Promoting synergy between airports and cities to achieve sustainable development
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Airports / Aviation
“Airports will shape business location and urban development in the 21st century as much as highways did in the 20th century, railways in the 19th and seaports in the 18th “

- Dr. John D. Kasarda

*Concept Adapted from Rodriguez, J.P (2007) Gateways, Corridors and Global Freight Distribution: Transpacific Issues*
Airport – Shifting Focus

Distribution of Airport Revenues, 2014
($142.5 billion in Total)

- Aeronautical: 55.5%
- Non-Aeronautical: 40.4%
- Others: 4.1%

Aviation – Insufficient Support

3.5% 34.6% 58M 1.1B

World’s GDP World Trade Value Employment Int’l Tourists

VERSUS

2.6%

Funding of Infrastructure and Service support
Urbanization
Rapid Urbanization

Urban Population Rate

1993: 30%
2008: 50%
2016: 54%
2050: 66%
Shared Threads & Opportunities
Shared Threads - Opportunities

- Air Pollution
- Urban Poverty
- Unaffordable Housing
- Uneven Distribution of Economic Opportunities
- Insanitary Water
- Congestion
- Urban Sprawl
- Excessive Noise
- Poor Planning
- Informal Settlement
- Insufficient Public Transportation

Urbanization

Aviation
Synergistic Development for Sustainability
Suitable Airport Location - close to the City

- Airports close to the CBD benefits of **short commuting distances**, however face **land use incompatibilities** and **excessive noise**
- Locations further from the city center enjoys **less restrictive land use**, however create **commuting inefficiencies**
- The combined suitability curve illustrate the most adequate locations **balancing different urban factors**

*Concept Adapted from Hofstra University (2015)*
Airports hubs create nodal points in a city region.

- Connected to city and rural areas via transport corridors.
- Circulation of people, goods and services boost economic growth along the corridors and on the neighboring urban area.
- As crucial link in integrating resources.

*Concept Adapted from Rodrique, J.P (2007) Gateways, Corridors and Global Freight Distribution: Transpacific Issues*
Aviation & Urbanization in Africa
Aviation in Africa

Share in Air Passengers (%) in 2015

- Africa
- Asia/pacific - 27.1%
- Europe - 30.2%
- Latin America - 8.2%
- Middle East - 4.5%
- North America - 27.5%

Source: ACI (http://www.aci.aero/Data-Centre/Monthly-Traffic-Data/Worldwide-Airport-Traffic-Summary)
Aviation in Africa

AIR PASSENGER MOVEMENTS BY COUNTRY

Legend
- Focal Passenger Flow (millions)
- Passenger Flow (millions)
- Countries Covered in Study
- Countries

Aviation in Africa

- **Focal 5 Airports** in 3 cities
- **Coverage and distribution of airports**
- **Intercontinental flight routes** between 12 countries
- **Emphasized routes / active triangles**
Urbanization in Africa

Africa Population 1950 - 2050 (millions)

Year

Urban

Rural
GDP & Total Air Passengers

• **Close alignment** between GDP and TAP

*GDP data extracted from United Nations Environment Programme. Global Environment Outlook, GEO Data Portal, Human Development Index (HDI) 2010*

TAP data provided by ICAO
Correlation between ITAs & HDI

- Countries with less arrivals (yellow & green) tend to have lower HDI (yellow & light red, shrinkage in area)
- Countries with more arrivals (dark blue) tend to have higher HDI (dark red, expansion in area) e.g. Swaziland & Lesotho

*Raw Data extracted from United Nations Environment Programme. Global Environment Outlook, GEO Data Portal, Human Development Index (HDI)2010*
Correlation between ITAs & HDI

- Ethiopia with less arrivals – reduced size due to lower HDI
- Kenya & South Africa with more arrivals - exaggerated/enlarged due to high HDI
- Aviation as one of the indicators of development level

• South Africa: strongest in Air Passengers, HDI, UR and GDP

• Kenya overtakes Ethiopia in HDI, UR and GDP

• Ethiopia with the largest population, and higher passengers than Kenya

### Overview of Country Profile

<table>
<thead>
<tr>
<th>Legend</th>
<th>Profile</th>
<th>Kenya</th>
<th>S. Africa</th>
<th>Ethiopia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Air Passengers (m.)</td>
<td>8.3</td>
<td>43.0</td>
<td>10.3</td>
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<tr>
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<td>Population (million)</td>
<td>45</td>
<td>55</td>
<td>99</td>
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<td></td>
<td>HDI</td>
<td>0.548</td>
<td>0.666</td>
<td>0.442</td>
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<tr>
<td></td>
<td>Urbanization Rate</td>
<td>26%</td>
<td>65%</td>
<td>19%</td>
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<tr>
<td></td>
<td>GDP (billion)</td>
<td>143</td>
<td>725</td>
<td>144</td>
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</tbody>
</table>

### Total Economic Impact Stimulated by Liberalisation

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<th>Ethiopia</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Jobs</td>
<td>14,800</td>
<td>14,500</td>
<td>14,800</td>
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<tr>
<td></td>
<td>GDP (million)</td>
<td>76.9</td>
<td>283.9</td>
<td>59.8</td>
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<tr>
<td></td>
<td>% of national GDP</td>
<td>0.1%</td>
<td>0.06%</td>
<td>0.05%</td>
</tr>
</tbody>
</table>

**Sources:**
- Overview of Country Profile
  - International Monetary Fund
  - Country Comparison: Population. The World Factbook
  - ICAO, total air passengers in 2009
- Total Economic Impact Stimulated by Liberalisation
  - Figure in parenthesis is the GDP impact as a percentage of national GDP
  - All financial figures are in 2013 prices
  - Transforming African Air Connectivity Final Report InterVista 2014
Case Study - Nairobi, Kenya

- Building Density
- Land Use
- Natural Setting
- Open Space
- Public Transportation
- Road Hierarchy
- Underdeveloped Area
- Waste & Recycling

Legend
- Nairobi CBD
- Nairobi Airports
- Landuse
- Forest
- Buildings per Square km
  - 0 - 99
  - 99 - 198
  - 198 - 296
  - 296 - 395
  - 395 - 494
  - 494 - 593
  - 593 - 692
  - 692 - 790
  - 790 - 889
  - 889 - 988

*Raw data downloaded from Openstreetmap*
Case Study - Ekurhuleni & Johannesburg, South Africa

- Residential, commercial and industrial land uses feature close to the airports
- Higher density of land use development around OR Tambo, which is closer to the CBD
- Diffused development around Lanseria airport, which is privately owned
Case Study - Ekurhuleni & Johannesburg, South Africa

- Quantify: the concentration of amenities
- OR Tambo IA: apparent concentration effect
- Lanseria: private, lack of transportation support

*Raw data downloaded from Openstreetmap
Case Study - Addis Ababa, Ethiopia

- Proximity to the CBD – both strength and constraint
- Proposed light rail expansion plan to connect the airport for sustainability
“The **city** is a place where a lot of **problems** are concentrated; but the city also has the **resources** to overcome these problems and be the place of development.”

- Prof. Valentino Castellini, Italy, 1998
Future areas of interventions

- Joint **Planning**
- **Assessment** of air transport’s contribution (GDP) to urban development
- Mobilise more cities/airport authorities for a **Network** of joint action
- **Analysis** of cities and their airports (e.g. impact of airport on the evolution of built up areas)
- Support the **implementation of SDG targets** in relation to cities and air transport