BRT in the Americas: New trends and opportunities

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Outline

What brought BRT?

BRT level of service and promise

BRT traditional components

BRT in the Americas: Brazil, Colombia, Mexico, US

BRT of the future, five elements
What brought BRT?
Public transport is victim of a vicious cycle

- Income and Population grows
- More cars in the city
- Bus demand drops
- More congestion and delays
- Car becomes more attractive
- Bus frequency drops
- Buses cover fewer miles per day
- Bus fare increases
- Operation cost grows
However, this cycle doesn’t affect **Metro** as much... (luckily, cars don’t go underground)
The BRT promise:
provide Metro-like service on the surface
What are the most distinctive elements of Metro’s level of service?

Fast
Low wait time
Comfortable
Reliable
Good information
Branding
Can we provide Metro-like service with buses?

Fast
Low wait time
Comfortable
Reliable
Good information
Branding
**Fast**
- Increase speed

**Reliable**
- Regular headways

**Comfort**
- Increase capacity

**Low waits**
- Increase frequency

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**Main drivers**
- Increase speed
- Increase frequency
- Increase capacity
- Regular headways

**Actions**
- Segregated ways/lanes
- Reduce dwell times
  - Fare payment off-bus
  - Buses with multiple doors
- Increase distance between stations
- Express services
- Traffic signal priority
- Improved headway control
And this is what BRT is about
BRT Key Components

- Distinctive Image
- Centralized Control
- Stations with Prepayment and Level Boarding
- Segregated Median Busways
- Large Buses
  Multiple Wide Doors
BRT evolution worldwide

- New cities
- Cumulative number of cities

Key events:
- 1974/1991*: Curitiba
- 2000: Bogotá
- 2010: Guangzhou
brtdata.org
BRT Centre of Excellence brt.cl
http://brtdata.org/
BRT in the Americas
Latin America
Curitiba: the cradle of BRT

- Median bus-ways longitudinally segregated
- Tube stations with fare prepayment and level access
- Physical and fare integration
- Dispatch control at terminal stations.
- Differentiated services:
  - Expresso, Ligerao, Ligeirinho, Interbairros, Alimentador
  - Special services downtown, hospitals, touristic bus, schools

Curitiba showed that buses can operate like Metro
Bogotá adapted the Curitiba concept for extremely high capacity

- Central corridors allowing overpassing
- Stations with multiple stops
- Regular and express services in the same infrastructure
- Off-board payment
- Large buses, lower emissions
- Image

Capacity: 48,000 pax/day-direction
Commercial speed: 26 km/h (regular service)

108 Km 2.4 million pax/day
Bogotá TransMilenio
Eje Ambiental Avenida Jiménez
Amazing achievement: Bogotá manages not just to increase the modal share of massive public transport, but also to keep public transport modal share constant.
The main challenge is extreme overcapacity in buses and stations.

150+ passengers per bus in the most loaded segments (aprox 7 pax/m²)
User satisfaction has dropped to its historical minimum.

dele los usuarios, están satisfechos con el TransMilenio (588 y 357 usuarios respectivamente)
Belo Horizonte: MOVE

5.4 mi
inhabitants
23 km
BRT
3 corridors
50% Trip time reduction
700k Pax/day
MOVE
Rio de janeiro

11.8 mi habitantes

160 km Red BRT
Four BRT corridors

TransOeste
TransBrasil
TransCarioca
TransOlimpica

2 mi pass/day (by 2016)

Source: Rio de Janeiro Municipality

TransBrasil is being designed for 60,000 pax/hr-direction
TransCarioca

39 km
450k pass/day - TransCarioca
Before & After
Sustainable Transport Award 2015

Belo Horizonte, Brazil

Rio de Janeiro, Brazil

São Paulo, Brazil

BRT systems in México
**Evolución de BRT en México**

2003
- Optibus Leon, Guanajuato
  - Length: 26 km
  - Fleet: 61

  - 237,000 Pax/día

2005
- +Metobus Insurgentes Mexico DF
  - Length: 46 km
  - Fleet: 156

  - 497,000 Pax/día

2008
- + Metrobus Insurgentes Sur
  - Length: 55 km
  - Fleet: 216

  - 552,000 Pax/día

2009
- +Macrobus Guadalajara
  - Length: 92 km
  - Fleet: 330

  - 814,000 Pax/día

2011
- +Mexibus Mexico State
  - Length: 128 km
  - Fleet: 472

  - 1,114,000 Pax/día

2012
- +Metrbus Line 4
  - Length: 156 km
  - Fleet: 526

  - 1,164,000 Pax/día

**Evolución de BRT en México**
Metrobús México DF
Mexico DF – Metrobus

5 Lines
105 km
900,000 pax/day
http://www.metrobus.df.gob.mx/mapa_L4.html
USA and Canadian Context

- High automobile ownership and use create challenges for transit and shared streets
- Growing political support for flexible, incremental implementation of BRT(-lite) elements in wide range of cities
  - Select Bus Service “a proven winner”
    – Michael Bloomberg, former Mayor of New York City
  - BRT “one of the easiest and most cost-effective ways to expand and modernize our city’s transit network”
    – Rahm Emmanuel, Mayor of Chicago
  - “We want BRT, we want it to move forward”
    – John Curtis, Mayor of Provo, Utah (pop. 112,500)
  - BRT in Boston is “next big wave of investment”
    – Jim Aloisi, former Massachusetts Secretary of Transportation
Project Types – USA and Canada

• New and upgraded express corridors – stations along highways to downtown, dedicated high-speed infrastructure
  – Ottawa: Transitway
  – Los Angeles: Silver Line
  – Pittsburgh: Busways

• Arterial corridors – mix of station types, some median dedicated lanes
  – Arlington/Washington: Metroway
  – Cleveland: HealthLine
  – San Bernardino: sbX

• Rapid bus networks – limited transit priority, wide coverage
  – Los Angeles: Metro Rapid
  – New York: Select Bus Service
Opportunities – USA and Canada

- Successful demonstration projects in early 2000s
- Now more than 20 cities with BRT corridors, 10 added since 2010
- Emerging recognition of BRT benefits, in cities with and without developed rail transit
Challenges – USA and Canada

- Major conflicts over the allocation of street space, links to land use
- High-profile “top-down” projects undermined or halted
- Need for tools that can better
  - Communicate holistic project benefits
  - Inform and enhance public participation
  - Help build stakeholder coalitions
- Successful BRT-based TOD requires coordination across scales
How should BRT evolve to ensure that in the long term we win the Car vs Public Transport battle?
This battle is not won through low fares, but through high quality of service.

Significant subsidies are needed.

Public Transport subsidies are not just equitable.

Cities are more efficient with subsidies.
What do we expect from BRT in the near future?

Can BRT offer features that Metro can’t?
1.- BRT must be **Rapid**
But... as cities grow, trips get longer

Express services are crucial: Overpassing facilities are needed

Which is the set of services that we should operate in BRT corridors?
But... as cities grow, trips get longer

BRT should conquer urban freeways

Provide higher than Metro speeds

Safety issues
2.- BRT must be **Reliable**
Bus Bunching

• Santiago, Chile
Bus Bunching

• Bogotá, Colombia
Bus Bunching

- Beijing, China
Bus Bunching

- Bruselas, Belgium
Bus Bunching

- Boston, USA
Bus Bunching

- London, England
Pilot tests of a headway control system

The system has been successfully tested in middle to high frequency bus services in Santiago.
The future of BRT must be written with double R

BRRT

Bus Rapid and Reliable Transit
Modern Metro systems are driverless or have drivers that do not drive.

Driverless cars are already being tested.

3. While BRT buses move inside corridors, they might be driverless too.
Potential benefits of driverless operation

Headway regularity
Schedules
Smotherer bus docking at stations
Eco-driving
Safety
4.- BRT must be comfortable. We must stop designing 6 pax/m² systems

Remember that this is an average across many buses and many areas inside the bus!

And operation is often exposed to incidents that make things worst
5.- BRTs are often designed under a trunk and feeder structure. It is very cost effective!!

But…. passengers hate transfers
What can we do about transfers

Buses are much more flexible than trains. An open system avoids many transfers

Run multi-corridor services

Station capacity is critical. It is the most likely bottleneck to be triggered first. We must design them well.

Transfers can be an opportunity to turn the travel experience into culture, commerce, fun.
BRT challenges

- Rapid
- Reliable
- Driverless
- Comfortable
- Few transfers
- Be careful with the urban context
- Low emissions
- Make it fun
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