NCHRP
SYNTHESIS 312

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Facilitating Partnerships in Transportation Research

A Synthesis of Highway Practice

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NCHRP SYNTHESIS 312

Facilitating Partnerships in Transportation Research

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SUBJECT AREAS
Planning and Administration, and Highway Operations, Capacity, and Traffic Control

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in Cooperation with the Federal Highway Administration

TRANSPORTATION RESEARCH BOARD

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

The Transportation Research Board of the National Research Council was requested by the Association to administer the research program because of the Board's recognized objectivity and understanding of modern research practices. The Board is uniquely suited for this purpose as it maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; it possesses avenues of communication and cooperation with federal, state, and local governmental agencies, universities, and industry; its relationship to the National Research Council is an insurance of objectivity; it maintains a full-time research correlation staff of specialists in highway transportation matters to bring the findings of research directly to those who are in a position to use them.

The program is developed on the basis of research needs identified by chief administrators of the highway and transportation departments and by committees of AASHTO. Each year, specific areas of research needs to be included in the program are proposed to the National Research Council and the Board by the American Association of State Highway and Transportation Officials. Research projects to fulfill these needs are defined by the Board, and qualified research agencies are selected from those that have submitted proposals. Administration and surveillance of research contracts are the responsibilities of the National Research Council and the Transportation Research Board.

The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

NOTE: The Transportation Research Board of the National Academies, the National Research Council, the Federal Highway Administration, the American Association of State Highway and Transportation Officials, and the individual states participating in the National Cooperative Highway Research Program do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report.

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The project that is the subject of this report was a part of the National Cooperative Highway Research Program conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council. Such approval reflects the Governing Board's judgment that the program concerned is of national importance and appropriate with respect to both the purposes and resources of the National Research Council.

The members of the technical committee selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and, while they have been accepted as appropriate by the technical committee, they are not necessarily those of the Transportation Research Board, the National Research Council, the American Association of State Highway and Transportation Officials, or the Federal Highway Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical committee according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

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FOREWORD

By Staff
Transportation
Research Board

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*.

The synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This report of the Transportation Research Board will be of interest to public- and private-sector managers and others who oversee research programs in the transportation community. The report examines partnerships, both internal and external, currently being used in transportation research, and presents methods and approaches that produce synergies beneficial to the research and to the participant organizations as a whole, It discusses the types of state and provincial transportation research partnerships, the functions of participants in research partnerships, motivations for and the benefits of research partnerships, the structure and elements of research partnerships, factors affecting the success of research partnerships, and provides information and examples to assist in the creation and management of research partnerships.

Information was derived from three primary sources: (1) 41 responses from a survey questionnaire sent to American Association of State Highway and Transportation Officials members departments' and Canadian provincial transportation ministries' research units, review of research unit management materials, and interviews with managers; (2) government publications, research and technology sources, and business management literature; and (3) state department of transportation unit peer exchange meeting reports.

A panel of experts in the subject area guided the work of organizing and evaluating the collected data and reviewed the final synthesis report. A consultant was engaged to collect and synthesize the information and to write this report. Both the consultant and the members of the oversight panel are acknowledged on the title page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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Barbara T. Harder, President, B.T. Harder, Inc., was responsible for collection of the data and preparation of the report.

Valuable assistance in the preparation of this synthesis was provided by the Topic Panel, consisting of William P. Carr, Washington, D.C.; Kenneth M. DeCrescenzo, Federal Relations Representative, California Department of Transportation; Geoffrey Frohnsdorff, Chief, Building Materials Division, National Institute of Standards and Technology; Gene Griffin, Director, Upper Great Plains Transportation Institute, North Dakota State University; Michael L. Halladay, Director, Office of Safety Integration and Delivery, Federal Highway Administration; David M. Johnson, Research Services Engineer, Minnesota Department of Transportation; Mark Norman, Director, Technical Activities, Transportation Research Board; Dale Peabody, Transportation Research Engineer, Maine Department of Transportation; Robert E. Spicher, Laurel, Maryland; Richard Woo, Director, Policy and Research, Maryland State Highway Administration; and Felicia B. Young, Team Leader, Community Programs, Office of Human Environment, Federal Highway Administration.

This study was managed by Stephen Maher and Jon Williams, Managers, Synthesis Studies, who worked with the consultant, the Topic Panel, and the Project 20-5 Committee in the development and review of the report. Assistance in project scope development was provided by Donna Vlasak, Senior Program Officer,. Don Tippman was responsible for editing and production. Cheryl Keith assisted in meeting logistics and distribution of the questionnaire and draft reports.

Crawford F. Jencks, Manager, National Cooperative Highway Research Program, assisted the NCHRP 20-5 Committee and the Synthesis staff.

Information on current practice was provided by many highway and transportation agencies. Their cooperation and assistance are appreciated.

FACILITATING PARTNERSHIPS IN TRANSPORTATION RESEARCH

SUMMARY

In today's transportation research community, no single research unit possesses every required resource in sufficient measure to operate independently or meet all of its strategic goals. Research programs are becoming more efficient and productive, yet problems of increasingly diversity continue to need solutions. Partnerships can contribute significantly to providing answers. Partnerships can provide broader resource availability, increased flexibility in research performance, and greater opportunities to maximize the value of the research function for the parent organization.

State and provincial transportation agency research units throughout the United States and Canada are making smart choices about research: they are leveraging funding and sharing vital resources through research partnerships. These research partnerships are occurring in unprecedented numbers in every agency research program. What is intriguing about this dynamic trend in transportation research is the unique nature of the partnerships. There are a multitude of partners, a seemingly infinite variety of needs, and a vast number of structures used to enable beneficial research collaboration. However, with all this variation, research partnerships still produce mission-critical results for their member organizations.

The purpose of the synthesis is to examine partnerships currently in use within transportation research, to identify key factors that facilitate these partnerships, and to present methods and approaches that produce synergies beneficial to the research program and to the participant organizations as a whole. Material in the synthesis is presented to assist state and provincial research units to form, manage, and sustain research partnerships more effectively.

The partnership arrangements discussed range from informal collaborative working relationships to formal contractual vehicles that detail alliances among diverse and disparate organizations. The primary focus of the synthesis is partnerships with state or provincial agency research units.

Material supporting findings in the synthesis came from three primary sources: (1) 41 research unit managers—by means of a mail survey to American Association of State Highway and Transportation Officials member departments' and Canadian provincial transportation ministries' research units, review of research unit management materials, and interviews with various managers; (2) government publications, research and technology sources, and business management literature; and (3) state department of transportation research unit peer exchange meeting reports.

At the time of the survey, research units were, on average, participating in 17 partnerships. They are categorized into two principal types of partnership relationships: those internal to the agency of which the research unit is a part, and those external to the agency—with

other organizations. Of the partnerships currently in operation, 47% are internal to the agency and 53% are with external partner organizations.

On average, research units had the highest level of effort in participation with other units within their own agency. The degree of participation with academic institutions and federal agencies was nearly as great. In general, all research units have a collaborative relationship or some form of alliance with at least one academic institution, and often many. Often these efforts are major commitments by the research unit and take the form of university consortia or institutes. Research units also participate to a high degree with federal agencies, many of which provide funding and other vital resources.

Partner functions most often relate to the types of resources contributed to the partnership. State and provincial research units as well as other state agencies and the federal government most frequently function as the funding provider, the supplier of various in-kind resources, and the source of project managers and administrators. Universities and the private sector function as technical experts and supply research facilities and equipment and materials as well as funding. Local government partners have a variety of functions, such as supplying pilot sites, funding, and technology transfer and implementation opportunities.

Thanks to U.S. federal-aid programs such as the State Planning and Research program, as well as state funds available for research, state research units provide substantial funding for many of the partnerships in which they are involved. On average state research units commit 53% of their federal-aid research funds and 38% of their state research funds to partnership activities.

Memorandums of understanding and contracts were the most frequently used methods for formalizing a research partnership. When more and diverse partners are involved, and particularly those from the public sector, memorandums of understanding are favored. With multiple partners, including private-sector companies, contracts were the preferred arrangement. Informal collaborations, with no written agreement, were often found when research units formed partnerships within their own agencies.

Responses to the synthesis survey show that 60% of the partnerships described by the research managers have two or three partners. Additionally, although a number of research units have long-standing partnerships, especially with universities, most partnerships have been formed since 1985. Furthermore, the states and provincial research units reported the partnerships that were considered beneficial (working well and producing benefits to the partners) have an average term of 3 years. Of the beneficial partnerships, 52% had defined goals, and these goals were achieved 88% of the time. On average, these beneficial partnerships implemented eight research results during the past 5 years.

For the overall health and success of research partnerships, the most important elements in forming a research partnership are common goals and expectations, mutual interest, and resource availability, particularly for funding. The most important elements in sustaining a research partnership are generating positive results or showing progress and successes, and the presence of stable resources, including maintaining technical expertise and funding.

Key findings of the synthesis are as follows:

- Internal partnerships produce more implementable results—Although external and internal partnerships all almost equal in number, approximately 65% report that internal partnerships produce more implementable results.

- Partnership or alliance managers are essential—Alliance managers are considered an essential element of private-sector partnerships. These individuals are responsible for the progress of the alliance or partnership for their respective partner organizations. They reflect their organizations' culture and values and identify with and understand the partner's motivations and needs. Little mention was made by the state and provincial research units of partnership or alliance managers except when asked about items that would facilitate successful partnerships. Only then were personnel committed to managing the partnership noted as a most important factor.
- The high level of commitment to transportation research partnerships will be stable for the next 3 to 5 years—Some additional funds may be committed to the same number of partnerships, although a substantial increase in the activity is not anticipated. This stable level is due in part to the level of anticipated research funding, as well as to of research unit staffing. Because there is little opportunity in most agencies for increased research staffing, there may be a lack of staff to properly manage added numbers of partnerships.
- There are few models or guidelines—Partnerships have myriad variables, unique circumstances, individual objectives, and a seemingly infinite source of participants, each with an agenda and expectations. Collaborative arrangements, for most research units, require a substantial start from the ground up each time a new partnership is created.
- Partnerships are usually formed on an ad hoc basis—Like most U.S. companies, most state and provincial research units form their research partnerships on an ad hoc basis. Only 3 of the 41 responding research units had research partnership policies, and 5 research units had partnership tools or guidelines.
- Sharing resources is basic—Of all the variability that accompanies partnerships, this is one area of agreement that stands out.
- Leveraged funds—On average, research units reported that they leveraged funds by 2.3 to 1 in their partnerships.
- Commitment to a project is advisable—A well-defined project having clear goals subscribed to by all partners is a important for success. Commitment to the research project results encourages innovative means to overcome problems and difficulties. In contrast, creating the structure of the partnership first, with projects to be defined later, tends to be more difficult.
- Top benefits are the gained technical expertise and leveraged funding—State and provincial transportation research units report that the primary two benefits of research partnerships are enhanced technical expertise and cost savings.
- Project benefits are the only benefits currently being measured—The benefits of research partnerships are generally measured by evaluating the research project results. There is no definitive methodology to determine the benefits of the partnership as compared with traditional ways of accomplishing research.
- Successful partnerships require trust—The literature identifies trust as one of the most important elements of the partnership relationship. Opportunities must be provided to foster trust in the partnership relationships.
- Bridging differences in organizational cultures requires extra effort—To enable a partnership to work well, much attention must be paid to mitigating the negative influences of any cultural differences. State and provincial research units commit substantial effort to bridging the differences among partners,although cultural differences still exist between the state and local research units and their academic partners.

Suggestions for implementation and future research are as follows:

- Identifying and training personnel to be alliance managers should greatly enhance the productivity and value of research partnerships.

- In-depth case studies of common partnership structures and operating procedures would be helpful for research units as they continue forming partnerships.
- Identification and development of generic policies and procedures guidelines for partnerships should help in forming productive partnerships.
- Research units could use their own successful partnerships as models for future partnership activities, although guidance in the form of workshops or seminars for preparing example partnerships might be necessary.
- The literature described two tools for enhancing the value of partnerships: (1) capturing best practices and sharing these practices within the organization and (2) institutionalizing skills required for participating in, forming, and sustaining partnerships.
- Research is needed to develop a better understanding of the differences in organizational cultures, and to document the strategies that break down barriers to success and that facilitate expertise and resources.
- Research to determine and quantify the benefits of research partnerships could encourage more effective use of partnerships and might improve the stewardship of research funds.