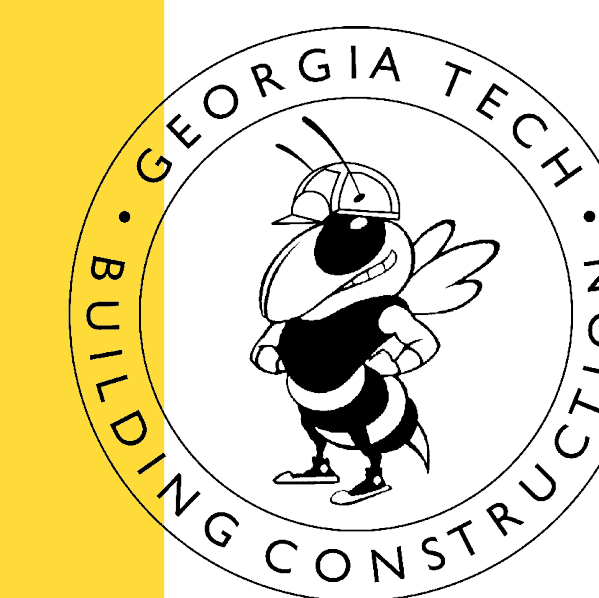


Determining Value of Transportation Research: Methods, Measures, and Data Sources

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Introduction

- The ultimate purpose of transportation research projects is to improve various features of transportation systems, such as safety, quality and cost effectiveness.
- However, the true impact of transportation research projects on the transportation systems is generally unclear.

Major Problem

- Lack of awareness about existing quantitative and qualitative methods for determining the value of transportation research projects
- Lack of awareness about existing measures and data sources for determining the value of transportation research projects

Research Background

- Florida DOT (Two research reports)
 - Review, Analyze and Develop Benefit Cost/Return on Investment Equations, Guidelines and Variables (2003)
 - Valuing the Benefits of Transportation Research: A Matrix Approach (2002)
- Ohio DOT (Two research reports)
 - Evaluation of ODOT Research and Development Implementation Effectiveness (1988)
 - Benefit-Cost Analysis of Transportation Research Projects (1992)
- Kentucky DOT (One research report)
 - Research report: Value of research: SPR projects (2001)
- Utah DOT (One research report)
 - Measuring the benefits of transportation research in Utah
- Minnesota DOT (One research report)
 - Economic benefits from road research (2008)
- National Cooperative Highway Research Program (NCHRP)
 - Performance Measurement Tool Box and Reporting System for Research Programs and Projects, NCHRP Project 20-63
 - RPM
 - Communication matters: a guidebook published by National Cooperative Highway Research Program (NCHRP), Report 610, Available from Transportation Research Board (TRB) (2009)
- Transportation Research Board
 - Research Pays Off
- American Association of State Highway and Transportation Officials (AASHTO)
 - Research Impacts: Better - Cheaper - Faster

Research Objectives

- The overall objective of this project was to **synthesize the best practices for determining the value of research results**, in order to demonstrate the impact that the research has on transportation system features, such as safety, quality and cost effectiveness.
 - Identifying **methods** used for determining the value of transportation Research.
 - Identifying various **measures and data sources** used for determining value of research.

Research Approach

- Review **literature** on determining value of research results
- Conduct **three fact-finding surveys**
 - Survey 1 was conducted to capture state of knowledge and practice in determining value of research in DOTs
 - Surveys 2 and 3 were conducted to collect best examples for determining value of transportation research
- Perform **content analysis** on the best examples for determining value of transportation research

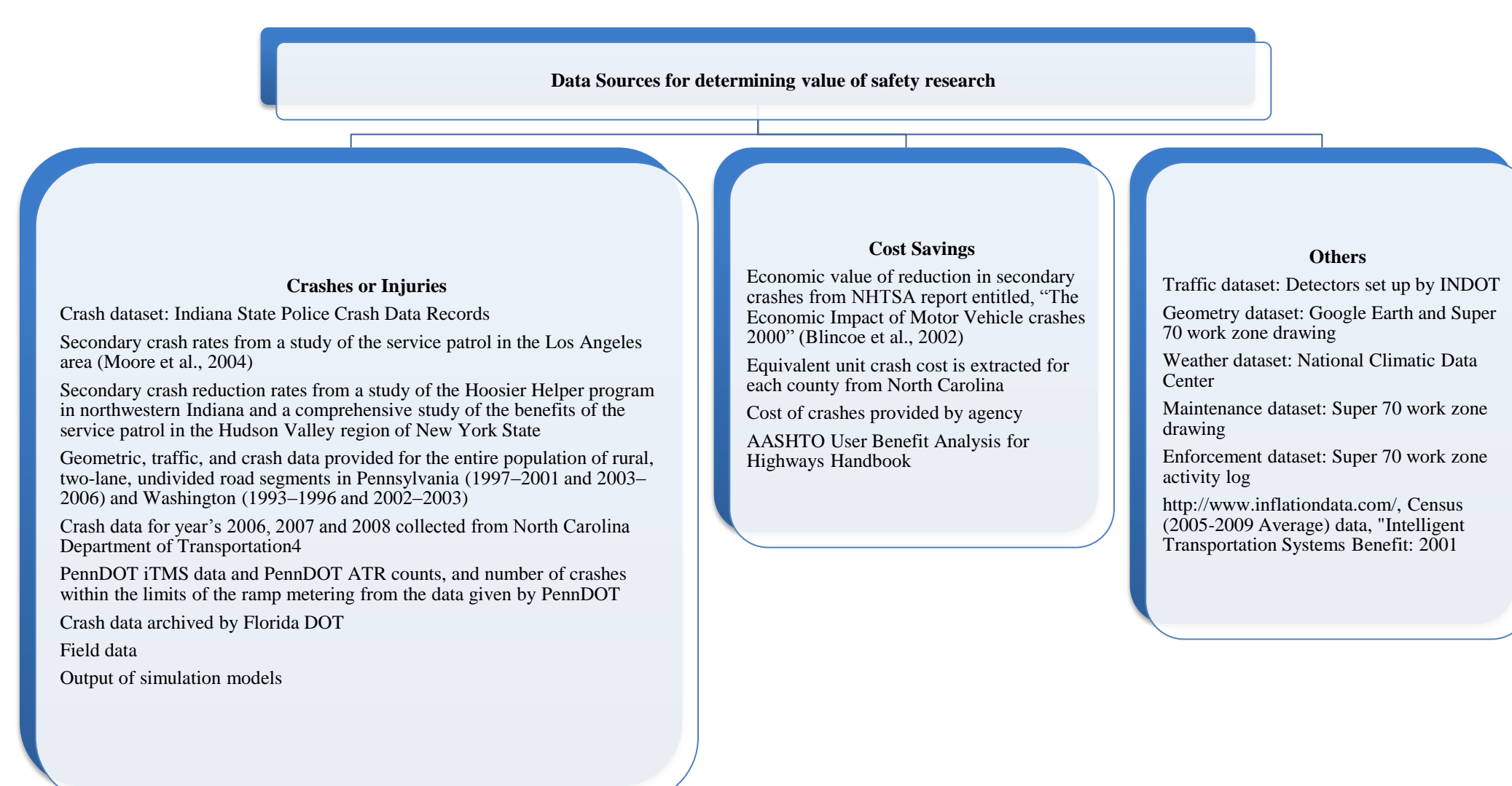
Identified Methods to Determine Value of Research

| Areas of Benefit | Benefit Analysis | | | | | | | | | Benefit (Dollar) Analysis | Benefit (Dollar) /Cost (Dollar) Analysis | Life Cycle Cost Analysis | Analysis of Dissemination of research output | |
|---|------------------------|----------------------|---------------------|-----------------------------|------------|------------|-----------------------------|---------|------------------------|---------------------------|--|--------------------------|--|---|
| | Before and After Study | Statistical Analysis | Simulation Analysis | Assumption-based Estimation | Field Exp. | Lab Exp. | Revenue Estimation Modeling | Surveys | Benefit in other areas | | | | | |
| Safety | 7,10,24,25,41 | 10 | 5,10 | 1,3,27,28 | 8 | | | | | | 3,5,41 | 1,11,27,28 | | |
| Environmental Sustainability | 24 | | 1 | 4 | 26,35,36 | 6,13,31,35 | | | | | 1,4,6,13,26,36 | | | |
| Improved Productivity and Work Efficiency | | | | 3,15,23,37 | 14,20 | | | | | | 3,15,20,23,37 | 11 | | |
| Traffic and Congestion Reduction | 24,25 | | 27,28,40 | | 3 | | | | | | 3 | 1,27,28 | | |
| Reduced Construction, O&M Costs | | | | | | | | | | | 6,14,21,23,25,26,,29,30,34,35,36,37,38,39,42 | 11,13,18,28 | 16,33 | |
| Management and Policy | | | | | | | 9 | | | | | | | |
| Customer Satisfaction | | | | | 1 | | | 25 | | | | 1 | | |
| System Reliability | | | | 4 | | | | | | | | | | |
| Expedited Project Delivery | | | | | | | | | | | | | | |
| Engineering Design Imp. | | 12 | 30 | | | | | | | 8 | 8,30 | | | |
| Increased Service Life | | 26 | | | 19,32 | 16,33 | | | | | 19,32 | | 16,33 | |
| Reduced User Cost | | | | | | | | | | | 1,3,5,11,27,28 | | | |
| Reduced Administrative Cost | | | | | | | | | | | | 11 | | |
| Materials and Pavements | | | | | | | | | | | 13,16,18,19,30,32,34,38 | | | |
| ITS | | | | | | | | | | | | | | 2 |

Identified Data Sources

The data sources for determining value of research in each area of benefit are identified.

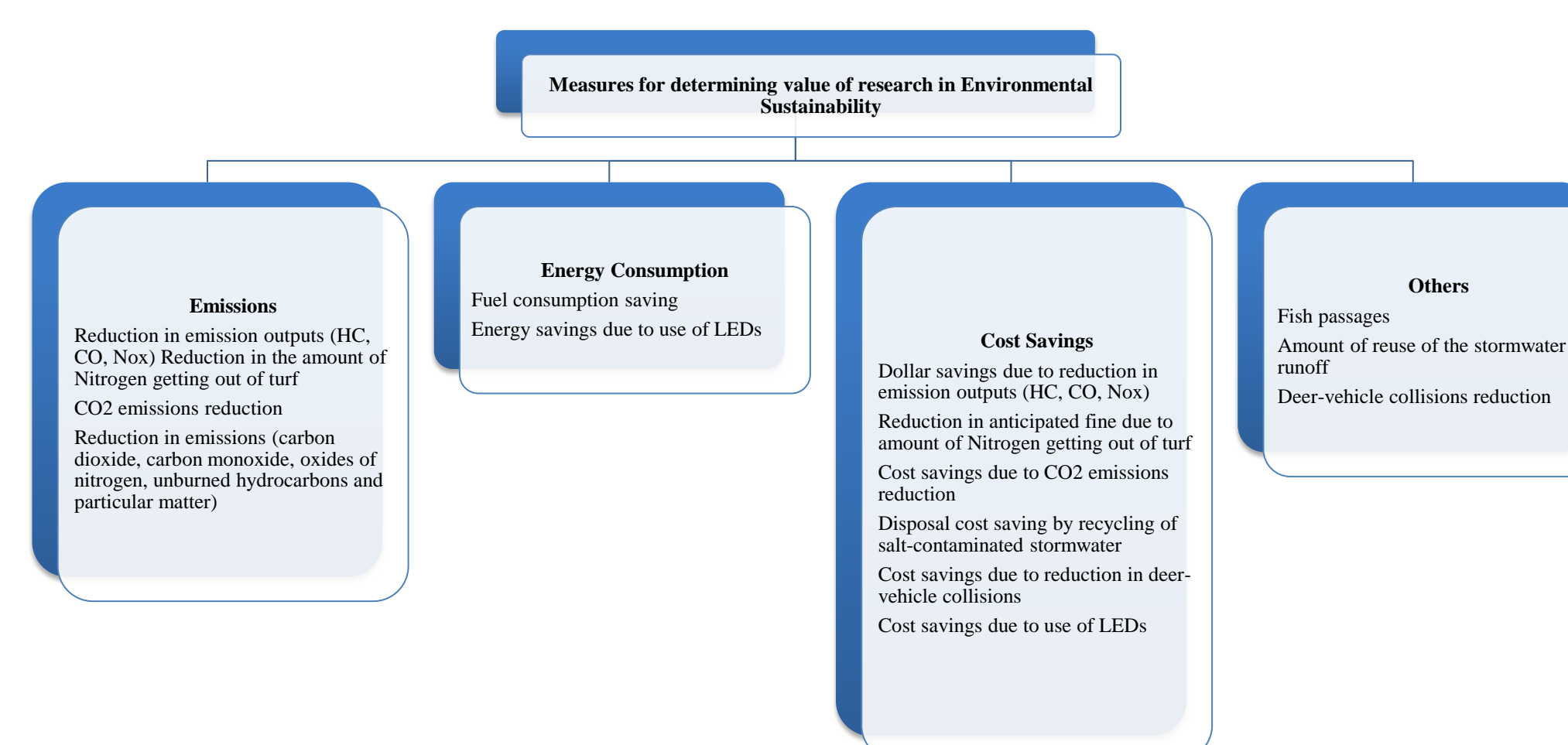
For example, in the area of safety:



Identified Measures

The measures for determining value of research in each area of benefit are identified.

For example, in the area of Environmental Sustainability:



Categories of Identified Data Sources

- Literature (Scholarly papers, databases, reports, etc.)
- Data provided by DOTs, FHWA, TRB, AASHTO (Performance records, ...)
- Data provided by manufacturers
- Outcomes of surveys
- Outcomes of lab experiments
- Outcomes of field experiments
- Outcomes of simulation studies
- Assumptions (Based on judgment, experience, literature, etc.)

Conclusions

- Existing quantitative and qualitative methods, measures and data sources for determining the value of transportation research projects were identified and classified.

Research Path Forward

- Developing a **systematic and transparent** approach to determine value of transportation research.
 - The proposed approach should be both **scalable and flexible, and easy to understand and follow**.
 - The proposed methods and measures should **not prohibit innovative ways** to objectively determine value of research.
- Developing a guidebook
 - Flexibility** is the key to create such a guidebook.
 - A proper guidebook should **facilitate communicating** value of research.
 - Training** is the key to succeed in implementing a proper guidebook

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