The economics and policy implications of infrastructure sharing and its role for the development of ICT networks in Africa

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Infrastructure sharing (IS) framework models and examples

1. IS framework
2. IS models and dimensions
3. IS examples in different network segments
4. IS as a tool to reduce market and regulatory failures
5. IS as a source of market distortions and potential solutions
6. Policy recommendations
Internet Supply chain

Internet Networks

- International Connectivity
- National Backbone
- Backhaul Network
- Access Network

Services

- Connectivity
- Management & Intelligence
- Value Added

Assets

- Passive Infrastructure
- Active Infrastructure
- Intangible

Internet Networks:
- International Connectivity
- National Backbone
- Backhaul Network
- Access Network

Services:
- Connectivity
- Management & Intelligence
- Value Added

Assets:
- Passive Infrastructure
- Active Infrastructure
- Intangible
Agents and Environment

Market agents
- Want to obtain a competitive advantage
  - Business Model

Environment
- Market competitive structure
- Market features
- Market and regulatory failures
- Existing technology

Regulators
- Want to reduce market failures and achieve redistribution policy goals
  - Regulation
### External factors: Demand and supply trends

<table>
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<th>Demand trends</th>
<th>Technical progress</th>
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<td>NEW DEVICES</td>
<td>INNOVATIVE ACCESS</td>
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<tr>
<td>MUTIMEDIA CONTENT DEMAND GROWTH</td>
<td>MULTICASTING - NGN</td>
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<tr>
<td>NEW TYPES OF TRAFFIC</td>
<td>• Shift interconnection point</td>
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<td></td>
<td>SPECTRUM SHARING</td>
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<td>• Light Licensing</td>
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<td>CONGESTION CONTROL TECHNOLOGIES</td>
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# Infrastructure Sharing

## Models

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<th>INFRASTRUCTURE ASSETS SHARING</th>
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## Dimensions

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Mutualisation waves in Africa

- **FIRST WAVE**
  - Undersea Cables

- **SECOND WAVE**
  - National Backbone

- **THIRD WAVE**
  - Mobile Access + Spectrum

Market Agents
- New Backbone: SOE (Rwanda) Consortium (Burundi)
- Existing Backbone: SBC (Botswana) FBC (South Africa)
- Kenya, Rwanda
  - Competition, innovation
  - And investment concerns

SBC: Service Based Competition
FBC: Facility Based Competition
Backbone Infrastructure Sharing

### ASSETS SHARING

- **Access/ Interconnection**
- **Transit Payments** (Tier 3 – ISP)
- **Peering** (Tier 1,2 – IBP)
- **Bargaining Power**
- Type of traffic
- Geography
- Competition if Multi-homing

### MUTUALISATION

- **PUBLIC PRIVATE PARTNERSHIP**
  - Ownership Structure
  - Risk Sharing
- **MULTIHOMING**
  - International + National Backbone
- **MUTUALISATION VS NETWORK DUPLICATION**
Fixed Access Infrastructure Sharing

**ASSETS SHARING**
- Full unbundling (Technology neutral)
- Line Sharing (Not neutral)
- Virtual unbundling (Control of access)
- Point of interconnection/ Multicast
- Competition VS Coordination Complexity

**MUTUALISATION**
- Bitstream Access (Bandwidth for entrants)
- Next generation (Flexibility)
- Service Based Competition
- Entry VS Innovation

High Sunk Cost- Entry barriers
Network: Asymmetry (xDSL) Mandated Sharing / Symmetry (NGN)
## Mobile Access Infrastructure Sharing

### ASSETS SHARING

- Passive Uncoordinated (Technology neutral)
- Active Coordination (Control of access)
- Site Sharing (30% Sharing)
- Tower sharing (30% Sharing)
- RAN sharing (Rural Access)
- Network Symmetry: Service based or Facility Based Competition

### MUTUALISATION

#### MARKET AGREEMENT
- National roaming (Early rollout Stages)
- Core Network Sharing (Uncertain)
- MNVO (Only Retail)
- Outsourcing (TowerCo & Tenancy Ratio)

#### MANDATED MUTUALISATION
- Participation of operators is KEY
- Risk of reduced investment & innovation
- Share of existing sites
- Other option: Refarming of existing bands
Reduction of market and regulatory failures

1. Externalities: Leverage Positive - Reduce Negative

2. Reduce entry barriers- Increase competition in the access network

3. Reduce coordination failures - Leverage synergies in construction, operation and maintenance of linear infrastructures.

4. Remove regulatory failures / Efficient spectrum allocations (Shared use, Light licenses, refarming)
Market Distortions

**CHALLENGES**

IS leads to SBC (Short Run Competition)  
BUT  
FBC (Long Run Competition) is the real competition

Leads to disincentives to investment & Innovation

Disincentives to enhanced network quality but incentives to cost reduction in service provision

**SOLUTIONS**

Ladder of investment: Increase Price of a shared asset over time to foster investment. Cave (2006)

Incorporate risk in Access Price from the beginning to reduce asymmetric allocation of risk - Pindyck (2007)

Control the ecosystem markets:  
Economies of scope- bundling  
Economies of scale- TowerCo

**Efficiency: Allocative/ Productive/ Dynamic**
Policy Recommendations

1. Enable commercially driven sharing when it doesn’t distort competition.

2. Enable the environment to leverage the opportunities of the collaboration among linear infrastructures providers.

3. Subsidies and State Aid to support mutualized network infrastructures should only be granted in cases where the private sector is not able to operate correctly.

4. Mandated sharing is the last resource to reduce infrastructure bottlenecks when infrastructure competition is not possible.

5. Political economy matters. Simple solutions, without complex regulatory changes are effective in most cases.
6. Demand side policies help. The aggregation of demand is a good measure to reduce connectivity prices.

7. The Government might better promote investments in the ICT sector acting as a demand anchor client rather than creating State Owned Enterprises

8. Remind the importance of the interactions of the Internet supply chain with the markets of the Internet ecosystem.

9. Tackle spectrum allocation bottlenecks, with additional allocations to mobile and innovative authorization regimes allowing the shared use of spectrum.
Thanks

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