

## FUNCTIONS OF PARTICIPANTS IN RESEARCH PARTNERSHIPS

### RESOURCES ARE THE COMMON DENOMINATOR

The literature on partnerships and alliances has much to say about creating and sustaining collaboration; however, as discussed earlier, no one type of arrangement is best. There is no guideline on the optimal number of partners, nor are there findings that govern the function of partnership participants. However, of all the variability that accompanies the partnership relationship, there is one area of agreement that stands out—sharing of resources as a basic function of any participant in a collaborative arrangement. Partnerships are a particularly effective means to leverage whatever resources an organization has to share (2, 4, 7, 18).

Collaboration allows individual partners to leverage their resources, reducing costs and risks and enabling research ventures that might not have been undertaken otherwise . . . more can be accomplished at lower cost when resources are pooled, especially if organizations complement each other in terms of expertise and/or research facilities (7).

State and provincial research units follow this thinking. Members of partnerships in which the state and provincial research units participate each bring a variety of resources. Resources that partners contributed to state and provincial research partnerships are listed here.

- Technical expertise—researchers and technicians,
- Project management and administration,
- Equipment and materials (including data),
- Research facilities,
- Funding,
- Research site or pilot site,
- Technology transfer or implementation expertise, and
- Training and education.

Each member organization in the partnerships described by the state and provincial research units tends to provide unique resources. There is a matching of complementary resources, with each partner bringing a necessary element to the relationship. Generally, funding is the only major exception to this tendency. Funding can be a resource brought to the partnership, along with other particular skills or property. In partnerships of multiple DOT research units, funding may be a resource contributed by all partners, forming the basis for a cooperatively funded effort such as the AASHTO NCHRP or the U.S. federal-aid FHWA-sponsored Pooled Fund Program. Contribution of expertise from multiple partners can occur in partnerships

that involve, for example, the transportation research unit, consultants, academia, and local government. Nevertheless, according to the survey respondents, generally one organization provided the lead on supplying expertise.

The types of resources and the tendency of certain partners to provide certain types of resources did not vary between beneficial partnerships and less than beneficial partnerships. This trend shows that success does not depend on the resources supplied to the partnership or influenced by the type of resources any one partner provides. Other factors are more dominant determinants of success, as will be discussed in chapter five. The following are application examples:

- The Ontario Ministry of Transportation Concrete Patching Materials Project for Engineering Standards was formed to evaluate field performance of proprietary patching systems for rehabilitation of concrete highway structures. There were seven members to the partnership. The ministry provided technical expertise, project management, equipment, research facilities, funding, pilot sites, technology transfer, and training. The National Research Council of Canada, Institute for Research in Construction provided technical expertise, project management, equipment, and research facilities. Five private-sector organizations provided materials.
- The South Carolina DOT formed a partnership with its agency's bridge design unit. The research unit provided technical expertise and researchers as well as project management and administration, and supplied funds for project administration. The bridge design unit funded the research for two projects. This example shows a match between those with the expertise and those with funds to accomplish the project. Only two partners were needed for such a project. This project is somewhat unusual because most research units provide the funding.
- A more typical arrangement for partners and the resources they provide are two examples from Florida DOT and Michigan DOT. In Florida, the research unit formed a partnership with the University of Florida. The research unit provided funding and project administration, and the university contributed training, education, and technical expertise. In Michigan, the DOT provided funding, and four universities in the state provided technical expertise and facilities.

The state and provincial research units supplied some amount of funding in nearly every situation reported from the survey. Other members in the partnership may also have provided funding. Most types of partners within the various partnerships contributed some level of funding at some point. Although state and provincial research units contribute substantial funds to the research partnerships, other funding is extremely important. On average, research units reported that they leveraged funds by 2.3 to 1 in the partnerships that were reported in the survey. The research units also provided various in-kind resources as well as project management and administration resources. University partners and private-sector organizations were most frequently called on to supply technical expertise. Universities also contributed research facilities, project administration, training and education, and funding, whereas the private-sector partners tended to supply equipment and materials, various in-kind services, and funding. In-kind resources are a popular vehicle for external organizations to contribute when there are no mechanisms in effect at the public-sector agency to accept funds from other entities. Table 2 summarizes the resources provided by the major partners, as identified by state and provincial research units.

The partnership with the FHWA is a given for many states. This resource at times is not highlighted because of its continued existence. During the peer exchange meetings conducted by the states, one exchange team member commented: “The relationship with the Federal Highway Administration . . . provides remarkable support and expertise to assist in building or rebuilding the research program. Use these resources to provide credibility for the RD&T program.”

Most frequently, tangible resources are the focus of partner contributions, but the literature adds an important

intangible resource to the traditional items. Of all the resources that partners can contribute, the ability to be a good partner is certainly a valuable addition. Good partners have a well-developed capacity to create and sustain fruitful collaborations that provide significant advantage to their organizations as well as to other partners (17).

## NUMBERS OF PARTICIPANTS

There are no right numbers of participants for a partnership (16). The resources needed govern whether an organization should be brought into the collaborative relationship. For the partnerships reported in the survey, the number of participants is given in Figure 6.

There is no definitive indication that certain types of partnerships must have a fixed number of partners. However, 60% of the partnerships described by survey respondents had two or three partners. The predominance of those numbers indicates that fewer numbers of partners correlates well with success for the types of partnerships conducted by transportation research agencies. Many of these partnerships are between the state or provincial research unit and academic institutions. Frequently these partnerships show broad mission statements and they experience relatively long-term relationships. At the other end of the spectrum, partnerships with many members are frequently based on specific projects with given term lengths in which local government, consultant engineers, materials vendors, and others are involved.

## PARTNER ROLES

Partners tend to have roles defined by the resources they provide. Not unexpectedly, the public-sector members are

TABLE 2  
RESOURCES CONTRIBUTED TO PARTNERSHIPS BY MAJOR PARTNERS

Partner	Primary	Resource Provided Secondary	Tertiary
DOT or provincial research unit	Funding—provided for nearly all partnerships reported by survey respondents	Various in-kind resources	Project management and administration
University	Technical expertise, researchers, and technicians	Research facilities Project management and administration Training and education Funding	No clear third preference
Private sector	Technical expertise, researchers, and technicians	Various in-kind resources Equipment and materials Funding	No clear third preference
Local government	No clear preferences: pilot sites, funding, technology transfer and implementation, in-kind resources, and technical expertise		
Other state or provincial government agency	Funding	Project management and administration (distant second)	No clear third preference
Federal government	Funding	Various in-kind resources	No clear third preference

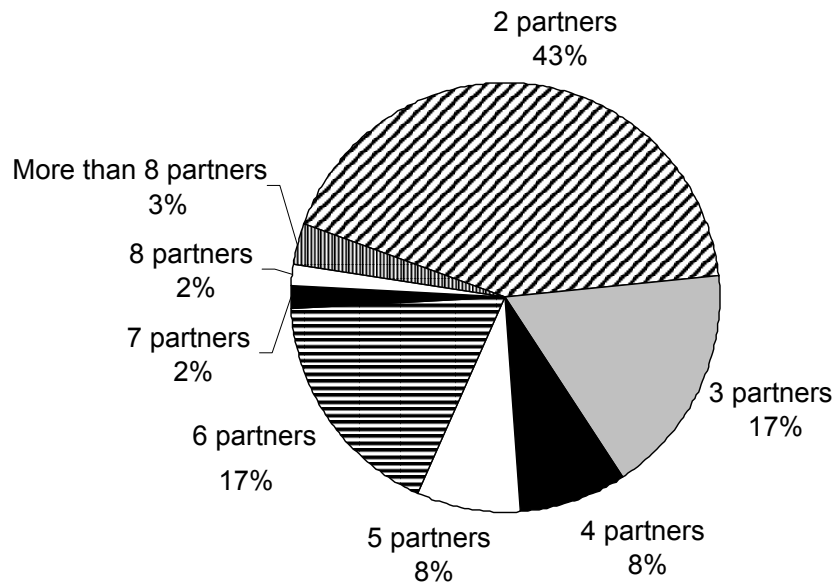


FIGURE 6 Number of partners in research partnerships (total of 63 partnerships examined).

the primary contributors of funding for the partnerships reported in the synthesis survey. Academia tends to be the primary supplier of technical expertise, project management, and training and education. Private-sector partners tend to supply technical expertise, technical equipment and materials, or other in-kind resources. Taken together, these various roles of the partners (and the resources they provide) form the total research effort.

Such roles are relatively familiar and not substantially different on the surface from the roles each type of organization plays in a traditional contract for products or services. In the traditional contract-for-fee service, the state research unit hires a researcher to produce a research result. Once the result is delivered to the client (the state), the researcher has no further obligation. The fees paid for the service contribute to the profit or expenses of the research

organization, and that organization goes on to other projects for other clients.

With partnerships, however, the whole relationship of the entities involved is different, and the manner in which the partners approach the collaboration is markedly different. With the increasing receptiveness to partnerships by public-sector entities, the role that government must now play, versus its traditional role, changes. Partnerships tend to cross traditional boundaries, requiring substantial infrastructure to operate; they may be multidisciplinary. Also, academic partners must find a means to balance the agenda for research with that for education. Although performing many of the same functions, state and provincial research units (as well as federal level units) are exhibiting a change in attitude—one that brings opportunity for results beyond the level of results from traditional research efforts (19).

## MOTIVATIONS FOR FORMING AND BENEFITS OF RESEARCH PARTNERSHIPS

There are perhaps as many reasons for forming a partnership as there are partnerships. Each collaboration has its unique mission and either a formal or informal vision. Yet, there is a set of underlying principles that must be addressed even prior to determining the operational purpose for which the collaboration exists. Literature on partnerships in both the public and private sector has much to say about why partnerships are and should be formed. The bases of forming partnerships deal with complex issues such as core competencies of the organization, timing of product development, acquiring new knowledge, and strategic advantage for the organization with its customers. Adding to the complexity of the issues is each partner has its own motivations for entering into partnership with others, and these motivations must be sufficiently complementary with all others' motivations in order for the alliance to proceed.

### MOTIVATIONS FOR FORMING RESEARCH PARTNERSHIPS

“Companies have come to realize that they cannot be good at everything” (20). The fast pace of the economy and the availability of expertise globally are major forces affecting the formation of private-sector partnerships (8). This first-to-market, just-in-time, manner of operating, or at ever-increasing speeds of delivery manner of operating is affecting the research community in substantial ways. As with those in the private sector, public-sector transportation researchers are being asked to deliver answers to problems in compressed time frames and in areas having greater technical complexity, and to provide information for policy decision making, all of this often requires skills outside current experience, as can be seen from a review of state DOT Research Units' Peer Exchange meetings for the District of Columbia, Indiana, Maine, Michigan, Minnesota, Ohio, Pennsylvania, and Virginia.

The time needed to produce results is a particular issue. For private-sector researchers, “The [motivation for] most alliances today is that markets [don't have] the patience to wait for internal growth” (21). For public-sector researchers, the customers are similarly demanding, whether they are senior management, legislators, or the public. However, for research to be a strategic asset to the organization, timely responses to customers are essential.

Researchers are also finding that innovation often occurs at the boundaries between technical disciplines, and multidisciplinary efforts are required to tackle tough and challenging problems (19). A broader scope of expertise in technical disciplines in addition to civil engineering is required. Economics, finance, policy, and management topics are also becoming a focus of research problem-solving activities. In past years, the primary answer to these research dilemmas was to fill the gaps through “contracting it out.” Today, partnerships present highly attractive alternatives. It is easier to initiate a partnership in today's economy. Partnerships are more readily accepted as a viable research framework, and often partnerships prove to be more efficient and productive than arm's-length contract agreements (2, 4, 21, 22).

The primary basis for forming partnerships in the private sector is to gain advantage in the marketplace for products and services, all relating to profit. However, the private sector cannot pursue this motive without restriction. The goals of satisfied customers, stewardship of stockholder funds, and product safety are integral elements to the overall corporate objective. Although public-sector organizations do not have the profit incentive, they do have similar incentives of satisfied customers, stewardship of public funds, and fostering public safety. Interestingly, although there are differences in the underlying bases for forming partnerships, there are far fewer differences than may be expected, and sufficient areas of intersection that allow public-private partnerships to prosper.

In general, academic institutions have a significantly different set of motivations than do both the public and private sectors. Their primary mission is to educate students and develop new knowledge. However, the public- or private-sector setting of research projects allows academics to apply the development of new knowledge to real-world problems—enhancing the knowledge development and often funding the other aspects of the academic mission. Such experience and funding are substantial enticements for academia to form partnerships with government and industry. However, significant barriers are created when partners show a lack of tolerance or an inability to recognize the desire of other partners to adhere to their basic motivations. Rather, understanding the motivations and acknowledging the partnership eliminates one of the major causes for failure.

The New Mexico Transportation Research Partnership’s vision and organizational statements provided here cite a clear acknowledgment of the motivations of the state transportation department and the university.

**Application Example**

**Vision Statement:** The New Mexico Transportation Research Partnership is committed to the identification, implementation, and dissemination of high quality transportation research that is collaborative, proactive, and forward-looking. The outcome of these research activities will be practical and extendible models and products that demonstrate accountability and a measurable return on research investment. Our partnership is built on the tenets of integrity and quality with a focus on assembling exceptional teams of researchers for a given project while developing and mentoring our next generation of transportation professionals.

**Organizational Statement:** The institutions of higher education in the State of New Mexico have each, through years of hard work and commitment, developed transportation expertise unique to their particular establishment and the cultural heritage in which New Mexico prides itself. These same institutions have determined that the value provided by a particular expertise is substantially enhanced when offered in tandem with complementary proficiencies, and results in a collaborative body more adept at addressing the transportation research challenges of the state and the nation. Product development from investments in transportation research must be timely and of value to the people of the State of New Mexico. These products are developed in cooperation with the state and federal government and the private sector. Our partnership is built on the tenets of integrity and quality with a focus on assembling exceptional teams of researchers for a given project while developing and mentoring our next generation of transportation professionals.

As such, the following New Mexico institutions have, on this date, entered into a collaborative process that shall be called the New Mexico Transportation Research Partnership. Through this document, the signatories commit their effort to developing this partnership between the parties and reaching out to those who would further the goals of transportation in New Mexico. (Signatories at present: New Mexico State Highway and Transportation Department, FHWA, University of New Mexico, and New Mexico State University.)

A summary of the general motivations for research partnerships is given in Table 3.

**State and Provincial Research Units’ Motivations for Forming Partnerships**

Information from the literature supports the information that state and provincial research units provided in the survey. Specifically, survey respondents were asked what

**TABLE 3  
GENERAL MOTIVATIONS FOR FORMING RESEARCH PARTNERSHIPS**

Type of Partner	General Motivation
Public sector	Spur innovations that enhance public well-being and economy, satisfy customers Leverage resources to maintain programs and fulfill agency mandates Exercise stewardship of public money Political considerations
Private sector and nonprofit organizations	Develop knowledge that results in cost savings or new products and services Develop new technologies that contribute to stockholder value Hire best and brightest students
Academic institutions	Develop new knowledge and convey that information to the next generation Seek real-world context for new knowledge development

[Sources: (4, 19)].

motivations their research unit had for forming partnerships. Respondents were encouraged to indicate any or all of the nine reasons provided (or others that could be added). On average, for all types of partnerships, the top reasons for forming partnerships are to gain technical expertise and to leverage funding. Reducing duplication of research efforts is the next most important reason (see Figure 7 for additional responses).

Respondents to the synthesis survey were also asked to provide the top three reasons for forming the specific partnerships about which they included detailed information. Respondents provided reasons for partnerships that they considered beneficial as well as for partnerships that were less than successful. Figures 8 and 9 show the results of this ranking as a weighted average of priority and the number of responses.

Reasons for forming the partnership have little bearing on whether it is ultimately a beneficial or less than successful partnership. The top two reasons are consistent in Figures 7 through 9.

**Off-Center Motivations**

“Although cost-sharing is generally considered a main motivation for partnering in R&D, evidence from partnerships . . . suggests that knowledge goals rank highest among participating firms” (10). Most of the literature about partnerships and the reasons for their formation deal with the positive aspects and benefits of partnerships. However,



FIGURE 7 Why research units form partnerships. (Respondents provided multiple reasons for partnership formation; total responses, 35.)

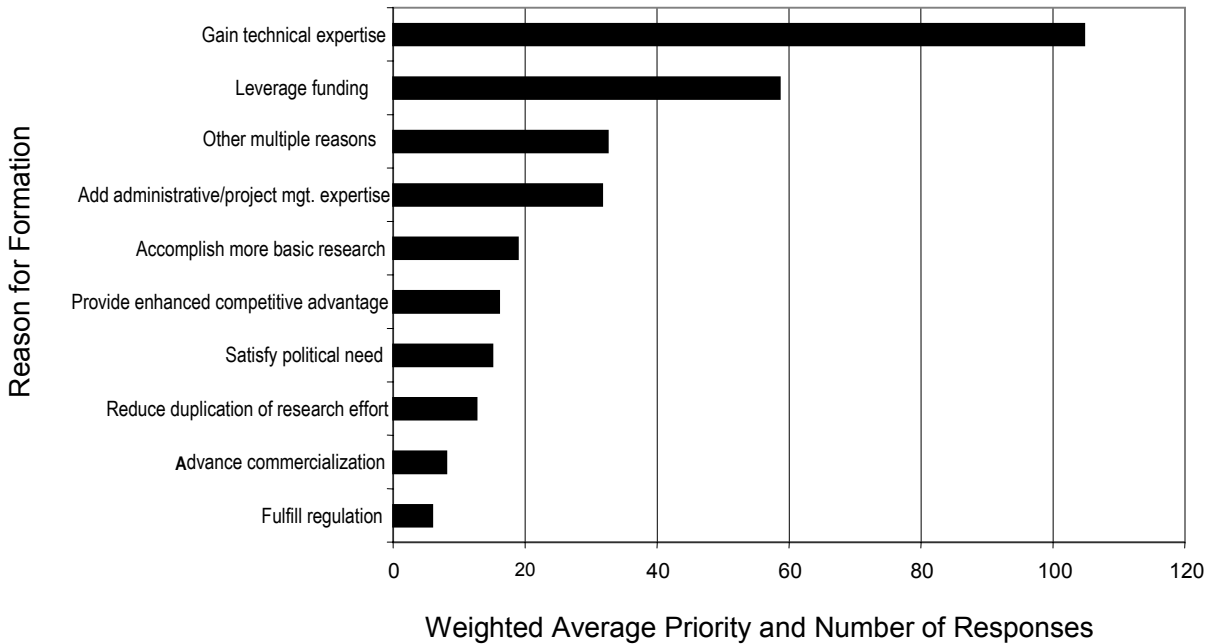


FIGURE 8 Why the partnership was formed. (Based on data from 48 beneficial partnerships—priority: 3 = highest priority; 2 = second priority; 1 = third priority.)

where there is substantial discussion about motivations that are not as conducive to benefits as others, several stand out.

Funding is one of the most common resources provided by research partners. Because of the influence that funding has on research, it may assume a role of disproportionate

importance. In a study of successful partnerships, Rosabeth Moss Kanter noted that

North American companies, more than others in the world, take a narrow, opportunistic view of [partnership] relationships, evaluating them strictly in financial terms or seeing them as barely tolerable alternatives to outright acquisition. Preoccupied with the economics of the deal, North American

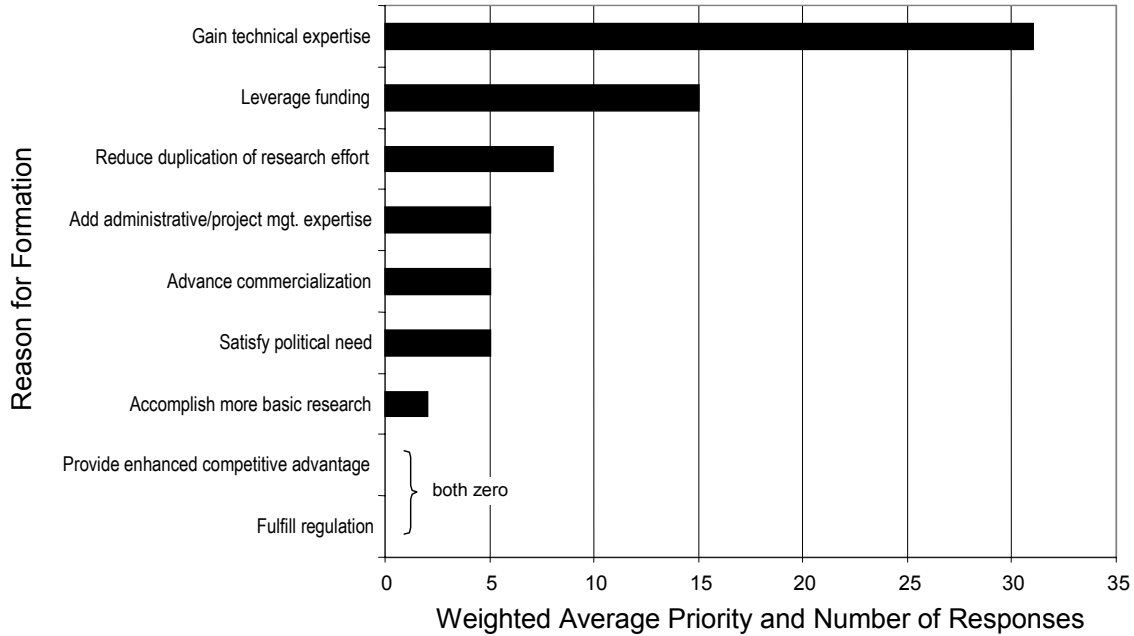


FIGURE 9 Why the partnership was formed. (Based on 13 less than successful partnerships—priority: 3 = highest priority; 2 = second priority; 1 = third priority.)

companies neglect the political, cultural, organizational, and human aspects of partnerships (17).

Her observation is further confirmed by the state and provincial research unit managers; one of whom says, “if funding is the primary reason for partnership formation, don’t form the partnership.” Leveraging funding may be an important reason for entering into a partnership as well as a valuable benefit. Nevertheless, the focus on funding to the exclusion of other critical factors can be counterproductive. Partnerships are complex, and focusing on any one reason to the exclusion of others can foster significant problems during the operation of the relationship.

Benjamin Gomes-Casseres presents a second point in a discussion of the dramatic proliferation of alliances and partnerships.

The creation of the big alliance came to be seen as an end in itself rather than a means toward a broader strategic goal. The failure of [such] deals teaches one clear lesson: It’s the strategy behind the deal that matters, not the deal itself (23).

The motivations for forming partnerships are critical and organizing these reasons into a coherent strategy is necessary. Without such strategy, Gomes-Casseres says, alliances will fail (23).

A third point pertains to creating a relationship that “builds on each other’s qualities rather than trying to fill gaps” (24). The most successful partnerships do not focus on plugging holes, but create results based on the partner capabilities. These partnerships are combinations of complementary strengths. Throughout the time frame of the

partnership, each partner remains a strong contributor to the common objectives of the relationship.

### BENEFITS OF RESEARCH PARTNERSHIPS

The rewards of participating in a well-functioning partnership can be great. Benefits can accrue that would not normally be received through a traditional contracted relationship. A study on alliances conducted in 1997 showed that U.S. private-sector partnerships produced 50% more than the average return on investment for the top 2,000 companies. The 25 companies most active in partnerships achieved a 40% greater average return on equity than did those listed on the Fortune 500. Moreover, the greater the experience an organization has with partnerships, the greater will be its returns (22). The private sector also touts benefits that are less tangible than financial returns. Benefits resulting from partnerships with stakeholders, for example, yield increased productivity, development of distinctive competencies arising from partnerships with local communities or government agencies, reduced adverse litigation, reduced levels of negative publicity, and more favorable regulatory policies (25). Not only do partnerships show greater returns and productivity, but through collaboration, partners create new value together rather than just getting something back in the same measure as what they put in (17).

Research and technology (R&T) partnerships are unquestionably a significant source of the dramatic financial returns and other benefits experienced by U.S. companies (8). Although positive bottom line numbers are not the

primary partnership benefits sought by public-sector agencies, the other benefits of productivity, cost savings, competency enhancement, and better customer service are valuable results of the partnership efforts. In the literature search for this synthesis, no studies were found that quantify partnership benefits within private-sector organizations and compares the benefits with those experienced by public-sector agencies. However, it is a relatively easy leap to conclude that benefits to public-sector agencies from similar research partnerships are also sizable. Several examples show these benefits.

- In an industry–government–academic partnership [National Science Foundation, Engineering Research Centers (18)] participants reported that they
  - Gained access to new ideas, know-how, or technologies (84%);
  - Received direct technical assistance (63%);
  - Reported a change in their R&D agendas (54%); and
  - Increased interaction with other participating organizations (50%).
- In an article examining general research collaborations, some of the benefits at the researcher level are identified (26).
  - Sharing of knowledge, skills, and techniques, yielding a more effective use of talent;
  - Transfer of skills or new knowledge, especially tacit knowledge;
  - Cross-fertilization of ideas that may be a source of stimulation and creativity (synergism—the new value created as mentioned—a result greater than the sum of its parts);
  - Connecting the researcher with a wider network of contacts; and
  - Enhanced potential for increasing the visibility of the work.
- In a presentation made at the 80th Annual Meeting of the Transportation Research Board, Session 253, “Research: Meeting the Needs of All Partners,” Les Hoel (University of Virginia) listed the following benefits that resulted from the partnership of the University and the Virginia Transportation Research Council (Virginia DOT). (Note that in other partnership arrangements, a number of the benefits may accrue to either partner):
  - Benefits to state DOT include
    - Access to expertise,
    - Availability of students to collect data,
    - Use of faculty for professional education,
    - Attractive cost structure,
    - Technical assistance, and
    - Continuity for the program.
  - Benefits to the academic program include
    - Access to modern materials labs and a comprehensive research library,

- Relevant projects for senior theses,
- Adjunct faculty (DOT employees) to provide practical examples,
- Support of graduate students,
- Office space and travel support, and
- Publication and editorial services.
- An NCHRP study on facilitating the implementation of research results credits stakeholder partnerships as an effective booster for applying research results to practice (27).

When state and transportation research units were queried about their beneficial partnerships, they identified multiple benefits received from these activities. Figure 10 shows the number of research units indicating the benefits they received. The most frequently cited benefit is enhanced technical expertise, with the second being cost savings. Recall also that gaining technical expertise is the primary reason for forming partnerships, and leveraging funding is the second. When matched, these two sets of rankings shows that research partnerships are meeting important expectations for many of the research units. Two other benefits also rank high in frequency of occurrence. As the literature indicates, benefits accrue not only to the research units and researchers, but to the agency as well. Additionally, research units reported that benefits from partnerships were greater than what could have been generated by their units acting separately. The synergy created by partnerships leverages resources—more benefits are received than are contributed.

#### Application Example

A compelling benefit from the collaborative relationship between the Washington State Department of Transportation and its university research program is “Once a solid relationship has been built . . . opportunities arise that never would have presented themselves in the absence of that relationship” (28). This is an attractive benefit for research efforts. Capitalizing on such opportunities enhances research effectiveness. Clearly, the partners are creating greater value for their respective organizations through their collaboration than what they could have accomplished alone.

Other benefits reported were increased productivity for the program and in relationships with other organizations; production of new methods, designs, or products; and management and administration. Interestingly, only 20% of the research units that answered specific questions about beneficial partnerships reported that the partnership would be used as a model for other partnerships. Furthermore, only 10% of the beneficial partnerships were viewed as enabling organizational learning about partnerships. Research units detailed “other benefits,” as seen in Figure 10, as follows:





FIGURE 10 Benefits resulting from partnership activities (total responses, 46). (Note: Respondents reported multiple benefits arising from partnerships.)

- Increased knowledge and training for each organization’s staff,
- Improved product,
- Increased technology transfer,
- Reestablished importance of transportation research for universities and the community at large, and
- Enabled organizational learning on technical topic of interest.

**MEASURING BENEFITS**

Measuring the benefits of partnerships is a difficult task. Aside from the bottom-line financial measures used in the private sector, when comparing corporate performance of partnership organizations with that of non-partnership organizations, there is little written on systematic measurement of partnership benefits. The general absence of research on this topic particularly extends to public-sector research units and agencies. Most of the state and provincial agencies measure the benefits of the research partnership by the degree of implementation of the research project results or by some performance measure based on the research results. Several states, including Kansas and New York reported that they perform a cost–benefit analysis on the completed research projects. A number of research units reported having had no formal measures, and still others had yet to develop some measurement system. One research unit survey respondent declared, “This area needs a lot of work.” It does need a lot of work. There is no definitive methodology to determine the benefits of the partnership as compared with traditional ways of accomplishing research.

Survey respondents indicated that there were few performance measures oriented toward the partnership arrangement. California measured benefits by whether there were more partners added to the partnership and by increased invitations to partner. The state also determined that it had a more comprehensive solution to the research problem than through traditional research arrangements. Rhode Island reported on the New England Transportation Consortia. Benefits are not measured directly, but are realized through, among other ways, the level of interaction of state members of the participating DOTs.

Several other revealing facts about partnerships are available from the survey. Outcome goals for the research performed were defined in more than half of the partnerships about which research units provided detailed information whether they experienced beneficial or less than successful partnerships. Approximately 15% more of the less than successful partnerships had goals defined. It is not known whether these projects had more stringent performance standards and therefore had more challenge to become beneficial; however, such factors are most likely not the case. As discussed in chapter five, other elements tend to support the success or failure of the partnership. Beneficial partnerships have a substantially higher percentage of achieved goals (88%) than do those partnerships considered less than successful (50%). Within the past 5 years, these beneficial partnerships produced on average 9 or 10 implementable results, of which 8 were put into practice. in contrast, less than successful partnerships on average produced less than one implementable result. (see Table 4).

TABLE 4  
GOALS DEFINITION AND IMPLEMENTABLE RESULTS—BENEFICIAL  
PARTNERSHIPS COMPARED TO LESS THAN SUCCESSFUL PARTNERSHIPS

Type of Partnership Item	Beneficial Partnership	Less Than Successful Partnership
Goals defined for the research activity	52%	67%
Extent to which goals were achieved	88%	50%
In past 5 years, the number of implementable results produced	9.5	0.7
In past 5 years, the number of results implemented in agency	8	0.7

### Application Example

One southern state reported that it entered into a research partnership with its state department of environmental quality, a county public works department, and three private-sector organizations to evaluate the performance of a crumb rubber-modified hot mix asphalt overlay on a low-volume two-lane road. The research was undertaken by the state to gain technical expertise, to add project management experience, and to leverage funding. The partnership term was for 2 years. A number of important factors supporting successful partnerships were present in this project. There was a mutually agreed upon need to dispose of waste tires in an appropriate manner. Funding was available, and the state had had success in another project using crumb rubber modifiers. The project was considered less than successful because the supplier could not produce the product. There were no implementable results, nor were there any means of restructuring the partnership to overcome this hurdle. For this example, the lack of implementable results was equated with a lack of success.

This does not mean that lessons were not learned about the supplier, the modifier, or partnerships, but it does confirm the importance of resource availability and, most importantly, implementable results.

### Application Example

For the Arizona DOT, the ultimate measurement of success in its partnership for evaluating the performance of a four-phase single-point urban interchange is the number of implementable products and the level of their implementation. The partnership with the Arizona Transportation Research Center, the department's traffic operations unit, its Phoenix District Office, two city governments, and an association of governments organization expects benefits of the partnership to be enhanced safety, cost savings, increased productivity, enhanced technical expertise, and enhanced relationships with important organizations, among others. The project is not complete; however, three project deliverables are anticipated.