UTILITY-COST ANALYSIS

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N-CATT State Summits
July and August 2020

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AGENDA

- Purpose of Workshop
- Determine/Discuss Agency Goals
- Weigh/Prioritize Goals
- Review Recommended Strategies/Technologies
- Utility-Cost Analysis
  - Rate Effectiveness/Utility of Each Strategy/Technology
  - Calculate Total Utility of Each Strategy/Technology
  - Review and Incorporate Strategy/Technology Costs
  - Calculate and Discuss Utility/Cost Ratios
- Next Steps

PURPOSE

- Explore **value** of recommended technologies or strategies
- Utility-cost methodology used when **benefits are hard to quantify** and monetize (convert to dollar values)
- Method produces measure of **utility** indicating how effective a technology or strategy will be in achieving a particular goal
- Utility-cost analysis should be used as a way of **assessing the costs and benefits of ITS** when:
  - **Benefits cannot be quantified** and/or monetized
  - **"Utility" measures of performance** goals/objectives can be created to **estimate benefits** to the agency
  - Benefits to provider, customer and other positive externalities **can be incorporated in the analysis**

PURPOSE (CONT'D)

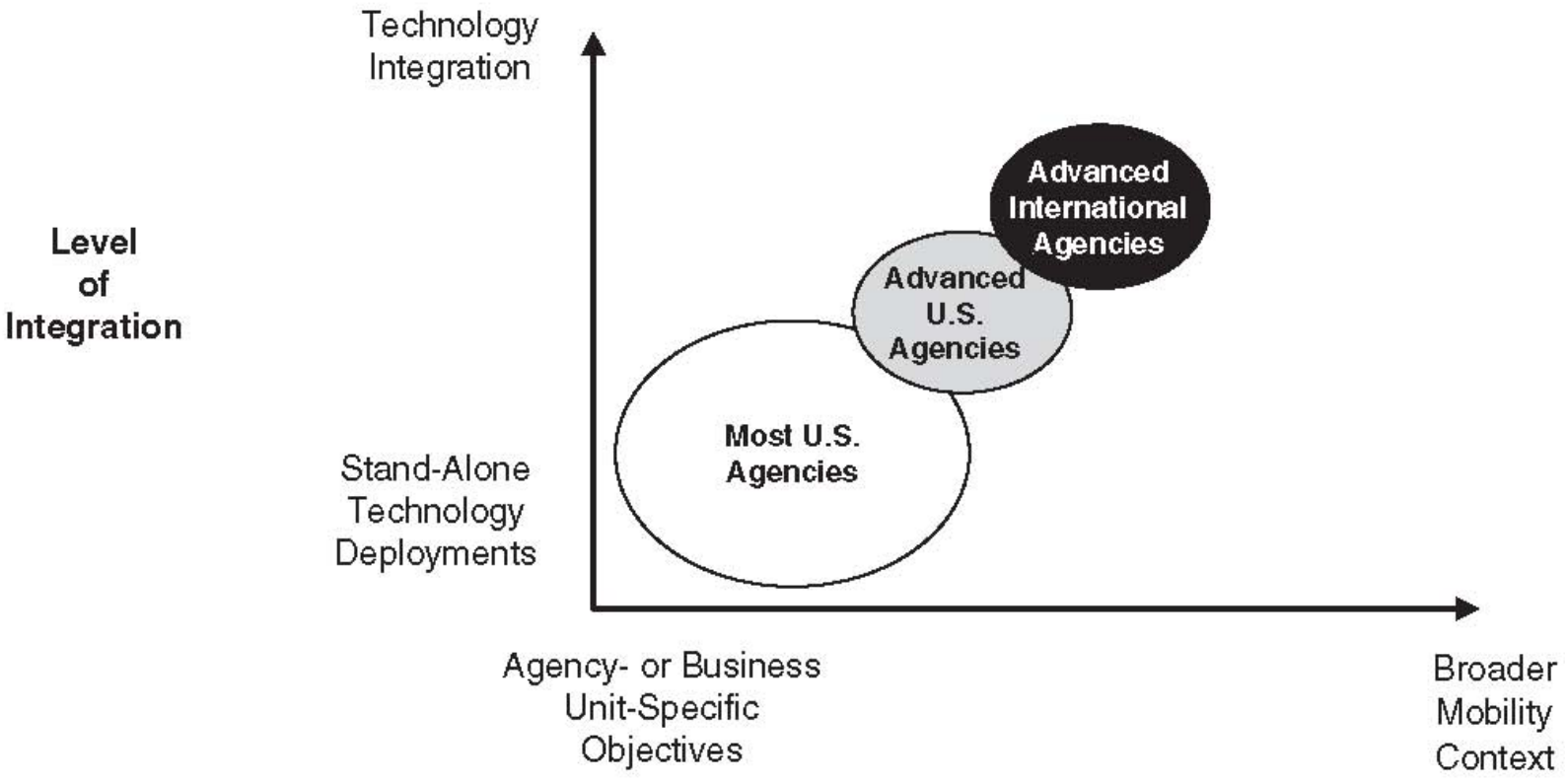
- Because potential technologies and strategies that will be considered typically **implemented using phased approach**, utility-cost analysis helps to systematically **determine and rank value of technologies/strategies**
- Utility-cost analysis **uses both objective and subjective factors** to assess relative priority of each technology/strategy
  - **Subjective assessment** focused on staff determining:
    - Agency's goals and objectives
    - Effectiveness of each technology/ strategy in meeting each goal
  - **Objective portion** uses cost estimates for each technology or strategy to determine the utility-cost ratio of each technology or strategy

HOW IT WORKS

- **Define**/discuss agency goals
- **Weigh or prioritize** each goal
- **Rate effectiveness** of each recommended strategy/ technology in meeting each goal
- **Multiply the effectiveness by the goal's/objective's weight** to determine the utility
- **Sum up all utilities** for each strategy/technology = Total system utility
- **Divide total system utility by cost of that strategy/technology** to determine utility-cost ratio

UTILITY-COST ANALYSIS PROCESS

WHY THIS PROCESS?



AGENCY MISSION STATEMENT

Sample Transit Agency (STA) is committed to providing safe, accessible and courteous public transportation services to our customers.

AGENCY VISION?

- Ideal image of possible and desirable future state of organization as it carries out its mission
- Necessarily broad and represents an ideal rather than specific achievement

STEP 1: GOAL DEVELOPMENT

- What is the overall agency direction?
- Identify strengths and weaknesses
- Goals should be:
  - **S**pecific
  - **M**easurable
  - **A**ttainable
  - **R**elevant
  - **T**imely

STEP 1: IDENTIFY STA GOALS

- Improve customer satisfaction and convenience (e.g., be more proactive with customers, provide customizable alerts/information)
- Obtain and utilize reliable data to make service improvements
- Provide more coordination/collaboration/connection between fixed route and paratransit, and between transit and other modes (traffic, bikesharing, ridesourcing, microtransit)
- Improve operational efficiency and service reliability

STEP 1 (CONT'D)

- Establish a unified climate among STA, the County, community and contractor (e.g., improve perception)
- Foster innovation within STA
- Adapt to changing customer needs and transportation ecosystem
- Ensure fiscal discipline and explore financial options
- Ensure technology efficiency and minimize duplication

SAMPLE GOALS

- Improve Service Reliability
- Improve Organizational Reliability
- Expand Service
- Improve Operational and Organizational Efficiency
- Obtain and Utilize Reliable Data
- Create/Maintain/Improve Relationships with Partners
- Ensure Organizational Effectiveness
- Ensure Fiscal Discipline
- Ensure Service Effectiveness
- Be Responsive to Customers' Needs (Internal and External)

SAMPLE GOALS 2

- Improve Customer Satisfaction
- Improve Operating Efficiency
- Increase Fixed-route Ridership
- Improve Service Reliability
- Improve Public Perception of Transit
- Reduce customer delay (note: this was for an agency that had on time performance issues)
- Increase rider convenience
- Reduce operating costs
- Improve environmental conditions
- Improve rider safety

STEP 2: WEIGH/PRIORITIZE GOALS

- Weigh each goal in terms of their relative importance on a scale of 1 (least important) to 5 (most important)

GOAL WEIGHTS

Goal	Weight
Improve customer satisfaction and convenience (more proactive with customers, provide customizable alerts/information)	5
Obtain and utilize reliable data to make service improvements	5
More coordination/collaboration/connection between fixed route and paratransit, and between transit and other modes (traffic, bikesharing, ridesourcing, microtransit)	4
Improve operational efficiency and service reliability	5
Establish unified climate among agency, County, community and contractor (e.g., improve perception)	5
Foster innovation within STA	3
Adapt to changing customer needs and transportation ecosystem	4
Ensure fiscal discipline and explore financial options	5
Ensure technology efficiency and minimize duplication	5

STEP 3: DISCUSS RECOMMENDED STRATEGIES

- Identify Super Users/Product Champions for each system
- Replace or Upgrade Avail (due to data quality and other issues)
- Procure and implement fixed-route scheduling software
- Enhanced data strategy

*If any technology upgraded or replaced, consider **open systems** providing more flexibility in terms of systems integration/adding technology

STEP 3: DISCUSS RECOMMENDED STRATEGIES (CONT'D)

- Upgrading Surveillance system for live feed
- Transit Signal Priority (TSP)
- Update to Farebox Lid & MDT
- Onboard Information Media
- Kiosk Information Media
- Paratransit Fare Solution
- Paratransit Interactive Voice Response (IVR)/Notifications
- Mobility Management Platforms (first last mile / micro-transit)

STEP 3: DISCUSS RECOMMENDED STRATEGIES (CONCLUDED)

- Address paratransit scheduling software issues
- Performance monitoring improvements
- Training improvements
- Technology integration

STEP 4: RATE EFFECTIVENESS/ UTILITY OF A STRATEGY/ TECHNOLOGY

- Assess each strategy/technology in terms of its effectiveness in meeting each goal
- Multiply the effectiveness times the goal's weight
- Then, total for each technology
- Calculate the utility values for each ITS technology

COST ESTIMATES FOR STRATEGIES/TECHNOLOGIES

- Components: hardware and software (including spares)
- Labor/staff costs (includes training)
- Vendor implementation management (10% of capital)
- Project implementation (10% of capital)
- Contingency (20% of capital + vendor impl mgmt + proj impl)
- Annual operations and maintenance (various percentages of capital cost items)

COST ESTIMATES FOR STRATEGIES/TECHNOLOGIES 2

Strategy/Technology	Capital Cost (low)	Capital Cost (high)
Identify Super Users/Product Champions for each system (1/4 time for super users)	$75,000	$112,500
Replace (or upgrade) CAD/AVL (add APCs, AVA)	613,000 (991,000)	1,386,000 (2,037,000)
Fixed-route scheduling software	163,000	449,000
Enhanced data strategy	60,000	75,000
Upgrading Surveillance system for live feed (e.g., Pro8 CMS)	37,000	67,000
Transit Signal Priority (TSP) (assumes that roadside TSP infrastructure exists-cost $25,000 per intersection)	22,000	72,000

COST ESTIMATES FOR STRATEGIES/TECHNOLOGIES 3

Strategy/Technology	Capital Cost (low)	Capital Cost (high)
Update to Farebox Lid & MDT Update	$133,200	$200,000
Onboard Information Media	35,000	68,000
Kiosk Information Media	2,000	10,000
Paratransit Fare Solution		
Paratransit Interactive Voice Response (IVR)/Notifications	149,000	355,000
Mobility Management Platforms (first last mile / micro-transit)	200,000	

STEP 5: CALCULATE THE UTILITY/COST RATIO

- Divide the total utility for each technology by the cost of that technology

INITIAL RECOMMENDATIONS, UTILITY SCORES & U/C RATIOS

Initial Recommendations	Utility Score	U/C Ratio
Identify Super Users/Product Champions	336	30.00
Replace/ Upgrade CAD/AVL	865	4.25
Fixed Route Scheduling Software	519	11.56
Enhanced Data Strategy	566	75.47
On-board Surveillance System Enhancement	443	66.12
Transit Signal Priority (TSP)	290	40.28
Upgrade Fare Logistics	541	27.05
On-board Information Media	245	36.03
Kiosk Information Media	265	265.00
Paratransit IVR/ Notifications	532	14.99

FINAL RANKING

1. Kiosk Information Media
2. Enhanced Data Strategy
3. On-board Surveillance System Enhancement
4. TSP
5. On-board Information Media
6. Identify Super Users/Product Champions
7. Upgrade Farebox
8. Paratransit IVR/ Notifications
9. Fixed Route Scheduling Software
10. Replace/ Upgrade CAD/AVL

THANK YOU!

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