Implications of the African Continental Free Trade Area for Demand of Transport Infrastructure and Services

Executive Summary
Exective Summary

The African Continental Free Trade Area (AfCFTA) agreement entered into force in 2019. It aimed to increase intra-African trade by eliminating import duties. Its planners hoped to double intra-African trade if non-tariff barriers were also reduced. It was a major milestone in the continent’s regional integration.

Inadequate transport infrastructure and services could hamper the realization of AfCFTA's benefits. The urgent need to improve transport connectivity in Africa in the context of AfCFTA has created new research demands. This report explored the effects of AfCFTA on trade flows in the African region and asked how the AfCFTA signatories could reap the agreement’s full benefits through the integrated planning of trade and transport.

The report’s specific objectives were to:

- Forecast the demand for different modes of transport—road, rail, maritime and air—because of AfCFTA.
- Estimate the infrastructure investments required for different modes of transport.
- Estimate the impact of improvements in transport infrastructure and services on the volume of intra-African trade.
- Forecast the demand for equipment for different modes of transport—trucks for roads, rolling stock for railways, aircraft for air transport and ships for maritime transport—because of AfCFTA.

Figure 1 Distribution of intra-African freight transport demand by transport mode

![Figure 1 Distribution of intra-African freight transport demand by transport mode](image-url)
To pursue these objectives, the project undertook four main tasks: data collection; modelling trade flows; modelling the choice of modes of freight transport and projecting the impact on infrastructure, services, and equipment.

The introduction of the AfCFTA will lead to a general increase in intra-African freight demand of around 28 per cent, compared with a scenario without the AfCFTA, according to the report.

Currently, intra-African freight transport demand is heavily skewed towards road transport (77 per cent), with rail’s share close to 0 per cent (figure 1). African transport policies to expand the rail network, combined with trade policies to implement the AfCFTA, are expected to change that distribution. By 2030, with the AfCFTA implemented and the continent’s plans for freight infrastructure and service improvements realized, the share of rail would increase from 0.3 per cent to about 7 per cent. The share of freight transport by road would decrease from 77 per cent to 70 per cent. The share of freight transport by ship would increase, but without AfCFTA it would be reduced. The air cargo transport mode share would remain almost unchanged from that without AfCFTA.

The study constructed four scenarios based on the factors that have the highest impacts and are most uncertain (Schwartz, 1997). Such factors fell into two categories (figure 2):

- AfCFTA implementation and socio-economic development.
- Transport services and infrastructure.

The scenarios in which the AfCFTA is fully implemented were called the maximum ambition scenarios. In contrast, the counterfactual scenarios without AfCFTA were called baseline. Both sets of scenarios use the same projections for population, but the counterfactual scenarios used more cautious projections for GDP and the workforce than the optimistic projections of the maximum ambition scenarios.

Figure 2 Four scenarios for AfCFTA implementation and socio-economic development
For transport supply, do-nothing scenarios, keeping current infrastructure and services wherever possible, were distinguished from do-everything scenarios, realizing planned infrastructure and services wherever possible. The project investigated the most relevant data sources for plans of African transport infrastructure:

- Programme for Infrastructure Development in Africa Priority Action Plan.¹
- New Partnership for Africa’s Development Presidential Infrastructure Champion Initiative.²
- Trans-African Highway network.³
- Programme for Infrastructure Development in Africa Priority Action Plan 2.⁴

In the report, road transport includes both road-only freight transport and the access and egress legs of rail, maritime and air freight transport. Maritime transport includes only seaports, not inland waterways or ports, because of data challenges. Airports are restricted to international airports. Because current plans did not identify new airports or seaports for construction, the 2030 projections use the same ones as in 2019. For road transport many planned new and upgraded road links belong to the Trans-African highway network. For rail the do-everything scenarios extend the rail network by almost 26,500 kilometres, with most new links belonging to the African Rail Network (ARN) Project.

The report focused on the elements—the links and nodes of each transport mode—it defined as critical. An element was considered potentially critical if the ratio of future freight traffic in tonnes on the link to the corresponding annual traffic in 2019 was higher than the ratio of total future freight demand in tonnes to total 2019 demand (table 1). Critical links are those whose ratios are above the 90th percentile of the potentially critical elements.

### Table 1 Total demand variation from scenario S0 to scenario S1 and S2

<table>
<thead>
<tr>
<th></th>
<th>ROAD</th>
<th>RAIL</th>
<th>MARITIME</th>
<th>AIR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S0: WITHOUT- AFCFTA, INFRASTRUCTURE DO-NOTHING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade flows (tonnes)</td>
<td>201,209,152</td>
<td>765,650</td>
<td>57,990,267</td>
<td>2,319,578</td>
</tr>
<tr>
<td>Modal share (per cent)</td>
<td>76.7</td>
<td>0.3</td>
<td>22.1</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>S1: WITH-AFCFTA, INFRASTRUCTURE DO- NOTHING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade flows (tonnes)</td>
<td>411,193,240</td>
<td>26,533,322</td>
<td>136,436,341</td>
<td>4,692,801</td>
</tr>
<tr>
<td>Modal share (per cent)</td>
<td>71.0</td>
<td>4.6</td>
<td>23.6</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>S2: WITH-AFCFTA, INFRASTRUCTURE DO-EVERYTHING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade flows (tonnes)</td>
<td>403,308,644</td>
<td>39,519,805</td>
<td>131,526,360</td>
<td>4,493,657</td>
</tr>
<tr>
<td>Modal share (per cent)</td>
<td>69.7</td>
<td>6.8</td>
<td>22.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Ratio [S1 ÷ S0]</td>
<td>2.04</td>
<td>34.65</td>
<td>2.35</td>
<td>2.02</td>
</tr>
<tr>
<td>Ratio [S2 ÷ S0]</td>
<td>2.00</td>
<td>51.62</td>
<td>2.27</td>
<td>1.94</td>
</tr>
</tbody>
</table>
The length of the top 10 per cent of road links in scenario S2 is 57,363 kilometres (map 1). Some 20,031 kilometres of links that were critical in scenario S1 were resolved in scenario S2 by completing the infrastructure planned for 2030.

Map 1 Critical road links in the with-AfCFTA, infrastructure do-everything scenario (S2)

Road network
With AfCFTA, infrastructure do-everything

- Trans African highway
- Resolved links
- Critical links
- African roads

0  750  1,500 km
The upgrade of the railway network in the with-AfCFTA, infrastructure do-everything scenario (S2) would have a major impact on the critical elements of the railway transport infrastructure and a positive effect on choice of this transport mode. Demand partly shifts from roads to railways: the modal share of the road was reduced from 77 per cent to 70 per cent, and the modal share of the railway grew from 0.3 per cent to 6.8 per cent (map 2).

The total length of the critical railway links in the with-AfCFTA, infrastructure do-everything scenario (S2) amounts to 9,059 kilometres. The critical links are mostly in Central Africa (Chad, Congo, Democratic Republic of Congo), East Africa (Kenya, United Republic of Tanzania, Uganda) and Southern Africa (Botswana, Malawi, Mozambique, Namibia, South Africa, Zimbabwe), plus a section of the railway network in Mali.
In the current scenario (2019), air transport accounted for only 0.9 per cent of the total intra-African freight transport demand. According to the report’s transport demand forecasting, the number of tonnes transported by aircraft with the implementation of the AfCFTA would nearly double from almost 2.3 million tonnes to 4.5 million by 2030. But that represents a decrease in the share of total demand transported by air to 0.8 per cent. The critical airports are mainly in East Africa (Djibouti, Eritrea, Ethiopia, Somalia, Sudan), along with in Mauritania in West Africa and Democratic Republic of Congo in Central Africa (map 3).
In the current scenario (2019), maritime transport accounted for 22.1 per cent of intra-African freight transport demand. According to the transport demand forecast, the number of tonnes transported by vessels with the implementation of the AfCFTA would more than double, from almost 58 million to 131.5 million. But the total maritime transport share is expected to increase by only 0.6 per cent, from 22.1 per cent to 22.7 per cent with AfCFTA, infrastructure do-everything scenario (S2) (map 4).

The increase in inter-African demand due to the implementation of the AfCFTA also requires expanding the fleets of cargo vehicles of the different transport modes. The report’s methodology considers the vehicles, their capacities, yearly mileage, the ratio of empty mileage to loaded mileage and variation according to the type of cargo to be transported—distinguished between vessels for bulk and non-bulk (here called “container”) cargo.

If the AfCFTA is implemented and the planned infrastructure projects are carried out by 2030 (S2), the size of the truck fleet should increase by 179 per cent for bulk cargo and 180 per cent for container units compared with the fleet in 2019 (S0) (table 2).

If the AfCFTA is implemented and the planned infrastructure projects are carried out by 2030 (S2), the rail wagon fleet should increase by 132,857 units for bulk cargo and 36,482 units for container cargo, compared with the fleet in 2019 (S0).

If the AfCFTA is implemented and the planned infrastructure projects are carried out by 2030 (S2), the vessel fleet should increase by 188 per cent for bulk vessels and 180 per cent for container vessels, compared with the fleet in 2019 (S0).

If the AfCFTA is implemented and the planned infrastructure projects are carried out by 2030 (S2), the aircraft fleet should increase by 141 per cent, compared with the fleet in 2019 (S0).

If the AfCFTA is implemented by the planned infrastructure projects are not completed, the fleet expansion for trucks would be somewhat smaller, the fleet expansion for rail wagons would be vastly smaller (about one-tenth the rate), while the expansions for maritime vessels and aircraft would be somewhat larger.

Demand for the different modes of transport varies from one region to another and from one trading pair of regions to another:

- Road transport. The largest truck demand to support trade flows is within West Africa, with 39.3 per cent, from West Africa to Southern Africa, with 19.8 per cent, and from Southern Africa to West Africa with 9.9 per cent.

- Rail transport. The largest rolling stock demand to support trade flows is within West Africa with 48.4 per cent, within Southern Africa with 19.6 per cent and within North Africa with 11.5 per cent.

- Maritime transport. The origin–destination pairs of regions that would require the largest number of vessels to meet demand are from Southern Africa to North Africa, with 26.7 per cent, from Southern Africa to East Africa, with 12.6 per cent, and from Southern Africa to West Africa with 10.3 per cent.

- Air transport. The largest aircraft demand to support trade flows is within West Africa with 13.2 per cent. The other origin–destination pairs of regions that would require the largest number of aircraft to meet demand are from North Africa to West Africa, with 12.9 per cent, and within Southern Africa, with 12.2 per cent.

So, implementing the AfCFTA should give rise to a substantial increase in intra-African trade, estimated in this report at 28 percent. Demand for all modes of transport and the vehicles that serve them will also increase. Pursuit of the continent’s planned transport infrastructure improvements will shift the share of transport somewhat from roads and trucks towards rail and railway wagons but have little effect on the shares of freight carried by maritime vessels or aircraft.

Endnotes

Map 4 Critical railway links in the with-AfCFTA, infrastructure do-everything scenario (S2)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>TRUCKS</th>
<th>RAILWAY WAGONS</th>
<th>VESSELS</th>
<th>AIRCRAFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk</td>
<td>1,945,141</td>
<td>132,857</td>
<td>121</td>
<td>243</td>
</tr>
<tr>
<td>Container</td>
<td>268,438</td>
<td>36,482</td>
<td>14</td>
<td>—</td>
</tr>
</tbody>
</table>