Which transit?

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Unattractive public transport systems

- Insufficient physical integration of various public transport modes and between public transport, walking, cycling and private car
- No integrated and transparent time schedules
- Signage, customer information on timetables, connecting services and fares not appropriate

→ discouraging the use of public transport
Unattractive public transport systems

- Insufficient cooperation between public transport operators
- Each change of mode normally requires the purchase of another ticket
- No uniform service level standards among modes and operators
What do citizens want?

- Convenience
- Easy Access
- Comfort
- Frequent Service
- Rapid journey
- Safety & Security
- Customer Service
- Affordability
- Have a network

Public Transport should be designed around the customer and not around a technology.
Conventional Public Transport Planning Approach

Step 1. Choose technology
- Technology chosen due to manufacturer lobbying efforts
- Design chosen to please existing operators
- Technology chosen to help property developer

Step 2. Fit city to the technology
- Reduce size of network due to financing limitations
- Charge higher fares in attempt to pay for expensive system
- Operate infrequent services to reduce operating losses
- Require large subsidies for lifetime of system’s operation

Step 3. Force customer to adapt to technology
- Extensive marketing campaign to convince customers that system is in their interest

EcoMobility
An IKEI-Led Governments for Sustainability Initiative
The innovative and successful approach

Step 1. Design a system from customer's perspective
- Rapid travel time
- Few transfers
- Frequent service
- Short walk to station from home / office
- Full network of destinations
- Low fare cost

Step 2. Evaluate customer driven options from municipality perspective
- Low infrastructure costs
- Traffic reduction benefits
- Environmental benefits

Step 3. Decision
- Technology decision based on customer needs and municipality requirements
- Economic / employment benefits
- Social equity benefits
- City image

EcoMobility
An ILRI-LocalGovernments for Sustainability Initiative
<table>
<thead>
<tr>
<th>Component</th>
<th>Metro</th>
<th>LRT</th>
<th>BRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running Ways</td>
<td>Rail Tracks</td>
<td>Rail Tracks</td>
<td>Roadway</td>
</tr>
<tr>
<td>Type of Right of Way</td>
<td>Underground/ Elevated/ At-grade</td>
<td>Usually At-grade – some applications Elevated or Underground (tunnel)</td>
<td>Usually At-grade – some applications Elevated or Underground (tunnel)</td>
</tr>
<tr>
<td>Segregation From the Rest of the Traffic</td>
<td>Total Segregation (no interference)</td>
<td>Usually Longitudinal Segregation (at grade intersections) – some applications with full segregation</td>
<td>Usually Longitudinal Segregation (at grade intersections) – some applications with full segregation</td>
</tr>
<tr>
<td>Type of Vehicles</td>
<td>Trains (multi-car)</td>
<td>Trains (two-three cars) or single cars</td>
<td>Buses</td>
</tr>
<tr>
<td>Type of Propulsion</td>
<td>Electric</td>
<td>Electric (few applications Diesel)</td>
<td>Usually Diesel/CNG – some applications Hybrid (Diesel/CNG-Electric) or Electric Trolleybuses</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Component</th>
<th>Metro</th>
<th>LRT</th>
<th>BRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stations</td>
<td>Level boarding</td>
<td>Level boarding or stairs</td>
<td>Level boarding (few with stairs)</td>
</tr>
<tr>
<td>Payment Collection</td>
<td>Off-board</td>
<td>Usually off-board</td>
<td>Off-board</td>
</tr>
<tr>
<td>Information Technology</td>
<td>Signalling, control, user information,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systems</td>
<td>advanced ticketing (magnetic/electronic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>cards)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Plan</td>
<td>Simple; trains stopping at every station;</td>
<td>Simple; trains stopping at every station</td>
<td>From simple to very complex; combined</td>
</tr>
<tr>
<td></td>
<td>few applications with express services or</td>
<td>between terminals</td>
<td>services to multiple lines; express,</td>
</tr>
<tr>
<td></td>
<td>short loops</td>
<td></td>
<td>local – some combined with direct</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>services outside the corridor</td>
</tr>
<tr>
<td>User Information</td>
<td>Very clear signage, static maps and dynamic systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image</td>
<td>Modern and attractive</td>
<td></td>
<td>Advanced as compared with standard buses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Bus lanes</th>
<th>Light Rail - Tramway</th>
<th>Heavy Rail - Metro</th>
<th>Bus Rapid Transit - Metrobus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Required</td>
<td>2-4 lanes Existing Roads</td>
<td>2-3 lanes Existing Roads</td>
<td>New Right of Way – Elevated or Underground</td>
<td>2-4 lanes Existing Roads</td>
</tr>
<tr>
<td>Flexibility</td>
<td>High</td>
<td>Limited</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Impacts on Traffic</td>
<td>Mixed</td>
<td>Mixed</td>
<td>Reducción de Congestión (?)</td>
<td>Mixed</td>
</tr>
<tr>
<td>Integration with Feeders</td>
<td>Easy</td>
<td>Difficult</td>
<td>Difficult</td>
<td>Easy</td>
</tr>
<tr>
<td>Level of Service (Frequency, Occupancy)</td>
<td>Low</td>
<td>Good</td>
<td>Muy Good (corredor denso)</td>
<td>Good</td>
</tr>
<tr>
<td>Safety</td>
<td>Low</td>
<td>Buena</td>
<td>Muy Buena</td>
<td>Good</td>
</tr>
<tr>
<td>Emmissions</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High (Medium)</td>
</tr>
<tr>
<td>Reliability</td>
<td>Low</td>
<td>Medium (bunching)</td>
<td>Good</td>
<td>Medium</td>
</tr>
<tr>
<td>Transfers /Walking</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

No single alternative dominates the others

Sources: Adaptado por el autor de Halcrow Fox, 2000; L. Wright and K. Fjellstrom, 2003, y V. Vuchic, 1992
Costs vs capacity of various transit systems

Capacity is the Main Driver of Capital Cost
### Common deviation between planning and implementation

<table>
<thead>
<tr>
<th></th>
<th>Actual/Estimated (Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>1.91</td>
</tr>
<tr>
<td>Passenger Demand</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Bent Flyvbjerg, "Cost Overruns and Demand Shortfalls in Urban Rail and Other Infrastructure," Transportation Planning and Technology, vol. 30, no. 1, February 2007, pp. 9-30. DOI: 10.1080/03081060701207938

Link to published article: [http://www.tandfonline.com/doi/full/10.1080/03081060701207938](http://www.tandfonline.com/doi/full/10.1080/03081060701207938)

12 urban rail transit projects with information before and after
BRT
Diverse Sizes

Source:
http://www.wri.org/publication/modernizing-public-transportation
Varied throughput

Source: http://www.wri.org/publication/modernizing-public-transportation
Commercial speed

Source: http://www.wri.org/publication/modernizing-public-transportation
Operational productivity

Source: http://www.wri.org/publication/modernizing-public-transportation
Capital productivity

Source: http://www.wri.org/publication/modernizing-public-transportation
Capital Cost

Source: http://www.wri.org/publication/modernizing-public-transportation
Comparing Alternatives

So...

Do **NOT** choose the technology and then justify it

For the conditions of any city the key is integration of different services, taking most advantage of the existing systems