

# ACCELERATING DIGITALIZATION CRITICAL ACTIONS TO STRENGTHEN THE RESILIENCE OF THE MARITIME SECTOR

Transport Global Practice



**IAPH**  
International Association  
of Ports and Harbors

**WPSP**  
WORLD PORTS SUSTAINABILITY PROGRAM

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# OUTLINE OF THE PRESENTATION



1. Why did we prepare this paper?
2. The digital roadmap
3. What is required?
4. How can the World Bank help?

# Accelerating Digitalization

**Why did  
we prepare  
this  
paper?**



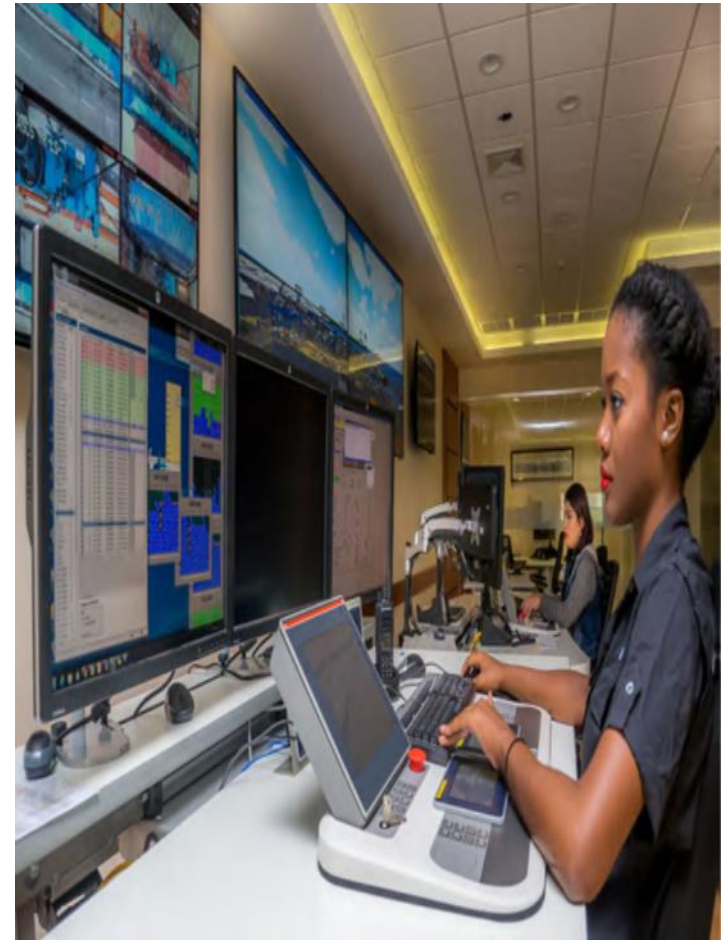
# Accelerating Digitalization

- World Development Report 2016: Digital Dividends underlined how digital technology creates opportunities to accelerate growth, generate jobs, and improve services;
- The digital revolution (the 4<sup>th</sup> Industrial Revolution) has emerged in the past decade as one of the main drivers of change in the port and maritime sector; and
- Digitization is rapidly creating a new ecosystem – one where being on the outside presents a significant risk, in the form of higher trade costs, lower competitiveness, and slower economic growth for countries.



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- The COVID-19 pandemic underlined the risk to global trade and the importance of digitization to ensure business continuity and improve the resilience of the maritime gateways and associated logistical chains;
- The pandemic also painfully demonstrated the heterogeneous landscape that currently exists across ports worldwide in terms of digitization;
- While some have developed into full-fledged “smart” ports, many others have barely grasped the essentials; and
- There are also the growing risks of cybersecurity - increasingly one of the major challenges facing the maritime industry.



# Digitalization: Some way to go

A recent IAPH survey (October 2020): just 34 percent of responding ports (n=110) meet the existing mandatory requirements of the FAL Convention;

In SSA (n=11), only 40 percent were at operational stage (5 ports?). 60 percent had taken no action or were at design or implementation stage; and

Reporting bias?

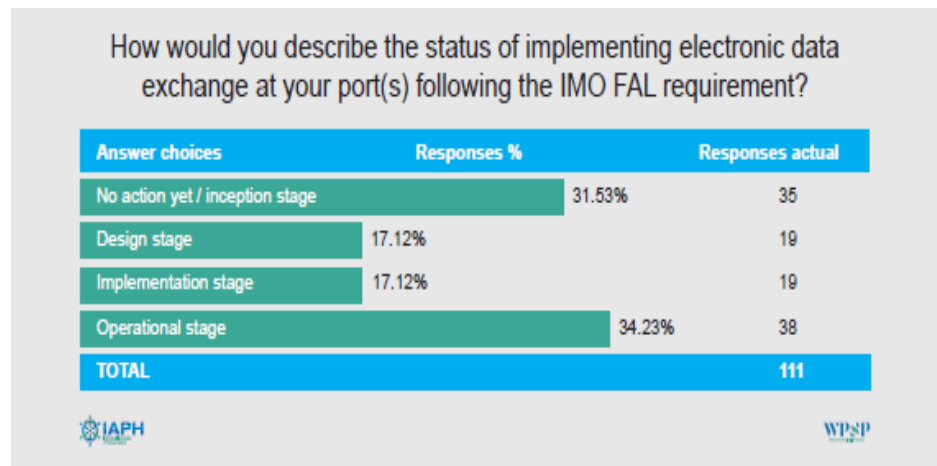
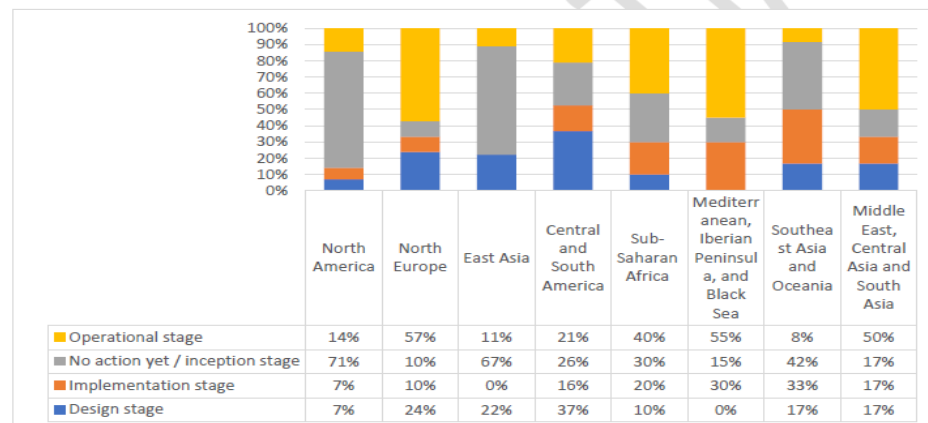


Figure 16- Status of implementing electronic data exchange at ports as required by the IMO FAL Convention



Source: International Association of Ports and Harbors (2020)

# Digitalization: Some way to go

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As of November 2020, only 49 of the 174 member states of the International Maritime Organization (IMO) possess functioning port community systems (PCSs); and

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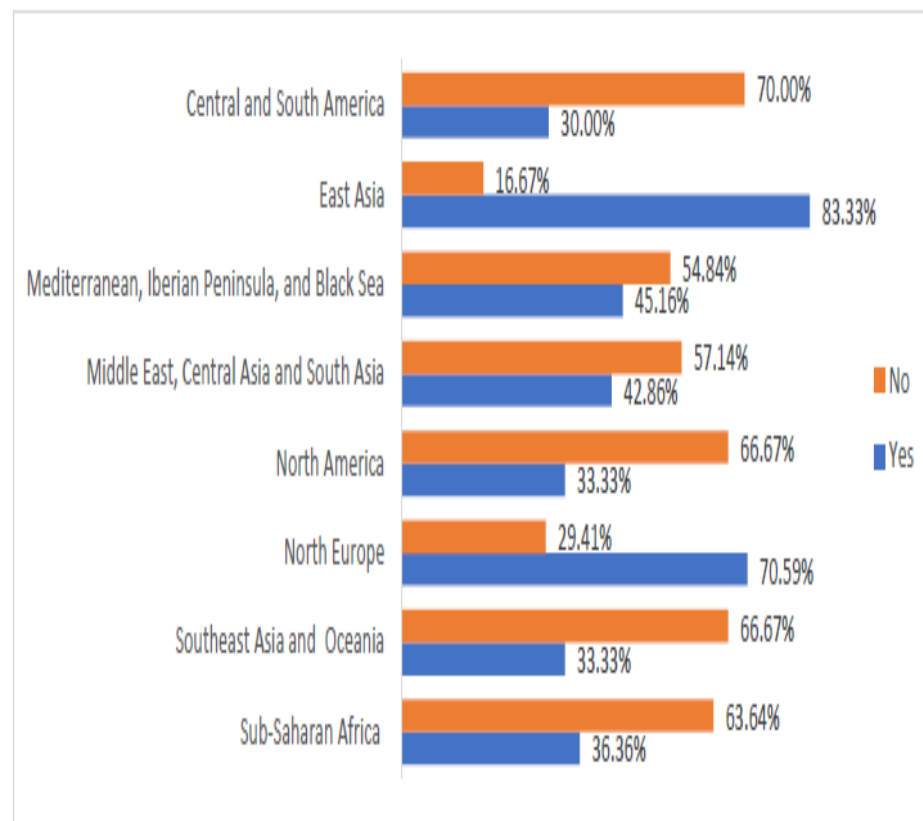
In SSA, only 36.36 percent of reporting ports had an operational PCS.

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Reporting bias, Omitted Variable Bias?

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Figure 17: The presence of port community systems (PCS)



Source: Maritime Street database (2021)

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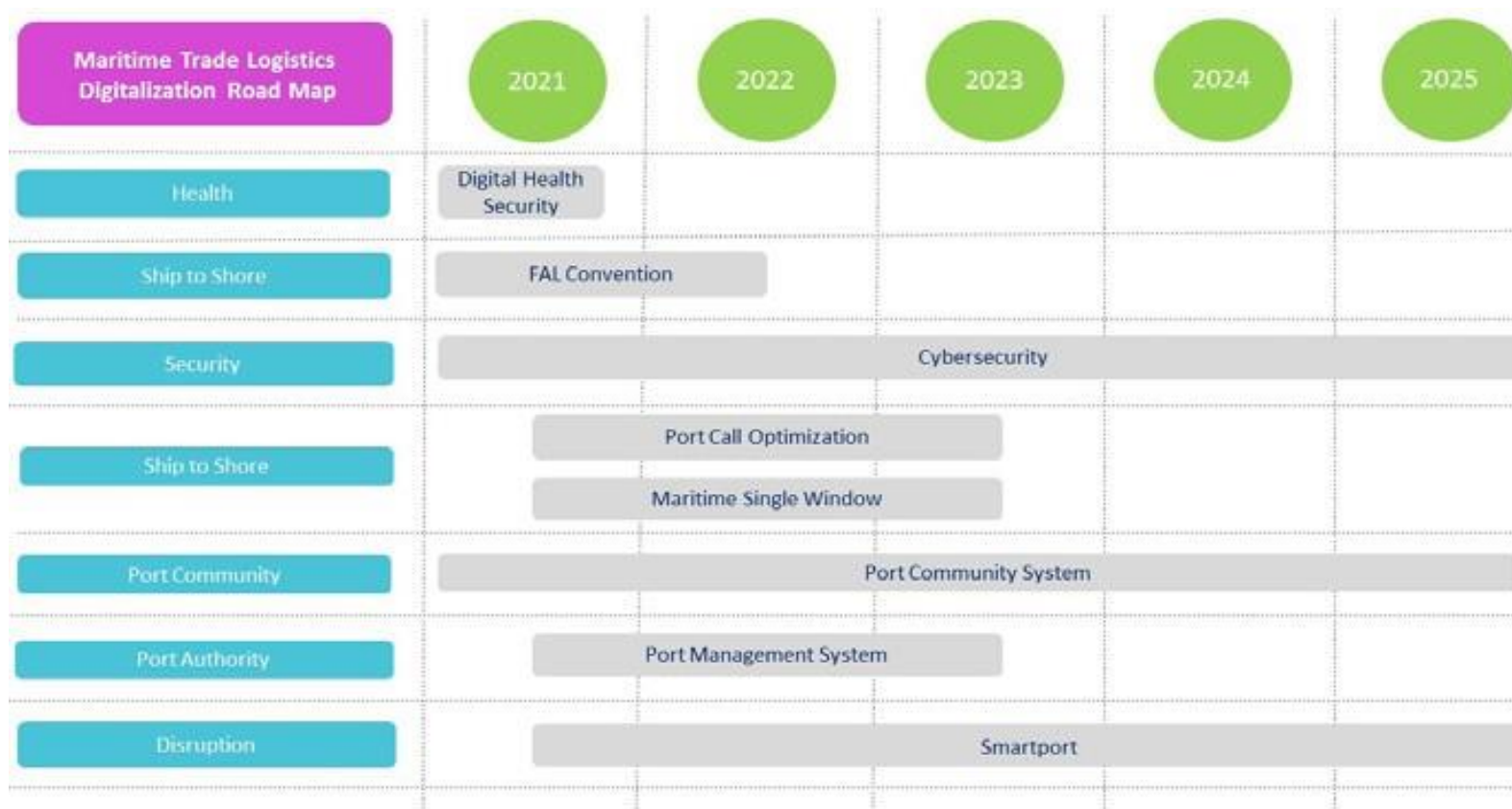
## The digital roadmap





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A schematic of the digital road map for a port/country to follow.



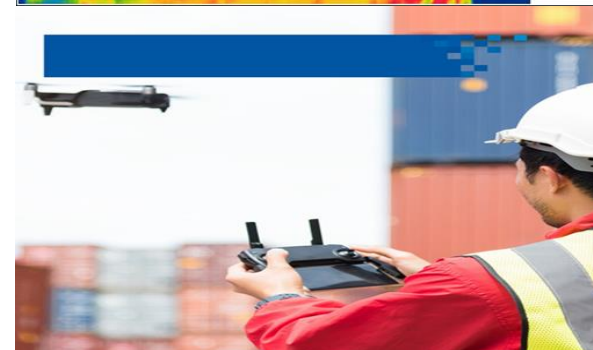
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**Step 1 : Improve Digital Health Security :** The impact of the COVID-19 pandemic underlined the need to improve digital health security at ports to protect workers.

**Electronic Wearables:** The Port of Antwerp has partnered with a Belgian startup, which has developed a wearable device, to monitor and maintain physical distance and to facilitate contact tracing through device-to-device communication.

**Thermal Cameras:** Port Coronel in Chile became one of the first ports to introduce this technology in the early days of the COVID-19 pandemic.

**Unmanned Aircraft Systems (Drones):** In terms of the pandemic, drones have been used at ports to enforce social distancing and mask wearing, monitor crowds, facilitate aerial broadcasting, spray disinfectant, conduct aerial thermal sensing, monitor traffic, and deliver medical supplies at ships.



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## Step 2 : Establish a Maritime Single Window



- The mandatory requirements are defined in the International Maritime Organization's Facilitation (FAL) Convention (IMO 1965).
- The FAL Convention aims to support transmission, receipt, and response of all necessary information in connection with the arrival, stay, and departure of ships, persons, and cargo, to be conveyed by EDI, as a first stage.
- This has been a mandatory requirement for all ports since April 2019, though implementation remains limited as the IAPH survey illustrated.
- The FAL convention also encourages the use of a MSW, to enable all information required submitted via a single portal without duplication which will become mandatory in Jan 2024.

# Accelerating Digitalization

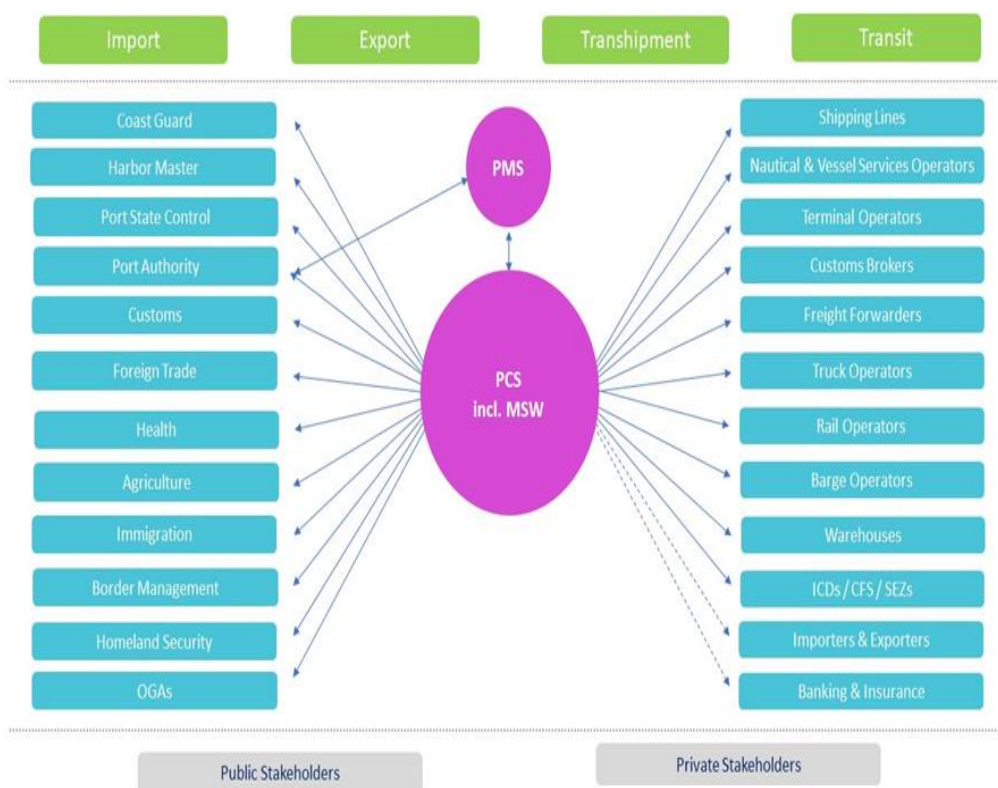
## Step 2 : Optimize port calls

In parallel, ports also need to initiate the discussion on port call optimization. The objective is to allow ships to optimize speed during the voyage to facilitate timely arrival at the pilot boarding place, thus securing berths, fairways, and nautical services at the destination ports.



# Accelerating Digitalization

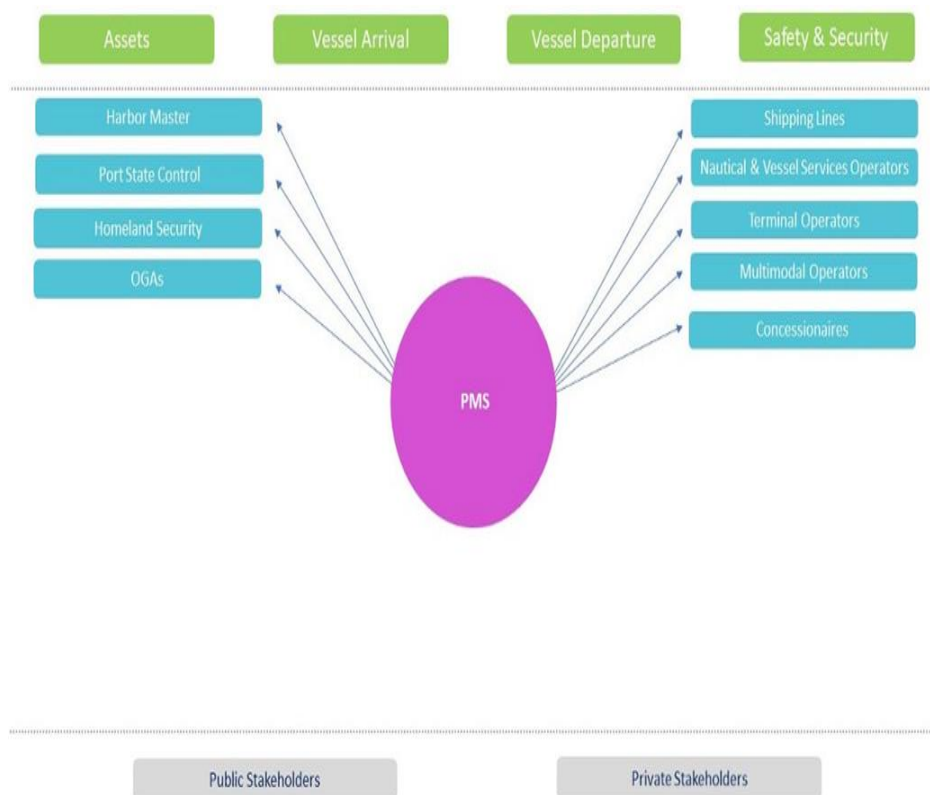
## Step 3 : Establish a Port Community System



- The next stage in the digital road map is the establishment of a port community system (PCS);
- A PCS is a platform to optimize, manage, and automate the port and logistics processes through a single submission of data in the transport and logistics chain;
- The core benefits provided by a PCS include higher efficiency and speed regarding port processes, reducing paperwork and cost, improved security, facilitating trade, and hinterland access;
- Despite the benefits, only 49 countries out of the IMO's 174 member states have introduced PCSs - although there are particularly challenges for small and medium ports.

# Accelerating Digitalization

## Step 4 : Establish a Port Management System



- Over the medium term, a port needs to upgrade to a PMS in order to ensure the full digitalization of processes
- A PMS encompasses the management of port calls, dues, journal, incidents, waste, dangerous goods, planner, cargo, inspections, permits, services, security, and assets in an integrated manner via one system
- This step will facilitate the movement from a cargo hub to a digital hub via the smart port concept
- The latter is defined as an automated port that uses disruptive technologies (big data, internet of things (IoT), fifth-generation technology (5G), Distributed Ledger Solutions, Digital Twins, and others) to improve performance and economic competitiveness.

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## Improve cybersecurity

- Many of the digital developments in the port sector were designed and deployed without considering cybersecurity.
- While IoT-enabled technologies offer significant potential operational efficiencies to port stakeholders, they also introduce new vulnerabilities.
- Between February and May 2020, cyberattacks increased 400 percent in the maritime industry (Captive International 2020).
- The risk of a cyberattack has emerged as the top risk for port authorities and the wider port community of stakeholders, necessitating improved cybersecurity at the port community level.

Cybersecurity consists of the collective measures implemented to defend a computer or computer-enabled system against cyber-enabled threats, such as hackers, hacktivists, foreign intelligence services, and organized criminal syndicates, among others



# Accelerating Digitalization



## G2 CSOC at Port of Los Angeles

- 2014 : G1 CSOC
- 2015 : 1st ISO 27001 Port
- 2019 : G2 CSOC
- **20 to 30 million unauthorized intrusion attempts per month**
- Moving towards cyber resilience



# What is required?



# Accelerating Digitalization

- **High-level political commitment** serves as the starting point to drive the change management process to digitalize the maritime, ports, clearance, and transport processes
- **An Appropriate Institutional Structure:** The recommended approach is to establish a three-tiered framework to move the agenda forward -
  - Level 1: an inter-ministerial committee - which would focus on the strategic coordination and the legal, regulatory, and policy issues;
  - Level 2: a steering committee - to define digital maritime trade and logistics roadmap, and play an instrumental part in the long term sustainability of the digital platform and systems; and
  - Level 3: a business-level process committee - business process analysis, optimization, automation, reengineering, and rethinking of the digital road map
- **Another option might be to use an existing structure** - the national trade facilitation committee (NTFC), established under the World Trade Organisation (WTO) Trade Facilitation Agreement (TFA) is one possibility.

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**How the World Bank can help?**



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- The World Bank Group (WBG) represents a unique source of knowledge, technical assistance, and financial support for developing countries around the world;
- **More specifically in the digitization of the maritime sector, the World Bank Group**, in partnership with others, would be happy to support client countries that wish to continue their digital development path in three ways:
  1. **Knowledge Transfer and Capacity Building** - in partnership with IAPH and others;
  2. **Potential grant support to facilitate upstream work**, subject to a successful application, from a range of potential sources—including, among other things, the Digital Development Partnership (DPP), the Public-Private Infrastructure Advisory Facility (PPIAF), and the Global Infrastructure Facility (GIF); and
  3. **Potential Financial Support for Implementation:** the WBG can provide, subject to the necessary due diligence, financing to support implementation and longer term capacity building, either unilaterally or in partnership with private finance.

# Accelerating Digitalization

## Current or recent support provided by the World Bank:

- Diagnostic Studies: Belize, Malaysia, Mozambique...more coming;
- Survey of all 27 SSA ports to assess progress and review institutional framework (with IAPH and SSATP)

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**Happy to answer  
any questions**

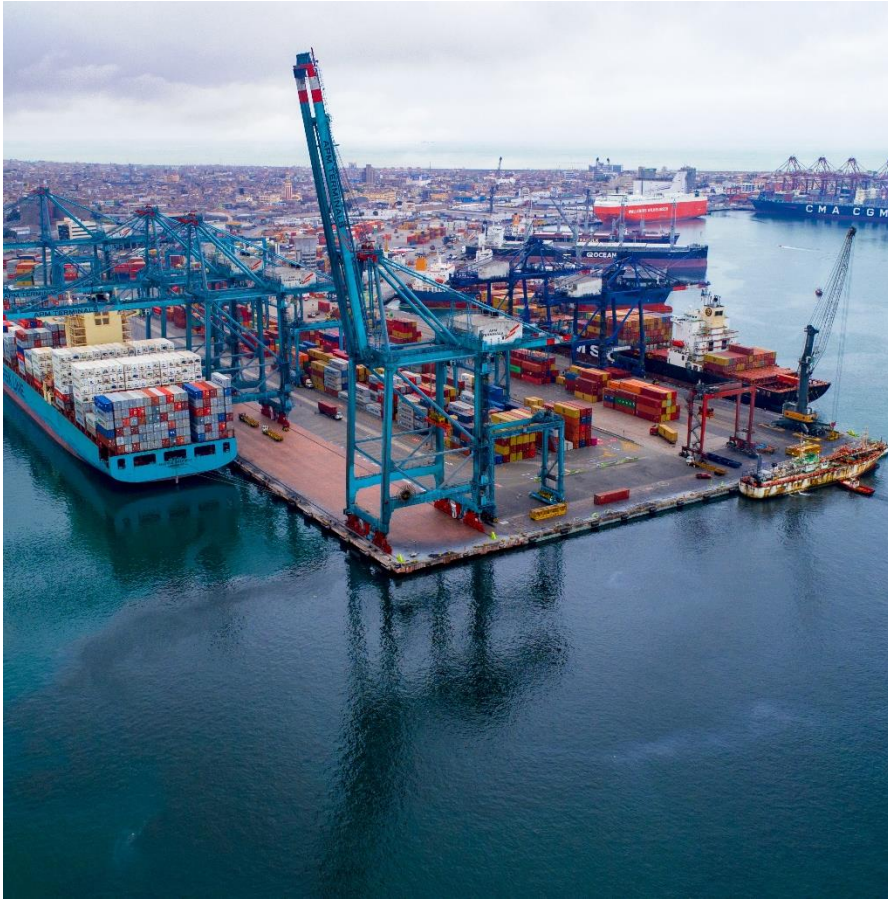


# Accelerating Digitization

## Annex: Case Studies



# Accelerating Digitalization



## Institutional Framework in Peru

- High-level political commitment
- May 10, 2020, Legislative Decree No. 1492
- Aug 3rd, 2020, Supreme Decree No. 008-2020-MINCETUR
- Inter-ministerial committee
- NSW, MSW, PCS



# Accelerating Digitalization



## Maritime Single Window in Panama

- VUMPA launch in 2017
- 20' to Zero for Vessel declaration
- Reduced 300.000 paper forms & documents
- Save 3260 hours person annually
- VUMPA 2.0 in 2020

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## Port Community System at Port of Cotonou

- First PCS in Africa
- Go Live Import in 11 months & Export in 20 months
- Reduced dwell time from 39 days in 2011 to an estimated 6 days in 2012
- Port of Cotonou, 2013 IAPH WPC Gold IT Awards

# Accelerating Digitalization



## Smartport at Port of Antwerp

- Digital Twin
- Physical assets, processes, people, systems, and devices
- Real time monitoring
- Situational Awareness