"Aviation in Africa" & 15th Aviation Student Research Workshop

21st June to 23rd June 2018, Bremen

Presentation by **Professor Emeritus Dr. Karl Wohlmuth**, University of Bremen, Faculty of Economics and Business Studies, Director of the Research Group on African Development Perspectives Bremen

Title of Presentation: **Transport Infrastructure and Regional Integration in Africa – A Neglected Link**

At **"Aviation in Africa" Second Workshop, Thursday, 21st of June, 2018, Hochschule Bremen**

Workshop organized by HSB (Hochschule Bremen/City University of Applied Sciences) and Bergamo University (Universita' Degli Studi Di Bergamo)

Transport Infrastructure and Regional Integration in Africa – A Neglected Link

Thursday, June 21st 2018, Hochschule Bremen

1. Introduction – Scoping the Neglected Link in Africa

2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

3. Transformative Regional Integration and Infrastructure Development in Africa

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

5. Conclusions – Way Forward in Africa

1. Introduction – Scoping the Neglected Link in Africa

Twenty-three African states launched on January 28, 2018 a single aviation market. The Single African Air Transport Market (SAATM) initiative was led by the African Union (AU) and goes back to the Yamoussoukro Decision of 1999 (and the earlier agreement of 1988). The map of the continent with the 23 signatory countries (see below: Twenty-three African states launch single aviation market, by Mark-Anthony Johnson, January 29, 2018) shows that **there is not a clear relation with the regional economic communities (RECs) which are recognized by the African Union (AU)**. A reduction of fares by around 30% is expected because of the direct connection flights.

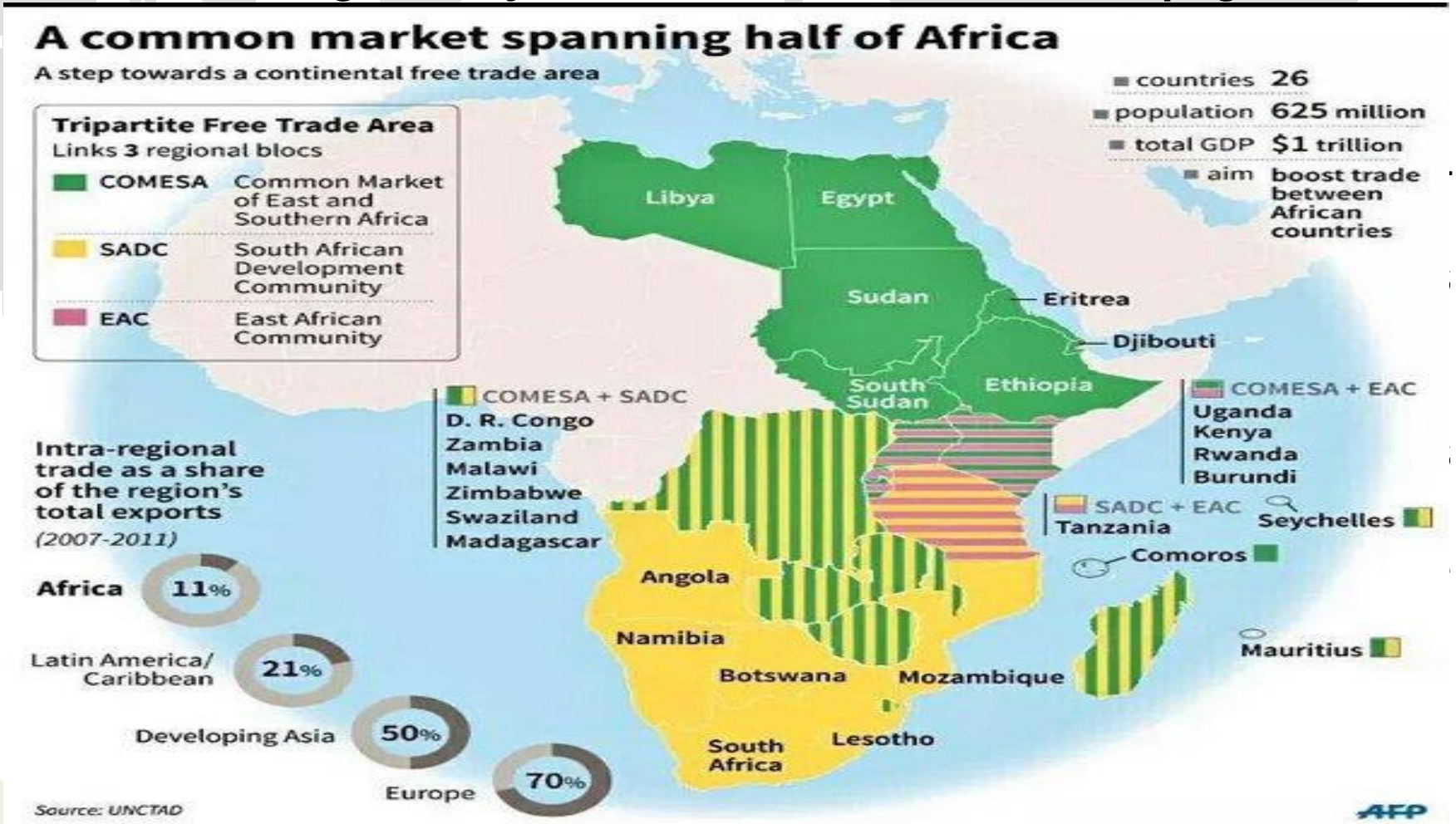
1. Introduction – Scoping the Neglected Link in Africa

This sounds positive, as the neglect of aviation in infrastructure development may be overcome from this side. The African Union (AU) has recognized eight RECs: ECOWAS (West Africa, with Nigeria), SADC (Southern Africa, with South Africa), EAC (Eastern Africa, with Kenya), COMESA (Common Market for Eastern and Southern Africa), IGAD (Intergovernmental Authority on Development) and CEN-SAD (Community of Sahel–Saharan States) are represented by major signatories (mainly via Egypt, Ethiopia and Kenya). The Arab Maghreb Union (UMA) and the Economic Community of Central African States (ECCAS) are not really part of the SAATM, what is limiting the infrastructure push.


African open skies
EGYPT
CAPE VERDE
MALI
NIGER
BURKINA FASO
GUINEA
NIGERIA
SIERRA LEONE
ETHIOPIA
LIBERIA
IVORY COAST
RWANDA
KENYA
GHANA
GABON
TOGO
CONGO-BRAZZAVILLE
BENIN
MOZAMBIQUE
ZIMBABWE
Single African Air Transport Market
BOTSWANA
SWAZILAND
S. AFRICA

1. Introduction – Scoping the Neglected Link in Africa

Source: Blog Post by C. Juma, 2016, Belfer Center, page 2



1. Introduction – Scoping the Neglected Link in Africa

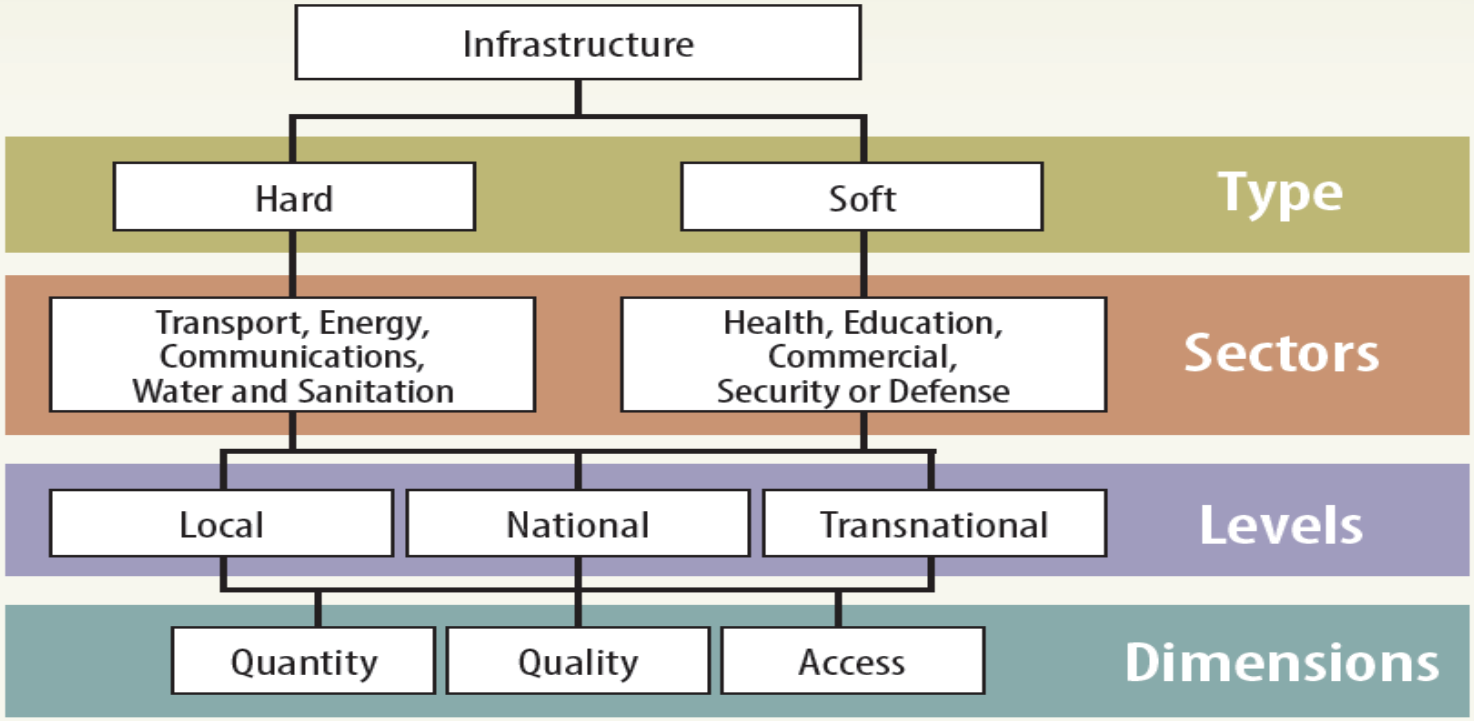
However, the **analysis of infrastructure development in Africa shows that infrastructure is highly unbalanced:** between “hard” and “soft” infrastructure, between categories (such as telecommunications and transport) and within categories (such as in transport between roads, railways, airports, ports, urban transport, and waterways/rivers and lakes). Most problematic is the lack of adequate data on subcategories (such as aviation and waterways/rivers in transport) and on certain performance aspects (quantity of infrastructure, quality of infrastructure, and access of the people to infrastructure). Also the links between categories and subcategories are largely unknown.

1. Introduction – Scoping the Neglected Link in Africa

Source: World Bank, Africa's Pulse, April 2017, page 43

BOX 2.1
Continued

FIGURE B2.1.1: Infrastructure Classification



Source: World Bank staff.

1. Introduction – Scoping the Neglected Link in Africa

Source: World Bank, Africa's Pulse, April 2017, page 44

TABLE 2.1: Indicators of Infrastructure Performance

Dimension	Telecommunications	Energy	Transport	Water and Sanitation
Quantity	Fixed telephone and mobile cellular subscriptions per capita Internet users Fixed broadband subscriptions	Total electricity-generating capacity per capita	-Total road length -Total railroad length -Total road and railroad length	
Quality	International Internet bandwidth Number of secure servers	-Energy quality (%) -WEF quality of power supply	-Paved roads (%) -WEF quality of roads -WEF quality of railroads	
Access		Access to electricity (% people)		Access to safe water (% people) Access to sanitation facilities (% people)

Sources: See the appendix.
Note: WEF = World Economic Forum.

1. Introduction – Scoping the Neglected Link in Africa

Source: World Bank, Africa's Pulse, April 2017, page 57

TABLE 2.2: Infrastructure Performance in Sub-Saharan Africa: A Scorecard

Country Groups	Quantity			Quality		Access					
	Telecommunications	Energy	Transport	Energy	Transport	Energy - Total	Energy - Rural	Water-Total	Water-Rural	Sanitation-Total	Sanitation-Rural
Panel A. SSA and subregions											
Sub-Saharan Africa											
LIC											
LMC											
UMC											
Panel B. SSA percentiles											
Top 10%											
Top 25%											
Bottom 25%											
Bottom 10%											

1. Introduction – Scoping the Neglected Link in Africa

The **analysis of the infrastructure gaps in Africa** reveals that all African countries (except the UMCs/Upper Middle Income Countries) have a gap exceeding 75 percent (relative to the top decile of the world sample) for energy-generating capacity and for road density and quality. For telecommunications the gap is exceeding 50 percent, although the UMCs have a gap being lower than 10 percent. Access to improved water sources has a gap being lower than 50 percent, and the gap is even lower than 10 percent in the UMCs. For the worst performers in Africa (10th and 25th percentiles) the gap is greater than 75 percent. Again, no reliable figures available on gaps for aviation and waterways.

2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

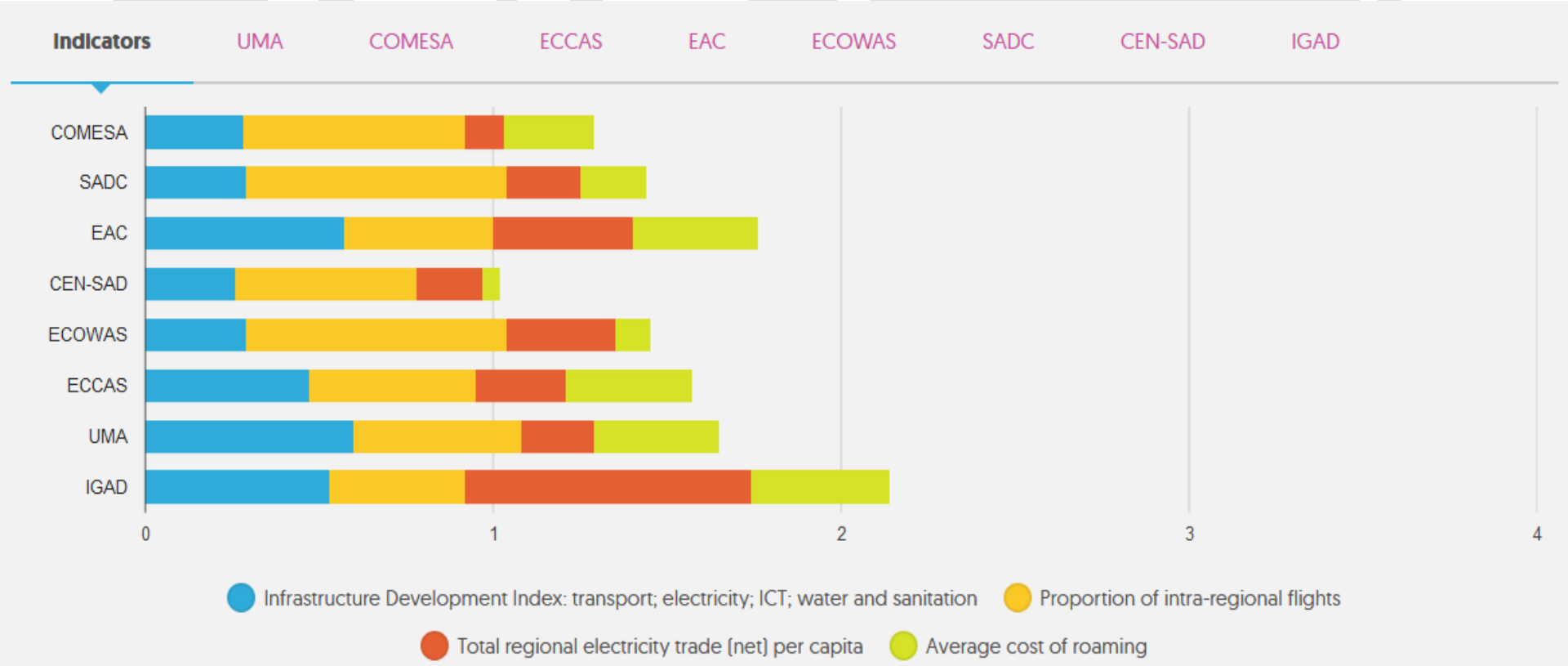
Various **initiatives** refer to infrastructure development in Africa, such as: AfCFTA (African Continental Free Trade Area), AUA 2063 (African Union Agenda 2063), PIDA (Programme for Infrastructural Development of Africa), AIDA (Action Plan for the Accelerated Industrial Development of Africa), BIAT (Action Plan for Boosting Intra-African Trade), CAADP (Comprehensive Africa Agriculture Development Programme), as well as initiatives for various “hard” and “soft” infrastructure components. **Most of these initiatives also emphasize transboundary and transnational transport infrastructure.** The African Open Skies Agreement (AOSA) is a further important step in this direction.

2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

The African Sustainable Development Goals Initiative (ASDGI) is another relevant approach as the **SDG (Sustainable Development Goal) 9** is of great importance for future infrastructure initiatives to support innovation and industrialisation in Africa. **All these initiatives should have an impact on the eight RECs**, and all these initiatives are linked among each other, so that complementarities are sought. But all these initiatives are designed and supported from the top (AU, NEPAD, AfDB, UNECA), and are **not initiated from the RECs** and countries. An important tool is the Africa Regional Integration Index (**ARII**), emphasizing also Regional Infrastructure.

2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

Source: Africa Regional Integration Index, Dimension “Regional Infrastructure”



2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

Source: Africa M. Arino, 9/2/2017, Regional Transport infrastructure improvements, Agenda 2063, Africa from Africa blog Network

Regional infrastructure index *	ECOWAS	COMESA	ECCAS	EAC	SADC
Overall Region **	0.43	0.44	0.45	0.5	0.5
Top country performers	Cabo Verde (0.68)	Seychelles (0.71)	Congo (0.69)	Burundi (0.84)	Botswana (0.82)
	Togo (0.65)	Libya (0.56)	Angola (0.66)	Uganda (0.48)	Seychelles (0.67)
	Ghana (0.6)	Burundi (0.52)	Gabon (0.52)	Kenya (0.44)	Namibia (0.67)

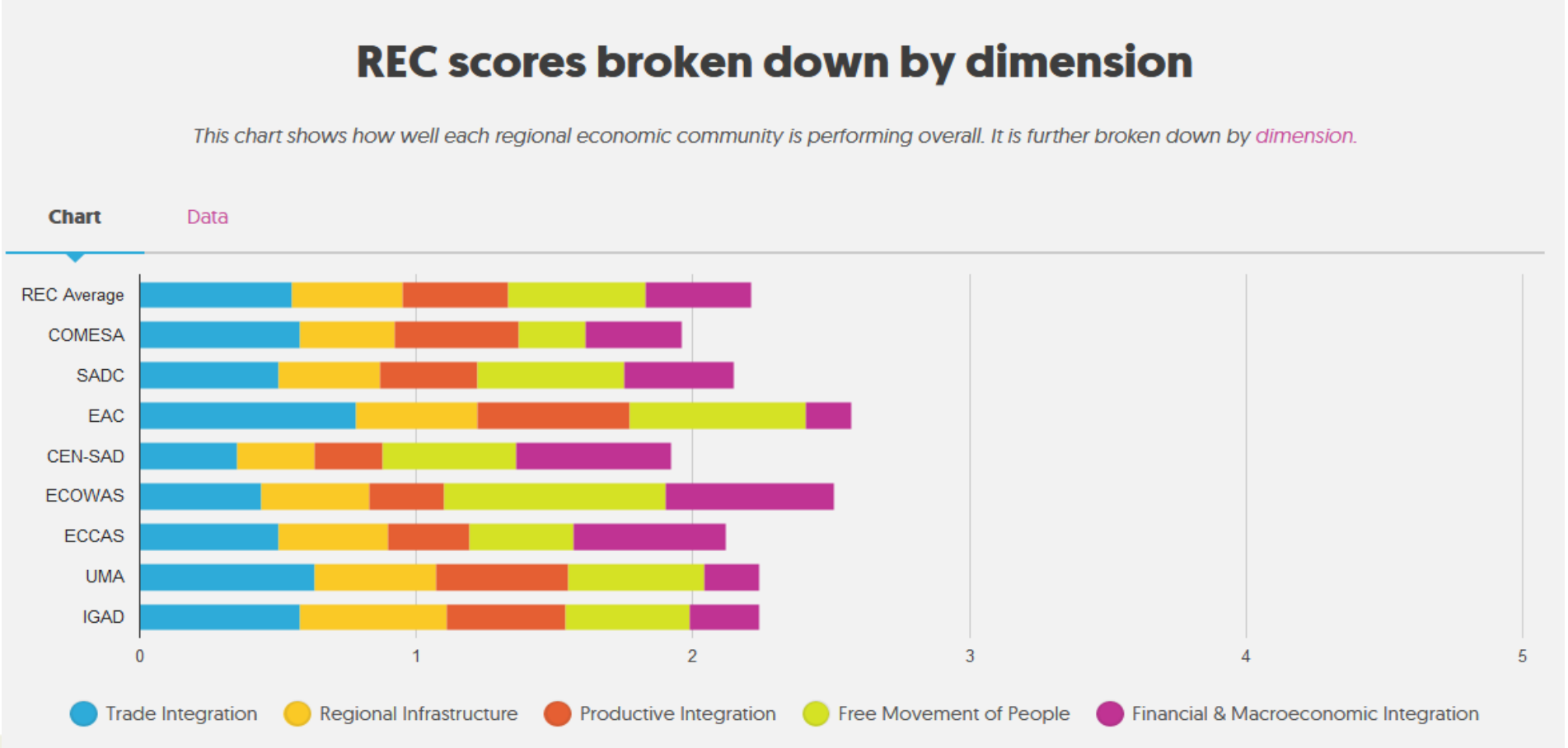
2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

The demand side is key for transport infrastructure development, but is neglected relative to the supply side

However, beside of the **hard infrastructure factors** (roads, ports, etc.) and the **soft infrastructure factors** (training, regulation, policymaking, securing finance, etc.) also the many **"soft infrastructure constraints"** have to be considered, such as trade, investment, labour mobility, and policy coordination constraints. In the **ARII** these are the dimensions trade integration, productive integration, free movement of people, and financial and macroeconomic integration. The reason is simply that the **demand side** also impacts heavily on infrastructure capacity and usage. Also, not less than 7 out of 17 SDGs have a role in transport (SDGs 1, 2, 3, 8, 9, 10,17, etc.).

2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

Source: Africa Regional Integration Index, REC scores broken down by dimension



2. New Initiatives to link Infrastructure, Continental and Regional Development in Africa

Source: Africa Regional Integration Index, REC scores broken down by dimension

REC scores broken down by dimension

This chart shows how well each regional economic community is performing overall. It is further broken down by dimension.

Chart **Data**

	Free movement of persons	Trade integration	Productive integration	Financial integration and macroeconomic policy convergence	Regional infrastructure and interconnections
Average	0.50	0.62	0.45	0.30	0.48
UMA	0.49	0.63	0.48	0.22	0.49
COMESA	0.27	0.57	0.45	0.34	0.44
EAC	0.72	0.78	0.55	0.16	0.50
ECCAS	0.40	0.53	0.29	0.60	0.45
ECOWAS	0.80	0.44	0.27	0.61	0.43
SADC	0.53	0.51	0.35	0.40	0.50
CEN-SAD	0.48	0.35	0.25	0.52	0.25
IGAD	0.45	0.50	0.43	0.22	0.63

3. Transformative Regional Integration and Infrastructure Development in Africa

Infrastructure Development can be supported when moving from a linear to a transformative regional integration approach

Infrastructure development is also blocked because of an **inadequate approach** to regional integration followed by the African Union (AU), the RECs, and the NEPAD. The reason is that the linear model assumes that also African countries have to progress from a trade preference zone to a free trade zone, to a customs union, to a single market, to a monetary and economic union, and then to a political union. It is also assumed that this development path also prescribes the infrastructure development path. The now eight reports on the state of regional integration by UNECA are modelled in this direction. Each integration step should give a particular emphasis on infrastructure development.

3. Transformative Regional Integration and Infrastructure Development in Africa

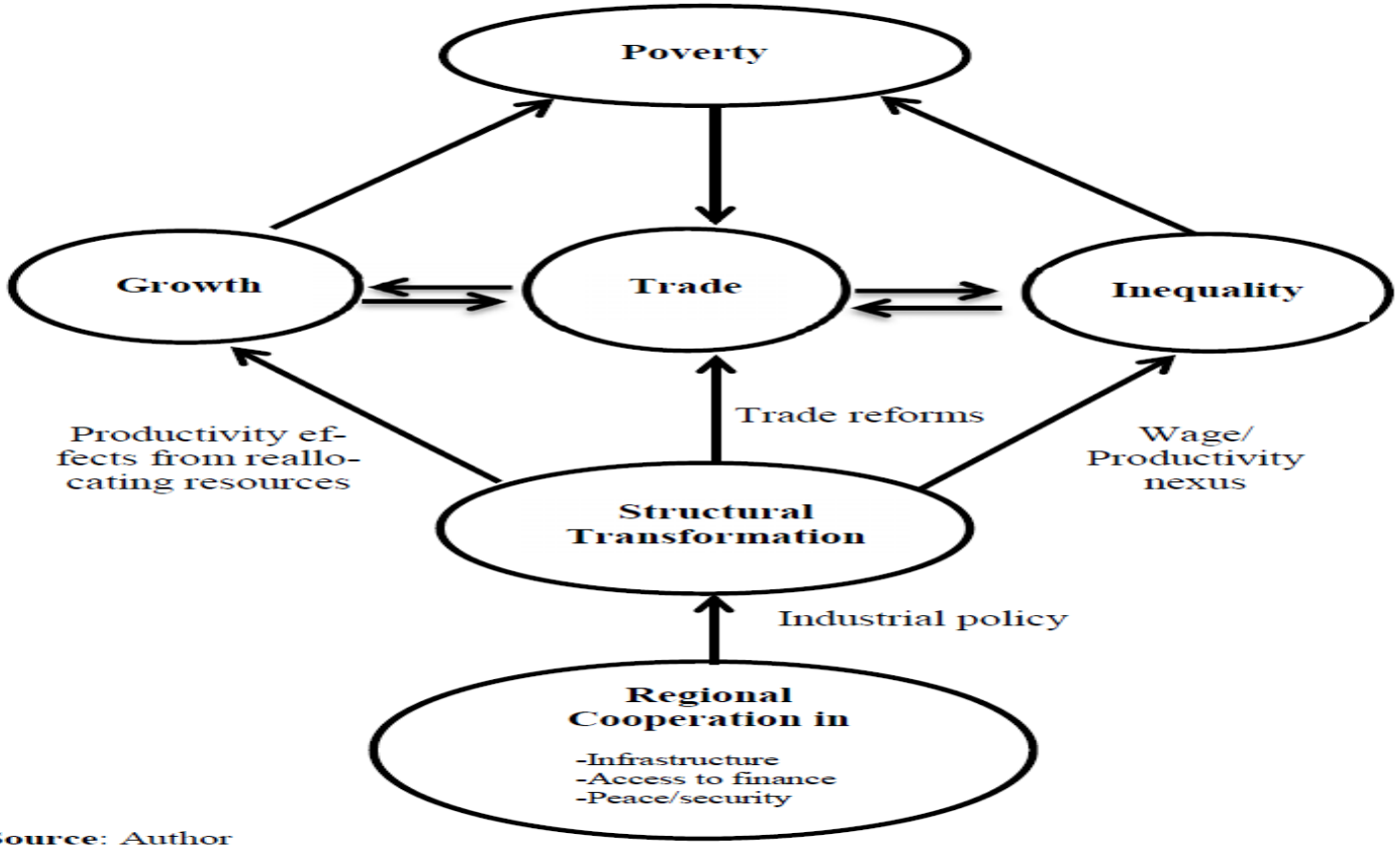
Infrastructure Development can be supported when moving from a linear to a transformative regional integration approach

The most recent report of 2017 (*Assessing Regional Integration in Africa VIII: Bringing the Continental Free Trade Area About)* brings now infrastructure development into context of the CFTA initiative. **Trade reforms are key and give the frame for infrastructure development.** The transformative regional integration approach is more developmental and emphasizes concrete steps to accelerate the structural transformation process. **Trade reforms are not the first priority** but follow as complementary policy measures. In the linear regional integration approach these policies are of primary importance, thereby ignoring largely the structural transformation process.

3. Transformative Regional Integration and Infrastructure Development in Africa

Source: P. Osakwe, African Development Perspectives Yearbook 2015/16, page 35

Figure 1: Framework for Transformative Regionalism

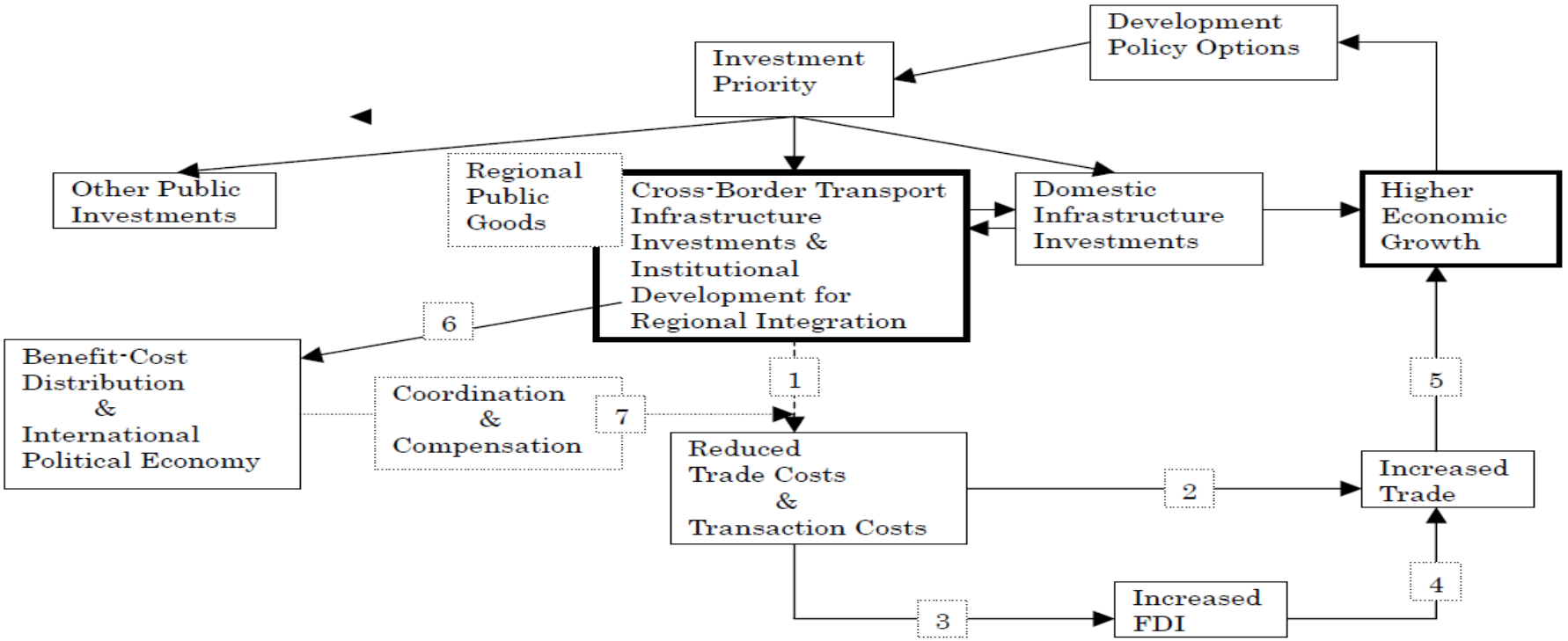


Source: Author

3. Transformative Regional Integration and Infrastructure Development in Africa

Source: Africa Transport Infrastructure Cross-Border Transport Infrastructure, Regional Integration and Development, Manabu Fujimura, November 2004, p. 4

Figure 1: Cross-Border Transport Infrastructure, Trade and Development



Source: Author

3. Transformative Regional Integration and Infrastructure Development in Africa

Source: PIDA, Africa Transport Sector Outlook 2040

The PIDA (Programme for Infrastructure Development in Africa), managed by NEPAD, is responsible also for a long-term development of the transport sector in Africa, labelled as ARTIN (African Regional Transport Infrastructure Network). ARTIN is including a) the *Trans-African Highway (TAH) network* (to link capital cities and to provide for North-South and West-East highway connections in Africa), b) *40 Freight Corridors* (including road, rail, river modes and major sea ports, especially to connect landlocked countries/LLCs with seaports), c) the *Major International Airports* (one per country), and d) the *High-level Air Traffic Control System*. But **ARTIN is integrated only on paper**.

3. Transformative Regional Integration and Infrastructure Development in Africa

Source: PIDA, Africa Transport Sector Outlook 2040

Although developed in cooperation with the RECs, **ARTIN is not supporting transformative regional integration**. The **soft infrastructure components** (training, maintenance skills, etc.) **are weak**, and the **soft infrastructure constraints** (regulations, standardizations, integration of formal and informal transport businesses, facilitation and harmonization of trade and transport policies, etc.) **are not removed by coordination**. **ARTIN is not** focussed on poverty reduction, is not supporting landlocked countries, is not balancing the various modes of transport, and is not providing for smart cross-border transitions. **Cooperation** in the RECs and between the RECs **is inadequate**.

3. Transformative Regional Integration and Infrastructure Development in Africa

Sources for the following Transparencies 26-31

Transparency 26: **Christian Kingombe, How Can Transport Infrastructure Promote Trade and Sustainable Development on the African Continent?, Bridges Africa, March 2017, p. 8**

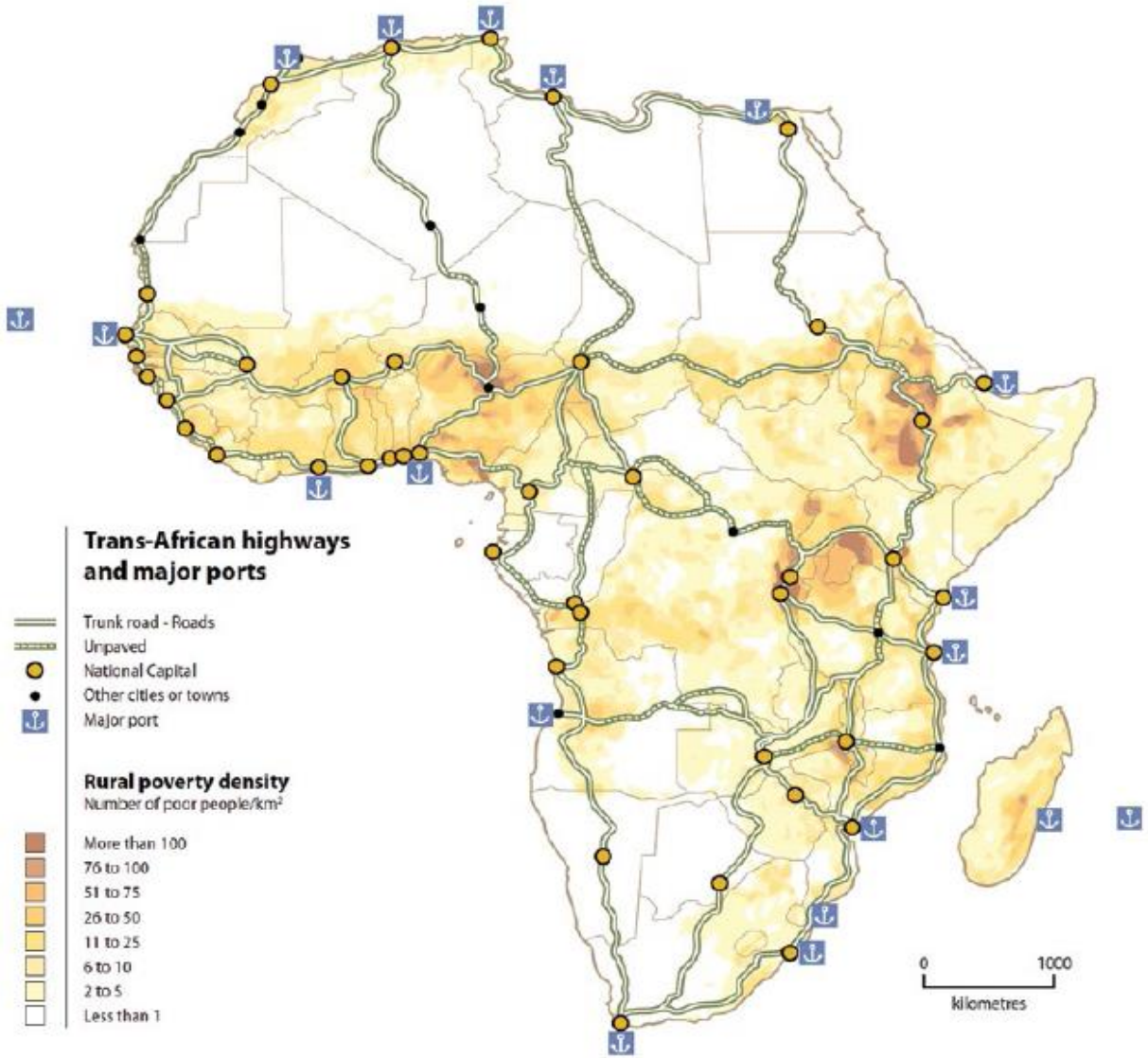
Transparency 27: **PIDA/AU, Africa Transport Sector Outlook 2040, p. 8**

Transparency 28: **Export-Import Bank of India, Connecting Africa: Role of Transport Infrastructure, March 2018, p. 42**

Transparency 29: **NEPAD/AU/AfDB, Study on Programme for Infrastructure Development in Africa (PIDA), Phase III, PIDA Study Synthesis September 2011, p. 19**w.nepad.org/download/file/fid/7547

Transparency 30: **PIDA/AU, Africa Transport Sector Outlook 2040, p. 18**

Transparency 31: **PIDA/AU, Africa Transport Sector Outlook 2040, p. 31**



Source: AfDB. Development Effectiveness Review 2012. Promoting Regional Integration.

Figure 3: Link between ARTIN Corridors and Production and Consumption Centres

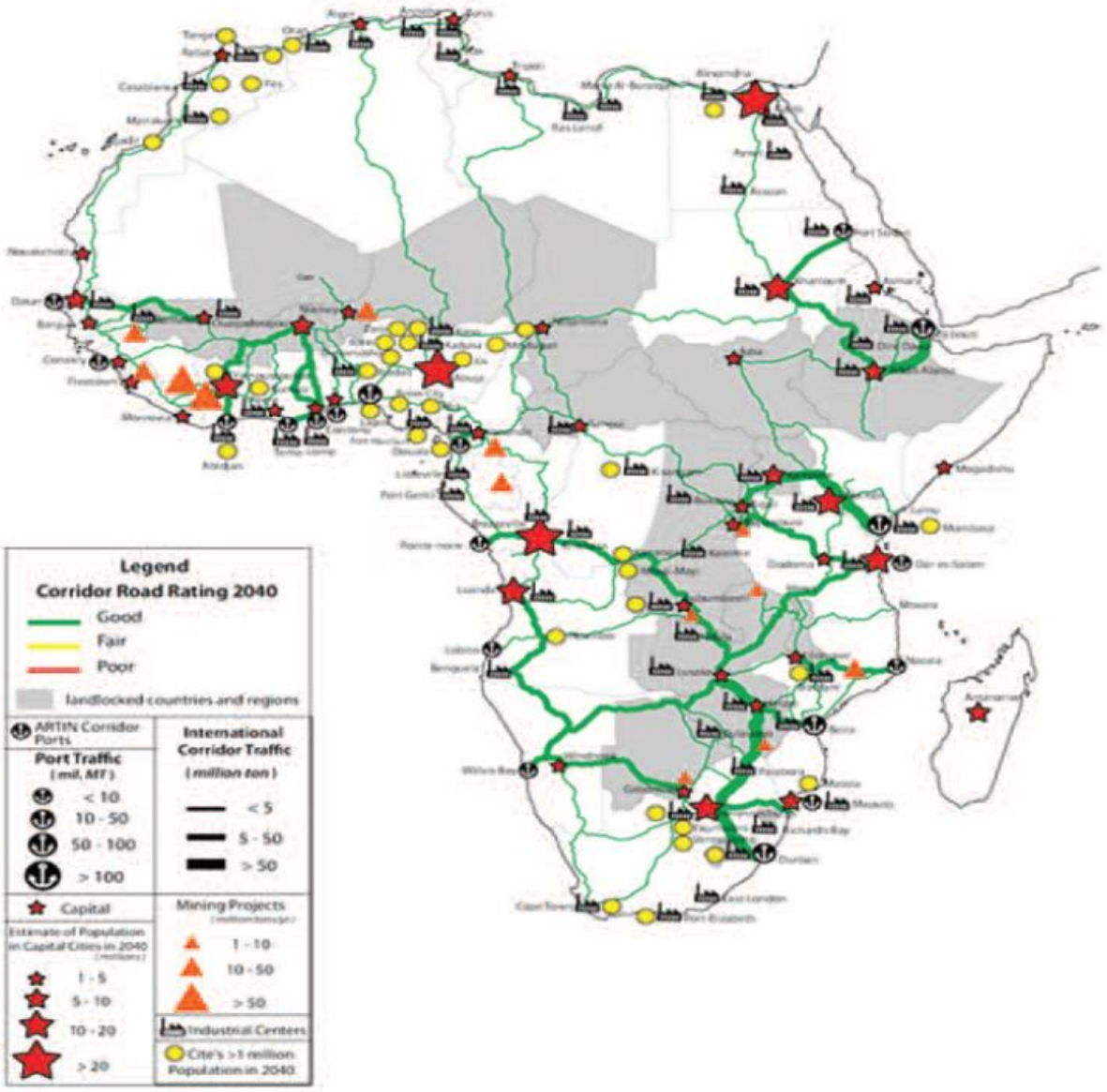
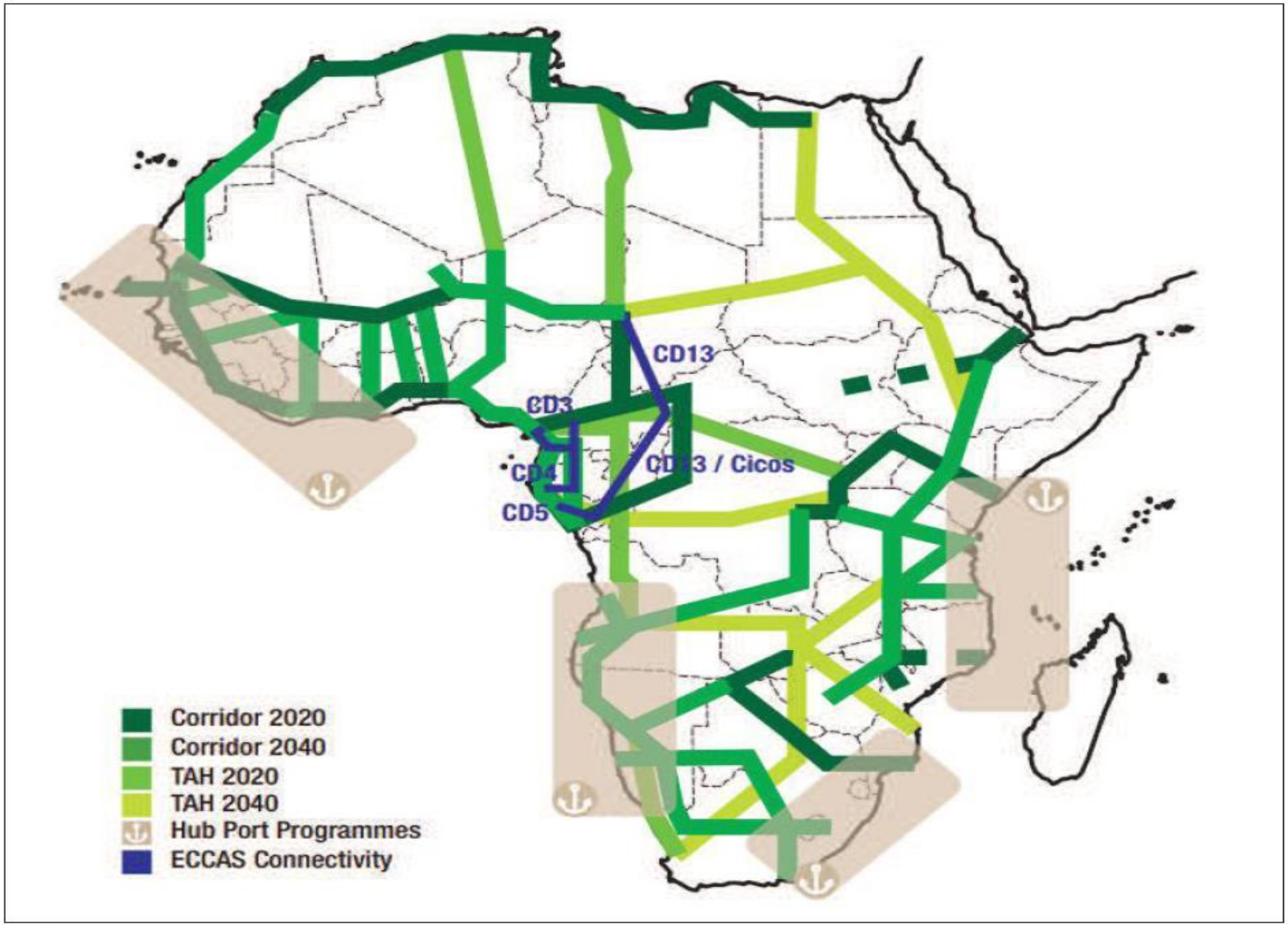


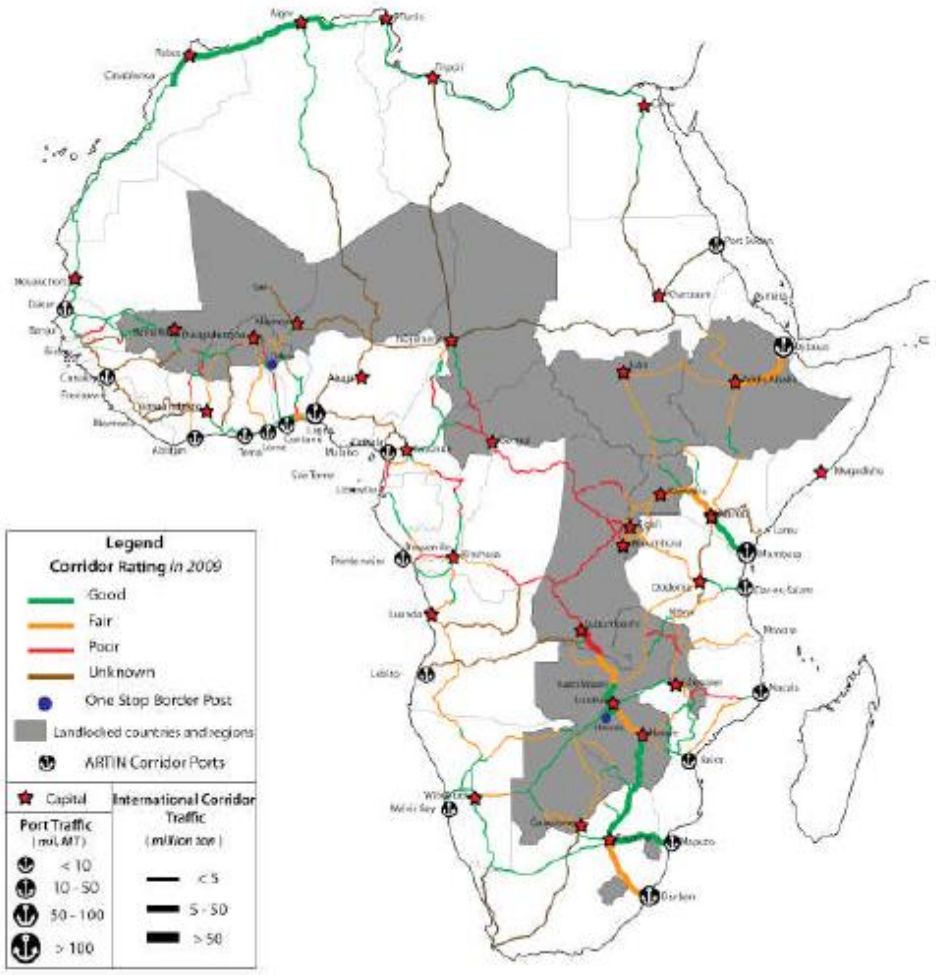
Exhibit 4.1: Transport Infrastructure Map of PIDA's Priority Action Plan



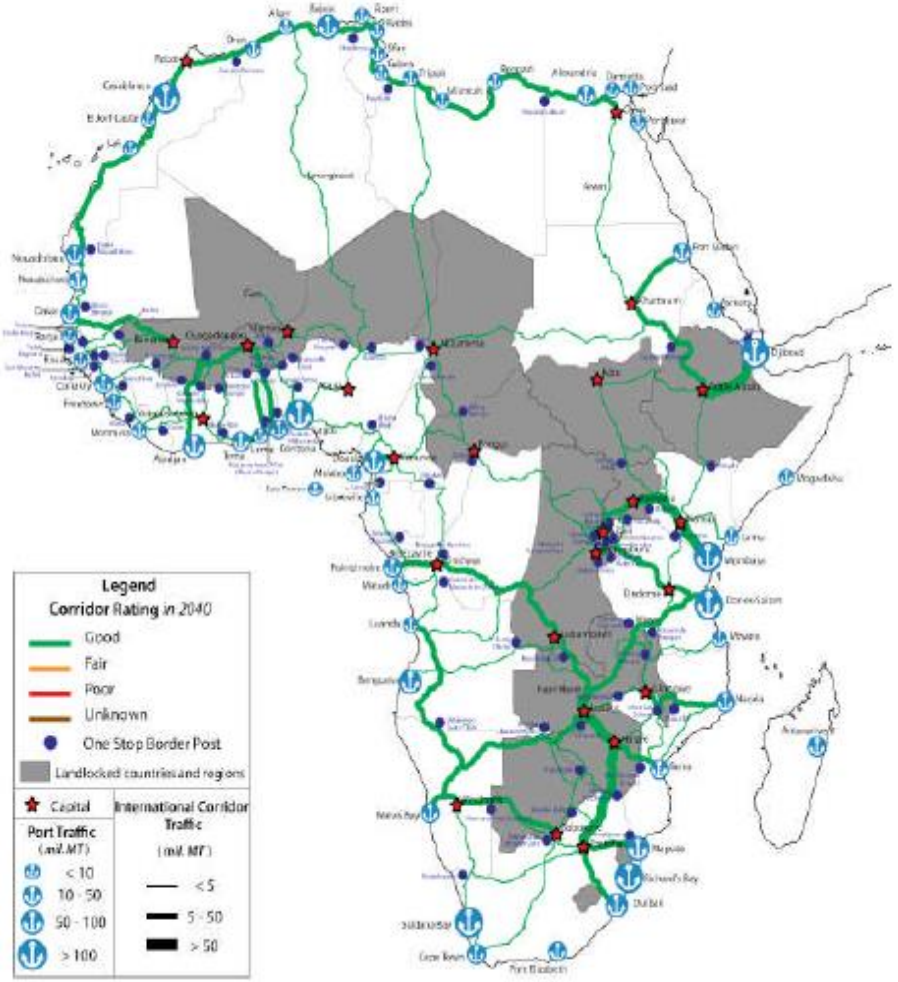
Source: PIDA

Figure 3.1. Africa's corridors of growth: ARTIN in 2009 and 2040

a. 2009



b. 2040

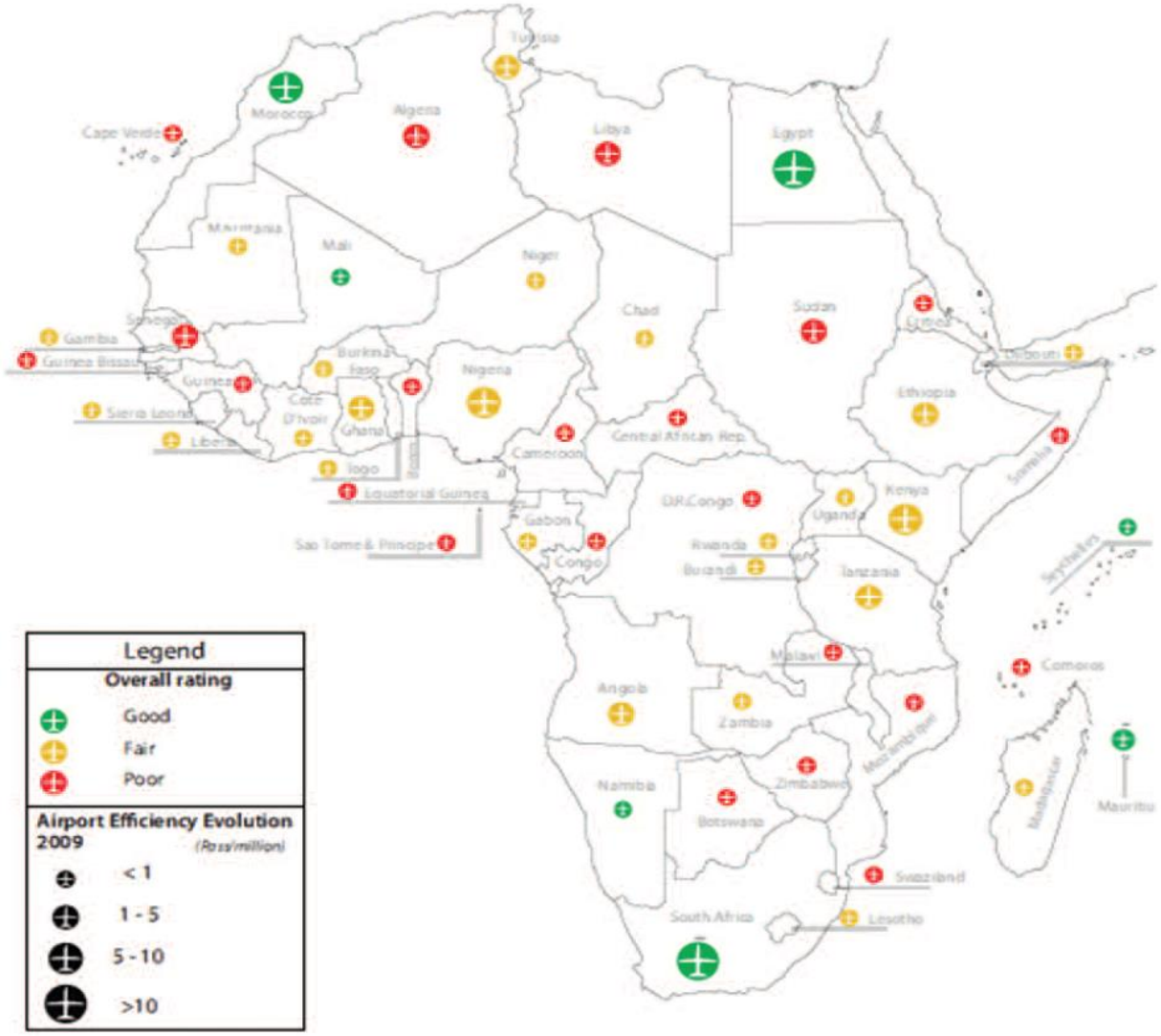


Source: PIDA.

Table 3: Key River and Lake Transport Locations in Africa

River	Countries Served	Organization	Port Condition	Dredging	Navigation
Shire-Zambezi Rivers	Malawi, Zambia, Mozambique, Zimbabwe	-	Undeveloped, but private ports are proposed	Needed	Major potential, for coal and agriculture but undeveloped
Congo-Ubangi-Sangha Rivers	Congo, Congo DR, CAR, Cameroon	CICOS	Neglected	Needed	Major potential, but no access to ocean and poor nav. aids
Niger River	Mali, Niger, Nigeria	-	Being developed in Nigeria, otherwise neglected	Major project in Nigeria for access to the sea	Primary potential is regional or national due to major falls in Nigeria
Senegal River	Mali, Senegal Mauritania,	OMVS	undeveloped	needed	Some potential, but no access to ocean and poor nav. aids
Lake Victoria	Kenya, Tanzania, Rwanda, Burundi, Uganda, Congo DR	Rift Valley Railway	Bujumbura and Mwanza good, others neglected	Some needed	Major potential, poor nav. aids
Lake Tanganyika	Tanzania. Burundi, Congo DR, Zambia	TRL	Neglected	Some needed	Some potential, poor nav. aids

Figure 19: Map of Airport Efficiency in 2009



Source: PIDA Study estimates based on available information and interviews

3. Transformative Regional Integration and Infrastructure Development

Source: Export-Import Bank of India, Connecting Africa, March 2018, p. 20

Table 1.1: Regional Comparison of Time and Costs for Trading Across Borders

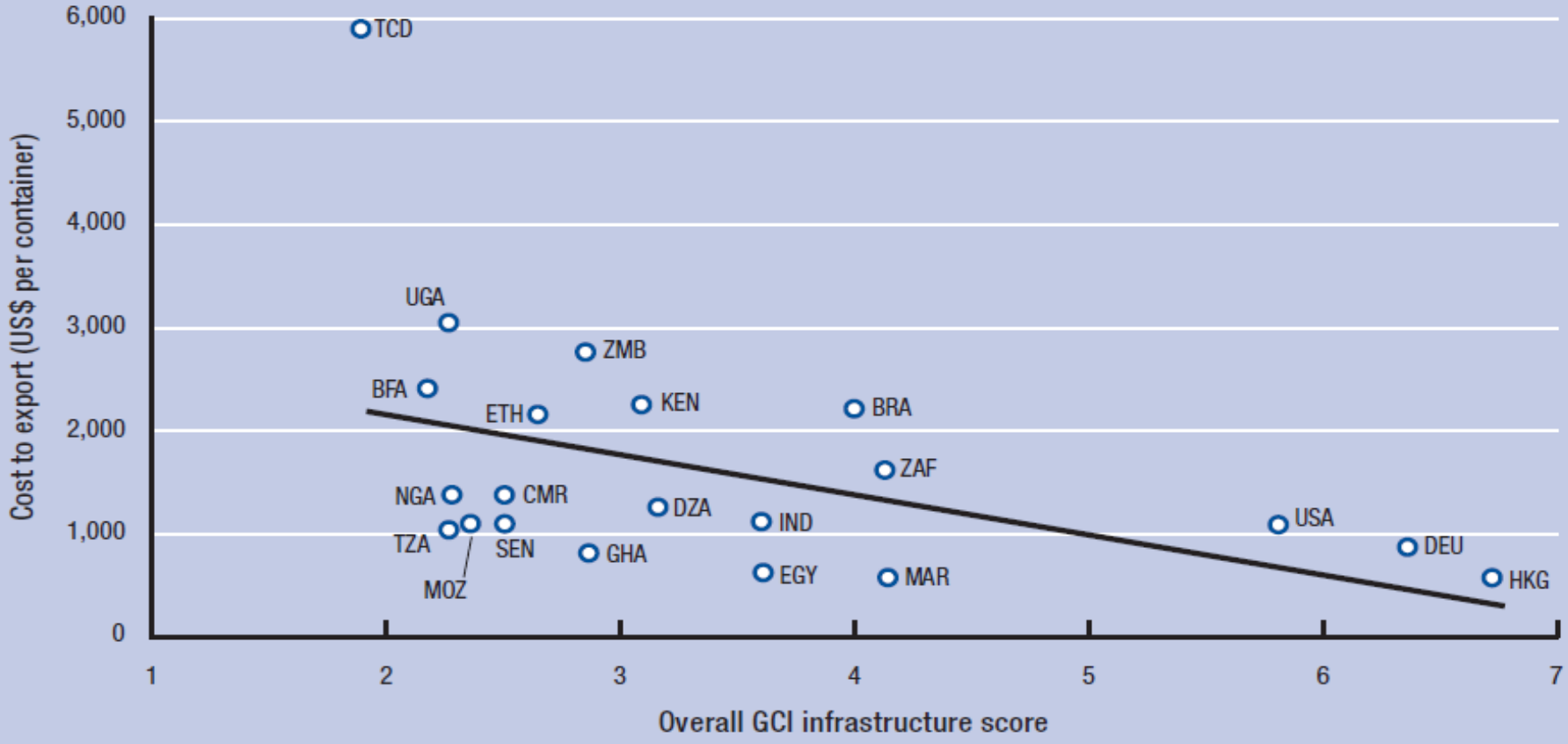
Region	Border compliance				Documentary compliance			
	Time to export (hours)	Cost to export (US$)	Time to import (hours)	Cost to import (US$)	Time to export (hours)	Cost to export (US$)	Time to import (hours)	Cost to import (US$)
East Asia & Pacific	55.9	387.5	70.5	431.0	68.2	112.1	65.6	111.4
Europe & Central Asia	28.0	191.4	25.9	185.1	27.9	113.8	27.3	94.7
Latin America & Caribbean	62.5	526.5	64.4	684	53.3	110.4	79.9	119.5
Middle East & North Africa	62.6	464.4	112.3	540.7	74.3	243.6	94.5	266.2
OECD high income	12.7	149.9	8.7	111.6	2.4	35.4	3.5	25.6
South Asia	59.4	369.8	113.8	638	77	179.5	104.7	341.6
Sub-Saharan Africa	*100.1*	*592.1*	*136.4*	*686.8*	*87.8*	*215.1*	*103*	*300.1*

Source: Trading Across Borders, World Bank Doing Business 2018

3. Transformative Regional Integration and Infrastructure Development

Source: World Economic Forum, The Africa Competitiveness Report 2013, p. 71

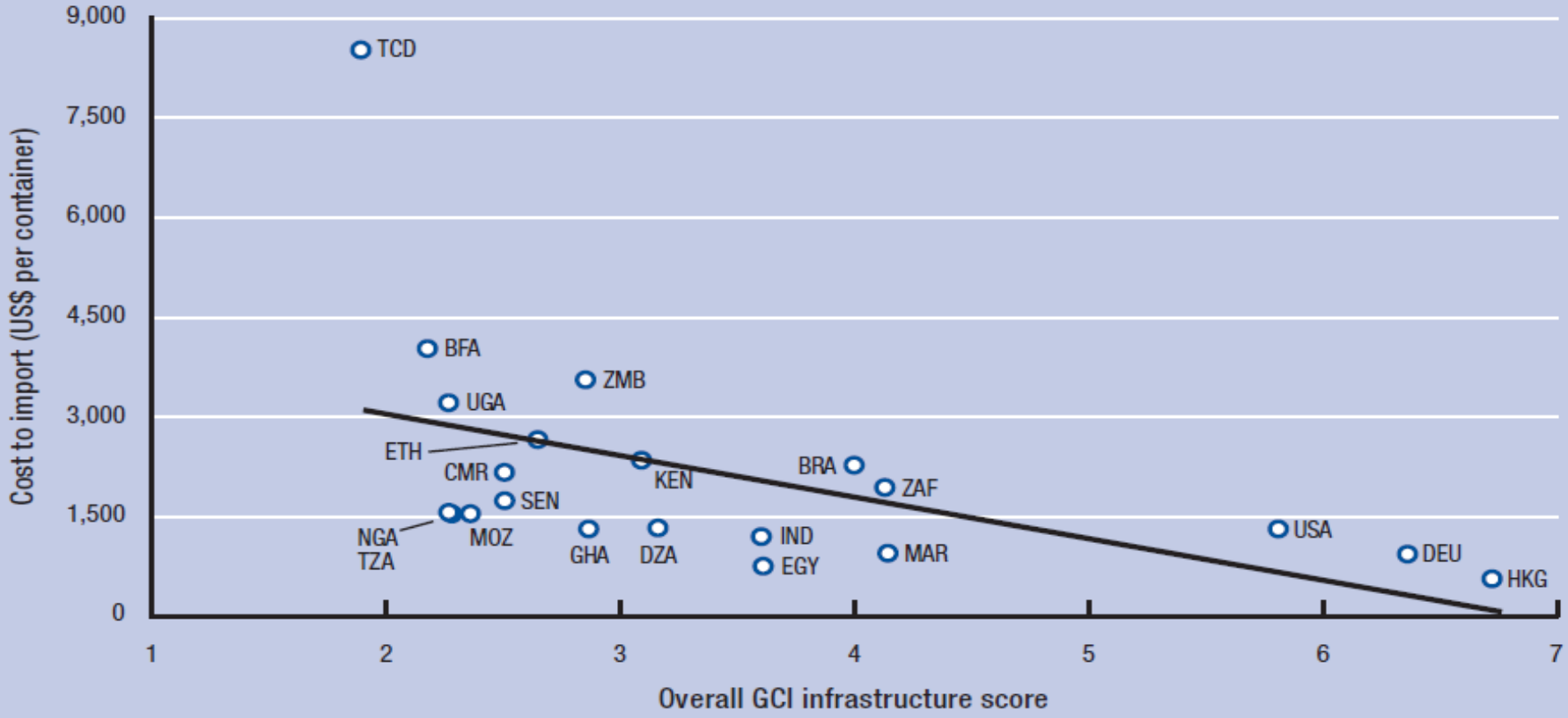
Figure A1: Cost to export



3. Transformative Regional Integration and Infrastructure Development

Source: World Economic Forum, The Africa Competitiveness Report 2013, p. 71

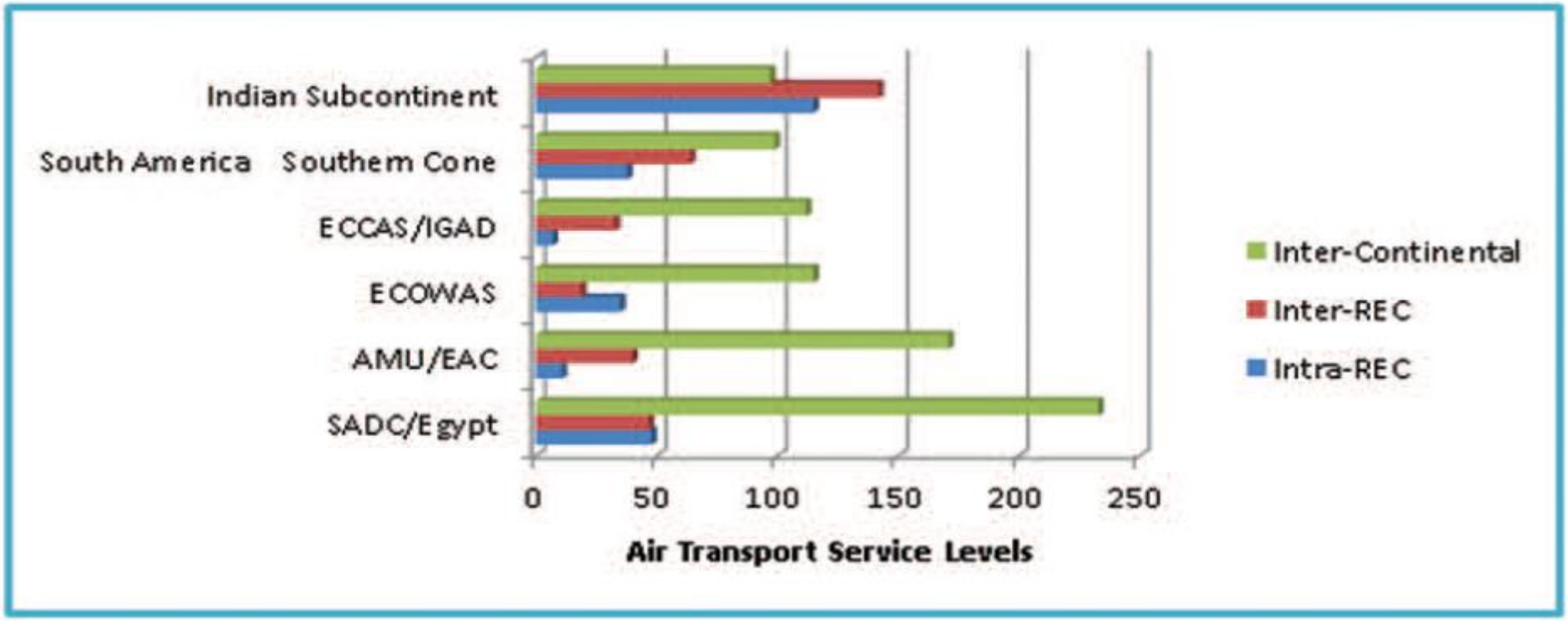
Figure A2: Cost to import



3. Transformative Regional Integration and Infrastructure Development

Source: PIDA, Africa Transport Sector Outlook 2040, p. 30

Figure 18: Comparison of Air Transport Service Levels, Africa, India and South America (average indicator of daily flights from regional hubs/centres)



Source: Service measured from one major hub airport in each REC[14], Rio de Janeiro and Mumbai

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

“Roads to Power: Britain Invents the Infrastructure State” by Jo Guldi is a Harvard University Press book which appeared in 2012. The purpose of the study is to show that a **state-led road development programme in Britain** between 1726 and 1848 had far-reaching effects on state-building, the industrial revolution, military development, technology development, economic diversification and social stratification. The story comes to one’s mind when looking at the infrastructure programmes in Africa. Similar is the **focus on roads** as the most important part of the infrastructure programmes, but all the other facets of the story are different.

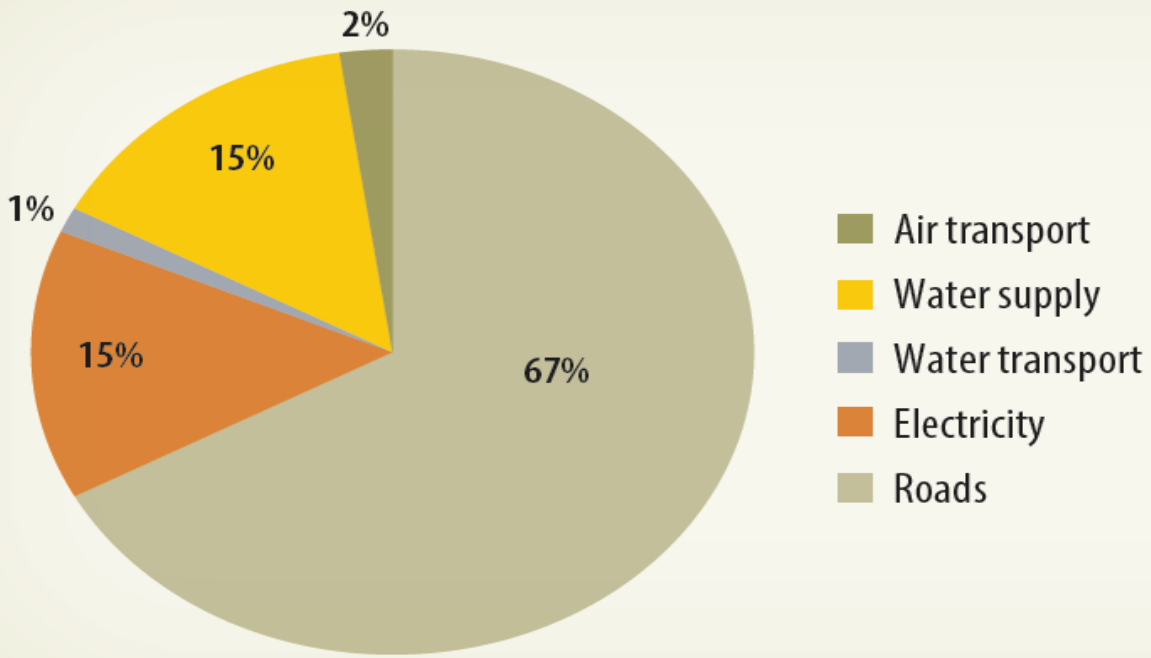
4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

There is **no centralized power** in Africa to build cross-border highways, and to link the system to the national and local roads systems and to other transport modes. There is **no clear policy** to strengthen political and economic power, neither by RECs nor by nation states. There are **no** military strengthening and **technological development components** of the road development programmes. There is **no clear policy** to standardize and to harmonize regulations, and there is **no clear strategy** to maintain the roads (the Trans-African Highways and the Road and Freight Corridors). The **services sectors are not exploited** for employment creation and economic development.

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa,

Source: World Bank, Africa’s Pulse, April 2017, page 85

FIGURE 2.33: Sectoral Distribution of Capital Spending



Expenditures on infrastructure are considerably lower than allocations, amounting to just 2% of GDP.

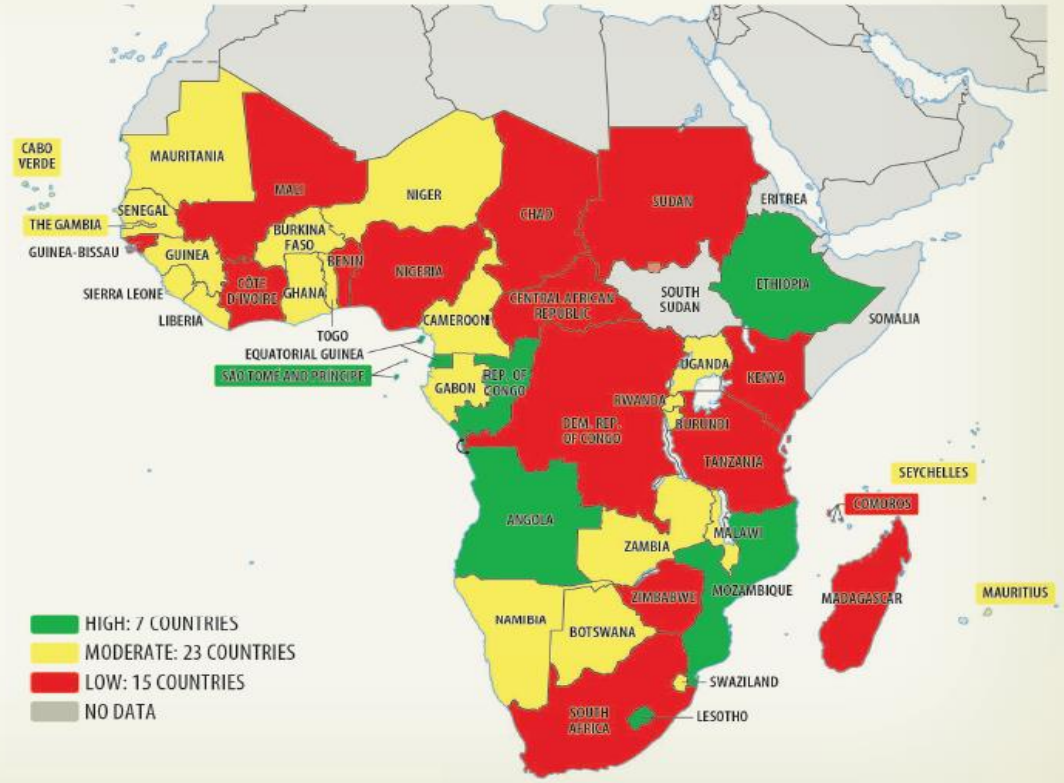
Source: World Bank, BOOST data, staff calculations.

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

Source: World Bank, Africa’s Pulse, April 2017, page 78

Low-investment countries in the region have an average public investment of 3.1% of GDP.

MAP 2.1: Public Investment across Countries in Sub-Saharan Africa (% GDP, average, 2011–15)



Source: IMF Investment and Capital Stock database.

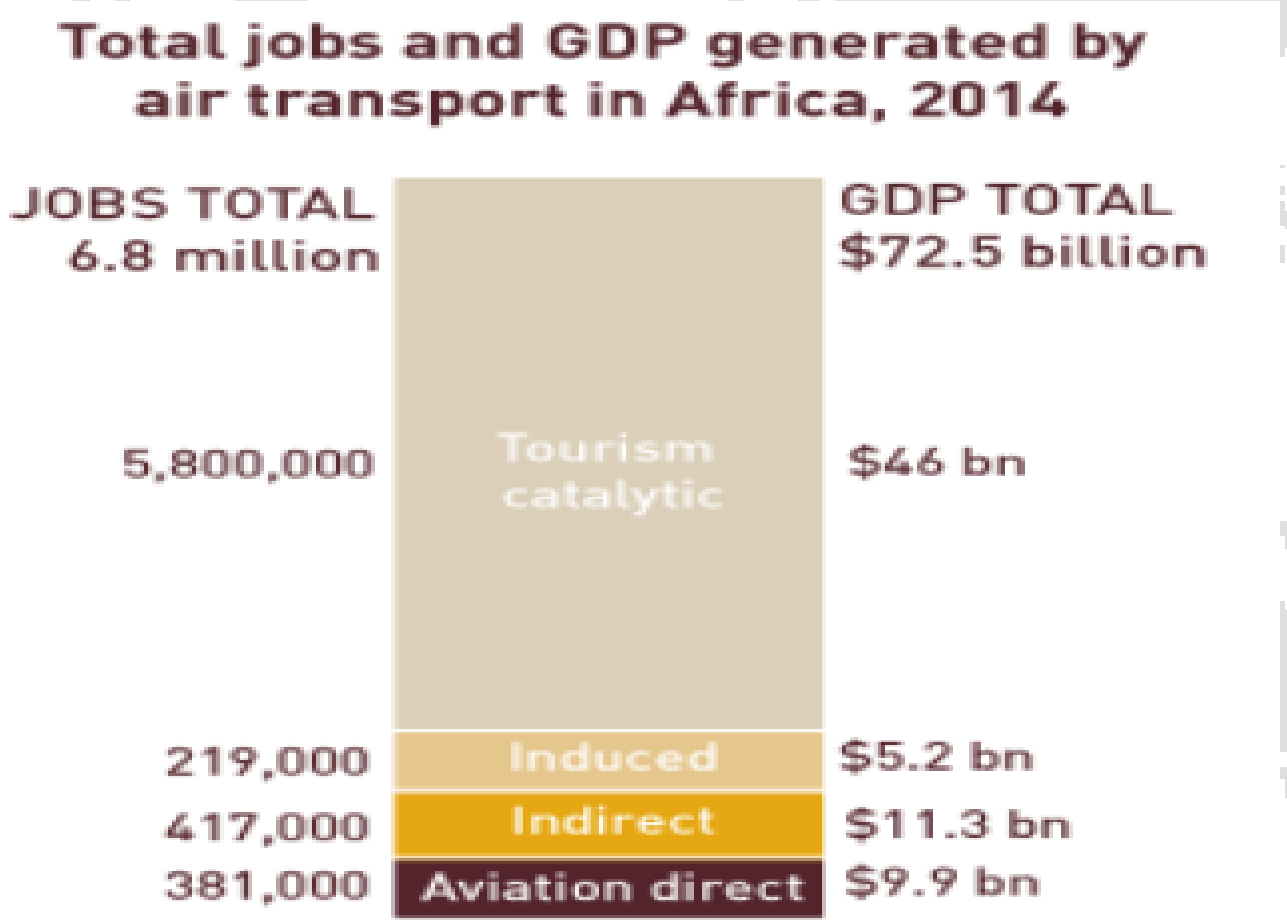
4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

Governance Systems determine the Relation Between Capital Allocations and Real Spending

The preference for roads (two thirds of capital investment) has also to do with governance systems. Bad governance implies a greater deviation of capital allocations and real spending. **African countries with bad governance systems have higher than average capital allocations for roads and lower than average rates of real spending on roads.** This refers to the national and local roads programmes, but has implications for the trans-boundary infrastructure investments (PIDA-type). There is a **serious neglect of waterways** (lakes and rivers) **and of aviation** (airports, services). The **neglect of navigation systems** is affecting traffic on waterways and in aviation.

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

The Neglect of Aviation has implications for job creation, economic development and regional integration; Source: Aviation Benefits Beyond Borders, p. 40



4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

The Neglect of Aviation and Waterways has implications for job creation, economic development and regional integration; Source: Seventh Conference Of African Ministers In Charge Of Integration, 14-18 July 2014, Swaziland, p. 5

Indicators	PIDA up to 2040 (Year 2020 for ICT)
Modern highways	37 300 KM
Modern railways	30 200 KM
Port Added ton capacity	1,3 billion tons
Hydroelectric power generation	61 099 MW
Interconnecting power lines	16 500 KM
New water storage capacity	20 101 hm3
ICT International Broadband Capacity	6 Terabits

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

Source: Policy Recipe for Fostering Regional Integration Through Infrastructure Development and Coordination in West Africa, Mariama Deen-Swarray et al., 2014

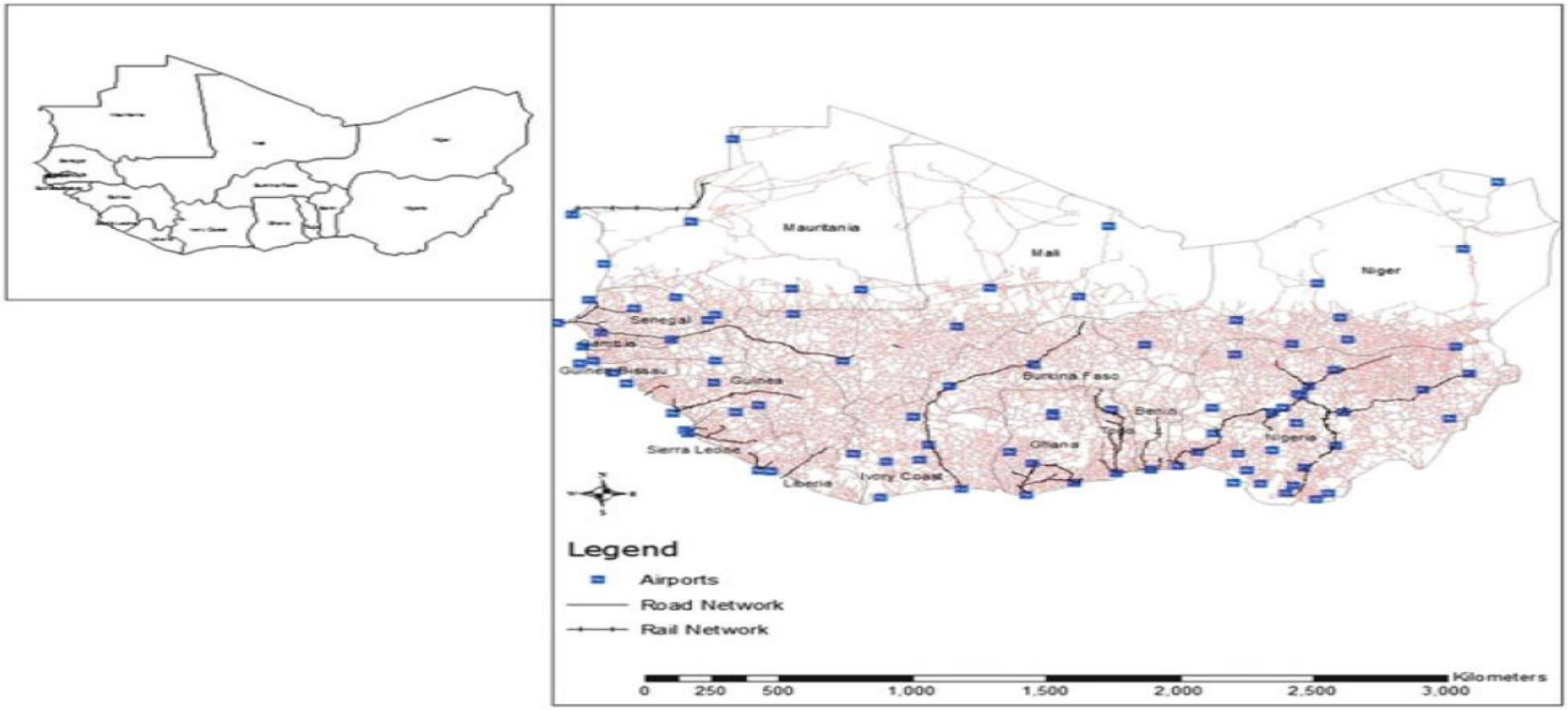


Fig. 6 Rail, roads and airports networks in ECOWAS

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

PIDA neglects the aviation subsector, but aviation is an important source of inefficiencies; Source: NEPAD/AU/AfDB, Study on Programme for Infrastructure Development in Africa (PIDA), PIDA Study Synthesis September 2011, p. 18 www.nepad

Table 3.1. Economic cost of inefficiencies in ARTIN, 2009

Type of cost	Amount (US$ billion)	%
Total ARTIN corridor inefficiency costs	75	43
Total ARTIN air transport inefficiency costs	25	15
Total value of suppressed freight demand	65	38
Total value of suppressed air transport demand	7	4
ARTIN total	172	100

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

The Aircraft Industry gives great opportunities to support a deeper regional integration process in Africa

First, because of the favourable position of Africa in terms of the **telecommunication infrastructure**, it is possible to look for **synergies with the aviation sector**. The same applies to **“smart corridors”** and other transport subsectors.

Second, the **employment opportunities** (direct, indirect, induced, etc.) and the **technological development spillovers** (in sectors, between sectors, and cross sectors) **of the aviation sector** are huge and not at all exploited.

Third, the aviation sector is working like **an “industrializing industry”**, supporting the development of **many new industry branches** and aiding the restructuring of established industries.

4. The “Infrastructure State”, Regional Integration and Aviation Development in Africa

The Aircraft Industry gives great opportunities to support a deeper regional integration process in Africa

Fourth, the aviation sector can **absorb a great number of tertiary education and vocational education graduates**, to work in various subsectors of the aviation sector (from aviation services to navigation tasks and aerospace industries).

Fifth, the aviation sector can more quickly support the economic and political **integration of the RECs** than other transport sub-sectors; the reduction of inefficiency costs and of the value of suppressed demand in air transport makes it self-financing.

Sixth, the aviation sector can support the development of intermediary cities and of small rural towns, thereby generating pressure to **develop rural areas and** the **agriculture sector**.

5. Conclusions – Way Forward in Africa

A deeper integration of the RECs can be supported by a more balanced development of the transport sub-sectors. The neglect of aviation in the visions of PIDA and in the development policies of the RECs is hindering a deeper integration.

Aviation should be a vital part of a **new concept of an African Infrastructure State**, as infrastructure is supporting a deeper regional trade and productive integration, and will be a push for the regional movement of people and skills and for a better coordination of policies and strategies. The **Open Skies Policy** will be the result of a series of actions to establish an African Infrastructure State, but it is definitely not the starting point.