X. Cost Analysis and Financial Planning

Public Transport Planning and Regulation: An Introduction
# Planning and Analysis Building Blocks

## Schedule Building
- Focus of Discussion

## Cost Analysis and Financial Planning

## Performance Analysis

<table>
<thead>
<tr>
<th>Measures &amp; Standards</th>
<th>Service Monitoring and Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network and Route Design</td>
<td>Fares and Revenue: Policy, Analysis, and Collection</td>
</tr>
<tr>
<td>Market Factors and Demand Analysis</td>
<td>Terminology and Basic Relationships</td>
</tr>
</tbody>
</table>

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X-2

WORLD BANK
Understanding Costs Is Essential to Effective Management & Governance

- Service Evaluations
- Budgeting
- Fare Setting
- Contract Specifications
- Operating Subsidies
- Capital Investments

Financial Sustainability
Basic Cost Concepts

• Total Costs of a Public Transport Operator
  – Operating and Capital Costs
  – Fixed and Variable Costs

• The Key “Drivers” of Public Transport Costs
  – KM of Service Operated
  – Hours of Service Operated
  – Number of Vehicles Operated
Total Cost Concept

• Basic Business Sustainability Principle
  
  *A public transport system must receive fare and other revenues that are sufficient to cover ALL of its costs*

• Cost Components
  
  – Operating and Capital Costs
  – Fixed and Variable Costs
Total Cost = Operating/Maintenance Costs + Capital Costs

- **Operating/Maintenance Costs** are for items consumed in less than one year, e.g., labor, fuel, vehicle replacement parts.

- **Capital Costs** are expenses for long-term assets, expressed as depreciation, e.g., buses, maintenance depots, stations,
Life-Cycle and Immediate Costing

- *Life-Cycle Costing* considers both operating and capital expenses
  - Funds for eventual bus or infrastructure replacement *are included*
- *Short Term “Immediate” Costing* considers only operating/maintenance expenses (immediate)
  - Funds for eventual bus or infrastructure replacement *are not included*
- *Financial Sustainability Depends On Life-Cycle Costing*
Total Cost = Fixed Costs + Variable Costs

- **Variable costs** vary as service levels change (e.g., operator labor, fuel)

- **Fixed costs** do not vary as service levels change (e.g., administrative salaries, garage electricity)
Importance of Total Cost Concepts to Public Authority

• All costs should be included in a financial analysis (e.g., a fare increase)
  – Operating/Maintenance and Capital Costs
  – Fixed and Variable Costs

• All costs should be included when assessing the reasonableness of tender bids
  – Failure may lead to poor service provision or inability to complete contract
Key Cost Parameters

- Individual expense items change in step with different service and network parameters
- Common parameters
  - KM of Service Operated
  - Hours of Service Operated
  - Number of Vehicles Operated
  - Passengers
  - Facilities (e.g., number of stations, KM of transit way)
# Colombian Assignment Example

<table>
<thead>
<tr>
<th>Expense Item</th>
<th>Hours</th>
<th>KM</th>
<th>Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td></td>
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</tr>
<tr>
<td>Operations</td>
<td>11.7%</td>
<td></td>
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</tr>
<tr>
<td>Maintenance</td>
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<td>9.6%</td>
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<tr>
<td>Gen. Admin</td>
<td></td>
<td></td>
<td>1.0%</td>
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<tr>
<td>Fuel</td>
<td></td>
<td>39.4%</td>
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<tr>
<td>Parts</td>
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<tr>
<td>Tires</td>
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<td>10.1%</td>
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<td>Lubricants</td>
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<td>5.1%</td>
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<tr>
<td>Other Consumables</td>
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</tr>
<tr>
<td>Depreciation</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Vehicles</td>
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<td>13.7%</td>
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<td>Other Assets</td>
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<td>Totals</td>
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<td>3.8%</td>
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<tr>
<td>Expense Item</td>
<td>Hours</td>
<td>KM</td>
<td>Peak Vehicles</td>
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<td>------------------------------</td>
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<td>Staff</td>
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<td>Traffic</td>
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<tr>
<td>Workshops/Maintenance</td>
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<td>3.7%</td>
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<tr>
<td>Gen. Admin</td>
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<tr>
<td>Fuel</td>
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<td>Spares &amp; Assemblies</td>
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<td>Tyres &amp; Tubes</td>
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<tr>
<td>Lubricants</td>
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<td>Other Consumables</td>
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<tr>
<td>Totals</td>
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<td>13.4%</td>
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</table>
Comparison of Colombian and Indian Examples

- Fuel is largest single cost item

- KM is the most important service parameter driving costs
  - Over 60 percent of costs

- Differences in examples probably due to differences in the ratio of personnel wages to fuel costs
Single Parameter Costing Also May Be Misleading

- Different services have different total unit costs (e.g., cost/KM or cost/hour)
- Why? Different combinations of cost driving parameters (e.g., hours, KM)

Examples
- Local services have higher driver labor costs/km than do express services
- Express services higher fuel and depreciation costs/hour than do local services
The current contract rate for bus service is $1.40/KM. What are the estimated costs for new Routes A and B?

<table>
<thead>
<tr>
<th>Route</th>
<th>Commercial KM</th>
<th>Commercial Hours</th>
<th>Speed (KPH)</th>
<th>Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1,036,800</td>
<td>79,754</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>B</td>
<td>1,036,800</td>
<td>39,877</td>
<td>26</td>
<td>6</td>
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</table>
Route Cost Using KM Cost Rate

Cost = Commercial KM * $1.40

Cost (Route A) = 1,036,800 * $1.40
= $ 1,451,520

Cost (Route B) = 1,036,800 * $1.40
= $ 1,451,520

Does this make sense that the costs are identical even though the service on Route B consumes less hours and requires fewer vehicles?
Conclusion
Single Parameter Costing

• *Be careful* about using single-factor contract rates for estimating future costs
  – This is particularly important for analyses involving different types of services
“Good” Incremental Cost Issue in Contracting

• The unit costs beyond the “base service” may be LOWER than base service unit cost

• Why?
  – The added service will not require the increase of certain fixed cost items such as supervision and garage facility costs
“Bad” Incremental Cost Issue in Contracting

• The unit costs beyond the “base service” may be *HIGHER* than base service unit cost

• When?
  – The added service may require the underutilization of new vehicles so that the depreciation cost per KM becomes very high
What is Financial Planning?

• **Systematic** approach that produces a *financially sustainable* program for implementing a service plan:
  – Maintaining existing services and
  – Adding improved and new services

• **Financial planning addresses:**
  – Operating and maintenance (O&M) and capital financial needs
  – Sources to fund these needs
  – The timely matching of needs and funding
Financial Planning Process

- Estimate O&M Costs
- Estimate Capital Replacement Costs
- Estimate Expansion Capital Costs

Are Revenues ≥ Costs?

- Yes
  - Prepare Financial Plan
- No
  - Set Fare Levels
  - Estimate Pass. and Other Revenues
  - Estimate Government Funding
Estimating O&M Costs

- Operation
- Administration
- Maintenance
- Contract Services
Estimating Capital Replacement Costs

• Based on replacing/renewing when needed
  – Replaced at the end of their useful lives
    e.g., Buses 15 years
    Shelters 10 years
    Garages/Stations 50 years
  – Some items renewed at mid-life points
    e.g., Roofs 20 years
    Repaving 10 years
Estimating Capital Costs

- Costs should include additional costs (as needed)
  - Engineering
  - Procurement
  - Testing/inspection
Good Public Policies for Setting Fares

- Fares should be increased as cost inflation increases
  - May not have to match inflation if patronage is rising
- Regular, small increases are better than infrequent large increases
  - Less of a “shock” to riders
  - Often less negative public reaction
  - Reinforces idea that public transport is no different than other consumer items
Options for Addressing Revenue/Cost Gaps

- **Multi-Year Service Plan**
  - Delay expansion of selected services
  - Revise selected services to reduce costs
  - Eliminate selected expansion services

- **Fare Levels**
  - Move fare increases forward
  - Increase the level of fare increases

- **Other revenues**
  - Examine potential of capital facilities to be self-supporting or profit-making

- **Government Funding**
  - Use financial projections to support requests for additional funding
Summary

• Defined total cost concepts
• Described key cost parameters
• Discussed incremental cost issue in contracting
•Outlined financial planning process and key activities
• *Cost analysis and financial planning are necessary for financial sustainability*