

# **S RTP AND SERVICE QUALITY MONITORING**

## **Outline:**

- 1. Measures and Standards (cont'd)**
- 2. Current Practice in SRTP**
- 2. Possible Improvements**
- 3. Service Quality Monitoring**

# Service Quality

Most agencies have formal procedures for monitoring service delivery focussing on on-time performance, typically defined as 0 minutes early to 5 minutes late.

About two-thirds of agencies report rush hour on-time performance of 90% or above.

## Example: MBTA

Local low frequency (headways  $> 10$  minutes) bus service:

- 75% of trips should depart 0-5 minutes after scheduled terminal departure times and arrive 0-5 minutes after scheduled terminal arrival times.

Local high frequency (headways  $\leq 10$  minutes) bus service:

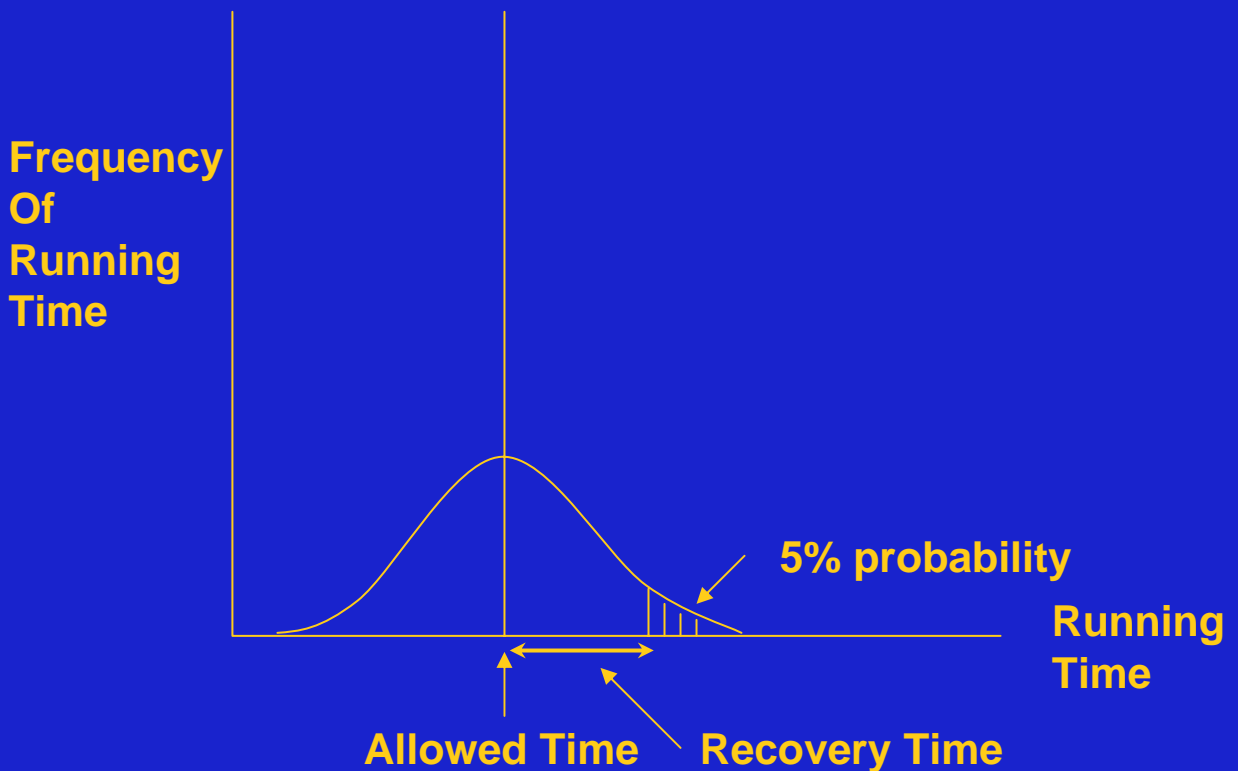
- 85% of trips should have headways no greater than 150% of scheduled headway.
- 95% of trips should have travel times no more than 5 minutes above scheduled times.

Most agencies also keep route level information on:

- Passenger complaints
- Missed trips
- Accidents

# Reliability

Want 95% of departures to be on-time



Implies a recovery time of (2x standard deviation of running time)

$$\text{where std dev.} = \sqrt{\frac{\sum (t_i - t_{mean})^2}{n - 1}}$$

# Economic/Productivity Measures

<u>Measure</u>	<u>% of Agencies Using Measure</u>	<u>Minimum Standard (Median)</u>
Passengers/veh hr	78%	11-35 pass/veh hr
Cost/Passenger	63%	3 x system average
Passengers/veh mile	58%	1-3 pass/veh mile
Passengers/trip	53%	---

Two most critical measures in assessing route performance:

- passengers/veh hour
- subsidy/passenger

## SERVICE INPUTS

Labor  
Capital  
Fuel



## SERVICE OUTPUTS

Vehicle Hours  
Vehicle Miles  
Capacity Miles  
Service Reliability

## SERVICE CONSUMPTION

Passengers  
Passenger Miles  
Operating Revenue  
Operating Safety

# Alternative Benefit Measures

## REVENUE

**PROS:** - relevance to financial concern  
- related to willingness to pay

**CONS:** - discounts value of reduced fare trips  
- favors higher income users

## PASSENGERS

**PROS:** - reflects number of people who benefit  
- values each passenger equally

**CONS:** - doesn't reflect trip length

## PASSENGER MILES

**PROS:** - weights longer trips more  
- most reflective of some benefits

**CONS:** - hardest to measure  
- favors higher income passengers

# Alternative Cost Measures

## NET COST (Subsidy)

**PROS:** - usually most directly constrained

**CONS:** - hardest to estimate

## COST

**PROS:** - may also be directly constrained

**CONS:** - hard to estimate

## VEHICLE MILES

**PROS:** - easy to measure

**CONS:** - directly reflects only 30% of bus costs  
- penalizes fast services

## VEHICLE HOURS

**PROS:** - easy to measure  
- related to >50% of bus costs

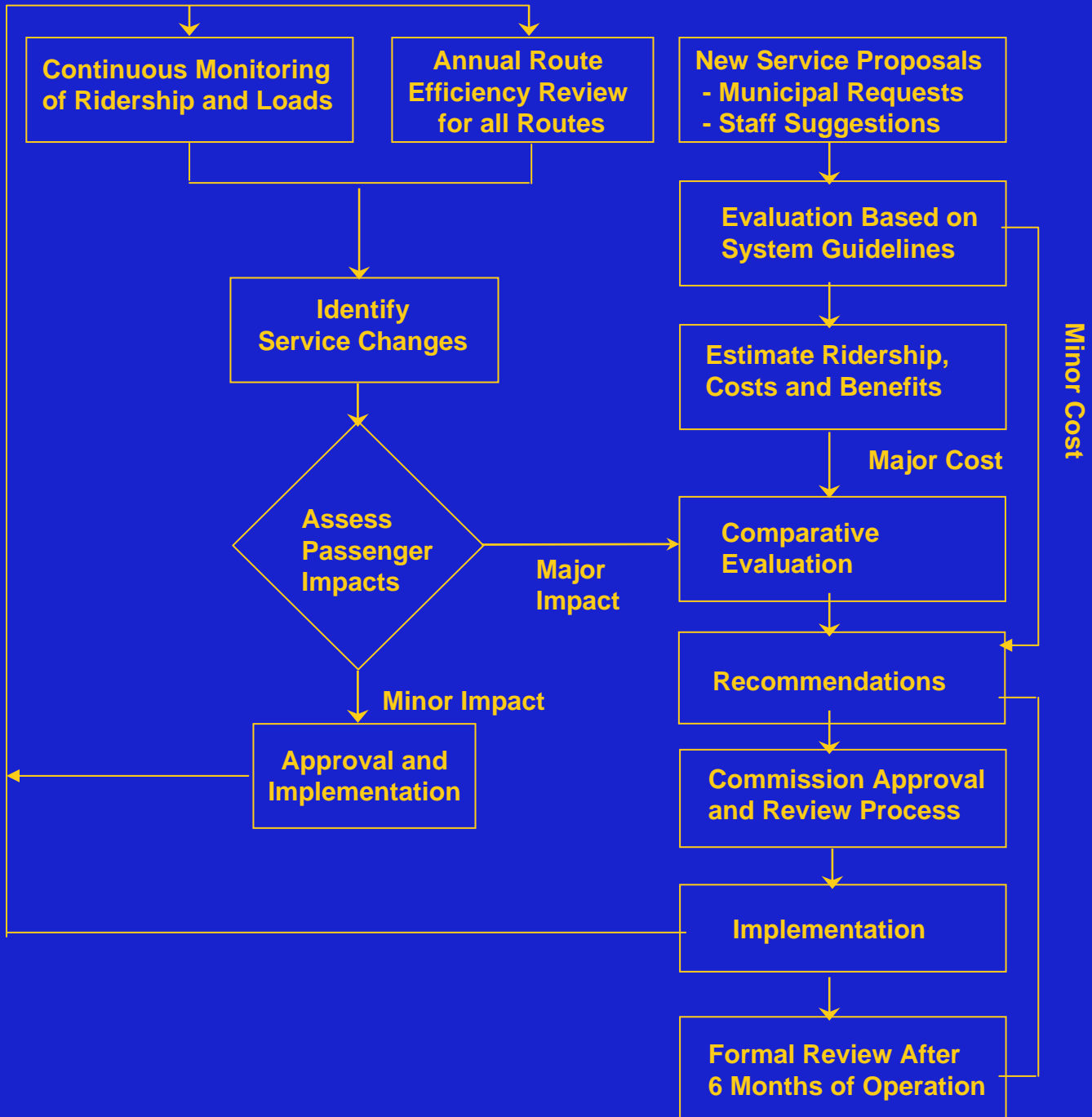
**CONS:** - doesn't reflect cost differences between  
peak and off-peak services

# Issues in Setting Up a Short-Range Transit Planning Process

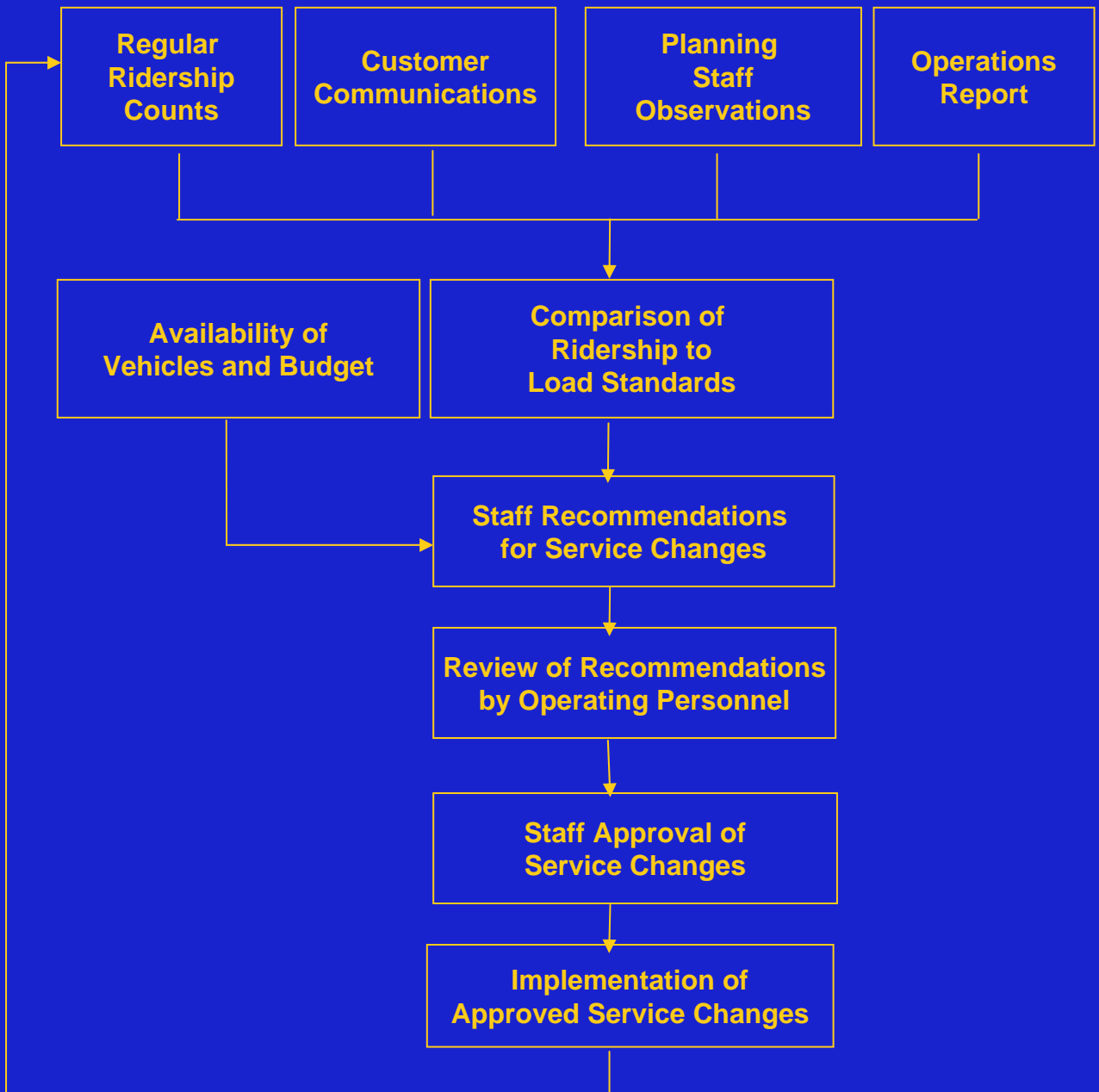
- **Role of budget constraints in the process**
  - => before budget is set
  - => after budget is set
- **Role of standards and constraints vs investing resources to obtain best ridership results**
- **Consideration of new service options vs protection of existing services**
- **Allocation of analysis/planning effort to “problem” routes vs other routes**
- **What form of standards/guidelines to use**
- **Focus on individual routes or route as component of system**



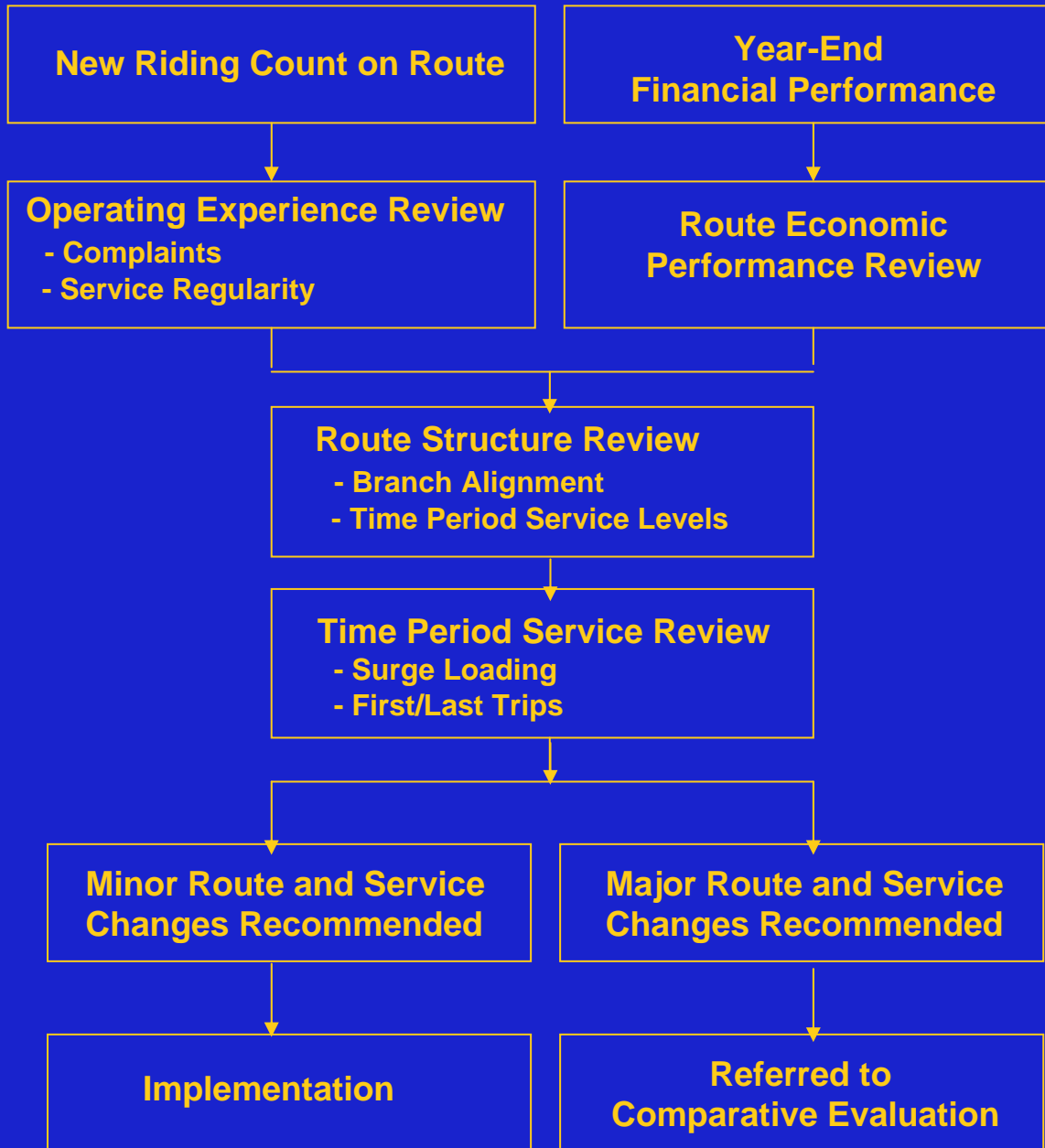
# TTC Service Standards Process: Overview



# TTC Service Standards Process: Ridership Monitoring and Service Adjustment



# TTC Service Standards Process: Route Efficiency Review Program



# TTC New Services Criteria

1. **Must serve people beyond 300 meters from current TTC service**
2. **Must maximize interconnections with rapid transit**
3. **Must result in a net benefit for customers**
  - **net benefit is measured by change in weighted travel time with**

**weighted travel time =**

$$A * \textit{in-vehicle time} + B * \textit{waiting time} + \\ C * \textit{walking time} + D * \textit{transfers}$$

**and  $A = 1.0$ ,  $B = 1.5$ ,  $C = 2.0$ ,  $D = 10.0$**

# TTC Financial Standards and Comparisons

**Single measure used to evaluate service change proposals is:**

**customers gained (lost) per dollar spent (saved)**

**Used for evaluating:**

- **new service proposals**
- **possible service reductions**
- **fare changes**

**The financial unit is the net cost (cost-revenue) associated with the change.**

**Currently, the threshold for new service is 0.23 new customers per dollar spent.**

**Services with performance of less than 0.23 customers per dollar spent are examined for possible cost reduction annually.**

# Service Change Process

- **Major service changes evaluated twice per year resulting in a ranking against other proposals and productivity for existing services**
- **Board provided with recommended service changes and ranked list of all other proposals evaluated and system average performance**
- **Experimental services are designated and evaluated after six months operation**

# A Critique Of Current Practice

- **Focus is on poorly-performing routes.**
- **Data limitations -- both type and quality.**
- **Measures not always closely tied to objectives.**
- **Focus on individual route performance rather than network contribution.**

# Important Factors

- **Multiple Goals of Agency**
- **Constraints on Planning Resources**
- **Limitations of Technical Analysis**



# Suggested Modifications

- **Action-Centered Screening**
- **Explicit Recognition of Multiple Objectives**

# Summary of Generic Actions By Level

## A. Area Coverage Level

1. New route
2. Route extension
3. A small set of routes replaced by a new set
4. Route abandonment
5. Shortening a route
6. Route realignment

## B. Route Structure Level

1. Route splitting
2. Zonal service
3. Express/local service
4. Linking two routes

## C. Scheduling Level

1. Changes in route frequency
2. Changes in departure times of individual trips
3. Changes in layover time, positioning time, etc.
4. Modify running times
5. Partial deadheading

# The Problem-Centered Approach

<u>Problem</u>	<u>Indicators</u>	<u>Possible Actions</u>
A. Poor productivity	Rev/cost Pass/veh hr Load	Decrease frequency Eliminate route or route segments Modify schedule
B. Overcrowding	Load	Increase frequency
C. Unreliable Service	% of trips late	Increase allowed time Modify route

# The Action-Centered Approach

## GENERIC ACTION

## FAVORABLE ROUTE CONDITIONS

### A. Area Coverage Level

1. **Eliminate Route Segment** Low ridership generation on segment  
Vehicle savings possible from elimination  
Higher frequency possible from elimination

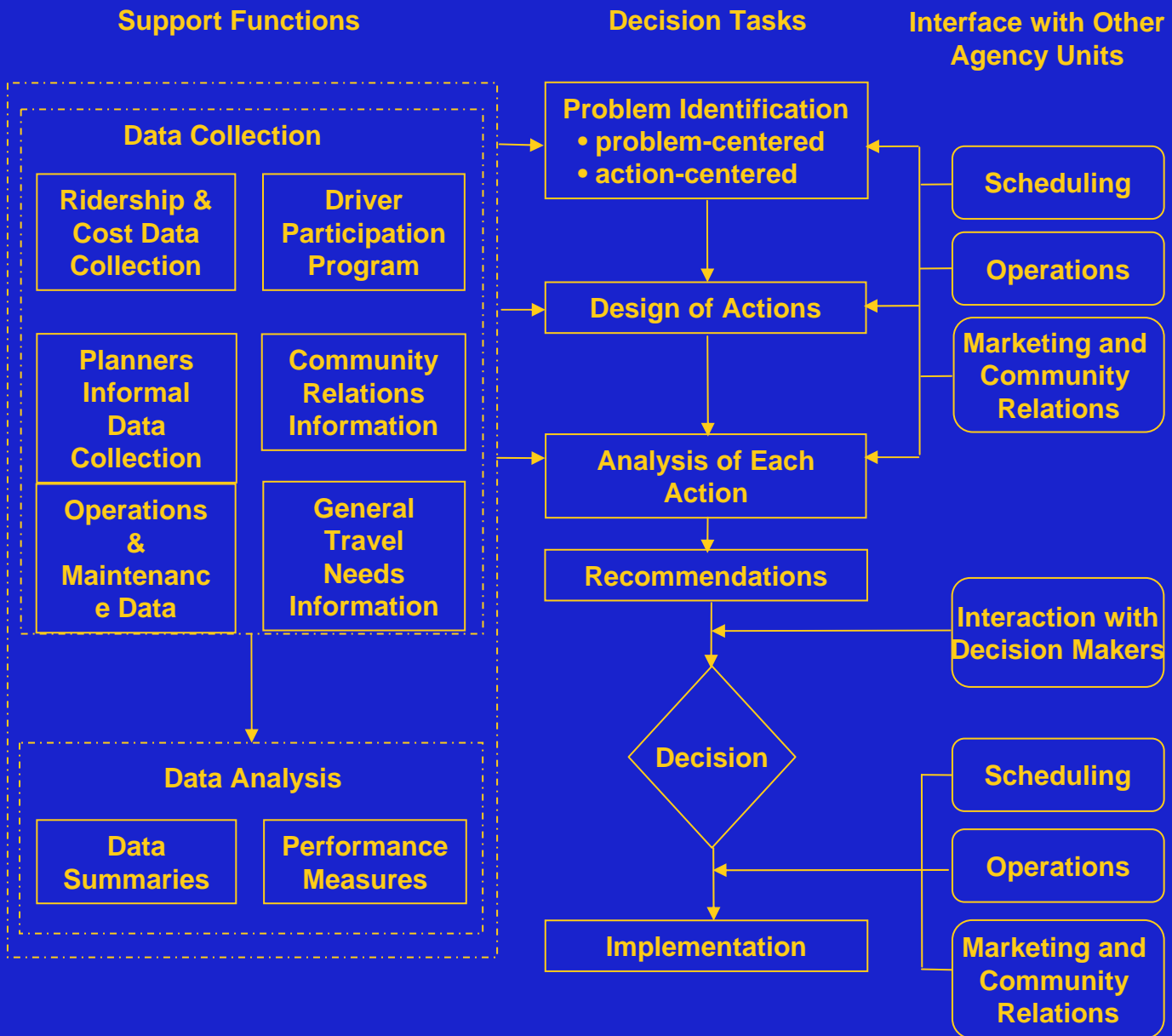
### B. Route Structure Level

1. **Split Route** Low productivity  
Uneven load profile  
Long route
2. **Zonal** Tapering load profile  
Long route  
High ridership
3. **Express/Local** High ridership  
Tapering load profile  
Long route  
Large time differential local/express

### C. Scheduling

1. **Increase Frequency** Overcrowding  
Moderate rather than high ridership  
Even load profile
2. **Decrease Frequency** Low productivity and loads  
Headway below policy levels
3. **Eliminate Trips** Low ridership on trips  
High cost savings from elimination
4. **Increase Running/  
Layover Time** Poor schedule adherence  
High loads
5. **Partial Deadheading** Large imbalance in flows  
Large time differential in service/deadhead  
High frequencies

# Proposed Short-Range Transit Planning Process



# Techniques Used to Collect Route Level Information/Data from Riders

	Under 50 buses (42)	51 to 200 buses (34)	201 to 500 buses (16)	501 to 1000 buses (9)	Over 1000 buses (10)	Total
Focus groups	7	9	6	5	4	31
General market research	12	18	8	3	5	46
On-board surveys	33	29	13	7	8	90
media-based surveys	2	3	3		2	10
Meetings with organized riders' groups, community councils, etc.	13	13	7	5	6	44

# Techniques Used to Collect Route Level Information/Data from Operators

	Under 50 buses (42)	51 to 200 buses (34)	201 to 500 buses (16)	501 to 1000 buses (9)	Over 1000 buses (10)	Total
Operator quality circles	8	7	3	2	3	23
TQM (Total Quality Management)	9	5	1	4	1	20
Special union-management meetings	10	12	5	5	7	39
Route or garage-based teams or task forces	4	8	6	5	6	29
Employee suggestion plans or comment processes	29	30	13	9	7	88

# Service Quality Monitoring

Increasing recognition of importance of monitoring and reporting service quality and customer satisfaction on a regular basis:

- **Customer Satisfaction Index**

5 agencies (Akron, Chicago, Minneapolis, Philadelphia and Portland) attempted to develop a CSI for the transit industry (funded by IDEA Program)

- **MBTA Service Quality Report Card**

It would include measures of:

- => Comfort -- passenger crowding
  - => Communications -- response time to complaints, waiting time for information calls, calls completed successfully
  - => Convenience -- population coverage, service frequencies, trip times
  - => Customer Satisfaction -- complaints
  - => Reliability -- elevator and escalator availability, schedule adherence, missed trips, vehicle breakdowns
  - => Security -- crime, passenger injuries
- plus results of Customer Satisfaction Survey

## Issues:

Is information meaningful at system level?

Will results help identify areas where improvement can be achieved?

Can the additional data collection and analysis be justified?