# UIC Symposium

**30 November – 1 December 2021**



# AFRICAN FOCUS
# Panel 1: The pan African Rail networks from vision to implementation

- Moderator: Ms. Heather Thompson, CEO, ITDP

- Mr. Mohamed Khlie, Director General, ONCF, Chairman of UIC Africa, UIC Vice Chairman
- Mr Younes Touitha, on Behalf of Dr. Towela Nyirenda-Jere, Head of Economic Integration Division, AUDA-NEPAD
- Mr. Wolfgang Küpper, Secretary General, OTIF
- Mr. Ayman Masoud Abdel Aziem, Director of the Risk Assessment Department, ENR

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**Mr. Mohamed Khlie, Director General, ONCF, Chairman of UIC Africa, UIC Vice Chairman**

# Africa, dynamics and mobility factors

**A remarkable evolution of mobility factors**

- Population clock: record growth
- A growing middle class
- Accelerated urbanization
- An economic reversal from 1995

**A socio-economic framework undergoing major changes for two decades**

- Productive sectors in transformation
- Attractiveness hampered by external constraints
- Low weight in international trade
- ZLECA, a geostrategic project

**16,6%**
Of global Population

**25%**
Middle class / total population

**43%**
Urbanization rate (2018)

**+40%**
GDP growth Per inhabitant

**1,2**
Exchanges / year Period 200-2019

**47%**
Global mineral wealth reserves

# Africa,
# a transport sector to develop

The road, a large predominance: 90% of the traffic

Ports provide 95% of import-export goods flows

Air transport, a strong weakness to external changes

Railways, a known underinvestment

- Sectoral and unilateral policy
- Budget constraints
- Planning difficulties

- Coordination and harmonization deficit
- Lack of adequate legal instruments
- Lack of experience and expertise….

**-40%**
Value of the annual loss of African GDP due to the transport deficit

**2 à 4**
GDP points / year the cost of the infrastructure deficit in Africa

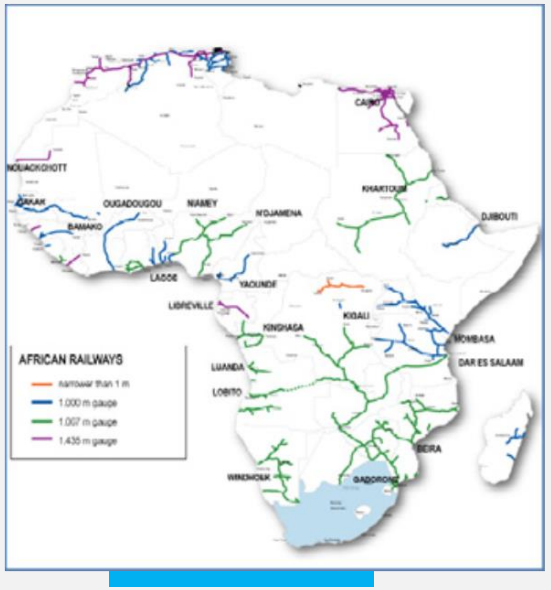
**6 à 6,8%**
Annual increase in transport demand

**30 à 40%**
of the value of imported products corresponds to the cost of transport in Africa

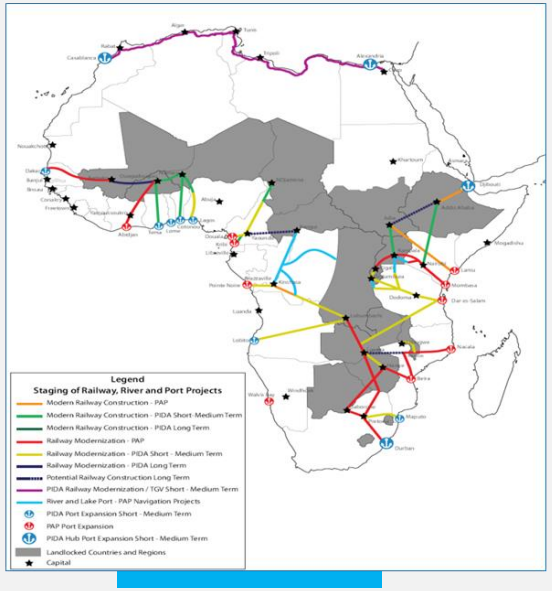
**+2 à 4**
times, logistics costs in sub-Saharan Africa than in other emerging countries

# Africa,
# the revitalization of the railways is imperative

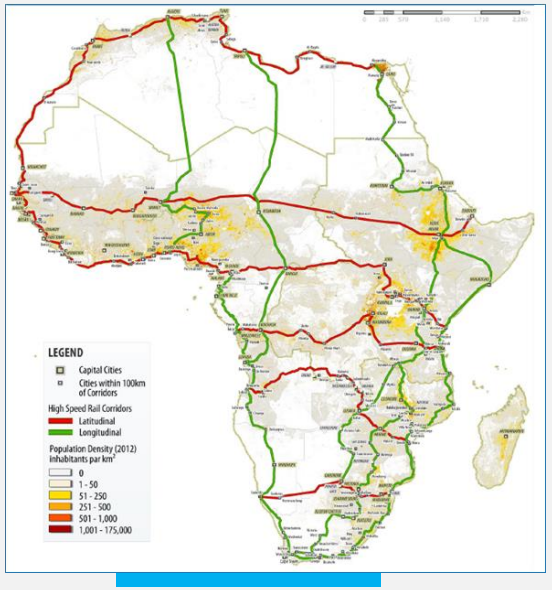
## EXISTING NETWORK




## CONVENTIONAL PROJECTS (PIDA 1)




## CONTINENTAL HSR




**90000 km**
Existing network

**14%**
Normal spacing

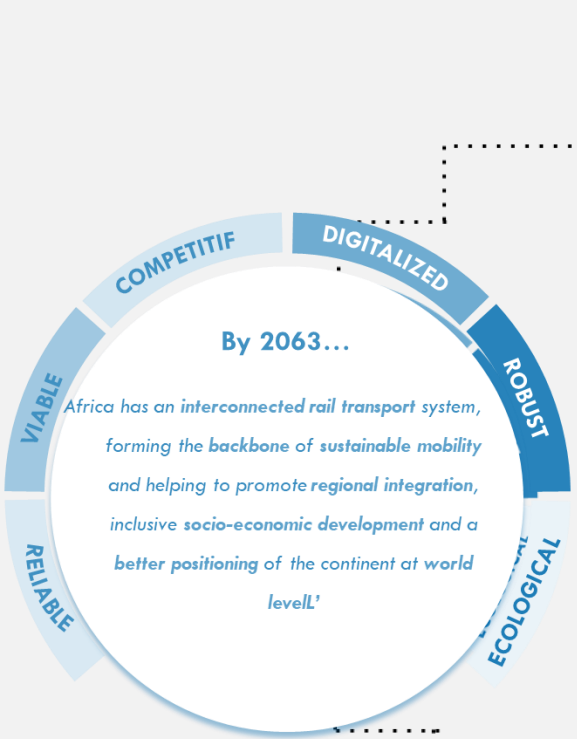
**3,4 km**
Network density

**7%**
of the world network

**2%**
world traffic

**12000 km**
AHSR length

# The ‘Africa Rail 2063’ strategy : One vision, four axes and three pillars




**1** Strength the DNA of sustainable passenger and freight mobility

**2** Support social and territorial inclusion policy

**3** Develop the internal performance of railway undertakings

**4** Promote regional integration by combining economic logic and ecological transition

**4 axes of transformation**

GARE DE DÉPART 2021

**3 pillars of change**

GARE TERMINUS 2063

**1** Rethink the economic model of the railway sector

**2** Accelerate digital transformation

**3** Ensure optimal irrigation of the territories

The ‘Africa Rail 2063’ strategy

# 20

## AMBITIOUS GOALS FOR A BRIGHT FUTURE ……..

### TERRITORIAL NETWORK

| | |
|---|---|
| Network doubling (km) | 150000 |
| Territorial coverage (km per km2) | 10 |
| Population served (%) | 80 |
| International airports served (%) | 100 |
| Connected ports (%) | 100 |
| Logistics sites and platforms (%) | 100 |

### ECONOMIC DYNAMICS

| | |
|---|---|
| Cumulative investment ($bn) | 660 |
| Need in relation to GDP (per year) | 0,6% |
| Contribution to GDP | 14% |
| Jobs created (million days) | 760 |
| Gains for the community ($M/year) | 34 |
| Creation of intangible capital ($M/year) | 75 |

### SUSTAINABLE MOBILITY

| | |
|---|---|
| Market share in passenger traffic | 25% |
| Market share of freight traffic | 35% |
| Freight transport cost savings | 30% |
| Satisfaction rate | 86% |
| Energy efficiency (2050) | Neutralité |
| GHG emissions (CO2 : Millions/year) | -80 |
| Number of road fatalities avoide/year | -20% |
| Number of cars avoided on the road | -30% |

# Thank you for your attention

# UIC Symposium

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**Mr Younes Touitha, on behalf of Dr. Towela Nyirenda-Jere, Head of Economic Integration Division, AUDA-NEPAD**

# UIC Symposium

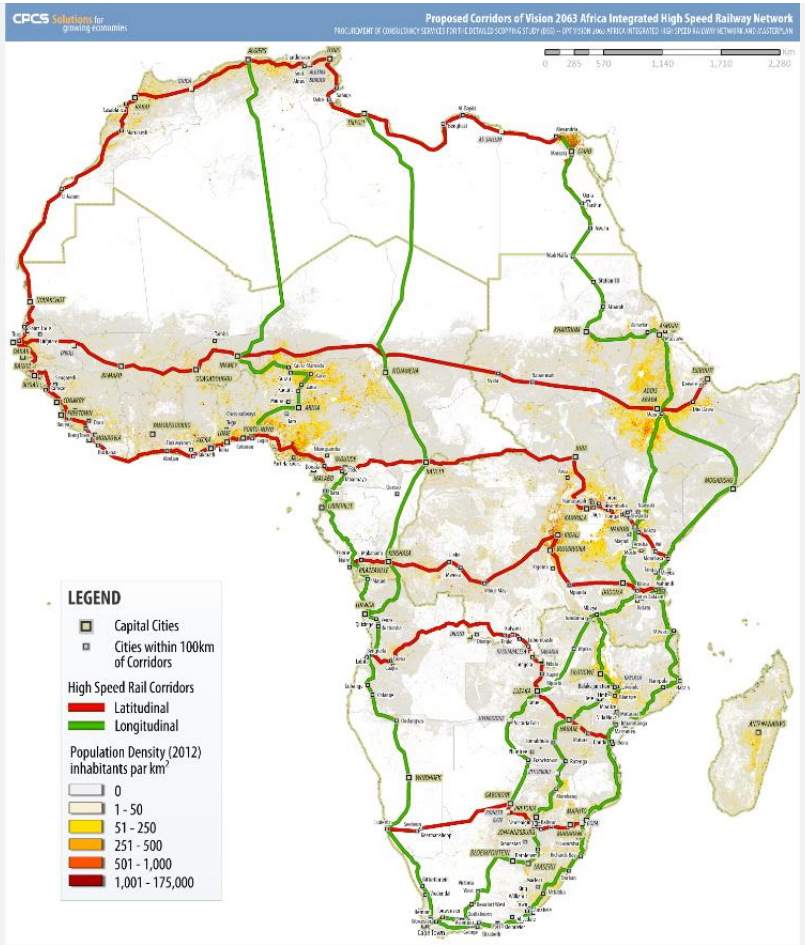
## The pan African Rail networks from vision to implementation

30 November – 1 December 2021

# Background - AIHSRN

- **In context of Agenda 2063, objective is to facilitate economic and physical integration of Africa**
  - Connect landlocked countries to seaports
  - Provide interconnections between different regions/parts of African
  - Establish “Trans-Africa beltways”, similar to Trans African Highways (TAH)
  - Connect all political and economic capitals
- **Detailed Scoping Study (DSS) undertaken**:
  - traffic demand forecasts, costs and revenue estimates,
  - corridor/ routes,
  - rail technology options,
  - innovative financing models

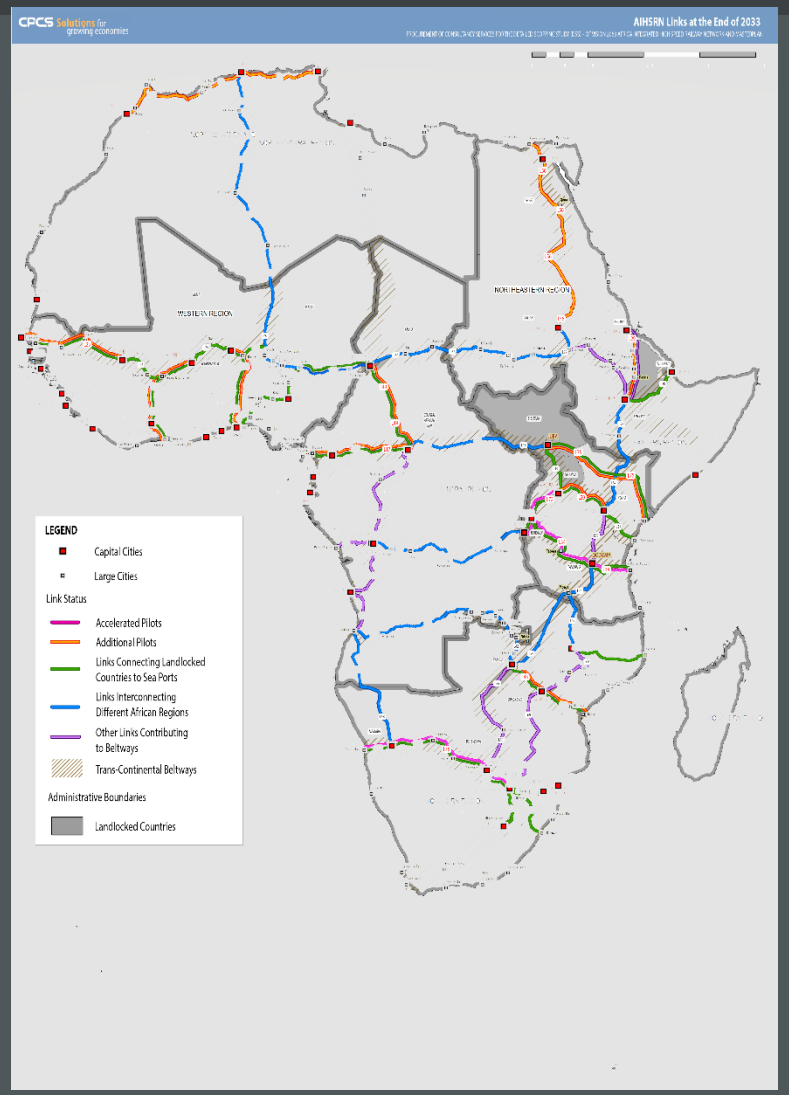
  => to develop a 10-year and beyond implementation plan



# DSS Results

- **Target Traffic & Speed options**
  - **Category A** – High speed, passenger trains only
    - Speeds up to 320 km/h (or 330 km/h
  - **Category B** – Semi high speed, mix of passenger and freight trains
    - Speed up to 240 km/h for passenger trains and up to 120 km/h for freight
  - **Category C** – mainly or only freight trains
    - Speed up to 120 km/h
- Interoperability
  - SGR recommended
- Electrification
- Operation
- Financing
- Implementation Framework

# Masterplan 2033




**Accelerated Pilots**

| No. | Project | Countries Involved | REC Ownership |
|---|---|---|---|
| 1 | Dar es Salaam-Kigali combined with Kampala-Bujumbura | Burundi, Rwanda, Tanzania, Uganda | COMESA, EAC, ECCAS, IGAD, SADC |
| 2 | Johannesburg-Gaborone-Windhoek-Walvis Bay | Botswana, Namibia, South Africa | SADC |

**Additional Pilots**

| No. | Project | Countries Involved | REC Ownership |
|---|---|---|---|
| 1 | Nairobi-Kampala | Kenya, Uganda | COMESA, EAC, IGAD |
| 2 | Abidjan-Ouagadougou | Burkina Faso, Ivory Coast | CEN-SAD, ECOWAS |
| 3 | Tunis-Algiers-Sidi Bel Abbes-Casablanca | Algeria, Morocco, Tunisia | UMA, COMESA, CEN-SAD |
| 4 | Cotonou-Niamey | Benin, Niger | CEN-SAD, ECOWAS |
| 5 | Alexandria-Khartoum | Egypt, Sudan | COMESA, CEN-SAD, IGAD |
| 6 | Addis Ababa-Asmara | Eretria, Ethiopia | COMESA, CEN-SAD, IGAD |
| 7 | Beira-Lusaka | Mozambique, Zambia, Zimbabwe | COMESA, SADC |
| 8 | Douala-Bangui | Cameroon, Central African Republic | CEN-SAD, ECCS |
| 9 | N'Djamena-Bangui | Chad, Central African Republic | CEN-SAD, ECCS |
| 10 | Dakar- Bamako | Mali, Senegal | CEN-SAD, ECOWAS |
| 11 | Lamu-Juba | Kenya, South Sudan | COMESA, EAC, IGAD |

# Conclusions

- Project Preparation is critical – need to ensure that adequate resources are provided for early-stage project preparation
- Innovative financing required to meet the infrastructure deficit
- Integrated Corridor Approach offers promise of multi-sectorial integrated infrastructure development
- Need to develop a Financing Strategy and Partnerships Strategy for HSR.
- AUDA-NEPAD has developed various tools and instruments that are readily available to support transport and other infrastructure projects
  - Advisory services based on our various tools, establishment of expert service pools and incorporation of sustainable business models and cost-recovery mechanisms are essential pivots

# Thank you for your attention

# UIC Symposium

**30 November – 1 December 2021**

**Mr. Wolfgang Küpper, Secretary General, OTIF**

# The Organisation and the Convention
## OTIF and COTIF: Key Facts

### THE ORGANISATION

Intergovernmental Organisation for International Carriage by Rail

**50** MEMBER STATES
**+1** ASSOCIATE MEMBER

3 WORKING LANGUAGES : FR/DE/EN

HEADQUARTERS: Berne, Switzerland

### COTIF THE CONVENTION

**COTIF 1999** Convention concerning International Carriage by Rail

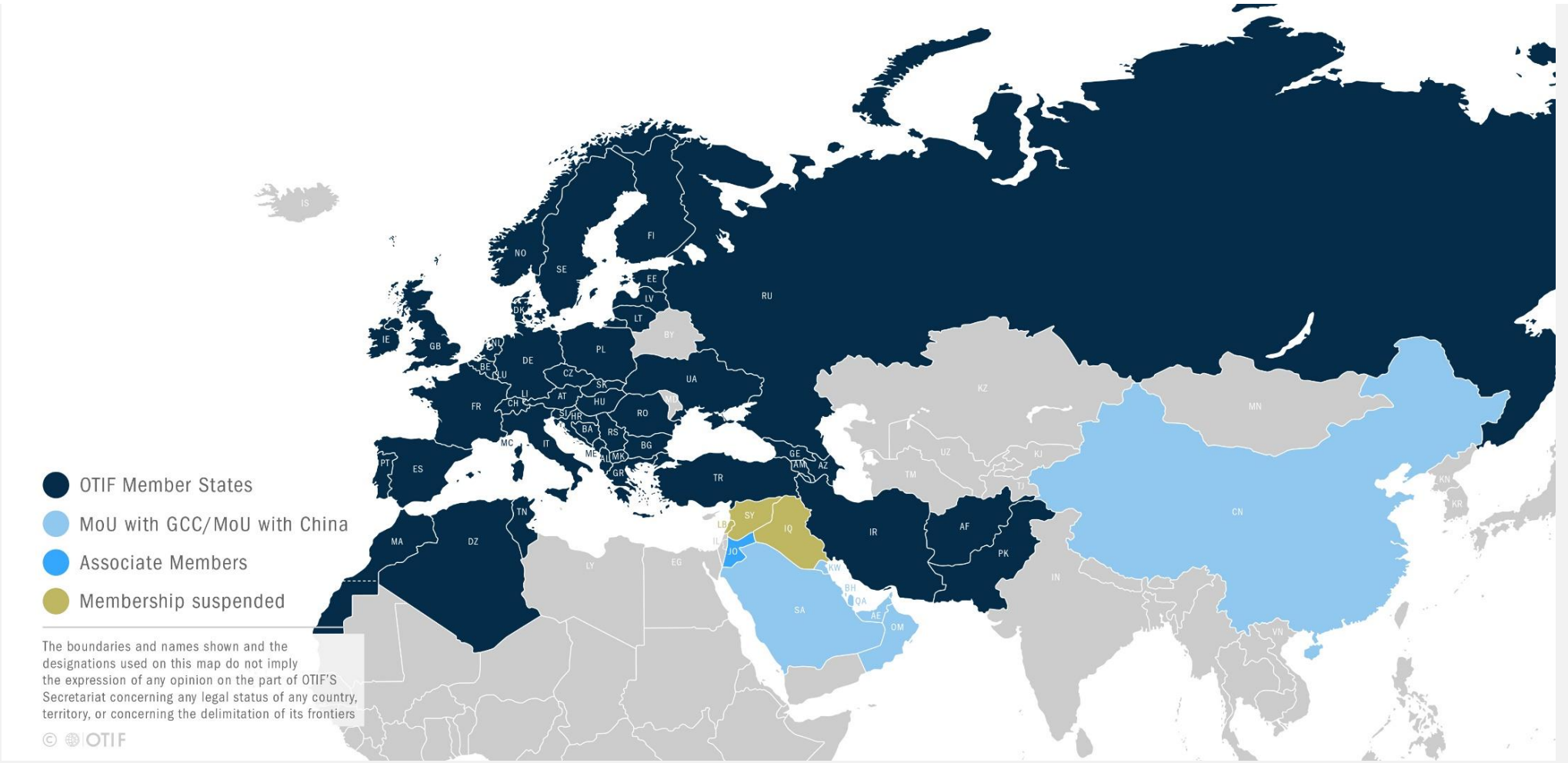
**1st** INTERNATIONAL TRANSPORT CONVENTION

ENTRED INTO FORCE IN **1893**

**COTIF** IS APPLIED ON **270,000 KM** OF RAILWAY LINES

**2011** ACCEDED TO **COTIF**

# OTIF Membership
## Situation on 1 May 2019



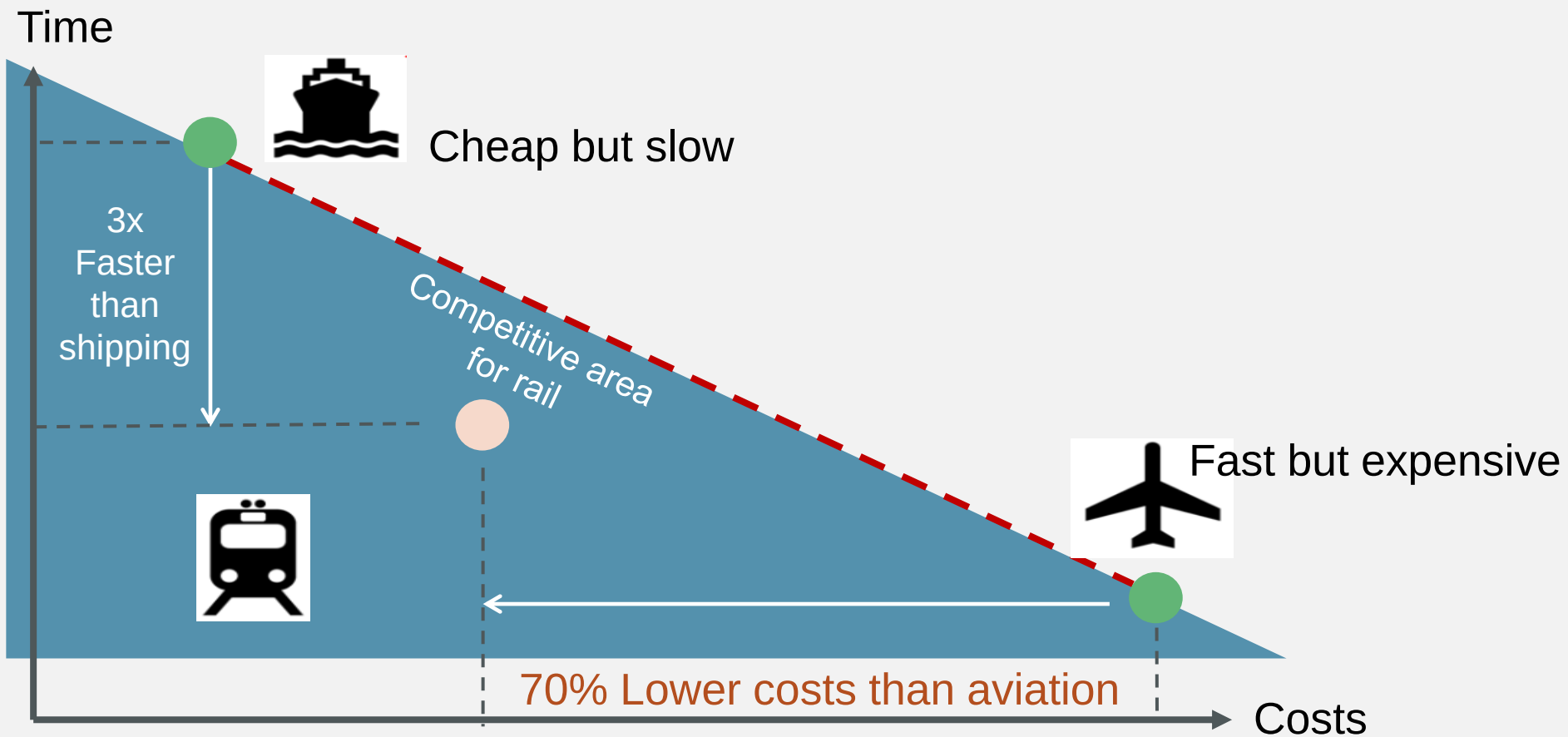
# COTIF – What for?

https://vimeo.com/349648465

# COTIF – developing uniform law for interoperable networks

- International binding law
- A bridging concept
- An approach based on partnership
- Railways as networks: connected, uniform and interoperable

# The case for international rail freight



# The “Luxembourg Rail Protocol”

**OTIF will in future be the Secretariat of the Supervisory Authority of the “Luxembourg Rail Protocol”**

What does this mean?

- The Luxembourg Rail Protocol offers an important means to finance railway rolling stock, by establishing a special register to safeguard the rights of different stakeholders.

- It is crucial that the Luxembourg Rail Protocol comes into effect asap by signing and ratifying it, because governments cannot afford not to use all potential sources to finance railway equipment.

# African Rail Perspectives

According to the African Development Bank (Study 2015) there are two major reasons for the poor condition of African Railway systems:

1. **A lack of investment in infrastructure**
2. **The absence of a supporting institutional framework**

**Both tasks are governmental tasks!**

**<u>Solution for 2.</u>: OTIF's legal framework as "best practice" for international rail transport in Africa!**

# Thank you for your attention

# UIC Symposium

**30 November – 1 December 2021**

**Mr. Ayman Masoud Abdel Aziem, Director of the Risk Assessment Department, ENR**

# Egyptian National Railways development plan

30 November 2021

# The development plan is based on five main axes

1. Rolling stock
2. Infrastructure
3. Train control
4. Workshop
5. Human resources

# Rolling stock

Abbreviations words

- (ENR) Egyptian National Railways
- (GE) American General Electric Company
- (PRL) American Progress Rail Company
- (TMH) Russian company Transmash
- (Talgo) Spanish company
- (Simaf ) ENR factory

## locomotive

- Supply of (110) new locomotive for passenger trains with (GE).
- Supplying (50) new locomotive for passenger trains with (PRL)
- Rehabilitation of (81) locomotive for freight trains with (GE).
- Rehabilitation of (41) locomotive for passenger trains with (PRL).
- upgrade efficiency of (50) Henschel locomotive with (PRL).
- Supply of spare parts required for maintenance and repairing with (GE) and (PRL)

## passenger coaches

- Supplying (300) 1st and 2nd air-conditioned coaches with (TMH).
- Supplying (500) 3rd air-conditioned coaches with (TMH).
- Supplying (500) 3rd dynamic ventilation coaches with TMH).
- Supplying (100) sleeping coaches with Simaf.
- Supplying (100) Power coaches with Simaf.
- Supplying (6) complete trains (1st, 2nd air-conditioned coaches and service coaches) with Talgo.
- Rehabilitation of (6) complete trains with Talgo.
- upgrade efficiency of (1223) regular coaches with ENR Workshops
- upgrade efficiency of (90) Spanish air-conditioned coaches with ENR Workshops

## Wagon Freight

- Supplying (375) container deck wagons with SEMAF.
- Supplying (300) dump wagons with SEMAF.
- Supplying (75) grain transport wagons with SEMAF.
- Supplying (150) tank wagons with SEMAF.
- Supplying (125) box wagons with SEMAF.
- Supplying (50) Spence wagons with SEMAF.

# Infrastructure

## Track

- Three companies from the Egyptian private sector were entered this field, in addition to the two companies of ENR (Egyfrail - Ertrack),

## Stations

- plan to improve (180) stations
- Improved and elongated platform of (119) stations

## Line Duplication

- planned to start (7) duplication of single lines

# Train control

## Developing Signal System

- Implementation (5) projects including construction of (86) main towers and (61) secondary towers, with a total length (971) km

## Developing Control system

- Implementation Electronic Train Control System (ETCSL1) from Alexandria / Cairo / Nagaa Hammadi, in addition to Banha / Port Said

## Level Crossings

- Developing civil works for (1102) level Crossings.
- Developing control systems for (1120) Level Crossings.

# Workshop

## Main workshops

- The first phase of workshop development has been completed
- The second phase of the workshop development is underway
- The third phase of workshop development is planned

## sub-workshops

- The first phase of the development of the sub-workshops, which includes (20) sub-workshops (completed)
- The second phase of the development of the sub-workshops, which includes (7) sub-workshops (planned)

# Human resources

## ENR employees

- Evaluate the performance of all employees.
- Determine training courses for each job.
- Annual medical examination for employees.
- Updating work regulations to ensure safety.

## New staff

- Updated list of mental and physical tests
- Developing scientific curricula for all jobs
- Practical courses in sectors and workshops

## ENR structure

- Development of the administrative structure of ENR

# Thank you for your attention

# UIC Symposium

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# AFRICAN FOCUS
# Panel 2: Digitalisation: the African solutions

- Moderator: Ms. Heather Thompson, CEO, ITDP

- Mr. Tilahun Sarka, Director General, EDR
- Ms. Samia Ben Hamida, Director of Planification and Controlling Department, SNCFT
- Ms. Mesela Nhlapo, CEO, African Railway Industry Association, ARIA
- Mr. Norman Frisch, Marketing Director of the Transport Sector, Enterprise Business Group, Huawei

# UIC Symposium

**30 November – 1 December 2021**

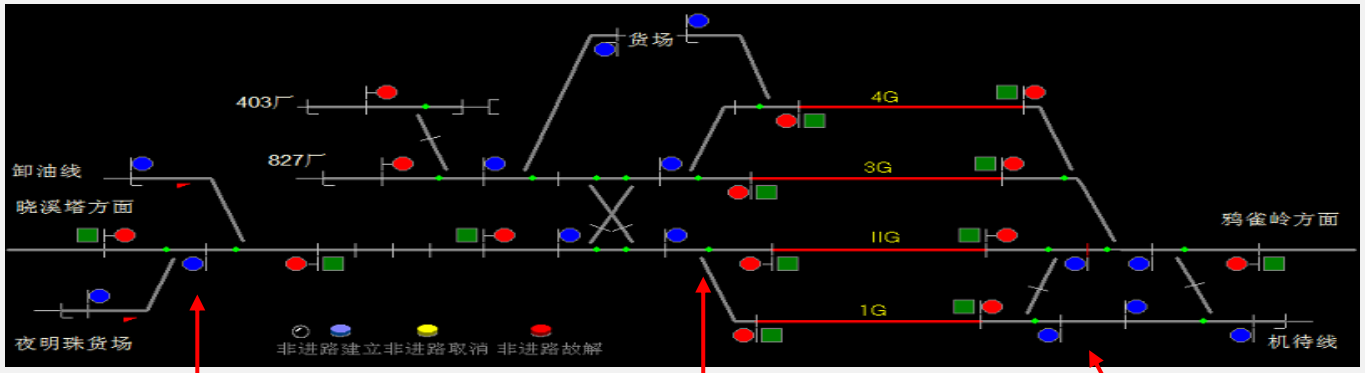
**Mr. Tilahun Sarka, Director General, EDR**

# Present Status of Digital Railway System in Ethio-Djibouti Railway line

- Ethio-Djibouti railway line is a fully electrified line that covers a length of 756km.
- It is a standard gauge(1.435m) electrified railway with a designed speed of 120km/hr for passengers and 80km/hr for freight transportation
- Some of the areas of digitalization in Ethio-Djibouti Railway, EDR are as follows:


15:55:08
ADAMA
BISHOFTU
DIREDAWA
ARAWA
DAWALE
ALI SABIEH

# Railway Interlocking System




Switch machine

Which route?

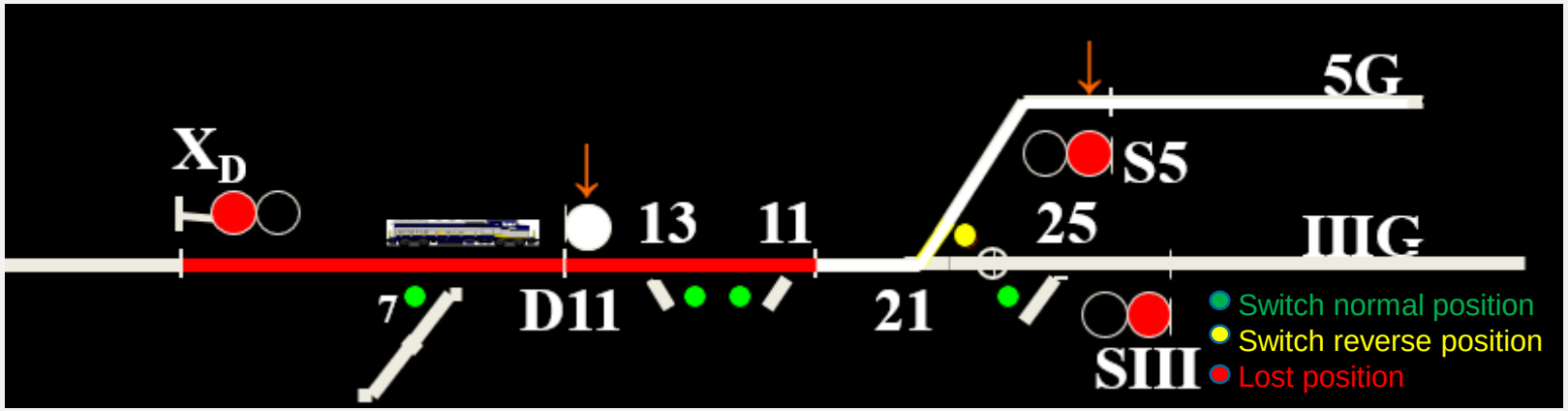
Track circuit :

Where is the train ?

Railway Interlocking System

Control Equipments

# Interlocking example

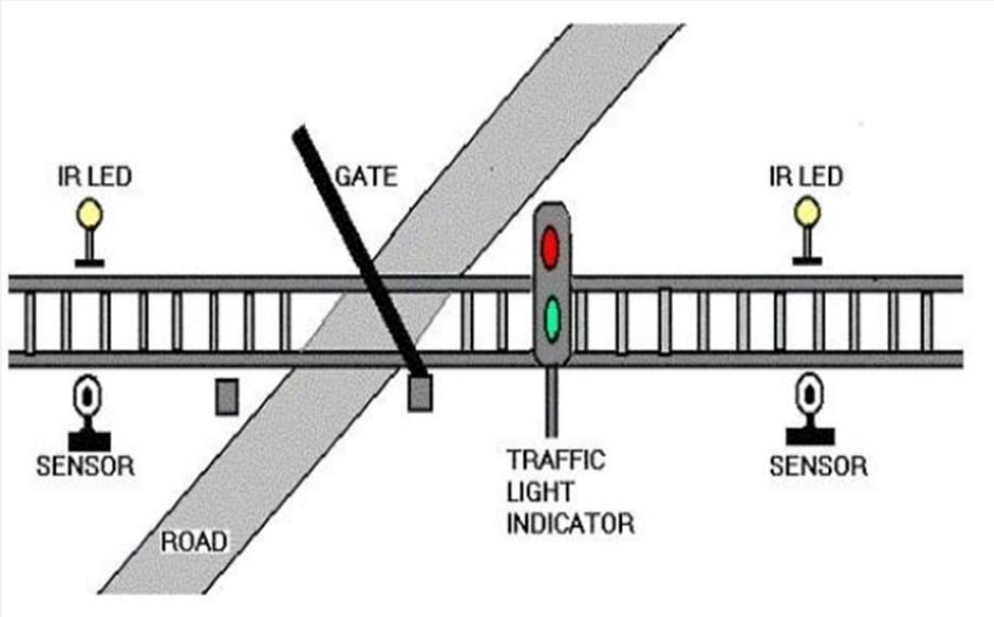



Interlocking System Execute

1. Operate: push down route buttons D11A and S5DA。
2. Route selection: determine the signal devices of the route, including D11, 11-13DG, 13(normal position), 11(normal position), 21DG, 21(reverse position), S5。
3. Change switch position: switch 21 to reverse position
4. Switch consistency check
5. Route lock （locked: display white color band）
6. Signal light( D11 light white color lamp)
7. Train enters the route → route release.

# Level crossing

- To avoid human error and to enhance efficiency, railway crossing systems can be controlled in an automated manner.
- In an automated rail crossing system a train that approaches the gate is detected by a sensor and also the speed of the train is noted.
- The departure of the train is detected by another sensor and the gate is restored to its initial position.
- Sensors placed on the level crossing and send data that, once collected and processed, can open or close the level crossing.



# Thank you for your attention

*Connect with us on social media*

# UIC Symposium

**30 November – 1 December 2021**

**Ms. Samia Ben Hamida, Director of Planification and Controlling Department, SNCFT**

# Intermodality

Project Subject:

Review the integration of public transport networks in terms of prices through the harmonization of structures and ticketing systems of all public operators for the bus and rail modes, with the main networks concerned ( STT and RFR lines A, D and E).


# Intermodality: RAIL ROAD

**2002** — **ZARZIS**
Gabes-Zarzis
SOTRAGAMES

**2003** — **DJERBA TATAOUINE**
MEDNINE - DJERBA/ TATAOUINE , SRTM

**2014** — **BEN GUERDENE**
MEDNINE -BEN GUERDENE,SRTM

**2016** — **KEBELLI**
GABES-KEBELLI , SOTRAGAMES

**2017** — **KEBELLI**

**2019** — **DJERBA TATAOUINE**

**2020** — **ZARZIZ**

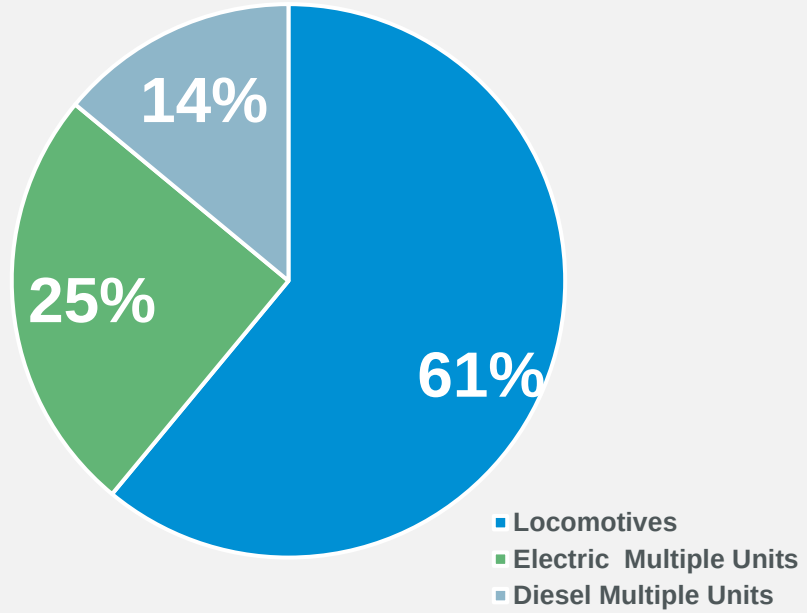
# Renewable Energy


Financially assisted by the CAMENA and the German agency for international cooperation GIZ, SNCFT had launched a call for tender for the elaboration of a roadmap and a decision support tool for:

- ✓ The deployment of an alternative diesel engine solution taking into account the environmental externalities
- ✓ The establishment of an infrastructure for recharging and refuelling railway rolling stock, potentially around stations, associated with the alternative solutions chosen.

A consortium (Studi International , EY and COWI Belgium) was selected to conduct the study that aims to:

- ➢ Assess the advantages/disadvantages of the latest technologies identifing the most relevant (natural gas/biogas, batteries, hydrogen, others) with the infrastructures associated to a possible decentralized production
- ➢ Assess and define the technologies and requirements for the production and storage of low-carbon gas and/or green electricity that will be used by the selected alternative powertrain solutions.

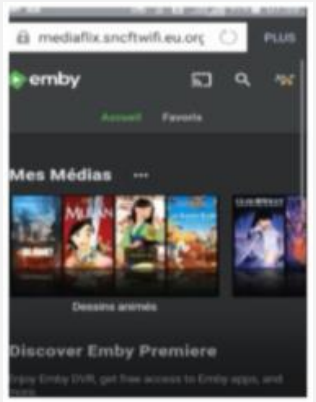


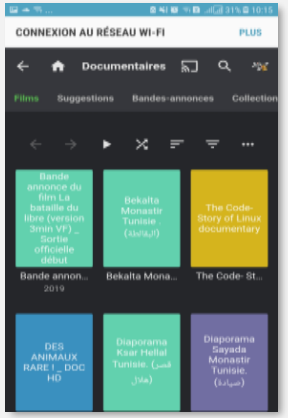

This is a pilot project that can easily be replicated in North Africa and many sub-Saharan African countries,thanks to the climatic conditions that are conducive to the development of clean energy, in particular green hydrogen.

# Digitalization

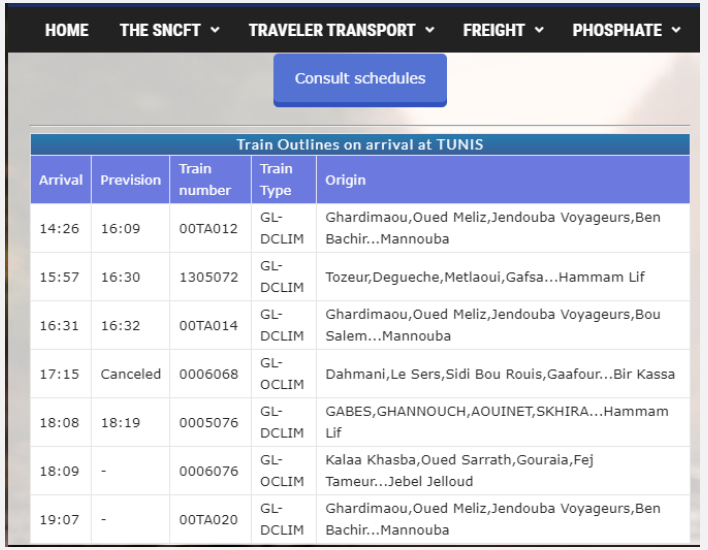
An information system for mobile phones (train schedule, instant location, costs, dispatches short message in case of emergency... )


Digital library and internet on board




Real Time Train Schedual




Train Outlines on arrival at TUNIS

| Arrival | Prevision | Train number | Train Type | Origin |
|---|---|---|---|---|
| 14:26 | 16:09 | 00TA012 | GL-DCLIM | Ghardimaou,Oued Meliz,Jendouba Voyageurs,Ben Bachir...Mannouba |
| 15:57 | 16:30 | 1305072 | GL-DCLIM | Tozeur,Degueche,Metlaoui,Gafsa...Hammam Lif |
| 16:31 | 16:32 | 00TA014 | GL-DCLIM | Ghardimaou,Oued Meliz,Jendouba Voyageurs,Bou Salem...Mannouba |
| 17:15 | Canceled | 0006068 | GL-OCLIM | Dahmani,Le Sers,Sidi Bou Rouis,Gaafour...Bir Kassa |
| 18:08 | 18:19 | 0005076 | GL-DCLIM | GABES,GHANNOUCH,AOUINET,SKHIRA...Hammam Lif |
| 18:09 | - | 0006076 | GL-OCLIM | Kalaa Khasba,Oued Sarrath,Gouraia,Fej Tameur...Jebel Jelloud |
| 19:07 | - | 00TA020 | GL-DCLIM | Ghardimaou,Oued Meliz,Jendouba Voyageurs,Ben Bachir...Mannouba |

The second African Digital Summitwill be held in Tunisia 2022 on collaboration with the UIC

# Thank you for your attention

# UIC Symposium

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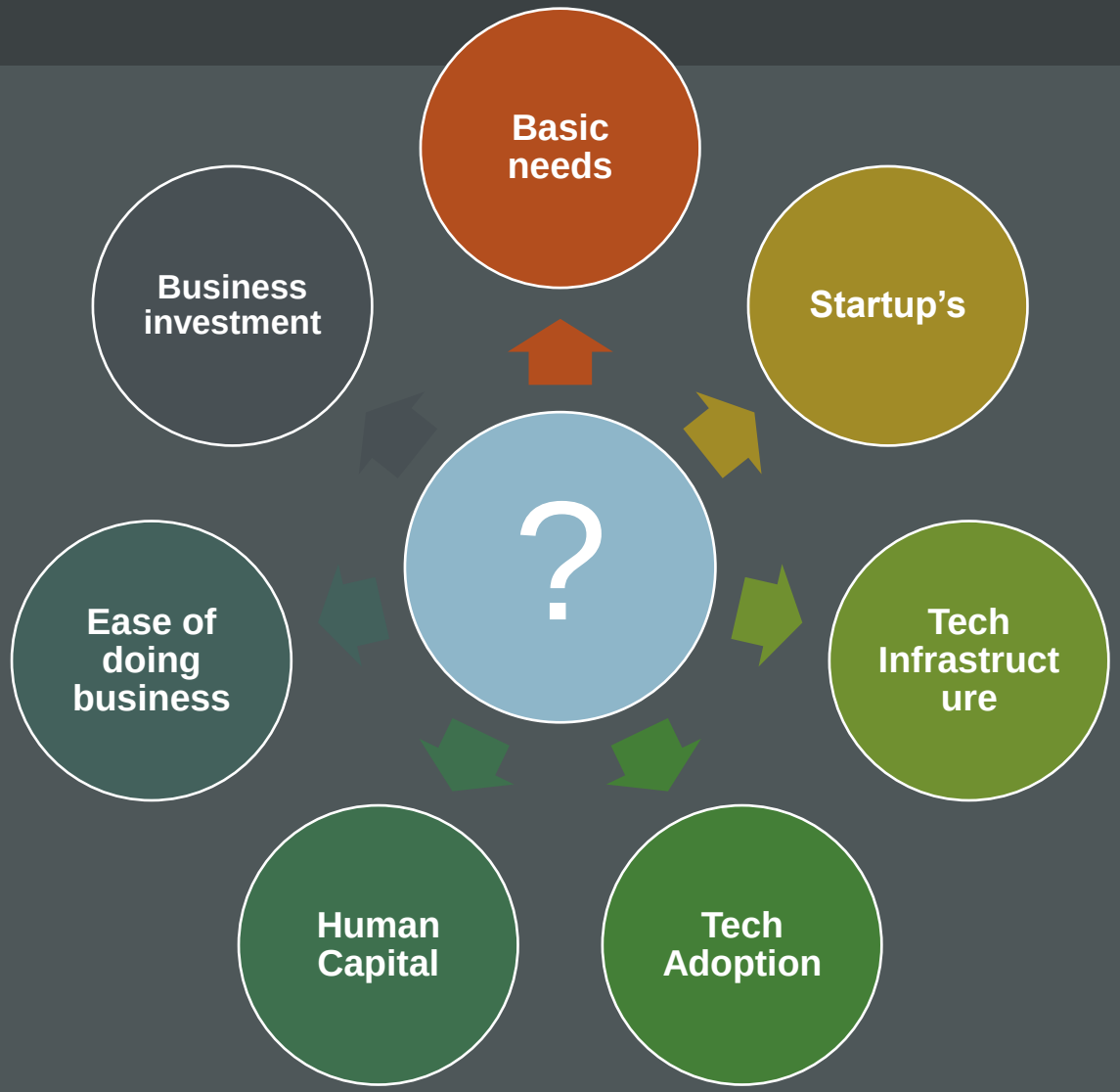
**Ms. Mesela Nhlapo, CEO, African Railway Industry Association, ARIA**

# If Digitalisation is the solution what is the PROBLEM?

## Overview

- Factors supporting digitalisation
- Relationship between literacy and digitalisation
- African Railways and digitalisation

# Factors supporting digitalisation



# Digitalisation – Literacy - GDP

## Country Literacy and GDP

**Literacy**

- South Africa
- Equatorial Guinea
- Seychelles

**GDP**

- Nigeria
- Egypt
- South Africa

## Country digital readiness

- Kenya
- Nigeria
- South Africa
- Rwanda

# African Railways and Digitisation

Rail rolling stock → Funding → LRP → URVIS → Digitalisation

**The value of a digitally literate nation is immediately reflected in the strong correlation that leading nations show against other indicators such as GDP**

# Thank you for your attention

# UIC Symposium

**30 November – 1 December 2021**

**Mr. Norman Frisch, Marketing Director of the Transport Sector, Enterprise Business Group, Huawei**

# Dive into Digital: The New Paradigm in Rail

## Transportation Industry Development in a Constantly Evolving World

### Industrial Era

Workers → Machines

### Electrical Era

Petroleum + Electric power

### Information Era

Computers: production tool
Digitalization: mainstream

### Intelligence Era

Empowering all things with intelligence using AI and big data

**Transportation enables mobility in the physical world**

**Communication drives data interaction in the digital world**

HUAWEI

# Unified Rail ICT Platform
# The Foundation of Digital Transformation

Converge IT Resource

Accumulate industry application models

Accumulate Data Assets

Support Technical Architecture Evolution

Integrated Operation Control (IOC)

Production | Management | Service

Digital Platform

AI

Data convergence
Service enablement

ROMA

ABC

New ICT

IoT | Big data | Video | ICP | GIS | ...

Cloud

Security

Connection

Terminal

INTELLIGENCE

PLATFORM

CONNECTION

HUAWEI

# Fully Connected, Integrated & Comprehensive

Wi-Fi 6

**Station WIFI6**

**Train-to-ground WIFI6** (for Urban Rail)

Staff(OA) | Passenger | Video+Data

LTE A GLOBAL INITIATIVE

**LTE for Metro**

4G-Based

Signaling | Voice Trunking | Video+Data

5G

**DIS**

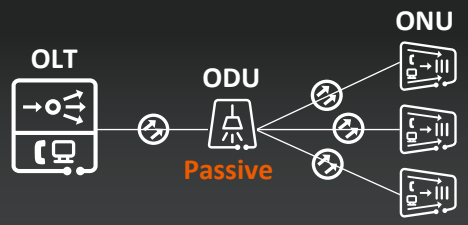
4G/5G Indoor Coverage Solution

**FRMCS** (5G-Based)

2B + 2C

*In October 2018, the Wi-Fi Alliance specified a new name for different Wi-Fi standards, and 802.11ax was named Wi-Fi 6.*

## Campus Access Network




GPON

## Network Energy

COMMS
AFC
SCADA
OA
.....

Centralized UPS + Lithium battery

**OTN/MSTP/IP MPLS Backbone Network**

**Datacenter**

**100G+ DWDM**

**Datacenter**

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# IOC: the “Brain” of Digital Twins for One Map Panoramic view

## Comprehensive Situation

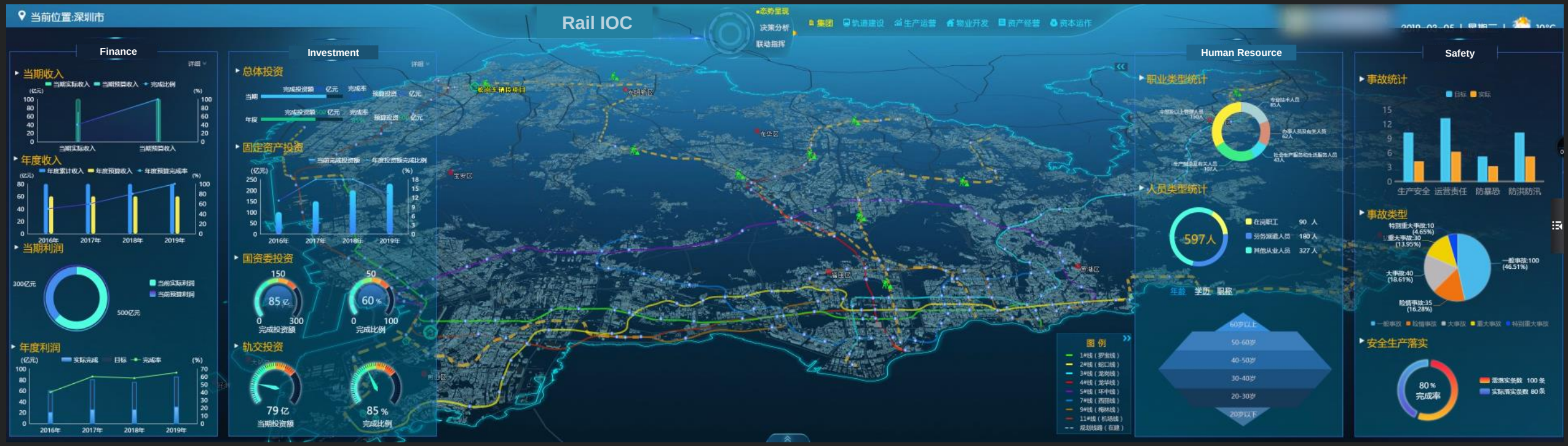
**Deeper understanding the overall rail operating status, property, and group views**

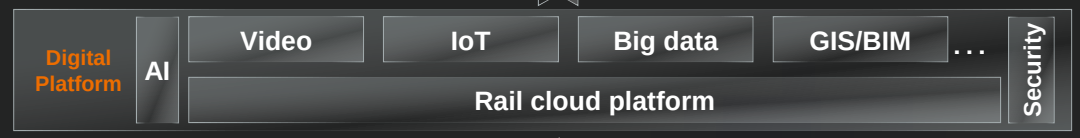
## Decision Support

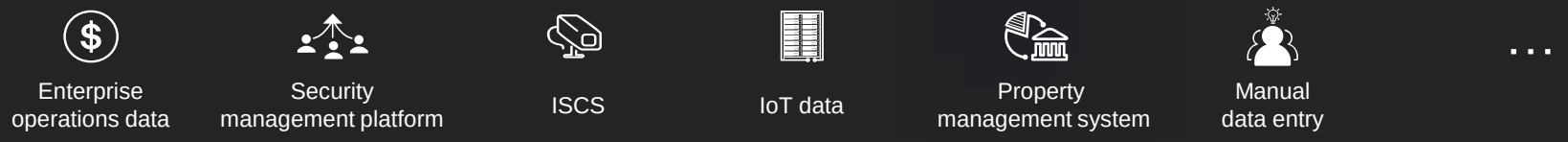
**Scientific decision-making based on data analysis**

## Collaborative Command

**Real-time monitoring and alert-warning, rapid emergency command**

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# Thank you for your attention