

# SPR RESEARCH PROGRAM

## SECOND-STAGE PROPOSAL SUMMARY

### PROBLEM NUMBER AND TITLE

24-42 Develop a Distance-Based Multimodal Benefit-Cost Analysis Framework for Oregon

### PROBLEM SUMMARY

Transportation decision-makers and planners in Oregon typically desire to use some form of benefit-cost analysis (BCA), but no state-specific BCA measures or guidance documents are available to consistently evaluate the full private and public (social) benefits and costs across all modes. The lack of such an Oregon-specific BCA framework leads to decisions being made on infrastructure, policies and support programs based on limited information on the economic and societal impacts stemming from the mode such efforts are designed to support. To address these gaps, this research aims to develop an Oregon-specific distance-based multimodal BCA framework, establish a process for timely and relevant updates, and develop methodology to incorporate equity and distributional concerns within this framework.

### ODOT OBJECTIVES

The objective of this research is to develop an accessible, applicable and updatable Oregon-specific multimodal BCA framework that enables the inclusion of a broad range of validated transportation benefits and costs conducted on a per unit traveled basis to support comparative assessments of the impacts of policies, programs and investments. Additionally, this research will develop methodology that incorporates equity and distributional assessments into the multimodal BCA framework to contribute to ODOT's Strategic Action Plan priority of equity and inclusion.

Key deliverables include (a) comprehensive transportation BCA literature review that identifies data sources, methodologies, gaps and opportunities for further research; (b) synthesized Oregon-specific distance-based multimodal BCA framework with guidance and methodology to incorporate equity and distributional issues and process for updates; and (c) Oregon case study developed with ODOT staff to demonstrate applicability of the multimodal BCA framework.

### BENEFITS

The primary positive return from this research is a quantified assessment of the comprehensive costs and benefits across modes that is specific to Oregon. Knowing both the public and private impacts will strongly support financially sustainable decision-making and contribute to ODOT's priorities in equity and inclusion as well as climate change. Absent this knowledge, transportation system decisions may default to assessments insufficient in scope and validity due to a lack of access to an accessible reference. This research will also improve applications for federal discretionary funding. Federal grant review guidance favors locally specific and well-sourced data that would be the result of this research.

### SCHEDULE, BUDGET AND AGENCY SUPPORT

**Estimated Project Length:** 24 months.

**Estimated Project Budget:** \$200,000

**ODOT Support:** Alex Bettinardi, Senior Integrated Analysis Engineer; Evan Rogers, Economist; Sylvan Hoover, Climate Technical Analyst.

### FOR MORE INFORMATION

For additional detail, please see the complete STAGE 2 RESEARCH PROBLEM STATEMENT online at: <https://www.oregon.gov/odot/Programs/ResearchDocuments/24-42.pdf>

# SPR RESEARCH PROGRAM

## SECOND-STAGE PROBLEM STATEMENT

### FY 2024

#### PROBLEM NUMBER AND TITLE

24-42 Develop a Distance-Based Multimodal Benefit-Cost Analysis Framework for Oregon

#### RESEARCH PROBLEM STATEMENT

While some form of benefit-cost analysis (BCA) is typically desired by transportation decision-makers and planners in Oregon, currently no state-specific BCA measures are available that allow for consistent evaluations of the full private and public (social) benefits and costs across all modes. The lack of such an Oregon-specific BCA framework leads to decisions being made on infrastructure, policies and support programs based on limited information on the economic and societal impacts stemming from the mode such efforts are designed to support. To address these gaps, this research aims to develop an Oregon-specific distance-based multimodal BCA framework, establish a process for timely and relevant updates, and develop methodology to incorporate equity and distributional concerns within this framework.

Existing research lacks analysis for a breadth of modes; was done in societal contexts meaningfully different to limit its applicability; or is too dated to adequately integrate the evolving understanding of various modes' broader impacts and lacks suitable methodology for necessary updates. There are some examples of Oregon-based research that have been conducted that illuminate a segment of such questions. For example, Oregon Mosaic serves as a 'decision analysis tool;' it supplies a broad BCA for a set of scenarios, but its applicability is limited by its reliance on a high-capacity planning professional to develop suitable inputs and execute— a process that is both resource intensive and out of reach for most decision-makers to conduct. The Oregon Metro Multi-Criteria Evaluation toolkit derived from the Benefit Cost Analysis for Travel Demand Models has similar intentions and hurdles to Oregon Mosaic. Neither readily presents as accessible or outwardly justifiable to be a ready reference for many transportation professionals nor the public when attempting to compare the full economic impacts between modes over specific distances.

On the other hand, more accessible examples such as the Rough Roads Ahead and Rough Roads Ahead 2 conducted for ODOT examine economic tradeoffs associated with deferred roadway maintenance, but the scenario analyses are limited to a narrow subset of on-road modes. The Integrated Transport and Health Impact Model considers a broader set of modes but primarily assesses benefit-cost impacts that arise from transportation's effects on public health. Gosling et al. (2019) and VTPI (2022) provide analyses across a range of modes and impacts by distance traveled, but the models and parameters used are European-centric, and additional research as proposed in this statement is required to corroborate the applicability within the Oregon context.

#### RESEARCH OBJECTIVES

The objective of this research is to develop an accessible, applicable, and updatable Oregon-specific multimodal BCA framework that enables the inclusion of a broad range of validated transportation benefits and costs conducted on a per unit traveled basis to support comparative assessments of the impacts of policies, programs and investments. Additionally, this research will develop methodology that incorporates equity and distributional assessments into the multimodal BCA framework to contribute to ODOT's Strategic Action Plan priority of equity and inclusion.

#### WORK TASKS, COST ESTIMATE AND DURATION

##### 1. **Literature review - \$35,000; 6 months**

A comprehensive review of the existing literature to identify validated BCA measures and

methodologies, including private and societal impacts, motorized and non-motorized modes, considerations for distributional or multicriteria BCA, and other relevant variations. This review will cover both personal (vehicle-mile or passenger-mile) and freight (ton-mile) modes of transport, but the first phase of this research will focus on developing the non-freight BCA framework.

**2. Framework development - \$115,000; 12 months**

- a. Develop an Oregon-specific BCA synthesis framework of validated BCA measures for distance-based multimodal assessment. Gaps in data sources or measure availability will be identified for further research and analysis.
- b. Establish a process for updating BCA measures
- c. Develop guidance and methodology to incorporate equity and distributional considerations

**3. Case study - \$50,000; 6 months**

An Oregon-specific application of the methodology both as a case study and to provide referenceable outcomes to Oregon decision-makers.

**Key Deliverables:**

1. Transportation BCA literature review
2. Framework for Oregon-specific distance-based multimodal BCA
3. Oregon case study

**Estimated Project Length:** 24 months

**Estimated Project Budget:** \$200,000

**IMPLEMENTATION**

Findings from this research will have broad application in ODOT. For example:

- VisionEval modeling has a social cost parameter that can be used to assess the cost of a scenario. The existing white paper that developed current values is outdated, has multiple challenges to updating, and is limited in modes. With new developments like the multi-modal module, updated values will be necessary.
- Support Multi-Criteria Evaluation toolkit work in Oregon by providing a reference for validated BCA values to apply.
- Help communication around tolling and road usage charges by providing a defensible assessment of the cost of subject modes.
- Guide efficient decision-making about transportation system development by demonstrating economically efficient modes.

**POTENTIAL BENEFITS**

The primary positive return from the development of this research is a quantified assessment of the comprehensive costs of modes. Knowing both the public and private costs will strongly support financially sustainable decision-making. Absent this knowledge, transportation system decisions may default to assessments insufficient in scope and validity due to a lack of access to an accessible reference. This research will also improve applications for federal discretionary funding. Federal grant review guidance favors locally-specific and well-sourced data that would be the result of this research.

**ODOT champion(s):** Amanda Pietz, Administrator of Policy, Data and Analysis Division; Daniel Porter, Budget, Economics, and Debt Services Manager

**Problem Statement Contributors:** Sylvan Hoover, Climate Office; Alexander Bettinardi, Transportation Planning and Analysis Unit; Evan Rogers, Office of Revenue, Finance and Compliance

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# STAFF REVIEW PAGE

## Literature Check

### **TRID&RIP**

**X** A review of TRID & RIP databases found no existing research that answers the research question

There is some research into BCA for various modes, but none have the results which are applicable to Oregon.

### **Technology & Data assessment**

**X** No Identified T&D output

At the end of this project, the implementing unit(s) within ODOT will need to coordinate the adoption of new technology or data in order to realize the full potential of this research.

## Cross-agency stakeholders

- List stakeholders or impacted units
- Identify any issues of concern raised by an ODOT stakeholder. Note expected mitigation