Integrated Transport System & Land-Use Planning

Challenges in Accra Metropolitan Area and Solutions for Addressing Them

SSATP Annual General Meeting

20th -24th February 2017
Marrakech, Morocco
Presentation Outline

• Introduction - Metropolitan Profile
• Integration of Transport Systems and Land-use Planning
  • Institutional
  • Financing
  • Provision of Mass Transport
  • Restructuring of Informal Sector
  • Traffic Management
Greater Accra Metropolitan Area

2010 Census Pop.: 4,010,054
2016 Pop. Est.: 4,613,637
Existing Policy Framework

- Environmental Sanitation Policy
- Ghana National Housing Policy
- National Urban Policy Framework and Action Plan
- Local Economic Development Policy
- Street Naming and Property Numbering Policy
- Urban Transport Policy

Urban Development Strategy
Urban Development

**Challenges**

- Inadequate local government systems management; capacity development and research
- Lack or inadequate investment governance for public funds
- Transport externalities as input for pricing undetermined
- Overly-emphasized service and infrastructure development approach to urban transport

**Solutions**

- Systems-view Approach to Local Governance
- Responsive National Development Planning System to Urban Development Strategy
  - Integrate existing policies
  - Implement legislative instruments for new Land Use and Spatial Planning Act
  - Establish Spatial Data Infrastructure
  - Legislate timeframe for the adoption of a single property addressing system
Institutional Development

**Challenges**

- Incomplete decentralisation process
- Unclear mandates and responsibilities for public institutions
- Poor coordination of policies, programmes, projects and activities
- Poor policy and institutional coherence

**Solutions**

- Local Government capacity development
  - Activation of Metropolitan Administration, Works and Planning Boards of the Executive Committee under the Local Governance Act, 2016 (Act 936)
  - Implement Legislative Instruments on stakeholder participation provisions of the Local Governance Act
    - Public Sector Agencies
    - Private Sector Institutions
    - Social Institutions
      - Visible and invisible
Legal Framework

- Policy Provisions
- Acts & Laws
- Ghana Urban transport Project
- Legislative Instruments (Dept. created by LI 1961)
- Passenger Transport Services Byelaws
  - Public Transport Standards

Regulatory Tools

- Security Holograms
- Vehicle Sticker
- Operating Permit
Financing of Public Sector

Challenges

- Application of Marketing Research
- Early stages of adoption of investment governance tools:
  - Multi-donor Budgetary Support System
  - Ghana Integrated Financial MIS
  - Electronic financial transactions and revenue collection
- Consolidated Fund a major drawback on departmental enterprise
- Financial rules used for role-hijacking

Solutions

- Human capital development
  - Training and Re-orientation of local government staff
- Technical leadership training for local government staff
  - Innovation and departmental vision development
  - Collaborative research with institutions of higher learning
- Research-led problem solving initiatives
  - To engender technical confidence for would-be financiers
  - To attract external funding resources
Challenges in the Provision of Mass Transport

• Absence of Urban Development Strategy
• Inability to define functional hierarchy of settlements
  • Urban sprawl
  • Difficulty in generating consistent land-use data over time
  • Limited accessibility planning
• Complexities of land market regulation
• Lack of substantive content to guide spatial development
  • Too many procedural documents
Solutions

- Define/ create compact settlement boundaries through Spatial Development Frameworks
- Expand existing Land Administration Project current national coverage rate beyond 10 percent
  - To strengthen and simplify land market regulation
- Improve accessibility planning through:
  - The creation of Transport Analysis Zones
  - Household Travel Survey
  - Application of the 4-Stage Transport Model
    - Network planning
    - Multimodal Study and Analysis

Provision of Mass Transport

Solutions

- Piloting scheduled services for Trotro Operations
  - Operator re-orientation
- Introduce fleet renewal programmes
  - Serve as Bus Feeder service
- Improve Trotro network infrastructure
  - On Bus Feeder network basis
- Create Geographic Information System attribute for all data
  - Engenders software interoperability
Other Studies Undertaken

- Reliability Studies and Collection of Service Provider Operational Data
- Transformation of Data into General Transit Feed Specification
- Engagement of Technology Community to Utilize Collected Data
- Data Collection and Mapping of Registered Public Transport Routes
- On-Street Parking Management Studies
Reliability Studies—What was Measured

1. Headway Variability
   • Time intervals between departing vehicles from terminal
   • Used as proxy to waiting time

2. Travel Time Variability
   • How much variation there is in travel between different trips
     • On the same route
     • Or on routes with similar attributes

3. Travel Itinerary Variability
   • How much variability there are in the itinerary of trips on the same route
     • A Transit Variation Index (between 0 and 1) of 0 means there is no similarity and 1 means no variation at all
# Headway Variability

<table>
<thead>
<tr>
<th>Route</th>
<th>Headway (in minutes)</th>
<th>Freq.</th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>01A</td>
<td>01A - Mortuary Road</td>
<td>527</td>
<td>11</td>
<td>8.7</td>
<td>0.57</td>
<td>96</td>
</tr>
<tr>
<td>01B</td>
<td>01B - Korle Bu</td>
<td>519</td>
<td>11</td>
<td>8.9</td>
<td>0.67</td>
<td>79</td>
</tr>
<tr>
<td>01C</td>
<td>01C - Chorkor</td>
<td>698</td>
<td>8.5</td>
<td>8.2</td>
<td>0.3</td>
<td>85</td>
</tr>
<tr>
<td>01D</td>
<td>01D - Shalom</td>
<td>385</td>
<td>15</td>
<td>10</td>
<td>1</td>
<td>79</td>
</tr>
<tr>
<td>01E</td>
<td>01E - Appiah Dankwa</td>
<td>444</td>
<td>13</td>
<td>11</td>
<td>1.3</td>
<td>109</td>
</tr>
<tr>
<td>01F</td>
<td>01F - Alhaji</td>
<td>194</td>
<td>26</td>
<td>17</td>
<td>2.6</td>
<td>89</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>2'767</td>
<td>12</td>
<td>11</td>
<td>0.3</td>
<td>10</td>
</tr>
</tbody>
</table>

### Graphs:

- 01A - Mortuary Road
- 01B - Korle Bu
- 01C - Chorkor
- 01D - Shalom
- 01E - Appiah Dankwa
- 01F - Alhaji

**Headway Variability**

- **Headway (in minutes)**
- **Fitted headway**

**Hour of the day**

**RELIABILITY STUDIES; GRADUATING INTO MASS TRANSPORT**
Travel Time Variability

- Mean Std. Deviation = 8.3
- Proportion of Route Legs with Std. Deviation < 10 min. = 72%
- Min. Std. Deviation = 0.43
- Max. Std. Deviation = 30.9

Number of Route Legs = 123
Number of Trips = 1,208
Itinerary variability

Number of Trips = 1,132
Average TVI = 88%
Std. Deviation of TVI = 17%
Min. TVI = 47%
Max. TVI = 100%
Itinerary Variability

Trip Variants of Route 03F-A

TVI = 98%

Trip Variants of Route 12C-B

TVI = 69%

Legend

03F-A1
03F-A2
03F-A3
03F-A4
12C-B1
12C-B2
12C-B3
12C-B4
12C-B5
Restructuring of Informal Sector

Challenges

- Manual identification of informal actors & operators
- Building trust for reform activities
- Extensive and expensive nature of regular engagement
- Difficulty in defining mutually acceptable boundaries for regulation
- Difficulty in finding intermediaries to guarantee/provide for fleet renewal initiatives
- Inadequate resources for enforcement of passenger transport byelaws

Solutions

- Use of crowdsourcing mobile applications to collect and update transport operator and user data
- Create a strong database
- Logistics support to identify new entrants
  - Networking with other registration agencies to receive automatic alerts
- Mobilise additional resources for stakeholder engagements/enforcement
- Adopt decent work approach to group animation
- Use of security holograms to strengthen enforcement regime
Trotro Network Mapped
Traffic Management

Challenges

- Difficulty in managing traffic supply and demand
  - Identification of traffic management sites
- Poor orientation of impact assessments to land-use
- Absence of Intelligent Transport Systems applications
- Poor/limited level/lack of stakeholder engagement in traffic management
- Lack of data for congestion management

Solutions

- Undertake Supply and Demand Management Studies
  - Multimodal interaction and analysis
  - On-street parking management studies
- Introduce area-wide traffic control technology applications
  - Establish traffic management centres
  - Real time travel planning information systems
    - Smart transport planning options with mobile technology
- Undertake congestion management studies
  - Stated preference methods
  - Value of travel time analysis
    - Creating income-proxy values for policy debate
Identification of Traffic Management Sites

Boarding and Alighting Patterns

- **AMA Boundary**
- **Trotro route**

<table>
<thead>
<tr>
<th>Boarding and alighting passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 9</td>
</tr>
<tr>
<td>10 - 19</td>
</tr>
<tr>
<td>20 - 29</td>
</tr>
<tr>
<td>30 - 56</td>
</tr>
</tbody>
</table>

**Kernel Density**
- 0 - 382,832
- 382,833 - 765,264
- 765,265 - 1,147,896
- 1,147,897 - 1,530,528
- 1,530,529 - 1,913,160
- 1,913,161 - 2,295,792
- 2,295,793 - 2,678,424

Public Transport Hotspots
Demand Management: On-street Parking Scheme
Sustainable Development

• Green Technology
• Artificial Landforms
  • Reclamation options
  • Multi-use option (Covered channels & Wetlands)
• Emission Management
• Recycling
CONCLUSIONS

1. Paratransit not as different as one would think from institutional transport services in terms of service reliability

2. Shows potential for reform and professionalization of the sector rather than simple removal and replacement by formal services (BRT, public buses)

3. Improving mobility requires capacity building and institutional strengthening programs, not just infrastructure building