



## **How can African ports be more competitive at the global level?**

### **Junior Member Presentation**

Pranav Sambhare

Junior Member

Learning Unit – Global Economy (I)

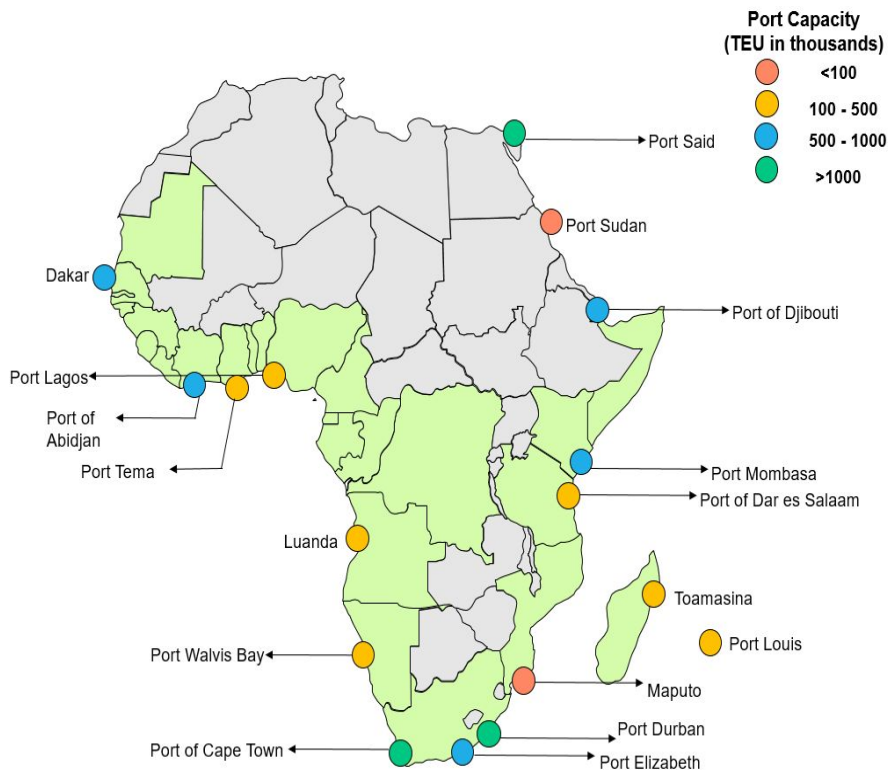
IIT Bombay



# Executive Summary

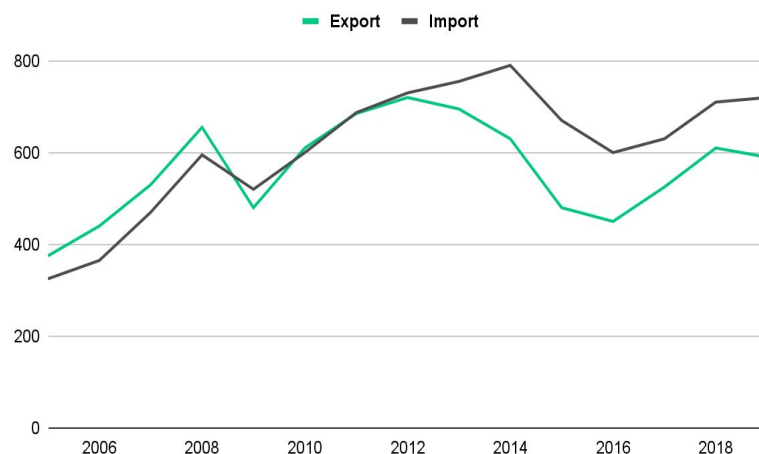
- **Africa's gateways to trade: Ports account for 80% of the continent's containerised cargo trade by volume and 70% by value**
- **Despite of its enormous size, Africa represents only about 3% of the world's trade by value**
- **Inefficient infrastructure has created a bottleneck in Africa's port sector growth**
- **Private firms often use long dwell times as a strategic tool to prevent competition**
- **African ports are embracing various technologies to achieve performance improvements realized by their counterparts**
- **Investment in automated equipment can save upto 30% time in shipment management at ports**
- **Port automation can help reduce operating expenses by 25% to 55% and increase productivity by 10% to 35%**

# Ports account for 80% of the continent's containerised cargo trade by volume and 70% by value



- While only one-third of the countries are landlocked, maritime transport is the main gateway to the global markets
- Africa accounts for: **3%** of the international freight transport by value

Trade in goods and services of Africa, 2005-19 (billion USD)



- Over the last decade, the volume of cargo moving through Africa's ports has nearly **tripled**
- In 2019, merchandise trade recorded:
  - Exports worth **US\$ 462 billion**
  - Imports worth **US\$ 569 billion**
  - an average drop of **3%** compared to 2018
- Africa accounts for **7%** and **5%** of maritime exports and imports by volume, respectively

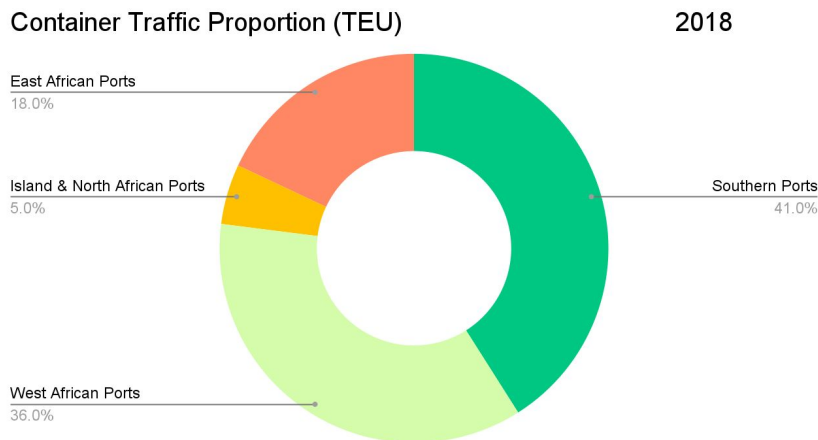
TEU: Twenty-foot equivalent unit, commonly used unit of cargo capacity for container ports.

Source: PwC, UNCTAD and World Trade Organization

# Despite of its enormous size, Africa represents only about 3% of the world's trade by value

## Current Scenario

- Cargo spends nearly **3 weeks** (dwell time) on average in Sub-Saharan African ports, **3 times more** as compared to European, Asian and Latin American ports
- The time spent by goods at a port in Africa accounts for about **75% of the total transit time**
- Below Global Average on 3 productivity measures of ports:
  - **Gross Moves Per Hour (GMPH)**: measures the crane's ability to move containers across the quay wall
  - **Berth Moves Per Hour (BMPH)**: total number of containers loaded/ unloaded on a vehicle in an hour
  - **Man Hours Per Move (MHPM)**: represents the efficiency of the labour



- **High transport costs** add around **75%** to the price of African goods
- Shipment sizes are small as compared to those globally, resulting in **high unit cost of a shipment**
- Africa's port sector attracted a net private funding of **\$15Bn** between 2015 and 2019
- Current port growth will not be able to keep up with the increasing demand growth, which is expected to grow by **6-8 times** by 2040

TEU: Twenty-foot equivalent unit, commonly used unit of cargo capacity for container ports.

Source: PwC

# Inefficient infrastructure has created a bottleneck in Africa's port sector growth

## Sea-side Front

- Most African countries have either **inadequately-developed** or **too few ports**
- Without adequate infrastructure, Africa risks **losing 2% GDP growth PA**
- Only **60%** of the **design capacity** is being used in West African ports

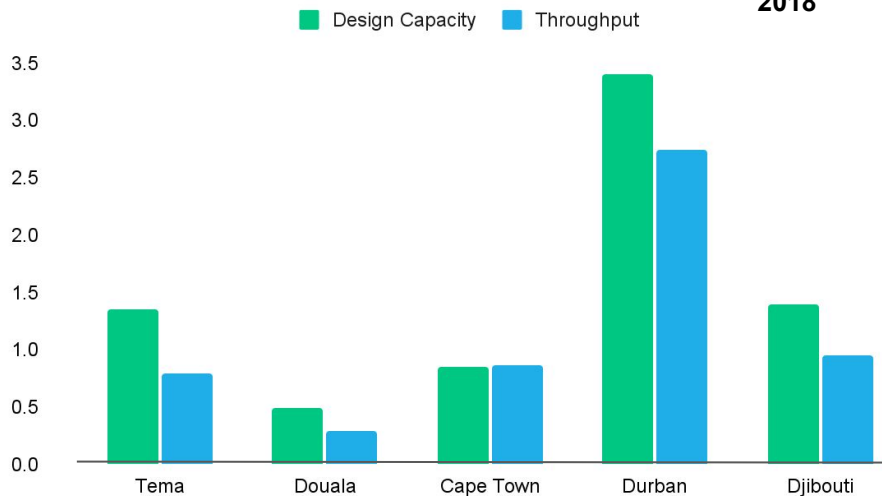
## Trade type

- Africa is heavily reliant on exporting **commodities**
- **Agriculture & Mining** account for **72%** of Africa's total trade
- **Fluctuations** in commodity prices results in a varying demand and hence, a higher risk

## Land-side Front

- **Logistics costs** as a percentage of total production costs remains high
- **High storage rates** in the hinterland, force private firms to use ports as storage facilities, causing delays
- **Slow transportation**, especially in Central & Western Africa

**Design Capacity vs. Throughput (in Million TEU)**  
2018



## World Bank Report

- A large portion of dwell time can be explained by the collusion between the different sectors of port operation
- Along with infrastructure development, it is important to disrupt the collusive activities of the private sector

TEU: Twenty-foot equivalent unit, commonly used unit of cargo capacity for container ports.

Source: PwC, WTO Secretariat Estimates, World Bank Research

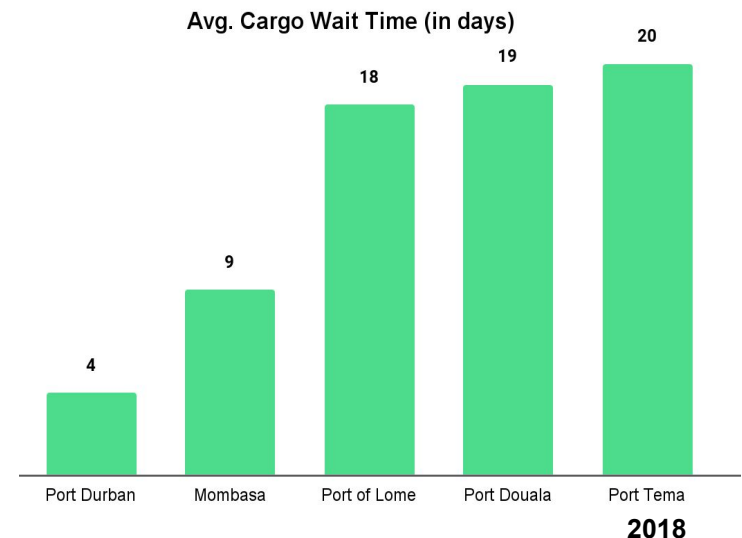
# Private Firms often use long dwell times as a strategic tool to prevent competition

According to reports, Govt. owned ports **lack exposure** to commercial competition and have **reduced incentives** to operate efficiently. Public-Private partnerships are introduced with the motive to **attract foreign investment** and to increase the **competitiveness** of ports.

- A large portion of dwell time can be explained by the collusion between the port authorities, private terminal operators, and shippers.
- The **port storage facilities are often cheaper** than hinterland storage facilities. At the Douala Port in Cameroon, the port is the cheapest option to store goods for upto 22 days.
- Storing goods at ports also acts as a **barrier to entry** for other traders. The consumers are worst hit by this strategy.
- However, a few ports like Port of Durban, have identified these issues and taken steps to pressurize the private sector to reduce delays.

## Port of Durban

- Managed to disrupt private firms' efforts to use such strategies to a great extent.
- The port authorities and the customs department put pressure on the private sector to reduce delays by:
  - levying prohibitive charges for storage.
  - strictly enforcing storage limits.
  - offering the option of pre-clearing goods of customs processes before arriving at the port.
- Today more than 90% of the cargo at Port Durban is cleared within 3 days.



# African ports are embracing various technologies to achieve performance improvements realized by their counterparts

## What are Smart Ports?

- Ports which use automation and innovative technologies like **Artificial Intelligence, Big Data, Blockchain** and **Internet of Things (IoT)** to improve performance
- Includes IoT platforms for traffic congestion management and pollution control, tracking barges using **RFID tags\*** and **intelligent trade flow solutions**

## Strategies

- **Blockchain Technology**
  - A unique code is assigned to containers, making it easier to track the containers
  - Can help **increase transparency** in transactions
  - Cuts down on the daily administrative duties, time and costs
  - **Smart contracts** allow automating and streamlining processes
- **Automated ports**
  - deploy cloud based software which assist in managing resources, traffic, infrastructure and maintenance
  - Container ports ideal for automation since the environment is structured and predictable, many activities are repetitive and they generate large amounts of data
  - For successful implementation of these, the ports must employ port operators with experience in automation

## Global Impact

- The semi and fully automated ports are currently worth **\$9.09B** and is expected to **jump 20%** to **\$10.89B** by the next year
- Port of Hamburg has heavily invested in Smart Port logistics equipped with **real-time navigation, intelligent railway points, E-mobility** in ports, **smart maintenance** to optimise movement of empty containers
- Smart Port technology helped the Port of Shanghai reach a record container traffic of **47M TEUs** in 2021

\* RFID Tags are a type of tracking system that uses smart barcodes in order to identify items.

Source: Mckinsey & Company, Daily Logistics, Hamburg Port Authority, SHM Group

# Investment in automated equipment can save upto 30% time in ship management at ports



## Equipment Control Systems

- Systems that integrate processes, make operations smoother
- Provide more information for decision making
- Integrated gate operating software, for example to automate gate operations and container identification and routing



## Human Machine Interaction

- The increasing use of robots makes interactions between them and humans more important
- Technologies like Augmented Reality can speed up complex tasks
- Along with modern technologies, methods to make human-machine interactions more effective are necessary



## Port Community Interaction

- Seamless connectivity along both seaside and landside is essential
- Digitization and real-time connectivity are important for collaboration of stakeholders throughout the value chain



## Terminal Control Tower

- Comprises of decision-making tools, advanced analytics, and the interface between community and customers
- Coordinates and optimizes the management of the entire port
- Handles:
  - demand forecasting
  - workflow management
  - scheduling and optimization
  - monitoring and control
- Instructs the Equipments Control and receives real-time feedback



## Automated Equipment

- Makes operations run more consistently and reduces downtime
- Requires large capital investment
- Implemented across ship to shore cranes, yard operations, ground transportation, gate automation
- Transitioning to automated ports, however, may result in job losses





# Port automation can help reduce operating expenses by 25% to 55% and increase productivity by 10% to 35% if implemented correctly

- Ports are ideal for automation since the port environment is **highly structured** and **predictable**
- Without proper implementation, automation fails to meet its expectations:
  - Expenses on an average decrease by about **15 - 35%** only
  - Productivity in fact, has **decreased** by about **7-15%** in some cases

## Major Barriers

---

- **Lack of quality resources:**
  - Shortage of talent for specialised technical positions
  - Ports have failed in planning and implementation for resource acquisition
- **Poor data quality:**
  - Lack of structured and transparent data makes it difficult to find issues
  - Ports haven't realised the scope of data analysis

## Solutions

---

- Redesigning the operational model integrating all the processes
- Ensure proper communication between all the stakeholders
- Merely adding new equipment and running old processes won't help
- Proper training for port operators and suppliers

- African ports face the challenges of underdeveloped infrastructure and inefficient operations
- To address these, global donor organizations have funded the development of various African trade corridors:
  - Capacity expansion
  - Deepening of canals
  - Widening basins