Netherlands-South Africa Smart Logistics Synergy

A Market Study of South Africa, Unveiling Opportunities and Partnerships

ABBEL

Netherlands-South Africa Smart Logistics Synergy

A Market Study of South Africa, Unveiling Opportunities and Partnerships

Authors:
Carolien van der Horst
Laurens Cloete
Lucia Schlemmer
Rhulani Madala

Commissioned by:
The Embassy of the Kingdom of the Netherlands in South Africa

Place, date:
Johannesburg, 29 July 2024

Status:
Final Document

RebelGroup Advisory Southern Africa (Pty) Ltd.
3rd Floor, Suite 21
Building 2, Glenhove and Oxford Precinct
114 Oxford Road
Houghton Estate, 2198, Johannesburg
South Africa
+27 10 591 9018 / 1232
adminsa@rebelgroup.com

www.rebelgroup.com

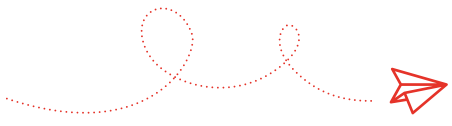


Table of contents

1. Executive Summary

This report presents an analysis of the smart logistics landscape in South Africa, focusing on key sectors such as agri-logistics supply chains and multimodal transport corridors. It outlines the current state of these sectors, identifies potential opportunities for technological advancement and infrastructure development, maps major stakeholders, assesses the capabilities of Dutch companies and expertise, and provides recommendations for collaboration and growth strategies.

This report provides insights for Dutch companies and government agencies seeking to capitalise on opportunities in South Africa's smart logistics landscape, fostering collaboration, innovation, and sustainable growth in key sectors. Each chapter provides an analysis and insights into the respective topics, supported by data, stakeholder engagements, and semi-structured interviews. The market study aims to provide valuable information for Dutch companies and public sector institutes interested in exploring business opportunities in the South African smart logistics market.

2. Introduction

2.1 Background to the study

The Netherlands Embassy and Consulate General in SA (the Mission network) and the Business Development coach of RVO are committed to promoting mutually beneficial trade and investment between South Africa and the Netherlands. One of the key focus areas in this regard is Smart Logistics.

In 2020 RVO commissioned a logistics market study in South Africa and organized a digital trade mission on smart logistics to South Africa in 2021. In addition, RVO commissioned an agri-logistic study in 2022 which investigated the domestic and international ambitions of Dutch agri-logistics companies. This study follows the 2021 study and aims to build upon the results of previous studies and focus on the following key sectors: agrifood (supply chains) and multimodal transport corridors in urban settings.

2.2 Smart Logistics in South Africa [1] [2]

South Africa has the most developed transport and logistics sector in Sub-Saharan Africa, which puts it on par with some of the industrialized countries. The country is also considered the top-performing country in Africa when it comes to trade-enhancing logistics, ranks among the best in transportation infrastructure, and serves the second-largest economy in Africa. The South African logistics sector experienced its strongest recorded growth in quarter 4 of 2020. The logistics sector makes up about 20% of SA's GDP and is estimated at $26 billion.

The local logistics market is driven by intracontinental trade growth, changes in consumption patterns, and e-commerce growth. Major market players in South Africa include several multinationals such as DHL, Imperial Logistics, DSV, DB Schenker, and ID Logistics.

The main market opportunities for technology include introducing and adopting innovations such as drones, blockchain, IoT, AI, and robotics. Additionally, there is significant potential in the proliferation of technology aimed at addressing the challenges of limited resources. As far as Dutch SMEs are concerned,

[1] https://virtual-tech-mission-south-africa.b2match.io/page-651

[2] https://www.linkedin.com/pulse/open-call-agrofood-market-study-kingdoms-of-the-netherlands-in-sou-gynwf/

there are opportunities for companies active in the transport sector. In South Africa, SMEs generated 21% of the industry's revenue (Q1-2019) and have continued to grow.

Smart logistics refers to the use of advanced technologies and data-driven solutions to optimize the movement and management of goods and resources in supply chains. It involves the integration of the Internet of Things (IoT), AI, machine learning, and real-time data analytics to enhance efficiency, reduce costs, and minimize environmental impact. Smart logistics enables various processes such as real-time tracking of shipments, predictive maintenance of vehicles and equipment, route optimization, and inventory management, ensuring timely deliveries and reduced wastage. By harnessing digital tools and automation, companies can streamline their operations, improve customer satisfaction, and make data-informed decisions, ultimately revolutionizing the way goods are transported and distributed.

The Impact of COVID on the Logistics Sector [3] [4]

The COVID-19 pandemic significantly impacted South Africa's logistics sector, causing disruptions across the entire supply chain. Here's a breakdown of the key effects:

- **Disruptions in International Trade:** Global lockdowns and travel restrictions hampered international trade, leading to a decrease in import and export volumes.
- **Port Congestion:** Strict border controls and reduced manpower caused delays at ports, leading to cargo backlogs and increased shipping costs.
- **Domestic Transport Restrictions:** Lockdowns and movement restrictions within South Africa disrupted domestic freight movement, impacting businesses and consumers.
- **Shifting Consumer Behaviour:** The pandemic led to a surge in e-commerce, placing pressure on last-mile delivery infrastructure.
- **Labour Shortages:** Strict quarantine measures and illness-related workforce reductions led to labour shortages within the logistics sector, further hindering operations.

Despite these challenges, the pandemic also triggered some positive transformations:

- **Increased Focus on Efficiency:** Companies began exploring innovative solutions like automation and data analytics to streamline operations and improve resilience.
- **E-commerce Growth:** The rise of e-commerce has spurred investment in last-mile delivery infrastructure and technology.
- **Digitalization:** The pandemic accelerated the adoption of digital technologies across the logistics sector, fostering improved communication and planning.

[3] https://seamaster.co.za/south-africas-logistics/

[4] Luke, Rose, 'The impact of COVID-2019 on transport in South Africa', 2020.

National Logistics Crisis Committee [5] [6] [7] [8]

Taking a significant step towards addressing South Africa's critical logistics issues, the government established the **National Logistics Crisis Committee (NLCC)** in June 2023, following President Ramaphosa's commitment, in his State of the Nation Address, to 'improve the efficiency of South Africa's logistics infrastructure'. This committee, comprised of government officials and senior business leaders, signifies the government's commitment to tackling this national challenge.

To tackle the ongoing rail, port, and road issues that threaten South Africa's economic growth and job market, the NLCC will implement a dual strategy. This approach combines immediate interventions to address pressing needs with a long-term reform agenda. The reform agenda will include measures like opening rail and port networks to private operators, aiming for a more sustainable and efficient logistics system in the future.

Work is underway to improve the operational performance of the bulk freight rail network and port system through the National Logistics Crisis Committee (NLCC). Corridor recovery teams have been established for five strategic rail corridors, comprising Transnet executives, industry representatives and independent experts. They are working to urgently increase the volume of freight traffic on our rail lines.

2.3 Scope of Market Study

Building on an initial analysis of South Africa's logistics sector, this market scan examines key trends and drivers of change within the logistics sector. The focus will be on the implementation of new technologies across the various market sectors of the South African economy with a particular focus on innovative digital solutions in agri-logistics and multi-modal transport corridors. The thematic areas of interest include:

- Location and visibility
- Management information, planning, and decision-making
- Efficiency improvements
- Warehouse management
- Automated transport
- Environmental impact
- Workforce training and development

The scope of this market study, are two separate sub-sectors in the logistical landscape, there may be overlap, however these are different areas that deserve separate analysis:

- **Multi-Modal Corridors**: identify opportunities for collaboration to reduce the reliance on road freight and optimize linkages with rail, ports, and air transportation, zooming in on the transportation of goods.

[5] https://saaff.org.za/national-logistics-crisis-committee/

[6] https://www.tralac.org/blog/article/16238-first-steps-taken-to-address-sa-s-logistics-crisis.html

[7] https://www.engineeringnews.co.za/article/national-logistics-crisis-committee-to-tackle-transport-emergencies-in-parallel-to-reform-agenda-2023-06-13

[8] https://www.stateofthenation.gov.za/newsletter/we-are-forging-practical-partnerships-for-growth-and-jobs

- **Agri-logistics**: smart solutions that can be applied along the value chain, from harvesting and processing, packaging and storage, transportation, distribution and marketing, quality control, through to traceability. In analyzing the supply chain, the study will particularly focus on perishables.

Smart Logistics addresses challenges and opportunities associated with transport systems and operations, infrastructure, transport operations, and logistics management in support of industrial and sustainable development in South Africa.

2.4 Methodology

The study objectives were addressed through desktop research and semi-structured interviews with key stakeholders, following and informed by the previous research.

2.4.1 Desktop Research & Literature Review

The desktop research provided insights into the state of development in the South African logistical landscape, as well as addressed opportunities, challenges, and current initiatives that drive the development of the sector, as well as Dutch expertise and technological capabilities.

2.4.2 Semi-structured Interviews

In the South African sector, interviews were conducted at the level of industry bodies and in some cases with individual firms, to obtain the best possible overview within the limited scope of the study. Forty-six (46) South African stakeholders were interviewed, engaging 70+ participants.

Regarding participants from the Dutch logistics sector, we engaged industry bodies, conducted desktop research, and made use of the referrals we received, leading us to more engagements. These players included stakeholders that have experience in setting up a business in the South African economy or collaboration and partnerships with South African companies.

Four interviews were conducted with Dutch stakeholders, including Flying Swans, Gordian Logistics, Port of Rotterdam, and the University of Twente. We aimed for a higher number of interactions with Dutch industry bodies or associations and Dutch businesses, however, it has proven difficult to find companies or industry bodies interested in partaking in the study, reasons offered were amongst others:

- Lack of available resources
- No particular know-how on the topic of smart logistics
- Limited benefit to the organization in question.

The following types of organizations participated in the study, see the below overview with the Dutch entities highlighted in red.

Types of organisations	Examples
Government Entities (including SOCs & IDZs)	Airports Company South Africa (ACSA) COEGA Development Corporation (Coega) Department of Trade, Industry and Competition (DTIC) InvestSA East London Industrial Development Zone (ELIDZ) Gauteng Growth and Development Agency (GGDA) Transnet Rail Trade & Investment KwaZulu-Natal (TIKZN) Transnet National Ports Authority (TNP) Western Cape Department of Economic Development and Tourism (WC DEDAT) Western Cape Tourism, Trade and Investment Promotion Agency (Wesgro)
Research Organisations	Agricultural Research Council (ARC) Bureau for Food and Agricultural Policy (BFAP) Council for Scientific and Industrial Research (CSIR) Stellenbosch University Aerotropolis Institute Africa (AIA) **University of Twente**
Industry Associations / Bodies	AgriCulture South Africa (AgriSA) Fresh Produce Exporters Forum (FPEF) FruitSA Hortgro SA Wine South African Table Grape Industry (SATGI) Southern African Association of Freight Forwarders NPC (SAAFF) Transport Forum
Individual businesses (South African as well as Dutch)	AFGRI CapeSpan Cato Ridge Logistics Hub Consortium CDScape **Flying Swans** Fresh Mark Systems GoGlobal Group **Gordian Logistics Experts** JC Auditors Klaus Engineering Group LiebenLogistics **Pargo** **Port of Rotterdam** RailRunners Riverside Orchards Group RocketDNA Rural Development Alliance Group Tambo Springs Teraka United Exports

Table 1. Stakeholders engaged in the study (Dutch Stakeholders in red)

3. Insights into opportunities for Smart Applications in the South African Logistics market

The levels of technology adoption by South African logistics players vary along the supply chain. In some cases, the newest available technology is utilized and adapted to transport goods efficiently. However, in other cases, there exists awareness regarding the availability of new technology, however, funds are lacking to implement the latest technology. In other environments, there is a lack of knowledge and awareness around continuous technological development, and hence no new technologies are interrogated, applied, and implemented indicating low absorptive capacity. This study will provide examples of these various levels of development in the logistics sector.

3.1 Multi-modal Corridors [9] [10] [11]

Definition of Multi-Modal transport, by UNCTAD (MT Convention 1980):

> "International multimodal transport' means the carriage of goods by at least two different modes of transport based on a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country"

Multimodal Transport includes international transport, at least one mode of transportation, one operator, and a single transport document and contract of carriage.

Cape Town and Durban are traditional hubs of multi-modal corridors for Southern Africa. Previous studies conducted provide insight into the challenges the multi-modal corridors are facing in the South African market; however, the following overview provides insights into the challenges faced in road freight, the state of the ports, linkages with air freight as mentioned by the various stakeholders in the logistical supply chain (including individual business, industry associations, State Owned Companies such as Transnet and government entities).

The indicated overreliance on road freight as per the first row in the below table, is addressed by the 2024 newly added portfolio of Road-to-Rail development that has been identified in the JET Implementation Plan, with allocated government financing support and could provide a way for the Netherlands to act on its $1 billion JETP commitment.

In 2019, rail was expected to deliver 47 billion tonne-km of the total general freight market but managed only 18 billion tonne-km, resulting in a shortfall of nearly 30 billion tonne-km. This reliable target for general freight is projected to grow to 77 billion tonne-km by 2050. Achieving success in the modal shift will require the general freight railway to more than quadruple its current capacity.

The below overview links the challenges to potential interventions and areas of development that can be realized by corresponding smart applications or solutions.

[9] https://www.unescap.org/sites/default/d8files/event-documents/03MultimodalTransportationConceptAndFramework.pdf

[10] https://www.stateofthenation.gov.za/assets/downloads/JET%20Implementation%20Plan%202023-2027.pdf

[11] https://www.bloomberg.com/news/articles/2023-10-19/s-africa-says-netherlands-denmark-join-climate-finance-pact?embedded-checkout=true

Mode of transport	Challenges / State of Affairs	Proposed interventions	Smart Applications	Development Trends
Road freight	Over-reliance on road freight, as the preferred mode of transporting freight.	Transparency and safe movement of goods from origin to destination.	Real-Time Traffic Monitoring and Analysis Fleet Management Systems Vehicle-to-Everything (V2X) Communication Geofencing Load Optimization Software Autonomous Route Planning Driver Assistance Systems Sustainability and Environmental Impact Tools Customer-Facing Applications Mobile Apps for Drivers Data Integration Platforms	Limited applications and data are often not shared with other stakeholders (due to lack of trust and or sensitive trade data).
	High transportation cost due to wasteful and fruitless expenses through unscheduled stoppages by transporter.	Route optimisation / maximising return leg through complementary goods.	Vehicle tracking units	Although route optimization is gaining traction, actively incorporating complementary goods for maximizing return legs seems less common at present.
	Degradation of road infrastructure specifically in certain regions (Eastern Cape).	Maintenance management systems	Computerized Maintenance Management Systems (CMMS)	South African National Roads Agency: SANRAL uses a road asset management system to prioritize maintenance needs for national roads. Each province in South Africa has its own Department of Transport responsible for maintaining provincial roads. Municipalities are responsible for maintaining local roads within their jurisdictions.

	Safety of the drivers - long routes	Automated driving: reduced accidents.	Advanced Driver Assistance Systems (ADAS)	Not currently applied in South Africa. The government is planning to introduce regulations for autonomous vehicles.
Rail freight	Declining state of infrastructure (lack of maintenance, theft, vandalism).	Update security to address theft and vandalism. Real-time applications to assist internal security measures with external response units.	Drone applications Interface applications between clients, private security companies, and the police.	Overall, drone applications in South Africa are evolving, with potential for interface applications in the security sector. As regulations become more established and protocols are developed for collaboration, we can expect to see these applications become more widely used.
	No subsidies to support Rail freight. Inefficient service offering for rail-friendly cargo owners.	Policy changes - loads of changes underway with Transnet. Introduction of private train operating companies to operate on the state-owned network as competition to Transnet Freight Rail. The government has set aside capital to support Transnet's turnaround strategy. This will flow to Transnet as a form of subsidy.	Big data & Analytics to assist with gaining insight into market dynamics (BI tools).	Overall, big data might not be currently used to address inefficiencies in rail cargo services, but the introduction of BI tools and focus on market dynamics suggests a potential shift towards data-driven decision-making. Implementing big data effectively can help Transnet improve service delivery, meet customer needs more effectively, and become a more competitive player in the South African rail freight market.

	Lack of readiness for perishables Poor operational design and systems.	Mindset change is required in Transnet to respond to opportunities for Rail transport. Long-term opportunity - Private sector to participate in delivering solutions.	Big data & Analytics to assist with gaining insight into market dynamics (BI tools), and digital twins.	See above.
	Poor operational design and systems to accommodate perishables and non-bulk commodities.	New business models in development with the private sector.	Business Intelligence tools	See above.
Ocean freight (ports)	Port planning (maintenance, etc) manual and inefficient port planning and operating techniques.	Smart Systems, and consultancy on the implementation of systems. Optimise management regime.	Smart Planning Systems	Currently applied, however, the implementation is not at an optimal point.
	Poor interface between the value chain - port terminal operator, ship liners, customs, cargo handlers etc.	Lesser waiting times for containers. Increased efficiencies. Increased volumes moved/shipped.	Better implementation of the Port Management Systems. Access to the internet in the whole port vicinity.	Currently applied, however, the implementation is not at an optimal point.
	Inclement weather conditions impacting on operations.	Predictive planning	Predictive analytics Real-time data on cargo movement Smart yard planning software Electronic Data Interchange	While there's no full-fledged predictive planning using advanced analytics, TPT employs some level of forecasting based on historical data.
Air freight	Security access to the cargo precinct	Improved efficiency and maintained security.	Biometric access control	Better efficiencies are required, to reduce waiting times.
	Cargo scanners	Reduced cost	AI-powered cargo screening	Currently applied, however, experiences issues at times.
	IVS system	Enhanced data visibility	Digital V3 system	Currently applied, however, experiences issues at times.
	Not all LSPs are well-integrated into the air cargo space.	Education & Training, Stakeholder Management	Communication Systems	Better integration is required.

	Imports are typically 60% of the total cargo – therefore, significant room exists for an increase in return (outbound) cargo for SA exports to exploit.	Collaboration between industry and airport to develop demand.	BI tools, Blockchain tech	Not currently applied in South Africa. Enhanced collaboration between different stakeholders is required.
	OR TAMBO is relatively efficient, moving 80% of the country's air cargo.	Opportunities to further develop smaller airports (including i.e. optimisation of CT airport).	AI and machine learning. GIS, IoT	Overall, AI, ML, GIS, and IoT offer significant potential for optimizing both O.R. Tambo and smaller airports in South Africa. By investing in these technologies, sharing data effectively, and developing a skilled workforce, South Africa can improve its air cargo infrastructure and enhance its position as a global trade hub.

Table 2. - Potential Smart Interventions per mode of transport, responding to challenges in the sector

3.1.1 Market dynamics and trends influencing sector growth

Rail and Ports [12] [13]

Smart applications make sense in a saturated market. The multi-modal connection in the South African environment still requires more basic interventions, such as general maintenance, and infrastructure development, and general internet connectivity. Transnet, the national rail operator, currently prioritizes bulk mining commodities like coal (currently 60-70 million tons per annum) over agricultural goods.

The mindset at Transnet is geared towards consistent, predictable transport of for example mining commodities, not the seasonal variations or smaller consignments from different sources. Farmers need reliable delivery times and temperature-controlled options (reefer wagons) to ensure product quality. Although these options are available through Transnet, their efficiency is questionable due to the logistical challenge of moving empty wagons to loading points. Furthermore, the lack of visibility and planning capabilities within Transnet makes it difficult for farmers to integrate rail into their supply chains effectively.

Secondly, while Transnet Engineering has the expertise to produce cutting-edge wagons for various agricultural products, the current fleet suffers from limitations. Notably, there's a lack of specialized wagons designed for grain, cattle, and cold chain needs. Countries like Australia have successfully adapted containers for agricultural purposes, demonstrating innovative solutions. To unlock the full

[12] https://www.transnetfreightrail-tfr.net/Business/Pages/3rdPartySlotsOverview.aspx

[13] https://www.freightnews.co.za/article/rail-network-reform-gathers-traction

potential of rail freight for agriculture, South Africa can leverage its manufacturing capabilities by prioritizing an increase in the overall fleet size and modernization of existing wagons. This strategic investment would improve both the volume of goods transported and the overall operational efficiency of the rail network.

The potential benefits of a robust agricultural rail network are undeniable. It could reduce reliance on road freight, a major contributor to carbon emissions, a growing concern for EU consumers. Additionally, a reliable rail system would streamline logistics, potentially lowering costs for both producers and consumers.

Third-party access, allowing private operators to utilize the rail network, could be a game-changer. Partnering with the road freight industry or granting operational control to private companies with a focus on customer service could breathe new life into the sector. There is the development of this opportunity with the draft Rail bill, which is setting up the rules for the introduction of third-party access assisting in the modernization of the sector. by private sector participation and investment in equipment and infrastructure. Overall prospective opportunities for intervention:

- **Dynamic Planning:** Transnet's current system prioritizes consistent bulk transportation, neglecting the dynamic nature of different markets. Implementing a new operating system specifically designed for flexibility and adaptability to seasonal variations is crucial. Comparative analysis of available systems will ensure the most efficient solution is chosen.
- I**nfrastructure Management:** Modernizing infrastructure goes beyond the rolling stock. Upgrading yard management systems to optimize stacking space, offloading areas, and specialized facilities is essential. Integrating these systems with the chosen operating system will create a holistic approach to efficient cargo handling.
- **Shifting the Operational Mindset:** Transnet currently lacks the orientation toward customer service and planning required for agricultural freight. Upskilling the workforce and fostering a culture that prioritizes collaboration with farmers and other stakeholders is vital.

Air freight [14] [15] [16]

The South African freight forwarding industry, represented by the SAAFF (South African Association of Freight Forwarders), is a key player in the country's logistics network. They handle a significant portion of containerized goods and active air cargo, with their 323 members ranging from multinationals to smaller businesses (SMMEs).

In collaboration with BUSA (Business Unity South Africa), the SAAFF has made strides in digitizing cargo movement. This includes a real-time dashboard providing insights into multimodal movement (water and land) and merging datasets for a clearer picture of national and regional cargo flow. This focus on data and transparency is crucial for optimizing logistics efficiency.

However, challenges remain in the air cargo space. Security accreditation processes for cargo handlers and agents, though improved since the COVID era, can still impact on-time delivery and reliability. Additionally, limited access to cargo scanners and technicians creates bottlenecks in the flow of goods.

[14] https://saaff.org.za/

[15] https://www.busa.org.za/

[16] https://www.youtube.com/watch?v=q6OsmuRLtSA&list=PLe04sDiMmldRjJIwXmxXoEpiitAMgSV8c&index=3

Despite these hurdles, there are positive signs. The volume of air cargo is gradually increasing, driven by factors like high ocean freight rates. This presents an opportunity to grow South African exports, as currently, inbound volumes significantly outweigh outbound volumes. The development of Winelands Airport and the potential for e-commerce growth offer further potential for the air cargo sector.

Looking ahead, the industry calls for a more synchronized approach. Freight villages, improved spatial connectivity, and multi-modal distribution centres could significantly enhance cargo movement efficiency. Furthermore, addressing regulatory hurdles, such as delays in permit issuance for the pharmaceutical sector, is crucial for smooth operations. By working collaboratively to overcome these challenges, the South African air cargo industry can unlock its full potential and support economic growth.

Cape Town Airport & Development of Smaller Airports

The Cape Town airport boasts both positive developments and areas for improvement in the city's air cargo sector. Here are some key takeaways, some of which apply to other smaller ports as well:

- **Data and Transparency:** Western Cape boasts live data maps and a progressive approach to data access, providing valuable insights for cargo movement.
- **Infrastructure:** Plans are underway for runway expansion and cargo facility development, indicating a commitment to growth. This includes the potential for an Integrated Terminal and Intermodal Freight Terminals.
- **Imbalance in Cargo Flow:** Currently, there's a significant imbalance with more incoming cargo than outgoing cargo. Wesgro, the Western Cape Investment and Trade Promotion Agency, may play a role in attracting more exports.
- **Expertise and Collaboration:** The industry requires expert consultants to identify profitable routes and foster collaboration between SAA (South African Airways) and ACSA (Airports Company South Africa).
- **Underutilized Capacity:** SAA operates at only 20% capacity, suggesting significant potential for growth.
- **Location Challenges:** Existing cargo facilities are considered landlocked and require expansion or relocation, possibly to the Western Land Precinct, a potential future Industrial Development Zone.
- **Data Gaps:** Detailed reporting on specific cargo categories is lacking as cargo is declared by airlines, not cargo operators.
- **Focus Needed:** The airport's business approach takes cargo as a secondary concern compared to passenger flights. Dedicated cargo specialists and improved systems for reporting are crucial.
- **E-commerce Growth:** While still a small segment, e-commerce is experiencing growth and requires last-mile delivery solutions.
- **Market Access:** Limited data access makes it challenging to qualify potential cargo volumes. Industry forums could bridge this gap by converting theoretical potential into actual demand.
- **High-Value Cargo:** Cape Town's location and the Amazon Africa branch suggest the development of high-value, lightweight cargo suitable for air freight.

- **Collaboration and Decision Making:** Enhanced communication between ACSA, Wesgro, Cape Town Air Access, cargo operators, and tenants is needed to address challenges and develop a consolidated view for better decision-making.

Smart Solutions for Big Retail in South Africa [17] [18] [19] [20] [21]

Interventions in the supply chain & logistics sector, utilizing smart solutions and technology:

- AI-powered demand forecasting: Optimize inventory management and reduce stockouts or overstocking through AI that analyzes historical sales data, seasonal trends, and even weather patterns.
    - Company: Pick n Pay partnered with IBM to implement AI-powered demand forecasting, reducing stockouts by 30%.
- Warehouse automation: Utilize robots and automated systems for tasks like picking and packing, improving efficiency and accuracy.
    - Company: Shoprite Holdings is investing in automation technology for its warehouses, including robotic picking systems.
- Real-time inventory tracking: Gain real-time visibility into stock levels across all locations, allowing for better allocation and preventing stockouts.
    - Existing Application: Many retailers, including Woolworths and Checkers, use cloud-based inventory management systems that offer real-time stock level visibility.
- Route optimization for delivery fleets: Optimize delivery routes using software that factors in traffic, distance, and customer location, leading to faster deliveries and reduced fuel costs.
    - Company: Several logistics companies in South Africa offer route optimization software, such as Route4Me and OptimoRoute.

Sustainability Initiatives, for big retail could include:

- Last-mile delivery: Utilise electric-powered vehicles for last-mile delivery of goods.
    - Company: Woolworths, in partnership with DSV and Everlectric, has launched an extensive rollout of electric panel vans (EVs) to deliver their customers' online purchases.
- Waste management solutions: Implement systems to minimize waste generation and promote recycling or composting initiatives.
    - Company: Pick n Pay partnered with Mr. Waste to implement in-store recycling programs.
- Sustainable product sourcing: Partner with suppliers who prioritize sustainable practices and offer eco-friendly products to customers.

[17] https://www.ibm.com/downloads/cas/B1V7QPZP

[18] https://www.shopriteholdings.co.za/newsroom/2024/robotics-labs.html

[19] https://businesstech.co.za/news/business/686947/woolworths-goes-electric-for-online-deliveries-in-south-africa/

[20] https://www.fasa.co.za/pick-n-pay-reintroduces-e-waste-recycling-bins-at-stores/

[21] https://www.woolworths.co.za/content/article/good-business-journey/e

- Company: Woolworths commits to sustainable sourcing practices and offers various eco-friendly product lines.

3.2 Agri-logistics

Definitions of agri-logistics according to the Department of Agriculture to South Africa:

''*Logistics is considered to be that part of the supply chain process that deals with the transportation, warehousing, as well as inventory administration and management of physical products between the point of production and the point of delivery to the final consumer. Per definition, this excludes the cost of passenger transport and the cost of transport, storage, packaging, handling etc. of mail and luggage, as well as the storage and transport tasks which occur during the production process.*''[22]

In this study we have taken this slightly wider interpretation, also including in parts the smart solutions applicable to the harvesting and production of agrifoods. Furthermore, to delineate the scope of the study, the focus will be on perishables and in particular, those perishables that are of relevance to the commodities exported from South Africa to the Netherlands.

Commercial Farming [23]

The geographical spread of commercial farming of perishable commodities across the different provinces is illustrated in the table below. Generally, these sub-sectors are well organized in various associations and industry bodies (see Table 7, in Chapter 7 of this report).

Geographical Spread of Commercial Farming in South Africa	
Western Cape	Dominates in wine grapes, apples, pears, stone fruits, citrus, and table grapes.
Eastern Cape	Known for citrus production.
KwaZulu-Natal	Focuses on vegetables, subtropical fruits, sugarcane, and tropical fruits.
Limpopo	Major producer of citrus, tropical fruits (including bananas), tomatoes, and potatoes.
Mpumalanga	Significant for citrus, subtropical fruits (including bananas), vegetables, maize, and potatoes.
Free State	Produces a variety of vegetables.
Gauteng	Intensive vegetable farming and horticulture.
Northern Cape	Known for table grapes and citrus.

Table 3. - Geographical spread of commercial farming perishables in South Africa

In the below table, one may find the custom values per key commodity chapters, per province. More detailed trade data per province and the specific commodities mentioned in table 3 can be found in *Appendix 2. - Detailed Trade Data on Key Commodities Per Province.*

[22] http://webapps.daff.gov.za/AmisAdmin/upload/The%20current%20status%20of%20agro-logistics%20report.pdf

[23] https://openknowledge.fao.org/server/api/core/bitstreams/66fc0ea0-b81f-4b9c-bb03-65da37eb622c/content#:~:text=There%20are%20approximately%202.5%20million,(Department%20of%20Statistics%202019).

Commodity Values per Province	Edible vegetables and certain roots and tubers	Fruit and nuts	Cereals	Oil seeds and oleaginous fruits	Grand Total Customs Value (ZAR)
Eastern Cape	R183 218 550	R7 010 350 829	R1 101 933 694	R1 157 443 604	R9 452 946 677
Free State	R267 160 282	R97 532 206	R666 930 291	R58 216 260	R1 089 839 039
Gauteng	R481 559 828	R2 378 252 025	R503 926 077	R337 956 838	R3 701 694 768
Kwazulu-Natal	R165 496 044	R12 372 768 529	R13 998 808 099	R6 213 263 039	R32 750 335 711
Limpopo	R280 064 683	R318 233 692	R1 971 501 714	R204 900 599	R2 774 700 688
Mpumalanga	R1 047 339 634	R861 526 279	R2 206 091 252	R1 270 264 665	R5 385 221 830
Northern Cape	R179 948 565	R298 131 138	R142 321 827	R8 647 234	R629 048 764
Northwest	R341 961 053	R671 633 018	R4 255 146 306	R212 070 337	R5 480 810 714
Western Cape	R559 919 490	R56 410 207 261	R283 432 019	R1 955 355 101	R59 208 913 871
Grand Total Customs Value (ZAR)	**R3 506 668 129**	**R80 418 634 977**	**R25 130 091 279**	**R11 418 117 677**	**R120 473 512 062**

Table 4. – Top custom values per key commodities in 2023 (SARS Trade Statistics Data)[24]

The buying power of commercial farmers has encouraged several companies to offer or endorse digital agricultural solutions. For example, the citrus industry is largely export-driven and is highly engaged in digital agriculture to maximize production and adhere to international export standards.

Commercial farms can generally afford premium services beyond those offered by the government and have the liquidity to invest in recommended innovations aimed at increasing yield and profit, such as precision agriculture and sensors. While the private sector tends to spearhead solutions for commercial farmers who can compete internationally in terms of yield, quality, and profitability.

Smallholder farming [25]

Smallholder farming across various regions of South Africa, including the Eastern Cape, Limpopo, Mpumalanga, and Free State, tends to be less organized. The country is home to approximately 2.5 million smallholder farming households and around 35,000 commercial farming units (Aliber et al., 2013). Despite having a sophisticated agrifood system, nearly 11% of South Africa's population experienced hunger in 2018 (Department of Statistics, 2019).

Significant inefficiencies and inadequacies plague the agricultural value chain, particularly for smallholder farmers. Common issues they face include limited access to basic services, dependence on rainfed crops, inconsistent policy enforcement, low capacity and knowledge-sharing, and challenges related to climate variability and change. Additionally, producers encounter challenges specific to their crops, livestock, and regions.

[24] https://tools.sars.gov.za/tradestatsportal/data_download.aspx

[25] https://openknowledge.fao.org/server/api/core/bitstreams/66fc0ea0-b81f-4b9c-bb03-65da37eb622c/content#:~:text=There%20are%20approximately%202.5%20million,(Department%20of%20Statistics%202019).

Other actors in the value chain, such as distributors, retailers, processors, packaging plants, and consumers, also face shared problems. These include concerns over product quality and safety, produce traceability, transportation, and cold chain costs, and balancing supply with demand.[26]

General challenges faced in the agricultural sector

- Aging farmer population
- Lack of access to finance
- Overstretched and under-resourced extension staff
- Lack of access to knowledge and training
- Drought and scarcity of water resources
- Climate variability and change
- Lack of participation in the value chain for smallholders
- Postharvest food waste

Eco-Innovation

Research indicates that agricultural businesses investing in process innovations, acquiring external knowledge, and leveraging technologies such as precision agriculture and sensor technologies are more likely to achieve improved environmental sustainability outcomes. A recent study by Buchana (2023) found that policy recommendations should stress the importance of incentivizing agricultural businesses to invest in innovative and sustainable practices, fostering collaboration with higher education and government research institutions, and facilitating the adoption of advanced ICTs to promote eco-innovation.[27]

Insights from businesses engaged in upskilling small-scale farmers reveal a complex landscape. While a lack of skills is a major hurdle, it's compounded by limitations in funding, legal resources, and access to commercial opportunities.

- **Food Security Challenges**

  From an advisory standpoint, farmers need guidance on what crops to grow, considering factors like land suitability, market demand, and testing procedures.

- **Legal and Financial Constraints**

  Compliance with tax regulations, business registrations, and general financial management pose significant challenges, especially for smaller operations. These limitations can also hinder the adoption of expensive foreign technologies.

- **Variable Technology Uptake**

  While some sectors, like poultry farming, embrace Dutch advancements, others, like livestock and beef production, remain more hesitant. There's also a need for increased automation and

[26] Ididem.

[27] Buchana, Y., 'Eco-innovation and agricultural sustainability: empirical evidence from South Africa's agricultural sector', 2023.

advanced disease control solutions in the processing sector. Remote monitoring solutions present promising opportunities for increased automation.

- **Opportunities in Technology Adoption**

  Cold chain solutions offer exciting possibilities. Utilizing digital twins can generate real-time data for improved decision-making. This technology could revolutionize data analysis for farmers currently relying on paper-based systems.

Limited access to cold chain infrastructure significantly disadvantages small-scale farmers. Perishable produce often spoils before reaching consumers, leading to wasted resources and lost income. One solution lies in establishing a network of smaller, strategically located collection hubs. These hubs, equipped with grading facilities, solar-powered cooling units, and containers, can efficiently store and aggregate produce from nearby farms. An online platform would further empower farmers by connecting them directly with buyers, eliminating middlemen, and increasing profit margins.

The lack of proper cold chain infrastructure has a harmful economic impact. Small farmers experience significant post-harvest losses, reducing their income and hindering their ability to invest in growth. Furthermore, establishing shared processing facilities in these hubs offers additional economic benefits. By sharing equipment under central control, farmers can access processing capabilities they may not individually afford, allowing them to add value to their produce and diversify their offerings. This integrated approach, combining efficient cold chain solutions, online marketplaces, and shared processing facilities, empowers small-scale farmers, reduces waste, and strengthens the overall agricultural sector.

An app designed for illiterate users could streamline logistics and empower smallholder farmers. Additionally, eliminating the need for bribes paid to truck drivers to enter the ports quicker, through a tech-enabled, transparent system would benefit both farmers and the industry.

Opportunities in Skills Development

The South African small-scale farming industry faces a unique challenge: a skills gap exacerbated by an aging farmer population and an exodus of younger, often white, farmers. These factors contribute to a knowledge and education deficit that hinders productivity and growth. However, there are promising opportunities to bridge this gap and empower small-scale farmers.

One key approach lies in targeted skills development programs. The development of in-house training of for example an 18-month program can offer valuable theoretical knowledge, and reaching a wider audience necessitates exploring alternative methods. On-site and remote customer training programs, both online and practical, can equip farmers with the skills they need without disrupting their daily operations. The AGRISETA[28] responsible for upskilling the agricultural sector offers training programs, however often the service providers offering the training are not sufficiently knowledgeable, and currently, there is no continuous development program offered, on matters such as exports and regulations.

Furthermore, attracting younger generations requires a shift in mindset. Apprenticeship programs can foster practical skills and knowledge transfer between experienced farmers and younger potential entrants. Before starting their own farm business, small-scale farmers need to develop essential skills in

[28] https://www.agriseta.co.za/

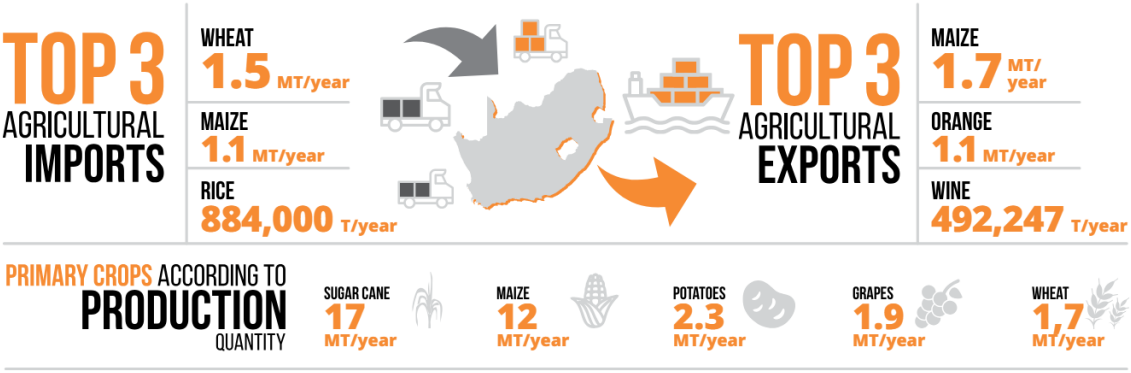
marketing, negotiation, and business management to avoid exploitation by middlemen and compete effectively in the market.

By offering innovative approaches and continuous development programs, the South African small-scale farming industry can bridge the skills gap and empower its workforce to allow for significant access to the market. With a wider application of training programs, utilising for example online programs the training can become cheaper.

Digitisation of the Agri Sector [29]

South African agriculture is highly profitable, primarily driven by exports, which reached R104 million in 2017/2018. There are significant opportunities for digital agricultural solutions to enhance resource use efficiency, profitability, transparency, market participation, and environmental sustainability.

However, three main obstacles hinder the scaling of these solutions in South Africa: limited network coverage, high data costs, and low digital literacy. Additionally, there is a significant digital divide between wealthy large-scale farmers and smallholders. Mobile platforms, vehicle tracking, database technology, and blockchain are the most promising technologies for developing digital solutions in the country. The private industry, non-profit organizations, public sector, and international community all have crucial and distinct roles to play in fostering sustainable digital agricultural solutions in South Africa.



Research Entities Involved in Innovation [30]

Several South African universities are engaged in developing digital agricultural solutions with stakeholders across all four hubs. The University of Stellenbosch's Faculty of AgriSciences collaborates with AgriColleges to provide services. The University of Johannesburg Technology Lab and the Elsenburg Agricultural Training Institute at the Western Cape Department of Agriculture have developed service platforms, and The University of the Free State is researching the feasibility of digital field management solutions in South Africa. The Agricultural Research Council, a state-owned research institution, also provides digital service platforms. Various other institutions are involved in developing and scaling digital solutions, such as the non-profit organization AgriSA, the Grain SA producers' organization, and the South African Organic Sector Organisation. The below table highlights some of the key stakeholders in the South African market conducting research.

[29] https://openknowledge.fao.org/server/api/core/bitstreams/66fc0ea0-b81f-4b9c-bb03-65da37eb622c/content#:~:text=There%20are%20approximately%202.5%20million,(Department%20of%20Statistics%202019).

[30] Ibidem.

Research Organisations Agricultural Development		
Agri Centre of Excellence (ACE)	ACE uses immersive learning technologies such as learning experiences and virtual reality platforms to deliver excellence in learning and development to enhance company capabilities.	www.agritechexcellence.com
Agricultural Research Council (ARC)	The Agricultural Research Council is a premier science institution that conducts research with partners, develops human capital and fosters innovation to support and develop the agricultural sector.	www.arc.agric.za
Bureau for Food and Agricultural Policy (BFAP)	They aim to objectively inform and support decision-making by key stakeholders in the agro-food, fibre and beverage sectors. Their solutions are based on independent, research-based analyses, underpinned by industry experience and a suite of models enabled by the Integrated Value Information System.	www.bfap.co.za
Casidra	Casidra renders a project management service to Departments within the Western Cape Government (WCG), local authorities, businesses, non-governmental organisations (NGO's) community-based organisations (CBO's), academic institutions, other governmental agencies and international assistance institutions.	www.casidra.co.za
Citrus Research International (CRI)	Citrus Research International (CRI) is a research and technical services organisation based in South Africa that focuses primarily on citrus.	www.citrusres.com
Council for Scientific and Industrial Research (CSIR)	The Council undertakes directed, multidisciplinary research and technological innovation that contributes to the improved quality of life of South Africans.	www.csir.co.za
Stellenbosch University	This multi-disciplinary school with a wine land backdrop specialises in the study of AgriScience.	www.sun.ac.za
University of Cape Town (UCT)	UCT is one of the leading higher education institutions on the African continent and has a tradition of academic excellence that is respected worldwide.	www.uct.ac.za

University of Pretoria	The African Research Universities Alliance (ARUA) Centre of Excellence in Sustainable Food Systems (formerly ACoE in Food Security) was established in 2018 and is one of 13 ARUA Centres of Excellence (CoEs). These CoEs form a network of universities from around the world, all undertaking collaborative research in priority thematic areas to find solutions to the development problems of Africa. ARUA-SFS was established in 2018 through a partnership between the host institution – the University of Pretoria – and collaborating partner institutions – University of Ghana and University of Nairobi.	www.up.ac.za/arua-centre-of-excellence-in-sustainable-food-systems

Table 5. - Key Research Organisation in the Agricultural Sector in South Africa

3.2.1 Market dynamics and trends influencing sector growth

Perishables	Specific Challenges Per sub-sector
Citrus	Export Market Access Logistics and Port Efficiency Labor Strikes Currency Fluctuations
Fresh Produce (Fruits and Vegetables)	Water Scarcity Pest and Disease Outbreaks Export Barriers Infrastructure Issues
Wine Industry	Economic Pressures Global Competition Water Scarcity Regulatory and Trade Issues
Sugarcane	Global Sugar Prices Land Reform Policies Climate Change Competition from Imports
Meat & Livestock	Stock Theft Disease Outbreaks Climate Variability High Feed Costs

Table 6. – Varying Challenges Faced in Different Agricultural Commodities

Industry Organisations [31] [32] [33] [34] [35]

The commodities listed in the table above, including citrus, fresh produce, and wine, are well-organized industries that collaborate with their respective associations and industry bodies to address logistical challenges and other issues.

For example, the South African Table Grape Industry (SATI) is in the process of developing a predictive model (using a digital twin) that plays a central role, this data-driven model will simulate the entire logistics network, including:

- Optimal Port Selection: The model will identify the most efficient ports to utilize based on factors like seasonality, congestion levels, and associated costs.
- Real-Time Data: By integrating data from various sources, including shipping lines, weather forecasts, and market conditions, the model will provide real-time insights to optimize transportation schedules and minimize delays.

Shipping lines are key stakeholders in a project to streamline South African grape exports. The goal is to rapidly establish a cost-effective logistics network, starting with grapes as a pilot commodity. The project's success hinges on its scalability. By demonstrating its effectiveness with grapes, the model can be adapted to encompass other agricultural products and commodities. This broader scope will attract participation from additional stakeholders across various industries interested in optimizing their export logistics.

Since 2020, the individual associations are responsible for the logistics of the commodities and are operating as a collective. Many smart solutions are already applied widely in the commercial production of fresh produce (FPEF), including fruit (Hortgro, SATI, CGA), vegetables (FPEF) and wine grapes (SAwine, and others). Solutions, such as precision agriculture, (long-term) cold chain warehousing, including dynamic controlled atmosphere storage on which continuous improvements are made, various packaging solutions adjusted per end-market, automated sorting, and grading, with the next step to integrate non-destructive internal testing. In terms of packhouses, different systems are used by different parties in the logistical process, there is a requirement for one system to integrate various systems utilized. As with the prospect of more volumes overall, the requirement is higher efficiencies and feedback from the data.

4. Dutch Strengths, Solutions & Innovations

4.1 Agri-logistics

The Dutch **agri-logistics sector** is a highly advanced and integrated ecosystem that leverages smart solutions across the entire value chain, from harvesting and processing to packaging, storage, transportation, distribution, marketing, quality control, and traceability. Dutch market players have

[31] https://www.satgi.co.za/
[32] https://www.fpef.co.za/
[33] https://www.hortgro.co.za/
[34] https://cga.co.za/
[35] https://sawine.co.za/

expertise in agri-logistics including cold chain management, precision farming technologies, and efficient transportation of agricultural products, which could ensure South African farmers to reduce post-harvest losses and enhance product quality. Below the key features and competitive advantages of Dutch companies in the agri-logistics sector are outlined:

Key Features and Competitive Advantages[36] [37] [38] [39]

- **Advanced infrastructure**: The Netherlands boasts a robust infrastructure that supports efficient logistics operations. The country is home to major international ports like the Port of Rotterdam and Schiphol Airport, which serve as critical hubs for global agri-food trade. The East Netherlands region, in particular, is a logistics hotspot with excellent multimodal accessibility by road, rail, and water, making it an ideal location for agri-food logistics companies.
- **Ports and Artificial Intelligence (AI):** Dutch ports are increasingly leveraging artificial intelligence (AI) to enhance various aspects of their operations, making them more efficient, sustainable, and competitive. This includes smart shipping, to assist human staff during shipping movements, optimizing navigation, and piloting to improve safety and efficiency. In addition, AI streamlines logistic processes, including tracking container movements and improving the interaction between different port operations. This helps in reducing delays, congestion, and emissions, making the logistics more efficient. It also helps with port maintenance and allows ports to better manage their energy consumption. Examples of research and collaboration initiatives in the Netherlands include the Dutch AI Coalition (NL AIC)[40], as well as collaboration between universities such as TU Delft, Leiden University, and Erasmus University[41], the AI Port Center[42].
- **Innovation and R&D**: The Netherlands is a global leader in agrifood research and development, driven by institutions like Wageningen University & Research, the world's top agrifood university. The country invests heavily in agritech and food innovation, focusing on sustainable practices and alternative protein sources. This strong R&D foundation supports the development of cutting-edge logistics solutions tailored to the needs of the agrifood sector.
- **Integrated solutions and use of technology**: Dutch companies are known for their integrated, data-driven solutions that enhance efficiency and productivity in agri-logistics. For instance, HORTILOGICS, a joint venture of four leading companies (Berg Hortimotive, KOAT, HortiKey, and Crux Agribotics), offers turnkey solutions for the automation and robotization of internal logistics in greenhouses and packing centres. Their smart platforms, Automated Guided Vehicles (AGVs), and robots handle data collection, crop maintenance, scouting, harvesting, product

[36] Crux Agribotics. 2021. Dutch companies join forces in joint venture for 'Smart Greenhouse Logistics'.

[37] Oost NL. 2021. Value proposition agri/ food logistics.

[38] Invest in Holland. n/d. Agrifood.

[39] Castelein, et al. 2022. Agrologistics sector study Netherlands.

[40] The NL AIC's Port and Maritime working group is actively involved in developing AI solutions for the sector. They focus on sharing knowledge, identifying problems that AI can solve, and conducting pilot projects to test these solutions. (NLAIC, n/d).

[41] These universities are conducting extensive research on AI applications in ports, including autonomous shipping, smart logistics, and predictive maintenance (TU Delf, n/d).

[42] A partnership between Delft University of Technology and Erasmus University Rotterdam, the AI Port Center focuses on research and innovation in AI applications for the port and maritime sector. This includes developing technologies for smart transportation, logistics, and asset management.

transport, and automated sorting and packing. In addition, companies in the Netherlands leverage data collection and analysis to provide insights into the productivity and efficiency of sub-processes. They employ self-learning algorithms to facilitate continuous optimization of logistics operations.

- **Strong collaboration and ecosystem development:** The Dutch agri-logistics sector benefits from a collaborative ecosystem involving government, academia, and industry. Initiatives like Foodvalley, the Protein Community, and the World Horti Centre foster innovation and knowledge sharing. This triple helix approach ensures that the sector remains at the forefront of global agrifood logistics.
- **Sustainability focus:** The Netherlands aims to lead in circular agriculture by 2030, emphasizing sustainable practices throughout the agri-food value chain. This commitment to sustainability is reflected in the development of smart logistics solutions that minimize waste and optimize resource use. The Netherlands is thus a pioneer in **smart greenhouse logistics**, integrating automation and data-driven tools to enhance productivity and reduce labour dependency. Companies like HORTILOGICS provide comprehensive solutions that cover all aspects of greenhouse operations, from planting to packaging.

There are a few specific areas of expertise in which the Dutch have a competitive advantage, namely:

- Dutch companies excel in **managing the logistics of perishable food products**, ensuring quality and freshness from farm to table. They employ advanced storage technologies, temperature-controlled transport, and real-time monitoring systems to maintain the integrity of perishable goods throughout the supply chain.
- **Agri-food logistics hubs:** Regions like East Netherlands serve as key logistics hubs, offering strategic locations for distribution centres and access to major European markets. This regional advantage, combined with a strong presence of food production companies, creates a conducive environment for agri-food logistics.

4.2 Multi-Modal Corridors

In the multi-modal space, the Dutch companies excel in creating integrated multi-modal transport solutions that combine road, rail, and sea transport to optimize logistics networks, reducing costs and improving delivery times. Below the key features and competitive advantages of Dutch companies in the multi-modal transport corridor space are outlined:

Key Features and Competitive Advantages[43] [44] [45] [46] [47]

[43] TNO. n/d. PLATO shows logistics the way in digital platforms.

[44] Ministerie van Infrastructuur en Milieu. 2012. ITS Plan The Netherlands.

[45] Tibor Rongen, Taede Tillema, Jos Arts, María J. Alonso-González, Jan-Jelle Witte, 2022. An analysis of the mobility hub concept in the Netherlands: Historical lessons for its implementation, Journal of Transport Geography, Volume 104, https://doi.org/10.1016/j.jtrangeo.2022.103419.

[46] Erasmus University. 2011. The strategic value of the Port of Rotterdam for the international competitiveness of the Netherlands.

[47] Royal Haskoning DHV. 2018. Freight broker multimodal transport in the Netherlands.

- **Strategic geographic location:** the Netherlands, particularly with major hubs like the port of Rotterdam, is strategically positioned as a gateway to Europe. This allows Dutch companies to optimize linkages between sea, rail, road, and air transportation efficiently.
- **Advanced infrastructure:** The Netherlands has a highly developed multimodal transport, knowledge, and energy infrastructure that supports efficient logistics operations. The Dutch have invested heavily in developing advanced infrastructure that supports multi-modal transport. This includes sophisticated port facilities, extensive rail networks, and efficient road systems.
- **Technological innovation:** Dutch companies are at the forefront of implementing digital solutions to optimize multi-modal transport. The PLATO project, mentioned in the search results, is a prime example of this innovation. It aims to help logistics companies navigate the maze of digital platforms, enhancing efficiency across different transport modes. In addition, as mentioned above, Dutch ports are at the forefront of integrating AI into their operations, with significant advancements in smart shipping, logistics, asset management, and energy management.
- **Collaborative ecosystem:** there's a strong culture of collaboration between companies, research institutions, and government bodies in the Netherlands. This is evident in projects like PLATO, which involves cooperation between organizations like Smartport, Evofenedex, the Port of Rotterdam, and various universities.
- **Expertise in sustainable logistics:** Dutch companies are focusing on developing sustainable logistics solutions, which often involve optimizing multi-modal transport to reduce reliance on road freight. This aligns with global trends towards more environmentally friendly transportation methods.
- **Regulatory expertise:** given the Netherlands' position as a major logistics hub, Dutch companies have developed significant expertise in navigating complex international regulations, which is crucial for efficient multi-modal transport across borders.
- **Experience in combining modalities:** The country has extensive experience in combining different transport modes for both passenger and freight logistics chains. This includes effectively linking infrastructures and ensuring seamless information exchange between modes.
- **Synchro-modal approach:** The Netherlands has pioneered the concept of synchro-modality, which allows for flexible selection of transport modes at the last minute based on real-time conditions and requirements
- **Innovative projects:** Several initiatives demonstrate the Netherlands' expertise, such as:
    - The Inland Waterways Dynamic Traffic Management Stimulus (IDVV) program is aimed at improving inland shipping reliability and flow.
    - The Neutral Logistics Information Platform (NLIP) for data exchange between various stakeholders.
    - ParckR trial for optimizing truck parking capacity using floating vehicle data and smartphone applications.

- **Strategic connectivity:** The Port of Rotterdam collaborates with inland container terminals and other logistic hubs, stimulating specialization, innovation, and utilization of competitive advantages present elsewhere in the country.
- **Digitalisation:** The Netherlands leverages digital technologies to enhance multimodal transportation, including the use of track and trace solutions, Terminal Operation Systems (TOS), IoT devices, and 5G networks.
- **Sustainability focus:** The country recognizes the environmental benefits of multimodal transportation and actively promotes it as a means to reduce pollution, noise, and greenhouse gas emissions.

A ranking of the capabilities of Dutch companies, per grouping of smart solutions both for the agri-logistics as well as the multi-modal corridors, can be found in Appendix number 2 – Dutch Expertise in the Smart Logistics.

5. Profiles of Dutch Companies Operating in South Africa and Their Impact on Local Industries

Various Dutch companies have a longstanding stronghold in South Africa in the logistics sector in South Africa, they offer a variety of smart solutions, amongst which advanced infrastructure and services, digital transformation, collaborative innovations, and smart infrastructure programs.

The Dutch companies that will be highlighted here, have had operations or ongoing collaborations in South Africa for a longer period of time, their impact on the local industry has been significant, in varying ways, and their challenges are diverse.

Flying Swans has been operating in South Africa since **2019**. Their involvement began with the signing of a multi-annual partnership with Transnet and Fruit SA, aiming to transform the supply chain for fruits by shifting transportation from road to rail, which is expected to significantly reduce CO2 emissions.

The consortium, comprising Dutch entities like the **Port of Rotterdam** and **GroentenFruit Huis**, focuses on developing logistical corridors to support the export of fruits and vegetables, seeing that the link with the Netherlands is very important because a lot of the agricultural goods are coming into Europe via the Port of Rotterdam.

Flying Swans developed a concept for a Consolidation Centre in Limpopo, allowing for cold storage, reefer consolidation and a container depot facility integrated into the Tzaneen railway terminal in the heart of South Africa's citrus exporting region with a capacity of 5,000 pallets.

After a long process and lengthy deliberations with Transnet, there is now an agreement in place to kickstart the project implementation in Tzaneen. There is significant interest from industry (including Dutch investors) to apply similar concepts across South Africa.

Flying Swans' competitive advantage in the South African market stems from their expertise in developing integrated cool logistics solutions, leveraging Dutch innovations in agri-logistics, and their collaborative approach with local partners to create sustainable and efficient supply chains.

Heineken has operated in South Africa since the late **2000s**. They initially entered the market through a joint venture with Diageo and Namibia Breweries in 2007 to form Brandhouse. This collaboration marked Heineken's formal entry into the South African market, allowing them to distribute and market their products locally.

In terms of recent investments, Heineken has committed to significant capital projects in South Africa. In April 2023, they announced a ZAR 15.5 billion (approximately **USD 857 million**) investment over the next five years. This includes the construction of a new brewery near Durban and a malting plant near Johannesburg, with the brewery costing around **USD 210 million** and the malting plant about **USD 94 million**. Additionally, Heineken is expanding its flagship Sedibeng brewery near Johannesburg, increasing its capacity from 5 million hectoliters to 8.5 million hectoliters annually.

Heineken is implementing smart solutions in their supply chains to improve efficiency and sustainability. Their "Brew a Better World 2030" initiative includes commitments to carbon neutrality, waste reduction, and water efficiency. They plan to achieve these goals through various projects and partnerships, promoting responsible consumption and expanding the availability of zero-alcohol beverages. Moreover, they are focusing on local supplier development and economic transformation through initiatives like Broad-Based Black Economic Empowerment (B-BBEE).

Gordian Logistics Services first started operating in South Africa in **2016**, offering professional advice, tailored solutions and ambitious innovations in the field of service logistics, spare parts management and supply chain management, to clients such as large mining companies and the engineering sector players and asset owners. They offer supply collaboration platforms along with their normal service offerings and are currently developing Digitalised (AI) to assist supply chain optimization. With end-to-end solutions, they attempt to directly influence the bottom line of their clients. The intent of their setup was a long-term vision; to allow for a springboard into the continent, the minimum requirement would be a SADC vision.

Their **challenges** in terms of their 8-year experience are a not always favourable experience with South Africa being a difficult country for a foreign company with restrictive conditions, such as the BB-EEE requirements for operations, sometimes a lack of the required skills, and the requirement for a long-term strategy in an immature environment. Setting up shop in their experience is costly in time and financial investment. However, with the business having a broader vision for working on the continent, the process has been hard but rewarding.

University of Twente has had a long-term interest in collaboration with South African research entities and business owners and has developed relationships over **the past 10 years**. The interest in the academic collaboration between University Twente and the South African entities stems from the desire to advance knowledge sharing and continue efforts in tracking food flows and future-proof agriculture in South Africa and the region.

Currently, the University of Twente runs a project financed by the Dutch Science Foundation on the transportation of avocados, looking at production sites, processing facilities, and container shipment to the Netherlands to better understand the sustainability impact and climate change effects, as well as measure the carbon footprint. This research project can be applied to other commodities, and there are efforts underway to further develop the scope of said project to help improve and reduce transportation costs, optimise packaging and avoid double counting.

The speed of business life in Europe is fast, contrary to things moving relatively slowly in South Africa. Therefore, one must muster a lot of patience and understanding to keep developing relationships over longer periods of time. Depending on the priorities of an individual in a large organisation such as the University of Twente, this may or may not develop into long-term collaborations. Personal relations may assist in motivation to connect with counterparts in South Africa and it requires a continuous drive to pursue opportunities.

Delivering packages in South Africa presents significant challenges, particularly in the realm of last-mile delivery. About 10 years ago, pick-up points were virtually non-existent, even though the need for them was clear. The post office, which many businesses relied on, proved to be unreliable. This dependence on an inefficient postal system hindered effective logistics. Despite these challenges, pick-up points became a hit, with stores showing great enthusiasm. The primary difficulty lay in creating access, given the high costs, vast distances, remote areas, townships, and the inconsistent reliability of couriers.

In **2015**, with the vision of two Dutch owners and the support of an angel investor, **Pargo** was established as a 100% South African company. Nine years later, Pargo has developed a network of 3,000 pick-up points across South Africa, with all major retailers on board. Doing business in South Africa has been challenging, as a "yes" is not always an immediate "yes," requiring considerable time and effort, compounded by the instability of the local currency. Nevertheless, the potential is undeniable, even if growth happens in what can be described as an "African way." The entrepreneurial climate is vibrant, allowing for opportunities despite the difficulties.

With a local partner experienced in logistics and company setup, **Pargo** managed to navigate the complexities of BEE compliance without much difficulty as a startup. Large customers, such as Woolworths and Mr Price, now demand compliance with BEE standards, reflecting the sensitivity and importance of this issue in the country.

These examples indicate different-sized companies having built the experience of working in South Africa, with varying degrees of success. Some of the challenges described are similar, like the importance of personal and well-developed relationships with local companies and individuals.

Other challenges include the lack of an enabling environment, where foreign businesses have a hard time adjusting to the stringent South African regulations, including BB-EEE, and or dealing with a state-owned entity such as Transnet, in shifting their business model to accommodate new commodities being transported via Rail. However, in the various engagements held to discuss the experiences of the business representatives, one softer issue was often part of the discussion, the specific interest in South Africa as a country and the fulfilment of building a business in an immature and sometimes difficult business environment.

6. Leveraging Partnerships

The challenges experienced in the South African logistics sector, as discussed earlier, can be addressed by some of the Dutch expertise and capabilities. A matrix of challenges experienced, in comparison to the Dutch expertise, can be found in **Appendix 3 - Matrix of Dutch Strengths and South African Logistical Challenges**, for further interrogation.

Based on the engagements with various Dutch entities experienced in collaborative opportunities with South African businesses, government agencies, industry associations, and research institutions, the following key recommendations are proposed:

1. **Establish Robust Partnerships**:
    - Develop and maintain strong partnerships and personal relationships with business partners and stakeholders. Actively manage these partnerships to explore and pursue new opportunities.
2. **Foster Integrated Solutions**:
    - Collaborate with multiple entities to realize comprehensive and integrated solutions that address complex challenges effectively.
3. **Invest in Local Knowledge**:
    - Prioritize understanding and learning about local and regional dynamics, including the local business culture and practices.
4. **Adopt a Long-Term Perspective**:
    - Approach investments in the South African market with a long-term vision. Patience and sustained effort are essential for success.
5. **Utilize South Africa as a Strategic Base**:
    - Consider South Africa as a strategic gateway for expanding into the Southern African Development Community (SADC) and other African markets.
6. **Offer Innovative Solutions**:
    - Integrate smart solutions or applications into your standard service offerings to enhance value and competitiveness.
7. **Optimize Market Engagement**:
    - Tailor your offerings to optimize the involvement of current market players. Focus on areas with established demand.
8. **Leverage Creative Financial Solutions**:
    - Employ innovative financial strategies to facilitate the adoption and affordability of your products or services, ensuring better market penetration and results.
9. **Leverage Networking Organisations:**
    - Join an established business network. Membership in a network organization like the Entrepreneurs' Organisation or Endeavor is crucial for building a vital business network that supports you in both prosperous and challenging times, helping your business stay afloat during times of turmoil.

South Africa boasts a rich cultural tapestry, and business environments are no exception. Predominantly black workspaces and businesses offer a valuable opportunity to learn and grow from diverse perspectives. However, unintentional white-splaining can be a barrier to collaboration. Here's how to navigate these interactions effectively:

1. Active Listening & Respectful Communication:

- **Listen actively:** Pay close attention to South African colleagues' ideas and experiences.
- **Ask clarifying questions:** Seek to understand their perspectives before offering solutions.
- **Focus on collaboration:** Instead of "presenting" ideas, work together to find the best solution.
- **Avoid interrupting or talking over others:** Maintain a respectful and inclusive communication style.

2. Recognize Expertise & Leverage Diversity (Optimize Market Engagement):

- **Assume expertise:** Any South African may have valuable knowledge and experience.
- **Seek diverse perspectives:** Different backgrounds bring unique strengths to the table.

3. Openness to Learning & Continuous Improvement (Leverage Creative Financial Solutions):

- **Be open to feedback:** If someone feels you're white-splaining, acknowledge it and adjust your approach.
- **Seek to learn:** Take the opportunity to learn from the South African colleagues' experiences.
- **Focus on continuous improvement:** Reflect on your interactions and strive to be a better communicator.

7. Market Entry Suggestions for Dutch Companies

Networking recommendations for Dutch stakeholders

Should there be sufficient interest from Dutch businesses to explore the opportunities for collaboration and new business initiatives in the space of Smart Logistics, a Trade Mission will be organized to assist in the facilitation of networking opportunities between the various South African stakeholders, including government representatives, individual business and research organizations and Dutch business.

Furthermore, there are annual events that can be attended to connect with industry stakeholders and facilitate networking opportunities. Here is a list of relevant industry events in South Africa focusing on multimodal transport and agri-logistics:

1. **NAMPO Harvest Day**:
    - **Description**: One of the largest agricultural exhibitions in the Southern Hemisphere, showcasing the latest in farming technology and equipment, including agri-logistics solutions.
    - **Location**: Bothaville, Free State
    - **Timing**: Annually in May
    - **Website**: NAMPO
2. **Africa Rail**:
    - **Description**: Africa's largest rail conference and exhibition, focusing on developments in rail transport, including integration with other transport modes.

- **Location**: Johannesburg
- **Timing**: Annually in June
- **Website**: Africa Rail

3. **Transport Evolution Africa Forum & Expo**:
   - **Description**: A comprehensive forum and expo covering all aspects of transport, including rail, road, and port logistics, focusing on innovation and infrastructure development.
   - **Location**: Durban
   - **Timing**: Annually in October
   - **Website**: Transport Evolution Africa
4. **SAPICS Conference**:
   - **Description**: The annual conference of the Professional Body for Supply Chain Management in South Africa, focusing on supply chain and logistics, including agri-logistics.
   - **Location**: Cape Town
   - **Timing**: Annually in June
   - **Website**: SAPICS
5. **Fruit Logistica Southern Africa**:
   - **Description**: A trade show for the fresh produce industry, focusing on innovations in logistics and supply chain management for fruit and vegetables.
   - **Location**: Cape Town
   - **Timing**: Annually in September
   - **Website**: Fruit Logistica
6. **SAFARI**:
   - **Description**: The Southern African Food Lab Innovation Fair focuses on innovations in the food and agribusiness sectors, including logistics and supply chain solutions.
   - **Location**: Various locations
   - **Timing**: Annually, dates vary
   - **Website**: SAFARI
7. **AgriTech Africa**:
   - **Description**: A leading trade fair showcasing agricultural technologies and innovations, including smart logistics solutions for agriculture.
   - **Location**: Cape Town
   - **Timing**: Annually in June
   - **Website**: AgriTech Africa

8. **Southern Africa Transport Conference (SATC)**:
    - **Description**: A conference focusing on all aspects of transport, including multimodal transport solutions and infrastructure development.
    - **Location**: Pretoria
    - **Timing**: Annually in July
    - **Website**: SATC

There are several different South African-based associations and industry bodies that represent specific parts of the agricultural industry, that as part of their mandate address matters around logistics. On the multi-modal as well as the agri-logistics sector, the below lists some of the key organizations.

	Industry Body/Association	Mandate
1	Agricultural Business Chamber (Agbiz)	A national organization that advocates for agribusinesses, providing a network for business development, policy advocacy, and market access support.
2	Agri Western Cape	A regional agricultural organization providing support to farmers in the Western Cape through advocacy, market access, and development initiatives.
3	AgriCulture South Africa (AgriSA)	Represents the agricultural sector, advocating for sustainable farming practices and supporting farmers through policy development and industry collaboration.
4	Citrus Growers Association of Southern Africa (CGA)	Supports citrus growers by providing technical advice, market access support, and advocacy to enhance the industry's global competitiveness.
5	Fresh Produce Exporters Forum (FPEF)	Promotes and facilitates the export of high-quality fresh produce globally, providing market access information, logistics support, and industry insights.
6	FruitSA	An umbrella body for the fruit industry, coordinating and representing the interests of fruit producers and exporters to ensure sector growth and competitiveness.
7	Grain SA	Represents grain producers, providing support through research, advocacy, and market access initiatives to enhance the competitiveness of the grain industry.
8	Hortgro	Supports the deciduous fruit industry, providing research, technical support, and market development services to members producing apples, pears, and other fruits.
9	National Agricultural Marketing Council (NAMC)	Provides market information, research, and policy advice to enhance the marketing of agricultural products.
10	Perishable Products Export Control Board (PPECB)	Promotes and facilitates the export of high-quality fresh produce globally, providing market access information, logistics support, and industry insights.
11	SA Wine (South African Wine Industry Association)	Represents the wine industry, supporting winemakers and grape growers through advocacy, market access, and industry development programs.
12	South African Association of Freight Forwarders NPC (SAAFF)	Represents freight forwarders and logistics service providers, working to improve the efficiency and effectiveness of freight logistics in the region.
13	South African Sugar Association (SASA)	Represents the sugar industry, providing support through research, market development, and advocacy to promote sustainable practices and industry growth.

	Industry Body/Association	Mandate
14	Southern African Association of Freight Forwarders NPC (SAAFF)	Represents freight forwarders and logistics service providers, working to improve the efficiency and effectiveness of freight logistics in the region.
15	South African Table Grape Industry (SATGI)	Represents table grape producers and exporters, offering technical support, market development, and research to enhance global competitiveness.
16	Transport Forum	Facilitates discussions and knowledge sharing among stakeholders in the transport sector, focusing on improving logistics, transport infrastructure, and multimodal solutions.
17	VinPro	A non-profit company representing South African wine producers, offering support through research, market development, and advocacy to ensure industry sustainability and growth.
18	Grain Handling Organisation of Southern Africa (GOSA)	This organisation focuses on creating an environment for institutions and individuals involved in handling, storage, marketing, financing, distribution, and processing of grain and related industries
19	Chartered Institute of Logistics and Transport SA (CILTSA)	While not exclusively focused on agriculture, this institute deals with transportation, logistics, supply chain, and storage across various sectors, including agribusiness
20	COFCO International South Africa	While not a professional body, this organization is a significant player in South African agri-logistics, with expertise in trading, logistics, and supply chain management for agricultural products
21	Multimodal Inland Port Association (MIPA)	Formed by leading entities in the transportation sector, including the Cato Ridge Inland Port, Tambo Springs Development Company, Cape Winelands Inland Port, the Musina Intermodal Terminal, RailRunner South Africa, and RailRunner Services, the association is dedicated to improving Southern Africa's supply chain. Through promotion, support, and advocacy, MIPA aims to optimise efficiency and cost-effectiveness by increasing cargo transportation via rail through the use of more inland ports.

Table 7. - South African Relevant Industry Bodies & their Mandate

Several partnership platforms and initiatives related to agri-logistics exist in South Africa which could be of relevance for Dutch firms. These platforms and initiatives provide opportunities to collaborate with South African partners, share expertise, and explore business opportunities. They focus on various aspects such as innovation exchange, entrepreneurship development, cool logistics improvements, and climate-smart agriculture technologies.

- #cocreateSA: This is a platform for South African and Dutch counterparts to exchange innovations for a sustainable future. It was initiated by the Kingdom of the Netherlands in South Africa and aims to stimulate conversation, offer a platform for innovations, and facilitate collaborations between South African and Dutch partners[48].
- Orange Corners: This platform provides business development services such as mentorship, marketing, legal, accounting, networking, and training for entrepreneurs. It can be used for

[48] Ministerie van Landouw, Visserij, Voedzelzekerheid en Natuur. n/d. Contributing in the Dutch-South Africa partnerships by introducing CSA technologies.

custom-made programs on Agrofood/Horticulture to stimulate entrepreneurship. The first Orange Corner was established in Johannesburg[49].

- Dutch-South African "Reefer corridor platform": This is a planned platform with representation from local and Dutch key stakeholders, aimed at improving the Dutch-South African trade relationship by establishing an interlinked and aligned cool logistics container system[50].
- Hortipreneurial Centre of Excellence: This is being developed at Stellenbosch University in collaboration between the Netherlands and South Africa, focusing on innovations in the agricultural sector[51].
- Cool Train project: A Dutch consortium is working with South African stakeholders on this project to improve the efficiency of the agro-logistic system, particularly for fruit exports. It focuses on developing cold containerised transport to reduce logistics costs and post-harvest losses[52].
- Innovation mission on Climate Smart & Sustainable Agriculture: In April 2022, a delegation of Dutch companies and knowledge institutes visited South Africa as part of this mission, meeting with top South African fruit producers and policymakers[53].

The Netherlands Enterprise Agency has information related to doing business in South Africa and has information on the market, international CSR and business support in both the agri-logistics and smart logistics sectors[54].

Lastly, Dutch stakeholders can also consider entering the market through **tendering opportunities,** however here it may be helpful to work together with a local partner with experience in the market. For the most recent and comprehensive information on agri-logistics tenders, the following platforms exist:

- SA-Tenders.co.za: This site provides an overview of open tenders in South Africa and allows the search for tenders to be refined through selecting specific sectors. For example, under 'Transport and Logistics' the following tender is advertised: Review of freight transport implementation strategy for Limpopo province (request for a service provider to review the Limpopo provincial freight transport implementation strategy);
- TendersOnTime.com: This is an online database providing an overview of global tenders, e-Procurement, RFP, global tenders, open tenders and government contracts. By refining the search to the relevant region and sector, Dutch companies may be able to find relevant tenders. For example, under 'Southern Africa Transportation Services Tenders, Bids and RFPs', 'Southern Africa Logistics Service Tenders, Bids and RFPs', 'Southern Africa Agriculture Tenders, Bids and RFP' or 'Southern Africa Vegetables Tenders, Bids and RFPs';

[49] Ministerie van Landouw, Visserij, Voedzelzekerheid en Natuur. n/d. Contributing in the Dutch-South Africa partnerships by introducing CSA technologies.

[50] RVO. 2020. Catalyzing South African rural development by cool logistics.

[51] Ministerie van Landouw, Visserij, Voedzelzekerheid en Natuur. 2022. 'Dutch companies support agricultural innovation in South Africa'.

[52] Ministerie van Landouw, Visserij, Voedzelzekerheid en Natuur. 2022. 'Dutch companies support agricultural innovation in South Africa'.

[53] Ministerie van Landouw, Visserij, Voedzelzekerheid en Natuur. 2022. 'Dutch companies support agricultural innovation in South Africa'.

[54] https://www.rvo.nl/onderwerpen/landen-en-gebieden/zuid-afrika

- The KwaZulu-Natal Department of Agriculture and Rural Development is another potential source of tenders and has a dedicated tender section on its website; and
- The e-Tender portal, which is a single point of access to information on all tenders made by all public sector organisations at all spheres of government. This includes tenders of amongst others all National and Provincial Departments, Metros, District Municipalities, Local Municipalities, Municipal Entities, all Public Entities, State Owned Enterprises, Constitutional Bodies etc.

However, some of these tendering opportunities may be more focused towards South African firms and suppliers, and thus may be of less relevance for Dutch firms or may require partnerships to be formed.

8. Recommendations for Ideal Trajectory, Outcomes, and Next Steps

Cross border collaboration: Transnational Legal Framework for AFCFTA

Most Dutch companies that have set up shop in South Africa started with a broader Southern African focus or an ambition to extend into the continent with South Africa as a stronghold. The recent developments around the African Continental Free Trade Area (AFCFTA) pose a significant opportunity for Dutch companies looking to expand their market across the continent. A good example of this strategy in the South African market is the Chinese company Hisense, which entered the market in 1996 with a local partner. In 2013, Hisense significantly strengthened its presence in South Africa by opening a manufacturing plant in Atlantis, Western Cape. This plant serves as a critical hub for producing and distributing products throughout Africa.

The African Continental Free Trade Area (AFCFTA) faces significant challenges in establishing a robust enabling environment. A comprehensive policy framework is essential, supported by sound public institutions capable of managing infrastructure systems. Attracting investors is critical, necessitating strong institutional collaboration between governments. However, there is a notable lack of technological and institutional expertise, internal skills, and local content, including investment.

Harmonization and integration of policies and strategies at both national and regional levels are imperative. Policy alignment across AFCFTA countries is necessary to ensure seamless trade and economic growth. Identifying and addressing barriers, both hard (infrastructure, tariff barriers) and soft (regulatory issues, lack of integrated systems, and trust), is crucial. The use of technology to enhance supply chains and improve efficiency, for example, the immigration departments and customs is vital. Developing a technology platform for seamless communication and linkages across borders is essential, as current systems are not collaborative and create inefficiencies.

For example, the South African Revenue Service (SARS) is implementing the Accredited Economic Operator Program, providing a "green line" for trading. However, the absence of integrated systems for various modes of transport and a lack of trust and data sharing hinder progress.

The AFCFTA Digital Trade Protocol[55] aims to address these issues, enhancing traceability across government and private sectors. Increased private sector involvement is crucial for Africa's integration

[55] https://au.int/en/documents/20200518/digital-transformation-strategy-africa-2020-2030

into the global value chain, which will assist in the continent's growth. Clear communication of the benefits of implementing collaborative cross-border information systems to participating countries is essential to ensure widespread support and participation.

One example of how there is active collaboration on Transport and Digitalisation of the industry is through the Programme for Infrastructure Development in Africa (PIDA), an African Union Commission (AUC) initiative, in partnership with the NEPAD Planning and Coordinating Agency (NPCA) the African Development Bank, and the United Nations Economic Commission for Africa, aims to accelerate infrastructure development across the continent.

PIDA as a strategic framework will run through 2040 to develop continental (cross-border) infrastructure (Energy, Transport, Information and Communication Technologies (ICT) and Transboundary Water Resources). PIDA's main purpose is to strengthen the consensus and ownership of large cross-border infrastructure projects that integrate energy, transportation, and water development on a continental scale.

The PIDA Priority Action Plan (PIDA-PAP)[56], which extends to 2020, comprises 51 programs and projects divided into 433 projects covering transport, energy, information, and communication technology (ICT) and transboundary water sectors. PIDA will allow countries to meet forecast demand for infrastructure services and boost competitiveness by (i) Increasing efficiencies; (ii) Accelerating growth; (iii) Facilitating integration in the world economy; (iv) Improving living standards and (v) Unleashing intra-African trade.

Integrative Stakeholder Communication

To move away from the inefficiencies of working in silos, different departments, stakeholders, and units within the government must achieve internal alignment. This includes aligning government systems for the issuance of licenses and optimizing processes between various modes of operation to reduce bottlenecks. All stakeholders must be on board, including technology departments and ICT, the Department of Digital Affairs, the Department of Transport, the Department of Public Enterprises, and the Department of Agriculture. Such alignment will facilitate smoother trade flows.

Mapping stakeholders, both within South Africa and across the continent, is essential to ensure comprehensive engagement and coordination. Effective communication and data sharing among stakeholders is vital. This requires robust data security measures and the establishment of trust, particularly when dealing with sensitive trade information. Leveraging opportunities for data availability can enhance trade operations and decision-making.

Additionally, addressing capacity challenges is imperative. This includes ensuring adequate human resources, effective implementation of policies, and the necessary skills and expertise for maintenance. By fostering integrative stakeholder communication and collaboration, the overall efficiency and effectiveness of trade operations can be significantly improved.

[56] https://www.au-pida.org/pida-pap/

9. Opportunities in Smart Logistics

From the stakeholder engagements held, varying specific opportunities have been identified. A summary is outlined below per technological application, more detail can be found in the overview provided in *Table 8. - Specific Opportunities per sub-sector listing* in Appendix 2.

Opportunities in Key Technology Applications:

1. **Drone Technology**:
    - Satellite and Drone Monitoring for algae blooms in fisheries.
    - Improving security and reducing livestock theft, including wildlife and game.
    - Enhanced safety for abalone production or the automotive industry.
    - Infrastructure security and maintenance (including solar park inspections, or traditional energy production sites of Eskom).
    - Surveillance and security of infrastructure like railways and ports.
    - Rehabilitation of the mines, monitoring illegal mining activity.

Strict regulations govern the flying of drones in South Africa, overseen by the South African Civil Aviation Authority (SACAA) under Part 101 of the Civil Aviation Regulations. Obtaining the necessary approvals can be costly, creating a barrier to entry, and there are also annual audits required. Additionally, the approval process is time-consuming, delaying the ability of a company to begin commercial operations. There are currently, 4 competitors operating in this space.

2. **Blockchain and IoT**:
    - Improving visibility and traceability of refrigerated containers.
    - Digital animal data management and biosecurity.
    - Enhancing abalone production.

There are several companies operational in South Africa that offer solutions utilising this technology, however, overall, the problem-solving is not adequately managed, and efforts are fragmented. The solution would be to work with existing operators and involve small businesses in the ecosystem involved.

3. **Sensors and Monitoring Systems**:
    - Early warning systems for algae blooms.
    - Tracking and smart monitoring for diseases such as Foot and Mouth disease (mainly to assist local government in better management).
    - Real-time fruit quality monitoring in pre-cooling facilities.
    - Tracking & traceability data from various stakeholders to provide a holistic market overview.

These technologies are widely applied in South Africa; however, some industries may be less exposed to the potential solutions, including the smallholders that may not have the funds to implement such technologies effectively.

4. **Digital Twins and AI**:

- Port management improvements.
- Enhancing port operations or i.e. mining operations.
- Digital solutions for animal data management.

Especially interesting for larger-scale operations, and multi-national companies with budgets to apply such technologies. Solutions are being developed and offered in the country, however, there is plenty of scope to develop this market further.

5. **Cold Storage and Refrigeration Solutions**:
    - Insulated warehouses with efficient refrigeration and solar power integration.
    - Reefer container management.
    - Solar-powered pre-cooling facilities to address carbon footprint.

Local and international players are active in South Africa; however, these areas provide opportunities for further development. Specifically, solutions for smallholders are required to lessen food wastage, due to breaking the cold chain.

6. **Infrastructure Development**:
    - Improved roads, railways, inland dry ports and/or freight villages/logistical parks.
    - Establishing agro-industrial parks.

The key element to infrastructure development is sourcing funding and fund management, also these developments require successful PSP models, to effectively implement the required upgrades.

7. **Smart Agriculture and Livestock Management**:
    - Smart milking machines and automated feeding systems for example goat milk production.
    - Digital solutions for animal data management, especially for smallholders.

Advancement of technologies ties in closely with available funding and knowledge of the technologies and how they can assist producers with better results. Creative solutions are required to address these developmental solutions, and in some areas, local and Dutch technologies are already implemented.

8. **Advanced Imaging and Scanning Technologies**:
    - LIDAR and 3-D scanning for infrastructure security and maintenance.

Limited implementation, however international and few local players are providing solutions in this space. Optimisation and scaling are the opportunities in this environment, including more trained personnel to be able to operate the technology and deal with any problems that may arise.

9. **Logistical Optimization**:
    - Logistical modelling and route optimization for container alignment.
    - Infrastructure management for reefer containers.

Solutions are being developed by local and international players; however, data integration from various stakeholders is key. In some cases, stakeholders may be reluctant to share data due to fears of a competitive disadvantage. The overall benefits of data integration will need to be effectively communicated.

These solutions address various logistical and infrastructural challenges across different regions in South Africa, benefiting farmers, logistical partners, and major entities like Transnet.

10. Conclusion

In conclusion, significant advancements are occurring in smart logistics, applications, and solutions for agri-logistics and multi-modal corridors, although these terms are not yet widely utilized amongst the study participants (both South African and Dutch).

Commercial farmers are increasingly adopting smart solutions such as precision agriculture, predictive analytics, cold chain management, smart warehousing solutions, automated sorting and grading, and smart packaging solutions tailored to market demands. They also utilize supply chain visibility, traceability, collaborative platforms, and marketplaces. Industry bodies are actively collaborating on various projects to address logistical challenges and stimulate sector growth.

Conversely, smallholder farmers have limited access to these advanced solutions, primarily due to financial constraints and a lack of education and training in the latest technologies. Enhancing collaboration and resource sharing among different stakeholders could help smallholder farmers expand their market share.

In the multi-modal environment, challenges predominantly stem from inadequate maintenance and infrastructure development. Addressing these basic requirements is essential before incorporating smart solutions into the discussion, however, at the same time, it may be a good time to start looking at integrative solutions from here on.

Nevertheless, promising developments are on the horizon. Positive discussions with entities like Transnet aim to improve rail freight access for non-mining commodities. Notably, Flying Swans and its partners have received the approvals to establish a consolidation centre in a Transnet yard, facilitating the transportation of perishables from the Limpopo and Mpumalanga regions directly to the Durban port by rail.

The South African government is taking the logistics crisis seriously, exemplified by the establishment of the National Logistics Crisis Committee, which includes both government and business leaders working collaboratively to resolve the country's logistics challenges.

Dutch companies, with their extensive experience in the South African market, recognize that business progress occurs at a different pace, necessitating patience and strong relationships with local businesses and communities to address logistical challenges. Despite the hurdles, such as the BB-EEE requirements, the South African market remains compelling and may be rewarding in the long run.

11. About Rebel

No change without a Rebel

Rebels work on the issues that affect all our futures, from sustainability, transportation, and urban development to healthcare and the social sector. We make an impact not only as consultants but also as investors. After all, anyone who believes in their own advice should be prepared to invest in it. We are committed to bringing change and initiating and realising our own projects. We are committed to bringing about change by initiating and realising our own projects. We provide quality strategic advice & development, business policy & evaluation, partnership consulting & contracts, financial advice & modelling, and investments and fund management.

Thinking beyond existing structures

The Rebel adventure began in 2002, with ten chairs around a large round table. Sitting around that table, we decided to continue our careers in consultancy by starting our own company – we were the first Rebels. It was to be a company without a hierarchy, without bosses, without limits. A place where everyone could realize their full potential, bringing everything we have inside to the table. We bring everything we have inside to the table. Intrinsic motivation, the urge to bring change, expertise and one constant focus: to make a real impact with our projects around the world. We now work with more than 300+ Rebels from our offices in Rotterdam, Amsterdam, Antwerp, Düsseldorf, London, Washington D.C., Nairobi, and Johannesburg.

The drive and determination of that first step in 2002 informs how we work with and on behalf of our partners to this day. Trust is everything. In everything we do, and we do a lot! Our objective is to have a positive impact on the world. Operating at the interface between the public and the private sectors, combining social values with a keen business sense is at the core of every Rebel. That might seem like an ambitious goal, perhaps, but we have always relished a challenge. We invite everyone to join in, to become part of the change. Let's think beyond existing structures. As governments, as companies and as individuals.

12. Appendix

1. Table Overview
2. Detailed Trade Data on Key Commodities Per Province
3. Specific Opportunities per sub-sector listing
4. Matrix of Dutch Strengths and South African Logistical Challenges

Appendix 1 Table Overview

Appendix 2 Detailed Trade Data on Key Commodities Per Province

Province	Eastern Cape	
HS Codes per key Commodity	**Total Customs Value 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	7 917 587,00
07101000 - Potatoes	R	496 468,00
08081000 - Apples	R	520 199 784,00
08083000 - Pears	R	315 955 916,00
08093000 - Peaches, Including Nectarines	R	45 351 565,00
08094000 - Plums And Sloes	R	64 954 619,00
08121000 - Cherries	R	1 637,00
10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding popcorn (ZEA MAYS EVERTA))	R	19 297 125,00
12129300 - Sugar Cane	R	514,00
08051010 - Oranges	R	2 525 363 633,00
08055010 - Lemons and limes	R	1 467 729 524,00
08061000 - Grapes	R	325 546 000,00
08045010 - Mangoes	R	3 632 900,00
08039010 - Banana	R	20 738 252,00
08054010 - Grapefruits	R	315 602 688,00
08043010 - Pineapples	R	3 693 270,00
08044010 - Avocados	R	18 972 691,00
Grand Total (ZAR)	**R**	**5 655 454 173,00**

Province	Free State	
HS Codes per key Commodity	**Total Customs Value 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	27 671 700,00
07101000 - Potatoes	R	2 726 661,00
08081000 - Apples	R	30 122 299,00
08083000 - Pears	R	6 243 714,00
08093000 - Peaches, Including Nectarines	R	1 749 087,00
08094000 - Plums And Sloes	R	483 048,00
10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding pop corn (ZEA MAYS EVERTA))	R	73 164 666,00
12129300 - Sugar Cane	R	160,00
08051010 - Oranges	R	9 705 235,00
08055010 - Lemons and limes	R	1 209 434,00
08061000 - Grapes	R	3 659 531,00
08045010 - Mangoes	R	1 332 127,00

08039010 - Banana	R	16 809 787,00
08054010 - Grapefruits	R	212 478,00
08043010 - Pineapples	R	1 717 368,00
08044010 - Avocados	R	2 117 028,00
Grand Total (ZAR)	**R**	**178 924 323,00**

Province	Gauteng	
HS Codes per key Commodity	**Total CustomsValue 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	2 194 777,00
07101000 - Potatoes	R	470 885,00
08081000 - Apples	R	36 233 267,00
08083000 - Pears	R	5 391 620,00
08093000 - Peaches, Including Nectarines	R	39 497 430,00
08094000 - Plums And Sloes	R	5 746 978,00
08121000 - Cherries	R	4 258 787,00
10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding pop corn (ZEA MAYS EVERTA))	R	20,00
08051010 - Oranges	R	29 816 792,00
08055010 - Lemons and limes	R	2 112 870,00
08061000 - Grapes	R	54 783 739,00
08045010 - Mangoes	R	61 470 911,00
08039010 - Banana	R	391 637,00
08054010 - Grapefruits	R	1 762 150,00
08043010 - Pineapples	R	29 745 123,00
08044010 - Avocados	R	52 946 197,00
Banana		367565
Grand Total (ZAR)	**R**	**327 190 748,00**

Province	KwaZulu Natal	
HS Codes per key Commodity	**Total CustomsValue 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	2 174 538,00
07101000 - Potatoes	R	23 461,00
08081000 - Apples	R	155 063 365,00
08083000 - Pears	R	25 808 300,00
08093000 - Peaches, Including Nectarines	R	9 279 596,00
08094000 - Plums And Sloes	R	4 376 474,00
08121000 - Cherries	R	146,00
10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding pop corn (ZEA MAYS EVERTA))	R	108 340 687,00
12129300 - Sugar Cane	R	27 275,00

08051010 - Oranges	R	2 411 800 070,00
08055010 - Lemons and limes	R	1 358 039 621,00
08061000 - Grapes	R	338 078 232,00
08045010 - Mangoes	R	14 294 774,00
08039010 - Banana	R	460 722,00
08054010 - Grapefruits	R	494 870 346,00
08043010 - Pineapples	R	531 442,00
08044010 - Avocados	R	7 710 837,00
Grand Total (ZAR)	**R**	**4 930 879 886,00**

Province	Limpopo	
HS Codes per key Commodity	**Total Customs Value 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	423 491,00
07101000 - Potatoes	R	6 123 933,00
08081000 - Apples	R	164 354 153,00
08083000 - Pears	R	11 099 856,00
08093000 - Peaches, Including Nectarines	R	2 547 581,00
08094000 - Plums And Sloes	R	9 861 906,00
08121000 - Cherries	R	29 170,00
10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding pop corn (ZEA MAYS EVERTA))	R	28 312 774,00
12129300 - Sugar Cane	R	32 000,00
08051010 - Oranges	R	20 610 156,00
08055010 - Lemons and limes	R	1 936 476,00
08061000 - Grapes	R	32 472 399,00
08045010 - Mangoes	R	522 975,00
08054010 - Grapefruits	R	661 607,00
08043010 - Pineapples	R	4 070 095,00
08044010 - Avocados	R	131 132,00
Grand Total (ZAR)	**R**	**283 189 704,00**

Province	Mpumalanga	
HS Codes per key Commodity	**Total Customs Value 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	39 074 249,00
07101000 - Potatoes	R	11 939 534,00
08081000 - Apples	R	193 789 999,00
08083000 - Pears	R	24 791 431,00
08093000 - Peaches, Including Nectarines	R	8 201 505,00
08094000 - Plums And Sloes	R	8 445 395,00
08121000 - Cherries	R	59 489,00

10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding pop corn (ZEA MAYS EVERTA))	R	805 846 391,00
12129300 - Sugar Cane	R	1 792,00
08051010 - Oranges	R	341 665 770,00
08055010 - Lemons and limes	R	32 796 625,00
08061000 - Grapes	R	41 669 364,00
08045010 - Mangoes	R	32 966 281,00
08039010 - Banana	R	6 490 668,00
08054010 - Grapefruits	R	1 836 340,00
08043010 - Pineapples	R	1 957 815,00
08044010 - Avocados	R	3 758 338,00
Grand Total (ZAR)	**R**	**1 555 290 986,00**

Province	Northwest	
HS Codes per key Commodity	**Total Customs Value 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	1 742 161,00
07101000 - Potatoes	R	80 943 342,00
08081000 - Apples	R	181 685 458,00
08083000 - Pears	R	34 220 567,00
08093000 - Peaches, Including Nectarines	R	14 498 957,00
08094000 - Plums And Sloes	R	12 600 262,00
08121000 - Cherries	R	148 792,00
10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding pop corn (ZEA MAYS EVERTA))	R	418 470 632,00
12129300 - Sugar Cane	R	3 850,00
08051010 - Oranges	R	32 990 485,00
08055010 - Lemons and limes	R	6 264 540,00
08061000 - Grapes	R	55 921 667,00
08045010 - Mangoes	R	21 931 577,00
08039010 - Banana	R	80 116 941,00
08054010 - Grapefruits	R	987 923,00
08043010 - Pineapples	R	10 975 215,00
08044010 - Avocados	R	16 927 317,00
Grand Total (ZAR)	**R**	**970 429 686,00**

Province	Western Cape	
HS Codes per key Commodity	**Total Customs Value 2023**	
07020000 - Tomatoes, Fresh Or Chilled	R	270 626,00
07101000 - Potatoes	R	481 943,00
08081000 - Apples	R	7 551 847 431,00

08083000 - Pears	R	3 168 867 913,00
08093000 - Peaches, Including Nectarines	R	826 114 533,00
08094000 - Plums And Sloes	R	1 575 280 570,00
08121000 - Cherries	R	7 468 397,00
10059010 - Dried kernels or grains fit for human consumption, not further prepared or processed and not packaged as seeds (excluding pop corn (ZEA MAYS EVERTA))	R	57 187,00
12129300 - Sugar Cane	R	49 168,00
08051010 - Oranges	R	9 040 706 153,00
08055010 - Lemons and limes	R	3 866 802 717,00
08061000 - Grapes	R	10 158 519 393,00
08045010 - Mangoes	R	84 941 599,00
08039010 - Banana	R	43 782,00
08054010 - Grapefruits	R	1 475 924 788,00
08043010 - Pineapples	R	45 707,00
08044010 - Avocados	R	2 418 293 311,00
Grand Total (ZAR)	**R**	**40 175 715 218,00**

Table 8. - Detailed Trade Data on Key Commodities per Province[57]

[57] Data source: https://www.sars.gov.za/customs-and-excise/trade-statistics/

Appendix 3 Specific Opportunities for Smart Logistics in South Africa

	Technology	Challenge	Sub-sector	Potential solution/opportunity	Geographical Area	Beneficiaries
1	Satellite and drone monitoring, real-time data analysis	Algae blooms (neurotoxins) pose a risk to consumers (oysters/mussels).	Fisheries	Smart early warning systems isolation of affected areas.	Eastern Cape	www.the-kingfish-company.com
2	Drone technology, Underwater cameras and sensors, Satellite imagery, DNA barcoding	Abalone, theft issues with trucks being ambushed. Livestock theft.	Fisheries / Livestock	Increased security and protection of wild-growing abalone. Train farmers to fly drones for applications such as Livestock counting.	Eastern Cape, Western Cape, fewer in Northern Cape	aqunion.com/ westcoastabalonecompany.com/ www.hik.co.za/
3	Drone technology, Blockchain technology, IoT	Abelone production in open sea (vs on land).	Fisheries	Open sea abalone production for less production costs.	Eastern Cape, Western Cape, fewer in Northern Cape	aqunion.com/ westcoastabalonecompany.com/ www.hik.co.za/
4	Improved Packaging, Smart Monitoring and Tracking (Sensors), Optimized Storage and Transportation	Spread of Foot and Mouth disease is currently taken as a blanket approach	Livestock	Better manage the biosecurity zones	Eastern Cape and others	Dept of Agri & Land Development in collaboration with veterinary section dep Agri Rural Development.
5	Drone Applications, LIDAR, 3-D scanning	Maintenance planning and inspection of infrastructure, security of infrastructure.	Multi-modal	Drone applications for solving security issues in multi-modal, inspection of infrastructure, such as rail tracks, and port infrastructure.	Countrywide	Transnet Port Terminals (TPT) is a division of Transnet SOC Limited, Inland Ports, Airports
6	Digital Twins	Port Management	Multi-modal	Opportunity to utilise AI and digital twins to draw up the port sites	Port hubs	Transnet Port Terminals (TPT) is a division of Transnet SOC Limited
7	Route optimisation	Imported goods such as fertiliser products could be filled with grain or other produce for exports.		Aligned usage of containers	Free State & others	Producers, Logistical Parties

8	Develop appropriate cold storage solutions using insulated warehouses with efficient refrigeration systems. Solar power could be integrated to reduce operating costs.	Lack of cold storage in some parts of the country, such as in East London port.	Cold Storage	Develop appropriate Cold Storage solutions.	Eastern Cape	Producers, Logistical Parties
9	Invest in infrastructure development such as improved roads,	Dysconnectivity in EC: production vs point of exit, connecting to the hubs in urban areas.	Infrastructure development	New infra development - move the container port and add a fuel terminal. Invest in Vessels.	Eastern Cape	Farmers (commercial and smallholders), Logistical partners
10	railways, and inland waterways to connect production centres to ports and urban hubs more efficiently.	Dysconnectivity in EC: production vs point of exit, connecting to the hubs in urban areas.	Infrastructure development	Agro-industrial inland park	Eastern Cape	Farmers (commercial and smallholders), Logistical partners
11	Digital solutions for animal data collection and management can improve transparency and traceability in the livestock sector. This could include mobile apps and cloud-based platforms for data storage and analysis.	Biosecurity: information asymmetry - bias	Biosecurity	Digital solutions to talk to animal safety, potential for smart data flows.	Countrywide	Farmers (commercial and smallholders)
12	Smart milking machines, Automated feeding systems, smart packaging, management software, education & training.	Demand for goat milk is not adequately optimised.	Infrastructure development	Goat milk production, with packaging and pasteurisation/sanitation facilities.	I.e. Eastern Cape, Free State	Farmers (commercial and smallholders)

13	Blockchain technology can be used to track the movement of refrigerated containers in real time, ensuring product quality and reducing spoilage.	Lack of visibility of reefer traceability.	Cold Storage	Visibility on the supply chain, reefer, temp/traceability/visibility.	Countrywide	Farmers (commercial and smallholders), Logistical partners
14	Artificial intelligence (AI) and digital twins can be used to optimize port operations, such as scheduling, yard management, and resource allocation. This can lead to faster cargo clearance and reduced congestion.	New operating systems are to be explored.	Management Solutions	Dynamic port planning is required, as the operating system (looking to buy these systems) and comparison of available systems.	KZN, WC	Transnet Port Terminals (TPT) is a division of Transnet SOC Limited, Farmers (commercial and smallholders), Logistical partners, Shipping lines
15	Improved Reefer Container Availability and Utilization.	Sufficient Management Solutions	Management Solutions	Infrastructure management side, run the yard, optimise stacking space.	KZN	Transnet Port Terminals (TPT) is a division of Transnet SOC Limited, Farmers (commercial and smallholders), Logistical partners, Shipping lines
16	Solar-powered pre-cooling facilities and real-time monitoring of fruit quality.	Insufficient offloading spaces and specialised facilities.	Infrastructure development	Improve offloading spaces, specialised facilities & systems to drive such.	KZN	Transnet Port Terminals (TPT) & Transnet Freight Rail (TFR) is a division of Transnet SOC Ltd, Farmers (commercial and smallholders), Logistical partners, Shipping lines

17	Drone technology can be used for surveillance and security purposes, monitoring infrastructure like railway tracks and port facilities for potential threats.	Requirement for Integrative security solutions.	Management Solutions	Integrative security solutions (police /centres of intelligence)	Mainly WC, KZN	Transnet Freight Rail (TFR) is a division of Transnet SOC Ltd, Transnet Port Terminals (TPT) is a division of Transnet SOC Limited

Table 9. – Specific Opportunities for Smart Logistics in South Africa

Appendix 4 Matrix of Dutch Strengths and South African Logistical Challenges

Opportunities for collaboration	South African Logistics Challenges	Road Freight:	Over-reliance on road freight.	High transportation costs.	Poor road conditions in certain regions.	Safety concerns for long-distance drivers.	Rail Freight:	Declining state of infrastructure.	Lack of funds to improve the rail infrastructure.	No subsidies to support rail freight.	Lack of readiness for perishables.	Port Freight:	Lack funds for maintenance & infrastructure dev	Poor port planning and maintenance.	Lack of transparency or predictability on arrival goods.	Port congestions, including weather events.	Air Freight:	Limited cargo scanner availability and technicians.	LSP's not all integrated into the air cargo space.	Data Gaps and Collaboration:	Limited access to data for some stakeholders.	Lack of collaboration between different players.
Dutch Expertise																						
Data-Driven Optimization:																						
Dutch companies excel at leveraging data analytics and artificial intelligence (AI) to optimize logistics operations.																						
Predictive Maintenance: AI algorithms analyze sensor data from equipment to predict maintenance needs and prevent downtime.				✓	✓			✓	✓		✓		✓	✓	✓			✓			✓	✓
Demand Forecasting: Advanced analytics help companies forecast demand for goods, allowing for optimized inventory management and resource allocation.				✓	✓			✓		✓			✓	✓	✓	✓		✓			✓	✓

Route Optimization: Using real-time data on traffic, weather, and vehicle location, Dutch companies can optimize delivery routes, reducing costs and emissions.			✓			✓			✓		✓		✓	✓	✓	✓					✓	✓
Advanced Warehousing & Automation:																						
Automated Storage and Retrieval Systems (AS/RS): Automated systems for efficient storage and retrieval of goods, reducing human error and increasing storage density.																					✓	✓
Warehouse Robots: Robots perform tasks like picking and packing, improving accuracy, speed, and safety in warehouses.																						
Warehouse Management Systems (WMS): Sophisticated software manages all warehouse operations, providing real-time inventory visibility and streamlining processes.													✓						✓			
Multimodal Transportation & Connectivity																						
Dutch companies are experts in integrating different modes of transport, such as:																						
Intermodal Logistics: Seamless movement of goods between different transport modes (road, rail, water) through standardized containers and efficient logistics hubs.			✓	✓				✓	✓	✓	✓			✓	✓	✓		✓	✓		✓	✓
Sustainability Focus																						
Sustainability is a core value for many Dutch companies, reflected in their smart logistics practices:																						

Green Logistics Initiatives: Focus on reducing emissions through measures like electric vehicles for last-mile delivery, biofuels for heavy transport, and optimizing routes for fuel efficiency.								✓					✓	✓								
Innovation & Collaboration																						
Dutch companies foster a culture of innovation and collaboration:																						
Open Innovation Ecosystem: Many Dutch companies collaborate with universities, research institutes, and startups to develop new technologies and solutions in smart logistics.			✓			✓					✓			✓	✓	✓			✓		✓	✓
Public-Private Partnerships: Collaboration between the public and private sectors ensures infrastructure development and implementation of smart logistics solutions that benefit all stakeholders.					✓				✓	✓	✓		✓	✓	✓	✓					✓	✓

Table 10. – Matrix of Dutch Capabilities and South African Logistical Challenges

Carolien van der Horst
+27 72 146 6384
carolienvanderhorst@rebelgroup.com

Laurens Cloete
+27 82 461 2404
Laurens.cloete@rebelgroup.com

Rhulani Madale
+27 72 863 5426
Rhulani.Madale@rebelgroup.com

3rd Floor, Suite 21
Building 2, Glenhove and Oxford Precinct
114 Oxford Road
Houghton Estate, 2198, Johannesburg
South Africa
+27 10 591 9018 / 1232
adminsa@rebelgroup.com
www.rebelgroup.com