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TRB Webinar: Prioritization of Public Transportation Investments

June 21, 2022

2:30 – 4:00 PM

NOVEMBER 2022 UPDATE

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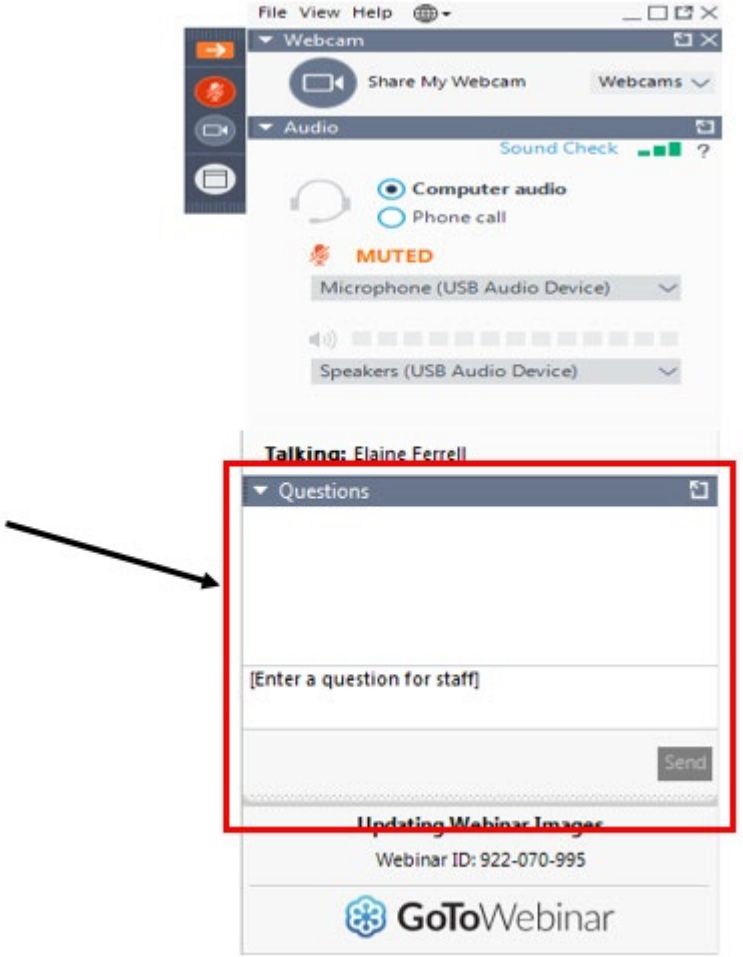
Learning Objectives

- Evaluate public transportation’s many benefits for users and society
- Address equity and distributional impacts, in addition to aggregate outcomes, through transit prioritization

Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



Today's presenters

Todd Lang

Baltimore Metropolitan Council

Naomi Stein

EBP

Bill Robert

Spy Pond Partners

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Prioritization of Public Transportation Investments

Webinar | June 21, 2022

Prepared by: **EBP**, with Spy Pond Partners and T.Y. Lin International

Agenda

- Project Background and Team
- Approach and Overview of Findings
- Selecting Prioritization Criteria
- Demonstration of Cross-Modal Prioritization
- Conclusions and Future Research

Research objectives

Context and Challenge

- Increased emphasis on metrics-based prioritization to support funding decisions
- Transit projects are often at a disadvantage, particularly in a multimodal context, because they have benefits that are either difficult to quantify or that have traditionally been inadequately addressed by methods developed with highway capacity projects in mind

Research Objectives

1. Present and evaluate methods and performance metrics that currently guide transportation investment decision-making, and
2. Propose improvements that advance the state of the practice for prioritizing public transit projects

Thank you to our panel of experts

Panel:

- Todd Lang (Baltimore Metropolitan Council)
- Celeste Chavis (Morgan State University)
- Kerry Doane (Utah Transit Authority)
- Daniel Goldfarb (Northern Virginia Transportation Commission)
- Maria Habba (Michigan DOT)
- John Hodges-Copple (Triangle J Council of Governments)
- Sarah Moran (Delaware Valley Regional Planning Commission)
- Erin Morrow (Metropolitan Washington Council of Governments)
- Jeffrey Owen (TriMet)
- Lorraine Snorden (Pace Suburban Bus)
- Cain Williamson (Atlanta Regional Commission)

FTA: Ryan Long, Cyrenthia Ward

AASHTO: Matthew Hardy

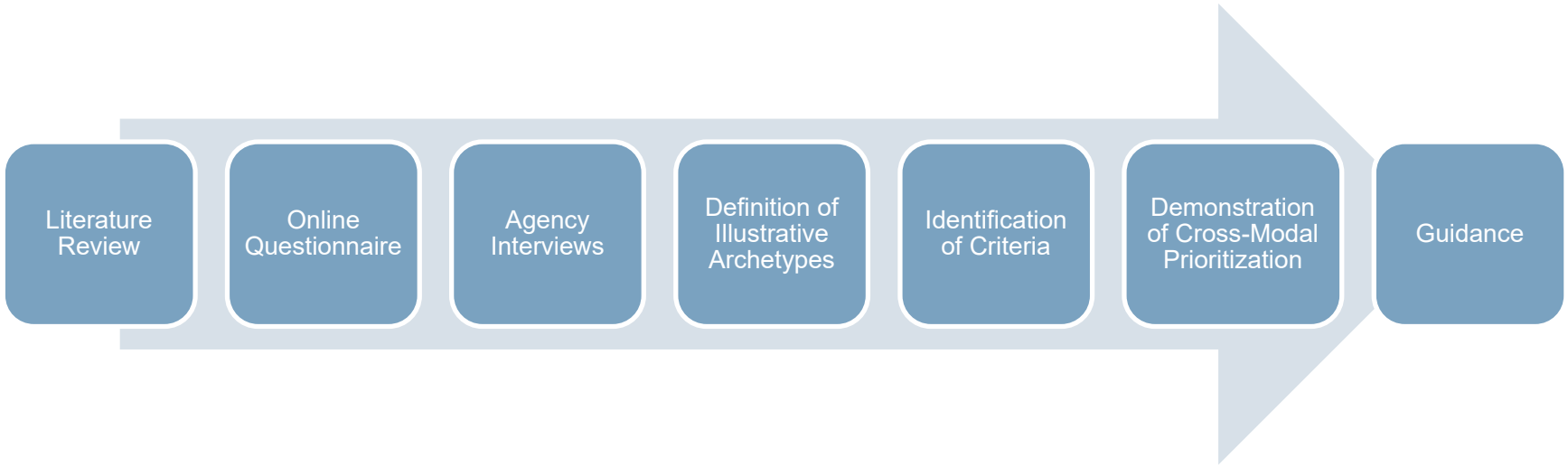
APTA: Richard Weaver

AMPO: DeLania Hardy

TRB: Dianne Schwager, Jarrel McAfee

Approach and Overview of Findings

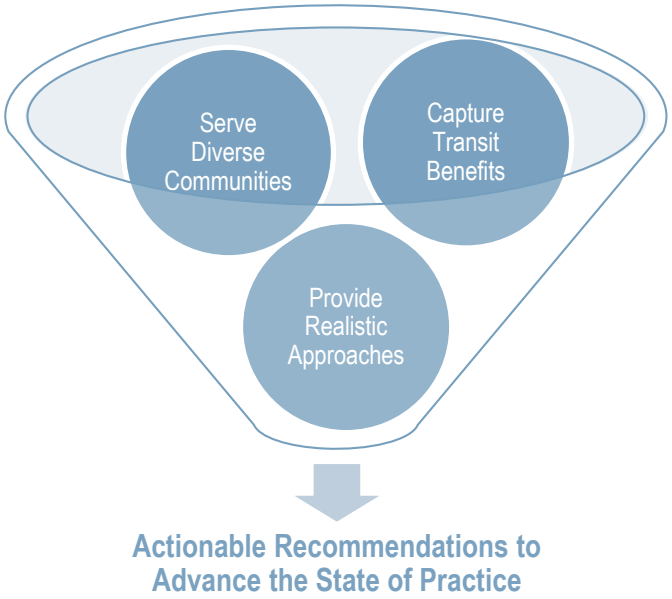
Research Approach



Elements of guidance

Core elements of guidance:

- Metrics that meaningfully represent the benefits of public transportation
- Recommendations that are appropriate to the realities of communities of different types
- Realistic approaches that will make a difference in “leveling the playing field” for transit



Multiple Audiences:

MPOs, state DOTs, regional and local transportation agencies, and public transit agencies

Transit investments target more than one goal

Traditional Traveler Benefits

- Travel Time & Reliability for Transit Users
- Travel Cost (Affordability)
- Congestion Reduction for Road Users
- Safety and Security

Wider Benefits for Society

- Accessibility
- Economic Impacts
- Social Equity / Environmental Justice
- Environmental Quality
- Public Health and Quality-of-Life

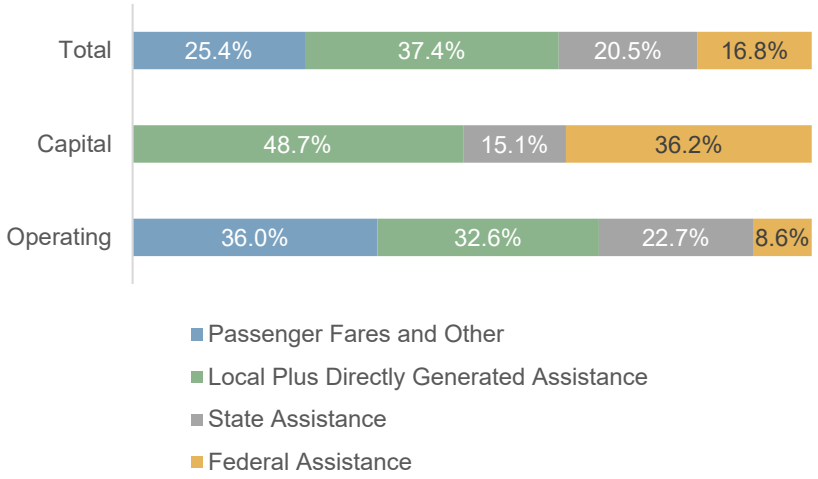
System Stewardship

- Cost Effectiveness / System Preservation
- Regional Integration and Coordination
- Project Viability / Feasibility
- Land Use Compatibility

Transit investments have multiple goals and diverse and often concentrated benefits.

Effective transit prioritization will address the full range of transit investment benefits.

A focus on prioritization of capital funds



Source: APTA 2020, data on transit funding from 2018

Operating funds:

- Largely locally funded
- Generally considered the purview of transit operators

Capital funds:

- Significant federal share
- Governed by LRTPs, TIPs/STIPs
- Varying levels of coordination between transit operators, MPOs, DOTs
- **More likely to be evaluated and prioritized in a multimodal context**

Attributes of successful prioritization practice, generally

The guidebook builds from existing best practice for multimodal prioritization…

Carefully define investment **objectives**	Measure **progress** toward objectives	Leverage **benefit-cost framework** to compare among objectives, scale relative to cost
Integrate **qualitative approaches** for objectives that are important but not easily quantified	**Context matters** – consider the decisions that are to be informed, types of investments, timeframe, available data	Work toward **structure, repeatability, and accountability** to stakeholders

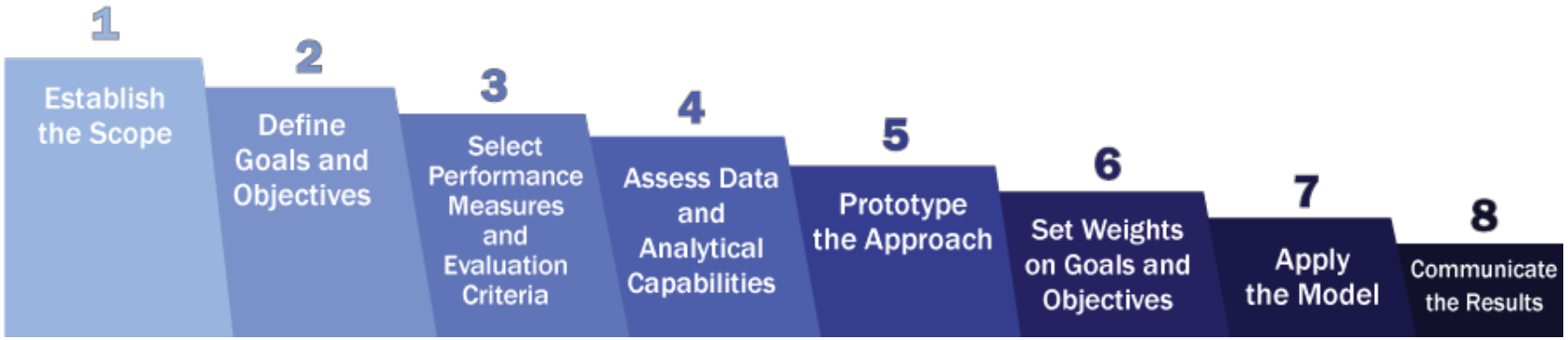
…while also recognizing what makes transit unique.

What makes for effective **transit** prioritization?

- "Widening the lens" to capture the full range of transit benefits
- Focusing on transit's core purpose of providing access to opportunities, particularly for those with limited mobility options
- Measuring progress toward objectives, relative to costs
- Opting for simplified or qualitative measures for objectives that are important but not easily quantified
- Addressing equity and distributional impacts, in addition to aggregate outcomes
- Testing and refinement over time

Choosing Criteria for Transit Prioritization

Multiple Objective Decision Analysis Approach



Strengthening Transit Prioritization

Approach Step	Key Questions
Establish the Scope	• Will transit investments be competing directly with non-transit investments? • What types of transit and non-transit investments are within scope? • Are there specific legislative, funding, or policy requirements that influence what must or should be included? • Does this prioritization process interact with those at other agencies?
Define Goals and Objectives	• What do the considered transportation investments seek to achieve? • Do goals differ across types of projects (transit v non-transit, or state of good repair v capacity)? • Do identified goals and objectives consider not only aggregate mobility and efficiency outcomes, but also broader social, economic, and environmental outcomes that may be the primary focus of transit investments?

Strengthening Transit Prioritization

Approach Step	Key Questions
Select Performance Measures or Evaluation Criteria	• Are all the primary objectives of transit investments addressed by the selected criteria? • In cases where models or data are lacking, have qualitative measures been incorporated and clearly defined? • Can selected measures successfully differentiate between projects and do they capture a range of outcomes? • Are any of the selected measures not applicable to transit? If so, are these balanced by those that are? • Across investment types, is there a need to develop measures that address the same conceptual outcomes but with different technical definitions (i.e., a planning time index on the roadway network compared to an on-time-performance measure for transit)? • Is distributional equity reflected in the selected measures/criteria?

Strengthening Transit Prioritization

Approach Step	Key Questions
Assess Data and Analytical Capacity	• Do available tools and data capture the benefits of transit? • Can additional data or qualitative information be incorporated to address any gaps? • Within any given performance category, who is best equipped to provide information?
Prototype the Approach	• Has the approach been tested on a sample set that includes a range of projects? • Are measures of different types and units appropriately normalized (e.g., on a scale of 0-100) prior to aggregation? • Are certain measures dominating or skewing the results?
Set Weights on Goals and Objectives	• Are certain weights dominating or skewing the results?
Apply the Model	• Is the methodology documented sufficiently to enable transparency and future iteration?
Communicate the Results	• Do the results empower decision-makers to select and advance beneficial transit investments?

Criteria to capture the benefits of transit

Criteria Type	Description
Accessibility	• Change in jobs / essential destinations accessible • Often focused on access for transit reliant communities
Congestion / Mobility	• Reduction in person hours of delay / travel time • Focus on congestion relief
Cost effectiveness / system preservation	• Maintaining existing assets as a long-term cost savings mechanism • Incorporate full lifecycle costs or quantify future cost avoidance
Economic impacts	• Transit and economic development • Economic productivity, output, or return on investment
Environmental quality	• Avoiding or reducing impacts to natural and cultural resources • Localized environmental impacts and broader climate change related goals of reducing greenhouse gas emissions.

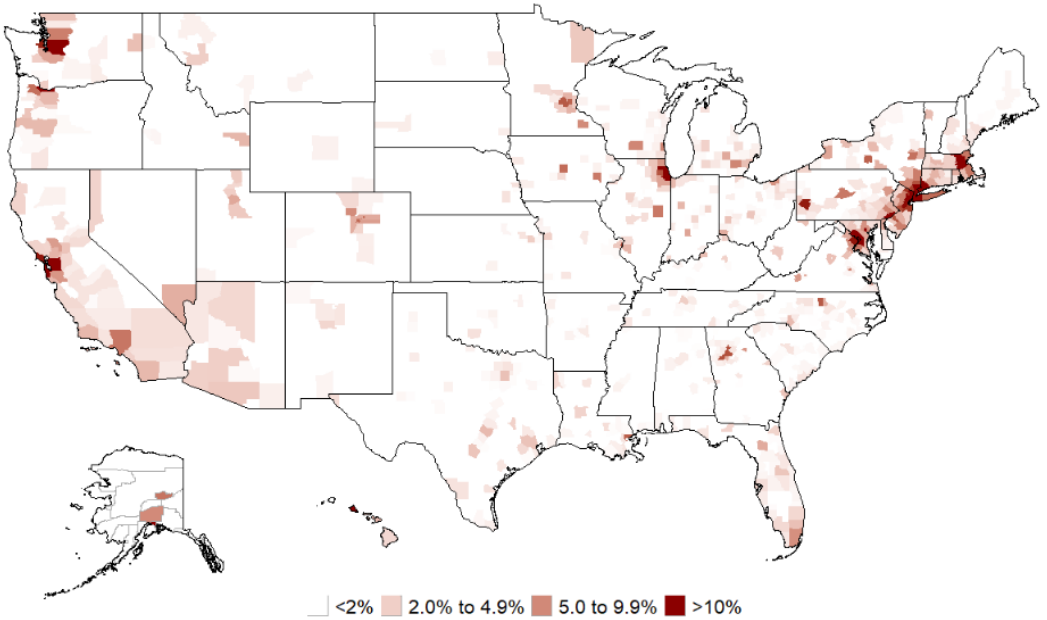
Criteria to capture the benefits of transit

Criteria Type	Description
Land use compatibility	Favors projects that have increased potential for success because of compatible land use (existing or planned) in the vicinity of a proposed project and/or projects that support efficient land development patterns
Public health and quality-of-life	Measures related to air quality, livability, and support for active transportation/healthy lifestyles (including walking to transit)
Regional integration and coordination	Measures a project's cohesiveness with broader regional plans from partner agencies; reflects the interagency nature of some transit planning
Social equity / environmental justice	Expansion of public transportation services has the potential to compensate for historic underinvestment in specific communities and to provide options to the mobility disadvantaged (whether due to income, location, race, ability, or the intersection of these)
Viability / feasibility	Evaluate whether the amount allocated can fund a viable project or set of projects, thus maximizing the cost effectiveness of transit capital investments

Differentiation across communities

The role and importance of transit is varied across communities and demographic groups – this necessitates analysis tailored to community needs and goals

Percent of workers who commute by public transit, by county: 2015-2019



Source: U.S. Department of Commerce, Census Bureau, 2019 American Communities Survey 5-year Estimates.

Tailor criteria to your situation

Five illustrative "archetypes"

Basic Access

- Focused on basic access
- Demand response / rural transit
- May be under jurisdiction of State DOT or MPO with rural area

Small Fixed Route

- Small fixed-route system
- Limited resources
- Multi-actor collaborative decision-making (MPO, locality, operator)

Growing Transit

- Gradual expansion of transit network via new investment to address regional growth
- MPO planning support on transit relationship to regional growth strategy

Large Legacy System

- Large transit system
- Significant institutional capacity within transit agency
- Aging system
- Struggle to keep up with state of good repair

Statewide

- State DOT exerting influence over a diversity of transit systems and regions
- Decision-making must accommodate diversity of needs

Some decision criteria types are always relevant, others vary

Criteria Type	Basic Access	Small Fixed Route	Growing Transit	Large Legacy System	Statewide
Accessibility	●	●	●	●	●
Congestion / Mobility	○	◐	●	●	◐
Cost effectiveness / preservation	◐	◐	◐	●	◐
Economic impacts	◐	◐	●	●	◐
Environmental quality	○	◐	●	●	◐
Land use compatibility	◐	◐	●	◐	◐
Public health and quality-of-life	◐	◐	◐	●	◐
Regional integration and coordination	○	◐	●	●	○
Social equity / environmental justice	●	●	●	●	●
Viability / feasibility	●	●	●	●	●

Evaluation criteria come in many forms that can be mixed

	Description	Pros & Cons
Qualitative input	Decision-factor considered through qualitative or descriptive analysis	Pros: • Does not require data collection or processing • Addresses hard-to-quantify objectives • Can be used to integrate expert knowledge Cons: • Subjective and hard to replicate consistently • Relationship to decision outcomes may not be clear
Ordinal scoring	Scoring of alignment with criteria along a point-based scale	Pros: • Simpler than full quantitative evaluations • Can integrate formalized guidelines for how to apply ordinal scores, which introduces greater objectivity and reproducibility • Helpful in data-poor environments or for hard-to-quantify outcomes Cons: • Can still be subjective • Requires great care in definition and application of scoring rubrics
Quantitative measures	Measures that represent the magnitude of alignment with objectives (e.g., travel time savings)	Pros: • Increased objectivity, replicability • Can address full spectrum of potential relative differences across projects, allowing for more comparability Cons: • May be constrained by data or analytical capacity or accuracy • Not all objectives can be easily quantified • Can be resource and time intensive

- Choice is not “all or nothing”
- Benefits to mixed approach
- Better to include an objective simply than to ignore it

Spotlight on equity analysis

Performance can be observed through two lenses:

- **Aggregate outcomes**: How well does the system serve its users overall?
- **Distributional equity**: How well does the system serve specific populations of interest? Does the system help address historic inequality in transportation access?

Key steps in equity analysis:

1. **Define the population(s) of interest** (commonly defined according to income, race/ethnicity, language ability, age, vehicle ownership, and ability)
2. **Select performance measures** for equity assessment (e.g., change in accessibility)
3. **Disaggregate results** based on geographic and/or demographic characteristics
4. **Assess differences in outcomes**, rating more equitable outcomes more highly.

Equity analysis - Examples from practice

Metropolitan Transportation Commission:

Plan Bay Area 2050

- Accessibility benefits for low-income persons / Accessibility benefits overall
- Does project serve communities of concern (minority, low income, limited English, elderly, zero-vehicle, single parent, disabled, rent burdened)?

Chicago Metropolitan Agency for Planning:

CMAQ Projects

- Sensitive population index x Total population benefiting x Emissions reduction
- Sensitive pop: over 65, under 5, minority, low-income

Cross-modal prioritization

Demonstration of cross-modal prioritization

- Pilot demonstration illustrating different approaches to prioritizing capital projects across multiple modes
- Tested anonymized data from a set of 20 projects, including 8 highway projects, 10 transit projects, and 2 combined transit/highway projects
- Objectives and measures based on review of practice
- Shows how measures representing multiple objectives, with various units of analysis, can be combined in a quantitative prioritization framework to identify funding priorities
- Includes a single set of projects with two approaches for prioritization:
  - Data intensive approach with multiple quantitative measures
  - Streamlined approach with fewer, more qualitative measures.

Pilot objectives and measures: data-intensive case

Mobility
- Travel time savings
- Increased transit ridership
- Multimodal mobility improvement score

Safety and security
- Crash reduction
- Safety and security score

Stewardship
- Increase in asset useful life
- Asset risk reduction score

Environmental performance
- Reduced fuel consumption
- Environmental performance score

Economic development
- Increased job access
- Economic development score

Equity
- Increased job access for disadvantaged areas
- Increased modal accessibility score

Consistency with plans and priorities
- Plans and priorities score

Pilot objectives and measures: streamlined case

Mobility
- Highway mobility improvement score
- Multimodal mobility improvement score

Safety and security
- Safety and security score

Stewardship
- Asset risk reduction score

Environmental performance
- Environmental performance score

Economic development
- Economic development score

Equity
- Increased modal accessibility score

Consistency with plans and priorities
- Plans and priorities score

Test projects

ID	Description	Mode	Cost ($M)
1	Airport BRT Line	Transit	60
2	ITS and Signal Upgrades	Highway	10
3	Magenta Ave Roadway, Safety and Pedestrian Improvements	Highway	3
4	Route 4 Roundabout	Highway	6
5	Maple Road Safety and Bike/Ped Improvements	Highway	3
6	Main Street Safety and Streetscaping	Highway	13
7	Elevated BRT Line	Transit	100
8	Commuter Rail Extension	Transit	14
9	Commuter Bus Fleet	Transit	1
10	Army Road Roundabout	Highway	7
11	Zero Emission Bus Fleet	Transit	23
12	Citywide Transit Signal Priority	Transit	2
13	Multimodal Transit Plaza	Transit	9
14	Intersection Restriping	Highway	2
15	New Traffic Signals and Sidewalks	Highway	4
16	BRT Southern Line Extension	Transit	8
17	Median-Separated BRT and Station Upgrades	Transit	50
18	Multimodal Stations and Pedestrian Access	Mixed	2
19	Multimodal Corridor Improvements	Mixed	6
20	Crosstown Light Rail Line Extension	Transit	300

Example results: baseline case

				Score		Score/Cost		Rank	
ID	Description	Mode	Cost	Data Int.	Streamlined	Data Int.	Streamlined	Data Int.	Streamlined
18	Multimodal Stations and Pedestrian Access	Mixed	2	442.8	787.8	221.4	393.9	1	1
3	Magenta Ave Roadway, Safety and Pedestrian Improvements	Highway	3	548.0	758.6	182.7	252.9	2	2
12	Citywide Transit Signal Priority	Transit	2	284.2	255.5	142.1	127.8	3	6
10	Army Road Roundabout	Highway	7	643.3	1,317.7	91.9	188.2	4	3
8	Commuter Rail Extension	Transit	14	1,262.1	1,168.4	90.2	83.5	5	9
16	BRT Southern Line Extension	Transit	8	674.1	1,254.9	84.3	156.9	6	4
9	Commuter Bus Fleet	Transit	1	69.4	3.3	69.4	3.3	7	20
2	ITS and Signal Upgrades	Highway	10	661.4	979.0	66.1	97.9	8	8
17	Median-Separated BRT and Station Upgrades	Transit	50	3,250.2	1,993.4	65.0	39.9	9	14
4	Route 4 Roundabout	Highway	6	386.8	871.1	64.5	145.2	10	5
19	Multimodal Corridor Improvements	Mixed	6	311.3	606.5	51.9	101.1	11	7
11	Zero Emission Bus Fleet	Transit	23	1,080.0	128.9	47.0	5.6	12	19
15	New Traffic Signals and Sidewalks	Highway	4	179.2	224.2	44.8	56.0	13	11
13	Multimodal Transit Plaza	Transit	9	390.1	483.8	43.3	53.8	14	12
14	Intersection Restriping	Highway	2	80.4	73.4	40.2	36.7	15	15
5	Maple Road Safety and Bike/Ped Improvements	Highway	3	105.5	148.3	35.2	49.4	16	13
1	Airport BRT Line	Transit	60	2,071.1	1,639.0	34.5	27.3	17	17
7	Elevated BRT Line	Transit	100	3,006.9	2,330.9	30.1	23.3	18	18
6	Main Street Safety and Streetscaping	Highway	13	385.9	989.1	29.7	76.1	19	10
20	Crosstown Light Rail Line Extension	Transit	300	8,358.2	9,111.1	27.9	30.4	20	16

Correlation coefficients for the baseline case

Variables Compared	Data Intensive Score	Streamlined Score	Data Intensive SCR	Streamlined SCR
Cost	0.98	0.97	-0.31	-0.29
Data Intensive Score		0.96	-0.27	-0.27
Streamlined Score			-0.21	-0.15
Data Intensive SCR				0.88

Sensitivity testing and exploration

– Analysis of scenarios with different objective and measure weights demonstrates the type of sensitivity testing that agencies can conduct

Description		1 Base	2 Transit-Focused	3 Highway-Focused	4 Safety-Focused	5 Economy-Focused	6 Equity-Focused	7 Environment-Focused	8 Consistency with Plans Perspective	9 Focus on Quantitative Measures	10 Focus on Measures of Time & Money
Objective Weights											
Mobility		20%	30%	25%	10%	10%	5%	10%	10%	10%	30%
Safety & Security		25%	10%	25%	40%	10%	15%	5%	10%	10%	5%
Stewardship		10%	5%	25%	15%	10%	5%	15%	10%	10%	15%
Environmental Performance		10%	20%	5%	15%	5%	15%	40%	10%	5%	5%
Economic Development		15%	10%	5%	5%	40%	10%	5%	10%	10%	30%
Equity		10%	20%	5%	5%	20%	40%	15%	10%	30%	10%
Consistency with Agency Plans & Priorities		10%	5%	10%	10%	5%	10%	10%	40%	5%	5%
Measure Weights											
Mobility	Travel Time Savings (hours/day)	40%	5%	80%	20%	70%	10%	5%	40%	50%	80%
	Increased Transit Ridership (pass/day)	40%	70%	5%	60%	20%	40%	60%	30%	40%	10%
	Multimodal Mobility Imp. Score (scaled)	20%	25%	15%	20%	10%	50%	35%	30%	10%	10%
Safety & Security	Crash Reduction (annual EPDO crashes)	50%	50%	50%	50%	90%	20%	50%	60%	90%	80%
	Safety and Security Score (scaled)	50%	50%	50%	50%	10%	80%	50%	40%	10%	20%
Stewardship	Increase in Asset Useful Life ($)	75%	75%	75%	20%	80%	20%	5%	80%	80%	80%
	Reduction in Asset Risk (scaled)	25%	25%	25%	80%	20%	80%	95%	20%	20%	20%
Env. Perf.	Red. Fuel Con. (000 gallons/yr)	75%	90%	50%	40%	80%	50%	70%	60%	90%	80%
	Enviro. Perf. Score (scaled)	25%	10%	50%	60%	20%	50%	30%	40%	10%	20%
Eco. Dev.	Increased Job Access (jobs)	50%	40%	50%	30%	60%	10%	20%	70%	90%	60%
	Eco. Dev. Score	50%	60%	50%	70%	40%	90%	80%	30%	10%	40%
Equity	Inc. Job Access - Disad. Areas (jobs)	50%	30%	80%	30%	80%	50%	20%	60%	90%	80%
	Increased Modal Accessibility Score (scaled)	50%	70%	20%	70%	20%	50%	80%	40%	10%	20%
Consist.	Plans and Priorities Score (scaled)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Description		11 Focus on Equity and Safety	12 Max 20%, Min 30%	13 Evenly Split	14 Random Mix 1	15 Random Mix 2	16 Random Mix 3	17 Maximized Score	18 Minimized Score	19 Max (Hwy Score - Transit Score)	20 Max (Transit Score - Hwy Score)
Objective Weights											
Mobility		5%	20%	15%	15%	10%	15%	5%	5%	5%	5%
Safety & Security		30%	20%	15%	30%	20%	10%	5%	5%	5%	5%
Stewardship		10%	15%	15%	10%	20%	20%	5%	5%	70%	5%
Environmental Performance		15%	10%	15%	10%	25%	15%	5%	5%	5%	70%
Economic Development		5%	20%	15%	20%	10%	10%	70%	5%	5%	5%
Equity		30%	10%	15%	5%	5%	10%	5%	70%	5%	5%
Consistency with Agency Plans & Priorities		5%	5%	10%	10%	10%	20%	5%	5%	5%	5%
Measure Weights											
Mobility	Travel Time Savings (hours/day)	10%	40%	40%	40%	20%	30%	80%	5%	90%	5%
	Increased Transit Ridership (pass/day)	60%	30%	40%	50%	30%	20%	5%	5%	5%	80%
	Multimodal Mobility Imp. Score (scaled)	30%	30%	20%	10%	50%	50%	5%	90%	5%	5%
Safety & Security	Crash Reduction (annual EPDO crashes)	50%	70%	50%	20%	40%	70%	95%	5%	95%	5%
	Safety and Security Score (scaled)	50%	30%	50%	80%	60%	30%	5%	95%	5%	95%
Stewardship	Increase in Asset Useful Life ($)	30%	70%	50%	50%	40%	40%	95%	5%	95%	5%
	Reduction in Asset Risk (scaled)	70%	30%	50%	50%	60%	60%	5%	95%	5%	95%
Env. Perf.	Red. Fuel Con. (000 gallons/yr)	40%	70%	50%	50%	80%	60%	95%	5%	95%	5%
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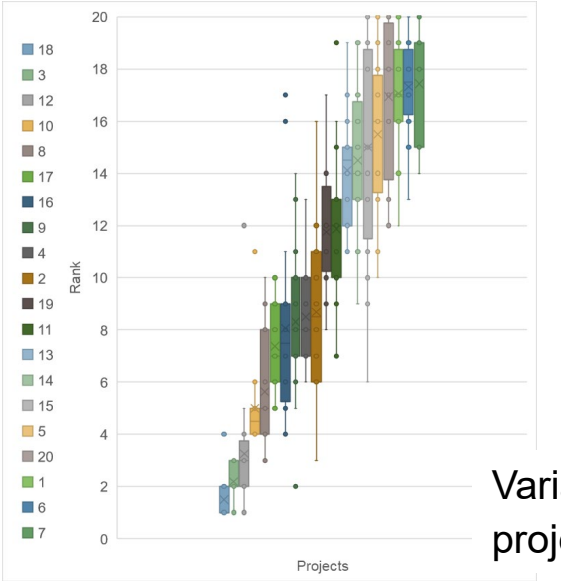
	Increased Modal Accessibility Score (scaled)	50%	30%	50%	90%	50%	90%	5%	95%	5%	95%
Consist.	Plans and Priorities Score (scaled)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Scenarios



Variation in project rankings

Pilot conclusions

1. It is feasible to design a prioritization process that prioritizes capital investments across multiple modes
   - Pilot includes a range of objectives, measures and project types
   - Constructed the pilot data using actual measures and data from various agencies
2. Measure selection is important
   - Need measures for each objective
   - Ideally should not be cross-correlated
   - Should cover the full range of project benefits
3. Careful consideration must be given to the approach for scaling and normalizing measures
   - Scaling: adjusting measure values to be proportional to the utility generated by the project with respect to the measure – particularly important for scores
   - Normalizing: adjusting scaled values to be on a 0% to 100% scale

Pilot conclusions (continued)

4. Results are not highly sensitive to weights on objectives and measures, except where project performance is highly skewed toward one performance area
   - See sensitivity analysis results
   - Priority tended to vary within a band, shifting only slightly as weights were adjusted
5. Project ranking is sensitive to the removal of an objective
   - Biggest impact is on projects structured to deliver benefits with respect to a specific objective
6. One can approximate the results of a data intensive approach using a streamlined set of measures
   - High correlation between the scores
   - Lower correlation between the score/cost ratio

Conclusions and Future Research

Key Findings from the Research

Successful transit prioritization builds on existing best practice for transportation investment prioritization

(The right) evaluation criteria can capture transit's many benefits

Some criteria are only applicable to transit investments, while others can be used to evaluate more than one mode

Certain factors can negatively impact the competitiveness of transit projects, but strategies exist for broadening criteria to be more applicable to transit

Equity scores offer an objective consideration of distributional equity that may enhance transit's competitiveness

Context matters and there are multiple routes to success

Future Research

Equity and accessibility guided investment for post-pandemic recovery and long-term prosperity

- Use of equity and accessibility metrics to make smart and targeted investments

Market segmentation in transit planning and evaluation

- Study the differential behavior of transit customer segments in response to changes in service or price
- Improved forecasting and impact analysis, including variation across market segments

Future Research

Implementation of cross-modal prioritization in different contexts

- Applying this research in agencies representative of each of the illustrative archetypes
- Explore tool and data availability, inter-agency cooperation, stakeholder engagement and oversight, and the interaction between funding and program definition and objective and criteria selection / application

Accounting for uncertainty in prioritization

- Address outside factors including land use patterns, the evolution of technology, economic trends, and evolving preferences – that can be particularly important to transit
- Advance methods such as ranking of projects under multiple futures to identify those that are most resilient or capturing the relative certainty/uncertainty of individual decision criteria

Learn more

For More Information:
https://www.trb.org/Main/Blurbs/182303.aspx

TCRP Research Report 227: Prioritization of Public Transportation Investments

Thank you to the key members of the research team!

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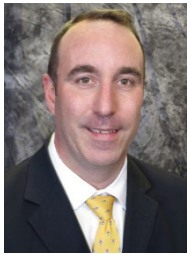

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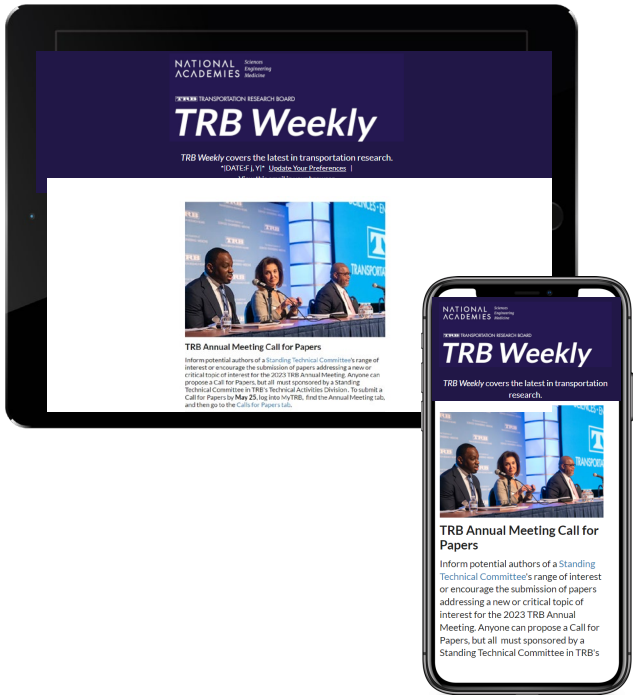

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