-motorized travel (3)	Traffic and aircraft noise (2)	
Accessibility indicators (1)	Travel speeds and delay (congestion) (1)	Transport quality for disadvantaged groups (3)	

This table rates the overall quality of various types of data from good (1), moderate (2), and poor (3).

Some statistics are of questionable accuracy. There is seldom independent review and reporting of data quality. International organizations, such as the International Road Federation and the International Energy Agency find significant errors, omissions and inconsistencies in much of the data they receive from national governments, requiring investigations and adjustments.

Many government agencies are under pressure to only implement "essential" activities. Few public officials appreciate the role these data play in efficiently achieving key planning objectives, and fewer are able to articulate these benefits to colleagues and the general public. Data programs are declining in some countries, including reduced scope, frequency, analysis and distribution of U.S. and Canadian census, American Community Survey and National Household Travel Survey data. This reflects a lack of appreciation by officials and the general public. Data program managers sometimes express reluctance or even fear of data program expansion and quality control. They express fears that standardization and quality control will increase their program costs and criticism of their work.

No U.S. government agency or major international professional organization currently promotes transport-related data program strategic planning.

Current U.S. Data Program Quality and Scope

Some U.S. transportation organizations have strategic data program development plans. For example, in 2011 the Transportation Research Board released, *How We Travel: A Sustainable National Program for Travel Data*, which outlined long-term data needs, and it currently has a Special Task Force on Data for Decisions and Performance Measures working on these issues.

However, their mandates tend to be limited, primarily concerned with meeting the transport modeling and agency performance evaluation needs. They are only beginning to consider the data needs for more multi-modal planning (such as improved travel demand surveys, detailed information on non-motorized and public transit conditions, and land use factors), there is little consideration for the data required for sustainability planning (information for social equity analysis, parking costs, land use impacts, etc.), and there is currently virtually no effort to make U.S. data sets consistent with other countries, and therefore suitable for research.

Table 6   **Conventional Planning Modes and Impacts**

		Expanded Scope ➔		
		Automobile-Oriented	Multi-Modal	Sustainability
		Vehicle travel demand, roadway conditions, traffic speeds, level of service, accident rates	Demand for alternative modes, quality of non-motorized and public transport service, land use accessibility	Various social and economic impacts including travel affordability, quality of access for non-drivers, health, etc.
◀ Quality Improved	Comprehensive	Good within U.S. transport agencies. Moderate to poor at local and regional levels.	Incomplete. Starting to improve for multi-modal level-of-service evaluation	Incomplete. Some data are starting to improve, but others not at all.
	Accurate	Good.	Generally poor.	Mixed, but generally poor
	Consistent	Good consistency between states. Moderate to poor at local and regional levels. Little consistency with other countries.	Generally poor.	Generally poor
	Transparent	Moderate to good.	Generally poor.	Generally poor
	Frequent	Moderate and declining	Generally poor.	Generally poor
	Available	Moderate to good	Generally poor.	Generally poor

Current efforts to improve U.S. data programs focus primarily on improving automobile-oriented performance evaluation data, such as vehicle travel demand, roadway conditions, fuel costs, etc. Less effort is being devoted to improving information concerning alternative modes or for sustainability factors. There is good consistency at the state level, but less at the local and regional level, and virtually no effort to develop consistent data with other countries.

Current U.S. data program development efforts may be adequate for improving the ability of transport agency to model and evaluate motor vehicle travel conditions, but will be inadequate for evaluating other modes and accessibility factors, and other types of impacts, and will be least adequate for research purposes. As a result, future research will be more costly and less effective than if we started now to expand and improve data programs.

This is not to single out U.S. data programs, other countries have even less adequate data program strategic development plans.

Who Should Lead?

Data program improvements are unlikely to occur on their own. Success will require leadership by appropriate organizations. This should include national organizations to support national data programs, and international organizations to provide guidance and coordination among various jurisdictions and agencies.

Several international organizations collect certain types of transport-related data, and have experience collecting data from various national agencies. The World Bank and the United Nations attempt to collect a wide range of data from all countries, but have little quality control (they seem to post whatever data are submitted by member nations and international organizations). The Air Quality Asia Emissions Database, the International Road Federation and the International Energy Agency collect specific types of data, and do have some degree of quality control. Cities ACT, OECD, and the European Union collect a variety of data for a specific geographic region, and have some quality control.

The Global Transport Intelligence Initiative has the goal to collect and dissemination transport-related data around the world, particularly in developing countries. It currently has limited resources, and few OECD countries or transport professional organizations are directly involved.

Some academic and research organizations have tried to collect transport and land use data for various countries and cities, but their resources are limited. The *Mobility In Cities Database*, the *Global City Indicators* and other similar efforts collect comprehensive data for various urban areas, but they generally lack the resources needed for quality control and regular updates.

Within the U.S., the Transportation Research Board, AASHTO, the U.S. Department of Transportation, and its subsidiary the Bureau of Transportation Statistics, all have responsibility for long-term strategic transport planning and data collection, and are highly respected. However, they are specifically prohibited from political lobbying, which constrain some of their activities. The Institute of Transportation Engineers (ITE), the American Planning Association (APA), the American Road and Transportation Builders Association (ARTBA), and the American Public Transportation Association (APTA) have somewhat more limited responsibilities, but are unrestricted in their political activities, and have government affairs programs. Of these, only the ITE is an international organization.

Currently, no organization seems to have both the strategic vision and the resources needed to expand the scope and quality of transport-related data programs needed for more comprehensive and consistent transport-related data. The Global Transport Intelligence Initiative is probably the best positioned to achieve implement this goal, if it can build the necessary resources and partnerships, particularly with OECD member countries that are not currently involved.

Data Program Best Practices
This section describes various easy to improve data programs.

Data should be treated as unique and valuable assets. Data should be collected, maintained and protected to maintain their future value.

Data program should have strategic plans that identify what and how data should be collected, who is responsible, and how program quality will be improved over time. These plans should attempt to anticipate future planning issues and their evaluation requirements, and therefore future data needs.

Transport-related data should be comprehensive and integrated, including multiple facilities, modes and impacts, at appropriate geographic scales (local, regional and national).

Data programs should strive to be efficient, taking advantage of existing data collection activities and newer technologies.

International organizations should establish data technical standards and guidelines for defining and collecting consistent, reliable transport-related data. These efforts should support professional development activities and apply Total Quality Management that continually improve data programs.

Transportation professional organizations should work to communicate the value of transport-related data programs. We must become articulate at explaining the various benefits provided by data, the risks of reduced data quality, and the economic returns provided by data program investments. This must include detailed technical analyses, and easy-to-understand storied that communicate these concepts to general audiences.

Conclusions and Recommendations

Comprehensive, high quality transport-related data are useful for many types of decision making. To be useful for planning and research, data sets much be suitably comprehensive, accurate, consistent, transparent, frequent and available, including multiple facilities, modes and impacts, at appropriate geographic scales (local, regional and national). New planning issues expand the demands for transport-related data.

Planners and researchers can describe countless situations in which our understanding of transport problems, and our ability to select optimal solutions, is constrained by inadequate data. Even basic data such as the number and types of vehicles on the road, the distances people travel, the amount of fuel consumed, and the number of traffic deaths and injuries that occur, are often difficult to determine and compare between different jurisdictions or time periods.

Different organizations, professions, and user groups have different perspectives concerning data priorities; many perceive the value of "their" data but not other types of data. Transport-related data are collected by many organizations, but resulting data sets are often incomparable or difficult to use due to inconsistent definitions and collection methods, or because the resulting data are difficult to obtain. Data program improvement costs are relatively modest compared with their potential benefits. Strategic planning can improve data program scope and quality at minimal cost by standardizing and coordinating existing data collection activities.

Governments should establish strategic data program development plans, which identify what, who and how transport-related statistics should be collected. This plan should strive to collect data efficiently, taking advantage of existing data collection activities and newer technologies. These programs should attempt to anticipate future planning demands, including newer planning issues, modes and impacts.

International organizations should establish data technical standards and guidelines for defining and collecting consistent, reliable transport-related data. These efforts should support professional development activities and apply Total Quality Management that continually improve data programs.

Some current data programs are under threat. In the future we may have less information on travel activity than we had in the past. A common narrative is that government activities in general, and data collection programs in particular, should be pared back to "essential" components. Yet, comprehensive and quality transport data essential for efficiently addressing many of the critical problems facing society, and it is impossible to know what data will be needed for future planning and research.

There is a need for transportation professionals to better communicate the value of data programs, and support strategic data program development. The transportation profession currently lacks leadership on these issues. Some organizations that have an interest in data program development are prohibited from lobbying, and some international organizations lack the resources to promote, plan, collect or improve data.

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