



MnDOT Measures of Financial Effectiveness

Key Facts and Findings:

- Financial effectiveness in transportation decision making is intrinsically difficult to measure.
- Formal benefit-cost analysis can provide important information to decision makers, but also has significant drawbacks.
- The Minnesota Department of Transportation (MnDOT) rarely uses benefit-cost analysis at the project level; when it is used, it may not affect decision making.
- MnDOT's planning and project selection processes inconsistently address cost-effectiveness.
- MnDOT does not document how it decides among possible alternatives to its project scoping decisions, making it difficult to assess their financial effectiveness.
- MnDOT is promoting new, more financially effective design principles, but it is not ensuring its engineers consistently follow the new approaches.
- Value engineering, a process where a team of outside engineers reviews the design of planned projects, has led to significant cost savings.
- MnDOT does not systematically assess the cost-effectiveness of most maintenance activities, nor has it gathered the performance data it would need to do so.

- However, MnDOT is developing a new database of infrastructure components and their conditions that could improve maintenance decision making.
- A law requiring MnDOT to report on financial "efficiencies" is not useful for assessing the department's financial effectiveness.

Key Recommendations:

- To optimize financial effectiveness, MnDOT decision makers should consistently assess both short-term and long-term outcomes, and both state costs and public impacts.
- MnDOT should reexamine how and why it uses benefit-cost analyses to inform decision making. (pp. 37-38)
- MnDOT should develop guidance on when and how to assess financial effectiveness in its planning processes.
- MnDOT should consider addressing cost-effectiveness more directly in its project scoping documentation.
- MnDOT should develop processes to ensure that district offices follow its new, more cost-effective design principles.
- MnDOT should move forward with efforts to improve the cost-effectiveness of its maintenance decisions.
- The Legislature should reconsider its requirement that MnDOT report on financial "efficiencies."

MnDOT's assessments of its financial effectiveness are inconsistent.

Report Summary

In Fiscal Year 2018, the Minnesota Department of Transportation (MnDOT) spent just over \$2.1 billion constructing, reconstructing, repairing, and maintaining the state's trunk highway system.

It is important that MnDOT use the large sums of money it receives as effectively as possible. But determining what constitutes an "effective" use of financial resources is complicated.

Measuring financial effectiveness requires assessments of long-term outcomes and public impacts.

We interpreted "financial effectiveness" to mean that the state gets as much benefit as it can for each dollar spent. But MnDOT's spending ideally results in public benefits—traffic flow, safety, access, improvements for business and tourism, and others—that can last for decades and are difficult to quantify.

A key approach to measuring financial effectiveness is benefit-cost analysis. Importantly, benefit-cost analyses address both the short-term and the long-term outcomes of decisions, and consider both state costs and public impacts.

However, such analyses are complex, reliant on predictions of the future, and unable to address some factors that are important to stakeholders. Thus, there are good reasons to limit their use.

We do not expect MnDOT to use a benefit-cost analysis for all decisions. However, to be financially effective, MnDOT decisions should use available evidence to assess the key components of benefit-cost analysis: short-term state costs, short-term public impacts, long-term state costs, and long-term public impacts.

A law requiring MnDOT to report on financial "efficiencies" does not meaningfully measure MnDOT's financial effectiveness.

Each year, MnDOT has reported its

progress implementing "efficiencies," as required by state law.

As required by the law, MnDOT's reports only identify decisions that saved money. The reports have not identified decisions that led to cost overruns or other unanticipated spending. A listing limited solely to cost-saving decisions does not provide a complete picture of MnDOT's overall performance in pursuing financial effectiveness. However, requiring MnDOT to assess all of its decisions would be infeasible.

The Legislature should reconsider the requirement that MnDOT identify and report on financial "efficiencies," and instead require MnDOT to provide more meaningful information.

MnDOT inconsistently considers financial effectiveness criteria in its planning and project selection processes.

MnDOT develops—or cooperates with others to develop—many plans, ranging from statewide plans to local plans that focus on individual cities or highway corridors. Some of these plans use detailed benefit-cost analyses; some do not mention costs at all. MnDOT should develop guidance on the analysis of cost-effectiveness in planning studies.

An important step in MnDOT's standard project selection process is the use of computer models to develop initial project lists. These initial lists are then modified by MnDOT's eight district offices.

The computer models do not directly account for the long-term public impacts of project selection decisions. For example, the benefits from a full highway reconstruction could last decades. In contrast, repeated overlays of new pavement on top of old could produce similar pavement smoothness—but would have far more impact on the traveling public through the cumulative effects of repeated construction delays. MnDOT's computer models do not take such impacts into account.

Measuring financial effectiveness in transportation spending is difficult.

MnDOT measures state costs and public impacts inconsistently in many decision-making processes.

MnDOT's computer model for bridge projects also does not address long-term state costs. Further, although it incorporates immediate construction costs, it does not analyze how different options would affect MnDOT's long-term maintenance costs.

MnDOT should consider adjusting the models to include these factors. MnDOT is currently revising its pavement model in a way that may address this recommendation.

MnDOT's project scoping documentation is insufficient for assessing the cost-effectiveness of scoping decisions.

Scoping is the process of deciding what will be built—for example, whether a road repaving project will also include replacing drainage structures or adding turn lanes at intersections.

MnDOT's scoping documents generally focus on the project team's final decisions. They do not compare the final configuration with rejected alternatives, nor do they explain the basis for decisions.

Projects that require detailed environmental reviews do document such comparisons. Our examination of a sample of such projects suggested that MnDOT project teams vary in their consideration of financial effectiveness criteria when making scoping decisions.

For example, some environmental documents we reviewed included project-level benefit-cost analyses. However, discussions of the final scoping decisions did not always take those analyses into account.

MnDOT should consider developing better documentation of the financial elements that influence its project scoping decisions.

MnDOT has introduced more cost-effective design approaches, but has not enforced their use.

In the design process, designers determine exactly how each element of the project

will be built, creating detailed plans and specifications that contractors follow during construction.

Following the lead of other states, MnDOT has introduced “performance-based practical design.” This design approach focuses on each location's unique context, rather than following standards that apply to all projects. For example, standards may call for eight-foot wide shoulders in a particular location, but designers may conclude that the existing four-foot wide shoulders have worked well and do not need to be widened.

MnDOT has directed that employees across the department use the new design principles. However, central office design specialists told us that some district-level MnDOT engineering staff are resistant to the new cost-saving approaches. In some cases, local opposition to new design principles may limit MnDOT's options; by law, local municipalities must consent to MnDOT's designs before certain construction projects can begin within their boundaries.

Because the new design approaches have the potential to lead to significant cost savings, MnDOT should create procedures to ensure that district-level staff will implement its new design principles.

“Value engineering” studies—comprehensive external reviews of planned projects—have a strong track record of cost savings.

MnDOT requires these special reviews of all projects expected to cost at least \$20 million. Our review of a sample of these studies suggested that they have consistently led to cost-saving suggestions that can reduce project costs by hundreds of thousands of dollars.

Although these studies were valuable, they often focused heavily on construction costs. MnDOT should consider adjusting the studies so they pay more attention to long-term outcomes.

MnDOT has not measured the financial effectiveness of most maintenance activities, but a new information system may bring changes.

MnDOT has not historically used cost-effectiveness as a basis for prioritizing and planning maintenance activities.

Maintenance activities include both infrastructure repairs and services like snow removal and vegetation mowing.

Historically, MnDOT has not maintained the information needed for effective long-term planning of many of its maintenance activities. MnDOT has not developed a complete inventory of all the infrastructure it is responsible for maintaining, kept integrated performance data showing the outcomes of maintenance activities, or tracked detailed spending information.

Maintenance decisions are made almost entirely by district-level staff and are focused on observed or reported problems. As new problems occur, maintenance crews reshuffle their existing plans to incorporate the needed work.

Budgeting for maintenance activities has not been tied to performance outcomes. MnDOT funds district maintenance offices based on historical formulas, not on evaluated needs and estimated costs.

A new MnDOT database could transform maintenance planning and decision making.

MnDOT has been developing a Transportation Asset Management System (TAMS). This database will track the condition of many highway infrastructure components—such as retaining walls, overhead signs, lighting, highway ramp meters, noise walls, and pedestrian structures—for which MnDOT has never previously kept data. TAMS will also track maintenance spending at a new level of detail.

If the new database works as planned, MnDOT maintenance offices will have access to a wealth of data that was not previously available. Eventually, the department should be able to develop performance benchmarks based on the data and create statewide maintenance priorities informed by long-term costs and outcomes.

We recommend that MnDOT continue its efforts to develop more cost-effective planning and budgeting processes for its maintenance activities.

Summary of Agency Response

In a letter dated February 28, 2019, Minnesota Department of Transportation Commissioner Margaret Anderson Kelliher agreed with most of the report's findings and recommendations and expressed appreciation that the report "affirms many efforts that MnDOT is working on to improve our abilities to measure and use financial effectiveness in our decision-making processes." She highlighted a number of departmental initiatives that will address the report's recommendations.

The full evaluation report, *MnDOT Measures of Financial Effectiveness*, is available at 651-296-4708 or: www.auditor.leg.state.mn.us/ped/2019/mndotmeasure.htm