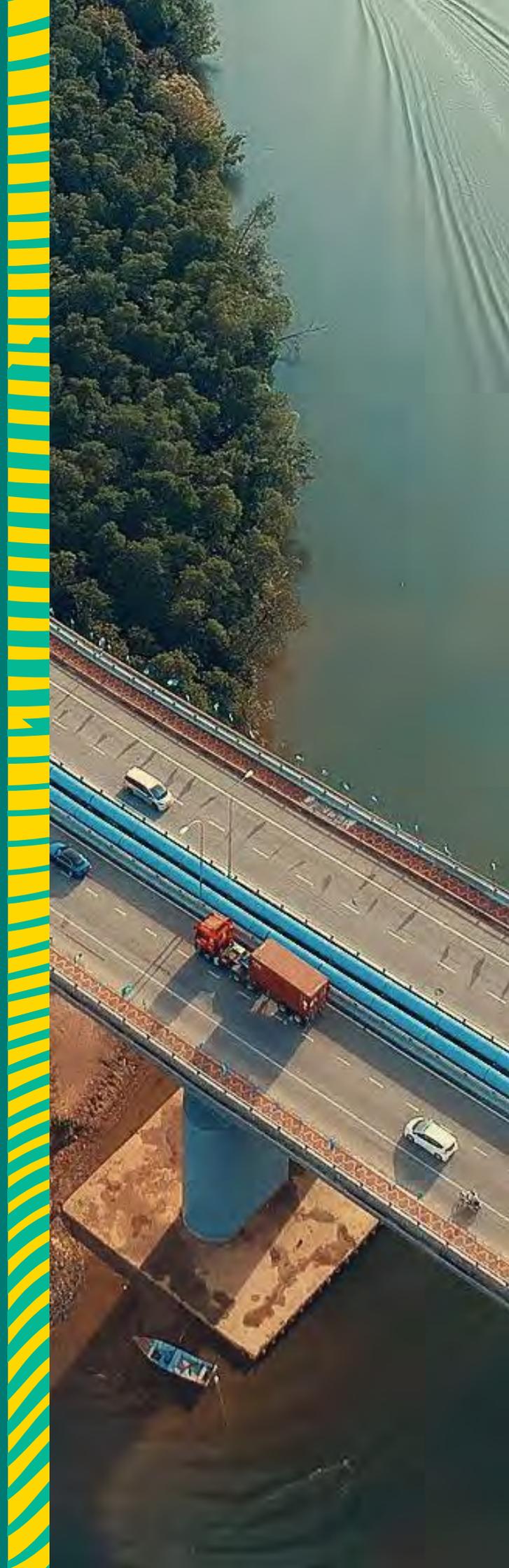




Transforming Africa's Trade

African Export-Import Bank
Banque Africaine d'Import-Export

Study on Trade-Carrying Infrastructure Gap in Southern African Development Community (SADC)



Study on
Trade-Carrying
Infrastructure
Gap in
Southern African
Development
Community
(SADC)

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Abbreviations

List of Abbreviations

Abbreviation	Description
AEO	Authorised Economic Operator
AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
Afreximbank	African Export-Import Bank
AID	Africa Infrastructure Database
ANE	Administração Nacional de Estradas
ASYCUDA	Automated System for Customs Data
ATM	Autoridade Tributária de Moçambique
AUDA-NEPAD	African Union Development Agency
BBR	Beitbridge Bulawayo Railway
BCP	Border Control Point
BCR	Benefit-Cost Ratio
BFS	Bankable Feasibility Study
BOT	Build-Operate-Transfer
BR	Botswana Railways
BURS	Botswana United Revenue Service
CAGR	Compound Annual Growth Rate
CBM	Coordinated Border Management
CdM	Cornelder de Moçambique
CDN	Northern Development Corridor
CEAR	Central East African Railways
CEN-SAD	Community of Sahel–Saharan States
CFAs	Clearing and Forwarding Agents
CFB	Caminho de Ferro de Benguela

List of Abbreviations

Abbreviation	Description
CFM	Caminhos de Ferro de Moçambique
CHEC	China Harbour Engineering Company
CN	Concept Note
COMESA	Common Market of Eastern and Southern Africa
COMTRADE	United Nations International Trade Statistics Database
CPMS	Corridor Performance Monitoring System
CPMZ	Companhia do Pipeline Mozambique Zimbabwe
CTMS	Corridor Trip Monitoring System
DBSA	Development Bank of Southern Africa
DCC	Dar es Salaam Corridor Committee
DFID	Department for International Development
DFIs	Development Finance Institutions
DGI	La Direction Générale des Impôts
DIDG	Diaspora Infrastructure Development Group
DMGP	Dar es Salaam Maritime Gateway Project
DPW	Dubai Ports World
DRC	Democratic Republic of Congo
DTI	Direct Trader Input
EAC	East African Community
ECOWAS	Economic Community of West African States
EDZ	Estradas de Zambeze
EIRR	Economic Internal Rate of Return
EM	Emerging Markets
EU	European Union

Abbreviations

List of Abbreviations

Abbreviation	Description
FIRR	Financial Internal Rate of Return
FQM	First Quantum Minerals
GDP	Gross Domestic Product
GoM	Government of Mozambique
GRZ	Government of Republic of Zambia
GVM	Gross Vehicle Mass
HDVs	Heavy-Duty Vehicles
IBM	Integrated Border Management
ICA	Infrastructure Consortium for Africa
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
IMF	International Monetary Fund
IT	Information Technology
ITC	International Trade Centre
JICA	Japan International Cooperation Agency
KPIs	Key Performance Indicators
KMTR	Kasomeno-Mwenda Toll Road
LDCs	Least Developed Countries
LIDCs	Low-Income Developing Countries
LME	London Metals Exchange
LNG	Liquefied Natural Gas
LPI	Logistics Performance Index
LTFP	Long-Term Forecasting Plan
LTPF	Long-Term Planning Framework

List of Abbreviations

Abbreviation	Description
MCBRTA	Multilateral Cross-Border Road Transport Agreement
MCLI	Maputo Corridor Logistics Initiative
MCNet	Mozambique Customs Network
MGT	Matadi Gateway Terminal
MHCL	Mpulungu Harbour Corporation Limited
MPDC	Maputo Port Development Company
MRA	Malawi Revenue Authority
MRL	Malawi Railways Limited
MSMEs	Micro, Small and Medium-Sized Enterprises
mtpa	million tons per annum
NAMPORT	Namibian Port
NamRA	Namibia Revenue Authority
NBF	NEPAD Business Foundation
NEPAD-IPPF	NEPAD Infrastructure Project Preparation Facility
NOIC	National Oil Infrastructure Company
NPV	Net Present Value
NRFA	National Road Finance Agency
NRZ	National Railways of Zimbabwe
NTBs	Non-Tariff Barriers
ntkm	net ton/kilometre
NWR	Northwest Rail
OEC	Observatory of Economic Complexity
OGAs	Other Government Agencies
OSBP	One-Stop Border Post

Abbreviations

List of Abbreviations

Abbreviation	Description
PAP	Priority Action Plan
PFS	Pre-Feasibility Study
PIDA	Programme for Infrastructure Development of Africa
PIM	Project Information Memorandum
PIMA	Public Investment Management Assessment
PPIAF	Public Private Infrastructure Advisory Facility
PPPs	Public Private Partnerships
PRC	People's Republic of China
RDA	Road Development Authority
RECs	Regional Economic Communities
RFA	Road Freight Association
RGR	Ressano Garcia Railway
RIDMP	Regional Infrastructure Development Master Plan
RoO	Rules of Origin
RSA	Republic of South Africa
SADC	Southern African Development Community
SADC-TFP	Southern African Development Community – Trade Facilitation Programme
SANRAL	South African National Roads Agency
SARS	South African Revenue Services
SATCP	Southern African Trade Connectivity Project
SCTP	Société Commerciale des Transports et des Ports
SDT	Special and Differential Treatment
SGR	Standard Gauge Railway
SNCC	Société Nationale des Chemins de Fer du Congo

List of Abbreviations

Abbreviation	Description
SOPs	standard operating procedures
SPS	Sanitary or Phytosanitary
SR	Swaziland Railways
SWIMOC	South-West Indian Ocean Maritime Corridor
TANROADS	Tanzania Roads Agency
TAZARA	Tanzania Zambia Railways Authority
TBTs	Technical Barriers to Trade
TCF	trillion cubic feet
TCM	Matola Coal Terminal
TEEN	Nacala Special Export Terminal
TEU	Measure of volume in units of 20-foot-long containers
TFA	Trade Facilitation Agreement
TFP	Trade Facilitation Programme
TFR	Transnet Freight Rail
TICTS	Tanzania International Container Terminal Services
tkm	tons/kilometres
TMS	Truck Monitoring System
TMSA	TradeMark Southern Africa
TNHL	TransNamib Holdings Ltd
ToR	Terms of Reference
TPA	Tanzania Ports Authority
TRAC	Trans African Concessions
TRIPDA	Tripartite Infrastructure Database
TRS	Time-Release Study

Abbreviations

List of Abbreviations

Abbreviation	Description
TTTFP	Tripartite Transport and Trade Facilitation Programme
UN COMTRADE	United Nations International Trade Statistics Database
UNCTAD	United Nations Conference on Trade and Development
VLMA	Vehicle Load Management Agreement
VOC	Vehicle Operating Cost
VPIC	Virtual PIDA Information Centre
WB	World Bank
WBCG	Walvis Bay Corridor Group
WCO-CBM	World Customs Organization-Coordinated Border Management
WITS	World Integrated Trade Solution
UNU-Wider	United Nations University World Institute for Development Economics Research
WTO	World Trade Organization
ZIMRA	Zimbabwe Revenue Authority
ZipBCC	Zambia Integrated Property Border Crossing Company
ZRL	Zambia Railways Limited





Executive Summary

Executive Summary

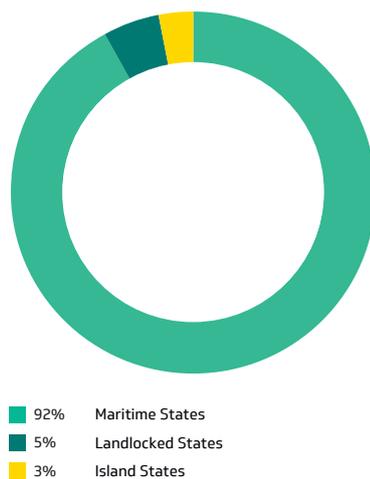
The overall objective of this assignment is to analyse the trade-carrying infrastructure gaps across one pilot African region and propose priority investments to fill these gaps. To do this, the report first quantifies existing and future intra-regional trade flows along the main transport corridors in the Southern African Development Community (SADC) region and ranks the importance of each corridor for future intra-Africa trade. Next, it assesses the condition, capacity and competitiveness of trade-carrying transport and logistics infrastructure, notably the main seaports, border posts, railways and roads that are the backbone of the main corridors traversing the region. It also analyses secondary and informal routes, highlighting the findings pertinent to these corridors in the SADC region. The assessment identifies major gaps in the trade-carrying transport and logistics infrastructure on each of the main transport corridors and frames the priority interventions on each regional transport route. Finally, the report develops a programme of priority interventions and a pipeline of proposed projects.

The report first quantifies existing and future intra-regional trade flows by type, value and volume along the main transport corridors in the SADC region and ranks the importance of each corridor for future intra-Africa trade within the SADC region to the year 2040. To isolate the impact of intra-regional trade, trade flows were categorised into regional, international and total flows and the SADC countries were grouped into maritime, landlocked and island states. Since the focus of the assignment is on trade-carrying infrastructure linked to regional transport corridors in the mainland SADC region, this summary focusses on the six key transit markets of landlocked Botswana, Democratic Republic of Congo (DRC) Copperbelt, Eswatini, Malawi, Zambia and Zimbabwe and the regions in South Africa that fall within the catchment of the Maputo Corridor. The core analysis is to link these markets to the six main regional transport corridors of Beira, Dar es Salaam,

Maputo, Nacala, North-South (Durban) and Walvis Bay that traverse the SADC mainland region. In 2017, maritime states comprised 91 per cent of all SADC trade flows, while landlocked states comprised only 5 per cent and island states just 3 per cent. By 2040, maritime states are projected to comprise 89 per cent of all trade flows, landlocked states 8 per cent and island states to remain at 3 per cent (see Figure 1 and Figure 2).

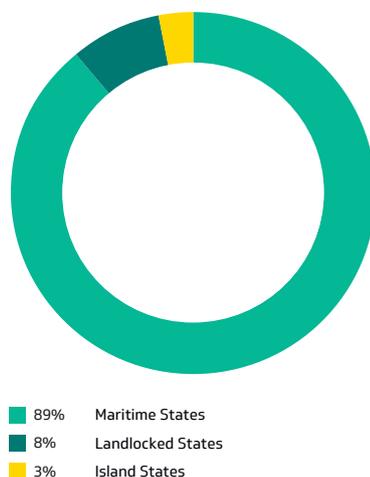
Landlocked states' share of regional trade flows is marginally increasing. In 2017, regional trade flows of maritime states were 74 per cent, compared to landlocked states at 22 per cent and island states at 4 per cent. By 2040, the share to maritime states will have dropped to 72 per cent whilst trade flows to landlocked states are projected to increase to 24 per cent and flows to island states will remain the same, at 4 per cent (see Figure 3 and Figure 4).

Figure 1: Total Trade Flows, 2017



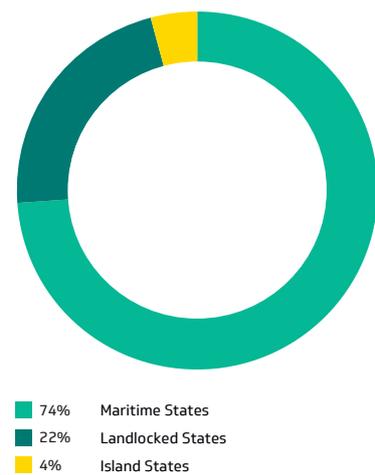
Source: ITC Trade Map.

Figure 2: Total Trade Flows, 2040



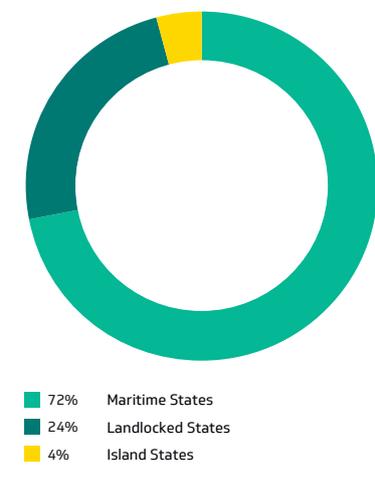
Source: ITC Trade Map.

Figure 3: Regional Trade Flows, 2017



Source: ITC Trade Map.

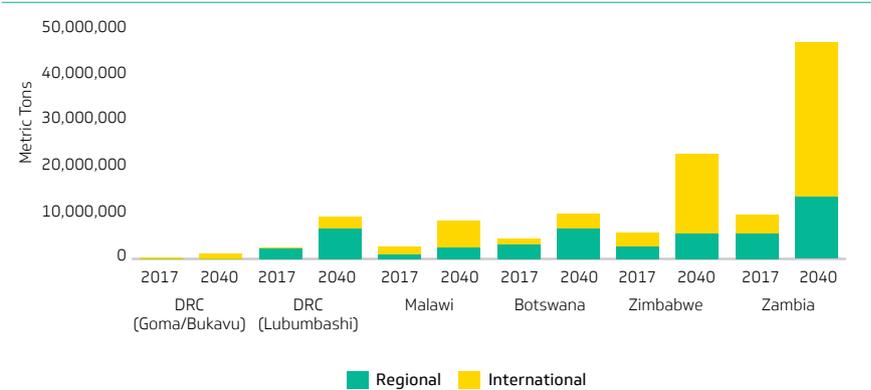
Figure 4: Regional Trade Flows, 2040



Source: ITC Trade Map.

In nominal terms, total trade flows of all landlocked states will increase dramatically by 2040. The bulk of this increase will be due to a spike in international trade, although the growth of regional trade is still noteworthy (see Figure 5).

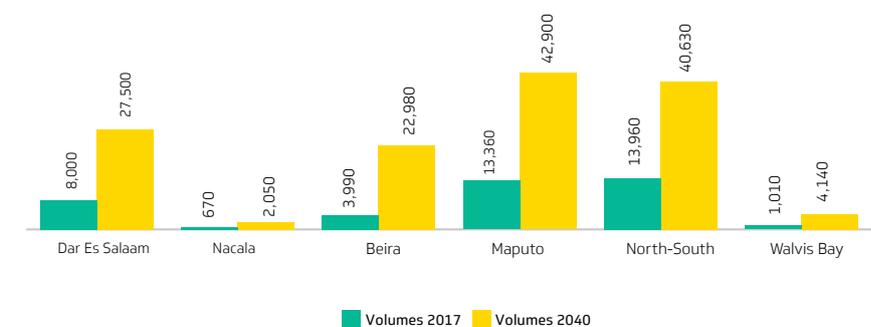
Figure 5: Trade Flows of Landlocked States, 2017 and 2040 (Metric Tons)



Source: ITC Trade Map.

Although they lack direct access to international trading partners, the landlocked states of Botswana, DRC, Malawi, Zambia and Zimbabwe are the region’s primary transit markets and are critical to assessing the region’s trade-carrying infrastructure. Transit trade linked to landlocked countries was superimposed on the trade-carrying infrastructure of the six main regional transport corridors in the SADC region. The dominant trade-carrying regional transport corridors are Maputo, followed by North-South, Dar es Salaam, Beira, Walvis Bay and Nacala. However, bulk mineral exports, primarily from South Africa, remain a dominant trade on the Maputo Corridor, with more diversified trade flows occurring along the North-South, Dar es Salaam and Beira Corridors, followed by Walvis Bay and Nacala Corridors (see Figure 6).

Figure 6: Trade-Carrying Regional Transport Corridors by Volume, 2017 and 2040



Source: ITC Trade Map.

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Based on the assessment of trade flows and a subsequent assessment of port and corridor trade-carrying infrastructure, 'hotspots' were identified where there are likely to be capacity gaps over the next 10 years. These hotspots were then assessed in terms of planned projects to see where there were potential investment gaps that Afreximbank could fill.

The envisaged initial project pipeline for Afreximbank to consider was a total of 15 projects, which are either cross-border in nature or are national projects that have regional significance in terms of improving efficiencies along the main SADC trade corridors. These are as follows:

1. Dar es Salaam – Chalinze Toll Road (Tanzania)
2. Kasomeno-Mwenda Toll Road Project (Zambia-DRC)
3. Machipanda-Forbes Border Post (Mozambique-Zimbabwe)
4. Tunduma-Nakonde Border Post (Tanzania-Zambia with focus on Nakonde)
5. Kasumbalesa Frontier Market (DRC-Zambia with focus on the Zambian side)
6. Groblersbrug-Martin's Drift Bridge straddling the border (Botswana-South Africa)
7. Dar es Salaam Container Terminal Expansion (Maritime Gateway Port in Tanzania)
8. Matola Coal/Manganese Terminal Expansion (Maritime Gateway Port in Mozambique)
9. Beira Port Expansion (Container & Bulk Terminals) (Maritime Gateway Port in Mozambique)

10. Mpulungu Port Rehabilitation (Inland Waterway Gateway to Great Lakes Region in Zambia)
11. Dilolo-Kolwezi-Lubumbashi Railway Rehabilitation (DRC link to the Lobito Port in Angola)
12. Line of credit on third party operators on CFM/NRZ Machipanda line (Mozambique-Zimbabwe)
13. Line of credit to third party operators on Tazara and ZRL railway networks (Tanzania-Zambia)
14. Strengthening the capacities of rail network owners/operators on the North-South system (South Africa, Zimbabwe, Zambia and DRC)
15. Improvements at the Cassacatiza-Chanida Border and Tete-Cassacatiza (Mozambique) and Chanida-Katete (Zambia) Approach Roads on the Beira Corridor (Mozambique-Zambia)

The initial update of the Phase 1 report focusses on developing a long list of projects, which includes a consideration of the projects proposed in the Phase 1 report. They are cross-referenced with projects contained in SADC Regional Infrastructure Development Master Plan (RIDMP) published in 2012, the Tripartite¹ Infrastructure Database (TRIPDA) completed in 2013 and the Programme for Infrastructure Development of Africa (PIDA) Priority Action Plan (PAP) approved in 2014.

Following this process, 43 projects comprised the 'long list' of priority projects.

Table 1 provides a summary of the project selection criteria used to rank the long list of projects. This table provides definitions within each of four dimensions and compiles a simple ranking from 1 to 3 for each one. Hence,

projects can score a maximum of 12 or a minimum of 4 points.

The higher the project scoring, the more interest it should generate amongst development finance institutions (DFIs), such as Afreximbank, as a potential funding target. A higher score would reflect that the country and project risks linked to a particular project have been identified and mitigated, or largely mitigated.

¹ Tripartite refers to the three Regional Economic Communities (RECs) of the SADC, East African Community (EAC) and the Common Market of Eastern and Southern Africa (COMESA).

Table 1: Project Selection Criteria to Rank Projects

DIMENSION ONE (D1): ENABLING ENVIRONMENT & PROJECT DEFINITION (DOES THE PROJECT FEATURE IN A REGIONAL PLAN AND/OR STUDY?)			
Categories	Relevant Plan & Latest Information	Scoring	Rationale
Primary concern is how old is the latest validated information on a high-priority project, so the newer the information the higher the score to the project.			
Old out-of-date Data (2012)	Projects identified in SADC-RIDMP (2012), but do not appear to have been validated and updated in the VPIC database.	1	Strategic projects identified in the SADC-RIDMP, but no updated validated information exists.
In-between Information (2013-17)	Projects classified as validated in the VPIC database, with most recent updates that range in the period 2013 to 2017.	2	Strategic projects in the SADC-RIDMP (or SADC/VPIC) that have more up-to-date and validated information.
Up-to-date Intelligence (2019-20)	New Projects identified in the Phase 1 Study (2019) that have been most recently validated and updated.	3	Strategic projects identified in the Phase 1 Study, which have been to use the assets through an initial project screening process.
DIMENSION TWO (D2): PROJECT PREPARATION PATHWAY (AT WHAT STAGE IS THE PROJECT ALONG THE PROJECT PREPARATION AND DEVELOPMENT PATHWAY?)			
Categories	Project Stages	Scoring	Rationale
Primary concern is access to intelligence to inform final investment decision, with intelligence improving as the project moves along the preparation pathway.			
Early-Stage	S1 Project Definition	1	Early stages of preparation provides limited intelligence on country and project risks.
	S2A Pre-Feasibility		
Mid-Stage	S2B Feasibility	2	Middle stages of preparation provide sufficient intelligence on country and project risks to proceed to next stage.
	S3A Project Structuring		
Late-Stage	S3B Transaction Support & Financial Close	3	Later stages of preparation provide detailed intelligence on country and project risks to make a final investment decision.
	S4A Tendering		
Implementation	S4B Construction	Not Applicable	
	S4C Operation		
DIMENSION THREE (D3): INFRASTRUCTURE FINANCING MARKET (IS THE PROJECT STILL DEPENDENT ON PUBLIC FUNDING, INCLUDING GRANT FINANCING FOR PREPARATION AND DEVELOPMENT?)			
Categories	Type of Financing	Scoring	Rationale
Primary concern is unsustainable public debt levels, so preference is for fully privately financed projects, without recourse to government-backed guarantees.			
Public Funding	Funding from budget, including grants (and development aid) and debt (domestic and foreign), to fund infrastructure.	1	Poorly managed publicly funded infrastructure projects a source of deepening debt in SSA.
Public Private Partnerships	Grants, debt, equity and guarantees from public partner and debt and equity from private partner to fund infrastructure.	2	PPPs can play a role in leveraging private finance but need careful structuring to avoid hidden risks.
Privately Financed	Private finance of infrastructure without recourse to public guarantees. Pays rents to entity for access to use the assets.	3	Private financing of infrastructure with no recourse to government-backed guarantees is the best way to limit debt.

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DIMENSION FOUR (D4): COUNTRY AND PROJECT RISKS (WHAT IS THE COUNTRY'S INVESTMENT GRADE? AT WHAT LEVEL OF RESOLUTION HAVE PROJECT RISKS BEEN IDENTIFIED AND MITIGATED?)

Categories	Country Investment Rating	Project Risk Profile	Scoring	Rationale
Primary concern is low risk, notably affordable and specific project risks that are increasingly mitigated as a project moves along the preparation pathway.				
High-Risk Criteria	Moody's Ba1-C (Extremely Weak)	Weakly Profiled (Concept Note)	1	Extremely weak investment grade and weakly defined risks because data is only at the Concept Note (CN) level of detail.
Medium-Risk Criteria	Moody's Baa1-Baa3 (Very Weak)	Partially Profiled (Pre-feasibility)	2	Very weak investment grade but partially defined risks because information has reached the level of Pre-feasibility Study (PFS) detail.
Low-Risk Criteria	Moody's Aaa-A3 (Weak)	Strongly Profiled (Feasibility)	3	Weak investment grade but strongly defined risks because intelligence has been further developed to the level of Bankable Feasibility Study (BFS) detail.

Source: Collated by Nathan Associates for this study.

Using the project selection criteria for each dimension laid out in Table 1, Table 2 provides a summary ranking of the long list of projects for further review to a proposed shortlist of 10-15 high-priority projects to elaborate in Phase 2 of the project.

Table 2: Initial Ranking of Project Long List

#	Short Project Name	D1	D2	D3	D4	Total
1	Matola Coal Terminal	3	3	3	3	12
2	TAZARA-Bridge/Steinweg	3	3	3	3	12
3	TAZARA-Calabash	3	3	3	3	12
4	TAZARA-Grindrod	3	3	3	3	12
5	Dar Berths 13-14	2	3	2	3	10
6	Beira Cargo Terminals	2	3	2	3	10
7	Dar-Chalinze Expressway	2	3	2	3	10
8	Solwezi-Chingola Railway	2	3	3	2	10
9	KMTR Project	3	2	2	2	9
10	Ressano Garcia Rail (Phase 1)	3	2	2	2	9
11	NSC Rail 'Block Train' Service	2	2	2	2	8
12	Beira-Machipanda Rail Upgrade	3	1	3	1	8
13	Machipanda-Harare Rail Upgrade	3	1	3	1	8
14	Kazungula OSBP	1	3	1	3	8
15	Mandimba-Chiponde OSBP	1	3	1	3	8
16	Mchinji-Mwami OSBP	1	3	1	3	8
17	Tete-Cassacatiza Road	2	2	2	1	7
18	Changara-Zobue Road	2	2	2	1	7
19	Ressano Garcia Rail (Phase 2)	3	1	2	1	7
20	Dilolo-Kolwezi Rail Upgrade	3	1	2	1	7
21	Chirundu OSBP	3	1	1	2	7
22	Ressano Garcia-Lebombo OSBP	2	2	1	2	7
23	Mpulungu Port Upgrade	3	1	1	1	6
24	Beira New Coal Terminal	2	1	2	1	6
25	Livingstone-Zimba Road	3	1	1	1	6
26	Solwezi-Chingola Road	3	1	1	1	6
27	Chanida-Katete Road	3	1	1	1	6
28	Zobue-Mwanza OSBP	2	2	1	1	6
29	Calomue-Dedza OSBP	2	2	1	1	6
30	Beitbridge OSBP	2	2	1	1	6
31	Cassacatiza-Chanida Border	3	1	1	1	6
32	Milanje-Muloza Border	3	1	1	1	6
33	Nyamapanda-Cuchamano OSBP	2	1	1	1	5
34	Groblersbrug-Martin's Drift Border	2	1	1	1	5
35	Machipanda-Forbes OSBP	2	1	1	1	5
36	Sesheke-Kazungula Road	1	1	1	1	4
37	Kaoma-Kasempa Road	1	1	1	1	4
38	Kasumulu-Songwe Border	1	1	1	1	4
39	Tunduma-Nakonde OSBP	1	1	1	1	4
40	Kasumbalesa OSBP	1	1	1	1	4
41	Victoria Falls-Livingstone Border	1	1	1	1	4
42	Kopfontein-Tlokweng Border	1	1	1	1	4
43	Wenela-Sesheke OSBP	1	1	1	1	4

Executive Summary

Following the presentation of the Phase 1 report during the virtual PIDA Week on 21 February 2021 and subsequent follow-up consultations, two additional projects were submitted, bringing the tally of projects for the long list to 45. The two additional projects were:

#	Short Project Name	D1	D2	D3	D4	Total	Promoter/Sponsor
44	Mukurara-Limbe Railway	3	2	2	2	9	CFM & Malawi Railways
45	Pemba Port Expansion	3	2	1	2	8	CFM

Source: Collated by Nathan Associates for this study.

The Phase 2 report begins with a ‘fatal-flaw’ analysis, which was used to reduce the project long list to a prioritised shortlist. The evaluation process was filtered through two layers. First, each project was filtered through four dimensions to assess its readiness for financing and, secondly, to assign a STOP/PUSH/GO result to proceed to the detailed risk assessment phase of the study. Ten project packages passed through the gate as either GO/PUSH projects. After a review with Afreximbank Senior Management, the list was whittled down to seven projects, which are listed in Table 3.

Table 3: Afreximbank Primary Project Targets

1	Name: Beira Port Terminals Expansion (Container and General Freight)	Size: ~US\$ 290 million	Sponsor: Cornelder de Moçambique (CdM)
2	Project Name: Kasomeno-Mwenda Toll Road and Bridge	Project Size: ~US\$ 500 million	Project Sponsor: Duna-Aszfalt and GED Africa
3	Project Name: Solwezi-Chingola Railway	Project Size: Not Specified	Project Sponsor: North-West Rail (Zambia) Limited
4	Project Name: North-South Corridor ‘Block-Train’ Rail Service	Project Size: To be decided	Project Sponsor: NEPAD Business Foundation (NBF)
5	Project Name: Ressano-Garcia Railway (Phase 2)	Project Size: ~US\$150 million	Project Sponsor: Caminhos de Ferro de Moçambique (CFM)
6	Project Name: Mpulungu Lake Port Upgrade	Project Size: ~US\$60 million	Project Sponsor: Mpulungu Harbour Corporation Limited (MHCL)
7a	Name: Muturara-Vila da Fronteira/Marka Railway (46km)	Size: ~US\$ 40 million	Sponsor: Caminhos de Ferro de Moçambique (CFM)
7b	Name: Vila da Fronteira/Marka - Nsanje Railway (26km) & Nsanje Inland Port	Size: ~US\$ 30 million	Sponsor: Malawi Railways Limited (MRL)

Source: Collated by Nathan Associates for this study.



After the meeting held between the consultants and Afreximbank on 22 February 2021, the consultants were asked to re-evaluate the projects categorised as STOP and assess whether those that could be impactful from a trade facilitation perspective could be advanced with donor funding, blended finance or otherwise. These projects were clustered into five projects, with specific recommendations of immediate next steps, as follows:

1. Resuscitate the Dar es Salaam-Chalinze Expressway Project
 - Next steps: Progress – Market study to restructure concession to structure PPP deal.
2. Strengthen Regional links on the Zambian trunk road network
 - Targets: Solwezi-Chingola, Sesheke-Kazungula, Kaoma-Kasempa and Chanida-Katete
 - Next steps: Progress – Project definition to market study to pre-feasibility to bankable feasibility to structure PPP deal(s), except Chanida-Katete, limited to project definition.
3. Improve operations on the TAZARA and Machipanda Railway Systems
 - Next steps on TAZARA: Technical advice on restructuring options (to unbundle the railway)
 - Next steps on Machipanda: Market study (assess scope to recapture lost traffic from road).

4. Target Improvements at border posts overlooked by donor programmes

- Targets²: Machipanda – Forbes; Katima Mulilo – Sesheke; Nyamapanda – Cuchamano; Groblersbrug – Martin’s Drift and Kasumbalesa Border Posts
 - Gaps³: Machipanda – Forbes, Katima Mulilo – Sesheke and Nyamapanda – Cuchamano Border Posts
 - Next steps: Engage in dialogue with SADC-TFP to align possible interventions with the overall regional programme and then follow-up with Mozambique, Namibia, Zambia and Zimbabwe on the three border posts where gaps in support from existing donor programmes appear to exist.
5. Initiate dialogue on market study to assess future prospects for Pemba Port
- Next steps: Progress – Market study to pre-feasibility study.

Finally, the consultant was asked to assess areas where Afreximbank could assist in addressing regulatory issues that were stopping or slowing down implementation of trade facilitation measures. In this regard, the Bank could play a very useful role in building a trade and transport facilitation platform or portal that is an easy-to-use, step-by-step implementation guide. The portal would consist of a series of online

how-to tutorials that would take the user through the practical steps of how to implement the various annexures of the African Continental Free Trade Area (AfCFTA) agreement. The portal could also provide a model for a single window that could combine a series of modules in configurations that would allow individual users to choose from the modules and construct a single window system that meets their requirements. Synergies with the EU-funded SADC Trade Facilitation Programme (TFP) could be sought where they exist and, if these recommendations go forward, a dialogue with the SADC Secretariat should be established to ensure no duplication of effort.

Regulations that stop or slow implementation of transport and transit facilitation measures are, at least for the SADC region, being addressed through the Tripartite Transport and Trade Facilitation Programme (TTTFP) at all levels: legal, regulatory, standards and systems. If Afreximbank chooses to assist SADC member states in addressing issues that stop or slow implementation of transport and transit facilitation, in support of existing initiatives rather than overlapping with or duplicating existing initiatives, Afreximbank should discuss ways it could assist with implementation of the TTTFP with the TTTFP Project Director in the SADC Secretariat.

² The SADC-TFP has identified five (5) port and border posts for which a Time-Release Study (TRS) will be conducted on the North-South Corridor. They are: Durban Port, Mussina/Beitbridge, Chirundu, Kasumbalesa and Groblersbrug/Martin’s Drift. However, the four (4) borders to be targeted for coordinated border management (CBM) on the North-South Corridor have not yet been selected.

³ These gaps are border posts on high-volume regional trade corridors in the SADC region that are not covered by the SADC-TFP, which include the Machipanda – Forbes (Beira Corridor), Katima Mulilo – Sesheke (Walvis Bay Corridor) and Nyamapanda – Cuchamano (North-South Corridor) Border Posts.





Chapter 1

Introduction

Introduction

1.1. BACKGROUND

Despite having the second largest continental land mass after Asia, African trade accounts for just 4.4 per cent of world trade.⁴ Commodities and natural resources continue to dominate Africa's export basket and the continent's participation in the global value chain has been minimal. In terms of intra-regional trade, Africa continues to trail other regions, which have drawn on vibrant cross-border trade to sustain growth and economic development, as well as integration into the global economy. At just 15.2 per cent, intra-African trade (average of imports and exports) compares unfavourably to intra-regional trade in Europe (67.1 per cent), Asia (61.1 per cent), America (47.4 per cent) and Oceania (7.2 per cent).⁵ However, Africa and Asia are the only regions where intra-regional trade has been rising over the last 10 years.

The promotion of intra-African trade is the arrowhead of Afreximbank's Fifth Strategic Plan, fostering the view that intra-African trade offers tremendous potential to facilitate industrialisation and socio-economic growth, as well as act as a mitigant against adverse external shocks and global volatility. Indeed, one of the core components of AfCFTA is the Boosting Intra-African Trade (BIAT) initiative, reflecting its tremendous potential for raising intra-regional and cross-border trade and stimulating opportunities for industrialisation and diversification while creating much-needed employment opportunities for the continent's growing population.

Specifically, in 2017, Afreximbank supported the growth of intra-regional trade through increased financing of and investment in, trade-supporting infrastructure to expand light manufacturing industries, transform

the structure of African economies and diversify exports. This assignment seeks to build on these efforts by analysing trade-carrying infrastructure gaps in the 16 countries of the SADC. SADC's intra-regional economic community trade is the highest in Africa, at US\$34.7 billion in 2016.⁶ The Community of Sahel-Saharan States (CEN-SAD) had the second-highest intra-regional economic community trade, at US\$18.7 billion, followed by the Economic Community of West African States (ECOWAS) at US\$11.4 billion.⁷

The report's focus is on landlocked states in SADC that are serviced by regional transport corridors along which imports and exports are carried to and from the region and beyond. Whilst the study is primarily centered on intra-Africa trade, it is not possible to assess 'trade-carrying' infrastructure without considering all trade that flows in the SADC region, including external trade. Infrastructure is a shared service. As such, any proposed improvements in infrastructure networks will benefit all users.

The majority of SADC cross-border trade moves along high-volume regional transport corridors. Trade to and from the landlocked hinterland dominates cross-border trade within the SADC region because it includes both international transit and intra-regional trade. There is limited transit trade to and from maritime or island states, other than specific regions in maritime states that use a gateway port in a neighbouring country, such as parts of South Africa that are closer to Maputo Port than to a South African port such as Durban.

Infrastructure investments in the SADC region have focussed on integrating national road and rail networks to create a lattice of regional transport corridors that carry most regional trade. Regional

transport corridors are transport routes from a maritime port (after which it is typically named) that serves at least three hinterland landlocked countries (or adjacent regions in a neighbouring maritime state). The two points of integration of national networks are at maritime ports, which are points of entry and exit into and out of a country from the sea and border ports, which are points of entry and exit into and out of a country by land. Cross-border trade travels overland using the different infrastructure components (ports, roads, railways, pipelines and border posts) of a regional transport corridor.

There are five primary regional transport corridors within the SADC region. From north-east to south-west, they are Dar es Salaam, Nacala, Beira, Maputo, North-South (Durban) and Walvis Bay. The infrastructure backbone of these five regional corridors carries the bulk of trade within the SADC region. The focus of the assignment is, therefore, to develop a pipeline of prioritised projects designed to enhance the competitiveness of these corridors to promote trade within the SADC region.

1.2. OBJECTIVES

The overall objective of this assignment is to analyse the trade-carrying infrastructure gap across one pilot African region: SADC. To achieve this objective, the following four sub-objectives have been defined:

- To quantify existing and future intra-regional trade flows, by type, value and volume, along the routes that currently carry, or are predicted in future to carry, significant trade, i.e. the main transport corridors in the SADC region,⁸ and rank the importance of each corridor for future intra-Africa

4 UNCTAD, Economic Development in Africa Report 2019, 19. Data from 2015-2017.

5 UNCTAD, Economic Development in Africa Report 2019, 20. Data from 2017 (percentage of total exports).

6 UNCTAD, Economic Development in Africa Report 2019, 21. Latest year with data available: 2016.

7 UNCTAD, Economic Development in Africa Report 2019, 21. Latest year with data available: 2016.

8 The main corridors comprise both primary and secondary routes. Per the Scope of Work, when information is available regarding secondary routes via a desktop review of corridor diagnostic reports, we will include recommendations regarding secondary as well as primary routes. However, our desktop review to date has found little information on these routes from secondary sources and the study does not have the mandate or resources to collect primary data.

trade within the SADC region, to the year 2040.

- To assess the condition, capacity and competitiveness of trade-carrying transport and logistics infrastructure, notably seaports, border posts, railways and roads, which are the backbone to the main corridors traversing the region;⁹
- To identify the major gaps in the trade-carrying transport and logistics infrastructure, notably seaports, border posts, railways and roads, on each of the main transport corridors and frame the priority interventions on each regional transport route; and
- To programme the priority interventions into a pipeline of proposed projects for each route and rank the importance of each proposed intervention based on the likelihood that it will unlock additional intra-Africa trade, particularly within, but also outside, the SADC region.

1.3. METHODOLOGY

The methodology to conduct this assignment had two main components: trade flow mapping and infrastructure gap analysis. The main assignment outputs are summarised as follows:

- The Inception Report was prepared following a brief kick-off meeting on 17 June 2019 and framed the justification for the selection of the SADC region as the pilot and the overall approach to the assignment.
- A Trade Flows Analysis, Corridor Competitiveness Matrix, Corridor Volumes Assessment and Secondary Routes Review were distilled into the first interim Trade Flows Report (Deliverable 2), which was presented via a video conference in August 2019. The following are the key outputs of the Trade Flow Mapping Report:

- Calculations of SADC trade flows for a base year of 2017
- Projections of SADC trade flows in 2040
- Mapping of trade flows by SADC regional transport corridor

This data-driven report provided a drill-down of current and projected trade flows in the SADC region, which built the foundation for the subsequent reports of this study. The mandate of this study is to look at infrastructure gaps for the corridors carrying, or projected to carry, significant volumes of trade. Therefore, the analysis in this report allowed the team to prioritise the SADC corridors in terms of their overall usage, usage for intra-Africa (regional) trade and usage of secondary/tertiary routes, in order to focus the analysis of the subsequent reports.

- The Draft Infrastructure Gap Analysis Report used the trade volumes from Deliverable 2 to conduct an infrastructure capacity gap analysis. The subsequent Draft Priority Project Pipeline Report then proposed an investment pipeline for filling these gaps. These two reports were developed and integrated into a second interim report, the Priority Project Pipeline Report (Deliverable 3). Deliverable 3 was presented at a workshop in December 2019.
- Following the workshop, the Final Close-Out Report (Deliverable 4) incorporates all the previous output reports and the inputs provided by participants at the workshop.

1.4. STRUCTURE OF THE REPORT

The structure of the report is as follows:

- Section 2 reviews the current trade flows for the base year of 2017 and future trade flows for the year 2040. The flows are constructed for all 16 SADC states, including maritime states (Angola, DRC, Mozambique, Namibia,

South Africa and Tanzania), landlocked states (Botswana, Eswatini, Lesotho, Malawi, Zambia and Zimbabwe) and island states (The Comoros, Madagascar, Mauritius and Seychelles).

- Section 3 compiles a corridor competitiveness matrix for both international and regional transit trade flows from six key transit markets (Botswana, Eswatini, Malawi, Zambia and Zimbabwe) for the six key regional transport corridors (Beira, Dar es Salaam, Maputo, Nacala, North-South and Walvis Bay).
- Section 4 describes current trade flows for 2017 for both imports and exports by transport mode, notably road and rail, along the six primary SADC regional transport corridors. It also includes an analysis of truck movements along secondary routes.
- Section 5 describes future trade flows for 2040 for both imports and exports by transport mode, notably road and rail, along the six primary SADC regional transport corridors.
- Section 6 presents an infrastructure assessment of the key SADC ports and the six transit corridors.
- Section 7 identifies potential capacity gaps and presents potential investments that are considered a priority in this report and are defined by port, roads, railways and border post investments.
- Section 8 integrates the potential investments identified in this report and cross-references them with high-priority projects identified in the SADC-RIDMP and the VPIC database to compile a long list of investment targets that will be subjected to an intensive due diligence review.

Annex 1 provides a further explanation of the scope of the study and why this report focusses on high-volume trade corridors.

⁹ Airports are not a focus of the study as it has been determined that SADC air cargo flows are not significant and the purpose of the study is to focus on routes that currently carry, or are predicted in future to carry, significant trade.





Chapter 2

SADC Trade Flows

SADC Trade Flows

2.1. CURRENT TRADE FLOWS

2.1.1. Trade By Value, 2017

Trade flows are generally reported by value. This indicator directly affects an economy's GDP and reflects the relative importance of an economy on the global stage.

2.1.1.1. Methodology

SADC's trade by value was pulled from the International Trade Centre (ITC) Trade Map, which combines data from the United Nations International Trade Statistics Database (UN COMTRADE) and national statistics bodies of each country. This data was cross-checked against the World Bank's World Integrated Trade Solution (WITS) database and the Observatory of Economic Complexity (OEC). To remain consistent with the volume data, which was only available through 2017, current trade flows are based on the year 2017. Regional, international and total trade flows are available for each of the 16 SADC countries, which are clustered¹⁰ into three sub-regions: maritime, landlocked and island states. Although the Democratic Republic of Congo (DRC) has access to the sea, it is categorised as landlocked since the majority of its territory is landlocked. These regional categories are as follows:

- Maritime states include Angola, Mozambique, Namibia, South Africa and Tanzania.
- Landlocked states include Botswana, DRC, Eswatini, Lesotho, Malawi, Zambia, Zimbabwe; and
- Island states include Comoros, Madagascar, Mauritius and Seychelles.

The ITC did not provide detailed regional or international trade flows for the DRC or Comoros. For this reason, only their total trade flows are listed in the trade by

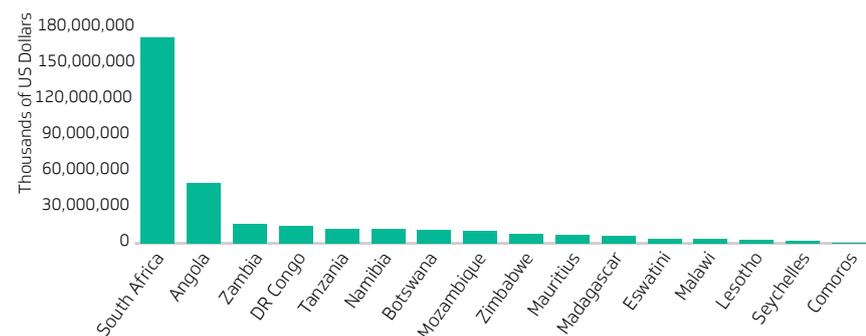
value summary and subtotals for regional and international flows omit the trade of these two countries. The ITC reports the total trade flows of the DRC and Comoros as mirror statistics, indicating that their data was reconstructed from the data of other reporting countries. Since this mirror data does not capture trade flows between two non-reporting countries, the ITC acknowledges that intra-African trade is not accurately captured in all instances.¹¹

2.1.1.2. Results

A summary of SADC's trade flows by value can be found in Table 4. SADC's total trade flows amount to roughly US\$342.4 billion with a fairly even split between exports (\$176.4 billion) and imports (\$166.1 billion). South Africa's total trade flows (\$176.7 billion) far surpass those of other SADC countries, with Angola distantly trailing behind at \$51.8 billion. For the remaining countries, trade flows range from \$17 billion to \$450 million.

The majority of SADC's trade is with international trading partners (\$263.5 billion, or 77 per cent), where the trade balance remains fairly split between 48.9 per cent imports and 51.1 per cent exports. Maritime states generate the overwhelming majority of this international trade, especially South Africa (see Figure 7), with only US\$25 billion attributed to the landlocked states. Excluding international flows, the share of trade generated by each sub-region is slightly more balanced: the maritime states comprise 63.1 per cent of all regional trade, the landlocked states comprise 34.3 per cent and the island states comprise 2.6 per cent (see Figure 8).

Figure 7: Total Trade Flows by Value, 2017 (Thousands of Dollars)



Source: ITC Trade Map.

¹⁰ The rationale for this clustering and what distinguishes international and regional trade is provided in Annex 1.

¹¹ For more information, please visit the ITC's Trade Map Glossary at <https://www.trademap.org/Index.aspx>

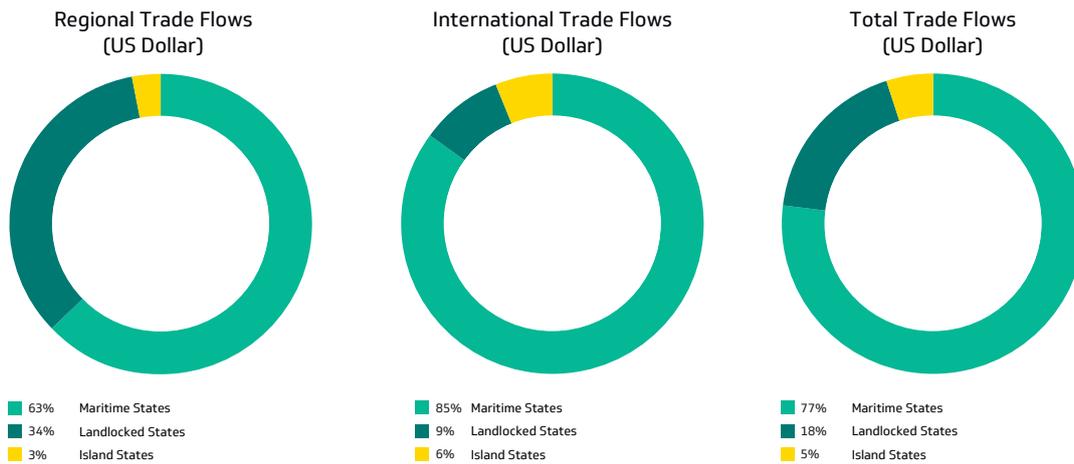
Table 4: SADC Trade by Value, 2017 (Thousands of US Dollars)

REGIONAL VALUES, 2017				INTERNATIONAL VALUES, 2017				TOTAL VALUES, 2017			
Maritime States	Imports	Exports	Total	Maritime States	Imports	Exports	Total	Maritime States	Imports	Exports	Total
Angola	\$868,350	\$1,466,861	\$2,335,211	Angola	\$15,901,782	\$33,594,927	\$49,496,709	Angola	\$16,770,132	\$35,061,788	\$51,831,920
Mozambique	\$1,830,871	\$996,784	\$2,827,655	Mozambique	\$3,967,177	\$3,712,777	\$7,679,954	Mozambique	\$5,798,048	\$4,709,561	\$10,507,609
Namibia	\$4,520,706	\$2,194,331	\$6,715,037	Namibia	\$2,295,788	\$3,080,604	\$5,376,392	Namibia	\$6,816,494	\$5,274,935	\$12,091,429
South Africa	\$6,210,414	\$20,252,990	\$26,463,404	South Africa	\$79,152,932	\$71,062,543	\$150,215,475	South Africa	\$85,363,346	\$91,315,533	\$176,678,879
Tanzania	\$563,066	\$1,008,443	\$1,571,509	Tanzania	\$7,498,026	\$3,712,839	\$11,210,865	Tanzania	\$8,061,092	\$4,721,282	\$12,782,374
Sub-Total	\$13,993,407	\$25,919,409	\$39,912,816	Sub-Total	\$108,815,705	\$115,163,690	\$223,979,395	Sub-Total	\$122,809,112	\$141,083,099	\$263,892,211
REGIONAL VALUES, 2017				INTERNATIONAL VALUES, 2017				Landlocked States			
Landlocked States	Imports	Exports	Total	Landlocked States	Imports	Exports	Total	Landlocked States	Imports	Exports	Total
Botswana	\$3,858,806	\$755,358	\$4,614,164	Botswana	\$1,432,094	\$5,145,024	\$6,577,118	Botswana	\$5,290,900	\$5,900,382	\$11,191,282
DR Congo			\$0	DR Congo			\$0	DR Congo	\$6,994,844	\$8,226,580	\$15,221,424
Malawi	\$703,664	\$211,628	\$915,292	Malawi	\$1,912,750	\$762,844	\$2,675,594	Malawi	\$2,616,414	\$974,472	\$3,590,886
Zambia	\$5,061,261	\$1,382,190	\$6,443,451	Zambia	\$3,718,510	\$6,887,730	\$10,606,240	Zambia	\$8,779,771	\$8,269,920	\$17,049,691
Zimbabwe	\$2,474,017	\$2,639,773	\$5,113,790	Zimbabwe	\$2,520,653	\$861,670	\$3,382,323	Zimbabwe	\$4,994,670	\$3,501,443	\$8,496,113
Eswatini	\$1,276,424	\$1,477,455	\$2,753,879	Eswatini	\$335,089	\$543,282	\$878,371	Eswatini	\$1,611,513	\$2,020,737	\$3,632,250
Lesotho	\$1,492,446	\$347,347	\$1,839,793	Lesotho	\$582,960	\$325,887	\$908,847	Lesotho	\$2,075,406	\$673,234	\$2,748,640
Sub-Total	\$14,866,618	\$6,813,751	\$21,680,369	Sub-Total	\$10,502,056	\$14,526,437	\$25,028,493	Sub-Total	\$32,363,518	\$29,566,768	\$61,930,286
REGIONAL VALUES, 2017				INTERNATIONAL VALUES, 2017				Landlocked States			
Island States	Imports	Exports	Total	Island States	Imports	Exports	Total	Island States	Imports	Exports	Total
Comoros			\$0	Comoros			\$0	Comoros	\$371,964	\$85,636	\$457,600
Madagascar	\$323,162	\$169,879	\$493,041	Madagascar	\$3,433,885	\$2,717,784	\$6,151,669	Madagascar	\$3,757,047	\$2,887,663	\$6,644,710
Mauritius	\$643,066	\$375,899	\$1,018,965	Mauritius	\$4,730,292	\$1,793,665	\$6,523,957	Mauritius	\$5,373,358	\$2,169,564	\$7,542,922
Seychelles	\$116,464	\$26,964	\$143,428	Seychelles	\$1,261,996	\$571,224	\$1,833,220	Seychelles	\$1,378,460	\$598,188	\$1,976,648
Sub-Total	\$1,082,692	\$572,742	\$1,655,434	Sub-Total	\$9,426,173	\$5,082,673	\$14,508,846	Sub-Total	\$10,880,829	\$5,741,051	\$16,621,880
Total	\$29,942,717	\$33,305,902	\$63,248,619	Total	\$128,743,934	\$134,772,800	\$263,516,734	Total	\$166,053,459	\$176,390,918	\$342,444,377

Source: ITC Trade Map.

SADC Trade Flows

Figure 8: Share of Regional and International Trade Flows by Value



Source: ITC Trade Map.

An examination of SADC’s trade flows reveals the region’s reliance on exporting natural resources and raw materials and importing energy, manufactured goods, medications and food. The most commonly imported commodity in terms of value is petroleum, which is a top import for 11 of the SADC countries. Other common imports include motor vehicles and wheat or meslin flour. Exported commodities in terms of value are typically high-value natural resources, including diamonds, gold, copper, platinum, coal, aluminum and nickel. While all other countries import oil, Angola is an oil exporter. Besides natural resources, other top exports are typically agricultural products. Few countries export manufactured goods, with the exception of South Africa (motor vehicles) and Lesotho (textiles). A full list of top commodities by value of trade can be found in Table 5.

Table 5: SADC’S Top Traded Commodities by Value, 2017

Maritime States		
Country	Top Commodities Imported	Top Commodities Exported
Angola	Petroleum oil, meat, machinery parts, motor cars and wheat or meslin flour	Petroleum oil, petroleum gas diamonds and oils
Mozambique	Petroleum oil, unwrought aluminum, electrical energy, vessels and rice	Coke and semi-coke of coal, unwrought aluminum, bars, rods and profiles of aluminum, petroleum gas and other gaseous hydrocarbons and electrical energy
Namibia	Petroleum oil, copper ores and concentrates, diamonds, copper and motor vehicles	Diamonds, gold, frozen fish, uranium or thorium ores and concentrates and fish fillets
South Africa	Petroleum oil, motor cars, telephone sets and medications	Platinum, coal, motor cars, gold and iron ores
Tanzania	Petroleum oil, medications, palm oil, wheat and meslin and motor cars	Gold, coconuts, unmanufactured tobacco, tobacco refuse, fish fillets and coffee
Landlocked States		
Country	Top Commodities Imported	Top Commodities Exported
Botswana	Diamonds, petroleum oil, medications, motor cars and motor vehicles	Diamonds, dust and powder, insulated wire or cable, meat of bovine animals – frozen, carbonates and peroxy-carbonates
DRC	Medications, human blood, petroleum oil, telephone sets and cane or beet sugar	Copper, cobalt mattes, copper ores and concentrates, cobalt oxides and cobalt ores and concentrates
Malawi	Petroleum oil, unused postage, medications, minerals and wheat and meslin	Unmanufactured tobacco, tea, oilcake, cane or beet sugar, and groundnuts
Zambia	Copper ores and concentrates, cobalt oxides, petroleum oil and minerals	Copper, cobalt oxides, cobalt matters and unused postage

Zimbabwe	Petroleum oil, electrical energy, medicaments, motor cars and telephone sets	Gold, unmanufactured tobacco, tobacco refuse, nickel mattes, nickel ores and concentrates and ferro-alloys
Eswatini	Petroleum oil, motor cars, medicaments, motor vehicles and mixtures of odoriferous substances	Mixtures of odoriferous substances, cane or beet sugar, prepared binders, women's or girls' suits and wood sawn or chipped lengthwise
Lesotho	Articles of iron, petroleum jelly, petroleum oil, fabrics and motor cars	Men's or boys' suits, women's or girls' suits and t-shirts

Island States		
Country	Top Commodities Imported	Top Commodities Exported
Comoros	Worn clothing, women's or girls' suits, furniture and parts, rice and tarpaulins	Cloves whole fruit cloves and stems, essential oils, vanilla, vessels and gold
Madagascar	Petroleum oil, rice, motor vehicles, palm oil and medicaments	Vanilla, unwrought nickel, cloves whole fruit cloves and stems, cobalt mattes and jerseys
Mauritius	Petroleum oil, frozen fish, motor cars, telephone sets and medicaments	Prepared or preserved fish, cane or beet sugar, t-shirts, men's or boys' shirts and men's or boys' suits
Seychelles	Petroleum oil, frozen fish, yachts, powered aircraft and centrifuges	Prepared or preserved fish, petroleum oil, powered aircraft, frozen fish and yachts or other vessels

Source: Collated by Nathan Associates for this study.

2.1.2. Trade By Volume, 2017

2.1.2.1. Methodology

SADC's trade flows by volume were mapped to assess the impact of trade on regional infrastructure; trade volumes impact the number of trucks and wagons moving through the corridors. This data was obtained primarily from the ITC Trade Map and current trade flows are based on the year 2017 since ITC had not yet published complete data for the year 2018.

A review of the ITC's volume data revealed several inconsistencies in a few key markets. To address these irregularities, we cross-referenced ITC's data with COMTRADE. This validated the majority of the data, though a few markets required additional analysis. In these markets, we again cross-referenced the ITC data with port data and analysed historical growth trends at the commodity level to identify and correct ITC's gaps.

To isolate the impact of intra-regional trade, trade flows were categorised into regional, international and total flows and

the SADC countries were grouped into maritime, landlocked and island states. As the DRC is predominantly landlocked but does have access to the sea in the west, we further divided the DRC into maritime and landlocked regions. The Kinshasa region is categorised as a maritime state, while the north and east provinces around Goma and Bukavu and the Lubumbashi Copperbelt are categorised as landlocked states.

These regional breakdowns are as follows:

- Maritime states include Angola, DRC (Kinshasa), Mozambique, Namibia, South Africa and Tanzania;
- Landlocked states include Botswana, DRC (Goma/Bukavu), DRC (Lubumbashi), Eswatini, Lesotho, Malawi, Zambia and Zimbabwe;¹² and
- Island states include Comoros, Madagascar, Mauritius and Seychelles.

2.1.2.2. Results

Table 6 summarises SADC's trade flows by volume. Our analysis revealed that the maritime states dominate 92 per cent

of SADC's total trade flows. South Africa represents the overwhelming majority of trade flows for both total imports (60.9 million tons, 46.8 per cent of all imports) and total exports (232 million tons, 66.6 per cent of all exports). Angola (113 million tons) trails South Africa in total trade volumes, distantly followed by Mozambique (11.8 million tons) and Tanzania (10.9 million tons). The maritime states' dominance of total trade flows reflects their ability to capitalise on their access to the sea and, by extension, non-regional trading partners. The landlocked states, in contrast, represent only 5.4 per cent of SADC's total trade flows, followed closely behind by the island states at 3.2 per cent.

¹² Eswatini and Lesotho are largely omitted from later analysis of the transit markets, due to their size and captive reliance on South Africa.

SADC Trade Flows

Table 6: SADC Trade by Volume, 2017 (Metric Tons)

REGIONAL VOLUMES 2017				INTERNATIONAL VOLUMES 2017				TOTAL VOLUMES 2017			
Maritime States	Imports	Exports	Total	Maritime States	Imports	Exports	Total	Maritime States	Imports	Exports	Total
Angola	985,734	3,127,861	4,113,595	Angola	14,991,587	94,338,975	109,330,562	Angola	15,977,321	97,466,836	113,444,157
DRC (Kinshasa)	788,000	20,000	808,000	DRC (Kinshasa)	2,012,000	435,000	2,447,000	DRC (Kinshasa)	2,800,000	455,000	3,255,000
Mozambique	1,296,007	835,063	2,131,071	Mozambique	8,445,993	1,267,937	9,713,929	Mozambique	9,742,000	2,103,000	11,845,000
Namibia	1,931,184	1,753,724	3,684,907	Namibia	508,503	647,096	1,155,598	Namibia	2,439,686	2,400,819	4,840,505
South Africa	11,568,890	26,428,219	37,997,109	South Africa	49,369,667	205,606,749	254,976,416	South Africa	60,938,557	232,034,968	292,973,525
Tanzania	629,735	415,857	1,045,592	Tanzania	7,482,991	2,381,572	9,864,563	Tanzania	8,112,726	2,797,429	10,910,155
Sub-Total	17,199,550	32,580,724	49,780,274	Sub-Total	82,810,740	304,677,328	387,488,068	Sub-Total	100,010,290	337,258,052	437,268,342
REGIONAL VOLUMES 2017				INTERNATIONAL VOLUMES 2017				TOTAL VOLUMES 2017			
Landlocked States	Imports	Exports	Total	Landlocked States	Imports	Exports	Total	Landlocked States	Imports	Exports	Total
DRC (Goma/Bukavu)	-	-	-	DRC (Goma/Bukavu)	390,000	-	390,000	DRC (Goma/Bukavu)	390,000	-	390,000
DRC (Lubumbashi)	1,700,000	695,000	2,395,000	DRC (Lubumbashi)	150,000	50,000	200,000	DRC (Lubumbashi)	1,850,000	745,000	2,595,000
Malawi	751,836	215,417	967,253	Malawi	1,337,462	332,954	1,670,416	Malawi	2,089,298	548,371	2,637,669
Botswana	2,380,209	875,109	3,255,318	Botswana	1,089,953	51,892	1,141,845	Botswana	3,470,162	927,001	4,397,163
Zambia	3,315,897	2,228,364	5,544,261	Zambia	2,346,457	1,889,858	4,236,315	Zambia	5,662,354	4,118,222	9,780,576
Zimbabwe	1,924,281	794,606	2,718,887	Zimbabwe	1,763,311	1,306,853	3,070,164	Zimbabwe	3,687,592	2,101,459	5,789,051
Eswatini	1,584,326	1,942,460	3,526,786	Eswatini	243,232	281,746	524,978	Eswatini	1,827,558	2,224,206	4,051,764
Lesotho	1,439,089	128,623	1,567,712	Lesotho	218,175	30,751	248,926	Lesotho	1,657,264	159,374	1,816,638
Sub-Total	10,072,223	4,808,496	14,880,719	Sub-Total	7,077,183	3,631,557	10,708,740	Sub-Total	17,149,406	8,440,053	25,589,459
REGIONAL VOLUMES 2017				INTERNATIONAL VOLUMES 2017				TOTAL VOLUMES 2017			
Island States	Imports	Exports	Total	Island States	Imports	Exports	Total	Island States	Imports	Exports	Total
Comoros	707,567	117,500	825,067	Comoros	N/A	N/A	N/A	Comoros	358,805	10,302	369,107
Madagascar	1,766,835	121,761	1,888,596	Madagascar	5,342,022	736,038	6,496,968	Madagascar	6,049,589	1,272,446	7,322,035
Mauritius	52,199	10,028	62,227	Mauritius	4,054,853	324,333	4,790,891	Mauritius	5,821,688	857,799	6,679,487
Seychelles	2,526,601	249,289	2,775,890	Seychelles	732,160	2,215,317	1,056,493	Seychelles	784,359	334,361	1,118,720
Sub-Total	29,798,374	37,638,509	67,436,883	Sub-Total	10,129,035	310,524,202	12,713,459	Sub-Total	13,014,441	2,474,908	15,489,349
Total	29,942,717	33,305,902	63,248,619	Total	100,016,958	134,772,800	410,910,267	Total	130,174,137	348,173,013	478,347,150

Source: ITC Trade Map.

Figure 9: Share of Regional and International Trade Flows by Volume



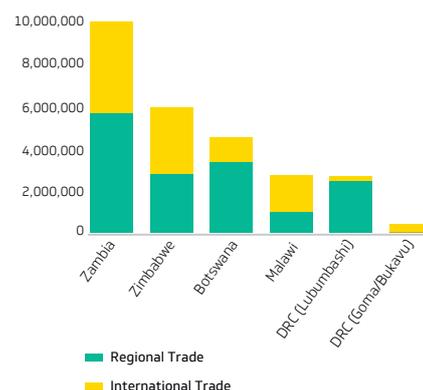
Source: ITC Trade Map.

Figure 9 depicts trade flows. The landlocked states claim a higher portion of trade flows at 22.1 per cent. While the maritime states appear to dominate regional trade, a closer look reveals that South Africa actually represents 56 per cent of all regional trade within SADC, inflating the maritime states' share of regional trade. Excluding South Africa from this analysis, the volume of maritime states' regional trade is on a par with that of the landlocked states: maritime states (without South Africa) represent 40 per cent of all trade within SADC while the landlocked states represent 50.5 per cent. In nominal terms, the volume of maritime states' regional trade ranges from 800,000 to 4.1 million tons and from 900,000 to 5.5 million tons in the landlocked states. These similar flows reveal that the maritime states' ports do not grant them a competitive advantage in terms of nominal regional trade flows compared to landlocked states.

Without direct access to international trading partners, the landlocked states of Botswana, DRC, Malawi, Zambia and

Zimbabwe are the region's primary transit markets and are critical to assessing the region's trade-carrying infrastructure (see Figure 10). Some 58 per cent of the landlocked states' trade flows remain within SADC and only total trade flows for Malawi and Zimbabwe are higher internationally than regionally. Within SADC, the top trading partner for landlocked states is almost always South Africa, with the exception of Malawi and Zambia, who trade primarily with Zimbabwe and the DRC, respectively. Regardless of the share of regional versus international trade, all the landlocked states' trade flows (25.5 million tons) are transported on the region's roads, rails and inland waterways, either to their SADC destination or to a maritime states' port. Both regional and international trade use the same primary or secondary corridors, as confirmed by the GPS data analysis in Section 4.6. As a result, analysing both regional and international trade flows of landlocked states is critical to assessing the region's trade-carrying infrastructure.

Figure 10: Regional and International Flows of Landlocked States, 2017



Source: ITC Trade Map.

SADC Trade Flows

The composition of the SADC's trade flows also has important implications for the region's infrastructure. The most commonly imported commodity in the SADC region is petroleum oil. It is the number one commodity imported in nine countries and falls within the top five commodities imported in the remaining seven SADC countries. Oil is transported primarily via pipeline or tank trucks, which increases security risks in the logistics chain. Other top imports like wheat, fertilisers and cement, which are imported in bulk, cause delays at the ports since there is often limited infrastructure to handle offloading cargo of this magnitude.

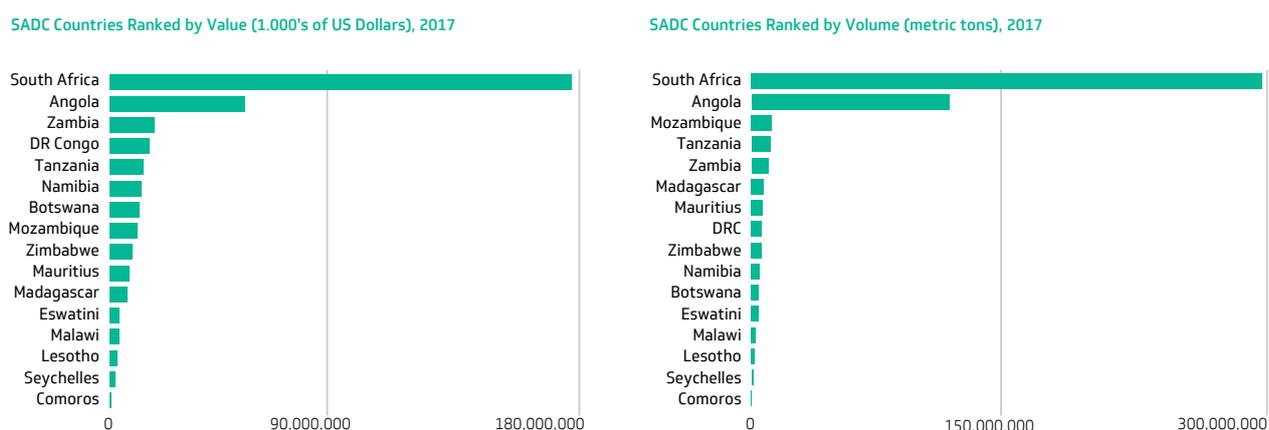
SADC's exports are more varied and reflect the region's overreliance on exporting raw materials and natural resources. These commodities require a range of infrastructure. Exported coal is transported as bulk cargo, which is best suited to rail, while copper is generally transported in containers for security purposes. Frozen fish and other perishable goods require cold chain infrastructure along the entire supply chain. A full summary of SADC's top imported and exported commodities can be found in Table 7.

Table 7: SADC's Top Traded Commodities by Volume

Maritime States		
Country	Top Commodities Imported	Top Commodities Exported
Angola	Meat, petroleum oils, fertilisers, wheat or meslin flour, pasta	Petroleum oils, cement, iron/steel wires, quartz, copper wires/cables
DRC (Kinshasa)	Petroleum oils, vehicles, fertilisers, wheat and other	Petroleum oil, hardwood timber and other
Mozambique	Rice, insecticides, petroleum oils, cement, unused postage	Sunflower seed oil, niobium ores, fertiliser, palm oil, wigs
Namibia	Petroleum oils, sulphuric acid, wheat and meslin, animal feed, maize	Salts, frozen fish, malt beer, marble, wood charcoal
South Africa	Petroleum oils, petroleum gas, coal, wheat and meslin	Coal, iron ores, manganese ores, chromium ores, petroleum oils
Tanzania	Petroleum oils, wheat and meslin, palm oil, petroleum coke, fertilisers	Dried vegetables, nuts, cement, bran, nickel ore
Landlocked States		
Country	Top Commodities Imported	Top Commodities Exported
Botswana	Petroleum oil, cement, maize, malt beer, wheat and meslin	Salt, carbonates, coal, nickel mattes, cement
DRC (Goma/Bukavu)	Not specified	Not specified
DRC (Lubumbashi)	Sulphuric acid, cement, quicklime, sulphur and other	Copper ores, refined copper, cobalt mattes, cobalt ores and other minerals
Malawi	Cement, petroleum oils, fertilisers, wheat and meslin, salt	Tobacco, soya beans, cane sugar, dried legumes, tea
Zambia	Petroleum oil, copper ores, fertilisers, sulphur, frozen fish	Sulphuric acid, unrefined copper, refined copper, cement, maize
Zimbabwe	Petroleum oil, maize, fertilisers, wheat and meslin, rice	Chromium ores, ferro-alloys, nickel ores, granite, tobacco
Eswatini	Petroleum oil, cement, fuel wood, maize, coal	Fuel wood, cane sugar, wood, coal, fruit juices
Lesotho	Glass, petroleum oils, cement, wheat and meslin, maize	Bran, wheat or meslin flour, granite, men's clothing, pebbles/gravel
Island States		
Country	Top Commodities Imported	Top Commodities Exported
Comoros	Cement, rice, worn clothing, meat, petroleum oil	Cloves, ferrous waste, wood charcoal, batteries waste, petroleum oil
Madagascar	Limestone, petroleum oil, cement, rice, coal	Titanium ores, chromium ores, fertilisers, dried legumes, petroleum oil
Mauritius	Petroleum oil, coal, cement, wheat and meslin, petroleum gas	Cane sugar, fish, frozen fish, petroleum gas, ethyl alcohol
Seychelles	Petroleum oil, frozen fish, cement, iron flat-rolled products, animal feed	Petroleum oil, fish, frozen fish, flour, ferrous waste

Source: Collated by Nathan Associates for this study.

Figure 11: Ranking of SADC Countries by Value and Volume, 2017



Source: Afreximbank.

The primary differences between SADC's trade by value and trade by volume arise from countries exporting high-value commodities that tend to be low-volume. Figure 11 demonstrates this variation. South Africa and Angola top the trade by value and trade by volume rankings, while Eswatini, Malawi, Lesotho, Seychelles and Comoros round-out the bottom rankings. The middle nine countries, however, fluctuate in ranking between the trade by value and trade by volume metrics due to high-value, low-volume exports and low-value, high-volume exports and imports.

2.1.2.1. Conclusions

SADC's trade flows by value and volume are generally similar. Both metrics indicate that the maritime states dominate the region due to the predominance of South Africa and Angola and that the landlocked states perform on a par with the maritime states when considering only intra-regional trade.

2.2. FUTURE TRADE FLOWS 2040

2.2.1. Trade By Volume, 2040

2.2.1.1. Methodology

To properly assess the impact of future trade on SADC's trade-carrying infrastructure, the team projected trade by volume to the year 2040. Projections by value were not considered, as trade by value can misrepresent the implications of increased trade on regional infrastructure. For example, \$1 million of a high-value export like diamonds generally puts less pressure on regional infrastructure than \$1 million of a low-value export like cement. Therefore, we project based on volume, not value, to focus on the corridors that are carrying the highest flows that put pressure on the trade-carrying infrastructure.

The team initially projected trade volumes to 2040 as a controlled scenario using linear projections based on ITC's historical

2001-2017 data. Unfortunately, these projections did not address a variety of variables, such as the practical maximum volume of exports for natural resources, changes in consumer demand and others. Non-linear historical trends in the ITC data also distorted these initial projections.

To compensate for these shortcomings, the team utilised Transnet's¹³ Long-Term Planning Framework (LTPF), a long-term unconstrained framework that forecasts freight demand for the 30-year period 2014-2044.¹⁴ Unlike the ITC linear projections, the LTPF considered multiple variables and provided the team with more robust growth projections. These rates also distinguish between growth of total trade flows and regional trade flows. The compound annual growth rates (CAGR) derived from the LTPF that were utilised for this study can be found in Table 8.

¹³ Transnet is the South Africa state-owned rail, port and pipeline company. The growth rates from this report were used because they were considered more comprehensive and reliable than other sources available.

¹⁴ For more information, please visit <https://www.transnet.net/BusinessWithUs/Pages/LTPF.aspx>

SADC Trade Flows

Table 8: Compound Annual Growth Rates used for 2040 Projections

2017-2040	ALL FLOWS		REGIONAL FLOWS	
	Exports CAGR	Imports CAGR	Regional Exports	Regional Imports
Angola	6.10%	5.10%	3.50%	4.20%
Botswana	4.50%	3.30%	2.70%	3.40%
DRC	7.00%	5.00%	4.20%	4.70%
Lesotho	0.40%	2.50%	1.20%	0.30%
Malawi	5.30%	5.10%	4.20%	4.30%
Mozambique	11.50%	8.10%	3.10%	3.90%
Namibia	9.30%	7.30%	2.80%	2.50%
South Africa	2.50%	3.60%	3.60%	2.80%
Eswatini	2.60%	3.10%	1.20%	2.30%
Tanzania	4.90%	2.90%	4.10%	4.00%
Zambia	5.50%	8.10%	3.70%	4.20%
Zimbabwe	6.10%	6.30%	3.00%	3.30%
Comoros	11.30%	3.70%	11.30%	3.70%
Madagascar	3.00%	2.60%	3.00%	2.60%
Mauritius	4.00%	4.00%	4.00%	4.00%
Seychelles	2.00%	3.70%	2.00%	3.70%

Source: Transnet, 30-Year Long-Term Planning Framework, 2017 Edition.

2.2.1.2. Results

SADC's 2040 trade flow projections are summarised in Table 9. Although total and regional growth rates vary by country, many of the general trends from the 2017 data are still present in the 2040 projections. Key observations from the 2040 trade flow by volume projections include:

- Led by South Africa, maritime states continue to dominate SADC's trade flows, though the gap between total trade flows of maritime states and landlocked states is steadily decreasing. In 2017, maritime states comprised 91.4 per cent of all SADC trade flows while landlocked states comprised only 5.4 per cent. In 2040, maritime states are projected to comprise 89.4 per cent of all trade flows and landlocked states comprise 7.9 per cent (see Figure 12).

- Within the maritime states, the gap between South Africa and Angola's total trade flows is also shrinking. In 2017, South Africa's trade flows were 258 per cent larger than Angola's; in 2040 this figure shrinks to 127 per cent.

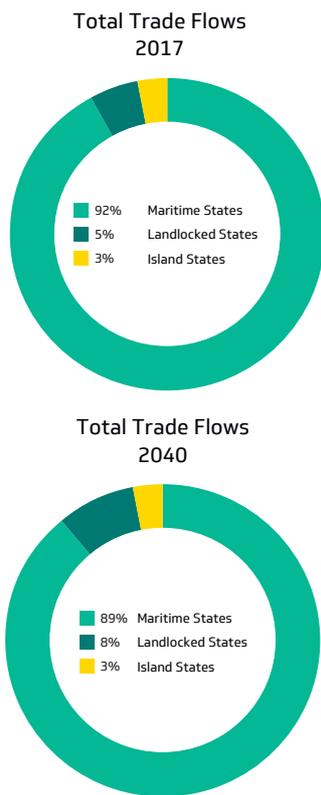
Landlocked states' share of regional trade flows is marginally increasing. In 2017, the regional trade flows of maritime and landlocked states varied 51.8 percentage points; by 2040, this difference falls only 3.4 percentage points to 48.4 (see Figure 13).

Figure 14 shows that in nominal terms, the total trade flows of all landlocked states will increase dramatically by 2040, in some cases tripling or quadrupling 2017 volumes. The bulk of this increase is due to a spike in international trade, although the expected growth of regional trade is still noteworthy.

Of the five transit markets, Zambia's growth is the most significant in both percentage (491.5 per cent) and nominal terms (38.3 million tons).

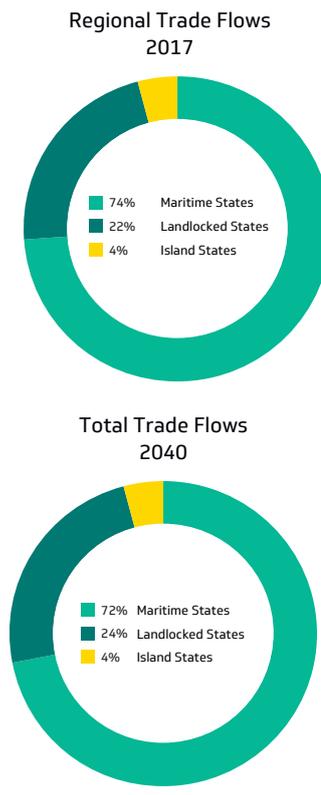
As the 2040 trade flows were projected using a controlled scenario, the region's top commodities do not change from 2017 to 2040. Petroleum remains a key import within SADC and the region will continue to rely on its natural resources for exports.

Figure 12: Total Trade Flows by Volume, 2017 Versus 2040



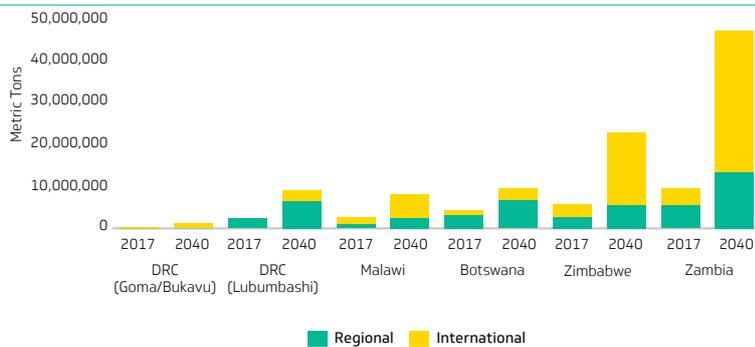
Source: ITC Trade Map.

Figure 13: Regional Trade Flows by Volume, 2017 Versus 2040



Source: ITC Trade Map.

Figure 14: Trade Flows of Landlocked States, 2017 and 2040 (Metric Tons)



Source: ITC Trade Map.

SADC Trade Flows

Table 9: SADC Trade By Volume, 2040 (Metric Tons)

REGIONAL VOLUMES 2040			INTERNATIONAL VOLUMES 2040			TOTAL VOLUMES 2040					
Maritime States	Imports	Exports	Total	Maritime States	Imports	Exports	Total	Maritime States	Imports	Exports	Total
Angola	2,539,319	6,900,420	9,439,739	Angola	47,621,709	373,561,064	421,182,773	Angola	50,161,028	380,461,484	430,622,512
DRC (Kinshasa)	2,266,209	51,521	2,317,730	DRC	6,334,058	2,105,420	8,439,478	DRC (Kinshasa)	8,600,267	2,156,941	10,757,208
Mozambique	3,124,389	1,685,267	4,809,656	Mozambique	55,306,041	24,028,234	79,334,276	Mozambique	58,430,431	25,713,502	84,143,932
Namibia	3,407,787	3,309,808	6,717,595	Namibia	8,926,883	15,252,123	24,179,006	Namibia	12,334,670	18,561,931	30,896,601
South Africa	21,834,001	59,613,178	81,447,179	South Africa	115,622,897	349,838,206	465,461,103	South Africa	137,456,898	409,451,383	546,908,282
Tanzania	1,552,118	1,047,878	2,599,995	Tanzania	14,105,311	7,358,237	21,463,547	Tanzania	15,657,428	8,406,114	24,063,543
Sub-Total	34,723,823	72,608,072	107,331,894	Sub-Total	247,916,899	772,143,284	1,020,060,183	Sub-Total	282,640,722	844,751,355	1,127,392,077
REGIONAL VOLUMES 2040			INTERNATIONAL VOLUMES 2040			TOTAL VOLUMES 2040					
Landlocked States	Imports	Exports	Total	Landlocked States	Imports	Exports	Total	Landlocked States	Imports	Exports	Total
DRC (Goma/Bukavu)	-	-	-	DRC (Goma/Bukavu)	1,197,894	-	1,197,894	DRC (Goma/Bukavu)	1,197,894	-	1,197,894
DRC (Lubumbashi)	4,889,029	1,790,368	6,679,397	DRC (Lubumbashi)	793,290	1,741,327	2,534,617	DRC (Lubumbashi)	5,682,319	3,531,695	9,214,014
Botswana	5,135,556	1,615,037	6,750,593	Botswana	2,186,906	936,224	3,123,131	Botswana	7,322,462	2,551,261	9,873,723
Malawi	1,979,986	554,929	2,534,916	Malawi	4,579,395	1,243,640	5,823,034	Malawi	6,559,381	1,798,569	8,357,950
Zambia	8,541,980	5,139,224	13,681,204	Zambia	25,419,607	8,970,429	34,390,036	Zambia	33,961,587	14,109,653	48,071,240
Zimbabwe	4,060,466	1,568,224	5,628,690	Zimbabwe	10,971,229	6,634,815	17,606,044	Zimbabwe	15,031,695	8,203,039	23,234,733
Eswatini	2,672,909	2,555,665	5,228,573	Eswatini	1,015,342	1,458,215	2,473,557	Eswatini	3,688,251	4,013,879	7,702,130
Lesotho	1,541,733	169,227	1,710,960	Lesotho	1,382,693	5,473	1,388,166	Lesotho	2,924,426	174,700	3,099,126
Sub-Total	24,607,018	10,667,781	35,274,799	Sub-Total	45,148,321	19,526,434	64,674,755	Sub-Total	69,755,338	30,194,216	99,949,554
REGIONAL VOLUMES 2040			INTERNATIONAL VOLUMES 2040			TOTAL VOLUMES 2040					
Island States	Imports	Exports	Total	Island States	Imports	Exports	Total	Island States	Imports	Exports	Total
Comoros	N/A	N/A	N/A	Comoros	N/A	N/A	948,371	Comoros	827,504	120,868	948,371
Madagascar	1,276,900	231,896	1,508,796	Madagascar	9,640,398	2,279,386	11,919,784	Madagascar	10,917,298	2,511,282	13,428,580
Mauritius	4,354,746	300,106	4,654,852	Mauritius	9,994,059	1,814,124	11,808,184	Mauritius	14,348,805	2,114,231	16,463,035
Seychelles	120,385	15,813	136,198	Seychelles	1,688,563	511,440	2,200,004	Seychelles	1,808,949	527,254	2,336,202
Sub-Total	5,752,031	547,816	6,299,847	Sub-Total	21,323,021	4,604,951	26,876,343	Sub-Total	27,902,555	5,273,634	33,176,190
Total	65,082,871	83,823,669	148,906,540	Total	314,388,241	796,274,669	1,111,611,281	Total	380,298,616	880,219,205	1,260,517,821

Source: ITC Trade Map.





Chapter 3

SADC Trade Corridors

SADC Trade Corridors

3.1. SADC Regional Transport Corridors

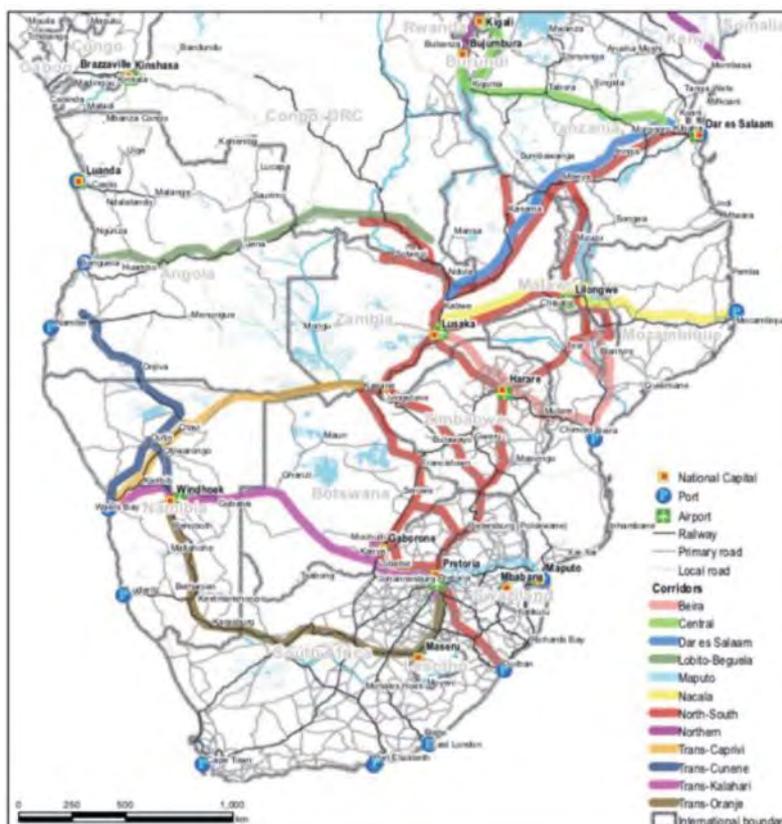
Figure 15 illustrates the primary regional transport corridors that traverse the SADC region. A regional corridor is any corridor that serves at least three countries, including the maritime states, of which two are landlocked countries or can be considered landlocked regions within a maritime state. A cameo profile of the infrastructure backbone of each corridor is summarised as follows:

- **Dar es Salaam Corridor:** Links the port of Dar es Salaam by road to Mbeya in southern Tanzania, which acts as a junction to Malawi, via the Kasumulu/Songwe border and Zambia via the Tunduma/Nakonde border and onto the DRC Copperbelt via the Kasumbalesa border. The TAZARA railway links Dar es Salaam to the junction at Kapiri Mposhi in Zambia where it connects to the Zambian rail network, which links to the DRC (SNCC) rail network via the rail border at Sakania. Finally, the TAZAMA oil pipeline connects Dar es Salaam to the Ndeni Oil Refinery in Ndola, located in the Zambian Copperbelt.
- **Nacala Corridor:** Links the general freight port of Nacala by road to Cuamba and Lichinga in Niassa province and Mocuba and Milanje in Zambezia province in northern Mozambique to Malawi, via the Mandimba/Chiponde and Milange/Muloza borders and onto Chipata in eastern Zambia via the Mchinji/Mwami border. The general freight railway extends from Nacala through to Blantyre and Lilongwe in Malawi via the Entre Lagos/Nayuchi border and onto Chipata in Zambia via the Mchinji/Mwami border. A new rail section from the Nyaka junction in Malawi to Moatize in Tete province in Mozambique has been constructed and the existing sections from Nkaya to the new coal terminal at Nacala-a-Vehla port have been upgraded to the standards of a heavy-haul coal line.
- **Beira Corridor:** Links the port of Beira by a road network through Chimoio in central Mozambique to Zimbabwe via the Machipanda/Forbes borders and onto Zambia via the Chirundu border and the DRC via the Kasumbalesa border. It also links Tete in central-north Mozambique and onto Blantyre in southern Malawi via the Zobue/Mwanza border, Lilongwe in central Malawi via the Calomue/Dedza border and an alternate route to Zambia via the Cassacatiza/Chimefusa border. Two railway systems complement the road network, namely the Machipanda line linking Beira to Harare in Zimbabwe and the Sena line connecting Beira to Moatize in Tete province. Moatize is also the junction that integrates the Sena and Nacala railway systems. Finally, the Feruka oil pipeline connects the port of Beira to an oil refinery at Feruka, just outside Harare in Zimbabwe, via the Forbes/Machipanda border.
- **Maputo Corridor:** Links the port of Maputo by a cross-border toll road to the Gauteng province in South Africa via Ressano-Garcia/Komatipoort border. A secondary regional road network radiates from Maputo, south to KwaZulu-Natal province in South Africa via the Ponta D'Ouro border and south-east to Swaziland via the Goba border. This road network is complemented by three regional railways. The first is the Ressano Garcia line that links Maputo to the South Africa rail network via the Ressano Garcia/Komatipoort border, the second is the Goba railway that links Maputo to the Eswatini rail network via the Goba border and the third is the Limpopo line that links Maputo to the Zimbabwean rail network via the Chicualacuala border. Finally, a pipeline transports offshore natural gas from southern Mozambique to Secunda in South Africa, via the Ressano Garcia/Komatipoort border, known as the Sasol pipeline.
- **North-South Corridor:** Links the port of Durban to Botswana, DRC Copperbelt, Malawi, Zambia and Zimbabwe by a road network that has three arms, as follows:

 - An eastern arm traverses South Africa to the Beitbridge border into Zimbabwe and onto either the Chirundu border or Victoria Falls/Livingstone border into Zambia before entering DRC via the Kasumbalesa border.
 - This eastern arm splits further at Harare in Zimbabwe in a north-easterly direction to Tete in Mozambique via the Nyamapanda/Cuchamano border to Lilongwe, Malawi, via the Dedza/Calomue border and Blantyre, Malawi, via the Zobue/Mwanza border and Chipata, Zambia, via the Cassacatiza/Chimefusa border.
 - The western arm traverses South Africa to either the Skilpadshek/Pioneer Gate, Kopfontein/Tlokweg or Groblersbrug/Martin's Drift borders into Botswana and onto the Kazungula border into Zambia before entering DRC via the Kasumbalesa border.
 - This lattice-like road network is also complemented by the North-South rail network, which commences on the South African rail network at the port of Durban (or the bulk port of Richards Bay) before entering onto the Zimbabwean rail network (including the privately operated Beitbridge Railway) at the Beitbridge border and then onto the Zambian rail network at the Victoria Falls/Livingstone border and onto the DRC (SNCC) rail network at the Sakania border. A secondary railway connects the South African rail network to the Botswana rail network at the Kopfontein/Tlokweg border. Whilst this railway terminates at Francistown, it is linked to the North-South

- rail network at the Plumtree border, where it connects to the Zimbabwean rail network.
- **Walvis Bay Corridor:** The Walvis Bay Corridor comprises four sub-corridors: the Trans-Cunene, Trans-Kalahari, Trans-Orange and Trans-Caprivi Corridors.
 - Trans-Cunene Corridor: Links the port of Walvis Bay by road through Windhoek in Namibia to Angola via the Oshikango/Santa Clara border.
 - Trans-Kalahari Corridor: Links the port of Walvis Bay by road through Windhoek in Namibia to Botswana via the Buitepos/Mamuno border and Gauteng in South Africa via the Skilpadshek/Pioneer Gate border.
 - Trans-Orange Corridor: Links the port of Walvis Bay by road through Windhoek in Namibia to Gauteng via the Ariamsvlei/Nakop border and, to the south, regional traffic from Windhoek to Cape Town in South Africa via the Vioolsdrif border; and
 - Trans-Caprivi Corridor: Links the port of Walvis Bay by road through Windhoek in Namibia to Zambia via the Katima Mulilo/Sesheke border and to the DRC Copperbelt via the Kazungula border.
- The following sub-section of the report ranks the competitiveness of these principal regional transport corridors in terms of key performance criteria for each of the target transit markets serviced by each corridor.

Figure 15: SADC Primary Regional Transport Corridors



Source: TradeMark Southern Africa (2014).

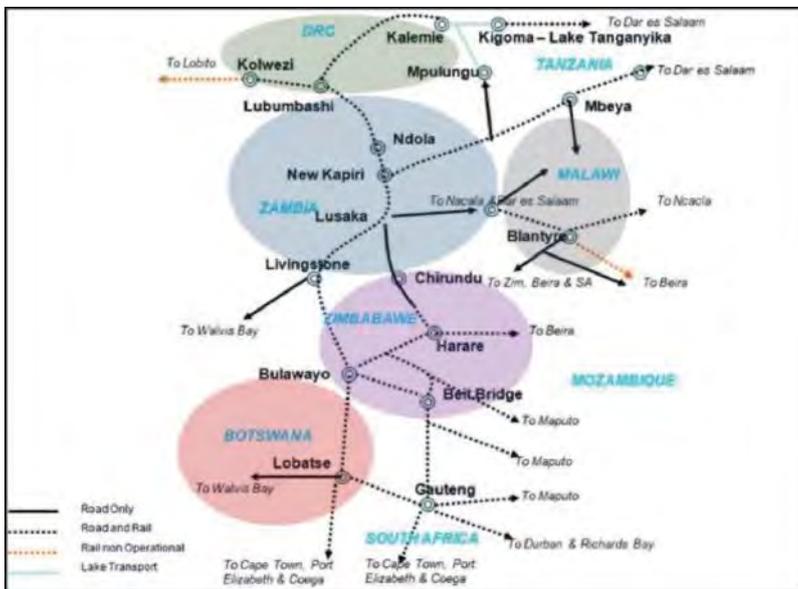
SADC Trade Corridors

3.2. CORRIDOR COMPETITIVENESS MATRIX, 2016¹⁵

3.2.1. Methodology

Figure 16 illustrates the location of the key transit markets of Botswana, DRC Copperbelt, Malawi, Zambia and Zimbabwe in relation to the principal regional transport corridors and their related anchor gateway ports, namely Dar es Salaam, Nacala, Beira, Maputo (Durban) and Walvis Bay.¹⁶

Figure 16: Key Landlocked Transit Markets in the SADC Region



Source: extracted by authors



¹⁵ Data was only available across corridors and dimensions for 2016; while volumes are available for 2017, other dimensions like time and cost from corridor diagnostic reports were not available.

¹⁶ The rationale for focussing on key transit markets of landlocked countries, international and regional trade flows and the entire infrastructure supply chain from port of entry/exit to initial/final point of origin/destination in the SADC region is provided in section 1.2 of the introductory chapter.

Six performance parameters assessed include volumes (in tons), distance (in kilometres), transit time (in days), transport cost (in US\$ per TEU), transport cost per kilometre (US\$ per kilometre) and export-import ratio (exports/imports). The purpose of this analysis is that the competitiveness matrix will be used to develop prioritisation criteria for proposed future investment along specific corridors. This is a key element of the subsequent chapters of this report.

The results of this analysis show that in terms of overall competitiveness, the top four most competitive corridors in order of ranking and market share are as follows:

- For international flows, Beira (Road), North-South (Road), Dar es Salaam (Road) and Walvis Bay (Road); and,
- For regional flows, North-South (Road), Dar es Salaam (Road), Beira (Road) and Walvis Bay (Road).

3.2.2. International Traffic Flows, 2016

Whilst this study focusses on intra-African trade, it is important to look at trends and the competitiveness of international transit cargo. International flows, especially imports from outside the SADC region, are critical to opening up new trade opportunities along the corridors. International trade comprises the highest volume of cargo flows on most of the region's corridors and provides the economies of scale for major investments in corridor infrastructure (roads, rail, border posts) and service markets (trucking). These flows act as a bridgehead to facilitate access by truckers into hitherto uncharted territory. Once there, intra-African trade business can be unlocked and the costs of exporting outside the region can be lowered with increased competition for backhaul cargo.

The results of the analysis for international flows, i.e. trade through a maritime port to/from each key transit market, is summarised in Table 10 and is elaborated in detail in Table 11.



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Table 10: Ranking of Corridor Competitiveness for International Flows, 2016

Corridor	Distance	% Market Share/ Volumes	Transit Times	Average Transport Cost/TEU	Scope To Reduce Cost/Km	Export- Import Ratio	Score/Rank		
							1 = Good	10 = Bad	
To/From Lubumbashi, DRC (Volumes to/from DRC = 2.133 mtpa)									
North-South (Durban-Rail)	6th	42%	4th	2nd	1st	6th	5th	4.00	5th
North-South (Durban-Road)	7th		2nd	2nd	4th	5th	1st	3.50	3rd
Dar es Salaam (Rail)	2nd	50%	5th	2nd	6th	4th	6th	4.17	6th
Dar es Salaam (Road)	4th		1st	6th	3rd	2nd	2nd	3.00	2nd
Beira (Road)	1st	5%	3rd	5th	2nd	1st	4th	2.67	1st
Walvis Bay (Road)	5th	3%	6th	1st	5th	3rd	3rd	3.83	4th
Nacala (Multi-Modal)	3rd	0%	7th	7th	7th	7th	7th	6.33	7th
To/From Lusaka, Zambia (Volumes to/from Zambia = 2.529 mtpa)									
North-South (Durban-Rail)	7th	50%	5th	3rd	2nd	6th	5th	4.67	5th
North-South (Durban-Road)	6th		3rd	2nd	5th	4th	1st	3.50	3rd
Dar es Salaam (Rail)	4th	19%	6th	6th	3rd	5th	4th	4.67	5th
Dar es Salaam (Road)	3rd		1st	5th	4th	3rd	6th	3.67	4th
Beira (Road)	1st	19%	2nd	4th	1st	2nd	3rd	2.17	1st
Walvis Bay (Road)	5th	13%	4th	1st	6th	1st	2nd	3.17	2nd
Nacala (Multi-Modal)	2nd	0%	7th	7th	7th	7th	7th	6.17	7th
To/From Harare, Zimbabwe (Volumes to/from Zimbabwe = 2.120 mtpa)									
North-South (Durban-Road)	5th	22%	2nd	4th	4th	4th	3rd	3.17	3rd
Beira (Rail)	2nd	17%	4th	1st	2nd	1st	1st	1.67	2nd
Beira (Road)	1st	58%	1st	1st	1st	2nd	2nd	1.33	1st
Maputo (Rail)	3rd	21%	3rd	1st	3rd	4th	5th	3.17	3rd
Walvis Bay (Road)	6th	3%	5th	4th	5th	3rd	4th	4.00	5th
Nacala (Multi-Modal)	4th	0%	6th	6th	6th	5th	6th	4.67	6th
To/From Blantyre, Malawi (Volumes to/from Malawi = 1.762 mtpa)									
North-South (Durban-Road)	4th	33%	2nd	2nd	4th	4th	3rd	3.17	3rd
Dar es Salaam (Road)	3rd	7%	4th	3rd	3rd	3rd	4th	3.33	4th
Beira (Road)	2nd	46%	1st	1st	2nd	1st	1st	1.33	1st
Nacala (Rail)	1st	14%	3rd	4th	1st	2nd	2nd	2.17	2nd
To/From Gaborone, Botswana (Volumes to/from Botswana = 0.340 mtpa)									
North-South (Durban-Road)	1st	96%	1st	1st	1st	2nd	2nd	1.33	1st
Walvis Bay (Road)	2nd	4%	2nd	2nd	2nd	1st	1st	1.67	2nd
Overall Rank 1 = Good 10 = Bad (All Volumes to/from Transit Markets = 8.755 mtpa)									
North-South (Durban-Rail)	8th	3%	6th	4th	2nd	9th	7th	6.00	6th
North-South (Durban-Road)	7th	29%	2nd	3rd	6th	5th	1st	4.00	3rd
Dar es Salaam (Rail)	4th	2%	9th	7th	7th	7th	6th	6.67	7th
Dar es Salaam (Road)	5th	25%	3rd	5th	4th	4th	4th	4.17	4th
Beira (Rail)	2nd	3%	7th	1st	3rd	1st	8th	3.67	2nd
Beira (Road)	1st	30%	1st	2nd	1st	2nd	3rd	1.67	1st
Maputo (Rail)	4th	5%	4th	5th	4th	6th	9th	6.67	7th
Walvis Bay (Road)	6th	4%	5th	2nd	7th	3rd	2nd	4.17	4th
Nacala (Multi-Modal)	3rd	3%	8th	8th	9th	8th	5th	6.83	9th
Nacala (Rail)	1st	14%	3rd	4th	1st	2nd	2nd	2.17	2nd

Source: authors' computations

Table 11: Ranking of Corridor Competitiveness for International Flows, 2016

Main Port (Corridor)	Transit Exports (Tons 000s)		Transit Imports (Tons 000s)		Transit Total (Tons 000s)		Distance (Kilometres)		Transit Times		Average Transport Cost (Port, Border and Way) for a 20 Foot Import Dry TEU (maximum weight 26 T)			
							Rank		Rank		Rank		Rank	
							To/From Lubumbashi							
North-South (Durban Rail)	424	51%	467	36%	891	42%	3,163	6	12	2	6,370	1	2.01	6
North-South (Durban Road)							3,197	7	12	2	7,475	4	2.34	5
Dar es Salaam (Rail)	364	44%	708	54%	1,072	50%	2,322	2	12	2	8,300	6	3.57	2
Dar es Salaam (Road)							2,396	4	16	6	6,970	3	2.91	4
Beira (Road)	20	2%	82	6%	102	5%	1,597	1	14	5	6,805	2	4.29	1
Walvis Bay (Road)	22	3%	46	4%	68	3%	2,462	5	10	1	7,840	5	3.04	3
Nacala (Multi- Modal)	-	-	-	-	-	-	2,380	3	-	-	-	-	-	-
Sub-Total	830	100%	1,303	100%	2,133	100%	To/From Lusaka							
North-South (Durban Rail)	407	50%	118	7%	525	21%	2,638	7	9	3	3,174	2	1.2	6
North-South (Durban Road)							2,381	6	8	2	4,843	5	2.03	3
Dar es Salaam (Rail)	155	19%	1,012	59%	1,167	46%	2,039	4	14	5	3,555	3	1.74	5
Dar es Salaam (Road)							1,985	3	14	5	4,832	4	2.44	3
Beira (Road)	157	19%	452	26%	609	24%	1,054	1	10	4	3,043	1	2.89	2
Walvis Bay (Road)	103	13%	125	7%	228	9%	2,067	5	6	1	6,614	6	3.2	1
Nacala (Multi- Modal)	-	-	-	-	-	-	1,810	2	-	-	-	-	-	-
Sub-Total	822	100%	1,707	100%	2,529	100%	To/From Harare							
North-South (Durban)	322	44%	45	5%	367	17%	1,680	5	7	3	3,174	2	1.20	6
Beira (By Rail)	411	56%	844	90%	1,255	59%	614	2	6	2	4,843	5	2.03	3
Beira (By Road)							576	1	6	5	3,555	3	1.74	5
Maputo (Rail)	-	-	-	-	443	21%	1,130	3	7	5	4,832	4	2.44	3
Walvis Bay (Road)	1	0%	54	6%	55	3%	2,293	6	7	4	3,043	1	2.89	2

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Nacala (Rail)	-	-	-	-	-	-	1,557	4	-	1	6,614	6	3.20	1		
Sub-Total	734	100%	943	100%	2,120	100%	To/From Blantyre									
North-South (Durban)	50	16%	530	36%	580	33%	2,340	4	12	2	4,945	4	2.11	4		
Dar es Salaam (Road)	0	-	129	9%	129	7%	1,978	3	14	3	4,801	3	2.43	2		
Beira (Road)	201	66%	611	42%	812	46%	812	2	9	1	2,476	2	3.05	1		
Nacala (Rail)	55	18%	186	13%	241	14%	799	1	15	4	1,940	1	2.42	3		
Sub-Total	306	100%	1,456	100%	1,762	100%	To/From Gaborone									
North-South (Durban)	56	95%	272	97%	328	96%	937	1	2	1	2,500	1	2.67	1		
Walvis Bay (Road)	3	5%	9	3%	12	4%	1,500	2	3	2	4,050	2	2.70	2		
Sub-Total	59	100%	281	100%	340	100%	Export: Import Ratio (Ideal = 1.00:1.00)									
							DRC Copperbelt		Zambia		Zimbabwe		Malawi		Botswana	
North-South (Durban)	1,259	46%	1,432	26%	2,691	31%	0.81:1.00	2	4.04:1.00	1	3.46:1.0	1	0.10:1.00	3	0.20:1.0	2
Dar es Salaam	519	19%	1,720	31%	2,239	26%	0.51:1.00	3	0.30:1.00	4	-	-	0.00:1.00	4	-	-
Beira	789	29%	1,989	36%	2,778	32%	0.24:1.00	4	0.35:1.00	3	0.49:1.0	2	0.33:1.00	1	-	-
Maputo	-	-	-	-	443	5%	-	-	-	-	-	-	-	-	-	-
Walvis Bay	129	5%	234	4%	363	4%	1.67:1.00	1	0.71:1.00	2	0.15:1.	3	-	-	0.25:1.0	1
Nacala	55	2%	186	3%	241	3%	-	-	-	-	-	-	0.30:1.00	2	-	-
Total	2,751	100%	5,561	100%	8,755	100%	0.64:1.00	2	0.48:1.00	3	0.78:1.0	1	0.21:1.00	4	0.17:1.0	5

Source: Collated by authors

The key observations to be drawn include the following:

- The overall transit market in 2016 for international flows for the five key transit markets of Botswana, DRC Copperbelt, Malawi, Zambia and Zimbabwe was 8.755 million tons.
- The largest transit markets for international cargo flows in 2016 are ranked as follows:
 - Zambia with 2.529 million tons;
 - DRC Copperbelt with 2.133 million tons;
 - Zimbabwe with 2.120 million tons;
 - Malawi with 1.762 million tons;
 - Botswana with 0.340 million tons.
- The most important regional transport corridor for international flows in 2016 from the five key transit markets are ranked as follows:
 - Beira Corridor with 2.778 million tons;
 - North-South Corridor with 2.691 million tons;
 - Dar es Salaam Corridor with 2.239 million tons;
 - Maputo Corridor with 0.443 million tons;
 - Walvis Bay Corridor with 0.363 million tons;
 - Nacala Corridor with 0.251 million tons.
- The most important corridor for each key transit market in 2016, for international flows, was as follows:
 - The DRC Copperbelt market is dominated by the Dar es Salaam Corridor, which has 50 per cent market share, followed by the North-South Corridor, with 42 per cent of the market.
 - The Zambian market is dominated by the Dar es Salaam Corridor, which has 46 per cent market share, followed by the Beira Corridor, with 24 per cent of the market.
 - The Zimbabwean market is dominated by the Beira Corridor, which has 59 per cent market share, followed by the Maputo Corridor with 21 per cent of the market.
 - The Malawian market is dominated by the Beira Corridor, which has a 46 per cent market share, followed by the North-South Corridor, with a 33 per cent market share.
 - The Botswanan market is dominated by the North-South Corridor, which has a 96 per cent market share, followed by the Walvis Bay Corridor, with 4 per cent of the market.
- The most balanced transit market in 2016, expressed by the export-import ratio (1.00:1.00 is ideal), was ranked as follows: Zimbabwe (0.78:1.00), DRC Copperbelt (0.64:1.00), Zambia (0.48:1.00), Malawi (0.21:1.00) and Botswana (0.17:1.00).
- The most balanced corridor, expressed by the export-import ratio in 2016, was ranked as follows: North-South (0.88:1.00), Walvis Bay (0.55:1.00), Beira (0.40:1.00), Dar es Salaam (0.30:1.00), Nacala (0.30:1.00) and Maputo (data not available).

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3.2.3. Regional Traffic Flows, 2016

The results of the analysis for regional flows, i.e. trade between hinterland destinations, are summarised in Table 12 and elaborated in detail in Table 13.

Table 12: Ranking of Corridor Competitiveness for Regional Flows, 2016

Corridor	Distance	% Market Share/ Volumes	Transit Times	Average Transport Cost/TEU	Scope To Reduce Cost/Km	Export- Import Ratio	Score/Rank		
							1 = Good	10 = Bad	
To/From Lubumbashi, DRC (Volumes to/from DRC = 2.513 mtpa)									
North-South (Durban-Rail)	6th		4th	5th	2nd	6th	4th	4.50	6th
North-South (Durban-Road)	7th	21%	2nd	5th	4th	5th	2nd	4.17	5th
Dar es Salaam (Rail)	2nd	73%	4th	1st	6th	2nd	5th	3.33	4th
Dar es Salaam (Road)	4th		1st	3rd	1st	4th	1st	2.33	1st
Beira (Road)	1st	0%	4th	4th	3rd	1st	6th	3.17	3rd
Walvis Bay (Road)	5th	7%	3rd	2nd	5th	3rd	3rd	2.67	2nd
Nacala (Multi-Modal)	3rd	0%	4th	7th	7th	7th	7th	5.83	7th
To/From Lusaka, Zambia (Volumes to/from Zambia = 5.143 mtpa)									
North-South (Durban-Rail)	7th		5th	3rd	2nd	6th	6th	4.83	6th
North-South (Durban-Road)	6th	51%	1st	2nd	5th	4th	5th	3.83	5th
Dar es Salaam (Rail)	4th	39%	5th	3rd	3rd	5th	2nd	3.67	4th
Dar es Salaam (Road)	3rd		2nd	3rd	4th	3rd	4th	3.17	3rd
Beira (Road)	1st	2%	4th	2nd	1st	2nd	1st	1.83	1st
Walvis Bay (Road)	5th	7%	3rd	1st	6th	1st	3rd	3.00	2nd
Nacala (Multi-Modal)	2nd	0%	5th	7th	7th	7th	7th	5.83	7th
To/From Harare, Zimbabwe (Volumes to/from Zimbabwe = 3.459 mtpa)									
North-South (Durban-Road)	5th	94%	1st	4th	4th	2nd	1st	2.87	3rd
Beira (Rail)	2nd	0%	3rd	1st	2nd	1st	3rd	2.00	2nd
Beira (Road)	1st	6%	2nd	1st	1st	5th	2nd	2.00	1st
Maputo (Rail)	3rd	0%	3rd	3rd	3rd	3rd	3rd	3.00	4th
Walvis Bay (Road)	6th	0%	3rd	3rd	5th	4th	3rd	4.00	5th
Nacala (Multi-Modal)	4th	0%	3rd	6th	6th	6th	3rd	4.67	6th
To/From Blantyre, Malawi (Volumes to/from Malawi = 1.132 mtpa)									
North-South (Durban-Road)	4th	78%	1st	4th	4th	2nd	3rd	3.00	4th
Dar es Salaam (Road)	3rd	10%	3rd	3rd	3rd	3rd	1st	2.67	3rd
Beira (Road)	2nd	12%	2nd	1st	2nd	1st	2nd	1.67	1st
Nacala (Rail)	1st	0%	4th	2nd	1st	4th	4th	2.67	2nd
To/From Gaborone, Botswana (Volumes to/from Botswana = 0.340 mtpa)									
North-South (Durban-Road)	1st	97%	1st	1st	1st	2nd	2nd	1.33	1st
Walvis Bay (Road)	2nd	3%	2nd	2nd	2nd	1st	1st	1.67	2nd
Overall Rank 1 = Good 10 = Bad (All Volumes to/from Transit Markets = 12.474 mtpa)									
North-South (Durban-Rail)	9th	0%	4th	8th	2nd	8th	8th	6.50	8th
North-South (Durban-Road)	6th	61%	1st	7th	5th	4th	1st	4.00	3rd
Dar es Salaam (Rail)	7th	0%	4th	2nd	7th	7th	7th	5.67	7th
Dar es Salaam (Road)	5th	31%	2nd	5th	4th	6th	6th	4.67	6th
Beira (Rail)	2nd	0%	4th	1st	2nd	1st	5th	2.50	2nd
Beira (Road)	1st	4%	3rd	3rd	1st	2nd	3rd	2.17	1st
Maputo (Rail)	4th	0%	4th	5th	5th	4th	5th	4.50	5th
Walvis Bay (Road)	8th	4%	3rd	3rd	7th	3rd	2nd	4.33	4th
Nacala (Multi-Modal)	3rd	0%	4th	9th	9th	8th	9th	7.00	9th

Source: authors' computations

Table 13: Detailed Ranking of Corridor Competitiveness for Regional Flows, 2016

Main Port (Corridor)	Regional Transit Exports (Tons 000s)		Regional Transit Imports (Tons 000s)		Regional Transit Exports & Imports (Tons 000s)		Distance (Kilometres)		Transit Times (Days)		Average Transport Cost (Port, Border and Way) for a 20 Foot Import Dry TEU (maximum weight 26 T)			
											TEU (US\$)		US\$/km	
							Rank		Rank		Rank		Rank	
							To/From Lubumbashi							
North-South (Durban Rail)	22	3%	498	27%	520	21%	3,163	6	11	5	5,570	2	1.76	6
North-South (Durban Road)							3,197	7	11	5	6,675	4	2.08	5
Dar es Salaam (Rail)	624	44%	1,198	64%	1,822	73%	2,322	2	5	1	6,702	6	2.89	2
Dar es Salaam (Road)							2,396	4	9	3	5,372	1	2.24	4
Beira (Road)	-	-	-	-	-	-	1,597	1	10	4	5,845	3	3.66	1
Walvis Bay (Road)	3	0%	168	9%	171	7%	2,462	5	8	2	6,583	5	2.67	3
Nacala (Multimodal)	-	-	-	-	-	-	2,380	3	-	-	-	-	-	-
Sub-Total	649	48%	1,864	100%	2,513	100%	To/From Lusaka							
North-South (Durban Rail)	1,004	44%	1,642	58%	2,646	51%	2,638	7	8	6	2,374	3	0.90	6
North-South (Durban Road)							2,381	6	7	3	4,043	5	1.70	3
Dar es Salaam (Rail)	1,110	48%	907	32%	2,017	39%	2,039	4	7	3	1,957	1	0.99	5
Dar es Salaam (Road)							1,985	3	7	3	3,234	4	1.63	4
Beira (Road)	23	1%	87	3%	110	2%	1,054	1	6	2	2,083	2	1.97	2
Walvis Bay (Road)	157	7%	213	7%	370	7%	2,067	5	4	1	4,382	6	2.12	1
Nacala (Multimodal)	-	-	-	-	-	-	1,810	2	-	-	-	-	-	-
Sub-Total	2,294	100%	2,849	100%	5,143	100%	To/From Harare							
North-South (Durban)	734	96%	2,501	93%	3,235	94%	1,680	5	6	6	3,680	4	2.19	2
Beira (By Rail)	29	4%	195	7%	224	6%	614	2	2	1	1,470	2	2.39	1
Beira (By Road)							576	1	2	1	1,040	1	1.81	5
Maputo (Rail)	-	-	-	-	-	-	1,130	3	5	3	2,240	3	2.16	3
Walvis Bay (Road)	-	-	-	-	-	-	2,293	6	5	3	4,903	5	2.14	4

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Nacala (Rail)	-	-	-	-	-	-	1,557	4	-	-	-	-	-	-		
Sub-Total	763	100%	2,696	100%	3,459	100%	To/From Blantyre									
North-South (Durban)	134	54%	310	35%	444	39%	2,340	4	11	4	4,145	4	1.77	2		
Dar es Salaam (Road)	59	-	54	6%	113	10%	1,978	3	7	2	3,202	3	1.62	3		
Beira (Road)	43	17%	94	11%	137	12%	812	2	5	1	1,516	2	1.87	1		
Nacala (Multimodal)	11	4%	427	48%	438	39%	799	1	6	2	995	1	1.25	4		
Sub-Total	247	76%	885	100%	1,121	100%	To/From Gaborone									
North-South (Durban)	886	99%	3,622	97%	4,508	98%	937	1	2	1	1,700	1	1.81	2		
Walvis Bay (Road)	10	1%	100	3%	110	2%	1,500	2	3	2	2,763	2	1.84	1		
Sub-Total	896	100%	3,722	100%	4,618	100%	Export: Import Ratio (Ideal = 1.00:1.00)									
							DRC Copperbelt		Zambia		Zimbabwe		Malawi		Botswana	
North-South (Durban)	2,791	58%	9,000	75%	11,791	67%	0.04:1.00	2	0.61:1.00	2	-	-	0.43:1.00	3	0.25:1.00	1
Dar es Salaam	1,734	36%	2,105	18%	3,839	23%	0.52:1.00	1	1.22:1.00	4	-	-	1.10:1.00	1	-	-
Beira	95	2%	376	3%	471	3%	-	-	0.24:1.00	3	0.15:1.00	1	0.46:1.00	2	-	-
Maputo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Walvis Bay	170	4%	481	4%	651	4%	0.02:1.00	3	0.73:1.00	1	0.00:1.00	2	-	-	0.10:1.00	2
Nacala	11	0%	427	3%	438	3%	-	-	-	-	-	-	0.03:1.00	4	-	-
Total	4,790	100%	11,962	100%	16,752	100%	0.35:1.00	2	0.81:1.00	1	0.28:1.00	3	0.28:1.00	4	0.25:1.00	5

Source: Collated by authors

The key observations to be drawn include the following:

- The overall transit market in 2016 for regional flows for the five key transit markets of Botswana, DRC Copperbelt, Malawi, Zambia and Zimbabwe was 16.752 million tons. The five largest transit markets were ranked as follows:
 - Zambia with 5.143 million tons;
 - Botswana with 4.618 million tons;
 - Zimbabwe with 3.459 million tons;
 - DRC Copperbelt with 2.513 million tons; and
 - Malawi with 1.132 million tons.
- The regional transport corridors for regional flows in 2016 from each key transit market were ranked as follows in order of trade volume:¹⁷
 - North-South Corridor with 11.791 million tons;
 - Dar es Salaam Corridor with 3.839 million tons;
 - Walvis Bay Corridor with 0.651 million tons;
 - Nacala Corridor with 0.438 million tons; and
 - Beira Corridor with 0.471 million tons.
- The most important corridors for the transit markets for regional flows in 2016 were as follows:
 - The DRC Copperbelt market was dominated by the Dar es Salaam Corridor, which had 73 per cent market share, followed by the North-South Corridor with 21 per cent of the market.
 - The Zambian market was dominated by the North-South Corridor, which had 51 per cent market share,

followed by the Dar es Salaam Corridor with 39 per cent of the market.

- The Zimbabwean market was dominated by the North-South Corridor, which had 94 per cent market share, followed by the Beira Corridor with 6 per cent of the market.
- The Malawian market was dominated by the Nacala and North-South Corridor, each of which had a 39 per cent market share; and
- The Botswanan market was dominated by the North-South Corridor, which had a 98 per cent market share, followed by the Walvis Bay Corridor with 2 per cent of the market.
- The most balanced transits market in 2016, expressed by the export-import ratio (1.00:1.00 is ideal), were ranked as follows: Zambia (0.81:1.00), DRC Copperbelt (0.35:1.00), Zimbabwe (0.28:1.00), Malawi (0.28:1.00) and Botswana (0.25:1.00).¹⁸
- The most balanced corridors, expressed in terms of the export-import ratio in 2016, were ranked as follows: Dar es Salaam (0.82:1.00), Walvis Bay (0.35:1.00), North-South (0.31:1.00), Beira (0.25:1.00), Nacala (0.03:1.00) and Maputo (data not available).

The following section presents the observations for both international and regional flows that highlight, contrary to expectations, that distance and cost are not the primary drivers of corridor competitiveness. The exception is if they are accompanied by supportive demand conditions, including balanced trade and reliability of corridor logistics.

Indeed, the *a priori* assumption is that the closer the port, the shorter the transit times and the cheaper the transport cost, the more competitive the route should be. However, this is not borne out in the above analysis. Consider the following case study for international flows to the most landlocked market reviewed, namely, the route from various regional ports to Lubumbashi, in the heart of the DRC Copperbelt:

- **DRC Copperbelt** – The closest port is Beira and the second cheapest route is the Beira Corridor, yet it only captures 5 per cent of the market. By contrast the Dar es Salaam port is 800km further away and the cost to move goods from the port to Lubumbashi is US\$165/TEU (2.5 per cent) more expensive than the price from Beira, yet the Dar es Salaam Corridor captures fully 50 per cent of the market. In even further contrast, the Durban port is 1,600km further away and the cost to move goods from the port to Lubumbashi is US\$670/TEU (10 per cent) more expensive than the price from Beira, yet the North-South Corridor captures 42 per cent of the market. Why is this? When interviewing representatives from shipping lines, five reasons are typically cited:
 - Port Calls – The number of port calls by international shipping lines is often cited as a reason why international cargo ends up at particular ports. For example, Durban in particular and Dar es Salaam to a lesser extent are much larger, more integrated regional ports, which can perform a gateway function to the region, either through transshipment to smaller ports or directly to landlocked destinations as a result of more

¹⁷ Maputo Corridor recorded zero flows but this does not mean that there are no regional flows but rather that there are none from the transit markets under review. The main regional flows on the corridor are imports and exports from South Africa, which are substantial, but South Africa is not strictly speaking a transit market as it is a maritime state. Indeed, the Maputo Corridor functions somewhat differently from these other five regional corridors. Whilst the Maputo Corridor does service more than two countries, it does so by radiating out from the Maputo port in three directions to Zimbabwe, South Africa and Swaziland rather than passing through a second country to a third one, which is how the other regional corridors are structured.

¹⁸ These metrics measure the balance of trade, i.e. the flow of imports versus the exports. There is a heavy import bias in SADC Trade Flows, so the prospects for backhaul exports are key to driving down transport costs. The more balanced the trade flow the lower the transport costs are likely to be.

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BOX 1: FACTORS AFFECTING CORRIDOR CHOICE – EXAMPLE OF COPPER FROM ZAMBIA/DRC COPPERBELT

Copper is Zambia's main export, so it is important to understand what is involved in its export and what is required by the client when shipping it. Transport and shipping of copper can be highly sophisticated and technical, and is dependent on the grade of copper. One of the main global platforms to trade copper is the London Metals Exchange (LME). To trade contracts in copper on the LME, the copper must be traded through an LME member. Purchasers of contracts, which are then left to reach maturity, will receive a warrant for a specific LME-approved warehouse to take delivery of the metal, if required. To support this mechanism, the LME approves and licenses a network of warehouses and storage facilities around the world. If copper is traded on the LME, it will need to be delivered to an approved LME warehouse in a way that the copper maintains its purity during transportation. A contract to transport copper from Zambia and the DRC Copperbelt often requires the freight forwarder/clearing agent to provide an all-in rate for the movement of a certain amount (usually defined by weight) of copper of a certain grade to a designated port along a preferred route. The freight forwarder/clearing agent will typically need to confirm the following requirements to meet LME standards:

- Availability of facilities required to load high-value cargo onto trucks and/or wagons;
- Reputation of the firm(s) responsible for handling high-value cargo onto transport;
- Security of the high-value cargo on the preferred corridor and at the maritime port;
- Compliance with LME quality standards on the condition of the high-value cargo;
- Actions to mitigate risks of delays in the arrival of high-value cargo at the preferred port; and
- Availability of facilities to receive, clean and pack high-value cargo, if needed.

extensive infrastructure networks linking the port to a wider regional market. Durban and Dar es Salaam are further supported by larger national (and port-city) markets in South Africa (Durban) and in Tanzania (Dar es Salaam) than is the case in Mozambique (Beira). As yet, no major Chinese shipping line has direct calls into Beira, Mozambique, so transshipment has to occur either through Durban in South Africa or Mombasa in Kenya.

- **Market Size** – Size matters because it enables shipping to harness the benefits of economies of scale to lower unit costs and economies of agglomeration that create additional complementary activities. When regional flows are included in the analysis, an estimated 2.290 million tons flows on the Dar es Salaam Corridor to/from Lubumbashi, followed by 1.390 million tons on the North-South Corridor and just 0.270 million tons on the Beira Corridor. When the DRC Copperbelt

and Zambian (which includes the Zambian Copperbelt) markets are taken together, the dominance of the Dar es Salaam Corridor rises, with an estimated 6.078 million tons compared to the North-South Corridor with an estimated 4.062 million tons and the Beira Corridor a distant third with an estimated 0.992 million tons.

- **Transit Times** – For time-sensitive cargo, time is clearly important. However, saving time on a round trip

to/from port to destination and back to port is one of the biggest cost-saving and/or revenue-enhancing interventions in the logistics supply chain. Notwithstanding the greater distances involved, truckers from Dar es Salaam took a day less to get to Lubumbashi than truckers from Beira, because they only had to go through two rather than three borders. Similarly, even though the distances from Durban are much longer to Lubumbashi and the number of border crossings the same at three, it took truckers one more day to get to Lubumbashi than it did from Beira and two of those three borders are likely to be the same for truckers from both Durban and Beira.

- Balance of Trade – Clearly, if a truck is fully laden at, say, 30 tons of imports from the port to a final destination point and then picks up 30 tons of exports from the final destination point to the port, the balance of trade is perfect. However, in reality this is very rarely the case. In the case of alternate routes to Lubumbashi, the most balanced route is the North-South Corridor, where for every 100 tons of imports delivered, an estimated 81 tons of exports are picked up. This is followed by the Dar es Salaam Corridor, where the comparable figure is 51 tons of exports and the Beira Corridor, at 24 tons of exports. Critically, transport costs pivot around the very high import bias in regional trade flows. Indeed, of the 8.755 million tons transported to/from the five transit markets, 2.751 million tons (31 per cent) are exports and 5.561 million tons (69 per cent) are imports. Hence,

market capture starts with securing the contracts to transport imports into the region. This is where the Dar es Salaam Corridor has a clear advantage, capturing 57 per cent of the market (1.720 million tons) for the DRC Copperbelt and Zambia compared to 19 per cent of the market (0.585 million tons) for the Beira Corridor and 18 per cent of the market (0.534 million tons) for the North-South Corridor. Since truckers from Tanzania are in the majority, are already in the Copperbelt and have priced their trip to cover the import cost (plus return of empty container), they can afford to offer competitive back-haul rates for export cargo back to the Dar es Salaam port. The size of the Tanzanian trucking fleet, which serves both the domestic and the regional market, also allows it to be more flexible and responsive to changing market conditions, which competitors in other countries – except perhaps the South African trucking fleet – are in a position to match.

- Customer Preference – This refers to specific preferences of key customers, primarily for reasons relating to the security of cargo, the reliability of the route of choice, the availability of specialised logistics services and the opportunities for back-haul cargo, when travelling from/to the point of origin/destination to/from the nearest maritime port for a consignment of export/import cargo. When interviewing specialised logistics handling companies, it is clear that for high-value cargoes such as copper and cobalt from the DRC and Zambian Copperbelt regions, operators on the Dar es Salaam and

North-South Corridors have become specialised in the handling of these cargoes by meeting the specific and exacting standards required by the international marketplace (see Box 1).

The core conclusion for the DRC Copperbelt market is that given acceptable standards of reliability and quality of the service, distance and transit times are not the driving factors. However, there is evidence to suggest that average transport costs are an important driving factor and are likely to become increasingly so in the future.

At present, the Tanzanian trucking industry is the dominant player, because it has the capacity and flexibility in the logistics supply chain to rapidly respond to changes in market demand across different sub-sectors. However, several pressures resulting from a combination of pull factors to the Durban port and push factors from the Dar es Salaam port are building that highlight the need to increase efficiency and lower costs by reducing the risks if they are going to capture a share of the prized copper export market.

The challenge for the Beira, Walvis Bay and Nacala Corridors, as well as for the Zambian market, is whether its stakeholders can attract a higher market share from its current position of approximately 5 per cent of copper exports or less from the Zambian and DRC Copperbelt. To do this, logistics supply chain actors linked to the ports of Beira, Walvis Bay and Nacala will have to consolidate their position in Zambia to create a bridgehead into the DRC Copperbelt market.





Chapter 4

Current Trade Flows on Corridors

Current Trade Flows on Corridors

4.1. METHODOLOGY

The methodology for determining the current trade flows along the principal SADC Corridors can be summarised as follows:

1. Define and determine the configuration of each of the six main regional transport corridors¹⁹ traversing the SADC region, serving the six main landlocked countries of Botswana, DRC Copperbelt²⁰, Eswatini, Malawi, Zambia and Zimbabwe.
2. Compile import and export profiles for each of the five transit markets using the ITC Trade Map Volumes database for the base year of 2017.²¹
3. Construct the national and transit cargo profile of the principal gateway ports of Mombasa, Dar es Salaam, Nacala, Beira, Maputo, Durban, Walvis Bay and Matadi serving the landlocked countries (or regions) of the SADC region.
4. Allocate the aggregate trade profile data, by imports and exports, to each of the respective gateway ports, using the port throughput data compiled from either official or secondary sources of data.
5. Calculate the residual regional flows, i.e. total imports and exports minus imports and exports that entered/exited maritime ports and allocate regional flows to main SADC transport corridors by constructing origin-destination links using the bilateral trade data derived from the ITC Trade Map database.
6. Construct international, regional and total trade flows by imports and exports for each of the five key transit markets (Botswana, DRC Copperbelt, Malawi, Zambia and Zimbabwe) across the six main regional transport corridors (Dar es Salaam, Nacala, Beira, Maputo, Durban [North-South] and Walvis Bay).²²
7. Summarise flows by international, regional and total flows by regional transport corridor to get a composite summary overview of the flows along each corridor.
8. Deconstruct these composite flows by port flows, national trade, transit trade, regional trade, by mode, i.e. by road/rail²³ through principal border posts to intermediary origin/destination points to final origin/destination points.
9. Develop a data capture module to distill the key metrics on port throughput, national cargo, international transit trade, regional trade and corridor transit trade by mode through intermediary border posts to final destination in six priority transit markets.

An analysis of primary vs secondary routes is discussed in Section 4.6.



19 A corridor was considered 'regional in nature' if it served at least three countries (or regions), two of which had to be landlocked, i.e. without easy access to a maritime port.

20 DRC North and South Kivu are nominally part of the SADC region, but are functionally linked to the economies of the East African Community (EAC) region, which are primarily serviced by the Dar es Salaam port in Tanzania and the Mombasa port in Kenya.

21 The base year of 2017 was used because there were gaps in the volumes database (a 4-digit level) for certain countries in the ITC Trade Map database.

22 Does not include the Bas-Congo Corridor (Matadi port), Lobito Corridor and Mtwara Corridor as these corridors do not currently serve, at best, even two countries.

23 Trade in petroleum fuel transported by regional pipelines, notably the Feruka pipeline, from Beira to Feruka (Mutare) and Msasa (Harare) in Zimbabwe and the TAZAMA pipeline, from Dar es Salaam to the Ndola in Zambia. According to the SADC Regional Infrastructure Plan (2012), there are no inland waterways formally linked to the SADC corridors.

4.2. SUMMARY: FLOWS BY TRANSIT MARKET, 2017

Table 14 provides a summary of the international trade flows by each of the five key transit markets.

Table 14: Summary of International Trade Flows by Transit Market, 2017

International Flows	Exports	Per cent	Imports	Per cent	Total	Per cent
MALAWI	332,000	7.3%	1,337,000	16.0%	1,669,000	13.1%
Per cent	19.3%		80.7%		100%	
ZIMBABWE	1,365,000	31.1%	1,741,000	20.8%	3,106,000	24.4%
Per cent	43.9%		56.1%		100%	
ZAMBIA	1,889,000	43.1%	2,346,000	28.0%	4,325,000	33.9%
Per cent	43.7%		56.3%		100%	
DRC COPPERBELT	745,000	17.0%	1,850,000	22.1%	2,595,000	20.4%
Per cent	28.7%		72.3%		100%	
BOTSWANA	52,000	1.5%	1,090,000	13.1%	1,142,000	8.2%
Per cent	4.6%		95.4%		100%	
TOTAL	4,383,000	100%	8,364,000	100%	12,747,000	100%
Per cent	34.4%		65.6%		100%	

Sources: ITC Trade Map.

The key conclusions to be drawn on international trade flows include the following:

- Total flows amounted to 12.747 million tons per annum (mtpa) of which 4.383 mtpa (34 per cent) were exports and 8.364 million tons (66 per cent) were imports; and
- The most important market by size was Zambia (4.325 mtpa), followed by Zimbabwe (3.106 mtpa), DRC Copperbelt (2.595 mtpa), Malawi (1.669 mtpa) and Botswana (1.144 mtpa).

Table 15 provides a summary of the regional trade flows by each of the five key transit markets.

Table 15: Summary of Regional Trade Flows by Transit Market, 2017

Regional Flows	Exports	Per cent	Imports	Per cent	Total	Per cent
MALAWI	216,000	4.5%	752,000	6.9%	967,000	6.2%
Per cent	22.6%		87.4%		100%	
ZIMBABWE	795,000	16.4%	1,925,000	17.7%	2,720,000	14.5%
Per cent	29.2%		71.8%		100%	
ZAMBIA	2,228,000	46.1%	3,316,000	30.6%	5,544,000	35.4%
Per cent	40.2%		59.8%		100%	
DRC COPPERBELT	715,000	14.8%	2,480,000	22.9%	3,195,000	20.4%
Per cent	22.4%		77.6%		100%	
BOTSWANA	875,000	18.2%	2,380,000	21.9%	3,255,000	23.5%
Per cent	36.8%		63.2%		100%	
TOTAL	4,828,000	100%	10,852,000	100%	15,681,000	100%
Per cent	30.8%		69.2%		100%	

Sources: ITC Trade Map.

Current Trade Flows on Corridors

The key conclusions to be drawn on regional trade flows include the following:

- Total flows amounted to 15.681 million tons of which 4.828 million tons (31 per cent) were exports and 10.852 million tons (69 per cent) were imports; and,
- The most important market by size was Zambia (5.544 million tons), followed by Botswana (3.255 million tons), DRC Copperbelt (3.195 million tons), Zimbabwe (2.720 million tons) and Malawi (0.967 million tons).

Table 16 provides a summary of all trade flows by each of the five key transit markets.

Table 16: Summary of All Trade Flows by Transit Market, 2017

Total Flows	Exports	Per cent	Imports	Per cent	Total	Per cent
MALAWI	548,000	5.9%	2,089,000	10.9%	2,636,000	9.3%
Per cent	20.8%		79.2%		100%	
ZIMBABWE	2,160,000	23.5%	3,665,000	19.1%	5,824,000	20.5%
Per cent	37.1%		62.9%		100%	
ZAMBIA	4,117,000	44.7%	5,662,000	29.5%	9,779,000	34.3%
Per cent	42.1%		67.9%		100%	
DRC COPPERBELT	1,460,000	15.9%	4,330,000	22.5%	5,790,000	20.4%
Per cent	25.2%		74.8%		100%	
BOTSWANA	927,000	10.0%	3,470,000	18.0%	4,397,000	15.5%
Per cent	21.1%		78.9%		100%	
TOTAL	9,211,000	100%	19,216,000	100%	28,428,000	100%
	32.4%		67.6%		100%	

Sources: ITC Trade Map.

The key conclusions to be drawn on all trade flows include the following:

- Total flows amounted to 28.428 million tons of which 9.211 million tons (32 per cent) were exports and 19.216 million tons (68 per cent) were imports; and
- The most important market by size was Zambia (9.779 million tons), followed by Zimbabwe (5.824 million tons), DRC Copperbelt (5.790 million tons), Botswana (4.397 million tons) and Malawi (2.636 million tons).

Table 17 provides a breakdown of international and regional trade flows for 2017.

Table 17: Breakdown of International and Regional Trade Flows, 2017

Breakdown of Flows	Exports	Imports	Total
% International	47.6%	43.5%	44.8%
% Regional	52.4%	56.5%	55.2%

Sources: ITC Trade Map.

The key conclusion to be drawn on all trade flows is the following:

- There was a slight bias in favour of imports across all key transit markets, with total flows split 45 per cent for international and 55 per cent for regional flows, export flows split with 48 per cent for international and 52 per cent for regional exports and import flows with 43 per cent for international and 56 per cent for regional imports.

4.3. SUMMARY: FLOWS BY PORT, 2017

Table 18 provides a summary of the port throughput data for each of the eight regional gateway ports that anchor six regional transport corridors.

Table 18: Summary of Port Throughput by Transit Market, 2016

	000's Metric Tons	Transit	%	Dar es Salaam	%	Durban	%	Beira	%	Maputo	%	Matadi	%	Mombasa	%	Nacala	%	Walvis Bay	%
DRC Kinshasa	3,280	100%	0	0%	0	0%	0	0%	0	0%	3,280	100%	0	0%	0	0%	0	0%	
DRC Goma- Bakavu	430	100%	80	19%	0	0%	0	0%	0	0%	0	0%	350	81%	0	0%	0	0%	
DRC Lubumbashi	1,870	100%	1,100	59%	640	34%	60	3%	0	0%	0	0%	0	0%	0	0%	70	4%	
Eswatini	820	100%	0	0%	0	0%	0	0%	820	100%	0	0%	0	0%	0	0%	0	0%	
Botswana	1,130	100%	0	0%	1,120	99%	0	0%	0	0%	0	0%	0	0%	0	0%	10	1%	
Malawi	1,670	100%	150	9%	320	19%	830	50%	0	0%	0	0%	0	0%	350	21%	20	1%	
South Africa	10,130	100%	0	0%	0	0%	0	0%	10,130	100%	0	0%	0	0%	0	0%	0	0%	
Zambia	4,250	100%	1,430	34%	1,750	41%	780	18%	0	0%	0	0%	0	0%	0	0%	290	7%	
Zimbabwe	3,060	100%	0	0%	650	21%	1,770	58%	580	19%	0	0%	0	0%	0	0%	60	2%	
Total	26,640	100%	2,760	10%	4,480	17%	3,440	13%	11,530	43%	3,280	12%	350	1%	350	1%	450	2%	

Sources: authors' computations from various sources including Tanzania Ports Authority, Tanzania International Container Terminal, Portos do Norte, Cornelder de Mozambique, Maputo Port Development Company, Transnet and Namport.

The most important port for transit goods to key transit markets in the SADC region can be summarised as follows:

- DRC Kinshasa – Through the Matadi port on the Bas-Congo Corridor running from Matadi to Kinshasa;
- DRC Goma-Bakavu – Through the Mombasa port on the Northern Corridor running from Mombasa through to the eastern DRC;
- DRC Lubumbashi – Through the Dar es Salaam port on the Dar es Salaam Corridor running from Dar es Salaam to Lubumbashi;
- Eswatini – Through the Maputo port on the Maputo Corridor (Goba Sub-Corridor) running from Maputo to Mbabane and Manzini;
- Botswana – Through the Durban port on the North-South Corridor running from Durban to Gaborone (and beyond to Francistown);
- Malawi – Through the Beira port on the Beira Corridor running from Beira to Blantyre (via Zobue/Mwanza) and Lilongwe (via Calomue/Dedza);
- South Africa – Through the Maputo port on the Maputo Corridor running from Maputo to the Mpumalanga, Gauteng and North-West provinces;
- Zambia – Through the Durban port on the North-South Corridor running from Durban to Lusaka (and beyond to the Zambian Copperbelt; and
- Zimbabwe – Through the Beira port on the Beira Corridor running from Beira to Harare (excludes refined petroleum imports on Feruka pipeline).

Current Trade Flows on Corridors

4.4. SUMMARY: FLOWS BY CORRIDOR, 2017

Table 19 provides a summary for each of the six regional transport corridors, in terms of international, regional and total trade flows.

Table 19: Summary of Trade Flows by Regional Transport Corridor, 2017

Malawi, Zimbabwe, Zambia, DRC Copperbelt and Botswana International Traffic														
2017	Dar es Salaam	%	Nacala	%	Beira	%	Maputo	%	North-South	%	Walvis Bay	%	Sub-Total	%
Exports	618,000	14.1	43,000	1.0	1,053,000	24.0	575,000	13.1	1,988,000	45.4	106,000	2.4	4,383,000	100
Imports	2,620,000	31.3	312,000	3.7	2,546,000	30.4	0	0.0	2,552,000	30.5	334,000	4.0	8,364,000	100
All	3,238,000	25.4	355,000	2.8	3,599,000	28.2	575,000	4.5	4,540,000	35.6	440,000	3.5	12,747,000	100

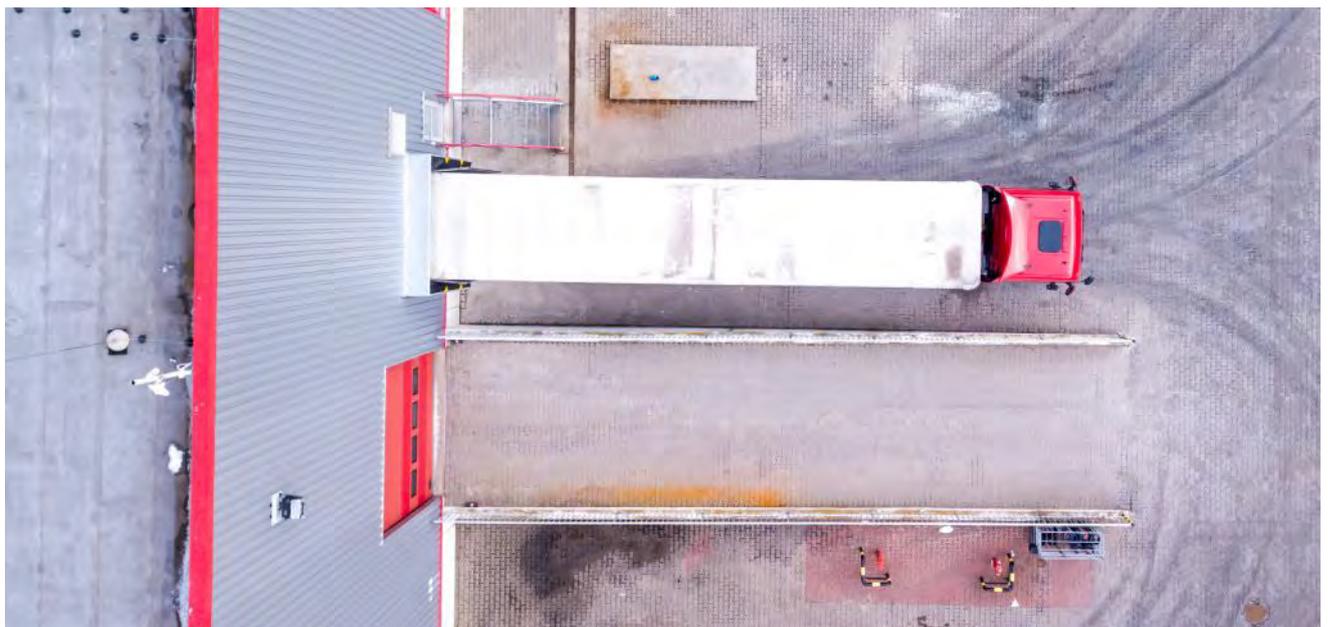
Malawi, Zimbabwe, Zambia, DRC Copperbelt and Botswana Regional Traffic														
2017	Dar es Salaam	%	Nacala	%	Beira	%	Maputo	%	North-South	%	Walvis Bay	%	Sub-Total	%
Exports	2,196,307	45.5	22,435	0.5	79,012	1.6	1,045	0.0	2,460,644	51.0	62,706	1.3	4,828,177	100
Imports	2,562,466	23.6	293,239	2.7	337,409	3.1	112,744	1.0	7,049,466	65.0	503,071	4.6	10,852,367	100
All	4,758,773	30.3	315,674	2.0	416,421	2.7	113,789	0.7	9,510,110	60.6	565,777	3.6	15,680,544	100

Malawi, Zimbabwe, Zambia, DRC Copperbelt and Botswana All Traffic														
2017	Dar es Salaam	%	Nacala	%	Beira	%	Maputo	%	North-South	%	Walvis Bay	%	Sub-Total	%
Exports	2,814,307	30.6	65,435	0.7	1,132,012	12.3	576,045	6.3	4,448,644	48.3	168,706	1.8	9,211,177	100
Imports	5,182,466	27.0	605,239	3.1	2,883,409	15.0	112,744	0.6	9,601,466	50.0	837,071	4.4	19,216,367	100
All	7,996,773	28.1	670,674	2.4	4,015,21	14.1	688,789	2.4	14,050,110	49.4	1,005,777	3.5	28,427,544	100



The key observations to be drawn include the following:

- The overall market for total flows in 2017 for the five key transit markets of Botswana, DRC (Copperbelt), Malawi, Zambia and Zimbabwe was 28.428 million tons. The breakdown by international and regional flows was as follows:
 - International flows estimated at 12.747 million tons (45 per cent); and
 - Regional flows estimated at with 15.680 million tons (65 per cent).
- The most important trade-carrying regional transport corridors for international flows in 2017 were ranked as follows:
 - Total flows estimated at 12.747 million tons (100 per cent);
 - North-South Corridor with 4.540 million tons (36 per cent);
 - Beira Corridor with 3.599 million tons (28 per cent);
- Dar es Salaam Corridor with 3.238 million tons (25 per cent);
- Maputo Corridor with 0.575 million tons²⁴ (5 per cent);
- Walvis Bay Corridor with 0.440 million tons (3 per cent); and
- Nacala Corridor with 0.355 million tons (3 per cent).
- The most important trade-carrying regional transport corridors for regional flows in 2017 were ranked as follows:
 - Total flows estimated at 15,680 million tons (100 per cent);
 - North-South Corridor with 9.510 million tons (60 per cent);
 - Dar es Salaam Corridor with 4.759 million tons (30 per cent);
 - Walvis Bay Corridor with 0.566 million tons (4 per cent);
 - Beira Corridor with 0.416 million tons (3 per cent);
- Nacala Corridor with 0.314 million tons (2 per cent); and
- Maputo Corridor with 0.114 million tons²⁵ (1 per cent).
- The most important trade-carrying regional transport corridors for all flows in 2017 were ranked as follows:
 - Total flows estimated at 28.428 million tons (100 per cent);
 - North-South Corridor with 14.050 million tons (49 per cent);
 - Dar es Salaam Corridor with 7.997 million tons (28 per cent);
 - Beira Corridor with 4.015 million tons (14 per cent);
 - Walvis Bay Corridor with 1.006 million tons (3.5 per cent);
 - Maputo Corridor with 0.689 million tons (2 per cent); and
 - Nacala Corridor with 0.670 million tons (2 per cent)



²⁴ This only includes imports and exports from Zimbabwe but not Eswatini or regions within South Africa that fall within the catchment of the Maputo Corridor.
²⁵ Maputo Corridor recorded flows but only for the transit markets under review. The main regional flows on the corridor are imports and exports from South Africa, which are substantial, but South Africa is not strictly speaking a transit market as it is a maritime state.

Current Trade Flows on Corridors

4.5. SUMMARY: DECONSTRUCTED FLOWS, 2017

Table 20 provides a summarised end-to-end breakdown by mode, i.e. road and rail for all flows, international and regional imports and exports, along each of the six primary transport corridors.

Table 20: Summary of Deconstructed Trade Flows by Corridor 2017

Port	Volumes	National	Transit	Corridor	Regional	Total	Road	Rail	Border 1	Border 2	Border 3			
Trucks Per Day Passing Through Border Posts on Regional Transport Corridor	000's Metric Tons								Trucks Per Day Excludes Rail Traffic Passing Through Borders					
Dar es Salaam (1,085)	13,070	8,460	4,610	3,240	4,760	8,000	7,830	170	700	a	360	c		
									25	b				
Nacala (35) [excludes coal]	2,250	1,900	350	350	320	670	350	320	5	d	30	e		
Beira (445) [excludes coal]	6,600	3,000	3,560	3,560	390	3,990	3,710	280	235	f	80	i	20	c
									20	g				
									90	h				
Maputo (400)	18,200	7,075	11,215	11,215	2,035	13,160	4,860	8,300	450	j				
									0	k				
									0	l				
North-South [Durban] (1,975)	68,560	59,920	8,710	4,540	9,415	13,960	13,670	290	770	m	350	i	85	c
											70	o	70	h
											50	p	10	c
									500	n	110	q	30	c
Walvis Bay (130)	5,170	4,155	1,010	440	570	1,010	1,010	0	75	r	35	c		
									20	s				
Total (4,190)	Trucks Per Day								Trucks Per Day					
Border Posts	a	Tanzania-Zambia		Tunduma-Nakonde		700	l	Mozambique-Zimbabwe		Chicalacuala		0		
	b	Tanzania-Malawi		Kasumulu-Songwe		25	m	RSA-Zimbabwe		Beitbridge		770		
	c	Zambia-DRC		Kasumbalesa		540	n	RSA-Botswana		Kopfontein-Tlokweng & Groblersbrug- Martin's Drift		500		
	d	Mozambique-Malawi		Entre Lagos-Nayuchi, Mandimba-Chiponde & Milanje-Muloza		5	o	Zimbabwe-Mozambique		Nyamapanda-Cuchamano		70		
	e	Malawi-Zambia		Mchinji-Mwami		30	p	Zimbabwe-Zambia		Victoria Falls-Livingstone		50		
	f	Mozambique-Zimbabwe		Machipanda-Forbes		235	q	Botswana-Zambia		Kazungula		110		
	g	Mozambique-Zambia		Cassacatiza-Chanida		20	r	Namibia-Zambia		Katima Mulilo-Sesheke		75		
	h	Mozambique-Malawi		Zóbue-Mwanza & Calomue-Dedza		160	s	Namibia-Angola		Oshikango-Santa Clara		20		
	i	Zimbabwe-Zambia		Chirundu OSBP		430		Namibia-Botswana		Buitepos-Mamuno				
	j	Mozambique-RSA		Ressano Garcia-Komatipoort		450		Namibia-RSA		Ariamsvlei-Nakop				
	k	Mozambique-Eswatini		Goba		0								

Sources: ITC Trade Map.

Figure 17: Dar Es Salaam Corridor - Deconstructed Trade Flows, 2017 to Figure 22: Walvis Bay Corridor - Deconstructed Trade Flows, 2017 present a 'deconstructed' perspective of these flows from each gateway port along the way, through border control points to/from intermediate points of origin/destination to the final point of origin/destination. The key conclusions to be drawn include the following:

- The largest port is Durban with a throughput of 68.5 mtpa tons, followed by Maputo with 18.2 mtpa, Dar es Salaam with 13.1 mtpa, Beira with 6.6 mtpa, Walvis Bay with 5.1 mtpa and Nacala with 2.3 mtpa tons.
 - The port handling the largest national volumes is also Durban at 8.5 mtpa, followed by Maputo with 7.1 mtpa, Walvis Bay with 4.2 mtpa, Beira with 3 mtpa and Nacala with 1.9 mtpa.
 - The port handling the most transit traffic is Maputo at 11.2 mtpa, followed by Durban with 8.7 mtpa, Dar es Salaam with 4.6 mtpa, Beira with 3.6 mtpa, Walvis Bay with 1.0 mtpa and Nacala with 0.4 mtpa.
 - The corridor that carries the most cargo, including both international and regional cargoes, is North-South with 14.0 mtpa, followed by Maputo with 13.2 mtpa, Dar es Salaam with 8 mtpa, Beira with 4 mtpa, Walvis Bay with 1 mtpa and Nacala with 0.7 mtpa.
 - The corridor that handles the most freight by rail is Maputo with 8.80 mtpa, followed by Nacala at 0.32 mtpa, North-South at 0.29 mtpa, Beira at 0.28 mtpa, Dar es Salaam at 0.17 mtpa and Walvis Bay which doesn't move any cross-border freight by rail.
- By contrast, road is the dominant mode throughout the region, with the most freight handled by road on the North-South Corridor with 13.7 mtpa, followed by Dar es Salaam with 7.8 mtpa, Maputo with 4.9 mtpa, Beira with 3.7 mtpa, Walvis Bay with 1.0 mtpa and Nacala with 0.4 mtpa.
 - The busiest border posts along the main regional transport corridors, measured in terms of trucks per day, are ranked as follows:
 1. Beitbridge at 770 trucks per day;
 2. Tunduma-Nakonde at 700 trucks per day;
 3. Kasumbalesa at 540 trucks per day;
 4. Kopfontein-Tlokweng and Martin's Drift-Groblersbrug at 500 trucks per day;
 5. Ressano Garcia-Komatipoort at 450 trucks per day;
 6. Chirundu at 430 trucks per day;
 7. Machipanda-Forbes at 235 trucks per day;
 8. Zobue-Mwanza and Calomue-Dedza at 160 trucks per day;
 9. Kazungula at 110 trucks per day;
 10. Katima Mulilo-Sesheke at 75 trucks per day;
 11. Nyamapanda-Cuchamano at 70 trucks per day;
 12. Victoria Falls-Livingstone at 50 trucks per day;
 13. Mchinji-Mwami at 30 trucks per day;
 14. Kasumulu-Songwe at 25 trucks per day;
 15. Cassacatiza-Chanida at 20 trucks per day;
 16. Oshikango-Santa Clara, Buitepos-Mamuno and Ariamsvlei-Nakop at 20 trucks per day; and
 17. Entre Lagos-Nayuchi, Mandimba-Chiponde and Milanje-Muloza at 5 trucks per day.

Current Trade Flows on Corridors

Figure 17: Dar Es Salaam Corridor - Deconstructed Trade Flows, 2017

International (000's tons)	Regional	Total	Mode	Border 1	Border 2		
Port Throughput	13,069						
Total National	8,461						
Total Transit	4,608						
On Corridor	3,238	4,759	7,997	Road	7,826		
				Rail	171		
				Total	7,997		
				Tanzania-Zambia	7,738	Zambia-DRC	3,905
				Truck Per Day	701	Trucks Per Day	362
				Tanzania-Malawi	259		
				Trucks Per Day	24		

Source: Collated by Nathan Associates for this study.

Figure 18: Nacala Corridor - Deconstructed Trade Flows, 2017

International (000's tons)	Regional	Total	Mode	Border 1	Border 2		
Port Throughput	2,255						
Total National	1,900						
Total Transit	355						
On Corridor	355	316	671	Road	351		
				Rail	320		
				Total	671		
				Mozambique-Malawi	355	Malawi-Zambia	316
				Trucks Per Day	3	Trucks Per Day	29

Source: authors' computations

Figure 19: Beira Corridor - Deconstructed Trade Flows, 2017

International (000's tons)	Regional	Total	Mode	Border 1	Border 2	Border 3			
Port Throughput	6,604								
Total National	3,005								
Total Transit	3,599								
On Corridor	3,599	392	3,991	Road	3,709				
				Rail	282				
				Total	3,991				
				Moz-Zimbabwe	2,820	Zim-Zambia	898	Zambia-DRC	230
				Trucks Per Day	235	Trucks Per Day	83	Trucks Per Day	21
				Moz-Malawi	951				
				Trucks Per Day	88				
				Moz-Zambia	220				
				Trucks Per Day	20				

Source: authors' computations

Figure 20: Maputo Corridor - Deconstructed Trade Flows, 2017

International (000's tons)		Regional	Total	Mode		Border 1	
Port Throughput	18,220						
Total National	7,075						
Total Transit	11,125						
On Corridor	11,125	2,035	13,160	Road	4,860		
				Rail	8,300		
				Total	13,160	Moz-RSA	11,621
						Trucks Per Day	450
						Moz-Eswatini	815
						Trucks Per Day	0
						Moz-Zimbabwe	575
						Trucks Per Day	0

Source: authors' computations

Figure 21: North-South Corridor - Deconstructed Trade Flows, 2017

International (000's tons)		Regional	Total	Mode		Border 1	Border 2		Border 3		
Port Throughput	68,561										
Total National	59,919										
Total Transit	8,707										
On Corridor	4,540	9,510	13,955	Road	13,667						
				Rail	288						
				Total	13,955	RSA-Zimbabwe	8,595	Zim-Zambia (1)	380	Zambia-DRC (1)	900
						Trucks Per Day	769	Trucks Per Day	350	Trucks Per Day	83
								Zim-Moz	740	Moz-Malawi	740
								Trucks Per Day	69		69
								Zim-Zambia (2)	830	Zambia-DRC (1)	100
								Trucks Per Day	50	Trucks Per Day	9
						RSA-Botswana	5,360	Bots-Zambia	1,200	Zambia-DRC (1)	300
						Trucks Per Day	496	Trucks Per Day	111	Trucks Per Day	28

Source: authors' computations

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Figure 22: Walvis Bay Corridor – Deconstructed Trade Flows, 2017

International (000's tons)	Regional	Total	Mode	Border 1	Border 2		
Port Throughput	5,168						
Total National	4,155						
Total Transit	1,013						
On Corridor	440	503	943				
			Road	943			
			Rail	0			
			Total	943			
				Namibia-Zambia	798	Zambia-DRC	362
				Trucks Per Day	74	Trucks Per Day	34
				Namibia-Other	145		
				Trucks Per Day	13		

Source: authors' computations

4.6. AVIATION TRADE FLOWS

Air freight trade in the SADC region is considerably small when compared to other forms of transport within the region, which makes it challenging to quantify and analyse. Publicly available

data through secondary sources is limited and presented in tons-kilometres (tkm), which can be misleading as it takes distance into consideration. Although slightly ambiguous, some sources provide useful background. For example, the sub-Saharan air freight market has

grown from about 1,800 billion to 2,900 billion tkm between 2008 and 2015.²⁶ Despite the limited amount of trade information in SADC specifically, Table 21 ranks the top countries in sub-Saharan Africa in air freight tkm.

Table 21: Sub-Saharan Africa Air Freight 2001-2015 (tkm millions)

Rank	Country	2001 Freight Tons (Millions)	2007 Freight Tons (Millions)	2015 Freight Tons (Millions)	Share 2015	Annual Growth 2007-2015	Annual Growth 2001-2015
1	Ethiopia	79,223	160,322	1,228.74	43.0%	29.0%	21.6%
2	South Africa	755,516	939,199	885,278	31.0%	-0.7%	1.1%
3	Kenya	92,732	298,083	286,4147	10.00%	-0.5%	8.4%
4	Mauritius	174,226	202,814	168,773	5.90%	-2.3%	-0.2%
5	Zambia	0.028	-	79,0928	2.80%	N/A	76.4%
6	Angola	50,818	72,888	46,043	1.60%	-5.6%	-0.7%
7	Madagascar	10,206	23,941	30,5126	1.10%	3.1%	8.1%
8	Namibia	74,744	-	30,3024	1.10%	N/A	-6.2%
9	Nigeria	2,792	10,036	22,4007	0.80%	10.6%	16.0%
10	Rwanda	-	-	21,3829	0.70%	N/A	N/A
11	Seychelles	22,009	27,644	19,235	0.70%	-4.4%	-1.0%
12	Sudan	32,648	45,892	13,1616	0.50%	-14.5%	-6.3%
13	Mozambique	6,885	5,778	5,1389	0.20%	-1.5%	-2.1%
14	Cote d'Ivoire	7,364	-	4,7191	0.20%	N/A	-3.1%
15	Senegal	7,364	-	30,955	0.10%	N/A	-6.0%

²⁶ Bofinger, Air transport in Africa, page 26.

	Subtotal	1,316,56	1,786,60	2,844,29	99.60%	6.0%	5.7%
	Others	360,335	147,83	10,4668	0.40%	-28.2%	-22.3%
	Total	1,676,89	1,934,43	2,854,76	100.00%	5.0%	3.9%

Source: Heinrich C. Bofinger's presentation based on World Bank/UNU-Wider (2017).

The largest air cargo market is Ethiopia (a non-SADC country), which maintains a share of 43 per cent of continental air cargo. Ethiopia relies on air freight for its highly developed flower market and aviation sector, with Ethiopian Airlines and Addis Ababa airport as an international hub. Third-ranked Kenya's relatively high market share in terms of air freight trade is also a prime example of this, as perishable exports rely on infrastructural connectivity with airport hubs. Lake Naivasha, where Kenya grows its flowers for exports, is well connected to the Nairobi airport, facilitating access to air freight transport.²⁷

Eight SADC countries are in the top 15 countries, with a combined share of 44.4 per cent of the sub-Saharan African air freight market in 2015 (the latest data available).²⁸ Meanwhile, although SADC countries together may account for almost half of the market share, their individual reliance on air freight transport remains limited as their infrastructure is usually not adequate enough to use this form of transport. There is no well-established market for regional flights, nor significant volume of goods that would require time-sensitive shipment. South Africa, the second-ranked country with a 31 per cent share, is the exception. South Africa has a wide global and regional reach for air passengers and subsequently freight.

Most of what is transported through air freight globally is high-value goods that

are time-sensitive, such as perishables, pharmaceuticals and others requiring present infrastructure and a developed aviation sector. It is important to note that globally, 30 to 50 per cent by weight of goods transported by air freight usually take place within the bellies of passenger planes. Thus, capacity to transport goods can fluctuate²⁹ and is dependent on commercial passenger routes. This remains true in Africa. Industrial air freight exports remain minimal and goods shipped by air freight are mainly high-value and take place in air freight hubs in Nairobi, Addis Ababa and Johannesburg (the only top market located within SADC).³⁰

Moreover, data on intra-regional trade is unavailable and most of the goods transported through air freight usually travel to Europe or elsewhere outside Africa.³¹ There are, however, some efforts to expand on this form of transport outside the aforementioned hubs in smaller airports, such as in Windhoek and Dar es Salaam, used mainly for fish, flowers and other horticultural products.³² However, although Tanzania is seeking to enhance their air freight exports, with fresh fish for example, it is difficult to quantify as all air shipment arrangements are usually made by the buyer of the product and not by the exporter.³³

In conclusion, while there is some anecdotal evidence, general data and background information, the

availability of useful public data and statistics regarding SADC's use of air freight transport remains limited. The methodology used for measuring data in ton-kilometres poses a challenge for analysis as it takes distance into consideration. Given the lack of relevant publicly available data, expanding the analysis on air freight would require primary research, which is beyond the scope of this project. However, the volumes are small and do not warrant significant trade flows. Consequently, this sector will not be pursued any further.

4.7. PIPELINE TRADE FLOWS

There are only three cross-border pipelines in the SADC region, namely the Beira-Feruka-Msasa pipeline between Mozambique and Zimbabwe, the Tazama pipeline between Tanzania and Zambia and the Sasol pipeline between Mozambique and South Africa. A brief profile of each one is provided below.

The Beira-Feruka-Msasa Petroleum Products Pipeline runs from the port of Beira in Mozambique to Msasa, which is located near Harare in Zimbabwe. Ownership of the pipeline is shared by Companhia do Pipeline Mozambique Zimbabwe (CPMZ) and the National Oil Infrastructure Company of Zimbabwe (NOIC), which recently acquired Lonrho's shares.³⁴ It is a 10-inch pipeline, approximately 300 km long

27 Bofinger, Air transport in Africa, page 28.

28 Bofinger, Air transport in Africa, page 29.

29 Bofinger, Air transport in Africa, page 29.

30 Nathan Associates, Definition and Investment Strategy, page 20.

31 Nathan Associates, Definition and Investment Strategy, page 20.

32 Nathan Associates, Definition and Investment Strategy, page 20.

33 Bofinger, Air transport in Africa, page 29.

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with a capacity of 2 million m³/year and transports in batches the following refined products: gasoline, diesel, ethanol, kerosene/Jet A1 and paraffin. Sakinda Holdings currently monopolizes Zimbabwe's fuel sector and controls the existing Beira to Harare pipeline that supplies the country with the majority of its fuel. The holding company also operates and franchises petrol filling stations, distributes commercial fuel products for the mining, transport, agriculture and industrial sectors, distributes a range of lubricants and chemicals and provides fuel transport and haulage services in the country. Sakunda recently invested \$11 million in the restoration of the Beira-Feruka oil pipeline and is operating the pipeline in partnership with the NOIC as it recovers its investment, with no immediate need for additional investment.³⁵

The Tazama Crude Oil Pipeline is co-owned by the governments of Zambia and Tanzania. It is an 8–12-inch pipeline, approximately 1,700 km long and transports crude oil only. It terminates at the Indeni Refinery in Ndola, Zambia, where refined product is stored and distributed throughout Zambia via third-party oil marketing companies. The Tazama Crude Oil Pipeline had a design capacity of 1.3 million m³/year, but it is 46 years old and known to be in poor condition. Pipeline leaks and mechanical failures in recent years have disrupted the flow of product to the Indeni Refinery. It has not transported more than 1 million m³/year. Work was recently carried out to replace damaged sections of the Tazama pipeline. In addition, pump station equipment is being renewed to reduce the frequency of mechanical failures. If the existing/new Indeni Refinery is to have a reliable crude feed, then sections of the pipeline will need to be replaced. However, replacement of pipeline sections will not increase capacity; therefore, replacement by

a parallel pipeline may be more cost-effective.

The 865-km Sasol Gas Transmission Pipeline, with a 26-inch design, runs from Mozambique to Secunda, South Africa, for the transmission of natural gas to its Secunda processing plant. The length of the pipeline on the South African side is 345 km and it is 520 km long in Mozambique. The gas is sourced from the Pande and Temane Gas Fields in Mozambique. The pipeline is currently operating at or close to its design capacity of 3.8 billion m³/year. The future of natural gas within the SADC region is inextricably tied to the downstream development of the 150 trillion cubic feet (Tcf) of proven natural gas reserves in the offshore Rovuma Basin off Mozambique's northern Cabo Delgado province.

There appears to be considerable speculative activity in the proposal of fuel pipelines within the region. However, the three cross-border pipeline projects profiled above do not present any significant short- to medium-term opportunities to advance the prospects for intra-Africa trade in the supply of refined petroleum products and natural gas to the wider SADC region.

4.8. TRAFFIC FLOWS ON SECONDARY ROUTES

4.8.1. Overview

Formal trade flows are generally limited to a few key routes based on the existence of sufficient border post infrastructure and services to process customs and transit declarations of goods. These routes are referred to as trade corridors and they typically traverse two or more countries, starting at a port in a gateway or maritime country. The main route is referred to as the primary trade corridor and may be a road, rail, inland waterway or multimodal

route. Some trade corridors have multiple arms of their primary routes – for instance, the Beira Corridor has a primary arm from Beira-Machipanda-Harare-Lusaka, as well as another primary route from Beira-Blantyre. Secondary routes are detours from the primary route, such as the route from Beira-Cassacatiza-Lusaka. In other instances, there may even be tertiary or quaternary routes.

Whether a transporter has alternative or secondary, route options from their origin to destination first depends on whether multiple routes and border posts exist. Multiple route options are more common for longer distance trips than shorter distance trips, but they vary by country. Some countries have more border posts than others. For example, Eswatini and Botswana have multiple border posts to access the main hinterland destinations. The next consideration is whether the route distances are similar (longer distances mean more fuel consumption and often more time). In some cases, the route may take longer to traverse, but it is an option because the transit time is comparable or shorter than the primary route. The next consideration is whether the inland infrastructure (road access) is sufficient to access the border (on both sides). In some instances, access to the border post is difficult due to poor road conditions, which increases wear and tear on trucks and risks breakdowns. In other instances, the route may not contain sufficient services for the transporters (fuel stations, rest stops, accommodation). Finally, the border post must have sufficient infrastructure and services for processing goods. In some instances, border post infrastructure exists, but services are limited – such as insufficient customs officers, hours of operation, sanitary or phytosanitary (SPS) services, or required brokers.

³⁴ Newsday, August 4, 2019.

³⁵ Africa Oil and Power, March 26, 2019.

Finally, some trade occurs off the official or formal routes, bypassing border posts. This informal trade is not legal trade that is captured in trade statistics or often studied/measured. Analysis of informal trade flows requires in-person field interviews of border areas, which was not within the scope of this desk study. Furthermore, while informal trade flows may be important to border economies, they are not considered significant in terms of volume or value, nor do they typically require infrastructure investments other than some improvements of local roads. Therefore, we focus our analysis on formal primary and secondary routes.

4.8.2. Methodology

The scope of this study is to conduct a desktop review to develop a consolidated picture of the trade flows and routes that carry, or will carry, significant volumes/values of intra-regional trade in the Pilot Region. The study should consider findings from major corridor diagnostics but focus on recommendations targeting secondary and informal trade routes. Given this mandate, we first conducted a desktop review of corridor diagnostic studies of the SADC region to see if any contained findings regarding secondary or informal routes.

Table 22 lists the major studies reviewed and references any mention of secondary routes. Consistent with our team's experience conducting such studies in the region, we found that few corridor diagnostic studies consider secondary routes.

In the absence of secondary information, primary research is required to fill data gaps. However, fieldwork is beyond the scope and budget of this desktop study. Considering the client's desire to better understand secondary routes in

the region, we developed an innovative approach to trying to identify and quantify utilisation of secondary routes. Nathan Associates has access to the Corridor Performance Monitoring System for Southern and Eastern Africa (TMS), a database of GPS tracking of more than 60,000 trucks in Eastern and Southern Africa. The TMS was developed and has been funded by donors ranging from the World Bank to USAID Southern Africa Trade and Investment Hub. Due to the absence of other available secondary information about secondary routes, in the subsections that follow, we analyse data from the TMS to identify and estimate the use of secondary routes in the SADC region.

The data used in this analysis is from the TMS Variable Route Report, which allows the user to capture all routes from the origin to the destination, including secondary routes (see snapshot in Figure 23). The main limitation of the report is that the data is monthly. The routes also include different sub-cities, so they must be manually aggregated into routes, which is time-consuming. Therefore, the data cannot be easily consolidated on an annual basis and we use a one-month sample for our analysis. As the data is reported monthly, we took a sample of data from November 2018, which is one of the highest months in terms of number of trucks plying key corridors in the database from 2018. Our sample included 52,201 truck movements from ports to hinterland destinations (import) and 237,799 truck movements from hinterland destinations to ports or other hinterland destinations (exports or transit movements). While the dataset is comprehensive, it does not cover a significant number of trucks to/from Malawi, the port of Nacala, or the port of Walvis Bay and does not cover any trucks from the SADC island states. Nevertheless, it provides a

useful snapshot of truck movements in the region and is one of the few, if not the only, such sources of quantitative information on truck movements by route in the region.

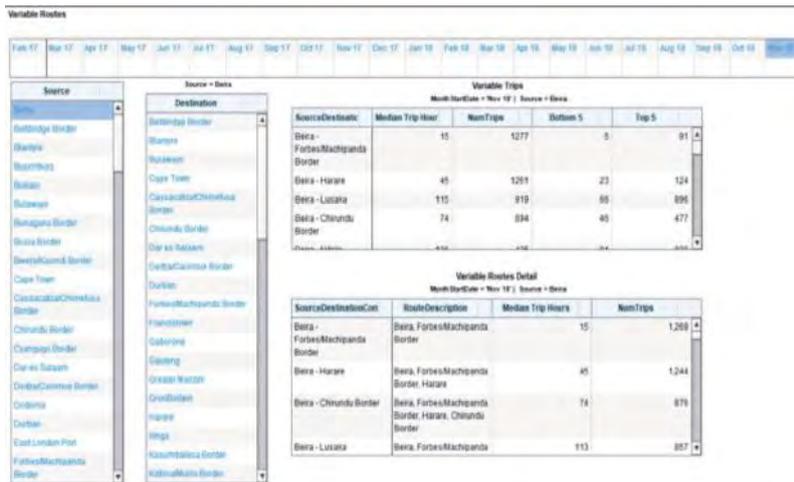
Below we present the results of the TMS analysis for imports, exports, regional flows and by corridor. While this study aims to focus on intra-Africa trade flows, the import/export analysis is important as it highlights primary and secondary trade corridors, which typically run from port to hinterland. The import/export data captures the largest number of trucks so it can be more easily used to calculate statistics. Regional trade often uses a subset of the route. We also used the data to look for purely regional trade routes beyond the main corridors (but did not identify any – an important finding of the analysis). Finally, when the team had access to other contextual information from interviews in prior projects, secondary reports or other data sources, it was used to supplement the TMS analysis.

Current Trade Flows on Corridors

Table 22: Desktop Review of Corridor Diagnostics and Secondary Routes

Study	Year	Author/Funder	Countries/ Corridors	Secondary/Informal Route Information
AgCLIR: Zambia Legal and Institutional Reform in Zambia's Agricultural Sector	2011	USAID	Zambia, DRC	Informal trade from Zambia to DRC via bike
Definition and Investment Strategy for a Core Strategic Transport Network for Eastern and Southern Africa ('CORE' Report)	2011	Nathan/ World Bank	Central, Dar es Salaam, Mtwara, Nacala, Beira, Maputo, North-South, Trans Kalahari, Trans Caprivi, Trans Cunene Lobito, Malange Corridors	No use of lake and inland waterways (Beira, Nacala)
Regional Infrastructure Development Master Plan	2012	SADC	All	None
What drives regional economic integration? Lessons from the Maputo Development corridor and the North-South corridor	2014	ECPDM	North-South, Maputo	None
Reviving trade routes: evidence from the Maputo corridor	2014	SSATP	Maputo	None
Master Plan For Development Of An International Logistics Hub For SADC Countries In The Republic Of Namibia	2015	JICA	Walvis Bay	None
Annual State of Cross-Border Operations Report	2017	Cross-Border Road Transport Agency	North-South, Maputo, Trans-Kalahari	N-S: mentions Botswana alternative, but confirms all analysis to primary route.
Africa Transport Demand and Infrastructure Planning	2017	Transet	All	Notes N-S Corridor alternative routes
Nacala Regional Market Analysis	2017-2018	Nathan	Nacala, other regional corridors	None
SPEED+: Assessment of Nacala Development Corridor	2017-2018	Nathan/USAID	Nacala	Mandimba's limited use as a secondary route from Nacala-Malawi and investment plans
SPEED+: Assessment of Beira Development Corridor	2018-2019	Nathan/USAID	Beira, other regional corridors	Cassacatiza's limited use as a secondary route from Beira-Lusaka despite poor road condition
Consultancy Services for a Comparative Transport Cost Study for the Central and Dar es Salaam Corridors Project	2018-2019	Nathan/ TanRoads	Central and Dar es Salaam Corridors	None

Figure 23: Screenshot of TMS Variable Route Report



Source: TMS (November 2018).

4.8.3. Summary of Secondary Route Findings

4.8.3.1. Import Direction

Looking at a sample of 52,201 truck movements from the TMS travelling from regional port cities³⁶ (Beira, Dar es Salaam, Durban, Maputo, Walvis Bay) to hinterland destinations (import direction) from November 2018, one of the highest traffic months, the following observations can be made:

- 1 The majority of trucks took expected routes via the primary, established corridors and border control points.
- 2 When trucks deviated from these routes, it was typically to cover several destinations, either dropping off multiple consignments, or picking up backhaul in another location. These movements were not considered 'secondary routes' and were excluded from the table whenever possible.
- 3 Secondary route findings varied by corridor/country and are as follows:
 - a. The Beira Corridor has one alternate route to Lusaka and the DRC, but no road alternatives to Harare (there is a secondary rail corridor). The Beira Corridor Malawi spur has two routes from Mozambique into Malawi. Historically, this route also had a railway, but is currently limited to road transport.
 - b. The Dar es Salaam Corridor has an alternate road route to Lusaka, as well as a rail corridor.
 - c. The Maputo Corridor had one alternate route to Cape Town and Botswana, but no road alternatives to Gauteng (only a rail option).
 - d. The Nacala Corridor is primarily a rail corridor, with two alternate road routes.
 - e. The North-South Corridor has three to four route options to destinations in Zimbabwe, Zambia and the DRC, as well as rail options.
 - f. Several of the Walvis Bay Corridor spurs have secondary routes.
 - g. The Mbabane–Durban corridor had four alternate routes due to the number of borders serving Eswatini, which is a small country.
 - h. No alternate routes were used to import cargo to Lesotho or from Zambia into the DRC.
 - i. Whilst alternative corridors are available from Malawi to the Beira, Nacala and North-South corridors, the TMS data only showed utilisation of one road route per corridor for import traffic.
- 4 In some instances, secondary routes are faster than primary routes, indicating that if constraining factors can be identified and mitigated, there is the potential for increased traffic and time savings to traders and transporters.

³⁶ While it is assumed that much of this cargo is international trade, the system does not distinguish between truck movements to/from the port vs the port city, it so can also capture some regional trade to/from the port city.

Current Trade Flows on Corridors

Table 23 shows secondary routes. While the statistics from the TMS in this section focus on cargo movements from the port cities (which could be international trade from the port or regional trade from the city) to the hinterland; these secondary routes are also available and used for regional trade between hinterland locations.

Table 23: Secondary Import Routes

Corridor	Route		Via	# of Trucks [a]	% of Traffic	Transit Time (Hrs)
Beira	Beira-Lusaka	1	Forbes/Machipanda-Chirundu	90	99	113
		2	Tete, Cassacatiza/Chimefusa		1	68
Dar es Salaam	Dar es Salaam-Lusaka	1	Nakonde/Tunduma	39	95	219
		2	Kasumu/Songwe/Mwami/Mchinji		5	220
Maputo	Maputo-Cape Town	1	Lebombo/Ressano Garcia	34	82	52
		2	Naamacha/Lomahasha/Lavumisa		18	44
	Maputo-Gaborone	1	Lebombo/Ressano Garcia/Pioneer Gate/Skilpadshek	70	73	86
		2	Lebombo/Ressano Garcia/Martin's Drift/Groblersbrug		27	118
Mbabane-Durban	Durban-Greater Manzini	1	Lavumisa Border	596	87	23
		2	Oshoek/Ngwenya		5	27
		3	Mahamba		3	29
		4	Lebombo/Ressano Garcia-Maputo		1	67
	Durban-Mbabane	1	Lavumisa	246	81	56
		2	Oshoek/Ngwenya		10	27
3		Mahamba	3		53	
North-South	Durban-Francistown	1	Martin's Drift/Groblersbrug	295	79	89
		2	Pioneer Gate/Skilpadshek		21	67
	Durban-Harare	1	Beitbridge	820	84	111
		2	Martin's Drift/Groblersbrug - Kazungula - Livingstone - Victoria Falls/Livingstone - Lusaka - Chirundu		2	199
		3	Pioneer Gate/Skilpadshek - Kazungula - Victoria Falls/Livingstone - Kazungula - Chirundu		1	194
	Durban-Lubumbashi	1	Beitbridge - Chirundu - Kasumbalesa	659	74	367
		2	Martin's Drift/Groblersbrug - Kazungula Victoria Falls/Livingstone - Kasumbalesa		21	321
	Durban-Lilongwe	1	Beitbridge - Nyamapanda/Cuchamano - Zobue/Mwanza	5	60	206
		2	Beitbridge - Nyamapanda/Cuchamano - Dedza/Calomue		40	207
	Durban-Maputo	1	Lebombo/Ressano Garcia	121	82	43
		2	Lavumisa		18	20
	Durban-Lusaka	1	Beitbridge - Chirundu	858	70	184
2		Martin's Drift/Groblersbrug - Kazungula - Victoria Falls/Livingstone	28		185	
3		Beitbridge- Victoria Falls/Livingstone-Kazungula	1		200	
4		Pioneer Gate/Skilpadshek - Kazungula - Victoria Falls/Livingstone - Kazungula	1		159	

Source: TMS (November 2018).

Note: The TMS contains limited data for Nacala port, Walvis Bay port and Malawi. [a] Total number of truck movements on the corridor in November 2018 recorded by the TMS, including some non-direct or circular routes as reported by the TMS for that corridor.

4.8.3.2. Export Direction

This section looks at secondary routes from hinterland destinations to regional port cities. In some cases, the patterns and options are the same as for imports, but there are some differences. Secondary routes observed are shown in Table 24. Key observations include the following:

- 1 The majority of trucks took expected routes via the primary, established corridors and border control points.
- 2 Exports on some routes take more secondary routes than imports. This may be because they are more time-sensitive, as they must arrive at the port on time to make a ship call and in other cases exports are agricultural products, which are perishable.
- 3 Exports on other routes like the North-South corridor used fewer secondary routes (for example, more traffic used Beitbridge than alternatives). This could be due to the fact that export volumes are lower than import volumes, so the routes may be less congested and, therefore, there is less of a need for alternatives.
- 4 Like imports, some routes had more options for secondary routes than others:
 - a. Interestingly, while all import traffic to the DRC used the Kasumbalesa border post, some exports deviated from this route and used the Mokambo border, saving considerable time.
 - b. Traffic to/from Zimbabwe cannot easily avoid Forbes, Chirundu, or Beitbridge. Traffic to/from Tanzania to Zambia cannot easily avoid Nakonde/Tunduma. These are some of the most congested borders.
 - c. North-South has several alternatives, especially to Botswana, but other North-South routes used fewer secondary borders for exports than for imports.
- 5 When alternative borders exist for one origin/destination on several corridors, the use by corridor sometimes varies (e.g. the Dar es Salaam corridor uses Mokambo more than the Beira or North-South corridors).
- 6 Circular/non-direct routing on occasion are used to pick up/drop off goods, most commonly detouring to Durban, Gauteng, DRC or Lusaka as part of another route, likely for backhaul. These were excluded from our analysis when possible.
- 7 In some instances, secondary routes are faster than primary routes, indicating that if constraining factors can be identified and mitigated, there is the potential for increased traffic and time savings to traders and transporters.



Current Trade Flows on Corridors

Table 24: Secondary Export Routes

Corridor	Route		Via	# of Trucks [a]	% of Traffic	Transit Time (Hrs)
Beira	Kolwezi – Beira	1	Kasumbalesa-Chirundu – Forbes/Machipanda	25	89%	551
		2	Mokambo – Chirundu – Forbes/Machipanda		11%	140
	Lubumbashi – Beira	1	Kasumbalesa – Chirundu – Forbes/Machipanda	119	58%	245
		2	Mokambo – Chirundu – Forbes/Machipanda		42%	119
	Kitwe – Beira	1	Chirundu – Forbes/Machipanda	342	95%	110
		2	Chimefusa/Cassacatiza		5%	101
	Lusaka – Beira	1	Chirundu – Forbes/Machipanda	874	97%	88
		2	Chimefusa/Cassacatiza – Beira		3%	57
	Ndola – Beira	1	Chirundu – Forbes/Machipanda	358	95%	106
		2	Chimefusa/Cassacatiza – Beira		5%	90
Cape-to-Cairo	Gaborone – Cape Town	1	Ramatlabama	145	58%	51
		2	Tlokwen/Kopfontein – Pioneer Gate/Skilpadshek		29%	63
		3	Pioneer Gate/Skilpadshek		13%	62
Dar es Salaam	Kolwezi – Dar es Salaam	1	Mokambo – Nakonde/Tunduma	89	66%	133
		2	Kasumbalesa – Nakonde/Tunduma		34%	427
	Lubumbashi – Dar es Salaam	1	Mokambo – Nakonde/Tunduma	397	65%	125
		2	Kasumbalesa – Nakonde/Tunduma		35%	426
	Lusaka – Dar es Salaam	1	Nakonde/Tunduma	41	95%	127
2		Mwami/Mchinji – Kasumulu/Songwe	5%		217	
Mbabane – Durban	Mbabane – Durban	1	Manzini – Lavumisa	252	84%	25
		2	Oshoek/Ngwenya		12%	52
		3	Manzini – Mahamba		4%	64
North-South	Blantyre – Durban	1	Zobue/Mwanza – Nyamapanda/Cuchamano – Beitbridge	23	91%	132
		2	Dedza/Calomue – Nyamapanda/Cuchamano – Beitbridge		9%	211
	Gaborone – Durban	1	Tlokwen/Kopfontein – Pioneer Gate/Skilpadshek	245	52%	49
		2	Pioneer Gate/Skilpadshek		33%	68
		3	Martin’s Drift/Groblersbrug		11%	106
		4	Ramatlabama		3%	156
	Kolwezi – Durban	1	Kasumbalesa – Chirundu – Beitbridge	179	77%	452
		2	Mokambo-Chirundu – Beitbridge		23%	235
	Lubumbashi – Durban	1	Kasumbalesa-Chirundu – Beitbridge	728	66%	272
		2	Kasumbalesa – Victoria Falls/Livingstone-Kazungula – Martin’s Drift/Groblersbrug		22%	275
3		Mokambo-Chirundu – Beitbridge	12%		236	

Kitwe – Durban	1	Chirundu – Beitbridge	767	77%	164
	2	Victoria Falls/Livingstone-Kazungula – Martin's Drift/ Groblersbrug		23%	197
Lusaka – Durban	1	Chirundu OSBP – Beitbridge	950	80%	140
	2	Victoria Falls/Livingstone-Kazungula – Martin's Drift/ Groblersbrug		20%	169
Ndola – Durban	1	Ndola – Chirundu – Beitbridge	815	77%	155
	2	Victoria Falls/Livingstone-Kazungula – Martin's Drift/ Groblersbrug		23%	185
Trans-Caprivi	1	Victoria Falls/Livingstone-Kazungula – Sesheke/Katima Mulilo	53	81%	126
	2	Sesheke/Katima Mulilo		9%	69
Trans-Orange	1	Vioolsdrif/Noordoewer	209	76%	32
	2	Nakop/Ariamsvlei		20%	67
	3	Mamuno – Pioneer Gate/Skilpadshek		4%	104

Source: TMS (November 2018).

Note: The TMS contains limited data for Nacala port, Walvis Bay port and Malawi.

[a] Total number of truck movements on the corridor in November 2018 recorded by the TMS, including some non-direct or circular routes as reported by the TMS for that corridor.

4.8.3.1. Regional Trade Routes Between Hinterland Destinations

This section looks more closely at secondary routes between hinterland locations, as summarised in Table 25. This data follows the same trends as the import and export data, i.e. the same routes are available as those discussed above. Regional secondary routes observed from the TMS include:

- Beira Corridor:
 - Secondary route using the Cassacatiza/Chimefusa Border instead of the primary route of the Forbes/Machipanda Border plus Chirundu OSBP from Mozambique to Zambia – and the rate of use was higher for the regional route than international trade;
- North-South:
 - Alternative use of the Zobue/Mwanza Border and Dedza/Calomue Border from Malawi to Mozambique;
 - Alternate routes on the North-South corridor utilising routes both into Botswana (Martin's Drift/Groblersbrug Border, Pioneer Gate/Skilpadshek Border, Tlokweg/Kopfontein Border) and through Botswana or Zimbabwe (Beitbridge Border) to Zambia and the DRC;
 - Use of the Victoria Falls/Livingstone Border as an alternative to Chirundu from Zimbabwe to Zambia;
 - Secondary route using the Mokambo Border from the DRC into Zambia instead of the Kasumbalesa Border;
- Walvis Bay Corridor:
 - Trans-Orange: use of the Nakop/Ariamsvlei Border and Mamuno + Pioneer Gate/Skilpadshek Border as alternatives to the Vioolsdrif/Noordoewer Border;
 - Trans-Kalahari: use of five different routes from Gaborone – Gauteng, four different routes from Gauteng – Windhoek and two different routes from Gaborone – Windhoek and Gauteng – Francistown; and
- Mbabane-Durban Corridor:
 - Secondary route using the Lavumisa Border and Mahamba Border as alternatives to the Oshoek/Ngwenya Border from Gauteng – Eswatini.

Current Trade Flows on Corridors

Table 25: Secondary Hinterland/Regional Routes

Corridor	Route		Via	# of Trucks [a]	% of Traffic	Transit Time (Hrs)
Beira	Tete – Lusaka	1	Forbes/Machipanda-Chirundu	16	69%	147
		2	Cassacatiza/Chimefusa		31%	44
Mbabane – Durban	Gauteng – Greater Manzini	1	Manzini-Oshoek/Ngwenya	701	85%	10
		2	Lavumisa		6%	55
		3	Mbabane – Mahamba		4%	8
	Gauteng – Mbabane	1	Oshoek/Ngwenya	709	96%	8
		2	Manzini – Mahamba		4%	21
	Mbabane – Gauteng	1	Oshoek/Ngwenya	712	95%	7
		2	Greater Manzini – Lavumisa		4%	60
		3	Greater Manzini – Mahamba		1%	11
	North-South	Blantyre – Gauteng	1	Zobue/Mwanza – Nyamapanda/Cuchamano – Beitbridge	73	90%
2			Dedza/Calomue – Nyamapanda/Cuchamano – Beitbridge	7%		79
3			Dedza/Calomue – Forbes/Machipanda – Beitbridge	3%		106
Blantyre – Harare		1	Zobue/Mwanza – Nyamapanda/Cuchamano	78	94%	20
		2	Dedza/Calomue – Nyamapanda/Cuchamano		6%	40
Lilongwe – Masvingo		1	Dedza/Calomue – Nyamapanda/Cuchamano		95%	21
		2	Dedza/Calomue – Forbes/Machipanda		5%	54
Bulawayo - Kolwezi		1	Chirundu – Kasumbalesa	66	95%	262
		2	Victoria Falls/Livingstone – Kasumbalesa		5%	315
Bulawayo – Lubumbashi		1	Chirundu – Kasumbalesa	134	98%	247
		2	Victoria Falls/Livingstone – Kasumbalesa		2%	292
Harare – Lilongwe		1	Nyamapanda/Cuchamano – Dedza/Calomue	61	84%	17
		2	Nyamapanda/Cuchamano – Zobue/Mwanza		16%	77
Gauteng – Harare		1	Beitbridge	1,898	96%	65
		2	Martin's Drift/Groblersbrug – Kazungula – Victoria Falls/Livingstone – Chirundu		3%	158
	3	Lebombo/Ressano Garcia – Maputo – Lebombo/Ressano Garcia – Beitbridge	1%		147	
Gauteng – Lubumbashi	1	Beitbridge – Chirundu – Kasumbalesa	1,140	86%	291	
	2	Martin's Drift/Groblersbrug – Francistown – Kazungula – Victoria Falls/Livingstone-Kasumbalesa		14%	251	

North-South	Gauteng – Lusaka	1	Beitbridge – Chirundu	1,522	77%	141
		2	Martin's Drift/Groblersbrug – Kazungula – Victoria Falls/Livingstone		21%	120
		3	Pioneer Gate/Skilpadshek – Kazungula – Victoria Falls/Livingstone		2%	114
		4	Lebombo/Ressano Garcia – Maputo – Lebombo/Ressano Garcia – Beitbridge – Chirundu		1%	427
	Gauteng – Ndola	1	Beitbridge-Chirundu-Ndola	1,252	87%	149
		2	Martin's Drift/Groblersbrug – Kazungula, Victoria Falls/Livingstone		12%	153
		3	Beitbridge – Victoria Falls/Livingstone – Kazungula		1%	175
	Kolwezi – Gauteng	1	Kasumbalesa – Chirundu – Beitbridge	460	54%	408
		2	Mokambo – Chirundu – Beitbridge		43%	116
	Kolwezi – Harare	1	Kasumbalesa – Chirundu	526	60%	351
		2	Mokambo – Chirundu		40%	64
	Kolwezi – Kitwe	1	Kasumbalesa	1,263	79%	189
		2	Mokambo		21%	23
	Kolwezi – Lusaka	1	Kasumbalesa	1,174	78%	209
		2	Mokambo		22%	40
	Kolwezi – Ndola	1	Kasumbalesa	1,282	75%	190
		2	Mokambo		25%	24
	Lubumbashi – Gauteng	1	Kasumbalesa – Chirundu – Beitbridge	1,211	60%	233
		2	Mokambo – Chirundu – Beitbridge		25%	100
		3	Kasumbalesa – Victoria Falls/Livingstone-Kazungula – Martin's Drift/Groblersbrug		14%	218
		4	Mokambo – Victoria Falls/Livingstone-Kazungula – Martin's Drift/Groblersbrug		2%	124
	Lubumbashi – Harare	1	Kasumbalesa-Chirundu	1,201	69%	146
		2	Mokambo-Chirundu		31%	53
	Lubumbashi – Kitwe	1	Kasumbalesa	3,278	81%	67
		2	Mokambo		19%	17
	Lubumbashi – Lusaka	1	Kasumbalesa	2,488	81%	74
		2	Mokambo		19%	26
	Lubumbashi – Ndola	1	Kasumbalesa	3,404	76%	57
2		Mokambo	24%		17	

Current Trade Flows on Corridors

	Kitwe – Gauteng	1	Chirundu – Beitbridge	1,287	84%	125
		2	Victoria Falls/Livingstone – Kazungula – Martin's Drift/ Groblersbrug		16%	140
	Lusaka – Gauteng	1	Chirundu-Beitbridge	1,628	84%	100
		2	Victoria Falls/Livingstone – Kazungula – Martin's Drift/ Groblersbrug		16%	108
	Ndola – Gauteng	1	Chirundu-Beitbridge	1,347	83%	122
		2	Victoria Falls/Livingstone-Kazungula – Martin's Drift/ Groblersbrug		17%	134
Trans-Orange	Windhoek – Gauteng	1	Mamuno-Pioneer Gate/Skilpadshok	487	61%	32
		2	Nakop/Ariamsvlei		25%	32
		3	Violsdrif/Noordoewer		9%	103
		4	Mamuno – Ramatlabama		3%	28
		5	Mamuno – Kazungula-Victoria Falls/Livingstone- Kazungula – Martin's Drift/Groblersbrug		2%	238
Trans-Kalahari	Gaborone – Gauteng	1	Tlokweng/Kopfontein	2,469	51%	6
		2	Martin's Drift/Groblersbrug		25%	71
		3	Pioneer Gate/Skilpadshok		19%	15
		4	Francistown – Kazungula – Francistown – Martin's Drift/ Groblersbrug		2%	67
		5	Ramatlabama		2%	22
	Gaborone - Windhoek	1	Francistown – Kazungula	50	50%	74
		2	Mamuno		50%	29
	Gauteng – Francistown	1	Pioneer Gate/Skilpadshok	1,072	58%	32
		2	Martin's Drift/Groblersbrug		42%	41
	Gauteng – Windhoek	1	Pioneer Gate/Skilpadshok – Mamuno	474	72%	37
		2	Nakop/Ariamsvlei		23%	32
		3	Ramatlabama – Mamuno		3%	33
		4	Pioneer Gate/Skilpadshok-Kazungula		3%	75

Source: TMS (November 2018).

Note: The TMS contains limited data for Nacala port, Walvis Bay port and Malawi.

[a] Total number of truck movements on the corridor in November 2018 recorded by the TMS, including some non-direct or circular routes as reported by the TMS for that corridor.

4.8.4. Secondary Routes by Corridor

4.8.4.1. Zambia/DRC Trade via Multiple Corridors

While all import traffic into the DRC exclusively used the Kasumbalesa border control point (BCP), a key finding is that some export traffic from the DRC to Zambia (and onward) instead uses the Mokambo Border (Figure 24). This is true for both international and regional cargo. Despite poor access roads to Mokambo, in all instances this route proved to be quicker in transit time – sometimes significantly (see Table 26).

Figure 24: DRC Export Route Map



Source: Google Maps.

Use of this route varied by corridor, as shown below. For Dar es Salaam corridor exports, Mokambo was actually the primary route, capturing about 2/3 of cargo to both Lubumbashi and Kolwezi. Use on the Beira and North-South corridors was not as common as the Dar es Salaam corridor.

Current Trade Flows on Corridors

Table 26: Summary of DRC Route Analysis

Measure	Lubumbashi to:			Kolwezi to:		
	Beira	Dar es Salaam	Durban	Beira	Dar es Salaam	Durban
Per cent of Traffic through Mokambo	42%	65%	12%	11%	66%	23%
Time Mokambo (hrs)	118.85	124.78	235.62	140.42	132.87	235.43
Time Kasumbelesa (hrs)	244.85	426.28	272.07	551.44	427.17	452

Source: TMS.

Given that using the Mokambo route seems to save significant time, avoiding the huge delays and congestion at Kasumbelesa, traffic is expected to grow provided there are no infrastructure or other constraints. It is our understanding that the access road from Kasumbelesa to Mokambo is currently poor and that the border infrastructure may not be sufficient. It is unclear why no import traffic uses this route, but it is likely due to regulatory or service market barriers. This will be further investigated in the next output, along with an analysis of planned investments and gaps.

A 2011 study funded by USAID³⁷ noted that a significant amount of informal agricultural trade occurs through Kasumbelesa. The study found that the DRC's agricultural demand exceeded supply, so food products were imported from Zambia, Tanzania and South Africa. The study found that much of this trade is informal, with an estimated 75-80 per cent of Zambia's agricultural exports to the Katanga region of the DRC being traded informally. According to the study, the trade process is efficient, starting with three food markets in Zambia near the DRC border. Bicycle couriers carry cargo through one of 200 paths into the DRC, where they are picked up by trucks. While the process is reasonably efficient, the transport costs are high, with one producer quoting her costs from Lusaka to Kasumbalesa at 40 per cent.

4.8.4.2. Beira Corridor

Beira-Harare-Lusaka-Lubumbashi Sub-corridor

The main Beira corridor road link from Beira-Harare only contains one route at present, which is the primary route via Machipanda/Forbes. The only secondary route is a rail route from Beira to Harare.

Traffic from Beira (or other hinterland destinations in Mozambique) to Zambia and the DRC has a secondary route option that bypasses Zimbabwe. Most traffic from Beira to Lusaka uses the primary corridor from Beira-Forbes/Machipanda-Harare-Chirundu-Lusaka through Zimbabwe. A small portion of trucks takes an alternate, secondary route from Beira-Tete-Cassacatiza/Chimefusa-Lusaka (see Figure 25). This route is also available to regional trade from Zambia to/from Mozambique, primarily the Tete region.

According to the TMS data, 99 per cent of Beira-Lusaka imports and 69 per cent of Tete-Lusaka imports use the primary route, with the remaining imports using the secondary route. It is interesting to note that regional trade from Tete-Lusaka appears to use the secondary route in a much higher proportion than the international cargo from Beira-Lusaka. The TMS also found that 97 per cent of exports from Lusaka-Beira, 95 per cent of exports from Kitwe-Beira and

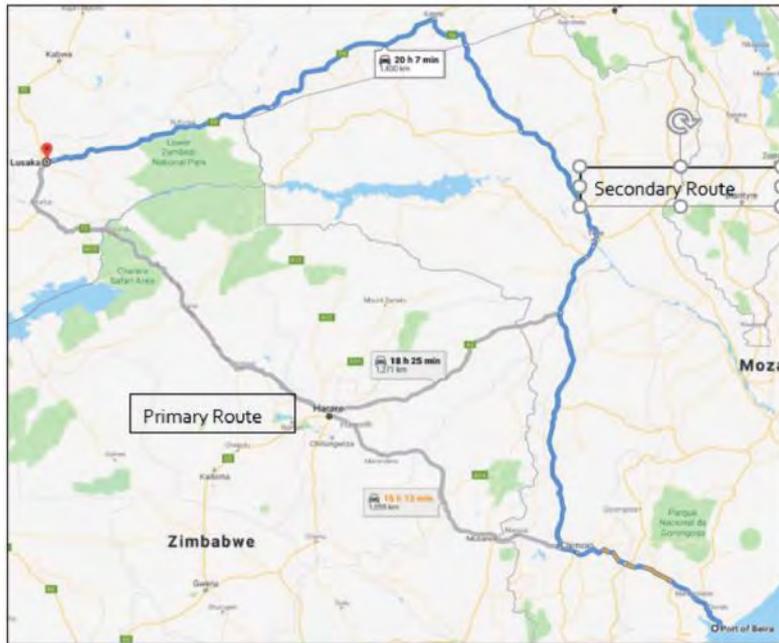
95 per cent of exports from Ndola-Beira used the primary route, with 3-5 per cent using the secondary route.

The secondary route is longer by about 350 km so requires more fuel, but it bypasses Zimbabwe, crossing only one border post instead of two and one transit country instead of two. Depending on the border crossing times, the secondary Cassacatiza route can actually take less time than the primary route. According to the TMS, using the secondary route was typically faster. For example:

- The secondary route from Tete-Lusaka took an average of 44 hours compared to 147 hours on the primary route;
- The secondary route from Lusaka-Beira (export) took 57 hours vs 88 hours; and
- Import trucks from Beira-Lusaka made the trip in 68 hours instead of 113 hours.

³⁷ United States Agency for International Development, AgCLIR: Zambia.

Figure 25: Beira-Lusaka Route Map



Source: Google Maps.

Several members of the Nathan Associates team conducted fieldwork on the Beira corridor in October 2018 for a mission funded by USAID. During this mission, they travelled major portions of the route and interviewed several transporters, shippers and freight forwarders, who provided the following information on the routes that they use to travel to/from Beira port to hinterland locations:

- The major transporters were split on their use of the Cassacatiza as an alternate corridor.
 - At least one major transporter indicated that they use Cassacatiza/Chimefusa instead of Machipanda/Forbes despite the longer distance to avoid bureaucracy to get to Lusaka. The transporter indicated that they consumed more fuel due to the longer distance, but that the actual transit time was less as the border processing is quicker.
 - Others only used Machipanda-Forbes, regardless of the delays.
- A major freight forwarder noted that they cannot use the alternate route even if there are delays at Machipanda-Forbes due to a lack of customs and clearing agents at the Cassacatiza border.
- While the road from Beira to Tete is in good condition, the road from Tete to Cassacatiza needs repair. The SPEED+ Beira Development Corridor Report (2018-2019) noted that the road sections from Vanduzi – Tete (354 km) and Tete – Cassacatiza (263 km) were in fair-poor condition, while the section from Cassacatiza – Katete (65 km) was in poor condition.

Current Trade Flows on Corridors

Nathan Associates also had access to transit movements from Mozambique Customs from 2013 to 2018 (see Table 27). This data shows that the Cassacatiza secondary route comprised 8-13 per cent of import movements, 2-16 per cent of export movements and 8-14 per cent of all movements from Beira port to Zimbabwe/Zambia/DRC. The data does not identify the destination, so it is not possible to separate Zimbabwe and Zambia trips to get an overall estimate of the percentage of Zambia or DRC cargo taking this alternate route. However, the data implies that the percentage is actually much greater than what the TMS captures. Most of the trucks taking this route are bringing imports and import traffic using the route has grown an average of 38 per cent per year from 2013-2018. Export traffic in 2018 was down to 2 per cent from a high of 16 per cent in 2013 and saw a 13 per cent annual average decline in traffic from 2013-2018.

Table 27: Transit Transport Movements on Beira Corridor, 2013-2018

Measure	2013	2014	2015	2016	2017	2018	Annual % Growth
Cassacatiza Imports	1,737	4,385	4,190	2,812	4,465	5,000	38%
Cassacatiza Exports	1,387	2,446	2,081	929	1,432	490	-13%
Cassacatiza Total	3,124	6,831	6,271	3,741	5,897	5,490	15%
Cassacatiza + Machipanda Total	25,762	62,987	63,665	49,876	53,951	65,177	31%
Cassacatiza per cent of imports	10%	10%	9%	8%	13%	11%	
Cassacatiza per cent of exports	16%	14%	11%	6%	8%	2%	
Cassacatiza per cent of total	14%	12%	11%	8%	12%	9%	

Source: Mozambique Customs MCNet (2018).

The MCNet data only contains transit movements, i.e. not regional trade between Mozambique and Zambia, but does also include regional movements from Malawi and Zimbabwe to/from Zambia via Mozambique, as shown below. These regional flows from Malawi-Mozambique-Zambia comprised 2-13 per cent of Cassacatiza traffic from Mozambique into Zambia and 0-3 per cent of Cassacatiza traffic from Zambia into Mozambique (Table 28).

Table 28: Regional Transit Transport Movements on Beira Corridor, 2013-2018

% of Cassacatiza BCP Traffic	2013	2014	2015	2016	2017	2018
Regional Exports to Zambia	2%	3%	3%	6%	13%	10%
Regional Imports to Zambia	1%	1%	1%	0%	3%	0%

Source: Mozambique Customs MCNet 2018.

Beira-Malawi Sub-Corridor

The Beira Corridor includes a second arm which connects Beira to Malawi. There are two BCPs used from Malawi to Mozambique (Zobue/Mwanza and Dedza/Calomue); while one is closer to Blantyre and the other to Lilongwe, we found that they were used occasionally as alternate routes, likely during periods of congestion.

Presently, the Beira-Malawi corridor is only a road route, but it has multimodal potential. The Sena Railway line used to run from Beira to Malawi, but the 44-km section from Mutarara (north bank of the Dona Ana Bridge) to Vila Fronteira (Malawi border) was destroyed in 1979 shortly after the commencement of the Mozambique civil war. A detailed feasibility study for reconstructing the line was conducted by DFID under the Mozambique Regional Gateway Project (MRGP) in 2015 but found the project to be cost-prohibitive at approximately US\$800 million. However, other recent proposals, including an option in the 2018 Malawi National Transport Master Plan as well as options presented by SPEED+, have presented more affordable multimodal options. If any of these plans moves forward, a railroad multimodal corridor could provide a secondary route along this arm of the Beira Corridor. However, such a route would likely focus on international trade to/from Beira port.

The Zambezi River was studied as a potential inland waterway secondary route, but was found not to be viable. According to the CORE report (2011), Zambezi River transport services have been limited to isolated projects and communities. As of the timing of the report (2011), the African Development Bank had approved funding for a feasibility study to assess the Shire River Waterway Scheme, which proposed the development of a port at Nsanje on the Shire River in Malawi. The project focussed on international trade from the region to Beira port. More recent news articles note that the feasibility study found that the waterway was 'not commercially navigable in its natural state and under these conditions, the general objective of the proposed project – the reduction of transport costs in terms of time and money – cannot be achieved.'³⁸

4.8.4.3. Dar es Salaam Corridor

The Dar es Salaam Corridor contains both road and rail routes. Figure 26 shows that the majority of cargo travelling from Dar es Salaam to Lusaka (and the DRC) by road travels through the Nakonde/Tunduma border (95 per cent of the TMS data). Five per cent of movements used the Kasumulu/Songwe Border and Mwami/Mchinji Border through Malawi (see map below). While this route is longer in distance by more than 200 km and includes an additional border post and transit country, the data showed nearly identical transit times due to the long delays at Nakonde/Tunduma.

As with imports, the majority of cargo travelling from Lusaka (and the DRC) to Dar es Salaam travels through the Nakonde/Tunduma border (95 per cent of the TMS data). Like imports, 5 per cent of movements from Lusaka to Dar es Salaam instead used the Kasumulu/Songwe Border and Mwami/Mchinji Border through Malawi.

³⁸ Green Muheya, 'Mozambique deals blow to Malawi on Shire-Zambezi waterway-project', Nyasa Times, 7 June 2017. <https://www.nyasatimes.com/mozambique-deals-blow-malawi-shire-zambezi-waterway-project/>

Current Trade Flows on Corridors

Figure 26: Dar Es Salaam-Lusaka Route Map



Source: Google Maps.

The corridor also has a secondary rail route (TAZARA), which runs from Dar es Salaam to Kapiri Mposhi in Zambia, then south to Lusaka or northwest to the Copperbelt and DRC, where it connects with the Congolese Railway, SNCC.

4.8.4.4. Maputo Corridor

The Maputo corridor from Maputo to Gauteng contains both road and rail routes, neither of which has secondary routes.

The TMS showed two road routes from Maputo to Cape Town: a primary route through the Lebombo/Ressano Garcia Border (82 per cent) and a secondary route via Eswatini through the Naamacha/Lomahasha and Lavumisa Borders. While the Eswatini route adds a border post and transit country, transporters saved 8 hours of transit time. The Eswatini route is about the same distance and avoids Johannesburg and Pretoria, although it adds a border crossing.

The TMS also showed two road routes from Maputo to Gaborone. Both routes initially cross the Lebombo/Ressano Garcia Border. One route then crosses from South Africa to Botswana via the Pioneer Gate/Skilpadshek Border (73 per cent) while the other uses the Martin's Drift/Grobbersbrug Border. In this case, the secondary route had a longer transit time (and is longer in distance).

4.8.4.5. Nacala Corridor

The primary Nacala corridor is the rail corridor stemming from Nacala port to Cuamba in Mozambique and on to Nkaya in Malawi. There are several branches, or primary sub-corridors (see Figure 27):

- Nacala-Cuamba-Lichinga (Mozambique – purely a national corridor)
- Nacala-Cuamba-Nkaya-Limbe (Malawi)
- Nacala-Cuamba-Nkaya-Tete (through Malawi to Mozambique)
- Nacala-Cuamba-Nkaya-Lilongwe (Malawi)
- Nacala-Cuamba-Nkaya-Lilongwe-Chipata (Zambia)

In addition, there are two secondary road routes that carry corridor cargo, including both international trade from Nacala port and regional trade to/from the Mozambican hinterland into Malawi and Zambia. However, regional trade volumes between Mozambique and Malawi are presently relatively low. The primary road corridor runs from Nacala-Nampula-Milange-Malawi (Blantyre and Lilongwe). In some ways, even the ‘primary’ road corridor can be considered a secondary route, as most cargo has historically utilised the railway due to poor road conditions. The SPEED+ Assessment of Nacala Development Corridor report (2017-2018) notes that the Milange sub-corridor is the preferred road route between Malawi and Mozambique as it is now in good condition except for about 30 kilometres which require surfacing. A secondary road route runs from Nacala-Nampula-Cuamba-Mandimba-Malawi (Lilongwe or Blantyre) (see Figure 27). The SPEED+ report notes that this route is not used as frequently as it has longer sections that are unsurfaced, including the portion between Cuamba and Lichinga. Historically, this northern region of Mozambique (from Cuamba to Lichinga) has been constrained by high transport costs and poor infrastructure, despite its potential and richness in agriculture, forestry and natural resources. The SPEED+ report notes that there are planned investments in both the road and for the construction and establishment of one-stop-border posts (OSBP) between Malawi and Mozambique at Chiponde/Mandimba border post; if realised, this secondary route could attract additional traffic in the future. Some of this cargo could be regional trade.



South Africa to/from Botswana, DRC, Zambia and Zimbabwe

As noted above, the North-South corridor contains several secondary routes and provides multiple mode and route options to transporters/shippers. For instance, from South Africa to Lusaka, a transporter can choose to traverse either Zimbabwe (primary route) or Botswana (secondary route). If going via Zimbabwe (71 per cent in the TMS), after crossing through Beitbridge, the transporter then must decide whether to enter Zambia via Chirundu or the Victoria Falls/Livingstone-Kazungula borders. Most transporters use Chirundu, with just 1 per cent taking the alternate route. The remaining 29 per cent of transporters bypass Zimbabwe and go via Botswana, with most entering Botswana via Martin's Drift/Groblersbrug Border and 1 per cent entering via Pioneer Gate (and both routes then converging to enter Zambia via the Victoria Falls/Livingstone-Kazungula Borders) (see Figure 28). Traffic continuing on from Lusaka to other destinations in Zambia or the DRC can take the same four route options. The Durban-Harare sub-corridor has similar options (Beitbridge, Martin's Drift, or Pioneer Gate) and Durban-Botswana traffic also can use either Martin's Drift or Pioneer Gate. These route options also apply to regional trade, from Gauteng or anywhere in the hinterland on the route between Durban and the DRC or Durban and Malawi.

Figure 28: Durban-Lusaka Route Map



Source: Google Maps.

Current Trade Flows on Corridors

Like imports, exports used several alternate routes on the North-South corridor. The sub-corridor with the most alternative export routes was the Gaborone-Durban route; while this import route only used two routes (via Martin's Drift and Pioneer Gate), exports used four. The most common border post was the Tlokweng/Kopfontein Border (52 per cent), which was not really used by import cargo, followed by the Pioneer Gate/Skilpadshek Border (33 per cent), Martin's Drift (11 per cent) and Ramatlabama (3 per cent). Transit times followed the ranking of the route utilisation, with the Tlokweng/Kopfontein Border being the fastest and so on. While the Durban-Harare sub-corridor used several options for imports (Beitbridge, Martin's Drift or Pioneer Gate), only Beitbridge was used for exports.

South Africa to/from Malawi

Figure 29 shows that Malawi and South Africa can also be linked through several routes. Most imports only used the primary route, but exports, especially regional exports from Blantyre-Gauteng, showed use of secondary routes.

There are two BCPs used from Malawi to Mozambique (Zobue/Mwanza and Dedza/Calomue); while one is closer to Blantyre and the other to Lilongwe, we found that they were used occasionally as alternates, likely during periods of congestion. For instance, traffic from Blantyre on the North-South corridor mainly used the Zobue/Mwanza Border (91 per cent), with some traffic using the Dedza/Calomue Border from Mozambique into Malawi. From Mozambique there are two options into Zimbabwe and on to South Africa.

Figure 29: Malawi-Gauteng Routes



Source: Google Maps

The overall route combinations from Blantyre-Gauteng included:

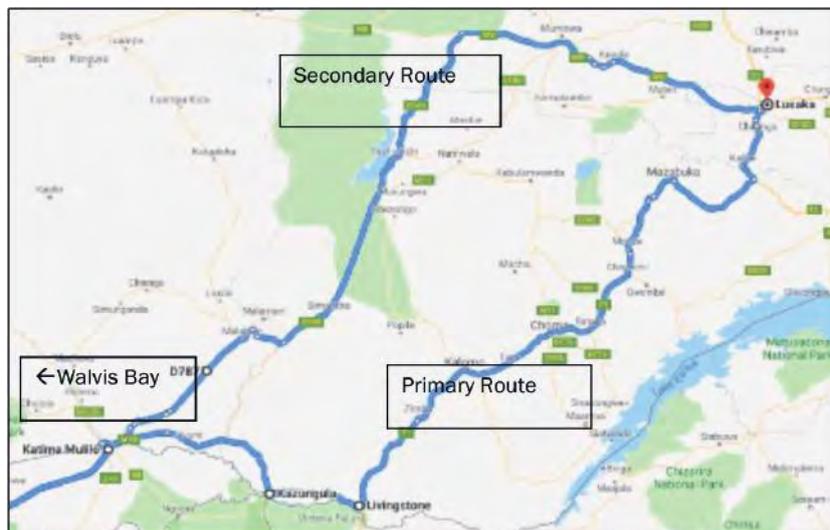
- Zobue/Mwanza Border + Nyamapanda/Cuchamano Border + Beitbridge (90 per cent, 41 hours);
- Dedza/Calomue Border + Nyamapanda/Cuchamano Border + Beitbridge (7 per cent, 79 hours); and
- Dedza/Calomue Border + Forbes/Machipanda Border + Beitbridge (3 per cent, 106 hours).

4.8.4.7. Walvis Bay Corridor

Trans-Caprivi Corridor

The majority of traffic from Lusaka to Walvis Bay used the combination of the Victoria Falls/Livingstone, Kazungula and Katima/Mulilo Borders (81 per cent at 126 hours), while 9 per cent of traffic used the Katima/Mulilo Border, saving a significant amount of time with a transit time of 69 hours due to the two fewer border crossings (see Figure 30).

Figure 30: Lusaka-Walvis Bay Export Routes



Source: Google Maps

Current Trade Flows on Corridors

Trans-Kalahari Corridor

Figure 31 illustrates that the primary route carrying regional trade from Gauteng – Windhoek used Pioneer Gate/Skilpadshak Border plus the Mamuno Border (72 per cent, 37 hours), with secondary routes using the Nakop/Ariamsvlei Border (23 per cent, 32 hours), Ramatlabama Border plus Mamuno Border (3 per cent, 33 hours) and Pioneer Gate/Skilpadshak Border plus Kazungula Border (3 per cent, 75 hours).

Figure 31: Windhoek-Gauteng Routes



Source: Google Maps

Trans-Orange Corridor

Finally, the route from Windhoek to Cape Town also used several border crossings. The Violsdrif/Noordoewer Border accounted for 76 per cent of traffic, followed by the Nakop/Ariamsvlei Border with 20 per cent of traffic and Mamuno Border and Pioneer Gate/Skilpadshok Border with 4 per cent. The Violsdrif route is the most direct and takes the shortest amount of time (see Figure 32).

Figure 32: Windhoek-Cape Town Export Routes



Source: Google Maps

Current Trade Flows on Corridors

4.8.4.8. Other Minor SADC Corridors

Cape to Cairo Corridor

The Gaborone to Cape Town route is not a key SADC corridor, but nevertheless highlighted several secondary routes worth mentioning. Some 58 per cent of exports used the Ramatlabama Border (51 hours), while the remainder utilised the Tlokweng/Kopfontein Border or Pioneer Gate/Skilpadshek Border, both of which had a travel time of 62-63 hours (see Figure 33).

Figure 33: Gaborone-Cape Town Export Routes



Source: Google Maps

Mbabane-Durban Corridor

The TMS showed four routes from Durban to Greater Manzini and three routes from Durban to Mbabane. The most popular border for both routes was the Lavumisa Border, with more than 80 per cent of traffic. This was followed by the Oshoek/Ngwenya Border (5-10 per cent) and the Mahamba Border (3 per cent). One per cent of trucks to Greater Manzini utilised the Lebombo/Ressano Garcia Border-Maputo route. Eswatini's small size and multiple border post options gives transporters and traders several alternatives to choose from (see Figure 34).

For exports, the TMS showed three routes from Durban to Mbabane. Like imports, the most popular border was the Lavumisa Border, with 84 per cent of traffic. This was followed by the Oshoek/Ngwenya Border (12 per cent) and Mahamba Border (4 per cent). The primary route was more than 50 per cent faster than the alternatives, so it is unclear why traders have chosen them.

Figure 34: Durban-Eswatini Routes



Source: Google Maps

Current Trade Flows on Corridors

4.8.5. Conclusions Regarding Secondary Routes

Our assessment of secondary routes in the SADC region, based on desk research of corridor diagnostic reports, as well analysis of secondary data from the TMS, Mozambican customs and interviews from prior recent corridor studies in Mozambique, Malawi, Zimbabwe and Tanzania found the following (see Table 29 and Annex 2):

- Primary routes dominate cargo flows.
- Secondary routes provide alternate routes to the trade corridors.
- Regional secondary corridors follow the same general routes as international cargo.
- 17 of the top 20 secondary routes identified by the TMS were part of the North-South Corridor, with the remaining three as alternative Trans-Kalahari routes.
- Regional routes comprised 17 of the top 20 secondary routes.
- The most commonly used secondary routes were regional alternatives to Kasumbelesa in the direction of exports from the DRC and this route showed significant time savings.
- The next most common secondary routes used the various Botswana BCPS to/from Gauteng (Johannesburg region), South Africa.
- The third most common routes were to/from Zambia to Durban via the Botswana route.



Table 29: Ranking of Secondary Route Usage, November 2018

Rank	Corridor	Route	Route #	Via	Total # of Trucks [a]	Route % of Traffic	Secondary # Trucks	Transit Time (Hrs)	Direction
1	North-South	Lubumbashi – Ndola	2	Mokambo	3,404	24%	817	17	Regional
2	North-South	Lubumbashi – Kitwe	2	Mokambo	3,278	19%	623	17	Regional
3	Trans-Kalahari	Gaborone - Gauteng	2	Martin's Drift/Groblersbrug	2,469	25%	617	71	Regional
4	North-South	Lubumbashi – Lusaka	2	Mokambo	2,488	19%	473	26	Regional
5	Trans-Kalahari	Gaborone - Gauteng	3	Pioneer Gate/Skilpadshek	2,469	19%	469	15	Regional
6	Trans-Kalahari	Gauteng - Francistown	2	Martin's Drift/Groblersbrug	1,072	42%	450	41	Regional
7	North-South	Lubumbashi – Harare	2	Mokambo – Chirundu	1,201	31%	372	53	Regional
8	North-South	Kolwezi – Ndola	2	Mokambo	1,282	25%	321	24	Regional
9	North-South	Gauteng – Lusaka	2	Martin's Drift/Groblersbrug – Kazungula – Victoria Falls/Livingstone	1,522	21%	320	120	Regional
10	North-South	Lubumbashi – Gauteng	2	Mokambo – Chirundu – Beitbridge	1,211	25%	303	100	Regional
11	North-South	Kolwezi – Kitwe	2	Mokambo	1,263	21%	265	23	Regional
12	North-South	Lusaka – Gauteng	2	Victoria Falls/Livingstone – Kazungula – Martin's Drift/ Groblersbrug	1,628	16%	260	108	Regional
13	North-South	Kolwezi – Lusaka	2	Mokambo	1,174	22%	258	40	Regional
14	North-South	Durban – Lusaka	2	Martin's Drift/Groblersbrug – Kazungula – Victoria Falls/Livingstone	8,58	28%	240	185	Import
15	North-South	Ndola – Gauteng	2	Victoria Falls/Livingstone- Kazungula – Martin's Drift/ Groblersbrug	1,347	17%	229	134	Regional
16	North-South	Kolwezi – Harare	2	Mokambo – Chirundu	5,26	40%	210	64	Regional
17	North-South	Kitwe – Gauteng	2	Victoria Falls/Livingstone – Kazungula – Martin's Drift/ Groblersbrug	1,287	16%	206	140	Regional
18	North-South	Kolwezi – Gauteng	2	Mokambo – Chirundu – Beitbridge	460	43%	198	116	Regional
19	North-South	Lusaka – Durban	2	Victoria Falls/Livingstone – Kazungula – Martin's Drift/ Groblersbrug	950	20%	190	169	Export
20	North-South	Ndola – Durban	2	Victoria Falls/Livingstone – Kazungula – Martin's Drift/ Groblersbrug	815	23%	187	185	Export

Source: TMS.



Chapter 5

Future Trade Flows on Corridors

Future Trade Flows on Corridors

5.1. METHODOLOGY

The methodology is the same for future trade flows as it was for current trade flows, as discussed in Section 4. The only difference is that growth rates for different transit markets were derived from the published Transnet Long-Term Forecasting Plan (LTFP), which are reproduced in Table 30.

Table 30: Long-Term Growth Rates By Transit Market Trade Flows 2017-2040

2017-2040	All Flows		Regional Flows		
	Exports CAGR	Imports CAGR	Exports CAGR	Imports CAGR	Total CAGR
Botswana	4.5%	3.3%	2.7%	3.4%	2.8%
DRC	7.0%	5.0%	4.2%	4.7%	4.3%
Malawi	5.3%	5.1%	4.2%	4.3%	4.2%
Mozambique	11.5%	8.1%	3.1%	3.9%	3.7%
Zambia	5.5%	8.1%	3.7%	4.2%	4.0%
Zimbabwe	6.1%	6.3%	3.0%	3.3%	3.1%

Source: Transnet LTFP (2013-2044).

5.2. SUMMARY: FLOWS BY TRANSIT MARKET, 2040

Table 31 provides a summary of the international trade flows by each of the six transit markets for the six regional transport corridors.

Table 31: Summary of International Trade Flows By Transit Market, 2040

International Flows	Exports	Per cent	Imports	Per cent	Total	Per cent
MALAWI	1,248,000	6.5%	4,626,000	9.7%	5,874,000	8.8%
Per cent	21.2%		78.8%		100%	
ZIMBABWE	6,635,000	34.4%	11,267,000	23.7%	17,902,000	26.8%
Per cent	37.1%		62.9%		100%	
ZAMBIA	8,973,000	46.6%	25,864,000	54.3%	34,837,000	53.1%
Per cent	25.6%		74.4%		100%	
DRC COPPERBELT	1,470,000	17.0%	3,658,000	7.7%	5,128,000	7.7%
Per cent	28.7%		72.3%		100%	
BOTSWANA	945,000	7.6%	2,187,000	4.6%	3,132,000	3.6%
Per cent	30.2%		69.8%		100%	
TOTAL	19,271,000	100%	47,603,000	100%	66,874,000	100%
Per cent	28.8%		71.2%		100%	

Source: Collated by Nathan Associates for this study.

The key conclusions to be drawn on international trade flows include the following:

- Total flows amounted to 66.874 million tons, of which 19.271 million tons (29 per cent) were exports and 47.603 million tons (71 per cent) were imports; and
- The most important market by size was Zambia (34.837 million tons), followed by Zimbabwe (17.902 million tons), DRC Copperbelt (5.128 million tons), Malawi (5.874 million tons) and Botswana (3.132 million tons).

Table 32 provides a summary of the regional trade flows by each of the six transit markets for the six regional transport corridors.

Table 32: Summary of Regional Trade Flows by Transit Market, 2040

Regional Flows	Exports	Per cent	Imports	Per cent	Total	Per cent
MALAWI	551,000	5.4%	1,933,000	8.7%	2,484,000	7.6%
Per cent	22.2%		78.8%		100%	
ZIMBABWE	1,568,000	15.3%	3,764,000	16.9%	5,332,000	16.4%
Per cent	29.4%		70.6%		100%	
ZAMBIA	5,137,000	50.2%	8,097,000	36.3%	13,234,000	40.7%
Per cent	38.8%		61.2%		100%	
DRC COPPERBELT	1,372,000	13.4%	3,362,000	15.1%	4,734,000	14.6%
Per cent	29.0%		71.0%		100%	
BOTSWANA	1,606,000	15.7%	5,135,000	23.0%	6,742,000	20.7%
Per cent	23.8%		76.2%		100%	
TOTAL	10,233,000	100%	22,292,000	100%	32,525,000	100%
Per cent	31.7%		68.3%		100%	

Source: authors' computations

The key conclusions to be drawn on regional trade flows include the following:

- Total flows amounted to 35.525 million tons of which 10.233 million tons (32 per cent) were exports and 22.292 million tons (68 per cent) were imports; and
- The most important market by size was Zambia (13.234 million tons), followed by Botswana (6.742 million tons), Zimbabwe (5.332 million tons), DRC Copperbelt (4.734 million tons) and Malawi (2.484 million tons).

Future Trade Flows on Corridors

Table 33 provides a summary of the total trade flows by each of the six transit markets for the six regional transport corridors.

Table 33: Summary of the Total Trade Flows by Transit Market, 2040

Total Flows	Exports	Per cent	Imports	Per cent	Total	Per cent
MALAWI	1,799,000	6.1%	6,559,000	9.4%	8,358,000	8.4%
Per cent	21.5%		78.5%		100%	
ZIMBABWE	8,203,000	27.8%	15,032,000	21.5%	23,235,000	23.4%
Per cent	35.3%		64.7%		100%	
ZAMBIA	14,110,000	47.8%	33,960,000,000	48.6%	48,071,000	48.4%
Per cent	29.4%		70.6		100%	
DRC COPPERBELT	2,842,000	9.6%	7,020,000	10.0%	9,682,000	9.7%
Per cent	29.3%		70.7%		100%	
BOTSWANA	2,551,000	8.6%	7,322,000	10.5%	9,874,000	9.9%
Per cent	25.8%		74.2%		100%	
TOTAL	29,504,000	100%	69,895,000	100%	99,399,000	100%
Per cent	29.7%		70.3%		100%	

Source: authors' computations

The key conclusions to be drawn on all trade flows include the following:

- Total flows amounted to 99.399 million tons of which 29.504 million tons (30 per cent) were exports and 69.895 million tons (70 per cent) were imports; and
- The most important market by size was Zambia (48.071 million tons), followed by Zimbabwe (23.235 million tons), Botswana (9.874 million tons), DRC Copperbelt (9.682 million tons) and Malawi (8.358 million tons).

Table 34 provides a breakdown of trade flows by each of the six transit markets for the six regional transport corridors.

Table 34: Breakdown of the Total Trade Flows by Transit Market, 2040

Breakdown of Flows	Exports	Imports	Total
% International	65.3%	68.1%	67.3%
% Regional	34.7%	31.9%	32.7%

Source: authors' computations

The key conclusion to be drawn on all trade flows includes the following:

- There was a slight bias in favour of exports across all key transit markets, with total flows split 67 per cent for international and 33 per cent for regional flows, export flows split with 65 per cent for international and 35 per cent for regional exports and import flows with 68 per cent for international and 32 per cent for regional imports.

The most important ports for transit goods to key transit markets in the SADC region are the following:

- DRC Kinshasa – Through the Matadi port on the Bas-Congo Corridor running from Matadi to Kinshasa;

- DRC Goma-Bakavu – Through the Mombasa port on the Northern Corridor running from Mombasa through to the eastern DRC;
- DRC Lubumbashi – Through the Dar es Salaam port on the Dar es Salaam Corridor running from Dar es Salaam to Lubumbashi;
- Eswatini – Through the Maputo port on the Maputo Corridor (Goba Sub-Corridor) running from Maputo to Mbabane and Manzini;
- Botswana – Through the Durban port on the North-South Corridor running from Durban to Gaborone (and beyond to Francistown);
- Malawi – Through the Beira port on the Beira Corridor running from Beira to Blantyre (via Zobue/Mwanza) and Lilongwe (via Calomue/Dedza);
- South Africa – Through the Maputo port on the Maputo Corridor running from Maputo to the Mpumalanga, Gauteng and North-West provinces;
- Zambia – Through the Dar es Salaam port on the Dar es Salaam Corridor running from Dar es Salaam to Lusaka and Zambian Copperbelt; and
- Zimbabwe - Through the Beira port on the Beira Corridor running from Beira to Harare (excludes refined petroleum imports on Feruka pipeline).

5.3. SUMMARY: FLOWS BY PORT, 2040

Table 35 provides a summary of the port throughput data for each of the eight regional gateway ports that anchor six regional transport corridors.

Table 35: Summary Of Port Throughput By Transit Market, 2040

000's Metric Tons	Transit		Dar es Salaam		Durban		Beira		Maputo		Matadi		Mombasa		Nacala		Walvis Bay	
	Transit	%	Dar es Salaam	%	Durban	%	Beira	%	Maputo	%	Matadi	%	Mombasa	%	Nacala	%	Walvis Bay	%
DRC Kinshasa	8,440	100%	0	0%	0	0%	0	0%	0	0%	8,440	100%	0	0%	0	0%	0	0%
DRC Goma-Bakavu	1,200	100%	230	19%	0	0%	0	0%	0	0%	0	0%	970	81%	0	0%	0	0%
DRC Lubumbashi	5,130	100%	3,280	64%	1,255	24%	455	9%	0	0%	0	0%	0	0%	0	0%	140	3%
Eswatini	2,470	100%	0	0%	0	0%	0	0%	2,470	100%	0	0%	0	0%	0	0%	0	0%
Botswana	1,130	100%	0	0%	1,120	99%	0	0%	0	0%	0	0%	0	0%	0	0%	10	1%
Malawi	5,875	100%	520	9%	1,140	19%	2,920	50%	0	0%	0	0%	0	0%	1,240	21%	55	1%
South Africa	17,000	100%	0	0%	0	0%	0	0%	17,000	100%	0	0%	0	0%	0	0%	0	0%
Zambia	34,840	100%	14,315	41%	10,630	31%	7,345	21%	0	0%	0	0%	0	0%	0	0%	2,550	7%
Zimbabwe	17,905	100%	0	0%	4,580	26%	11,370	64%	1,595	9%	0	0%	0	0%	0	0%	360	2%
Total	93,990	100%	18,345	20%	18,725	20%	22,090	24%	21,065	22%	8,440	9%	970	1%	1,240	1%	3,115	3%

Source: authors' computations

Future Trade Flows on Corridors

5.4. SUMMARY: FLOWS BY CORRIDOR, 2040

Table 36 provides a summary for each of the six regional transport corridors, in terms of international, regional and total trade flows.

Table 36: Summary of Port Throughput by Transit Market, 2040

Malawi, Zimbabwe, Zambia, DRC Copperbelt and Botswana International Traffic														
2040	Dar es Salaam	%	Nacala	%	Beira	%	Maputo	%	North-South	%	Walvis Bay	%	Sub-Total	%
Exports	1,852,743	9.6	161,647	0.8	5,840,451	30.3	1,594,938	8.3	9,345,850	48.5	475,754	2.5	19,271,384	100
Imports	16,260,064	34.2	1,079,494	2.3	16,248,272	34.1	0	0.0	11,364,206	23.9	2,650,746	5.6	47,602,781	100
All	18,112,807	27.1	1,241,141	1.9	22,088,723	33.0	1,594,938	2.4	20,710,056	31.0	3,126,500	4.7	66,874,165	100

Malawi, Zimbabwe, Zambia, DRC Copperbelt and Botswana Regional Traffic														
2040	Dar es Salaam	%	Nacala	%	Beira	%	Maputo	%	North-South	%	Walvis Bay	%	Sub-Total	%
Exports	4,813,527	47.0	229,493	2.2	124,672	1.2	1,918	0.0	4,938,184	48.3	125,308	1.2	10,233,101	100
Imports	4,569,284	20.5	41,570	0.2	762,406	3.4	243,243	1.1	15,789,268	70.8	886,409	4.0	22,292,180	100
All	9,382,811	28.8	271,063	0.8	887,078	2.7	245,161	0.8	20,727,452	63.7	1,011,717	3.1	32,525,282	100

Malawi, Zimbabwe, Zambia, DRC Copperbelt and Botswana All Traffic														
2040	Dar es Salaam	%	Nacala	%	Beira	%	Maputo	%	North-South	%	Walvis Bay	%	Sub-Total	%
Exports	6,666,270	22.6	391,140	1.3	5,965,123	20.2	1,596,856	5.4	14,284,034	48.4	601,062	2.0	29,504,485	100
Imports	20,829,347	29.8	1,121,064	1.6	17,010,679	24.3	243,243	0.3	27,153,474	38.8	3,537,155	5.1	69,894,962	100
All	27,495,618	27.7	1,512,204	1.5	22,975,801	23.1	1,840,099	1.9	41,437,508	41.7	4,138,217	4.2	99,399,447	100

Source: authors' computations



The key observations to be drawn include the following:

- The overall market for total flows in 2040 for the five key transit markets of Botswana, DRC (Copperbelt), Malawi, Zambia and Zimbabwe was 99.400 million tons. The breakdown by international and regional flows is as follows:
 - International flows estimated at 66.874 million tons (67 per cent); and
 - Regional flows estimated at with 32.526 million tons (33 per cent);
- The most important trade-carrying regional transport corridor for international flows in 2040 are ranked as follows:
 - Total flows estimated at 66.874 million tons (100 per cent);
 - Beira Corridor with 22.089 million tons (33 per cent);
 - North-South Corridor with 20.710 million tons (31 per cent);
 - Dar es Salaam Corridor with 18.113 million tons (27 per cent);
 - Maputo Corridor with 1.595 million tons³⁹ (2 per cent);
- Walvis Bay Corridor with 3.127 million tons (5 per cent); and
- Nacala Corridor with 1.241 million tons (2 per cent).
- The most important trade-carrying regional transport corridor for regional flows in 2040 are ranked as follows:
 - Total flows estimated at 32.525 million tons (100 per cent)
 - North-South Corridor with 20.727 million tons (64 per cent);
 - Dar es Salaam Corridor with 9.383 million tons (28 per cent);
 - Walvis Bay Corridor with 1.012 million tons (3 per cent);
 - Beira Corridor with 0.887 million tons (3 per cent);
 - Nacala Corridor with 0.271 million tons (1 per cent); and
 - Maputo Corridor with 0.245 million tons⁴⁰ (1 per cent).
- The most important trade-carrying regional transport corridor for all flows in 2040 are ranked as follows:
 - Total flows estimated at 99.400 million tons (100 per cent);
 - North-South Corridor with 41.438 million tons (42 per cent);
 - Dar es Salaam Corridor with 27.496 million tons (28 per cent);
 - Beira Corridor with 22.976 million tons (23 per cent);
 - Walvis Bay Corridor with 4.138 million tons (4 per cent);
 - Maputo Corridor with 1.840 million tons (2 per cent); and
 - Nacala Corridor with 1.512 million tons (1 per cent).

³⁹ This only includes imports and exports from Zimbabwe but not Eswatini or regions within South Africa that fall within the catchment of the Maputo Corridor.

⁴⁰ Maputo Corridor recorded flows but only for the transit markets under review. The main regional flows on the corridor are imports and exports from South Africa, which are substantial, but South Africa is not strictly speaking a transit market as it is a maritime state.

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5.5. SUMMARY: DECONSTRUCTED FLOWS, 2040

The main drivers of change between the 2017 and 2040 in the distribution of flows, particularly between the two 'arms' of the North-South Corridor, have been the swing to the western arm through Botswana because of the construction of the Kazungula Bridge and the swing from road to rail, based on usage of the current available stated capacity on the North-South Rail Corridor. Significant growth in non-mineral rail traffic is envisaged on the Dar es Salaam, North-South and Beira Corridors, where it is assumed that at least the current capacity on the Tazara, Machipanda and North-South railway networks will be absorbed. Growth is also expected on the two heavy-haul coal railways of Nacala and Sena, both of which transport coal from Moatize in Tete Province in Mozambique to a coal terminals at Nacala-A-Velha and Beira, respectively.

Steady growth is expected on the three railways linked to the Maputo port, namely the Ressano Garcia, Goba and Limpopo lines to/ from South Africa, Eswatini and Zimbabwe, respectively, where continued growth in mineral exports is envisaged. Table 37 provides a summary of modal growth by corridor over the period 2017-2040. These rates are derived from the assumed growth by country, for both international and regional trade, which are overlain on the grid of regional transport corridors with a bias in the shift from road to rail on the one hand and from the eastern to the western arm of the North-South Corridor on the other. These rates show that whilst these rates vary by corridor, the overall growth in rail-based traffic is higher than for road-based traffic and that growth on the highest trade-carrying corridor, the North-South Corridor, is considerably higher on the western arm through Botswana than for the eastern arm through Zimbabwe.

Table 37: Growth Assumptions and Modal Shift Impacts, 2017-2040

Country	Trade Growth by Country (% per annum)			
	International Trade (outside SADC region)		Regional Trade (inside SADC region)	
Angola	6.10%	5.10%	3.50%	4.20%
Botswana	4.50%	3.30%	2.70%	3.40%
DR Congo	7.00%	5.00%	4.20%	4.70%
Eswatini	2.60%	3.10%	1.20%	2.30%
Lesotho	0.40%	2.50%	1.20%	0.30%
Malawi	5.30%	5.10%	4.20%	4.30%
Mozambique	11.50%	8.10%	3.10%	3.90%
Namibia	9.30%	7.30%	2.80%	2.50%
South Africa	2.50%	3.60%	3.60%	2.80%
Tanzania	4.90%	2.90%	4.10%	4.00%
Zambia	5.50%	8.10%	3.70%	4.20%
Zimbabwe	6.10%	6.30%	3.00%	3.30%

Corridor	Growth in HDV Transit Traffic (%)	Growth in Rail Traffic (%)
Dar es Salaam	5.23%	13.26%
Nacala	5.50%	3.77%
Nacala (Coal Line)	-	10.02%
Beira	7.97%	7.54%
Sena (Coal Line)	-	5.94%
Maputo	8.67%	3.06%
North-South	4.45%	10.73%
- NS (Eastern Arm)*	3.56%	10.73%
- NS (Western Arm)**	5.90%	-
Walvis Bay	5.39%	-
Overall Growth	5.74%	5.87%

Sources: ITC (2019), Transnet (2009), Transnet (2016) and Nathan Associates (2019). *The eastern arm of the North-South Corridor passes through Zimbabwe to Malawi via Mozambique and north to DRC via Zambia, entering at Chirundu for road-based traffic and Victoria Falls for rail-based traffic. **The western arm of the North-South Corridor passes through Botswana to DRC via Zambia, entering at Kazungula with no current rail-based traffic on this route.

Table 38 provides a summarised end-to-end breakdown by mode (road and rail for all flows), i.e. international and regional imports and exports, along each of the six primary transport corridors.

Table 38: Summary Deconstructed Trade Flows by Corridor 2040

Port Trucks Per Day Passing Through Border Posts on Regional Transport Corridor	Volumes	National	Transit	Corridor	Regional	Total	Road	Railway	Trucks Per Day Excludes Rail Traffic Passing Through Borders						
									Border 1	Border 2	Border 3	Border 4	Border 5	Border 6	
									000's Metric Tons						
Dar es Salaam (3,505)	57,110	31,230	25,875	18,110	9,380	27,490	24,490	3,000	2,195	a	1,235	c			
									75	b					
Nacala (120)	9,465	8,225	1,240	1,240	810	1,240	1,300	750	45	d	75	e			
									1,390	f	450	i	40	c	
Beira (2,480)	45,310	22,230	22,090	22,090	890	22,980	21,480	1,500	300	g					
									300	h					
									2,510	j					
Maputo (2,510)	70,930	28,370	42,560	42,560	4,340	42,900	27,075	19,820	0	k					
									0	l					
									1,880	m	740	i	90	c	
											200	o	200	h	
North-South [Durban] (5,735)	148,250	108,490	39,760	20,710	19,920	40,630	37,630	3,000			50	p	25	c	
									1,600	n	735	q	55	c	
									320	r	50	c			
									65	s					

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Walvis Bay (435)	24,170	16,980	7,170	3,130	1,010	4,140	4,140	0	320	r	50	c		
									65	s				
Total (14,625)	Trucks Per Day							Trucks Per Day						
Border Posts	a	Tanzania-Zambia	Tunduma-Nakonde	2,195	l	Mozambique-Zimbabwe	Chicualacuala	0						
	b	Tanzania-Malawi	Kasumulu-Songwe	75	m	RSA-Zimbabwe	Beitbridge	1,880						
	c	Zambia-DRC	Kasumbalesa	1,495	n	RSA-Botswana	Kopfontein-Tlokweng & Groblersbrug-Martin's Drift	1,600						
	d	Mozambique-Malawi	Entre Lagos-Nayuchi, Mandimba-Chiponde & Milanje-Muloza	45										
	e	Malawi-Zambia	Mchinji-Mwami	75	o	Zimbabwe-Mozambique	Nyamapanda-Cuchamano	200						
	f	Mozambique-Zimbabwe	Machipanda-Forbes	1,390	p	Zimbabwe-Zambia	Victoria Falls-Livingstone	50						
	g	Mozambique-Zambia	Cassacatiza-Chanida	300	q	Botswana-Zambia	Kazungula	735						
	h	Mozambique-Malawi	Zóbue-Mwanza & Calomue-Dedza	500	r	Namibia-Zambia	Katima Mulilo-Sesheke	320						
	i	Zimbabwe-Zambia	Chirundu OSBP	1,190	s	Namibia-Angola	Oshikango-Santa Clara	65						
	j	Mozambique-RSA	Ressano Garcia-Komatipoort	2,510		Namibia-Botswana	Buitepos-Mamuno							
	k	Mozambique-Eswatini	Goba	0		Namibia-RSA	Ariamsvlei-Nakop							

Source: Transnet (2009).

Figures 35 to 40 present a deconstructed perspective of these flows from each gateway port along the way, through border control points to/from intermediate points of origin/destination to the final point of origin/destination. The key conclusions to be drawn include the following:

- The largest port is Durban with a throughput of 148.3 mtpa tons, followed by Maputo with 70.9 mtpa, Dar es Salaam with 57.1 mtpa, Beira with 45.3 mtpa, Walvis Bay with 24.2 mtpa and Nacala with 9.5 mtpa tons.
- The port handling the largest national volumes is also Durban, at 108.5 mtpa, followed by Maputo with 28.4 mtpa,
- Beira with 22.2 mtpa, Walvis Bay with 17 mtpa and Nacala with 8.3 mtpa.
- The port handling the most transit traffic is Maputo at 42.6 mtpa, followed by Durban with 39.7 mtpa, Dar es Salaam with 31.2 mtpa, Beira with 22.1 mtpa, Walvis Bay with 7.2 mtpa and Nacala with 1.2 mtpa.
- The corridor that carries the most cargo, including both international and regional cargoes, is Maputo with 42.9 mtpa, followed by North-South with 40.6 mtpa, Dar es Salaam with 27.5 mtpa, Beira with 23.0 mtpa, Walvis Bay with 4.1 mtpa and Nacala with 2.1 mtpa.
- The corridor that handles the most freight by rail is Maputo with 17.60 mtpa, followed by North-South at 3 mtpa, Dar es Salaam at 3 mtpa, Beira at 1.5 mtpa, Nacala at 0.75 mtpa and Walvis Bay, which doesn't move any cross-border freight by rail.
- By contrast, the road is the dominant mode throughout the region with the most freight handled by road is the North-South Corridor with 37.63 mtpa, followed by Maputo with 29.3 mtpa, Dar es Salaam with 24.49 mtpa, Beira with 21.48 mtpa, Walvis Bay with 4.1 mtpa and Nacala with 1.3 mtpa.
- The busiest border posts along the main regional transport corridors, measured in terms of trucks per day, are ranked as follows:

1. Ressano Garcia-Komatipoort at 2,510 trucks per day;
2. Tunduma-Nakonde at 2,195 trucks per day;
3. Beitbridge at 1,880 trucks per day;
4. Kopfontein-Tlokweng and Martin's Drift-Groblersbrug at 1,600 trucks per day;
5. Kasumbalesa at 1,495 trucks per day;
6. Machipanda-Forbes at 1,390 trucks per day;
7. Chirundu at 1,190 trucks per day;
8. Kazungula at 735 trucks per day;
9. Zobue-Mwanza and Calomue-Dedza at 500 trucks per day;
10. Katima Mulilo-Sesheke at 320 trucks per day;
11. Cassacatiza-Chanida at 300 trucks per day;
12. Nyamapanda-Cuchamano at 200 trucks per day;
13. Mchinji-Mwami at 75 trucks per day;
14. Kasumulu-Songwe at 75 trucks per day;
15. Oshikango-Santa Clara, Buitepos-Mamuno and Ariamsvlei-Nakop at 65 trucks per day;
16. Victoria Falls-Livingstone at 50 trucks per day; and
17. Entre Lagos-Nayuchi, Mandimba-Chiponde and Milanje-Muloza at 45 trucks per day.

Figure 35: Dar Es Salaam Corridor - Deconstructed Trade Flows, 2040

International (000's tons)	Regional	Total	Mode	Border 1	Border 2
Port Throughput	57,109				
Total National	31,234				
Total Transit	24,875				
On Corridor	18,113	9,383	27,496		
			Road	24,826	
			Rail	3,000	
			Total	27,496	
				Tanzania-Zambia	26,738
				Truck Per Day	2,194
				Tanzania-Malawi	800
				Trucks Per Day	74
				Zambia-DRC	13,348
				Trucks Per Day	1,236

Source: Collated by Nathan Associates for this study.

Figure 36: Nacala Corridor - Deconstructed Trade Flows, 2040

International (000's tons)	Regional	Total	Mode	Border 1	Border 2
Port Throughput	9,466				
Total National	8,255				
Total Transit	1,241				
On Corridor	1,241	271	1,512		
			Road	762	
			Rail	750	
			Total	1,512	
				Mozambique-Malawi	1,241
				Trucks Per Day	45
				Malawi-Zambia	811
				Trucks Per Day	75

Source: authors' computations

Future Trade Flows on Corridors

Figure 37: Beira Corridor - Deconstructed Trade Flows, 2040

International (000's tons)	Regional	Total	Mode	Border 1	Border 2	Border 3			
Port Throughput	45,316								
Total National	23,227								
Total Transit	22,089								
On Corridor	22,089	887	22,976	Road	21,476				
				Rail	1,500				
				Total	3,991				
				Moz-Zimbabwe	16,496	Zim-Zambia	4,829	Zambia-DRC	455
				Trucks Per Day	1,389	Trucks Per Day	447	Trucks Per Day	42
				Moz-Malawi	3,240				
				Trucks Per Day	300				
				Moz-Zambia	3,240				
				Trucks Per Day	300				

Source: authors' computations

Figure 38: Maputo Corridor - Deconstructed Trade Flows, 2040

International (000's tons)	Regional	Total	Mode	Border 1	
Port Throughput	70,930				
Total National	28,372				
Total Transit	42,558				
On Corridor	42,558	4,337	46,895	Road	27,075
				Rail	19,820
				Total	46,895
				Moz-RSA	43,825
				Trucks Per Day	2,507
				Moz-Eswatini	1,675
				Trucks Per Day	0
				Moz-Zimbabwe	1,395
				Trucks Per Day	0

Source: authors' computations

Figure 39: North-South Corridor - Deconstructed Trade Flows, 2040

International (000's tons)	Regional	Total	Mode	Border 1	Border 2	Border 3			
Port Throughput	148,252								
Total National	108,459								
Total Transit	39,763								
On Corridor	20,710	19,920	41,437	Road	37,630				
				Rail	3,000				
				Total	40,630				
				RSA-Zimbabwe	23,315	Zim-Zambia (1)	8,000	Zambia-DRC (1)	975
				Trucks Per Day	1,881	Trucks Per Day	741	Trucks Per Day	90
						Zim-Moz	2,205	Moz-Malawi	2,205
						Trucks Per Day	204	Trucks Per Day	204
						Zim-Zambia (2)	3,540	Zam-DRC (1)	570
						Trucks Per Day	50	Trucks Per Day	25
				RSA-Botswana	17,315	Bots-Zambia	7,925	Zambia-DRC (1)	600
				Trucks Per Day	1,603	Trucks Per Day	734	Trucks Per Day	56

Source: authors' computations

Figure 40: Walvis Bay Corridor - Deconstructed Trade Flows, 2040

International (000's tons)	Regional	Total	Mode	Border 1	Border 2		
Port Throughput	24,174						
Total National	16,982						
Total Transit	7,192						
On Corridor	3,127	1,012	4,139	Road	4,139		
				Rail	0		
				Total	4,139		
				Namibia-Zambia	3,441	Zambia-DRC	537
				Trucks Per Day	319	Trucks Per Day	50
				Namibia-Other	698		
				Trucks Per Day	68		

Source: authors' computations

5.6. SUMMARY: DECONSTRUCTED FLOWS, 2017-2040

Table 39 presents a deconstructed perspective of the increase in traffic

flows over the period 2017-2040. The key conclusions to be drawn include the

Future Trade Flows on Corridors

following:

- The port with the greatest absolute growth in throughput is Durban, with an increase of 79.7 mtpa tons, followed by Maputo with 52.7 mtpa, Dar es Salaam with 44 mtpa, Beira with 38.7 mtpa, Walvis Bay with 19 mtpa and Nacala with 7.2 mtpa tons.
- The port handling the largest increase in national volumes is also Durban at 48.6 mtpa, followed by Maputo with 21.3 mtpa, Beira with 19.2 mtpa, Walvis Bay with 1.8 mtpa and Nacala with 6.3 mtpa.
- The port handling the biggest increase in transit traffic is Maputo at 31.4 mtpa, followed by Durban with 31.1 mtpa, Dar es Salaam with 21.3 mtpa, Beira with 18.5 mtpa, Walvis Bay with 6.2 mtpa and Nacala with 0.9mtpa.
- The corridor that will see the largest increase in cargo, including both international and regional cargoes, is Maputo with 29.7 mtpa, followed by North-South with 26.7 mtpa, Dar es Salaam with 19.5 mtpa, Beira with 19.0 mtpa, Walvis Bay with 3.1 mtpa and Nacala with 1.4 mtpa.
- The corridor that had the highest increase in rail volumes is Maputo, with 8.80 mtpa, followed by Dar es Salaam at 2.83 mtpa, North-South at 2.71 mtpa, Beira at 1.22 mtpa, Nacala at 0.43 mtpa. Walvis Bay does not move

any cross-border freight by rail.

- By contrast, the greatest increase in road volumes was on the Maputo with 24.9 mtpa, followed by the North-South with 23.7 mtpa, Beira with 17.8 mtpa, Dar es Salaam with 16.7 mtpa, Walvis Bay with 3.1 mtpa and Nacala with 1.0 mtpa.
- The border posts along the main regional transport corridors, measured in terms of trucks per day, with the greatest increase are ranked as follows:
 1. Ressano Garcia-Komatipoort at 2,060 trucks per day.
 2. Tunduma-Nakonde increased by 1,495 trucks per day.
 3. Machipanda-Forbes increased by 1,155 trucks per day.
 4. Kopfontein-Tlokweg and Martin's Drift-Groblersbrug increased by 1,100 trucks per day.
 5. Kasumbalesa increased by 985 trucks per day.
 6. Chirundu increased by 760 trucks per day.
 7. Beitbridge increased by 1,110 trucks per day.
 8. Kazungula increased by 625 trucks per day.
 9. Zobue-Mwanza and Calomue-Dedza increased by 340 trucks per day.
 10. Cassacatiza-Chanida increased by 280 trucks per day.
 11. Katima Mulilo-Sesheke increased by 245 trucks per day.
 12. Nyamapanda-Cuchamano increased by 210 trucks per day.
 13. Kasumulu-Songwe increased by 50 trucks per day.
 14. Mchinji-Mwami increased by 45 trucks per day.
 15. Oshikango-Santa Clara, Buitepos-Mamuno and Ariamsvlei-Nakop increased by 45 trucks per day.
 16. Entre Lagos-Nayuchi, Mandimba-Chiponde and Milanje-Muloza increased by 40 trucks per day.
 17. No increase in envisaged at Victoria Falls-Livingstone as it will increase its rail traffic.

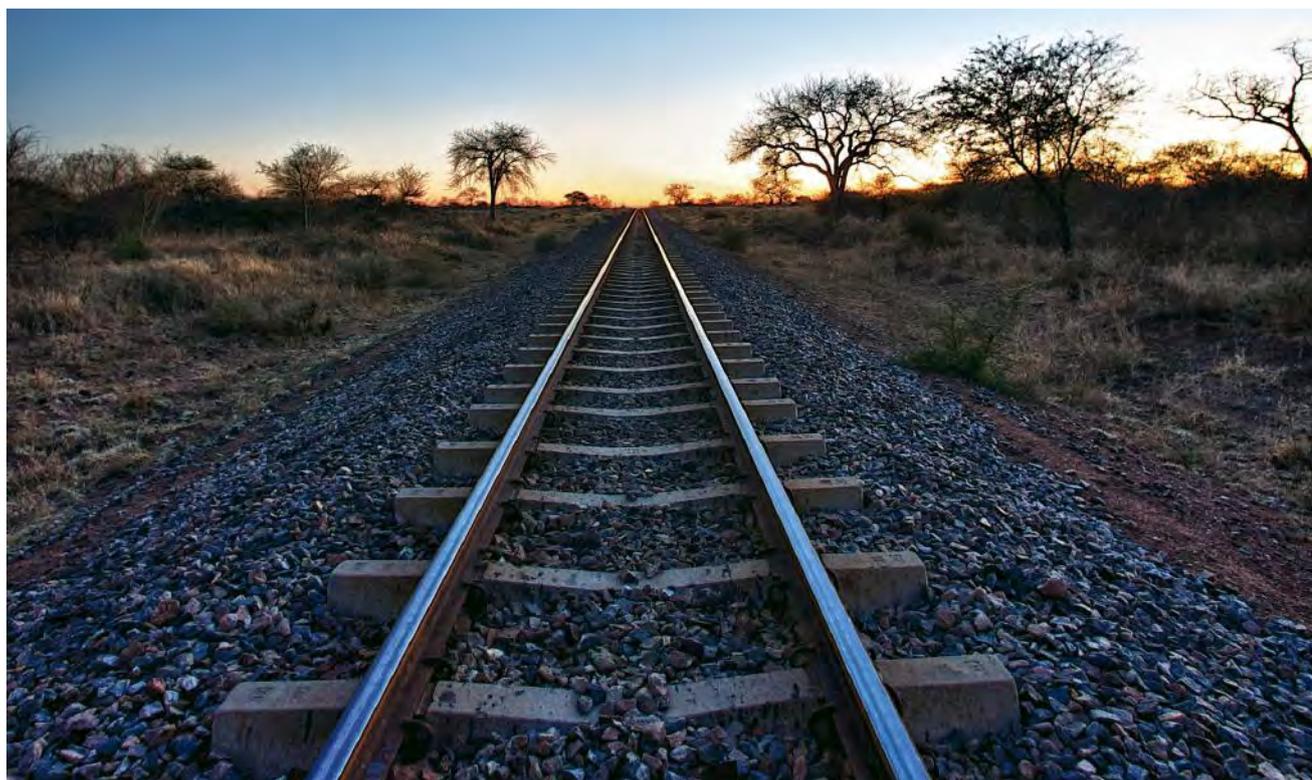
Table 39: Summary of Increase in Transit Traffic on SADC Corridors 2017- 2040

Port Trucks Per Day Passing Through Border Posts on Regional Transport Corridor	Volumes	National	Transit	Corridor	Regional	Total	Road	Railway	Border 1		Border 2		Border 3	
	Increase In 000's Metric Tons Between 2017-2040								Increase in Trucks Per Day Between 2017-2040 Excludes Rail Traffic Passing Through Borders					
Dar es Salaam (2,420)	44,040	22,770	21,265	14,870	4,620	19,490	16,660	2,830	1,495	a	875	c		
									50	b				
Nacala (85)	7,215	6,325	890	890	490	1,380	950	430	40	d	45	e		
Beira (2,480)	38,710	19,230	18,530	18,530	500	18,990	17,770	1,220	1,155	f	370	i	20	c
									280	g				
									210	h				
Maputo (2,035)	52,730	21,295	31,345	31,345	2,305	29,740	22,215	11,520	2,060	j				
									0	k				
									0	l				
North-South [Durban] (3,840)	79,690	48,570	31,050	16,170	10,505	26,670	23,960	2,710	1,110	m	390	i	20	c
											130	o	130	h
											0	p	15	c
									1,110	n	625	q	40	c
									245	r	15	c		
									45	s				
Walvis Bay (305)	19,000	12,825	6,160	2,690	440	3,130	3,130	0	320	r	50	c		
										s				
Total (10,435)	Trucks Per Day								Trucks Per Day					

Future Trade Flows on Corridors

Border Posts	a	Tanzania-Zambia	Tunduma-Nakonde	1,495	l	Mozambique-Zimbabwe	Chicualacuala	0
	b	Tanzania-Malawi	Kasumulu-Songwe	50	m	RSA-Zimbabwe	Beitbridge	1,110
	c	Zambia-DRC	Kasumbalesa	985	n	RSA-Botswana	Kopfontein-Tlokwen & Groblersbrug-Martin's Drift	1,100
	d	Mozambique-Malawi	Entre Lagos-Nayuchi, Mandimba-Chiponde & Milanje-Muloza	40				
	e	Malawi-Zambia	Mchinji-Mwami	45	o	Zimbabwe-Mozambique	Nyamapanda-Cuchamano	130
	f	Mozambique-Zimbabwe	Machipanda-Forbes	1,155	p	Zimbabwe-Zambia	Victoria Falls-Livingstone	0
	g	Mozambique-Zambia	Cassacatiza-Chanida	280	q	Botswana-Zambia	Kazungula	625
	h	Mozambique-Malawi	Zóbue-Mwanza & Calomue-Dedza	340	r	Namibia-Zambia	Katima Mulilo-Sesheke	245
	i	Zimbabwe-Zambia	Chirundu OSBP	760	s	Namibia-Angola	Oshikango-Santa Clara	45
	j	Mozambique-RSA	Ressano Garcia-Komatipoort	2,060		Namibia-Botswana	Buitepos-Mamuno	
	k	Mozambique-Eswatini	Goba	0		Namibia-RSA	Ariamsvlei-Nakop	

Source: Transnet (2009).







Chapter 6

Infrastructure Assessment

Infrastructure Assessment

6.1. METHODOLOGY

This section aims to provide an assessment of the current and planned trade-carrying infrastructure in the SADC region and whether it is of sufficient quantity and quality to handle future SADC trade estimates. It then identifies gaps where it is not anticipated to be sufficient and Chapter 7 proposes recommendations for filling these gaps.

The infrastructure assessment has been built around two modules, a port and a corridor module. The corridor module is more detailed as the highest trade volumes flow along corridors and they are where the trade-carrying infrastructure investment is concentrated. The coverage of these two modules is as follows:

Step 1 – Port Assessment Module: This step involved a review of the current capacity, overall condition and any envisaged future improvements for ports in both maritime states (Angola, DRC, Namibia, Mozambique, South Africa and Tanzania) and island states (Comoros, Madagascar, Mauritius, Seychelles and Zanzibar). The purpose of the port assessment is to identify any gaps in port infrastructure that are envisaged to be an impediment to trade to/from and within the SADC region. This assessment is based primarily on a recently detailed World Bank report on ports within the Eastern and Southern African regions, as well as updated information from port authority or operator websites. It is a stand-alone assessment that informs the corridor assessment.

Step 2 – Corridor Assessment Module: This step focusses on a review of the current capacity, overall condition, trade facilitation performance and any envisaged future improvements along the six principal regional transport corridors that traverse the SADC region (Dar es Salaam, Nacala, Beira, Maputo, North-South and Walvis Bay). The purpose of this module is to identify gaps in each trade-carrying component of each corridor's infrastructure 'spine'.

Specific focus is placed on the principal maritime port that anchors each corridor, the road and rail network that act as the arteries along which trade flows and the principal border posts through which trade flows.

To construct a realistic perspective of the capacity, condition and gaps of trade-carrying infrastructure along each corridor, five key steps are to be followed, namely:

1. Summarise the current (2017) and future (2040) trade flows by volume (metric tons), number of truck and train movements by corridor, from the trade flows section of the report. The data-capture sheet for 2017 and 2040 for this component looks as follows:

Trade (Tons)			Mode	Trucks Movements Per Day				
International	Regional	Total	Road	Origin to Border 1	Border 1 to Destination 1	Destination 1 to Border 2	Border 2 to Destination 2	Destination 2 to Border 3 to Final Destination
Trade (Tons)			Mode	Train Movements Per Month				
International	Regional	Total	Rail	Origin to Border 1	Border 1 to Destination 1	Destination 1 to Border 2	Border 2 to Destination 2	Destination 2 to Border 3 to Final Destination

2. Review the condition of the road and rail network and principal border posts by leveraging personal knowledge and contacts of team members. The data-capture sheet for this component on the work looks as follows:

Port Network	Condition Survey Report (World Bank)	Condition Assessment: • Good (Green) • Fair (Amber) • Poor (Red)
Road Network	Condition Survey Report (TMSA, World Bank & USAID)	Condition Assessment: • Good (Green) • Fair (Amber) • Poor (Red)
Rail Network	Condition Survey Report (TMSA)	Condition Assessment: • Good (Green) • Fair (Amber) • Poor (Red)
Border Post Network	Border Crossing Time (Crickmay TMS)	Condition Assessment: • Good (Green) • Fair (Amber) • Poor (Red)

3. Conduct a capacity assessment of the port, road, rail and border post network along each corridor by reviewing existing and estimated future flows against the existing capacity of the above networks. The data-capture sheet for this component on the work looks as follows:

Port Network			
Throughput 2017 (Tons)	Current Capacity 2017 (Tons)	Throughput 2040 (Tons)	Capacity Assessment: • Good (Green) • Fair (Amber) • Poor (Red)
Road Network			
Section	Current Capacity 2017 (Trucks/Day)	Future Transit Traffic Flows 2040 (Trucks/Day)	Capacity Assessment: • Good (Green) • Fair (Amber) • Poor (Red)
Rail Network			
Section	Current Capacity 2017 (Railcars/Day)	Future Transit Traffic Flows 2040 (Trains/Month)	Capacity Assessment: • Good (Green) • Fair (Amber) • Poor (Red)
Border Post Network			
Border Post	Current Performance 2018 (Crossing Time)	Absolute Increase in HDV Per Day 2017-2040	Capacity Assessment: • Good (Green) • Fair (Amber) • Poor (Red)

4. Undertake a trade facilitation assessment of each corridor country. The data-capture sheet for this component, which is based on a review of available laws and regulations and recent reports on relevant subject matter, looks as follows:

Trade Facilitation Assessment	
Transit and Transport Facilitation Instruments	Vehicle Overloading
	Vehicle Dimensions
	Third-Party Vehicle Insurance
	Multilateral Cross-Border Transport Agreement
	Corridor Management Authorities
Trade Facilitation Measures	Advance Rulings
	Pre-Arrival Processing
	Electronic Payment
	Separation of Release from Final Determination of Customs Duties
	Risk Management
	Post-clearance Audit
	Trade Facilitation Measures for Authorised Operators
	Border Agency Coordination
	Movement of Goods Intended for Import Under Customs Control
	Single Window
Freedom of Transit	
Customs Cooperation	

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5. The final step is to pull together the analysis by ranking the bottlenecks in the port, road, rail and border post sectors to highlight priority 'hotspots' for targeted interventions on the high-volume trade-carrying corridors. These priority hotspots are then reviewed against recent and active investment activity to assess the immediate scope for possible intervention by Afreximbank. The data-capture sheet for this component of work looks as follows:

Ports 'Hotspots'			
Port	Ranking from infrastructure assessment	Review of active and recent interventions	Scope for possible Afreximbank intervention
Road 'Hotspots'			
Road Network	Ranking from infrastructure assessment	Review of active and recent interventions	Scope for possible Afreximbank intervention
Rail 'Hotspots'			
Rail Network	Ranking from infrastructure assessment	Review of active and recent interventions	Scope for possible Afreximbank intervention
Border Post 'Hotspots'			
Border Post	Ranking from infrastructure assessment	Review of active and recent interventions	Scope for possible Afreximbank intervention
Trade Facilitation 'Hotspots'			
Trade Facilitation Interventions	Ranking from trade facilitation assessment	Review of active and recent interventions	Scope for possible Afreximbank intervention

The following section of this report begins with an analysis of the ports in maritime states linked to the main regional transport corridors of the SADC region and the principal ports in each of the island states within the SADC region.



6.2. PORTS

6.2.1. Overview of Key SADC Ports

Trade through SADC seaports is projected to increase from 92 million tons in 2009 to 500 million tons in 2027.⁴¹ SADC set forth its policy framework for meeting this demand in Chapter 8 of its Protocol on Transport, Communications and Meteorology, which dates back to 1996 and entered into force in 1998.⁴² Under this protocol, member states were encouraged to support investments in the port and inland waterway sector, including private sector investment. More recently, the 2012 SADC Regional Infrastructure Development Master Plan⁴³ developed a framework for infrastructure investment, including in the port sector.

The SADC region contains 13 key ports, of which eight are located in maritime and five within island states (see Figure 43, page 130). This analysis focusses on the seven principal ports that anchor regional transport corridors on the SADC mainland. It also includes Lobito in Angola and Matadi in the DRC, although the regional transport corridors these ports currently anchor are only likely to fully develop over the next decade. The main ports in each island state, including the autonomous island of Zanzibar, which is part of Tanzania, are also profiled.

These ports are as follows:

- Maritime States (from north-east to north-west):
 - Dar es Salaam, Tanzania
 - Nacala, Mozambique
 - Beira, Mozambique
 - Maputo, Mozambique
 - Durban, South Africa
 - Walvis Bay, Namibia
 - Lobito, Angola
 - Matadi, DRC
- Island states (from north to south):
 - Zanzibar, Tanzania
 - Moroni, Comoros
 - Toamasina, Madagascar
 - Port Louis, Mauritius
 - Port Victoria, Seychelles

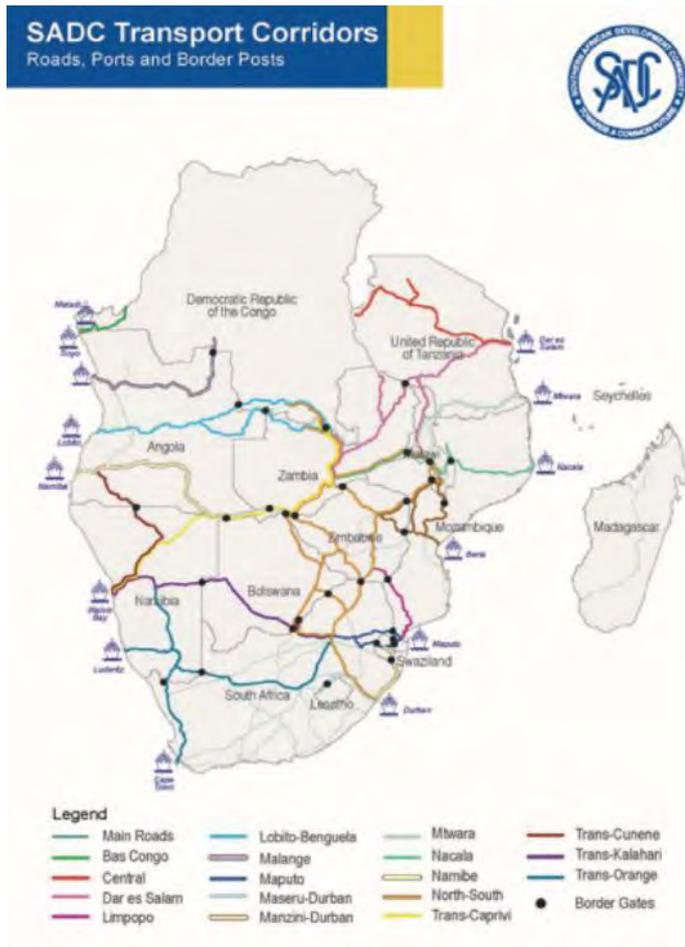
41 'Maritime, Ports, & Inland Waterways' (web page), Southern African Development Community (SADC), <https://www.SADC.int/themes/infrastructure/maritime-ports-inland-waterways/>.

42 'Protocol on Transport, Communications and Meteorology (1996)' (web page), SADC, https://www.SADC.int/documents-publications/show/Protocol_on_Transport_Communications_and_Meteorology_1996.pdf.

43 SADC, Regional Infrastructure Master Plan.

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Figure 41: SADC Region Ports



Source: Southern African Development Community.

The maritime state ports anchor the main SADC regional trade corridors, including both primary and secondary routes. A few other maritime state ports exist, but they mainly handle national cargo. Additionally, the region has several lake or river ports, but these handle little trade. Indeed, according to the SADC Regional Infrastructure Development Master Plan:⁴⁴ 'There are no inland waterways formally linked to the SADC corridors, although the Mtwara Corridor crosses Lake Malawi. The services on Lake Malawi have declined, partly due to road development along its shore and changing political and economic circumstances affecting trade flows. The services on Lake Malawi are mainly focussed on public sector obligations to remote communities. Revival will likely depend on economic development in northern Mozambique and southern Tanzania and in particular the development of major anchor projects within

44 SADC, Regional Infrastructure Master Plan.

the Mtwara Corridor.¹ Therefore, given the study mandate and resources, we focus our efforts on seaports and not lake ports or inland waterways.

The only exception to this is an emerging case for the Mpulungu port on the southern shores of Lake Tanganyika in Zambia. It is a gateway to the Great Lakes region, in particular, the link to the port of Bujumbura, in Burundi, on the northern shores of Lake Tanganyika. This is effectively an extension of the North-South Corridor, which intersects with the Central Corridor that links the Great Lakes region to the Dar es Salaam port.

Table 40 provides a summary of the projections of traffic through the Mpulungu port over the period 2017-2030. It shows a gradual growth of 221,000 tons over this period, with the Mpulungu-Bujumbura leg becoming increasingly important over time.

Table 40: Traffic Projections through the Port of Mpulungu 2017-2030

Tons	2017*	2018*	2020	2025	2030
Mpulungu to All Destinations	172,000	150,200	191,100	294,700	422,400
Mpulungu to Bujumbura	126,600	104,700	143,000	235,100	348,100
% to Bujumbura	73.6%	69.7%	74.8%	79.8%	82.4%

* Actual traffic in 2017 and 2018.

Source: African Development Bank (2018).

6.2.1.1. SADC Port Infrastructure Capacity

Table 41 presents estimated current port capacity for the eight key SADC maritime state ports that are linked to regional transport corridors.

The largest container port by far is Durban at nearly 4 million TEUs per year, followed by Dar es Salaam with a design capacity of 700,000 TEUs and Beira with a capacity of 400,000 TEUs. The largest bulk terminal is also Durban, when the combined capacity of bulk, break bulk, liquid bulk and mineral bulk is considered.

Durban has a bulk capacity of just over 50 mtpa, followed by Maputo at 18 mtpa, Beira at 14.5 mtpa and Dar es Salaam at 14 mtpa.

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Table 41: Current Port Capacity, Maritime States

Port	Containers (TEU)	Bulk, Break Bulk, Liquid Bulk & Mineral Bulk (mtpa)
Dar es Salaam	700,000	14
Nacala	180,000	1[a]
Beira	400,000	14.5
Maputo	350,000	18
Durban	3,930,000[a]	51
Walvis Bay	350,000	5
Lobito	40,000	1.2
Matadi	350,000	2.5

Sources: Listed in footnote below.⁴⁵

[a] Excludes the 18 mtpa Nacala-A-Vehla Coal Terminal, as this terminal is separately managed.

Table 42 below presents current port capacity for the five key SADC island state ports. The largest is Port Louis in Mauritius, which handles transshipment cargo as well as freight for national trade. This is followed by Toamasina, the largest port in Madagascar, with the other principal ports of Zanzibar (Tanzania), Moroni (Comoros) and Victoria (Seychelles) handling relatively small cargo volumes.

Table 42: Current Port Capacity, Island States

Port	Containers (TEU)	Bulk (T)
Zanzibar	50,000	150,000
Moroni	20,000	-
Toamasina	150,000	-
Port Louis	1,000,000	-
Victoria	25,000	-

Sources: Listed in footnote below.⁴⁶

45 Hartmann, Port Development and Competition in East and Southern Africa. doi:10.1596/978-1-4648-1410-5;

Transnet, 30-Year Long-Term Planning Framework, 2017 Edition;

https://www.transnetportterminals.net/Ports/Pages/Durban_Container.aspx;

https://www.transnetportterminals.net/Ports/Pages/Durban_MaydonWharf.aspx;

<http://www.meridian-ebooks.com/Port-of-Maputo/mobile/index.html#p=18>;

<https://www.namport.com.na>; <https://dlca.logcluster.org/>;

<https://www.maritime-executive.com/article/plans-underway-to-boost-congo-river-shipping-capacity>

46 Humphreys et al., Port Development and Competition in East and Southern Africa;

<https://www.bollere-ports.com/en/worldwide-network/africa/port-of-moroni-union-of-the-comoros.html>;

https://www.zpc.go.tz/malindi_port.html;

https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Seychelles_-_Infrastructure_Action_Plan_Report.pdf

According to a recent report published by the World Bank in June 2018, Southern and Eastern African port freight volumes have been growing at an overall rate of 9 per cent per year, with transit cargo to landlocked countries growing even faster at 16.5 per cent per year. The report notes that these growth trends are expected to continue in the medium term and that ports have struggled to keep up with these high growth rates, leading to congestion and time delays.

As a result, ports have been implementing or planning expansions to meet projected capacity. There are also several greenfield port investments in progress or the planning phase. According to SADC, its member states have 64 maritime and inland waterway transport projects under development, with projects currently concentrated on ports in Dar es Salaam, Tanzania and Walvis Bay, Namibia.

Additionally, substantial development projects are also being undertaken at Nacala, Beira and Maputo in Mozambique, Luanda in Angola, Durban in South Africa and Matadi in the DRC, covering all of the SADC maritime states. An increasing trend is the use of private sector investment through public-private partnerships (PPPs) to fund port investments, notably in Mozambique, Angola and the DRC.

Table 43 presents projected port capacity after each planned expansion. Following these expansions, amongst the maritime states, Durban in South Africa is projected to remain the largest container port in the region, followed by Maputo in (southern) Mozambique, Walvis Bay in Namibia, Beira (in central Mozambique), Lobito (in Angola), Matadi (in DRC) and Nacala (in northern Mozambique). Amongst the island states, Port Louis (in Mauritius) is emerging as a major transshipment hub in the South-West Indian Ocean Maritime Corridor (SWIMOC), with the other principal island ports serving the national needs of the island people.



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Table 43: Planned Port Capacity

Port	Country	Current Capacity (TEU)	Projected Capacity (TEU)
Maritime State Ports			
Dar es Salaam	Tanzania	700,000	Unknown
Beira	(Central) Mozambique	400,000	700,000
Maputo	(Southern) Mozambique	350,000	1,000,000
Nacala	(Northern) Mozambique	180,000	300,000
Durban	South Africa	3,600,000	4,000,000
Walvis Bay	Namibia	350,000	750,000
Lobito	Angola	40,000	700,000
Matadi	DRC	350,000	350,000
Island State Ports			
Zanzibar	Tanzania	50,000	250,000
Moroni	Comoros	20,000	Unknown
Toamasina	Madagascar	150,000	Unknown
Port Louis	Mauritius	1,000,000	2,500,000
Victoria	Seychelles	25,000	Unknown

Sources: Listed in footnote below.⁴⁹

49 Humphreys et al., Port Development and Competition in East and Southern Africa; Transnet, 30-Year Long-Term Planning Framework, 2017 Edition; https://www.transnetportterminals.net/Ports/Pages/Durban_Container.aspx; <https://dredgingandports.com/news/2018/congo-builds-sea-trade-self-reliance/>; <http://www.dpworldmaputo.com/eng/Our-Business/Projects>; <http://www.the-businessreport.com/article/an-ocean-of-economic-opportunity-maritime-territory/>; http://www.mauport.com/sites/default/files/public/port_trade_statistics_cy2018.pdf; <https://www.portoluanda.co.ao/movimentos.php>; <http://www.eplobito.net>; <https://www.maritime-executive.com/article/plans-underway-to-boost-congo-river-shipping-capacity>; <https://www.export.gov/apex/article?id=Angola-Marine-Technology>; <https://cdn.co.mz/en/modernization-of-the-port-of-nacala-works-started-last-week/>; <http://apanews.net/en/news/mozambique-beira-port-concession-extended-by-15-more-years>

Table 44 presents key infrastructure metrics for the eight key SADC maritime state ports. All of the key regional ports have been undergoing expansion and deepening projects in order to accommodate larger vessels, which is considered necessary to remain competitive. The key takeaways from the table include the following:

- Nacala has the deepest draft, followed by Maputo, Durban, Dar es Salaam, Lobito, Walvis Bay and Matadi (which is a river port).
- Durban has the longest container quay length (4,150 m), followed by Walvis Bay (2,400 m), Matadi Gateway Terminal (MGT) (1,610 m) Dar es Salaam (1,200 m), Beira (650 m), Matadi (502 m), Nacala (200 m), Lobito (414 m) and Maputo (308 m);
- Durban has the capacity to handle the largest ships (14,000+ TEU vessel), followed by Walvis Bay (9,000 TEU vessel), Dar es Salaam (6,000 TEU vessel), Nacala (6,000 TEU vessel), Lobito (6,000 TEU vessel), Maputo (5,000 TEU vessel), Beira (3,000 TEU vessel) and MGT/Matadi (2,500 TEU vessel); and,
- Durban has the highest productivity measured in terms of crane moves per hour (25), followed by Maputo (22), Dar es Salaam (17), Beira (12) and Nacala (10).⁵⁰

Table 44: Current Port Infrastructure, Maritime States

Port	Max Draft (M)	Max Container Berth Length (M)	Total Container Quay Length (M)	# Container Berths	Max TEU Vessel	Quay Equipment (#STS)	Crane Productivity (Moves/Hr)	# General Cargo/ Bulk/ RoRo Berths
Dar es Salaam	12.5	250	1,200	4[a]	6,000	9	17	10
Nacala	15	200	375	Unknown	6,000	0	10	Unknown
Beira	12	185	650	4	3,000	4	12	7
Maputo	14	330	308	1	5,000	0/3MHC	22	13
Durban	12.5	350	4,150	8	14,000	30	25	25
Walvis Bay	10	Unknown	2,400	Unknown	9,000	Unknown	Unknown	Unknown
Lobito	12	Unknown	414	2	6,000	Unknown	Unknown	Unknown
Matadi	8.2	188	502/1 610	3[b]	2,500	3	Unknown	7

Sources: Listed in footnote below⁵¹

[a] Total quay length. [b] 4 dedicated plus TPA has 7 berths that are shared by general cargo and containers. [c] Dedicated are listed, plus others available in general cargo terminals.

50 Information on crane moves per hour could not be sourced for the ports of Walvis Bay, Lobito or MGT/Matadi.

51 Humphreys et al., Port Development and Competition in East and Southern Africa; Transnet, 30-Year Long-Term Planning Framework, 2017 Edition; https://www.transnetportterminals.net/Ports/Pages/Durban_Container.aspx; http://www.budd-pni.com/news-art-the-budd-group.asp?ANNEE=2015&ID_A=1292; <https://dredgingandports.com/news/2018/congo-builds-sea-trade-self-reliance/>; <http://www.portmaputo.com/berth-quay-details/>; <http://www.portmaputo.com/terminal/container-terminal/>; <https://dlca.logcluster.org/display/public/DLCA/2.1.1+Angola+Port+of+Luanda>

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Table 45 presents current port infrastructure for the 5 key SADC island state ports.

Port Louis, a transshipment port, which has the deepest port at 16.5 m, largest total berth length at 800 m, can handle the largest vessels (14,000+ TEU vessel) and has the highest productivity measured in terms of crane moves per hour (20).

Whilst there are many information gaps with respect to the other island ports, they serve the needs of local populations, which means that their capacity is limited.

Table 45: Current Port Infrastructure, Island States

Port	Max Draft (M)	Max Length (M)	Total Quay Length (M)	Total # Berths	Max TEU Vessel	Quay Equipment (#STS)	Crane Productivity (Moves/Hr)
Zanzibar	10	240	400	2	20,000	Unknown	Unknown
Moroni	5.5	80	100	Unknown	Unknown	0 2 MHC	Unknown
Toamasina	14	230	Unknown	Unknown	Unknown	Unknown	Unknown
Port Louis	16.5	360	3,095	16	14,000	7	20
Victoria	Unknown	Unknown	270	1	Unknown	0	Unknown

Sources: Bollore Ports, Agence Francaise de Développement, Malindi Port (Unguja) and Mauritius Ports Authority.

The next section provides a summary of the envisaged capacity gaps in each of the principal ports linked to major regional transport corridors in the SADC region.

6.2.2. Projected Port Capacity Gaps

Taking into consideration the above assessment, the World Bank's 2019 report Port Development and Competition in East and Southern Africa: Prospects and Challenges projects SADC port capacity gaps for Maritime States in Table 46 and Island States in Table 47.

Table 46: Maritime Ports - Projected Port Capacity Gaps

Port	Country	Projected Year To Reach Container Capacity	Projected Year To Reach General Cargo Capacity	Projected Year To Reach Bulk Capacity
Dar es Salaam	Tanzania	2022	2050	2019
Nacala	(Northern) Mozambique	2032–35	2024	2050
Beira	(Central) Mozambique	2030	2030	2050
Maputo	(Southern) Mozambique	2032–35	2050	2019
Durban	South Africa	2028	2050	2019
Walvis Bay	Namibia	Not assessed in World Bank report		
Lobito	Angola	Not assessed in World Bank report		
Matadi	DRC	Not assessed in World Bank report		

Sources: Humphreys et al. (2019) and Transnet (2016).

The key takeaways in terms of anticipated port capacity gaps with respect to maritime ports linked to the principal regional transport corridors are as follows:

- Dar es Salaam is anticipated to reach capacity constraints in its container terminal first (by 2022), followed by Durban (by 2028), Beira (by 2030), Maputo (by 2032) and Nacala (by 2032). Walvis Bay, Lobito and MGT/Matadi have just completed significant capacity enhancements in the container terminals, which are expected to last until 2030-2035.
- Only Nacala is anticipated to reach capacity constraints in its general cargo operations in the foreseeable future (by 2024), followed by Beira (by 2030), but all other ports have capacity to beyond 2050.
- Bulk capacity constraints appears to be more pressing with capacity limitations reported in Durban, Maputo and Dar es Salaam in 2019, but both Beira and Nacala having spare capacity beyond 2050.

Table 47: Island States - Projected Port Capacity Gaps

Port	Country	Projected Year Reaching Container Capacity	Projected Year Reaching General Cargo Capacity	Projected Year Reaching Bulk Capacity
Zanzibar	Tanzania	No projection	Insufficient but no year listed	Insufficient but no year listed
Moroni	Comoros	No projection	No projection	No projection
Toamasina	Madagascar	No projection	2030	No projection
Port Louis	Mauritius	2032–35	2040	Insufficient but no year listed
Victoria	Seychelles	No projection	No projection	No projection

Sources: Humphreys et al. (2019) and Transnet (2016).

The key takeaways in terms of anticipated port capacity gaps with respect to island states are as follows:

- Data limitations exist for all principal ports in Island States, except Port Louis in Mauritius and Zanzibar in Tanzania. However, Port Louis is the most important port in terms of international and regional trade and capacity gaps only exist in bulk operations, with constraints in container operations expected only in 2032 and in general cargo operations in 2040.
- Zanzibar port is expected to have insufficient general cargo and bulk capacity, but the study did not provide an estimated timeframe.

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6.2.3. Maritime States – Planned Port Improvements

The major proposals for each of the regional gateway ports are summarised in the following section. This section focusses on recent and/or active port improvement projects.

6.2.3.1. Port of Dar es Salaam

The port of Dar es Salaam is the largest seaport in Tanzania and is an important hub for the international trade of the neighbouring landlocked countries including Zambia, DRC, Rwanda, Burundi, Malawi and Uganda. The port is surrounded by the city of Dar es Salaam to the north, west and south, so there is limited space to expand the port precinct to increase the capacity of the port, which is current operating above its design capacity (in terms of container traffic).

The Tanzania Ports Authority (TPA) is the port authority of the port of Dar es Salaam and acts as both a landlord and operator. The port has two container terminals, one operated by TPA and one by the Tanzania International Container Terminal Services (TICTS), who has a concession until 2025. The port has 11 berths for general cargo, container, Ro-Ro (roll-on roll-off) and dry bulk vessels as well as two oil jetties and one Single Point Mooring for tankers.

The major programme that has been undertaken to expedite port improvement at Dar es Salaam port is the implementation of Dar es Salaam Maritime Gateway Project (DMGP). The physical investments component of the DMGP is a programme of 29 projects comprised of two parts:

- The modernisation of the entire port, which covers deepening and strengthening of Berths 1-7 including deepening of the adjacent port basin and construction of a new Ro-Ro terminal and relocation of sheds, improvement to the port layout and the construction of new gates, road and rail accesses.

- The modernisation of the dry bulk, break bulk and cargo handling methods on Berths 1-7 including the following: (i) construction of bulk handlers and conveyor systems for grains, fertilisers, cement, clinker and other dry bulks and (ii) construction of new port sheds, vehicles and other open storage yards.

The DMGP is funded by a joint Development Partners Agreement consisting of TMEA, the Department for International Development (DFID) and the World Bank (WB). It amounts to a outlay of some US\$565 million.⁵² In June 2017, TPA signed a 36-month contract worth TZS 336.641 billion (approximately US\$149 million) with M/S China Harbour Engineering Construction Company Limited (CHEC) to construct a Ro-Ro terminal at Gerezani Creek and to deepen and strengthen Berths 1-7 during the ongoing first phase works of the DMGP. The implementation of this programme will result in the increase of port space for cargo movements/manoeuvring at berths, reduce dust and truck turnaround times within the port, attract bigger ships and increase efficiencies for serving customers. The project aims to reduce capacity constraints, increase capacity from 15 to 25 mtpa, improve operational efficiency and allow larger ships to call on the port.

6.2.3.2. Port of Nacala

Nacala Port is currently under major rehabilitation using a Japan International Cooperation Agency (JICA) loan of approximately US\$350 million. Given the state of degradation of the Nacala Port, the first tranche of financing was for emergency rehabilitation, followed by a credit line for what is called the Nacala Port Development Project,⁵³ which will be implemented over three phases. The project has been delayed several times, but it is now underway and expected to be completed in 2021.

- Phase 1, financed by a US\$30 million grant, consisted of north quay

pavement repair, a new container area, purchase of two reach stackers, two RTG and the repair of the liquid bulk quay and the installation of firefighting equipment (March 2014 to September 2015).

- Phase II, financed by a US\$70 million loan, includes the construction of a new access road to the port, pavement of the container yard, construction of a new rail transport container terminal, dredging, purchase of three RTG and the construction of a new entrance.
- Phase III, at a cost of US\$250 million, will involve the reconstruction of the quay, pavement of the container terminal, dredging, pavement of the access road, purchase of three RTG and tug-masters.

Prior to reconstruction, Nacala port had two container berths along the south quay and three general cargo berths along the north quay, the most northern berth serving as an oil terminal. Under the JICA master plan, the container and general cargo berths are being swapped. During construction, some general cargo ships call on the container quay due to draft restrictions. The existing container berths have depths of 14 m and the general cargo berths 10 m. The new container berths will be 12 m, requiring some reconstruction and deepening of the berth. Vessels of up to 50,000 dwt or 4,000 TEUs can thus be accommodated.

At the present time, all ship loading and unloading is carried out by ship cranes (geared vessels) and yard handling by reachstackers and tractor trailers. To the extent possible, direct transfer onto trucks is carried out on the quayside. The rehabilitated port will have two ship-to-shore cranes, doubling handling capacity and bringing its handling capabilities more in line with regional competitors.

⁵² <https://www.trademarka.com/impact-stories/>

⁵³ Infrastructure Consortium for Africa (ICA), Final Report on the Project for Improvement of Nacala Port.

At present, the port is not congested, though bulk vessels can be slow to unload, leading to waiting at anchor. The main constraint for future expansion is the limited space available for terminal activities and storage. On-site storage is currently very limited. A large temporary bulk storage inflatable warehouse has been provided, but the main storage is provided by the private sector, along the N8, about 5–8 km from the port.

Road access is direct from the N8, via a narrow, but good condition, single-lane road in both directions. The port access traverses the town and congestion from the port (and particularly the scanner) can lead to local congestion. A second access point is being constructed as part of the JICA project.

The Nacala port also now has access to a high-capacity and reliable railway, which provides hinterland access to the port from northern Mozambique, Malawi and eastern Zambia. The port has direct access from the railway mainline into the port marshalling yard, which is capable of handling up to 30 wagons (450 m). It is thus not able to handle full 42-wagon train sets in the port. This requires splitting and shunting, which is not ideal. The rail sidings to serve the container terminal are currently limited to 20 wagons and the future layout has not yet been finalised. This could be an operational and capacity constraint affecting train turnaround time in the port.

6.2.3.3. Port of Beira

The Port of Beira, the second-largest port in Mozambique, is primarily a transit gateway, handling import and export cargoes from Zimbabwe, Malawi, Zambia and other countries in the region. The port handles a wide variety of traffic, including containers, break bulk, general cargo, Ro-Ro and wet and dry bulks. It is able to receive ships with a maximum

tonnage of 60,000 tons, 24 hours a day. While the port is open 24 hours a day, night navigation is restricted due to the bottleneck at Macuti Curve. The port is tidal, with a channel ranging from 60 m to 200 m wide. The approach to the Púngue River is obstructed by a number of banks and shoals that constantly change. Vessels awaiting berth must anchor at the bar. The location of the port at the mouth of the Púngue River has proven a constraining factor. Levels of silt outflow from the river mean that the port channel requires almost continuous dredging.

In October 1998, the Government of Mozambique (GoM) concessioned the Port of Beira to Cornelder de Moçambique (CdM), a joint venture between Dutch Cornelder Holdings (67 per cent) and Caminhos e Portos de Ferro de Moçambique (CFM), E.P. (33 per cent) for a period of 25 years. The concession included the multipurpose container terminals and general cargo terminals.

In July 2018, CdM was awarded a concession extension for another 15 years, from 2023 to 2038. Similar to remaining ports in Mozambique, the GoM decided to maintain the liquid bulk terminal, under CFM management. The liquid bulk terminal is linked to a direct fuel pipeline, which is owned and operated by the Companhia do Pipeline Moçambique-Zimbabwe Limitada (CPMZ) between the Port of Beira, Mozambique, to the oil refinery in Feruka, Zimbabwe.

Dredging services are provided by Mozambique Dredging Company (Emodraga), who have recently entered a maintenance dredging contract with CFM (the port authority) for the period 2018–2022 to dredge 2.5 million cubic meters per year, with the aim of guaranteeing the current conditions of navigation. Beira can accommodate vessels with drafts of between 10 m and 12 m at high tide, if continuous maintenance dredging is

carried out in at the berths and entrance channel, as is envisaged by the new Emodraga contract.

Under the extension of the concession agreement between Cornelder and the GoM, it is understood that Cornelder itself will invest US\$154 million in the container terminal, with US\$30 million allocated to infrastructure improvements and US\$124 million allocated to equipment to enhance the productivity of the port, as follows:

- Rehabilitation and expansion of the warehouse;
- Rehabilitation of quays 2, 3, 4 and 5;
- Modernisation of operating systems;
- Construction of new access infrastructures; and
- Acquisition and Modernisation of new container cranes.

There is also planned investment with a total value of US\$110 million in the general cargo terminal, with US\$53 million allocated to infrastructure improvements and US\$57 million allocated to equipment to enhance the productivity of the port. The key elements are as follows:

- Rehabilitation and expansion of the warehouse;
- Rehabilitation of quays 7, 9 and 10;
- Modernisation of operating systems; and
- Construction of new access infrastructures.

6.2.3.4. Port of Maputo

The Maputo port handles domestic cargo as well as transit cargo to/from South Africa, Zimbabwe, Eswatini and Botswana. The Maputo port access channel was dredged to 14.3 m in 2016–2017 and will soon benefit from a follow-up maintenance dredging contract, which will remove 1.4 million meters of sand.⁵⁴

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The port is operated by the Maputo Port Development Company (MPDC), which is a partnership between Mozambique Port and Railway Company (CFM) and Portus Indico, comprising Grindrod, Dubai Ports World (DPW) and Mozambique Gestores. The port has two terminals, Matola Bulk Terminal and Maputo Cargo Terminal.

The key responsibilities in terms of terminal operations within the MPDC consortium are as follows:

- Matola Bulk Terminal:
 - Aluminum terminal is independently operated by Mozal;
 - Grain terminal is independently operated by STEMA; and
 - Coal terminal is operated by Grindrod;
- Maputo Cargo Terminal:
 - Container terminal is operated by DPW;
 - Grain and car terminals is operated by Grindrod; and
 - Bulk minerals, vegetable oil, sugar, molasses, general cargo and cabotage terminals are operated by the MPDC consortium.

The consortium's initial 15-year concession from 2003 was extended in 2010 for another 15 years to 2033. Along with port operations, the group is also the Port Authority. The Container Terminal, which is concessioned to DPW, has the following planned investments:⁵⁴

- Increase capacity from 350,000 TEU to 500,000 TEU (2020) and to 1 million TEU (2022);
- Increase quay length from 308 m to 655 m (2020);
- Increase terminal size from 15 ha to 17 ha (2020) to 30 ha (2022);

- Increase depth from 12 to 16 m;
- Increase container yard from 2,450 TEU to 5,000 TEU (2022); and,
- Add three STS cranes by 2020 and six STS cranes by 2022.

The Maputo Port Master Plan has also prioritised the expansion of the coal terminal from its current capacity of 7.5 mtpa to 20 mtpa, but Grindrod, the terminal operator, has not unveiled any detailed investment plans.

6.2.3.5. Port of Durban

Transnet owns and operates all of South Africa's maritime ports. Port planning is communicated through the annual Transnet Long-term Planning Framework, which frames strategic investment decisions and capacity requirements for the next 30 years.

The port of Durban is sub-Saharan Africa's largest container terminal. It is the key gateway to the SADC region and anchors the North-South Corridor. The port can be accessed by both road and rail and it has transport links to the SADC hinterland region.

Durban's container terminal has a capacity of 3.6 million TEU over two piers/terminals. Pier 1 has a capacity of 700,000 TEU over two berths with a maximum draft of 12.5 m. Pier 2 has a capacity of 2.9 million TEU over six berths with a maximum draft of 12.2 m. The terminal is the only one in Africa that has tandem lift cranes that can lift two containers (80 t) at one time. The port can handle large ships, with up to 24 containers across.⁵⁶ Transnet is undertaking works to expand the Durban Container terminal⁵⁷ from 3.6 million TEU to 4 million TEU per year. The project will also increase the terminal draft from 12.5 m to 16 m and includes investments in cargo handling equipment.

The port also holds Africa's largest Ro-Ro terminal. The terminal has seven berths with 12.5 m draft. Three berths handle automotive trade, which can handle 520,000 fully built units (vehicles). The terminal can also handle 230,000 TEU.

The break bulk terminal has a capacity of 1.6 mtpa over two terminals (Ro-Ro and Maydon Wharf) and handles abnormal cargo, steel commodities and project cargo, as well as a niche container business.

Agricultural bulk is handled at Maydon Wharf, with a capacity of 1.6 mtpa. The port mainly handles wheat, maize, soya bean meal, animal feed and woodchips.

6.2.3.6. Port of Walvis Bay

The port of Walvis Bay handles domestic cargo as well as transit cargo to/from Zambia, Angola, DRC, Botswana and Zimbabwe. The port is managed by the Namibian Port Authority (NAMPORT), a state-owned enterprise.

The present container terminal has three berths (Berths 1-3) totalling 500 m and can handle 350-400,000 TEU per annum. Berth 3 is also used for handling exports of bulk salt due to the required deeper berth; the container berth is 14 m compared to 10.6 m for the general cargo berths. The terminal received ship-to-shore gantry cranes in 2018. The container terminal is just finishing a major expansion, which will more than double its capacity from 350,000 TEU to 750,000 TEU per annum. It was opened in the second half of 2019.⁵⁸ The expansion will increase quay length from 1,800 to 2,400 m and includes three new berths (Berths 9-11), with a depth of 16 m.

54 <http://www.portmaputo.com/port-o230f-maputo-access-channel-maintenance-soon-to-begin/>

55 <http://www.dpworldmaputo.com/eng/Our-Business/Projects>

56 https://www.transnetportterminals.net/Ports/Pages/Durban_Container.aspx

57 https://www.transnetportterminals.net/Ports/Pages/Durban_Container.aspx

<https://www.transnetportterminals.net/About/Pages/MDS.aspx>

58 <https://www.namport.com.na/mega-projects/new-container-terminal/371/>

The port saw an 11 per cent drop in container traffic from 2017 to 2018, mainly due to a large fall in transshipment volumes as major shipping lines moved to new privately operated West African ports. These ports can handle larger vessels, including 9,000 TEU ships, which Walvis Bay cannot handle due to depth restrictions in the entrance channel and at the quay. However, the port sees opportunities for increasing transit cargo from SADC countries to fill this gap.⁵⁹

General cargo is handled at multi-purpose berths 1-8. Berth 6 handles sulphuric acid and the remaining liquid bulk shipments are handled at the Tanker Berth. The Tanker Berth is outdated and beyond its lifespan, requiring structural modifications in 2013 to allow its use up to 2018.

The Ministry of Mines and Energy has funded the development of a new liquid bulk terminal, which is nearly completed. It will contain two tanker berths.

There are also plans for a North Port of Walvis Bay⁶⁰ including construction of a Liquid Bulk Terminal for hydrocarbons. The North Port also had planned for an Liquefied Natural Gas (LNG) Terminal, which is currently on hold and multi-purpose general cargo terminal, which is undergoing a feasibility study.

6.2.3.7. Port of Lobito

The port of Lobito serves Angola, as well as Zambia and the DRC via railway connections that connect to the Zambian and DRC rail networks. However, this system is not fully operational as the section from Dilolo to Kolwezi in the DRC still needs to be rehabilitated. The port's

entrance channel is 27–36 m deep and the port's entrance is 17 m deep.

The port of Lobito has four terminals, namely a general cargo, a reefer, a container (concessed to Sogester, owned by APMT, in 2017);⁶¹ and an oil (concessed to Sonamet). The main pier is 1,122 m, with depths up to 12 m, allowing six to eight ships to berth simultaneously. The port also has a 150 m cabotage pier with a depth up to 5 m.

A five-phase expansion programme was initiated in 2008. Phase 1 and Phase 2 have been completed, including rehabilitation of the 1,122 m existing quay, paving, rail replacement (Phase 1) and construction of the container terminal including a 414 m pier with a depth of 14.7 m, construction of a dry port and bridge (Phase 2). Phase 3, development of an ore terminal, is underway.⁶² Phase 4 and Phase 5 include plans for a mineral container terminal, 1,200ft pier, cruise ship dock and club. The total rehabilitated and expanded port will consist of a 7,800 m berth that can handle 20 vessels, 11 mtpa of general cargo and 700,000 TEU.⁶³

6.2.3.8. Ports of Matadi and Banana

Matadi Port is the DRC's only national port. It is a river port located 230 km from the sea. The Matadi Port terminal, owned and operated by the state-owned entity Société Commerciale des Transports et des Ports (SCTP), is a multipurpose terminal allowing the handling of container, break bulk cargo, bagging and timber logs. The port is connected to Kinshasa by road and rail. Draft varies based on conditions of

the Congo River and can fall to as low as 5.8 m. This can lead to congestion and delays. However, the new container terminal operator has plans to dredge the river to 12.5 m allowing for Panamax vessels and then 14 m.⁶⁴

The Matadi Gateway Terminal (MGT), a new container terminal opened in 2016, is supported by a US\$100 million investment from International Container Terminal Services Incorporated (ICTSI). Capacity was doubled to 350,000 TEU/year. Prior, the port had been operating near capacity. The port has 10 quays and can in theory handle 10 ships simultaneously, but several berths are not operational. While the port has three cranes, in recent years most of its equipment has not been functional and breaks down frequently. Thus, ship gears are required for offloading.⁶⁵ However, the situation should improve as the port recently purchased two mobile harbour cranes and handled its first gearless vessel in January 2019.⁶⁶ The port will also purchase a third mobile harbour crane.⁶⁷

A new greenfield deep-water port is planned at Banana Port.⁶⁸ The port will be the DRC's first seaport. The ownership structure is 70 per cent DPW/30 per cent government under a 30-year concession and includes a US\$1 billion investment over four phases. The first phase (\$350m) is supposed to take 24 months and was to start in late 2018. Phase 1 will include a new 600m quay, a 25-ha yard expansion, a container capacity of 350,000 TEU and a general cargo capacity of 1.5 mtpa. Subsequent phases of investment will depend on market demand.⁶⁹

59 Namibian Ports Authority (NAMPORT), Group Annual Report 2017/18.

60 <https://www.namport.com.na/files/files/NAMPORT%20MEGA%20Projects%202019.pdf>

61 <https://www.portstrategy.com/news/101/world/south-america/lobito-port-privatises-terminal-operations>

62 <http://www.eplobito.net/index1.asp?qm=v&ed=6&c=57>

63 <http://www.eplobito.net/index1.asp?qm=v&ed=6&c=57>

64 <https://www.maritime-executive.com/article/plans-underway-to-boost-congo-river-shipping-capacity>

65 <https://dlca.logcluster.org/display/public/DLCA/2.1.1+Democratic+Republic+of+Congo+Port+of+Matadi>

66 <https://www.maritime-executive.com/article/plans-underway-to-boost-congo-river-shipping-capacity>

67 <https://www.maritime-executive.com/article/plans-underway-to-boost-congo-river-shipping-capacity>

68 <https://dredgingandports.com/news/2018/congo-builds-sea-trade-self-reliance/>

69 <https://www.seatrade-maritime.com/news/middle-east-africa/dp-world-wins-30-year-for-port-of-banana-in-democratic-republic-of-the-congo273/>

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6.2.4. Island States – Planned Port Improvements

The major proposals for each of the principal ports of each island state is summarised in the following section, which focusses on recent and/or active port improvement projects.

6.2.4.1. Port of Zanzibar

Malindi Port in Zanzibar has one 240 m berth that can handle 20,000 DWT vessels with a draft up to 10 m. The port has limited handling equipment (just one MHC), so mostly geared vessels call on the port. The port is has limited space and faces congestion, despite low traffic volumes; however, expansion space is limited. In 2017, the port of Zanzibar planned to install a new weighbridge and construct a liquid bulk terminal under a PPP arrangement. No additional information is available.⁷⁰ Additionally, in 2014, Zanzibar announced plans to begin a three-year project to construct a new port on Zanzibar 3 km from Malindi at Maruhubi. Plans included a new 300 m berth that would be able to handle 200,000 TEU and 250,000 mtpa of bulk cargo. The project would be implemented by the China Harbour Engineering Company (CHEC) supported by a US\$200 million loan from China's Exim bank.⁷¹ At the time, PPP options for the project were prepared, but no updated information is available on the project's current status.

6.2.4.2. Port of Moroni

The port of Moroni is located on Grand Comoros. The port handles imports of food and petroleum, and exports of agricultural products including vanilla, spices and flowers. The port has two

berths, a container and general cargo/dry bulk berth. Bollore operates the terminal via a 10-year concession that began in 2011. The draft at the quay is very low (only 4.5 m), so large vessels have to remain at anchor and send cargo to the port via barges. This process is impacted each year during the cyclone season from November to April.⁷² Comoros has several planned improvements, based on its 2014 port master plan.⁷³ Planned works at Moroni port include reconstruction of the general cargo quay and extension of 145 m, extension of the container quay by 275 m, dredging to 10 m, construction of a Ro-Ro passenger terminal and creation of a special economic zone at Moroni port. Additionally, there are plans for a greenfield deep-water port 2–3 km south of the existing port at Sereheni. However, there are concerns that the new port does not have road connections to Moroni and that the current plans will not alleviate port-city congestion.

6.2.4.3. Port of Toamasina

The main port of Madagascar is the port of Toamasina, which is on the east side of the island in the country's second largest city. The port handles 90 per cent of Madagascar's containers and 90 per cent of trade volumes. The port of Toamasina is managed and operated by the Société du Port à Gestion Autonome de Toamasina. The container terminal is operated by a private operator (International Container Terminal Services Inc) via a 20-year concession. Other port facilities include handling of bulk grain and Ro-Ro. Additionally, the port started handling nickel and cobalt mineral exports.⁷⁴ There is a planned Toamasina port development project via a JICA loan,⁷⁵ which is projected

to be undertaken between now and 2026. The project includes expansion of the breakwater, expansion and dredging of the container berths and expansion of the container yard.

6.2.4.4. Port of Port Louis

Port Louis is the largest SADC island port, handling not only 99 per cent of domestic island trade but also transshipment for the region. The port has three terminals, including a container terminal, multipurpose terminal and cruise terminal. Cargo Handling Corporation Limited, a public company, has a 30-year concession on the container terminal. In 2017, the terminal's capacity was expanded from 550,000 TEU to 1 million TEU by lengthening the quay to 800 m so that the port can accommodate two 360 m vessels at once on its three berths. The navigation channel was also deepened from 14.5 m to 16.5 m. The port can now handle 13,000 TEU vessels with a draft of up to 15 m. Handling equipment includes 14 RTG, five Post Panamax cranes and two Super Post Panamax cranes.⁷⁶ A new US\$734 million container terminal will further expand capacity at Port Louis from 1 million TEU/year to 2.5 TEU/year by 2025, with a focus on transshipment.⁷⁷

6.2.4.5. Port of Victoria

Port Victoria on the Seychelles' main island of Mahé is the largest in the island nation, handling 95 per cent of the country's imports. The port's one 270 m berth handles fishing boats, cruise ships and container ships. This means that the port can only handle one large (up to 250 m) vessel at once or two vessels if one overhangs the quay. There is no dedicated container

70 Humphreys et al., Port Development and Competition in East and Southern Africa.

71 <https://moguldom.com/46534/chinese-firm-contributes-230-million-zanzibar-port-construction/>, <https://china.aiddata.org/projects/30937?iframe=y>

72 Humphreys et al., Port Development and Competition in East and Southern Africa.

73 Humphreys et al., Port Development and Competition in East and Southern Africa.

74 Humphreys et al., Port Development and Competition in East and Southern Africa.

75 https://www.jica.go.jp/english/news/press/2018/180427_05.html

76 <http://www.mauport.com/transshipment>

77 <http://www.the-businessreport.com/article/an-ocean-of-economic-opportunity-maritime-territory/>

berth and issues regarding priority arise when a container ship and cruise ship arrive at the same time. An expansion at Port Victoria began in 2019 and is in progress with a projected completion by 2021. The expansion is anticipated to cost US\$41 million with funding from French Development Bank and European Investment Bank loans.⁷⁸ The scope of the project includes expanding the shared freight and cruise berth from 270 m to 600 m, rehabilitating the existing berth, installing two mobile harbour cranes; and dredging to allow for larger ships.

6.3. CORRIDORS

6.3.1. Logistics Performance of SADC Trade/Transit Corridors

SADC's main supply chains for all commodities are predominantly the road corridors linking SADC's agricultural production and manufacturing areas with the major ports. To improve logistics along the corridors, to reduce costs of production and improve competitiveness, both infrastructure, including ports, border crossings, road, rail, warehousing and inland container depots (ICDs), and logistics systems (or soft infrastructure) will need to be improved.

The World Bank's Logistics Performance Index (LPI) measures the relative positions of countries in terms of how well they are performing against each other. The LPI is derived by assessing relative scores of each country using the following six indicators:

- 1) efficiency of customs and border management clearance
- 2) quality of trade- and transport-related infrastructure

- 3) ease of arranging competitively priced international shipments
- 4) competence and quality of logistics services
- 5) ability to track and trace consignments and
- 6) frequency with which shipments reach consignees within the scheduled or expected delivery time

Table 48 gives the scores and rankings from the World Bank's 2014 LPI for SADC countries.⁷⁹ The index ranges from 1 to 5 with a higher score representing better performance.

As can be seen in Table 48, SADC countries score relatively badly against other countries in the world. South Africa, ranked 34 out of 160 countries, is the only country in SADC within the top 100 performing countries in the world, meaning that all SADC countries, except South Africa, are in the bottom 50 per cent and often in the bottom 25 per cent of the LPI. In 2014, all SADC countries except South Africa and Malawi were in the bottom 30 per cent of the LPI index and so are amongst the worst-performing countries in terms of logistics.

This implies that Africa needs improved infrastructure to improve its logistical performance, which is necessary if Africa is to attain levels of economic growth that will lift Africans out of poverty. However, improving infrastructure in itself is not the ultimate goal. The real challenge is to use infrastructure to provide efficient logistics services. Africa needs roads and railway lines, but this infrastructure does not guarantee that transport logistics will improve. Logistics cannot be improved without improving infrastructure, but

unless infrastructure leads to improved logistics being delivered, then the infrastructure itself will not solve any of Africa's economic development challenges. It is important to improve infrastructure, but it is equally important to develop and deliver trade, transport and transit facilitation programmes together with the infrastructure.

78 <https://www.afd.fr/en/port-victoria-crucial-renovation-seychelles>, <http://www.seychellesnewsagency.com/articles/9057/++million+secured+for+extension+and+rehabilitation+of+Seychelles+main+port>

79 2014 is the latest year for which updated LPI information is available for all of the SADC countries. The 2016 and 2018 LPI have information for some, but not all, SADC countries.

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Table 48: World Bank's Logistical Performance Index for SADC Countries - 2014

Country	Score and Rank	Overall LPI	-1 Customs	-2 Infrastructure	-3 International Shipments	-4 Logistics quality and competence	-5 Tracking and tracing	-6 Timeliness
South Africa	score	3.43	3.11	3.20	3.45	3.62	3.30	3.88
	rank	34	42	38	25	24	41	33
Malawi	score	2.81	2.79	3.04	2.63	2.86	2.63	2.99
	rank	73	62	48	108	70	100	100
Angola	score	2.54	2.37	2.11	2.79	2.31	2.59	3.02
	rank	112	114	140	84	128	103	96
Mauritius	score	2.51	2.25	2.50	2.63	2.48	2.34	2.88
	rank	115	128	91	109	110	133	110
Botswana	score	2.49	2.38	2.23	2.42	2.58	2.40	2.94
	rank	120	112	125	129	99	127	103
Zambia	score	2.46	2.54	2.31	2.13	2.47	2.47	2.91
	rank	123	86	115	152	114	120	105
Comoros	score	2.40	2.58	2.30	2.51	2.26	2.37	2.37
	rank	128	81	117	119	134	128	154
Madagascar	score	2.38	2.06	2.15	2.38	2.33	2.29	3.07
	rank	132	144	136	133	127	138	89
Lesotho	score	2.37	2.22	2.35	2.48	2.23	2.35	2.60
	rank	133	129	110	122	137	132	139
Zimbabwe	score	2.34	1.89	2.25	2.25	2.50	2.22	2.93
	rank	137	154	123	143	108	143	104
Tanzania	score	2.33	2.19	2.32	2.32	2.18	2.11	2.89
	rank	138	135	114	137	145	150	107
Mozambique	score	2.23	2.26	2.15	2.08	2.10	2.08	2.74
	rank	147	126	135	154	153	152	134
DR Congo	score	1.88	1.78	1.83	1.70	1.84	2.10	2.04
	rank	159	158	156	160	158	151	159

Source: World Bank (2014).

Most SADC countries are either members of the World Trade Organisation (WTO) or are in accession to the WTO. One of the most important, if not the most important, outcome of the Doha Development Round of trade negotiations has been the ratification and adoption of the Trade Facilitation Agreement, which outlines modalities to implement Articles V, VIII and X of the General Agreement on Tariffs and Trade. The TFA has 12 articles that address notifying, publishing and implementing trade facilitation instruments. Trade facilitation is also addressed in the Agreement establishing the Africa Continental Free Trade Area (AfCFTA). Annex 3 of the Protocol on Trade in Goods of the AfCFTA Agreement addresses Customs Co-operation and Mutual Administrative Assistance and Annex 4 addresses Trade Facilitation. Both of these AfCFTA annexes follow the WTO's Trade Facilitation Agreement and are considered to be WTO+, meaning that they go beyond the provisions of the WTO.

Annex 3 covers state parties' cooperation in all areas of customs administration while Annex 4 addresses how state parties can simplify and harmonise international trade procedures and logistics to expedite importation, exportation and transit processes, including how to expedite the movement, clearance and release of goods, including goods in transit across borders within state parties.

The COMESA-EAC-SADC Tripartite Free Trade Agreement also has, as one of its programmes, the Tripartite Transport and Transit Trade Facilitation Programme (TTTFP), which has developed model laws, regulations and instruments to simplify and harmonise cross-border transport and transit trade. The main instruments

of the TTTFP are a Vehicle Load Axle Management System and a Cross-Border Road Transport Agreement. The TTTFP allows COMESA-EAC-SADC Tripartite countries to comply with international standards and to reduce the costs of cross-border transport by simplifying and harmonising procedures.

Finally, transport and transit corridors are defined by their weakest links. For example, on the North-South Corridor, if the infrastructure and trade facilitation systems in South Africa are very good but are not good in Zimbabwe and Zambia, then the costs of trade and transport along the North-South Corridor and into DRC will continue to be high. The management of trade, transport and transit corridors can, therefore, only be done on a regional basis. These corridor management systems could be done through regional organisations, but this has proved to be an inefficient and ineffective way of managing corridors, presumably because corridor management is only a priority of the few members of the regional organisation that benefit from the corridor. Therefore, in the SADC region, the trend has been to set up corridor management agencies and agreements such as the (now defunct) Maputo Corridor Logistics Initiative (MCLI), the Walvis Bay Corridor Group, the Dar es Salaam Corridor Committee and the Central Corridor Transit Transport Facilitation Agency. There have been unsuccessful attempts to establish a Corridor Management Authority, based on an intergovernmental agreement, for the North-South Corridor. The performance of a corridor in terms of delivery of logistics services is also dependent on how effective and efficient is the governance of the corridor.

We have used components of infrastructure, trade facilitation (in this case the WTO Trade Facilitation Agreement), transit and transport facilitation (in this case the provisions of the TTTFP) and corridor management systems (in this case the effectiveness of the corridor management system in place) as a framework to carry out a gap analysis of the SADC transport and transit corridors along which most of SADC's trade takes place. The framework used and the issues to be addressed to ensure implementation of an efficient freight logistics system along the SADC corridors are given in tabular form in Table 49.

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Table 49: Issues to Address to Implement an Efficient Freight Logistics System

Infrastructure	Trade Facilitation Articles (TFA)	Transit/Transport Facilitation	Management Systems
Road: Roads that make up SADC's main corridors are mainly in reasonable to good condition. Ideally, this assessment should be based on the international roughness index (IRI) of the road, but the classification is usually based on a visual assessment because of the lack of HDM4 data.	Article 3. Advance Rulings. An advance ruling is binding for the period the advance ruling is valid.	System to manage vehicle loads: definition of GVM and axle loads.	Corridor Management Authority
Rail: Cape Gauge rail. Track in reasonable condition apart from few sections. Poor management.	Article 7.1. Allow submission of import documentation to allow processing pre-arrival. Need to do this electronically.	Regulations on cross-border road transport and cabotage.	Cross-Border Road Transport Agreement
Warehousing and ICDS: Few non-private warehouses or ICDS.	Article 7.2. Allow electronic payment for duties, taxes, fees and charges.	Regulations on transport of dangerous goods.	Cross-Border Rail Transport Agreement
Ports: Port infrastructure improving and not usually a main bottleneck.	Article 7.3. Allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.	Regulations on transport of abnormal loads.	Bilateral/regional OSBP legislation and regulations
Border Posts: Need adequate infrastructure to ensure CBM can be implemented efficiently.	Article 7.4. Risk Management Adopt a risk management system for customs control.	Vehicle standards and dimensions.	CBM legislation and regulations
	Article 7.5. Adopt or maintain post-clearance audit to ensure compliance with customs and other related laws and regulations.		
	Article 7.7. Trade Facilitation Measures for Authorised Operators.		
	Article 8. Border Agency Coordination. Ensure coordination between national border agencies.		
	Article 9. Movement of Goods Intended for Import Under Customs Control.		
	Article 10.4. Single Window.		
	Article 11. Freedom of Transit. Transit charges should just cover administrative charges and costs of services provided.		
	Article 12. Customs Cooperation.		

Sources: Humphreys et al. (2019) and Transnet (2016).

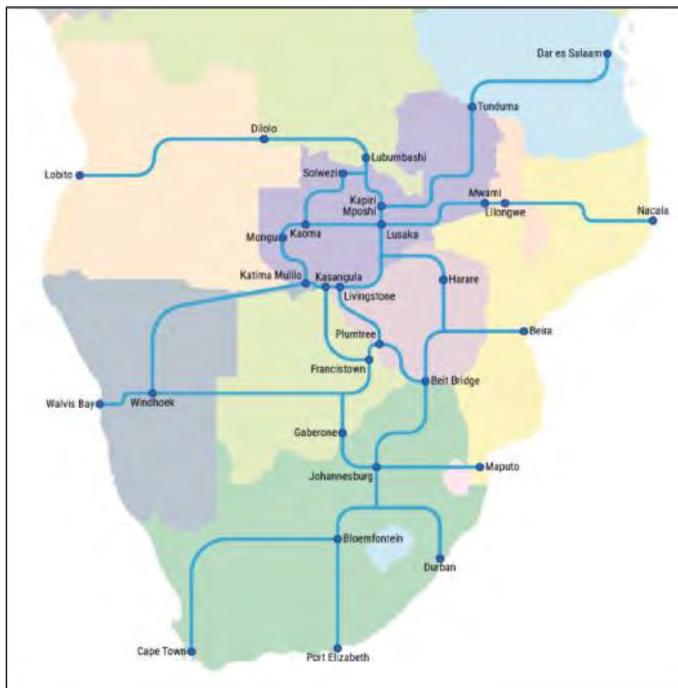
In summary, these logistics functions of service delivery of trade infrastructure, the trade facilitation regime, the transit/transport facilitation regime and management systems are component parts of transit and transport corridors. By analysing infrastructure gaps, implementation of trade facilitation measures and implementation of transit and transport facilitation measures, one can get a reasonable assessment of what needs to be fixed if African countries are to improve their logistics performance.

What is clear is that this can only be done through a regional effort, that a regional governance structure is required to improve logistics systems and that most African countries will need external assistance to close the gaps.

As can be seen from other chapters of this report, transport of goods in SADC is usually done by road transport – with smaller volumes being transported by rail – along SADC’s major transport and transit corridors, these being the

North-South Corridor, the Dar es Salaam Corridor, the Walvis Bay Corridor and the Mozambique corridors (Nacala, Beira and Maputo). Figure 42 shows the major transport/transit routes and corridors in the African mainland SADC region. The other corridor shown on the map, the Lobito Corridor, is less busy than the aforementioned corridors, mainly because of poorly developed infrastructure and lack of trade and transport facilitation instruments in place.

Figure 42: Major Corridors In Mainland Africa SADC Region



Source: extracted by authors

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Road transport tariffs are based on cost, plus an operating margin, whereas general freight rail transport is most often loss making because of low volumes and poor asset utilisation and tariffs are generally set on what the market can bear. The fixed cost/variable cost ratio for road is typically 40 per cent:60 per cent and for rail the opposite. Private sector investment in rail infrastructure can only be viable for large volume contract-based and dedicated rail services.

In the following sections, we discuss each of the individual components of the SADC inland transport corridor network.

6.3.2. SADC Road Network

As mentioned previously, most cargo in the SADC region is transported by road. This is partly because of the lack of investment that has gone into the SADC rail network compared to road transport, partly because of the technological advances that have been made in road transport and equipment, which have greatly improved road efficiency and partly because of the greater flexibility of road transport and its ability to do door-to-door deliveries.

As a general rule, the mainland SADC road infrastructure is in fair to good condition, with some notable exceptions where roads have failed beyond the point where they can be repaired. These sections need complete reconstruction, from the sub-base up, but even these road sections do not stop traffic moving along the corridors. Although the road sections have failed, traffic still passes along them, although at a slower speed and with more wear and tear inflicted on the truck and trailer than would be the case if the road were in good condition.

Land transport is the largest cost element on most of Africa's international trade routes, with sea transport costs

accounting for about one-third of the total cost and land transport about two-thirds of the cost. There is little that importers and exporters in Africa can do to reduce costs of sea transport, but there is a lot that can be done to reduce the costs of land transport.

Distance is a major factor of cost, but the condition of the road or track, vehicle condition and the cost of tyres and spare parts are also factors. Delays along routes for border crossing, vehicle check points and turnaround affect time and, in the SADC region, are a major cause of increased route costs.

The cost of freight services along the regional transport corridors, for both road and rail, is governed by the cost of a return trip. A road truck or rail wagon must return to base as quickly as possible to collect a new load and so optimise utilisation and reduce unit fixed costs. In the SADC region, unlike some other regions in Africa, the private sector operates all road transport and average transport charges or tariffs are based on actual cost plus an operating margin.

The transport tariff charged by truckers to their customers is, therefore, market-related and is often different for imports and exports, depending on whether the freight flow is balanced. An empty return can virtually double the cost of a one-way delivery. The South Africa Road Freight Association (RFA) has in the past published detailed vehicle operating cost (VOC) schedules for a full range of truck concepts.

These VOC are no longer published, but are prepared at the request of RFA members and can be adapted for the SADC region.⁸⁰ From the latest published RFA figures:

- The typical cross-border truck in SADC is a seven-axle trailer combination,

carrying a maximum of 32 metric tons of freight or one heavy 6 m container (TEU).

- The large operators tend to purchase new trucks, which are replaced every three to four years, having travelled up to 500,000 km. The smaller operators tend to purchase used trucks, which are less reliable and cover a shorter distance per annum.
- The typical operating costs for a seven-axle trailer combination truck, carrying a maximum load of 32 metric tons, is about US\$1.30 per km. The costs are typically split into 40 per cent fixed costs and 60 per cent variable costs, depending on utilisation – typically 120,000 km per annum. The shorter the annual distance covered, the higher the percentage of fixed costs. According to the 2015 RFA, a six-axle trailer combination new truck has an operating cost of US\$1.50/km, based on 150,000 km per annum, with a 70 per cent payload utilisation and loaded 75 per cent of the distance. This is similar to operating always full in one direction and empty on return.
- Road transport benchmark costs include all transport-related costs, but not cargo-related costs. Typical average transport tariffs for the longer cross-border routes of 2,000 km to 3,000 km are about US\$145 per ton (US\$0.064 per ton kilometre), but the import leg is charged higher at \$195 per ton (US\$0.09 per ton kilometre) and the export leg at US\$95 per ton (US\$0.04 per ton kilometre). For example, the export leg from the Zambian Copperbelt to all the regional competing ports have similar tariffs of about US\$95 per ton to US\$110 per ton and road tariffs compete with rail tariffs. Road tariffs for the import leg are much higher.

⁸⁰ In the following section, vehicle operating costs are derived from a report done by HPC Hamburg Port Consulting GmbH and Corridor Development Consultants (Pty), Ltd., in November 2018 on a marketing strategy for Namibia that, in turn, was derived from RFA figures.

- Road user fees are included in these costs. Toll and user fees vary from country to country. The SADC benchmark for heavy trucks is US\$10/100 km, which is the COMESA road user charge.
- Maximum speed is legislated at 80 Km/hr Average speeds are generally 60 km/hr on good surfaced roads and usually night-time driving is not allowed.
- The transit time for longer cross-border routes are typically three to four days for the large operators, including border crossings of one day – longer if there is border post congestion.
- It is very important for trucking companies on the longer cross-border routes to pick up return loads unless they are carrying high-value and /or 'just in time' goods such as refrigerated goods or fuel. Otherwise, the import route is charged the same as the return cost.

6.3.3 SADC Rail Network

The railway system throughout Southern Africa faces substantial challenges. The deregulation of road transport caused an initial loss in traffic volume that has since rapidly expanded. Unlike road transport, the operating costs of railways remain largely fixed and a decrease in traffic has forced railways to operate at a loss, with any income diverted toward salaries and fuel costs instead of maintenance and upkeep. Dwindling traffic and deteriorating infrastructure have resulted in less investment in the rail system and now most SADC railway systems find themselves in financially unsustainable positions. Table 50 gives details of the SADC rail system.



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Table 50: SADC Rail System Corridors and Routes

Corridor Name	Corridor Members	Corridor Extreme Points	Main Sections or Rail Network Lengths (km)	
Beira	Caminhos de Ferro de Moçambique (CFM)	Lubumbashi (DRC) to Beira (Mozambique)	DRC: 255	2,327
	National Railways of Zimbabwe (NRZ)		Zambia: 798	
	Zambia Railways Limited (ZRL)		Zimbabwe: 945	
	Société Nationale des Chemins de Fer du Congo (SNCC)		Mozambique: 329	
Beitbridge	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Durban (RSA)	DRC: 255	3,188
	Beitbridge Bulawayo Railway (BBR)		Zambia: 798	
	Zambia Railways Limited (ZRL)		Zimbabwe (BBR&NRZ): 794	
	Société Nationale des Chemins de Fer du Congo (SNCC)		RSA: 1,341	
Plumtree	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Durban (RSA)	DRC: 255	3,216
	Botswana Railways (BR)		Zambia: 798	
	National Railways of Zimbabwe (NRZ)		Zimbabwe: 474	
	Zambia Railways Limited (ZRL)		Botswana: 641	
Société Nationale des Chemins de Fer du Congo (SNCC)			RSA: 1048	
	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Port Elizabeth (RSA)	DRC: 255	3,575
	Beitbridge Bulawayo Railway (BBR)		Zambia: 798	
	National Railways of Zimbabwe (NRZ)		Zimbabwe: 794	
Zambia Railways Limited (ZRL)	RSA: 1,728			
Société Nationale des Chemins de Fer du Congo (SNCC)				
	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Port Elizabeth (RSA)	DRC: 255	3,311
	Botswana Railways (BR)		Zambia: 798	
	National Railways of Zimbabwe (NRZ)		Zimbabwe: 474	
Zambia Railways Limited (ZRL)	Botswana: 641			
Société Nationale des Chemins de Fer du Congo (SNCC)			RSA: 1,143	
	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Richards Bay (RSA)	DRC: 255	3,101
	Beitbridge Bulawayo Railway (BBR)		Zambia: 798	
	National Railways of Zimbabwe (NRZ)		Zimbabwe: 794	
Zambia Railways Limited (ZRL)	RSA: 1,254			
Société Nationale des Chemins de Fer du Congo (SNCC)				
	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Richards Bay (RSA)	DRC: 255	2,168
	Botswana Railways (BR)		Zambia: 798	
	National Railways of Zimbabwe (NRZ)		Zimbabwe: 474	
Zambia Railways Limited (ZRL)	Botswana: 641			
Société Nationale des Chemins de Fer du Congo (SNCC)				

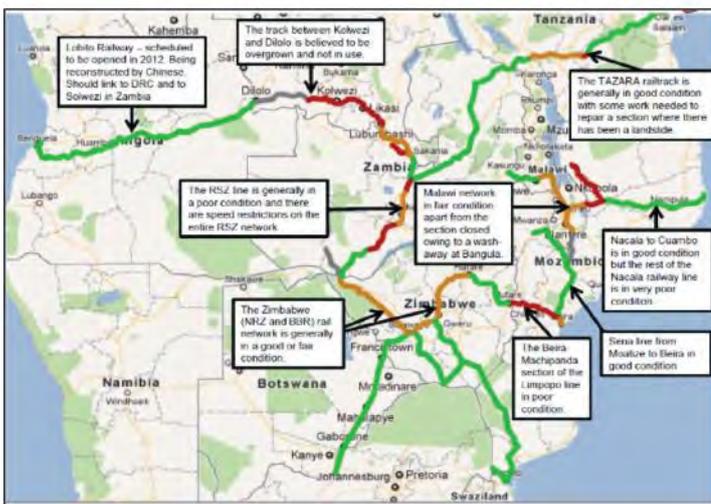
Beitbridge	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Cape Town (RSA)	DRC: 255	3,952
	Beitbridge Bulawayo Railway (BBR)		Zambia: 798	
	National Railways of Zimbabwe (NRZ)		Zimbabwe: 794	
	Zambia Railways Limited (ZRL)		RSA: 2,105	
	Société Nationale des Chemins de Fer du Congo (SNCC)			
Plumtree	Transnet Freight Rail (TFR)	Lubumbashi (DRC) to Cape Town (RSA)	DRC: 255	3,590
	Botswana Railways (BR)		Zambia: 798	
	National Railways of Zimbabwe (NRZ)		Zimbabwe: 474	
	Zambia Railways Limited (ZRL)		Botswana: 641	
	Société Nationale des Chemins de Fer du Congo (SNCC)		RSA: 1,422	
Central	Tanzania Railways Limited (TRL)	Kigoma to Dar es Salaam (both in Tanzania)		1,250
Dar es Salaam	Tanzania-Zambia Railways (TAZARA)	Lubumbashi (DRC) to Dar es Salaam (Tanzania)	DRC: 255	2,240
	Zambia Railways Limited (ZRL)		Zambia: 125	
	Société Nationale des Chemins de Fer du Congo (SNCC)		Tanzania: 1,860	
Goba	Caminhos de Ferro de Moçambique (CFM)	Mpaka Swaziland to Maputo (Tanzania)	Swaziland: 151	225
	Swaziland Railways (SR)		Mozambique: 74	
Limpopo	Caminhos de Ferro de Moçambique (CFM)	Lubumbashi (DRC) to Maputo (Mozambique)	DRC: 255	2,533
	National Railways of Zimbabwe (NRZ)		Zambia: 798	
	Zambia Railways Limited (ZRL)		Zimbabwe: 950	
	Société Nationale des Chemins de Fer du Congo (SNCC)		Mozambique: 530	
Lobito	Caminho de Ferro de Benguela (CFB)	Ndola (Zambia) to Lobito (Angola)	Zambia: 13	2,259
	Société Nationale des Chemins de Fer du Congo (SNCC)		DRC: 902	
	Zambia Railways Limited (ZRL)		Angola: 1,344	
Nacala	Mozambique Ports and Railways (CFM) and Central East African Railways (CEAR) (Malawi currently not a SARA Member)		Mozambique: 800	800
Namibian	TransNamib Holdings Ltd (TNHL)	Upington (RSA) to Lobito Angola	RSA:	1,149
	Transnet Freight Rail (TFR)		Namibian:	
Ressano Garcia	Caminhos de Ferro de Moçambique (CFM)	Komatipoort (RSA) Maputo (Mozambique)	Mozambique: 88	101
	Transnet Freight Rail (TFR)		RSA: 13	
Richards Bay	Transnet Freight Rail (TFR)	Komatipoort (RSA) to Richards Bay (RSA) via Golela (Swaziland)	Swaziland: 251	446
	Swaziland Railways (SR)		RSA: 195	

Source: SARA Information Brochure (2012).

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In 2012, TradeMark Southern Africa (TMSA) did a rail track assessment of SADC's railways, which is summarised in Figure 43. From this summary it can be seen that most of the rail track in SADC is functional but needs repair and rehabilitation. It can also be seen that SADC's railways are all interlinked and all use the same gauge – the Cape Gauge.

Figure 43: TMSA Rail Track Assessment, 2012



Source: extracted by authors

The changes that we are aware of and which have taken place since this 2012 assessment are:

- The condition of the Nacala railway has been significantly improved since 2012 and is now in excellent condition.
- There are reports of at least one passenger train running between Dilolo and Kolwezi, which implies that the rail track is at least contiguous between Kolwezi and Dilolo, although the condition and load-bearing capacity of the track is unknown.

Recent plans for rehabilitating the rail network have tended towards installing new railway lines and implementing expensive upgrades, such as converting the entire network to European Standard Gauge rails as promoted by the African Union. However, these plans are mainly promoted by governments (not railway companies) for political rather than operational reasons. The railway companies usually prefer to revive existing infrastructure.

While new railway lines are beneficial under certain scenarios, they are only effective when tied to a productive industry, as with the line to the Moatize coal site in Mozambique. Most current rail infrastructure can be made functional with minimal upgrades and is simply not operating at capacity. To become sustainable, additional

capacity requirements can be met through increased freight loads, though this increase has yet to occur because of the unreliability and cost inefficiency of the current rail network in comparison with road transport.

In spite of these challenges, the region maintains a strong interest in revitalizing the railway sector and is currently handling several proposals for new projects. As outlined in the 2012 Regional Infrastructure Development Master Plan, the SADC region has 31 rail projects under consideration. However, for these projects to be financially viable, railways must significantly increase the volume of freight transported. Key issues include:

1. Operating Costs – For low-volume general freight lines, the fixed operating cost can typically be between 60 and 80 per cent of the total cost. The main target is, therefore, to increase volumes to reduce unit costs. Operating costs can vary between US\$0.03 and US\$0.10 per ton kilometre or more, depending on the annual freight volume carried.
2. Specifications – The regional benchmark is to operate up to a 40-wagon train with 2x3000hp locomotives, with a minimum axle load of 18 tons, which allows two heavy 6-metre containers to be carried per wagon.
3. Transport Tariffs – Regional rail transport tariffs are currently set at about US\$0.05 per ton kilometre for rail to be price competitive with road (ZRL, NRZ and TAZARA) and yet rail is typically carrying less than 5 per cent of the freight on regional corridors. Reliability remains the main obstacle to increasing volumes.
4. User Charges and Access Fees – National rail operators (ZRL, TAZARA, NRZ) have started allowing private operators to use their lines with their own equipment on the basis of a track access fee. This access fee can be as low as US\$0.01 per ton kilometre (TAZARA), or as high as US\$0.034 per ton kilometre (CFM in Mozambique).
5. Speed and Transit Time – Maximum speed is 60 km/hr, but the average operating speed is about 20 to 25 km/hr, mainly because all the railways operate on single lines and the need to frequently stop at passing loops to allow for oncoming trains to pass. Passenger trains generally have right of way. This applies to the region as a whole. The transit time on the longer cross-border services, such as the North-South Corridor, are generally four to five days. Trains are not required to stop at border posts unless a locomotive or crew change is required.
6. Turnaround Time – This is a measure of wagon utilisation. For cross-border services this has been as high as 30 days against a target of 12 to 14 days. CDN on the Nacala Corridor reports as little as seven days for block trains that weigh more than 800 kg and this should also be achievable for other rail operators. The main reason for long wagon turnaround times is usually poor locomotive availability.
7. Balanced Loads – It is less important for rail to achieve balanced return loads, because of the high cost of waiting or repositioning. On the North South Corridor between Ndola and Durban, sulphur is imported (northbound), but only about 20 per cent is loaded with copper as an export (southbound).
8. Availability and Utilisation – Equipment availability benchmarks (wagons and locomotives) should be in the +85 per cent range. Utilisation is when the equipment is revenue earning and for general freight services this can be as low as 20 per cent to 25 per cent, but ideally should be double that.

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BOX 2: DEFINITION OF ONE-STOP BORDER POST (OSBP)

The OSBP concept promotes a coordinated and integrated approach to facilitating trade, the movement of people and improving security. The concept eliminates the need for travellers and goods to stop twice to undertake border crossing formalities. The OSBP concept calls for the application of joint controls to minimise routine activities and duplications. Through a 'whole-of-government' approach, the OSBP concept reduces the journey time for transporters and travellers and shortens the clearance time at border crossing points.

The OSBP concept consists of four pillars:

- **Legal and Institutional Framework:** The state extends the application of specific national laws outside its own territory.
- **Simplification and Harmonization of Procedures:** At a typical border post, there are several government agencies that are responsible for border controls. For efficient and effective OSBP operations, these agencies need to coordinate their operations to minimise duplication and redundancies.
- **ICT and Data Exchange:** ICT is a critical component of collaborative single window systems, simplification of documentation, border management and modernisation of customs, immigration and related services.
- **Hard Infrastructure:** The level of facilities required depends on the type and size of operations at a border post.

Table 51 provides a summary of some benchmark costs on the SADC railway system on the Walvis Bay, Dar es Salaam and North-South (Durban) corridors.

Table 51: Cost for Walvis Bay, Dar es Salaam and Durban Corridors

Benchmark Tariffs and Costs	Corridor Tariffs
Rail tariff (US cents per ntkm)	5
Rail tariff (US cents per km for 2 x light 20' containers or 1 x 40' container – one 40t wagon)	240
Road tariff (US cents per ntkm one way, full return import)	9
Road tariff (US cents per ntkm one way, full return export)	4
Road tariff (US cents per km for 2 x light 20' containers or 1 x 40' container – 32t truck load)	300
Road/Rail transfer cost (US cents/ton)	500
ICD consolidation cost for road to rail (US cents/ton)	400
Road/Rail transfer costs (US cents/TEU)	9,000

Source: HPC Hamburg Port Consulting GmbH and Corridor Development Consultants (2018).

Costs on these corridors are relatively high and need to be reduced to below road freight tariffs if rail is to compete with road, especially considering that road freight is a door-to-door service while rail is node-to-node and still needs road collection and delivery services.

There is a common belief that SADC needs one-stop border posts (see Box 2) to solve the challenges of crossing borders because it is assumed that an OSBP reduces the time taken to cross borders. This is only true if the relevant border agencies use the OSBP as a platform to implement coordinated border management, which is achieved by all border control agencies, both domestic and international, coordinating their functions and activities to get greater efficiencies in managing trade and travel flows.

In the case of transport logistics, time is money. This is because a truck (or any other mode of transport) only makes money when it is moving. A truck owner needs to cover his fixed costs (such as repayments on the truck, insurance, road tax, salaries of permanent staff etc. – costs which do not depend on the number of trips made by the truck fleet), as well as his operating costs

(such as costs of fuel, lubricants, tyres, road user charges, tolls, etc. – costs which depend on the number of trips made). In the SADC region, where transport costs are market driven, if a truck can make four round trips a month, the charges to the client will be based on the monthly fixed costs divided by four plus the trip operating costs. If, however, the truck is delayed on the journey and can only do one trip a month, then the client's charges will be based on the full monthly fixed costs and the cost of transport will naturally increase.

The main delays to transport on all SADC transport and transit corridors are at border posts. These delays can account for more than half of the journey time, even more if more than one border has to be crossed, of a 'normal' trip. Figure 44 summarises the waiting times at the key borders throughout the SADC region.

The main causes for the delays at borders is the inability to start processing a final clearance or removal in bond or removal in transit until the goods physically arrive at the border. Then, when the goods do arrive at the border post, delays occur because of weaknesses in the processing of clearance or transit documents,

multiple inspections, multiple forms to be completed – often requiring the same information for different border agencies – and a lack of trust between the Customs, the other government agencies (OGAs), the transporters and the importers and exporters and their agents, resulting in no or limited risk assessment being implemented.

As mentioned above, the solution to these delays is implementation of a Coordinated Border Management (CBM) system or an Integrated Border Management (IBM) system. The difference between the two systems is whether Customs and OGAs coordinate with each other or are integrated into one agency. In Africa, countries tend to aspire to a coordinated approach while in Europe and the United States, Customs, Immigration and OGAs are integrated into a UK-style 'Border Force' or U.S.-style 'Border Protection Agency'.

A one-stop border post provides the physical infrastructure and the standard operating procedures (SOPs) that allow CBM to be implemented. However, before a decision is taken to invest in the physical infrastructure of an OSBP there needs to be an assessment of whether the

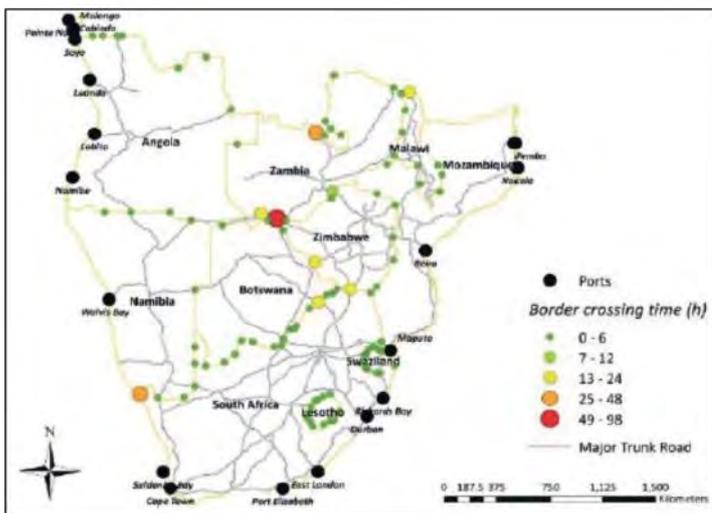
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infrastructure will be used effectively. An OSBP works best if countries share import/export data, if there are joint inspections – when inspections are necessary, if there is full cooperation between national border

agencies and between Customs of the two countries concerned. These specific issues are addressed under the framework of the World Trade Organization’s Trade Facilitation Agreement (TFA) which all SADC

member states, as members of the WTO or observers, are obliged to implement and are discussed in detail in Section 6.3.5.

Figure 44: Median Waiting Times At Borders In SADC Region (1q/2018)



Source: Humphreys et al. (2019).



6.3.4. SADC Trade and Transport Facilitation Instruments

Each SADC, or even each African, country is trying to reduce the costs of surface freight logistics individually, although within the framework of a multinational agenda (such as the World Trade Organization's TFA) or a regional agenda (such as COMESA or SADC or EAC). The challenge for African countries and especially those that do not have direct access to a seaport and must traverse another country to get to a port, is that they alone do not control their logistics strategies and costs, so costs need to be reduced along a multimodal and multinational transit and transport corridor.

The main delays in transit and transport are at the borders. To address border delays, it is suggested that all countries implement the WTO TFA,⁸¹ or at least the Articles that relate to customs procedures at, or behind, the border. This will further the implementation of coordinated border management (CBM), which implies implementation of at least the following components of the Trade Facilitation Agreement:

- Article 3 (Advance Rulings) – Each Member shall issue an advance ruling in a reasonable, time-bound manner to the applicant that has submitted a written request containing all necessary information. An advance ruling is binding for the period the advance ruling is valid.
- Some sub-articles of Article 7
 - Article 7.1 – Pre-arrival Processing – Adopt procedures allowing for the submission of import documentation and other required information, including manifests, to allow processing pre-arrival. Need to do this electronically.

- Article 7.2 – Electronic Payment – Allow electronic payment for duties, taxes, fees and charges.
- Article 7.3 – Separation of Release from Final Determination of Customs Duties, Taxes, Fees and Charges – Allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.
- Article 7.4 – Risk Management – Adopt a risk management system for customs control.
- Article 7.5 – Post-clearance Audit – Adopt or maintain post-clearance audit to ensure compliance with customs and other related laws and regulations.
- Article 7.7 – Trade Facilitation Measures for Authorised Operators – Trade facilitation measures related to import, export or transit formalities and procedures to operators who meet specified criteria for Authorised Economic Operators.
- Article 8 – Border Agency Coordination – Ensure coordination between national border agencies.
- Article 9 – Movement of Goods Intended for Import Under Customs Control – Allow goods intended for import to be moved within its territory under customs control from a customs office of entry to another customs office in its territory from where the goods would be released or cleared.
- Article 10.4 – Single Window – Establish or maintain a single window enabling traders to submit documentation and/or data requirements for importation, exportation or transit of goods through a single entry point and notified through the single window.
- Article 11 – Freedom of Transit – The rules that apply to transit traffic are designed to ensure that a country does not impose additional charges on transit traffic, so that transit charges should just cover administrative charges and costs of services provided; rules should be based on MFN and National Treatment rules and should be no more burdensome than necessary and Members are encouraged to provide physically separate infrastructure for transit traffic.
- Article 12 – Customs Cooperation.
- As part of the TFA notification process countries have to categorize the TFA Article and sub-Articles into Category A, B and C where:
 - Category A – measures which can be implemented immediately by the country concerned.
 - Category B – measures where a country needs more time than the time agreed to by all members to implement that particular instrument.
 - Category C – measures where a country will need technical assistance and capacity building and more time to implement the measures.

Table 52 shows the categorization of that instrument as A, B, or C and, if B or C, then the definitive date by which the country has indicated that the instrument would be implemented. As can be seen in Table 49 (page 142), no country, not even South Africa, considers itself able to implement all of the TFA instruments necessary to execute CBM in an efficient manner. However, in the case of South Africa, the only instrument they need more time to implement is the Single Window commitment and this is by no means essential for CBM. For all other

⁸¹ Trade Facilitation is also addressed in the Agreement establishing the Africa Continental Free Trade Agreement (AfCFTA). Annex 3 of the Protocol on Trade in Goods of the AfCFTA Agreement addresses Customs Co-operation and Mutual Administrative Assistance and Annex 4 addresses Trade Facilitation. Both of these AfCFTA annexes follow the WTO's Trade facilitation agreement and are considered to be WTO+, meaning that they go beyond the provisions of the WTO

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corridor countries, many of the instruments essential for CBM to work fall under either category B or category C.

Countries that are furthest behind in terms of implementing trade facilitation measures have not categorised TFA instruments into either B or C and have left the date of implementation as 'to be determined'. This implies that they realise they have challenges but have yet to determine how to address them, how long it will take to address them and whether they will need external assistance to address the challenges that are still to be fully defined.

The relevance of the Trade Facilitation Agreement implementation matrix in Table 49 is that unless a country has the necessary trade facilitation measures in place to allow it to implement at least coordinated border management, then building infrastructure, whether this is a one stop border post or upgrades to a two-stop border post, will not make the border more efficient. This is because the services that are supposed to be provided using the new infrastructure will not be able to be delivered because of 'soft' infrastructure constraints and challenges.

One of the main challenges to improving the efficiency of border posts is the failure of most countries to utilise risk assessment effectively. Risk assessment is designed to categorise economic operators (traders, drivers, agents, etc.) into those that are high risk (operators whose activities and transactions need to be checked in detail) and those that are low risk (operators whose activities and transactions do not need to be checked) and medium risk (operators whose documents need to be checked). High-risk operators take a long time to clear through a border (because their documents need to be scrutinized in detail and their cargoes need to be scanned and possibly physically inspected), whereas low-risk operators cross very quickly.

If an effective and efficient risk assessment is not in place, it precludes the use of other trade facilitation measures such as Pre-Clearance, Post Clearance Audits, AEO or preferred trader schemes, Separation of Release from Final Determination of Customs Duties, Border Agency Cooperation and Customs Cooperation.

Border control agencies and particularly Customs, usually staff their border posts

according to a percentage of high-risk operators they expect to encounter. Normally, Customs would expect about 20 per cent of trucks coming through a border to be high risk. Thus, if an average of 400 trucks use the border, Customs would have enough inspectors to physically inspect 80 trucks a day, which, in this case, would be three to four inspection staff. However, because Customs do not use the Risk Assessment instruments, mainly because they are under huge pressure to meet revenue targets and do not believe that risk assessments catch tax evaders, up to 80 per cent of trucks can be designated as high risk. The number of customs inspectors remains the same. Therefore, cargo is delayed by inspections and it is further delayed because an inspection queue builds up. The solution to this would be to assist Customs to profile economic operators adequately (some Customs agencies do not profile economic operators and base their risk assessment on the classification of goods only, which means that risk assessment will not work) and to rely more on post-clearance audits and pre-arrival clearances and an authorised economic operator (AEO).

Table 52: TFA Instruments Necessary for Full and Effective Implementation of CBM

Article	Description	Country																			
		South Africa		Namibia		Botswana		Zimbabwe		Zambia		Malawi		Tanzania ⁸²		Angola		Mozambique		DRC	
		Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date
3	Advance Ruling	A	22/02/28	C	31/12/21	A	.	B	31/12/20	B	31/12/21	C	TBD			C	TBD	C	TBD	B	20/08/19
7.1	Pre-Arrival Processing	A	.	A	.	A	.	B	31/12/21	C	31/12/22	A	.			A	.	A	.	B	20/08/19
7.2	Electronic Payment	A	.	A	.	A	.	B	31/12/21	C	31/12/25	A	.			A	.	A	.	B	20/08/19
7.3	Separation of Release from Final Determination of Customs Duties	A	.	A	.	A	.	A	.	B	31/12/22	B	TBD			B	TBD	A	.	B	20/08/19
7.4	Risk Management	A	.	C	31/12/22	A	.	C	31/12/23	C	31/12/25	C	TBD			C	TBD	A	.	B	20/08/19
7.5	Post Clearance Audit	A	.	C	31/12/22	A	.	C	31/12/27	C	31/12/25	C	TBD			A	.	A	.	B	20/08/19
7.7	Trade Facilitation Measures for Authorised Operators	A	.	C	31/12/23	B	31/12/21	B	31/12/22	C	31/12/24	C	TBD			C	TBD	A	.	B	20/08/19
8	Border Agency Cooperation	A	.	C	31/12/22	B	31/12/21	A	.	C	31/12/23	C	TBD			C	TBD	C	TBD	C	20/02/22
9	Movement of goods intended for import under customs control	A	.	A	.	A	.	A	.	A	.	A	.	A	.	A	.	A	.	B	20/08/19

⁸² Tanzania has only notified Category A provisions which are to have been implemented upon entry into force of the Agreement. The assumption must be that the other instruments outlined in the table are either Category B or Category C provisions.

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Article	Description	Country																			
		South Africa		Namibia		Botswana		Zimbabwe		Zambia		Malawi		Tanzania ⁸²		Angola		Mozambique		DRC	
		Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date	Category	Definitive Date
10.4	Single Window	B	22/02/38	C	31/12/23	C	31/12/27	C	31/12/29	C	31/12/30	C	TBD			C	TBD	C	TBD	C	20/02/22
11	Freedom of Transit	A	-	C	31/12/23	B	31/12/20	B	31/12/20	C	31/12/30	A	-			B	TBD	A	-	A	-
12	Customs Cooperation	A	-	A	-	B	31/12/20	A	-	C	31/12/38	A	-			B	TBD	A	-	A	-

Source: Collated by Nathan Associates for this study (Derived from the Trade Facilitation Agreement notifications).

6.4. DAR ES SALAAM CORRIDOR

6.4.1. Corridor Description

The Dar es Salaam Corridor links the landlocked countries of Democratic Republic of Congo (DRC) (Tanganyika, Haut-Lomami, Lualaba and Haut-Katanga provinces, which used to be the Katanga Province of DRC), Zambia and Tanzania with the port of Dar es Salaam. The main transport routes on the corridor are road and rail.

The Dar es Salaam Corridor has a committee, Dar es Salaam Corridor Committee (DCC), which acts as a forum for regional cooperation on cross-border transport policy formulation, regulation and operation. The DCC has members from the public and private sectors of DRC, Zambia, Malawi and Tanzania and was established under SADC by constitution in 2003.

The DCC, with World Bank support, has allocated funds for the development of a Corridor Performance Monitoring System

(CPMS) that will capture data from different stakeholders, such as the Tanzania Ports Authority, truckers, railways, clearing and forwarding agents, traffic police and others from all member countries.

The CPMS will provide Corridor Performance Benchmarking that measures the following key performance indicators (KPIs):

- infrastructure and asset utilisation levels;
- turnaround times for major routes;
- processing times at critical service points;
- cargo and vehicle losses to support risk management;
- driver and operator performance to enable incentive schemes;
- profitability of routes per cargo type to prevent loss of business to other regional corridors.

Through the quality data and reports produced by the CPMS, the DCC aims to pinpoint where improvements and interventions can be made along the corridor to improve its efficiency. The data generated will provide evidence to support their suggestions and recommendations for future projects to be actioned along the corridor, ultimately improving the overall efficiency and effectiveness of the corridor and subsequently increasing trade and travel along the road network and surrounding areas.

6.4.2. Road Infrastructure Condition and Capacity

Table 53 shows that, generally, the road condition is fair to good, with some sections having recently been reconstructed and with other sections in need of preventive maintenance and regular maintenance. Table 50 gives the condition of each section of the road in terms of whether the road is in good condition (IRI=1 or 2), fair condition (IRI=3 or 4) or poor condition (IRI = or > 5).

Table 53: Road Condition on the Dar es Salaam Corridor

Corridor Road/Rail		Town Name From	Town Name To	Condition	Km	Description
Dar es Salaam	Road	Lubumbashi	Kasumbalesa	Fair	99	Road in reasonable condition but with heavy mining trucks.
	Road	Kasumbalesa	Chingola	Fair	43	Road in reasonable to poor condition. Lots of police, customs and security checks.
	Road	Chingola	Kitwe	Good	54	Road in process of being rebuilt. Now a toll road. Very heavy traffic. Can be congested.
	Road	Kitwe	Kapiri Mposhi	Good	157	Road in reasonable condition. Now a toll road. Can be congested.
	Road	Kapiri Mposhi	Mpika	Fair	446	This road needs preventative maintenance and if this is not done soon then the road will most likely fail and will need to be reconstructed from the sub-base up.
	Road	Mpika	Nakonde	Good	374	Mpika to Chinsale in reasonable condition. Chinsale to Nakonde under construction.
	Road	Nakonde	Mbeya	Fair	106	In reasonable condition.
	Road	Mbeya	Dar es Salaam	Fair	813	In reasonable condition – large sections have been reconstructed in last 5 years. Proposal to construct a 6-lane and 4-lane tolled highway linking Dar es Salaam with Chalinze.
	Road	Lusaka	Kapiri Mposhi	Fair	201	Very heavy, slow-moving traffic. Some rutting and potholing but reasonable.
	Road	Mpika	Mpulungu	Fair	417	Road in reasonable condition – some steep gradients.
	Road	Lilongwe	Mzuzu	Fair	355	In reasonable condition. Narrow road and missing hard shoulders.
	Road	Mzuzu	Songwe	Fair	301	In reasonable condition. Narrow road and missing hard shoulders. Steep gradients.
	Road	Songwe	Mbeya	Fair	137	In reasonable condition. Narrow road and missing hard shoulders. Steep gradients.

Source: Nathan Associates (2019).

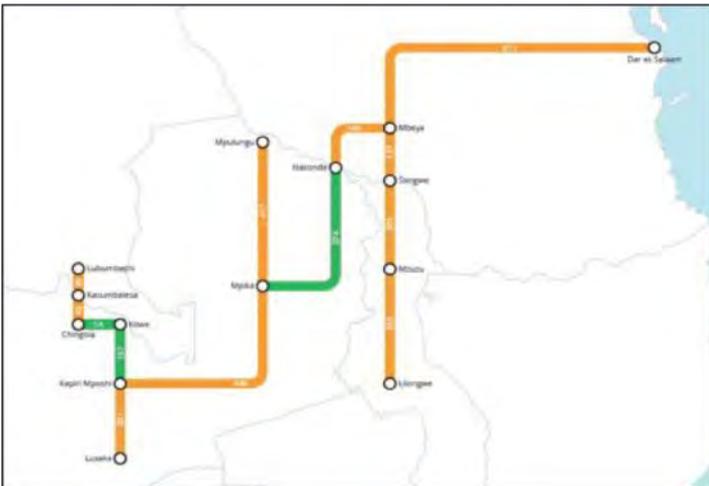
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In the countries the Dar es Salaam Corridor traverses, all roads are public sector roads in that they belong to the state and are managed and maintained using public sector funds. All countries operate road funds, which are administered by specially created agencies and financed from fuel levies, transit fees, overloading fees and other monies. In Tanzania, for example, the Road and Fuel Tolls Act 2006, which established the road fund, prescribes that at least 90 per cent of the road fund must be used for maintenance and repair of public roads, with the remaining 10 per cent used for road development and administrative costs.

There are sections where the road speed is slow, such as in Dar es Salaam and its outskirts, in major towns along the route, in hilly sections, including the areas in the north-east of Zambia and around the Mpika area. There is a proposal to build a six-lane expressway out of and into Dar es Salaam for 50 km to ease traffic congestion and reduce delays, but a major challenge of traversing the last mile to and from the port of Dar es Salaam remains. It would also be useful to install climbing lanes on all major gradients so that slow-moving traffic will not hold up the faster-moving traffic. This would result in reduced transport and transit times. With the current volumes of traffic using the Dar es Salaam road corridor, it is probably not economically justifiable to dualize the entire corridor.

Overall, the road condition of the Dar es Salaam Corridor is not considered to be a major factor in adding either costs or time delays to cargo moving along the corridor. There are plans to reduce the congestion in and around Dar es Salaam. This will have a major impact on the time it takes to complete the journey to and from the port of Dar es Salaam.

Figure 45: Dar Es Salaam Corridor Road Map



Source: Collated by Nathan Associates for this study.

One challenge on the Dar es Salaam route, which limits the capacity of the corridor, is the insistence by Tanzania not to allow seven-axle trucks to operate normally on the Dar es Salaam to Tunduma section of the road corridor.⁸³ This restricts the capacity of the corridor because trucks of only 48 ton gross vehicle mass (meaning a load weight of about 24 tons) can be used. It also restricts the number of vehicles that can provide a transport service on the Dar es Salaam Corridor. Most SADC cross-border transporters would use a seven-axle combination, with a gross vehicle mass of 56 tons and so maximize the weight of the load carried at about 32 tons, except Tanzanian transporters, so most of the carriers on the Dar es Salaam corridor are Tanzanian registered trucks.

The capacity of the corridor is also reduced because of the poor utilisation of the corridor's multimodal facilities. For example, fuel from Dar es Salaam moves to Zambia and Malawi using road tankers. Another option would be to transport the fuel to the fuel storage tanks at Mbeya on the TAZARA railway and then to transport the fuel into Malawi and Zambia by road. Fuel for Zambia could be transported all the way to Kapiri Mposhi and then transported by road transport or rail (ZRL) to storage depots in Zambia.

6.4.3. Rail Infrastructure Capacity and Condition

The TAZARA railway links the port of Dar es Salaam to Kapiri Mposhi in Zambia (see Figure 46).

Figure 46: Dar Es Salaam Corridor Rail Map



Source: Nathan Associates (2019).

⁸³ Tanzania does not ban seven-axle trucks to use the Dar es Salaam section of the road but treats seven-axle trucks with a gross vehicle mass of 56 tons as abnormal loads. This means that operators need to buy an abnormal load licence and accept the extra costs and restrictions involved in transporting under abnormal load conditions.

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The Tanzania-Zambia Railway Authority was established in March 1968, with survey and design work carried out by the Chinese government between October 1968 and May 1970. In July 1970 China offered an interest-free loan of CNY 988 million (around US\$500 million) to be repaid in 30 years (although the loan has never been repaid), which would cover the costs of construction, supporting infrastructure, motive power, rolling stock and staff training. The rail track is a single-track Cape Gauge (1,067mm (3'-6")) which was to allow through-working of rolling stock to the existing Zambian system. This remains valid today, with the trains able to link to the Zambia Railway (ZR) system at Kapiri Mposhi.

Table 54 shows the condition of TAZARA from an assessment done by TMSA in 2012.

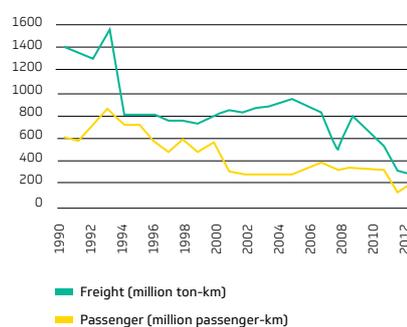
Table 54: Condition of the Tazara Line in 2012

From	To	Est Freight mtpa, both directions	Km	Category	Comments
TAZARA		Max traffic in 1990, 1.2 mtpa	1,859		45 kg rail on concrete sleepers for whole system, built 1975
Dar es Salaam	Mlimba	0.6	555	G	45 kg rail on concrete sleepers, generally good, but rail wear on curves
Mlimba	Uchindile	0.6	6	P	Landslides in 1979, non-yet repaired but track realigned with sharp curves – causing wheel wear
Uchindile	Mbeya	0.6	294	F	Sections with black cotton soils, poor track foundation and alignment
Mbeya	Kapiri	0.45	1,004	G	Generally good, wear on curves

Source: TradeMark Southern Africa (2012).

Figure 47 shows the amount of freight and the number of passengers TAZARA carried between 1990 and 2012. As can be seen from Figure 47, even in the 1990s, TAZARA operated at less than 20 per cent of its design capacity. During the railway's nearly 45 years of operation, the line has never achieved the efficiency and volume of traffic that it was designed for. This is mainly because of poor maintenance of the track, which caused derailments and slow speeds all along the network. Lack of sufficient locomotive power (to move from Mpika to Mbeya requires the locomotive power of two GE30 locomotives, providing 6,000 horsepower), lack of wagons and lack of maintenance of the locomotives and wagons available cause regular equipment failures, which also increases the time and cost of freight movements.

Figure 47: Freight and Passengers on the TAZARA Line from 1990 to 2012



Source: World Bank (2017).

6.4.4. Border Post Condition and Capacity

The capacity of the Dar es Salaam corridor is affected primarily by the border facilities at Nakonde/Tunduma, between Tanzania and Zambia, at Kasumbalesa between Zambia and DRC and at Songwe between Tanzania and Malawi. Descriptions of the Nakonde/Tunduma and Songwe border posts are given below. The description of the Kasumbalesa (which can be considered to be on 4 transit/transport corridors) is given under the North-South Corridor section.

6.4.4.1. Nakonde/Tunduma

Figure 48 shows that new border infrastructure has been built on the Tanzanian (Tunduma) side of the border and some infrastructure has been built on the Zambian (Nakonde) side of the border. On the Zambian side of the border, there is no room available for expansion because the border post is now in the middle of a town. Zambia plans to create a commercial goods yard where all commercial goods coming from and going to Dar es Salaam will be cleared for final entry or as goods in transit. Zambia Revenue Authority has secured a suitable site south of the existing border infrastructure and plans to start construction of a commercial goods border crossing at this site.

Figure 48: Nakonde/Tunduma Border Post between Zambia and Tanzania



Source: extracted by authors

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6.4.4.2. Kasumbalesa Border Post

Kasumbalesa, between the DRC and Zambia, is the busiest transit border in Zambia and handles an average of 650 trucks per day (see Figure 49).

Figure 49: Kasumbalesa Border Post between Zambia and DRC



Source: extracted by authors

Southern DRC is heavily dependent on food and general goods imported through Kasumbalesa. It imports fuel, acid (for the mines), sugar, cement, timber, mattresses, mealie-meal, agricultural products, cooking oil, fresh vegetables, livestock, fish and other general and household goods through Kasumbalesa.

The only goods coming from DRC into Zambia are copper (transiting through Zambia), copper concentrate (usually to be processed in Zambia into copper and then exported) and cobalt concentrate (usually transiting through Zambia).

Kasumbalesa is the only border in Zambia which collects border/terminal crossing fees. The arrangement is under a PPP Agreement between the Government of Zambia and the Zambia Integrated Property Border Crossing Company (ZipBCC). ZipBCC obtained the 20-year concession to build and operate Kasumbalesa Border Post⁸⁴ on both the Zambian and the DRC sides of the border. The Congolese have now cancelled the concession, but the Zambian concession is operational and ZipBCC charges each truck US\$100 on entry and exit into the border facilities. It is understood that the Congolese do the same on their side of the border. This adds a total of US\$400 to the cost of a round trip between Zambia and DRC through Kasumbalesa. Between January and October 2017, the total number of trucks crossing at Kasumbalesa was 164,000. The total number of trucks using Kasumbalesa in 2017 was about 220,000, giving the concessionaire a revenue of about US\$22 million a year. Considering that the facility is reputed to have cost US\$33 million, this represents a very healthy return on the original investment made by ZipBCC. It also brings into question whether Zambia and DRC are not in contravention of the provisions of Article 6 of the Trade Facilitation Agreement that states that fees and charges must be limited in amount to the

approximate cost of the services rendered. In the case of Kasumbalesa, they patently are not.

One of the consequences of the user charges imposed on all trucks using the border facilities on both sides of the border, as well as the random and undocumented and unreceipted charges that are imposed on transporters in DRC (a practice that is also in contravention of the Trade Facilitation Agreement), is that owners of trucks that are not registered in DRC are reluctant to let them cross into DRC. This results in transshipment taking place at the border itself. This transshipment, which is all one-way – from Zambia to DRC – involves truckers unloading goods on the Zambian side of the border and Congolese traders buying the goods they need on the Zambian side of the border. The traders then hire bicycles that have been modified to carry large loads (up to 4-5 tons). These bicycles are pushed through a specially created 'Passenger Corridor' at Kasumbalesa into DRC. The goods, which are all goods excluding fuel and acid, are then reconsolidated on the DRC side of the border and transported to their final destinations in DRC by truck.

There is also a railway link between Zambia and DRC. Some goods, although not many compared to what is transported by road, are transported to and from Lubumbashi by rail. The rail crossing border post is, however, not at Kasumbalesa but at Sakania.

Zambia has been discussing various options related to the Kasumbalesa Border Post, including a one-stop border post, a border marketplace where traders from DRC can come and buy goods in Zambia and transport them to DRC (similar to what is currently happening but would be more structured) and a truck-stop with hotels and other facilities for use by drivers crossing the border or terminating at Kasumbalesa.

It is unlikely that a one-stop border post would be a good investment, given that the required trade facilitation measures are not in place to allow CBM to be implemented. A significant amount of trade at Kasumbalesa is transshipment, with Congolese traders coming into the marketplace at Kasumbalesa on the Zambian side, purchasing goods and transporting them by modified bicycle (see Figure 50 and Figure 51) across the border (which amounts to transshipping with no paperwork done on the Zambian side). An OSBP will not solve this transshipping challenge, nor will it reduce costs or time taken to move general goods across the border. The reasons why this transshipment by bicycle is used are mainly the cost of using a truck to cross the border (US\$400) for a return journey, the lack of coordination and cooperation between the border control agencies on either side of the border and the challenges faced by drivers of non-Congolese registered trucks once they get into DRC. These are all pre-requisites for an OSBP. Until these issues are resolved, there is little economic justification in constructing an OSBP at Kasumbalesa.

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Figure 50: Modified Bicycles used for Transshipping at Kasumbalesa



Source: extracted by authors

Figure 51: Transshipping through the Pedestrian Corridor at Kasumbalesa



Source: extracted by authors

With respect to trade flows, this report affirms that there is increasing traffic at Mokambo border post, but only from DRC to Zambia and not in the opposite direction. Mokambo is at the southern end of the Pedicle road, which is used mainly by Zambian traffic going to and coming from the Zambian Copperbelt and Zambia's North-West Province. It is the shortest route, but 70 km of it passes through DRC. It is possible that the increased traffic is coming from Kolwezi, via Lubumbashi and Whiskey (where DRC Customs clears goods) with copper and cobalt concentrate and going either to the railhead at Sakania, or to Ndola or the smelter at Chambeshi. This would be a cheaper option than using the border facilities at Kasumbalesa, as the truckers would not have to pay US\$100 on the DRC side and US\$100 on the Zambian side of the Kasumbalesa border. It is, therefore, likely that the increased traffic at Mokambo can be attributed to attempts to avoid using Kasumbalesa because of the high costs imposed on truckers at the Kasumbalesa border crossing.

The Chililabombwe Municipal Council is at an advanced stage of planning to construct a truck park with facilities for drivers, including hotel accommodation and restaurants, south of the Kasumbalesa marketplace. Plans have been approved, but there is a legal issue to resolve. According to unofficial sources, the concession agreement with ZipBCC includes a clause that would bind Chililabombwe Municipal Council to involve the concessionaire in the development of the truck park.

A third option at Kasumbalesa under discussion is the creation of a frontier market, which would support the existing system but provide covered market stalls

and hardstands, warehousing facilities and ablution and accommodation facilities for marketeers and traders. COMESA is analysing this option using EDF11 regional funds and working with the Cross-Border Traders Association.

6.4.4.3. Songwe

Songwe Border Post between Malawi and Tanzania is a small border post that handles mainly fuel and general cargo transported to Malawi from Dar es Salaam. It also handles minimal traffic as a secondary route to DRC and Zambia. It is a normal border post (i.e. not an OSBP).

Although the Songwe Border Post is congested, it may not be necessary to invest in infrastructure. Unlike airports, where passengers must spend time waiting for connecting flights and need facilities at the airport, land border facilities should aim to get both cargo and passengers through the border as quickly as possible. In a border control zone, there should be minimal facilities for passengers, especially so that they are not encouraged to linger at the border facility.

The main gains to be achieved at border posts in terms of reducing time delays and trip costs (directly and indirectly) are through implementation of coordinated border management (CBM). The infrastructure investment should be limited to what is required to support implementation of CBM. In the case of Songwe, most activity is the clearance of fuel tankers from Dar es Salaam into Malawi. Separation of fuel tankers from the rest of the traffic and clearing fuel tankers separately from other cargo would probably reduce congestion, reduce crossing times and improve safety.

6.4.5. Trade Facilitation Performance

The performance of transport and transit corridors depends on whether or not the countries along the corridor implement trade and transport facilitation measures that allow unrestricted trade and transport to take place along the corridor. Table 55 provides details of the status of trade and transport facilitation instruments in place along the Dar es Salaam Corridor.

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Table 55: Trade and Transport Facilitation Measures

Dar es Salaam Trade and Transport/Transit Facilitation Data Sheet		
Transit and Transport Facilitation Instruments	Vehicle Overloading	There appears to be no serious overloading issues on the corridor.
	Vehicle dimensions	The Dar es Salaam Corridor does not have harmonised vehicle dimensions in that Tanzania limits trucks to 6 axles and a gross vehicle mass (GVM) of 48 tons. In Zambia and DR Congo and in the rest of SADC, 7-axle trucks are allowed to operate at a GVM of 56 tons.
	3rd Party Vehicle Insurance	Although Tanzania is not part of COMESA, it uses the COMESA Yellow Card, as does Zambia and DR Congo. Operators have a choice of using the Yellow Card or of buying insurance at the border.
	Multilateral Cross-Border Road Transport Agreement	The Tripartite Transport and Transit Facilitation Programme (TTTFP) is working with COMESA-EAC-SADC Tripartite countries to design and implement a MCBRTA. This has been approved by COMESA-EAC-SADC Tripartite Ministers but needs to be ratified by all member states.
	Corridor Management Authorities	The Dar es Salaam Corridor Committee (DCC) is a forum for regional cooperation on cross-border transport policy formulation, regulation and operation. It is not an inter-governmental authority, so has little authority.
Trade Facilitation Instruments	Advance Rulings	All three countries are endeavouring to implement an advance ruling system but none of the three countries have designated Advance Rulings as Category A.
	Pre-Arrival Processing	Practically, pre-arrival processing is not available at Tunduma/Nakonde or at Kasumbalesa border posts, partly because of a lack of traffic separation and queuing systems.
	Electronic Payment	Electronic payments are available in Zambia and Tanzania but not between countries.
	Separation of Release from Final Determination of Customs Duties	All three countries, under certain and special circumstances, allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.
	Risk Management	The implementation of risk management systems pose serious challenges for all three countries along the corridor. The main reason for this is a lack of faith from Customs that risk management will not result in a loss of revenue, as well as a failure to link the risk management module to the main customs management system, plus calibrating the system with relevant data on known traders and economic operators.
	Post-clearance Audit	All countries, under certain and special circumstances, implement post-clearance audits to ensure compliance with customs and other related laws and regulations.
	Trade Facilitation Measures for Authorised Operators	Tanzania is part of the EAC AEO system but has very few registered AEOs (in 2017 there were two registered AEOs in Tanzania). Zambia has a preferred trader scheme. DR Congo does not operate a preferred trader scheme or an AEO scheme. Even if there was a cross-border AEO or preferred trader scheme in operation, this would not assist the private sector because of the congestion at the border posts, caused by not implementing other trade facilitation measures.
	Border Agency Coordination	All three countries are working towards improved coordination between border agencies nationally but there is still plenty of room for improvement.
	Movement of Goods Intended for Import Under Customs Control	All three countries allow goods intended for import to be moved within its territory under customs control from a Customs Office of entry to another Customs Office in its territory from where the goods would be released or cleared.
	Single Window	All countries are working on national single window systems but none of the three countries have a functional system yet.
	Freedom of Transit	All countries, directly or indirectly, impose additional charges on transit traffic, usually at the border, such as concessionaire fees at Kasumbalesa, which are obviously well above the cost of services provided.
Customs Cooperation	Zambia is working hard to improve the level of cooperation between Zambia Revenue Authority and other national Customs agencies. Zambia is in the process of signing data sharing agreements with DR Congo, Tanzania and Malawi.	

Source: TradeMark Southern Africa (2012).

6.4.6. Proposed/Planned Corridor Projects

6.4.6.1. Roads

The Dar es Salaam Corridor road is generally in fair to good condition and many sections have recently been rehabilitated or reconstructed. Chinese contractors, using financing from the African Development Bank, are currently reconstructing the road from Chinsali to Nakonde in Zambia. However, there are also other sections of road that could be considered for upgrading. The following changes are recommended:

- Putting in climbing lanes in sections where gradients slow down the traffic, especially heavy goods trucks, which would allow safe overtaking and reduce overall journey times for all but the slowest trucks, instead of reducing journeys to the speed of the slowest-moving trucks.
- Dar es Salaam – Chalinze Toll Road. The government of Tanzania has announced plans for the upgrading of a significant portion of the Dar es Salaam to Morogoro trunk road to expressway standard. The plans involve the upgrade of approximately 100 km from Dar es Salaam to Chalinze to ease traffic congestion along the route. This project is of national importance to Tanzania, given that it is the main westbound arterial route from the main commercial hub and port, Dar es Salaam and serves much of mainland Tanzania in addition to the neighbouring landlocked countries of Malawi, Zambia, DRC, Rwanda and Burundi. It is estimated that the road carries up to 70 per cent of the freight from the port of Dar es Salaam. Chalinze is also the point at which the main Dar es Salaam to Morogoro road meets the Tanga road, which links Dar es Salaam to Mombasa in Kenya.

The project, which is estimated to cost US\$535 million, will involve the construction of a six-lane expressway for the first 50 km from Dar es Salaam, reducing to a four-lane expressway for the remainder of the way to Chalinze, with grade-separated junctions and service roads on both sides in addition to toll collection facilities and amenities for road users. It will significantly improve the safety, speed and reliability of journey times along the route.

TANROADS has so far advertised tenders for contracting financing proposals (February 2013) and preliminary design work (June 2014), both of which have now closed. In its tender documents, TANROADS indicated that it is flexible with regard to the structure of the tender, be it design and build; design, build and operate; build, operate and transfer; or other similar arrangements.

It is envisaged that a second phase of this project will upgrade the section of this road continuing from Chalinze to Morogoro at some point in the future when funding and priorities allow.

6.4.6.2. Railways

Some investment opportunities are the following:

- Track Upgrades – There are likely to be opportunities to assist TAZARA to upgrade the track in the sections where derailments take place.
- Marshalling Facilities – There may be opportunities to improve marshalling facilities and so improve loading and unloading and build up trains quicker and more efficiently.
- Rolling Stock and Locomotives – This would provide financing to either purchase or lease additional rolling stock either by TAZARA and/or by companies that have access agreements with TAZARA, such as Calabash and Zambia Railways Limited (ZRL).

TAZARA also does not have a modern, or even a functioning, signalling system, although with such small amounts of traffic, it could be argued that a signalling system is not required by TAZARA.

6.4.6.3. Border Posts

The main border posts on the Dar es Salaam Corridor are:

- Nakonde/Tunduma: Tunduma has recently been upgraded as a component of an OSBP by TradeMark East Africa (TMEA) and no further upgrades are required. On the Nakonde side of the border, the Zambia Revenue Authority plans to move the commercial freight terminal to a greenfield site. There may be an opportunity for Afreximbank to assist with the financing of this new infrastructure.
- Songwe: Most traffic going through Songwe is fuel from Dar es Salaam. It is unlikely that an investment in infrastructure will lead to savings in time or costs for fuel imports. It is also unlikely that border upgrades at Songwe will attract other traffic to that border post. The main export from Malawi is tobacco and most of it is exported to and through South Africa. One reason for this is that Malawi imports significant volumes of goods from and through Kasumbalesa and so tobacco is considered to be, most often, as a back haul.
- Kasumbalesa: Kasumbalesa could be considered as a 'problem' border post, but construction of an OSBP facility at Kasumbalesa would appear to the consultants to be economically unviable and will not lead to the desired results. There may be an opportunity to work with COMESA to finance a frontier market in partnership with the Cross-Border Traders Association.

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6.5. NACALA CORRIDOR

6.5.1. Corridor Description

The Nacala Corridor covers the central and southern regions of Malawi and five provinces in northern Mozambique: Cabo Delgado, Nampula, Niassa, Tete and Zambezia (see Figure 52).

Figure 52: Nacala Corridor Road and Rail Network



Source: World Bank (2018).

Large projects have driven infrastructure improvements along the corridor, the largest being the construction of a coal mine at Moatize, a new section of railway and rehabilitation of the existing railroad and a new coal terminal at Nacala. These investments, made by the Vale-Mitsui Consortium, totalled US\$7 billion.

Governments and donors also realise the potential of the corridor. The governments of Malawi, Mozambique and Zambia have committed resources, with support from the EU, AfDB, JICA and Korea EXIM, for the Nacala Corridor Road Project, which is rehabilitating more than 1,000 km of road at a cost of approximately US\$758 million.

As part of the Nacala Corridor, a rail line was constructed so that coal from mines in western Mozambique could be

transported by rail east to the port of Nacala via Malawi. The project included both construction of new track and the rebuilding of existing lines.

In 2010, the Brazilian mining company Vale purchased majority ownership in CDN, the Mozambican railway company and Central East African Railways in Malawi as the beginning phase of a project to develop rail access from the deep-water port at Nacala to the company's mines near Moatize, Mozambique.

In December 2011, Vale agreed with the Government of Malawi to construct 136 km of new railroad from Cambulatsissi on the

western border of Malawi to Nkaya, where it would connect with the existing line. In July 2012, Vale entered into a partnership with Mozambican state company Mozambique Ports and Railways (CFM) to improve the existing CDN line.

Early estimates placed the cost of the project, arranged as an 80/20 partnership between Vale and CFM, respectively, at US\$1.1 billion. The first test trains began operating over the line in November 2014 and regular service began the following year. In late 2016, the Siemens-designed positive train control system came online, allowing for train frequency to increase with coal production. In May 2017, a ceremony in Nacala marked the formal completion of the line, by which time 22 daily coal trains were operating over the route. By the time of its completion, the total cost of the line had risen to US\$4.4 billion. However, there are still issues that need to be addressed, including the need to upgrade infrastructure on some sections of the corridor and to construct more storage facilities at/near Nacala port and production centres along the corridor.

Mozambique is removing barriers to trade, including the repeal of the mandatory use of the Nacala Special Export Terminal (TEEN) for road exports from Mozambique, effective from 31 July 2017 and has also structured concession agreements to ensure third-party access for general freight cargo. There are, however, regulatory issues that need to be addressed, including the high costs of road user fees in Mozambique, checkpoint regulations, customs regulations (Contra Marka system) and import/export procedures at border posts.

6.5.2. Road Infrastructure Condition and Capacity

The 1,650 km-long Nacala Corridor connects Zambia to the port of Nacala in Mozambique via Malawi. This road, built in the 1960s, has been poorly maintained for many years. However, the governments of Malawi, Mozambique and Zambia have now committed investment, with support from the EU, AfDB, JICA and Korea EXIM, for the Nacala Corridor Road Project. It is being implemented in four phases, at a cost of approximately US\$758 million.

- Phase 1 involves the rehabilitation of 348 km of road from Nampula to Cuamba in Mozambique (US\$270 million) and construction of a 13 km-bypass road west of Lilongwe city in Malawi (US\$24 million).
- Phase 2 involves the rehabilitation of 360 km of road from Luangwa Bridge to Mwami in Zambia (US\$237.5 million).
- Phase 3 involves the rehabilitation of 175 km from Cuamba to Lichinga, including a spur to Mandimba in Mozambique (US\$150 million).
- Phase 4 involves rehabilitation of 75 km between Liwonde and Mangochi in Malawi and construction and establishment of one-stop border posts (OSBP) between Malawi and Mozambique at Chiponde/Mandimba border post and between Malawi and Zambia at Mchinji/Mwami border post (US\$76.5 million).

Rehabilitation work on 360 km of the Great East Road between Luangwa and Mwami, which is broken down into eight sections, is bringing the road up to the regional technical standards of the Southern African

Transport and Communication Commission in terms of widening the main carriageway and hard shoulders. The rehabilitation also includes reinforcing the road structures, repaving its surface and building rest areas and car parks.

In Mozambique, the two main corridors from Nacala to Malawi include (see Table 56):

- Milange Corridor. This is the preferred route between Malawi and Mozambique and is in good condition except for about 30 km which requires surfacing. The distance between Milange and Nacala of 750 km, can be covered in one day by some truckers.
- Nampula–Cuamba Sub-Corridor. Recently upgraded to a surfaced road and almost completed in excellent condition.
- Nacala–Nampula Sub-Corridor. Surfaced and in fair to good condition.

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Table 56: Road Condition on the Nacala Corridor

Corridor	Road/ Rail	Town Name From	Town Name To	Condition	Km	Description
Nacala Corridor	Road	Lusaka	Chipata	Fair	229	This road is in fair condition but is a narrow carriageway with no constructed hard shoulders and with potholes in parts. It needs periodic maintenance.
	Road	Chipata	Luangwa Bridge	Good	339	This section has recently been reconstructed as part of the Nacala Corridor Road Project.
	Road	Luangwa Bridge	Mwami/ Mchinji	Fair	36	The road to the border is in reasonable condition but has multiple checkpoints between Chipata and the border.
	Road	Mwami/Mchinji	Lilongwe	Fair	109	This road is in fair condition but is single carriageway. The 74-km section from Liwonde to Mangochi was rehabilitated as part of the Nacala Corridor Road Project.
	Road	Lilongwe	Chiponde/ Mandimba	Fair	296	This road is in reasonable condition.
	Road	Chiponde/ Mandimba	Cuamba	Good	151	This road has been recently rehabilitated under the Nacala Corridor Road Project and the National Five-Year Investment Plan.
	Road	Chiponde/ Mandimba	Lichinga	Good	162	This road has been recently rehabilitated under the National Road Sector Investment Plan.
	Road	Cuamba	Nampula	Good	352	Recently upgraded to a surfaced road and almost completed. In excellent condition.
	Road	Nampula	Nacala	Fair	194	Surfaced and in fair to good condition.
	Road	Blantyre	Chiponde/ Mandimba	Fair	230	Surfaced and in fair to good condition, but there are sections that are potholed.
	Road	Blantyre	Muloza/ Milanje	Fair	101	Surfaced and in fair to good condition.
	Road	Muloza/Milanje	Nacala	Fair	750	In fair to good condition except for about 30 km, which requires surfacing. The distance between Milanje and Nacala of 750 km can be covered in one-two days by truckers.

Source: TradeMark Southern Africa (2012).

Although strictly not on the Nacala Corridor, as part of the Nacala Corridor Road Project the AfDB also finance the resealing of the Cuamba – Lichinga road for a cost of US\$50 million.

6.5.3. Rail Infrastructure Condition and Capacity

The Nacala main line railway between Moatize and the Nacala terminal has been rebuilt to a high standard to handle up to 18 mtpa of coal exports, 20.5t axle loads, using special wagons able to carry 63t of coal, with current train lengths of 120 wagons. The Nacala railway is a single track, with passing loops to allow trains to pass each other safely. It is controlled by a central train control system. At full capacity, the Nacala railway will handle up to 10 trains per day in each direction.

The general freight branch lines in Mozambique extend from Cuamba to Lichinga (346 km) and from Nacala port to the junction with the coal main line (26 km). These lines have been repaired and upgraded to 18t axle loads, which should permit up to 53t of freight to be carried in each wagon, but the branch lines are presently limited to 40t or 15t axle loads because of bridge load limitations.

In Malawi, the key branch line is between Nkaya and Limbe (96 km). Axle loads are currently limited to 15t because of bridge load restrictions. The upgrading of this branch line, particularly in respect of the bridge loads, is being addressed by CDN-CEAR and the intention is to increase the rail axle loads on the Malawi branch lines to 18t.

The railway line to the south beyond Limbe is non-operational and CEAR has no plans to reopen this section for now.

The branch line from Nkaya to Lilongwe (283 km) is in poor condition, but operational with speed restrictions, using 25-wagon train lengths. CDN-CEAR is currently implementing a US\$10 million repair programme, focussing first on bridge and culvert repairs and then on formation and sleeper replacement. The line is prone to flood damage.

The rail link to Mchinji and Chipata is of a higher standard, but also is in poor condition (erosion of the ballast and the formation). It is operational. There are privately operated ICDs in Blantyre with restricted rail access, but not at Lilongwe/Kanengo.

Besides the current upgrade of the Nkaya-Lilongwe rail section, which is clearly essential for this rail service to be viable, it is understood from CEAR that a freight terminal and interchange will be developed at Nkaya to adjust the length of the trains from the branch lines to the main line. The branch lines can presently handle train lengths of up to 30 wagons, whereas the mainline operates up to 42 wagons for the general freight services. The Nkaya location seems logical because it is where the branch lines link to the higher specification main line, although there is presently no customer base at Nkaya.

There is also a private sector proposal to build a freight terminal/ICD at Liwonde. Discussions held with one of the financial backers, Pembani-Remgro, indicate that a freight terminal/ICD is being considered, but there is as yet no agreement with CDN-CEAR on this proposal, nor has a final decision been taken to fund Moto-Engil, the developers of the project.

The construction of an ICD has commenced at Chipata to serve the eastern Zambia market, but it was halted due to the lack of demand. The start-up of recent maize exports may provide the required incentive.

CDN-CEAR is investigating the possibility of establishing warehouses at Chipata to capture maize and cotton exports that are currently transported by road to Beira through Katete and Tete.

6.5.4. Border Post Condition and Capacity

The main border posts on the Nacala Corridor are:

- Mwami/Mchinji: The Zambian and Malawian governments, with support from the African Development Bank (AfDB), have started the construction of a one-stop border post at the Mwami/Mchinji border. The scope of work consists of both building and civil works that include, but will not be limited to:
 - Construction of 3 two storey blocks (combined floor area of approximately 6,000 sqm);
 - Construction of 5 single storey blocks; and,
 - Construction of roads linking the Mwami and Mchinji one-stop border facilities between Zambia and Malawi.
- Chiponde/Mandimba: The Chiponde/Mandimba border post is part of the Nacala Road Corridor Project, which is supported by the governments of Malawi, Mozambique and Zambia and by the EU, AfDB, JICA and Korea EXIM, for the Nacala Corridor Road Project. A bilateral agreement between the governments of Malawi and Mozambique has been prepared. Financing of the OSBP by AfDB includes construction, installation of information technology (IT) equipment and establishment of the OSBP between Malawi and Mozambique at Chiponde. The OSBP is expected to contribute to reducing cargo traffic waiting time. AfDB is also financing compensation for all persons affected by the construction of the OSBP, although it is assumed that compensation will be minimal, as the Malawian and Mozambican sites for the planned OSBP are not inhabited.

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6.5.5. Trade Facilitation Performance

Table 57 provides a summary of the status of the trade facilitation performance on the Nacala Corridor.

Table 57: Trade and Transport Facilitation Measures - Nacala Corridor

Nacala Corridor Trade and Transport/Transit Facilitation Data Sheet		
Transit and Transport Facilitation Instruments	Vehicle Overloading	There are frequently reported instances of overloading on the Nacala Corridor, especially in Mozambique.
	Vehicle dimensions	Vehicle dimensions between Mozambique, Malawi and Zambia are harmonized and both countries operate on a maximum gross vehicle mass of 56t on 7 axles and a maximum length of 22 m.
	3rd Party Vehicle Insurance	Zambia and Malawi uses the COMESA Yellow Card or a transporter can opt to buy 3rd party vehicle insurance at the border. In Mozambique 3rd party vehicle insurance can be bought at the border.
	Multilateral Cross-Border Transport Agreement	The Tripartite Transport and Transit Facilitation Programme (TTTFP) is working with COMESA-EAC-SADC tripartite countries to design and implement a MCBTA but this is not in place and remains work in progress.
	Corridor Management Authority	The Nacala Corridor has no Corridor Management Authority.
Trade Facilitation Instruments	Advance Rulings	Zambia, Malawi and Mozambique Customs can issue Advance Rulings.
	Pre-Arrival Processing	Zambia, Malawi and Mozambique Customs can provide pre-arrival processing.
	Electronic Payment	Zambia, Malawi and Mozambique Customs use a version of electronic payments.
	Separation of Release from Final Determination of Customs Duties	Zambia, Malawi and Mozambique Customs allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.
	Risk Management	The implementation of risk management systems pose serious challenges for Zambia, Malawi and Mozambique Customs. The main reason for this is a lack of faith from Customs that risk management will not result in a loss of revenue, as well as a failure to link the risk management module to the main customs management system, plus calibrating the system with relevant data on known traders and economic operators.
	Post-clearance Audit	Zambia, Malawi and Mozambique Customs use post clearance audits.
	Trade Facilitation Measures for Authorised Operators	Zambia, Malawi and Mozambique do not have an Authorised Economic Operator system in place.
	Border Agency Coordination	Zambia, Malawi and Mozambique Customs are working towards improved coordination between border agencies nationally, but there is still plenty of room for improvement.
	Movement of Goods Intended for Import Under Customs Control	Zambia, Malawi and Mozambique Customs allow goods intended for import to be moved within its territory under customs control from a Customs Office of entry to another Customs Office in its territory from where the goods would be released or cleared.
	Single Window	Zambia, Malawi and Mozambique do not, as yet, operate a Single Window.
	Freedom of Transit	Although there is freedom of transit on the Nacala Corridor, the road user charges in Mozambique are disproportionately high and would appear to be revenue-raising rather than reflecting the costs of service delivery.
Customs Cooperation	Zambia, Malawi and Mozambique Customs continue to make improvements in customs cooperation.	

Source: Collated by authors

6.5.6. Proposed/Planned Corridor Projects

6.5.6.1. Roads

Most of the Nacala Corridor roads are being upgraded through the donor-financed Nacala Road Project and there is no obvious scope for further interventions, even if they were to be grant funded.

6.5.6.2. Railways

The following concepts may be worth exploring:

- The Blantyre ICDs are located at Chirimba Industrial Area in Blantyre, operated by the private sector. The rail siding lengths are limited to accommodating 10 wagons, requiring the train to be split at Limbe and shunted in and out of Chirimba. It can take up to four days to handle a full-length container train. There appears to be enough space at the existing ICDs to lengthen the sidings, initially to handle up to 20 wagons, which could save two days.
- There is no formal ICD at Kanengo in Lilongwe. There is a rail yard able to handle up to 30 wagons (sufficient for the current train lengths on the Nkaya–Lilongwe line). Short sidings serve individual warehouses and factories in Kanengo by shunting from the rail yard. This practice is no longer used because it is expensive and time-consuming. Kanengo could possibly be developed and equipped as an ICD to serve the industrial area.
- In Liwonde, Farmer’s World imports bagged fertilisers in containers and open wagons, but the sidings are limited to handling 10 wagons with a labour-intensive unloading system. It takes four days to handle a 40-wagon import train from Nacala. Farmer’s World is planning to upgrade the siding and equipment.

In the first instance, it should be lengthened to 20 wagons, which will result in lower freight costs due to higher wagon utilisation. (Do they have funding?)

- The Chipata ICD has been planned (is now being planned by CDN), but is not yet developed. There is currently no paved area, no warehousing and no equipment. The commencement of maize exports from Zambia by rail through Nacala could promote further investment in the ICD. The possibility of fuel imports to eastern Zambia via Nacala could be investigated.
- In Mozambique, both Cuamba and Lichinga stations have rail yards, with 450-metre sidings, but no ICDs or equipment to handle and store containers. At the present time, cotton is exported in bulk box wagons and transferred to containers in Nacala. Formal ICDs would allow empty containers returning from Malawi to Nacala to be used for exports from Cuamba and possibly Lichinga.

6.5.6.3. Border Posts

Although there are no obvious opportunities to invest in infrastructure in the Nacala Corridor border post infrastructure, there may be small investments that could be made to improve the implementation of coordinated border management. These include providing back-up sources of electricity at border posts, improving IT connectivity, ensuring traffic can be physically separated, introducing a risk assessment system and linking scanners to the risk assessment system.

Road transport is the predominant mode of transport for freight on the Beira Corridor, accounting for approximately 68 per cent of all cargo and 95 per cent of non-coal cargo traffic in 2017. The Beira Corridor's road network and reach is extensive, covering five countries and thousands of kilometres. The primary road corridors (Figure 54) include:

- Beira-Tete, Mozambique (600 km)
- Beira-Blantyre, Malawi (818 km)
- Beira-Lilongwe, Malawi (957 km)
- Beira-Chipata, Zambia (958 km)
- Beira-Harare, Zimbabwe (559 km)
- Beira-Lusaka, Zambia (1,054 km)
- Beira-Ndola, Zambia (1,370 km)
- Beira-Lubumbashi, DRC (1,604 km)

Figure 54: Beira Corridor Road Network



Source: DFID (2016).

The Beira Corridor's main road network in Mozambique is generally in good condition. The roads just outside Beira port and inside the port, are congested. Access to the port can be difficult given traffic from trucks, with common delays of three or four hours. There is a proposal to develop a bypass from Dondo to the port.

Transporters note that there can sometimes be five or six traffic stops between Beira and Dondo, with up to 15 stops in total between Beira and Manica. Large, national transporters seem to have less of an issue with the police stops than smaller transporters and foreign vehicles. There is a second customs check and weighbridge at Dondo for transit cargo. There are also new toll gates at Dondo, Nhamatanda and Chimoio, but they are not yet operational and the future fees are not yet determined.

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The N6 to Zimbabwe was recently rehabilitated and corridor users note that it is in excellent condition, without any issues. EN6 has one or two lanes in each direction, depending on the section. In uphill areas, there are usually two lanes to allow for passing. In other areas, the road is only one lane in each direction. Near Chimoio city there are also two lanes in each direction.

The conditions of the branch to Tete/Malawi/Eastern Zambia are not as favourable. Road conditions from Tete to the border with Zambia (Cassacatiza), Malawi (Zobue) and Malawi (Calomue) are passable but in need of rehabilitation.

The roads from Tete to Zobue and Cuchamano are under the Estradas do Zambeze concession. For approximately 300 km of road, there are four tollgates. There are two weighbridges at Zobue and Calomue, with a new one under construction at Songo.

There are two bridges in Tete: an old bridge that is not for heavy vehicles and a new bridge for all vehicles, including trucks. The new bridge charges a toll, with a fee of up to US\$23 for trucks travelling in a northbound direction only.

Table 58 provides a summary of the Beira Corridor road network that is not part of other corridor networks covered in this report and the reported condition. It shows that whilst the road condition varies it is, for the most part, in good condition.



Table 58: Road Condition of Each Section of the Beira Corridor

Corridor	Road/ Rail	Town Name From	Town Name To	Road/Rail Condition	Km	Description
Beira Corridor	Road	Beira	Dondo	Good	33	Very good condition.
	Road	Dondo	Machipanda/ Forbes	Good	255	
	Road	Machipanda/ Forbes	Harare	Good	254	
	Road	Harare	Lion's Den	Fair*	216	Road in reasonable condition, single carriageway.
	Road	Lion's Den	Chirundu	Fair*	139	In reasonable condition but through the escarpment, single carriageway, with heavy, slow-moving, goods traffic.
	Road	Chirundu	Kafue	Fair*	92	
	Road	Kafue	Lusaka	Fair*	51	Reasonable condition toll road but heavy and slow-moving traffic, although with passing lanes on the hills.
	Road	Lusaka	Kapiri Mposhi	Fair*	200	Road is tolled and in reasonable condition although heavily trafficked and slow-moving as it is single carriageway.
	Road	Kapiri Mposhi	Kitwe	Fair*	159	Road is tolled and in reasonable condition but single carriageway with no passing lanes on hills so can be slow.
	Road	Kitwe	Chingola	Good*	54	This road is being reconstructed.
	Road	Chingola	Kasumbalesa	Fair*	43	Road heavily trafficked with trucks carrying general goods, copper and concentrate, and fuel and acid tankers.
	Road	Kasumbalesa	Lubumbashi	Fair*	99	Road in reasonable condition but heavily trafficked with mining equipment and goods, general goods, fuel and acid.
	Road	Lubumbashi	Kolwezi	Fair*	301	The road is now paved and in reasonable condition with a lot of mining equipment and copper using the road.
	Road	Vanduzi	Tete	Fair	354	Fair to poor condition.
	Road	Tete	Cassacatiza	Poor	263	Poor condition. Was included as part of the EdZ PPP concession, but the revenue stream (road tolls) to support this component were removed by government and would need to be restored for it to become viable as part of a cross-border PPP.
	Road	Chanida	Katete	Poor	65	Poor condition. This section of road could be included in a revamped cross-border PPP project, if the revenue streams could be restored and the viability of the project secured.

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Beira Corridor	Road	Tete	Junction N7/ N304	Fair	91	Fair to Good Condition.
	Road	Junction N7/N304	Calomue	Fair	153	Fair to Good Condition.
	Road	Calomue	Lilongwe	Good	93	Good Condition.
	Road	Tete	Zobue	Fair	121	Fair to Good Condition.
	Road	Zobue	Blantyre	Good	110	Good Condition.
	Road	Blantyre	Lilongwe	Good	312	Good Condition.

Source: TradeMark Southern Africa (2012).

6.6.3. Rail Infrastructure Condition and Capacity

The rail network comprises the following routes:

- From the port of Beira in Mozambique through the Machipanda/Forbes border to Harare in Zimbabwe (Machipanda Line); and
- From the port of Beira in Mozambique to Moatize in Tete province, which is also the junction with the Nacala Railway (Sena Line).⁸⁶

The pipeline network comprises the following route:

- From the port of Beira in Mozambique through the Machipanda/Forbes border to the oil refinery at Feruka in Zimbabwe (Feruka Pipeline).

Figure 55 shows that there are two railway lines feeding into Beira, as follows:

- The Machipanda line links the Beira port to Harare and beyond and carries commercial cargo; and
- The Sena line links the port of Beira to the Moatize coalfields and is mainly used as a coal export line, although it is also used to carry small volumes of goods like sugar and cotton.

⁸⁶ Historically, the Sena line also connected to Southern Malawi but does not at present.

Figure 55: Beira Corridor Rail Network



Source: DFID (2016).

The railway line between Beira and Harare has been and will continue to be, considered as a strategic transport link for Zimbabwe's international trade. It has been kept operational through many years of political and economic turmoil, including the Mozambique civil war when it was protected by the Zimbabwe military. During the 1990s, the railway carried close to 1 mtpa of freight, which accounted for virtually all the transit freight on the corridor. Since then, the volumes have fallen to 0.39 mtpa in 2016 and 0.26 in 2017 but picked up again to 0.35 mtpa in 2018 according to NRZ. The import/export ratio is about 3:2.

The current capacity of the Machipanda line has been assessed as 1 mtpa according to CFM, the same as the freight volumes carried in the 1990s, despite the gradual deterioration of the track due to deferred maintenance. Although the 'design' operating speed of the NRZ and CFM sections is set at 60 km/hr, the average line speeds are much lower at less than 20 km/hr, because of the poor condition of the track and operating procedures on the single line.

Table 59 summarises the performance of the Machipanda line. This shows that the wagons from each system are held in the neighbouring system for up to 14 days, indicating that the wagons are only loaded about twice per month.⁸⁷

⁸⁷ On the CDN Nacala Railway, CEAR reported that general freight wagons are loaded four times per month, which illustrates the benefit of a seamless cross-border rail service on the Nacala Corridor.

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Table 59: Machipanda Line Performance

	Unit	2016	2017	2018	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	%
Exchange of Wagons														
CFM Wagons on NRZ	Days	14.1	14	13.4	10.9	13.2	12.4	9.3	13.2	19.1	16.1	13	13.6	-4
NRZ wagons on CFM	Days	10.2	8.2	9.3	13.2	7.8	8.7	11.1	6.7	5.7	8.8	11.2	10.9	14
Machipanda Line														
Derailments	No	73	46	48	8	4	1	15	2	1	6	8	3	4
Time Delays	Hrs	585	492	520	49	18	13	234	20	7	77	76	28	6
Machipanda Line														
Derailments	No	83	61	65	10	5	10	9	4	4	8	6	9	7

Source: TradeMark Southern Africa (2012).



There are regular derailments, up to eight a month, on the CFM section of Machipanda line, resulting in annual time loss of about 500 hours. The time lost because of inefficient rail yard procedures and interchange will be much higher.

Within Mozambique, the railway extends from Beira port to Dondo, a single line with two passing loops, serving both the Machipanda line and the Sena line for coal exports, with an axle load of 20.5t and a safe operating speed of 60 km/hr. From Dondo to Machipanda (301 km), the line consists mainly of 30 kg/m rail with an axle load of 15t to 16t, but has also been used by the larger GE 120t-20t axle load locomotives.⁸⁸ The line is not in good condition and requires refurbishment and upgrading with 45 kg/m rails to an axle load of not less than 18t.

The design line speed is 60 km/hr, but this has been reduced to 30 km/hr for safety reasons with five sections totalling 48.5 km restricted to 20 km/hr, mainly in the section near Machipanda, where there are sharp curves and steep gradients. Train lengths are restricted to 35 wagons, but generally less than 20 wagons are used. The container terminal is restricted to 20 wagons.

Within Zimbabwe, the NRZ section, the track is mainly 40 kg/m and 45 kg/m track with 18t axle loads, but some sections are rated at 16.2t axle loads. The most constrained section of track is the Theydon-Matinidza section with an axle load restriction of 16.2 ton per axle. The Kildonan branch line carries most of the chrome exports transported on the Harare-Beira Corridor. The branch line has a 15.2t axle restriction and currently there is a 10.9 km stretch of caution resulting in a loss of half an hour in journey time.⁸⁹

The Sena line was upgraded to 45 kg/m rail on concrete sleepers, with a 20.5t axle load, initially to transport up to 7 mtpa of coal exports from Moatize through

Beira. The railway has subsequently been further upgraded to handle up to 20 mtpa of coal exports, with train lengths of up to 84 wagons. However, current export volumes from Jindal and ICVL are recorded at only 1.56 mtpa for ICVL and 0.44 mtpa for Jindal, using 42-wagon trains and shipment sizes of up to 40,600t (Handymax). The operating speed on the Sena line is 60km/hr, but with some minor sections with speed restrictions: 20 km/hr on the Dona Ana bridge and 15 km/hr on the passing loops. The 88 km spur to Marromeu (sugar) is 15t axle loads with a 40 km/hr speed restriction.

The Sena Railway line used to run from Beira to Malawi, but the 44km section from Mutarara (north bank of the Dona Ana bridge) to Vila Fronteira (Malawi border) was destroyed in 1979 shortly after the commencement of the Mozambique civil war. DFID conducted a detailed feasibility study for reconstructing the line under the Mozambique Regional Gateway Project (MRGP) in 2015, but found the project to be cost-prohibitive at approximately US\$800 million. However, other recent proposals, including an option in the 2018 Malawi National Transport Master Plan and options presented by SPEED+, have presented more affordable multimodal options. If any of these plans move forward, a railroad multimodal corridor could provide a secondary route along this arm of the Beira Corridor. However, such a route would likely focus on international trade to/from Beira port.

Additional infrastructure investments planned for the Sena line include the development of a new rail connection to the planned new coal terminal and the possible reopening of the connection to Malawi from Mutarara to Vila Nova. The development of an ICD at Moatize would promote a general cargo rail service to serve eastern Zimbabwe (granite) and eastern Zambia (agriculture), as well as a multimodal service to Malawi.

6.6.4. Border Post Condition and Capacity

6.6.4.1. Machipanda-Forbes

The Machipanda/Forbes border between Zimbabwe and Mozambique is scheduled to be converted into a one-stop border post (Figure 56). There have been several meetings on the project, but, as yet, there is no activity on the ground.

This is a reasonably busy border post as it is the main border between Harare and Beira, with most traffic coming from Beira to Zimbabwe and onwards to Zambia. This is the shortest route from the sea to Zimbabwe and Zambia and is the route used to transport most fertiliser imports.

There are regular reports that this border is congested, with queues of more than a hundred trucks on the Mozambique side of the border waiting to proceed into Zimbabwe. The challenge seems to be that there is very little space for vehicles to park on the Zimbabwean side. If processing of trucks coming into Zimbabwe slows down to slower than the rate at which the trucks arrive at the border, queues build up on the Mozambique side.

⁸⁸ Caminhos de Ferro de Moçambique (CFM), Meeting the Rail Challenge Ahead.
⁸⁹ NRZ.

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Figure 56: Machipanda-Forbes Border Crossing



Source: collated by authors.

6.6.4.2. Zobue/Mwanza Border Post

The border post is situated at the eastern end of the Tete Corridor, approximately 118 km from Tete and is the principal entry point when travelling either by road or rail between Malawi and Mozambique. The Mozambican and Malawian border posts are separated by approximately 5 km of 'no man's land'. As shown in Figure 56, the facilities at Mwanza are better than at Zobue. However, even with these better facilities, the operations at the border are still not efficient.

In 2011, the Southern Africa Trade Hub conducted a Border Operations Assessment of the Zobue/Mwanza border post⁹⁰ and listed the following key challenges:

- Border agencies have varying opening and closing hours.
- There is limited coordination among agencies at the border, resulting in duplication of inspections or goods being released without being attended to by necessary agencies.
- A number of border agencies operate purely as a countercheck, referring traders/agents back to Lilongwe/Blantyre to obtain permits.
- There is no electronic/remote filing of declarations by Clearing and Forwarding Agents (CFAs). Declarations are prepared and physically delivered to the Direct Trader Input office (DTI) for capturing into ASYCUDA.
- Customs risk analysis profiles are not adhered to for determining physical inspection of imports which are cleared at the border. Physical inspections are conducted on 100 per cent of imports, which creates long queues.
- There are no scanners to support risk analysis profiling decisions.

90 https://www.satradehub.org/images/stories/downloads/powerpoint/IBM_Program/2_ibm_program-mwanza_summary_of_findings.pdf

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- Most of the border agencies lack basic facilities and equipment such as phones, faxes, internet and computers.
 - While most border agencies need access to the same information to assess consignments; there is no ICT connectivity between agencies and, therefore, no sharing of information, with the loss of potential concomitant benefits.
 - A lot of restrictions exist around the exportation and importation of agricultural products, however, such information and the effective dates are not readily available or known at the border by ICBTs and CFAs.
 - Criteria for inland-transit/clearance are not clear and transparent and clearance is granted at the discretion of the Customs Station Manager.
 - Long application process for inland-transit/clearance. A bond guarantee is required for goods that transit inland. If the carrying truck is foreign registered, a temporary import permit, which requires physical examination of the truck, has to be processed.
 - Informal cross-border traders have inadequate access to information about customs provisions for duty-free trade and rebates and restrictions on trade in certain products by border agencies.
 - Tolls/transit fees/road user charges, calculated using distance to be travelled and number of axles instead of flat rates for specific destinations like in Mozambique, are collected in US dollars for foreign registered vehicles and the money is paid to the road fund.
 - Lack of fast-tracking provision for certain traffic (empties, tankers, through-country transit cargo).

Some of these challenges have been addressed, but the two border posts still require interventions to make them efficient.

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Figure 57: Zobue-Mwanza Border Crossing



Mwanza Border Post, Malawi

Source: collated by authors.

6.6.4.3. Chanida/Cassacatiza Border Post

The border post is situated north of Thequesse and borders Mozambique and Zambia. This border post has a steady volume of traffic, with about 60 trucks per day crossing. The access from the T4 via the T6 highway is of broken bitumen from Katete for 54 kms. Most truck cargo is transiting to Beira or Nacala ports in Mozambique. Clearance with all correct documentation and pre-alerts takes approximately three hours. It is not a border that can handle much commercial traffic.

The Chanida/Cassacatiza border post is an alternative crossing if a driver is travelling between Lusaka and Beira and wants to avoid congestion at Forbes/Machipanda and avoid travelling through Harare and Zimbabwe. The Beira-Forbes-Harare-Lusaka route by road is 1,033 km whereas the Beira-Tete-Chanida-Katete-Lusaka route is 1,400 km, or 377 km longer. However, the Chanida route may be longer in terms of distance, but it is shorter in terms of time as it avoids the border crossings at Forbes/Machipanda and at Chirundu. Even if these two borders are not congested (which they usually are), the Chanida route means that the driver only has to cross one border post, rather than two, between Beira and Lusaka.

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6.6.5 Trade Facilitation Performance

Table 60 provides a summary of the trade and transport facilitation measures deployed on the Beira Corridor.

Table 60: Trade and Transport Facilitation Measures - Beira Corridor

Beira Corridor Trade and Transport/Transit Facilitation Data Sheet		
Transit and Transport Facilitation Instruments	Vehicle Overloading	Beira Corridor is well regulated as regards axle load monitoring and overloading is infrequent.
	Vehicle dimensions	Vehicle dimensions between Mozambique, Malawi and Zambia are harmonized.
	3rd Party Vehicle Insurance	Zambia and Malawi use the COMESA Yellow Card or a transporter can opt to buy 3rd party vehicle insurance at the border. In Mozambique 3rd party vehicle insurance can be bought at the border.
	Multilateral Cross-Border Transport Agreement	The Tripartite Transport and Transit Facilitation Programme (TTTFP) is working with COMESA-EAC-SADC Tripartite countries to design and implement a MCBTA but this is not in place and remains work in progress.
	Corridor Management Authority	The Beira Corridor has no Corridor Management Authority.
Trade Facilitation Instruments	Advance Rulings	Zambia, Malawi and Mozambique Customs can issue Advance Rulings.
	Pre-Arrival Processing	Zambia, Malawi and Mozambique Customs can provide pre-arrival processing but congestion at the border means that pre-arrival processing does not save any time.
	Electronic Payment	Zambia, Malawi and Mozambique Customs use a version of electronic payments.
	Separation of Release from Final Determination of Customs Duties	Zambia, Malawi and Mozambique Customs allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.
	Risk Management	The implementation of risk management systems poses serious challenges for Zambia, Malawi and Mozambique Customs. The main reason for this is a lack of faith from Customs that risk management will not result in a loss of revenue, as well as a failure to link the risk management module to the main customs management system, plus calibrating the system with relevant data on known traders and economic operators.
	Post-clearance Audit	Zambia, Malawi and Mozambique Customs use post clearance audits.
	Trade Facilitation Measures for Authorised Operators	Zambia, Malawi and Mozambique do not have an Authorised Economic Operator system in place.
	Border Agency Coordination	Zambia, Malawi and Mozambique Customs are working towards improved coordination between border agencies nationally, but there is still plenty of room for improvement.
	Movement of Goods Intended for Import Under Customs Control	Zambia, Malawi and Mozambique Customs allow goods intended for import to be moved within its territory under customs control from a Customs Office of entry to another Customs Office in its territory from where the goods would be released or cleared.
	Single Window	Zambia, Malawi and Mozambique do not, as yet, operate a Single Window.
	Freedom of Transit	Although there is freedom of transit on the Beira Corridor, the road user charges in Mozambique are disproportionately high and would appear to be revenue-raising rather than reflecting the costs of service delivery.
Customs Cooperation	Zambia, Malawi and Mozambique Customs continue to make improvements in customs cooperation.	

Source: Collated by authors

6.6.6. Proposed/Planned Corridor Projects

The following projects are possible, but at the concept stage:

- **Machipanda Railway Line:** CFM has reported that there are no immediate plans for the repair and upgrading of the Machipanda line, but that a Chinese contractor has shown some interest in carrying out the work with a budget of US\$300 million. The likelihood of this proceeding will depend on the funding terms and will likely require some commitment from the Government of Mozambique. NRZ has reported that 'there

are no specific plans as yet apart from installation of communication systems for trains working as well as upgrading of Theydon-Matinidza block to 18 tons per axle from the current 16.2 tons per axle.'

- Forbes/Machipanda Border Post: As Beira gets busier, the amount of traffic passing through Forbes/Machipanda will increase. Already there are indications that the border facilities are not able to cope with existing traffic and there is need to construct more infrastructure. The challenge is that there is no room to expand on the Zimbabwean (Forbes) side of the border because of the terrain. Probably the best technical option would be an OSBP wholly located in Mozambique (Machipanda).
- Chanida/Cassacatiza Border Post: This border post will get busier as Beira gets busier and could become the preferred crossing point for goods moving between Beira and Lusaka. Although the distance is longer than the route through Forbes/Machipanda by almost 400 km, it has the advantage of being the only crossing point between Beira and Lusaka and of avoiding both Forbes/Machipanda and Chirundu.



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6.7. MAPUTO CORRIDOR

6.7.1. Corridor Description

Before 1975, the Maputo Corridor was an integral part of the Southern African transport network and a prime route for the South African province of Transvaal to access the sea. In its heyday, some 40 per cent of South African industrial exports were transported along that route and exported through the Port of Maputo, which lies 92 km away from the South African border (see Figure 58).

Figure 58: Maputo Corridor Road and Rail Network



Source: World Bank (2014).

For several decades, the production areas of citrus, timber and sugar in landlocked Swaziland (now Eswatini) also relied on the Maputo Corridor as its primary export corridor. At the time, the Port of Maputo handled about 14 million tons of cargo per year, the most being transported by rail. Following Mozambique's independence and the outbreak of civil war in 1978, cargo levels at the port dropped dramatically to around 1 million tons per year and the railway lines leading to Maputo were severely damaged.

South African exports and those of other landlocked countries in Mozambique's hinterland were then diverted to the emerging ports of Durban and Richards Bay, dramatically increasing the region's dependence on South Africa's transport infrastructure. Once peace was restored in Mozambique, the challenge was to rehabilitate the infrastructure and resume transport services with low volumes. Although transport was a key enabler in restarting the Mozambican economy (on the Maputo Corridor as well as on the other corridors), the government of Mozambique had insufficient resources for the level of expenditure required given the condition of the corridor and had to turn to the private sector for investing in and managing the transport network. However, the demand that would make private sector investments viable was uncertain.

The governments of Mozambique and South Africa set out to create an environment to attract private sector investment. They sought to make both the political and the economic context favourable in the two countries. There was an alignment of interest between a post-apartheid South Africa and a post-civil war Mozambique with a strong economic potential in the hinterland of the port of Maputo. Opportunities for industrial development, major anchor projects, were identified, investors found and deals

successfully closed (notably the two key investments for the MOZAL aluminum smelter and the development of the Pande and Temane gas fields in Mozambique).

At a regional level, there was also consensus on the role of the private sector in transport infrastructure financing and operation. Despite those favourable conditions, execution was not always smooth, although the overall outcome was positive. Several concession models were used for the different transport corridor components, with varying degrees of success.

For road infrastructure, the N4 toll road concession enabled the rehabilitation of the highway between Maputo and the Gauteng Province of South Africa, which led to the rapid growth of vehicle traffic (for all sizes of vehicles, personal and heavy goods). The Maputo Corridor was a PPP and the Maputo Corridor Logistics Initiative (MCLI) supported the development of the corridor using a partnership approach which helped grow the corridor to one that handled 19.5 million tons of throughput via Port Maputo in 2018. However, MCLI lost the support of two institutional partners: TRAC (the road concessionaire) and the Port of Maputo in 2014 and 2016, respectively and had to close in February 2019 because of a lack of funds.

For the railway, the concession attempt failed, but a strategic partnership was forged between the port authority and the national railways in Mozambique to support capacity development to respond to increasing demand.

For the port concession, the initial uncertainties triggered a restructuring of the shareholding which stabilised the partnership. The rehabilitation of the facilities at the border post was critical for facilitating cross-border trade, but the process to convert the border post to a 24/7 one-stop operation has faced

difficulties and delays, although there was progress on automation.

With the completion of the Catembe Bridge and the construction of a new road from Maputo to Ponto D'Ouro, the southern route to Durban, South Africa, has been opened up. However, the border at Ponta D'Ouro/Kosi Bay currently does not operate as a commercial border and only allows transit of passenger vehicles and light commercial traffic. There are plans to upgrade this to a fully-fledged commercial border, but the process is currently stalled pending the finalisation of a restructuring process in South Africa that is seeking to establish a new National Border Agency.

6.7.2. Road Infrastructure Condition and Capacity

In 1997, the governments of South Africa and Mozambique (represented by their respective national roads agencies, SANRAL and ANE) signed a Build-Operate-Transfer (BOT) Concession Agreement with Trans African Concessions (TRAC), a private sector consortium, to finance, design, construct, rehabilitate, operate, maintain and secure the future expansion of the highway, for a 30-year concession period (see Table 6.1). The concession of the toll road was awarded under the South African PPP framework, with the winning consortium investing more than US\$400 million in 2002 and committing to spend a similar amount on maintenance for the duration of the 30-year BOT concession. Funding for this concession came from equity investments by four of the major South African banks together with the Development Bank of Southern Africa.

Given the limited exposure of Mozambique to the toll road system and the inherent risk associated with a concession, both countries jointly guaranteed these investments and a complex scheme of cross-subsidisation from South African to Mozambican user fees was instituted.

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Actual construction work on the N4 started in March 1998. The first toll plaza, Middelburg, opened in December of the same year and two more toll plazas were opened the following year. The two to four-lane toll road was completed in 2004. Initially, the project involved the upgrading and rehabilitation of 390 km of existing road between Balmoral (20 km west of Witbank) and Moamba (near the South Africa Mozambique border) with a further 50 km-long road between Moamba and Maputo. The concession was extended in 2004 to include the N4 road sections between Witbank and Pretoria, a total of 630 km.

Since 2006, there has been a significant increase in traffic on the EN4/N4. Despite a steady traffic growth, the sustainability of the PPP arrangement underpinning the concession has been challenged by the lack of responsiveness of the Mozambican authorities to clear land slated for future expansions of the highway and adjust user fees to account for inflation and by poor monitoring of overloaded trucks, which can cause a rapid deterioration of the road and a significant increase of maintenance costs. The concession agreement did not include regulation for overload control.

A survey conducted in 2000 indicated that more than 32 per cent of vehicles were overloaded. To protect the infrastructure, TRAC entered into an agreement with SANRAL in 2002 and equipped traffic control centres (seven in South Africa and two in Mozambique) to enable law enforcement officers to perform their role. In 2007, tracking technology was added to the system. Since the introduction of axle load controls, overloading has reduced to 9 per cent.



Table 61: Road Condition of Each Section of the Maputo Corridor

Corridor	Road/ Rail	Town Name From	Town Name To	Condition	Km	Description
Maputo Corridor	Road	Maputo	Namaacha	Good	77	This road has in good condition.
	Road	Namaacha	Manzini	Good	110	This road is in good condition.
	Road	Manzini	Mbabane	Good	39	This road is in good condition.
	Road	Maputo	Ressano-Garcia/ Komatipoort	Good	95	This road is in good condition as it is part of the TAC N4 Toll Concession.
	Road	Ressano-Garcia/ Komatipoort	Nelspruit	Good	107	
	Road	Nelspruit	Emalahleni	Good	210	
	Road	Emalahleni	Johannesburg	Good	138	
	Road	Maputo	Ponta D'Ouro	Good	120	This road is in good condition as it was recently upgraded as part of the China Exim Bank funding to build the Catembe Bridge, to construct the Catembe-Ponta-D'Ouro Road and to upgrade the Bela Vista-Boane road.
	Road	Ponta D'Ouro	Hluhluwe	Fair	183	This road is in fair condition, with sections of the road characterised by potholes, once the route leaves the main N2 Toll Concession.
	Road	Hluhluwe	Durban	Good	264	This road is in good condition as it is part of the N2 Toll Concession.

Source: Collated by authors from interviews with the TRAC Concession.

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6.7.3. Rail Infrastructure Condition and Capacity

The Ressano Garcia Railway (RGR) runs for 89 km between Maputo and the South African border, where it connects to the South African system linking to Gauteng and beyond. The network is connected with those of South Africa, Zimbabwe and Eswatini and represents a key component of the Maputo corridor transport system. However, despite the rehabilitation of the Ressano Garcia Railway, CFM and TFR are still far from meeting the needs of rail transport in the region. Limited actual demand for rail services is partly driven by a combination of deficiencies in the rail infrastructure (availability of rolling stock and infrastructure at the port to facilitate rail transport) and deficiencies in the management of rail services, which constrain transport capacity. However, medium- to long-term demand for rail transport exists, particularly in the mining industry.

6.7.4. Border Post Condition and Capacity

The Komatipoort/Ressano Garcia border post is located approximately 90 km from the city and port of Maputo on the N4/EN4 highway. Today, it is one of the busiest border crossings in Southern Africa for trucks as well as passengers, with traffic peaking at 120,000 persons per day during the busiest holidays.

Performance of the border post improved in recent years, in line with developments in the other components of the transport corridor. The most noteworthy changes have been the creation of new facilities for clearing agents to be physically stationed at the border post, the end of visa requirements for South African and Mozambican nationals in 2006 and the

introduction of separate lanes (through freight by-pass) to optimise border traffic flows.

Separating flows improved management with differentiated treatment of goods at the border, between transit and final clearance. With a view to creating a seamless border post and expediting crossing, the Alfândegas de Moçambique (Mozambican Customs) and the South African Revenue Services (SARS) established an initial agreement to develop a single facility for a 24-hour one-stop border post by 2010. Several factors placed this project on hold: the deterioration of the economic climate in 2009, disagreements as to the exact location of the facilities, the high cost of the project and the waning interest of SARS to invest in what is still strategically seen by South African authorities as mainly an export, low-revenue corridor. Moreover, experience of 24-hour operation on other border posts has been inconclusive, notably at the Beitbridge border post between South Africa and Zimbabwe, where traffic continued to peak during regular (day) business hours, despite a change to a 24-hour schedule. However, shippers view the 24-hour border post as critical for the competitive hinterland of the Port of Maputo to stretch as far as the Northwest Province (reaching the Rustenburg mining area, approximately 150 km west of Pretoria) and to attract the fast-moving consumer goods heading in and out of Gauteng, which require fast turnaround times.

Overall, increasing the performance of the border post will require complementary investments in hard infrastructure such as facilities for parking and storage and in soft infrastructure such as increasing the efficiency of document submission in addition to the extension of working hours of the border post. For now, a phased

approach has been adopted, with the creation of a bypass road for commercial cargo to be separated from passenger traffic. Processing of documentation, which was still in paper format and was taking place separately on each side of the border, is now improved with the rollout of the electronic single window facility to the Ressano Garcia border post.

Changes in legislation to remove transit bonds for some low-risk products and reduce it for others is also considered a major boost in encouraging South African imports through the port of Maputo. These investments could significantly reduce transaction costs and times, increasing the attractiveness of the Maputo Corridor as an import and export corridor for South African cargo. This can result in a more balanced and consequently, cost-effective flow of cargo through the corridor.⁹¹

An additional constraint faced by Maputo Corridor is the absence of intermodal transport nodes that can enable cargo to be transferred seamlessly across the most efficient transport modes. At present, the key clearance areas are located at the port of Maputo and at the Komatipoort/Ressano Garcia border post.

The establishment of a fully-fledged commercial border post at Ponta D'Ouro/Kosi Bay to consolidate the southern route to Durban, South Africa, will be critical to harness the US\$682 million investment in the new Catembe Bridge over the Maputo Bay and Maputo to Ponta D'Ouro national road.

⁹¹ Unfortunately, recent developments are exactly the opposite. With electronic seals (MECTS) DM 18/2020, Mozambique did exactly the opposite and added another charge of +/- US\$50 (plus administration and waiting time) to the corridor making South African imports through Maputo even less viable, even though there are no imports now (Grindrod comment on 22.01.2021).

6.7.5. Trade Facilitation Performance

Table 62 provides a summary of the status of the trade facilitation performance on the Maputo Corridor.

Table 62: Trade and Transport Facilitation Measures - Maputo Corridor

Maputo Corridor Trade and Transport/Transit Facilitation Data Sheet		
Transit and Transport Facilitation Instruments	Vehicle Overloading	Overloading on the corridor has been reduced to less than 10% of the vehicles using the corridor
	Vehicle dimensions	Vehicle dimensions between South Africa and Mozambique are harmonised
	3rd Party Vehicle Insurance	South Africa uses the fuel levy system and 3rd party vehicle insurance can be bought at the border on entry into Mozambique.
	Multilateral Cross-Border Transport Agreement	The concessionaire, TRAC, has a cross-border transport agreement for the Maputo Corridor
	Corridor Management Authority	MCLI did provide the corridor management coordination but MCLI has now closed.
Trade Facilitation Instruments	Advance Rulings	Both South Africa and Mozambique can issue Advance Rulings
	Pre-Arrival Processing	Both South Africa and Mozambique Customs can provide pre-arrival processing.
	Electronic Payment	Both South Africa and Mozambique Customs use a version of electronic payments
	Separation of Release from Final Determination of Customs Duties	South Africa and Mozambique Customs allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.
	Risk Management	It is understood that both South Africa and Mozambique have successfully integrated risk management modules into their Customs Management Systems.
	Post-clearance Audit	South Africa and Mozambique use post clearance audits.
	Trade Facilitation Measures for Authorised Operators	Neither South Africa nor Mozambique have an Authorised Economic Operator system in place although South Africa is still piloting a preferred trader scheme.
	Border Agency Coordination	South Africa and Mozambique have good coordination at the Komatipoort – Ressano Garcia border post.
	Movement of Goods Intended for Import Under Customs Control	South Africa and Mozambique allow goods intended for import to be moved within its territory under customs control from a customs office of entry to another customs office in its territory from where the goods would be released or cleared.
	Single Window	South Africa and Mozambique use a Single Window at Komatipoort - Ressano Garcia
	Freedom of Transit	There is freedom of transit on the Maputo Corridor
	Customs Cooperation	Both countries continue to make improvements in customs cooperation.

Source: Collated by authors

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6.7.6. Proposed/Planned Corridor Projects

The following projects are possible projects but at the concept stage:

- Maputo Coal Terminal:** Grindrod, the TCM operator, recently reported significant improvements in the TCM's performance. This is due to three factors. The first is that due to the completion of the deepening of the Maputo Channel by the MPDC in 2017 at a cost of US\$85 million, larger Panamax vessels can enter the port. The second is the impact of the Berth Deepening and Quay Offset Project at TCM allowing fully-laden Panamax vessels to berth at TCM, which has been supported by a further investment of US\$25 million in freight handling equipment. The third has been an enhanced collaboration between TFR, CFM and MPDC that has resulted in 25 per cent and 7 per cent improvement in the performance of the coal and magnetite rail lines, respectively. These improvements, buoyed by strong market demand, have paved the way to review the expansion of the existing capacity at TCM. To date, US\$70 million has been invested in the refurbishment and building of infrastructure, expanding the capacity of the terminal to 6 mtpa. A feasibility study has been done for an expansion of capacity from the current 7.5 mtpa by 20 mtpa at an anticipated cost of US\$800 million.
- Ressano-Garcia Railway:** CFM Sul (South) is committed to a number of key improvements on the Ressano Garcia line to ensure that market demand is met to 2023. This is divided into two phases. The total capital cost to implement the Phase 1 infrastructure upgrade to address current maintenance backlog, loop and yard extensions, a full centralized traffic control solution and additional locomotives and rolling stock is estimated at US\$112.3 million. The Phase 2 infrastructure upgrade involving the doubling and completion of signalling of the dual railway

is estimated at US\$209.1 million.

A decision to implement Phase 2 should be subject to the realization of traffic growth as expected post-implementation of Phase 1. The most probable traffic forecast, however, suggests that Phase 2 be implemented during years 2022 to 2025.

- Ponto D'Ouro/Kosi-Bay Border Post:** Ressano Garcia-Komatipoort is on the Maputo corridor and on the N4 highway linking Gauteng with Maputo. However, there seem to be delays in implementing border post upgrades caused by the delays in processing the Border Management Agency Bill. Once the Bill is passed the Border Management Agency's pilot projects will start and focus on OR Tambo International Airport, Cape Town Airport, Cape Town Harbour, the Oshoek border post between South Africa and Eswatini, as well as the Kosi Bay/Ponta D'Ouro Lebombo border between South Africa and Mozambique.
- Ressano Garcia/Komatipoort Border Post:** There may be opportunities to invest in border post infrastructure such as facilities for parking and storage and in intermodal transport nodes that can enable cargo to be transferred seamlessly across the most efficient transport modes. However, there is a need to assess how an outside investor could have access to these types of investment.

6.8. NORTH-SOUTH CORRIDOR

6.8.1. Corridor Description

The North-South Corridor (NSC) is a multimodal corridor connecting the port of Durban with sources and destinations principally in Zimbabwe, Zambia, Malawi and DRC. It is designated as a priority project under the Programme for Infrastructure Development (PIDA) in Africa and is championed by South Africa. In terms of traffic use and volumes of goods moved, the North-South Corridor is, if not the busiest, then one of the most busy, regional transport and transit

corridors in Sub-Saharan Africa. South Africa is the main destination market (17 per cent) for intra-African trade. Botswana and Zambia each account for 7 per cent of the destination market for intra-African trade and most of this trade is along the North-South Corridor.

Although the North-South Corridor is one of the most important transport and transit corridors in Sub-Saharan Africa, there is no North-South Corridor Authority in place. Numerous attempts have been made to establish an NSC Authority at the regional level, but South Africa has blocked them.

There are a few priority projects listed under the PIDA Priority Action Plan (PIDA PAP). The work done on the North-South Corridor by TradeMark Southern Africa, which was operational in 2009-2014, suggested that, in the short term, 1,041 km of road should be upgraded, with another 5,156 km to be upgraded in the next two to five years (so between 2016 and 2020). There have been upgrades on the corridor as defined in the infrastructure section, but there are also sections of road that have not been rehabilitated through periodic and regular maintenance, so there are some road sections that have deteriorated further and others which have been reconstructed. Overall, the road network of the NSC is in fair to good condition.

The railway corridor links Durban port (in South Africa) with railway lines in Botswana, Zimbabwe, Zambia and DRC, all using the same Cape gauge (of 1,067 mm). The aim is to ensure easy border crossing for both people and goods to increase the efficiency and capacity of the transport sector. This, in turn, will speed up regional integration and will increase regional trade, while leading to cost savings. The North-South Corridor hosts SSA's first one-stop border post at Chirundu and some of the continent's most busy border posts, including Beitbridge and Chirundu Current.

6.8.2. Road Infrastructure Condition and Capacity

Table 63 and Figure 59 gives the condition of each section of the road in terms of whether the road is in good condition (IRI=1 or 2), fair condition (IRI=3 or 4) or poor condition (IRI => 5). Generally, the road condition is fair to good, with some sections of the road having recently been reconstructed and with other sections in need of preventive maintenance and regular maintenance.

Table 63: Road Condition on the North-South Corridor

Corridor	Road/ Rail	Town Name From	Town Name To	Condition	Km	Description
North-South Corridor	Road	Kolwezi	Lubumbashi	Fair	301	The road is now paved and in reasonable condition, with a lot of mining equipment and copper using the road.
	Road	Lubumbashi	Kasumbalesa	Fair	99	Road in reasonable condition, but heavily trafficked with mining equipment and goods, general goods, fuel and acid.
	Road	Kasumbalesa	Chingola	Fair	43	Road heavily trafficked with trucks carrying general goods, copper and concentrate, fuel and acid tankers.
	Road	Chingola	Kitwe	Good	54	This road is being reconstructed.
	Road	Kitwe	Kapiri Mposhi	Fair	159	Road is tolled and in reasonable condition, but single carriageway with no passing lanes on hills so can be slow.
	Road	Kapiri Mposhi	Lusaka	Fair	200	Road is tolled and in reasonable condition although heavily trafficked and slow-moving as it is single carriageway.
	Road	Lusaka	Kafue	Fair	51	Reasonable condition toll road but heavy and slow-moving traffic, although with passing lanes on the hills.
	Road	Kafue	Chirundu	Fair	92	In reasonable condition, but through the escarpment, single carriageway, with heavy, slow-moving, goods traffic.
	Road	Chirundu	Lion's Den	Fair	216	
	Road	Lion's Den	Harare	Fair	139	
	Road	Harare	Rutenga	Fair	443	Road in reasonable condition, single carriageway.
	Road	Rutenga	Beitbridge	Fair	141	
	Road	Beitbridge	Mokopane	Good	285	
	Road	Mokopane	Pretoria	Good	208	All at least 3-lane, tolled highways in very good condition with fast-moving traffic and services, such as fuel stations and places to eat and stay along the way. The highways all have weigh stations as part of the infrastructure,
	Road	Pretoria	Johannesburg	Good	75	
	Road	Johannesburg	Durban	Good	568	
	Road	Solwezi	Chingola	Good	177	This road is heavily trafficked with trucks servicing the mine. Road has recently been rehabilitated and maintenance has in the past been done by the mines, so could be structured as a PPP project in the future.
	Road	Kafue	Livingstone	Fair	434	Sections needing reconstruction (Kafue to Mazabuka), sections that are excellent (Monze to Livingstone) and sections in reasonable condition, but would benefit from period maintenance (Mazabuka to Monze).
	Road	Livingstone	Kazungula	Good	62	This road is in good condition, although would benefit from having passing lanes on long hills constructed or the road dualized.
	Road	Kazungula	Francistown	Good	491	This road has either recently been reconstructed (Nata to Kazungula) or is in the process of being reconstructed (Francistown to Nata).

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Road	Francistown	Palapaye	Good	169	This road is in good condition as it has recently been reconstructed as a dual carriageway.
Road	Palapaye	Martin's Drift	Fair	208	The road is a single carriageway with sections that are potholed.
Road	Martin's Drift	Mokopane	Good	181	A single carriageway but in good condition, except the section that passes through Mokopane.
Road	Livingstone	Victoria Falls	Poor	12	This is a border crossing across the original bridge. The border facilities are rudimentary.
Road	Victoria Falls	Bulawayo	Fair	442	This road is in reasonable condition but could benefit from periodic maintenance. The Gwanda to Beitbridge section, which is 197 km, is a PIDA priority project and scheduled for rehabilitation and upgrading.
Road	Bulawayo	Beitbridge	Fair	321	

Source: Collated by authors

Figure 59: North-South Corridor Road Network



*Note that the section between Solwezi and Chingola has recently been rehabilitated so should be green (good) and not red (poor).
Source: Collated by authors

6.8.3. Rail Infrastructure Condition and Capacity

The North-South Rail Corridor consists of a rail network that stretches more than 3,000 km from Durban in South Africa through Zimbabwe and Botswana and links to DRC, passing through Zambia. It is SADC's main international rail gateway for transporting inbound and outbound cargo. Table 64 gives the state of the rail track in Zambia, Table 65 gives the state of the rail track in DRC and Table 66 gives the state of the rail track in DRC, all components of the NSC railway. The assessments were done by TMSA in 2012, together with an estimated cost, in US dollars, of the rehabilitation required.

Table 64: Zambia's Rail Track Condition on the North-South Corridor

From	To	Est Freight mtpa, both directions	KM	Category	Comments	Cost US\$
					General condition poor, lack of maintenance, requires upgrading of rail and sleepers.	
Livingstone	Choma	0.6	190	Good	40 kg rail on concrete and wood sleepers.	–
Choma	Kafue	0.6	210	Poor	45 kg rail on wooden sleepers, occasional concrete sleepers.	84,000,000
Kafue	Lusaka	0.6	55	Fair	45 kg rail on wooden sleepers, occasional concrete sleepers.	11,000,000
Lusaka	Kabwe	0.5	110	Fair	45 kg rail on wooden sleepers, occasional concrete sleepers.	22,000,000
Kabwe	Kapiri	0.5	65	Poor	45 kg rail on wooden sleepers, built 1964.	26,000,000
Kapiri	Ndola	0.5	110	Good	45 kg rail on concrete sleepers laid 1989-97.	–
Ndola	Sakania	0.05	30	Fair	40 kg rail on steel sleepers, built 1959.	6,000,000
Ndola	Chingola	0.3	90	Poor	45 kg rail on wood and concrete sleepers, built 1979-85.	36,000,000

Source: TradeMark Southern Africa (2012).

Table 65: DR Congo's Rail Track Condition on the North-South Corridor

From	To	Est Freight mtpa, both directions	KM	Category	Comments
Sakania	Lubumbashi	Est 0.05	255	Fair	Fair, being rehabilitated under WB project.
Lubumbashi	Tenke	Est 0.1	237	Poor	Electrified, poor condition, being renewed under WB project, probably upgraded to 50 kg rail.
Tenke	Kolwezi	Est 0.1	95	Poor	Electrified, poor condition, 30 kg on steel sleepers. Being rehabilitated under current WB rail project.
Kolwezi	Mutshatsha	0	157	Poor	Poor condition, corroded sleepers. Electrified, believed non-operational.
Mutshatsha	Dilolo	0	270	n	30 kg rail on steel sleepers. Line intact, but closed – no link to Angola yet. No funding for rehabilitation. Detailed inspection in 2010.

Source: TradeMark Southern Africa (2012).

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Table 66: Zimbabwe's Rail Track Condition on the North South Corridor

From	To	Est Freight mtpa, both directions	KM	Category	Comments
					Generally fair to good, 40 kg and 45 kg rail on concrete sleepers, total of 69 speed restrictions of down to 10 km/hr reported in 2009 (total length 320 km). Relative to RSZ and TRL, NRZ is still in reasonably good condition. Signalling system no longer functioning. Total freight traffic 2010 about 2.5 mtpa.
Beitbridge	Bulawayo	1.5	310	Good	Built 1999, new line to West Nicholson concessioned to BBR.
Bulawayo	Thompson Junction	1.1	350	Fair	Main NS line, 2 trains per day, coal from Hwange, 22 caution and speed restrictions.
Thompson Junction	Vic Falls	0.6	125	Fair	Main NS line, 1 train per day, serving RSZ in Zambia.
Beitbridge	Rutenga	0.5	135	Good	Main line from SA to Harare via Somabhula.
Rutenga	Somabhula	1	245	Fair	Main line from SA to Harare via Somabhula, also line to Maputo for chrome and sugar exports – mainly export line.
Bulawayo	Somabhula	0.5	130	Fair	Problems with rail fracture, requires renewal.
Somabhula	Harare	1	300	Fair	Problems with rail fracture, requires renewal, section from Gweru electrified (no longer operational).
Harare	Mutare – Forbes Reef (Moz)	0.3	306	Good	Upgraded during 1990's, fairly good, constrained by CCFB performance in Mozambique.
Rutenga	Chicalacuála (Moz)	0.5	135	Good	Operating well at 40 km/hr, 11 km of speed restrictions, Zimbabwe export line to Maputo.

Source: TradeMark Southern Africa (2012).

Movement of people and cargo by rail along the North-South Corridor and in the SADC region in general, has been declining for decades partly because of underinvestment in railway infrastructure and rolling stock, and partly because of the competition provided by the road sector. The result is that the NSC railway system moves less than 10 per cent of surface transport freight volumes.

However, there are signs that the North-South Rail Corridor is beginning to improve its performance and service delivery with a memorandum of understanding being signed between the rail operators on the North-South Rail Corridor, which includes Zambia Railways Limited (ZRL), Grindrod/Beitbridge-Bulawayo Railways (BBR), Société Nationale des Chemins de fer du Congo (SNCC), National Railways of Zimbabwe (NRZ), Swaziland Railway (SR), Transnet SOC and Botswana Railways (BR).

The five railway companies have agreed to prepare a single coordinated corridor development plan to address the modal imbalance between road and rail on the North-South Corridor. The so-called North-South Rail Corridor Infrastructure and Logistics Study will focus on the rehabilitation and upgrade of the rail corridor and is being financed by the SADC Infrastructure Project Preparation Fund, managed by the Development Bank of Southern Africa (DBSA).

6.8.4. Border Post Condition and Capacity

6.8.4.1. Chirundu One Stop Border Post

Chirundu is a border post between Zambia and Zimbabwe located on either side of the Zambezi River (see Figure 60). It is a busy border with about 650 trucks crossing each day.

The idea to convert Chirundu into a one-stop border post (OSBP) was first

mooted in the late 1990s and Japan assisted Zambia with the initial financing of the construction of the new buildings on the Zambian side and to mobilise the construction contract for the border post buildings on the Zimbabwean side. The Japanese also financed the construction of the new road bridge at Chirundu, which was built by a Japanese construction company.

The UK's Department for International Development (DFID), through the Regional Trade Facilitation Programme (which was the predecessor of TradeMark Southern Africa, (TMSA)), became involved at Chirundu in 2007, with the recruitment of a Programme Manager to manage implementation, support for the various technical committees and Steering Committee, financing of technical assistance inputs and financing of minor works.

The main objective of the Chirundu OSBP was, by working in a sequenced and harmonised way with other initiatives on the North-South Corridor, to reduce the costs of cross-border transactions by reducing the time taken to cross a border.

The Chirundu one-stop border post was officially opened on 5 December 2009 by the presidents of Zambia and Zimbabwe and was Africa's first functioning OSBP.

One of the main challenges that needed to be addressed in establishing the Chirundu OSBP was the change management aspect of the programme. It took a lot longer and a lot more resources to change the way border agencies and staff worked at Chirundu Border Post than was originally budgeted for. For example, the position of project manager was a short-term intervention when the manager was first appointed, but it became clear during implementation that the process of establishing a OSBP was going to be a longer and more complicated process than had initially been envisaged. The

programme manager was retained as an essential component of the OSBP from 2007 until its opening in December 2009 and beyond, as, even though the OSBP was officially opened in December 2009, there remained several issues to address to ensure the smooth functioning of the OSBP.

The Chirundu OSBP procedures are as follows:

- For southbound traffic, all procedures for persons, vehicles and goods to exit Zambia and enter Zimbabwe are carried out in the Zimbabwe terminal. For northbound traffic, all procedures for the persons, vehicles and goods to exit Zimbabwe and enter Zambia take place in the Zambian terminal.
- Entry procedures cannot begin until all exit procedures are completed and jurisdiction has formally passed from the exit state to the entry state, except in cases where goods are pre-cleared. This is to avoid any conflict over national jurisdiction within the OSBP. Jurisdiction is based on the officer performing the controls, not on the national territory in which the controls are performed.
- Officers carry out their own border control laws even when acting in the adjoining country, but only within the common control zone established by the Bilateral Agreement between Zambia and Zimbabwe.
- Wherever possible, inspections and other procedures are carried out jointly to increase effectiveness and save time.
- Cross-border risk assessment of persons and goods should be employed to the extent possible.
- If at any point in the processing, persons are denied exit or entry or an arrest is made, or goods are confiscated, return of said persons or goods will be carried out.

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- National police address any law-and-order offences that occur on national territory. Any regulatory infringements that occur in the performance of border control duties is referred to the agency management to which the officer reports.

The common control zone has three gates: a south gate for entry to and exit from Zimbabwe and two north gates for entry to and exit from Zambia. The terminal in Zimbabwe is used for all southbound border controls and is referred to as the southbound terminal. The terminals in Zambia (passenger and freight) are used for all northbound border controls and are referred to as the northbound terminal.

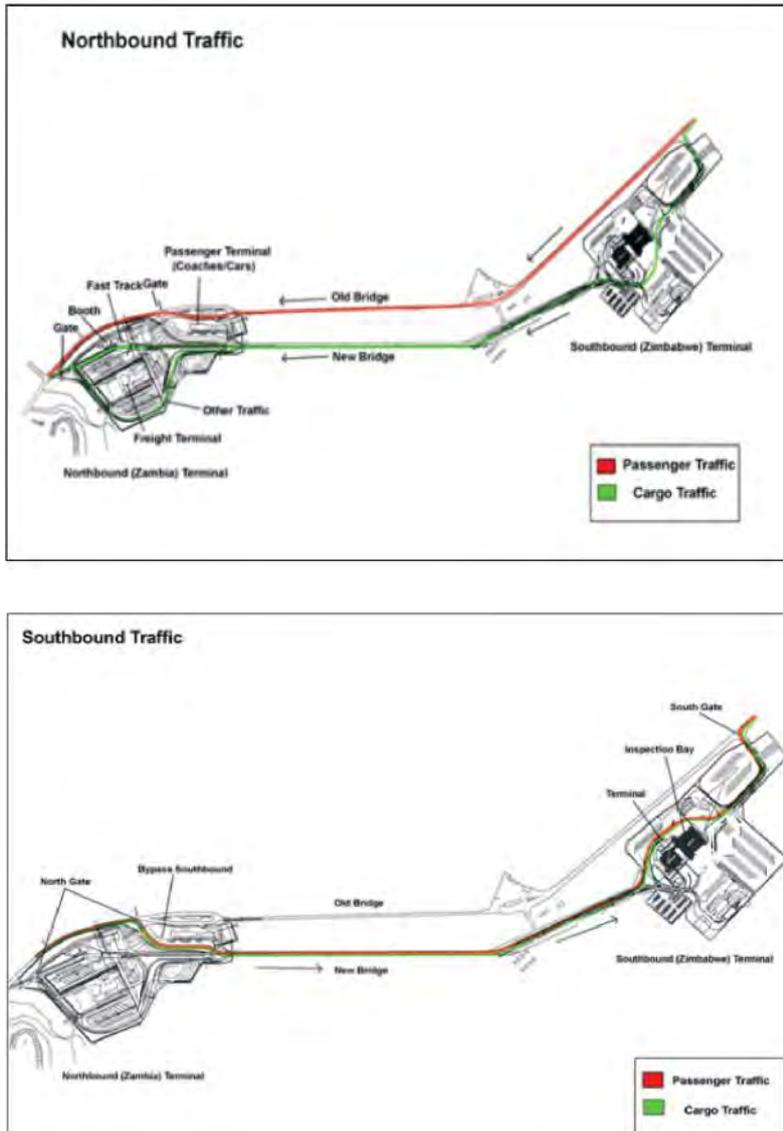
In summary:

- All southbound traffic takes the bypass route through the northbound terminal, across the new bridge and parks on the eastern side of the southbound terminal. Border controls are carried out in the public hall of the terminal, exit first and entry second. Coaches park in the inspection bays or adjacent parking area, where inspections are conducted, as necessary. Heavy goods vehicles are inspected in the inspection bays, as necessary. After completion of border controls, heavy goods vehicles proceed for weighing and departure at the south gate. Border gate passes are given by

the first border control agent in the process and checked on departure to ensure that all necessary controls have been completed.

- Northbound passenger cars and coaches drive past the south gate and cross the old (Sir Otto Beit) suspension bridge. Travellers follow exit procedures for Zimbabwe and entry procedures for Zambia in the public hall. Inspections are carried out in the parking area and travellers exit through the passenger north gate.

Figure 60: Traffic Flows through Chirundu OSBP



Source: Nathan Associates (2019).

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Northbound commercial drivers enter through the south gate. Completed gate passes are presented by the clearing agent or driver.

The Standard Operating Procedures had trucks carrying goods that are pre-cleared, goods in transit, trucks carrying hazardous goods or part of the Zambian Customs Accredited Clients Programme proceed to the Fast-Track lane or parking area.

A special Fast-Track unit was set up at the freight terminal to provide rapid processing for Fast-Track cargo. Once released by both Zimbabwe customs, and any other concerned officers, and Zambian customs and any other concerned officers, the driver can proceed on the Fast-Track lane to the clearance booth. At the Fast-Track booth, both immigration services process the driver's passport and customs officers provide the documentation and release orders.

The vehicle then enters Zambia through the commercial north gate, using risk management techniques and intelligence information relating to established parameters.

However, very soon after the Chirundu opened as a true OSBP, it faced political economy (as opposed to technical or administrative) challenges. Although the passenger side of the border still provides an OSBP service, the commercial freight operates as a traditional two-stop border post.

6.8.4.2. Beitbridge Border Post

In July 2018, Zimbabwe's President Emmerson Mnangagwa presided over a ground-breaking ceremony at Beitbridge border post, ahead of a planned US\$200 million revamp of the facility. The refurbishment of the border post, among the busiest in the region, is expected to ease congestion.

Upon completion, it will become an OSBP. An estimated 15,000 people and 500 commercial trucks pass through the border post daily. The numbers often double during peak holiday season and traffic delays can run up to several days. The establishment of an OSBP at Beitbridge will have an economic impact if the time taken to cross the border is significantly reduced. A recent study estimated that savings of about US\$29 million per annum for northbound and US\$35 million for southbound traffic will be made with the implementation of an OSBP (see Figure 61).

Figure 61: Beitbridge Border Post between South Africa and Zimbabwe



Source: Nathan Associates (2019)

6.8.4.3. Kazungula Border Post

Kazungula is a small town on the Zambian side, which is described as a village on the Botswana side of the border. Four countries meet at Kazungula: Zambia, Botswana, Zimbabwe and Namibia. The border town is on the North-South Corridor and is currently mainly used as a secondary route.

Zambia and Botswana approached the African Development Bank (AfDB) to do a feasibility study to build a bridge across the Zambezi River at Kazungula border between Zambia and Botswana and a feasibility study for an OSBP at Kazungula. The AfDB approved the Botswana/Zambia Kazungula Bridge Project (Reference P-Z1-DB0-031) on 7 December 2011 (see Figure 62) and the project was anticipated to be completed in 2020.

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Figure 62: Kazungula Border Post between Zambia and DRC



Source: Road Development Agency, Zambia (2019).

The project is described as a multi-national project on the North-South Corridor within the SADC region and part of a corridor-long infrastructure improvement programme. The project scope includes constructing a bridge linking Botswana and Zambia over the Zambezi River to replace the existing ferry and juxtaposed OSBPs at Kazungula. The project's main components comprise the construction of a new road/rail bridge, OSBP and access roads at Kazungula border.

The project also includes the following complementary components:

- implementation of hard and soft infrastructure to achieve full operation of a complete border infrastructure system;
- a feasibility study and engineering design of additional transport facilities to meet medium- to long-term corridor development and regional connectivity needs.

The original plan was to site the bridge at the narrowest point of the river, which is where the ferries presently cross and to construct a straight bridge. However, because of objections to the original siting of the bridge from Zimbabwe, the bridge location needed to be moved further upstream. The design of the bridge was changed to a curved cable-stay bridge so that the bridge did not infringe on Zimbabwean territory. This delayed the start of construction and significantly increased the cost of the bridge.

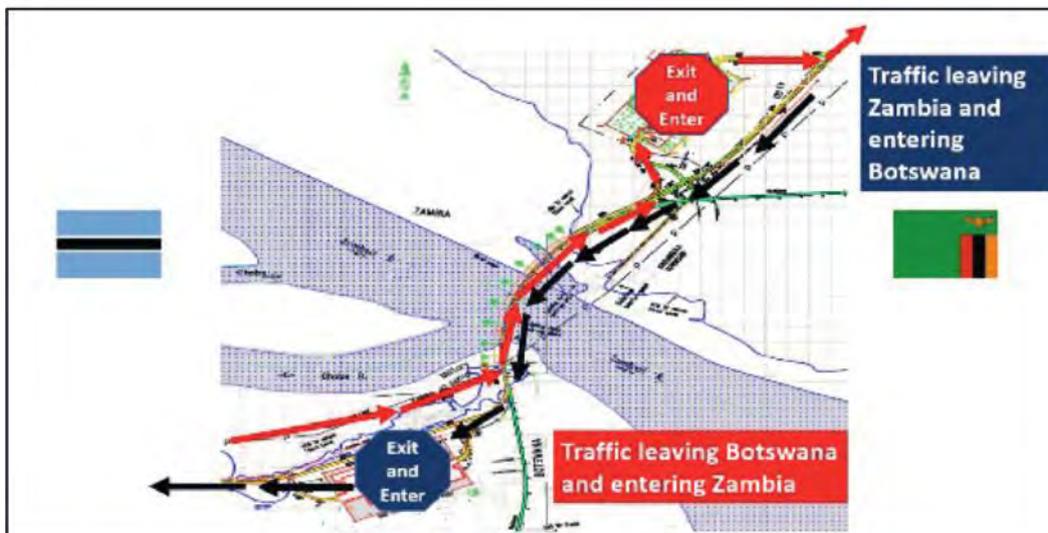
The main trunk road, part of the North-South Corridor, is already in place whereas the railway is planned. In Botswana, the plan is to connect the existing line which runs from Plumtree (on the border between Botswana and Zimbabwe) to join onto the South African railway network. The existing network will be extended by building a 1,067 mm gauge (or 3ft 6in Cape Gauge) line from Moseitse (just south of Sowa in Botswana) to Kazungula and to join up with the Zambia Railways network at Kazungula.

Figure 63: Kazungula Border Post Layout



Source: Road Development Agency, Zambia (2019).

Figure 64: Kazungula Border Post Flow Diagram



Source: Road Development Agency, Zambia (2019).

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The OSBP at Kazungula (see Figure 63 and Figure 64) is designed so that:

- All traffic going to Botswana is cleared at Botswana Kazungula border facility and all traffic going to Zambia is cleared at Zambia Kazungula border facility.
- Entry procedures then exit procedures – jurisdiction is formally passed.
- Officers operate in accordance with their own national border control laws.
- Scans are based on risk assessment. All border agencies have full access to scanning results. If physical inspection is required, joint physical inspections are conducted.
- Inspections and other procedures are carried out jointly and for all concerned agencies.
- Risk management systems are integrated to the best extent possible.
- Passenger and vehicle queues are minimised.
- People denied entry are allowed back to the state they have left.
- National police address any law and order offences that occur on national territory.
- Regulatory infringements are referred to the agency management to which the officer reports.

6.8.5. Trade Facilitation Performance

Table 67 provides a summary of the status of the trade facilitation performance on the North-South Corridor.

Table 67: Trade and Transport Facilitation Measures - North-South Corridor

North-South Corridor Trade and Transport/Transit Facilitation Data Sheet		
Transit and Transport Facilitation Instruments	Vehicle Overloading	The North-South Corridor has little vehicle overloading because of the strict enforcement of overloading controls and strategically placed weighbridges along the entire length of the corridor, except perhaps in DR Congo. However, if an overloaded truck passes through the border from DR Congo into Zambia on the NSC the chances are that it will be stopped and fined, and requested to reload.
	Vehicle dimensions	The NSC has a uniform regulation on vehicle dimensions and all countries through which the NSC passes allow 7-axle configuration with a vehicle length of 22 metres.
	3rd Party Vehicle Insurance	There are 3 systems for 3rd party vehicle insurance on the NSC – the COMESA Yellow Card (DR Congo, Zambia, Zimbabwe), 3rd party vehicle insurance included in the fuel levy (South Africa, Botswana). There is also an option to pay cash at the border posts, and cash paid at the border only (Angola and Mozambique).
	Multilateral Cross-Border Transport Agreement	The Tripartite Transport and Transit Facilitation Programme (TTTFP) is working with COMESA-EAC-SADC Tripartite countries to design and implement a MCBRTA, but this is not in place and remains work in progress.
	Corridor Management Authority	The North-South Corridor has no corridor management body in place.

Trade Facilitation Instruments	Advance Rulings	All countries on the NSC are endeavouring to implement an advance ruling system but none of the countries, except South Africa and Botswana, have designated Advance Rulings as Category A.
	Pre-Arrival Processing	Pre-arrival processing is, technically, available at all border posts but most borders on the NSC are heavily congested and all trucks, except dangerous goods and abnormal loads, need to queue to get into the border areas. This means that even goods that have been cleared before they arrive at the border post need to queue and are not processed and released immediately at the border posts.
	Electronic Payment	Most countries not only allow electronic payments but often insist on electronic payments, but then demand a printed proof of payment from the bank.
	Separation of Release from Final Determination of Customs Duties	All countries, under certain and special circumstances, allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.
	Risk Management	The implementation of risk management systems poses serious challenges for all countries along the corridor. The main reason for this is a lack of faith from Customs that risk management will not result in a loss of revenue, as well as a failure to link the risk management module to the main customs management system, plus calibrating the system with relevant data on known traders and economic operators.
	Post-clearance Audit	All countries, under certain and special circumstances, implement post-clearance audits to ensure compliance with customs and other related laws and regulations.
	Trade Facilitation Measures for Authorised Operators	South Africa has launched an AEO program that follows in the footsteps of Customs' Preferred Trader programme which offers various benefits to compliant Customs clients. SARS Customs intends to pilot the AEO programme in South Africa before the end of 2019. No other country on the NSC operates an AEO programme but some operate preferred trader schemes, although with limited success. South Africa plans to put in place Mutual Recognition Agreements (MRAs) for its AEO Programme and intends to commence engagements within Africa.
	Border Agency Coordination	All countries are working towards improved coordination between border agencies nationally, but there is still plenty of room for improvement.
	Movement of Goods Intended for Import Under Customs Control	All countries allow goods intended for import to be moved within its territory under customs control from a Customs Office of entry to another Customs Office in its territory from where the goods would be released or cleared.
	Single Window	All countries are working on national single window systems, but no country has a functional system yet.
	Freedom of Transit	There is freedom of transit on the NSC.
	Customs Cooperation	Zambia is working hard to improve the level of cooperation between Zambia Revenue Authority and other national Customs agencies. Zambia is in the process of signing data sharing agreements with DR Congo, Tanzania and Malawi.

Source: Collated by authors

6.8.6. Proposed Corridor Projects

There have been a number of projects proposed for the North-South Corridor, but most of them have either not materialised, mainly because they were not financially or economically viable, or the ones that are viable, such as the Kazungula OSBP and the road upgrades, are in the process of being implemented.

However, there are still some projects that may be viable and worth further analysis, including:

- The railway line linking Francistown in Botswana to the Zambia Railways

system over the Kazungula bridge and joining up with the old Mulobezi railway line. This will create an alternate route between Lubumbashi, the Copperbelt and South Africa via Botswana, and avoid the bottleneck of the BBR line in Zimbabwe.

- Support to the railway corridor development plan. The five railway companies have agreed to prepare a single coordinated corridor development plan to address the modal imbalance between road and rail on the North-South Corridor. The so-called North-South Rail Corridor infrastructure

and logistics study will focus on the rehabilitation and upgrade of the rail corridor and is being financed by the SADC Infrastructure Project Preparation Fund, managed by the Development Bank of Southern Africa.

There is also a need to reconstruct some of the roads and to provide infrastructure upgrades at some borders but, for the former, there is no opportunity to invest in the road network on the North-South Corridor and for the latter, some regulatory issues need to be resolved before infrastructure upgrades can be effective.

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6.9. WALVIS BAY CORRIDOR

6.9.1. Corridor Description

The Walvis Bay Corridor links Lubumbashi with the port of Walvis Bay through Namibia and Zambia. It links up with the North-South Corridor at Kazungula, Lusaka and Chingola.

The Walvis Bay Corridor Group (WBCG) was established in 2000 to engage in business development activities, promote cargo for Walvis Bay Port and engage in the facilitation of corridor and infrastructure development. It has promotional offices in Lusaka and Lubumbashi.

The WBCG serves as the interim secretariat of the Walvis Bay Corridor. The Memorandum of Understanding signed in March 2010 between the ministers responsible for transport of DRC, Namibia and Zambia aims to facilitate trade along the corridor.

The WBCG has a 2016-2020 Strategic Plan which focusses on efforts to increase cargo volumes for the port of Walvis Bay and the Walvis Bay Corridors and enhance the competitiveness of the corridors. The immediate focus is to identify and pursue possibilities for substantial short- to medium-term growth in container volumes through the new container terminal. Increased growth in container volumes can come from several sources:

- Increased local demand within the existing Namibian catchment area.
- Increase in transshipments. Container volumes and projections through Walvis Bay have decreased due to the port upgrades in Angola and the consequent fall in transshipment for Angola.

- The development of new hubs and terminals. The objective is to develop Namibia as a logistics hub to serve the SADC region.
- New industrial, processing and mining projects. The establishment of new industrial and processing plants in Namibia would assist in providing the necessary base volumes required to a regional logistics hub, for example, the car assembly plant, the development of renewable energy projects in Namibia and the development of new mining projects in eastern Zambia, where the location of Walvis Bay has been shown to be competitive.
- Transfer of existing volumes from other corridors. If Walvis Bay could attract existing volumes of transit traffic from other corridors on the basis of better reliability and capacity for targeted commodities and goods, this could provide the desired short-term increases in transit traffic. Despite Walvis Bay suffering from a transport distance and cost disadvantage compared to the other regional corridors, land transport cost is not the determining factor in the choice of route and port by importers and exporters.

6.9.2. Road Infrastructure Condition and Capacity

Table 68 gives the condition of the Walvis Bay Corridor road network.

Table 68: Road Condition on the Walvis Bay Corridor

Corridor	Road/ Rail	Town Name From	Town Name To	Condition	Km	Description
Walvis Bay Corridor	Road	Walvis Bay	Okahandja	Fair	326	The road is a single carriageway in fair to good condition. It is easily able to handle the traffic that uses it and the road infrastructure is not a constraint to trade.
	Road	Okahandja	Grootfontein	Fair	386	
	Road	Grootfontein	Rundu	Fair	258	
	Road	Rundu	Katima Mulilo	Fair	514	
	Road	Katima Mulilo	Kazungula	Poor	146	This road has failed completely and needs to be completely rebuilt. It takes 5-7 hours to drive the 146 km between Katima Mulilo and Kazungula.
	Road	Katima Mulilo	Mongu	Good	314	This road (from Senanga to Katima Mulilo) has recently been reconstructed and is in good condition.
	Road	Mongu	Kaoma	Fair	198	The road from Mongu to Kaoma is in reasonable condition but would benefit from periodic maintenance taking place.
	Road	Kaoma	Kasempa	Poor	218	The Kasempa-Kaoma road is a gravel road that is maintained under licence by BUKS Transport under licence from the Zambia Roads Department.
	Road	Kasempa	Solwezi	Fair	182	The road is a surfaced road in reasonable condition.
	Road	Solwezi	Chingola	Good*	177	This road is heavily trafficked with trucks servicing the mine. Road has recently been rehabilitated and maintenance has in the past been done by the mines, so could be structured as a PPP project in the future.
	Road	Chingola	Kasumbalesa	Fair*	43	Road heavily trafficked with trucks carrying general goods, copper and concentrate, fuel and acid tankers.
	Road	Kasumbalesa	Lubumbashi	Fair*	99	Road in reasonable condition but heavily trafficked with mining equipment and goods, general goods, fuel and acid.
	Road	Lubumbashi	Kolwezi	Fair*	301	The road is now paved and in reasonable condition, with a lot of mining equipment and copper using the road.

Source: Collated by authors from interviews with Road Department (Namibia) and Road Development Agency (Zambia).

*Overlap with North-South Corridor.

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6.9.3. Rail Infrastructure Condition and Capacity

As noted above, the Government of Namibia has made a very large investment in the construction of a new container terminal at Walvis Bay Port, with a capacity of 750,000 TEUs per annum. Namport wants to expand the volume of containers handled to achieve a higher degree of asset utilisation and hence lower costs.

The traffic projections done by Walvis Bay Port are for 330,000 TEUs per annum by 2025. If it is assumed that this will be 165,000 TEUs in each direction and that 60 per cent of the containers are serviced by rail with each train handling 60 TEUs (30 wagons), this would translate into five trains per day in each direction and 165 trucks per day in each direction.

TransNamib plans to increase the current rail freight volume of 1.5 mtpa to 3 mtpa in the short term with increased investment in track infrastructure and equipment. This short-term target will primarily be achieved by the shift of freight from road to rail, rather than the overall growth of freight volumes. Unhindered rail access to the port terminals, therefore, of prime importance.

With respect to the freight train service to the north, TransNamib has introduced a daily 'dedicated' service. The relatively low rail volumes dictate that this will likely be a 'mixed' service, made up of several freight components: containers, bulk and fuel.

To attract copper exports from Zambia for a scheduled low-cost multimodal transport service, Namibia is examining the feasibility of promoting and implementing a dedicated 'copper' container block train between the Grootfontein ICD and the Walvis Bay container terminal.

6.9.4. Border Post Condition and Capacity

The border post at Wenela/Katima Mulilo is shown in Figure 65.

Figure 65: Wenela (Namibia) and Katima Mulilo (Zambia) Border Post



Source: collated by authors

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As can be seen from the satellite image of both sides of the border (Wenela in Namibia and Katima Mulilo in Zambia), there is some traffic congestion, indicating that truck parking is scarce and there may be need to construct additional parking facilities. This is especially the case if it is assumed that in the near future the volumes of traffic passing through Walvis Bay Port from and to Zambia is likely to increase.

The Logistics Hub Master Plan expects a rapid increase of cargo (0.8 million tons in 2013 to 3.4 million tons in 2025) from Namibia to Zambia and DRC through the Walvis Bay Corridor, which will require improvements in efficiencies at the border post between Zambia and Namibia.

The buildings at the border post are relatively new, but a JICA report⁹² suggests that the border control area should be expanded and new staff housing and quarantine and health check facilities need to be built and there needs to be additional parking created for trucks.

92 http://open_jicareport.jica.go.jp/pdf/12230918_02.pdf

6.9.5. Trade Facilitation Performance

Table 69 provides a summary of the status of the trade facilitation performance on the Walvis Bay Corridor.

Table 69: Trade and Transport Facilitation Measures - Walvis Bay Corridor

Walvis Bay Corridor Trade and Transport/Transit Facilitation Data Shee		
Transit and Transport Facilitation Instruments	Vehicle Overloading	The Walvis Bay Corridor does not face major vehicle overloading challenges.
	Vehicle dimensions	Vehicle dimensions between Zambia and Namibia are harmonised.
	3rd Party Vehicle Insurance	Zambia uses the COMESA Yellow Card or a transporter can opt to buy 3rd party vehicle insurance at the border. Namibian 3rd party vehicle insurance is included in the fuel levy.
	Multilateral Cross-Border Transport Agreement	The Tripartite Transport and Transit Facilitation Programme (TTTFP) is working with COMESA-EAC-SADC Tripartite countries to design and implement a MCBRTA, but this is not in place and remains work in progress.
	Corridor Management Authority	The Walvis Bay Corridor Group acts as a Corridor Management Secretariat.
Trade Facilitation Instruments	Advance Rulings	Both Zambian and Namibian Customs can issue Advance Rulings.
	Pre-Arrival Processing	Both Zambian and Namibian Customs can provide pre-arrival processing.
	Electronic Payment	Both Zambian and Namibian Customs use a version of electronic payments.
	Separation of Release from Final Determination of Customs Duties	Zambian and Namibian Customs allow the release of goods prior to the final determination of customs duties, taxes, fees and charges.
	Risk Management	The implementation of risk management systems pose serious challenges for Zambia and Namibia. The main reason for this is a lack of faith from Customs that risk management will not result in a loss of revenue as well as a failure to link the risk management module to the main customs management system, plus calibrate the system with relevant data on known traders and economic operators.
	Post-clearance Audit	Zambia and Namibia use post clearance audits.
	Trade Facilitation Measures for Authorised Operators	Neither Namibia nor Zambia have an Authorised Economic Operator system in place.
	Border Agency Coordination	Zambia and Namibia are both working towards improved coordination between border agencies nationally, but there is still plenty of room for improvement.
	Movement of Goods Intended for Import Under Customs Control	Zambia and Namibia allow goods intended for import to be moved within its territory under customs control from a Customs Office of entry to another Customs Office in its territory from where the goods would be released or cleared.
	Single Window	Zambia and Namibia do not, as yet, operate a Single Window.
	Freedom of Transit	There is freedom of transit on the Walvis Bay Corridor.
	Customs Cooperation	Both countries continue to make improvements in customs cooperation.

Source: Collated by authors from interviews with Road Department (Namibia) and Road Development Agency (Zambia).

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6.9.6. Proposed/Planned Corridor Projects

The Walvis Bay Corridor has the potential to rapidly expand in terms of traffic handled from and to Zambia and DRC. Walvis Bay is considered to be an efficient port, the road network is reasonable except for a few sections and there is only one border to cross between Zambia and the port.

Some of the projects which may be interesting to an investor are:

- Establishing an Inland Container Depot at Grootfontein to take advantage of the TransNamib railhead. Cargo from Zambia and DRC could travel under bond (removal in transit – RIT) from the border at Katima Mulilo to Grootfontein and then go into a bonded warehouse and be loaded onto the railway and transported to Walvis Bay Port by rail. This is a distance of 624 km, so it would considerably shorten the road transport distance. A multimodal system could also be explored where cargo from the DRC and the Zambian Copperbelt could be transported by rail to Livingstone, then transported by truck from Livingstone to Grootfontein and then by rail from Grootfontein to Walvis Bay. The reverse route could also be used.
- Road upgrades on the Kaoma-Kasempa and the Katima Mulilo-Kazungula sections.
- Upgrades to the Katima Mulilo Wenela Border Post.





Chapter 7

Priority Project Pipeline

Priority Project Pipeline

7.1. METHODOLOGY

This section of the report represents the final step in pulling together the preceding analysis by ranking the 'bottlenecks' in the port, road, rail and border post sectors to highlight priority hotspots for targeted interventions on the high-volume trade-carrying corridors. These priority 'hotspots' are then reviewed against recent and active investment activity to assess the immediate scope for possible intervention by Afreximbank.

7.2 TRANSIT TRADE BY CORRIDOR

Table 70 summarises the transit trade projections by regional transport corridors in the SADC region over the period 2017-2040. Figure 66 provides an illustration of the table.

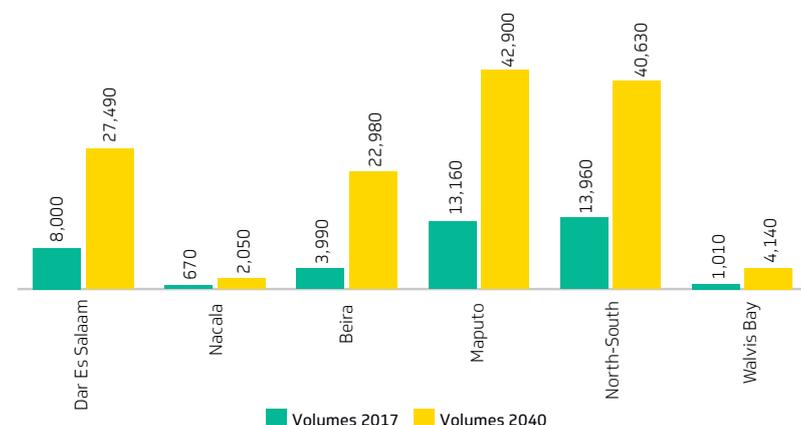
Table 70: Transit Trade by Regional Corridor, 2017-2040 (000s Tons)

Corridor	Volumes 2017	Volumes 2040	Growth 2017-2040
Dar es Salaam	8,000	27,490	5.51%
Nacala	670	2,050	4.98%
Beira	3,990	22,980	7.91%
Maputo	13,160	42,900	5.27%
North-South	13,960	40,630	4.75%
Walvis Bay	1,010	4,140	6.33%

Source: Collated by authors

The dominant trade-carrying regional transport corridors are Maputo, followed by North-South, Dar es Salaam, Beira, Walvis Bay and Nacala. However, bulk mineral exports, primarily from South Africa, remain a dominant trade on the Maputo Corridor with more diversified trade flows occurring along the North-South, Dar es Salaam and Beira corridors, followed by Walvis Bay and Nacala corridors.

Figure 66: Transit Trade by Regional Corridor, 2017-2040 (000s Tons)



Source: Nathan Associates (2019).

7.3. PROJECT PIPELINE

The last section of the report identified and profiles investment hotspots requiring intervention in the short-to-medium term to enhance the condition and capacity of trade-carrying infrastructure on SADC six main regional transport corridors. The Lobito and Bas Congo corridors have not been included in this analysis because they have not yet emerged as fully functional regional transit-transport corridors. This section focusses on investments that improve the prospects of trade, particularly intra-Africa trade between maritime and hinterland states of the SADC mainland, only on the six main current corridors.

7.3.1. Priority Projects in Port Sector

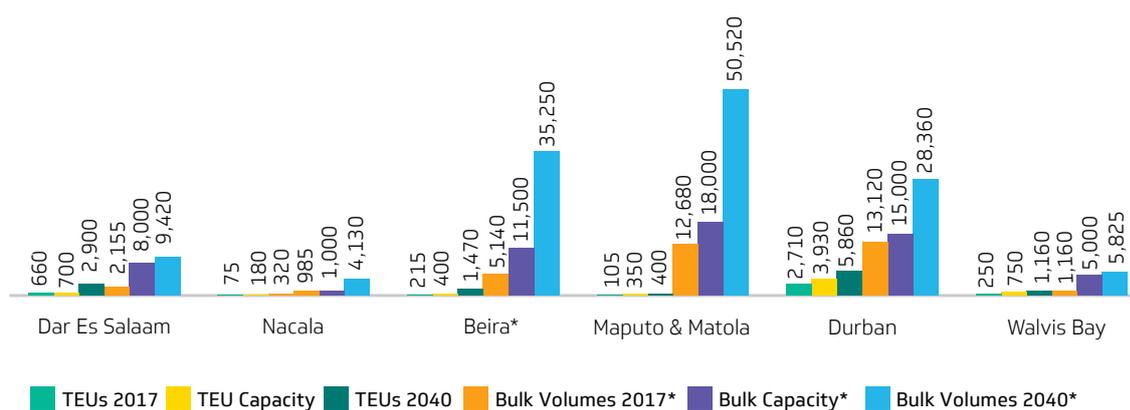
Table 71 summarises the TEU and bulk cargo projections against the current capacity for each of the six regional gateway ports that anchor the regional transport corridors in the SADC region.

Table 71: TEU and Bulk Projections vs Current Port Capacity, 2017-2040

Port	TEUs 2017 000s	TEU Capacity 000s	TEUs 2040 000s	Bulk 2017* 000s tons	Bulk Capacity* 000s tons	Bulk 2040* 000s tons
Dar es Salaam	660	700	2,900	2,155	8,000	9,420
Nacala	75	180	320	985	1,000	4,130
Beira*	215	400	1,470	5,140	11,500	35,250
Maputo	105	350	400	12,680	18,000	50,520
Durban	2,710	3,930	5,860	13,120	15,000	28,360
Walvis Bay	250	750	1,160	1,160	5,000	5,825

Source: Collated by authors

Figure 67: TEU and Bulk Projections vs Current Port Capacity, 2017-2040



Sources: Humphreys et al. (2019) and Transnet (2016).

Priority Project Pipeline

The infrastructure assessment conducted in the previous chapter of this report identified nine port hotspots that require some intervention to avoid bottlenecks in the next 10 years.

These are in order of urgency:

- Dar es Salaam Port reached bulk capacity limit in 2019, so is over-capacity.
- Maputo Port reached bulk capacity limit in 2019, so is over-capacity.⁹³
- Durban Port reached bulk capacity limit in 2019 so is over-capacity.
- Dar es Salaam Port requires additional container capacity by 2022.
- Nacala Port requires additional general cargo capacity by 2024.
- Beira Port requires additional container capacity by 2025.
- Durban Port requires additional container capacity by 2028.
- Nacala Port requires additional container capacity by 2030.
- Beira Port requires additional general cargo capacity by 2030.
- Each hotspot is discussed in Table 72, with main takeaways from a review of these projects being as follows:
 - Expansion of the general cargo-handling capacity at the port of Dar es Salaam is covered in the Dar es Salaam Maritime Gateway Project (DMGP). Expansion of the container handling capacity at the port lies in

the development of Berths 13 and 14, which lies outside the DMGP and has been planned for more than a decade. However, the latest readily available information is outdated and there is a need for Afreximbank to follow up on the status of this project.

- Both demand conditions and supply-side responses to existing infrastructure bottlenecks have significantly improved operations at Maputo's Matola Coal Terminal (TCM). As a result, the case to expand the coal terminal's capacity has been significantly enhanced, which presents an opportunity for Afreximbank to assess whether there is a role for itself on this project.
- Expansion of both the general cargo and container handling capacity at the port of Nacala is being addressed by the ongoing Nacala Port Development Project being implemented by US\$350 million financing from JICA, so the scope for Afreximbank involvement is limited.
- Expansion plans to expand the port of Durban's general cargo and container handling capacity are fully detailed in Transnet's LTPF, including the envisaged capex, estimated at US\$1.5 billion, which will be financed off Transnet's own balance sheet, so the scope for Afreximbank involvement is limited.

⁹³ Following the presentation of the Phase 1 report on 21 January 2021 during the virtual PIDA week, Grindrod raised a concern that this statement on the Maputo port is no longer correct. There has been significant investment in port infrastructure and operations since 2016, the base year used for data analysis in the World Bank report from which this conclusion is drawn. Consequently, there is adequate capacity for handling bulk cargos at both the Matola Bulk Terminal and the Maputo Cargo Terminal for the foreseeable future.

Table 72: Review of Port ‘Hotspots’

Gateway Port	Ranking	Review of Current Investment Plans	Afreximbank Action
Dar es Salaam	1 + 4	The modernisation of the dry bulk, break bulk and cargo handling methods on Berths 1-7 is a major component of the DMGP, which is designed to increase the overall capacity of the port of Dar es Salaam to 28 mtpa by 2025. Outside the DMGP is the development of new container terminal at Berths 13 and 14, including the dredging of the access channel. The new container terminal will have a capacity of 600,000 TEU per annum and will allow the port to accommodate larger vessels to meet future demand. A detailed project feasibility study has been completed and the capital investment for the project is estimated to be US\$628 million. China Exim Bank is to provide 85% and the Government of Tanzania 15% of the financing. In 2016, the project was reported to be in Transaction Support and Financial Close Phase, but no discernible progress appears to have been made and no further details could be obtained on the current status of the project.	Follow up with the Tanzania Ports Authority (TPA) to assess the status of the new container terminal project.
Maputo	2	Grindrod, the TCM operator, recently reported significant improvements in the TCM’s performance. This is due to three factors. The first is that due to the completion of the deepening of the Maputo Channel by the MPDC in 2017 at a cost of US\$85 million, larger Panamax vessels can enter the port. The second is the impact of the Berth Deepening and Quay Offset Project allows fully-laden Panamax vessels to berth at TCM now, which has been supported by a further investment of US\$25 million in freight handling equipment. The third has been an enhanced collaboration between TFR, CFM and MPDC that has resulted in 25% and 7% improvement in the performance of the coal and magnetite rail lines, respectively. These improvements, buoyed by strong market demand, have paved the way to review the expansion of the existing capacity at TCM. To date US\$70 million has been invested in the refurbishment and building of infrastructure expanding the capacity of the terminal to 6 mtpa. A feasibility study has been done for an expansion of capacity from the current 7.5 mtpa to by 20 mtpa at an anticipated cost of US\$800 million.	Follow up with MPDC to assess the extent of any future expansion plans for TCM and whether there is scope for Afreximbank’s participation.
Nacala	5 + 8	The port of Nacala is undergoing a major US\$350 million rehabilitation and expansion through a loan provided by JICA. The first tranche was for emergency rehabilitation, followed by a line of credit for the Nacala Port Development Project, currently being implemented over three phases with completion expected in 2021. The container handling capacity will increase to 300,000 TEUs per annum but the inadequate capacity to handle general cargo will have to be managed because the main constraint to future expansion is the limited space available for additional on-site storage. Capacity is provided by private sector warehouses located on the N8, some 5–8 km from the port via a good, but narrow, road. The current programme provides additional access to/from the port and improves the internal circulation in the port precinct.	No action anticipated as the current investment programme is dealing with the bottlenecks in the best way possible.
Beira	6 + 9	Under the extension of the current concession agreement to 2038 Cornelder de Moçambique (CdM) will invest US\$154 million in the container terminal, with \$30 million allocated to infrastructure improvements and \$124 million allocated to equipment to enhance the productivity of the port. CdM also plans to invest a total of US\$110 million in the general cargo terminal, with US\$53 million allocated to infrastructure improvements and \$57 million allocated to equipment to enhance the productivity of the port. This investment programme should address anticipated bottlenecks in both the container and general cargo terminals, but it is not known if this programme is fully-funded and, if not, what the scope is for Afreximbank’s possible participation.	Follow up with CdM to assess the extent to which the port of Beira investment plan for the period 2018-2038 is funded and whether there is scope for Afreximbank’s participation.

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Durban	3 +7	Transnet operates the port of Durban and port planning is communicated through the annual Transnet Long-term Planning Framework (LTPF) that frames strategic investment decisions and capacity requirements for the next 30 years. The LTPF acknowledges that there are certain individual dry and break bulk terminals in the port have insufficient capacity to meet their demand. Provision of new infrastructure, handling equipment and more efficient hinterland logistics is required in order to provide unconstrained growth of the dry and break bulk terminals. The LTPF makes provision for what Transnet can do to address these constraints. The development of Durban container capacity envisages an increase at Pier 2 from 2.0m TEUs in 2017 to 2.9m TEUs in 2023, which is then augmented by Pier 1 (Phase 2 infill) by 1.3m TEUs to 4.2m TEUs in 2027 and then an additional 0.4m TEUs in 2028 to reach 4.6m TEUs. The Durban Dig-Out Port (DDOP) Phase 1 will come online in 2037 to meet demand of 7.7m TEUs by 2045 and phase 2 in 2046 to meet demand beyond 8.0m TEUs. This total investment for key investments in container terminals to 2028 is estimated at ZAR 21.7 billion (US\$1.5 billion), which is expected to be financed off Transnet's own balance sheet.	No action anticipated as the current investment programme is dealing with the bottleneck in the best way possible.
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Sources: VPIC-PIDA (2019), USAID (2019), Transnet (2016) and Grindrod (2018).

7.3.2. PRIORITY PROJECTS IN ROADS SECTOR

Table 73 summarises the growth in heavy-duty vehicles (HDVs) on each road network of landlocked countries (or landlocked regions within maritime states) within the catchment of the six regional transport corridors that traverse the SADC region. Figure 68 provides an illustration of the table.

Table 73: HDV/Day Projections on Regional Road Network, 2017-2040

Road Network	Total 2017	Total 2040	Increase 2017-2040	Increase 2017-2040 %
Zambia	1,415	4,860	3,445	5.51%
Zimbabwe	1,005	3,270	2,265	5.26%
South Africa	452	2,516	2,064	7.75%
Botswana	505	1,617	1,112	5.19%
DR Congo	540	1,490	950	4.51%
Malawi	190	620	430	5.28%

Source: Collated by authors

The infrastructure assessment conducted in the previous chapter of this report identified the absolute increase in the number of HDVs on each of the road networks traversing the six regional transport corridors. The results from the trade flow analysis can be summarised as follows:

1. The Zambian network will experience the highest increase over 2017–2040.
2. The Zimbabwean network follows the second highest increase over 2017–2040.
3. The South African network follows with the third highest increase over 2017–2040.

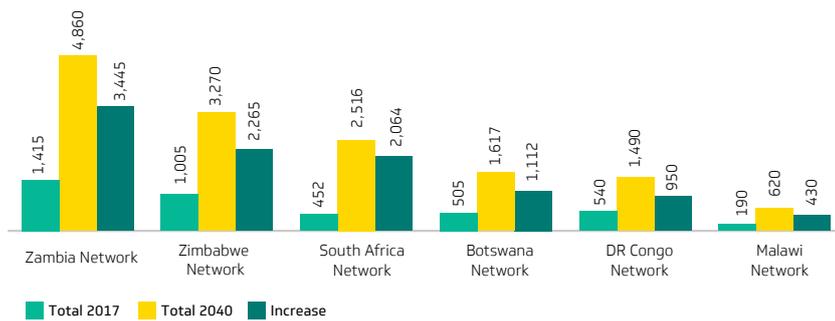
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4. The Botswana network follows with the fourth highest increase over 2017–2040.
 5. The DRC network follows with the fifth highest increase over 2017–2040.
 6. The Malawian network follows the lowest increase over 2017–2040.

The infrastructure assessment has provided a broad overview of the condition and capacity of sections of the national road network that form part of the backbone of each of the main regional transport corridors. This assessment has identified those sections where particular problems currently exist, but these hotspots are typically addressed under the aegis of national road sector investment programmes. Such programmes are typically funded out of allocations from the national budget and/or from financing agreements signed with development partners. Consequently, investment falling under such programmes is not the target of Afreximbank. Finally, whilst the use of tolling is being used, notably in Zambia and Zimbabwe at present, and about to be introduced in Malawi and Mozambique, it is not being used to structure PPP projects but rather as an additional source of revenue to fund the roads sector.



Priority Project Pipeline

Figure 68: HDV/Day Projections on Regional Road Network, 2017-2040



Source: computations by authors.

Within the road networks identified above, there are only three projects that have been structured as PPP projects. The first, the N4 Toll Road linking South Africa and Mozambique, has been in operation since 1997. The second is the Kasomeno-Mwenda Toll Road Project, which is currently being developed by a private sponsor. Boxes 3 to 5 provide a profile for these three PPP projects.

BOX 3: N4 TOLL ROAD CONCESSION – SOUTH AFRICA AND MOZAMBIQUE

Initially, the project involved the upgrading and rehabilitation of 390 km of existing road between Balmoral (20 km west of Witbank) and Moamba (proximity of RSA/Mozambique border) and a further 50-km long road between Moamba and Maputo. The project was later extended to include the N4 road sections between Witbank and Pretoria, a total of 630 km, with 580 km in South Africa and 50 km in Mozambique. The road is partly four-lane separated carriageways and partly two-lane, with widening to accommodate large-haul vehicles. A one-stop border facility was developed at Komatipoort/Ressano Garcia to reduce cross-border bottlenecks between the two countries.

The original agreement stipulated a 30-year concession period beginning in 1997. This period was maintained, although in 2004 the contract was amended to extend the concessionaire's responsibility over the N4 road section between Witbank and Pretoria. The cost of the initial contract was about 3 billion ZAR – about US\$660 million in 1996 value over 30 years. The concession was awarded to the Trans African Concessions (TRAC) consortium. TRAC is responsible for the financing, design, construction, rehabilitation, operation and maintenance of the toll road. Financing for the project was split between 20 per cent equity and 80 per cent debt. The governments of South Africa and Mozambique jointly and severally guarantee the debt of TRAC, and to a certain extent, the equity. The concession contract was signed with South African National Roads Agency (SANRAL) and the Mozambique Roads Agency (ANE) and ends in 2027, after which the road reverts to the governments.

This PPP project is an example of a successful implementation of a toll road project which involves the cooperation of two neighbouring countries of southern Africa. The implementation of the project stemmed from the political will of the two countries to build cross-border economic relations after years of unfavourable political conditions in both countries that hampered such relationships. This project came into being despite the imbalance, regarding various aspects related to such a project between the two partners of South Africa and Mozambique. The risk associated with the financing of the project was borne entirely by the TRAC consortium (no government subsidies were allocated), although the two governments guarantee the debt. The entire toll road was rehabilitated and reconstructed to appropriate standards, including both dual and single carriageway road sections. This is believed to be in line with forecast traffic flows. Among the problems encountered with the implementation of this project:

- Complaints by commuters and other normal users, to the effect that a road that was previously free of charge becomes a toll road after upgrading, which was addressed by introducing lower toll fees for these users; and
- Potentially higher-than-expected damage due to overloading of trucks, which was addressed via the implementation of an efficient axle load control system along the corridor.

Given the level of maturity of the TRAC concession, the main purpose of profiling this PPP project is to illustrate to Afreximbank what the contours of a successful PPP project look like.

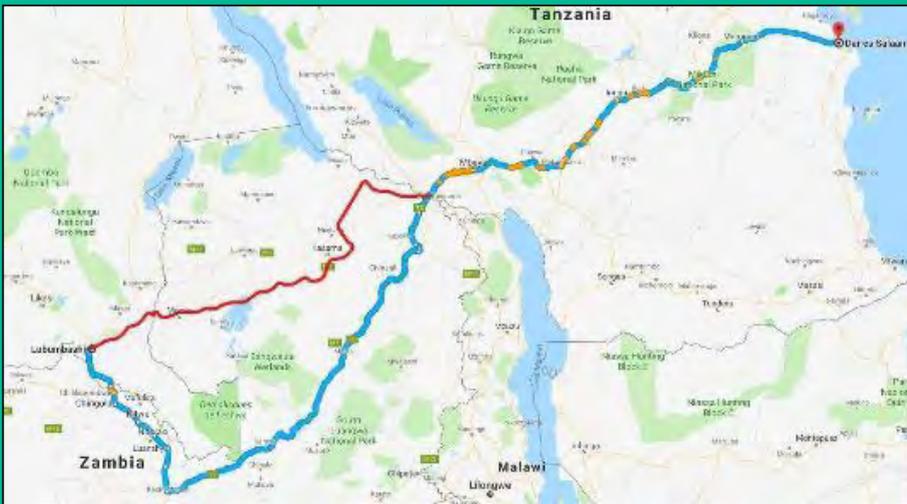
Source: PPIAF (2009).

Priority Project Pipeline

BOX 4: KASOMENO-MWENDA TOLL ROAD PROJECT – ZAMBIA AND DRC

The Kasomeno-Mwenda Toll Road Project (KMTR) is a 25-year build, operate and transfer (BOT) PPP between GED Africa (concessionaire) under separate agreements with the governments of the Democratic Republic of Congo (DRC) and the Republic of Zambia (GRZ).

The project consists of a new 182-km highway, a 400-metre cable-stayed bridge over the Luapula River, two border posts close to the bridge (including warehousing and parking facilities) and a tolling system and associated infrastructure. This represents a major distance and time-saving from the DRC to Dar es Salaam via Zambia (see route below) and will develop a secondary route that will relieve some of the considerable stress that is periodically experienced at the Kasumbalesa border between Zambia and DRC on the current route. It will also relieve pressure on the Zambian road network, particularly the sections from the Nakonde border to the junction at Kapiri Mposhi, and especially the pressure on the sections from the junction at Kapiri Mposhi through Ndola, Kitwe, Chingola and the Kasumbalesa border to Lubumbashi.



In 2016, GED Africa and the Development Bank of Southern Africa (DBSA) signed a facility agreement to grant funding in two tranches, first for pre-feasibility studies and, secondly, for bankable feasibility studies, which would be made available by the DBSA/European Union (EU) for assisting in the development of the project to full bankability.

Phase 1 was tendered in 2016 for the appointment of a Transaction Advisor, who would be responsible for producing a pre-feasibility report to GED Africa with a recommendation on whether to proceed with the project towards full bankability.

A Steering Committee has been set up that includes GED Africa, DBSA and the Transaction Advisor to manage the development of the project.

The Transaction Advisor appointed was a consortium led by Musa Capital and began work in 2017. Phase 1 has been completed. Initial indications are that the capital cost of the project is likely to be more than US\$500 million. The Transaction Advisor has concluded that there are no fatal flaws to the project and that the project is economically viable. This conclusion was endorsed by the Steering Committee. Accordingly, the Steering Committee has recommended to DBSA that the second tranche of grant funding be made available to GED Africa to assist the project in achieving full bankability. GED Africa is now in the process of tendering workstreams for Phase 2 of the project to help enable it to reach financial closure.

The status of this project represents an excellent opportunity for Afreximbank to consider entering this process as a potential financier of what is a key project in building the capacity of trade-carrying infrastructure in the SADC region and, in particular, a secondary route.

Source: DBSA (2019).

BOX 5: DAR ES SALAAM-CHALINZE TOLL ROAD, TANZANIA

Initially, the government of Tanzania has announced plans for the upgrade of a significant portion of the Dar es Salaam to Morogoro trunk road to expressway standard. The plans involve the upgrade of approximately 100 km from Dar es Salaam to Chalinze to ease traffic congestion along the route. This project is of national importance to Tanzania, given that it is the main westbound arterial route from the main commercial hub and port and Dar es Salaam and serves much of mainland Tanzania in addition to the neighbouring landlocked countries of Malawi, Zambia, DRC, Rwanda and Burundi. It is estimated that the road carries up to 70 per cent of the freight from the port of Dar es Salaam. Chalinze is also the point at which the main Dar es Salaam to Morogoro road meets the Tanga road, which links Dar es Salaam to Mombasa in Kenya.

The project, which is estimated to cost US\$535 million, will involve the construction of a six-lane expressway for the first 50 km from Dar es Salaam, reducing to a four-lane expressway for the remainder of the way to Chalinze, with grade-separated junctions and service roads on both sides, in addition to toll collection facilities and amenities for road users. It will significantly improve the safety, speed and reliability of journey times along the route.

TANROADS has so far advertised tenders for contracting financing proposals (February 2013) and preliminary design work (June 2014), both of which have now closed. In its tender documents, TANROADS has indicated that it is flexible with regard to the structure of the tender, be it design and build; design, build and operate; build, operate and transfer; or other similar arrangements.

It is envisaged that a second phase of this project will upgrade the section of this road continuing from Chalinze to Morogoro at some point in the future when traffic flows justify the funding that will be required.

Source: Nathan Associates (2019).

Priority Project Pipeline

Notwithstanding the key point made above that most road projects are funded from the fiscus of SADC member states, a summary of the key sections of road network by SADC corridor is provided in Table 74, which is derived from the analysis undertaken in the previous chapter.

Table 74: Summary of Road Sections on SADC Corridors in Poor Condition

Corridor	Road/ Rail	Town Name From	Town Name To	Condition	Km	Description
Beira	Road	Chanida	Katete	Poor	65	Poor condition. This section of road could be included in a revamped cross-border PPP project, if the revenue streams could be restored and the viability of the project secured.
	Road	Tete	Cassacatiza	Poor	263	Poor condition. Was included as part of the EdZ PPP concession, but the revenue stream (road tolls) to support this component were removed by government and would need to be restored for it to become viable as part of a cross-border PPP.
North-South	Road	Livingstone	Victoria Falls	Poor	12	This is a border crossing across the original bridge. The border facilities are rudimentary.
	Road	Solwezi	Chingola	Good	177	This road is heavily trafficked with trucks servicing the mine. Road has recently been rehabilitated and maintenance has in the past been done by the mines, so could be structured as a PPP project in the future.
Walvis Bay	Road	Katima Mulilo	Kazungula	Poor	146	This road has failed completely and needs to be completely rebuilt. It takes 5-7 hours to drive the 146 km between Katima Mulilo and Kazungula.
	Road	Kaoma	Kasempa	Poor	218	The Kasempa-Kaoma road is a gravel road that is maintained under licence by BUKS Transport under licence from the Zambia Roads Department.

Source: Collated by authors

7.3.3. Priority Projects in Rail Sector

Table 75 summarises the growth in railcars per day on each major railway within the catchment of the six regional transport corridors in the SADC region. Figure 69 provides an illustration of the table.

Table 75: Railcars/Day Projections on Regional Rail Network, 2017-2040

Railway Line	Total 2017 Railcars/Day	Capacity Railcars/Day	Total 2040 Railcars/Day	Increase 2017-2040 Railcars/Day	Growth 2017-2040 % Railcars/Day
Ressano Garcia	590	1,000	1,435	845	3.94%
Tazara	15	260	260	245	13.20%
North-South	25	260	260	235	10.72%
Goba	70	175	145	75	3.22%
Machipanda	25	130	130	105	7.43%
Limpopo	50	175	120	70	3.88%
Nacala	15	350	65	50	6.58%

Source: Collated by authors

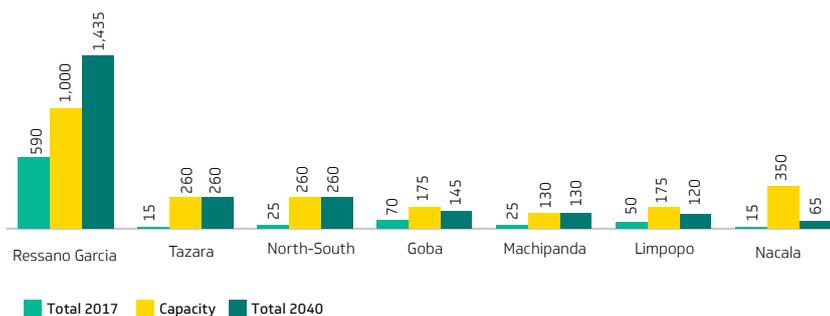
Priority Project Pipeline

The infrastructure assessment conducted in the previous chapter of this report identified the absolute increase in the number of railcars per day on each of the regional rail networks that provide a key element of the infrastructure backbone of the six regional transport corridors. The results from the trade flow analysis can be summarised as follows:

- The Ressano Garcia line, linking the CFM Sul and the TFR network has the highest increase over 2017-2040 and it is the only railway that is expected to hit capacity limits (in 2023).
- The TAZARA line, linking up the ZRL and SNCC networks to provide a service to the Zambian and DRC Copperbelt, follows the second highest increase over 2017-2040.
- The North-South line, linking the TFR, BBR, NRZ, ZRL and SNCC networks to service Zimbabwe, Zambia and DRC, follows with the third highest increase over 2017-2040.
- The Machipanda line, linking up the CFM Centro and the NRZ network to service Zimbabwe from the Beira port follows with the fourth highest increase over 2017-2040.
- The Goba line, linking up the CFM Sul and the Eswatini Rail networks to service Eswatini from the Maputo port follows with the fifth highest increase over 2017-2040.
- The Limpopo line, linking the CFM Sul and the NRZ network to service Zimbabwe from the Maputo port has the sixth highest increase over 2017-2040.
- The Nacala line, linking the CDN to the CEAR and ZRL networks to service north Mozambique, Malawi and Zambia from the Nacala port has the lowest increase over 2017-2040.

The infrastructure assessment provided a broad overview of the condition and capacity of the main rail corridors that form the backbone of each regional transport corridor. It identified those sections where particular problems exist, but these hotspots are typically addressed by national rail sector investment programmes. Such programmes are usually funded out of the national budget and/or from financing agreements signed with donors. Consequently, investment falling under such programmes is not the target of Afreximbank. However, an increasing number of state-owned and operated railways are allowing third-party access to operate their own locomotives and rolling stock on the track in exchange for an access fee. Moreover, where railways are concessioned out, investment programmes are typically part and parcel of contract obligations. Where private sector operators are in play provides the most fertile ground for Afreximbank entry into the railway sector. These prospects are elaborated in more detail in Table 76.

Figure 69: Railcars/Day Projections on Regional Rail Network, 2017-2040



Source: Authors' computations

The main takeaways from a review of the prospects presented in Table 75 can be summarised as follows:

- An investment programme is proposed for the Ressano Garcia line in Mozambique to meet market demand to 2023, but it is possible that for the Phase 2 component (2022-2025), which entails the dualization of the line, Afreximbank could participate in the financing of this project.
- In an attempt to increase volumes and boost revenues, TAZARA has recently allowed for third parties to run their own rolling stock on the line from Ndola in Zambia to the port of Dar es Salaam. These reforms should be encouraged and Afreximbank should engage with the operator (Calabash) to assess if they can participate in the financing of rolling stock.
- Due to various reasons ranging from the technical to the financial and even political, the scope for Afreximbank participation on the ZRL and SNCC networks is limited. The one caveat to this is the 428-km Dililo-Kolwezi section, which needs to be rehabilitated at an estimated cost of approximately US\$400 million, to complete the full integration of the regional railway to the port of Lobito in Angola.
- An opportunity for Afreximbank to finance the construction and/or operation of the new North-West Railway from the new copper producing region around Lumwana in Zambia to the ZRL railhead at Chingola.
- The Beitbridge-Bulawayo Railway (BBR) is a mature concession and is fully

funded, so no follow up actions are envisaged for Afreximbank.

- Although the case for the recapitalisation of the NRZ has been made, no follow up actions are envisaged for Afreximbank until key macro-fiscal reforms have opened up the space to allow Zimbabwe to absorb further debt. Indeed, a 2012 study funded by the DBSA found that in order to restore the railway to acceptable operating standards and to accommodate the projected traffic an investment programme of US\$1.92 billion is required over a 20-year period.
- CFM Sul and Eswatini Rail have not reported any concrete investment plans for the Goba line in the short to medium term, so no follow-up actions are required from Afreximbank.
- CFM Sul and NRZ have not reported any concrete investment plans for the Limpopo line in the short-to-medium term, so no follow-up actions are required from Afreximbank.
- The Nacala Rail concession is now fully operational and the large investment programme has been concluded and the railway is self-financing, so no further action from Afreximbank is envisaged.
- Five prospective projects require a special mention, but are not put forward because they are considered to still be in the concept phase. These include the following:
 - Expansion at the Malawi Fertiliser Company (MFC) Depot at Liwonde: Farmer's World who owns the MFC facility, imports bagged fertilisers

in containers and open wagons, but the sidings are limited to handling 10 wagons with a labour-intensive unloading system.

- Freight Terminal/Inland Container Depot at Liwonde: A private sector proposal to build a freight terminal/inland container depot at Liwonde has been completed to the level of a (pre-)feasibility study.
- Extension of the Botswana Railway System: The railway line linking Francistown in Botswana to the Zambia Railways system over Kazungula Bridge and joining up with the old Mulobezi railway line.
- Strengthening the North-South Corridor Railway System: Support to the railway corridor development plan whereby the five railway companies have agreed to prepare a single coordinated corridor development plan to address the modal imbalance between road and rail on the system.
- Grootfontein Inland Container Depot (Namibia): Establishing an Inland Container Depot at Grootfontein and so take advantage of the TransNamib railhead to establish a multimodal transport hub linking up the Zambian and DRC Copperbelt to the port of Walvis Bay.

Priority Project Pipeline

Table 76: Review of Railway ‘Hotspots’

Railway	Ranking	Review of Current Investment Plans	Afreximbank Action
Ressano Garcia (CFM Sul and TFR)	1	CFM Sul (South) is committed to a number of key improvements on the Ressano Garcia line to ensure that market demand is met to 2023. This is divided into two phases. The total capital cost to implement the Phase 1 infrastructure upgrade to address current maintenance backlog, loop and yard extensions, a full centralized traffic control solution, and additional locomotives and rolling stock is estimated at US\$112.3 million. The Phase 2 infrastructure upgrade involving the doubling and completion of signalling of the dual railway is estimated at US\$209.1 million. A decision to implement Phase 2 should be subject to the realization of traffic growth as expected post implementation of Phase 1. The most probable traffic forecast, however, suggests that Phase 2 be implemented during years 2022 to 2025.	Follow up with CFM Sul to assess the status of these rail enhancement projects.
TAZARA (TAZARA, ZRL and SNCC)	2a	Despite its design capacity of 5 mtpa, the TAZARA line has been operating well under capacity with an estimated tonnage of 175,000 tpa in 2017, which is a concern because the financial breakeven point is estimated at 1mtpa. Over many years, TAZARA has requested its shareholders to recapitalise the railway with investments of between US\$200-300 million, but this has never been implemented. Current investment programmes are limited to between US\$10-15 million to deal with piecemeal priority items. To increase the utilisation of the railway, TAZARA permitted the operation of a private sector rail service for the export of copper, operating between Ndola and Dar es Salaam, using private locomotives and private wagons. Two private sector services are being operated by Calabash and Bridge/Steinweg on the basis of an MOU with TAZARA. A formal access agreement remains subject to TAZARA shareholder approval (governments of Tanzania and Zambia). The access of Calabash and Bridge/Steinweg trains to the ZRL track between Kapiri Mposhi and Ndola is governed by the reciprocal access agreement with TAZARA. These kinds of reforms should be encouraged as they hold the greatest prospect for increasing the volume of traffic and provides an opportunity for Afreximbank to fund the leasing of locomotives and rolling stock.	Follow up with Calabash to assess status of the access agreement with TAZARA and the scope for any Afreximbank participation.
ZRL	2b	The Zambian system is now able to carry 18.5t axles, which allows the TAZARA wagons to be fully loaded at Ndola and hauled by ZRL locomotives between Kapiri Mposhi and Ndola. The track is considered to be safe, but is subject to many speed restrictions. ZRL also suffers from locomotive shortages, although a major locomotive rehabilitation programme is underway with Malaysian contractors, and locomotives are currently being leased from Transnet. Although the ZRL trains are permitted to operate through to Dar es Salaam, in practice ZRL operates a weekly passenger service to Chozi, 100 km from Nakonde, where the wagons are handed over to TAZARA locomotives. The freight service is hauled by TAZARA locomotives between Kapiri Mposhi and Dar es Salaam. The ZRL locomotives are GE U20 type, 2,100hp, which are not powerful enough to operate in the steep sections in Tanzania, which requires the +3,000hp TAZARA locomotives. During 2017/18, the copper export service by rail using TAZARA has been operated from Ndola, 117 km north of Kapiri Mposhi on the ZRL system, with a handover to TAZARA at Kapiri Mposhi.	
SNCC	2c	The railway system in southern DRC is operated by SNCC since the concession with Vecturis ended in 2013. The World Bank provided funding in June 2010 to rehabilitate the eastern section of SNCC, between Sakania and Kolwezi, but not including the Kolwezi-Dilolo section. The total budget was US\$750 million with a 50% contribution from the World Bank, allocated as follows: 50% to staff costs, 25% to infrastructure and 25% to operations. The 10-year programme is complete and is considered by the World Bank to have performed very poorly. As a result, the SNCC system is not considered to be fully functional by the main copper exporters, with infrequent services on the 220-km section from Sakania on the Zambian border and Lubumbashi, with security concerns, restricted wagon axle loads (15t) and high railway tariffs cited as the main operational constraints.	

Lobito (CFB* and SNCC)	2d	The Dilolo-Lobito section is in excellent condition. It is 1,344 km in length, including 174 rebuilt bridges. It is designed for 18t axle loads, allowing 54t wagon loads. Up to five trains per day move to Lobito carrying manganese from Kisenge, about 150 km from Dilolo, the border between DRC and Angola. A rail agreement between the DRC and Angola has been signed. One or two copper trains have been railed via Lobito, but this routing is considered too risky because of the poor state of the track, which requires urgent rehabilitation, estimated to cost up to US\$400 million but which is yet to be funded. This route is unlikely to compete with the Dar es Salam route for some time because of the absence of funding and the difficult political climate. The 428-km Kolwezi-Dilolo section is in poor condition but operational. It is furnished with wooden and steel sleepers, carrying 15t axle loads, allowing for only a 43t wagon load. Train lengths are 10 wagons and there are two trains per month. The upgrade of this line is being considered by Glencore, but seems unlikely to proceed unless agreement on how to structure the project can be reached with the DRC Government and potential off-takers/operators.	Follow up with SNCC to assess status of this key project and scope for any Afreximbank participation.
NW Rail	2e	A private sector-funded extension of the Zambia rail system is planned from Chingola to Solwezi and further to Lumwana, known as North West Rail (NWR). It is still in the bankable feasibility stage, but seems likely to proceed. NWR is connected to the North-South corridor rail operations and may also benefit TAZARA if a reciprocal access agreement can be negotiated.	Follow up with NWR to assess status of this key project and scope for any Afreximbank participation.
North-South (NRZ and BBR)	3a	The NRZ is the parastatal railway of Zimbabwe. NRZ operates about 3,000 km of rail at the 1.067 m gauge providing passenger and freight services. NRZ has an important transit function in the southern part of Africa and is well linked with neighbouring countries: toward the north, at Victoria Falls, the system links to the Zambia Railways, crossing the Victoria Falls Bridge. The rail sector in Zimbabwe is in dire need of recapitalization as the wagons, locomotives, tracks and signalling systems are all antiquated and in need of replacement. The NRZ has also suffered because of the decline of the country's economy. Neglect of maintenance, lack of spare parts and overdue replacement of equipment have led to a situation where only part of the railroad network is in good condition and equipment problems have led to reduced service. Indeed, a 2012 study funded by the DBSA found that in order to restore the railway to acceptable operating standards and to accommodate the projected traffic, an investment programme of US\$1.92 billion is required, which will be rolled out over a 20-year period, amounting to almost US\$100 million per annum, consisting both of infrastructure improvements (54%) and investment in rolling stock (46%). Given the scale of the investment required, in addition to dealing with the high level of indebtedness of the NRZ, it is unlikely that Afreximbank could go it alone in Zimbabwe, especially at the current time when the Government of Zimbabwe is struggling to restructure its massive national debt.	No action until macro-fiscal reforms opens up the space to allow further debt to be absorbed, including NRZ recapitalisation.
Beit-Bridge Bulawayo Railway (BBR)	3b	The NLPI Group, in which Grindrod has a controlling interest, operates in Zimbabwe through its subsidiary Beitbridge Bulawayo Railway (BBR). BBR was formed in 1997 in partnership with National Railways of Zimbabwe (NRZ) to manage the railway concession between Beitbridge and Bulawayo. The concession provides a key link in the North/South corridor and included a Build Operate Transfer (BOT) arrangement to construct 150 km of new track and the upgrade of a further 172 km of existing track. Construction was completed in 1999 and operations commenced that year. The concession completes a missing link between the South African border at Musina and Bulawayo on the North-South corridor and saves significant travel distance compared to the original route via Botswana. The concession runs until 2029. The NLPI Group also enjoys an access agreement with NRZ to operate trains between Bulawayo and Victoria Falls. Total volumes carried, of around 1 million tonnes of general freight annually, consists of sulphur, fuel (diesel), clinker, coal, copper, cobalt and containers.	No action.

*Caminho de Ferro de Benguela, a division on Angolan Railways

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Machipanda (CFM Centro and NRZ)	4	The Machipanda Line to the Zimbabwe border (318 km), operated by CFM and then a further section to Harare (280 km) operated by the NRZ. During the 1990's the railway carried close to 1 mtpa of freight but since then volumes have fallen to 0.35 mtpa in 2018. CFM is currently implementing a US\$150 million rehabilitation programme over the period 2018-2020 to increase traffic from 0.5 mtpa to 1.5 mtpa. The key elements of this programme are as follows: increase axle load from 16.5t to 18t, strengthen rail from 40kg/m to 45kg/m; replace defective concrete sleepers, improve ballast (tramping to at least 250mm), construct 600m of crossing loops; weld the entire length of the line, lengthen train configuration from 27 to 35 wagons and increase the speed from 30km/hr to 60km/hr. In addition, CFM have reported their intention to procure rolling stock using a US\$95 million line of credit from the Government of India over the period 2019-2020, comprising five 3,000+hp locomotives, 90 passenger coaches and 300 freight wagons. NRZ has reported that there are no specific plans as yet apart from installation of communication systems for trains working, as well as upgrading of Theydon-Matinidza block to 18 tons per axle from the current 16.2 tons per axle.	No action until macro-fiscal reforms opens up the space to allow further debt to be absorbed by NRZ in Zimbabwe and CFM Centro in Mozambique. However, possible follow-up on reviewing the prospects to increase 3rd party access onto the line using the model now being deployed on the TAZARA line.
Sena Link to Malawi	-4	The Sena Railway line used to run from Beira to Malawi, but the 44 km section from Mutarara (north bank of the Dona Ana Bridge) to Vila Fronteira (Malawi border) was destroyed in 1979 shortly after the commencement of the Mozambique civil war. A feasibility study under the DFID-funded MRGP in 2015 found the project to be cost-prohibitive at US\$800 million. However, recent proposals, including an option in the 2018 NTMP and options presented by SPEED+ are more affordable. If any of these plans move forward, a rail/road multimodal corridor could provide a secondary route along this arm of the corridor.	No action, but need to keep a watching brief to assess market interest in a multimodal option to rehabilitate the Sena Line to Nsanje for onward trucking to Blantyre.
Goba (CFM Sul and Eswatini Rail)	5	CFM Sul and Eswatini Rail have not reported any concrete investment plans for the Goba line in the short to medium term.	No action.
Limpopo (CFM Sul and NRZ)	6	CFM Sul and NRZ have not reported any concrete investment plans for the Limpopo line in the short to medium term.	No action.
Nacala (CDN and CEAR)	7	The Nacala main line railway between Moatize and the Nacala terminal has been rebuilt to a high standard to handle up to 18 mtpa of coal exports, 20.5t axle loads, using special wagons able to carry 63t of coal, with current train lengths of 120 wagons. The Nacala railway is a single track, with passing loops to allow trains to pass each other safely. It is controlled by a central train control system. At full capacity, the Nacala railway will handle up to 10 trains per day in each direction. The concession agreements require the provision of at least two general freight trains per day, initially 35 to 42 wagons long, using the older passing loops, which are about 600 m long. The current general freight capacity has been given by CDN-CEAR as 2.4 mtpa in both directions, slightly less than two trains per day in each direction. The investment programme is now complete and the railway in self-financing.	No action.
Expansion at the Malawi Fertilizer Company (MFC) Depot at Liwonde	Special Mention	Farmer's World, who owns the MFC facility, imports bagged fertilisers in containers and open wagons, but the sidings are limited to handling 10 wagons with a labour-intensive unloading system. It takes four days to handle a 40-wagon import train from Nacala. Farmer's World is planning to upgrade the siding and equipment. In the first instance, it should be lengthened to 20 wagons, which will result in lower freight costs due to higher wagon utilisation.	Afreximbank should approach Farmers World to assess the status of the initiative and if there is a financing role for the bank.
Liwonde Inland Container Depot	Special Mention	A private sector proposal to build a freight terminal/inland container depot at Liwonde has been completed to the level of a (pre-)feasibility study. Land has been acquired and the necessary environmental and social impact assessments have been completed. Discussions have been held with one of the financial backers, Pembani-Remgro, who have confirmed that a freight terminal/inland container depot is being considered, but there is as yet no agreement with CDN-CEAR on this proposal nor has a final decision been taken to fund Moto-Engil, the developers of the project.	Afreximbank should approach Farmers World to assess the status of the initiative and if there is a financing role for the bank.
Extension of Botswana Railway System	Special Mention	The railway line linking Francistown in Botswana to the Zambia Railways system over Kazungula Bridge and joining up with the old Mulobezi railway line. This will create an alternative route between Lubumbashi, the Copperbelt and South Africa via Botswana and avoid the bottleneck of the BBR line in Zimbabwe.	Afreximbank should maintain a watching brief on this as it could evolve as a project in the medium term.

Strengthening of the North-South Corridor Railway System	Special Mention	Support to the railway corridor development plan. The five railway companies have agreed to prepare a single coordinated corridor development plan to address the modal imbalance between road and rail on the North-South Corridor. The so-called North-South Rail Corridor infrastructure and logistics study will focus on the rehabilitation and upgrade of the rail corridor and is being financed by the SADC Infrastructure Project Preparation Fund, managed by the Development Bank of Southern Africa (DBSA) through the NEPAD Business Foundation (NBF).	Afreximbank should approach NEPAD/ DBSA to assess the status of the initiative and if there is a financing role for the bank.
Grootfontein Inland Container Depot, Namibia	Special Mention	Establishing an Inland Container Depot at Grootfontein and so take advantage of the TransNamib railhead. Cargo from Zambia and DR Congo could travel under bond from the border at Katima Mulilo to Grootfontein and then go into a bonded warehouse and be loaded onto the railway and then transported to Walvis Bay Port by rail. This is a distance of 624 km so would considerably shorten the road transport distance. A multimodal system could also be explored where cargo from the DRC and Zambian Copperbelt could be transported by rail to Livingstone, then transported by truck from Livingstone to Grootfontein and then by rail from Grootfontein to Walvis Bay and back the same way.	Afreximbank should approach TransNamib to assess the status of the initiative and if there is a financing role for the bank.

Sources: CFM (2019), Nathan Associates (2018) and Nathan Associates (2019).



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7.3.4 Priority Projects in Border Post Sector

Table 77 summarises the growth in Heavy Duty Vehicles (HDVs) on each road network of landlocked countries (or landlocked regions within maritime states) within the catchment of the six regional transport corridors in the SADC region. Figure 70 provides an illustration of the table.

Table 77: Ranking of Border Posts on Regional Road Network, 2017-2040

Border Post Adjoining Countries	2017 HDVs/Day	2040 HDVs/Day	2017-2040 Increase HDVs/Da	2018 Border Crossing Time (Hours)	Number of Corridors Served	Number of Corridors Served
Kasumbalesa Zambia/DRC	540	1,495	955	25 to 48	4	97
Beitbridge South Africa/Zimbabwe	770	1,880	1,110	13 to 24	1	81
Kazungula Botswana/Zambia	110	735	625	49 to 98	1	76
Tunduma-Nakonde Tanzania/Zambia	700	2,195	1,495	1 to 6	1	73
Ressano Garcia-Komatipoort Mozambique/South Africa	450	2,510	2,060	1 to 6	1	73
Chirundu OSBP Zimbabwe/Zambia	430	1,190	760	7 to 12	2	72
Kopfontein-Tlokweng South Africa/Botswana	400	880	480	13 to 24	1	67
Machipanda-Forbes Mozambique/Zimbabwe	235	1,390	1,155	1 to 6	1	64
Groblersbrug-Martin's Drift South Africa/Botswana	100	720	620	1 to 6	1	53
Katima Mulilo-Sesheke Namibia/Zambia	75	320	245	1 to 6	1	48
Zóbue-Mwanza Mozambique/Malawi	35	250	215	1 to 6	2	47
Calomue-Dedza Mozambique/Malawi	35	250	215	1 to 6	2	47
Kasumulu-Songwe Tanzania/Malawi	25	75	50	13 to 24	1	43
Cassacatiza-Chanida Mozambique/Zambia	20	300	280	1 to 6	1	41
Nyamapanda-Cuchamano Zimbabwe/Mozambique	70	200	130	1 to 6	1	39
Mchinji-Mwami Malawi/Zambia	30	75	45	1 to 6	1	32

Victoria Falls-Livingstone	50	50	0	1 to 6	1	29
Zimbabwe/Zambia						
Oshikango-Santa Clara	13	42	29	1 to 6	1	25
Namibia/Angola						
Milanje-Muloza	4	35	31	1 to 6	1	23
Mozambique/Malawi						
Buitepos-Mamuno	5	17	12	1 to 6	1	21
Namibia/Botswana						
Mandimba-Chiponde	1	10	9	1 to 6	1	16
Mozambique/Malawi						
Ariamsvlei-Nakop	2	6	4	1 to 6	1	15
Namibia/South Africa						

Sources: Nathan Associates (2019) and TMS (2019).

The infrastructure assessment conducted in the previous chapter of this report identified the absolute increase in the number of heavy-duty vehicles (HDVs) per day that are anticipated to pass through border posts on the main regional transport corridors in the SADC region. In addition, a review of the 2018 results from the real-time truck monitoring system (TMS) study for the SADC region was conducted for the border posts on each of SADC's main regional transport corridors. Table 77 illustrates the scoring for each of the 22 border posts to derive the ranking shown in Table 78.

Table 78: Scoring Methodology to Rank of Border Posts

2017 HDVs/Day A	2040 HDVs/Day B	2017-2040 Increase HDVs/Day C	2018 Border Crossing Time (Hours) D		Number of Corridors Served E		Total Score Border Post F
Ranking of the Border Post based on Volumes			Hours		Number		A + B + C + D + E = F
1-22	1-22	1-22	25	49-98	25	5	
			20	25-48	20	4	
			15	13-24	15	3	
			10	7-12	10	2	
			5	1-6	5	1	
Measures the importance of the border post today (22 = Most and 1 = Least Important) Measures the importance of the border post in the future (22 = Most and 1 = Least Important) Measures the shift in importance of the border post over 2017-2040 (22 = Most and 1 = Least Important) Measures the efficiency of border post crossing today (25 = Most and 5 = Least Border Post Bottlenecks) Measures the risk of underperformance on the entire regional system (20 = Most and 5 = Least Overall Risk) Composite measure out of 116 points (build up like this 22[a] + 22[b] + 22 [c] + 25 [d] + 25[e] = 116 Score							

Sources: Nathan Associates (2019) and TMS (2019).

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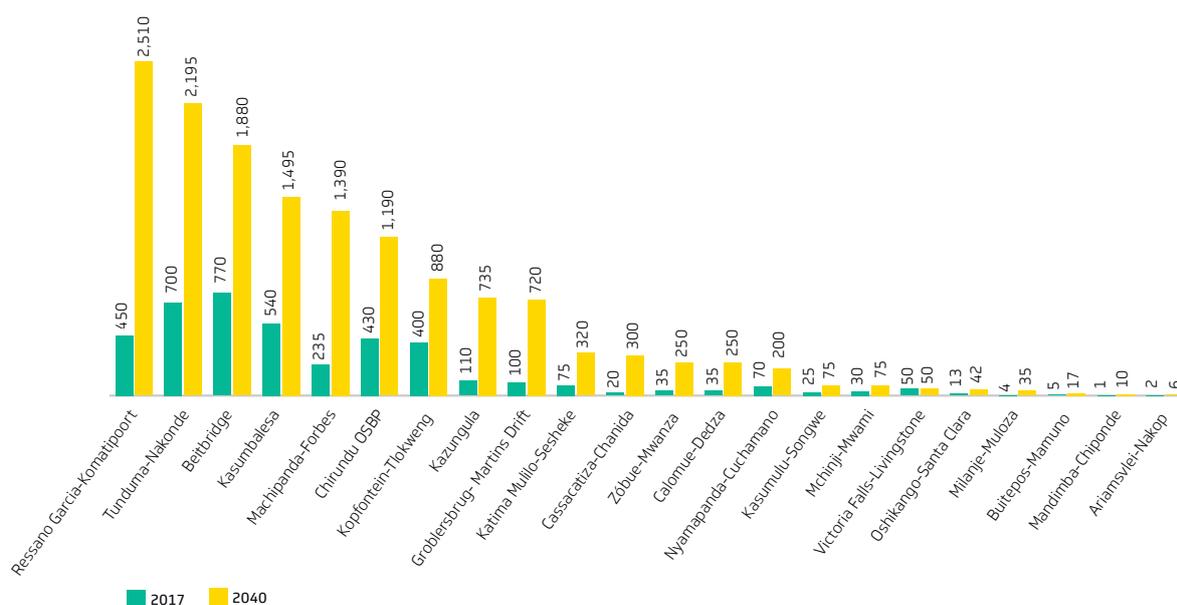
Table 79 further summarises the composite ranking scores by cross-referencing scores for all the border posts across the main regional development corridors.

Table 79: Border Post Ranking

Corridor	Border	Score	Corridor	Border	Score
North-South (Eastern Arm)	Beitbridge	71	Beira	Machipanda-Forbes	64
	Chirundu	72		Chirundu	72
	Victoria Falls-Livingstone	29		Kasumbalesa	97
	Kasumbalesa	97		Cassacatiza-Chanida	41
	Nyamapanda-Cuchamano	39		Zobue-Mwanza	47
	Zobue-Mwanza	47		Calomue-Dedza	47
	Calomue-Dedza	47		Sub-Total	315
	Sub-Total	402			
North-South (Western Arm)	Kopfontein-Tlokweng	67	Walvis Bay	Katima Mulilo-Sesheke	48
	Grobblersbrug-Martin's Drift	53		Kasumbalesa	97
	Kazungula	76		Oshikango-Santa Clara	25
	Kasumbalesa	97		Buitepos-Mamuno	21
	Sub-Total	293		Ariamsvlei-Nakop	15
	Sub-Total (North-South)	695		Sub-Total	206
Dar es Salaam	Kasumulu-Songwe	43	Nacala	Mchinji-Mwami	32
	Tunduma-Nakonde	73		Milanje-Muloza	23
	Kasumbalesa	97		Mandimba-Chiponde	16
	Sub-Total	213		Sub-Total	71
			Corridor System	Total	1,530

Sources: Nathan Associates (2019) and TMS (2019).

Figure 70: Border Projections on Regional Road Network, 2017-2040 (HDV/Day)



Source: Authors' computations

The main takeaways from Tables 75 and 77 in terms of identifying the border post hotspots can be summarised as follows:

- Kasumbalesa, between Zambia and the DRC, emerges as the border post most in need of support. It is the convergence point for four regional transport corridors and will experience very high growth in the future, which will put already very poor crossing times under enormous pressure.
- Beitbridge, between South Africa and Zimbabwe, on the North-South Corridor, is the second-ranked border most in need of support and will experience high growth that will continue to put pressure on poor border crossing times.
- Kazungula, between Botswana and Zambia, on the North-South Corridor is the third-ranked border most in need of support because it will experience high growth in the future. Since it has relied on a ferry, crossing times have been very slow, but these are expected to improve once a new bridge over the Zambezi River and a new one-stop border post have been completed.
- Tunduma-Nakonde, between Tanzania and Zambia, on the Dar es Salaam Corridor, is the fourth-ranked border most in need of support because it is expected to have very high growth, which will require additional expansion and continual improvement to keep crossing times where they are today.
- Ressano Garcia-Komatipoort, between Mozambique and South Africa, on the Maputo Corridor is the fifth-ranked border most in need of support because it will experience very high growth in the future, which will require additional expansion and continual improvement to keep crossing times where they are today.
- Chirundu, between Zimbabwe and Zambia, on the North-South and Beira corridors, is the sixth ranked border most in need of support growth, which is expected to be high and will require continual improvements – particularly in trade facilitation enhancement measures – if current crossing times are to be improved upon.
- Kopfontein-Tlokweng, between South Africa and Botswana, on the North-South Corridor, is the seventh-ranked border most in need of support because it will experience high growth in the future, which will require additional expansion and continual improvement to lower crossing times from where they are today.
- Machipanda-Forbes, between Mozambique and Zimbabwe, on the Beira Corridor, is the eighth-ranked border most in need of support because

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it will experience very high growth in the future, which will require the border post to be relocated, because of severe space constraints and redeveloped as a one-stop border to accommodate the anticipated increase in future traffic flows and to keep crossing times where they are today.

- Groblersbrug-Martin's Drift, between South Africa and Botswana, on the North-South Corridor, is the ninth-ranked border most in need of support because it will experience high growth in the future, which will require additional expansion and continual improvement to keep crossing times where they are today.
- Katima Mulilo-Wenela, between Namibia and Zambia, on the Walvis Bay Corridor, is the tenth-ranked border most in need of support because it will experience moderate growth in the future, which will require additional expansion and continual improvement to keep crossing times where they are today.

Finally, the remainder of the border posts are not considered as high a priority as the top ten listed above, because they are anticipated to experience moderate growth, but in order of priority at this secondary level, the list is as follows:

- Zobue-Mwanza between Mozambique and Malawi;
- Calomue-Dedza between Mozambique and Malawi;
- Cassacatiza-Chaninda between Mozambique and Zambia;
- Nyamapanda-Cuchamano between Zimbabwe and Mozambique;
- Mchinji-Mwami between Malawi and Zambia;
- Victoria Falls-Livingstone between Zimbabwe and Zambia;
- Oshikango-Santa Clara between Namibia and Angola;

- Milanje-Muloza between Mozambique and Malawi;
- Buitepos-Mamuno between Namibia and Botswana;
- Mandimba-Chiponde between Mozambique and Malawi; and
- Ariamsvlei-Nakop between Namibia and South Africa.

Table 80 profiles the top ten border post hotspots, including the prospects for Afreximbank involvement in future financing of infrastructure improvements.

The main takeaways from a review of the prospects presented in Table 78 can be summarised as follows:

- There are few opportunities to invest in border post projects mainly because of the structure of the project financing. At Kasumbalesa, where there is a concessionaire involved in financing infrastructure, the money in tolls from truckers who use the border facilities is contributing to a distortion of cross-border trade by discouraging truckers from crossing the border into DRC. This, in turn, encourages transshipment and smuggling activities. One possibility at Kasumbalesa could be to work with the Chililabombwe Municipal Council to finance and construct the border market. The Council has already secured the land and have drawn up plans and have approval from Central Government.
- There are plans to make Beitbridge into an OSBP and it is possible that Afreximbank could play a role in making Beitbridge border post into a functioning OSBP.
- ZRA is relocating the commercial freight terminal at Nakonde to a greenfield site and there may be a role Afreximbank could play in financing this new infrastructure.
- Kazungula OSBP is currently being constructed, along with a double dose

cable stay road and rail bridge. The financing of the border posts and bridge are at least partially financed from the budgets of the two countries and it is possible that Afreximbank could play a role in completing the Kazungula OSBP and the road-rail link across the bridge.

- Once Kazungula OSBP is opened it is anticipated that most traffic using the North-South Corridor will use the Kazungula crossing, which means that there will be significant growth in traffic using the Groblersbrug-Martin's Drift border crossing. This will mean that both borders will probably need to expand their facilities and a new bridge across the Limpopo should be built. Afreximbank could play a role in the expansion of this border post facility.
- Katima Mulilo will most probably need to expand the infrastructure on both sides of the border, including the parking facilities and Afreximbank could explore the possibility of whether it could assist in financing the expansion of the border facilities on both sides of the border.

Table 80: Review of Border Post ‘Hotspots’

Border Post	Ranking	Review of Current Investment Plans	Afreximbank Action
Kasumbalesa	1	The Zambian side of the Kasumbalesa border is concessioned to ZipBCC, who charge US\$100 for every truck using the facility. ZipBCC also had the concession on the DR Congo side of the border but this was taken from ZipBCC by the DR Congo Authorities. However, the Congolese still charge US\$100 per truck for use of the border facilities. This adds US\$400 to a round trip from Zambia into DR Congo. This, plus the additional charges imposed on trucks in DR Congo, some of which are not gazetted or receipted, is deterring truck owners from sending their trucks into DR Congo. Instead, they are opting to either off-load their goods on the open market on the Zambian side of the border or put the goods into a bonded warehouse on the Zambian side of the border. Goods are then transhipped across the border using modified bicycles. It is estimated that about 2,000 bicycles cross the border from Zambia to DR Congo every day. If each bicycle carries 2 tons (which is a conservative estimate) then this is 4,000 tons of goods transhipped every day. It is also clear that there is also rampant smuggling taking place, especially of maize meal, sugar and cement. Zambia had plans to develop an OSBP at Kasumbalesa but these plans have been shelved, at least until the border takes on some semblance of normality. The Chililabombwe Municipal Council has plans to create a border market and negotiations with ZipBCC are at an advanced stage.	There are little or no investment opportunities at Kasumbalesa border post. Afreximbank could monitor the situation to see whether there are any trade finance or infrastructure investment opportunities in the future.
Beitbridge	2	An estimated 15,000 people and 500 commercial trucks pass through the Beitbridge every day and the numbers can double during peak holiday season. It is not unusual to be delayed at Beitbridge, because of traffic congestion, for days at a time. There are plans for a US\$200 million revamp of the facility. The refurbishment of the border post is expected to ease congestion and be part of the process to convert Beitbridge into an OSBP. Upon completion it will become a one-stop border crossing. There is certainly a need to improve infrastructure at Beitbridge to allow separation of traffic and so reduce congestion and it is hoped that this will be the main outcome of the ongoing rehabilitation of the border facilities.	The Beitbridge border post is a public sector investment and there would appear to be little or no opportunity to invest in the border post infrastructure.
Tunduma-Nakonde	3	In October 2019, Presidents Lungu and Magufuli commissioned the Tunduma-Nakonde One Stop Border Post, which is one of the busiest border posts in Zambia and Tanzania. The intention is that the OSBP will reduce clearing times from an average of 4 days to 1 day. There is a shortage of space on the Zambian side of the border so the intention of ZRA is to relocate the commercial cargo terminal away from the existing site and use the existing site for passengers only. ZRA have located the new site for the commercial cargo terminal, but is still seeking finance to build and equip the terminal.	Afreximbank could hold discussions initially with ZRA to ascertain how the new commercial cargo terminal is to be financed and whether there could be a role for Afreximbank to play.
Kazungula	4	Kazungula OSBP, comprising a juxtaposed OSBP (two facilities – one on the north bank of the river, in Zambia and one on the south bank of the river, in Botswana) and a double dose cable stay road and rail bridge is currently under construction. The border post facilities and the bridge are being financed mainly from Zambia’s and Botswana’s budget and Zambia, in particular, is having difficulty in meeting its payment obligations. There may be opportunities for Afreximbank to play a refinancing role.	Afreximbank could explore the possibility of whether it could assist in financing the completion of the bridge and the Zambian border facility.

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Ressano Garcia-Komatipoort	5	Ressano Garcia-Komatipoort is on the Maputo corridor and on the N4 highway linking Gauteng with Maputo. However, there seem to be delays in implementing border post upgrades caused by the delays in processing the Border Management Agency (BMA) Bill. Once the bill is passed the Border Management Agency's pilot projects will start and focus on OR Tambo International Airport, Cape Town Airport, Cape Town Harbour, the Oshoek border post between South Africa and Eswatini, as well as Lebombo border between South Africa and Mozambique.	There are currently no obvious investment opportunities at the Lebombo Ressano Garcia border post.
Chirundu	6	Chirundu was Sub-Saharan Africa's first one-stop border when it opened in 2009. It functioned well as an OSBP at the beginning, but now it is not operating as an OSBP except for passengers. For commercial freight it is operating as a normal two-stop border post. There are multiple opportunities to improve the situation at Chirundu and to revert the border back to an OSBP. This would involve some infrastructure upgrades (such as upgrades to separate traffic) but most of the changes needed are in trade facilitation measures. It is unclear whether both parties have the political will to change the status quo and unless there is a clear signal that both Zambia and Zimbabwe are willing to invest political capital in Chirundu then there is no opportunity to become involved as an investor in infrastructure.	Afreximbank could let it be known that it would be willing to assist Zambia and Zimbabwe to restructure Chirundu as an OSBP under certain conditions.
Kopfontein-Tlokweng	7	The Kopfontein-Tlokweng border post is generally considered to provide a good service by customs and immigration officials, although trucks are not allowed to cross the border after 4.30 pm. There are also complaints about the road to Tlokweng, which is considered to be in poor to fair condition and with a lot of livestock on the road.	There would appear to be no plans to upgrade the facilities at Kopfontein-Tlokweng and there is no obvious role for Afreximbank to play in this border.
Machipanda-Forbes	8	Machipanda-Forbes was to be converted into an OSBP, but these plans would appear to be on hold for the time being. As Beira gets busier, the amount of traffic passing through Machipanda-Forbes will increase. Already there are indications that the border facilities are not able to cope with existing traffic and there is need to construct more infrastructure. The challenge is that there is no room to expand on the Zimbabwean (Forbes) side of the border because of the terrain. Probably the best technical option would be an OSBP wholly located in Mozambique (Machipanda).	There would appear to be no plans to upgrade the facilities at Machipanda-Forbes and there is no obvious role for Afreximbank to play in this border.
Groblersbrug-Martin's Drift	9	Groblersbrug-Martin's Drift border post is a small border post with limited facilities. It is located on either side of the Limpopo River and the bridge is single lane and can only handle traffic in one direction. This means that traffic is stopped for a certain period of time to allow traffic from the opposite direction to cross the bridge and then the order is reversed. Once Kazungula OSBP is opened, it is anticipated that most traffic using the North-South Corridor will use the Kazungula crossing, which means that there will be significant growth in traffic using the Groblersbrug-Martin's Drift border crossing. This will mean that both border facilities will probably need to expand and a new bridge across the Limpopo should be built.	Afreximbank should monitor the situation and could offer South Africa and Botswana loan finance to expand the border and construct a new bridge.
Katima Mulilo-Sesheke	10	The Logistics Hub Master Plan expects a rapid increase of cargo (0.8 million tons in 2013 to 3.4 million tons in 2025) from Namibia to Zambia and DR Congo through the Walvis Bay Corridor, which will require improvements in efficiencies at the border post between Zambia and Namibia. The buildings at the border post are relatively new but a JICA report suggests that the border control area should be expanded and new staff housing, quarantine and health check facilities need to be built, and there needs to be additional parking created for trucks.	Afreximbank should monitor the situation and could offer Mozambique and Zambia loan finance to expand the border and improve the access road on both sides.
Cassacatiza-Chanida	Special Mention	This border post will get busier as Beira gets busier and could become the preferred crossing point for goods moving between Beira and Lusaka. Although the distance is longer than the route through Forbes/Machipanda by almost 400 km it does have the advantage of being the only crossing point between Beira and Lusaka avoiding both Machipanda-Forbes and Chirundu. A recent study on the Beira Corridor noted that the growth in traffic through this border to/from Zambia over the period 2013-2018 was estimated at 13.9% per annum, which is the second highest on the Beira Corridor after Machipanda-Forbes to/from Zimbabwe (21.6%) and much higher than through the two border posts to/from Malawi at Zobue-Mwanza (6.4%) and Calomue-Dedza (4.3%).	Afreximbank should monitor the situation and could offer Mozambique and Zambia loan finance to expand the border and improve the access road on both sides.

Source: Collated by authors

A special mention is also made of the Cassacatiza-Chanida border post because it has seen significant growth, albeit off a low-base over the period 2013-2018. In addition, this border is expected to receive continued growth over the period 2017-2040, from approximately 20 HDVs per day in 2017 to 300 HDVs per day in 2040.

7.3.5 Priority Projects in the ‘Soft Infrastructure’ Sector

Currently, each country is developing its own Single Window. Very often, African countries purchase Single Window packages from foreign-based companies who offer different financing packages, such as PPPs and self-financing and sometimes a country gets a package financed through donor funds, but they still have to pay for day-to-day operating costs and required changes. The operating costs and sometimes the development costs, are passed on to the users, which ironically increases the costs of trade. The costs of design and development are significant, at more than US\$10 million and operating costs are about 20 per cent of the design and development costs.

BOX 6: WHAT IS A SINGLE WINDOW?

A Single Window is an interface between existing systems that are used by Customs and other government agencies (OGA). The agent submits all the information that is required by Customs and OGA only once into the Single Window environment. Once the Customs and OGA systems have processed the information, the responses go back to the agent through the Single Window environment.



Source: <https://slideplayer.com/slide/11505298/>.

One of the challenges of implementing a national Single Window is that implementation does not mean that there is any data sharing between countries. Thus, the Single Window may only improve cooperation between national border control agencies but not improve customs cooperation.

There is scope for Afreximbank, or another DFI to finance the development of an African Single Window system that could also include risk assessment packages and could be used cross-border.

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7.4. SUMMARY OF PRIORITY PROJECTS

Table 81 provides a summary of the project envisaged initial project pipeline for Afreximbank to consider. These projects were prioritised on the following criteria:

- **Road Projects:** Project preparation is ADVANCED with the focus now shifting to structuring and financing the projects.
 - **Border Post Projects:** Significant pressure on either one or both sides of the border due to pre-existing levels of high UNDER investment, which needs to be addressed as a matter of urgency to maintain the integrity of trade flows through these borders.
 - **Port Projects:** Significant CAPACITY CONSTRAINTS acknowledged at the port, either by the state-owned operator or the private sector concessionaire, notably for ports that have well-developed expansion plans.
 - **Railway Projects:** Major outstanding GAPS in the railway network and/or the need to increase access to funding for enhancing OPERATIONS on the railway, notably on those sections of the network where the state has sanctioned access for third party private sector operators to run trains on their track.
 - **Soft Infrastructure Projects:** The priority project would be the design and roll-out of a continental Single Window system.
- There are a total of 15 projects, which are either cross-border in nature or are national projects that have regional significance in terms of improving efficiencies along the main SADC trade corridors. These are as follows:
 - Dar es Salaam – Chalinze Toll Road (Tanzania);
 - Kasomeno-Mwenda Toll Road Project (Zambia-DRC);
 - Machipanda-Forbes Border Post (Mozambique-Zimbabwe);
 - Tunduma-Nakonde Border Post (Tanzania-Zambia with focus on Nakonde);
 - Kasumbalesa Frontier Market (DRC-Zambia with focus on the Zambian side);
 - Groblersbrug-Martin's Drift Bridge straddling the border (Botswana-South Africa);
 - Dar es Salaam Container Terminal Expansion (Maritime Gateway Port in Tanzania);
 - Matola Coal/Manganese Terminal Expansion (Maritime Gateway Port in Mozambique);
 - Beira Port Expansion (Container & Bulk Terminals (Maritime Gateway Port in Mozambique));
 - Mpulungu Port Rehabilitation (Inland Waterway Gateway to Great Lakes Region in Zambia);
 - Dilolo-Kolwezi-Lubumbashi Railway Rehabilitation (DRC link to the Lobito Port in Angola);
 - Line of credit on third party operators on CFM/NRZ Machipanda line (Mozambique-Zimbabwe);
 - Line of credit to third party operators on TAZARA and ZRL railway networks (Tanzania-Zambia);
 - Strengthening the capacities of rail network owners/operators on the North-South system (South Africa, Zimbabwe, Zambia and DRC); and
 - Improvements at the Cassacatiza-Chanida Border and Tete-Cassacatiza (Mozambique) and Chanida-Katete (Zambia) approach roads on the Beira Corridor (Mozambique-Zambia).

Table 81: Summary of Project Pipeline (Initial Target Projects)

Project Type	Project Name	Status	US\$m	Comments
Toll Road	Dar es Salaam – Chalinze Toll Road, Tanzania	Feasibility	535	The plans involve the upgrade of approximately 100 kms from Dar es Salaam to Chalinze to ease traffic congestion along the route. It is estimated that the road carries up to 70% of the freight from the port of Dar es Salaam. Chalinze is also the point at which the main Dar es Salaam to Morogoro road meets the Tanga road, which links Dar es Salaam to Mombasa in Kenya. The project, which is estimated to cost US\$535 million, will involve the construction of a six-lane expressway for the first 50 kms from Dar es Salaam, reducing to a four-lane expressway for the remainder of the way to Chalinze, with grade separated junctions and service roads on both sides, in addition to toll collection facilities and amenities for road users. It will significantly improve the safety, speed and reliability of journey times along the route. TANROADS has so far advertised tenders for contracting financing proposals (February 2013) and preliminary design work (June 2014), both of which have now closed. In its tender documents, TANROADS has indicated that it is flexible with regard to the structure of the tender, be it design and build; design, build and operate; build, operate and transfer; or other similar arrangements.
Toll Road	Kasomeno-Mwenda Toll Road Project – Zambia and DRC	Feasibility	500+	Phase 1 has been completed. Initial indications are that the capital cost of the project is likely to be in excess of \$500 million. The Transaction Advisor has concluded that there are no fatal flaws to the project and that the project is economically viable. This conclusion was endorsed by the Steering Committee. Accordingly, the Steering Committee has recommended to DBSA that the second tranche of grant funding be made available to GED Africa to assist the project in achieving full bankability. GED Africa is now in the process of tendering workstreams for Phase 2 of the project to help enable the project to reach financial closure. Some confusion on the route in Zambia and what needs to be done to upgrade the roads there. May also be possible to put exports onto rail at Kasama.
Border Post	Machipanda	Concept	10+	No room for expansion at the current site. Border post site needs to move – probably into Mozambique. Explore possibility of an OSBP wholly located in Mozambique.
Border Post	Nakonde	Feasibility	10	The Zambia Revenue Authority has secured a greenfield site at Nakonde to construct a commercial clearing terminal. Plans have been drawn up, but financing has yet to be secured. This could be financed together with software to improve trade facilitation and so reduce the time taken to get to and from the Dar es Salaam port.
Border Post	Kasumbalesa Frontier Market	Feasibility	10	As a result of the dysfunctional systems in DRC, there are considerable amounts of transshipment and smuggling taking place into DRC at and around Kasumbalesa border post. It is highly unlikely that coordinated border management (CBM) between Zambia and DRC can be achieved, so an OSBP is unlikely to be effective at Kasumbalesa. One possibility is to provide facilities at Kasumbalesa (Zambian side) for Congolese to come into Zambia and purchase goods and export into DRC, supporting the existing system. These facilities could include covered market stalls, ablution blocks for small-scale traders, safe hostels for traders (many of whom are women), warehousing, bonded warehouses, etc. Note that the Chililimbombwe Municipal Council has already reached an advanced planning stage with this concept and has secured land for this.

Priority Project Pipeline

Border Post	Groblersbrug-Martin's Drift Bridge	Concept	50	If traffic on the North-South Corridor is to expand as projected, the main road transport route that will be used is Johannesburg-Mokopane-Martin's Drift-Palapye-Francistown-Kazungula. The border at Groblersbrug-Martin's Drift between South Africa and Botswana is small and has a very narrow bridge linking the two countries across the Limpopo River. The border facilities at Martin's Drift (Botswana) are built to a standard Botswanan design and are probably adequate. South Africa needs to upgrade its facilities. Most traffic is transit, so it is probably not necessary to build an OSBP. The bridge will need to be widened to take two-way traffic or another bridge will need to be built.
Port	Dar es Salaam Container Terminal	Feasibility	628	The modernisation of the dry bulk, break bulk and cargo-handling methods on Berths 1-7 is a major component of the DMGP, which is designed to increase the overall capacity of the port of Dar es Salaam to 28 mtpa by 2025. Outside the DMGP is the development of new container terminal at Berths 13 and 14, including the dredging of the access channel. The new container terminal will have a capacity of 600,000 TEU per annum and will allow the port to accommodate larger vessels to meet future demand. A detailed project feasibility study has been completed and the capital investment for the project is estimated to be US\$628 million. China's Exim Bank is to provide 85% and the Government of Tanzania 15% of the financing. In 2016, the project was reported to be near financial closure, but no discernible progress appears to have been made and no further details could be obtained on its current status.
Port	Matola Coal Terminal	Feasibility	800	In 2012, Vitol acquired from Grindrod a 35% interest in Terminal de Carvão da Matola (TCM), which owns the Maputo coal terminal concession, for US\$67.7 million. Grindrod has the concession to operate TCM until 2033 with an option to extend the concession for 10 years. To date, US\$70 million has been invested in the refurbishment of infrastructure expanding the capacity of the terminal to 6 mtpa. A feasibility study has been done for an expansion of capacity by 20 million tons with an investment of US\$800 million. The expansion project involves excavation and land reclamation, resulting in a footprint of 120 hectares – the construction of two additional berths – a stockyard and railway infrastructure.
Port	CdM port expansion (2018-2038)	Implementation	264	Under the extension of the current concession agreement to 2038 Cornelder de Moçambique (CdM), CdM will invest US\$154 million in the container terminal, with \$30 million allocated to infrastructure improvements and US\$124 million allocated to equipment to enhance the productivity of the port. CdM also plans to invest a total of US\$110 million in the general cargo terminal, with US\$53 million allocated to infrastructure improvements and \$57 million allocated to equipment to enhance the productivity of the port. This investment programme should address anticipated bottlenecks, but it is not known if this programme is fully-funded and, if not, what the scope is for Afreximbank's possible participation.
Railways	Dilolo-Kolwezi-Lubumbashi	Pre-feasibility	750+	The Lobito-Dililo section is in excellent condition. It is 1,344 km in length, including 174 rebuilt bridges. It is designed for 18t axle loads, allowing 54t wagon loads. Up to five trains a day move to Lobito carrying manganese from Kisenge, about 150 km from Dilolo, the border between DRC and Angola. A rail agreement between the DRC and Angola has been signed. One or two copper trains have been railed via Lobito, but this routing is considered too risky because of the poor state of the track requiring urgent rehabilitation. The 733-km Kolwezi-Dilolo-Lubumbashi section is in poor condition but operational. It is furnished with wooden and steel sleepers, carrying 15t axle loads, allowing for only a 43t wagon load. Recently, it was reported that Glencore were interested in upgrading the 428-km section from Dilolo-Kolwezi at a cost of US\$400 million, but seems unlikely to proceed without an agreement with the DRC government on how to structure the project.

Railways	TAZARA Calabash Freight LOC/Bridge-Steinweg	Implementation	2.5 pa per operator	In 2018, Calabash Freight and Bridge/Steinweg signed access agreements with TAZARA that allows Calabash and Bridge/Steinweg access to the TAZARA track using their own rolling stock and locomotives. There is also talk of Zambia (and possibly Tanzania) using legislation to force some road freight onto rail. In addition, in October 2017, TAZARA and ZRL signed an Open Access Agreement (OAA) to give the two companies access to each other's track. An LOC could provide finance to either purchase or lease additional rolling stock. It is understood that a third agreement is currently being negotiated with Grindrod.
Railways	CFM-NRZ Machipanda Rail third party access	Concept	2.5 pa per operator	CFM has received a loan of US\$95 million from Exim Bank of India in 2019, to be used to launch a tender for a range of equipment, including locomotives, freight wagons and passenger coaches. The equipment is expected to benefit the 318-km line between the port of Beira in central Mozambique to Machipanda on the border with Zimbabwe. This line, which offers significant commercial opportunities to Zimbabwe, is to undergo a US\$150 million CFM-led rehabilitation announced in July 2019. The bulk of the works will be financed by Mozambique commercial banks, with CFM's capital reserves covering the remaining US\$30 million. With this investment there is an opening to explore the possibility of allowing third-party access rights, similar to what has been allowed on the TAZARA line, to private sector operators to run specialist logistics operations on the railway.
Railways	Strengthening of the North-South Corridor Railway System	Feasibility	Unknown	The five railway companies on the North-South Corridor have agreed to prepare a single, coordinated corridor development plan to address the modal imbalance between road and rail on the North-South Corridor. The so-called North-South Rail Corridor infrastructure and logistics study will focus on the rehabilitation and upgrade of the rail corridor and is being financed by the SADC Infrastructure Project Preparation Fund, managed by the Development Bank of Southern Africa through the NEPAD Business Foundation. This project would provide support to the railway corridor development plan.
Border post	Cassacattiza-Chaninda Border Post and Access Roads (Mozambique - Zambia)	Concept	Unknown	This border post will get busier as Beira gets busier and could become the preferred crossing point for goods moving between Beira and Lusaka. Although the distance is longer than the route through Forbes/Machipanda by almost 400 km, it does have the advantage of being the only crossing point between Beira and Lusaka and of avoiding both Machipanda-Forbes and Chirundu. A recent study on the Beira Corridor noted that the growth in traffic through this border to/from Zambia over the period 2013-2018 was estimated at 13.9% per annum, which is the second highest on the Beira Corridor after Machipanda-Forbes to/from Zimbabwe (21.6%) and much higher than through the two border posts to/from Malawi at Zobue-Mwanza (6.4%) and Calomue-Dedza (4.3%). The access roads on either side of the border are in urgent need of rehabilitation.

Source: Collated by authors

Priority Project Pipeline

Table 82 provides a list of projects that deserve special mention and could be investigated further with the project sponsors highlighted in the table. There are four additional projects that are also either cross-border in nature or are national projects that have regional significance in terms of improving efficiencies along principal SADC trade corridors. These are as follows:

- Expansion at the Malawi Fertiliser Company (MFC) Depot at Liwonde, Malawi
- Development of a Freight Terminal/Inland Container Depot at Liwonde, Malawi
- Extension of Botswana Railway System to enhance capacity of regional network
- Development of a Freight Terminal/Inland Container Depot at Grootfontein, Namibia

Table 82: Summary of Project Pipeline (Special Mention Projects)

Project Type	Project Name	Status	US\$m	Comments
Railways	Expansion at the Malawi Fertilizer Company (MFC) Depot at Liwonde	Concept	Unknown	Farmer's World owns the MFC facility and imports bagged fertilisers in containers and open wagons from Nacala to Liwonde using the railway. However, the sidings are limited to handling 10 wagons with a labour-intensive unloading system. It takes four days to handle a 40-wagon import train from Nacala. Farmer's World is planning to upgrade the siding and equipment. In the first instance, it should be lengthened to 20 wagons, which will result in lower freight costs due to higher wagon utilisation.
Railways	Liwonde Inland Container Depot	Feasibility	Unknown	A private sector proposal to build a freight terminal/inland container depot at Liwonde has been completed to the level of a (pre-)feasibility study. Land has been acquired and the necessary environmental and social impact assessments have been completed. Discussions have been held with one of the financial backers, Pembani-Remgro, who have confirmed that a freight terminal/inland container depot is being considered, but there is as yet no agreement with CDN-CEAR on this proposal nor has a final decision been taken to fund Moto-Engil, the developers of the project.
Railways	Extension of Botswana Railway System	Concept	Unknown	The railway line linking Francistown in Botswana to the Zambia Railways system could run over the Kazungula Bridge, joining up with the old Mulobezi railway line. This will create an alternative route between Lubumbashi, the Copperbelt and South Africa via Botswana and avoid the bottleneck of the BBR line in Zimbabwe.
Railways	Grootfontein Inland Container Depot, Namibia	Concept	Unknown	Establishing an inland container depot at Grootfontein would take advantage of the TransNamib railhead. Cargo from Zambia and DR Congo could travel under bond from the border at Katima Mulilo to Grootfontein and then go into a bonded warehouse and be loaded onto the railway and be transported to Walvis Bay Port by rail. This is a distance of 624 km, so would considerably shorten the road transport distance. A multimodal system could also be explored where cargo from the DRC and Zambian Copperbelt could be transported by rail to Livingstone, then transported by truck from Livingstone to Grootfontein and then by rail from Grootfontein to Walvis Bay and back the same way.
Trade Facilitation	Continental Single Window	Concept	20	The proposal is to develop an Africa-wide Single Window module that can be used by all African countries as a standard so that all Single Window modules can be linked.

Source: Collated by authors





Chapter 8

Elaboration of Projects

Elaboration of Projects

8.1 INTRODUCTION

Afreximbank engaged consultants to undertake a study entitled 'Study on the Trade-Carrying Infrastructure Gap in One African Region'. The overall objective of the assignment was to analyse the trade-carrying infrastructure gap across one pilot African region, which was agreed as the SADC region. To achieve this overall objective, four sub-objectives were achieved, as follows:

- Quantified the existing and future intra-regional trade flows, by type, value and volume, along the 'routes that currently carry, or are predicted in future to carry, significant trade', that is, the main transport corridors in the SADC region and rank the importance of each corridor for future intra-Africa trade within the SADC region, to the year 2040;
- Assessed the condition, capacity and competitiveness of 'trade-carrying' transport and logistics infrastructure, notably seaports, border posts, railways and roads that provide the backbone to the main corridors traversing the region;
- Identified the major gaps in the trade-carrying transport and logistics infrastructure, notably seaports, border posts, railways and roads, on each of the main transport corridors and frame the priority interventions on each regional transport route; and,
- Programmed the priority interventions into a pipeline of proposed projects for each route and ranked the importance of each proposed intervention based on the likelihood of it unlocking additional intra-Africa trade, particularly within, but also outside, the SADC region.

The project produced a final report presenting the results of the study. This second phase of the project builds on that initial report to add to and further develop the project profiles, present the findings of the report to stakeholders and finalise and publish the report. Phase 2 also includes a second workstream which

will provide financial advisory services to further assess the potential projects in the pipeline and propose a way forward.

8.2. OBJECTIVES AND OUTPUTS OF PHASE 2

The additional work on this assignment is framed in the Terms of Reference (ToR). The consultants are to organise a workshop, publish a report on the outcome of the workshop and prepare projects that can be used to mobilise resources required to close the gaps on trade-carrying infrastructure that have been identified in the draft report. The key objectives and outputs of the assignment include the following:

1. Publication of the Report and Advocacy
 - a. Review the SADC-SADC Regional Infrastructure Development Master Plan (RIDMP) and the Programme for Infrastructure Development in Africa (PIDA) Priority Action Plan (PAP) and integrate any current strategic projects into the priority project pipeline (SADC-RIDMP and PIDA-PAP Review).
 - b. Organise a virtual workshop with the AU, AUDA-NEPAD, SADC Secretariat and DFIs at which the findings and recommendations of the Phase 1 Report will be presented and discussed and an 'Aide Memoire' of these discussions will be prepared as a record of the meeting (Stakeholder Workshop 'Aide Memoire' 1).
 - c. Finalise the report considering input from the workshop and prepare a report for publication (Final Phase 1 Report).
2. Financial and Advisory Services
 - a. From the review of the SADC-RIDMP and PIDA-PAP, together with an additional interrogation of the 10 projects recommended in the Phase 1 report, compile an initial long-list of target investment projects for further verification. Develop an initial framework, based on screening criteria, to rank the longlist and verify the status of each project through interviews with project promoters/sponsors. Following verification each project will be filtered through the screening process again and a shortlist of 10-15 priority projects will be compiled for elaboration. These projects, irrespective of their origination (i.e. SADC-RIDMP, PIDA-PAP or Afreximbank Phase 1 Report) will be aligned to the high-priority regional trade corridors in the SADC region (Project Selection).
 - b. Prepare a detailed Project Sheet for each shortlisted priority project, using the format of the Virtual PIDA Information Centre (VPIC) database, which includes a project Location, Description and Objectives; what supporting documentation is available, especially Pre-Feasibility Study (PFS) or Bankable Feasibility Study (BFS); key economic and financial metrics, if available, such as Net Present Value (NPV), Benefit-Cost Ratio (BCR), Financial Internal Rate of Return (FIRR) and Economic Internal Rate of Return (EIRR); status of Project Preparation Funding and any details on Implementation Financing (Detailed Project Profiles).
 - c. Develop a set of project appraisal criteria to be used to assess the 'attractiveness' of each priority project. In the likely absence of, or access to, a feasibility study, which typically provides intelligence on specific project risks, six (6) criteria will be prioritised, namely: (i) commercial viability of the project, (ii) political and currency risk, (iii) counterpart regulatory framework, (iv) deal flow in country, (v) availability of, and priority for,

MFI finance in jurisdiction; and (vi) any specific project-related risks. The existence of these core risks typically reflect specific market failures that occur in the project preparation pathway that can be characterised as ‘fatal flaws’ to the likelihood of the project going ahead. At this stage, internal working session(s), particularly with Afreximbank’s Project Finance Specialists, is envisaged to ensure alignment with the bank’s risk appetite (Project ‘Fatal-Flaw’ Analysis).

d. Following the fatal-flaw analysis, follow-up consultations with the sponsor of each priority project will need to be undertaken, with the following five objectives in mind: (i) to confirm interest in engaging the Bank and the name and contact details of the counterpart focal-point person, (ii) to solicit relevant project documents, (iii) to frame recommendations that reflect the sponsor’s interest but also flags any concerns and/or preconditions, (iv) to propose a ‘road map’ on possible support from the Bank and (v) to introduce Project Sponsors to Afreximbank to ensure a hand-over on high-priority projects. This road map will outline the gaps to be addressed so that the Bank can elaborate the form of intervention required. Recommendations on the preferred type of financing and an outline structure of the financing options will be made (Project ‘Route-To-Market’ Assessment). The project ‘fatal-flaw’ analysis and ‘route to market’ assessment will be integrated into a Project Assessment and Recommendation Report.

e. Prepare a workshop presentation for a list of stakeholders approved by the Bank and manage the implementation of the workshop, which will be either virtual or physical (in Cairo, Egypt) in nature, including preparation of the ‘aide memoire’ of the discussion at the event (Stakeholder Workshop ‘Aide Memoire’ 2).

f. Following the stakeholder workshop, a draft final report will be prepared and submitted for internal review by Afreximbank to enable the project finance team to stress-test the alignment of each priority project target with the Bank (Final Phase 2 Report).

8.3. METHODOLOGY FOR PROJECT SELECTION

8.3.1. Project Selection Challenges

In March 2020, McKinsey released a succinct assessment of the state of infrastructure financing in Africa. Called ‘Solving Africa’s Infrastructure Paradox’, it argues that whilst in ‘there is a need and available funding, together with a large pipeline of potential projects, not enough money is being spent’. Despite significant efforts to address this paradox, expenditure on infrastructure, as a percentage of GDP, has hovered around 3.5 per cent per year since 2000 and needs to rise to 4.5 per cent if the continent is to close its infrastructure gaps. In absolute terms, this means a doubling of annual investment in infrastructure to US\$150 billion by 2025. The prospects for unlocking such a step change in infrastructure investment are challenging. On the one hand, many governments in Africa are facing rising debt-to-GDP

ratios, since exacerbated by the COVID-19 pandemic, which will constrain their infrastructure spending. On the other hand, international investors have demonstrated a considerable appetite for infrastructure projects in Africa. For example, Africa’s current pipeline of infrastructure investments has been estimated at US\$2.5 trillion worth of projects, scheduled for completion by 2025, but more than 50 per cent of these projects, estimated at US\$30 billion, are in the feasibility stage and remain a long way from reaching financial closure.

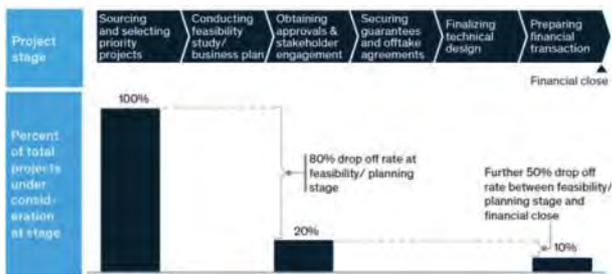
For countries in Africa to close their infrastructure gap it will be imperative for a critical mass of projects to move from feasibility to completion. Figure 8.1 highlights that most infrastructure projects in Africa fail to reach financial closure, with fewer than 10 per cent of projects achieving this milestone and 80 per cent of projects failing at the feasibility/business-plan stage.

This low success rate represents a significant financial burden for developers, since a conservative estimate of preparation costs is between 1-5 per cent of total project cost.⁹⁴ Using the estimate of US\$30 billion, the failure rate of 80 per cent between ‘sourcing and selecting priority projects’ and ‘conducting feasibility study/business plan’ depicted would, at the 3 per cent benchmark, translate into project preparation costs of about US\$720 million that will have to be written off.

94 European Bank for Reconstruction and Development (EBRD) Evaluation Department, Figure A6.1, ‘Project Preparation Process’, in Thematic Evaluation of Infrastructure Project Preparation Facility (EBRD, 2018), 78.

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Figure 71: Africa's Infrastructure Paradox



Source: McKinsey (2020).

This analysis includes financing regardless of the source of funding. That is, it includes projects that are funded through government’s own resources, with support from development partners and in the form of public-private partnerships (PPPs). It is important to remember that funding for infrastructure projects requires access to private capital markets to raise finance to meet obligations contained in budget commitments, counterpart funding linked to projects funded by development partners and for state participation in PPP projects.

There is a bias in practice to link private financing of infrastructure to the PPP procurement modality. Whilst the procurement of projects through PPPs is a critical channel to accelerate investment in infrastructure, it remains, as with all procurement, dependent on the efficacy of the public investment management (PIM) system, which is a central pillar that underpins an enabling environment for investment in long-term infrastructure assets. No country will be able to develop and sustain a portfolio of PPP projects without building and institutionalizing an integrated, robust and transparent PIM system.

A review of a country’s PIM system is the focus of the Public Investment Management Assessment (PIMA) framework developed by the International Monetary Fund (IMF). PIMA is a tool to help countries identify strengths and weaknesses and make recommendations to improve public investment efficiency. It was launched in 2015, revised in 2018 and evaluates 15 key institutions in three phases as depicted in Figure 71.

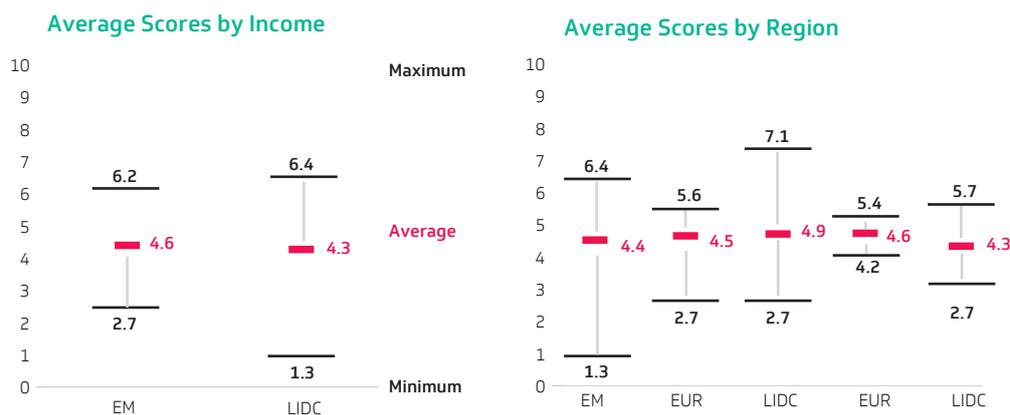
Figure 72: PIMA Framework



Source: IMF (2019).

Figure 72 summarises the review of 30 PIMAs in 2018, with a focus on emerging markets (EM) and Low-Income Developing Countries (LIDCs).

Figure 73: PIMA Scores by Income, Region and Performance



Ranking of Institutions by Scores in Design



Source: IMF (2019).

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Using a scoring system from 1 (poor) to 10 (excellent), Emerging Markets (EMs) scored higher in design when compared to Low Income Developing Countries (LIDCs) - Figure 73, page 255. Europe scored higher than other regions, with Africa being the weakest, but with a large dispersion across African countries - Figure 73, page 255. Nonetheless the room for improvement is high, even the best-performing countries in EMs and LIDCs. Indeed, weaknesses are widespread across the public investment cycle, but are the greatest in project appraisal, project selection, monitoring of assets, project management, management of PPPs and protection of investment – see Figure 73, page 255.

These findings support those of McKinsey and point to the need to improve the overall PIM system, notably improving the quality-at-entry of projects into the cycle and securing guarantees and offtake agreements to ring-fence revenue streams that underpin the bankability of PPP projects. Indeed, the infrastructure paradox referred to by McKinsey can be viewed, not necessarily as a structural problem, but the result of six discrete and critical market failures during the project preparation process. These failures and their root causes, include:

1. Poor project selection leading to a limited deal pipeline: Results from the lack of a long-term plan that identifies realistic PPP project targets and can bridge political cycles, which is exacerbated by poorly developed policy legal and regulatory frameworks, which lead to poor project prioritisation.
2. Weak bankable feasibility studies and business plans: Low technical capabilities and limited financial resources dedicated to developing

feasibility studies and business plans result in many projects being rejected, mainly because risks and how they are to be mitigated are not adequately defined.

3. Delays in obtaining licences, approvals and permits: Poor coordination across government agencies result in lengthy and costly delays in obtaining the licences, approvals and permits necessary for the project to proceed, which is often compounded by community resistance to projects that is not adequately managed and mitigated.
4. Disagreements on how to allocate project risks: Results from skills gaps in quantifying and correctly allocating risks to their natural owners, a challenge that persists in even the most sophisticated public agencies worldwide, which is often compounded by an excessive focus on risk avoidance rather than risk management and mitigation.
5. Inability to secure offtake agreements and guarantees: Challenges in securing offtake agreements are linked to governments' inability to provide sovereign guarantees from the fiscus, which is constrained by debt-ceiling targets in the rolling three-year medium-term expenditure framework that define external and domestic borrowing limits.
6. Poor programme delivery: Results from insufficient capabilities across all stages of the PIM cycle, namely project screening, appraisal, review, selection, budgeting, implementation, adjustment, monitoring and ex-post evaluation, which will need to be strengthened if a critical mass of

capacity is to be developed to address the 'infrastructure paradox'.

To address these market failures, a number of practical steps need to be undertaken by proactive governments in collaboration with development partners, multilateral finance institutions and private sector investors and/or developers.

The first step is for governments, supported by national and multilateral development financing institutions, to review the scope for increasing the flow of private sector financing into infrastructure projects. To do this it will be important to frame projects that are commercially viable and to identify the risks that will need to be mitigated to ensure that projects are bankable.

The second step is for governments to consider reallocating public funds to projects that are less viable and, therefore, unlikely to attract private sector interest. This would prevent the crowding out of private sector investment and would signal to governments where public funds to PPP projects would be the most impactful and where additional up-front private funds could be mobilised to enhance the bankability of the project.

The third step is for governments to strengthen collaboration with MFIs who can offer governments critical skills in areas such as project screening, appraisal and selection. In particular, they can assist in identifying, framing and prioritising a portfolio of PPP projects in a specific sector and in identifying, framing and prioritising risks and how they can be mitigated to entice interest from credible private sector investors and/or developers (see Figure 74).

Figure 74: Five Factors to Attract More Private-Sector Finance in Infrastructure

Commercial Viability/Bankability	<ul style="list-style-type: none"> Private sector will only get involved in projects with adequate returns Preference goes to projects with predictable and stable revenues (e.g. tariffs, offtake agreements), coupled with speed to profit Ability to ring-fence revenues to pay off debt enables project finance
Political and Currency Risk	<ul style="list-style-type: none"> Degree of perceived country political risk, driven by political instability and situation in a country Strong currency fluctuations can hamper project development if funds are sourced in dollars, but offtake revenues are priced in local currency
Counterpart Regulatory Risk	<ul style="list-style-type: none"> A credible offtaker is critical to guarantee revenues A clear PPP regulation, legal protections for investors and easy permitting and land acquisition reduce legal and operational risks and enhance the commercial viability of projects
Deal Flow	<ul style="list-style-type: none"> Private sector players need to invest time and funds to settle into a country and will do so only if deal flow is significant and clear Sufficient deal flow provides exit options and a track record for investors
Availability and Priority of MFI Finance	<ul style="list-style-type: none"> The involvement of DFIs has a multiplier effect on private capital as they are a guarantee of serious due diligence and a conservative approach Risk mitigation instruments help improve the credit rating of the borrower

‘I look at eight things before investing: the sponsor, the project, how the project was awarded, the country, the documentation required, the currency risk, the environment and political risks, the presence of DFIs and exit opportunities.’ – Fund Manager, Africa Infrastructure Investment Fund

Source: McKinsey (2020).

8.3.2. Project Screening Framework

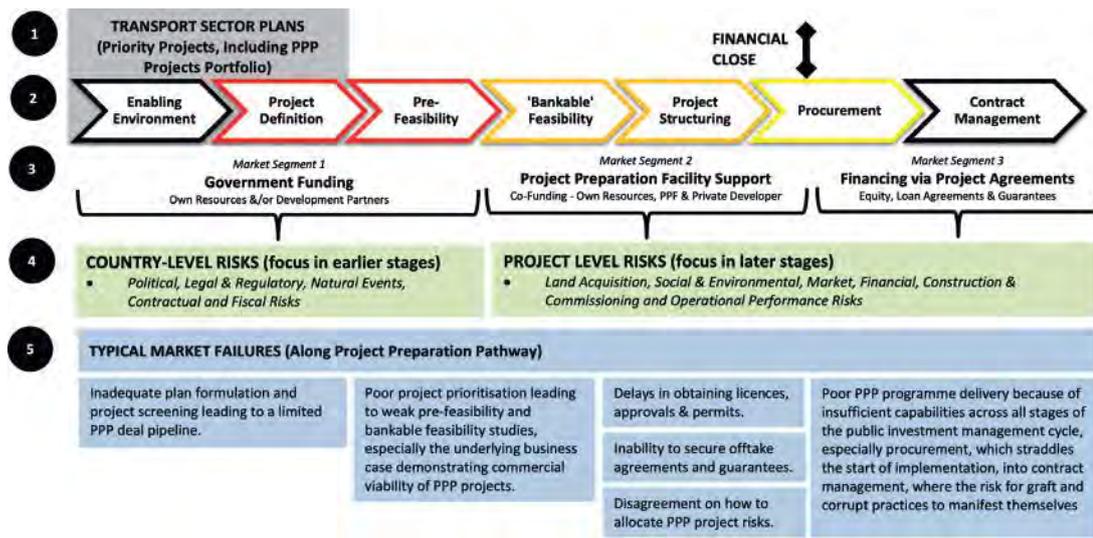
The insights provided in the above overview offer some key guidance on a multi-dimensional design framework to structure the applied research to improve access to private sector finance for road and rail transport infrastructure in low-income countries. These dimensions provide a framework to structure project selection, which is highlighted in schematic form in Figure 75.

The four key dimensions that are used as filters to screen infrastructure projects in terms of their attractiveness to be financed, developed and operated by the private sector are as follows:

1. The project portfolio in transport sectors – This dimension is concerned with the screening of projects, including those that are most suited for delivery through a PPP procurement modality.
2. The infrastructure project preparation pathway – This dimension is concerned with the progress of a project’s development along the preparation pathway, from project definition to financial close, which is typically more complicated for PPP projects.
3. The marketplace for infrastructure project financing – This dimension is concerned with the mobilisation of funding for a project’s development along the preparation pathway, which can be defined in market segments, particularly if a project is to be delivered through a PPP procurement modality.
4. The identification and mitigation of risks to infrastructure investment – This dimension is concerned with the identification and mitigation of both country and project level risks, to ensure that a project moves along the project preparation pathway, which again is typically more complicated for PPP projects, as risks have to be allocated between the public and private sectors.

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Figure 75: Framework To Structure Project Screening



Source: Collated by Nathan Associates for this study.

The six key market failures highlighted in the previous section that occur at different stages of the project preparation process are depicted in Figure 75. They represent the types of bottlenecks that typically need to be addressed if a project, particularly a PPP project, is to be successfully financed, implemented and operated over the life cycle of the infrastructure asset.

These failures, which occur at specific stages along the pathway, are typically more pronounced with PPP projects. The process starts with Project Definition followed by a Pre-Feasibility Study (PFS). This is usually the responsibility of government, which then leverages additional funding, notably from PPFs, to develop a Bankable Feasibility Study (BFS), which includes some market sounding with private sector stakeholders.

Once a BFS is completed, a Project Structure is developed that equitably allocates risks between the public and private sectors, which is key to a competitive Procurement Process that culminates in the award of the project to

a preferred investor who will implement and operate the infrastructure asset for a defined period of time.

The next section of this report focusses on developing an initial long-list of projects, which includes a consideration of the projects proposed in the Phase 1 report, which are cross-referenced with projects contained in SADC Regional Infrastructure Development Master Plan (RIDMP) published in 2012, the Tripartite⁹⁵ Infrastructure Database (TRIPDA) completed in 2013 and the Programme for Infrastructure Development of Africa (PIDA) Priority Action Plan (PAP) approved in 2014.

8.4. REVIEW OF PROJECTS

8.4.1. SADC-RIDMP, TRIPDA and PIDA-PAP

Figure 76 provides a summary of projects from a review of the SADC-RIDMP, TRIPDA and PIDA-PAP. The process for this filtering is as follows:

1. Engage the Virtual PIDA Information Centre (VPIC) Secretariat (<https://>

www.au-pida.org) to establish the status of the database and obtain approval for 'reviewer' access rights for the Africa Infrastructure Database (AID), specifically for transport infrastructure projects in the SADC region (<https://aid.nepad.org>), which is the underlying database that captures both validated and unvalidated projects into the system.

2. Projects are then arranged along the stages of the project preparation pathway, which are as follows:
 - S1: Project Definition
 - S2A: Pre-Feasibility Study
 - S2B: Feasibility Study
 - S3A: Project Structuring
 - S3B: Transaction Support and Financial Close
 - S4A: Tendering
 - S4B: Construction
 - S4C: Operation

⁹⁵ Tripartite refers to the three Regional Economic Communities (RECs) of the Southern African Development Community (SADC), East African Community (EAC) and the Common Market of Eastern and Southern Africa (COMESA).

Figure 76: Review of Projects in VPIC Database

S1 Project Definition	Date	Data %	S3A Project Structuring	Date	Data %	S4B Construction	Date	Data %
Forbes/Machipanda OSBP	2013	26%	Bulawayo-Gwanda Road	2017	43%	Beitbridge OSBP	2019	43%
Nyamapanda/Cuchimano OSBP	2013	26%	Goma-Kisangani Road	2013	43%	Kitwe-Chingola Road	2019	35%
Grobiersbrug/Martin's Drift OSBP	2013	26%	Brazzaville-Kinshasa OSBP	2013	26%	Machipanda-Harare Railway	2013	30%
Zobue/Mwanza OSBP	2013	26%				Nacala Railway Line	2013	43%
North-South Rail Master Plan	2013	9%				Kinshasa-Luanda Road	2013	13%
Tete Toll Bridge	2013	9%				Durban Port Expansion	2013	35%
Luanda Port Expansion	2013	22%				Maputo Port Expansion	2013	39%
Dar es Salaam New Berths - Vijibweni, Mbwamaji & Kunduchi	2013	48%				Nacala Port Container Terminal Expansion	2013	26%
						Dar es Salaam Port Modernisation	2018	48%
						Serenje-Nakonde Road (Chinsali-Nakonde Section)	2019	52%
S2A Pre-Feasibility	Date	Data %	S3B Transaction Support & Financial Close	Date	Data %	S4C Operation	Date	Data %
Beira New Coal Terminal	2017	39%	Gwanda-Beitbridge Road	2019	43%	Sena Railway Rehabilitation	2019	48%
N'diji Airport Expansion	2013	35%	Dar es Salaam New Container Terminal	2016	52%	Huambo-Kuito Road	2019	22%
						Beira Port Dredging	2019	39%
S2B Feasibility	Date	Data %	S4A Tendering	Date	Data %	Nacala Port New Coal Terminal	2019	43%
Harare-Nyamapanda Road	2019	52%	Beira-Machipanda Railway Upgrade	2019	35%	Dar es Salaam New SPM Oil Terminal	2018	30%
KIA Turnoff - Mzimba Road	2018	70%	Colomue-Dedza OSBP	2019	35%	Dar es Salaam Port Access Roads	2016	35%
Kalemie Port Upgrading	2018	39%	Brazzaville-Kinshasa Road/ Rail Bridge	2019	65%			
Chingola-Solwezi Railway Extension	2017	43%	Chirundu-Harare	2016	52%			
Walvis Bay Port New Container Terminal	2017	52%	Harare-Beitbridge	2016	52%			
Kinshasa-Illebo Railway	2017	61%						
Serenje-Nakonde Road (Serenje-Mpika Section)	2019	52%						
Serenje-Nakonde Road (Mpika-Chinsali Section)	2019	52%						
Projects	No		Projects	No	%			
SADC-VPIC Validated (2020)	32		Early-Stage Project Preparation (S1 & S2A)	10	23%			
SADC-RIDMP (2012)	20		Mid-Stage Project Preparation (S2B & S3A)	11	25%			
plus SADC-TRIPDA (2013)	24		Late-Stage Project Preparation (S3B & S4A)	7	16%			
plus PIDA-PAP (Projects not in SADC-VPIC or SADC-RIDMP)	44		Project in Implementation (S4B & S4C)	16	36%			
			Total	44	100%			

Source: VPIC Database.

Elaboration of Projects

The stages of interest for this assignment include those from S1 to S3A, with the two stages of S2B and S3A being of the greatest interest as these are the stages when DFIs typically enter the process, which has been confirmed as the case for Afreximbank following discussions with the Project Finance specialists. In addition, the database provided the latest year that the project was reviewed and critically provides a measure of the level of data completeness in terms of the information needed to provide an informed decision on the project at the stage indicated in the database. A cursory review of the table reveals that much of the data in the VPIC database is outdated and there are significant gaps that need to be plugged.

A review of validated VPIC projects for the SADC region revealed a total of 32 projects of which 20 appeared on the SADC-RIDMP and 24 featured on TRIPDA. When the SADC filter was removed and a tally of all transport projects that fell within the SADC region was compiled a further 12 projects were identified from the VPIC database, although seven out of the 12 were in already in operation, construction, being tendered or about to reach financial closure. Nonetheless, a total of 44 projects were identified as validated projects, which then had to be cross-referenced with the proposed list.

8.4.2. Project Selection Criteria

Table 83 provides a summary of the project selection criteria by each dimension, which were used to rank the long-list of projects. Table 83 provides definitions within each of four dimensions and compiles a simple ranking from 1 to 3 for each one. Hence, projects can score a maximum of 12 or a minimum of 4 points. The higher the project scoring, the more interest it should generate amongst Development Finance Institutions (DFIs), such as Afreximbank, as a potential funding target, as a higher score would

reflect that the country and project risks linked to a particular project have been identified and mitigated, or largely mitigated.

8.4.3. Phase 1/VPIC Integration

Table 83: Project Selection Criteria to Rank Projects provides a summary of the long-list of 43 projects that were compiled through an integration of the projects listed in the Phase 1 Report and the VPIC database.

The table is self-explanatory, with the 'new projects' indicated in the right-hand column being the ones that were identified in the Phase 1 report.

It shows that 16 projects, (37 per cent) already featured on the VPIC database as validated projects, another 16 projects, (37 per cent), were technically new projects, but often an elaboration of existing validated VPIC projects and 11 projects, (25 per cent) were on the SADC-RDIMP.

Table 83: Project Selection Criteria to Rank Projects

DIMENSION ONE (D1): ENABLING ENVIRONMENT & PROJECT DEFINITION (DOES THE PROJECT FEATURE IN A REGIONAL PLAN AND/OR STUDY?)			
Categories	Relevant Plan & Latest Information	Scoring	Rationale
Primary concern is how old is the latest validated information on a high-priority project, so the newer the information the higher the score for the project			
Old Out-of-Date Data (2012)	Projects identified in SADC-RIDMP (2012), but don't appear to have been validated and updated in the VPIC database.	1	Strategic projects identified in the SADC-RIDMP but no updated validated information exists.
In-Between Information (2013-17)	Projects classified as validated in the VPIC database, with most recent updates that range in the period 2013 to 2017.	2	Strategic projects in the SADC-RIDMP (or SADC/VPIC) that have more up-to-date and validated information.
Up-To-Date Intelligence (2019-20)	New Projects identified in the Phase 1 Study (2019) that have been most recently validated and updated.	3	Strategic projects identified in the Phase 1 Study, which have been through an initial project screening process.
DIMENSION TWO (D2): PROJECT PREPARATION PATHWAY (AT WHAT STAGE IS THE PROJECT ALONG THE PROJECT PREPARATION AND DEVELOPMENT PATHWAY?)			
Categories	Project Stages	Scoring	Rationale
Primary concern is access to intelligence to inform final investment decision, with intelligence improving as the project moves along the preparation pathway.			
Early-Stage	S1 Project Definition	1	Early stages of preparation provides limited information on country and project risks.
	S2A Pre-Feasibility		
Mid-Stage	S2B Feasibility	2	Middle stages of preparation provide sufficient information on country and project risks to proceed to next stage.
	S3A Project Structuring		
Late-Stage	S3B Transaction Support & Financial Close	3	Later stages of preparation provide sufficient information on country and project risks to make a final investment decision.
	S4A Tendering		
Implementation	S4B Construction	Not Applicable	
	S4C Operation		
DIMENSION THREE (D3): INFRASTRUCTURE FINANCING MARKET (IS THE PROJECT STILL DEPENDENT ON PUBLIC FUNDING, INCLUDING GRANT FUNDING FOR PREPARATION AND DEVELOPMENT?)			
Categories	Type of Financing	Scoring	Rationale
Primary concern is unsustainable public debt levels, so preference is for fully privately financed projects without recourse to government-backed guarantees.			
Public Funding	Funding from budget, including grants (and development aid) and debt (domestic and foreign) to fund infrastructure.	1	Poorly managed publicly funded infrastructure projects a source of deepening debt in SSA.
Public Private Partnerships (PPPs)	Grants, debt, equity and guarantees from public partner and debt and equity from private partner, to fund infrastructure.	2	PPPs can play a role in leveraging private finance but need careful structuring to avoid hidden risks.
Privately Financed	Private finance of infrastructure without recourse to public guarantees. Pays rents to entity for access to use assets.	3	Private financing of infrastructure with no recourse to government-backed guarantees is best way to limit debt.

Elaboration of Projects

DIMENSION FOUR (D4): COUNTRY AND PROJECT RISKS (WHAT IS THE COUNTRY'S INVESTMENT GRADE? AT WHAT LEVEL OF RESOLUTION HAVE PROJECT RISKS BEEN IDENTIFIED AND MITIGATED?)

Categories	Country Investment Rating	Project Risk Profile	Scoring	Rationale
Primary concern is low risk, notably affordability and specific project risks that are increasingly mitigated as a project moves along the preparation pathway.				
High-Risk Criteria	Moody's Ba1-C (Extremely Weak)	Weakly Profiled (Concept Note)	1	Extremely weak investment grade and weakly defined risks because data is only at the Concept Note (CN) level of detail.
Medium-Risk Criteria	Moody's Baa1-Baa3 (Very Weak)	Partially Profiled (Pre-Feasibility)	2	Very weak investment grade but partially defined risks because information has reached the level of Pre-Feasibility Study (PFS) detail.
Low-Risk Criteria	Moody's Aaa-A3 (Weak)	Strongly Profiled (Feasibility)	3	Weak investment grade but strongly defined risks because intelligence has been further developed to the level of Bankable Feasibility Study (BFS) detail.

Source: VPIC Database.

The list of project sponsors/promoters are listed below for ease of reference against the acronyms in Figure 77, as follows:

1. AfDB – African Development Bank
2. ANE – Administração Nacional de Estradas (Mozambique)
3. ATM – Autoridade Tributária de Moçambique (Mozambique)
4. AUDA-NEPAD – African Union Development Agency
5. BURS – Botswana United Revenue Service (Botswana)
6. CdM – Cornelder de Mozambique (Mozambique)
7. CFM – Caminhos de Ferro de Moçambique (CFM)
8. COMESA – Common Market of Eastern and Southern Africa
9. DBSA – Development Bank of Southern Africa
10. DGI – La Direction Générale des Impôts (DRC)
11. EAC – East African Community
12. ECOWAS – Economic Community of West African States
13. EDZ – Estradas de Zambeze (Mozambique)
14. ER – Eswatini Railways (Eswatini)
15. FQM – First Quantum Minerals (Zambia)
16. GED Africa (South Africa)
17. IDC – Industrial Development Corporation (Zambia)
18. MHCL – Mpulungu Harbour Corporation Limited (Zambia)
19. MRA – Malawi Revenue Authority
20. NamRA – Namibia Revenue Authority (Namibia)
21. NEPAD-IPPF – NEPAD Infrastructure Project Preparation Facility
22. NRFA – National Road Finance Agency (Zambia)
23. NRZ – National Railways of Zimbabwe (Zimbabwe)
24. NWR – North West Rail (Zambia)
25. PPIAF – Public Private Infrastructure Advisory Facility
26. SADC – Southern African Development Community
27. SARS – South African Revenue Service (South Africa)
28. SNCC – Société Nationale des Chemins de Fer du Congo (DRC)
29. TANROADS – Tanzania Roads Agency (Tanzania)
30. TAZARA – Tanzania Zambia Railways Authority (Tanzania and Zambia)
31. TCM – Terminal de Carvão da Matola (Mozambique)
32. TFR – Transnet Freight Rail (South Africa)
33. TPA – Tanzania Port Authority (Tanzania)
34. TRA – Tanzania Revenue Authority
35. WB – World Bank
36. ZIMRA – Zimbabwe Revenue Authority (Zimbabwe)
37. ZipBCC – Zambia Border Crossing Company (Zambia)
38. ZRA – Zambia Revenue Authority
39. ZRL – Zambia Railways Limited (Zambia)
40. ZRD – Zambian Railway Development

Elaboration of Projects

Figure 77: Integration of Phase 1, SADC-RIDMP and VPIC Projects

#	PORTS (3)	Project	Sponsor	VPIC	VPIC/ SADC	RIDMP	New
1	Dar es Salaam (Dar es Salaam Corridor)	New Container Terminal (Berths 13-14)	TPA	Y			
2	Mpulungu (North-South Corridor)	Lake Tanganyika Port Upgrade (Zambia)	MHCL/IDC				y
3	Beira (Beira Corridor)	General Cargo & Container Terminals	Cornelder		Y		
4		Beira New Coal Terminal	Essar		Y		
5	Maputo (Maputo Corridor)	Matola Coal Terminal (TCM)	Grindrod				Y
#	ROADS (9)	Project	Sponsor	VPIC	VPIC/ SADC	RIDMP	NEW
6	Dar es Salaam Corridor	Kasomeno-Mwenda Toll Road Project	GED Africa				Y
7		Dar es Salaam - Chalinze Expressway	Tanroads		Y		
8	North-South Corridor	Livingstone-Victoria Falls (12 kms)	NRFA/ZRD				Y
9		Solwezi-Chingola (177 kms)	NRFA				Y
10		Cassacatiza-Katete (65 kms)					Y
11	Beira Corridor	Tete-Cassacatiza (271 kms)	Estradas do Zambeze (EDZ)		Y		
12		Changara-Zobue (216 kms)			Y		
13	Walvis Bay Corridor	Sesheke-Kazungula (147 kms)	NRFA (Zambia)			Y	
14		Kaoma-Kasempa (218 kms)				Y	
#	RAIL (8)	Project	Sponsor	VPIC	VPIC/ SADC	RIDMP	NEW
15		Tazara-Bridge/Steinweg	Bridge/Steinweg				Y
16	Dar es Salaam Corridor	Tazara-Calabash	Calabash				Y
17		Tazara-Grindrod	Grindrod				Y
18	North-South Corridor	Solwezi-Chingola Railway Extension	North-West Rail		Y		
19		North-South Rail 'Block Train' Operation	TFR-NRZ-ZRL-SNCC		Y		
20	Beira Corridor	Beira-Machipanda Rail 3rd Party Access	CFM (Centro)				Y
21		Machipanda-Harare Rail 3rd Party Access	NRZ				Y
22	Maputo Corridor	Ressano Garcia Railway Upgrade (Phase 1)	CFM (Sul) & TFR				Y
23		Ressano Garcia Railway Upgrade (Phase 2)					Y
24	Lobito Corridor	Dilolo-Kolwezi Railway Upgrade	SNCC		Y		
#	Border postS (16)	Project (SADC-RIDMP)	Sponsor	VPIC	VPIC/ SADC	RIDMP	NEW
25	Dar es Salaam Corridor	Kasumu-Songwe Border	TRA/MRA			Y	
26		Tunduma-Nakonde OSBP	TRA/ZRA			Y	
27	Dar es Salaam, North-South, Beira & Walvis Bay corridors	Kasumbalesa OSBP	ZRA/DGI/ZipBCC			Y	
28		Chirundu OSBP	ATM/SARS				Y
29	North-South & Beira corridors	Zobue-Mwanza OSBP	ATM/MRA		Y		
30		Calomue-Dedza OSBP	ATM/MRA		Y		

31	North-South Corridor (Eastern Arm)	Beitbridge OSBP	ZIMRA/SARS		Y		
32		Victoria Falls-Livingstone Border	ZIMRA/ZRA			Y	
33		Nyamapanda-Cuchamano OSBP	ZIMRA/ATM		Y		
34	North-South Corridor (Western Arm)	Kopfontein-Tlokweng Border	SARS/BURS			Y	
35		Groblersbrug-Martin's Drift Border	SARS/BURS		Y		
36		Kazungula OSBP	BURS/ZRA			Y	
37	Beira Corridor	Machipanda-Forbes OSBP	ATM/ZIMRA		Y		
38		Cassacatiza-Chanida Border	ATM/ZRA				Y
39	Maputo Corridor	Ressano Garcia-Lebombo OSBP	ATM/SARS		Y		
40	Walvis Bay Corridor	Wenela-Sesheke OSBP	NamRA/ZRA			Y	
41	Nacala Corridor	Milanje-Muloza Border	ATM/MRA				Y
42		Mandimba-Chiponde OSBP	ATM/MRA			Y	
43		Mchinji-Mwami OSBP	MRA/ZRA			Y	
Total			43	1	15	11	16
%			100%	2%	35%	26%	37%

Source: Collated by Nathan Associates for this study.

Elaboration of Projects

8.4.4. Initial Ranking of Projects

Table 84: Initial Ranking of Project 'Long-List' provides a summary ranking of the longlist of projects for further review to a proposed shortlist of 10-15 high-priority projects to elaborate in Phase 2 of the project.

Table 84: Initial Ranking of Project 'Long-List'

#	Short Project Name	D1	D2	D3	D4	Total
1	Matola Coal Terminal	3	3	3	3	12
2	TAZARA-Bridge/Steinweg	3	3	3	3	12
3	TAZARA-Calabash	3	3	3	3	12
4	TAZARA-Grindrod	3	3	3	3	12
5	Dar es Salaam Berths 13-14	2	3	2	3	10
6	Beira Cargo Terminals	2	3	2	3	10
7	Dar es Salaam-Chalinze Expressway	2	3	2	3	10
8	Solwezi-Chingola Railway	2	3	3	2	10
9	KMTR Project	3	2	2	2	9
10	Ressano Garcia Rail (Phase 1)	3	2	2	2	9
11	NSC Rail 'Block Train' Service	2	2	2	2	8
12	Beira-Machipanda Rail Upgrade	3	1	3	1	8
13	Machipanda-Harare Rail Upgrade	3	1	3	1	8
14	Kazungula OSBP	1	3	1	3	8
15	Mandimba-Chiponde OSBP	1	3	1	3	8
16	Mchinji-Mwami OSBP	1	3	1	3	8
17	Tete-Cassacatiza Road	2	2	2	1	7
18	Changara-Zobue Road	2	2	2	1	7
19	Ressano Garcia Rail (Phase 2)	3	1	2	1	7
20	Dilolo-Kolwezi Rail Upgrade	3	1	2	1	7
21	Chirundu OSBP	3	1	1	2	7
22	Ressano Garcia-Lebombo OSBP	2	2	1	2	7
23	Mpulungu Port Upgrade	3	1	1	1	6
24	Beira New Coal Terminal	2	1	2	1	6
25	Livingstone-Zimba Road	3	1	1	1	6
26	Solwezi-Chingola Road	3	1	1	1	6
27	Chanida-Katete Road	3	1	1	1	6
28	Zobue-Mwanza OSBP	2	2	1	1	6
29	Calomue-Dedza OSBP	2	2	1	1	6
30	Beitbridge OSBP	2	2	1	1	6
31	Cassacatiza-Chanida Border	3	1	1	1	6
32	Milanje-Muloza Border	3	1	1	1	6
33	Nyamapanda-Cuchamano OSBP	2	1	1	1	5
34	Groblersbrug-Martin's Drift Border	2	1	1	1	5
35	Machipanda-Forbes OSBP	2	1	1	1	5

36	Sesheke-Kazungula Road	1	1	1	1	4
37	Kaoma-Kasempa Road	1	1	1	1	4
38	Kasumulu-Songwe Border	1	1	1	1	4
39	Tunduma-Nakonde OSBP	1	1	1	1	4
40	Kasumbalesa OSBP	1	1	1	1	4
41	Victoria Falls-Livingstone Border	1	1	1	1	4
42	Kopfontein-Tlokweng Border	1	1	1	1	4
43	Wenela-Sesheke OSBP	1	1	1	1	4

Following the presentation of the Phase 1 report during the virtual PIDA Week on 21 February 2021 and subsequent follow-up consultations, two additional projects were submitted, as follows:

#	Short Project Name	D1	D2	D3	D4	Total	Promoter/Sponsor
44	Muturara-Limbe Railway	3	2	2	2	9	CFM & Malawi Railways
45	Pemba Port Expansion	3	2	1	2	8	CFM

Source: Collated by Nathan Associates for this study.

8.4.5. Fatal-Flaw Analysis of Projects

Table 85: Project Long-List To Project Shortlist provides a summary of how the project longlist has been reduced to a project shortlist. The evaluation process was filtered through two layers as follows:

- Layer 1: This layer required a two-step process to evaluate each of the 45 projects on the project long-list:
 - Score for each project on a scale of 1-3 derives a total score for each project, responses to the following questions that consider four dimensions (D1-D4), as follows:
 - D1: Does the project feature in a regional plan and/or study?
 - D2: At what stage is the project along the project preparation pathway?
 - D3: Is the project dependent on public funds, including grants for preparation?
 - D4: What is the investment grade and have project risks been identified/mitigated?

- From this assessment provide a STOP/PASS assessment on whether the project proceeds should pass through the gate to the next stage and a substantiation for this decision.
- Layer 2: The layer is concerned with an elaboration of the STOP/PASS decision through the assignment of the well understood traffic light system, as follows:
 - Red: REVIEW, because the project does not meet the criteria to be considered ready for financing;
 - Orange: PUSH, because the project partially meets the criteria to be selected for financing and with some assistance could be pushed into the green GO zone OR the project is nearing the end of a key stage in the project preparation process, which if positive, could push the project into the green GO zone; and
 - Green: GO, because the project meets the criteria to be ready for financing, but would still need to be subjected to the normal rigorous

internal due diligence process of the financial institution considering the transaction.

Table 89 reorders the projects after the review process and highlights the main reason for the decision taken.

Note that projects that have been abandoned, or have been completed, or have significant information gaps, are not scored. Projects are pooled together if the project sponsor has aggregated specific projects into an integrated portfolio of projects.

It is recommended that the 10 projects with a green GO and orange PUSH light pass through the gate to the next phase of this assignment.

Elaboration of Projects

Table 85: Project Long-List to Project Shortlist

Old #	Short Project Name (Original)	Original Score					Revised Score					Stop Push Go	Summary
		D1	D2	D3	D4	Total	D1	D2	D3	D4	Total		
1	Matola Coal Terminal	3	3	3	3	12	-	-	-	-	-	Review	Project is no longer going ahead and is being reconfigured
2	TAZARA-Bridge/Steinweg	3	3	3	3	12	2	2	1	2	7	Review	TAZARA in a weak financial position to receive loans
3	TAZARA-Calabash	3	3	3	3	12						Review	Combined with 2 above
4	TAZARA-Grindrod	3	3	3	3	12						Review	Combined with 2 above
5	Dar es Salaam Berths 13-14	2	3	2	3	10	-	-	-	-	-	Push	Project is not being pursued but could be resuscitated
6	Beira Port Terminals	2	3	2	3	10	3	3	3	3	12	Go	Sponsor interested in dialogue with potential financiers
7	Dar es Salaam-Chalinze Expressway	2	3	2	3	10	3	2	1	2	8	Review	Project is currently on hold but could be resuscitated
8	Solwezi-Chingola Railway	2	3	3	2	10	3	2	2	2	9	Push	Await feasibility study & due diligence before engaging
9	Kasomeno-Mwenda Toll Road	3	2	2	2	9	3	3	3	2	11	Go	Project currently being structured, so good time to engage
10	Ressano Garcia Rail (Phase 1)	3	2	2	2	9	-	-	-	-	-	Review	Sponsor has completed Phase 1 of the project
11	NSC Rail 'Block Train' Service	2	2	2	2	8	3	2	2	1	8	Push	Await feasibility study & due diligence before engaging
12	Beira-Machipanda Rail	3	1	3	1	8	-	-	-	-	-	Review	Project is funded in Mozambique but stalled in Zimbabwe
13	Machipanda-Harare Rail	3	1	3	1	8						Review	Combined with 12 above
14	Kazungula OSBP (Staff Housing)	1	3	1	3	8	3	3	2	3	11	Go	Small project to be rolled into a portfolio of OSBP projects
15	Mandimba-Chiponde OSBP	1	3	1	3	8	3	1	2	1	7	Review	Project covered by WBG funded SATCP to GoMw/GoMz
16	Mchinji-Mwami OSBP	1	3	1	3	8						Review	Combined with 15 above

17	Tete-Cassatiza Road	2	2	2	1	7	-	-	-	-	-	Review	Under existing concession but unable to collect revenue
18	Changara-Zobue Road	2	2	2	1	7						Review	Combined with 17 above
19	Ressano Garcia Rail (Phase 2)	3	1	2	1	7	3	2	2	1	8	Push	Await finalisation of project structuring process
20	Dilolo-Kolwezi Rail	3	1	2	1	7	-	-	-	-	-	Review	There is no updated information on this project
21	Chirundu OSBP	3	1	1	2	7	3	3	2	3	11	Go	Combined with 14 into a OSBP staff housing portfolio
22	Ressano Garcia-Lebombo OSBP	2	2	1	2	7	3	2	2	1	8	Go	SA Treasury to approve OSBP-PPP process in 2021
23	Mpulungu Port Upgrade	3	1	1	1	6	3	2	1.5	1.5	8	Push	Await outcome of due diligence process before engaging
24	New Coal Terminal Beira	2	1	2	1	6	3	2	2	1	8	Review	Await return of demand from users to support the project
25	Livingstone-Zimba Road	3	1	1	1	6	-	-	-	-	-	Review	Project has been completed
26	Solwezi-Chingola Road	3	1	1	1	6	2	1	1	2	6	Review	Project is stalled in early PPD stages & not yet funded
27	Chanida-Katete Road	3	1	1	1	6						Review	Combined with 17 above
28	Zobue-Mwanza OSBP	2	2	1	1	6						Review	Combined with 15 above
29	Calomue-Dedza OSBP	2	2	1	1	6						Review	Combined with 15 above
30	Beitbridge OSBP	2	2	1	1	6						Go	Combined with 22 as part of RSA-OSBP PPP portfolio
31	Cassatiza-Chanida Border	3	1	1	1	6						Review	Combined with 15 above
32	Milanje-Muloza Border	3	1	1	1	6						Review	Combined with 15 above
33	Nyamapanda-Cuchamano OSBP	2	1	1	1	5						Hold	Data not received due to COVID death of ZIMRA contact
34	Groblersbrug-Martin's Drift Border	2	1	1	1	5						Review	Combined with 22, but not in RSA-OSBP PPP portfolio
35	Machipanda-Forbes OSBP	2	1	1	1	5						Hold	Data not received due to COVID death of ZIMRA contact

Elaboration of Projects

36	Sesheke-Kazungula Road	1	1	1	1	4	2	1	1	2	6	Review	Project is stalled in early PPD stages & not yet funded
37	Kaoma-Kasempa Road	1	1	1	1	4	2	1	1	2	6	Review	Project is stalled in early PPD stages & not yet funded
38	Kasumulu-Songwe Border	1	1	1	1	4						Review	Combined with 15 above
39	Tunduma-Nakonde OSBP	1	1	1	1	4	-	-	-	-	-	Review	TMEA is providing support to TRA/ZRA to develop OSBP
40	Kasumbalesa OSBP	1	1	1	1	4	-	-	-	-	-	Review	No unified strategy on how to develop a seamless OSBP
41	Victoria Falls-Livingstone Border	1	1	1	1	4	-	-	-	-	-	Review	From 01.03.3021 only passengers & rail freight allowed.
42	Kopfontein-Tlokweng Border	1	1	1	1	4						Go	Combined with 22 as part of RSA-OSBP PPP portfolio
43	Wenela-Sesheke OSBP (Housing)	1	1	1	1	4	3	3	2	3	11	Go	Combined with 14 into a OSBP staff housing portfolio

Old #	Short Project Name (Workshop)	Original Score					Revised Score					Stop Push Go	Summary
		D1	D2	D3	D4	Total	D1	D2	D3	D4	Total		
44	Mukurara-Limbe Railway	3	2	2	2	9	3	2	1	2	8	Push	Await outcome of bi-lateral talks on project phasing
45	Pemba Port Expansion	3	2	1	1	8						Hold	Awaiting outstanding information to prepare project profile

Source: Collated by authors

Table 86: Prioritised Project Shortlist

New	Short Project Name	Revised Score					Stop Push Go	Project Package	Reason for Decision
		D1	D2	D3	D4	Total			
1	Beira Port Terminals	3	3	3	3	12	Go	1	CdM investment plan approved & looking for financing
2	Kasomeno-Mwenda Toll Road	3	3	3	2	11	Go	2	DBSA doing final structuring, so good time to engage
3	Kazungula OSBP (Housing)	3	3	2	3	11	Go	3	ZRA cannot borrow from banks, so looking for financing
4	Chirundu OSBP (Housing)								
5	Wenela-Sesheke OSBP (Housing)								
6	Solwezi-Chingola Railway	3	2	2	2	9	Push	4	NWR feasibility study & due diligence process in progress
7	Ressano Garcia-Lebombo OSBP	3	2	2	1	8	Go	5	SA Treasury to approve OSBP-PPP procurement in 2021
8	Beitbridge OSBP								
9	Kopfontein-Tlokwenig Border								
10	NSC Rail 'Block Train' Service	3	2	2	1	8	Push	6	Feasibility study & due diligence process in progress
11	Ressano Garcia Rail (Phase 2)	3	2	2	1	8	Push	7	Project realisation linked to TFR positioning in market
12	Mpulungu Port Upgrade	3	2	1.5	1.5	8	Push	8	DBSA in final due diligence to address market concerns
13	Muturara-Limbe Railway	3	2	1	2	8	Push	9	CFM-MRL bi-lateral agreement on deal structure needs to be finalised, specifically for Phase 1 in Malawi
14	Pemba Port Expansion						Hold	10	Outstanding project information from CFM required

Elaboration of Projects

15	Dar es Salaam-Chalinze Expressway	3	2	1	2	8	Review		Project stalled as impacts of SGR project not assessed
16	New Coal Terminal Beira	3	2	2	1	8	Review		Project stalled as coal production has faltered
17	TAZARA-Bridge/Steinweg								
18	TAZARA-Calabash	2	2	1	2	7	Review		TAZARA is in a weak financial position, so any project finance deal will need to be supported by guarantees
19	TAZARA-Grindrod								
20	Mandimba-Chiponde OSBP								
21	Mchinji-Mwami OSBP							Projects not ready to receive financing	Project portfolio funded by upcoming World Bank Southern Africa Trade Connectivity Project (SATCP)
22	Zobue-Mwanza OSBP								
23	Calomue-Dedza OSBP	3	1	2	1	7	Review		
24	Cassacatiza-Chanida Border								
25	Milanje-Muloza Border								
26	Kasumulu-Songwe Border								
27	Solwezi-Chingola Road	2	1	1	2	6	Review		RDA has no budget allocation, but PPP deal may be possible, if support for project structuring is available
28	Sesheke-Kazungula Road	2	1	1	2	6	Review		
29	Kaoma-Kasempa Road	2	1	1	2	6	Review		Projects not ready to receive financing
30	Chanida-Katete Road	2	1	1	1	5	Review	RDA has no budget allocation & no current scope for full PPP deal to rehabilitate road & recover investment	
31	Beira-Machipanda Rail						Review		CFM's project under implementation, but ZRL's financial position is weak & needs to be recapitalised, so project finance deal will need to be supported by guarantees
32	Machipanda-Harare Rail	-	-	-	-	-			

33	Tete-Cassacatiza Road						Review	Projects not ready to receive financing	Part of Tete Bridge PPP concession but users opposed to pay tolls accepted, so no basis to collect revenue
34	Changara-Zobue Road	-	-	-	-	-	Review		
35	Dilolo-Kolwezi Rail	-	-	-	-	-	Review		No information and stalled due to political uncertainty
36	Matola Coal Terminal	-	-	-	-	-	Review		Project scrapped due to low demand & is under review
37	Dar es Salaam Berths 13-14	-	-	-	-	-	Review		Project not currently being pursued as a priority by TPA
38	Ressano Garcia Rail (Phase 1)	-	-	-	-	-	Review		CFM has completed the project using its own resources
39	Livingstone-Zimba Road	-	-	-	-	-	Review		RDA has completed project using GRZ budget allocation
40	Groblersbrug-Martin's Drift Border	-	-	-	-	-	Review		RSA-DHA has excluded border from OSBP-PPP package
41	Tunduma-Nakonde OSBP	-	-	-	-	-	Review		ZRA/TRA priorities are being funded by TMEA
42	Kasumbalesa OSBP	-	-	-	-	-	Review		ZRA/DGDA have no unified OSBP strategy to support IBM
43	Victoria Falls-Livingstone Border	-	-	-	-	-	Review		ZRA has decreed border will no longer process freight
44	Nyamapanda-Cuchamano OSBP						Hold		Project information outstanding because contact person in ZIMRA passed away suddenly from COVID-19
45	Machipanda-Forbes OSBP						Hold		

Source: Collated by authors

Elaboration of Projects

Table 87: Priority Project Shortlist Elaborated

#	Project Name	Status	Location	Project Sponsor	Value (US\$)
1	Beira Port Terminals	Go	Mozambique	Cornelder de Moçambique (CdM)	290,000,000
2	Kasomeno-Mwenda Toll Road	Go	DRC-Zambia	Duns Azfalt - GED Africa	500,000,000
3	OSBP Staff Housing Project	Go	Zambia	Zambia Revenue Authority (ZRA)	10,920,000
4	OSBP Programme	Go	South Africa	Department of Home Affairs (DHA)	400,000,000
5	Solwezi-Chingola Railway	Push	Zambia	North-West Rail (NWR) Zambia Limited	500,000,000
6	NSC Rail 'Block Train' Service	Push	South Africa-Zimbabwe-Zambia-DRC	Transnet Freight Rail (TFR), Beitbridge Railway (BBR), National Railways of Zimbabwe (NRZ), Zambia Railways Limited (ZRL) & Société Nationale des Chemins de Fer du Congo (SNCC)	Not Specified
7	Ressano Garcia Rail (Phase 2)	Push	Mozambique	Caminhos de Ferro de Moçambique (CFM)	200,000,000
8	Mpulungu Port Upgrade	Push	Zambia	Mpulungu Harbours Corporation Limited (MHCL)	60,000,000
9	Mukurara-Limbe Rail (Phase 1)	Push	Mozambique-Malawi	Caminhos de Ferro de Moçambique (CFM) & Malawi Railways Limited (MRL)	75,000,000
10	Pemba Port Expansion	Hold	Mozambique	Caminhos de Ferro de Moçambique (CFM)	115,000,000

Source: Collated by authors

These projects were discussed with Afreximbank senior management on 22 February 2021. The following key decisions were taken:

- Afreximbank's mandate does not extend to housing projects and investments > US\$30 million, which rules out its participation in the ZRA OSBP Staff Housing Project Portfolio (Project 3 above);
- Afreximbank cannot participate, as a Policy Bank, in competitive procurement processes, which rules out its involvement in the RSA OSBP-PPP Project Portfolio (Project 4 above);
- Categorise the remaining GO (Projects 1 and 2 above) and PUSH (5 to 9 above) projects in terms of what is needed to accelerate these 'hard' infrastructure projects along the 'route to market' (i.e. financial closure), including the type(s) of intervention needed; and
- Revisit REVIEW projects, particularly those that could be impactful from a trade facilitation perspective, to assess how they could be taken forward in terms of regulatory reform and investment in 'soft' interventions, through collaboration with donors and/or leveraging blended finance.

The elaboration of Decision 3 above contains what is considered confidential information, so is omitted from the public report, but an elaboration of Decision 4 above is deemed in the public interest, as it flags gaps that need to be addressed to improve the performance of trade-carrying infrastructure in the SADC region.

8.5. TRADE FACILITATION INTERVENTIONS

8.5.1. Introduction

After the meeting held between the consultants and Afreximbank on 22 February 2021 when the results of the Fatal Flaw Analysis were presented, the consultants were requested to re-evaluate the projects categorised as STOP and assess whether there are those that are impactful from a trade facilitation perspective that could be advanced with donor funding, blended finance, or otherwise. In addition, the consultant was asked to assess areas where Afreximbank could assist to address regulatory issues that were stopping or slowing down implementation of trade facilitation measures.

The projects that could be impactful from a trade facilitation perspective and whether they could be advanced with donor funding, blended finance or otherwise, are considered to be the following five projects (or cluster of projects):

1. Resuscitate the Dar es Salaam-Chalinze Expressway Project;
2. Strengthen regional links on the Zambian Trunk Road Network;
3. Improve operations on the TAZARA and Machipanda railway systems;
4. Target improvements at border posts overlooked by donor programmes; and
5. Initiate dialogue on market-study to assess future prospects for Pemba Port.

8.5.2. Reviving REVIEW Projects that Promote Trade

The five interventions listed above are considered likely to have the greatest impact on accelerating trade flows on the high-volume trade corridors in the SADC region. Consequently, it does not include projects (or clusters of projects) that are not considered critical to supporting intra-regional and international trade flows in the SADC region.

8.5.2.1. Resuscitate the Dar es Salaam-Chalinze Expressway Project

Description: The Dar es Salaam-Chalinze Expressway is an important regional road, in that it is part of the Dar es Salaam–Morogoro highway, which links Dar es Salaam to Zambia (and the North-South Corridor) and to Rwanda and Burundi on the Central Corridor. At Chalinze, the road branches to Arusha and so links Dar es Salaam with Kenya. A full feasibility study for the project was completed in December 2016 and a Project Information Memorandum (PIM) was issued in November 2017. The feasibility study estimated a total development cost of about US\$1 billion. The project is planned to be implemented through a PPP with either a local or foreign investor and would be operated as a toll road. The feasibility study recommended an annuity fee mechanism or unitary payment for the private concessionaire. However, TanRoads reported in November 2020 that the project had been suspended because Tanzania was in the process of constructing a Standard Gauge Railway (SGR) and the financial implications of the SGR were not fully considered while preparing the toll road feasibility study report.

Impact: The road would have a large trade facilitation impact as part of an upgraded trunk road on the Dar es Salaam and Central corridors.

Possible interventions: To revive this project Afreximbank could provide support in three ways, as follows:

1. Initially, Afreximbank could offer support to TanRoads to update the original market study to assess the current and projected impact of the SGR on traffic flows on the road, from which the financial impacts can be modelled;
2. Depending on the results, Afreximbank could assist TanRoads to restructure the concession agreement, as it may need to be adjusted, to ensure a rate

of return that would be sufficiently attractive to local and foreign investors; and

3. Afreximbank could also offer support to TanRoads to structure the PPP transaction, including an assessment of whether the legal and regulatory framework is robust enough for the PPP transaction to be properly regulated.

8.5.2.2. Strengthen Regional Links on the Zambian Trunk Road Network

Zambia lies at the heart of the trade routes traversing the SADC region. Five regional corridors converge in the Copperbelt region of Zambia. Included in the north-east to the south-west of the region are the following corridors: Dar es Salaam, Nacala, Beira, North-South and Walvis Bay. The vast majority of traffic, excluding coal, iron ore, manganese and chrome, that traverses the SADC region used road transport. Four key road projects are identified under this portfolio, as follows:

- Solwezi-Chingola Road;
- Sesheke-Kazungula Road;
- Kaoma-Kasempa Road; and
- Chanida-Katete Road.

Solwezi-Chingola Road

Description: Zambia's main copper mines are now located in North-Western Province and around Solwezi (Kalumbila and Kansanshi). All mine inputs and all copper come into and go out of Solwezi by road, most to Chingola. At Chingola (or Ndola) there is the option of putting goods onto rail or taking them off the rail if they are imports. The Solwezi road is, therefore, very heavily trafficked and the mines (First Quantum Mining) have invested a lot in keeping the road open. Recently the Roads Department of Zambia (RDA) has patched the road, but this rehabilitation will not last long.

Impact: The impact on Zambia's exports and earnings will be considerable.

Elaboration of Projects

Possible interventions: To accelerate the development of this project, Afreximbank could provide support in five ways, as follows:

1. Initially, Afreximbank could assist the RDA to properly design the project as a PPP transaction, which would have to include an assessment of the potential impact of the proposed North-West Railway from Solwezi to Chingola.
2. Depending on the results of the concept study framing the design of the project, Afreximbank could support the RDA to conduct a more detailed market study to confirm the revenue streams derived from traffic on the road, which would then be used to define what standard of road could be afforded (number of lanes, construction methods, surface materials and so forth).
3. Once these projects' economic and technical parameters are understood, Afreximbank could assist the RDA in compiling a pre-feasibility study (preliminary technical, environmental, social, costing and structuring components), which could inform the design of the preferred PPP option.
4. Following the approval of the pre-feasibility study, Afreximbank could mobilise additional project preparation funds to support the RDA to prepare a bankable feasibility study that is signed off by the RDA and, if necessary, financiers required to back the project.
5. Once the bankable feasibility study is signed off, Afreximbank could assist the RDA to take the PPP transaction to the market by supporting the tender preparation, adjudication, selection, negotiation and award process, of whether the legal and regulatory framework is robust enough for the PPP transaction to be properly regulated.

Sesheke-Kazungula Road

Description: The road linking Sesheke with Kazungula is part of the corridor that links

Livingstone and Walvis Bay. The road is in a poor state of repair and it can take 3-5 hours for trucks to traverse this 135 km section of road. The RDA has plans to reconstruct this road but does not have the budget to do this work. The potholes in the road are being filled but not as fast as they appear and this is, at best, a temporary solution as the pavement has failed and so cannot be patched. It will have to be reconstructed from the sub-base up.

Impact: As this section of road is the weakest link between Walvis Bay and the Copperbelt, via Livingstone, the impact of reconstructing the road will be positive. It will reduce the time and cost of transport, using the Livingstone route, to and from the Copperbelt and Walvis Bay, which will have an impact on both the cost of imports and the cost of transport of copper to Walvis Bay.

Possible interventions: To accelerate the development of this project, Afreximbank could provide support in five ways, as follows:

1. Initially, Afreximbank could assist the RDA to properly design the project as a PPP transaction.
2. Depending on the results of the concept study framing the design of the project, Afreximbank could support the RDA to conduct a more detailed market study to confirm the revenue streams derived from traffic on the road, which would then be used to define what standard of road could be afforded (number of lanes, construction methods, surface materials and so forth).
3. Once these projects' economic and technical parameters are understood, Afreximbank could assist the RDA in compiling a pre-feasibility study (preliminary technical, environmental, social, costing and structuring components), which could inform the design of the preferred PPP option.
4. Following the approval of the pre-feasibility study, Afreximbank could

mobilise additional project preparation funds to support the RDA to prepare a bankable feasibility study that is signed off by the RDA and, if necessary, financiers required to back the project.

5. Once the bankable feasibility study is signed off, Afreximbank could assist the RDA to take the PPP transaction to the market by supporting the tender preparation, adjudication, selection, negotiation and award process, of whether the legal and regulatory framework is robust enough for the PPP transaction to be properly regulated.

Kaoma-Kasempa Road

Description: The Kaoma-Kasempa is an unsurfaced section of road that links the north-west Copperbelt to the port of Walvis Bay in Namibia. It is maintained by BUKS Transport, under agreement with RDA, but is very much a seasonal road. In the wet season, trucks carrying project cargo and copper to and from the mines in Northwestern Province and trucks carrying large logs still use this road, which becomes very muddy and impassable. The RDA does not have the funds to surface the road despite its importance on the Walvis Bay Corridor.

Impact: As this section of road is the weakest link in the shortest route between Walvis Bay and the north-west Copperbelt, the impact of reconstructing the road will be positive, as it will reduce the time and cost of transport between the north-west Copperbelt and Walvis Bay and will allow the road to be used all the year round.

Possible interventions: To accelerate the development of this project, Afreximbank could provide support in five ways, as follows:

1. Initially, Afreximbank could assist the RDA to design an improved project by assessing the costs and benefits of maintaining the current PPP arrangements on a gravel road compared to upgrading the road into either an all-season low-volume sealed or bitumen-surfaced road.

2. Depending on the results of the concept study framing the design of an improved project, Afreximbank could support the RDA to conduct a more detailed market study to confirm the revenue streams derived from traffic on the road, which would then be used to define what standard of road could be afforded (number of lanes, construction methods, surface materials and so forth).
3. Once these projects' economic and technical parameters are understood, Afreximbank could assist the RDA in compiling a pre-feasibility study (preliminary technical, environmental, social, costing and structuring components), which could inform the design of the preferred PPP option.
4. Following the approval of the pre-feasibility study, Afreximbank could mobilise additional project preparation funds to support the RDA to prepare a bankable feasibility study that is signed off by the RDA and, if necessary, financiers required to back the project.
5. Once the bankable feasibility study is signed off, Afreximbank could assist the RDA to take the PPP transaction to the market by supporting the tender preparation, adjudication, selection, negotiation and award process, of whether the legal and regulatory framework is robust enough for the PPP transaction to be properly regulated.

Chanida-Katete Road

Description: The Cassacatiza-Chanida border between Mozambique and Zambia is becoming increasingly busy for traffic to and from the port of Beira and Zambia and DRC, particularly during the height of the fertiliser import season between August to November, where the Machipanda-Forbes border between Mozambique and Zimbabwe can become very congested.

Even through it is a longer trip, the time savings attributed to only having to go through one quiet (Cassacatiza-Chanida) rather than two congested (Machipanda-

Forbes and Chirundu) borders are high.

Moreover, larger Mozambique trucking companies that benefit from economies of scale and agglomeration by working a regional market also use the Cassacatiza-Chanida border to pick up backhaul seasonal export cargoes from eastern Zambia after dropping off imports in neighbouring Malawi.

The approach roads from Tete (on the N7) to Cassacatiza in Mozambique (263 km) and from Chanida to Katete (on the T4) in Zambia (55 km) are in poor condition, but the road is under a basic maintenance regime as a component of a PPP transaction in Mozambique, but RDA does not have adequate resources to rehabilitate the Chanida-Katete section.

Impact: This road is unlikely to have a significant trade facilitation impact because it is not currently a major constraint on the Beira Corridor.

Possible interventions: Traffic volumes on this route are currently too low for a PPP transaction to be considered. However, if Afreximbank were to provide targeted assistance on this project, it would be to undertake a project definition study to determine at what traffic volumes and associated tariffs a PPP transaction becomes realistic.

8.5.2.3. Improve Operations on the Tazara and Machipanda Railways

TAZARA Railway

Description: TAZARA has faced operational difficulties from the start and has been kept running by continued assistance from China, several European countries and the United States. Freight traffic bottomed out at 88,000 metric tons in 2014/2015, less than 2 per cent of the railway's design capacity of 5 million tons per year.

Since then, TAZARA has continued to post net losses, its operational efficiency remains low, its liquidity position remains negative and, as a result, it continues to drain public resources. TAZARA urgently needs to recapitalise.

Following a failed attempt to do so with support from the People's Republic of China (PRC) in 2016, TAZARA entered into access agreements with a Zambian operator (Calabash). Under this agreement, TAZARA allocates Calabash slots for which they pay an access fee. In addition to this, TAZARA has also entered into a strategic business alliance with Zambia Railways Limited (ZRL). Both initiatives have resulted in an expansion of the market and customer base.

Impact – A revitalised TAZARA operating at, or close to, its design capacity of 5 million tons of cargo per annum would have a huge trade and transport facilitation impact in the region.

Possible intervention – Until TAZARA is restructured and the over-reliance of TAZARA on PRC-financed Protocols of Technical and Economic Corporation (PTEC) is rolled back, it will be difficult for any other interested party, apart from the two governments, to intervene. It may be possible for Afreximbank to provide technical advice to TAZARA on how it could be restructured while keeping the commitments and obligations of TAZARA and the PRC's interests in the line. However, this would require sustained commitment from the two governments to ensure that any kind of unbundling into separate operating entities would be sustainable.

MACHIPANDA Railway

Description: CFM has raised US\$150 million from local capital markets for the rehabilitation of the Beira-Machipanda section of the railway. This project will increase the capacity on the line to approximately 3 million tons per annum (mtpa) from its current capacity of 0.5 mtpa. The project is currently in implementation, with commencement in Q1 2022 and completion envisaged in Q1 2022. CFM indicated that no specific bilateral discussions have been held with NRZ to join-up CFMs investment with the complementary investments by NRZ on the Machipanda-Harare section of the railway.

Elaboration of Projects

The DBSA finalised a draft PIM for the recapitalisation of the NRZ back in 2012 that at the time was estimated at approximately US\$2 billion over a 20-year period, which is approximately US\$100 million per annum. The initial investment was turned down by the DBSA because the NRZ could not secure an equity investment of approximately US\$100 million from the government of Zimbabwe to fund the initial working capital requirements of the recapitalisation programme. The US\$2 billion is still referenced by the Infrastructure Development Bank of Zimbabwe (IDBZ),⁹⁷ so it is assumed that the NRZ recapitalisation plan envisaged in the DBSA-PIM remains broadly applicable.

In 2017, following a competitive tender process the NRZ Recapitalisation Project, valued at US\$400 million, was awarded to a consortium comprising the Diaspora Infrastructure Development Group (DIDG) and Transnet. However, the deal was subsequently cancelled because 'the consortium failed to meet contractual timelines two years after winning the tender, principally failing to provide proof of funding despite repeated enquiries from the government.'⁹⁸ DIDG has legally challenged the cancellation and has instructed a legal firm to 'sue the Transport Minister... and National Railways of Zimbabwe for US\$215 million after the cabinet scrapped the consortium's US\$400 million bid to recapitalise the rail operator,'⁹⁹ which remains an active case where Afreximbank is referenced as the 'mandated lead arranger' for the deal.¹⁰⁰

Whilst this legal challenge continues, the NRZ with the approval of the Government of Zimbabwe, is entering into new deals, notably with the United Wagon Company

(headquartered in Russia), where it is reported that a deal for the delivery of 100 wagons and 40 locomotives to NRZ, valued at US\$10 million has been signed, with the initial amount of US\$1.5 million to initiate this transaction apparently confirmed.¹⁰¹

Impact: A revitalised Machipanda railway operating at, or close to, the estimated capacity of 3 mtpa would have a huge trade and transport facilitation impact in the region.

Possible interventions: Despite the obvious benefits to Zimbabwe, the Machipanda railway system and the regional railway network, it appears that there are some critical legal issues that first need to be resolved, vis-à-vis the DIDG-Transnet deal.

However, given the specific focus on the Machipanda line as an integrated system offering an alternative to road and (fuel) pipeline¹⁰² modes on the Beira-Machipanda/Forbes-Harare route, Afreximbank could consider support to both CFM and NRZ for a market study to assess the scope for the railway to capture back some of the traffic it lost to the road and (fuel) pipeline since the mid-2000s.¹⁰³

8.5.2.4. Target Improvements at Border Posts overlooked by Current Donor Programmes

Description: The findings of the border post assessment in the Phase 1 report on Trade Flows, Infrastructure Bottlenecks and Preliminary Project Pipeline are summarised in Table 88, from which the following key gaps emerge, in order of priority for Afreximbank engagement:

1. Machipanda-Forbes border between Mozambique and Zimbabwe

2. Katima Mulilo-Sesheke border between Namibia and Zambia
3. Nyamapanda-Cuchamano border between Zimbabwe and Mozambique
4. Groblersbrug-Martin's Drift border between South Africa and Botswana and
5. Kasumbalesa border between Zambia and the Democratic Republic of Congo.

Under the current EU-supported SADC Trade Facilitation Programme (TFP), provision is made to conduct Time Release Studies (TRS) and support Coordinated Border Management (CBM) on the North-South Corridor. The SADC-TFP has identified the Durban Port, Mussina/Beitbridge, Chirundu, Kasumbalesa and Groblersbrug/Martin's Drift for TRS. However, the four borders to be targeted for support to CBM have not yet been selected. Hence, it will be important that Afreximbank establishes with the SADC Secretariat how best to support further engagements on the Groblersbrug-Martin's Drift (4) and Kasumbalesa (5) border posts. The main targets should therefore be the Machipanda-Forbes (1), Katima Mulilo-Sesheke (2) and Nyamapanda-Cuchamano (3) border posts.

97 'NRZ recapitalisation: No breakthrough as board members and minister clash over DIDG deal', Zimbabwe Morning Post, 5 February 2020.

98 'Back to Tender... Fresh start for NRZ Recapitalisation Project', SARA Newsletter, 27 November 2019.

99 'Zimbabwe signs up with Russia's United Wagon Company for NRZ Recapitalisation', Zimbabwe Digital News, 23 February 2020.

100 'NRZ slapped with US\$ 236m lawsuit', The Zimbabwe Independent, 24 December 2020

101 'Zimbabwe signs up with Russia's United Wagon Company', Zimbabwe Digital News.

102 The Beira-Feruka-Msasa Petroleum Products Pipeline runs from the port of Beira in Mozambique to Msasa, which is located near Harare in Zimbabwe.

It is a 10' pipeline, approximately 300 km long with a capacity of 2 million m³/year and transports in batches the following refined products: gasoline, diesel, ethanol, kerosene/Jet A1 and paraffin.

103 Railway volumes grew steadily through the end of the civil war in 1992 to rise to approximately 1 million tons by 1995 that declined to approximately 750,000 by 2000 before recovering back to approximately 900,000 ton in 2005. However, by 2010 volumes had declined to approximately 300,000 tons and have oscillated between approximately 250,000 to 400,000 tons over the last decade. Volumes were 259,720 tons in 2017, preceded by 388,730 tons in 2016 with estimated volumes of 328,250 tons for 2018.

Table 88: Summary of Border post Assessment

Rank	Border Post	Neighbouring Countries	Growth 2017-2040	Support to Improve Coordinated Border Management Practices
1	Ressano Garcia-Komatipoort	Mozambique–South Africa (Maputo Corridor)	2,060 trucks per day	South Africa and Mozambique are currently in discussions to establish an OSBP at Ressano Garcia-Komatipoort (and an OSBP at Ponto D'Ouro-Kosi Bay).
2	Tunduma-Nakonde	Tanzania–Zambia (Dar es Salaam Corridor)	1,495 trucks per day	TradeMark East Africa providing support to Tanzania and Zambia to establish an OSBP at Nakonde-Tunduma.
3	Machipanda-Forbes	Mozambique–Zimbabwe (Beira Corridor)	1,155 trucks per day	No support to this key border post was sourced from a review of donor programmes.
4	Beitbridge	South Africa–Zimbabwe	1,110 trucks per day	South Africa and Zimbabwe are currently in discussions to establish an OSBP at Beitbridge. It is possible that this border post could be supported by the SADC Trade Facilitation Programme (TFP).
5	Kopfontein-Tlokweng and Groblersbrug-Martin's Drift	South Africa–Botswana (North-South corridor)	1,100 trucks per day	South Africa and Botswana are currently in discussions to establish an OSBP at Kopfontein-Tlokweng, but not at Martin's Drift-Groblersbrug. It is possible the latter could be supported by the SADC Trade Facilitation Programme (TFP).
6	Kasumbalesa	Zambia–DRC (Dar es Salaam, North-South, Beira and Walvis Bay corridors)	985 trucks per day	No support to this key border post was sourced from a review of donor programmes. It is possible, that this border post could be supported by the SADC Trade Facilitation Programme (TFP). The key concern at this border post is the lack of an integrated CBM strategy between Zambia and DRC.
7	Chirundu	Zimbabwe–Zambia (North-South, Beira and Walvis Bay corridors)	760 trucks per day	This OSBP is established and operational. The only outstanding investment is staff housing, but this investment is not eligible for support from Afreximbank.
8	Kazungula	Botswana–Zambia (North-South and Walvis Bay corridors)	625 trucks per day	This OSBP has recently been completed and is being commissioned. The only outstanding investment is staff housing, but this investment is not eligible for support from Afreximbank.
9	Zobue-Mwanza and Colomue-Dedza	Mozambique–Malawi (Beira and North-South corridors)	340 trucks per day	These border posts will be supported by the upcoming World Bank funded Southern African Trade Connectivity Project (SATCP).
10	Cassacatiza-Chanida	Mozambique–Zambia (Beira and North-South corridors)	280 trucks per day	
11	Katima Mulilo-Sesheke	Namibia–Zambia (Walvis Bay corridor)	245 trucks per day	No support to this border post was sourced from a review of donor programmes.
12	Nyamapanda-Cuchamano	Zimbabwe–Mozambique (North-South corridor)	210 trucks per day	No support to this border post was sourced from a review of donor programmes.
13	Kasumu-Songwe	Tanzania–Songwe (Dar es Salaam Corridor)	50 trucks per day	This border post will be supported by the upcoming World Bank funded Southern African Trade Connectivity Project (SATCP).
14	Mchinji-Mwami	Malawi–Zambia (Nacala Corridor)	45 trucks per day	This border post is currently under construction under an AfDB credit to the Nacala Corridor project and will receive support from the upcoming World Bank funded Southern African Trade Connectivity Project (SATCP).
15	Oshikango-Santa Clara, Buitepos-Mamuno and Ariamsvlei-Nakop	Namibia–Angola (Trans-Cunene) Namibia–Botswana (Trans-Kalahari) Namibia–South Africa (Trans-Orange)	45 trucks per day, including all three border posts	No support to these border posts was sourced from a review of donor programmes. However, these are borders that are not on major regional trade routes and are not expected to have significant trade flows, so should be able to be managed under bilateral arrangements.
16	Entre Lagos-Nayuchi (Rail) Mandimba-Chiponde Milanje-Muloza	Mozambique–Malawi (Nacala Corridor)	40 trucks per day, including all three border posts	These border posts will be supported by the upcoming World Bank funded Southern African Trade Connectivity Project (SATCP).
17	Victoria Falls-Livingstone	Zimbabwe–Zambia	0 trucks	This border has been closed to road-based freight traffic, which will be diverted to Kasungula.

Source: Nathan Associates (2021).

Elaboration of Projects

Dialogue with each member state should be framed to include both an assessment of the hard and soft interventions that would cover the following dimensions of trade facilitation:

- Rehabilitation of the physical infrastructure at the border post (e.g. physical rehabilitation, expansion and integration of border operations between the two countries).
- Expedition of the movement, release and clearance of goods, including goods in transit (e.g. measures to support business continuity for frontline border agencies during and immediately after the COVID crisis).
- Implementation of the recently developed World Customs Organization-Coordinated Border Management (WCO-CBM) Model (e.g. pre-clearance, risk management, post-clearance audit and authorised economic operators to reduce the burden of inspections).
- Support Micro, Small and Medium-Sized Enterprises (MSMEs), especially women traders, who have been hit hard during the COVID crisis, (e.g. implement simplified trade regimes and, where appropriate, border residency card system).
- Streamline trade, particularly agricultural trade requirements, between neighbouring states, (e.g. simplify complex regulatory procedures and reduce border burdens to increase exports and strengthen the development of regional value chains).

Impact: Improved CBM at border posts, particularly those along high-volume corridors, will have a massive impact on trade facilitation throughout the region.

Possible Interventions: Interventions at specific border posts will need to be aligned with what is currently being planned for each border post. This was beyond the scope of this assignment, which has limited the focus to a review of gaps in the current donor support to improving CBM in the SADC region.

Additional insights into how Afreximbank could collaborate with the SADC Secretariat on regional-scale trade facilitation and transit-transport facilitation interventions are provided in section 8.5.3, which is concerned with addressing regulatory bottlenecks that impede trade in the SADC region.

8.5.2.5. Initiate Dialogue on Market Study to Assess Future Prospects for Pemba Port

Description: The port of Pemba's access channel is 5,400 metres (m) long, approximately 1,800 m wide and 50 m deep at the entrance. The quay is asymmetrically T-shaped with an access branch of 79 m in length and 12.5 m in width. The berthing is done in two zones, one on the sea side, which is 183 m long and 17 m wide and the other on the land side, which is 25 m long and 17 m wide. The current depth at berth is approximately 8.5 m.

The quayside has 15,000 m² of uncovered area with storage capacity of 800 containers. In addition, the port has covered warehouses over an area of 1,700 m² with storage capacity for 3,500 tons of diversified cargo. The existing terminals have the following characteristics:

- General cargo terminal has a capacity of 64,000 tons per annum;
- Container cargo terminal has an installed capacity of 18,000 TEU's per annum; and,
- Bulk oil terminal for the discharge of liquid fuels has an installed capacity of 7,300 m³ and an operational capacity of 5,600 m³.

The anchor cargoes flowing through the port include graphite (from Ancuabe, Montepuez and Balama), fuel, general cargo (mainly clinker and gypsum), cotton and marble (from Montepuez).

Due to increased importation of fuel, construction materials, machinery and equipment to serve the oil and gas exploration and mining projects in Cabo Delgado province, particularly over the last seven years, the port received a

significant increase in the number of vessel calls. This dipped in 2016, which coincided with the end of the oil and gas exploration programme and tightening of regulations on the export of hardwood timber. However, vessel calls are expected to stabilize in the foreseeable future due to an anticipated increase in exports, notably graphite, marble, hardwoods and cotton and imports, notably fuel, clinker, construction materials and machinery and equipment.

The port has recently benefitted from a US\$4.5 million investment in a fleet of state-of-the-art handling equipment, including tugboats, which allows for operations to take place on a 24-hour basis. CFM has plans to modernise and expand the port of Pemba at an estimated cost of US\$115 million, which includes the following proposed improvements:

- Enhance the capacity of the general cargo terminal from 64,000 to 287,000 tons per annum and the container terminal from 18,000 to 30,000 TEUs per annum, and
- Expand and deepen the berths from 8.5 m to 15 m, that will allow one Panamax¹⁰⁴ and one Handymax¹⁰⁵ vessel to dock at the same time.

The land-side quay is to be used to moor small vessels, tugboats and pilot boats used for port operations.

Impact: The port of Pemba has become increasingly strategic both to the expanding mining industry in Cabo Delgado and to the build-out of the oil and gas sector in the Rovuma Basin. The potential for downstream industrial development has been elaborated in a seminal report by Standard Bank entitled *Rovuma LNG Project: Macroeconomic Study*, published on 19 March 2019. Whilst there are a number of substantial risks that need to be managed, there is no other cluster of projects within the SADC region that have the potential to transform Mozambique's economy, with significant overspill effects to the rest of the SADC region, than the development of Liquefied Natural Gas (LNG) platforms in the Rovuma Basin, bordering Mozambique and Tanzania.

Possible interventions: CFM has requested support to assist them in developing a pre-feasibility study for the port of Pemba expansion plans. Given the potential growth linked to the oil and gas platform in northern Mozambique, Afreximbank could position itself well to be the lead arranger on this project by acceding to this request. However, an initial discussion on exactly what information exists vis-à-vis the requirements for a pre-feasibility study should be the immediate next step. For example, support may start with a market study to confirm port throughput.

8.5.3. Address Regulatory Bottlenecks Impeding Regional Trade

This section looks at the regulatory bottlenecks in the trade facilitation and transport transit facilitation separately to be able to provide clear guidance to Afreximbank on how to engage the SADC Secretariat on specific regulatory issues.

8.5.3.1. Trade Facilitation Interventions in the SADC Region

The World Trade Organization's (WTO) Trade Facilitation Agreement (TFA) is in force and, as SADC Members are WTO

members, they have an obligation to implement the WTO-TFA.

Section I of the WTO-TFA addresses trade facilitation measures and obligations under the following 12 Articles:

- Article 1: Publication and Availability of Information
- Article 2: Opportunity to comment, information before entry into force and consultations
- Article 3: Advance Rulings
- Article 4: Procedures for Appeal or Review
- Article 5: Other Measures to Enhance Impartiality, Non-Discrimination and Transparency
- Article 6: Disciplines on fees and charges imposed on or in connection with importation and exportation and penalties
- Article 7: Release and Clearance of Goods
- Article 8: Border Agency Cooperation
- Article 9: Movement of goods intended for import under customs control
- Article 10: Formalities connected with importation, exportation and transit
- Article 11: Freedom of transit
- Article 12: Customs Cooperation

Section II of the TFA addresses flexibility arrangements for Developing and Least Developed Countries (LDCs) and contains special and differential treatment (SDT) provisions that allow Developing and LDCs to determine when they will implement individual provisions of the TFA and to identify provisions that they will only be able to implement upon the receipt of technical assistance and support for capacity building. To take advantage of these SDT flexibilities, a developing country or LDC must place each provision of the TFA into three categories:

1) Category A: provisions that will be

implemented within one year of the TFA entering into force;

- 2) Category B: provisions that will be implemented after an additional transitional period following the entry into force of the TFA; and
- 3) Category C: provisions that will be implemented on a date after a transitional period following the entry into force of the TFA and requiring the acquisition of technical assistance and support for capacity building.

TFA also provides additional protection:

- Early Warning Mechanism: whereby a WTO member can request an extension from the WTO Trade Facilitation Committee if it experiences difficulties in implementing a provision in Category B or C by the date it had notified, the extension will be automatic if the additional time requested does not exceed three years;
- Expert Group: where a requested extension has not been granted and a member lacks capacity to implement, the WTO Trade Facilitation Committee will establish an Expert Group to examine the issue and to make a recommendation;
- Shifting between Categories: Developing Countries and LDCs members may shift provisions between Categories B and C; and
- Grace Period: following entry into force of the Agreement, LDCs will not be subject to the Dispute Settlement Understanding for a period of six years for Category A provisions and for eight years for Category B and C provisions.

In addition to the commitments and obligations under the WTO-TFA and the TTTFP, each SADC Member State is also a signatory to the African Continental Free Trade Area (AfCFTA) agreement and is obliged to implement the Trade and Transport Facilitation measures contained in the AfCFTA Trade in Goods Protocol and

104 Panamax Dry Bulk: Length Overall=230 m; Beam=32.3 m; Loaded Draught=13.7 m and Deadweight Tonnage DWT=70,000 tons.
105 Handymax: Length Overall=150 m; Beam=24 m; Loaded Draught=9 m and Deadweight Tonnage DWT=25,000 tons.

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its annexes. This means that each country needs to implement:

- Annex 2 – Rules of Origin (RoO);
- Annex 3 – Customs Cooperation and Mutual Administrative Assistance;
- Annex 4 – Trade Facilitation, noting the Annex on Trade Facilitation is similar to the WTO-TFA;
- Annex 5 – Non-Tariff Barriers (NTBs);
- Annex 6 – Technical Barriers to Trade (TBTs);
- Annex 7 – Sanitary and Phytosanitary Measures (SPS); and
- Annex 8 – Transit.

Finally, all SADC countries are obliged to comply with and implement the provisions of the SADC Trade Protocol (1996) as amended in 2010, which is one of the most important legal instruments guiding trade in SADC. The SADC Trade Protocol is an agreement between SADC Member States to reduce customs duties and other barriers to trade on imported products amongst SADC Member States and encourages the following strategies as a way to foster trade throughout southern Africa:

- Gradual elimination of tariffs;
- Adoption of common RoO;
- Harmonization of customs rules and procedures;
- Attainment of internationally acceptable standards, quality, accreditation and metrology;
- Harmonization of SPS measures;
- Elimination of NTBs (i.e. any barrier to trade other than import and export duties); and
- Liberalisation of trade in services.

For SADC countries, as is the case for the rest of Africa, there is no shortage of guiding principles or rules and regulations regarding trade and transport facilitation. The real challenge for most countries is not determining what to do, but how to do it.

It is not intuitive, for example, on how to implement Articles 1 to 12 of the TFA, or Annexes 4, 5 and 6 of the AfCFTA Protocol on Trade in Goods. Afreximbank could play a very useful role in building a trade and transport facilitation platform or portal that is an easy-to-use, step-by-step implementation guide.

The portal would be a series of online, how-to tutorials that would take the user through the practical steps of how to implement Annexes 1 to 12 of the TFA (and also of Annex 4 of the AfCFTA Trade in Goods Protocol), Annex 5 of the AfCFTA on Non-Tariff Barriers, Annex 6 of the AfCFTA on Technical Barriers to Trade, Annex 7 of the AfCFTA on Sanitary and Phytosanitary Measures and Annex 8 of the AfCFTA on Transit.

The portal could also provide a model of a single window. Presently, each country in Africa is trying to develop its own national single window and is spending hundreds of thousands of US dollars in buying software from companies such as Crimson Logic, Web Fontaine, SGS and so forth. If Afreximbank could build a series of modules that could be 'bolted' together in configurations that would allow individual users to pick and choose from the modules and so construct their own single window system that meets their own requirements, this would not only be of considerable benefit to the implementation of the AfCFTA agreement but would also save member states a considerable amount of money.

Synergies with the EU-funded SADC Trade Facilitation Programme could be sought where they exist and, if these recommendations go forward, a dialogue

with the SADC Secretariat should be established to ensure no duplication of effort.

8.5.3.2. Transport and Transit Facilitation Interventions in the SADC Region

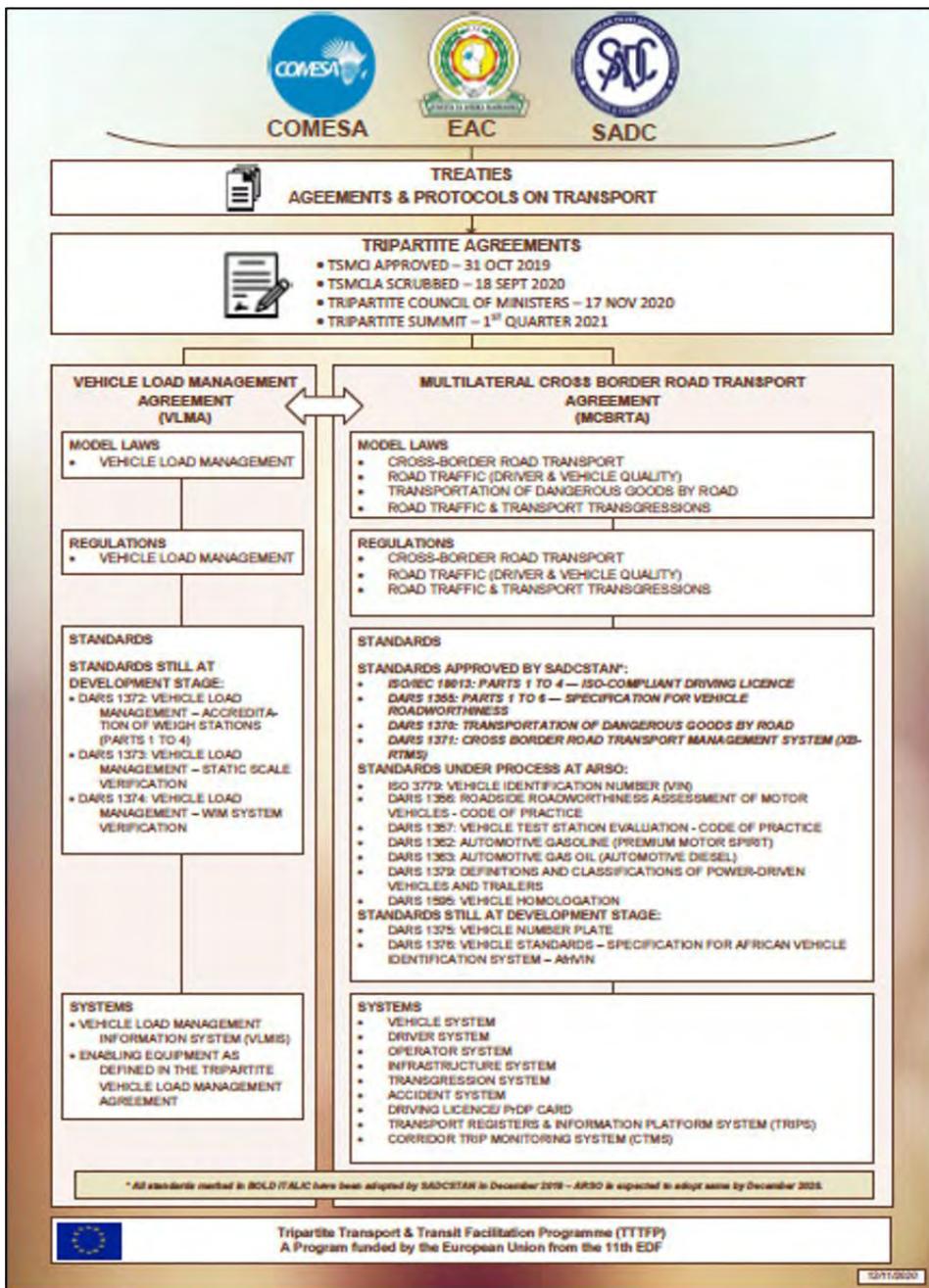
All SADC countries, some more diligently than others, are implementing the Tripartite Transport and Transit Facilitation Programme (TTTFP), which is an EU-financed programme managed on behalf of the COMESA-EAC-SADC Tripartite by the SADC Secretariat.

The TTTFP has two interventions, the Vehicle Load Management Agreement (VLMA) and the Multilateral Cross-Border Road Transport Agreement (MCBRTA). Under both the VLMA and the MCBRTA there are model laws, regulations, standards and systems that are to be rolled out in each country. Figure 78 contains a summary of the TTTFP implementation programme.

Possible regulatory issues stopping or slowing down implementation of transport and transit facilitation measures are, therefore, at least for the SADC region, being addressed through the TTTFP at all levels: legal, regulatory, standards and systems. If Afreximbank would like to assist SADC member states in addressing issues that stop or slow down implementation of transport and transit facilitation and to do this in support of existing initiatives rather than overlapping with or duplicating existing initiatives, then it is suggested that Afreximbank discuss with the TTTFP Project Director in the SADC Secretariat how it could assist with the implementation of the TTTFP.¹⁰⁶

¹⁰⁶ In follow-up discussions with the SADC Secretariat, the TTTFP has indicated that they stand ready to engage and have identified initiatives that will address regulatory issues: 1. Supporting rolling out of Corridor Trip Monitoring System (CTMS); 2. Supporting implementation of National Transport Information Systems in selected Member States; 3. Regional Customs Bond Guarantee Scheme; and 4. Investments in critical strategic weighbridges located on key nodes on the Regional Road Trunk Road Network as per the Tripartite Regional Weighbridge Location Plan, which is designed to protect the regional road infrastructure/investments.

Figure 78: Summary of the TTTFP



Source: Tripartite Transport and Transit Facilitation Programme (2020).



Chapter 9

Conclusions and Recommendations

Conclusions and Recommendations

The Phase 2 report has commenced with a ‘fatal-flaw’ analysis, which has been used to reduce the project long-list to a prioritised shortlist. The evaluation process was filtered through two layers: firstly, to filter each project through four dimensions to assess their readiness for financing and secondly, to assign a REVIEW/PUSH/GO result to proceed to the detailed risk assessment phase of the study. Ten project packages passed through the gate as either GO/PUSH projects, but after a review with Afreximbank Senior Management, this was whittled down to seven projects, which are reflected in Table 89.

Table 89: Afreximbank Primary Project Targets

1	Name: Beira Port Terminals Expansion (Container and General Freight)	Size: ~US\$290 million	Sponsor: Cornelder de Moçambique (CdM)
2	Project Name: Kasomeno-Mwenda Toll Road and Bridge	Project Size: ~US\$500 million	Project Sponsor: Duna-Aszfalt and GED Africa
3	Project Name: Solwezi-Chingola Railway	Project Size: Not Specified	Project Sponsor: North-West Rail (Zambia) Limited
4	Project Name: North-South Corridor ‘Block-Train’ Rail Service	Project Size: To Be Decided	Project Sponsor: NEPAD Business Foundation (NBF)
5	Project Name: Ressano-Garcia Railway (Phase 2)	Project Size: ~US\$150 million	Project Sponsor: Caminhos de Ferro de Moçambique (CFM)
6	Project Name: Mpulungu Lake Port Upgrade	Project Size: ~US\$60 million	Project Sponsor: Mpulungu Harbour Corporation Limited (MHCL)
7a	Name: Mutorara-Vila da Fronteira/Marka Railway (46 km)	Size: ~US\$40 million	Sponsor: Caminhos de Ferro de Moçambique (CFM)
7b	Name: Vila da Fronteira/Marka-Nsanje Railway (26 km) & Nsanje Inland Port	Size: ~US\$30 million	Sponsor: Malawi Railways Limited (MRL)

Source: Collated by authors



After the meeting held between the consultants and Afreximbank on 22 February 2021, the consultants were asked to re-evaluate the projects categorised as STOP and assess whether there are those that are impactful from a trade facilitation perspective that could be advanced with donor funding, blended finance, or otherwise. The projects that could be impactful from a trade facilitation perspective and whether they could be advanced with donor funding, blended finance or otherwise, were considered and clustered into five projects, with specific recommendations of immediate next steps, as follows:

2. Resuscitate the Dar es Salaam-Chalinze Expressway Project (see 8.5.2.1, page 275):

- Next Steps: Progress - Market study to restructure concession to structure PPP deal

6. Strengthen Regional Links on the Zambian Trunk Road Network (see 8.5.2.2, page 275):

- Targets: Solwezi-Chingola, Sesheke-Kazungula, Kaoma-Kasempa and Chanida-Katete

- Next Steps: Progress - Project definition to market study to pre-feasibility to bankable feasibility to structure PPP deal(s) – except Chanida-Katete, limited to project definition

7. Improve Operations on the TAZARA and Machipanda railway systems (see 8.5.2.3, page 277):

- Next Steps on TAZARA: Technical advice on restructuring options (to unbundle the railway)

- Next Steps on Machipanda: Market study (assess scope to recapture lost traffic from road)

8. Target improvements at border posts overlooked by donor programmes (see 8.5.2.3, page 278):

- Targets¹⁰⁷: Machipanda - Forbes; Katima Mulilo - Sesheke; Nyamapanda - Cuchamano; Groblersbrug - Martin's Drift and Kasumbalesa Border Posts.

- Gaps¹⁰⁸: Machipanda – Forbes, Katima Mulilo – Sesheke and Nyamapanda – Cuchamano Border Posts

- Next Steps: Engage in dialogue with SADC-TFP to align possible interventions with the overall regional programme and then follow-up with Mozambique, Namibia, Zambia and Zimbabwe on the three border posts where gaps in terms of support from existing donor programmes appear to exist.

9. Initiate dialogue on market study to assess future prospects for Pemba Port (see 8.5.2.5, page 280):

- Next Steps: Progress – Market study to pre-feasibility study

Finally, the consultant was asked to assess areas where Afreximbank could assist to address regulatory issues that were stopping or slowing down implementation of trade facilitation measures. In this regard, the bank could play a very useful role in building a trade and transport facilitation platform or portal that is an easy-to-use, step-by-step implementation guide. The portal would be a series of online, how-to tutorials that would take the user through the practical steps of

how to implement the various annexures of the African Continental Free Trade Area (AfCFTA) agreement. The portal could also provide a model for a single window whereby a series of modules that could be bolted together in configurations that would allow individual users to pick and choose from the modules and so construct their own single window system that meets their requirements. Synergies with the EU funded SADC Trade Facilitation Programme (TFP) could be sought where they exist and, if these recommendations go forward, a dialogue with the SADC Secretariat should be established to ensure no duplication of effort.

Regulatory issues stopping or slowing down implementation of transport and transit facilitation measures are, at least for the SADC region, being addressed through the Tripartite Transport and Trade Facilitation Programme at all levels – legal, regulatory, standards and systems. If Afreximbank would like to assist SADC member states in addressing issues that stop or slow down implementation of transport and transit facilitation and to do this in support of existing initiatives rather than overlapping with or duplicating existing initiatives, it is suggested that Afreximbank discuss with the TTTFP Project Director in the SADC Secretariat how Afreximbank could assist with the implementation of the TTTFP.

107 The SADC Trade Facilitation Programme (TFP) has identified five (5) port and border posts for which a Time-Release Study (TRS) will be conducted on the North-South Corridor are as follows: Durban Port, Mussina/Beitbridge, Chirundu, Kasumbalesa and Groblersbrug/Martin's Drift. However, the four (4) borders to be targeted for Coordinated Border Management (CBM) on the North-South Corridor have not yet been selected.

108 These gaps are border posts on high-volume regional trade corridors in the SADC region that are not covered by the SADC-TFP, which include the Machipanda – Forbes (Beira Corridor), Katima Mulilo – Sesheke (Walvis Bay Corridor) and Nyamapanda – Cuchamano (North-South Corridor) border posts.



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Annex

ANNEX 1. SCOPE AND FOCUS OF DIAGNOSTIC ANALYSIS

This appendix has been inserted to clarify why this report has focussed on high-volume trade rather than secondary corridors. Secondary corridors in this instance are routes that are not an origin or destination point on one of the six high-volume transnational corridors in the SADC region that service at least three countries, which are the focus of this report. To be clear, these six regional cross-border corridors, which are explained in detail in section 3.1 of the report, are as follows:

1. Dar es Salaam Corridor
2. Nacala Corridor
3. Beira Corridor
4. Maputo Corridor
5. North-South Corridor
6. Walvis Bay Corridor

The approach has been to link all trade flows to/from the SADC region with movement along high-volume primary regional transport corridors by integrating trade flow volume, transport transit time and cost and port throughput datasets to provide the basis for assessing demand for (mode/route) and supply of (capacity/condition) infrastructure. The requested focus on intra-Africa trade moving on lower-volume secondary and informal routes would have to rely on anecdotal evidence gleaned from interviews with key informants, as there is no reliable data available from secondary sources for secondary and informal routes.

Whilst the importance of trade flows on secondary and informal routes is noted, it is not possible to undertake such an analysis without conducting some primary research, which was not part of this study, but could be an interesting follow-up

assignment. To be able to provide some insight on secondary routes, data from the USAID-TMS was used to identify busy secondary routes, but this analysis did not identify a reason to deviate from a focus on the high-volume cross-border regional trade corridors in the SADC region.

The purpose of the assignment is to develop a pipeline of priority infrastructure projects by high-volume regional transport corridors in the SADC region. The process to drill down to this key output has to be highly focussed and needs to prioritize where the limited level of effort and associated budget has to be directed to develop the project pipeline. This drill down narrows the cone of uncertainty to focus on priority investment targets through the following steps, which are aligned to the various envisaged outputs:

1. Map existing and future trade flows by value and volume by the country level.
2. Assess competitiveness of regional transport corridors servicing transit markets.
3. Allocate trade volumes to regional corridors based on a port throughput analysis.
4. Identify secondary routes based on a review of truck movements across the region.
5. Identify major gaps in trade-carrying infrastructure on high-volume regional corridors.
6. Review, prioritise and propose infrastructure improvements on regional corridors; and
7. Distil a pipeline of priority projects by corridor to enhance regional trade performance.

The preferred approach is framed by answering the following questions:

1. Why distinguish between external (international) and internal (regional) trade flows?
2. Why focus on a review of both external (international) and internal (regional) trade?
3. Why focus on landlocked rather than maritime and island states in the SADC region?
4. Why focus on the volumes rather than the value of trade flows to and from the SADC region?
5. Why focus on primary regional corridors more than secondary routes and not informal ones?
6. Why focus on road transport rather than other modes, notably air, rail and pipelines (liquid fuel and gas)?

Each will briefly be discussed in turn.

1. Why does the report distinguish between external (international) and internal (regional) trade flows? External (international) trade flows are imports and exports that flow to/from the SADC region from outside the African continent, through a gateway port. Internal (regional) trade flows are in two forms. The first are imports and exports that flow to/from the SADC region from within the African continent but from another regional bloc (known as intra-Africa trade) and the second are imports and exports that flow to/from within the SADC region (known as intra-SADC trade).
2. Why does the report focus on a review of external (international) and internal (regional) trade? Whilst the terms of reference refer to intra-Africa trade, it is not possible to assess 'trade-carrying' infrastructure without considering all trade that flows in the SADC region. Infrastructure is

a 'shared service' so any proposed improvements in infrastructure networks will benefit all users. It is not possible to isolate infrastructure that serves just intra-Africa trade.

3. Why does the report focus on landlocked countries rather than maritime and island states? The study is focussed on cross-border trade that moves along high-volume regional transport corridors. Cross-border trade within the SADC region is dominated by trade to/from the landlocked hinterland because this trade includes both transit international and intra-regional trade. There is no transit trade to/from maritime or island states and cross-border trade between maritime and island-states is typically from port-to-port and then onto the national transport system for onward distribution. Hence, it is trade to and from landlocked countries (or regions in maritime states that use a gateway port in a neighbouring country) which is the focus of the study.
4. Why does the report focus on the volumes rather than the value of trade flows to and from the region? The movement of trade volumes generates the traffic that flows along regional transport corridors from points of origin to destination. These flows can be imports or exports destined to/from a regional or international market. This movement is in the form of maritime vessels entering and exiting gateway ports, trains on the regional railway network, trucks on the regional road network or fixed point-to-point pipelines that transport-specific commodities, notably liquid fuels and gas. These vessels, trains, trucks and pipelines all carry volumes of cargo and, as such, are the users

of trade-carrying infrastructure. This movement of trade volumes, therefore, generates the demand for infrastructure. Volumes rather than value of trade is what is prioritised because volumes impact on the capacity and condition of infrastructure, which directly informs the infrastructure gap analysis.

5. Why does the report focus on primary corridors more than secondary and not informal routes? Infrastructure investment in the SADC region have focussed on integrating national road and rail networks to create a lattice of regional transport corridors, which carry most of the trade within the region. Regional transport corridors are typically defined as transport routes from a maritime port (after which it is typically named) that serves at least three hinterland landlocked countries (or adjacent regions in a neighbouring maritime state). The two points of integration of national networks are at maritime ports, which are points of entry and exit into and out of a country from the sea and border ports, which are points of entry and exit into and out of a country by land. The point that trade flows to/from landlocked countries (or regions in maritime states that use a gateway port in a neighbouring country) dominate cross-border trade has been made above. This trade travels overland using the different infrastructure components (ports, roads, railways, pipelines and border posts) of a regional transport corridor. There are five primary regional transport corridors within the SADC region, namely (from north-east to south-west): Dar es Salaam, Nacala, Beira, Maputo, North-South (Durban) and Walvis Bay. The infrastructure backbone of these five regional

corridors carry the bulk of trade within the SADC region. The focus of the assignment is therefore, directed, at developing a pipeline of prioritised projects designed to enhance the competitiveness of these corridors to promote trade within the SADC region. As this is a desk-based study, it is not possible to rely on anecdotal evidence from key informant interviews to support the case for secondary routes and an assessment of informal routes requires primary research in the field, which is not allowed for in the limited study budget.

6. Why does the report focus on road transport rather than other modes (air, rail and pipelines)? The vast majority of the cross-border trade that is carried on regional infrastructure networks throughout the SADC region is by road, so given our limited resources, this is our focus. Whilst rail is an important mode for some corridors, notably the Maputo Corridor, its share remains marginal on other regional transport corridors. There are some key pipeline investments, but they have been purpose-built to carry specific commodities, notably crude oil, refined petroleum products and natural gas and they are limited to the TAZAMA Crude Oil Pipeline (Dar es Salaam Corridor), FERUKA Refined Petroleum Products Pipeline (Beira Corridor) and the SASOL Natural Gas Pipeline (Maputo Corridor). Since, cross-border cargo carried on railway or by pipeline bypasses checks at borders, road transporters are typically held up often for long periods at busy borders, which are widely acknowledged to represent the most significant bottlenecks to cross-border trade.

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Annex 2: Full Secondary Route Ranking

Rank	Corridor	Route	Route #	Via	Total # of Trucks [a]	Route % of Traffic	Secondary # Trucks	Transit Time (Hrs)	Direction
1	North-South	Lubumbashi - Ndola	2	Mokambo	3,404	24%	817	17	Regional
2	North-South	Lubumbashi - Kitwe	2	Mokambo	3,278	19%	623	17	Regional
3	Trans-Kalahari	Gaborone - Gauteng	2	Martin's Drift/Groblersbrug	2,469	25%	617	71	Regional
4	North-South	Lubumbashi - Lusaka	2	Mokambo	2,488	19%	473	26	Regional
5	Trans-Kalahari	Gaborone - Gauteng	3	Pioneer Gate/Skilpadshek	2,469	19%	469	15	Regional
6	Trans-Kalahari	Gauteng - Francistown	2	Martin's Drift/Groblersbrug	1,072	42%	450	41	Regional
7	North-South	Lubumbashi - Harare	2	Mokambo - Chirundu	1,201	31%	372	53	Regional
8	North-South	Kolwezi - Ndola	2	Mokambo	1,282	25%	321	24	Regional
9	North-South	Gauteng - Lusaka	2	Martin's Drift/Groblersbrug - Kazungula - Victoria Falls/Livingstone	1,522	21%	320	120	Regional
10	North-South	Lubumbashi - Gauteng	2	Mokambo - Chirundu - Beitbridge	1,211	25%	303	100	Regional
11	North-South	Kolwezi - Kitwe	2	Mokambo	1,263	21%	265	23	Regional
12	North-South	Lusaka - Gauteng	2	Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	1,628	16%	260	108	Regional
13	North-South	Kolwezi - Lusaka	2	Mokambo	1,174	22%	258	40	Regional
14	North-South	Durban - Lusaka	2	Martin's Drift/Groblersbrug - Kazungula - Victoria Falls/Livingstone	858	28%	240	185	Import
15	North-South	Ndola - Gauteng	2	Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	1,347	17%	229	134	Regional
16	North-South	Kolwezi - Harare	2	Mokambo - Chirundu	526	40%	210	64	Regional
17	North-South	Kitwe - Gauteng	2	Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	1,287	16%	206	140	Regional
18	North-South	Kolwezi - Gauteng	2	Mokambo - Chirundu - Beitbridge	460	43%	198	116	Regional
19	North-South	Lusaka - Durban	2	Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	950	20%	190	169	Export
20	North-South	Ndola - Durban	2	Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	815	23%	187	185	Export
21	North-South	Kitwe - Durban	2	Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	767	23%	176	197	Export
22	North-South	Lubumbashi - Gauteng	3	Kasumbalesa - Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	1,211	14%	170	218	Regional
23	North-South	Lubumbashi - Durban	2	Kasumbalesa - Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	728	22%	160	275	Export

24	North-South	Gauteng - Lubumbashi	2	Martin's Drift/Groblersbrug - Francistown - Kazungula - Victoria Falls/Livingstone-Kasumbalesa	1,140	14%	160	251	Regional
25	North-South	Gauteng - Ndola	2	Martin's Drift/Groblersbrug - Kazungula, Victoria Falls/Livingstone	1,252	12%	150	153	Regional
26	Dar es Salaam	Lubumbashi - Dar es Salaam	2	Kasumbalesa - Nakonde/Tunduma	397	35%	139	426	Export
27	North-South	Durban - Lubumbashi	2	Martin's Drift/Groblersbrug - Kazungula Victoria Falls/Livingstone - Kasumbalesa	659	21%	138	321	Import
28	Trans-Orange	Windhoek - Gauteng	2	Nakop/Ariamsvlei	487	25%	122	32	Regional
29	Trans-Kalahari	Gauteng - Windhoek	2	Nakop/Ariamsvlei	474	23%	109	32	Regional
30	North-South	Lubumbashi - Durban	3	Mokambo - Chirundu - Beitbridge	728	12%	87	236	Export
31	North-South	Gaborone - Durban	2	Pioneer Gate/Skilpadshek	245	33%	81	68	Export
32	North-South	Durban - Francistown	2	Pioneer Gate/Skilpadshek	295	21%	62	67	Import
33	North-South	Gauteng - Harare	2	Martin's Drift/Groblersbrug - Kazungula - Victoria Falls/Livingstone - Chirundu	1,898	3%	57	158	Regional
34	Beira	Lubumbashi - Beira	2	Mokambo - Chirundu-Forbes/Machipanda	119	42%	50	119	Export
35	Trans-Kalahari	Gaborone - Gauteng	4	Francistown - Kazungula - Francistown - Martin's Drift/Groblersbrug	2,469	2%	49	67	Regional
36	Trans-Kalahari	Gaborone - Gauteng	5	Ramatlabama	2,469	2%	49	22	Regional
37	Trans-Orange	Windhoek - Gauteng	3	Violsdrif/Noordoewer	487	9%	44	103	Regional
38	Mbabane-Durban	Gauteng - Greater Manzini	2	Lavumisa	701	6%	42	55	Regional
39	Cape-to-Cairo	Gaborone - Cape Town	2	Tlokweng/Kopfontein - Pioneer Gate/Skilpadshek	145	29%	42	63	Export
40	Trans-Orange	Windhoek - Cape Town	2	Nakop/Ariamsvlei	209	20%	42	67	Export
41	North-South	Kolwezi - Durban	2	Mokambo - Chirundu - Beitbridge	179	23%	41	235	Export
42	North-South	Gauteng - Lusaka	3	Pioneer Gate/Skilpadshek - Kazungula - Victoria Falls/Livingstone	1,522	2%	30	114	Regional
43	Dar es Salaam	Kolwezi - Dar es Salaam	2	Kasumbalesa - Nakonde/Tunduma	89	34%	30	427	Export
44	Mbabane-Durban	Mbabane - Durban	2	Oshoek/Ngwenya	252	12%	30	52	Export
45	Mbabane-Durban	Durban - Greater Manzini	2	Oshoek/Ngwenya	596	5%	30	27	Import
46	Mbabane-Durban	Mbabane - Gauteng	2	Greater Manzini - Lavumisa	712	4%	28	60	Regional
47	Mbabane-Durban	Gauteng - Mbabane	2	Manzini - Mahamba	709	4%	28	21	Regional
48	Mbabane-Durban	Gauteng - Greater Manzini	3	Mbabane - Mahamba	701	4%	28	8	Regional
49	North-South	Gaborone - Durban	3	Martin's Drift/Groblersbrug	245	11%	27	106	Export
50	Beira	Lusaka - Beira	2	Chimefusa/Cassacatiza - Beira	874	3%	26	57	Export

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51	Trans-Kalahari	Gaborone - Windhoek	2	Mamuno	50	50%	25	29	Regional
52	Mbabane-Durban	Durban - Mbabane	2	Oshoek/Ngwenya	246	10%	25	27	Import
53	North-South	Lubumbashi - Gauteng	4	Mokambo - Victoria Falls/Livingstone - Kazungula - Martin's Drift/Groblersbrug	1,211	2%	24	124	Regional
54	North-South	Durban - Maputo	2	Lavumisa	121	18%	22	20	Import
55	North-South	Gauteng - Harare	3	Lebombo/Ressano Garcia - Maputo - Lebombo/Ressano Garcia - Beitbridge	1,898	1%	19	147	Regional
56	Maputo	Maputo - Gaborone	2	Lebombo/Ressano Garcia - Martin's Drift/Groblersbrug	70	27%	19	118	Import
57	Cape-to-Cairo	Gaborone - Cape Town	3	Pioneer Gate/Skilpadshek	145	13%	19	62	Export
58	Beira	Ndola - Beira	2	Chimefusa/Cassacatiza - Beira	358	5%	18	90	Export
59	Mbabane-Durban	Durban - Greater Manzini	3	Mahamba	596	3%	18	29	Import
60	Beira	Kitwe - Beira	2	Chimefusa/Cassacatiza	342	5%	17	101	Export
61	North-South	Durban-Harare	2	Martin's Drift/Groblersbrug - Kazungula - Livingstone - Victoria Falls/Livingstone - Lusaka - Chirundu	820	2%	16	199	Import
62	North-South	Gauteng - Lusaka	4	Lebombo/Ressano Garcia - Maputo - Lebombo/Ressano Garcia - Beitbridge - Chirundu	1,522	1%	15	427	Regional
63	Trans-Orange	Windhoek - Gauteng	4	Mamuno - Ramatlabama	487	3%	15	28	Regional
64	Trans-Kalahari	Gauteng - Windhoek	3	Ramatlabama - Mamuno	474	3%	14	33	Regional
65	Trans-Kalahari	Gauteng - Windhoek	4	Pioneer Gate/Skilpadshek-Kazungula	474	3%	14	75	Regional
66	North-South	Gauteng - Ndola	3	Beitbridge - Victoria Falls/Livingstone - Kazungula	1,252	1%	13	175	Regional
67	Mbabane - Durban	Mbabane - Durban	3	Manzini - Mahamba	252	4%	10	64	Export
68	North-South	Harare - Lilongwe	2	Nyamapanda/Cuchamano - Zobue/Mwanza	61	16%	10	77	Regional
69	Trans-Orange	Windhoek - Gauteng	5	Mamuno - Kazungula-Victoria Falls/Livingstone-Kazungula - Martin's Drift/Groblersbrug	487	2%	10	238	Regional
70	Beira	Beira - Lusaka	2	Tete, Cassacatiza/Chimefusa	908	1%	9	68	Import
71	North-South	Durban - Lusaka	3	Beitbridge - Victoria Falls/Livingstone - Kazungula	858	1%	9	200	Import
72	North-South	Durban - Lusaka	4	Pioneer Gate/Skilpadshek-Kazungula - Victoria Falls/Livingstone - Kazungula	858	1%	9	159	Import
73	Trans-Orange	Windhoek - Cape Town	3	Mamuno - Pioneer Gate/Skilpadshek	209	4%	8	104	Export
74	North-South	Durban - Harare	3	Pioneer Gate/Skilpadshek - Kazungula - Victoria Falls/Livingstone - Kazungula - Chirundu	820	1%	8	194	Import
75	Mbabane-Durban	Durban - Mbabane	3	Mahamba	246	3%	7	53	Import

76	North-South	Gaborone - Durban	4	Ramatlabama	245	3%	7	156	Export
77	Mbabane-Durban	Mbabane - Gauteng	3	Greater Manzini - Mahamba	712	1%	7	11	Regional
78	Maputo	Maputo - Cape Town	2	Naamacha/Lomahasha/ Lavumisa	34	18%	6	44	Import
79	Mbabane-Durban	Durban - Greater Manzini	4	Lebombo/Ressano Garcia - Maputo	596	1%	6	67	Import
80	North-South	Blantyre - Gauteng	2	Dedza/Calomue - Nyamapanda/Cuchamano - Beitbridge	73	7%	5	79	Regional
81	Beira	Tete - Lusaka	2	Cassacatiza/Chimefusa	16	31%	5	44	Regional
82	Trans- Caprivi	Lusaka - Walvis Bay	2	Sesheke/Katima Mulilo	53	9%	5	69	Export
83	North-South	Blantyre - Harare	2	Dedza/Calomue - Nyamapanda/Cuchamano	78	6%	5	40	Regional
84	North-South	Lilongwe - Masvingo	2	Dedza/Calomue - Forbes/ Machipanda	78	5%	4	54	Regional
85	North-South	Bulawayo - Kolwezi	2	Victoria Falls/Livingstone - Kasumbalesa	66	5%	3	315	Regional
86	Beira	Kolwezi - Beira	2	Mokambo - Chirundu- Forbes/Machipanda	25	11%	3	140	Export
87	North-South	Bulawayo - Lubumbashi	2	Victoria Falls/Livingstone - Kasumbalesa	134	2%	3	292	Regional
88	North-South	Blantyre - Gauteng	3	Dedza/Calomue - Forbes/ Machipanda - Beitbridge	73	3%	2	106	Regional
89	North-South	Blantyre - Durban	2	Dedza/Calomue - Nyamapanda/Cuchamano - Beitbridge	23	9%	2	211	Export
90	Dar es Salaam	Lusaka - Dar es Salaam	2	Mwami/Mchinji - Kasumulu/ Songwe	41	5%	2	217	Export
91	North-South	Durban - Lilongwe	2	Beitbridge - Nyamapanda/ Cuchamano - Dedza/ Calomue	5	40%	2	207	Import
92	Dar es Salaam	Dar es Salaam - Lusaka	2	Kasumulu/Songwe/Mwami/ Mchinji	39	5%	2	220	Import

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