



**TRANSPORT 2040: AUTOMATION, TECHNOLOGY, EMPLOYMENT  
THE FUTURE OF WORK**

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President of the World Maritime University

**Livorno,  
24 May 2019**



A postgraduate level university  
established by and within the framework of the IMO

# Our Mission

To be the world centre of excellence in postgraduate maritime and oceans education, professional training and research, while building global capacity and promoting sustainable development.



# Centre of Excellence recognized by the UN General Assembly

## Academic Excellence

The UN General Assembly on 11 December 2018 adopted the [Resolution 73-124 on Oceans and the Law of the Sea](#). The Resolution continues to recognize the importance of WMU, which celebrated its thirty-fifth anniversary in 2018, as a centre of excellence for maritime education and research, confirms its effective capacity-building role in the field of maritime transportation, policy, administration, management, safety, security and environmental protection, as well as its role in the international exchange and transfer of knowledge, welcomes the inauguration in 2018 of the World Maritime University-Sasakawa Global Ocean Institute, and urges States, intergovernmental organizations and other bodies to make voluntary financial contributions to the University's Endowment Fund.

## How we contribute globally



Master Programmes



PhD Programme



Postgraduate Diplomas offered via distance learning



English and Study Skills Programme



Customized Professional Education



Solution focused and policy relevant Maritime and Ocean Research



Technical Cooperation Support at request by IMO



# Our Master Programmes

## Malmö based MSc in Maritime Affairs

Port Management

Maritime Education and Training

Shipping Management and Logistics

Maritime Energy Management

Maritime Law and Policy

Maritime Safety and Environmental Administration

Ocean Sustainability, Governance and Management

## Dalian based MSc programme

Maritime Safety and Environmental Management

International Transport and Logistics

## Shanghai based MSc programme

Mphil WMU/IMLI International Maritime Law and Ocean Policy

International Maritime Law (LLM)

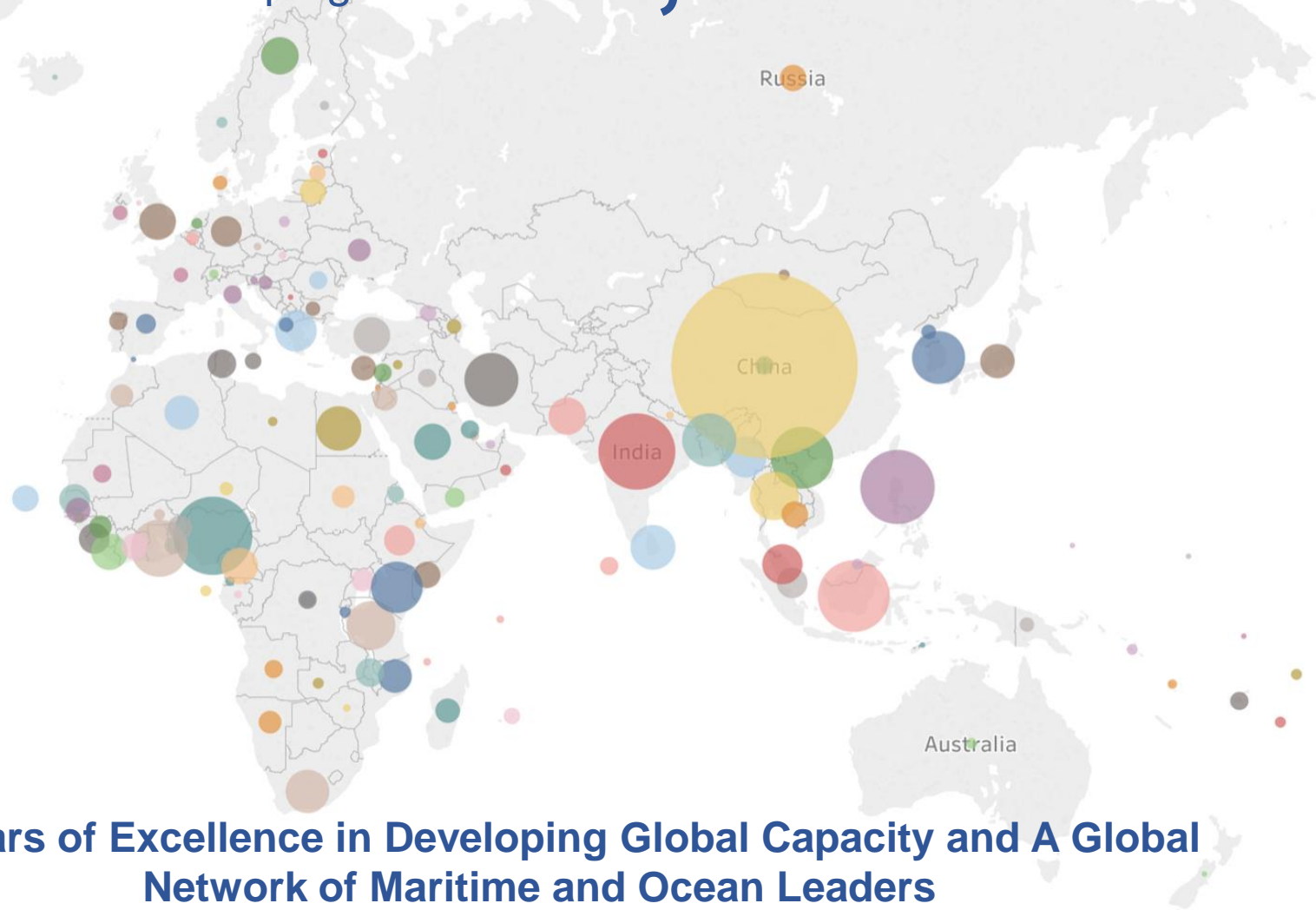
# Our Results

**4,919** Graduates

**168** Nationals

**90%** Developing Countries

**1,029** Female Graduates





A dedicated global educator to promote **gender equality** and **empowerment of women**

- First female Director General, National Fisheries & Aquaculture Authority Liberia
- First Argentinian woman who command a patrol boat

## Leaders in Maritime and Ocean Sectors (selected)

- IMO Secretary-General, 2 ASGs, Director of TCD, Head of Division, Experts etc.
- IMO Council Chair and Delegates
- Ministers, Vice Ministers and Directors-General in Member States Administrations (Ministries, Port Authorities, Maritime Administrations, Marine Department, Coast Guard) Antigua and Barbuda, Argentine, Bahrain, Bangladesh, Cambodia, Cape Verde, Chile, China, Ghana, Grenada, Guyana, Indonesia, Iran, Iraq, Jordan, Liberia, Lithuania, Malawi, Mauritius, Nigeria, Oman, Philippines, Republic of Korea, Senegal, Sierra Leone, Tanzania, Trinidad & Tobago, Turkey, Vietnam
- Director General, International Mobile Satellite Organization
- Secretary General, International Commission of the Congo Obangui-Sangha Basin
- Professors and Researchers

# Report Launch



15 Jan 2019

**International Maritime Organization**







## High Impact

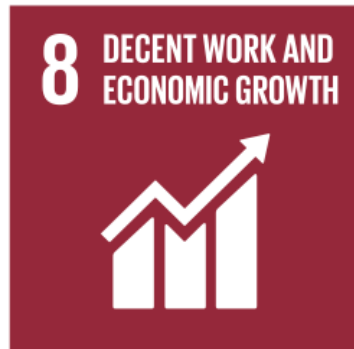
Downloads: 4,000+

Highly covered by the reputable media sources

Extensive sharing in social media



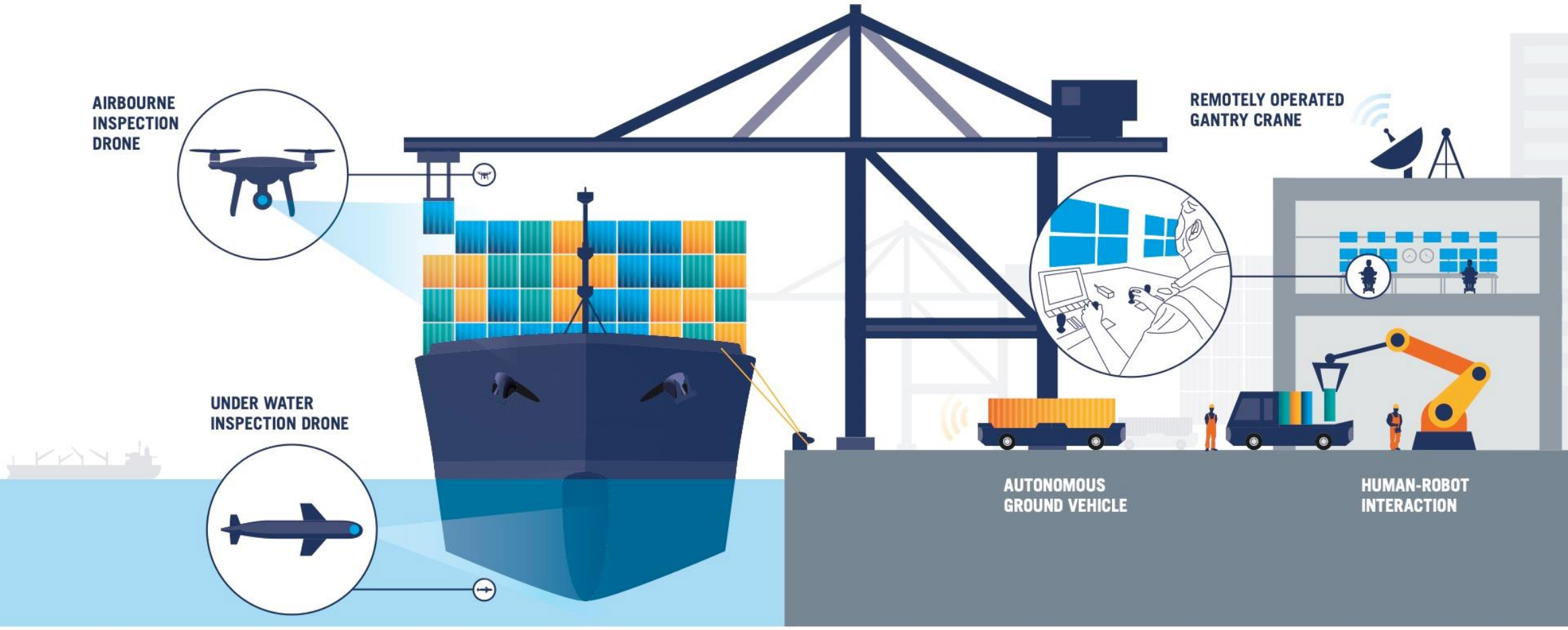
# Related UN SDGs to this research





-  Technology Trends
-  Transport Forecast
-  Overview of the Labour Force
-  Country Profiles
-  Case Studies
-  Conclusions & Recommendations

# Technology Trends: Maritime



AIRBOURNE  
INSPECTION  
DRONE

UNDER WATER  
INSPECTION DRONE

REMOTELY OPERATED  
GANTRY CRANE

AUTONOMOUS  
GROUND VEHICLE

HUMAN-ROBOT  
INTERACTION

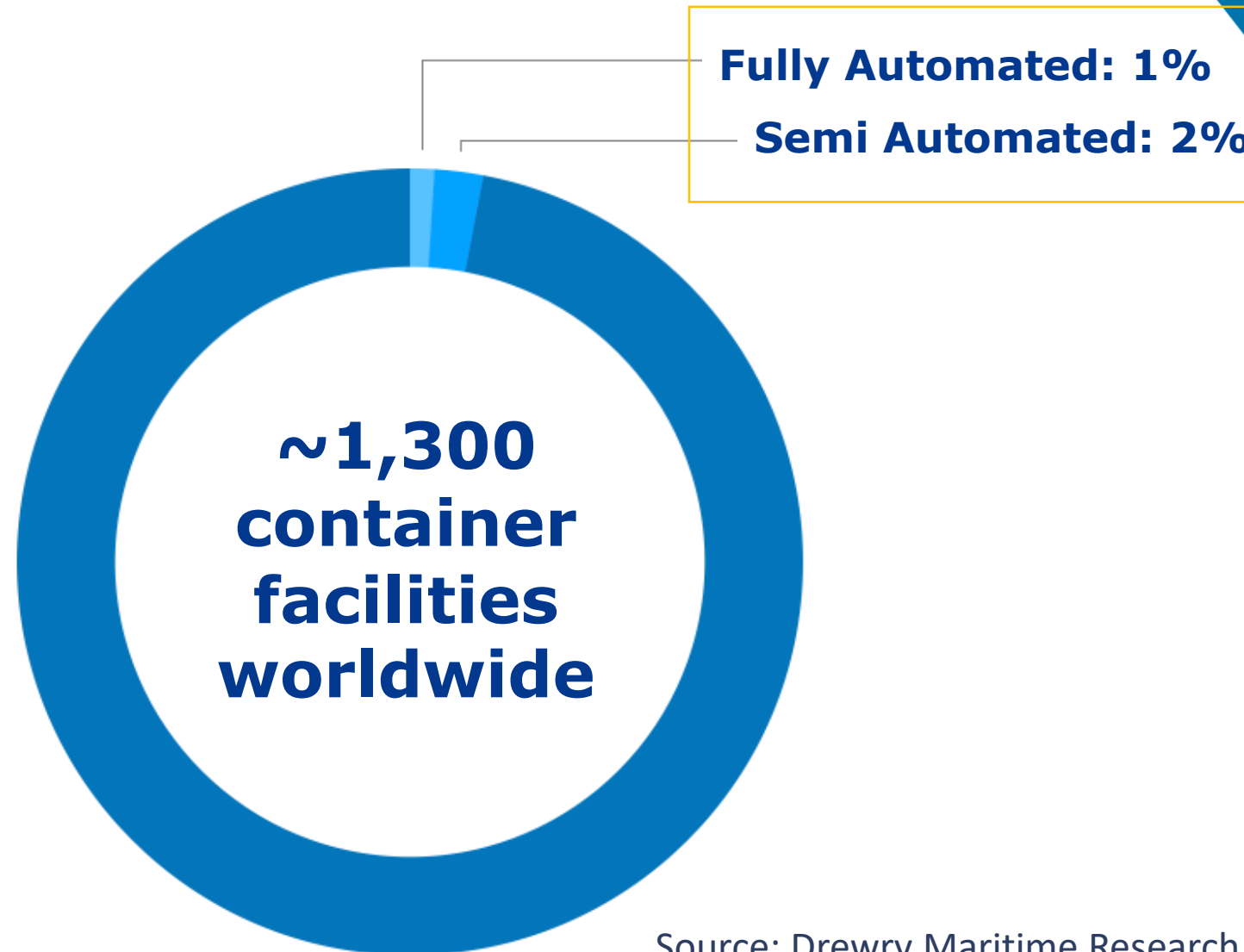


# Technology Trends: Ports

**Fully automated port terminals** are already a **reality**, but are newly built. **“Traditional” ports** will become **more digital**, improving the safety and efficiency of use of the available port infrastructure.



# Current automated terminals



**Not Automated: 97%**

Source: Drewry Maritime Research

# Automated terminals: examples



**NETHERLANDS:**  
**Rotterdam**  
**Maasvlakte II**  
**(opened: 2015)**





# Automated terminals: examples



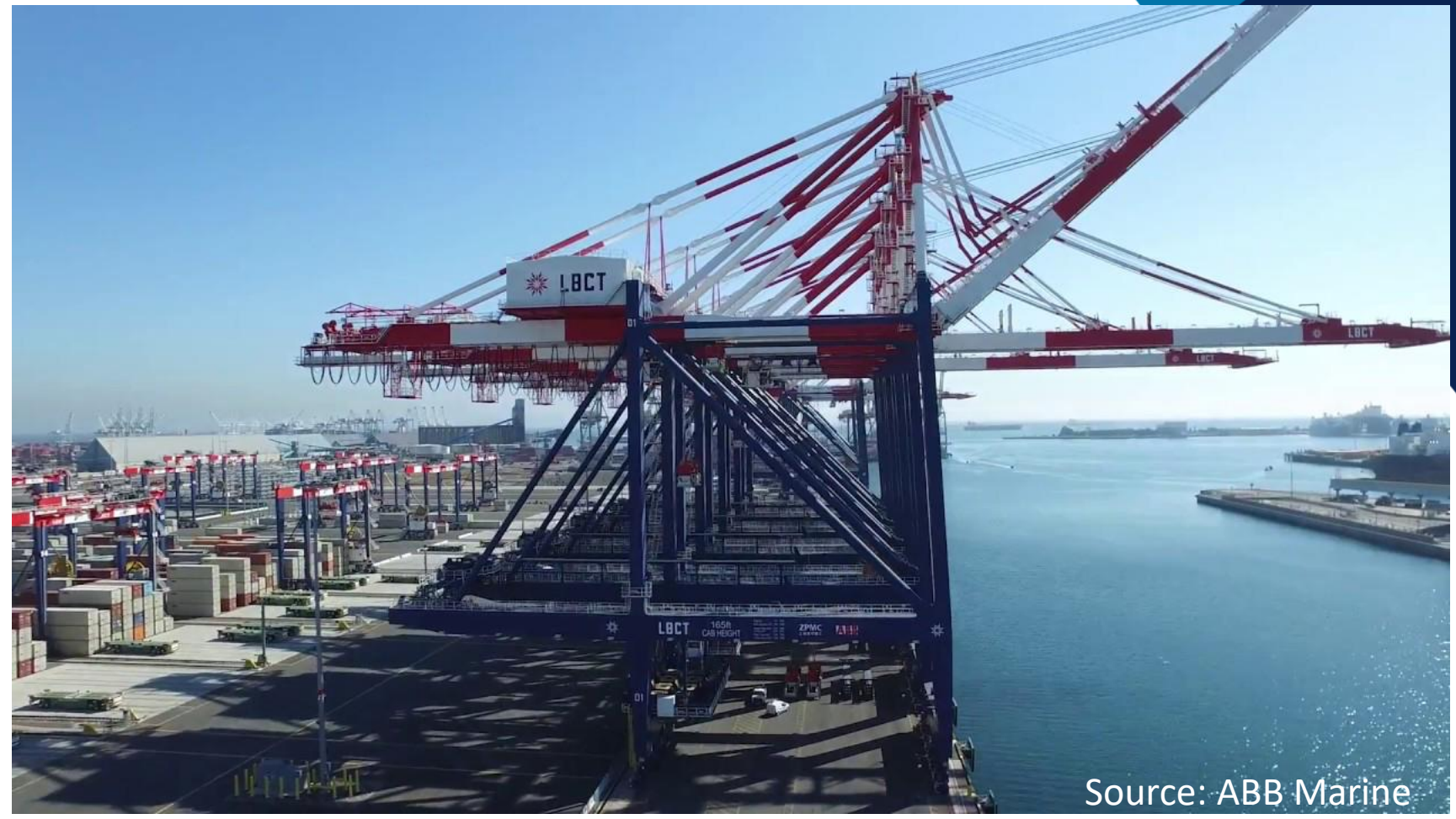
**CHINA:**  
**Qingdao**  
**Qianwan**  
**(opened: 2017)**



# Automated terminals: examples



**UNITED STATES:  
Long Beach - LA  
(opened: 2017)**





# Automated terminals: examples



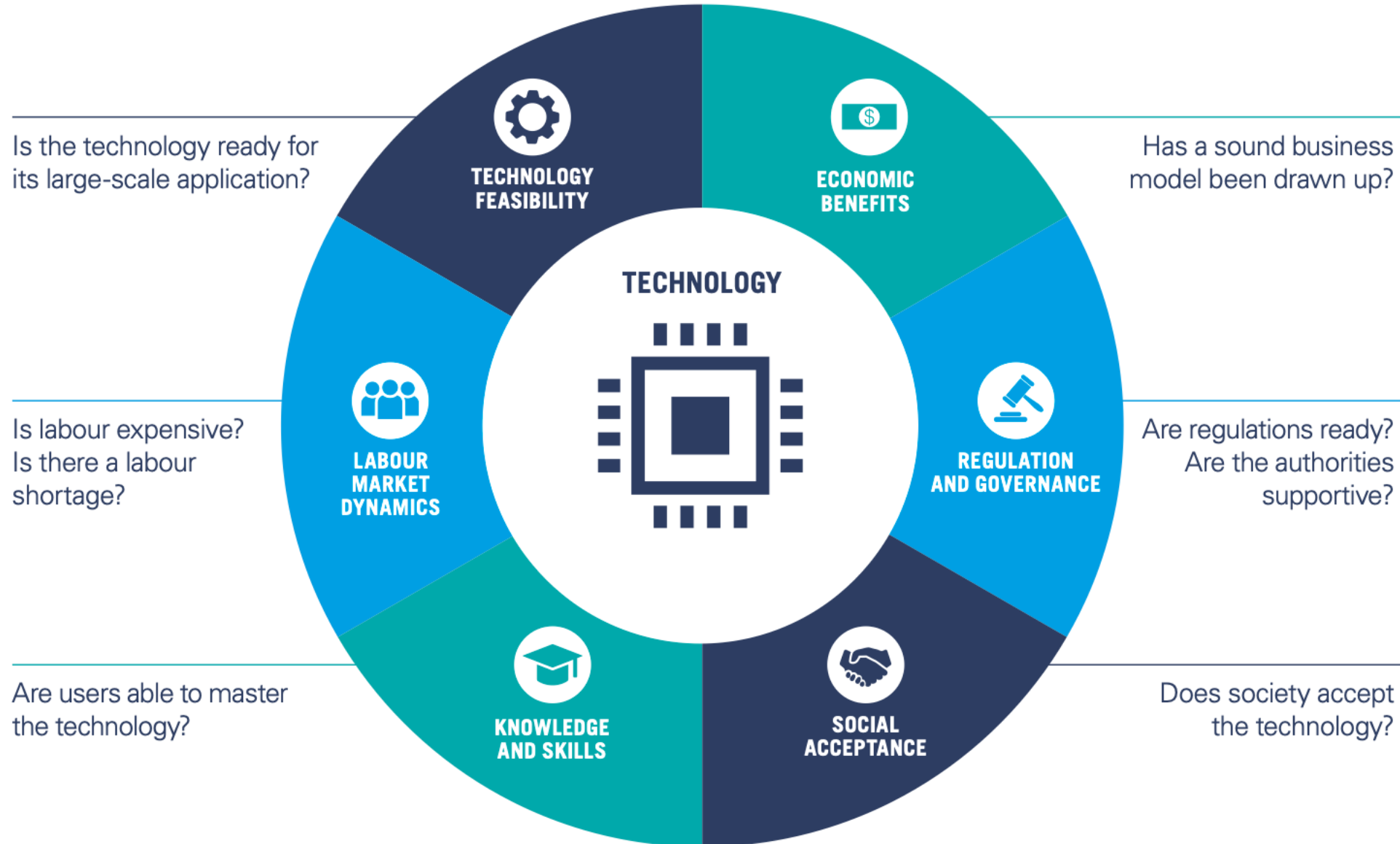
**MOROCCO:  
Tanger-Med  
(expected: 2019)**



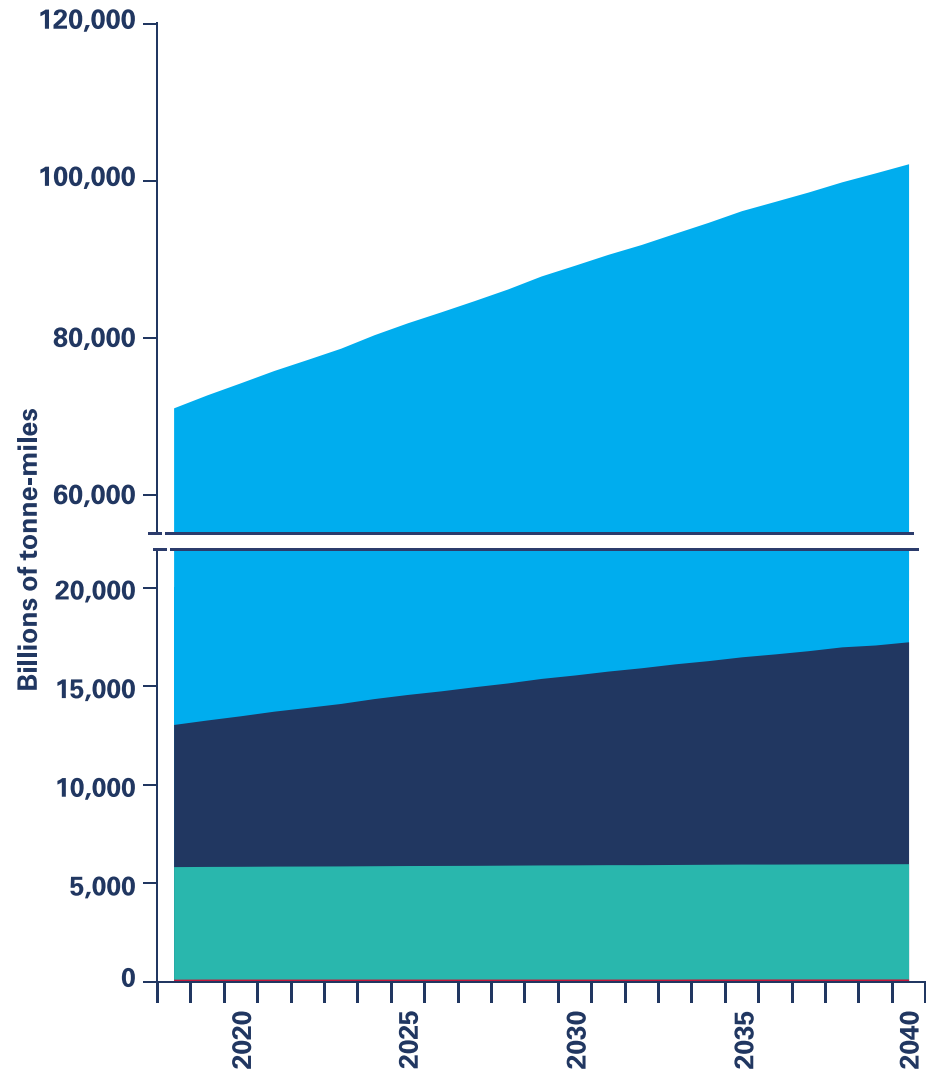
Source: Seatrade Maritime News



# THE SIX MAIN FACTORS THAT DETERMINE TECHNOLOGY ADOPTION



# Seaborne trade will continue to grow



Seaborne trade will continue to **increase**, putting pressure on ports to **handle more cargo in the future.**

Seaborne Road Rail Air Freight

# Overview of the Labour Force



168 Million  
Transport Workers

3.3 Million  
Sea Transport

## Occupations

12%  
High-Skill

|                        |
|------------------------|
| Ship Engineer          |
| Ship Officer           |
| Aircraft Pilot         |
| Air Traffic Controller |
| ...                    |

72%  
Medium-Skill

|                    |
|--------------------|
| Crane Operator     |
| Forklift Operator  |
| Heavy Truck Driver |
| Ship Rating        |
| ...                |

16%  
Low-Skill

|                  |
|------------------|
| Dock Worker      |
| Warehouse Porter |
| Freight Handler  |
| Baggage Handler  |
| ...              |



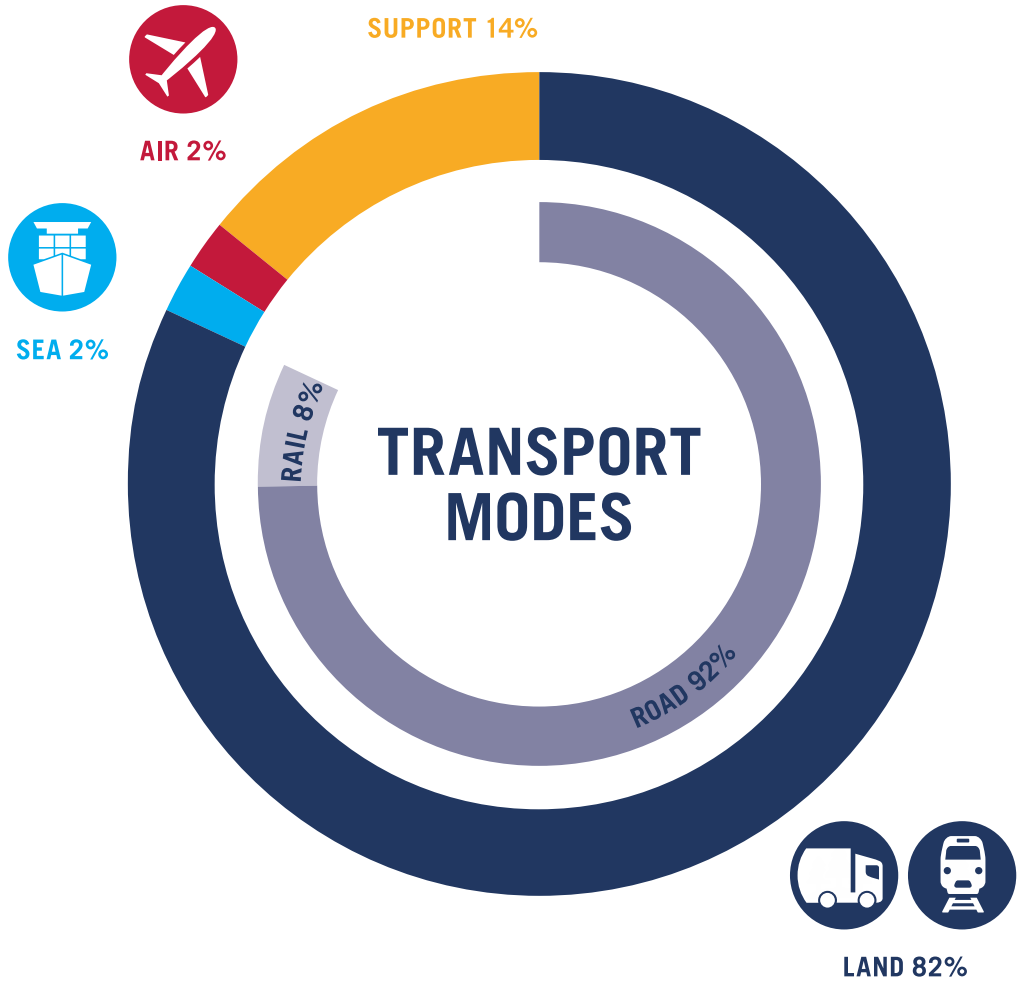
2,000+ detailed  
work activities  
(all occupations)

70+ countries  
analysed



# Overview of the Labour Force

**T** Most port-related workers are in this group

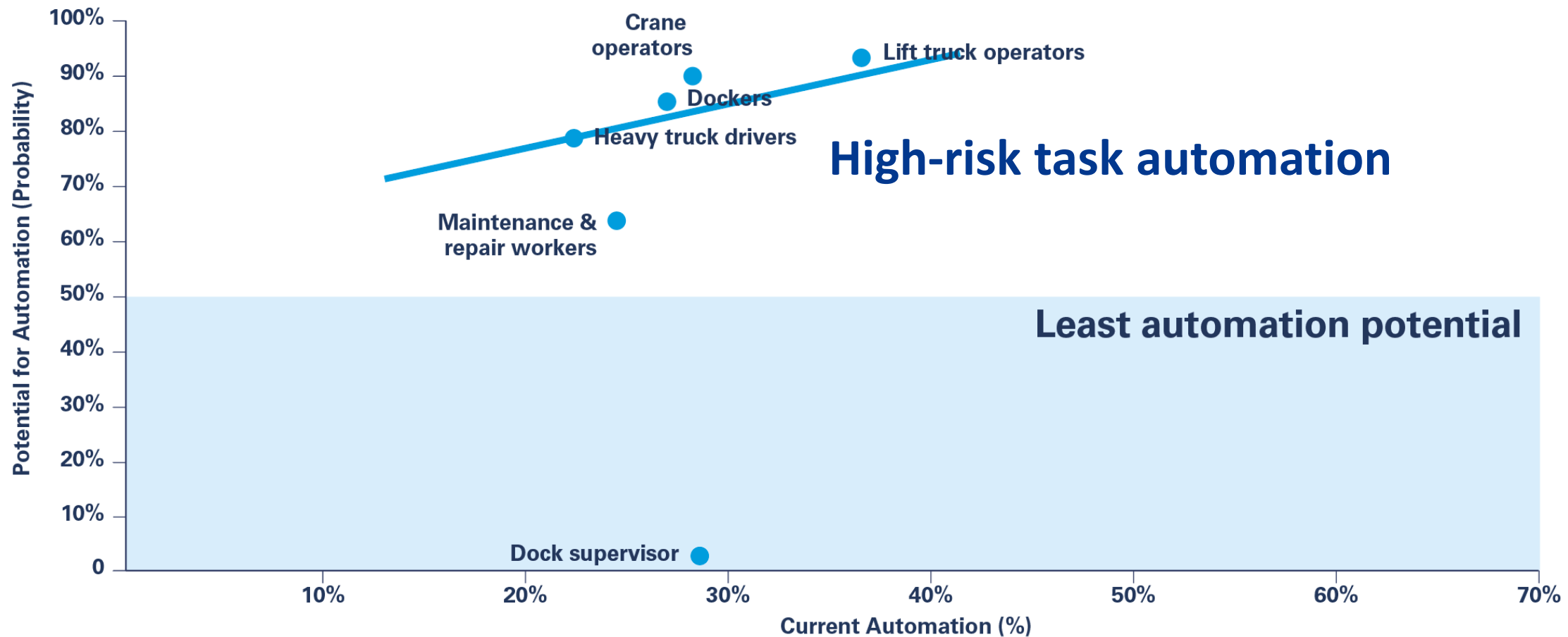


## GENDER SPLIT ALL MODES



MALE 80% FEMALE 20%

# Overview of the Labour Force



# Country Profiles as a tool for assessing technology

Key factors influencing the introduction of new and emerging technologies in a country



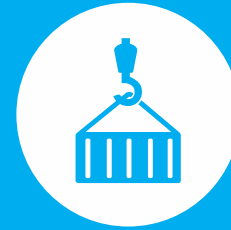
Innovation and Technology



Human Capital and Skills



Regulation and Governance



Infrastructure Quality

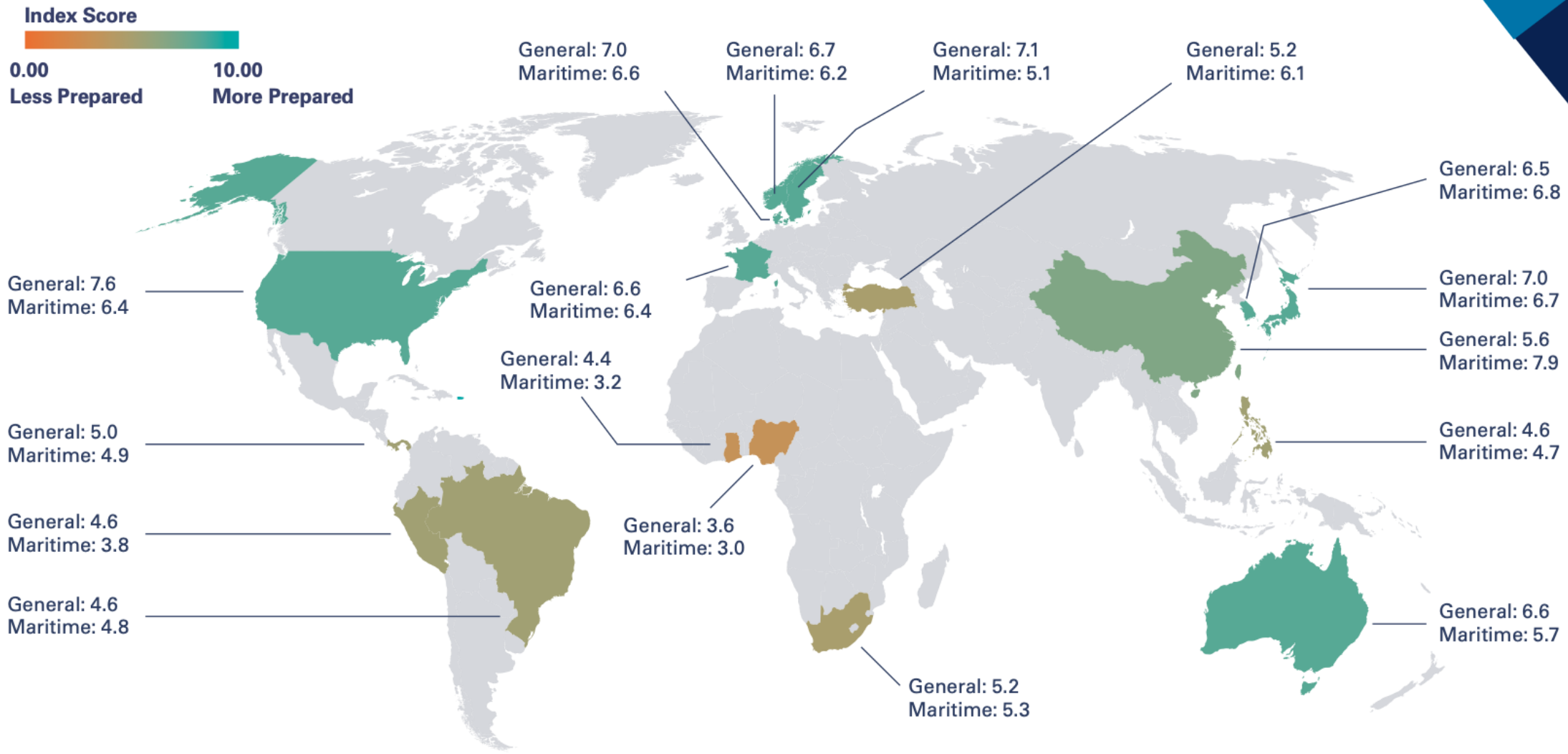


Business and Investment

Five factors influencing readiness to introduce new technologies and automation in a country



# Country Profiles as a tool for assessing technology



Source: WMU Country Profiles – Technology Readiness: Maritime

# Main Conclusions and Findings

## **Main conclusion:**

Qualified human resources with right skills will still be needed in transport

## **Findings:**

1. Gradual pace of introduction of automation and technology influenced by economics benefits, demographic trends and safety factors
2. Higher demands for transport resulting from continuous growth in trade
3. Effects of automation and technology are predictable and impact low and medium skill jobs most
4. Automation and technology is influenced by the local context

# Conclusion

***Automation is here to stay. Nations need to anticipate for shifts to come as the nature of work will change. Education and re-training systems are essential for the adaptation of workers to the new skills needed. ITF-WMU study provides the facts for developing a voice that can effectively ameliorate the effects of technology in the world of labour.***



# THANK YOU FOR YOUR ATTENTION

FREE TO DOWNLOAD AT:  
[HTTPS://COMMONS.WMU.SE/LIB\\_REPORTS/58/](https://commons.wmu.se/lib_reports/58/)



TRANSPORT 2040

## AUTOMATION TECHNOLOGY EMPLOYMENT

THE FUTURE OF WORK



THE FUTURE OF WORK

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