Revitalising Urban Public Transport in Megacities in the Developing World

John Austin
My background

- Became a Christian while at university; but was already a) from a church-going background and b) had some interest in sustainability. Always had a transport interest: academic background is Economics, Geography, Statistics. My faith therefore was and is one of a number of elements in work motivation.

- Became a transport consultant in 1994 after a post-university gap year in India and a range of subsequent related but varying posts. Have worked in the UK and Europe; awarded a Churchill Travelling Fellowship to Australia, Singapore, Hong Kong in 2000

- Worked in Nigeria (Lagos) in much of 2011 to 2013

- Worked in Indonesia (Jakarta) in 2014, 2015, 2016

- Strong interest in Intelligent Mobility / Smart Cities / Big Data / ‘Mobility as a Service’ etc.
Why is Transport in developing-world Megacities a matter of concern?

THEOLOGICAL REASONS
God’s Kingdom

Cities representing Religious Govts. in the Bible – a clear theme:
- Babylon - "that great city which rules over the kings of the earth" (Rev. 17:18)
- "Jerusalem" - nearly 800 references to Jerusalem as “the City of our God”

Cities represent a key focus for bringing the Kingdom of God into the world – they are where people are. Transport a key enabler by which people live and engage with the city. Transport systems in developing world reflect presence or lack of:
- Justice
- Equality
- Safety
- Stress
- Exhaustion

Megacities in developing world are huge and growing hugely
God’s Earth

- God’s environment now
  - Pollution of resources
  - Transport a major greenhouse-gas emitter
    - World Resources Institute – 2014: “Transport is responsible for 22 percent of energy-related greenhouse gas (GHG) emissions worldwide, and its emissions are increasing at a faster rate than any other sectors”

- Humanity
  - Poor health
  - Premature death
    - WRI: Outdoor air associated with 3.7 million premature deaths in 2012, and fuel combustion in motor vehicles responsible for up to 75 percent of urban air pollution.

- Sustainable development
  - Caring for God’s resources in the long term
  - Use of land
    - Unplanned / non-integrated development takes up more land
  - Fossil fuels will run out, or be harder and more costly to extract
ECONOMIC REASONS
The importance of transport

- Has intensive use of infrastructures: therefore a common tool used for development
- Can provide economic and social opportunities and benefits
- A major component of cost of goods
- A major component of household costs
- Urban form characterised by separation of residential and employment locations: urbanisation requires more transport
- Urbanisation trends in 20\textsuperscript{th} century: since 1950, the world’s urban population has more than doubled, to reach nearly 3.8 billion in 2014, about 54\% of the global population
- Transport is not the same as mobility
- Sustainability advocates argue that we need to focus on moving People not Vehicles
Megacity trends – 2014 to 2030

Cities with a projected 2030 population of more than 10 million

2030 population

<table>
<thead>
<tr>
<th>Change in population from 2014 to 2030</th>
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<tbody>
<tr>
<td>2030 population</td>
</tr>
<tr>
<td>+0-15%</td>
</tr>
<tr>
<td>16-30%</td>
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<tr>
<td>31-45%</td>
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<td>46% or more</td>
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</tbody>
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Bolded cities: projected to surpass 10 million people between 2014 and 2030

Note the huge importance of the Developing world

From Quantumrun Consulting

JRI: Annual Environment Day Conference 2018:
Transport Now and in the Future: What are the Issues?
Some current worldwide features affecting the developing world re Transport

- Essentially Urban Issues
  - In the last 30 years the world’s economy has witnessed unprecedented growth and dramatic changes: magnified effect on the developing world.
  - The world has reached an especially critical point in its development resulting from increased globalisation: Global Warming

- Transport Investment Priorities
  - The ‘New Regionalism’ affecting transport investment characteristics. Previously the rationale was providing links that bind together adjacent, nearby communities.
  - World-wide trends of hyper-mobility
The changing nature of cities in the developing world

Some developments previously more associated with the developed world

- New shopping malls
- High-rise residential buildings
- Elevated highways
- Fast train / metro projects

Jakarta
LAND-USE PLANNING
Some Key Factors

- Urban Sprawl
- Boundaries rarely align with metropolitan area
- Land use and transport not usually planned together
- A national role in metropolitan urban transport planning is seldom significantly filled
- Vigorous debate between proponents of caring for the environment about how best to do that in relation to urban planning and transport planning
  - One view: Forcefully limit decentralization of urban development; design shorter trips into land-use densities and allocations
  - Another view: Sprawl has little effect on transport costs; and impractical to significantly reduce it
TRANSPORT PROJECT DELIVERY CONTEXT
Political Context

- Politicians often with good intentions but not necessarily taking the right approaches technically. Keen to get things done but also to be seen to get things done.

- Long-term versus short-term objectives

- Rapidly changing policy, which may not be able to be questioned

- Vested interests

- Conflicting / overlapping public organisations

- ‘Regulatory Capture’
‘Aid’ Context

- Economic objectives

- Transport Infrastructure Development
  - Projects meeting the Funding Agency’s criteria
  - Distinct Terms of Reference
  - Project Implementation using Best Practice
  - Economic Assessment Techniques used within Project

- Capacity Building
  - Monitoring of Effectiveness / Performance Metrics
  - E.g. Reduced Journey Time to Work

- But Capacity Building may require cultural adjustments

- And may require expenditure on Technology – is there Financing?
THE ISSUES
The Challenges

- Congestion
- Environment
- Energy Use
- Economy
- Personal Choice
- The consequences of change
- Regulation, Governance, Political Support
- Actual Delivery of transport schemes
Motorbikes

Ho Chi Minh City, Vietnam
PUBLIC TRANSPORT ISSUES
Why Public Transport is a key solution

- Fast movement of large numbers of people
- Efficient in use of space and resources
- Can provide door-to-door where there is proper integration
- Accessible (to most)
- Alleviates congestion

- But debates over what is appropriate mode for different environments
The BRT ideal

From ITDP

Clean, accessible, well-ordered, well-maintained
New lines usually elevated: may follow line of existing major roads.
Bus Rapid Transit in context

May coexist with congestion, with incursion of normal traffic into dedicated bus lanes; ramps may not be accessible to all.
Delivery Challenges
The Traditional Regime

Replacement of old vehicles and old business regime would mean need to find employment for displaced drivers etc. in new system.
Delivery can be slow and tortuous

Revitalisation of urban rail takes time. These old-style boarding systems still exist on what is a very heavily-used rail network.
THE ROLE OF TECHNOLOGY DEVELOPMENTS
Bike-Sharing?

Ofo
Pune, India – but within a gated community

CitiesToday

JRI: Annual Environment Day Conference 2018:
Transport Now and in the Future: What are the Issues?
Big Data

- Collecting data on all real bus routes: mapping them
- Collecting large enough sample of running times to be able to model timetables of all routes
- Equipping vehicles with working comms so as to be able to predict real-time arrivals at stops, modelling for data gaps – machine learning
- Equipment vandalism could be a problem?
- Communications may not always work – are there ‘canyons’ / gaps?
- What happens when routes change? How do you monitor this?
- It all costs money!
Informally-run minibus taxis form a complex network in Cape Town, with 652 routes covering 8,870 kilometres.

At Whereismytransport, we collected data from the city's entire minibus taxi network using our unique technologies and techniques.

To create this simplified map, we used our full database to establish which taxi ranks are most active - defined by the most inward and outward modes. From there, we included return routes starting or ending at these ranks. The result is a map of 127 routes, offering an insight into how minibus taxis serve the city, and the potential for better integration between transport modes.

Cape Town is the world's first city to have its entire formal and informal public transport network mapped, integrated and made openly available - on the WhereismyTransport platform.
Inviting IT-savvy commuters to help populate apps; Inviting the developer-community to build them

Cape Town: populating public transport databases

A Hackathon: International Public Transport union (UITP) worldwide competition to build public transport apps: this is the local round in Uganda
Existing Apps

Motorbike Taxi app in Jakarta, Indonesia

Public Transport network map of Sao Paulo, Brazil on the Trafi app
‘Missions Issues’ publications of ‘Global Connections’ at http://www.globalconnections.org.uk, particularly on ‘Environment & development’ and ‘Understanding Cities’

- An excellent overview, but as published in 2011 omits recent technological developments

‘Cities Today’ https://cities-today.com

- Technical, but has a good focus on emerging economies and practical challenges
SOME CONCLUSIONS

- Effectively functioning Public Transport is essential
- Land Use Planning integration is essential though quite rare
- But there are a range of challenges in doing that
- New technology offers some solutions
- But it needs to have local adaptation / be community-based