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# *Lake Tanganyika: turning corridors into sustainable opportunities*

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# Lake Tanganyika: turning corridors into sustainable opportunities

*A study on maritime corridor development at Lake Tanganyika*

UPT Erasmus
ERASMUS CENTRE FOR URBAN PORT AND TRANSPORT ECONOMICS

3:S group

# Lake Tanganyika: turning corridors into sustainable opportunities

## *A study on maritime corridor development at Lake Tanganyika*

*Commissioned by the Netherlands Enterprise Agency*

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# Preface

This study on the Lake Tanganyika Transport Corridor was prepared by Erasmus Centre for Urban, Port and Transport Economics (Erasmus UPT), in cooperation with 3S Group and three local consultants.

The Netherlands is actively involved in infrastructure investments to develop African transport corridors to boost regional markets and trade. To facilitate strategic decision making and a coordinated donor approach, as well as to avoid investments in potentially competing projects, more information is needed about the supra-regional transport systems. The Netherlands Development Agency has commissioned Erasmus UPT to conduct a research study to contribute to the sustainable development of the Lake Tanganyika Transport Corridor (LTTC).

The study provides a regional perspective on maritime transport corridor development, using a systematic corridor assessment as well as a cost and transit time comparison with the Northern, Central and Southern Corridors. The findings from this report support the formulation of a shared vision for the government authorities in the riparian countries, based on the foundations of collaboration and a joint approach to corridor development.

The report was prepared under project leadership of Maurice Jansen and his colleagues Niels van Saase and Susan Vermeulen at Erasmus UPT and professor Michael Dooms from 3S Group. Due to the travel restrictions because of the covid-19 pandemic, it was not possible to travel. For that reason, the project team relied heavily on the expertise and presence of our team members and local consultants Freeman Dickie, Juliette Watiku Nyerere and Geoffrey Ngombo Mwango. They visited the ports, conducted interviews on site and collected data systematically, thereby using a systematically structured questionnaire designed by Erasmus UPT. In Zambia Freeman Dickie visited the port of Mpulungu and Lusaka. Juliette Watiku visited Kigoma in Tanzania and Geoffrey Mwango visited Bujumbura in Burundi and Kalundu in DRC. For information on the port of Kalemie we received valuable input from Michael Fuenfzig and his team from Ecorys as well as from Lydia van Os and Guy Motchebe from World Food Programme, who had visited the ports in the first quarter of 2021.

The research team is thankful for the support received from RVO, especially Robin Nieuwenkamp, Nkuruma Chama Kalaluka (Zambia), Ether Loeffen (Embassy of the Netherlands in Bujumbura) as well as from Lydia van Os and Guy Motchebe (World Food Programme). We also would like to thank the many stakeholders both from government agencies, donor organisations, NGOs and private sector who were willing to have interviews via Zoom or Teams. Without their valuable insights and local knowledge, this study would not have been possible.

We sincerely hope the findings from this report - the corridor assessment on a regional scale, the roadmap for setting up a corridor management body - will support the sustainable development of the Lake Tanganyika Transport Corridor.

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# List of abbreviations

| Abbreviation | Explanation |
|---|---|
| **AfDB** | African Development Bank |
| **CDC** | Carrière du Congo |
| **CMB** | Corridor Management Body |
| **COMESA** | Common Market for Eastern and Southern Africa |
| **CCTTFA** | Central Corridor Transit Transport Facilitation Agency |
| **CCTO** | Central Corridor Transport Observatory |
| **DRC** | Democratic Republic of Congo |
| **EAC** | East African Community |
| **ECCAS** | Economic Community of Central African States |
| **ECGLC** | African Union and the Economic Community of the Great Lakes Countries |
| **ETA** | Estimated Time of Arrival |
| **GDP** | Gross Domestic Product |
| **ICD** | Inland Container Depot |
| **JICA** | Japan International Cooperation Agency |
| **KPI** | Key Performance Indicator |
| **LTA** | Lake Tanganyika Authority |
| **LTTC** | Lake Tanganyika Transport Corridor |
| **LTCCI** | Lake Tanganyika Corridor Connectivity Index |
| **MWTC** | Ministry of Works, Transport and Communications |
| **MHCL** | Mpulungu Harbour Corporation |
| **MSCL** | Marine Services Company Limited |
| **MT** | Metric Ton |
| **NCTTA** | Northern Corridor Transit Transport Agreement |
| **PLSCI** | Port Liner Shipping Connectivity Index |
| **RSZ** | Railway Systems of Zambia |
| **RVO** | Netherlands Enterprise Agency<br>(In Dutch: Rijksdienst voor Ondernemend Nederland) |
| **SADC** | Southern African Development Community |
| **SNCC** | Société National des Chemins de Fer du Congo |
| **SGR** | Standard Gauge Railway |
| **TAZARA** | Tanzania/Zambia Railway Authority |
| **TEN-T** | Trans European Transport - Network |
| **TKM** | Ton-Kilometer |
| **TMEA** | Trade-Mark East Africa |
| **TRL** | Tanzania Railway Line |
| **UAE** | United Arab Emirates |
| **VTS** | Vessel Traffic Systems |

# Executive summary

**1. Background to the study**

Lake Tanganyika is part of the East African Rift, which is part of the even larger geological trenches, which stretch out from Lebanon all the way to Mozambique, and are referred to as the Great Rift Valley. The borders of four countries meet at the lake – Burundi, Democratic Republic of the Congo (DRC), Tanzania and Zambia. The shoreline is divided between Burundi (8%), DRC (45%), Tanzania (41%) and Zambia (6%). The entire lake ecosystem provides an untapped potential for life in many ways: for biodiversity, for humanity and for economy. As previously indicated, the four riparian countries inhabit 174 million people, with a growing population of 12 million living in local communities around the lake, particularly on the western and northern shore.

The transport system of Lake Tanganyika can be considered from an intra-regional and international perspective. From an international perspective, the economies around the lake are landlocked and on a very remote distance from seaports, which provide access to international markets, with Lake Tanganyika stretching southwards, while the shortest geographical route to the nearest seaport is eastbound via the Central (Dar-es-Salaam) or Northern Corridor (Mombasa). On the other hand, Lake Tanganyika does provide an alternative for riparian countries to further integrate their economies. The lake has a regional service area, where population may be less dense, but still provides the best accessibility and cheapest route to go from one community to the other.

Lake Tanganyika transport development provides opportunities for cross-border and intra-regional trade and investment as well as deeper regional economic integration. Development of the lake as an integrated Transport Corridor would reduce transportation costs and time, increase sustainability of transport by creating a modal shift from truck to barge transport, and it would strongly improve the connectivity and stability between surrounding countries. Economic and transport integration could even lead to a stronger peace dividend, when stakeholders try to avoid conflicts to keep the transport corridor together. In order to reap the benefits of these opportunities, it is crucial that regional stakeholders, public and private parties, and donors, are mobilized to undertake collective and collaborative action. However, before these local and international decision makers can agree about a common future for Lake Tanganyika, they are demanding more reliable information and data related to markets, trade, transport and efficiency. The structural registration and analysis of such data at the level of the Lake Tanganyika corridor would be of high importance and value. Creating an integral picture of the Lake Tanganyika (maritime) transport system is what has been developed in this study, alongside a first blueprint (for discussion) of a common vision.

**1.1 Aims of the study**

The Netherlands is actively involved in infrastructure investments to develop African transport corridors to boost regional markets and trade. To facilitate strategic decision making and a coordinated donor approach, as well as to avoid investments in potentially competing projects, more information is needed about the supra-regional transport systems. The Netherlands Development Agency has commissioned Erasmus UPT to conduct a research study in order to contribute to the sustainable development of the Lake Tanganyika Transport Corridor (LTTC) in the following ways:

1) A structural collection of data on trade, trade costs, transit times, modalities, barriers, and trade benefits.

2) A systematic corridor assessment as well as a competitive comparison to other Southern African corridors.

3) Support to formulate a vision for the government authorities in the riparian countries, based on the foundations of collaboration and a joint approach to corridor development.

**1.2 Rationale for corridor development**

- The corridor agenda is widely adopted by governments, which seek to involve the private sector, development agencies and corridor development bodies. Because of the need for collaborative action, more attention is raised for managing cross-sectoral partnerships effectively.
- The majority of the stakeholders consent with Lake Tanganyika as an underutilized resource for transport, which could enable trade. Respondents elaborate on various reasons why people would currently not see the potential: issues related to safety of navigation, lack of knowledge among traders with regard to vessel capacity, unsatisfactory experiences with the reliability of shipping services and misconceptions on cost competitiveness.
- Furthermore, the interviewed stakeholders witness an unawareness, even a reluctance among traders and port operators to pro-actively develop new business by connecting with market players on the other end of the lake.
- There are many urban areas with a fast-growing population, which creates a demand for goods and services. An effective transport system on Lake Tanganyika could be a viable alternative for traders considering the relatively lower cost per ton-kilometer as well as the possibility to circumvent cumbersome border procedures, checkpoints, and weight bridges on the road.
- Poor infrastructure and trade facilitation costs, high transport costs, long lead times and unpredictability of supplies all place a burden on traders and manufacturers. Consequentially, their safety stocks need to be higher, quality of perishable agricultural products deteriorates, which all add up to higher prices, both on local markets as well as on the global marketplace.
- To unlock the potential, the respondents believe the LTTC could facilitate two distinguished trade flows: foster intra-regional supply chains for localized trade and improve connectivity with international corridors.
- Various stakeholders have been active over the years and conceptualized on the Lake Tanganyika corridor development. The research team concludes that there have been extensive studies on the potential, but there is a sense of a momentum among stakeholders that requires a clear and collaborative action agenda, which aims for better coordination on further developing the corridor. Such action agenda does not only entail alignment of infrastructure project financing but would be aimed to pursue both a top-down and bottom-up approach.

**2. Corridor performance**

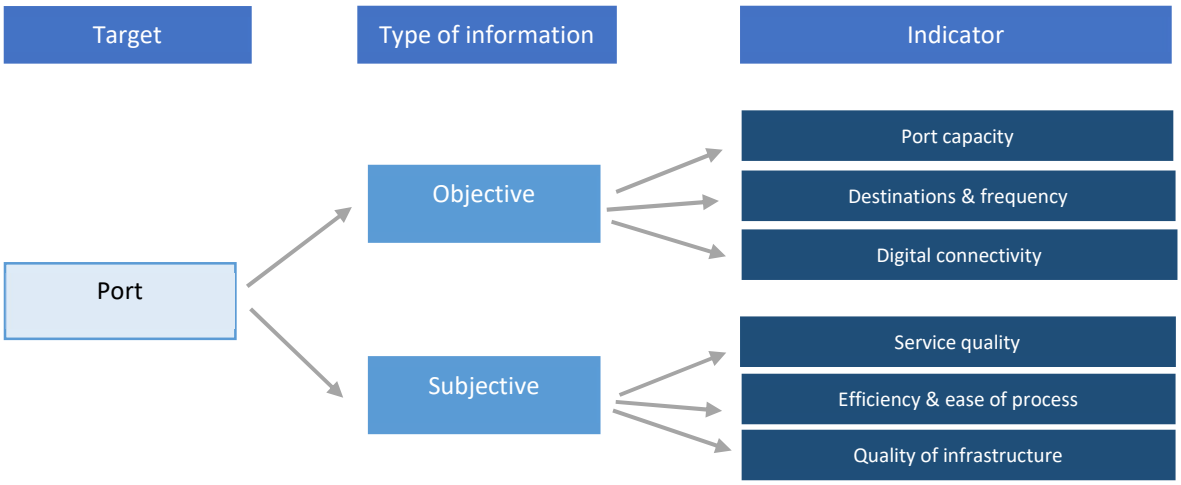
- From both scientific research as well as studies by institutions such as the World Bank and African Development Bank, there is consensus that Lake Tanganyika Transport Corridor has an enormous potential to lift trade by improving connectivity to and across the Lake Tanganyika. Transport connectivity is a precondition but has also been a key binding constraint for economic growth, poverty reduction and shared prosperity.
- Lake Tanganyika corridor development is not just about upgrading of port infrastructure and facilities, but also about enhancing road accessibility, facilitation of information exchange on vessel

traffic, harmonization of legislation on transport and port operations, as well as the installation of a harmonized customs territory for cargo.

- There are two important transport routes across the lake: north-south between Mpulungu and Bujumbura. Second the East-West between Kalemie (DRC) and Kigoma (TZ). There is a potential for a third route, which is currently competing with a road transport connection. This route goes from Kigoma to Bujumbura when intermodal transport is re-introduced on the lake; AfDB has introduced phase I and phase II for upgrading the north-south corridor. Meanwhile, the World Bank is concentrating on Kigoma and the wider Tanzania transport system.
- Differences exist between intra-regional and international trades. Local value chains support local communities, such as agriculture and fisheries. Mining products are one of the few exported commodities that are part of international value chains. These bulky commodities are relatively time-insensitive, have a low value per ton and often make part of vertically integrated value chains, controlled by a handful of multinationals.
- Main bottlenecks are the shortage of vessel capacity on the lake, alongside safety of navigation, exacerbated by ships that are not seaworthy, resulting in ship wreckage and casualties. Lack of (perceived) reliability is another consequence of the poor condition of the fleet. This makes waterborne transport less attractive for cargo owners.
- On the landside, port equipment is outdated and does not cater for scaling up intermodal transport. Intermodal transport at a scale that fits with local demand would especially support local value chains.
- The intermodal system on the lake is strongly connected to the railway rehabilitation (SGR) project in Tanzania. With the deterioration of the railway network in Tanzania, containerized transport over the lake disappeared and resulted in a reverse modal shift from rail to road. The upgraded railway between Dar-es-Salaam and Kigoma would bring back containers to the lake.
- Central and Northern Corridors are taking a joint approach to enhance transport performance in the region, using the corridor performance observatories as the yardsticks.
- As both corridors serve the same vast hinterland (174 million people), an extension and strong link with the Lake Tanganyika corridor has the potential to further integrate the economic system.

**3. Connectivity assessment among Riparian ports**

Connectivity is a key concept in determining the position of an inland port within the network. The aim is to create a Lake Tanganyika Corridor Connectivity Index (LTCCI) that shows the relative connectivity performance of one port relative to the other ports around Lake Tanganyika. This index will be constructed using a methodology like existing indices, such as the Port Liner Shipping Connectivity Index (UNCTAD STAT), Logistic Performance Index (World Bank) and the Global Connectedness Index (DHL). Various elements of these indices were applied in the set-up of the methodology LTCCI. Next to this, we have used the steps for constructing a composite index following Mazziotta and Pareto (2013).




These indicators are the starting point to develop questions, in a survey format, for interviews, which are executed by three local Transport and Logistics experts. Each interview was targeted on one specific node to keep the information flow for each port clear and to ensure comparability between the ports. The following types of stakeholders have been interviewed for the ports of Mpulungu, Kigoma, Bujumbura, Uvira (Kalundu): Port authorities, shippers, barge operators, logistics service providers, customs, hinterland transport operators and embassies. Kalemie could not be measured because our local consultant could not reach Kalemie due to fierce Covid-19 restrictions. Relative performance between the ports is what has been measured. Six indicators are applied: 1) Port capacity 2) Frequency and destinations 3) Digital connectivity 4) Service quality 5) Efficiency and ease of process 6) Quality of infrastructure. Indicators 1-3 are objective indicators, indicators 4-6 are subjective indicators. Data has been retrieved from interviews with local stakeholders on the ground.

**3.1 Transit time and costs analysis.**

We have performed a transit time and costs analysis, focused on transporting bulk goods via the Northern, Central and Southern Corridor towards Kalemie (DRC) and Bujumbura (Burundi). The total transit times that are reported include the moment of arrival in seaports (before goods clearance) until the moment of arriving in a riparian port. This analysis answers the following questions: 1) What is the cheapest transport option for each corridor? 2) What is the fastest transport option for each corridor? 3) Which corridor provides the fastest transit time towards afore-mentioned destinations? We have also gathered data for the container business, however more limited, because lake transportation is not very containerized. It is important to note that due to the lack of fixed tariffs, costs are not stable and can differ from our report in reality. The same is valid for transit time measurements. Disruptions along the way, extreme waiting times in (sea)ports and other occurrences might lead to significant deviations in reality.

This section provides insights in the “best route – modality combination” by differentiating the most cost-efficient route on the one hand, and the most time-efficient route on the other hand. For example: transporting goods over the central corridor towards Bujumbura is most cost-efficiently performed by using rail and barge (65 USD/MT, 243 hours). However, choosing for dedicated truck transport would lead to a faster transit time and a higher price (100 USD/MT, 192 hours). These are the trade-offs that shippers and forwarders make. The better the data about multiple route options around and towards the lake, the

better these parties can make their transport decisions. An overview of all route/modality combinations can be found in Appendix 2.

### 3.1.1 Kalemie route

The tables below **Error! Reference source not found.** show respectively the most cost efficient and most time efficient route combinations towards Kalemie. Several things are notable. First, the Northern corridor has only one viable option of reaching Kalemie and that is via truck and barge (210 USD/MT, 444 hours). Second, the central corridor reaches Kalemie in the most cost-efficient way by using modalities rail and barge (57 USD/MT, 285 hours). The most time-efficient way is to use truck and barge (107 USD/MT, 225 hours). However, this results in a doubling of the transport costs per MT. Third, the only viable option to reach Kalemie via the Southern corridor is to use a combination of truck and barge, this holds both for the starting point Durban (180 USD/MT, 498 hours) and Beira (170 USD/MT, 594 hours).

*Route towards Kalemie - most **cost efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 210 | 444 | Truck-barge |
| **Central** | $ 57 | 285 | Rail-barge |
| **Southern (Durban)** | $ 180 | 498 | Truck-barge |
| **Southern (Beira)** | $ 170 | 594 | Truck-barge |

*Route towards Kalemie - most **time efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 210 | 444 | Truck-barge |
| **Central** | $ 107 | 225 | Truck-barge |
| **Southern (Durban)** | $ 180 | 498 | Truck-barge |
| **Southern (Beira)** | $ 170 | 594 | Truck-barge |

### 3.2.2 Bujumbura route

The tables below show respectively the most cost efficient and most time efficient route combinations towards Bujumbura. Several things are notable. First, the Northern corridor has only one viable option of reaching Bujumbura and that is via truck (150 USD/MT, 276 hours). Second, the central corridor reaches Bujumbura in the most cost-efficient way by using modalities rail and barge (65 USD/MT, 243 hours). The most time-efficient way is to use the truck (100 USD/MT, 192 hours). Third, the only viable option to reach Bujumbura via the Southern corridor is to use a combination of truck and barge, this holds both for the starting point Durban (185 USD/MT, 522 hours) and Beira (175 US/MT, 618 hours).

*Route towards Bujumbura - most **cost efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 150 | 276 | Truck |
| **Central** | $ 65 | 243 | Rail-barge |
| **Southern (Durban)** | $ 185 | 522 | Truck-barge |
| **Southern (Beira)** | $ 175 | 618 | Truck-barge |

*Route towards Bujumbura - most **time efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 150 | 276 | Truck |
| **Central** | $ 100 | 192 | Truck |
| **Southern (Durban)** | $ 185 | 522 | Truck-barge |
| **Southern (Beira)** | $ 175 | 618 | Truck-barge |

### 3.2.2 Corridor assessment

Regarding the overall performance, there is a clear difference in port performance on the "Northern" part of the Lake Tanganyika and the "Middle/Southern" part of the Lake Tanganyika. The performance levels of Mpulungu and Kigoma do not differ much, whilst Bujumbura and Kalundu are below these overall scores. All ports perform badly on digital connectivity and communication.

The performance of Mpulungu and Kigoma is relatively similar, where Mpulungu can improve with more physical infrastructure such as more storage, ship repair and a larger berth length. Kigoma can improve with some physical infrastructure such as storage, but mainly needs to investigate optimizing the overall efficiency of the process and shorten the general waiting times. The complexity of the port of Kigoma is higher than the port of Mpulungu, since they only have the option road or barge, whilst Kigoma also has a rail option to Dar-es-Salaam to integrate in the process. It can be the case that when complexity increases in Mpulungu port, efficiency will decrease as well.

For Bujumbura and Kalundu, there are again some differences in terms of potential for improvement. The Bujumbura port has a high amount of port capacity, but also shows low performance on efficiency of processes, waiting times and scores low on legislation and documentation processes. The improvements mainly reside in streamlining efficiency and looking critically towards customs and efficiency in this process. For the port of Kalundu it is harder to indicate where the improvements exactly are located, since the port performs relatively poorly on all aspects, except for the service quality. It is important to note, that products for the port of Kalundu must call the port of Kalemie, even though there is no cargo for Kalemie to discharge or load.

The table below shows the outcome of the corridor assessment. The numbers will be validated during the technical workshops focused on each riparian port.

| Indicator | Mpulungu | Kigoma | Bujumbura | Kalundu | Kalemie |
|---|---|---|---|---|---|
| Port capacity | *71.42* | *63.96* | *81.48* | *47.25* | *71.29* |
| Frequency & destinations | *80.00* | *63.40* | *50.64* | *32.09* | *63.19* |
| Digital connectivity | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| Service Quality | *80.11* | *86.94* | *57.52* | *66.72* | **NA** |
| Efficiency & Ease of process | *100.00* | *87.17* | *59.35* | *64.77* | **NA** |
| Quality of physical infrastructure | *52.20* | *90.46* | *50.56* | *43.01* | **NA** |
| **Overall index value** | ***64.0*** | ***65.3*** | ***49.9*** | ***42.3*** | ***44.8*** |

**4. Corridor organization**

- Based on a benchmark of 9 international case studies (including 3 African examples), we uncovered a number of key success factors when defining corridor governance arrangements under the form of the set-up of a CMB (Corridor Managing Body):

  (1) Adopting a strong focus on concrete objectives, where the CMB can make a difference, and avoiding dilution of objectives over the lifetime;

  (2) Building a solid stakeholder coalition upfront, including a strategy to expand this coalition, but also avoiding dilution of objectives by 'overstretching' the bandwagon;

  (3) Appointing a strong leadership team at the CMB, including a 'champion', i.e.(an) individual(s) with significant weight and legitimacy on both the political and industry level to lead the initiative;

  (4) Inclusive stakeholder management and data-driven decision-making when setting the priorities, both at the start and during the lifetime;

  (5) Ensuring stable, sufficient resources that permit keeping a strong, close link with key stakeholders such as Member States and key private sector players, in particular in a transnational context.

- Our conclusion, based on the respondents' feedback on various scenarios, is to explore the potential to empower the Lake Tanganyika Authority to set-up, within its existing organization, a Corridor Managing Body, which could take the form of an LTA sub-entity, branch or department with an own identity and champion oriented at the trade and transport activities on the lake.

- This department would need to benefit from and leverage knowledge and capabilities already present at the existing Corridor Managing Bodies (in particular, Central and Northern). However, we need to stress that respondents were not equivocally agreeing on this option, as some respondents questioned the availability of resources at the LTA to move forward in the short term, as currently, the LTA seems to lack both some power and visibility at the level of both the private sector and on national political levels.

- The main advantage, as confirmed by respondents, is that the LTA is currently the unique body where the 4 riparian states meet regarding matters specific to the lake, and that also trade related matters (in particular aspects related to the transport of goods) are within the mandate. In sum, Lake Tanganyika Authority has the mandate to bring riparian countries together under an existing convention, which would prevent more lengthy political processes to establish new transnational organizations. The convention has a clause on navigation over the lake, which could be an opening to add a Transport Protocol to the Convention.

- This action agenda would require a unique set of capabilities, not just skills and knowhow, but would need people with a 'can do' mentality, and involvement of traders and transport associations combined with strong ties and advocacy towards higher government levels.

- The main, overarching longer-term vision (2030 as milestone) would be to effectively realize and stimulate seamless end-to-end intermodal transport on the lake, through the development of state-of-the-art infrastructure and efficient services both on the lake- and landside. Both intermodal solutions for intra-regional trade and international logistics chains would need to be developed, and the optimal conditions defined (types of vessels, types of intermodal units, types of infrastructure).

- In the shorter term, within a 3- to 5-year perspective (2025 as milestone), the following high-level agenda should be realized, and is consistent with the typical activities deployed by smaller-scale international corridor initiatives, be it from a public or private perspective:
  - Develop a common marketing and information platform facilitating and promoting the access to local, regional and international shippers and logistics providers; this includes the set-up of continuous but targeted 'advocacy' initiatives towards central governments;
  - Increasing the animation within the transnational business ecosystem around the lake through stimulating development of activities such as trade fairs, set-up of a common lake ports community, etc.;
  - Agree on a common infrastructural policy allowing more focus and alignment towards the realization of infrastructural projects benefitting the entire corridor, increasing the efficiency of invested funds of various governments and donors, and aiming towards the implementation of the longer-term vision on intermodal transport;
  - Further increase the transnational dialogue on trade facilitation for lake trade flows at the level of administrative and financial matters;
  - Improve the navigational safety conditions on the lake (e.g. beaconing), and set-up a basic 'lake community system' for information exchange;
  - Set up a basic monitoring instrument for the performance of lake transport services and ports;
  - Stimulate the development of ship repair and maintenance services;
  - Set up a common framework for training, certification and watchkeeping for inland navigation, including an educational infrastructure, which covers adjacent professions in the maritime domain: shipbuilding, port logistics, intermodal transport, trade and customs compliance.

For each of the activities, the main supporting stakeholders will be defined, as well as concrete next steps under the form of a high-level roadmap.

# 1 Introduction

Lake Tanganyika is the second largest of the lakes in Eastern Africa and it is the longest freshwater lake in the world with its length of 673 km from North to South. Its shoreline is divided between Burundi, Zambia, the Democratic Republic of Congo and Tanzania. The lake is fed by a number of rivers of which the largest are Malagarasi, the Ruzizi and the Kalambo. The lake lies at the crossroads of three main sub-Saharan African Trade Corridors: The Northern Corridor, the Southern Corridor and the Central Corridor.

The riparian countries around the lake have a total population of 174 million people. Most of the people in this region live on the north and northwest side of the lake, which is a sizeable regional market. The agricultural production has a potential value of US$950 billion (market prices end 2017). The region has a confirmed reserve of US$200 billion of mineral resources[1].

Over the last decade the economies of several east and southern African countries showed a stable increase. However, riparian countries are facing common problems among which are border conflicts, political instability, high trade facilitation and transport costs, uncoordinated investments, outdated infrastructure, regulatory discrepancies and lack of safety and security. National governments are attempting to tackle these issues, but the problem is that this often only leads to national implementation of measures and thereby not towards real integration of the region.

## 1.1 Problem background

### 1.1.1 The Lake Tanganyika ecosystem

Lake Tanganyika is part of the East African Rift, which is part of the even larger geological trench, which stretches out from Lebanon all the way to Mozambique, referred to as the Great Rift Valley. The Great Rift runs along two separate branches, which meet each other at the southern end in Southern Sudan, with the border of Zambia. Lake Tanganyika is the longest lake of all the Great Lakes in Africa with 673 kms in length. On average the lake is 50 kms wide (72 km at its widest). The shore length is 1,828 kms. The lake is also one of the deepest in the world (1,470 metres). The borders of four countries meet at the lake – Burundi, Democratic Republic of the Congo (DRC), Tanzania and Zambia. The shoreline is divided between Burundi (8%), DRC (45%), Tanzania (41%) and Zambia (6%).

The entire lake ecosystem provides an untapped potential for life in many ways: for biodiversity, for humanity and for economy. As previously indicated, the four riparian countries inhabit 174 million people, with a growing population of 12 million living in local communities around the lake, particularly on the western and northern shore. Given the absence of an adequate road system, the transport and commuting over the water is the best alternative. The lake contains 17% of world's free freshwater[2]. The lake, rich of natural resources, especially its biodiversity (1,400 species of plants and animals, of which 600 endemic animal species), is one of the world's richest freshwater ecosystems, which provides essential ecosystem services to regional populations in terms of fisheries, clean water, and transportation.

The four countries sharing the Lake Tanganyika basin are among the poorest in the world according to the UN Human Development Index. Population grows annually at a rate of 2 – 3.2% per year. Although Swahili is an official national language in DRC and Tanzania and is common in Zambia and Burundi, imperial powers have left a language divide over the region, with different inherited societal structures and legal frameworks as a result. Over a timespan of decades, civil wars and conflicts have displaced hundreds of thousands of people who have sought refuge in Tanzania. These refugees crossed the lake on small fishing boats and still live in refugee camps near the lake. For local communities, waterway transport is the main

mode of transport between communities along the lake, not the least because of the inaccessible roads and the relative absence of rail infrastructure around the lake.

From an environmental perspective, a growing population and absence of law enforcement leads to pollution, which is a major threat for the lake ecosystem. Pollution comes from industries, fuel and oil from ships, pesticides, and fertilizers. Erosion from deforestation leads to sediment deposition in the littoral zone of the lake where most water organisms live. Over-fishing is another threat, which not only has a negative impact on biodiversity but also on employment and food security. The pressure is aggravated by natural phenomena such as earthquakes, heavy seasonal rain, causing floods and landslides with consequential casualties. The Convention on the Sustainable Management of Lake Tanganyika entered into force in 2005 and was intended by the four riparian countries to commit to cooperation for the conservation and preservation of Lake Tanganyika's biological resources. Lake Tanganyika Authority (LTA) started its operations in 2009 with its initial implementation focusing on administration and organisation of the Convention. Effectiveness of implementation is hampered by lack of funding. A self-sustaining financial mechanism is lacking. Consequentially, this makes LTA as the coordinating body heavily dependent on support from international partners.

### 1.1.2 Transport system

The transport system of Lake Tanganyika can be considered from an intra-regional and international perspective. From an international perspective, the economies around the lake are landlocked and on a very remote distance from seaports, which provide access to international markets, with Lake Tanganyika stretching southwards, while the shortest route to the nearest seaport is eastbound via the Central or Northern Corridor. Cities and communities around Lake Tanganyika itself are somewhat at the periphery of the major trade routes and networks. The corridor from the copper belt of DRC and Zambia runs south from and bypasses Lake Tanganyika. Populous countries such as Rwanda, Uganda, Burundi and north-east of DRC are connected by the Central and Northern corridor to the seaports of Mombasa and Dar-es-Salaam. On the other hand, Lake Tanganyika does provide an alternative for riparian countries to further integrate their economies. The lake has a regional service area, where population may be less dense, but still provides the best accessibility and cheapest route to go from one community to the other.

For a considerable part, the stagnating development of trade over the lake is caused by the dysfunctional transport system, which neither caters for large trade volumes being exchanged between local communities, and neither supports mining materials and agricultural products in reaching international markets efficiently. On a smaller scale, the lake does provide links between communities through informal trade. Such societies are bothered by conflict and civil wars, which does not provide stability and foundations for more sophisticated value chains. A large number of studies have been reporting on the poor transport infrastructure: insufficient vessel capacity, inadequate aids to navigations (navigational charts, vessel traffic system (VTS) services, limited weather forecast information, and absence of shipyards[3]. Moreover, the available capacity to construct, repair and maintain ships has deteriorated over the years. On the intersection between water and land, ports are bothered by sedimentation, which sets limitations for draught of larger vessels; this is mainly an issue in DRC. On the landside, the port infrastructure (quays, berths, jetties, access channels) and superstructure (pavement, cranes, mobile equipment, terminals, public utilities) are in a rundown state. The poor infrastructure and high trade facilitation costs are hampering the competitiveness of exporters and is an impediment to further economic integration within the region and with international markets. Although landlocked countries

are already in a disadvantaged position compared to countries with direct access to international maritime transport routes, long transit times and high costs put traders further behind.

### 1.1.3 Problem statement

Lake Tanganyika corridor development provides opportunities for cross-border and intra-regional trade and investment as well as deeper regional economic integration. Development of the lake as a transport Corridor would reduce transportation costs and time, increase sustainability of transport by creating a modal shift from truck to barge transport, and it would strongly improve the connectivity and stability between surrounding countries. Economic and transport integration could even lead to a stronger peace dividend, when stakeholders try to avoid conflicts to keep the transport corridor together. To reap the benefits of these opportunities, it is crucial that regional stakeholders, public and private parties, and donors, are mobilised to undertake collective and collaborative action. However, before these local and international decision makers can decide about the future of Lake Tanganyika, they are demanding information and data about exact numbers and figures related to markets, trade, transport, and efficiency. The structural registration and analysis of such data at the level of the Lake Tanganyika corridor would be of high importance and value. Creating an integral picture of the Lake Tanganyika (maritime) transport system is what will be developed in this study.

## 1.2 Aims of the study

The Netherlands is actively involved in infrastructure investments to develop African transport corridors to boost regional markets and trade. To facilitate strategic decision making and a coordinated donor approach, as well as to avoid investments in potentially competing projects, more information is needed about the supra-regional transport systems. This study is meant to contribute to the sustainable development of the Lake Tanganyika Transport Corridor (LTTC) in the following ways:

1) A structural collection of data on trade, trade costs, transit times, modalities, barriers, and trade benefits.

2) A systematic corridor assessment as well as a competitive comparison to other Southern African corridors.

3) Support to formulate a blueprint vision of government authorities in the riparian countries, based on the foundations of collaboration and a joint approach to corridor development.

## 1.3 Data collection methods

The research method is centred around a model that the research team has developed in a European Project called PLANET and is derived from the Port Liner Shipping Connectivity Index (PLSCI). This instrument shows a transport node's level of integration in the inland network, as manifested by its relative position in port capacity, efficiency and ease of processes, service frequency, service quality, digital connectivity and quality of infrastructure. The tool has been designed to help corridor authorities to identify at which transport nodes to make 'hard' and 'soft' interventions and improve their position in the network and thereby improve the entire network. It will be instrumental in measuring the effectiveness of the corridor partnership over time as well. Data was collected by means of mixed methods. Three local, on-the-ground, fact finding missions took place that provided input to the corridor assessment and the state of play in lakeside ports. Data was collected first-hand from local stakeholders

in the ports of Bujumbura, Mpulungu, Kigoma and Uvira. Due to travel restrictions it was impossible to reach Kalemie in DRC in November and December of 2020.

*Table 1: Overview of research methods*

| Research section | Data collection | Source |
|---|---|---|
| **Trade and transport profiles** | Desk research | Report library from RVO and expansion by the research team |
| **Cost and transit time analysis** | Survey | Local stakeholders with relations to the LT ports |
| **Connectivity assessment framework** | Survey | Local stakeholders with relations to the LT ports |
| **Governance structures** | Interviews<br>Desk research | Donors, governmental, corridor authorities, LT-authority, private sector (transport & logistics suppliers) |
| **Vision on corridor organization** | Interviews<br>Workshop | Donors, governmental, corridor authorities, LT-authority, private sector (transport & logistics suppliers) |

## 1.4 Rationale for corridor development

### 1.4.1 Corridor development

A trade- and transport corridor is a coordinated set of transport infrastructure, governance and associated (economic) activities and processes, which aim to facilitate trade and transport flows between major economic centres. History shows that corridor governance forms the basis for long term prosperity and peace through partnerships. One of the clearest examples is the Act of Mannheim of 1868, a convention by river states along the river Rhine, which secured free trade, free river navigation and free access to the North Sea[4]. Over the years, there have been amendments to adjust to the changing needs of the trade and transport system, but the principles still hold to this very day. The joint approach to the Rhine Alpine corridor is now embedded in Europe's TEN-T network, which is the backbone of the single market of the European Union. The TEN-T policy supports and symbolizes the importance of connectivity and accessibility for all regions of the European Union[5]. On a global scale, the World Bank has developed a toolkit to stimulate the adoption of the corridor approach in all regions of the world, particularly those where economies of landlocked countries are concerned[6].

The corridor agenda is widely adopted by governments, which seek to involve the private sector, development agencies and Corridor Development Bodies (CDB). Because of the need for collaborative action, more attention is raised towards a more effective management of cross-sectoral partnerships. On the African continent, there are several trade corridors, which are in different stages of development[7]. In Eastern Africa, the transport network consists of three main arteries: the Northern Corridor connects the port of Mombasa in Kenya with Uganda along Lake Victoria to Burundi and Rwanda and finally reaches Bujumbura at Lake Tanganyika. The Central corridor connects the port of Dar- es-s Salaam to Burundi, Rwanda, Uganda and the Eastern part of DRC and the central and northern regions of Tanzania itself. The Southern Corridor connects the port of Dar-es-Salaam towards the south to reach Lake Malawi. The North-South corridor has a dual purpose. It connects DRC, Zambia with Botswana, Zimbabwe and South Africa, and is a link for overseas imports and exports via Durban. Further to these major arteries, there are secondary corridors to Beira and Nacala (Mozambique) as well as the Walvis Bay Corridor.

The legal framework is currently limited to the Convention on the Sustainable Management of Lake Tanganyika, and the mandate that LTA is currently developing, remains restricted to the part on sustainable development in relation to fisheries and biodiversity.

### 1.4.2 Corridor performance

In practice, the characteristics of the corridor determine its performance. These do not only relate to the narrow definition of corridors in the sense of the flow of goods and passengers over a transport route, but also relate to economic, spatial and institutional characteristics[8]. Corridor performance is positively influenced by the alignment of policies and instruments on local, regional, national and transnational levels. The positive impact of a transnational corridor will not be fully realized when adjacent towns and communities are not actively engaged. Parallel investments in agriculture, energy provision and water accessibility are prerequisites for corridor effectiveness in terms of unlocking prosperity to landlocked communities. Poor infrastructure and trade facilitation costs, high transport costs, long lead times and unpredictability of supplies all place a burden on traders and manufacturers. Consequentially, their safety stocks need to be higher, and the quality of agricultural products deteriorates, which all add up to higher prices, both on local markets as well as on the global marketplace. For every day saved on inland travel time, export performance goes up with seven percent on average, based on global data[9].

# 2 Perspectives on corridor development in riparian countries

## 2.1 Macro perspective on regional economic integration

To assess the potential for international trade, the economic complexity of a country is a good measure. The economic complexity of a country is calculated based on the diversity of exports a country produces and the ubiquity, i.e. the number of countries able to produce them[10]. The more sophisticated the know-how of a country, the better the industrial capabilities and the wider the range of products, including complex products that few other countries can make. This diversification of the economy then allows for more opportunities for export. On the contrary, a low level of complexity often leads to a higher dependency on imports. The outlook of economic complexity is a good index to assess the connectedness of an economy's existing capabilities to diversify into complex production locations. The values for Riparian countries can be found in Table 2, the higher the value, the higher the economic complexity. In the process of moving towards a more complex economy, activities move out of agriculture into textiles, then into simple electronics appliances and gradually into manufacturing of machinery and computers. The Atlas of Economic Complexity (2021) created by Harvard University is a visualization tool that allows for breakdowns of imports and exports, trade commodities, GDP growth prospects and projections of industry growth. From the four countries, Tanzania ranks 64, followed by Zambia, ranked 94 out of 133 countries measured. The Economic complexity index is a good predictor of future growth of a countries' export basket both in terms of a country's sophistication and diversification of export products. To further explain the low rankings of the riparian countries, we need to look closer to the African context, specifically to the regional integration of countries with its neighbours. Geographical proximity is a good indicator for the exchange of goods and services with each other, as long as transaction costs are low. Historical links, language, comparative advantages, regional policies, and topography also play a role[11]. The African Regional Integration Index assesses a country's regional integration on 6 dimensions: trade integration looking at intra-regional trade (import-export), intra-regional trade tariffs, free trade agreements), productive integration which is the share of intra-regional trade in intermediate goods, macro-economic integration (bilateral investment treaties, currency convertibility, inflation), infrastructure integration (intra-regional connections and infrastructure development), and lastly free movement of people (such as visa requirement).

*Table 2: Economic complexity and regional Source: Africa Regional Integration Index, 2019*

| Type of integration | Zambia | DRC | Tanzania | Burundi | Average (n=54) | Best |
|---|---|---|---|---|---|---|
| **Economic Complexity index** | -0.82 (94) | -1.80 (132) | -0.09 (68) | Not included | | 0.33 (Tunisia) |
| **Regional integration** | 0.282 (42) | 0.241 (48) | 0.312 (28) | 0.203 (52) | 0.327 | 0.625 (S-Africa) |
| **Trade integration** | 0.431 (16) | 0.299 (42) | 0.323 (35) | 0.301 (41) | 0.383 | 0.730 (Eswatini) |
| **Productive integration** | 0.324 (5) | 0.121 (45) | 0.205 (20) | 0.123 (44) | 0.201 | 1.00 (S-Africa) |
| **Macro-economic** | 0.185 (52) | 0.292 (46) | 0.422 (27) | 0.379 (31) | 0.399 | 0.809 (Morocco) |
| **Infrastructure** | 0.258 (14) | 0.112 (43) | 0.197 (22) | 0.091 (44) | 0.220 | 1.00 (S-Africa) |
| **Free movement of people** | 0.229 (38) | 0.407 (32) | 0.420 (30) | 0.037 (50) | 0.441 | 1.00 (Djibouti) |
| **Overall performance** | low | Low | average | low | | |
| **COMESA** | Yes | Yes | | yes | | |
| **ECCAS** | | Yes | | yes | | |
| **EAC** | | | Yes | yes | | |
| **SADC** | Yes | Yes | Yes | | | |

The macro perspective on trade and development provides an indication for transport volumes between riparian countries. The most serious concern is the low level of (specialized) manufacturing activities, which is holding back further integration. Especially DRC and Burundi need to position themselves in intra-regional manufacturing value chains, while Zambia and Tanzania will have to firmly root their emerging positions. Value chain frameworks in different sectors depend on better technology, higher-quality inputs, skills workforce and updated marketing techniques. Another impediment for further regional implementation relates to the infrastructure gap. For production to take place across borders, an efficient transport system is needed. Value added activities will be located where cost advantages can be realized, due to the presence of specialized resources and capabilities. Poor infrastructure has a negative effect on cost of goods produced as well as on the product quality itself. Regional integration also comes from the ease of people movement, cross border investments and macro-economic stability (currency fluctuations, inflation differences). The index values for the four riparian countries show that on a policy level, many progress is yet to be made.

# 3 Democratic Republic of the Congo

### 3.1.1 Macro indicators

The Democratic Republic of the Congo is by size the largest country in sub-Saharan Africa and the second largest in all of Africa, after Algeria. By comparison it is four times the size of France. With approximately 85 million people the country is the 4th most populous country in Africa.

The country's inhabitants have an annual income of US$ 580 on average According to World Bank[12]. GDP per capital has grown over the last 5 years. Countries with competitive markets often are well equipped to produce and sell goods which satisfy the needs of the people both domestically and internationally. Those countries, which have the ability to leverage their know-how, can more easily diversify their production. Compared to the previous decade, the DRCs economy has become relatively less complex, going down 9 places. Consequentially the economy is expected to grow relatively slow with 1,9% annually over the forthcoming 10 years.

### 3.1.2 Trade relationships

DRC is a member of the Economic Community of Central African States (ECCAS), Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA), the African Union and the Economic Community of the Great Lakes Countries (ECGLC). The export out of DRC has a value of US$ 9.38 bn. Export have grown by an average of 6.6% over the past five years. This is faster than world economic growth. Top trading countries for export products are China (51%), Zambia (12.5%) and United Arab Emirates (7.6%). Within the region, Zambia is the only country of significance. There are hardly any exports to Tanzania or Burundi.

In terms of import, DRC imports most from China, followed by South Africa with Zambia coming third. In terms of export, China, Zambia and United Arab Emirates (UAE) are its most important trading destinations. DRC exports cobalt and cobalt ore, and copper(ore) to China. 90% of DRC reported export value to Zambia is copper ore (77%) and cobalt ore (14%). UAE imports refined copper and copper alloys (71%) and diamonds (28%) from DRC. The few export trading partners makes DRC vulnerable for volatility in demand from these countries.

*Table 3: Main trade relations DRC*

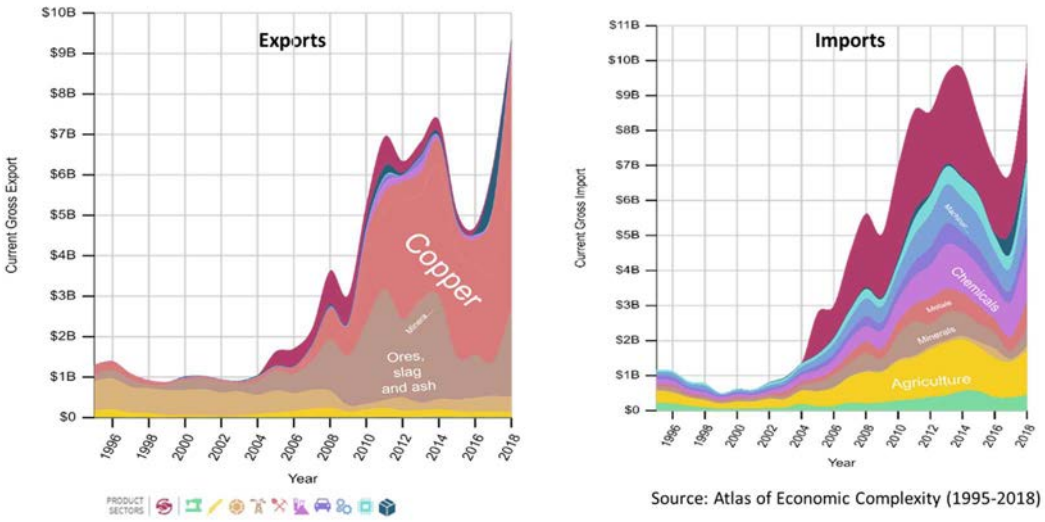
| | 1st trading country | 2nd trading country | 3rd trading country | Zambia | Tanzania | Burundi | Value 2018 (US$) |
|---|---|---|---|---|---|---|---|
| Export | China 51.01% | Zambia 12.51% | UAE 7.63% | 1.16 bn | 467 k | 3.26 mn | 9.38 bn |
| Import | China 24.59% | S-Africa 17.71% | Zambia 11.98% | 864 mn | 311 mn | 18.9 mn | 10.0 bn |

### 3.1.3 Traded goods

Agriculture contributed 44% to the national GDP of DRC. Cassava is the most grown crop with smaller crops including tobacco, coffee, sugar cane, cocoa, rubber and palm oil. Challenges remain as there are barriers to diversify the economy and move towards higher value food processing. Nonetheless the potential of the country's agriculture business is enormous given the vast areas of available arable land[13].

Industry accounts for 22% of DRC's national GDP. Largest commodities exported from DRC are copper ore, cobalt ore, carbonates and cobalt to Zambia. Production volumes totalled 1,225,227 Metric Tons (MT) of copper and 109,402 MT of cobalt. There are investment opportunities in the construction sector, the mining sector, power generation, real estate, commercial agriculture, processing industry for the food value chain and in cross-border logistics services[13]. The services sector accounts for 33% of national GDP and includes retail (mainly small kiosks and container stores), transport and telecommunication. DRC imports chemicals (oleum, explosives), raw materials (sulphur, cement, quicklime) as well as agricultural goods (sugarcane and flavoured waters).

*Figure 1: Gross export and imports of DRC 1995-2018*




### 3.1.4 Transport sector

Years of conflict have had a devastating effect on transport infrastructure in the country. The country's geography with extensive rain forests, river systems, and dispersed economic and population centres already make it difficult to efficiently organize transport. Major rehabilitation of all transport infrastructure components: rail, road, waterways are necessary. The extensive river system provides relatively modest investments to make river navigation possible again. This includes an intervention to rehabilitate the scales and depth gauging section, which is supported by the European Union and Belgian Technical Cooperation[13].

Road transport is very difficult in DRC with only 2% of a total of 152,400 km paved. Of priority roads (30,786 km), 59% are in pore condition. Of local roads only 11% are in a good state. Security on the roads is another issue, which is the reason for many checkpoints by DRC security forces. Because of the many rivers in the country, bridges can be an obstacle as well as they are either semi-permanent, temporary bridges or in a poor or average condition.

In DRC the main ports on the lake are Kalemie and Kalundu (Uvira). Kalemie is situated on the western shore of the lake. Artificial breakwaters have been constructed to protect the harbour basin from the open waters. Overall, the port equipment and infrastructure are in a poor condition. There is a dry dock, which provides repair and maintenance services, and recently also newbuilding. Kalundu port is located 4.5 km south of Uvira, which is 25 km by water transport and 35 km by road to Bujumbura. The road from

Kalundu to Bakuvu (94 km) links Lake Tanganyika with Lake Kivu and is currently being upgraded with support from Trade Mark East Africa (TMEA).

## 3.2 Burundi

### 3.2.1 Macro indicators

Burundi is a country in East Africa, locked in by Rwanda in the north, Tanzania to the east, DRC to the west and bordered by Lake Tanganyika to the southwest. The country with a comparable size as Belgium has 11.6 million inhabitants, and is one of the most densely populated societies in the world. GDP per capita is estimated at about US$ 260 in 2019. Economic growth is relatively low from 1.6% in 2018 to 1.8% in 2019. The country suffers from price fluctuations with deflation in 2018 (-2.8%) and 2019 (-0.8%) and inflation (16%) in 2017. Volatility of food prices plays a significant role in price fluctuations.

### 3.2.2 Trade relationships

The country is rich in natural resources: gold, nickel, columbite and tantalite. Apart from the mining industry, the agricultural sector's value added as percentage of GDP is 40%, with almost 90% of the total labour force working in agriculture. Burundi has the potential to be self-sufficient in food production, given the fertile soil, abundant rainfall, a large farming population. An extensive network of lakes and rivers provides fresh water supply. Nevertheless, food security is a major threat and especially malnutrition of children is alarming. The main crops are banana, cassava, sweet potatoes and bean. Coffee is a main agricultural export product.

Burundi is a member of the Economic Community of Central African States (ECCAS), East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA). Despite the membership of Burundi in these economic integration frameworks, much progress is yet to be made as Burundi ranks among the lowest (52 out of 54 countries). Several non-tariff barriers are still in place, especially customs clearance and inefficient administrative procedures at the port of Bujumbura[14].

Export value has shrunk from US$ 500 mln in 2012 to US$ 214 mln in 2018. The spike in 2012 can be explained by the exported value of gold. Top trading countries for export products are UAE (44.4%), DRC (8.9%) and Pakistan (6.2%). The trading relationship with UAE consists for 95% of gold export, which makes the country highly dependent, both on the gold price as well as on one trading partner.

*Table 4: Main trade relations Burundi*

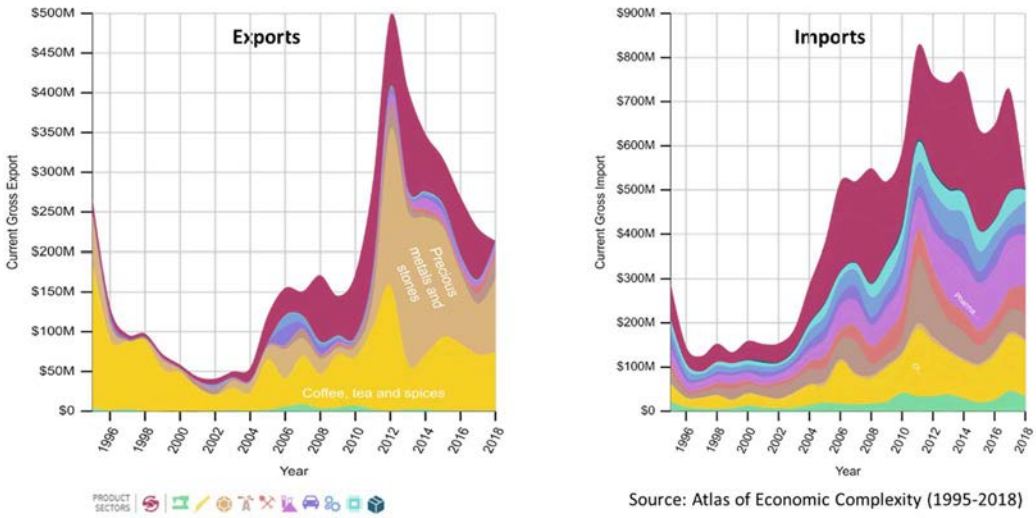
| Top 3 | 1st trading country | 2nd trading country | 3rd trading country | DRC | Tanzania | Zambia | Value 2018 (US$) |
|---|---|---|---|---|---|---|---|
| Export | UAE 44.36% | DRC 8.84% | Pakistan 6.22% | 18.9 mn | 1.21 mn | 409 k | 214 mn |
| Import | Kenya 12.47% | S-Arabia 9.25% | Tanzania 8.33% | 3.26 mn | 41.9 mn | 22.6 mn | 503 mn |

### 3.2.3 Traded goods

Within the region DRC is the largest trading partner, although transit of goods at the borders is cumbersome. Burundi exports most agricultural products (beer, wheat, cigars, cigarettes) to DRC, but also petroleum oils. On the import side, Kenya is the largest trading partner, mainly for imports of agricultural products (beer, malt, sugar, palm oil), chemicals (fertilizers, paints, medicaments, cleaning products), metals (iron and iron products). From Tanzania, Burundi imports agricultural goods (rice, wheat, corn,

sugar), hygiene products, and minerals (cements, gypsum, salt). Saudi Arabia is important for refined petroleum products.

*Figure 2: Gross export and imports of Burundi 1995-2018*




Road transport is the most common mode of transport in Burundi with a share of 90% in the country's modal split. Even though waterborne transport over Lake Tanganyika would be cheaper, the lack of vessel capacity results in highly unreliable services. The long distance by road to seaports as well as the cumbersome border crossings, non-tariff barriers, administrative procedures (weight bridges, checkpoints), poor quality of road and logistics infrastructure raises the share of transport costs as part of the total costs of goods. Heavy rainfall in combination with the poor condition of the road network makes it even more difficult for traders to transport goods to regional and international markets. This is aggravated by the emerging effects of climate change. The poor condition of the road makes it vulnerable for degradation. Frequent floods reduce the reliability of the road transport mode. Consequentially, basic supplies of food and water cannot be delivered to remote communities[15].

African Development Bank (AfDB) estimates that 80% of Burundi's international trade is transported via the Central Corridor via Dar-es-Salaam. The main ports in Burundi are Bujumbura in the Northwestern tip of the lake and Rumunge halfway between Bujumbura and Kigoma. The latter port caters mainly for the informal trade on the lake. It is foreseen that an upgrade of Bujumbura port in parallel with the rehabilitation project of the Tanzanian railway between Dar-es-Salaam and Kigoma will boost waterborne transport and revive containerized transport over the lake. The rehabilitation project for which project financing was approved by AfDB in December 2019 is part of a multinational development project for the Lake Tanganyika Transport Corridor, which consists of two phases. The first phase comprises the rehabilitation of Bujumbura port, while the second phase is the modernization of the Mpulungu Port[16]. Japan International Cooperation Agency (JICA) has also committed financing for the development of a new passenger terminal, cargo hangar and access roads to Kigoma port.

## 3.3 Tanzania

### 3.3.1 Macro indicators

Tanzania counts 56.3 million inhabitants, who have an annual income (GDP per capita) of US$ 1,060. GDP growth in the period 2013-2018 was above regional averages with 3.3%, which allowed Tanzania to move from a lower to middle income category. The economy of Tanzania is projected to grow 7.2% annually in the period 2018-2028, which places Tanzania's growth projection in the top percentile in the world[17]. The country has a high population growth rate, which offsets the relatively high economic growth in recent years.

Tanzania's economy is more complex than what is expected from a lower to middle income country, which is an important reason why export projection is estimated higher than the other countries around the lake. Tanzania's largest goods exports are in low and moderate complexity products, such as in Agriculture and raw materials (stone). The largest contribution to export growth has come from low complexity products such as fruits and nuts, as well as from high complex products such as electrical machinery and equipment products.

The Covid-19 pandemic jeopardizes the tourism sector, a major contributor to GDP growth of the country. Travel and tourism have declined sharply in 2019. Business expectations for sales and employment are pessimistic. The current economic outlook is highly uncertain as trade and logistics restrictions may remain in force for a considerable time into the future.

### 3.3.2 Trade relationships

The export out of Tanzania has a value of US$ 4.43 bn (2018). Export have declined by an annual average of 11.2% over the past five years. Tanzania is a member of the East African Community (EAC) as well as the Southern African Development Community (SADC).

Top export destinations for goods produced in Tanzania are India (18%), UAE (8%) and China (7%). On the import side, Tanzania imports most from China (31%), India (16.6%) and UAE (8.5%). Intra-regionally, DRC is the most important trading partner (7%), followed by Zambia (5%) and Kenya (4%).

*Table 5: Main trade relations Tanzania*

| Top 3 | 1st trading country | 2nd trading country | 3rd trading country | DRC | Zambia | Burundi | Value 2018 |
|---|---|---|---|---|---|---|---|
| Export | India<br>18.3% | UAE<br>7.76% | China<br>7.04% | 311 k | 216 mn | 41.9 mn | 4.43 bn |
| Import | China<br>31.26% | India<br>16.6% | UAE<br>8.56% | 467 k | 55.7 mn | 1.22 mn | 11.3 bn |

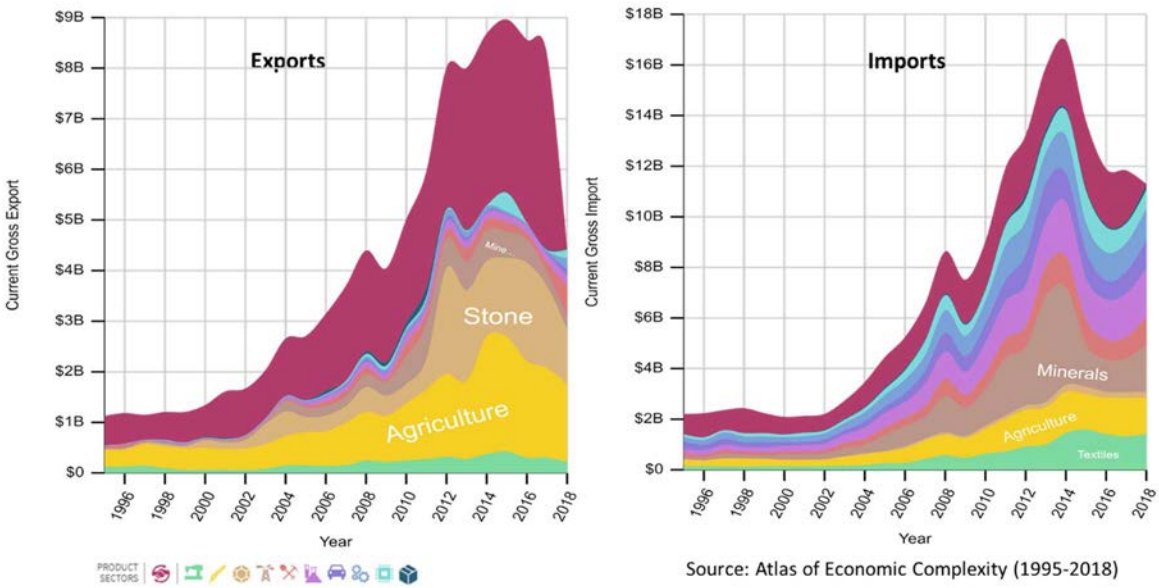
### 3.3.3 Traded goods

Tanzania's main export products are agricultural products (cashew nuts, coffee, tobacco, wheat/flour), gold, and copper and copper alloys. With the riparian countries, Tanzania trades agricultural products (wheat/flour, rice, corn), quicklime, iron and iron/steel wires, and dental hygiene products. Main imports are fuels and oil products, chemicals (plastics, pharma, rubber, fertilizers).

Tanzania's export has been driven by precious metals (gold). Economic growth depends on a declining sector of global exports. Tourism and Transport make up a large share of the services sector, but these

industries have fallen in 2018. Intra-regionally, Tanzania most important export product is quicklime and wheat/meslin flour to DRC. It imports corn, copper wire, soybean residues and iron bars from the neighbouring countries.

*Figure 3: Gross export and imports of Tanzania 1995-2018*




### 3.3.4 Transport sector

Tanzania is the most favourably positioned country from the four riparian countries with a coastline of 1,400 km, providing access to six landlocked countries (Burundi, Rwanda, Uganda, Zambia and Malawi), which places the transport sector in a pivotal position to elevate East African economies. However, international shipping executives have reported that "Tanzania is losing its position as a regional hub". Over recent years development of the transport sector has been guided by medium- and long-term strategies such as the Tanzania Development Vision 2015 and initiatives such as the Implementation Strategy of the Transport Policy 2010/11 – 2024/25, the Five Year Development Plan II 2016/17 – 2020/21 and the second phase of the Transport Sector Investment Programme 2012/13 – 2016/17. In 2017, the government announced increase in spending by 7.3% (FY2017/18 budget) with transport infrastructure and industrialization being the focus areas[18]. The Ministry of Works, Transport and Communications (MWTC) is responsible for executing the strategy and has the mandate to provide affordable, safe, and reliable transport systems for the greater public good. Rail corridors are undergoing a major overhaul as most railways have suffered from decades of underinvestment, poor maintenance, and debts of the railway companies. In 2017 the SGR project was officially announced, which consists of a standard gauge track that will connect the port of Dar-es-Salaam with Mwanza on Lake Victoria and Kigoma on Lake Tanganyika, a stretch of more than 2,561 km in total. Development will be done in phases, which are to be tendered to attract foreign investments.

The World Bank provides support through a facility to maintain the existing TRL rail network. Meanwhile, road transport handles most of the country's internal trade, however the road network is under pressure because of the rapidly rising vehicle use. TANROADS a division of MWTC has been constructing new roads and rehabilitating existing roads. Financing these projects remains a challenge for further enhancing the

capacity of the country's transport system. Although the government made progress with the implementation of its transport strategy, the covid-19 pandemic faces new challenges, which draws financial resources away from the much-needed upgrading of the national transport network.

The main Tanzanian Riparian port is the Port of Kigoma, which is relatively sheltered by a range of hills. Several institutions have expressed their interest to support the development of Kigoma: a passenger terminal (JICA), a container terminal (TMEA), construction of a new jetty for fishing boats (World Bank). Further south of Kigoma lies Karema, which has the interest of Tanzanian Ports Authority (TPA).

## 3.4 Zambia

### 3.4.1 Macro indicators

Zambia has 17.4 million inhabitants, who have an average annual income (GDP per capita) of US$ 1,539, which places Zambia in the lower-middle-income category. The GDP growth in the period 2013-2018 was fairly modest with 0.6%. The economy of Zambia is projected to growth 4.1% annually in the period 2018-2028[19].

### 3.4.2 Trading relationships

Top export destinations for goods produced in Zambia are China (39.25%), DRC (10.35%) and Namibia (8.82%). On the import side, Zambia import most from South Africa (33.49%), DRC (15.97%) and China (13.37%). Intra-regionally, DRC is by far the most important trading partner, both for import as well as for export.

*Table 6: Main trade relations Zambia*

| Top 3 | 1 | 2 | 3 | DRC | Tanzania | Burundi | Value 2018 |
|---|---|---|---|---|---|---|---|
| Export | China 39.25% | DRC 10.35% | Namibia 8.82% | 864 mn | 55.7 mn | 22.6 mn | 9.3 bn |
| Import | South Africa 33.49% | DRC 15.97% | China 13.37% | 1.16 bn | 216 mn | 409K | 8.93 bn |

Between 2000 and 2014, Zambia witnessed an average annual GDP growth rate of 6.8%, but the pace of growth has slowed to 3.1% in the period 2015-2019. The small basis of economic output makes Zambia vulnerable for price fluctuations on the commodity market. The slowdown can be attributed to the falling copper prices. Furthermore, Zambia is also vulnerable for periods of drought, which results in declines in agricultural output and energy production from hydro-electric power generation. The covid-19 pandemic has had a worsening effect. The lockdown of factories in China has negatively influenced export in 2020 and also has an effect on domestic consumption.

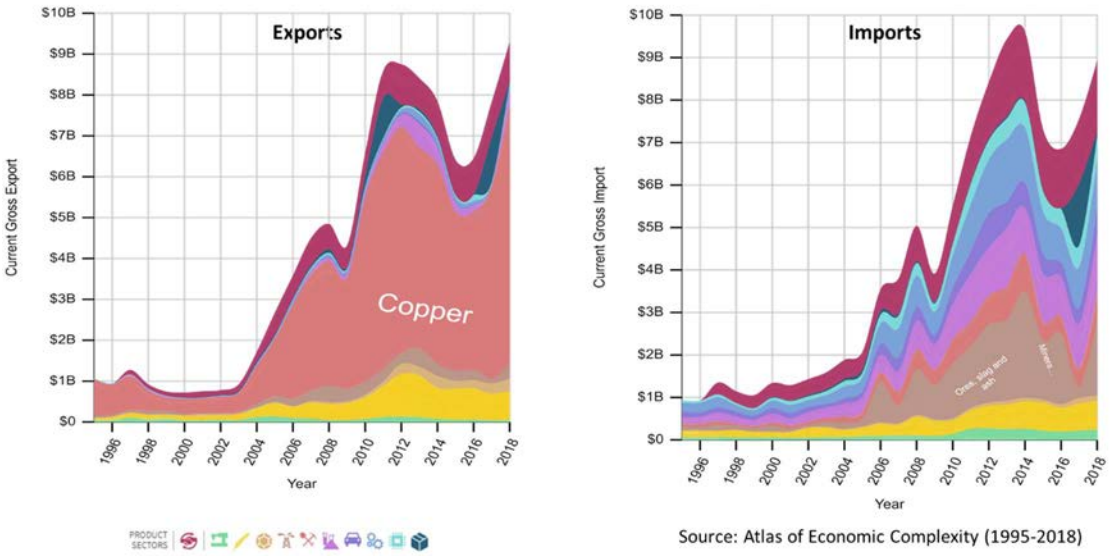
### 3.4.3 Traded goods

Zambia's main export products are unrefined and refined copper, agricultural products and travel/tourism services. With the riparian countries, Zambia trades mainly chemicals, minerals, water, limestone (quicklime) and cement. Main import commodities are copper ore, petroleum oils and ICT services. Regionally Zambia imports minerals (copper ore, cobalt ore), carbonates and corn.

Zambia has a static pattern of export growth, which means the economy is not diversifying a lot and export remains dependent on similar industry sectors and products. There is a slight export growth in the

segment of copper and travel and tourism products. The Northern Province of Zambia is predominantly an agricultural area with 75 – 80% of the population being active in farming. This is also an area of rich biodiversity, but as population grows, the area has been under pressure, which has led to significant deforestation and environmental degradation. The main grown crops are cassava, mixed beans, corn and groundnuts. The area also provides fertile soil for coffee, avocados, potatoes, soybeans, rise and other vegetables. Export markets are available in the Great Lakes Region which has good potential for economic growth after the end of conflicts. The market conditions however remain volatile because of trade barriers and food security. Mpulungu is well positioned to export agricultural products to the Great Lakes Region, however port infrastructure and (temperature controlled) storage facilities will have to be upgraded[20].

*Figure 4: Gross export and imports of Zambia 1995-2018*




### 3.4.4 Transport Sector

Zambia's transport system is dominated by road transport, which is in relatively good condition as 75% of primary and secondary roads is being paved. Rail infrastructure has been constructed to provide access to the copper belts in the DRC and the Copperbelt Province in Northern Zambia. Rail transport is fit for shipping out large bulky volumes and is therefore a crucial component of Zambia's transport system. There are two main lines: the RSZ and the TAZARA line.

*Table 7: Zambia railway sector, source: Kasoma, A.C. (University of Zambia, 2019)*

| Line | Ownership | Corridor | Dimension | Volume 2004 | Volume 2017 |
|---|---|---|---|---|---|
| **Zambia Railways Limited** | Concession | North-South (Livingstone, Zimbabwe – border DRC | 1,266 kms | 1,323,191 | 961,883 * |
| **Tazara** | Government Zambia and Government Tanzania | East-West (Kapiri-Mposhi – Dar-es-Salaam) | 1,900 kms | 459,009 | 166,144 * |

Over time, the volume transported by rail has declined considerably due to inefficiencies, low productivity and low service levels. In 2012, the Zambian Government withdrew the concession agreement signed with RSZ, a private company which was established under the Railways act in 2003. RSZ was accused of failing to invest in maintenance and renewal of both railway infrastructure and rolling stock (locomotives, wagons) which resulted in deterioration of the rail track, derailments, poor safety and even loss of lives. The TAZARA is co-owned by the governments of Zambia and Tanzania and was constructed in the late 1960s. The railway is a vital link for Zambia but is outcompeted by road transport. The Zambian government has emphasized the need for transport infrastructure development, which would provide export opportunities with Angola and DRC as well as creating stronger links to Atlantic Ocean and Indian Ocean. The Chipata-Patauke-Serenje Railway line was recently established to link Zambia railway system with port of Nacala in Mozambique. Chipata is designated as new dry port on the eastern border, 150 road kilometers from Lilongwe in Malawi. Seven extensions of the Zambian railway network are planned for[21]. The Nseluka-Mpulungu railway line of 175 km is to be constructed to create a link between TAZARA and Mpulungu Port in order to provide cheaper and efficient access to the Great Lakes region of East Africa via Lake Tanganyika. It is envisaged to transport bulk commodities such as sugar, cement, coffee and minerals which are currently being transported by road. After a feasibility study and detailed design which was financed by AfDB. In 2018 the Zambian government implemented a ruling (Statutory Instrument No.7) which provides for mandatory movement of 30% designated bulk cargo by rail for mining, cement and sugar companies. These measures resulted in an increase of volume by rail of 5.2% in 2019 on a national basis, but TAZARA saw a decline of 18.7% compared to the previous year. Performance is to be improved by having availability of more locomotives, wagons and rehabilitation of the rail track which would improve the speed and would reduce accidents.

There is increasing competition between land corridors that connect Zambia with the Atlantic and Indian Oceans. Although distance plays a role, this cannot explain the increase and decrease in cargo volumes over the corridors. Overall, there is a reverse modal shift taking place from rail to road. New intermodal links are dependent on the various initiatives to rehabilitate rail tracks. The Walvis Bay Corridor Group shows that soft interventions do make a difference as well. With active business development, branch offices and frequent stakeholder meetings with traders and logistics providers, significant cargo volumes are being routed via Walvis Bay.

In 2019 the Ministry of Transport & Communications reported a throughput volume in Mpulungu port of 181,747 tonnes an increase of 8.8%% compared to the previous year. The increase is attributed to two commodities. Clinker exports increased from an average 5,000 MT to 10,000 MT per month which is due to the expansion of the Burundi Cement Plant, demanding more clinker from Lafarge, Clinker, situated in Ndola and Lusaka. Passenger traffic has been significantly lower compared to the time that the MV Liemba was still in service, totalling 1,494 passengers in 2019, which is an increase of 14.5% compared to the previous year.

# 4 Lake Tanganyika Transport Corridor

In this chapter, we will position the Lake Tanganyika Transport Corridor in the context of the transport system in East and Southern Africa: how the lake connects with seaports via rail and road corridors, an inventory of transport services available on the lake and the existing traffic forecasts. In this chapter, we also include the perceptions and insights about these matters from stakeholders whom we have interviewed.

## 4.1 Land corridors to and from Lake Tanganyika Transport Corridor

Five land corridors connect Lake Tanganyika Transport Corridor with seaports. The most important ports on the lake are Bujumbura (Burundi), Kigoma (Tanzania), Kalemie and Kalundu (DRC) and Mpulungu (Zambia).

*Table 8: Cargo volumes per corridor; source: CCTTFA Corridors Report, 2020*

| | Central *) | Northern *) | Southern-SA **) | Southern-MZ **) | Walvis Bay ***) |
|---|---|---|---|---|---|
| **Seaport** | Dar-es Salaam | Mombasa | Durban | Beira (Mozambique) | Walvis Bay |
| **Nearest lake port** | | Kigoma | Bujumbura | Mpulungu | Mpulungu |
| **Shortest distance** | 1,241 km | 1,519 km | 3,340 km | 1,700 km | 2,998 km |
| **Transport modes** | Rail / Road | Road | Road | Road | Road/rail |
| **Corridor organisation** | CCTTFA | NCTTCA | Transnet | NA | Walvis Bay Corridor Group |
| **Total volumes per country** | | | | | |
| • **Tanzania** | 9,452,000 | 255,000 | NA | NA | NA |
| • **DRC** | 1,914,000 | 547,000 | 110,000 | NA | 102,000 |
| • **Burundi** | 453,000 | 2,000 | NA | NA | NA |
| • **Zambia** | 166,000 *) | NA | 301,000 | 28,000 | 450,000 |

*) estimated based on TAZARA volume in 2019.**) World Bank volumes of 2008; ***) Walvis Bay Corridor Group, volume in 2018

The shortest connection to reach a seaport is via the Central Corridor to Port of Dar-es-Salaam. This is also the reason why Dar-es-Salaam has served as the regional gateway for populous countries of Burundi, Rwanda, Uganda and DRC. The poor performance of the railway services between Kigoma and Dar-es-Salaam has resulted in a modal shift from rail to road, with cargo volumes going down from 2.5 million tons in 2003 to 130,000 MT in 2016. In recent years, cargo volumes are increasing again with annual volume at 425,000 MT in 2018-2019[22]. The upgrading of the railway and the development of a new Standard Gauge Railway (SGR) has the potential to realise a reverse modal shift to rail, which would also bring back containerised traffic to the lake and give Kigoma a position as intermodal hub in the region. The Corridor Transit Transport Facilitation Agency (CCTTFA) is the multilateral agency which was formed through an agreement between Burundi, DRC, Rwanda, Tanzania and Uganda and has the mandate to promote the optimal utilization of the Central Corridor. Main tasks are "to encourage maintenance, upgrading and improvement of infrastructure and supporting service facilities at port, rail, lake, road and border posts as a means to meet users' requirements, and enhance open competition with the ultimate

goal to reduce costs of transit transport for landlocked member states". The CCTTFA uses the Central Corridor Transport Observatory (CCTO) Portal to monitor the performance of the corridor. The aim is to engage transport users with the CCTO and develop dashboard in line with stakeholders' requirements. The performance monitor features 34 indicators, divided in economic indicators, volume and capacity indicators, transport rates and costs, productivity and efficiency, transit time and delays, and safety indicators.

The second option is to use the port of Mombasa in Kenya, which connects the lake by road through Tanzania, taking the border passage at Holili or taking the route to Kampala, then into Uganda, Rwanda, Burundi and finally reaches Kisangani in eastern DRC. Because of multiple borders on this route, an alternative connection over Lake Victoria is also considered an option. Kenya Ports Authority (KPA) has constructed inland container depots (ICD) in Nairobi, Kisumu and Eldoret, which are linked by a rail-trainer service. These ICDs serve as extended gates, where imports can be directly delivered from Mombasa on a Through Bill of Lading. Exports can also be consolidated at the ICDs and railed to the port. This integration enhances the transit time and reduces paperwork in the port. To facilitate transit cargo between the port of Mombasa and the hinterland of Burundi, DRC, Rwanda, Uganda and South Sudan, the Northern Corridor Transit Transport Agreement (NCTTA) was established in 1985 and revised in 2007. The advantage of this agreement compared to bilateral agreements is that it provides a coherent framework for standardised services and transit procedures across the member state territories.

The third option is to connect Mpulungu via the Southern Corridor with the port of Beira in Mozambique, which is a distance of 1,700 km direct and 2,140 kms via Lusaka. Then there is also the North-South Corridor which is part of a wider Southern African Development Community (SADC) north-south corridor, connecting the South African port of Durban to Lusaka (Zambia) and Lubumbashi (DRC) through Johannesburg and Gaborone (Botswana). International trade was routed in the past via Durban and taken inland because of its relative maritime connectivity however is in decline resulting from improved performance of other transport corridors[23]. Exact information about transit times and costs per MT for the three corridors can be found under chapter 8.

Walvis Bay Corridor Group is responsible for the strong growth of import and export volumes from Zambia via Walvis Bay in Namibia. This corridor organisation is proactively engaging with trade and transport stakeholders in Zambia and DRC. Cross border cargo volumes via port of Walvis Bay are growing with double digit figures year over year. In 2018, 450,000 MT of transit cargo in Walvis Bay was destined for Zambia in 2018, a 51% increase compared to 2017. The development of Walvis Bay is embedded in the Namibia Logistics Hub Project.

## 4.2 Transport services on Lake Tanganyika

There are a dozen of state-owned and private shipping companies active on Lake Tanganyika. In terms of transport services, shipping operators are bound to specific ports or countries, each operating unscheduled service to the other ports. Because of the age and deprived state of the vessels it is not easy to determine the actual combined vessel capacity. Appendix 1 provides the most comprehensive overview of deployed capacity.

*Table 9: Overview of vessel capacity on Lake Tanganyika per agent and country*

| Agent | Number of ships in ownership | Country |
|---|---|---|
| **ABS Mamry** | 8 | Burundi |
| **AMI LTD** | 2 | Burundi |
| **ARNOLAC** | 15 | Burundi |
| **BATRALAC** | 1 | Burundi |
| **FALCONY** | 12 | DRC |
| **SNCC** | 14 | DRC |
| **MSCL** | 3 | Tanzania |

Various companies operate on the lake. Arnolac and Batraluc operate out of Bujumbura and use a combination of container and general cargo vessels. Arnolac operates a handful barges, tugboats and two oil tankers. Batrolac operates the Rwegura with 500 tons. The Tora with 1,100 tons and the Teza with 1,500 tons seem to have been transferred to AMI Ltd in Burundi.

Marine Services Company Limited (MSCL) is a Tanzanian state-owned company with home base in Kigoma. Besides Lake Tanganyika, MSCL also provides shipping services on Lake Victoria and Lake Nyasa. At present MT Sangara is a tanker ship built in the region in 1981 and is the only ship in operation by MSCL. On Lake Tanganyika MSCL deployed the MV Mwongozo, a cargo ferry built in 1982 has a carrying capacity of 800 passengers and 850 tons of cargo. The ship would normally sail between Kigoma and Bujumbura but is currently grounded in Kigoma[24]. The historical ship MV Liemba, built in Germany in 1913 was taken out of service in 2016, but in December 2020 MSCL announced a call for tender to rehabilitation of the ship and bring it back in service. Despite her age, MSCL believes MV Liemba could still be of value as it used to fill a niche between wooden boats and larger bulk carriers. This niche market is especially important for smallholders trading on informal markets. Furthermore, in December 2020, MSCL sent out an invitation for tender for designing, supplying and commissioning of a multipurpose cargo ship with a payload of 3000 MT on Lake Tanganyika.

The state-owned railway company Société National des Chemins de Fer du Congo (SNCC) has the largest operations. It is reported that only five of their ships are operational, while the others are in deprived state[23]. In DRC, two young engineers took on the venture under the name Carrière du Congo (CDC) to build a brand-new vessel. After three years of construction they delivered the ship to SNCC on 30$^{th}$ of June 2020 in Kalemie. With a length of 90 meters, 3 decks and 60 luxurious rooms, a restaurant and a VIP lounge, the ship can also carry 2,000 MT of goods and 400 passengers. The ownership of the vessel is former DRC president Joseph Kabila. Another DRC shipowner is Falcony who owns 10 ships in the range of 276 and 726 GRT.

From the interviews with stakeholders it comes to front that the existing fleet of vessels is outdated and cannot fulfil the need of reliable and frequent sailing schedules and port calls. Safety of navigation was also frequently mentioned as a serious issue, which consequentially gives a negative reputation for waterborne transport. With reference to the past when MV Liemba operated a milkrun trip around the lake, stakeholders are convinced that the deployment of more modern vessels would attract trade. These trades have now shifted to smaller, unsafe boats and fishing vessels, as the respondents conclude.

## 4.3 Trade forecasts on Lake Tanganyika

Various studies have quantified the trade and traffic forecast of cargo and passengers on Lake Tanganyika. Ecorys created a comprehensive summary of the trade forecasts. These traffic forecasts are often based on extrapolations using GDP and population growth as indicators, however, the instability in the region, caused by political conflicts which also translate in tariff and non-tariff barriers, do not provide a solid basis for such long-term projections. Further to this, the informal economy in lake communities is significant and therefore a factor to consider.

*Table 10: Projected traffic Mpulungu-Bujumbura; Ecorys,2019; 1) 2020 is a forecast, 2), AfDB, 2019*

| Year | Commodities | AfDB 2018 | HPC 2018 | JICA 2012 |
|---|---|---|---|---|
| **2020** | Breakbulk (,000 tons) | 143,000 | 103,700 | 220,800 |
| | Container (TEU) | 0 | 0 | |
| | Passengers (,000) | 0 | 1,200 | Not provided |
| **2025** | Breakbulk (,000 tons) | 235,100 | 131,700 | 220,800 |
| | Container (TEU) | 25,000[2] | 0 | 0 |
| | Passengers (,000) | 15,000 | 5,200 | Not provided |
| **2030** | Breakbulk (,000 tons) | 348,100 | 141,100 | 397,900 |
| | Container (TEU) | Not provided | 0 | 0 |
| | Passengers (,000) | Not provided | 5,900 | Not provided |

On the connection Mpulungu – Bujumbura, JICA (2012) predicted a cargo volume of 220,800 MT in 2020 which would increase to 397,900 in 2030. African Development Bank (2018) is more conservative with projected volumes in 2020 of 143,000 and 348,100 in 2030. Hamburg Port Consultants (2018) is even more conservative with 103,700 in 2020 and 141,100 in 2030. The port expansion project in Bujumbura will put in place container capacity, which is projected to grow volumes to 25,000 TEU in 2023 and 15,000 passengers.

## 4.4 Potential impact of enhancing connectivity to and across the lake

From both scientific research as well as studies by institutions such as the World Bank and African Development Bank, there is consensus on the positive impact of improving connectivity to and across the Lake Tanganyika. Transport connectivity is a precondition but has also been a key binding constraint for economic growth, poverty reduction and shared prosperity[25]. According to World Bank "an integrated approach which involves both investment in primary infrastructure, but also on secondary and tertiary infrastructure along the corridors would realize a wider economic and poverty impact".

Despite the current challenges for transport on the lake, there is considerable potential: a growing population, a string of towns and villages around the lake with little alternatives for transport other than using the waterways. Furthermore, the rehabilitation projects of the railway connections (Mpulungu, Kigoma) offers a new era for intermodal transport. The lake ports of Kigoma, Mpulungu, Bujumbura, Kalemie and Kalundu have the potential to become maritime gateways for intra-regional trade.

In various ports around the lake, investments are being done such as in Bujumbura, Kigoma and Mpulungu. The introduction of intermodal transport facilities has the potential to revitalise container trade across the lake and a modal shift from road to waterborne transport. Intermodal transport would also provide for a more robust, secure transport system, which would allow for regional trades, thereby supporting small traders who are involved in local value chains, such as agri-business.

Various stakeholders have been active over the years and conceptualised on the Lake Tanganyika corridor development. Africa Development Bank has approved multinational project financing with a focus on rehabilitation of Bujumbura and Mpulungu port with the aim to develop the intermodal corridor over the lake. JICA (Japan), Africa Investment Facility of the EU and RVO Drive (Netherlands) are involved in phase II of the multinational project. This project is set up in two phases running from 2019-2024. Phase 1 has a project value of EUR 47 mln, while the upgrading of Mpulungu will require EUR 65 million of financing. The corridor will facilitate connections with adjacent landlocked areas. This programme is not only about upgrading of port infrastructure and facilities, but also about enhancing road accessibility, facilitation of information exchange on vessel traffic, harmonisation of legislation on transport and port operations, as well as the installation of a single customs territory for cargo transiting through Kigoma Port. The project will support in resumption of intermodal transport in conjunction with the rehabilitation of the Tanzanian railway between Dar-es-Salaam and Kigoma. The project is split into two phases as Zambia is facing debt issues which puts the upgrading of port Mpulungu further ahead in time.

The Key Performance Indicators (KPI) which we have identified in project appraisal reports and stakeholders' interviews can be summarized as follows:

*Table 11: KPIs of corridor performance in project appraisal reports and stakeholder interviews,*

| | Output | Outcome | Impact |
|---|---|---|---|
| **Economic** | • Improved road access<br>• Improved berth capacity<br>• Improved vessel capacity<br>• Single window established<br>• Enhanced maritime communication | • GDP growth<br>• Trade facilitation<br>• Intra-regional trade volume increase | • Regional economic integration<br>• Transport contribution to national GDP |
| **Social** | • Staff trained<br>• Jobs created (direct)<br>• Jobs created (indirect) | • Employment<br>• Empowerment of women | • Production integration<br>• Free movement of people |
| **Sustainability** | • Effective environment protection monitoring | • Conservation of fish spawning grounds | • Sustainable development of Lake Tanganyika in terms of biodiversity |

## 4.5 Stakeholders' perspective on unlocking long term benefits of corridor development

The majority of the stakeholders consent with Lake Tanganyika as an underutilised resource for transport which could enable trade. Respondents elaborate on various reasons why people would not see the potential: safety of navigation, insufficient knowledge of traders of the vessel capacity, subpar experience with the reliability of shipping services and misconceptions on cost competitiveness. Furthermore, the stakeholders who we have interviewed witness an unawareness, even a reluctance among traders and port operators to pro-actively develop new business by connecting with market players on the other end of the lake. Trade shows and trade missions could be an easy way to start to build a regional network of relationships. A critical note was also placed by excessive intervention of government in direct business

economic activities, which are allegedly a sign of vested interests of road transport and government-owned companies.

There are many urban areas with fast populations growth, which spurs the demand of goods and services. An effective transport system on Lake Tanganyika could be a viable alternative for traders considering the relatively lower cost per Ton-Kilometer (TKM) as well as the possibility to circumvent cumbersome border procedures, checkpoints, and weight bridges on the road. To unlock the potential, the respondents believe the LTTC could facilitate two distinguished trade flows: foster intra-regional supply chains for localized trade and improve connectivity with international corridors. On the one hand there are intra-regional value chains, which comprised producing, processing, marketing, and trading of agricultural products. Respondents acknowledge that there is a lot of trade which is not captured in formal trade statistics data. It was mentioned that a threshold of US$ 2000 per day per trader applies on the border of DRC and Zambia, which is a considerable trade volume and value. Considering the debate on value chain development, respondents mention that there is quite some emphasis on agricultural production, but not so much on improving the 'finishing line', in the sense of added value by processing crops, but also in the sense of delivery of products in good quality. To set up an attractive agribusiness cluster, 'cold chain' solutions are of utmost importance. Most plans do not cover the need for temperature-controlled transport and warehousing, but this is what needs to be invested in to further support sector development.

Regarding international corridor connectivity, respondents emphasize the potential for intermodal transport per container on the lake. In the past, containerized transport did exist on the lake, but has shifted to road transport due to underperformance of the railways, poor equipment and lack of vessel capacity on the lake. Respondents mention the decoupling point between the international intermodal transport system with Kigoma as the 'final destination': here, containers are stripped, deconsolidated and shipped in smaller quantities for further destinations in DRC. This way of working has a background in the security issues relating to transport in conflict regions. Further, container shipping companies have strict demurrage and detention regimes, which means that shipping lines charge a fee for holding the container longer than the agreed free time, which often is the case when dwell times and variability of transit times are high. These two reasons make Kigoma a logical final-destination for container lines' repositioning strategies. Moreover, Kigoma can serve as a favourable decoupling point of two intermodal transport systems, with the LTTC for lake bound trade and the Central Corridor for international trades.

The rehabilitation plans of the railway line between Dar-es-Salaam and Kigoma as well as in Bujumbura are perceived as critical components, which would mean that Kigoma-Bujumbura and Kigoma-Kalemie could become extensions of the existing Central Corridor. Some respondents referred to Kalemie as the 'big unknown' and as a 'gamechanger' for the region. This is because of an interesting dynamic in DRC: despite being a conflict zone, there are large construction projects ongoing and regional economy in and around Kalemie is said to be flourishing. Kalemie is a multimodal hub – rail, road and water transport – and serves as a gateway between the DRC hinterland and the lake.

# 5 Assessment methodology on the potential of a maritime LT-Corridor

This chapter presents the methods that have been applied to assess the potential of the development of a maritime transport corridor at Lake Tanganyika. First step is to map the current state of the Riparian ports in the Lake Tanganyika port network (5.1). Second step is to use this information to analyse the connectivity and competitiveness of each port within the network, compared to its peers (5.2). Third step is to identify the transit times and costs of transporting goods over the Northern, Central and Southern corridor towards Riparian ports (5.3). The paragraphs below explain the relation between those steps in more detail.

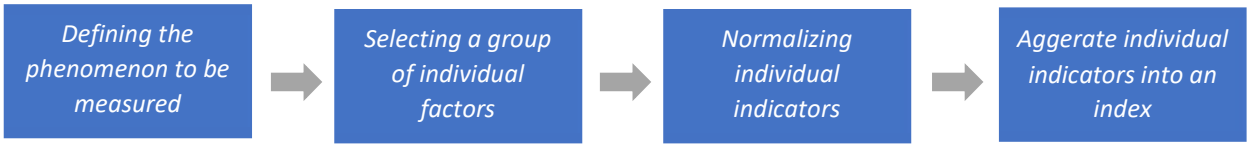
## 5.1 Lake Tanganyika port network

Riparian ports in the network are in different stages of development. A port profile has been developed to indicate this state and to form an understanding of the current capacity of each port. Each port profile consists of the following elements: annual trade volumes, commodity types, infrastructure and equipment, current bottlenecks, a photo repertoire from the field trip, and an overview of investments (foreseen/ scheduled/ planned/approved/ completed, as stated by RVO). Investments will be linked to indicators of the corridor assessment framework (see chapter 5.2). The results of this section will be presented in chapter 6.

## 5.2 Corridor connectivity assessment framework

Connectivity is a key concept in determining the position of an inland port within the network. The aim is to create a Lake Tanganyika Corridor Connectivity Index (LTCCI) that shows the relative connectivity performance of one port relative to the other ports around Lake Tanganyika. This index will be constructed using a methodology like existing indices, such as Port Liner Shipping Connectivity Index (PLSCI) developed by UNCTAD, Logistic Performance Index (LPI) developed by World Bank[26] and the Global Connectedness Index (GCI) developed by DHL[27]. Various elements of these indices and were applied in the set-up of the methodology LTCCI. Next to this we have used the steps for constructing a composite index following Mazziotta and Pareto (2013).

*Figure 5: Constructing an index according to Mazziotta and Pareto (2013)*



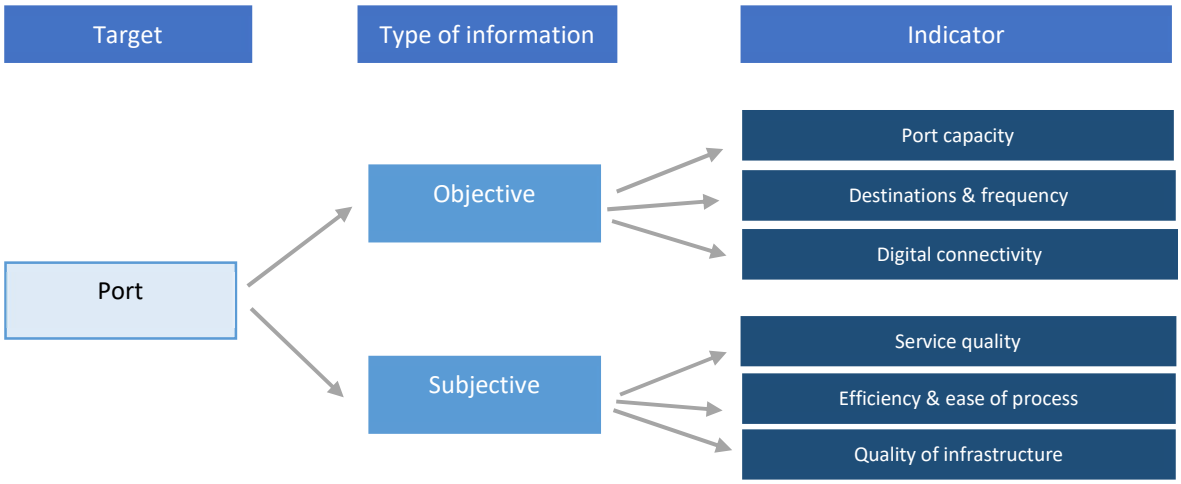

### 5.2.1 Step 1. Defining the phenomenon

The LTCCI has been designed to measure the overall connectivity and performance of a Riparian port. The connectivity and the performance of the port can be indicated by 'objective' indicators, such as transit time toward other ports, number of berths in a port, production locations or stacking area. However, the performance of the port can also be influenced by 'subjective' indicators such as import-export relations, complexity of processes and the perceived quality of infrastructure. Since we want to measure the overall performance as well as their position in the network, a relative method is the most suitable for our approach. In the relative method, we compare the Riparian ports with each other. This method is also used in the PLSCI methodology, which was always relative to Hong Kong values in 2006. Hong Kong performed the best in 2006. Using specific values as baseline, also allows for comparability over years[28].

### 5.2.2 Step 2. Selecting a group of individual indicators

The PLSCI, LPI and GCI have a category where several individual indicators are assigned. Medda and Caschili (2015) also used categories in their port attractiveness index. Based on the existing indices we decided to include the following elements to construct the index.

*Figure 6: Overview of indicators in index*




These indicators are the starting point to develop questions, in a survey format, for interviews, which are executed by three local Transport and Logistics experts. Each interview was targeted on one specific node to keep the information flow for each port clear and to ensure comparability between the ports. The following types of stakeholders have been interviewed: Port authorities, shippers, barge operators, logistics service providers, customs, hinterland transport operators and ambassies. An overview of the interviewed parties can be found in Appendix 4. In case that the information was not available we have used existing sources to obtain information about that specific question. The objective answers could be verified or supplemented in this way.

**Respondents**

Each group of respondents within a port is a balanced group with different parties: shippers, authorities, logistic providers. It might have been the case that respondents, which fall in the same type of "stakeholder", do respond in the same way. If they are a little bit overrepresented, this might influence the results. Therefore, we checked if the stakeholders, which fall in the same groups and are a little bit overrepresented, such as shipping companies in Kigoma and Port Authorities in Kalundu, respond in the same direction. In both instances this was not the case.

**Objective indicators**

For each group of objective indicators an average was taken between the values of given by the respondents. This is done to smooth out the values and an average value will give a more objective indication of day-to-day business. Next to this the average ship waiting time, ship waiting time spread and import dwell time are converted to negative numbers since a low dwell-time is better than a high dwell time.

For the digital connectivity, we initially wanted to use binary numbers to indicate if it was available or not, however none of the ports surrounding Lake Tanganyika had any digital connectivity. Therefore, we have collectively decided to set this value at 0 instead of an index value of 100 everywhere, because it gives a better representation that none of these indicators is in place at one of the ports.

For the yard capacity, Kigoma and Mpulungu reported in MT instead of in $m^2$, thus these values are converted to $m^2$ assuming the stack height is around 3 meters and the volume density ratio is like sugar, fertilizer and cement (849;961;1290 kg/$m^3$). We used an approximate measure of 666 kg/$m^3$ to calculate the storage spaces, since this estimates the storage space slightly larger.

**Subjective indicators**

For subjective answers verification was not possible since we specifically asked for their opinion. which were scaled on a 5-point Likert scale: very poor – excellent. We calculated a grade out of 10 based on these findings.

$$Grade_{subj} = \frac{(N_{very\ poor} * 1 + N_{poor} * 2 + N_{average} * 3 + N_{good} * 4 + N_{excellent} * 5)}{\sum N * 5} * 10$$

This grading system worked very well for most of the ports, however it is highly dependent on the spread of the answers. We noticed that the port of Kigoma only had reported values on poor, average and good. Therefore, this grading system would be constantly around the 6, whilst with the others showed more variation. Therefore, we decided to harmonize this more with the other ports and use the following grading for Kigoma.

$$Kigoma{:}\ Grade_{subj} = \frac{(N_{poor} * 1 + N_{average} * 3 + N_{good} * 5)}{\sum N * 5} * 10$$

### 5.2.3 Step 3. Normalizing the individual indicators

We have taken the highest value of each of the indicator as base. This is the best performing port on this indicator, compared to its Riparian peers. In this way a relative index is constructed, where each port can score in total 100 points if they have the highest score on a specific part. This is a relative index; thus, the ports will be only compared to each other. In this way we normalize the variables of the survey and these can be directly compiled into the index. For the negative values the index calculation is slightly adapted. This also means that over time each port can grow in its performance, but still receive a lower score compare to its peer port.

$$Index = \frac{Value_n}{Value_{base}} * 100$$

$$Index_{neg} = \frac{Value_{base}}{Value_n} * 100$$

| Indicator | Index measurements | Base Value (Max) | Port |
|---|---|---|---|
| Port capacity | Size of ships (tons) | 1850 | Mpulungu |
| | Draught (m) | 6 | Kalemie |
| | Length of berth (m) | 388 | Kalemie |
| | Crane capacity (in tonnage) | 200 | Mpulungu |
| | Yard capacity ($m^2$) | 18,560 | Bujumbura |
| | Service offerings (nr.) | 14 | Kigoma |
| | Type of goods (nr.) | 4 | Kigoma |
| Frequency & destinations | Nr. destinations by barge | 5 | All except Kigoma |
| | Nr. destinations by rail | 1 | Kigoma |
| | Ship waiting times (hours) | 13.00 | Mpulungu |
| | Ship waiting time spread (hours) | 18.33 | Mpulungu |
| | Import dwell time | 10.67 | Mpulungu |

| | | | | |
|---|---|---|---|---|
|  | Digital connectivity | Navigation aid | 0 | None |
| | | Port communication system | 0 | None |
| | | Port performance dashboard | 0 | None |
| | | Track & trace information | 0 | None |
| | | Online booking system | 0 | None |
|  | Service quality | Problem Solving Quality | 8.7 | Mpulungu |
| | | Variety of service offerings | 6.5 | Kigoma |
| | | Quality of service offerings | 8.0 | Mpulungu |
| | | Price-Quality of service offerings | 6.0 | Kigoma |
| | | Flexibility of service providers | 6.7 | Mpulungu |
| | | Quality of trucking services | 6.6 | Kigoma |
| | | Quality of barge services | 8 | Mpulungu |
| | | Quality of train services | 3.7 | Kigoma |
|  | Efficiency & ease of process | Ease and reliability of customs process | 7,6 | Mpulungu |
| | | Ease of documentation process | 9,3 | Mpulungu |
| | | Ease of reaching the node | 7 | Mpulungu |
| | | Timeliness of cargo handling cycle | 3.7 | Mpulungu |
|  | Quality of infrastructure | Maritime infrastructure - Navigability | 7.0 | Kigoma |
| | | Maritime infrastructure – Vessel capacity | 7.0 | Kigoma |
| | | Maritime infrastructure - Shipyards | 5.2 | Kigoma |
| | | Maritime infrastructure - Communication | 4.4 | Kigoma |
| | | Maritime infrastructure - Legislation | 7.2 | Kalundu |
| | | Port infrastructure - Quayside | 4.8 | Bujumbura |
| | | Port infrastructure – Stacking area | 5.3 | Kigoma |
| | | Port infrastructure – Storage area | 6.0 | Mpulungu |
| | | Land infrastructure - Rail | 4.0 | Kigoma |
| | | Land infrastructure - Road | 6.0 | Mpulungu & Kigoma |
| | | Land infrastructure - Pipeline | 6.0 | Kigoma |

### 5.2.4 Step 4. Aggerating the individual indicators into an index

The normalised variables will be grouped into the six different indicators, since not all the indicators are evenly distributed in the survey. This will allow an intermediate assessment and an equal distribution of these components.

The combination of these six indicators will together determine the final “index” number of each port. An average value will be constructed on the base of these values. These numbers should be interpreted as relative values to each other. None of the ports will have the value 100, since they are all based on a maximum value. The results of this connectivity assessment can be found in chapter 7.

## 5.3 Cost base and transit time analysis

Shippers, freight forwarders and importers/exporters operate on the level of supply chains. They are not interested as such in having one efficient port within the network but prefer to have a seamless and cost-efficient supply chain. This is what can give them a competitive advantage over their competitors. The cost base and transit time analysis focuses on this level. It elaborates on the region as a network of ports that are connected with multiple corridors over the continent to distribute freight via multiple modalities.

Aim of this section is to create an overarching insight in transit times (in hours) and costs (in USD/MT) for the multiple corridors. We distinguish again the Northern Corridor, which starts in the seaport of Mombasa, the central corridor, which starts in Dar es Salaam and the Southern corridor, which starts in Durban or Beira. The riparian destinations that we take into account for the analysis are the Port of Bujumbura and Port of Kalemie. Along these routes we automatically map the transit times and costs towards the other Riparian ports like Mpulungu and Kigoma because routes pass these ports along the way. The following elements are within scope of this transit time and costs analysis:

- Transit time in hours: dwell time in seaport, riparian port and at border crossings, handling time in seaport, transportation time by modalities truck/rail/barge. Handling and dwell time in Riparian port of arrival will not be considered.
- Costs in USD/MT: transport costs are within the scope of this analysis. Handling costs at ports are not considered and we assume that the port of choice is fixed. The costs are applicable for bulk transportation over the corridors, as the transportation of containers is still immature.

The result of this transit time and costs analysis can be found in chapter 8.

# 6 Lake Tanganyika port assessment

A port profile has been developed for each Riparian port. This port profile includes information about commodity types, annual trade volumes, infrastructure and equipment, bottlenecks, investments, and a photo repertoire of the fieldtrip towards each of the port regions.

## 6.1 Mpulungu Harbour, Zambia

Mpulungu Harbour is managed by Mpulungu Harbour Corporation Limited (MHCL). On a port level the throughput consists of two main goods types. First, dry bulk in the form of cement, clinker, sugar and corn. Second, breakbulk mainly in the shape of big bags. Container throughput in Mpulungu Harbour is very limited. Cool-storage facilities are available, but in the form of stationary reefer containers continuously operational inside the port area.

*Figure 7: throughput volumes at Riparian ports, Source: Ecorys, 2019*

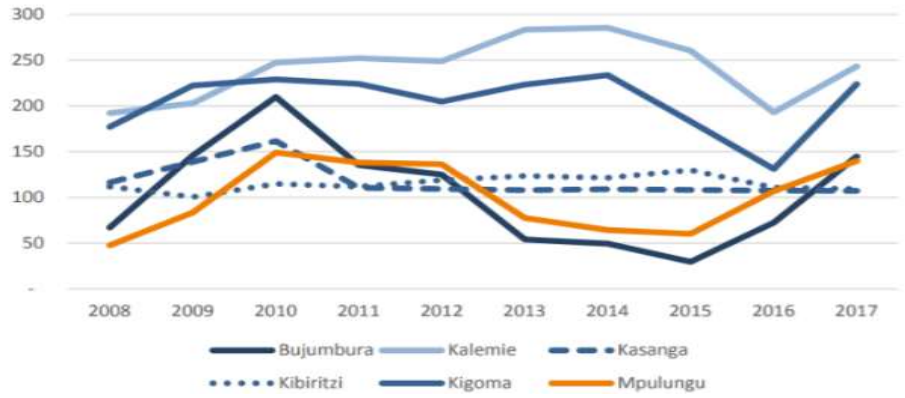



Image 1 shows Mpulungu Harbour from above in satellite view. Most shipping, transport and storage activities take place on the Northern part of the landside, where also the vessels are positioned.

*Image 1: Mpulungu Harbour, Source: Bing, 2021*

In Image 2 you can see an overview of the port operations in Mpulungu harbour. The quay at the right corner of the picture is the only one operational and has a length of only 20 meters. On the lower side of the image you see several trucks with cargo in bags that are ready to be loaded on ships for export.

*Image 2: Mpulungu harbour overview 2020 (source: Industrial Development Corporation)*

Annual trade volumes through Mpulungu Harbour are estimated on 150,000 tons in 2017[29]. During field research the local consultant reported a total throughput volume over 2019 of 132,000 tons. Mpulungu Harbour is export-oriented and 95% of the throughput volume is export. Bujumbura is the biggest export country which accounts for 80% of the throughput volume. From the registered port volumes 70% of the goods are exports originated from Zambia, while 20% are goods in transit from the seaports of Beira, Nacala and Durban, part of the southern corridor. Currently, no traffic relations are present between Mpulungu and Tanzanian lake ports. An overview of the key infrastructure and equipment available in Mpulungu Harbour follows below. Sources are a combination of interviews with local port stakeholders, prior research, and the Logistics Capacity Assessment database from DLCA[30].

*Table 12: Infrastructure and equipment in Mpulungu Harbour, Zambia*

| Element | Explanation |
|---|---|
| **Berths** | 2 berths: one of 20 meters length and two smaller ones of 5 meters length |
| **Maximum ship size in GT** | Ships with a maximum size of 1.850 GT have called at the port |
| **Cranes** | 1 crane with a capacity of 200 MT |
| **Forklifts** | A few forklifts with 5 MT capacity |
| **Reach stackers** | 1 reach stacker with a capacity of 45 MT |
| **Breakbulk storage capacity** | The total storage capacity – both sheltered and unsheltered – is 10.000 MT. |
| **Liquid bulk storage capacity** | Not available |
| **Dry bulk storage capacity** | Not available |
| **Container yard capacity** | Not available |
| **Container freight station** | Available |
| **Cool-storage capacity** | Available in the form of two stationary reefer containers. |
| **Weighbridge** | Available |
| **Shiprepair** | Not available |

*Mpulungu Photo collection 2020: container reach stacker, breakbulk storage in bags, trucks waiting for freight to return back, cool storage in permanent plugged reefer containers in the port area.*




The interviews revealed that there are several bottlenecks that prevent efficient transport and logistics operations, both within and towards the port. This paragraph sets out the biggest bottlenecks that came across, and the solutions that stakeholders proposed, if given at all. The bottlenecks will be linked to the elements of the LT-Connectivity index: 1) port capacity 2) destination and frequency 3) digital connectivity 4) service quality 5) efficiency and ease of processes and 6) quality of infrastructure. An important note is that these bottlenecks and solutions are proposed by the local stakeholders, and do not directly represent the opinion of the research team.

***Bottlenecks***

**Port capacity:** Stakeholders complained about the short berth length in the port of only 20 meters. An expansion in the direction of 200 meters would be appropriate, they mentioned. The berth is big enough for the current volumes but is not capable of accommodating future growth. The same holds for shipping capacity. Warehousing capacity is too limited and most storage is unsheltered. There is no cold storage available, which is a bottleneck in the future attraction of fresh fruits transport and logistics.

**Digital connectivity:** Communication between land and maritime stakeholders is underdeveloped on the lake. Ship captains use their mobile phones to contact the land side about their destination and estimated time of arrival (ETA).

**Free trade zone:** There is no Free Trade Zone in Mpulungu Harbour. Free Trade Zones can generally be found in seaports, inland ports and airports. Goods handlings such as landing, storage, manufacturing, reconfiguration, and re-exporting can take place in these areas under specific customs regulations and

the absence of customs duties. An area like this could attract volumes and increase production activities in the region.

**Quality of infrastructure:** both port equipment and land access infrastructure are of low quality. Poorly maintained cranes lead to inefficient cargo operations and delays. Access roads are at the end-of-life stage and should be renewed to attract more cargo in the future.

**Governance and management:** Stakeholders mention a lack of proactiveness from the port authority towards the hinterland of DRC and Burundi. Having a more proactive attitude could lead to more cargo flows towards these destinations and could be a trigger for ship owners to increase their carrying capacity. Lastly, unnecessary weighbridges between Lusaka and Mpulungu leads to delays and among stakeholders.

**Bottlenecks with the highest impact:** The table below shows the top-10 bottlenecks that stakeholders experienced about using the Port of Mpulungu. Stakeholders have been asked to divide 100 points over a number of pre-defined bottlenecks. Besides, stakeholders could note down bottlenecks by themselves. The top-3 in bottlenecks related to the port are high transport costs, lack of vessel capacity and lack of information.

*Table 13: Bottlenecks in Mpulungu harbour, Zambia*

| *Category* | *High to low* |
|---|---|
| **High transport costs** | *19%* |
| **Lack of vessel capacity** | *16%* |
| **Lack of information** | *13%* |
| **Other, namely: Connectivity** | *13%* |
| **Low service levels** | *11%* |
| **Regulatory discrepancies** | *6%* |
| **Other, namely: Berth limitation** | *6%* |
| **Criminal activities** | *5%* |
| **Border controls and inspections** | *5%* |
| **Strikes** | *4%* |
| **Congestion** | *3%* |
| ***Total %*** | *100%* |

***Investments***

Table 14 provides insights in investment projects by donor organisations in Mpulungu Harbour. Four elements are described: 1) type of investment 2) involved donor organisations 3) status and 4) link with one of the six corridor connectivity indicators. The aim is to show what the current focus of donor organisations is regarding investments in the port. It is a tool that helps donor organisations structuring their investment policy in relation to the factors that make a port better connected within the network.

*Table 14: overview of investments, Mpulungu, Zambia*

| **Mpulungu, Zambia** | | | |
|---|---|---|---|
| ***Infrastructure development*** | ***Organisation(s)*** | ***Status*** | ***Indicator*** |
| Cranes | AfDB/RVO | Foreseen/ Scheduled | Port capacity |
| Dredging | AfDB/RVO | Foreseen/ Scheduled | Port capacity |
| Forklifts | AfDB/RVO | Foreseen/ Scheduled | Port capacity |
| Construct new warehouses | AfDB/RVO | Foreseen/ Scheduled | Port capacity |
| Repair storage facilities | AfDB/RVO | Foreseen/ Scheduled | Port capacity/ service quality |
| Container handling equipment | AfDB/RVO | Foreseen/ Scheduled | Port capacity |
| Berth construction | AfDB/RVO | Foreseen/ Scheduled | Port capacity |
| Extending berth length | AfDB/RVO | Foreseen/ Scheduled | Port capacity |
| Lighthouse for port access | AfDB/RVO | Foreseen/ Scheduled | Efficiency and ease of process |
| Reconstructing slipway | AfDB/RVO | Foreseen/ Scheduled | Port capacity/ service quality |
| Fire extinguishers | TBD | Foreseen/ Scheduled | Port capacity |
| Pumps | TBD | Foreseen/ Scheduled | Port capacity |
| ***Capacity building*** | | | |
| Improve Port Management | AfDB/RVO | Foreseen/ Scheduled | Service quality |
| Breakbulk operations management | RVO (executed 2019) | Foreseen/ Scheduled | Service quality |
| Streamline Admin. Procedures | AfDB/RVO | Foreseen/ Scheduled | Service quality |
| Implement labor shift system | TBD | Foreseen/ Scheduled | Service quality |
| Analyse feasibility RORO vessel use | AfDB/RVO | Foreseen/ Scheduled | Destinations and frequency |
| Capacity building port/ employee safety | AfDB/RVO | Foreseen/ Scheduled | Efficiency and ease of process |
| Occupational health and safety in the maritime environment (incl. Maritime Safety Authority at policy level) | RVO (concluded 2019) | Foreseen/ Scheduled | Efficiency and ease of process |
| Improve navigational safety | AfDB/ RVO | Foreseen/ Scheduled | Efficiency and ease of process |
| Establish Maritime Training facilities aligned with international standards (IMO / STCW / IAATA) | 5-year operational plan in the making by Zambian authorities (supported by STC) | Foreseen/ Scheduled | Service quality |
| ***Trade development*** | | | |
| Analyse potential trade-flows by vessels | RVO (report 2019) | Ongoing | All indicators |
| Customs: one-stop border posts | potential link with WB's TFSP programme | Unknown | Efficiency and ease of process |

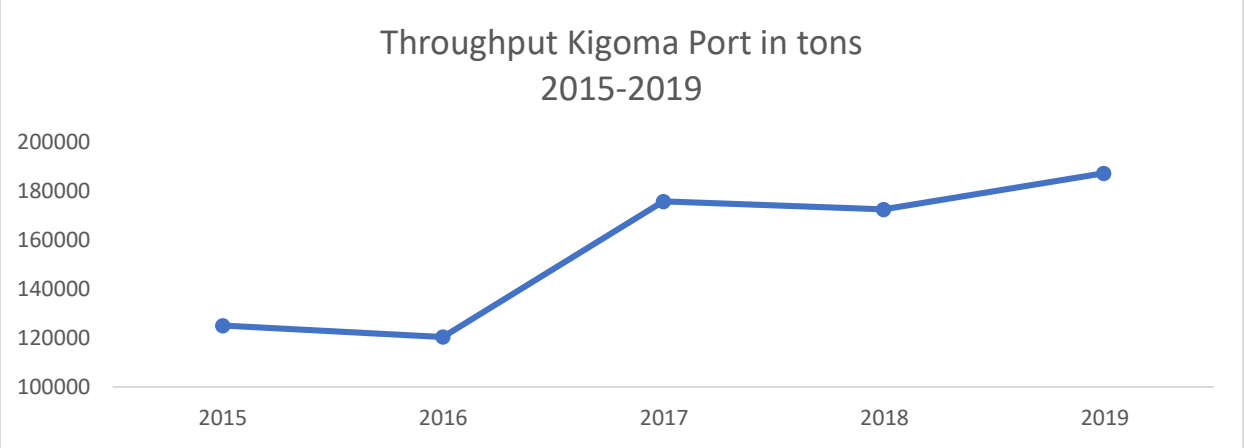
## 6.2 Tanzania Ports Authority (Kigoma), Tanzania

Tanzania Ports Authority (TPA) is the managing body of the Port of Kigoma. On a port level the throughput consists of dry bulk, liquid bulk, breakbulk and containers. Dry bulk is mainly corn, cement, sugar, fertilizer and WFP cargo. Liquid bulk are petroleum products that can also be stored in tanks on the port area. Breakbulk consists of general cargo and containers are stuffed with merchandise cargo.

*Image 3: Kigoma harbour, source: Bing Maps*

The throughput volume in MT was 187,550 in 2019. WFP reports an annual throughput of 200.000 MT. Kigoma is strategically located because of its strong rail connection with the seaport of Dar es Salaam. The Port of Kigoma has a gateway function to the riparian countries of Lake Tanganyika for traffic flows that are coming from Tanzania and/or from Dar es Salaam. Kigoma's main trade relations are with DRC, Burundi and Dar-es-Salaam.

*Figure 8: Throughput Kigoma Port in MT, source: Tanzania Ports Authority 2020*

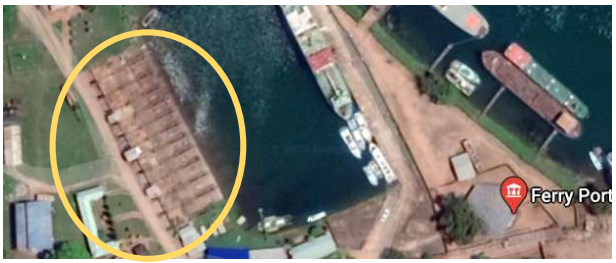


An overview of the key infrastructure and equipment available in Kigoma port follows below. Sources are a combination of interviews with local port stakeholders, prior research reports and the Logistics Capacity Assessment database from DLCA[31].

*Table 15: Infrastructure and equipment in Kigoma Port, Tanzania*

| Element | Explanation |
|---|---|
| **Berths** | Berth 1: 200 meters – general cargo, Berth 2: 100 meters – containers. |
| **Maximum ship size in GT** | Ships with a maximum size of 1.900 GT have called at the port |
| **Cranes** | 3 dockside cranes (2x 3 tons, 1x 35 tons). The 30 tons crane is modern, the others are old, but functional. |
| **Forklifts** | 4 forklifts present. 3 modern ones and 1 older one which is still functional. Carrying capacity is 3-16 MT. |
| **Reach stackers** | Not available |
| **Breakbulk storage capacity** | The total storage capacity – both sheltered and unsheltered – is 12.200 MT. |
| **Liquid bulk storage capacity** | 4 liquid bulk tank containers |
| **Dry bulk storage capacity** | Not available |
| **Container yard capacity** | Not available |
| **Container freight station** | Available |
| **Cool-storage capacity** | Not available |
| **Weighbridge** | Available |
| **Oil jetty** | Available |
| **Shiprepair** | Available, currently not operational |

*Kigoma Photo collection 2020: liquid bulk storage in tanks containers, sheltered breakbulk storage, quaycrane, shipyard (yellow circle), weigbridge*


***Bottlenecks***

This paragraph sets out the biggest bottlenecks that came across in Kigoma port, and the solutions that stakeholders proposed, if given at all. The bottlenecks will again be linked to the components of the LT-Connectivity index. An important note is that these bottlenecks and solutions are proposed by the local stakeholders, and do not directly represent the opinion of the research team.

**Port capacity:** Stakeholders mentioned that there is a lack of shipping companies active at Lake Tanganyika. Another complaint referred to the rail services between Dar es Salaam and the Port of Kigoma. The first issue is related to a lack of available wagons on the route. The second issue is related to large delays, which are caused by shippers in Dar es Salaam arriving late with their cargo. The train does not leave Dar-es-Salaam before it is enough loaded. Transit times are therefore varying between 3 and 10 days.

**Service quality:** The price/quality levels of the provided port services in Kigoma is not in balance and the prices should be reviewed. According to one of our local transport and logistics experts the tariffs are currently under revision. Also, stakeholders mention that the unloading order of ships is not always fair. This means that ship A can call earlier in the port than ship B, while ship B is handled with priority of ship A. The solution proposed by interviewees is to use the First-In-First-Out principle (FIFO) to increase the fairness of operations.

**Efficiency and ease of processes:** Bottlenecks that prevent smooth transit of goods are weighbridge delays on the way to Kigoma due to unofficial weighbridge points. Another obstacle on the way can be a roadblock by police officers. A third obstacle that port users are experiencing is a lack of customs revenue authority support.

**Quality of infrastructure:** Crane breakdowns can lead to big delays and the quality of inland roads is insufficient to sustain future growth of cargo flows.

**Governance:** Capacity building among stakeholders is needed.

**Bottlenecks with the highest impact:** The table below shows the most significant bottlenecks that stakeholders experienced about using the Port of Kigoma. Stakeholders have been asked to divide 100 points over a number of pre-defined bottlenecks. Besides, stakeholders could note down bottlenecks by themselves. The top-3 in bottlenecks relate to high port tariffs – TPA is currently revising its port handling tariffs – congestion and regulatory discrepancies.

*Table 16: Bottlenecks in Kigoma port, Tanzania*

| Bottlenecks from high to low(er) importance | |
|---|---|
| High port tariffs | 25% |
| Congestion | 15% |
| Regulatory discrepancies | 14% |
| Low service levels | 11% |
| High transport costs | 9% |
| Lack of information | 8% |
| Lack of vessel capacity | 7% |
| Border controls and inspections | 6% |
| Roadblocks, traffic police, weigh bridges delays | 4% |
| Criminal activities | 2% |
| Strikes | 1% |
| ***Total %*** | *100%* |

***Investments***

Table 17 provides insights in investment projects by donor organisations in the Port of Kigoma. Four elements are described: 1) type of investment 2) involved donor organisations 3) status and 4) link with one of the six corridor connectivity indicators. The aim is to show what the current focus of donor organisations is regarding investments in the port. It is a tool that helps donor organisations structuring their investment policy in relation with the factors that make a port better connected within the network.

*Table 17: overview of investments in Kigoma, Tanzania (Based on JICA report outside RVO overview)*

| Kigoma, Tanzania | | | |
|---|---|---|---|
| ***Infrastructure development*** | ***Organisation(s)*** | ***Status*** | ***Port capacity*** |
| Rehabilitation program Kigoma Port:<br>• Rehabilitation Passenger Wharf<br>• Construction passenger terminal building<br>• Construction cargo warehouse<br>• Pavement of Access Road<br>• Construction new general cargo warehouse | JICA | Planned | JICA |

## 6.3 Port of Bujumbura, Burundi

On a port level, the throughput consists of dry bulk, liquid bulk, breakbulk and containers. Dry bulk is mainly in the form of clinker, coal, cement, grain, sugar and corn. Liquid bulk consists mainly of fuels. Breakbulk is in the form of cars, fruit and construction materials like wood and steel. Containers throughput mainly consists of (electronic) spare parts, general cargo and food products. [32]

*Image 4: Port of Bujumbura, source: Bing Maps*


The annual throughput volumes at the Port of Bujumbura are estimated by Ecorys at levels around 150,000 MT in 2017. WFP reports a throughput of 205,000 MT over 2019 of which 175,000 shipped via the lake and 30,000 MT via land[33]. See Figure 7 for the comparison of throughput volumes between riparian ports. The biggest trade relations in terms of volume are with Mpulungu. Other important trade relations are present with Kigoma, Kalemie, Kasanga, Uvira and Kalundu. The latter four all located in DRC. The Port does not have a direct connection via rail, but trucks are driving between Bujumbura and Kigoma. From the Port of Kigoma goods can be transported by rail towards the seaport of Dar es Salaam. Currently, 80% of Burundi's international trade passes through the Central Corridor via Dar-es-Salaam.

An overview of the key infrastructure and equipment available in the Port of Bujumbura follows below. Sources are a combination of interviews with local port stakeholders, prior research reports and the Logistics Capacity Assessment database from DLCA[34].

*Table 18: Infrastructure and equipment in Port of Bujumbura, Burundi*

| Element | Explanation |
|---|---|
| **Berths** | 4 berths are present with a total length of 360 meters. |
| **Maximum ship size in GT** | Ships with a maximum size of 2,185 GT have called at the port |
| **Cranes** | 1 fixed berth crane, 1 mobile truck with 40MT crane, 4 flexible cranes of 5MT, 1 mobile crane of 81 MT |
| **Forklifts** | 11 forklifts available |
| **Reach stackers** | 1 reach stacker |
| **Breakbulk storage capacity** | The total storage capacity – both sheltered and unsheltered – is 18.560 m2. H1 (packages, 4,000m2), H2 (miscellaneous goods, 4,000m2), H3 & H4 (goods for export, 8,000 m2), H A1, A2, A3, A4 (2,560m2)<br><br>If measured in weight, the total storage area has a capacity of 500,000 MT |
| **Liquid bulk storage capacity** | Available in silos. Capacity unknown[1] |
| **Dry bulk storage capacity** | Not available |
| **Container yard capacity** | Not available |
| **Container freight station** | Available |
| **Cool-storage capacity** | Not available |
| **Weighbridge** | Available, capacity 50 MT |
| **Oil jetty** | Available, 150 meters |
| **Shiprepair** | Not available |

[1] Check the Google Maps picture of fuel silos in the next photo collection of the Port of Bujumbura.

*Bujumbura photo collection 2020: quaycrane, wooden logstorage, oil tank silos, warehousing capacity*


***Bottlenecks***

This paragraph sets out the biggest bottlenecks that came across in Bujumbura port, and the solutions that stakeholders proposed, if given at all. The bottlenecks will again be linked to the components of the LTCCI. An important note is that these bottlenecks and solutions are proposed by the local stakeholders, and do not directly represent the opinion of the research team.

**Port capacity:** stakeholders complain about a lack of pallets and other equipment and a lack of vessel capacity. Also, the lack of search- and rescue services was mentioned. Not only for Bujumbura, but for the whole Lake Tanganyika. Ideally stakeholders would like to have a rail connection as well.

**Service frequency and destinations:** there are very little container movements and services by barge. Little export from Bujumbura towards other destinations takes place via containers. A suggestion of one stakeholders is to position Bujumbura more as a transit hub for import and export of containers towards other Riparian countries.

**Digital connectivity:** stakeholders call for improvements in digitalisation of processes. Also, communication between stakeholders – e.g. ports and shipping companies – happens only via a

WhatsApp platform. This could be professionalized. At the same time, it serves as a good basis to build further on digital connectivity without big investments upfront.

**Service quality:** First, training programs should be developed and implemented for personnel in the ports to increase the quality of services. Second, freight tariffs between Bujumbura and Dar-es-Salaam are too high, both directly via truck services and indirectly via rail services from Kigoma to Dar-es-Salaam. Some stakeholders also talk about the governance structure that should be reviewed.

**Efficiency and ease of processes:** One main topic was mentioned, namely harmonisation of import and export regulations between Riparian countries. This should lead to less border checks and controls and lower taxes on trade of goods. This could be beneficial for regional trade development.

**Quality of infrastructure:** low level of infrastructure quality. The lifting equipment is outdated, navigation equipment inside the port and on the lake is poor or not present at all, port operations are not possible during adverse weather conditions and spells of power outage regularly result in big delays.

**Governance:** Stakeholders in the region do not speak with each other on a regular basis.

**Bottlenecks with the highest impact:** The table below shows the top-10 bottlenecks that stakeholders experienced about using the Port of Bujumbura. Stakeholders have been asked to divide 100 points over a number of pre-defined bottlenecks. Besides, stakeholders could note down bottlenecks by their selves. The top-3 in bottlenecks are high transport costs, lack of vessel capacity and lack of information.

*Table 19: Bottlenecks in Port of Bujumbura, Burundi*

| Bottlenecks from high to low(er) importance | |
|---|---|
| **High transport costs** | 28% |
| **Lack of vessel capacity** | 14% |
| **Lack of information** | 12% |
| **Low service levels** | 11% |
| **Border controls and inspections** | 10% |
| **Congestion** | 9% |
| **Regulatory discrepancies** | 7% |
| **Cargo loss** | 5% |
| **Strikes** | 2% |
| **Criminal activities** | 1% |
| **Other** | 0% |
| ***Total*** | *100%* |

***Investments***

Table 20 provides insight in investment projects by donor organisations in Port of Bujumbura. Four elements are described: 1) type of investment 2) involved donor organisations 3) status and 4) link with one of the six corridor connectivity indicators. The aim is to show what the current focus of donor organisations is regarding investments in the port. It is a tool that helps donor organisations structuring their investment policy in relation with the factors that make a port better connected within the network.

*Table 20: overview of investments in Burundi, Bujumbura*

| **Bujumbura, Burundi** | | | |
|---|---|---|---|
| ***Infrastructure development*** | ***Organisation(s)*** | ***Status*** | ***Indicator*** |
| Cranes | AfDB/EU | Planned/approved | Port capacity |
| Dredging | JICA | On-going | Quality of infrastructure |
| Repair storage facilities | AfDB/EU | Planned/approved | Port capacity/ service quality |
| Shipyard/ ship repair facilities | JICA | On-going | Port capacity/ service quality |
| Deviate sewage canal | AfDB/EU + JICA | Planned/approved | Quality of infrastructure |
| Open 2nd gate | AfDB/EU + TMEA | Planned/approved | Port capacity |
| Berth construction | JICA | On-going | Port capacity |
| Access roads to port | AfDB/EU | Planned/approved | Quality of infrastructure |
| ***Capacity building*** | | | |
| Improve Port Management | AfDB/EU | Planned/approved | Service quality |
| Breakbulk operations management | Unknown | Planned/approved | Efficiency and ease of process |
| Streamline Admin. Procedures | AfDB/EU | Planned/approved | Efficiency and ease of process |
| ***Trade development*** | | | |
| Enhance LTA trade mandate + capacity | TMEA | Completed | Port capacity |
| Establish Special Economic Zones at ports | TMEA | Completed | Service quality |
| Standardize & harmonize Admin. Procedures /Software/ Equipment & Infra | TMEA | Completed | Efficiency and ease of process |
| Analyse potential trade-flows by vessels | RVO | Completed | All indicators |

## 6.4 Port of Kalundu (Uvira), DRC

DRC has two main ports, Kalemie and Kalundu. The Port of Kalemie and the Port of Kalundu are both managed by SNCC[35]. The port of Kalundu is located in the North-Western part of the lake and is about 4.5 km south of Uvira. It is in very close proximity to the Port of Bujumbura, namely 25 km by barge and 35 km by road. The port has been constructed in the late 1950s and forms a link between Bukavu and Lake Kivu. The port has been constructed on a narrow stretch of land with dimensions of 60 meters width and 300 meters long[36]. The annual throughput within the port lies around 120,000 MT[37]. Key products that are being handled in the port are cement, wheat flour, rice, and sugar.

*Image 5: Port of Kalundu, source: DLCA and Google Maps*


An overview of the key infrastructure and equipment present in the Private Port of Kalundu (in Uvira) follows below. Sources are a combination of interviews with local port stakeholders, prior research reports and the Logistics Capacity Assessment database from DLCA[38].

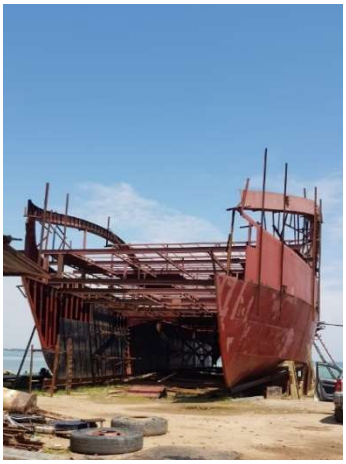
*Table 21: Infrastructure and Equipment in Port of Kalundu, DRC*

| Element | Explanation |
|---|---|
| **Berths** | 2 berths with a total length of 311 meters |
| **Maximum ship size in GT** | 500-1,000 MT due to sedimentation in the port basin |
| **Cranes** | Berth crane 50MT |
| **Forklifts** | Available, capacity 6 MT |
| **Reach stackers** | Unavailable |
| **Breakbulk storage capacity** | The total storage capacity in terms of warehouses is 4,000 m2, consisting of 3 warehouses with capacities of 1,000, 1,500 and 1,500 m2. |
| **Liquid bulk storage capacity** | In tanks (based on Google Maps) |
| **Dry bulk storage capacity** | Available |
| **Container yard capacity** | Available |
| **Container freight station** | Unknown |
| **Cool-storage capacity** | Not available |
| **Weighbridge** | Unknown |
| **Oil jetty** | Available |
| **Shiprepair** | Shipbuilding and shiprepair capacity available[2] |

[2] Check the current shipbuilding activities in Kalundu in the photo collection of Kalundu Ports

*Kalundu photo collection 2020: Shipbuilding by "Ingenieurs Constructeurs de bateaux en acier" (starboard and front perspective), Port safety equipment and mobile crane.*






***Bottlenecks***

This paragraph sets out the biggest bottlenecks that came across in the Port of Kalundu, and the solutions that stakeholders proposed, if given at all. The bottlenecks will again be linked to the components of the LTCCI. An important note is that these bottlenecks and solutions are proposed by the local stakeholders, and do not directly represent the opinion of the research team.

**Port capacity:** Lack of storage capacity. Besides there is a lack of handling equipment, both for loose and containerized cargo[39].

**Digital connectivity:** There is no digital connectivity.

**Service quality:** Lack of trained personnel. Capacity building among personnel is needed.

**Efficiency and ease of processes:** Visiting the Port of Kalemie is obligatory, even in situations where no cargo can be (un)loaded. This is very unbeneficial for transit times.

**Quality of infrastructure:** Berths are in bad condition and need extension. The draught in the port is very limited due to sedimentation. Ships are sanding, and large vessels of 1.000 tons cannot enter the port anymore. According to World Bank, sedimentation in ports is a natural process that takes place continuously. It is predictable and without much uncertainty. Therefore, it can be managed easily by timely dredging and maintenance[40]. Also, there is a lack of well-functioning handling machinery, electricity/power generation, communication equipment, parking yard, sewing system. TMEA is currently working on upgrades in the port[41]. The CCTO also mentions the presence of an inefficient road- and transportation system connecting the port of Kalundu and the neighbouring regions.

**Bottlenecks with the highest impact:**

The table below shows the biggest bottlenecks that stakeholders experienced about using the Port of Kalundu. Stakeholders have been asked to divide 100 points over a number of pre-defined bottlenecks. Besides, stakeholders could note down bottlenecks by themselves. The top-3 in bottlenecks are high transport costs, regulatory discrepancies and lack of information.

*Table 22: Bottlenecks in Port of Kalundu, DRC*

| Bottlenecks from high to low(er) importance | |
|---|---|
| **High transport costs** | 38% |
| **Regulatory discrepancies** | 18% |
| **Lack of information** | 16% |
| **Border controls and inspections** | 10% |
| **Lack of vessel capacity** | 8% |
| **Low service levels** | 6% |
| **Strikes** | 2% |
| **Congestion** | 2% |
| **Total** | 100% |

***Investments***

Table 23 provides insights in investment projects by donor organisations in the Port of Kalundu. Four elements are described: 1) type of investment 2) involved donor organisations 3) status and 4) link with one of the six corridor connectivity indicators. The aim is to show what the current focus of donor organisations is regarding investments in the port. It is a tool that helps donor organisations structuring their investment policy in relation with the factors that make a port better connected within the network.

*Table 23: Overview of investments in Kalundu, DRC*

| Kalundu, DRC | | | |
|---|---|---|---|
| ***Infrastructure development*** | ***Organisation(s)*** | ***Status*** | ***Indicator*** |
| Cranes | TMEA | Completed | Port capacity |
| Forklifts | TMEA | Completed | Port capacity |
| Lighthouse for port access | TMEA | Completed | Efficiency and ease of process |
| Generators | TMEA | Completed | Port capacity |
| ***Capacity building*** | | | |
| Streamline Admin. Procedures | TMEA | Completed | Efficiency and ease of process |
| Capacity building port/ employee safety | TMEA | Completed | Efficiency and ease of process |
| ***Trade development*** | | | |
| Analyse potential trade-flows by vessels | RVO (planned) & TMEA 2019 | Completed | All indicators |

## 6.5 Port of Kalemie, DRC

The Port of Kalemie is managed by the National Railway Company of the Congo (SNCC). The Port serves the largest city and capital of Tanganyika province. The main port connected with Kalemie with weekly schedules is Kigoma in Tanzania. Most volumes are import products from other Riparian ports. Examples of items are cement, sugar, corn, construction materials, fuel in drums and food. Export products are mainly wood and mining products (coltan and cassiterite). Ecorys estimates a total throughput volume of nearly 250,000 MT in 2017. WFP reports that the Port of Kalemie has an annual capacity of 220,000 MT[42].

*Image 6: Port of Kalemie, source: Bing maps*

An overview of key infrastructure and equipment available in the Port of Kalemie follows below. Unfortunately, physically visiting Kalemie was impossible due to Covid-19 restrictions. Therefore, information is mainly retrieved from the Logistics Capacity Assessment database from DLCA[43] and consultation with WFP and Ecorys that both performed a research at the same time. We are very pleased with the close cooperation with these organisations and the information that they could provide us with.

*Table 24: Infrastructure and equipment in Port of Kalemie, DRC*

| Element | Explanation |
|---|---|
| **Berths** | 1 quay, 388 meters |
| **Maximum ship size in GT** | 1,500 tons (DLCA) |
| **Rail connection** | Available, but not reliable. No fixed schedule. |
| **Cranes** | 5 dock cranes, 3-65MT, poor condition |
| **Forklifts** | Available |
| **Reach stackers** | Not available |
| **Breakbulk storage capacity** | Total storage capacity: 6,600 m2 |
| **Liquid bulk storage capacity** | Not available |
| **Dry bulk storage capacity** | Available |
| **Container yard capacity** | Total container handling surface: 2,210 m2 (DLCA) |
| **Container freight station** | Not available |
| **Cool-storage capacity** | Not available |
| **Weighbridge** | Not available |
| **Oil jetty** | Not available |
| **Ship repair** | Available |
| **Shipbuilding** | Available, dry-dock of 135x22 meters |

***Bottlenecks***

This paragraph sets out the most significant bottlenecks that came across in the Port of Kalemie. The bottlenecks will again be linked to the components of the LTCCI. The main source of information is prior research about the port since the research team could not visit the port and talk with local stakeholders. The bottlenecks that will be mentioned below are retrieved from the monitoring report of CCTO over 2019**Error! Bookmark not defined.**.

*Table 25: bottlenecks and solutions in the Port of Kalemie, source: CCTO, 2020*

| Indicator | Bottleneck | Solution |
|---|---|---|
| **Port capacity** | Lack of handling equipment, both for loose and containerized cargo. Most cargo handling is done manually which is much slower than mechanical handling of cargo. | Acquisition of handling equipment. Acquisition of locomotives and wagons. Construction of a container and a petroleum products terminal. Construction of warehouses. |
| **Port capacity** | The port is heavily congested according to WFP_[44]. Main reason according to WFP is the limited handling equipment WFP reports that incoming vessels sometimes need to wait 10-15 days until they can obtain a quayside spot for docking their vessel. | Increase vessel capacity on the lake. Improvement of port processes to speed up turnaround times and thereby free up more capacity. |
| **Digital connectivity** | Not available | - |
| **Service quality** | Multiple taxes including port charges, berthing fees, provincial taxes on imports. Lack of interconnection and collaboration of service providers operating in the port. | Exchange of customs information between Kalemie and Kigoma Ports. Implementation of One Stop Centre and harmonization of fees and charges. |
| **Quality of infrastructure** | Port entrance is silted. Inefficient roads and railways transportation system connecting the port of Kalemie and the neighbour regions. Absence of dedicated petroleum terminal constitutes a serious threat for the port safety and security. | Construction of Kalemie-Nyunzu-Kongolo road. Dredging and protection of the port. Construction of the port fence. |

**INVESTMENTS**

Table 26 provides insights in investment projects by donor organisations in Port of Kalemie. Four elements are described: 1) type of investment 2) involved donor organisations 3) status and 4) link with one of the six corridor connectivity indicators. The aim is to show what the current focus of donor organisations is regarding investments in the port. It is a tool that helps donor organisations structuring their investment policy in relation with the factors that make a port better connected within the network.

*Table 26: overview of investments in Kalemie, DRC*

| **Kalemie, DRC** | | | |
|---|---|---|---|
| ***Infrastructure development*** | ***Organisation(s)*** | ***Status*** | ***Indicator*** |
| Cranes | TMEA | Completed | Port capacity |
| Forklifts | TMEA | Completed | Port capacity |
| Construct new warehouses | TMEA | On-going | Port capacity |
| Berth construction | TMEA | On-going | Port capacity |
| Lighthouse for port access | TMEA | On-going | Efficiency and ease of process |
| Generators | TMEA | On-going | Port capacity |
| ***Capacity building*** | | | |
| Streamline Admin. Procedures | TMEA | On-going | Efficiency and ease of process |
| Capacity building port/ employee safety | TMEA | On-going | Efficiency and ease of process |
| ***Trade development*** | | | |
| Analyse potential trade-flows by vessels | RVO (planned) & TMEA 2019 | Completed | All indicators |

# 7 Lake Tanganyika connectivity assessment

Chapter 6 described the status of each Riparian port in terms of trade volumes, commodity types, infrastructure and equipment, bottlenecks and an overview investment projects. Data that has been presented in chapter 6 is partly used as a basis for the Corridor Connectivity Assessment in this chapter. The aim is to compare the individual ports on the multiple components of port capacity, frequency and destinations, digital connectivity, service quality, efficiency and ease of process, and port infrastructure. Each component will be analysed individually, and after that we will present the total index score of each port. The higher a port's Index, the better a port is connected and equipped to attract cargo as a competitive port. We have implemented a colour scheme to understand the index values better. If an index value is lower or equal to 25, the index value has a red text. If the value is between 25 and 75, the index value has an orange colour and if the index value is higher than 75, the colour of text is green.

It is important to note that only riparian ports are compared, thus not towards other ports in the area, such as Dar-es-Salaam or Durban ports, or elsewhere in the world. This index is a relative index, so an index value of 100 indicates that it performs as the best compared to its peer riparian ports.

*Disclaimer Port of Kalemie:*

> *The Port of Kalemie could not be visited due to Covid-19 restrictions. However, we feel that Kalemie is a crucial Riparian Port that cannot be excluded from the connectivity assessment, this is also what we heard out of the interviews. Therefore, we included an index value that has been constructed on the base of the first three objective indicators: Port capacity, Frequency & Destinations and Digital Connectivity. Within "frequency and destinations", the number of destinations by barge and the presence of train connection have been verified. Other sub-indicators related to (dwell) time have been constructed by taking the average of the other Riparian ports. Subjective indicators are excluded because we simply do not have observations to use. Future research should investigate deeper into Kalemie to reach the level of detail as in the other riparian ports.*

## 7.1 Port Capacity

Regarding the performance on the factor port capacity, Bujumbura performs best when looking at multiple elements of port capacity compared to the other ports surrounding Lake Tanganyika. After that comes Kalemie, which has the biggest berth length and scores second on crane capacity. Bujumbura handles all types of goods (containers, breakbulk, fuels and dry bulk) and compared to the other ports it has a larger amount of yard capacity. In the interviews with respondents of Mpulungu and Kigoma, respondents complained about the lack of storage capacity. This is clearly visible in the index values. Bujumbura has the second largest crane capacity, but the crane capacity of Mpulungu exceeds the capacity of the other ports by far, namely 200 MT of capacity compared to 65 MT maximum in Kalemie. This indicates that heavy objects received by Mpulungu port must be shipped from other ports than the ports surrounding Lake Tanganyika. The crane capacity of Mpulungu compensates in the index for the small length of berth in the port of Mpulungu because more freight can be lifted at once. The current berth length in Mpulungu is only about 20 meters, which is very small compared to the other ports. The berth length of Kigoma and Kalundu are relatively close together. When looking at the size of ships, Mpulungu and Bujumbura can accommodate a similar ship size of around 1,850 MT, whilst Kigoma accommodates only smaller ships and Kalundu accommodates even smaller ship sizes due to issues with

sedimentation in the port basins. The small maximum ship size works negatively for the connectivity of a port. Overall, Kalundu performs worst when looking at port capacity compared to the other ports in Lake Tanganyika.

*Table 27: Port connectivity index - port capacity*

| | | Base value | Mpulungu | Kigoma | Bujumbura | Kalundu | Kalemie |
|---|---|---|---|---|---|---|---|
| Port Capacity | Size of ships (in tons) | 1,850 | 100.0 | 54.1 | 94.7 | 27.0 | 81.1 |
| | Draught (m) | 6 | 100.0 | 63.6 | 79.3 | 72.7 | 100.0 |
| | Length of berth (m) | 388 | 5.2 | 77.3 | 92.8 | 80.2 | 100.0 |
| | Crane capacity (in tonnage) | 200 | 100.0 | 15.0 | 25.0 | 15.0 | 32.5 |
| | Yard capacity (m2) | 18,560 | 26.9 | 37.7 | 100.0 | 21.6 | 31.8 |
| | Service offerings (nr) | 14 | 92.9 | 100.0 | 78.6 | 64.3 | 64.3 |
| | Type of goods (nr) | 4 | 75.0 | 100.0 | 100.0 | 50.0 | 100.0 |
| | | | **71.4** | **64.0** | **81.5** | **47.2** | **72.8** |

## 7.2 Frequency & destinations

Regarding the performance of frequency & destinations, Mpulungu performs the best. This is mainly due to the low dwell times in the port and the low spread in the waiting times. The port of Mpulungu seems to be the most efficient port with regards to ship waiting times and the spread. This can partly be explained by the relatively low amount of calls and thereby a low risk for delays and waiting times. Kigoma and Kalemie are the only ports with direct rail connections in the port. On the one hand, this is positive due to an extra modality with high carrying capacity. On the other hand, the rail services can be unreliable and lead to dwell and waiting times in the port and extra complexity (in Kigoma). Bujumbura scores on some aspects higher and on some aspects lower than Kigoma. The average waiting time and import dwell time are in general higher, however the spread in Bujumbura is larger than in Kigoma. This can give more unreliable time windows. Obviously, the port of Kalundu scores the lowest of all ports on the ship waiting times and dwell time of the port. This information seems to indicate that port of Kalundu has relatively long waiting times.

*Table 28: Port connectivity index - frequency & destinations*

| | | Base value | Mpulungu | Kigoma | Bujumbura | Kalundu | Kalemie |
|---|---|---|---|---|---|---|---|
| Frequency & destinations | Barge (Nr. of destinations) | 5.00 | 100.0 | 80.0 | 100.0 | 100.0 | 100.0 |
| | Rail (Nr. destinations) | 1.00 | 0.0 | 100.0 | 0.0 | 0.0 | 100.0 |
| | Ship waiting time (in hours) | 13.00 | 100.0 | 39.4 | 50.2 | 21.7 | 39.4 |
| | Ship waiting time spread (min - max) | 18.33 | 100.0 | 76.4 | 61.9 | 25.5 | 50.9 |
| | Dwell time – import | 10.67 | 100.0 | 21.2 | 41.0 | 13.3 | 25.6 |
| | | | **80.0** | **63.4** | **50.6** | **32.1** | **63.2** |

## 7.3 Digital connectivity

The digital connectivity in all ports is currently at a similarly low level of maturity. There is no navigation aid or port communication system in place for any of the ports. The level of digital connectivity is everywhere at a similar level, communication mainly works via WhatsApp or telephone calls. In order to keep the communication costs low, multiple sim-cards are used and must be switched between phones to communicate at the lowest costs in each country. First, a good navigation aid and a port communication system should be in place, however for further digital connectivity, such as digital dashboards, track & trace and online booking, the platforms often benefits of a high number of users and could have high initial investments. Therefore, a collaboration between ports on this level could be a starting point for improving coordination between riparian ports.

*Table 29: Port connectivity index - digital connectivity*

| | | Base value | Mpulungu | Kigoma | Bujumbura | Kalundu | Kalemie |
|---|---|---|---|---|---|---|---|
| Digital Connectivity | Navigation aid | *0* | *0* | *0* | *0* | *0* | *0* |
| | Port communication system | *0* | *0* | *0* | *0* | *0* | *0* |
| | Port Performance dashboard | *0* | *0* | *0* | *0* | *0* | *0* |
| | Track & trace information | *0* | *0* | *0* | *0* | *0* | *0* |
| | Online booking system | *0* | *0* | *0* | *0* | *0* | *0* |
| | | | **0** | **0** | **0** | **0** | **0** |

## 7.4 Service quality

The service quality is assessed subjectively by the respondents linked to each port. These numbers should be interpretated with caution and with the perspective of the local users of the facilities and their quality standards. So, quality measures should not be confused with e.g. European standards and only represent the local situation. Stakeholders are used to certain processes and judge these qualities based on this. The sub-indicators about truck, barge and train are not about the quality of the mode itself, but say something about the quality of the service providers that arrange these services. Kigoma performs best on service quality, since it has the highest variety of service offering and the price quality of the service quality scores a 6.0 out of 10. This is not very high; however it is the highest score compared to other riparian ports. Especially, considering that the high port tariffs are stated as the largest bottleneck. Next to this, it is the only port which has a proper rail connection; therefore, the quality of train connections is the highest. Even though Kigoma has the highest score on variety of service offerings, the overall quality is not stated as the highest scoring value. Mpulungu seems to offer a higher quality of service offerings than Kigoma, just like the flexibility of the service providers. The quality of barge services in Mpulungu scores the highest compared to the other ports. An explanation for this could be that the call frequency is limited, which makes it relatively easy to adjust port operations to the calls. Another factor could be that cargo is always lifted and nothing is left behind due to the relatively small call sizes. Lastly, the value is dependent on the stakeholders that have been interviewed. A stakeholder in the Port of Mpulungu might have a more positive mindset compared to stakeholders in other regions, or it could be that the stakeholder does not have knowledge about the service quality in other ports to make a comparison. It is remarkable that Bujumbura scores low on the various aspects of service quality. On multiple aspects it scores way lower than Kalundu, whilst the Port capacity in Bujumbura is way higher. It might be the case that the expectations of service quality of Bujumbura are higher than Kalundu.

*Table 30: Port connectivity index - service quality*

| | | Base value | Mpulungu | Kigoma | Bujumbura | Kalundu | Kalemie |
|---|---|---|---|---|---|---|---|
| Service quality | Problem solving quality | 8.7 | *100.0* | *69.2* | *51.5* | *55.4* | *NA* |
| | Variety of service offerings | 6.5 | *71.8* | *100.0* | *68.6* | *92.3* | *NA* |
| | Quality of service offerings | 8.0 | *100.0* | *68.8* | *51.9* | *65.0* | *NA* |
| | Price-Quality of service offerings | 6.0 | *77.8* | *100.0* | *66.7* | *93.3* | *NA* |
| | Flexibility of service providers | 6.7 | *100.0* | *82.5* | *69.2* | *84.0* | *NA* |
| | Quality of trucking services | 6.6 | *91.3* | *100.0* | *77.3* | *83.7* | *NA* |
| | Quality of barge services | 8.0 | *100.0* | *75.0* | *75.0* | *60.0* | *NA* |
| | Quality of train services | 3.7 | *0.0* | *100.0* | *0.0* | *0.0* | *NA* |
| | | | **80.1** | **86.9** | **57.5** | **66.7** | **NA** |

## 7.5 Efficiency & Ease of process

*Table 31: Port connectivity index - efficiency & eae of process*

| | | ***Base value*** | Mpulungu | Kigoma | Bujumbura | Kalundu | Kalemie |
|---|---|---|---|---|---|---|---|
| Efficiency & Ease of process | Ease and reliability of customs process | 7.6 | *100.0* | *100.0* | *66.8* | *68.4* | *NA* |
| | Ease of documentation process | 9.3 | *100.0* | *75.0* | *52.7* | *47.1* | *NA* |
| | Ease of reaching the node | 7.0 | *100.0* | *95.2* | *68.1* | *74.3* | *NA* |
| | Timeliness of cargo handling cycle | 8.7 | *100.0* | *78.5* | *49.7* | *69.2* | *NA* |
| | | | **100.0** | **87.2** | **59.3** | **64.8** | **NA** |

## 7.6 Port infrastructure

In the case of efficiency & ease of process, Mpulungu port scores the highest on all elements. Our local consultant states that this is due to stable and unchanged processes over time and therefore everybody knows where to go, thereby the operation seems seamless. Initially stakeholders scored very high on ease and reliability of customs processes. However, after a detailed consultation with WFP we decided that it is not realistic to assign the port such a high score for customs processes. There are a number of reasons for this. First, customs systems are relatively simple compared to the systems in for example Kigoma. Second, Zambian customs sometimes puts a sudden ban on exporting products (e.g. grains and corn). Third, Zambia suffers quite often from power outages, which shuts down systems that are needed to fulfil customs procedures. Because of the aforementioned, together with the fact that Kigoma has the most sophisticated customs procedures, we decided to score 'Ease and reliability of customs processes' at the same score as Kigoma receives. It could still be that importers/exporters are satisfied with the ease and reliability of customs processes due to the standardised and simple processes, so this seems to be the best way forward. It is striking that the Northern side of Lake Tanganyika scores relatively lower than the other parts. Kigoma has slightly lower overall values, but still performs very well on most cases. It is notable that the timeliness of the cargo handling cycle for Kigoma still is judged relatively high, whilst the

actual times in the frequency and destinations index was relatively low. When looking to the Northern side of the lake, the customs and documentation process in Bujumbura and Kalundu is judged with a poor score. It seems that this could be a point of improvement for the ports on the Northern side of Lake Tanganyika. The ease of reaching the node could be improved for both ports but does not have a low score. The port of Bujumbura scores relatively low with regards to timeliness of the cargo handling cycle.

*Table 32: Port connectivity index - Port infrastructure*

| | | ***Base value*** | **Mpulungu** | **Kigoma** | **Bujumbura** | **Kalundu** | **Kalemie** |
|---|---|---|---|---|---|---|---|
| **Quality of physical infrastructure** | Maritime Infrastructure – Navigability | 7.0 | *47.62* | *100.00* | *39.56* | *28.57* | *NA* |
| | Maritime Infrastructure - Vessel capacity | 7.0 | *66.67* | *100.00* | *59.34* | *47.62* | *NA* |
| | Maritime Infrastructure - Ship repair | 5.2 | *0.00* | *100.00* | *0.00* | *0.00* | *NA* |
| | Maritime Infrastructure – Communication | 4.4 | *45.45* | *100.00* | *59.44* | *45.45* | *NA* |
| | Maritime Infrastructure – Legislation | 7.2 | *55.56* | *97.22* | *53.42* | *100.00* | *NA* |
| | Physical port infrastructure – Quayside | 4.8 | *83.87* | *97.85* | *100.00* | *67.10* | *NA* |
| | Physical port infrastructure - Stacking area | 5.3 | *75.00* | *100.00* | *86.54* | *84.38* | *NA* |
| | Physical port infrastructure - Storage area | 6.0 | *100.00* | *0.00* | *71.79* | *60.00* | *NA* |
| | Land infrastructure – Rail | 4.0 | *0.00* | *100.00* | *0.00* | *0.00* | *NA* |
| | Land infrastructure – Road | 6.0 | *100.00* | *100.00* | *86.11* | *40.00* | *NA* |
| | Land infrastructure – Pipeline | 6.0 | *0.00* | *100.00* | *0.00* | *0.00* | *NA* |
| | | | **52.20** | **90.46** | **50.56** | **43.01** | **NA** |

The overall quality of the Port Infrastructure is the highest in Kigoma. Mpulungu, Kigoma and Bujumbura perform all around the same score. This is mainly because there is no ship repair, rail and a (functioning) pipeline. These values get a score of null. Next to this, the values of Kigoma are relatively close to the other scores. The navigability is better around Mpulungu than in the Northern part of the Lake close to Bujumbura and Kalundu. The legislation in Kalundu performs the best, which does not align with the difficulty in the score of customs and documentation process in *the efficiency and ease of process (7.5).* whilst Mpulungu and Bujumbura score around the same. The scores for stacking and quay side are in general not very high, however the values are quite close to each other. The road infrastructure in Kalundu scores below all the other points and there is enough room for improvement.

## Corridor connectivity index

Looking at the overall performance there is a clear difference in port performance on the "Northern" part of the Lake Tanganyika and the "Middle/Southern" part of the Lake Tanganyika. The performance levels of Mpulungu and Kigoma are relatively close to each other. Whilst Bujumbura and Kalundu are below these overall scores. As mentioned in the introduction, the value of Kalemie ports should be interpreted with caution.

*Table 33: Port connectivity index - overall scores*

| Indicator | Mpulungu | Kigoma | Bujumbura | Kalundu | Kalemie |
|---|---|---|---|---|---|
| **Port capacity** | *71.42* | *63.96* | *81.48* | *47.25* | *71.29* |
| **Frequency & destinations** | *80.00* | *63.40* | *50.64* | *32.09* | *63.19* |
| **Digital connectivity** | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| **Service Quality** | *80.11* | *86.94* | *57.52* | *66.72* | **NA** |
| **Efficiency & Ease of process** | *100.00* | *87.17* | *59.35* | *64.77* | **NA** |
| **Quality of physical infrastructure** | *52.20* | *90.46* | *50.56* | *43.01* | **NA** |
| **Overall index value** | ***64.0*** | ***65.3*** | ***49.9*** | ***42.3*** | ***44.8*** |

The connectivity index values of Mpulungu and Kigoma are relatively similar, where Mpulungu can improve with more physical infrastructure such as more storage, ship repair and a larger berth length. Kigoma can improve with some physical infrastructure such as storage, but mainly needs to investigate optimizing the overall efficiency of the process and shorten the general waiting times. The complexity of the port of Kigoma is higher than the port of Mpulungu, since they only have the option road or barge, whilst Kigoma also has a rail option to Dar-es-Salaam to integrate in the process. It can be the case that when complexity increases in Mpulungu port, efficiency will decrease as well.

For Bujumbura and Kalundu, there are again some differences for room of improvement. The Port of Bujumbura has a high amount of port capacity, but also performs badly on efficiency of process, waiting times and scores low on legislation and documentation process. The improvements mainly lay in streamlining efficiency and looking critically towards customs and efficiency in this process. When looking towards the port of Kalundu, it is harder to indicate where the improvements exactly lie, since the port performs relatively poorly on all aspects, except for the service quality. It is important to note, that products for the port of Kalundu must call the port of Kalemie, even though there is no freight for Kalemie to bring or pick-up. Digital connectivity is a weak spot for all ports.

# 8 Cost base and transit times

The aim of this section is to create an overarching insight in transit times (in hours) and costs (in USD/MT) for the multiple corridors. We distinguish again the Northern Corridor, which starts in the seaport of Mombasa, the Central Corridor, which starts in Dar es Salaam and the Southern corridor, which starts in Durban or Beira. Chapter 5.3 provides an elaborate overview of the methodology applied.

## 8.1 Corridor costs and transit time

This section provides insights in the 'best route – modality combination' by differentiating the most cost-efficient route on the one hand, and the most time-efficient route on the other hand. For example: transporting goods over the central corridor towards Bujumbura is most cost-efficiently performed by using rail and barge (65 USD/MT, 243 hours). However, choosing for dedicated truck transport would lead to a faster transit time and a higher price (100 USD/MT, 192 hours). These are the trade-offs that shippers and forwarders make. The better the data about multiple route options around and towards the lake, the better these parties can make their transport decisions. An overview of all route/modality combinations can be found in Appendix 2.

### 8.1.1 Kalemie route

Table 34**Error! Reference source not found.** and Table 35 **Error! Reference source not found.**show respectively the most cost efficient and most time efficient route combinations towards Kalemie. Several things are notable. First, the Northern corridor has only one viable option of reaching Kalemie and that is via truck and barge (210 USD/MT, 444 hours). Second, the central corridor reaches Kalemie in the most cost-efficient way by using modalities rail and barge (57 USD/MT, 285 hours). The most time-efficient way is to use truck and barge (107 USD/MT, 225 hours). However, this results in a doubling of the transport costs per MT. Third, the only viable option to reach Kalemie via the Southern corridor is to use a combination of truck and barge, this holds both for the starting point Durban (180 USD/MT, 498 hours) and Beira (170 USD/MT, 594 hours).

*Table 34: Route towards Kalemie - most **cost efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 210 | 444 | Truck-barge |
| **Central** | $ 57 | 285 | Rail-barge |
| **Southern (Durban)** | $ 180 | 498 | Truck-barge |
| **Southern (Beira)** | $ 170 | 594 | Truck-barge |

*Table 35: Route towards Kalemie - most **time efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 210 | 444 | Truck-barge |
| **Central** | $ 107 | 225 | Truck-barge |
| **Southern (Durban)** | $ 180 | 498 | Truck-barge |
| **Southern (Beira)** | $ 170 | 594 | Truck-barge |

### 8.1.2 Bujumbura route

Table 36**Error! Reference source not found.** and Table 37 show respectively the most cost efficient and most time efficient route combinations towards Bujumbura. Several things are notable. First, the Northern corridor has only one viable option of reaching Bujumbura and that is via truck (150 USD/MT, 276 hours). Second, the Central corridor reaches Bujumbura in the most cost-efficient way by using modalities rail and barge (65 USD/MT, 243 hours). The most time-efficient way is to use truck (100 USD/MT, 192 hours). Third, the only viable option to reach Bujumbura via the Southern corridor is to use a combination of truck and barge, this holds both for the starting point Durban (185 USD/MT, 522 hours) and Beira (175 US/MT, 618 hours).

*Table 36: Route towards Bujumbura - most **cost efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 150 | 276 | Truck |
| **Central** | $ 65 | 243 | Rail-barge |
| **Southern (Durban)** | $ 185 | 522 | Truck-barge |
| **Southern (Beira)** | $ 175 | 618 | Truck-barge |

*Table 37: Route towards Bujumbura - most **time efficient***

| Corridor | Costs in USD/MT | Transit time in Hrs. | Modalities |
|---|---|---|---|
| **Northern** | $ 150 | 276 | Truck |
| **Central** | $ 100 | 192 | Truck |
| **Southern (Durban)** | $ 185 | 522 | Truck-barge |
| **Southern (Beira)** | $ 175 | 618 | Truck-barge |

## 8.2 Northern corridor

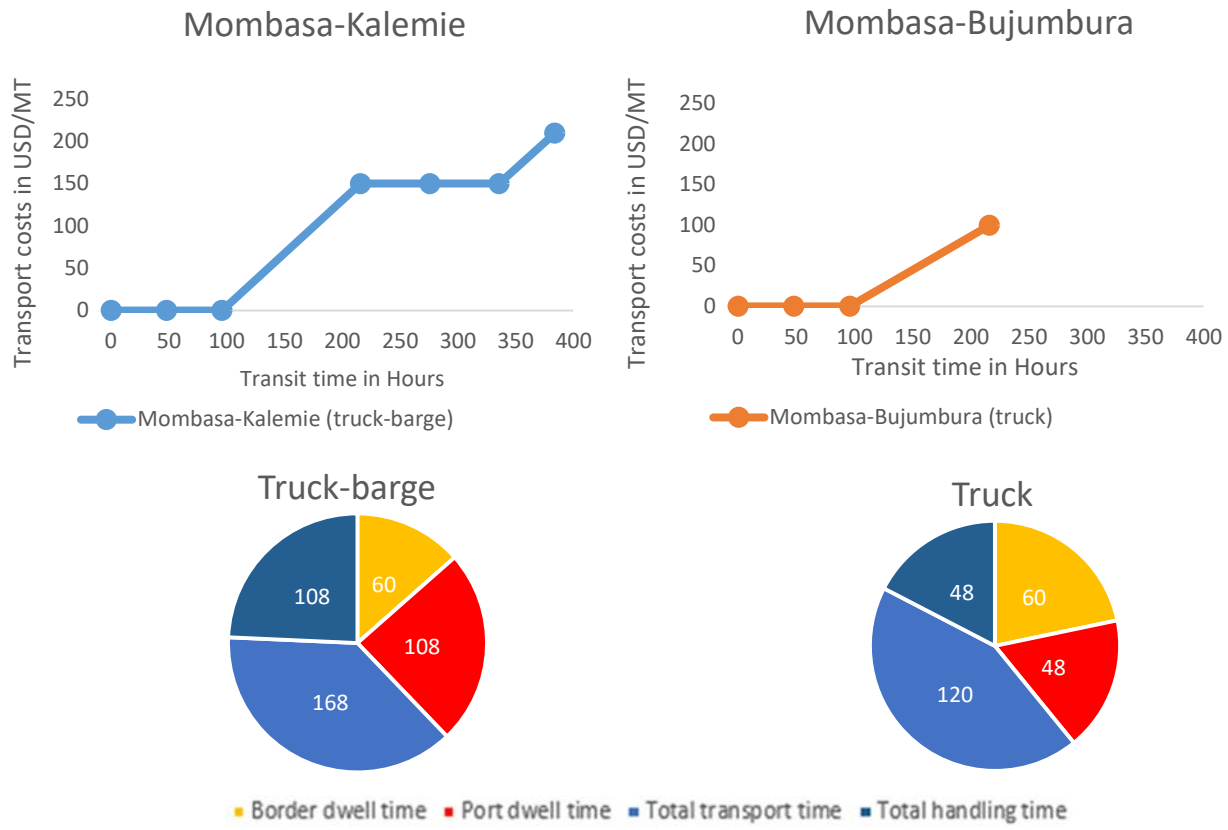
This section shows the detailed route options for the routes starting from Mombasa towards Kalemie and Bujumbura. The graphs provide insight in the relation between transit time in hours and transport costs in USD/MT. Besides, it shows the amount of idle time over the route in terms of handling time and dwell time in ports. The underlying data of these graphs can be found in the Appendix 2.

*Important: graphs do not include border dwell time since the information of border dwell time was only available on a higher aggregate route level. So, border dwell time is not included in the line-graphs with transit time and costs/MT. However, below each line-graph we show a pie chart with the total transit time divided over 4 categories. Border dwell time IS included over here.*

| Routes-Northern corridor | Modalities |
|---|---|
| **1) Mombasa – Kalemie** | Truck-barge |
| **2) Mombasa – Bujumbura** | Truck |

For the Northern corridor there are two routes to be analysed. The first route is between Mombasa and Kalemie. This route takes 444 hours in total and is only performed by a combination of truck and barge. In 38% of the total transit time goods are in movement by means of transportation. Rest of the time consists of dwell time and handling time. The second route is between Mombasa and Bujumbura. This route takes 276 hours and is carried out by truck. In 43% of the total transit time goods are in movement.

*Figure 9: Transit time and costs analysis - Northern Corridor*



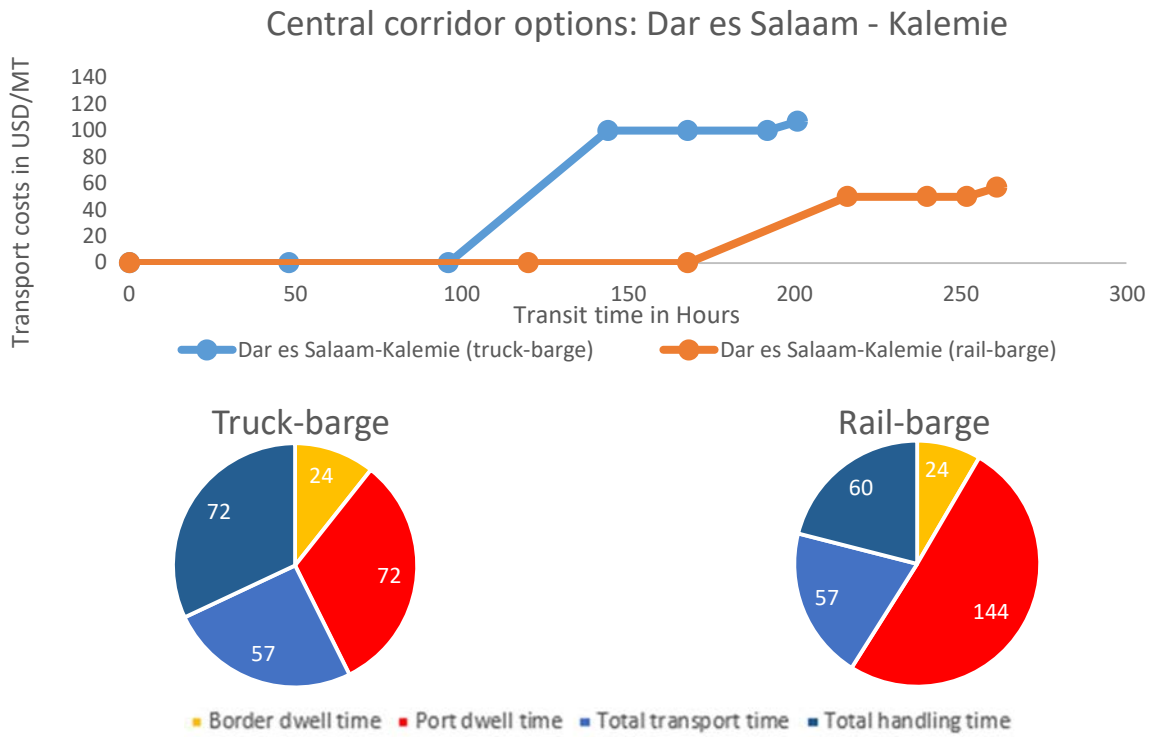
## 8.3 Central corridor

For the Central corridor the starting point is the seaport of Dar-es-Salaam (Tanzania)

| Route | Modalities |
|---|---|
| **1) Dar es Salaam – Kalemie** | Truck-barge |
| **2) Dar es Salaam – Kalemie** | Rail-barge |
| **3) Dar es Salaam – Bujumbura** | Truck-barge |
| **4) Dar es Salaam – Bujumbura** | Truck |
| **5) Dar es Salaam – Bujumbura** | Rail-barge |

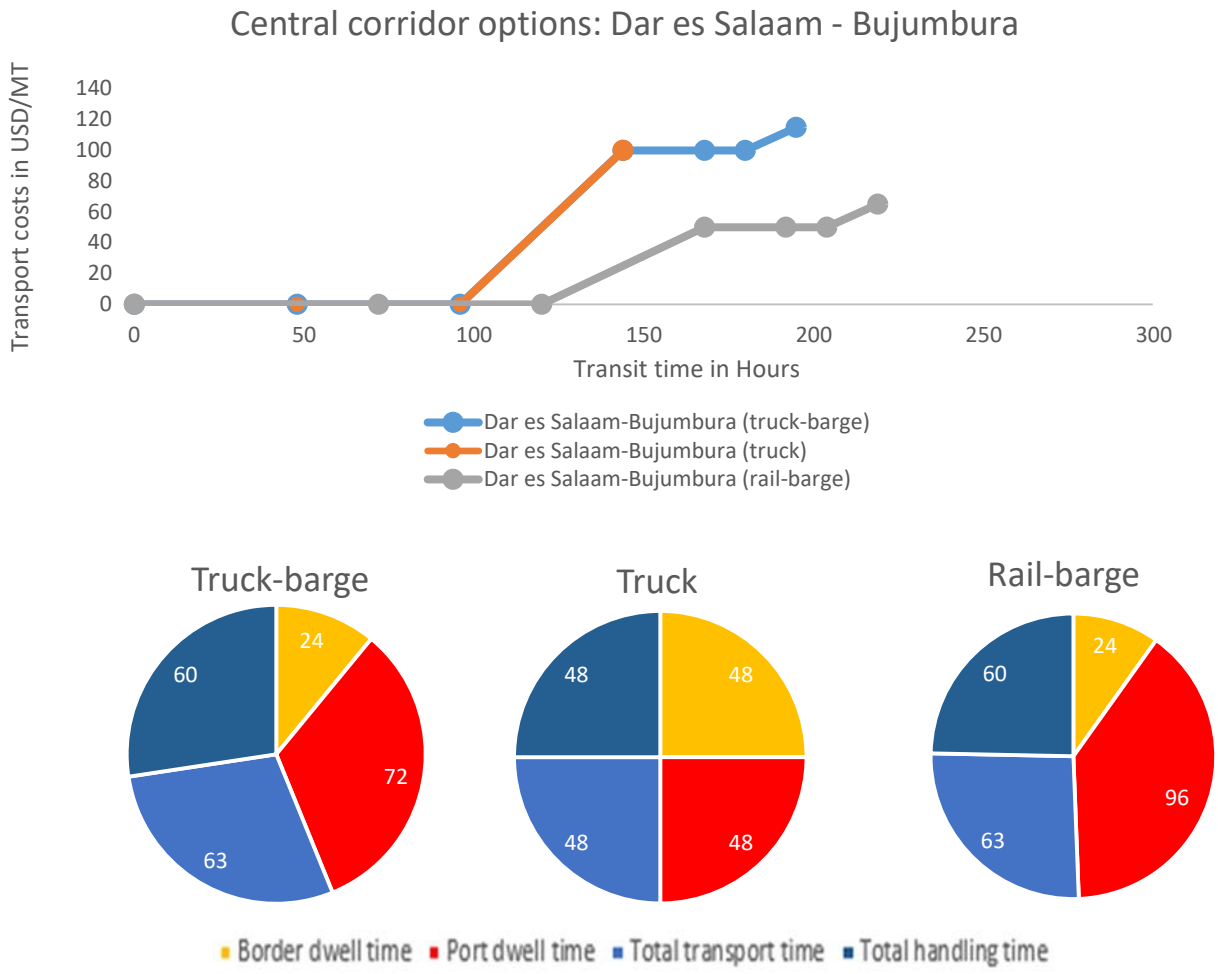
Two options are competing regarding transport from Dar es Salaam towards Kalemie: truck-barge and rail-barge. By analysing the graphs, it is obvious that port dwell time (144 hours) is an issue that makes the rail-barge route less attractive compared to truck-barge (72 hours) from a transit time perspective. In terms of costs rail-barge is almost half price.

*Figure 10: Transit time and costs analysis - Central Corridor (towards Kalemie)*




Three options are competing regarding transport from Dar-es-Salaam towards Bujumbura: truck-barge, rail-barge and direct trucking. Dedicated truck is the best option in terms of time according to the data that we retrieved. In terms of costs per MT the rail-barge option is most attractive of the three options. Truck-barge has the highest price of all and is not faster than dedicated truck. Thus, it does not seem competitive in any scenario. Yet, drawing hard conclusions on the competitiveness of one of the options is not desirable. We know that tariffs are subject to change, negotiable and dependent on the available capacity at that moment. Besides, influences from the weather – e.g. heavy rainfall during rainy season – can make one option preferable over the other.

*Figure 11: Transit time and costs analysis – Central Corridor (towards Bujumbura)*



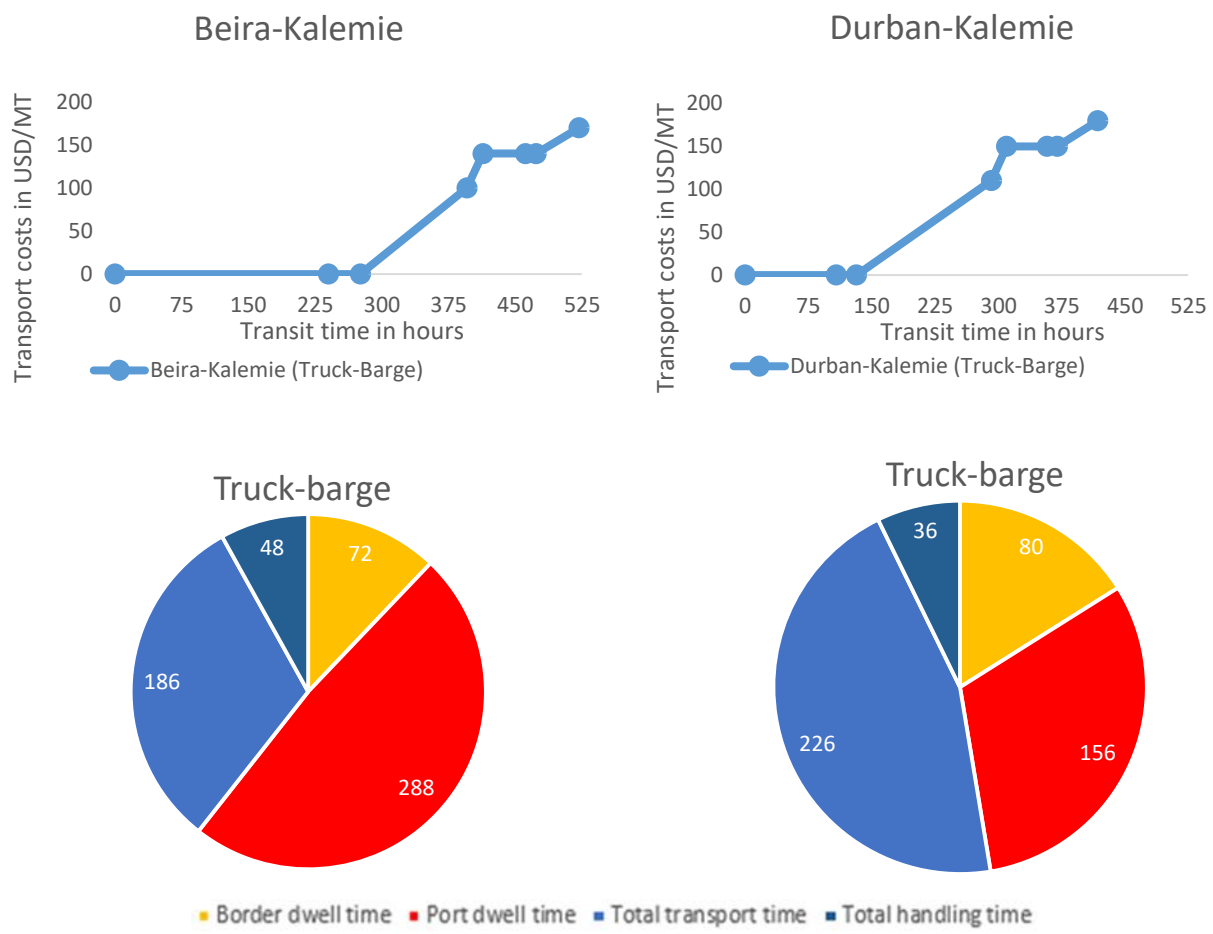
## 8.4 Southern corridor

For the Southern corridor there are two important starting points: Beira (Mozambique) and Durban (South Africa). The route combinations that can be made via these locations towards Kalemie and Bujumbura are the following:

| Route | Modalities |
|---|---|
| **1) Beira - Kalemie** | Truck – barge |
| **2) Durban - Kalemie** | Truck – barge |
| **3) Beira - Bujumbura** | Truck – barge |
| **4) Durban - Bujumbura** | Truck – barge |

The only way to reach Kalemie via the Southern corridor is by truck and barge, of which largest part is done by truck. Total transit time towards Kalemie is shortest via the Seaport of Durban. This is the result of the very high port dwell time in Beira of 288 hours, which consumes almost half of the total transit time. So, the fact that Durban is located more than 1.500 km more to the south, and having 2 days extra transport time, does not make it a slower option. The Seaport of Durban is thereby a smarter option for importing goods into the country, if judged on total transit time. Using the Seaport of Durban in terms of costs totals 180 dollars/MT for transport costs, which is only 10 dollars more than the route via Beira.

*Figure 12: Transit time and costs analysis - Southern Corridor*



The story for the route towards Bujumbura is identical to the Kalemie route: truck-barge is the only option for transportation and using the Seaport of Durban is only 10 dollars/MT more expensive but saves more than four days in transit time.

# 9 Corridor governance

## 9.1 Corridor governance

In addition to transport infrastructure, the corridor performance depends on the smooth cooperation of a large group of stakeholders (port authorities, terminal operators, rail operators, transport operators, customs authorities, freight forwarders and government institutions). A common problem to enhancing cross-border transport performance – and thereby lowering transport costs and improving quality and reliability – is that these stakeholders pursue their individual short-term company objectives, while collective problems are not addressed, neither solved. This is one of the main reasons why connectivity problems persist for decades in landlocked regions. New insights into coordination mechanisms on hinterland chains bring to front that alternative forms of coordination are required, such as the creation of public-private partnerships[45]. Public-private partnerships have been a widely used governance mechanism that effectively contributes to regional economic growth[46]. Cross-sector partnerships and collaborative approaches are increasingly adopted by large corporations, governments and civil society organizations (as opposed to confrontational approaches) to more effectively address economic, social, and environmental problems by overcoming institutional and regulatory voids [47]. Van Tulder et al. (2013) developed a partnering space model to address the sustainable development issue by describing trilateral relationships in which governments (state), businesses (market) and communities (civil society) attribute specific roles to each other as a means to address the issue at stake. In further advancement of partnerships as a coordination mechanism, the Partnerships Effectiveness Model allows for monitoring and evaluation of partnerships. This model will be used as a basis for establishing a joint vision, value proposition and corridor governance.

## 9.2 Lake Tanganyika corridor coordination framework

The partnership effectiveness model summarises the approach for the establishment of the partnership between stakeholders. The model contains two dimensions: (1) a descriptive part that follows the corridor partnership organisation and (2) an analytical part that covers the four most relevant aspects of partnering: context, efficiency, effectiveness, output, outcome and impact. The model differentiates between efficiency (organisation time and cost) and effectiveness (goal achievement) as two important evaluative dimensions. The partnership effectiveness framework will be developed by the involved corridor authorities to shape and detail out the partnership. As a joint effort, this framework distinguished direct output (e.g. cost savings) from outcome (e.g. better connectivity) and from impact (the long-term sustainable development and economic growth for the region). This hierarchy of indicators makes sure that short term collaborative actions are not confused with long term impact, which facilitates expectations management from a stakeholder perspective.

The Partnership Effectiveness model and methodology are used to build trust, commitment and establish a constructive dialogue. The agenda for the partnership framework is founded on four main themes: infrastructure interventions, regional cooperation, market information, awareness[48]. By means of 18 interviews with key stakeholders as well as an international benchmark of corridor governance constellations, we will draw lessons and determine complementary themes to be addressed for effective corridor governance of LTTC.

## 9.3 International benchmark

In order to provide inspiration towards the development of a Lake Tanganyika Corridor Partnership, an international benchmark was conducted based on corridor development initiatives in various world regions (North America, Europe, Africa, Asia). In total, nine corridors and their managing or representative bodies (named 'Corridor Managing Bodies' or CMBs) were assessed, through desk research as well as ad-hoc small written e-mail or telephone interactions if clarification was needed.

The case studies were selected based on expert knowledge, ensuring a sufficient geographical spread of initiatives. Mainly corridors with a transnational perspective were included, given the context of Lake Tanganyika. In terms of transport modes, both larger corridor arrangements covering all modes, as well as specific arrangements for one single mode were included. Overall, a large variety of corridor projects was achieved, providing broad insights towards the development of a Lake Tanganyika Corridor Partnership.

For this analysis, a case study template containing the various elements relevant for corridor governance and development was developed. For each corridor (organization), the following elements were discussed:

At the level of the **Corridor**:

(1) **Coverage** of countries & Regions
(2) **Historical context** of the Corridor: description of the rationale/logic to start up the Corridor (political/institutional, market), initiators and their objectives (public sector, private sector, mixed), context within which the Corridor was created, main developments and achievements over time (evolution)
(3) **Main objectives and scope of activities**: description of the main objectives and scope of the Corridor, and the activities developed by the Corridor Managing Body
(4) **Main transport markets** served (freight, passengers, industries, transport & flows modes): description of the main focus(-i) of the corridor in terms of transport markets, economic clusters & transport modes

At the level of the **Corridor Managing Body (CMB)**:

(1) **Name** of the Managing Body of the Corridor
(2) **Governance structure** of the Managing Body of the Corridor: Description of the membership structure, conditions of membership, main underlying documents, governance levels and structures (incl. stakeholder representation), main decision-making procedures
(3) **Main strategic documents** (visions, masterplans, other): Description of the main documents used to determine and implement the objectives (vision, masterplans, action plans, other…), and how these are developed (stakeholder inclusion, studies, …)
(4) **Funding Mechanism**(s) for Corridor Development: Description of the main funding flows and mechanisms used to finance the Corridor's objectives. If available, a short report on the capital and operational budgets
(5) **Project appraisal tools, processes & methodologies**: description of how funding is allocated to projects (competitive /non-competitive; PPPs; …), and which processes are used (e.g. Social-Cost Benefit Analysis). If available, a short report how budget is allocated towards various projects and objectives.

(6) Corridor performance management and **Key Performance Indicators**: Description of how the Corridor Managing Body reports about the performance in light of the achievements of the Corridor objectives. Does the CMB publish structural KPIs or rather ad-hoc? Which indicators are published?

The case study templates were largely populated through desk research, analysing reports and website information. In some cases, personal contact was taken with regional or local experts to clarify some key elements (e.g., sometimes it was unclear if the initiative still was operational, why it was abandoned, etc.). Following this part of the research, as the case studies were performed by various members of the research team, interaction within the team was held to determine a framework to compare the various corridors towards the identification of lessons learned, as well as to uncover both the conditions of successful corridor development as well as the various types of organizational arrangements and the pathways to those. The discussions and the ensuing analysis also informed the questionnaire for our in-depth interviews with both public and private stakeholders in the Lake Tanganyika region.

## 9.4 Comparative analysis and lessons learned

Based on the gathered materials through the case study templates (see appendix) for all individual templates as well as the generic structure), the research team uncovered three main themes to compare across the cases. The three themes were unbundled in different features, and a basic qualitative assessment based on expert judgment was made to assess to which extent certain features are present for each individual corridor case.

The themes and underlying features are the following.

First, we compared the **stated objectives** within the main strategy documents of the corridor. These objectives generally relate to three underlying themes and are consistent with the main literature on the topic:

(1) Increase of regional integration at the level of trade, transport and logistics)
(2) Increasing the overall economic competitiveness and development of the region
(3) Increasing the sustainability of transport and logistics operation along the corridor

Second, we analysed the **operational focus and the type of activities** developed by the CMB, and found four overarching features:

(1) Policy formulation
(2) Gathering, analysing and publishing corridor performance management & data
(3) Transport Infrastructure development (including financing)
(4) Support of trade facilitation processes and infrastructure

Third, we compared the **governance features** of the CMB, and identified five distinct features:

(1) Existence of a dedicated, permanent secretariat
(2) Broader stakeholder inclusion (in policy formulation and governance)
(3) Private sector inclusion (including co-funding and co-financing)
(4) Financial transparency (& evaluation)
(5) Championing activities (incl. strong corporate identity and marketing)

Table 38 shows the results of this assessment. The interpretation of the table warrants some care, as the outcomes do not necessarily mean that the CMB is e.g. delivering towards its objectives. It rather exemplifies the common thread between corridor arrangements, as well as their differences.

*Table 38: Corridor governance bodies in international context*

| | Stated objectives | | | Operational focus & activities | | | | Governance aspects | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Regional Integration (transport, trade & logistics) | Economic competitiveness | Sustainability & Safety | Policy formulation | Corridor Performance data management | Infrastructure development (incl. co-financing) | Trade facilitation | Permanent Secretariat (unique structure) | Broader stakeholder inclusion (policy and governance) | Private sector inclusion (co-financing) | Financial transparency & evaluation | Championing (corporate identity) |
| APGCI | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 1 | 2 | 3 | 3 | 2 |
| GLSLS | 1 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 2 |
| Northern C | 3 | 2 | 2 | 3 | 3 | 1 | 2 | 3 | 2 | 1 | 1 | 1 |
| WBCG | 3 | 3 | 2 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| Borderless Alliance (Ghana) | 3 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | 2 | 1 | 3 |
| TEN-T Rhine-Danube | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 1 | 3 | 3 |
| Motorways of the Sea | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 2 | 3 | 2 | 3 | 3 |
| FERRMED | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 3 | 3 | 3 | 1 | 2 |
| TRACECA | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 3 | 2 | 1 | 2 | 2 |

Some commonalities and differences per thematic area are:

(1) Most CMBs intend to deliver on all three identified objectives of regional integration (transport and trade), competitiveness (economic growth) and sustainability and safety of transport. Nevertheless, we observe in reality, through the actual operational activities, that most weight is given to regional integration and in second order aspects of sustainability and safety. We suggest that the economic competitiveness objective is a rather indirect feature of stated objectives, needed to also find the necessary societal and political support for the mandate. While increased regional integration surely contributes to competitiveness, the CMBs do not seem to play a direct, substantial role in e.g. development of economic clusters along the transport corridor(s) they are involved in.

(2) At the operational level, trade facilitation support (both at the level of processes and infrastructure, e.g. border posts) is the most common and most important feature of most CMBs. At the level of actual transport infrastructure development, the CMBs largely play a coordinating or consultative role, but without taking up a first line managerial or financing role, as this is left to national and regional authorities, and the private sector. At the level of performance data brokerage and information provision, there is a general lack of structural provision of KPIs associated to the corridor development and outcomes. Nevertheless, exceptions to these general observations exist. Both the Asia-Pacific Gateway Corridor Initiative (APGCI) and the EU TEN-T were/are substantially involved in co-financing of larger scale infrastructure projects, but both are located within regions with strongly integrated single markets or very advanced free trade agreements. At the level of performance data brokerage, the Northern Corridor (NCTTA) provides with the financial and technical support of donors (such as TMEA) weekly, monthly and yearly reports on performance metrics (transit times, costs, productivity measures, etc.).

(3) At the level of governance features of CMBs, the common elements are the existence of permanent, dedicated and specific organisations (with the exception of the APGCI which was entirely coordinated from within the Ministry of Transport), as well as the existence of well-established processes for broader inclusion of stakeholders in policy formulation. A lot of value seems to exist in having a neutral, broad platform for dialogue between transnational stakeholders active on the transport corridor, to coordinate and advance initiatives at the

individual country or regional level. At the level of both direct private sector inclusion, as well as the financial reporting on resources, the picture is more scattered as some have direct involvement of private sector. Likewise, at the financial reporting side, transparency is not present in all cases, which leads to unclarities in terms of how resources are obtained, and toward which activities they are oriented. Some CMBs benefit however of indirect private funding, as a levy is collected and earmarked on the flow of goods transiting through the corridor by governments and then transferred to the CMB. Finally, we observed that also on the level of 'championing', some CMBs have developed a strong capability in terms of marketing their initiatives; on another level, this also refers to the staff profiles ('people') to create a strong corporate as well as individual identity / leadership. However, this strongly relates to certain path dependencies (i.e. profile of the leadership, position of the CMB vis-à-vis participating members/countries), which often relate back to the initial creation and the actual mandate of the corridor initiative.

In sum, we observe that there is no 'one-size-fits-all' CMB governance structure, and that the absence of a specific feature does not prevent to reach objectives, such as the case of the APGCI where there was no separate structure outside the Canadian Ministry of Transport. Therefore, based on our case study analysis, we also identified a list of 'best practices' to uncover the basic conditions leading to potential success, as a complement to the comparative assessment.

Table 39 shows the observed best practices for each corridor initiative.

*Table 39: Best practices international transport corridors, source: team analysis*

| Corridor | Main insights – Lessons Learned – Best practices |
|---|---|
| **APGCI** | • Strong research focused and stakeholder-based policy formulation<br>• Important leverage of public and private funds (> 60% co-funding)<br>• Superior project management & implementation (low overheads, concrete implementation of infrastructure projects) |
| **GLSLS** | • Strong initial coalition building between cross-border government departments<br>• Integrated policy formulation (infrastructure, processes, spatial development, environment) |
| **Northern C** | • Strong data management & transparency on corridor performance, supporting policy discussions<br>• Focus on specific areas as difference makers (Border Crossings, Road Safety) |
| **WBCG** | • Strong marketing and promotion in a public/private setting<br>• Strong networking within different adjacent countries and impact on agenda-setting, leading to concrete implementation |
| **Borderless Alliance** | • Open partnership with strong mobilization from the private sector, extending into building relationships with transnational donors and institutions<br>• Large geographical coverage. |
| **TEN-T Corridors (Rhine-Danube)** | • Strong focus on intermodality and interoperability of transport systems in the context of sustainable development and competitiveness<br>• Championing with former high-level politicians or commissioners as corridor coordinators<br>• Strong and stable financial base through basic EU funding |
| **Motorways of the Seas** | • Strong focus at the level of the transport mode (coastal shipping) with integrated attention to both infrastructure and processes<br>• Championing with former high-level politicians or commissioners as corridor coordinators<br>• Strong and stable financial base through basic EU funding |
| **FERRMED** | • Building a bandwagon of private and public members, with sustained commitment<br>• Successful lobbying towards local, regional, national and transnational authorities |

| Corridor | Main insights – Lessons Learned – Best practices |
|---|---|
| | • Strong focus on one transport mode (rail) and its challenges, little dilution of objectives |
| **TRACECA** | • Gathering potential of countries interests in a large region divided by geopolitical tension<br>• Network structure of the permanent secretariat with representation in each member state to the corridor agreement |

The 'best practices' highlight a number of key success factors when defining corridor governance arrangements under the form of the set-up of a CMB:

(1) Adopting a strong focus on concrete objectives, where the CMB can make a difference, and avoiding dilution of objectives over the lifetime;
(2) Building a coalition upfront, including a strategy to expand this coalition, but avoiding dilution of objectives by building the bandwagon;
(3) Appointing a strong leadership team at the CMB, including a 'champion' with significant weight and legitimacy on both the political and industry level to lead the initiative;
(4) Inclusive stakeholder management and data-driven decision-making when setting the priorities, both at the start and during the lifetime;
(5) Ensuring stable, sufficient resources that permit keeping a strong, close link with key stakeholders such as Member States and key private sector players, in particular in a transnational context.

Obviously, the investigated case studies all were developed within specific contexts. Based on these specific contexts, some elements of further consideration are needed, in relation to the key success factors identified above:

(1) CMBs may be seen as temporary agreements. One of the best performing arrangements, the APGCI (Canada) was abolished after a 12-year period. Basically the main targets were achieved and "corridor" thinking was largely absorbed by both public and private stakeholders at various levels, and the need to have a coordinating entity at a higher governmental level was not deemed as a condition to pursue further development. While this initiative was mainly based on a single country level (Canada), the particularity of the Canadian structure with various Provinces having (and claiming) larger autonomy (Quebec, Alberta) remains relevant. Further, the APGCI initiative also led to closer collaboration within Provinces and key gateways (such as the port of Vancouver), and between stakeholders in the transport chain, and left a legacy (or even strong culture) of collaboration behind.

(2) A lot of examples show a dilution of objectives over time within CMBs, transitioning too fast from mere transport to a broader concept of economic corridors. While the narrative on economic development along the corridor, and the alleged benefits from these developments in terms of employment and added value creation is very attractive, there exists a risk that particular stakeholder issues (e.g. competition to attract private investments along the corridor between regions and countries) hamper the achievement of the initial core objective (transport and trade facilitation).

(3) A critical, often underestimated, success factor is the 'people' component under the form of both leadership and staffing of the CMB: personnel changes at the top management often lead to momentum losses, as well as on other staff levels. Leadership recruitments and appointments , as well as succession planning, are thus key considerations.

(4) Joint research and stakeholder inclusion at the start of the initiative, to outline the vision based on sound research, is a crucial element to gain traction at the political level, as e.g. the APGCI and other selected initiatives have shown.

(5) Sustained private sector participation under different forms (including co-funding through memberships) should clearly lead to benefits for private sector members and stakeholders. These benefits need to be identified upfront and have a clear positive impact on private sector stakeholders. While marketing and communication is important to raise awareness, the CMB should provide tangible benefits through e.g. common data platforms, information websites on corridor services, networking activities, etc.

## 9.5 Typologies and pathways

Based on our sample of investigated corridor initiatives, some 'stylized' corridor development models can be uncovered, based on their initial set-up:

(1) Larger-scale, government driven initiatives, focused on investments on both infrastructure and processes (including ICT), with large budgets for expenditure (examples: EU TEN-T, Motorways of the Sea, APGCI);

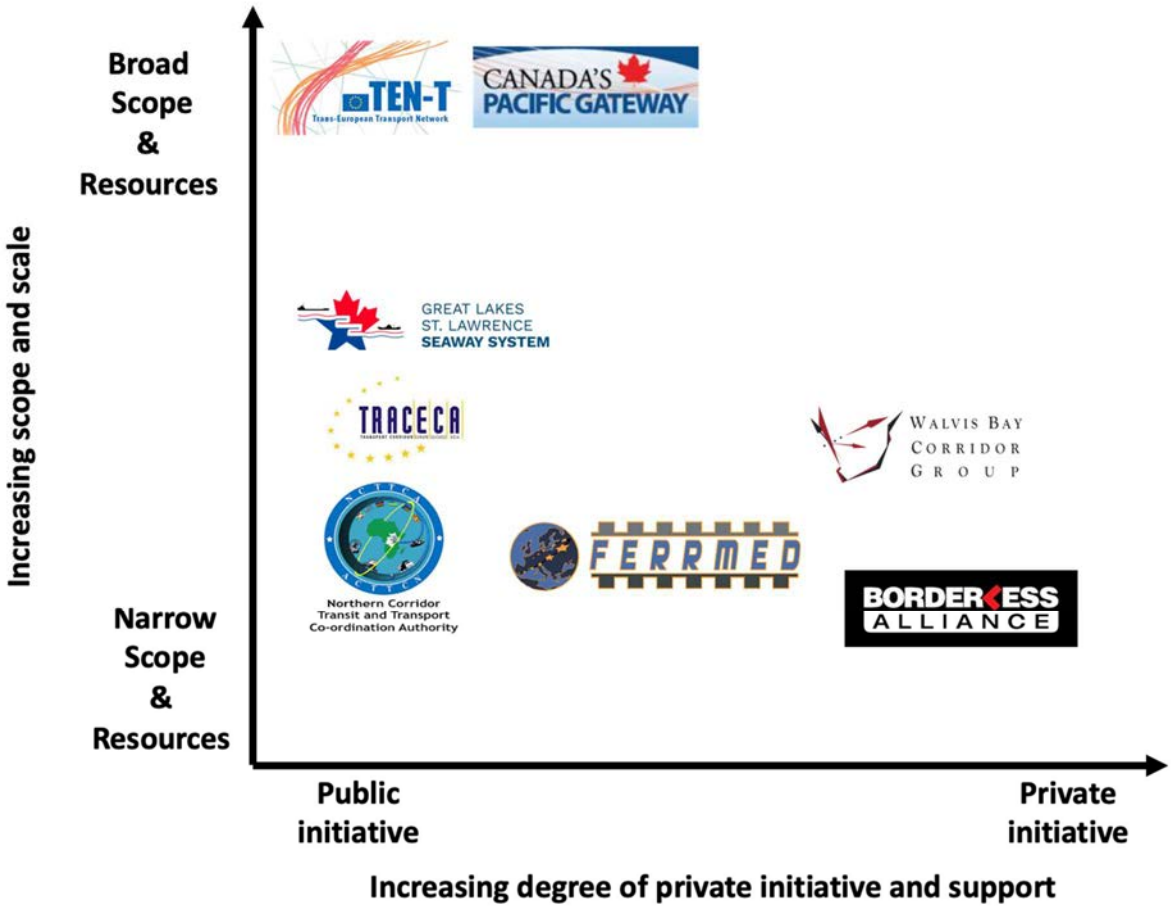
(2) Smaller-scale, government driven initiatives, focused on trade facilitation and dialogue on the establishment of common policies in specific domains (e.g. road safety, navigational safety, environmental issues) (examples: Northern Corridor, GLSLS, TRACECA);

(3) Smaller-scale, private sector driven or supported initiatives (often with implicit support from a governmental institution, international donors and/or designed as PPPs at the outset), focused on advocacy, marketing, visibility, and shorter term initiatives with real impact 'on-the-ground' (examples: WBCG, Borderless Alliance, FERRMED).

Figure 13 positions the various initiatives on two dimensions:

- The increasing degree of private sector initiative and support (e.g. through direct co-funding or membership);
- The increasing scale and scope of the initiative (transport modes covered, activities, budgets for investments and operations).

*Figure 13: Positioning and typology of the various case studies, source: team analysis*




Our research has shown that while these 3 models represent specific choices made at the start, they often evolve over time, and neither of the models shows a consistent 'going concern' over their lifetime:

- The APGCI was discontinued after 12 years, even considering it was a large-scale, government driven initiative;
- GLSLS remained a rather loose platform for government agency collaboration across the US-Canada border, but does not seem to have deployed concrete initiatives since the initial study work. Similarly TRACECA seems to have lost some momentum;
- WBCG showed a remarkable path of building a large bandwagon, including gradually establishing presence on the ground in various countries through representative offices, and becoming an important driver and partner to governments for trade and transport development. The impact of a recent leadership change needs to be assessed however (cfr. the importance of 'championing');
- FERRMED has greatly expanded its scope in geographic terms from Europe to Asia, but it remains to be seen whether this will impact the focus of activities, and value provided to its many members (in particular the core advocacy activity); its small support structure may be a risk for the going concern;
- The Northern Corridor and the EU TEN-T initiatives seem strongly embedded or supported by governments, and quite stable arrangements.

Most corridor initiatives have either a strong, or large involvement of port managing bodies.

For a future Lake Tanganyika corridor organization, we believe it is worthwhile to consider the smaller scale models, also given the absence of large port or gateways along the corridor. In the next section, we explore through the results of the in-depth interviews, the necessary conditions and potential pathways to set-up a dedicated organizational arrangement to increase coordination and collaboration towards the development of the transport corridor. Both specific and general insights from the benchmark were confronted with the views of both private and public stakeholders in the broader region around LT, at the level of organizational development. An open dialogue through individual in-depth interviews was thus held, exploring different generic scenario's:

(1) Continuing the current situation, i.e. without a formal CMB, and relying on ad-hoc arrangements, initiatives or projects.
(2) Extending or developing the mandate of currently active organizations, such as the Lake Tanganyika Authority (LTA), or the existing Corridor organizations (Northern, Central, Southern), including installing permanent collaborations between existing organisations (e.g. by creating a dedicated joint taskforce).
(3) Creating a new organization.

## 9.6 Analysis of stakeholders' perspective on corridor governance

Overall, the majority of respondents active within the broader LT region agreed that an increased coordination between different stakeholders (both at the level of national governments, international donors, existing regional multilateral initiatives and private sector) was necessary at various levels of intervention:

- Creating more awareness of the lake transport services and economic development potential at both the level of transport and logistics industry in the region, as well as towards the national governments;
- Develop a common, coordinated plan for infrastructure development on and around the lake;
- Increase trade facilitation processes at the level of administrative and financial elements of lake trade (taxes, fees,…).

Most respondents agreed that a more formal organisational arrangement was needed toward this end, and that it should preferably be initiated and supported by the public sector (i.e. riparian states), with formal involvement of the private sector at the outset within a committee-based structure. Further, a 'business-development' mindset would be important at the level of the corridor managing body. Most respondents pointed out that the private sector stakeholders operating around the lake currently lack the capability to set-up their own proprietary strong initiative that transcends the borders.

However, some respondents did not entirely exclude the set-up of a private sector supported organization gathering the interests of traders and logistics service providers around the lake, as around the larger ports it was confirmed that local shippers and trader's associations exist.

Most respondents prefer that an existing organisation would be empowered to extend the mandate, instead of creating a new organizational arrangement, which would require a specific, potentially time-consuming negotiation of a new transnational agreement. Preferably, transnational agreements where

the four riparian countries are already represented could play a role. Three lines of thought were put forward:

- Setting up a joint task force or group within or emanating from the larger, existing supranational bodies such as COMESA, EAC and SADC, as all riparian countries are associated to one or more of these bodies;
- Extending the mandate (and resources) of the Lake Tanganyika Authority (LTA), which by means of the existing Treaty gathers the four riparian governments, and has the mandate to also develop initiatives at the level of commerce and trade on the lake;
- A final option would be to empower the Central Corridor (CCTTFA), given its track record and ongoing collaborations e.g. with the Northern Corridor, but this would need Zambia to become part of the agreement, which seems less likely and feasible, as negotiations would need to be opened.

## 9.7 Conditions for successful corridor governance

Our conclusion, based on the respondents preferences, is to initially explore the potential to empower the LTA to set-up, within its existing organization, a Corridor Managing Body which could take the form of an LTA sub-entity, branch or department with an own identity and champion oriented at the commercial and transport activities on the lake. This department would need to benefit from and leverage knowledge and capabilities already present at the existing Corridor Managing Bodies (Central and Northern). However, we need to stress that respondents were not equivocally agreeing on this option, as some respondents questioned the availability of resources at the LTA to move forward in the short term, as currently, the LTA seems to lack both power and visibility at the level of both the private sector and on national political levels. The main advantage, as confirmed by respondents, is that the LTA is currently the unique body where the 4 riparian states meet regarding matters specific to the lake, and that also trade related matters (in particular aspects related to the transport of goods) are within the mandate.

# 10 A prospective competitiveness assessment and value proposition

## 10.1 Analysis on accessibility and connectivity of Great Lakes region

In mature markets, transport is a derived service, which is only requested when manufacturers require their goods to be shipped to a customer overseas and/or over land. However, in the Lake Tanganyika region, it seems to be the other way around. Due to the absence of well-functioning waterborne transport system, transport infrastructure and shipping services are at the very essence for regional economic integration.

The burden of landlocked countries is the comparative cost disadvantage. Distance matters for exporters. From the corridor assessment in the previous chapters, we arrive at the conclusion that Lake Tanganyika is the 'final destination' for existing land corridors, rather than a starting point for export. Mining products are one of the few commodities that are shipped out of the region. These bulky commodities are relatively time-insensitive, have a low value per ton and often part of vertically integrated value chains, controlled by a handful of overseas multinationals.

Corridors thrive by a holistic perspective on overall performance, the willingness and commitment to eliminate trade barriers, overcome physical bottlenecks, improve infrastructure and empowerment of human ingenuity.

The transit time analysis and cost base analysis are evidence to the relative inaccessibility of the riparian countries around Lake Tanganyika. Transport is a spot market with high volatility in price levels. Variability of transit times are high on all corridors between seaports and riparian ports, which is caused by long dwell times both in ports as well as in transit.

Priority should be given to address the outdated maritime transport infrastructure (ship capacity, aids to navigation, vessel traffic services, shipyards for newbuildings, repair and maintenance, nautical services (tugs, pilots, search and rescue services, patrol ships for inspection, security and safety)). Safe navigation on the lake should be the first priority. Without a trustworthy and safe transport service over water, other rehabilitation projects in port infrastructure and equipment will only result in partial or even negative return on the investments.

Kigoma can serve as a favourable decoupling point of two intermodal transport systems, with the LTTC for lake bound trade and the Central Corridor for international trades. Here, containers are stripped, deconsolidated and shipped in smaller quantities for further destinations in DRC. This way of working has a background in the security issues relating to further inland transport. Mpulungu port functions as an export node, but has a high dependency on the construction value chain (cement, clinker). Bujumbura is an import node, where the challenge is to have a more balanced throughput of import and export commodities. Cool chain facilities are of utmost importance to lift agribusiness to a higher plateau. Kalemie is the only port with a shipyard. Other countries could place orders at these shipyards instead of rehabilitating overaged ships. This would trigger demand and a start to develop a local shipbuilding cluster for the region, which can then branch out to other lake ports.

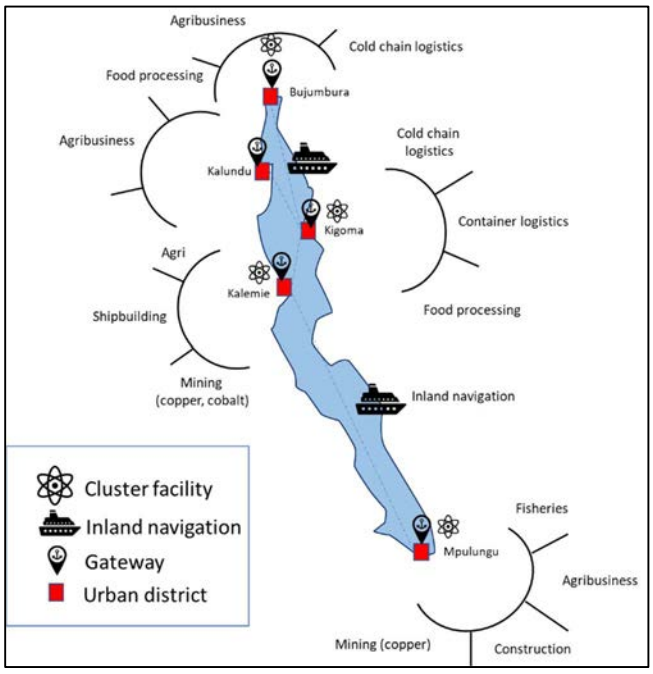
## 10.2 Positioning of LT-corridor by defining a niche market and defining the universal value proposition compared to other corridors

Lake Tanganyika Transport Corridor is the missing link for regional integration of the four economies of the riparian countries, in all its aspects: trade integration, infrastructure integration, freedom to travel, cross-border investments and cooperation. In this day and age of globalization and free trade, the countries in the Lake Tanganyika region maintain unnecessary and ineffective non-tariff barriers, which put local manufacturers and traders in a backward position. From the perspective of trade and transport, to escape from this gridlock is merely a matter of willingness to move ahead as a joint and coordinated effort rather than of lack of funding for investments.

Although lake ports of Bujumbura, Kigoma, Mpulungu and Kalemie are the outposts of international mining related supply chains, the true value proposition is in facilitating intra-regional value chains and supporting a network of smallholders and traders. Developing the corridor should go together with sector or cluster development (as e.g. evidenced by Rwanda, which has implemented a successful cluster development strategy), which would address both supply and demand for transport.

Given the fact that agriculture is a significant part of these economies, it makes sense to develop agri-business value chains (e.g. food processing industries), while at the same time establish supporting cluster facilities such as vocational education, universities, chambers of commerce, and transport facilities and specialized 'cold chain' logistics services.

*Figure 14: Connection of Lake Tanganyika Transport Corridor with intra-regional value chains*




However, for the long term, these countries will have to diversify in industrial (manufacturing) sectors as well. Sector development of the maritime sector fits in this diversification strategy. Such a cluster would take the example of Oman's diversification strategy and would consist of a wide variety of sub-sectors: shipbuilding, port logistics, inland navigation, maritime education, fisheries, logistics and even water sports and water tourism.

# 11 Vision on building a competitive Lake Tanganyika Transport Corridor

## 11.1 Proposed vision statement

Visions come in many forms, but in general need to comply with the following elements:

- They are presented as a longer-term, more general objective with a sufficient level of ambition ('stretch targets') motivating the stakeholders of an organization or a project to contribute resources towards the achievement of the vision;
- Managers (and stakeholders) can use the vision to evaluate strategic actions against it ;
- The vision is further declined towards a strategy to realize the vision. The strategy is a plan of action towards realizing the vision.

Based on the collected views of the interviewed experts and stakeholders, and our assessment through the gap analysis, we believe the following vision can be put forward:

*The main, overarching longer-term vision (with 2030 as milestone) for the Lake Tanganyika Corridor would be to effectively realize and stimulate seamless end-to-end intermodal transport on the lake, through the development of state-of-the-art infrastructure and efficient services both on the lake- and landside. Both intermodal solutions for (smaller-scale) intra-regional trade and (larger-scale) international logistics chains would need to be developed to stimulate both types of trade, and the optimal conditions defined (types of vessels, types of intermodal units, types of infrastructure).*

For the realization of this ambition, a Corridor Managing Body is needed. The mission of this corridor body would be to ensure, through stakeholder consultation, research and partnerships, the harmonization of trade and transport related procedures, the development of focused and aligned infrastructure and service development schemes, and the promotion of the lake as a transport mode towards business and government stakeholders.

## 11.2 From vision towards strategy

### 11.2.1 General framework: the strategic roadmap

The longer-term vision needs to be declined into more specific and concrete projects.

In the shorter term, within a 3- to 5-year perspective (2025 as milestone), the following high-level strategic agenda towards realization of the vision should be realized, and is consistent with the typical activities deployed by smaller-scale international corridor initiatives (see supra, chapter 9), be it from a public or private perspective:

- Develop a common marketing and information platform facilitating and promoting lake transport services access to local, regional and international shippers and logistics providers; this also includes the set-up of continuous but targeted 'advocacy' initiatives towards central governments;
- Increasing the animation within the transnational business ecosystem around the lake through stimulating the development of activities such as trade fairs, the set-up of a common lake ports community, etc.;

- Agree on a common infrastructural policy allowing more focus and alignment towards the realization of infrastructural projects benefitting the entire corridor, increasing the efficiency of invested funds of various governments and donors, and aiming towards the implementation of the longer-term vision on intermodality;
- Further increase the transnational dialogue on trade facilitation for lake trade flows at the level of administrative and financial matters;
- Improve the navigational safety conditions on the lake (e.g. beaconing), and set-up a basic 'lake community system' for information exchange;
- Set-up a basic monitoring instrument for the performance of lake transport services and ports;
- Stimulate the development of ship repair and maintenance services, as well as the training for both port and shipping operations on the lake.
- Set up a common framework for training, certification and watchkeeping for inland navigation, including an educational infrastructure which covers adjacent professions in the maritime domain: shipbuilding, port logistics, intermodal transport, trade and customs compliance.

Based on the interviews, the corridor benchmark and interaction within the research team, the following high-level roadmap is therefore proposed. This roadmap in Figure 15 represents an agenda towards 2025 and is set up around 5 programs which each include separate projects. It is important that while the program around 'governance' is an important condition, it does not prevent that separate stakeholders form alliances to tackle particular elements within the four other programs, by means of e.g. preparing actual implementation or performing preliminary negotiations, fact finding or implementation of partial solutions under a more agile 'learning by doing' approach.

*Figure 15: high-level roadmap for Lake Tanganyika Corridor Development*

| LAKE TANGANYIKA CORRIDOR ROADMAP | Time horizon (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| **Governance** | | | | | | | | | | |
| Agreement on LT CMB organizational vision, structure, resources | | | | | | | | | | |
| Set-up LT CMB within LTA (incl. Committee structure) | | | | | | | | | | |
| **Coordination and advocacy** | | | | | | | | | | |
| Develop common strategy to increase navigational safety | | | | | | | | | | |
| Define common corridor infrastructure development plan | | | | | | | | | | |
| Define common strategy to support intermodal transport services | | | | | | | | | | |
| Support trade facilitation processes (common "transport protocols") | | | | | | | | | | |
| Determine conditions for a 'lake community information system' | | | | | | | | | | |
| Implement 'lake community information system' | | | | | | | | | | |
| Develop a performance dashboard to track progress | | | | | | | | | | |
| **Marketing and awareness** | | | | | | | | | | |
| Development of website for LT CMB | | | | | | | | | | |
| Development of online information platform with transport service offer | | | | | | | | | | |
| **Lake Tanganyika business ecosystem animation** | | | | | | | | | | |
| Mapping existing trade associations (traders, forwarders, ports,...) | | | | | | | | | | |
| Stimulate development of missing associations in the ecosystem | | | | | | | | | | |
| Support trade fairs, trade missions and exchanges (intra-regional trade) | | | | | | | | | | |
| Attract supporting cluster services (ship repair, maintenance) | | | | | | | | | | |
| **Capacity building** | | | | | | | | | | |
| Mapping existing educational intiatives for lake trade/transport | | | | | | | | | | |
| Define common strategy for lake trade/transport education | | | | | | | | | | |
| Support development of a common Maritime Training Institute | | | | | | | | | | |

Source: Team analysis; darker bricks represent the date for completion; lighter bricks show the duration and start (note that all projects may start following setting up stakeholders coalitions and do not have to wait until the CMB has been set-up).

As set out by Figure 15, the high-level roadmap revolves around five themes or 'programs'. These are discussed in the following sections.

### 11.2.2 Program 'Governance'

*Description and rationale*

This program relates to the actual set-up of a Corridor Managing Body. Both from the benchmark and stakeholder interviews, the need to set-up a dedicated, formal Corridor Managing Body (CMB) is considered as a necessary condition to increase the speed of implementation of projects and actions leading to higher corridor performance and the associated wider benefits.

Typically the realization of this program contains two phases:

(1) building a transnational coalition of public and private parties to incite the four riparian governments to dedicate structural resources for the set-up of the organization, including agreements on the vision and mandate; in essence, setting up a political process to achieve an intergovernmental agreement on the set-up (which, as explained before, can be achieved as an extension of the current agreement on the LTA, setting up a dedicated branch within LTA);
(2) setting up the actual organization, i.e. appointing an executive secretary or CEO and support staff, setting up committees and working groups, etc.

While the establishment of a CMB is an important step and key success factor for successful implementation, it should not delay the start of the activities described in the roadmap. Should coalitions of stakeholders emerge around the lake, even without the initial full support of all countries, 'lighthouse' projects may be defined in several areas of the roadmap. Lighthouse projects serve as beacons and are formulated bottom-up. The need to be considered as grassroots / entrepreneurial based projects with high visibility; they serve as pilot projects for a larger program implementation[3].

The first step of the process, is to start a political dialogue, based on the various studies, and with the support of key stakeholders (donors, trade associations). A key challenge remains at the level of the stakeholder(s) who will initially champion the vision and the associated creation of a dedicated CMB.

[3] "*A lighthouse project is a small-scale but big-picture project*" (see https://sonin.agency/lighthouse-projects-digital-transformation-innovation/)

Figure 16 contains the items on the roadmap governance:

*Figure 16: Programme Governance*


*Expected outputs, outcome and impacts*

Outputs:

- Memorandum of Understanding and Attachment to the Lake Tanganyika Authority to develop a Corridor Management Body (CMB)
- Working and operational structure supporting the various programs
- Development of a strategic plan based on previous studies and extensive stakeholder consultation
- Formal sign-off of program and project charters by contributing stakeholders

Outcomes:

- Improved stakeholder coordination on transport and trade policies around the lake
- Improved implementation rate of projects
- Improved mobilization and efficiency of funds

Impacts:

- Indirect contribution as a supporting factor to realise the impacts of the various programs

*Key stakeholders*

Lake Tanganyika Authority, Related Corridor Managing Bodies (Central, Northern), Governments (Ministries of Transport and Trade of the riparian countries), Port Authorities, Trade Associations, Donors.

In essence, the set-up of a CMB with sufficient resources and capabilities depends directly on a favourable government decision in each of the countries.

### 11.2.3 Program 'Coordination and advocacy'

*Description and rationale*

This program forms the core of any corridor initiative, be it smaller or larger-scale. While the program intends to achieve typical outcomes of corridor initiatives (such as increased and coordinated development of infrastructure and services considering the wider benefits, assuring the right scale of development is achieved, i.e. efficient use of financial resources, etc.; developing common transport and trade protocols), we also highlight specific projects which warrant short-term attention, such as

improvements of navigational safety (being the basic precondition for any transport mode to be attractive) as well as improvements of information and data exchange (e.g. on vessel traffic), which may include quick -wins in the shorter term. Typically public stakeholders support these activities, although user inclusion both at the level of input and validation of 'strategy document' outputs as well as the implementation of 'on-the-ground' solutions under the form of e.g. basic data exchange solutions or navigational aid solutions is required. Lighthouse projects would consist of the increase of navigational safety and the set-up of a basic information system of vessel traffic.

Figure 17 contains the projects within the program:

*Figure 17: Program: Coordination and advocacy*

| LAKE TANGANYIKA CORRIDOR ROADMAP | Time horizon (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| **Coordination and advocacy** | | | | | | | | | | |
| Develop common strategy to increase navigational safety | | | | | | | | | | |
| Define common corridor infrastructure development plan | | | | | | | | | | |
| Define common strategy to support intermodal transport services | | | | | | | | | | |
| Support trade facilitation processes (common "transport protocols") | | | | | | | | | | |
| Determine conditions for a 'lake community information system' | | | | | | | | | | |
| Implement 'lake community information system' | | | | | | | | | | |
| Develop a performance dashboard to track progress | | | | | | | | | | |

*Expected outputs, outcome and impacts*

Outputs:

- Implemented technological solutions (e.g. beaconing)
- Jointly approved infrastructure development masterplan
- Study on the potential of multi- and intermodal concepts on the lake and conditions for implementation
- Common transport and trade protocols
- Shared ICT platform for data exchange between stakeholders (shippers, forwarders, transport service providers, ports)
- Performance Dashboard (in line with other regional CMBs)

Outcomes:

- Improved navigational safety, reduction of accidents
- Improved safety profile / perception of the lake transport
- More efficient and coordinated infrastructure spending
- New services and new intermodal concepts (renewal of vessel fleet)
- Reduction of transit times
- Reduction of trade and transport-related costs
- Improved stakeholder dialogue
- Modal Shift from road to water (reduction of accidents and road congestion)

Impacts:

- Increase of trade volumes
- Increase of welfare (incl. job creation)
- Increase of investments
- Increased air quality in communities bordering main roads in the region (modal shift)
- Peace dividend

Note: attention needs to be paid to specific local externalities on port towns around the lake, given the need for pre-and post- haulage via road (and rail), which may lead to local increases of road transport.

*Key stakeholders*

Lake Tanganyika Authority, Related Corridor Managing Bodies (Central, Northern), Governments (Ministries of Transport and Trade of the riparian countries), Port Authorities, Trade Associations, Donors.

### 11.2.4 Program 'Marketing and awareness'

*Rationale and description*

This program is strongly B2B oriented in the sense that it needs to contribute to improved, more transparent access of shippers/traders, forwarders and other logistics providers to the full offer of transport services across the lake. It needs to foster increased use of lake transport services and allow to make a better assessment of costs and benefits for individual users towards using lake transport services instead of e.g. road transport. In sum, the program needs to enhance the profile of the lake transport corridor towards the intra-regional and wider international logistics community. At the same time, it raises the profile towards riparian governments and other stakeholders such as donors. Typically, this is managed by the CMB, with support from and outreach to the business community as they would need to share information about the offered services (and changes) on the platform. It also requires advocacy towards trade associations in terms of stimulating their members to contribute. There is a strong dependency between this program and the program on 'business ecosystem animation'.

While the website development is linked to the creation of the CMB, the set-up of the requirements and feasibility of the online information portal / platform could be considered as a lighthouse project.

Figure 18 contains the proposed projects in the program.

*Figure 18:Programme Marketing and awareness*

| LAKE TANGANYIKA CORRIDOR ROADMAP | Time horizon (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| **Marketing and awareness** | | | | | | | | | | |
| Development of website for LT CMB | | | | | | | | | | |
| Development of online information platform with transport service offer | | | | | | | | | | |

*Expected outputs, outcome and impacts*

Outputs:

- Well-functioning and maintained website for the CMB
- B2B web platform integrated on the CMB website

Outcomes:

- Improved image and recognition of the lake transport services (within the region and internationally)
- Improved access to and transparency/accuracy of information on transport services (frequency, vessel capacity, commercial contacts, pricing, processes)

Impacts:

- Increase of trade volumes
- Increase of welfare (incl. job creation)

*Key stakeholders*

Lake Tanganyika Authority, Port Authorities, Trade Associations of shippers and transport service providers

### 11.2.5 Program 'Business ecosystem animation'

*Description and rationale*

This program is oriented at increasing the interaction of business communities around the lake, while also creating stronger representative organizations (e.g. trade associations) at a transnational level, and structuring the interaction of the CMB with the private sector. Furthermore, these interactions also could lead to the strengthening of important supporting and related services around the lake, such as e. g. ship repair and maintenance, or information services, as they may lead to the pooling of resources from a private sector perspective to foster the development of these services. From a public sector perspective, the ports as offering infrastructure and cargo handling services, play a pivotal role as an interface between public and private sector, and may consider to form their own branch organization ('Lake Tanganyika Port Association') to work on common issues of interest (e.g. nautical conditions, services and access, business development).

Lighthouse projects in this case are the mapping of business ecosystems (trade associations, ports,…) as well as smaller scale trade fairs and trade mission. Although not all stakeholders are convinced, based on previous experiences, we believe an increased and structural interaction between the business ecosystems around the lake would increase trade potential. At least, determining the format and conditions to organize these structural interactions may be worth investigating.

Figure 19 shows the proposed projects within this program.

*Figure 19: Programme Business ecosystem animation*

| LAKE TANGANYIKA CORRIDOR ROADMAP | Time horizon (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| **Lake Tanganyika business ecosystem animation** | | | | | | | | | | |
| Mapping existing trade associations (traders, forwarders, ports,...) | | | | | | | | | | |
| Stimulate development of missing associations in the ecosystem | | | | | | | | | | |
| Support trade fairs, trade missions and exchanges (intra-regional trade) | | | | | | | | | | |
| Attract supporting cluster services (ship repair, maintenance) | | | | | | | | | | |

*Expected outputs, outcome and impacts*

Outputs:

- Business ecosystem map at a transnational level
- New trade associations
- Strengthening of the private sector as a partner for dialogue and advocacy
- Structural program of trade missions and other types of B2B exchange platforms
- Creation of new services

Outcomes:

- Stronger mobilization of private sector funding
- Strengthening of transport and export-oriented clusters
- Increased integration of business communities around the lake
- Cost reduction for supporting services (repair, maintenance)

Impacts:

- Increase of trade volumes
- Increase of welfare (incl. job creation)
- Peace dividend

*Key stakeholders*

Port Authorities, Trade Associations of shippers and transport service providers, Lake Tanganyika Authority, Ministries of Trade and Foreign Affairs, Governmental Export Agencies (Trade Commissions).

### 11.2.6 Program 'Capacity Building'

*Description and rationale*

While not within the direct remit of traditional corridor initiatives, our interviews have pointed out that a more coordinated approach towards capacity building in various trade, transport and logistics operations through various educational modes (academic, professional, vocational) and formats (long and short programs and courses, workshops, implementation guidance sessions) is required to successfully realize the impacts by the above mentioned programs and projects. The human resources component, next to

infrastructure investments, is crucial to implement and operate the various initiatives mentioned on the roadmap, and would benefit greatly from a coordinated approach, leading to increased efficiency of educational budget and resources across the lake, including the development of a complementary offer accessible to the whole Lake Tanganyika community. The CMB can play a role in pulling the various initiatives of governments and donors together, offering the information on educational activities on one single platform, fostering exchange and participation, and initiating complementary initiatives.

In terms of lighthouse projects, a mapping exercise on the current offer of related educational programs on trade, transport, navigation across the various types of education (incl. vocational training) in the broader region and potential for exchange would be proposed.

Figure 20 shows the proposed projects within this program.

*Figure 20: Programme Capacity Building*

| LAKE TANGANYIKA CORRIDOR ROADMAP | Time horizon (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| **Capacity building** | | | | | | | | | | |
| Mapping existing educational intiatives for lake trade/transport | | | | | | | | | | |
| Define common strategy for lake trade/transport education | | | | | | | | | | |
| Support development of a common Maritime Training Institute | | | | | | | | | | |

*Expected outputs, outcome and impacts*

Outputs:

- Inventory of educational projects and activities related to transport and trade around the lake, incl. maritime related training
- Coordinated and shared strategy for training towards the corridor vision
- A dedicated, common Maritime Training Institute (or a network/alliance of interlined institutes)
- Development of new courses and programs

Outcomes:

- Increased efficiency of existing educational resources
- Increased and more specialized training offer
- Increased exchange and mobility of students
- Increased employability of lake communities within the transport and trade sector
- Strengthening of transport and export-oriented clusters

Impacts:

- Improved efficiency of transport and trade
- Increase of welfare (incl. job creation)
- Peace dividend

*Key stakeholders*

Education providers, Ministries of Education and Foreign Affairs, Port Authorities, Trade Associations of shippers and transport service providers, Lake Tanganyika Authority, Donors.

### 11.2.7 Next steps in the process

A suggested next step, is to discuss this initial roadmap with key stakeholders through a stakeholder workshop, and receive their inputs in terms of prioritization of programs and projects, in particular the lighthouse projects (depending on implementation feasibility, tangible impacts, potential for quick-wins, stakeholder acceptance and contribution, resource availability).

Following this prioritization of the programs and projects, the next step towards concrete implementation by the stakeholders 'on the ground' is to further decline the programs into full-fledged separate projects, using concise 'project briefs' identifying both program sponsors/leader (program managers), individual project sponsors and champions (project managers), identifying the key stakeholders for support, and set-up a concrete stepwise implementation plan for each project, including quick-wins to be achieved as well as indicators to assess project progress towards both outputs and outcomes. While this process could be supported by external advisory and coaching, we believe this step needs to be ensured by the implementing stakeholders 'on the ground' in order to solidify the ownership.

In this context, the value of a CMB, which acts as the 'guardian angel' of the roadmap and ensures and monitors the implementation, is an important success factor. In sum, the CMB functions as a 'Project Management Office' or PMO for the whole program, even if for some projects, they may be more the facilitator rather than the 'champion' (e.g. capacity building).

This raises an important point as program and project managers within the CMB (and/or temporarily detached from other organizations) need to be considered and respected as leaders, with a thorough understanding of both public and private sector functioning, the ability to forge partnerships, and the ability to have contributing stakeholders effectively deliver towards the project's objectives. As the international benchmark has shown, staff appointments are a key success factor. Given the presence of well-functioning and well-respected Corridor organizations in the region (Central and Northern), we believe that tapping into the knowledge and capabilities of these existing organizations, and finding synergies (e.g. at the level of managerial capabilities), will be a crucial success factor.

Overall, we believe a staff requirement of about 8 FTE is needed in a first phase, to support the start and establishment of the CMB:

- Executive director and management assistant
- Program managers:
    - Coordination and advocacy: 2 FTE
    - Marketing and awareness: 2 FTE
    - Business Ecosystem animation: 2FTE

Optionally, 1 FTE could be added to the program on capacity building.

# Appendix 1: Overview of ships

Ships and ship operators on Lake Tanganyika, source: MSCL, 2020

| SHIPS NAME | AGENT | RT | NRT | GT | LOA | COUNTRY |
|---|---|---|---|---|---|---|
| TEZA | AMI LTD | | | 1880 | 60 | BURUNDI |
| TORA | AMI LTD | | | 1424 | 58.6 | BURUNDI |
| MISISI | ARNOLAC | | | 144.237 | 23 | BURUNDI |
| BIHANGA | ARNOLAC | 123.57 | 506.422 | 630 | 44 | BURUNDI |
| BUYENZI | ARNOLAC | 380.39 | 537.825 | 918.212 | 52.77 | BURUNDI |
| BURAGANE | ARNOLAC | | | 916.993 | 54.01 | BURUNDI |
| CHOHOHA | ARNOLAC | | | 350 | 42.35 | BURUNDI |
| KABAMBARE | ARNOLAC | | | 550.525 | 42.7 | BURUNDI |
| MUMIRWA | ARNOLAC | | | 918.627 | 52.77 | BURUNDI |
| MURINZI | ARNOLAC | 424.44 | 884.616 | 1309.05 | 59.6 | BURUNDI |
| NDAJE | ARNOLAC | 423.82 | 618.305 | 1042.12 | 54.65 | BURUNDI |
| RUREMESHA | ARNOLAC | 200 | 350 | 550 | 41.25 | BURUNDI |
| RWERU | ARNOLAC | | | 150 | 32.7 | BURUNDI |
| SAGAMBA | ARNOLAC | | | 647 | 65.7 | BURUNDI |
| TUG KIZIGENZA | ARNOLAC | | | 595.581 | 33.5 | BURUNDI |
| TUG TANGANYIKA | ARNOLAC | | | 595.581 | 31.2 | BURUNDI |
| BYAMWEZI | ARNOLAC | | 1837 | 2500 | 71 | BURUNDI |
| RWEGURA | BATRALAC | 147 | 500 | 647 | 45 | BURUNDI |
| DALILA | ABS MAMRY | 18.48 | 58.52 | 77 | 19.6 | DRC |
| DIEU MERCI / SHALOM | ABS MAMRY | | | 381.648 | 34.5 | DRC |
| KASENGA | ABS MAMRY | | | 210 | 27 | DRC |
| KATANGA | ABS MAMRY | 63.36 | 240.16 | 303.52 | 31.2 | DRC |
| LENGWE | ABS MAMRY | 172.93 | 252.098 | 425.03 | 34 | DRC |
| LUBUDA | ABS MAMRY | | | 123 | 17 | DRC |
| MOBA | ABS MAMRY | | | 190.482 | 19.2 | DRC |
| MPALA | ABS MAMRY | 40 | 88.926 | 124.274 | 20.95 | DRC |
| LUFUKO | FALCONY | | | 170 | 24 | DRC |
| M.BENITA | FALCONY | 172.04 | 104.85 | 276.887 | 28.4 | DRC |
| M.ALPHONSINE | FALCONY | 111.35 | 495.415 | 506.769 | 38.51 | DRC |
| IMAN | FALCONY | 29.789 | 132.25 | 162.039 | 28 | DRC |
| MUDEKERA | FALCONY | | | 574.42 | 41.54 | DRC |
| PACIFIC | FALCONY | | | 416.168 | 42.6 | DRC |

| SHIPS NAME | AGENT | RT | NRT | GT | LOA | COUNTRY |
|---|---|---|---|---|---|---|
| RAFIKI III | FALCONY | 170.34 | 556.007 | 726.346 | 55 | DRC |
| LA GRACE | FALCONY | | | 287.186 | 26.45 | DRC |
| SAFINA 2 | FALCONY | | | 610.512 | 38.55 | DRC |
| KAPANGA | FALCONY | | 240 | 276.88 | 28.4 | DRC |
| FARAJA | FALCONY | | 240 | 276.88 | 28.4 | DRC |
| AFRICA | SNCC | 43.991 | 200 | 244.046 | 35 | DRC |
| ASIFIWE | SNCC | | | 413.634 | 37.59 | DRC |
| ASIFIWE 2 | SNCC | 114.99 | 1007.01 | 1122 | 58.5 | DRC |
| KATUMBI | SNCC | | | 1308.02 | 57.07 | DRC |
| KAVALLA | SNCC | 29.789 | 132.25 | 162.039 | 28 | DRC |
| LUKUGA | SNCC | 355 | 602.354 | 957.774 | 49.2 | DRC |
| MALUNGU | SNCC | 359.09 | 547.947 | 907.041 | 52.77 | DRC |
| MPALA | SNCC | | | 351.277 | 35 | DRC |
| TEMBWE | SNCC | 136.72 | 500.004 | 636.725 | 47.49 | DRC |
| ULINDI | SNCC | 71.785 | 307.058 | 378.843 | 33.4 | DRC |
| VUA | SNCC | | | 595.581 | 45.24 | DRC |
| YUNGU | SNCC | | | 595.581 | 52.015 | DRC |
| TUG ZONGWE | SNCC | 419.74 | 175.844 | 595.581 | 30.35 | DRC |
| AMANI | SNCC | | | 3250 | 90 | DRC |
| MALAGARASI | FALCONY | | 500 | 647 | 49 | TANZANIA |
| LIEMBA | MSCL | | | 1080 | 71.4 | TANZANIA |
| MWONGOZO | MSCL | | | 850 | 59.5 | TANZANIA |
| SANGARA | MSCL | | | 385 | 38.8 | TANZANIA |

# Appendix 2: Transit time and costs analysis – detailed overview

| Legend | |
|---|---|
| Truck | |
| Inland waterway | |
| Railway | |
| Dwelltime | |
| Port handling | |
| Total | |

## Northern Corridor

**1) Mombasa-Bujumbura (truck)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| *Mombasa dwell* | 48 | - |
| *Mombasa handling* | 48 | - |
| *Mombasa-Bujumbura* | 120 | 150 |
| *Total transit excl. Dwell time at border* | **216** | **150** |
| *Dwell time borders* | 60 | - |
| *Total transit time* | **276** | **150** |

**2) Mombasa-Kalemie (truck-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| *Mombasa dwell* | 48 | - |
| *Mombasa handling* | 48 | - |
| *Mombasa-Bujumbura* | 120 | 150 |
| *Bujumbura dwell* | 60 | - |
| *Bujumbura handling* | 60 | - |
| *Bujumbura-Kalemie* | 48 | 60 |
| *Total transit excl. Dwell time at border* | **384** | **210** |
| *Dwell time borders* | 60 | - |
| *Total transit time* | **444** | **210** |

## Central Corridor

**1) Dar es Salaam-Bujumbura (truck-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Dwell Dar | 48 | 0 |
| Handling Dar | 48 | 0 |
| Dar-Kigoma | 48 | 100 |
| Kigoma dwell | 24 | 0 |
| Kigoma handling | 12 | 0 |
| Kigoma-Bujumbura | 15 | 15 |
| Total transit excl. Dwell time at border | **195** | **115** |
| Dwell time border | 24 | 0 |
| Total transit time | **219** | **115** |

**2) Dar es Salaam-Bujumbura (truck)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Dwell Dar | 48 | 0 |
| Handling Dar | 48 | 0 |
| Dar-Bujumbura | 48 | 100 |
| **Total** | **144** | **100** |
| Dwell time border | 48 | 0 |
| **Total transit time** | **192** | **100** |

**3) Dar es Salaam-Bujumbura (rail-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Dwell Dar | 72 | 0 |
| Handling Dar | 48 | 0 |
| Dar-Kigoma | 48 | 50 |
| Kigoma dwell | 24 | 0 |
| Kigoma handling | 12 | 0 |
| Kigoma-Bujumbura | 15 | 15 |
| Total transit excl. Dwell time at border | **219** | **65** |
| Dwell time border | 24 | 0 |
| Total transit time | **243** | **65** |

**4) Dar es Salaam-Kalemie (truck-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Dwell Dar | 48 | 0 |
| Handling Dar | 48 | 0 |
| Dar-Kigoma | 48 | 100 |
| Kigoma dwell | 24 | 0 |
| Kigoma handling | 24 | 0 |
| Kigoma-Kalemie | 9 | 7 |
| Total transit excl. Dwell time at border | **201** | **107** |
| Dwell time border | 24 | 0 |
| Total transit time | **225** | **107** |

**5) Dar es Salaam-Kalemie (rail-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Dwell Dar | 120 | 0 |
| Handling Dar | 48 | 0 |
| Dar-Kigoma | 48 | 50 |
| Kigoma dwell | 24 | 0 |
| Kigoma handling | 12 | 0 |
| Kigoma-Kalemie | 9 | 7 |
| Total transit excl. Dwell time at border | **261** | **57** |
| Dwell time border | 24 | 0 |
| Total transit time | **285** | **57** |

## Central Corridor

**1) Beira-Bujumbura**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Beira dwell | 240 | 0 |
| Beira handling | 36 | 0 |
| Beira-Lusaka | 120 | 100 |
| Lusaka dwell | - | 0 |
| Lusake handling | - | 0 |
| Lusaka-Mpulungu | 18 | 40 |
| Mpulungu dwell | 48 | 0 |
| Mpulungu handling | 12 | 0 |
| Mpulungu-Bujumbura | 72 | 35 |
| Total transit excl. Dwell time at border | **546** | **175** |
| Dwell time border | 72 | 0 |
| Total transit time | **618** | **175** |

**2) Durban-Bujumbura (Truck-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Durban dwell | 108 | 0 |
| Durban handling | 24 | 0 |
| Durban-Lusaka | 160 | 110 |
| Lusaka dwell | - | 0 |
| Lusaka handling | - | 0 |
| Lusaka-Mpulungu | 18 | 40 |
| Mpulungu dwell | 48 | 0 |
| Mpulungu handling | 12 | 0 |
| Mpulungu-Bujumbura | 72 | 35 |
| Total transit excl. Dwell time at border | **442** | **185** |
| Dwell time border | 80 | 0 |
| Total transit time | **522** | **185** |

**3) Beira-Kalemie (Truck-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Beira dwell | 240 | 0 |
| Beira handling | 36 | 0 |
| Beira-Lusaka | 120 | 100 |
| Lusaka dwell | - | 0 |
| Lusake handling | - | 0 |
| Lusaka-Mpulungu | 18 | 40 |
| Mpulungu dwell | 48 | 0 |
| Mpulungu handling | 12 | 0 |
| Mpulungu-Kalemie | 48 | 30 |
| Total transit excl. Dwell time at border | **522** | **170** |
| Dwell time border | 72 | 0 |
| Total transit time | **594** | **170** |

**4) Durban-Kalemie (Truck-barge)**

| | Travel time in hours | Costs in USD/MT |
|---|---|---|
| Durban dwell | 108 | 0 |
| Durban handling | 24 | 0 |
| Durban-Lusaka | 160 | 110 |
| Lusaka dwell | - | 0 |
| Lusaka handling | - | 0 |
| Lusaka-Mpulungu | 18 | 40 |
| Mpulungu dwell | 48 | 0 |
| Mpulungu handling | 12 | 0 |
| Mpulungu-Kalemie | 48 | 30 |
| Total transit excl. Dwell time at border | **418** | **180** |
| Dwell time border | 80 | 0 |
| Total transit time | **498** | **180** |

# Appendix 3: Interviews Corridor Governance

| ID | Interviewee | Organisation | Date and time |
|---|---|---|---|
| **1** | Lydia van Os<br>Guy Ngamba | WFP | 22 January 2021 |
| **2** | Sibeti Masuka | Ministry Transport Zambia | 25 January 2021 |
| **3** | Roel Derudder | Transfreight | 28 January 2021 |
| **4** | Egide Niyogusaba<br>Massimo SCALORBI | European Commission | 28 January 2021 |
| **5** | Silvester Kututa | ESL (private sector) | 29 January 2021 |
| **6** | Professor Chirhalwirwa<br><br>Denis Lewa Muganga | Northern Corridor Transit and Transport Coordination Authority | 29 January 2021 |
| **7** | Nkuruma (Chama Kalaluka) | Liaison officer Dutch government Zambia | 29 January 2021 |
| **8** | Charles Kunaka<br>Julien Emmanuel Galant<br>Nyembezi Myunga | World Bank | 29 January 2021 |
| **9** | Mari Pennanen | Africa Port and Corridor Holdings | 2 February 2021 |
| **10** | Capt. DieuDonne Dukundane | Central Corridor Transit Transport Facilitation Agency | 2 February 2021 |
| **11** | Christian nIbasumba<br>Sjoerd Visser | Trade Mark East Africa | 3 February 2021 |
| **12** | Godfrey Nengo | Africa Shipping Logistics | 3 February 2021 |
| **13** | Kafuta Mulemba | Lobito Corridor (SADC Secretariat | 3 February 2021 |
| **14** | Steffie Mahoro | IFC | 4 February 2021 |
| **15** | Philippe Accilien | US Aid | 8 February 2021 |
| **16** | Gabriel Hakizimana | LTA | 9 February 2021 |
| **17** | Alphonse Kimararungu | JICA | 9 February 2021 |

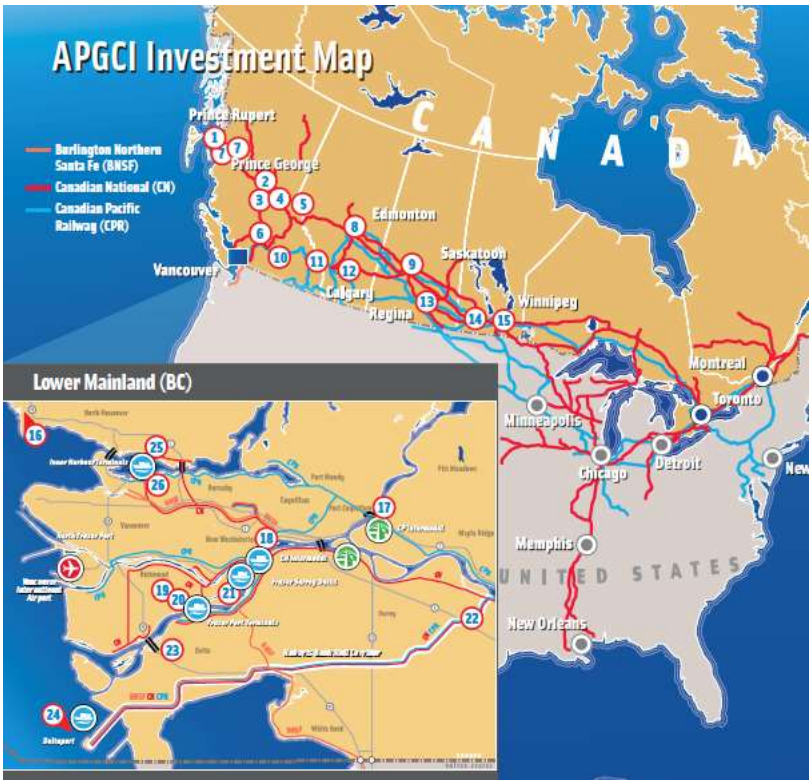
# Appendix 4: List with companies involved in corridor assessment

| ID | Port | Company | Date fact finding |
|---|---|---|---|
| **1** | Bujumbura | Global Port Services Burundi | Port operator |
| **2** | Bujumbura | Bollore Logistics | Logistics Services |
| **3** | Bujumbura | Batralac | Shipping |
| **4** | Bujumbura | RAD Marine | Shipping |
| **5** | Bujumbura | Arnolac Shipping company | Shipping |
| **6** | Bujumbura | Transbuja | Shipping |
| **7** | Bujumbura | ATIB - International Transport association | Association |
| **8** | Bujumbura | Burundi Maritime Ports | Port authority |
| **9** | Bujumbura | Railway Authority | Railway authority |
| **10** | Bujumbura | Bakhresa Grain Milling Burundi Ltd | Manufacturer |
| **11** | Bujumbura | Savonor Sa | Importer |
| **12** | Bujumbura | Sodetra Spil | Freight forwarder |
| **13** | Bujumbura | Buecco | Manufacturer |
| **14** | Bujumbura | Brarudi | Manufacturer |
| **15** | Uvira | BCP | Logistics services |
| **16** | Uvira | Establishment Olgra House | Shipping |
| **17** | Uvira | Port of Kasenga | Port authority |
| **18** | Uvira | SNNC Port of Kalundu | Port authority |
| **19** | Uvira | SEP Congo | Port authority |
| **20** | Uvira | Kalundu Fuel Terminal | Port operator |
| **21** | Kigoma | SNCC | Shipping |
| **22** | Kigoma | Falcony | Shipping |
| **23** | Kigoma | Arnolac Shipping company | Shipping |
| **24** | Kigoma | G&K Enterprises | Shipping |
| **25** | Kigoma | Kipara | Exporter |
| **26** | Kigoma | Jorum Transport | Road transport |
| **27** | Kigoma | Freight forwarding agency | Freight forwarder |
| **28** | Kigoma | Association of barge operators | Barge operators |
| **29** | Mpulungu | Road development agency (RDA) | Road transport |
| **30** | Mpulungu | Bollore Logistics | Logistics services |
| **31** | Mpulungu | Batralac Shipping Company | Shipping |
| **32** | Mpulungu | Fim de Semena | Port authority |
| **33** | Mpulungu | Mpulungu Harbour Corporation Limited | Port authority |
| **34** | Mpulungu | Zambia Revenue Authority | Revenue authority |

# Appendix 5: Corridor governance initiatives

**APGCI - Corridor Governance**

| Name of the Corridor |
|---|
| Asia-Pacific Gateway and Corridor Initiative (APGCI) |
| Coverage of countries & Regions |
| Canada, United States. Transport Canada leads the initiative, with 5 other federal departments and agencies supporting. The APGCI covers both ports of Vancouver and Price Rupert (British Columbia) and the road and rail network of Western Canada ((a) similar initiative(s) exists at the Eastern side of the country). |
| Historical context of the Corridor |
| The APGCI was launched in 2006 in view of trade facilitation between Canada and the Asia-Pacific region. It is presented as an integrated set of infrastructure, policy and research initiatives. An in-depth evaluation took place in 2017.<br><br>The conclusions were that:<br>(1) Stakeholder inclusion was a success factor |



(2) Merit-based selection of projects was well implemented and respected, including objective evaluation, transparency and implementation support. However, stronger support by cost-benefit analysis is advised
(3) Research played an important role
(4) Ex-post reporting was less relevant
(5) Project calls were potentially too broad

The initiative was not prolonged, as during 2016/2017 key staff at Transport Canada was leaving and the effectiveness of delivery was somewhat at risk. However, Transport Canada's Gateways and Corridor's initiatives are still formally mentioned and it appears there is a lasting legacy in terms of strategy and policy implementation (e.g. structural dialogue between stakeholders).

Main objectives and scope of activities

The objectives of the APGCI are to:

- Increase Canada's trade with the Asia-Pacific region
- Increase the share of North-America bound containers imports from Asia
- Improve the efficiency and reliability of the Gateway for Canadian and North American exports

There is an explicit element of competition included with the United States. Overall, the initiative makes part of a broader 'competitiveness' agenda, and provides an integrated action plan (including marketing).

Main transport markets served (freight, passengers, industries, transport & flows modes)

The main focus is both the attraction as well as the facilitation of the movement of freight flows between the Asia-Pacific Region and North-America, with Canada's Pacific ports as main spearheads, with the aim to serve markets across the border (e.g. up to Chicago in the US).

Main import categories in value are ICT equipment, automobiles and parts, toys, clothing, furniture and cameras; Main exports are coal, agricultural products (seeds, meslin and wheat), chemical wood pulp and potash. Other exports are ores, forest products, chemicals and meat.

The initiative focused a lot on east-west / west-east flows whereas the main flows are directed north-south (and vice-versa). This apparently created some political challenges, also related to the large geography and the fact that in Canada distribution of federal funds is influenced by a quest to compromise different provinces' needs.

Name of the Managing Body of the Corridor

Transport Canada, as the main Canadian Federal Agency

Governance structure of the Managing Body of the Corridor

The governance was mainly based on a unit within Transport Canada. The initiative was stopped as most persons responsible within Transport Canada have retired or moved on. Some provinces set up their own councils gathering the local and regional stakeholders such as the Vancouver Gateway Council.

Main strategic documents (visions, masterplans, other)

Apart from studies outlining policy agendas and priorities, as well as program evaluations and associated findings and implications, who feed in to national transportation plans, there is no specific document such as masterplan or a vision.

Funding Mechanism(s) for Corridor Development

In total, GoC spent 1,17 billion C$ (ca. 900 million USD) between 2006-2018.

For transport infrastructure, the Asia-Pacific Gateway and Corridor Transportation Infrastructure Fund (APGCTIF) was established. It acts as a merit-based contribution fund providing funding for infrastructure projects enhancing international trade with the Asia-Pacific Region. The APGCTIF provides co-funding of up to 50% for provinces, municipalities, government agencies and boards, NPOs and private companies and port authorities. Between 2009 and 2015, between 73 and 185 million C$ was disbursed.

For trade facilitation, the Gateways and Border Crossing Fund (GBCF) was established, based on similar principles of co-funding. This fund invests in strategic trade related transportation assets, mainly focused on border crossings (ports, airports, intermodal facilities, Canada-US border crossings). The GBCF budget was 2,1 billion C$ for the period 2007-2014. Interestingly, caps are set for overhead spending with concrete allocations for monitoring and evaluation, program development and management, etc. (not exceeding 3% of the budget).

The evaluation reports contains year-on-year spending, specified in terms of costs (salary versus non-salary), type of funding program as well as geographical allocations of funding.

Another important indicator is the financial leverage obtained by Transport Canada from other entities: this was assessed as 66% being contributed by other entities for the GBCF and up to 70% for the APGCTIF.

Project appraisal tools, processes & methodologies

There was no information available in public documents.

The evaluation in 2017 points to a transparent and objective selection process for projects submitted by stakeholders, but highlights that more in-depth cost-benefit analysis is required at the project level.

Corridor performance management and Key Performance Indicators

The 2017 evaluation report contains various KPIs on:

- Transit times on end-to-end trade routes (Hong Kong – Toronto), including benchmarks; border crossing times
- Evolution of trade flows
- Safety indicators

However, it does not appear a structural scorecard or observatory was put in place, although elements exist at the level of Transport Canada (measurement of transit times on trade corridors, establishment of a Performance Table, port fluidity indicators).

List of main information sources

*List the main information sources used for the case study (URLs, title of documents)*

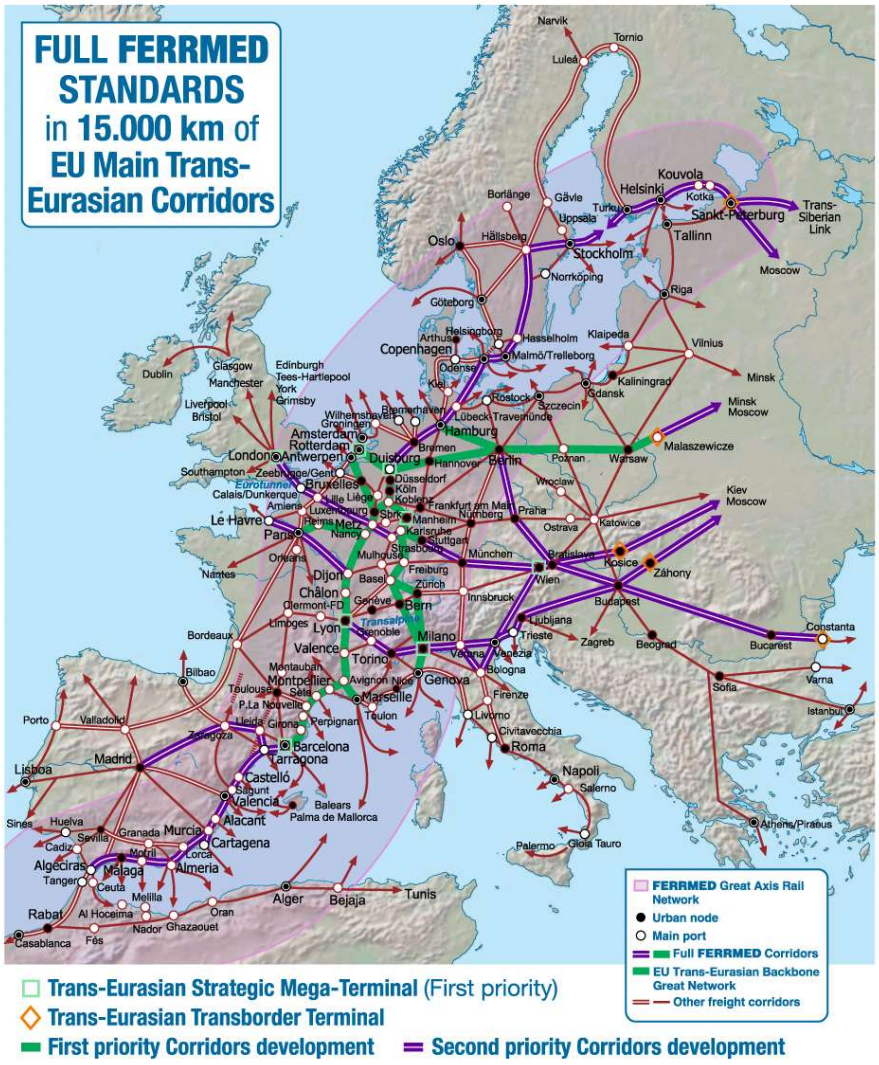
https://tc.canada.ca/en/corporate-services/policies/gateways-corridors

Evaluation of the Asia-Pacific Gateway and Corridor Initiative and the Gateways and Borders Crossing Fund. October 2017. Transport Canada – Evaluation and Advisory Services

E-mail communication with Prof. Gilen (UBC)

**FERRMED – Corridor Governance**

| Name of the Corridor |
|---|
| FERRMED |
| Coverage of countries & Regions |
| The FERRMED corridor is initially built on a North-South logic creating an integrated railway corridor between Northern Europe (Scandinavia) to Southern Europe (Western Mediterranean). Later, the scope was expanded into Eastern Europe as well as a Trans-Eurasian axis. |




| Historical context of the Corridor |
|---|
| After a large inaugural event in October 2003, FERRMED was formed in 2004 as a multisectoral private sector association promoting the role of rail freight transport and industrial competitiveness |

| |
|---|
| in Europe. Although positioned as a private sector initiative taking the form of a not-for-profit organization, a significant part of membership consists of port authorities, chambers of commerce (public), and various branch organizations. Other members include terminal operators, rail equipment manufacturers, railway undertakings, and consultants and research institutes. The core of the initiative was situated in the Western Mediterranean (Southern Europe). At present, the association reports ca. 150 members. |
| Main objectives and scope of activities |
| The main objectives are related to the promotion of seamless, faster and reliable rail transport on the North-South axis in Europe by performing studies and events, based on the formulation of position papers, manifesto's and lobbying towards the EU authorities (e.g. inclusion of all FERRMED network branches in the core EU Transportation network).<br><br>The main activities revolve around:<br>- Performing studies on railway equipment and infrastructure development, common standards, etc.;<br>- Organizing workshops and events for members and outside stakeholders;<br>- Follow-up of government initiatives both on regional, national and international level, including studies on performance;<br>- Lobbying.<br><br>A key element constitutes the lobbying for a more reticular and polycentric development of rail transport corridors, as well as advocating the use of longer and heavier freight trains. |
| Main transport markets served (freight, passengers, industries, transport & flows modes) |
| Freight transport via rail, including interconnectivity with airports, inland ports and seaports.<br><br>All railway freight segments, on the North-South Axis in Europe. More recently, the geographic interest was expanded to Asia with the signing of various MoUs and MoCs with Russian and Asian stakeholders. |
| Name of the Managing Body of the Corridor |
| FERRMED ("Promotion of the Great Freight Railway axis Scandinavia, Rhine, Rhone, Western Mediterranean"). |
| Governance structure of the Managing Body of the Corridor |
| The organization is managed by a Steering Committee of about 20 members representing the various interests (next to the traditional General Assembly of members). Next to the Steering Committee, there exists an Advisory Board comprised of non-member experts (about 40 members). The secretariat has 2 permanent staff members, next to the President and a Press relations officer.<br><br>There are 3 FERRMED Working Groups with member representation:<br>- Infrastructure<br>- Operations<br>- Rolling Stock |
| Main strategic documents (visions, masterplans, other) |

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| Frequent ad-hoc studies, outlining measures and intentions. These studies serve to lobby political decision-makers at regional, national and international level. |
| Funding Mechanism(s) for Corridor Development |
| Annual membership fees.<br><br>The income serves to finance the secretariat as well as the ad-hoc studies performed by consultants and research institutes. |
| Project appraisal tools, processes & methodologies |
| Not Applicable |
| Corridor performance management and Key Performance Indicators |
| Through studies and working groups, information is obtained on infrastructure and operations performance of the corridor. There is no publication of a structural performance dashboard. |
| List of main information sources |
| *List the main information sources used for the case study (URLs, title of documents)*<br>https://www.ferrmed.com<br>Press releases and studies available on the website |

**Northern Corridor – Corridor Governance**

| Name of the Corridor |
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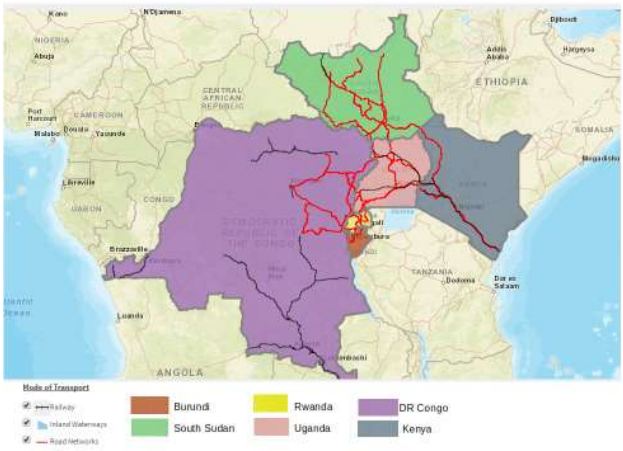
| Northern Corridor |
| Coverage of countries & Regions |
| Burundi, Democratic Republic of Congo*, Rwanda, South Sudan*, Uganda, Kenya. The corridor also serves parts of Southern Somalia, Northern Tanzania and Ethiopia.<br>(* joined later)<br>NORTHERN CORRIDOR MEMBER STATES<br>  <br> |
| Historical context of the Corridor |
| Before the existence of the Corridor, transport conditions from and to the Port of Mombasa (Kenya) were set under bilateral agreements between countries. As a result, there was no coherent framework for transit services and procedures on the different territories. A multilateral agreement (Treaty) was signed in 1985/ratified 1986 (NCTA: Northern Corridor Transport Agreement), reviewed in 2007, and currently being revised as well. The Corridor clearly was thus set up on the initiative of public sector bodies / country governments.<br><br>The main achievement of the Corridor over time has been the creation of a wealth of information on the performance of infrastructure and processes, informing discussions between policy stakeholders. This had led to improved procedures, identification of road safety black spots, implementation of One Stop Border Ports (OBSPs), etc.. |
| Main objectives and scope of activities |
| The main objective is to facilitate transit trade in the landlocked countries through the port of Mombasa:<br>- to promote the Corridor as the most efficient way of transport from the port to the hinterland (and back).<br>- to offer the right of transit to the signatory countries<br>- to provide transit traffic facilities.<br><br>Mostly road transport (about 13.000 kilometres of road) and pipelines (about 1.300 kilometres) are covered. There is a protocol for rail transport and inland waterways as well, but it is not clear whether these have priority when looking at the main achievements over time. |

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| The Agreement also sets forwards explicit objectives of safety as well as social and economic development of the corridor, with respect for environmental sustainability. |
| Main transport markets served (freight, passengers, industries, transport & flows modes) |
| The main focus is the movement of freight to and from the Port of Mombasa, Kenya. While there is a clear focus on land surface transport modes (hinterland transportation), the Corridor also deals with port performance on the maritime side.<br><br>In total, the port of Mombasa in 2019 handled ca. 32 million tonnes of which 27,5 million tonnes of import cargo. The main products from the region for export are agricultural goods (main market USA) while mostly manufactured goods are imported from the Middle East and Asia. |
| Name of the Managing Body of the Corridor |
| Northern Corridor Transit and Transport Coordination Authority (NCTTCA) |
| Governance structure of the Managing Body of the Corridor |
| As countries are signatories or members to the Agreement, the highest body of decision-making is the Council of Transport Ministers. It is supported by an Executive Committee comprised of Permanent Secretaries (or equivalent) to initiate and guide the Permanent Secretariat of the NCTTCA. Several supporting committees exist: Transport Policy and Planning, Customs and Transit Facilitation, Infrastructure Development and Management, Private Sector Investment Promotion. Since 2017, there is a formal committee with participation from the private sector, the so-called Public Private Stakeholders Committee.<br><br>The main underlying document explaining the governance is the NCTA agreement of 2007, which is publicly available. |
| Main strategic documents (visions, masterplans, other) |
| The NCTA does not foresee a masterplan or any form of shorter or longer term policy plan. Only an Annual Budget is required. In 2011, an infrastructure masterplan for the corridor was drafted by a consultant, but it is not sure whether this was formally adopted and used at the Member States's level.<br><br>There are no further public documents available with regard to the overall strategy. |
| Funding Mechanism(s) for Corridor Development |
| The NCTTA (art. 11) sets out the financing sources of the NCTTCA:<br>- Contributions of contracting parties<br>- Funding by Donor agencies<br>- Levy on good loaded/unloaded at the port of Mombasa<br><br>There are no public data available on both resources and expenditure of the NCTTCA. |
| Project appraisal tools, processes & methodologies |
| As it appears, the NCTTCA is rather a coordinating entity, and does not manage capital investment projects on its own. It appears most funding goes to the functioning of the committees, financing of studies in various areas (road safety, environmental sustainability, harmonization of transit and customs procedures, etc.) and performance monitoring. The website contains a repository of various studies and supporting documents for member states (a PPP handbook, etc.). |

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| There are no publicly available data on budget allocation. |
| Corridor performance management and Key Performance Indicators |
| With the support of Donor Agencies (TMEA), a weekly Corridor Performance Dashboard is publicly available containing KPIs on the following areas (see http://kandalakaskazini.or.ke ):<br>- Maritime indicators (2 KPIs) – Ship wait time to berth and Ship Turnaround Time<br>- Port indicators (6 KPIs) – of which Customs and Process indicators<br>- Corridor indicators (4 KPIs) – of which transit times<br><br>In total the Observatory monitors about 40 indicators, with weekly, quarterly, annual and sometimes multi-annual reports. The weekly performance report also serves a weekly meeting on port performance held between Mombasa port stakeholders (the so-called Mombasa Port Community Charter). More recently, a joint performance report with the Central Corridor was published.<br><br>Therefore, a very structured account of corridor performance is publicly available, with high levels of detail. |
| List of main information sources |
| *List the main information sources used for the case study (URLs, title of documents)*<br><br>http://www.ttcanc.org (various documents) |

**STLWR-GL – Corridor Governance**

| Name of the Corridor |
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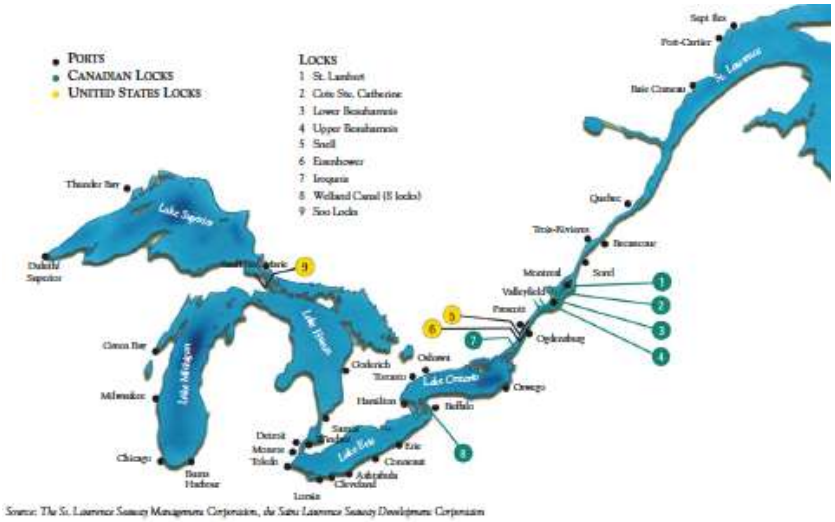
| St. Lawrence – Great Lakes Trade Corridor or Great Lakes St. Lawrence Seaway (GLSLS) |
| Coverage of countries & Regions |
| Canada, United States. The corridor plays an important role in trade flows between North America, South America and Europe. The waterway distance covers up to 3.700 kilometres and serves the core of North America's industrial area.<br>  <br><br>Source: The St. Lawrence Seaway Management Corporation, the Saint Lawrence Seaway Development Corporation |
| Historical context of the Corridor |
| A memorandum of cooperation between Canada and the US on the development of the GLSLS system (2003) led to a joint multi-year study completed in 2007, steered by 7 departments of both governments, in three working groups: Economic, Environment and Engineering. The 2007 study recommended the creation of a binational body of government representatives.<br><br>Further, regional initiatives took form through the Marine Industry Forum, a public/private forum consisting of the regional Quebec government and private sector representatives from the transportation sector. The Forum designated the St. Lawrence Economic Development Council (SODES) as the coordinating entity of the process. This organization gathers about 100 regional economic actors, of which a significant amount of industrial companies.<br><br>Finally, there exists a Regional Maritime Initiative (Great Lakes St. Lawrence Governors & Premiers) gathering public stakeholders across the border, taking charge of the Great Lakes Maritime Transport System (MTS). A Regional Maritime Entity was created by the governors and premiers of regions and provinces surrounding the MTS. |
| Main objectives and scope of activities |
| The main objective is to increase trade flows along the corridor, and reduce bottlenecks. The larger objective is to define and implement a strategy for economic growth, on the local level, and facilitate cargo flows. The initial study identified 15 priority actions including developments of infrastructure (ports, rail and road), regulatory reform (including tariff reductions and regulatory |

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| harmonization between Canada and the United States) and the definition of larger policies on labour and training. An update study of 2013 carried out by SODES identified six areas of intervention: infrastructure, governance and leadership, human resources, land use and urban cohabitation, regulatory structure and performance indicators. |
| Main transport markets served (freight, passengers, industries, transport & flows modes) |
| Freight transport, on waterway, rail and road.<br><br>Main cargoes transported: grain, iron ore, coal, cokes, stone, petroleum, chemicals, salt, cement, containers. |
| Name of the Managing Body of the Corridor |
| Several bodies exist as a patchwork:<br>- Great Lakes Commission<br>- Great Lakes St. Lawrence Governors & Premiers<br>- St. Lawrence Economic Development Council (SODES)<br><br>Next to the federal governmental entities (Department of Transport US, Army Corps of Engineers, Transport Canada), as well as a common governmental entity for the Saint-Lawrence Seaway management where both managing companies coordinate. |
| Governance structure of the Managing Body of the Corridor |
| Unclear given the many organizations present: no formal unique entity for integrated corridor management. |
| Main strategic documents (visions, masterplans, other) |
| Frequent ad-hoc studies, outlining measures and intentions. No formal unique visioning or masterplan document. |
| Funding Mechanism(s) for Corridor Development |
| Funding allocated through national transportation infrastructure development plans (or national corridor initiatives, cfr. Transport Canada). |
| Project appraisal tools, processes & methodologies |
| There was no information available in public documents. |
| Corridor performance management and Key Performance Indicators |
| All studies mention the need for a joint performance monitoring system, with indicators on infrastructure quality, transit times, economic and environmental impacts. |
| List of main information sources |
| *List the main information sources used for the case study (URLs, title of documents)* |

Great Lakes St-Lawrence Seaway Study – Final Report, Fall 2007 (The Great Lakes St. Lawrence Seaway Study's Steering Committee) – Joint
study between Transport Canada and the US Department of Transportation

St. Lawrence – Great Lakes Trade Corridor. Access road to economic prosperity. Winter 2013 (Update of the 2008 study). Groupe IBI on behalf of SODES (St. Lawrence Economic Development Council).

Strategy for the Great Lakes – St. Lawrence river maritime transportation system. 2016. Great Lakes St. Lawrence Governors and Premiers.

**WBCG – Corridor Governance**

| Name of the Corridor |
|---|
| Walvis Bay Corridor<br><br>WALVIS BAY CORRIDOR GROUP |
| Coverage of countries & Regions |
| Three corridors starting from Walvis Bay port:<br>- Trans-Kalahari : Namibia, Botswana, South Africa, Zimbabwe<br>- WBNLDC: Namibia, Zambia, DRC, Zimbabwe<br>- Trans-Cunene: Namibia, Angola, South-Africa<br><br>Representative offices in DRC, Zambia, South Africa and Brazil (HQ: Namibia)<br><br>  <br> |
| Historical context of the Corridor |
| The WBCG was established by two State-Owned Enterprises, Namport and Transnamib, as a Public Private Partnership (PPP) in 2000, as a service and facilitation centre to promote transport through the Port of Walvis Bay. The WBCG has gradually expanded its footprint through the opening of representative offices in neighboring countries such as DRC, Zambia and South Africa. Also an overseas office in Brazil (Sao Paulo) was established. The WBCG initiative is closely aligned with the Namibia national development plan to develop into a logistics hub in the Southern African region. WBCG has expanded its interest and vision towards becoming an economic corridor, beyond the core elements of transport and trade facilitation.<br><br>At the start, activities were focused on marketing and promotion. Afterwards, representative offices for business development were established in adjacent countries, and the organization shifted focus to trade and transport constraints identification and resolution. The WBCG evolved to a project management organization, establishing Corridor Management Secretariats to enhance seamless cross-border trade, transport and passenger facilitation, based on MoUs between the |

different countries. The organization now takes up a larger role in developing Namibia's economic competitiveness, by undertaking studies and managing projects supported by both Namibian public and private stakeholders as well as international bodies.

Main objectives and scope of activities

The core objective is to grow cargo volumes on the corridors from and to Walvis Bay port.

Activities include:

- Marketing and promotion of the Corridors
- Setting up transport fora with public and private stakeholders in the different corridor countries
- Offering the information on the various transportation services active on the corridor and supporting the development of new services
- Establishing transregional and transnational committees to enhance trade facilitation and seamless procedures
- Facilitating the provision of road and rail infrastructure
- Developing wellness centres along the corridor in the fight against HIV/AIDS, and broader health monitoring of transport and logistics workers (screening services, training, advice,…)

More recently, WBCG has been mandated by the Namibian Government to act as the spearhead of the Namibia Logistics Hub project, a larger project to make Namibia a logistics hub in the region, integrating next to logistics other economic areas such as Manufacturing, Agriculture and Tourism. Similarly, knowledge and research is mobilized in the context of Spatial Development Initiatives (SDIs) in collaboration with South Africa, mainly through studies and policy formulation.

Main transport markets served (freight, passengers, industries, transport & flows modes)

Freight transport via road and rail.

Main traffic categories at Walvis Bay port: containers, bulk and break-bulk of various commodities (such as salt in bulk and bags). Main industries served: petroleum, salt, mining and fishing industries.

Name of the Managing Body of the Corridor

Walvis Bay Corridor Group

Governance structure of the Managing Body of the Corridor

The organization is managed by a Board with representatives of member organizations (government departments, state-owned enterprises, private sector associations). It has an executive committee with a CEO, and the organization employs ca. 30 FTE.

Main strategic documents (visions, masterplans, other)

According to the website information, there exists a 5-year development and strategic plan (2016-2021), but this is not publicly available. Annual reviews are published (most recently 2016/2017). Following the CEO change in 2018, there are no annual reviews available.

Funding Mechanism(s) for Corridor Development

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| Annual membership fees and donor funding.<br><br>There are no publicly available figures available; annual review reports only contain qualitative information. |
| Project appraisal tools, processes & methodologies |
| Not available. |
| Corridor performance management and Key Performance Indicators |
| Annual reviews and brochures contain information on corridor transit times (end-to-end) as well as stated objectives. The reports suggest a function that deals with compilation of statistics and KPIs, without having a public dissemination component under the form of an observatory. |
| List of main information sources |
| *List the main information sources used for the case study (URLs, title of documents)*<br><br>A guide to the Walvis Bay Corridors. Facilitating free flow of trade to and from the SADC region. WBCG.<br><br>WBCG website http://www.wbcg.com.na (various articles and press releases)<br><br>http://namibiatradedirectory.com/portfolio-items/walvis-bay-corridor-group/ |

**Borderless Alliance – Corridor Governance**

| Name of the Corridor |
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| Borderless Alliance |
| Coverage of countries & Regions |
| Senegal, Mali, Burkina Faso, Ghana, Cote d'Ivoire, Niger, Benin, Togo, Nigeria. |
| Historical context of the Corridor |
| *Initial rationale/logic to start up the Corridor*<br>The initial rationale was improving transport, since efficient transport means more trade and in turn means stronger economic growth, higher profits for companies, greater income for national governments, increased investment and more jobs. Another important rationale is the safety issue in several African countries: since many transported goods are of high value (gold), many trucks are highjacked.<br><br>*Identify the initiators and their objectives (public sector, private sector, mixed)*<br>Borderless is a partnership of public and private sector stakeholders across the region. It is not entirely clear which countries were initiators but the Borderless Alliance was officially launched in May 2012 with support from the USAID West Africa Trade Hub and its partners. Some important partners are the Economic Community of West African States (ECOWAS), the West African Economic and Monetary Union (UEMOA), the Afrika Development Bank, the West Africa Food Markets (WAFM) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).<br><br>*Explain the context within which the Corridor was created*<br>In the countries in which Borderless Alliance is active, before the corridor was created, there was a lot of road harassment. Especially when high-value goods were transported, they were highjacked. Political uncertainty was also, and still is, an important factor for joining forces and working together on one trade corridor.<br><br>*Main developments and achievements over time (evolution)*<br>Each year there are several committees coming together (including members, ministers and other private parties).<br>2012: focussed on gathering more members.<br>2014: establishment of Border Information Centres (BICs), to provide technical services to its members and other stakeholders at various border posts along major trade corridors.<br>2015: road governance workshops & trade facilitation agreements. 2016: capacity building workshops. 2017: trainings, workshops and opening of another BIC. 2018/2019: more meetings, trainings and workshops. |
| Main objectives and scope of activities |
| The overall objective is to create a strong platform for Private Sector participation in the sub-regional trade facilitation and integration efforts, as well as provide significant business networking opportunities for increased West African Trade and Investment. |
| Main transport markets served (freight, passengers, industries, transport & flows modes) |
| *Transport markets* |

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| The Western African coastal transport market.<br><br>*Economic clusters*<br>Senegal: fish. Cote d'Ivoire: cocoa beans. Ghana: oil. Togo: cotton. Benin: cotton. Nigeria: petroleum. Niger: uranium. Burkina Faso: gold. Mali: cotton. |
| Name of the Managing Body of the Corridor |
| Borderless Alliance Executive Council |
| Governance structure of the Managing Body of the Corridor |
| *Membership structure and conditions of membership*<br>Membership of the Alliance is open to all private sector organizations and stakeholders in trade and transport facilitation in West Africa. Borderless Alliance membership is activated by submitting a completed membership form and the payment of annual membership dues.<br><br>*Main underlying documents*<br>Not 100% clear since it is a corridor focussed on private parties. Difficult to find online.<br><br>*Governance levels and structures*<br>Executive Council, Secretariat, Members.<br><br>*Main decision-making procedures*<br>Mainly via working groups and the annual conference. |
| Main strategic documents (visions, masterplans, other) |
| Not available |
| Funding Mechanism(s) for Corridor Development |
| Via membership fee as well as donations. |
| Project appraisal tools, processes & methodologies |
| Difficult to find for 2019, but in 2017 the total cost of the activities carried out stood at $ 494,446 as against a forecast of $967,211, thus showing a realization rate of about 51%. The partners which funded this were:<br>- Food Across Borders (ProFAB) program jointly by USAID and the Canadian Ministry of Foreign Affairs, Trade and Development (MAECD)<br>- USAID/West Africa<br>- GIZ/German Cooperation<br>- African Development Bank<br>- The West Africa Food Markets Program and the USAID Advance project also contributed to activities organized locally by the Ghana National Chapter. |
| Corridor performance management and Key Performance Indicators |
| *Corridor performance management*<br>Unclear, can not be found online.<br><br>*Key Performance Indicators* |

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| Same as TEN-T: no information online available. Perhaps same proposed indicators as TEN-T: Mobility, Optimal Use of Capacities, Safety, Intermodality, Accesibility, Economic Viability, Environment, Modal Balance. |
| List of main information sources |

**Motorways of the Sea – Corridor Governance**

| Name of the Corridor |
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| Motorways of the Sea |
| Coverage of countries & Regions |
| Motorway of the Baltic Sea: linking the Baltic Sea Member States with Member States in Central and Western Europe, including the route through the North Sea/Baltic Sea canal)<br>Motorway of the Sea of western Europe: leading from Portugal and Spain via the Atlantic Arc to the North Sea and the Irish Sea<br>Motorway of the Sea of south-east Europe: connecting the Adriatic Sea to the Ionian Sea and the Eastern Mediterranean, including Cyprus<br>Motorway of the Sea of south-west Europe: western Mediterranean, connecting Spain, France, Italy and including Malta and linking with the Motorway of the Sea of south-east Europe and including links to the Black Sea |
| Historical context of the Corridor |
| *Initial rationale/logic to start up the Corridor*<br>The two main logics behind starting up the Motorways of the sea is the improvement of access to markets throughout Europe. Secondly, the reduction of the strain upon already over-stretched European road systems is a rationale.<br><br>*Identify the initiators and their objectives (public sector, private sector, mixed)*<br>As the MoS is part of the TEN-T project, the European Parliament and Comission were the initiators, with similar objectives as for TEN-T.<br><br>*Explain the context within which the Corridor was created*<br>See the context of TEN-T.<br><br>*Main developments and achievements over time (evolution)*<br>Real LNG: Turning LNG as marine fuel into reality in the North Sea-Baltic region.<br>Blue Baltics: LNG infrastructure facility deployment in the Baltic Sea region.<br>Poseidon Med II: Adoption of LNG as marine fuel in the East-Mediterranean Sea.<br>Fresh Food Corridors: test and enhance a sustainable inter-modal transport and logistics system for freight movement between Mediterranean and Northern Europe by rail and sea.<br>Traffic management: Sea Traffic Management (STM) validation project Safety.<br>Picasso: Preventing incident and accident by safer ships on the oceans |
| Main objectives and scope of activities |
| Motorways of the Sea (MoS) is the maritime pillar of the TEN-T. It consists of short-sea routes, ports, associated maritime infrastructures, equipment, facilities and relevant administrative formalities. MoS contributes towards the achievement of a European Maritime Transport Space without barriers, connecting Core Network Corridors by integrating maritime links with hinterland. In doing so, it aims at providing more efficient, commercially viable and sustainable alternatives to road-only transport. |
| Main transport markets served (freight, passengers, industries, transport & flows modes) |
| *Transport markets*<br>The main transport market served is similar to that of the TEN-T: the internal market of the Member States. The mode is maritime based only.<br>*Economic clusters* |

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| Difficult to describe as Motorways of the Seas also helps overseas markets. |
| Name of the Managing Body of the Corridor |
| Cooperation between European Commission and The European Coordinator Kurt Bodewig |
| Governance structure of the Managing Body of the Corridor |
| *Membership structure and conditions of membership*<br>All countries which are not land locked are member (only when part of the EU/EEC)<br><br>*Main underlying documents*<br>The current TEN-T policy is based on Regulation (EU) No 1315/2013. Article 12a of the TEN-T guidelines (see sources for a link) gives three main objectives for the sea motorways projects: (1) freight flow concentration on sea-based logistical routes; (2) increasing cohesion; (3) reducing road congestion through modal shift.<br><br>*Governance levels and structures*<br>Each Corridor has its own European Coordinator, who manages the corridor by attending meetings and workshops. All corridors are in the end managed by the European Commission (in terms of funding and approval). |
| Main strategic documents (visions, masterplans, other) |
| Not available |
| Funding Mechanism(s) for Corridor Development |
| Financial support for the implementation of TEN-T guidelines stems from the following rules: Regulation (EC) No 2236/95 of 18 September 1995 contains general rules for the granting of Community financial aid in the field of trans-European networks. Regulation (EC) No 680/2007 of the European Parliament and of the Council of 20 June 2007 supplies general rules for granting Community financial aid for trans-European transport and energy networks. In general, TEN-T projects are mostly funded by national or state governments. Other funding sources include: European Community funds (ERDF, Cohesion Funds, TEN-T budget), loans from international financial institutions (e.g. the European Investment Bank), and private funding. |
| Project appraisal tools, processes & methodologies |
| 378.8 million euro of grant financing. While all corridors were recipients of CEF financing throughout the 2014 - 2017 period, the North Sea - Baltic and Scandinavian - Mediterranean corridors have been larger recipients of EU financing for the maritime investments through MoS. |
| Corridor performance management and Key Performance Indicators |
| *Corridor performance management*<br>Unclear, can not be found online.<br><br>*Key Performance Indicators*<br>Same as TEN-T: no information online available. Perhaps same proposed indicators as TEN-T: Mobility, Optimal Use of Capacities, Safety, Intermodality, Accesibility, Economic Viability, Environment, Modal Balance. |

| List of main information sources |
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| https://ec.europa.eu/transport/themes/infrastructure/motorways-sea_en<br>https://ec.europa.eu/inea/sites/inea/files/201803_mos_report_withcover.pdf<br>https://eurlex.europa.eu/legalcontent/EN/TXT/?uri=CELEX%3A32004D0884R%2802%29&qid=1606767672129 |

**TEN-T – Corridor Governance**

| Name of the Corridor |
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| TEN-T Rhine Danube |
| Coverage of countries & Regions |
| The corridor connects Strasbourg and Southern Germany with the Central European cities of Vienna, Bratislava and Budapest, before passing through the Romanian capital Bucharest to culminate at the Black Sea port of Constanta. A second branch of the corridor tracks a path from Frankfurt to the Slovakian/Ukrainian border, linking Munich, Prague, Zilina and Kosice. |
| Historical context of the Corridor |
| *Initial rationale/logic to start up the Corridor*<br>The overall TEN-T policy addresses the implementation and development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals. The ultimate objective is to close gaps, remove bottlenecks and technical barriers, as well as to strengthen social, economic and territorial cohesion in the EU.<br><br>*Identify the initiators and their objectives (public sector, private sector, mixed)*<br>The decision to adopt TEN-T was made by the European Parliament and Council. The European Parliament and Council envisaged improvements to primary roads, railways, inland waterways, airports, seaports, inland ports and traffic management systems, providing integrated and intermodal long-distance, high-speed routes. The overall objective was thus to interconnect Europe better.<br><br>*Explain the context within which the Corridor was created*<br>The development of the European Common Transport Policy began long before the TEN-T. The European Coal and Steel Community (ECSC) was established in 1951 and in 1957 the European Economic Community (EEC) was founded. Six years later, the EEC defined a common policy in the sphere of transport. Despite the progressive integration of European Communities, by the beginning of the 1980's there still was no Common Transport Policy. The European Court of Justice admonished the Council in 1985 on account of its policy. The member states changed their position and the Council decided in 1988 to introduce the Internal Market for Transport. Most of the projects were not started until the foundation of the European Union in 1992. In the Treaty, the Trans-European Networks were inserted. National experts were addressed and TEN-T was a fact.<br><br>*Main developments and achievements over time (evolution)*<br>The development of the European Common Transport Policy began long before the TEN-T. The European Coal and Steel Community was established in 1951 and in 1957 the European Economic Community (EEC) was founded. Six years later, the EEC defined a common policy in the sphere of transport. Despite the progressive integration of European Communities, by the beginning of the 1980's there still was no Common Transport Policy. The European Court of Justice admonished the Council in 1985 on account of its policy. The member states changed their position and the Council decided in 1988 to introduce the Internal Market for Transport. Most of the projects were not started until the foundation of the European Union in 1992. In the Treaty, the Trans-European Networks were inserted. National experts were addressed and TEN-T was a fact. |
| Main objectives and scope of activities |
| The main objective is smooth functioning of the internal market and the strengthening of economic, social and territorial cohesion. Other specific objectives also include allowing the seamless, safe and |

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| sustainable mobility of persons and goods, ensuring accessibility and connectivity for all regions of the Union, and contributing to further economic growth and competitiveness in a global perspective. Those specific objectives should be achieved by establishing interconnections and interoperability between national transport networks in a resource-efficient and sustainable way. |
| Main transport markets served (freight, passengers, industries, transport & flows modes) |
| *Transport markets*<br>TEN-T tries to serve the whole internal market of the European Union. To this extent the Rhine-Danube Corridor contributes to the transport market in central and Eastern Europe. The corridor consists of several modes: barge, train and truck (but with a main focus on barge and train, as TEN-T predominantely focusses on sustainability).<br><br>*Economic clusters*<br>Overall, most important is the automotive industry and car parts. Germany: automotive industry as well as wheat and grains. Austria: iron and steel market. Czech Republic & Slovakia: automotive industry (cars and parts). Hungary: machinery and equipment, as well as automotive industry. Romania: vehicle parts and insulated wire. Serbia: automotive industry. |
| Name of the Managing Body of the Corridor |
| Cooperation between European Commission and The European Coordinator Karla Peijs |
| Governance structure of the Managing Body of the Corridor |
| *Membership structure and conditions of membership*<br>All countries which lie in the corridor are member (only when part of the EU/EEC)<br><br>*Main underlying documents*<br>TEN-T guidelines were initially adopted on 23 July 1996, with Decision No 1692/96/EC of the European Parliament and of the Council on Community guidelines for the development of the trans-European transport network. In May 2001, the European Parliament and the Council adopted a Decision No 1346/2001/EC, which amended the TEN-T Guidelines with respect to seaports, inland ports and intermodal terminals. In April 2004, the European Parliament and the Council adopted Decision No 884/2004/EC (added to the list by Decision No 884/2004/EC), amending Decision No 1692/96/EC on Community guidelines for the development of the trans-European transport network. The April 2004 revision was a more fundamental change to TEN-T policies, intended to accommodate EU enlargement and consequent changes in traffic flows.<br><br>*Governance levels and structures*<br>Each Corridor has its own European Coordinator, who manages the corridor by attending meetings and workshops. All corridors are in the end managed by the European Commission (in terms of funding and approval). |
| Main strategic documents (visions, masterplans, other) |
| Not available |
| Funding Mechanism(s) for Corridor Development |
| Financial support for the implementation of TEN-T guidelines stems from the following rules: Regulation (EC) No 2236/95 of 18 September 1995 contains general rules for the granting of Community financial aid in the field of trans-European networks. Regulation (EC) No 680/2007 of the European Parliament and of the Council of 20 June 2007 supplies general rules for granting Community financial aid for trans-European transport and energy networks. In general, TEN-T projects are mostly funded by |

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| national or state governments. Other funding sources include: European Community funds (ERDF, Cohesion Funds, TEN-T budget), loans from international financial institutions (e.g. the European Investment Bank), and private funding. |
| Project appraisal tools, processes & methodologies |
| So far, 232 projects have been completed on the Corridor, for an overall cost of € 14 billion. By the time of the publication of the latest Work Plan, a total number of 736 projects and global investment needs close to € 100 billion have been identified. |
| Corridor performance management and Key Performance Indicators |
| *Corridor performance management*<br>Unclear, cannot be found online.<br><br>*Key Performance Indicators*<br>Currently the Infrastructure Reporting mechanism. However, new set of indicators was created in 2003 (cannot be found online). In project plan (https://trimis.ec.europa.eu/sites/default/files/project/documents/20060811_134610_51499_Indicators%20_Final_Report.pdf) it can be read that the indicators contain the following components: Mobility, Optimal Use of Capacities, Safety, Intermodality, Accesibility, Economic Viability, Environment, Modal Balance.<br>TEN-T does publish a yearly performance report on roads(average traffic flow, traffic density, proportion of heavy good vehicles, heavy goods vehicle traffic flow, road transport mileage, fatal accident rate) |
| List of main information sources |
| **https://ec.europa.eu/transport/themes/infrastructure/rhine-danube_en**<br>**https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996D1692:EN:HTML**<br>**https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R1315**<br>**http://komunikacie.uniza.sk/index.php/communications/article/view/1181/1145**<br>**https://www.danubecommission.org/uploads/doc/2020/CEF_INEA_RD_Report_2020.pdf**<br>**https://oec.world/en/visualize/tree_map/hs92/export/rou/all/show/2017/**<br>**http://publikacije.stat.gov.rs/G2019/pdfE/G20191198.pdf**<br>**https://www.cedr.eu/download/Publications/2018/TEN-T-Performance-report-2017.pdf** |

**TRACECA – Corridor Governance**

| Name of the Corridor |
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| TRACECA (Transport Corridor Europe-Caucasus-Asia) |
| Coverage of countries & Regions |
| Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Turkey, Ukraine, Uzbekistan, Tajikistan, Turkmenistan. Iran officially joined in 2009 after their request was accepted. However technical assistance related to the project has not been provided to Iran since 2010 due to UN Security and EU sanctions. |
| Historical context of the Corridor |
| *Initial rationale/logic to start up the Corridor*<br>Members of the Conference in Brussels in 1993 adopted the Brussels Declaration, to give rise to implementation of the interregional programme of technical assistance "TRACECA", financed from the European Union and aimed at the development of the transport corridor from Europe, crossing the Black Sea, Caucasus, the Caspian Sea and reaching the Central Asian countries.<br><br>*Identify the initiators and their objectives (public sector, private sector, mixed)*<br>Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan were the initiators. The main objective was for every initiator the same: enhancing the transport between the countries and developing a corridor from Europe all the way to Asia. Solely public sector.<br><br>*Explain the context within which the Corridor was created*<br>The corridor was initiated after a turbulent number of decades marked by the Cold War. Europe and Asia were torn apart and even within Europe there was a clear division between East and West. By working together through TRACECA, connections between Europe and Asia via former USSR countries could be restored and even improved.<br><br>*Main developments and achievements over time (evolution)*<br>May 1993: Brussels conference and foundation of TRACECA.<br>1995-1999: four working groups (Trade Facilitation, Road, Rail and Maritime Transport) with representatives from all the participating states were responsible for project identification and for the endorsement of projects proposed the EC financing.<br>1996-1998: Ukraine, Mongolia and Moldova joined the Programme<br>April 1997: Black Sea Economic Cooperation Conference, it was determined that TRACECA and TEN-T would not integrate but would cooperate closely together.<br>September 1998: Restoration of the Historic Silk Route International Conference, with the main outcome the signing of the "Basic Multilateral Agreement on International Transport for Development of the Transport Corridor Europe- the Caucasus – Asia".<br>March 2000: Bulgaria, Romania and Turkey officially applied to the European Commission with a request to join TRACECA Programme and as a result have become members of the Basic Multilateral Agreement of the international transport on development of the Europe-Caucasus-Asia corridor (MLA).<br>February 2001: Inauguration of the Permanent Secretariat Secretariat`s office |

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| Each consecutive year: annual meetings<br>Amongst its specific projects was the creation of a new bridge to replace and protect the heritage Red Bridge, located between Georgia and Azerbaijan |
| Main objectives and scope of activities |
| TRACECA has five working groups: maritime transport, aviation, road and rail, transport security, and transport infrastructure. Each working group has the objective of enhancing trade and in turn trade in the corridor. The scope of the working groups thus apply to all sorts of transport (on water, rail, air and road). |
| Main transport markets served (freight, passengers, industries, transport & flows modes) |
| *Transport markets*<br>Main transport markets lay in the countries specified by TRACECA. Most importantly, the cluster of the Eastern European States on one hand and the Central Asian States. The modes are road, air, rail and maritime transport.<br><br>*Economic clusters*<br>Mainly oil, cotton and copper. Kazakstan: oil. Uzbekistan: oil & cotton. Armenia: copper. Azerbajan: oil. Georgia: copper. Kyrgyzstan: cotton. Moldova: clothing. Turkey: Boilers, machineries and mechanical appliances, parts thereof. Ukraine: metals. Tajikistan: cotton. Turkmenistan: oil & cotton. |
| Name of the Managing Body of the Corridor |
| Intergovernmental Commission TRACECA |
| Governance structure of the Managing Body of the Corridor |
| *Membership structure and conditions of membership*<br>12 members + 27 EU countries. Members must contribute in investments.<br><br>*Main underlying documents*<br>TRACECA was established in May 1993 in Brussels, upon the signing of a Multilateral Agreement on International Transport for the development of transport initiatives (including the establishment and development of a road corridor) between the EU member states, the Caucasus and Central Asian countries.<br><br>*Governance levels and structures*<br>The Intergovernmental Commission (IGC) works according to “Rules of Procedure” and its decisions and recommendations govern the work of the Permanent Secretariat of the IGC TRACECA located in Baku. It is important to note, that the Permanent Secretariat maintains in each of its member countries permanent representations. |
| Main strategic documents (visions, masterplans, other) |
| Funding Mechanism(s) for Corridor Development |
| Unclear mechanisms. Minimum of 475 000 euros, maximum of 15 million euros. Different projects and different purposes. Interesting: has not been an investment since 2009! |
| Project appraisal tools, processes & methodologies |

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| Minimum of 475 000 euros, maximum of 15 million euros. Different projects and different purposes. Interesting: has not been an investment since 2009! |
| Corridor performance management and Key Performance Indicators |
| There is no control cyclus given. The same applies for some sort of corridor performance management. No information on this is provided on the website. Maybe this is considered confidential information. |
| List of main information sources |
| http://www.traceca-org.org/en/countries/<br>https://www.researchgate.net/figure/The-TRACECA-corridor_fig2_227580186<br>http://www.traceca-org.org/en/about-traceca/history-of-traceca/<br>https://tel.archives-ouvertes.fr/file/index/docid/731245/filename/Romania_s_Post-Cold_War_International_Relations.pdf<br>http://www.traceca-org.org/fileadmin/fm-dam/Routes_Maps/MAP_TRACECA_ROUTES_10_09_2017_300DPI.png<br>http://www.traceca-org.org/fileadmin/fmdam/pdfs/Appendix_3_Strategy_Master_plan_TRACECA_eng.pdf<br>http://www.traceca-org.org/en/home/intergovernmental-commission/<br>http://www.traceca-org.org/en/investments/ |

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