TRANSPORTATION RESEARCH BOARD

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TRB REPORT IN BRIEF

Framing Surface Transportation Research for the Nation's Future

Despite major progress in U.S. transportation systems and services, particularly since the 1950s and 1960s, further improvements are needed if the nation is to continue competing effectively in the global marketplace and enhancing its inhabitants' quality of life. Research is expected to play a major role in addressing the challenges facing U.S. surface transportation. TRB's Special Report 313: Framing Surface Transportation Research for the Nation's Future *explores opportunities for improving the productivity of U.S. expenditures on surface transportation research by building on lessons learned from transportation research in other countries and from research in nontransportation sectors in the United States. According to the committee that produced the report, the timely development of a new national research framework that engages the public, private, academic, and nonprofit sectors and draws on the nation's research capacity in academia, industry, and elsewhere is needed.*

ISSUE

Surface transportation in the United States has seen numerous major improvements and policy innovations informed by research: safer and more fuel-efficient automobiles, more durable and economical pavement designs, real-time tracking of cargo shipments, and a resurgence of freight rail following deregulation of the railroad industry, to cite but a few examples. Currently, the U.S. surface transportation research enterprise is characterized by a diversity of participants, activities, and funding sources and is highly decentralized, with most research programs initiated from the bottom up. As a result, much of the current research aims at specific problems identified by sponsors and is relatively short term, focused on individual modes (highway or rail, for example), and applied in nature.

PROBLEM

Leaders within the transportation community have questioned whether the current U.S. approach to surface transportation research will lead to the kinds of innovations in transportation services and policies needed to support national goals for economic

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development, safety, mobility, competitiveness, and sustainability in the 21st century. The current research enterprise too frequently lacks clear linkages between research and national goals, and it tends to focus on solving narrowly defined problems at the expense of basic and advanced research that could form the basis for exploring broader crosscutting issues and developing innovative solutions to long-term challenges. Moreover, because research activities remain largely uncoordinated and fragmented, the integrative systems-level research needed to support national goals receives insufficient attention.

The issue is rendered all the more pressing by the policy stances of a number of the United States' competitors in Europe and Asia. These nations not only place greater emphasis on transportation research as a vital means of achieving economic, societal, and environmental goals, but also have effective frameworks for prioritizing, funding, assembling, and coordinating research activities.

SCOPE OF THE STUDY

In 2008, U.S. transportation research experts undertook a scanning tour of European and Asian countries, and what they saw during the tour highlighted the potential of alternative research frameworks for improving the effectiveness of transportation research in the United States. Subsequently, the state departments of transportation, through the National Cooperative Highway Research Program, asked TRB to convene an expert committee for a follow-on assignment: to describe and evaluate potential frameworks and institutional models for surface transportation research in the United States on the basis of experience in the transportation sector internationally and in nontransportation sectors domestically. To render its task tractable with available resources, the committee focused on highways, rail, and public transportation and excluded pipelines, inland waterways, and coastal shipping, even though these latter modes fall within the conventional scope of surface transportation.

FINDINGS

Innovations in surface transportation are needed to support the economic growth of the United States, strengthen its global competitiveness, and enhance its inhabitants' quality of life. However, the United States lacks a cohesive national framework to link surface transportation research activities to societal goals. In the absence of such a framework, current U.S. surface transportation research tends to be organized by mode, funding source, federal government department, and other arbitrary groupings.

A more cohesive national framework would offer the opportunity to strengthen U.S. surface transportation research by establishing a holistic approach to problem solving and by building greater connectivity between researchers and research activities. To help create such a framework, the committee considered the attributes desirable in a research framework, devised a framework concept, and recommended the necessary steps to develop the concept into a new national research framework.

RECOMMENDATIONS

There is no silver bullet that could rapidly transform the current fragmented and ad hoc national research framework for surface transportation into a more cohesive alternative. Rather, a series of steps over a period of some years will be needed, both to engage a broad spectrum of interested groups fully and to implement strategies for making more effective use of the nation's extensive research capabilities. Taking the initial steps without delay is essential, given the growing and changing demands on the nation's transportation, the ever-increasing pressure on research budgets, the need to use research funds wisely, and the emphasis placed on transportation research by many of the United States' competitors.

Building and Implementing a New National Research Framework

The proposed steps leading to a new national research framework are illustrated schematically in Figure 1. The committee recommends that

an initiative to establish a new framework for U.S. surface transportation research be launched without delay. A group of influential organizations led by AASHTO's Standing Committee on Research and composed of representatives from the public, private, academic, and nonprofit sectors should launch the framework initiative. This leadership group would market the potential advantages of a cohesive research framework to a broad spectrum of public, private, academic, and nonprofit organizations; raise funding for a national surface transportation summit; and appoint a convener for this summit, which would use the framework concept to explore effective strategies for addressing major challenges in surface transportation research.

The summit would engage a broad range of interested parties, including representatives from entities outside the traditional transportation research community, such as the information technology and communications industries. The committee recommends that the summit convener issue a report to the leadership group on the outcomes of the summit. This report would address two important questions:

- Which group or organization should take the lead in furthering the framework initiative after the summit?
- Where is the initiative's funding to come from?

Building a More Productive Federal Research Enterprise

The committee also recommends actions to be taken by the federal government in support of the transition to a new national research framework for surface transportation. These actions would help build a more productive federal research enterprise.

The U.S. Department of Transportation (DOT) has primary responsibility for the health of the nation's transportation system, but other federal departments, such as the Departments of Energy and Defense, also devote considerable resources to

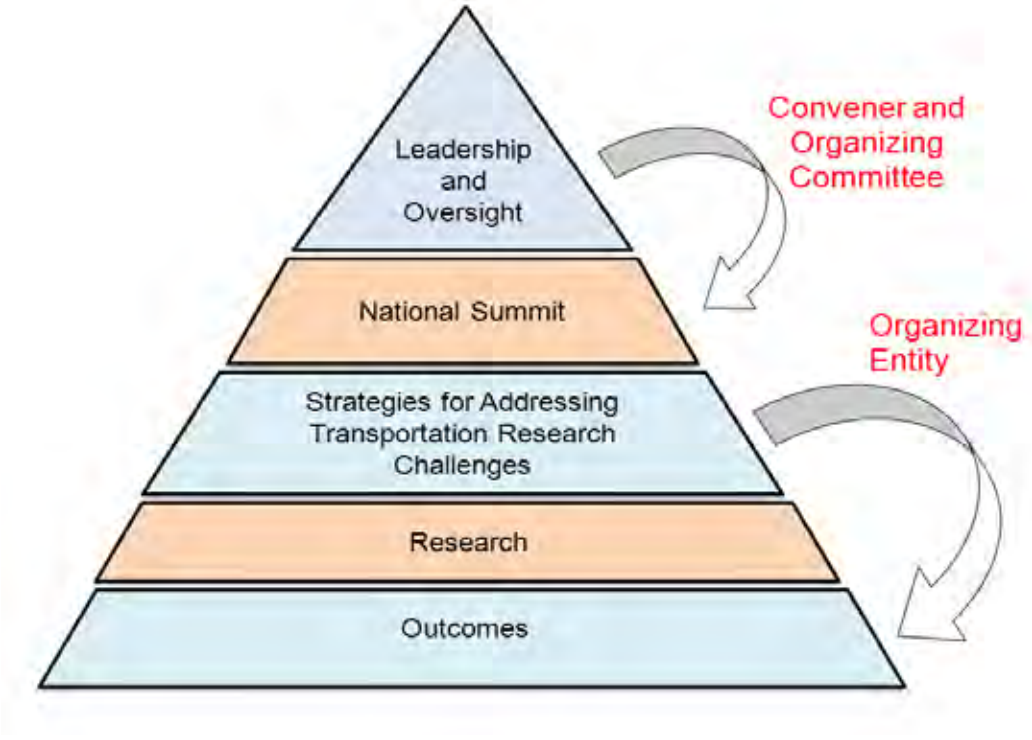

FIGURE 1 Steps leading to a new national research framework.

research related to surface transportation in support of their missions. To make better use of federal resources, the White House Office of Science and Technology Policy should create a task force to explore potential synergies and gains from greater coordination between pertinent agencies.

For the U.S. DOT to be an important player in the new national research framework, as befits its mission, the department needs to strengthen its overall research culture and capacity. In addition, the department should engage more fully with the research community; doing so would help it leverage the investments in technical and policy areas made by other federal departments as well as by the states, industry, and academia. One option the secretary of transportation may wish to consider for furthering progress toward both these objectives is to establish the position of chief scientist within the Office of the Secretary. This individual could serve as a science and technology advisor to the secretary and be the U.S. DOT's champion for research.

Finally, federally funded research should more explicitly and intensively explore high-risk, high-pay-off opportunities for quantum leaps in transportation performance. In that spirit, the committee recommends the establishment of a broad and robust program of basic and advanced research encompassing the many disciplines relevant to surface transportation.

Replacing the current fragmented assemblage of activities and funding with a more cohesive research framework is not without challenges. For example, there is no current organization or research group that could effectively serve the multimodal leadership, stewardship, and funding roles that the framework calls for. By working together, however, surface transportation leaders and the research community have an opportunity to build a more productive research enterprise in support of national goals. The end result will be a more cohesive and coordinated national research framework.

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This report brief was prepared by the National Research Council on the basis of the committee's report. Permission granted to reproduce this brief in its entirety with no additions or alterations. *Framing Surface Transportation Research for the Nation's Future* is available from the Transportation Research Board, 500 Fifth Street, NW, Washington, DC 20001 (telephone 202-334-3213; fax 202-334-2519; or e-mail TRBsales@nas.edu).

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