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Data Sharing of Traveler Information with the Public and Private Sectors: State of the Practice

Mark A. Miller, Kevin Balke

Report for TO 4124

CALIFORNIA PARTNERS FOR ADVANCED TRANSIT AND HIGHWAYS

Data Sharing of Traveler Information with the Public and Private Sectors:

State of the Practice

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Final Report for Task Order 4124

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ABSTRACT

This report presents the results of its examination of the current state of the practice of traveler information data sharing with the public and private sectors. A review of the literature was initially performed followed by an analysis of responses to a survey instrument that was designed and administered to practitioners in the field, primarily representatives from public sector agencies, who are in the business of collecting traveler information data. Survey results have addressed the subjects of what data is shared, with whom it is shared, why it is shared, how it is institutionally arranged and managed, how effective the sharing enterprise has been, and how the enterprise can be improved. More work is needed and a next step could be the development of an action plan to implement the lessons learned.

Key Words: traveler information, data sharing, survey

EXECUTIVE SUMMARY

This report constitutes the final deliverable for PATH Project Task Order 4124 — "Data Sharing

of Traveler Information with the Public and Private Sectors: State of the Practice". The project

investigated the primary questions relating to traveler information data sharing including:

- Who shares traveler information data?
- What data is shared?
- Why is such data shared?
- What are the institutional and/or policy-related settings associated with data sharing?
- How can the physical or technical aspects of data sharing be described?
- How effective has the data sharing experience been?
- Has the data sharing experience provided lessons learned for the future?

To get answers to these questions, a survey instrument was designed and administered and

responses were analyzed. The survey was administered to members of the public and private

sectors with knowledge and experience in the data sharing business in order to elicit insight and

expertise from these real-world practitioners. A total of thirty-six completed and returned

surveys were analyzed and form the basis of the findings documented in this report. A

comparison was also made between overall responses and responses restricted to members of the

four-State Multi-State Operations Research and Implementation Program (MORIP) Pooled Fund

Study: California, Minnesota, Texas, and Washington.

Principal findings include:

- Generally, more than _ of survey respondents share data with members of the private sector.
- From eighty to over 90% of survey respondents share data with public sector organizations.
- Highway electronic/digital data, both real-time and static, is shared with both the private and public sectors, to a greater degree compared to verbal and video type of data.
- Transit data, regardless of the type of data or with whom it is shared, is shared only in limited and small ways, relative to highway data.
- Data is shared verbally to a considerable degree, especially given the ever-increasing electronic and digital format of traveler information data.
- The most important reason given as to why agencies and organizations share data is to enhance coordination levels among the region's transportation agencies to improve overall travel conditions
- Approximately _ of all respondents and three-quarters of MORIP respondents have a formal policy toward data sharing and of those with a formal policy, a majority stated that the policy was developed either because agency wants to help disseminate traveler information or to establish process for handling data requests

- For those respondents without a formal policy, agency views are usually expressed through contracts or agreements with recipients
- Over 85% of respondents, both overall and MORIP, require a written agreement when sharing data at least some of the time
- Approximately only _ of respondents, both overall and MORIP, seek to recover revenue from the use of their agency's/organization's data beyond the costs of making it accessible; Of these respondents, more than _ view such arrangements as successful and would recommend revenue sharing to others
- Exclusive arrangements for data access are used only minimally
- At least 80% of respondents, both overall and MORIP, require that users pay for their own hardware, communications, and/or software costs for accessing the data
- At least 85% of respondents, both overall and MORIP, require that users acknowledge the source(s) of the data, while _ to _ of respondents impose technical and use restrictions
- Over _ of respondents, both overall and MORIP, favor the development of guidelines as a proper federal activity to promote data dissemination
- The Internet is the most popular means through which data is retrieved with approximately 60% and 75% of overall and MORIP respondents, respectively, selecting the Web
- Generally, MORIP and overall responses follow very similar response patterns though differences in degree exist
- Respondents' most important lessons learned include:
  1. Standards and consistency would be very valuable, e.g., data collection methods, data format, protocol
  2. Establish and maintain open lines of communication among agencies as to data availability, its benefits, and what other organizations are doing—a marketing effort
  3. Be realistic and practical about costs, especially, O&M costs of data sharing
  4. ATIS marketplace is very immature with a small user base, financially weak, and limited market demand
  5. Establishing partnerships is time consuming and cumbersome with public sector lagging market speed
  6. Public sector role should be to supply data, not serve a retail role nor prescribe outcomes while performing data collection/processing functions and delivering multiple data types while private industry serves as a source for customized distribution
  7. Cost of data sharing is burdensome on public agencies driving a search for ways of "sharing the costs of sharing the data" with private industry
  8. Establish upfront written agreements and policies
  9. Work needed to maintain data accuracy, timeliness, reliability and to enhance the type and quality of shared data
  10. Too much competition on whose system is better; do more for common good
  11. Need for education in the data sharing business
  12. Take the time upfront to define objectives, plans and system design in data sharing enterprises vis-à-vis available funds
  13. Resources need to be adequate and reliable to handle and maintain data requests
  14. Need to have a common and centralized point of access for data

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1.0 INTRODUCTION

This report constitutes the final deliverable for PATH Project Task Order 4124 — "Data Sharing of Traveler Information with the Public and Private Sectors: State of the Practice". The remainder of this section discusses the motivation for, objectives of, and the methodological approach used in the project.

1.1 Motivation and Objectives

With the installation of more and better traffic surveillance equipment and better methods for collecting, processing, and characterizing this information, its potential value to travelers has been and will be enhanced. Better processing of 911 data may also provide more timely information on incidents. Paralleling the enhancement of information is the improvement of methods to disseminate the information through such means as the Internet/World Wide Web, in-vehicle computers, hand-held devices, and other methods yet to be developed. At the same time private industry is developing other sources of traffic information, most notably cell phone tracks, which give information on travel times not only on freeways but on arterials with signals, where standard surveillance devices can not provide travel times. These tracks may also be able to provide information on origins and destinations and vehicle volumes if combined intelligently with other data sources, such as household travel surveys and loop detector counts. There is also a potential for private firms to perform conventional traffic surveillance for public agencies, just as many municipal services, such as waste collection and disposal are now contracted out to private firms. So sharing can work two ways, the public sector providing data to private industry and private industry providing data to public agencies.

With such changes in many aspects of the traveler information data usage business, the MORIP four-State Group felt it was an appropriate time to step back and assess where the state of the practice is by taking a snapshot of current activities especially in the context of the four MORIP States of California, Minnesota, Texas, and Washington, yet also, to the extent possible, on a national scale.

The primary objectives of this work were to assess the state of the traveler information data sharing practice to be able to answer the following major questions:

- Who shares traveler information data?
- What data is shared?
- Why is such data shared?
- What are the institutional and/or policy-related settings associated with data sharing?
- How can the physical or technical aspects of data sharing be described?
- How effective has the data sharing experience been?
- Has the data sharing experience provided lessons learned for the future?

1.2 Methodological Approach

To fulfill the project's objective, we initially identified partial answers to some of the above questions by means of reviewing the literature and the knowledge and experience of project team members. Next, we honed these incomplete answers from the experiential point of view of individuals working on traveler information data sharing in the "real world". We gained insight from people with direct and first-hand data sharing experience by designing and administering a survey instrument to numerous individuals around the U.S. and subsequently analyzing survey responses. By design, the survey sample size was relatively small and thus even with a large response rate, survey response analysis was accomplished more descriptively than statistically with an assessment of current opinions on this topic rather than a scientific study.

During the course of the project, we learned of very similar and concurrent work sponsored by the Federal Highway Administration[1]. There were several areas of overlap between the two projects, including:

- Objective
- Use of survey instrument to collect data
- Survey questions
- Sites for case studies
- End date

Because of the enthusiasm for collaboration to leverage the projects off each other, the two teams merged their projects through an informal arrangement with a common Statement of Work and

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[1] The prime contractor for this work was Battelle Corporation.

survey instrument, survey administered to a list of Points-Of-Contact that were jointly identified, shared survey results, and separate final reports (deliverables). The advantages are three-fold:

- Opportunity for state/federal collaboration
- Potentially have much wider geographic coverage for survey
- Avoid making multiple calls to same people

1.3 Contents of the Report

This is the first of five sections. Section 2 provides general background material along with a summary of previous work on this subject. Discussion of the survey design and administration is presented in Section 3, followed by the analysis of survey findings in Section 4. Conclusions are provided in Section 5.

2.0 BACKGROUND

This section provides a brief discussion, based on a review of the literature, of the questions being raised with respect to traveler information data sharing practices in the U.S. This review serves as a foundation from which the survey work—its design, administration, and analysis—flows.

2.1 Macroscopic Examination of Traveler Information Data Sharing

The primary sources of information for the review of the literature were two workshops held under the auspices of the Advanced Traveler Information Systems (ATIS) Committee of the Intelligent Transportation Society of America (ITS-A). The first workshop was held in San Diego, California in October 1997 and focused on the development of business models for ATIS deployment (References 1 and 2). The second workshop was held in Scottsdale, Arizona in February 2000 and focused on ATIS-related data collection and data quality (References 3 through 8).

Data sharing issues/questions raised at the ATIS data collection workshop include:

- Who has the data?
- What data will be made available?
- Who needs the data?
- What kinds of policies are in place to maintain the integrity of the data?

- How much enthusiasm is there on the part of the public sector, usually the collector and maintainer of traveler information data, to share with the private sector?
- Is the data gathered by the public sector sufficient for private ATIS needs?
- Under what limitations will the public sector allow the private to use the regional data?
- What are the constraints in sharing data between public sector agencies or the private sector sharing their data with the public sector?
- How will the data be accessed?
- To whom will the data be made available?
- How often will the data be accessed?
- Is there a cost to provide access, and is there an appropriate cost recovery mechanism?
- Are there system or privacy security issues and how will they be handled?
- Are there to be assurances or caveats to users regarding accuracy, reliability or availability?
- Should there be "performance" or data integrity requirements to ensure that the data are "properly" used?
- Is there any liability for use of the data, or relief from such liability?
- How would archived data be made available to interested public and private parties?

Both public sector agencies and private industry have their own perspectives and concerns about data sharing and about each other relative to this enterprise, including issues of access, service, data quality, and costs. Members of the private sector view the public sector as having data that they are not making available to them, while some in the public sector see private sector requests as unreasonable, costly, or contrary to public policy considerations. Some, but not all, states and metropolitan areas seem to have worked out agreements.

The following steps were proposed at the Workshop as a starting point:

- Gain a better understanding of the issues of all parties.
- Identify the parties' specific objectives, how they vary, and what barriers exist.
- Identify examples where those barriers have been creatively addressed.
- Share the information in the form of recommended best practices, model agreements, etc.
- Recommend other actions, if required

The issues and questions about data sharing that have been raised have assisted the project team in designing a survey instrument that focuses on most, if not all, of these same issues to elicit the insights from field practitioners regarding data already being collected to determine if this data are being leveraged to the maximum extent possible for traveler information applications.

3.0 SURVEY DESIGN AND ADMINISTRATION

The survey instrument was designed and administered to solicit the "real world" opinions and experiences of individuals actively involved in the sharing of traveler information data. The opinions of respondents provided this study with insight and expertise grounded in experience intended to provide guidance for on-going and future data sharing activities. Our goal was to investigate the following topics:

- Extent of data sharing
- Content and format of data sharing
- With whom is data sharing taking place
- Objectives, expectations for sharing of data
- Type of policy(ies)/mechanism(s) set up to share data including level of exclusivity, method to recover revenue, and conditions on data access
- Effectiveness of alternative data sharing models
- Lessons learned and recommendations for improvement

3.1 Participant Identification

An initial candidate list of potential participants was developed based on the experience of the project team members in the area of traveler information data. Breadth across rather than depth within individual organizations was preferred. This initial list was reviewed and additional names supplied by the teams' management oversight partners, both from MORIP and FHWA. Additional potential participants were identified following-up on leads obtained from early contacts.

3.2 Design of the Survey Instrument

On the survey, participants were identified by their city/region, job title, and organizational type. The survey (See Appendix A) contents consisted of a set of twenty questions requiring mainly simple check-off "Yes" or "No" responses as well as multiple choice responses together with open-ended questions that gave respondents the opportunity to convey more detail in their answers as well as allowing the questioner (See Section 3.3 Survey Administration) to probe for additional information with follow-up questions. There is naturally a trade-off between the close- and open-ended questions. The former allows for much simpler data reduction and analysis processes than the latter, while the latter provides the opportunity to get added detail and more

enriched answers. Participants also had the option not to respond if they thought a question was "Not Applicable" to them or they felt they just did not know how to answer a specific question. Finally, participants could list additional issues they felt were overlooked by the survey.

The team, that is, the extended MORIP/Battelle team, designed a draft survey covering the primary issues listed above in Section 3.0. This instrument was tested for comprehensiveness, readability, and clarity by administering it to individuals familiar with the data sharing knowledge domain but who would not be part of the pool of potential respondents. The survey was revised and finalized based upon the results of these tests.

3.3 Survey Administration

The survey was administered by initially placing telephone calls to each person on the master survey contact list, which contained 51 names. The purpose of these initial calls was to introduce the project to potential participants and request participation in the survey. The MORIP and Battelle team members called the MORIP and non-MORIP contact names, respectively[2]. Repeated attempts (two to three calls) to contact people on the master contact list were made. Due to the time constraints of both project team members and potential participants, especially in the scheduling of and administering a telephone interview survey, the team felt it would be better to give potential participants the option of filling out the survey on their own and returning it to the project team without the interviewer/interviewee interaction while the survey was being administered. While the survey was not purposely designed to fill out on-line, this method could be and was used by several respondents and returned via e-mail. Of course, the survey could be printed, filled out, and returned by fax. Giving participants this alternative helped increase the number of completed and returned surveys than otherwise possible, but at the cost of the interaction between interviewer and interviewee. Where appropriate and necessary, follow-up calls were made to compensate for this shortfall.

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[2] There is some likelihood of inconsistency in survey administration because more than one Project Team member administered the survey. However, this was moderated by the fact that several of the participants filled out the survey without the benefit of an actual interview and thus differences in interview style would have been lessened.

3.4 Survey Limitations

Initially 51 people were identified as potential survey participants and were contacted by the project team, resulting in 40 people willing to participate in the survey and 36 returned and completed surveys from the four-State MORIP Group as well as numerous other regions in the U.S. including Georgia, Kentucky, Missouri, and Pennsylvania (See Appendix B for a complete listing of respondents' regions). The decrease from 51 to 40 was due to candidates 1. not returning telephone calls, 2. declining to participate either at the initial contact stage or once they read the survey and not providing a substitute contact, 3. not returning the survey in time to be included in the analysis of responses, and/or 4. selecting only one individual to represent an organization rather than multiple representatives.

There were two occasions in which the survey was implemented in a group setting with multiple respondents, one occasion with two people and the other with three people. The completed survey represented the group's consensus views considered more as a unit rather than two or three individuals. On one other occasion, a willing participant returned the survey answering "No" to the initial question ("Do you currently share data used in traveler information with private and public entities?") and thus ending participation in the survey. This clustering resulted in 36 completed surveys on which the analysis was based. The study and its associated sample size were, a priori, not intended to be of the sort or the magnitude where standard statistical validity concerns and associated techniques would come into play, such as the use of over sampling to obtain a pre-determined distribution of particular respondents by a certain attribute. Due to the small number of survey participants, we did not intend this survey to be a statistical evaluation but rather a descriptive one with study findings interpreted as an assessment of current opinions and experience on this topic rather than a scientific study. We believed a small, yet knowledgeable and experienced group of participants would provide greater insight than a larger population of speculative or uninformed participants.

When viewed on a state-by-state basis, it appears as though the findings may be skewed toward certain geographical regions of the U.S., especially California and Texas, because of the number of responses from those two states, namely, 7 and 5, respectively, representing 19% and 14% of the total number of responses (See Appendix B). Whereas each returned non-MORIP survey

almost unanimously represented distinct states and regions in the U.S. However, each of the two large state "delegations" from California and Texas represent not only different branches of the same organization, e.g., Caltrans and TX DOT individual district offices, but also different organizational types, e.g., department of transportation, metropolitan planning organization, and regional transit authority. These differences are represented in the variety of responses observed. Surveys were distributed to approximately equal numbers of participants per individual organization. Overall, the objective was to obtain information from as wide a variety of different regions, including major urban and non-urban areas.

4.0 SURVEY FINDINGS: OVERALL AND FOUR-STATE MORIP GROUP

This section presents the results from our analysis of the completed surveys. The sub-sections correspond to major survey components. Survey findings were based on two separate analyses of survey responses:

- Findings based on all responses
- Findings restricted to the four-State MORIP Group

Approximately three-quarters of the respondents, both overall (26/36) and when restricted to the four-State MORIP Group (12/16), were affiliated with State Departments of Transportation (DOT), thus making the responses heavily weighted toward the opinions and views of State DOTs (Appendix B). As a result, a separate analysis of DOT-only responses was not made. The remaining 10 respondents from the total population of 36 include four transit agency respondents, two from the private-sector, a single regional transportation planning agency representative, a single respondent from a countywide roadway authority for construction and maintenance, and two multi-jurisdictional transportation organizations (each containing state DOT representation). Because all other respondents pooled together from transit authorities, the private sector, MPOs, and other organizations comprised only 25% of the total respondent population, segmenting the responses into other such groupings would leave us with even fewer responses from which to analyze results as well as make it more difficult to maintain the confidentiality promised of all potential participants when first contacting them.

It must be reiterated that comparisons that are made, e.g., between overall and MORIP results, while informative and valuable, must be viewed through a more qualitative than quantitative and statistically rigorous lens.

4.1 Data Recipients

This section addresses the question: Who gets the data? The results are summarized in Table 1 for the survey findings overall and restricted to the MORIP 4-State Group. The first five data recipients listed in Table 1 are private sector entities[3]. Overall, except for local newspapers, more than one-half of survey respondents shared data with these members of the private sector. For the MORIP Group, in all these private sector cases, more than one-half of responses shared data with them. Relative to sharing data with public sector organizations, from eighty to over ninety percent of survey responses indicated a sharing of data with such entities. The biggest differences between the overall responses and those from the MORIP Group are relative to sharing data with local newspapers and the "Other" category. An explanation for this difference could be that the non-MORIP respondents simply just have not tapped the newspaper market and/or do not yet view this as a valuable outlet.

TABLE 1 Recipients of Data.

Who gets the data?	OVERALL (% of 36 responses)	MORIP (% of 16 responses)
Local TV or cable TV stations	77.8	75.0
Local radio stations	66.7	81.3
Local newspapers	36.1	68.8
Private sector Internet Service Providers	52.8	62.5
Traffic reporting organizations (private sector)	75.0	75.0
Other public agencies	91.7	81.3
Other	38.9	56.3

Examples of the types of "Other public agencies" include:
- Police Agencies/departments (local, state)
- Chambers of Commerce
- Colleges/Universities

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[3] With the possible exception of local TV in the case of local <u>public</u> television stations such as KTEH and KQED in the San Francisco Bay Area.

- Transit Authorities
- Municipal agencies
- Courts
- Local cities, towns, and counties
- Regional Transportation Planning Agencies (Metropolitan Planning Organizations, Councils of Governments)
- Emergency medical response

Examples of the types of "Other" include:

- Local sports teams/franchises
- Major activity centers/traffic generators (malls, other businesses)
- Commercial vehicle operators
- Information integrators

4.2 Contents of Data

This section answers the question: What are the contents of the data? The results are summarized in Tables 2a and 2b for the survey findings overall and the MORIP 4-State Group, respectively. Data types were grouped into two categories: real-time and static. Real-time data refers to frequently changing information, sometimes also referred to as "dynamic". "Static" data refers to information that either does not change or changes so infrequently that it could be considered to be unchanging for purposes of this investigation. For example, "Transit/static" data could include bus schedules and route maps; "Highway/static" could include posted speed limits or long-term construction projects (e.g., seismic retrofit of San Francisco Bay Area bridges). The numbers listed in the tables indicate the percentage of survey respondents who share this type of data with either private entities or public organizations. The following observations may be made from the tables:

- Highway electronic/digital data, both real-time and static, shared with both the private and public sectors garnered the largest percentage of affirmative responses compared to verbal and video type of data.
- Transit data, regardless of the type of data or with whom it is shared, is shared only in limited and small ways, relative to highway data.
- Data is shared verbally to a considerable degree, especially given the ever-increasing electronic and digital format of traveler information data.
- MORIP and overall responses follow very similar patterns though differences in degree exist.

TABLE 2a Contents of Data (OVERALL).
(% of 36 Responses)

	Electronic/Digital		Verbal		Video	
	Private	Public	Private	Public	Private	Public
Highway/real-time	75.0	69.4	52.8	55.6	63.9	66.7
Highway/static	58.3	63.9	38.9	36.1	2.8	5.6
Transit/real-time	5.6	11.1	2.8	11.1	0.0	8.3
Transit/static	16.7	19.4	0.0	11.1	0.0	2.8

TABLE 2b Contents of Data (MORIP).
(% of 16 Responses)

	Electronic/Digital		Verbal		Video	
	Private	Public	Private	Public	Private	Public
Highway/real-time	93.8	75.0	43.8	50.0	68.8	68.8
Highway/static	68.8	68.8	31.3	25.0	6.3	6.3
Transit/real-time	12.5	6.3	0.0	0.0	0.0	0.0
Transit/static	37.5	18.8	0.0	0.0	0.0	0.0

4.3 Institutional Aspects of Data Sharing

This section presents the institutionally related findings from the survey with a discussion of the following topics:

- Motivation
- Policy making
- Cost recovery
- Conditions on data use
- National role

4.3.1 Motivation

This section addresses the question of why data is shared in the first place. Respondents were asked to rate the reasons they share data on a scale of "1" to "5" with "1" indicating the highest rating and "5" the lowest. Results are shown in Table 3. The table entries in parentheses indicate the number of responses who rated the corresponding reason while the other number indicates

the average rating based on all the scores a particular reason received. For example, for Reason #1, 23 out of a total of 36 responses rated this reason while the other 13 respondents did not and of these 23 responses, the average rating on a scale of 1 to 5 was 2.6. Once again, overall and MORIP responses closely match each other with the highest rated motivation for sharing data being to enhance coordination levels among the region's transportation agencies to improve overall travel conditions. Respondents were also given the option of stating their own reasons and examples include:

- Contractual obligations
- Out of altruism (for public agencies)
- Helps promote centralized data collection operations

TABLE 3 Motivation for Sharing the Data.
Average Rating (Number of responses to this question)

Why do you share the data?	OVERALL (36)	MORIP (16)
1. My organization is currently participating as an institutional partner in a regional program that requires my agency to share data.	2.6 (23)	2.3 (9)
2. My organization has received data solicitations from the private and public sectors.	3.0 (29)	2.8 (10)
3. To enhance coordination levels among the region's transportation agencies to improve overall travel conditions.	1.6 (32)	1.8 (13)
4. My organization has an internal policy to use traveler information to improve utilization of the transportation system.	2.4 (31)	2.4 (14)

4.3.2 Data Sharing Policies

This section discusses the policy-related aspects of data sharing. Findings are presented in Tables 4 through 6.

With respect to the responses overall and MORIP, 52.8% (19/36) and 75.0% (12/16) of respondents, respectively, indicated that their organization does have a formal policy toward data sharing. Reasons why such a formal policy was developed are provided in Table 4. For both overall and MORIP responses, a majority stated that the policy was developed either because the agency wants to help disseminate traveler information and/or to help establish a process for handling data requests. These policies range in age from 0-1 year old to 30 years old, with

approximately half of the policies being no older than three years. Examples of other reasons for establishing formal policies include

- Manage expectations and assets by being formalized upfront
- Facilitate agency coordination for incidents and construction activities
- Help ensure fair and equal treatment across all data requests, i.e., for consistency and standardization purposes
- Issues of privacy
- Help establish partnerships
- Mutual agreement

TABLE 4 Formal Policies for Data Sharing.
(% of Applicable Responses)

Does your organization have a formal policy about data sharing?	OVERALL (19)	MORIP (12)
Policy developed because agency wants to help disseminate traveler information	57.9	58.3
Policy developed to establish process for handling data requests	68.4	58.3
Policy developed for other reasons	42.1	25.0

For respondents who do not have a formal policy, i.e., the remaining 17 out of 36 overall respondents and remaining 4 out of 16 MORIP respondents, Table 5 provides the means through which organizational views on data sharing are expressed. Again, overall and MORIP responses follow a similar trend though have differences. Nevertheless, in both cases contracts and agreements with recipients is the primary means through which such views are expressed.

TABLE 5 Means of Expressing Data Sharing Views.
(% of Applicable Responses)

Without a formal policy, how are your agency's data sharing views expressed?	OVERALL (17)	MORIP (4)
Contract or agreements with recipients	52.9	25.0
Training or procedure manuals	11.8	0.0

(Percentages do not add up to 100% because some respondents did not answer this question)

The respondents who do not have a formal policy were then questioned on whether they have plans on issuing a formal policy. Of the 17 and 4 responses overall and for MORIP, respectively, only 6 respondents overall and no MORIP respondents indicated any plans for issuing a formal policy. Reasons for issuing a policy and the level of support are stated in Table 6.

TABLE 6 Future Plans for Data Sharing.
(% of Applicable Responses)

Do you have plans for issuing a formal policy?	OVERALL (6)	MORIP (0)
We have such plans because agency desires to help disseminate traveler information	83.3	N/A
We have such plans to establish process for handling data requests	83.3	N/A
We have such plans for other reasons	16.7	N/A

The next question investigated dealt with the need for documenting in some way any data sharing activity. Results applied to all respondents, i.e., 36 and 16 respondents overall and MORIP, respectively. Results show (Table 7) that for both overall responses as well as for MORIP responses, at least 86% of respondents require some form of written agreement documenting any data sharing agreements.

TABLE 7 Requirement for Written Agreement.
(% of All Responses)

Is a written agreement required when you share data?	OVERALL (36)	MORIP (16)
All the time	50.0	50.0
Sometimes	36.1	37.5
None of the time	11.1	6.3

(Percentages do not add up to 100% because some respondents did not answer this question)

4.3.3   Cost Recovery Mechanisms

This section addresses the cost-related issues associated with data sharing. The issues considered include

- Effectiveness of cost recovery mechanisms
- Exclusivity of data access arrangements
- Financial arrangements for data access

Regarding the effectiveness of cost recovery mechanisms, survey respondents were asked whether they sought to recover revenue from the use of their data beyond the costs of making it accessible. Twelve of 36 respondents overall and 5 of 16 MORIP respondents said "Yes" to this inquiry. The "Yes" respondents were then asked whether they thought such mechanisms were successful and if they would recommend revenue sharing to others. Percentages of "Yes" responses to these two follow-up questions are shown in Table 8, again displaying very close behavior between MORIP respondents and the overall perspective. Reasons given for recommending revenue sharing to others include:

- Provides opportunity to offset costs (O&M and infrastructure)
- Helps develop additional funding mechanisms to expand data coverage
- Encourage alternative forms of "revenue" sharing, such as through bartering

TABLE 8 Effectiveness of Cost Recovery Mechanisms.
(% of Applicable Responses)

Do you seek to recover revenue from the use of your data beyond costs of making it accessible?	OVERALL (12)	MORIP (5)
Such arrangements are successful	58.3	60.0
Would recommend revenue sharing to others	66.7	60.0

Regarding the exclusivity of data access arrangements, survey respondents were asked whether they have exclusive arrangements for entities for data access. Five of 36 respondents overall and 1 of 16 MORIP respondents replied "Yes" to this inquiry. The "Yes" respondents were then asked what these exclusivity arrangements were intended to accomplish and if their agency funds

or in any way subsidizes such entities for disseminating data. Percentage of "Yes" responses to the first of these two follow-up questions is shown in Table 9. Responses to this inquiry showed the greatest difference between the MORIP Group and all respondents as a group, however, these findings should be viewed with caution given the extremely small sample size upon which they are based. Examples of "Other reasons" include:

- Helps encourage alternative/unusual productive partnerships
- Convenience factor

Only 1 of the 5 responses overall and none of the MORIP responses fund or in any way subsidizes such entities for disseminating data.

TABLE 9 Exclusive Arrangements for Data Access.
(% of Applicable Responses)

Do you have exclusive arrangements for entities to access your data?	OVERALL (5)	MORIP (1)
Intended to maximize return to agency for use of the data	40.0	0.0
Intended to minimize burden on agency by creating distribution channel for data	80.0	0.0
Other reasons	40.0	0.0

Regarding financial arrangements for data access, survey respondents were asked whether specific financial arrangements were required of users of their data. MORIP and overall responses display very close behavior relative to each other. More than 80% of respondents overall and for MORIP agreed that data users need to pay for their own hardware, communications, and/or software costs to access the data.

TABLE 10 Financial Arrangements for Data Access.
(% of All Responses)

Which of the following data sharing arrangements are required of the user?	OVERALL (36)	MORIP (16)
Reimburses agency for its costs to provide data	22.2	18.8
Pays for its own hardware, communications, and/or software costs for accessing the data	80.6	81.3
Required to share a portion of the revenue generated from its business	22.2	18.8
Makes in-kind contribution	22.2	31.3
Makes its value-added information available to agency for its internal use	41.7	25.0

4.3.4   Conditions on Use of Data

This section examined the area of conditions on the use of data and respondents were asked about such conditions. Results are shown in Table 11. Thirty out of 36 total respondents and 15 out of 16 MORIP respondents said there were data use conditions. Table entries indicate the percentage of these respondents indicating which type of conditions are applicable for them. Again, MORIP and overall responses parallel each other closely with approximately 90% of each group saying that source acknowledgement is definitely a condition for data usage. A few respondents from each group indicated other types of conditions that are listed below.

TABLE 11 Conditions on the Use of the Data.
(% of Applicable Responses)

Are there conditions you place on the use of the data?	OVERALL (30)	MORIP (15)
Technical specifications	53.3	66.7
Use restrictions (cannot use personally identifiable information, not for law enforcement, no injury/fatality scenes vis-à-vis P-T-Z[4] during accidents)	66.7	60.0
Acknowledgement of source(s)	90.0	86.7
Other	16.7	20.0

---

[4] PTZ = Pan-Tilt-Zoom camera movements

Examples of "Other" conditions include:

- Presentation of data
- Provide status on data usage
- Acknowledgement of lack of data accuracy warranty
- Can not resell (a private sector respondent)

4.3.5 Extent of National Role

This section presents the survey findings on the extent of the national role to help promote or encourage productive data sharing endeavors. Twenty-eight of the 36 respondents (77.8%) and 13 of the 16 MORIP respondents felt there is a need for a national or industry-wide standard format for sharing or archiving travel-related data. Exactly the form of national/federal participation to promote data dissemination was the subject of another question with results shown in Table 12. MORIP and overall responses again display similar response patterns with "Development of guidelines" attracting the greatest level of support among respondents. There is little, if any, support for the legislative route with voluntary means capturing the most support among the alternatives.

TABLE 12 Federal Activities to Promote Data Dissemination.
(% of All Responses)

What means are there to promote data dissemination at the national level?	OVERALL (36)	MORIP (16)
Information distribution or technical assistance regarding best or common practices	63.9	43.8
Development of guidelines	75.0	62.5
Promulgation of regulation or statute	8.3	0.0

4.4 Data Retrieval, Access, and Format

This section addresses the physical aspects of the data sharing process considering the means through which entities access data, limitations on the volume of simultaneous data accesses, means through which the public receives information, and data format.

Figure 1 shows the different physical ways data is retrieved and its level of use by all respondents and MORIP respondents. MORIP and overall responses again display similar

response patterns. By a sizable margin over all other media, the Internet captures from approximately 60% to 75% of all and MORIP responses, respectively, as a means through which data is retrieved. An almost totally monotonic decrease in level of other media use may be seen in the figure. Almost all respondents reported that more than a single medium is used for data retrieval.

Seventeen out of the 36 respondents (47.2%) and 10 out of the 16 MORIP respondents (62.5%) indicated that there was an upper limit on capacity for the number of simultaneous data accesses possible. While precise upper limits depend on the nature of the specific system, these limits can take the form of the number of port connections for Internet, phone, fax, e-mail, video output usage.
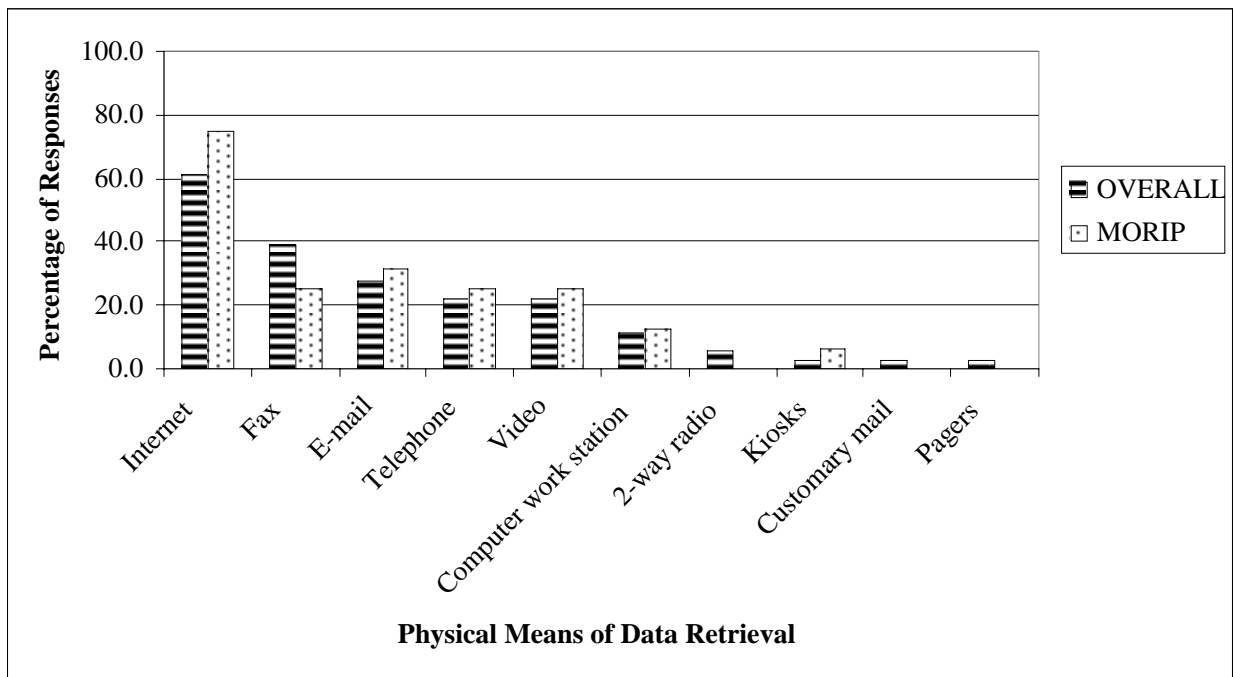
FIGURE 1 Physical Means of Data Retrieval

Thirty-four of 36 total respondents and all 16 MORIP respondents said that their organizations either currently or has plans to deliver traveler information directly to the public. Of these respondents, various means are used as a delivery device and are shown in Figure 2. MORIP and

overall responses again display similar response patterns. As was the case with respect to ways of data retrieval, the Internet, i.e., Web sites, are the primary medium through which the public receives traveler information, followed by VMS/CMS and Kiosks, then HAR and IVR. Examples of other medium mentioned by survey respondents include:

- E-mail via pagers and beepers
- Personal Digital Assistants
- Cell phones
- Local cable TV
- Fax

Twenty-one out of the 36 respondents (58.3%) and 13 out of the 16 MORIP respondents (81.3%) indicated that a common format was used for the distribution of data to the private sector as well as to public agencies. This correlates with the responses regarding participation at the national level (See Section 4.3.5) for a national or industry-wide standard format for sharing or archiving travel-related data.

FIGURE 2 Means of Data Delivery to the Public

4.5 Lessons Learned

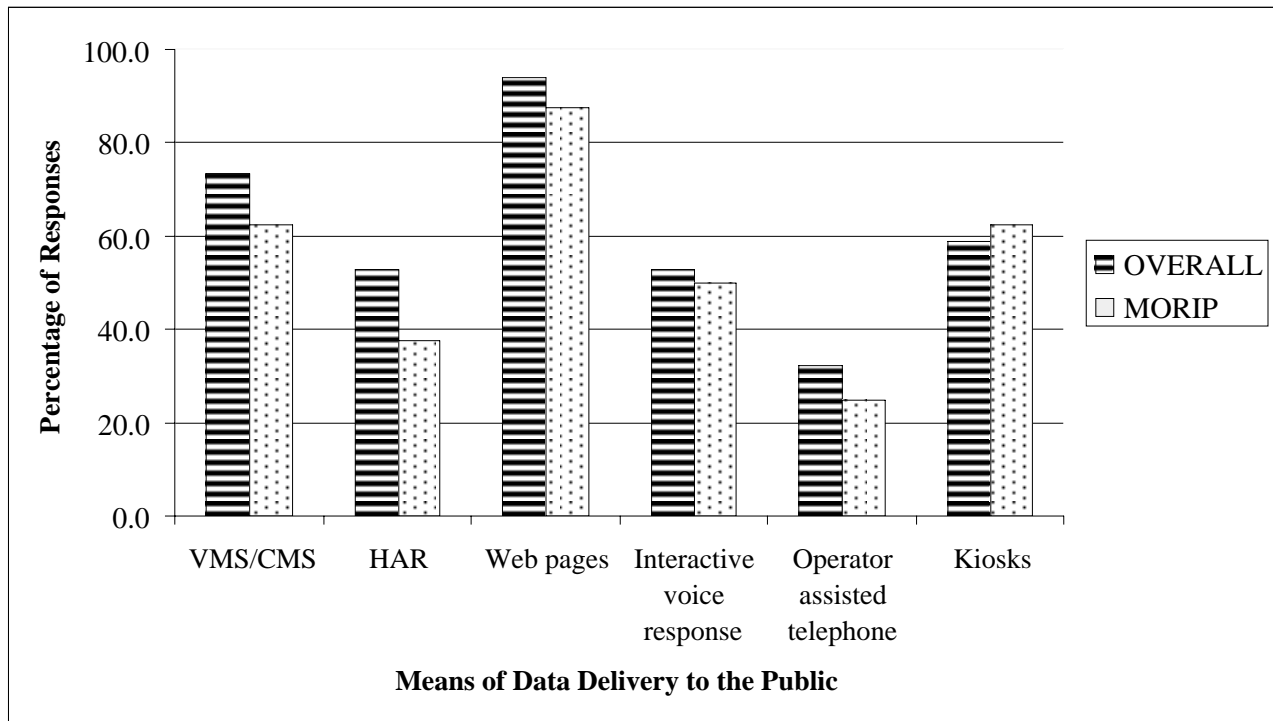Respondents were asked to summarize the overall effectiveness of their organization's data sharing methods in meeting its objectives on a scale of 1 (not at all effective) to 5 (completely effective). The average rating given by the respondents overall and by the MORIP Group were very close: 3.7 and 3.9, respectively. Each group felt positive about its organization's efforts, with over 60% of all respondents and of all MORIP respondents giving a rating of 4 or 5.

These high ratings notwithstanding, 35 out of 36 respondents provided lessons learned about their data sharing experiences. These are summarized below with the number in parentheses after each topic area indicating the number of respondents who mentioned that topic, except for those topics that were suggested only once, which remain un-numbered.

2. Standards and consistency would be very valuable, e.g., data collection methods, data format, protocol (6)

5. Establish and maintain open lines of communication among agencies as to data availability, its benefits, and what other organizations are doing—a marketing effort (4)

6. Be realistic and practical about costs, especially, O&M costs of data sharing (3)

7. ATIS marketplace issues (3):
    o still very immature, small user base, financially weak, limited market demand with limited information supply though has large growth potential and expectation

5. Institutional partnerships (3):
    o market conditions outpace contact terms, establishing relationships is time consuming, public sector lags market speed, public/private partnerships are cumbersome, RFP process obsoletes finished product

15. Roles of public and private sectors: public provide data supply role, not retail role, do not prescribe outcomes, perform data collection/processing functions, deliver multiple data types while private industry be a source for customized distribution (3)

16. Cost of data sharing is burdensome on public agencies driving a search for ways of "sharing the costs of sharing the data" with private industry, e.g., its distribution (2)

17. Establish upfront written agreements and policies (2)

18. Work needed to maintain data accuracy, timeliness, reliability and to enhance the type and quality of data that is shared, e.g., include travel time (2)

19. Too many turf wars and competition on whose system is good, better, and the best; do more for common good (2)

20. Need for education, e.g., newcomers in the data sharing business, public agency staff in certain technical issues (2)

21. Take the time upfront to define your organization's goals, objectives, plans and system design in data sharing enterprises vis-à-vis available funds (2)

22. Resources need to be adequate and reliable to handle and maintain data requests (2)

23. Need to have a common and centralized point of access for data (2)

24. Training is an important element to a successful data sharing enterprise

25. Need institutional leadership, perhaps at State level, to work out issues

26. Bring the parties together and first focus on solving the technical issues

27. Encourage open architecture, e.g., open software

28. States should be open and adaptable to public input in the traveler information arena

29. One size may not fit all: State, county, city solutions to issues may differ

30. Protection of personally identifiable information—privacy is still an issue

31. Remember the multi-modal nature of traveler information needs, i.e., the entire trip

32. Work to fill the data gaps and coverage, and enhance 24/7 data feed reliability

33. Data gap and coverage issues: existing data not always available to others, deficiency may be institutionally caused (public policy, funding, management resources, or no local desire to support)

34. Gaps in infrastructure need to be addressed

35. Know and understand your audience: data expressed through more visual means is better than just words, numbers, or maps

5.0 CONCLUSIONS

Data sharing of traveler information plays an important role in the daily business lives of both public transportation agencies and members of private industry. This report documents a

snapshot look at the current state of the practice of data sharing with the public and private sectors. Documenting this state of the data sharing practice involved as its central task addressing the often repeated inquiries of what data is shared, with whom it is shared, why it is shared, how it is institutionally arranged and managed, how effective the sharing enterprise has been, and how it can be improved. This was performed through a nationwide survey with an added focus on the major players in the traveler information and traffic management arenas, such as California, Texas, Minnesota, and Washington. Though the sample size was small and the analysis of survey responses was performed more descriptively than statistically, valuable insight was gained into this ever-changing field, with changes coming mainly as a result of advances in technology.

More work remains to be done to help smooth out the rough edges of the data sharing enterprise. Naturally, local and regional conditions and stakeholders play a significant role that must be integrated into the entire process. Survey respondents have shared with us the valuable lessons that they have learned over time in this business. These lessons need to be taken the next step, i.e., development of an implementable action plan and beyond.

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APPENDIX A: Survey Instrument

Telephone Survey on Data Ownership and Sharing with Private and Public Sectors

Name of respondent: _____
Job title: _____
Agency/Company: _____
Contact information: _____

Date and time of interview: _____
Name of interviewer: _____

Interview can be prearranged or done at the time of the first call if respondent is available. Agency needs to be screened to confirm it is sharing data with the private sector or public agencies.

Introductory remarks: Hello, my name is _____ of Battelle/The PATH Program at the University of California Berkeley/Texas Transportation Institute, and I am conducting a survey of knowledgeable persons in the field of traffic management and traveler information. We have been asked by the U.S. DOT and several state departments of transportation to investigate the current approaches to sharing and ownership of data being taken by public and private sector organizations. This interview will take about 20 to 30 minutes to complete.

Definition of data: For the purposes of this survey, please consider data for traveler information to be electronic or digital (original or processed), audio (e.g. verbal information), or video images. The data can be real-time or not and deal with highway or transit transportation.

1.   Do you currently share data used in traveler information with private and public entities?
____Yes ____No
 (*INTERVIEWER*: If "Yes", continue with Question 2, if "No", ask "Why not" and end the interview.)
_____

2.   What types of organizations are receiving data directly from you? (check all that apply)
a. Local television or cable TV stations
b. Local radio stations
c. Local newspapers
d. Private sector Internet Service Providers
e. Traffic reporting organizations (e.g. Metro Networks, SmartRoute Systems)
f. Other public agencies _____
g. Other (specify) _____

INTERVIEWER: Please note whether answers to Question 2 pertain <u>entirely</u> to the private sector, to public agencies, or a combination of the two. If answers are of only <u>one</u> type, ask all remaining questions consistent with this type. If answers involve a mix of both private and public then consistently ask questions relative to one of these (and note which one) with a follow-up question inquiring about any differences pertaining to the other, if any.

3. What types of data do you share? (check all that apply and indicate with how many private and public entities you share this data.)

	Electronic/digital		Verbal		Video	
	Private	Public Org.	Private	Public Org.	Private	Public Org.
Highway/real-time						
Highway/static						
Transit/real-time						
Transit/static						

4. Why do you share the data? (Check all that apply and please prioritize them, i.e., "#1', "#2", etc.)
   a. My organization is currently participating as an institutional partner in a regional program that requires my agency to share data.
   b. My organization has received data solicitations from the private and public sectors.
   c. To enhance coordination levels among the region's transportation agencies to improve overall travel conditions.
   d. My organization has an internal policy to use traveler information to improve utilization of the transportation system.
   e. Other (specify) _____

5. Does your organization have a formal policy about sharing of data?
   ____Yes ____No
   If "Yes", continue with this question then skip to Question 7.
   If "No", skip the rest of this question and go to Question 6.
   a. When was the policy issued?
   b. Why was the policy developed? (Check all that apply)
      i. Agency desires to help disseminate traveler information
      ii. To establish process for handling requests being made for agency data
      iii. Other (specify) _____
   c. May I get a copy of the policy (by e-mail, preferably)? (*REMINDER TO INTERVIEWER*: At this point, skip Question 6 and go to Question 7).

6. a. For recipients outside your organization, are agency views regarding data sharing expressed in
      i. Contract or agreements with recipients?
      ii. Training or procedure manuals?
      iii. If "Yes" to either of the above, may I get a copy of the applicable documents?

    b. Do you have plans for issuing a formal policy?
        ____Yes ____No
           i. If "Yes, why are you planning?
                1. Agency desires to help disseminate traveler information
                2. To establish process for handling requests being made for agency data
                3. Other (specify) _____
           ii. If "No", why are you not planning? (e.g., no demand for data, problem)
                _____

7.   When you share data with other entities (check all that apply):
    a. Is a written agreement required?
           i. All the time
           ii. Sometimes. (Specify what conditions.) _____
          iii. Never

8.   Have you sought to recover revenue from the use of your data beyond the costs of making it accessible?
    ____Yes ____No
    If "Yes", continue with this question.
    If "No", skip the rest of this question and go to Question 9.
    a. Have such arrangements been successful?
           i. Yes
           ii. No. Why not? _____

    b. Would you recommend revenue sharing to other public agencies?
           i. Yes, why?_____
           ii. No, why not?_____

9.   Does your agency have any exclusive arrangements with entities for getting access to your data?
    ____Yes ____No
    If "Yes", continue with this question.
    If "No", skip the rest of this question and go to Question 10.
    a. Are such arrangements intended to (check all that apply)
           i. Maximize the return to the agency for use of the data?
           ii. Minimize burden on the agency by creating a broker or distribution channel for the data?
          iii. Other? (specify)_____
    b. Does your agency fund or subsidize such entities for disseminating data?

10.   Which, if any, of the following arrangements regarding data sharing apply? (check all that apply)
    a. User reimburses agency for its costs to provide data

     b. User pays for its own hardware, communications, or software costs for accessing the data

     c. User required to share a portion of the revenue generated from its business

     d. User makes in-kind contribution (e.g. sharing part of a communications fiber)

     e. User makes its "value added" information available to the agency for internal use.

     f. Any other forms? If so, specify._____

11.   When you share data with other entities, are there conditions that you place on accessing data?

     ____Yes ____No

     If "Yes", check all that apply and ask respondent to explain.

     If "No", skip the rest of this question and go to Question 12.

     a. Technical specifications (e.g. hardware or software required)

       _____

     b. Restriction on use (e.g. depiction of injury or identity on video images)

       _____

     c. Acknowledgement of the source (e.g., use of logo, verbal mention)

       _____

     d. Any other conditions? _____

12.   How do entities (again, private and public) retrieve the data from your system from a technical and/or physical perspective, e.g., via e-mail, direct hardwired connection over the Internet, fax, etc.)?

_____

13.   Is there a limit to the number of entities that can simultaneously access your system for data?

     ____Yes ____No

     a. If "Yes", what is the limit? _____

     b. If "Yes", what causes it?_____

14.   Does your agency currently (or have plans) to deliver traveler information directly to the public?

     ____Yes ____No

     If "Yes", check all that apply, otherwise, go to Question 15:

     a. VMS/CMS

     b. HAR

     c. Web pages

     d. Interactive voice response (automated telephone)

     e. Operator assisted telephone

     f. Kiosks

     g. Other (specify) _____

15.   What traveler information is made available to the public by private entities in your region, such as Metro Networks or local television stations? (check all that apply)
     a. Traffic and road conditions
     b. Incident information
     c. Transit delays
     d. Special events information (e.g. stadium or concert transportation)
     e. Planned construction information
     f. Other (specify)

16.   Do you have a common format for distribution of data to the private sector and to public agencies?
     ____Yes ____No

17.   In your view, is there a need for a national or industry-wide standard format for sharing or archiving of travel related data?
     a. Yes, why? _____
     b. No, why not?_____

18.   In your view, which, if any, federal activities regarding travel data dissemination would be helpful? (check all that apply)
     a. Information distribution or technical assistance regarding best or common practices?
     b. Development of guidelines
     c. Promulgation of regulation or statute
     d. Other activities?

     If yes to any of the above, please elaborate. _____
     _____

19.   Overall, how effective have your organization's data sharing methods been in meeting its objectives? (Circle only **one** number with "1" representing "least effective" or "not at all" and "5" representing "completely effective".)

     1   2   3   4   5

20.   What, if any, lessons have you learned from your organization's data sharing experience that you have observed from technical, operational, or institutional perspectives and can use to improve data sharing in the future?

     _____

     _____

     _____

This completes the prepared questions. Do you have any other comments you would like to make on the subject of data ownership or data sharing?

Thank you for your assistance. Good-bye.

APPENDIX B: List of Survey Respondents

NAME	STATE/REGION	TYPE OF AGENCY
M. Seiler	Missouri	DOT
M. Knopp	Utah	DOT
R. Dye	Maryland	DOT
B. Smith	Georgia	DOT
J. Galas	Illinois	DOT
R. Bamford	NY/NJ/CT	Transcomm[5]
A. Satraitis	Michigan	DOT
B. Stoeckert	Connecticut	DOT
J. Corbin & P. DeCabooter	Wisconsin	DOT
L. Wassong	New Jersey	Transit Authority
D. Love	Chicago, Illinois	Transit Authority
K. Lamb	Washington, D.C.	Transit Authority
S. Bravo	Florida	DOT
S. Evans	Ohio & Kentucky	DOT
D. Munizza	Pennsylvania	DOT
D. Wetherelt	Montana	DOT
G. Piotrowicz	Oakland County, Michigan	Road Commission Oakland County (RCOC)
S. Hanshaw	Virginia	DOT/Smart Traffic Center
N. Rohleder	Nevada	Las Vegas Area Traffic Computer System[6]
D. Jenkins	South Carolina	DOT
V. Avedissian	California	DOT
C. Aboufadel	California	DOT
A. Chen	California	DOT
J. Chen	California	DOT
M. Berman & E. VanWagoner	California	Metropolitan Planning Organization (MTC of SF Bay Area)
J. Coxx	California	Private Sector (Traveler Advisory News Network = TANN)
D. Delgado	California	Transit Authority
N. Thompson & S. Groth	Minnesota	DOT
S. Bahler	Minnesota	DOT
J. Trotsky	Minnesota	Private Sector (SmartRoutes)
W. Ewell, G. Flores, & K. Woods	Texas	DOT
S. Wegmann	Texas	DOT
B. Fariello	Texas	DOT
A. Obelander	Texas	DOT
A. Kosik	Texas	DOT
D. McCormick	Washington	DOT

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[5] Multi-jurisdictional organization comprised of Connecticut DOT, Metropolitan Transportation Authority, MTA Bridges and Tunnels, New Jersey DOT, New Jersey Highway Authority, New Jersey Transit Corporation, New Jersey Turnpike Authority, New York City DOT, New York City Transit Authority, New York State DOT, New York State Police, New York State Thruway Authority, Palisades Interstate Park Commission, Port Authority of New York and New Jersey, Port Authority Trans-Hudson Corporation

[6] Multi-jurisdictional traffic signal system managed by cities of Las Vegas, North Las Vegas, and Henderson, Clark County, Clark County Regional Transportation Commission and Nevada DOT