



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

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World Maritime University



Geneva, 13 February 2019

WORLD MARITIME UNIVERSITY

MALMÖ, SWEDEN



Mission

Educate future maritime and ocean leaders



Global Relevance

A UN specialized institution in Sweden



Postgraduate Programmes

7 master programs + 1 PhD program in maritime and ocean affairs



Alumni

More than 4000 maritime and ocean maritime professionals from 167 countries



**António Guterres,
UN Secretary-General**

25 September 2018
Address to the General Assembly

“

***Technological advances** may disrupt labour markets as traditional jobs change or disappear, even as the number of young job-seekers continues to grow. Re-training will be needed at previously unimaginable scales. Education must adapt, from the earliest grades. And the very nature of work will change.*

”



TRANSPORT 2040

AUTOMATION TECHNOLOGY EMPLOYMENT

THE FUTURE OF WORK



Report Launch



15 Jan 2019, IMO



TRANSPORT 2040

AUTOMATION TECHNOLOGY EMPLOYMENT

THE FUTURE OF WORK



Technology Trends



Transport Forecast



Overview of the Labour Force



Country Profiles



Case Studies



Conclusions & Recommendations

THE FUTURE OF WORK

1. TECHNOLOGY TRENDS: MARITIME



1. TECHNOLOGY TRENDS: FOUR CLUSTERS



Automation

Maintenance



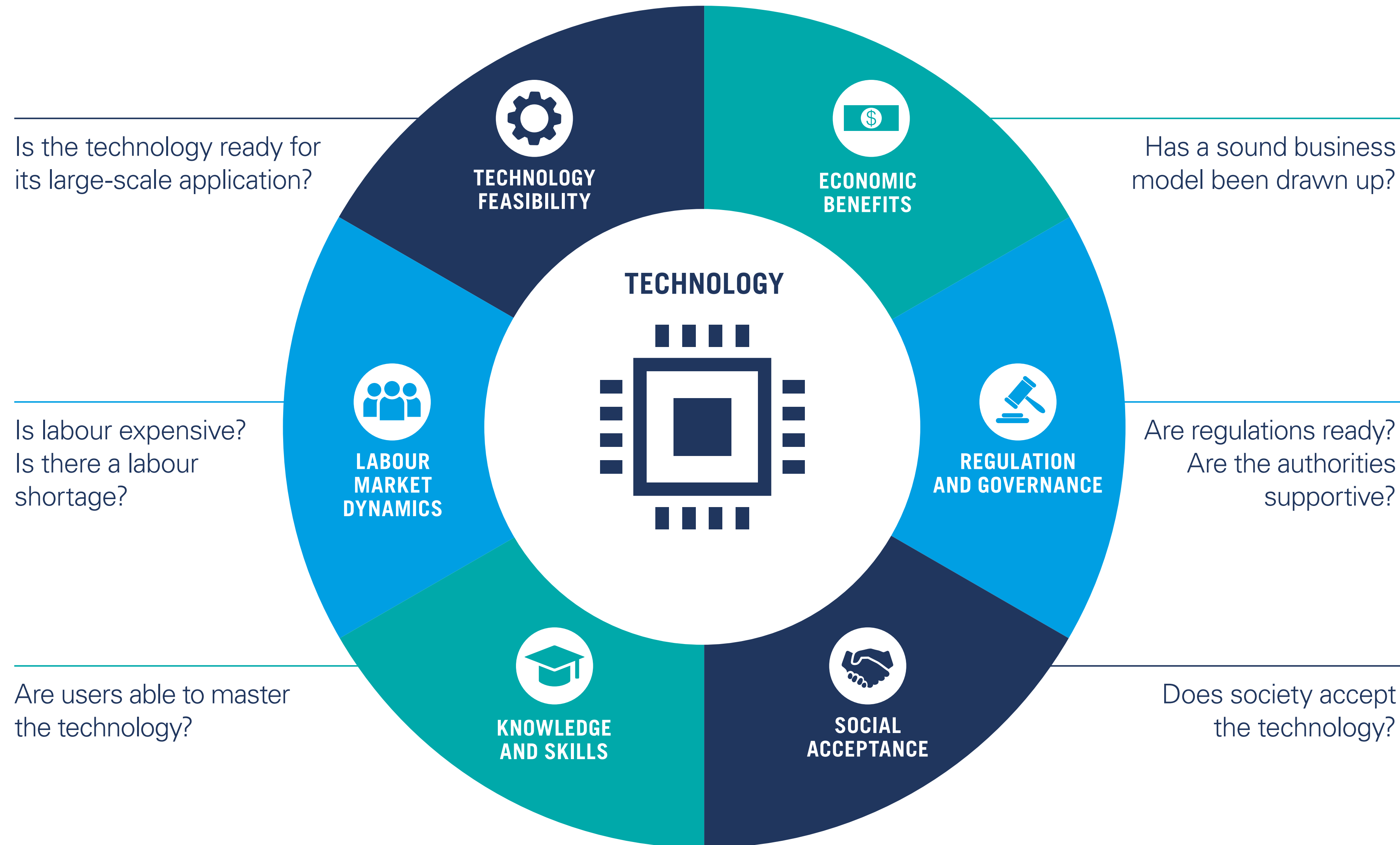
New Interfaces

New Services



**FOUR
CLUSTERS**

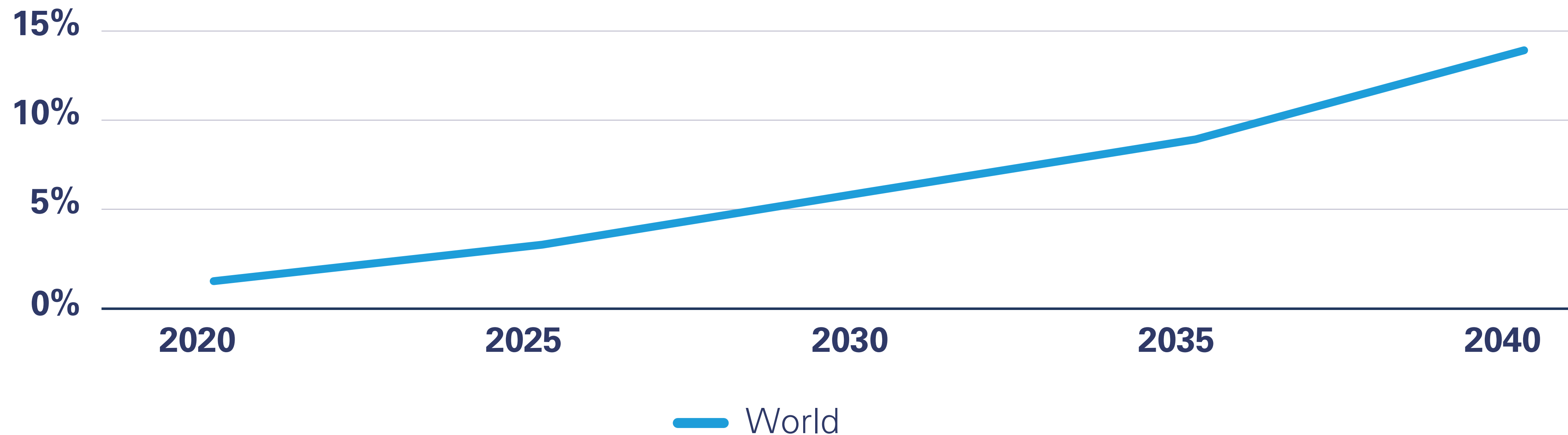
WMU RESEARCH HAS IDENTIFIED SIX MAIN FACTORS THAT CAN ACCELERATE OR DELAY THE ADOPTION OF TECHNOLOGY



1. TECHNOLOGY TRENDS: S-CURVES

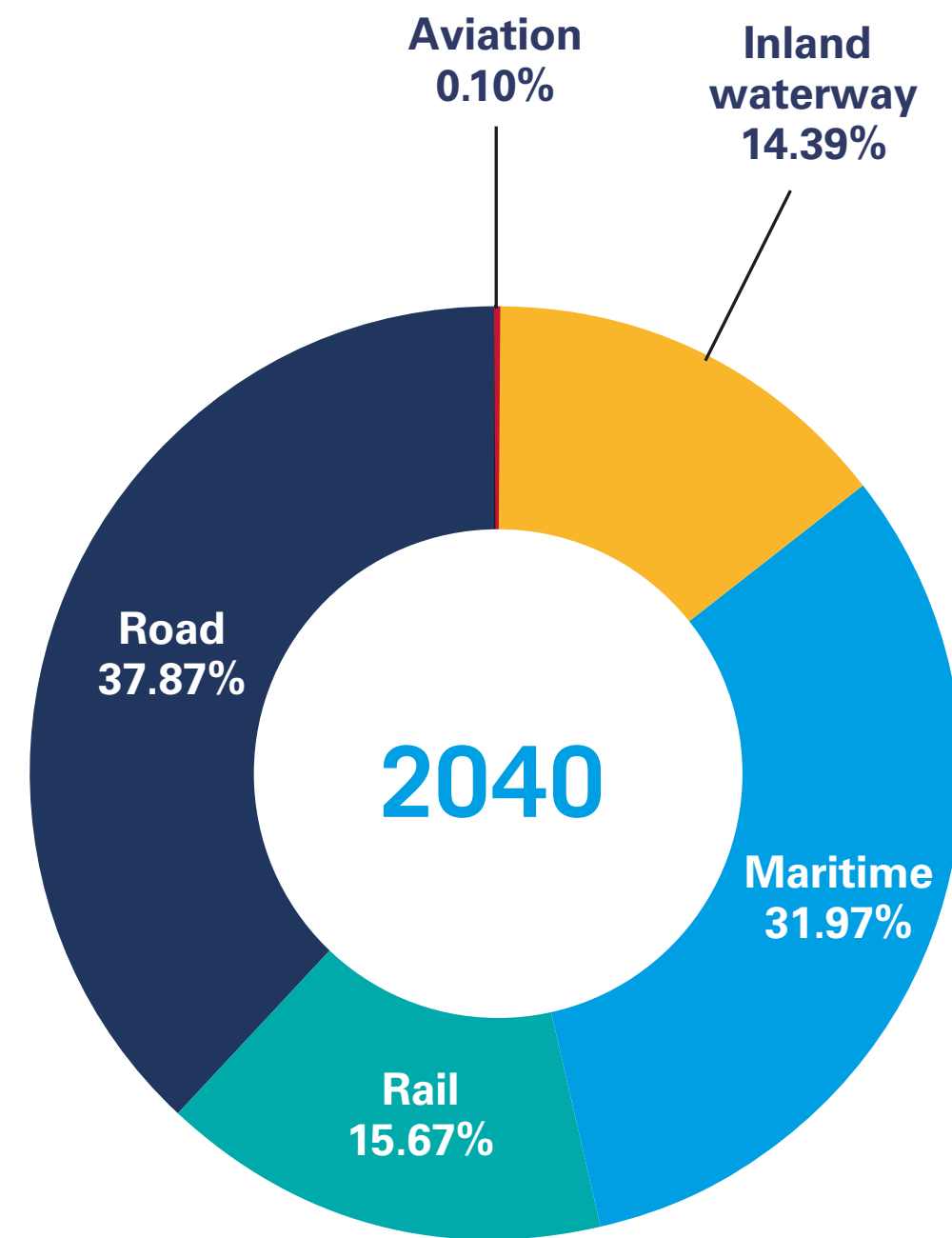
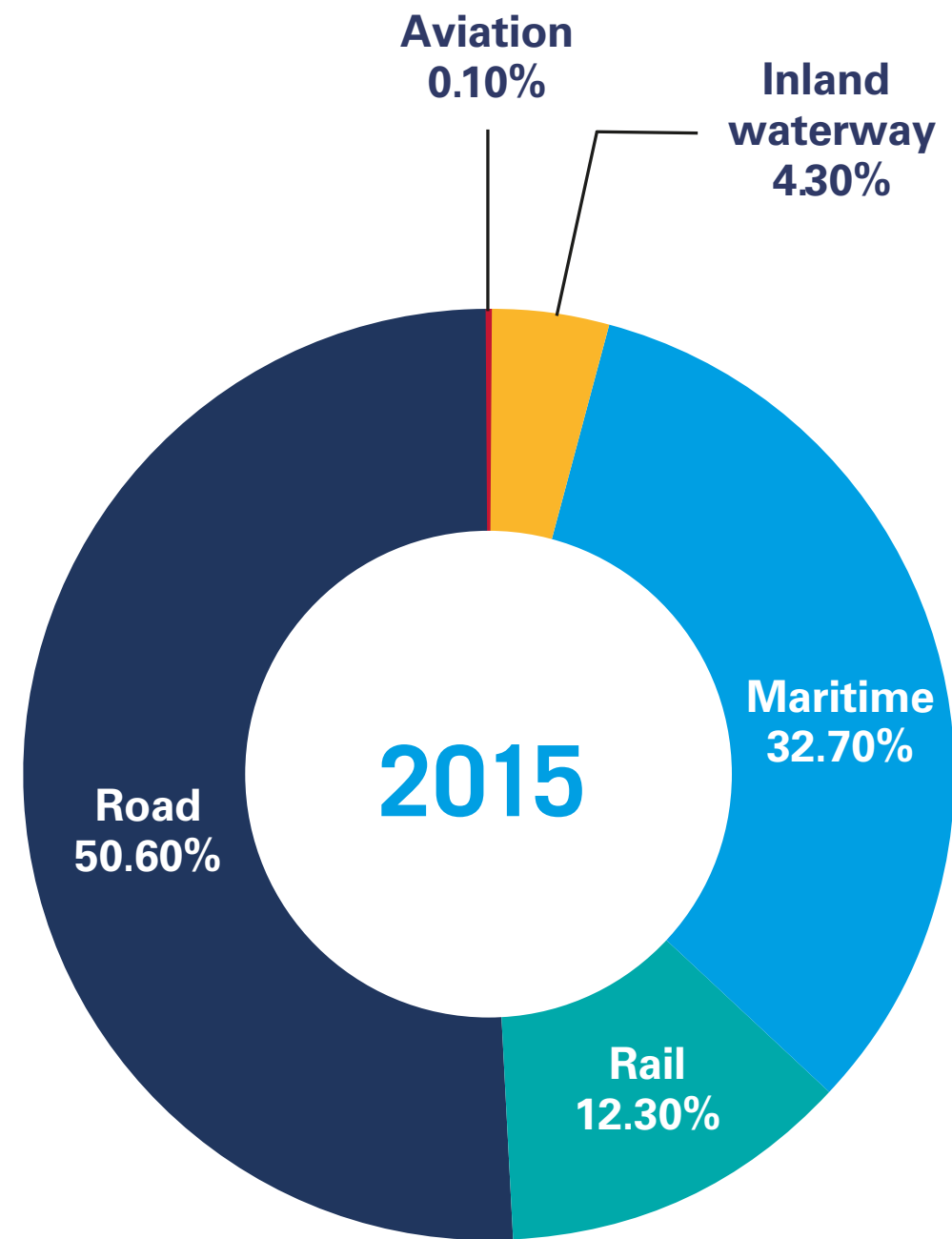
“The introduction of automation will be evolutionary, rather than revolutionary”

Autonomous ships with human supervision

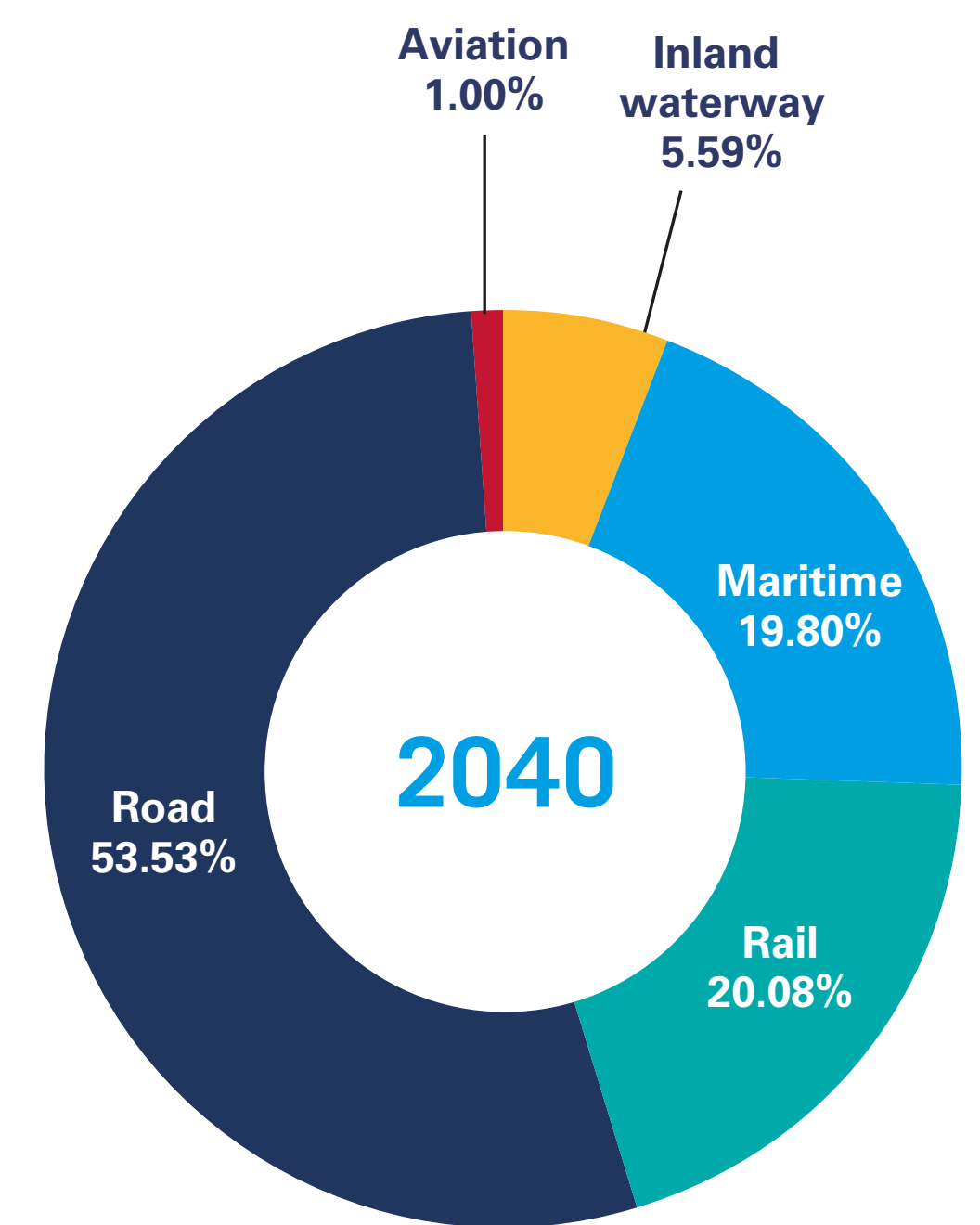
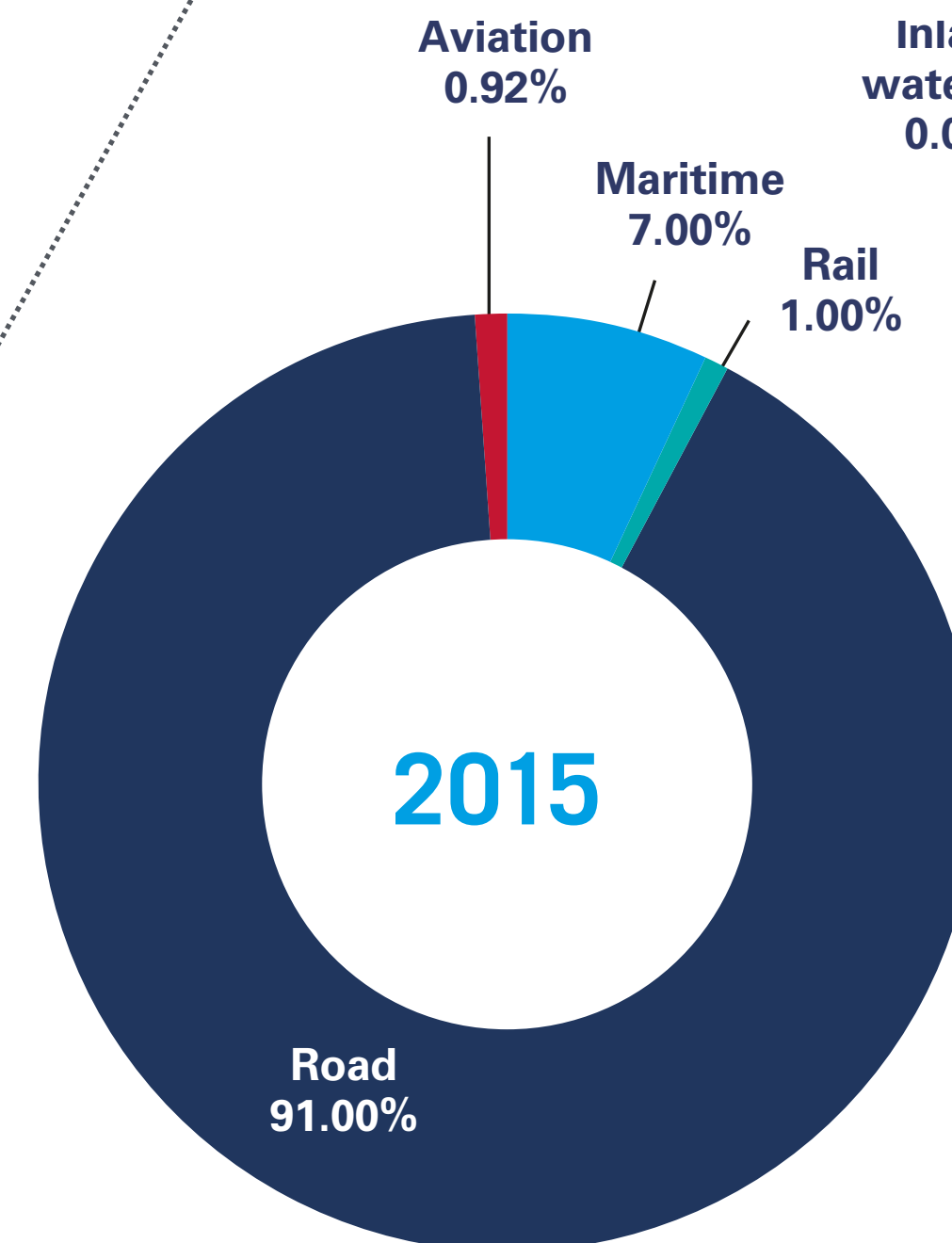


2. TRANSPORT FORECAST: MODAL SHIFTS

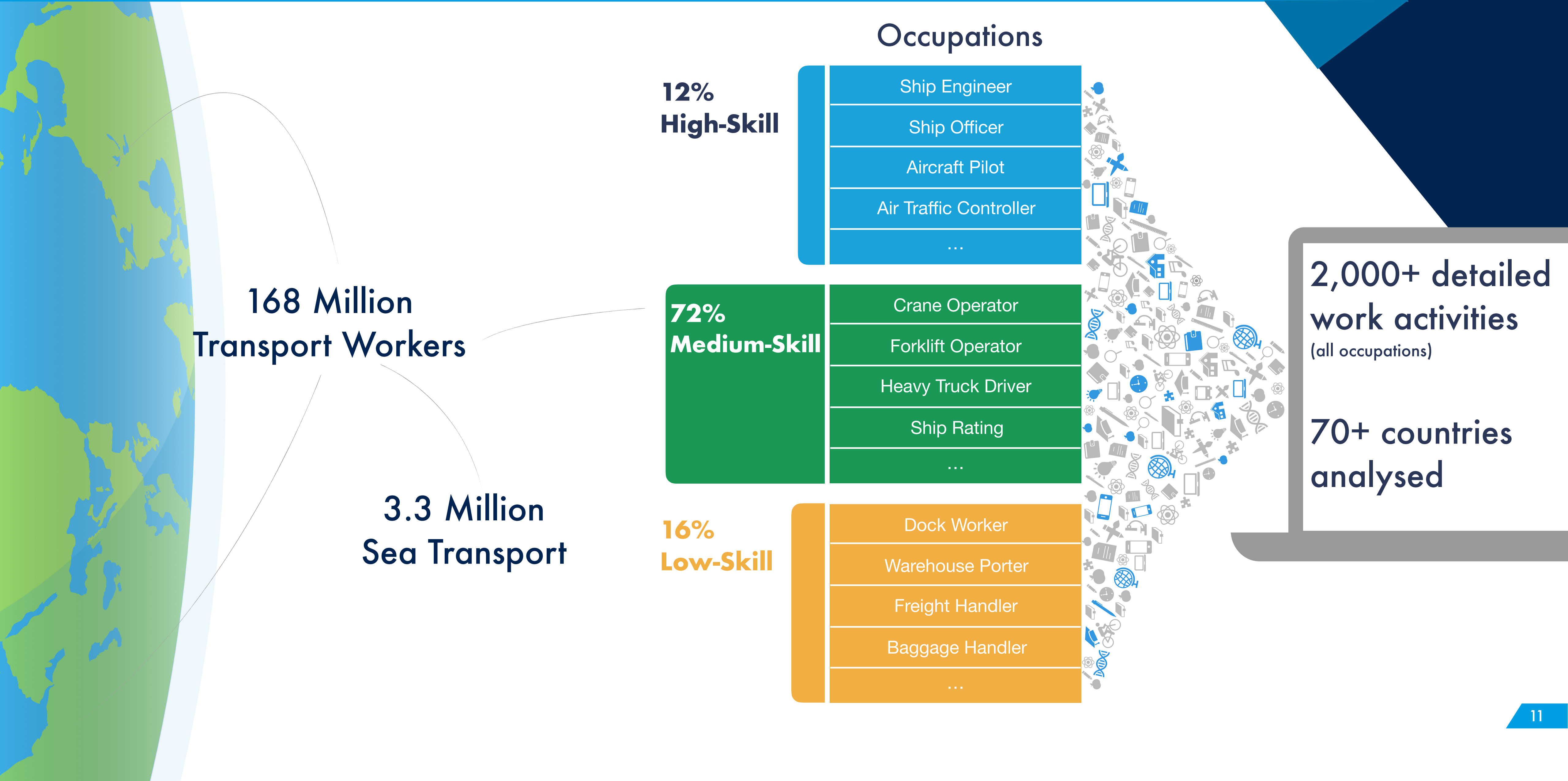
EU



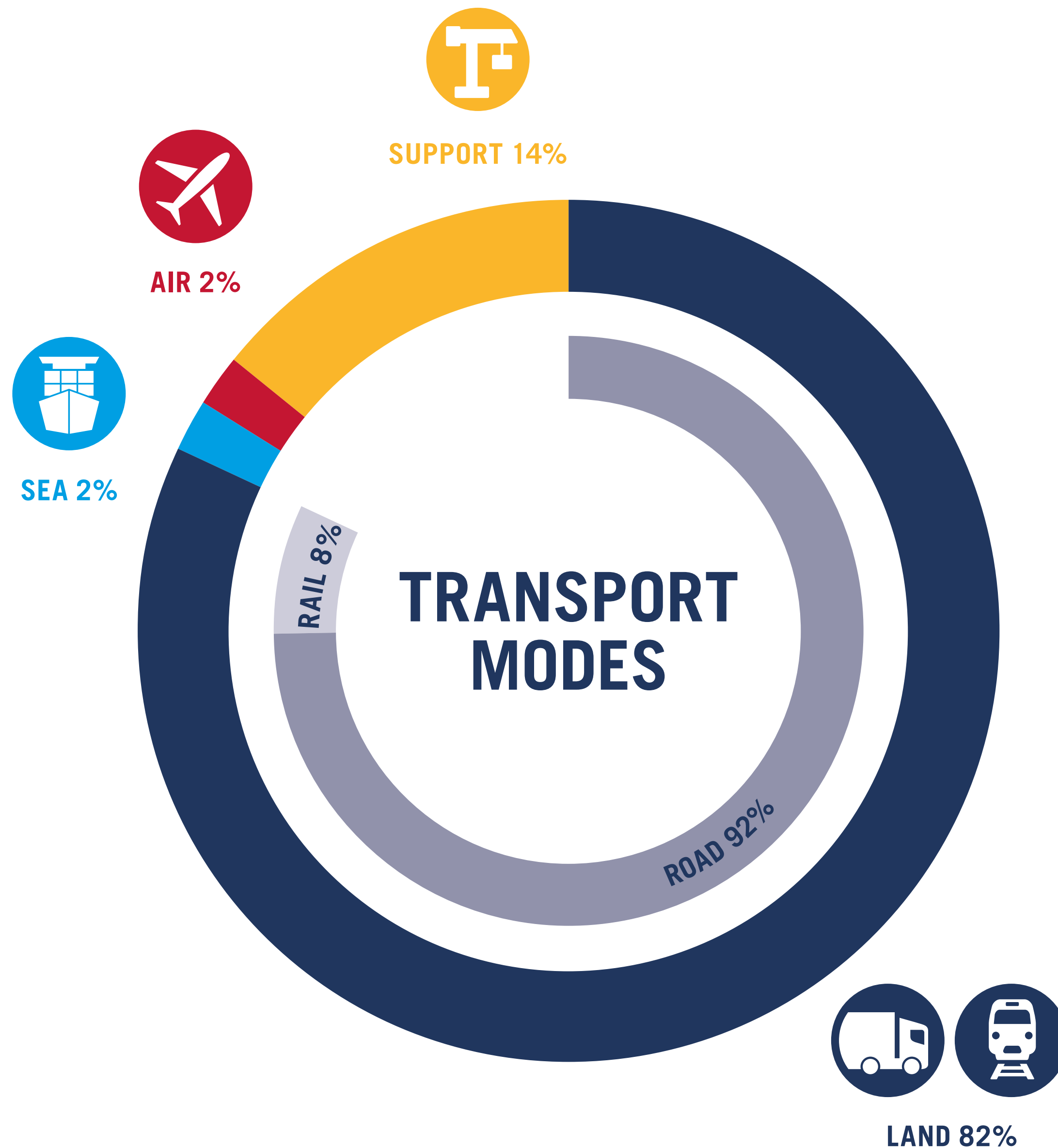
ASEAN



3. OVERVIEW OF THE LABOUR FORCE



3. OVERVIEW OF THE LABOUR FORCE



GENDER SPLIT ALL MODES



MALE 80% FEMALE 20%

3. OVERVIEW OF THE LABOUR FORCE

TRANSPORT WORKERS

LOW SKILL



BAGGAGE HANDLER
 WAREHOUSE PORTER
 DOCK WORKER

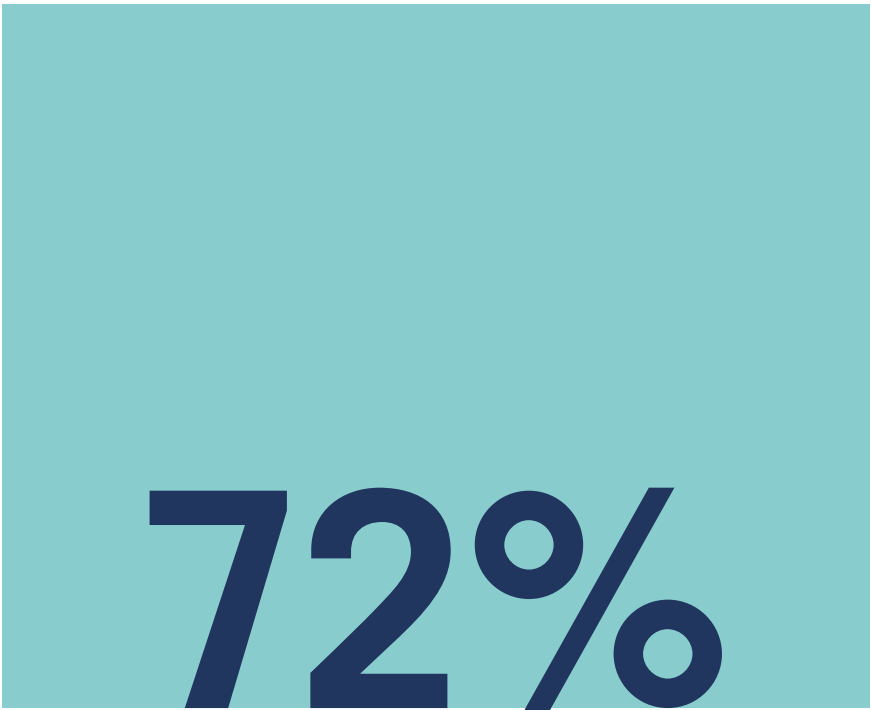
FREIGHT HANDLER



- Move materials, equipment, or supplies
- Sort materials or objects for processing or transport
- Load shipments, belongings, or materials
- Mark materials or objects for identification

...

MEDIUM SKILL



OCCUPATIONS

CRANE OPERATOR
 FORKLIFT OPERATOR
 SHIP RATING

HEAVY TRUCK DRIVER



- Operate vehicles or material-moving equipment
- Follow safety procedures for vehicle operation
- Inspect cargo to ensure it is properly loaded or secured
- Secure cargo
- Monitor cargo area conditions

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HIGH SKILL



AIR TRAFFIC CONTROLLER
 SHIP ENGINEER
 SHIP OFFICER

AIRLINE PILOT

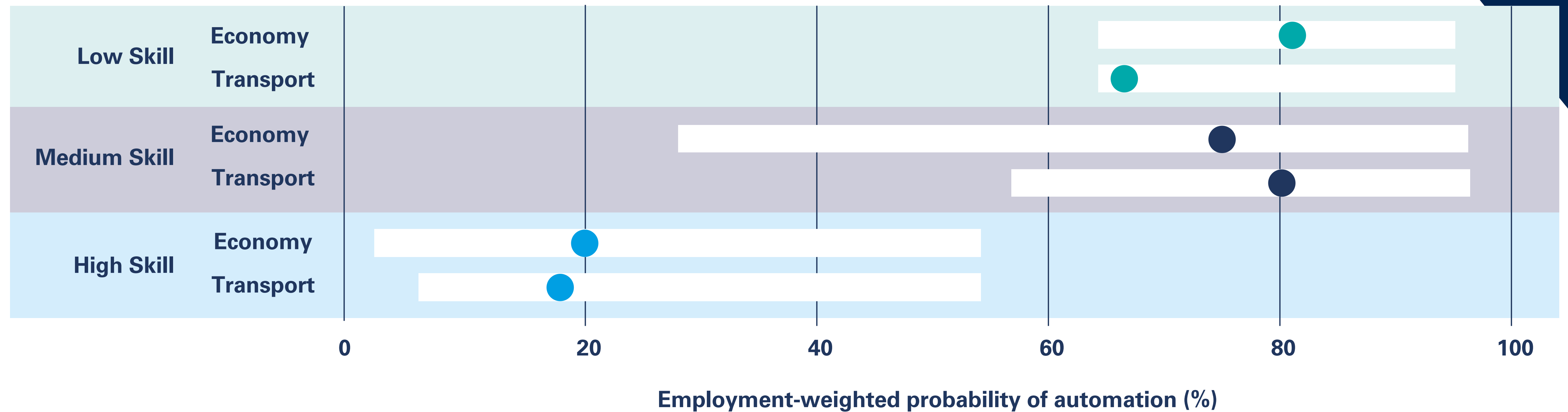


- Pilot aircraft
- Communicate with others to coordinate vehicle movement
- Monitor equipment gauges or displays to ensure proper operation
- Notify others of emergencies, problems, or hazards
- Respond to transportation emergencies
- Record operational details of travel

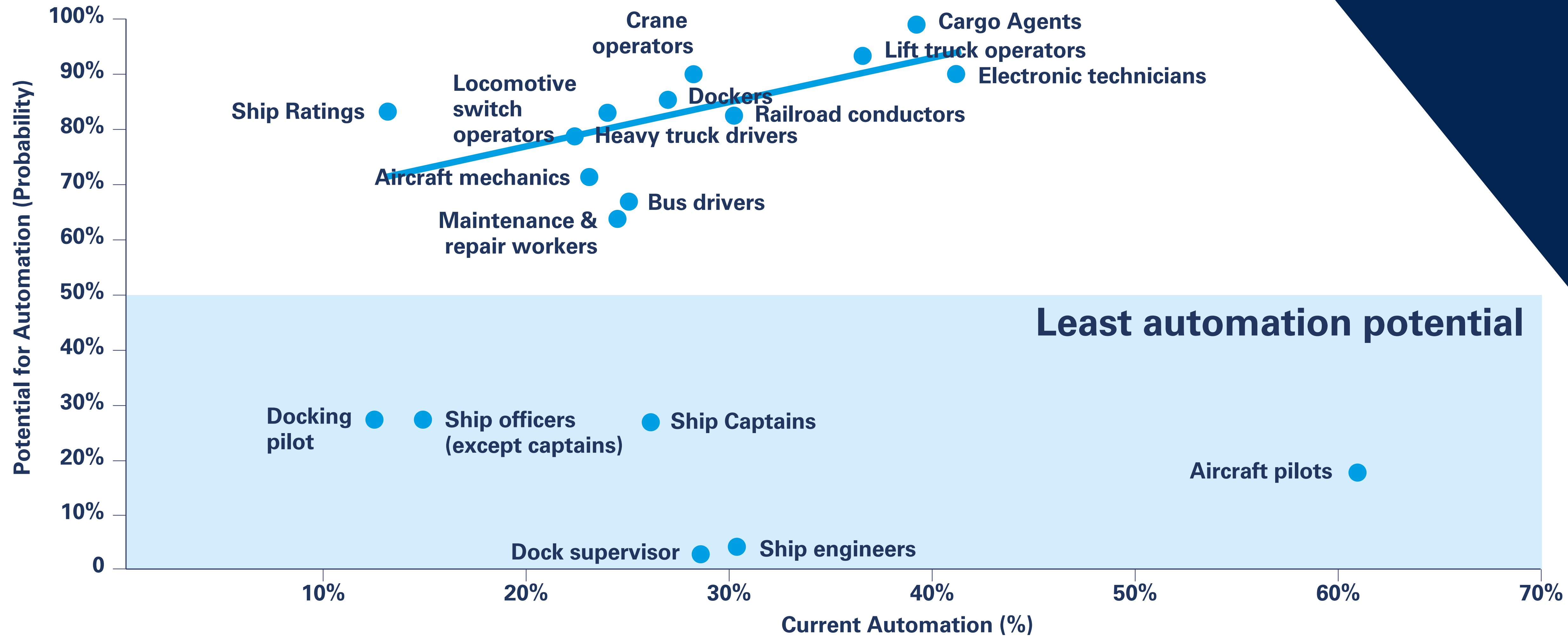
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3. OVERVIEW OF THE LABOUR FORCE

AUTOMATION POTENTIAL



3. OVERVIEW OF THE LABOUR FORCE

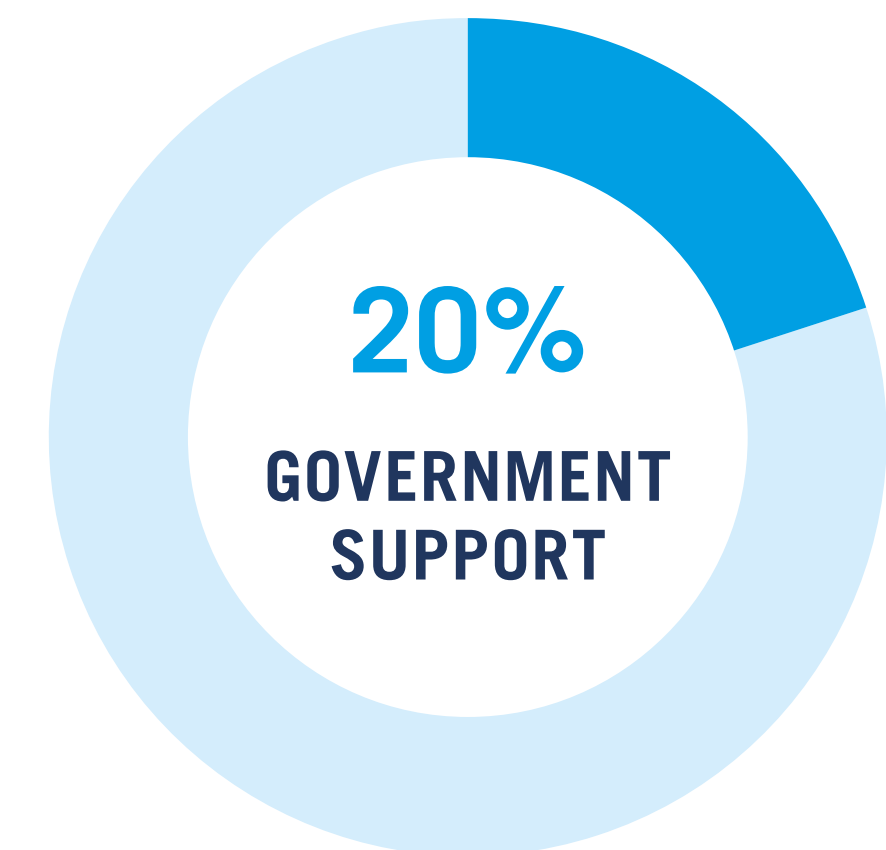
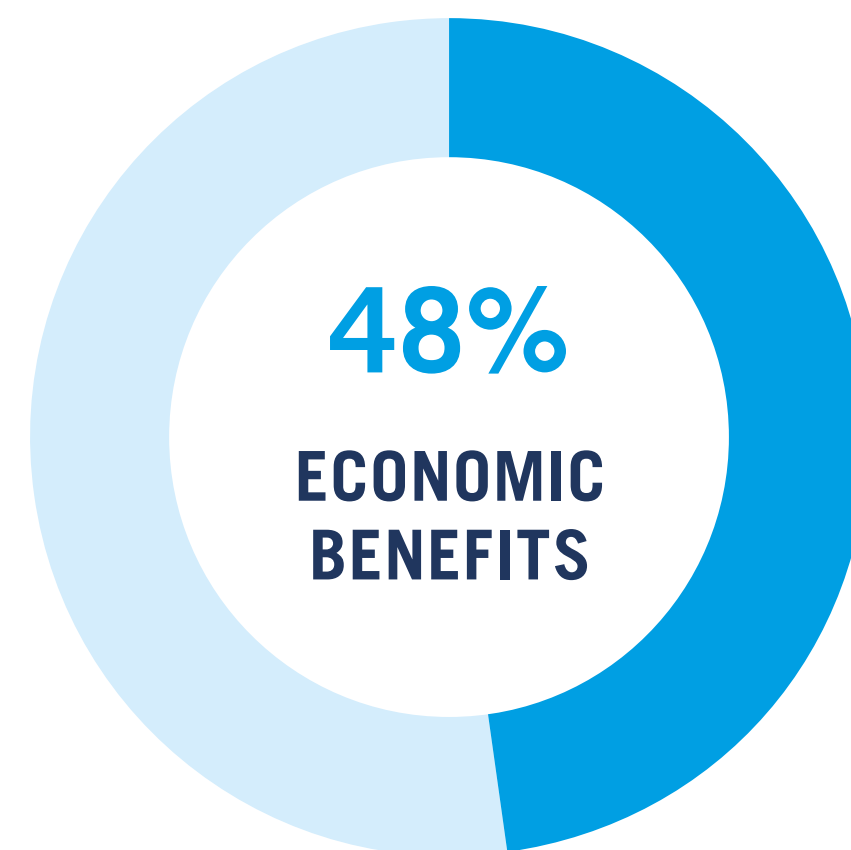


WHAT FACTORS CAN ENABLE OR DELAY HIGHLY AUTONOMOUS SHIP DEPLOYMENT?

HIGHLY AUTOMATED SHIPS



ENABLERS



HURDLES

14%

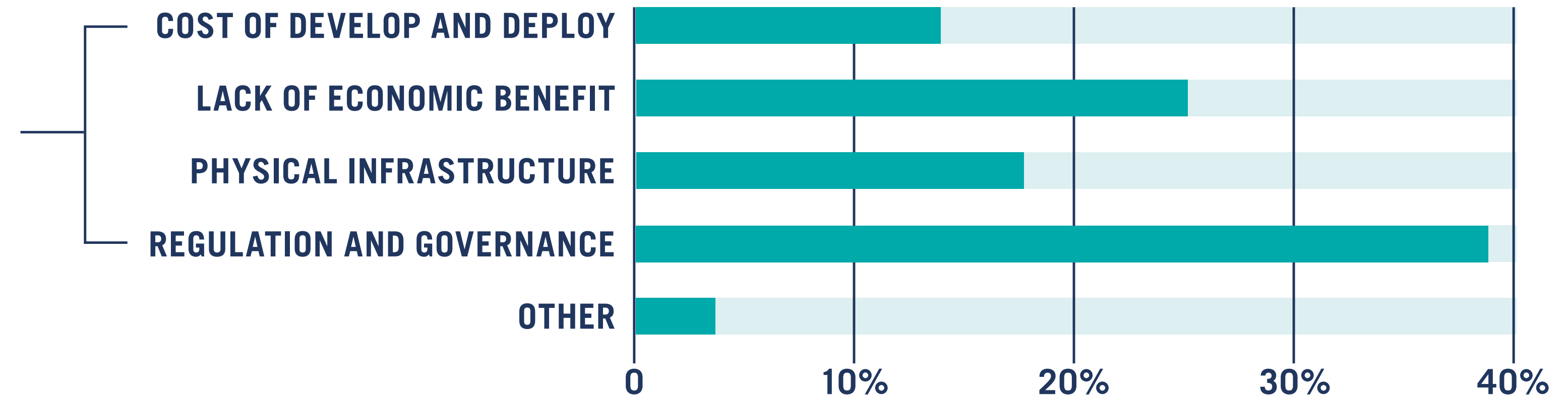
COST

25%

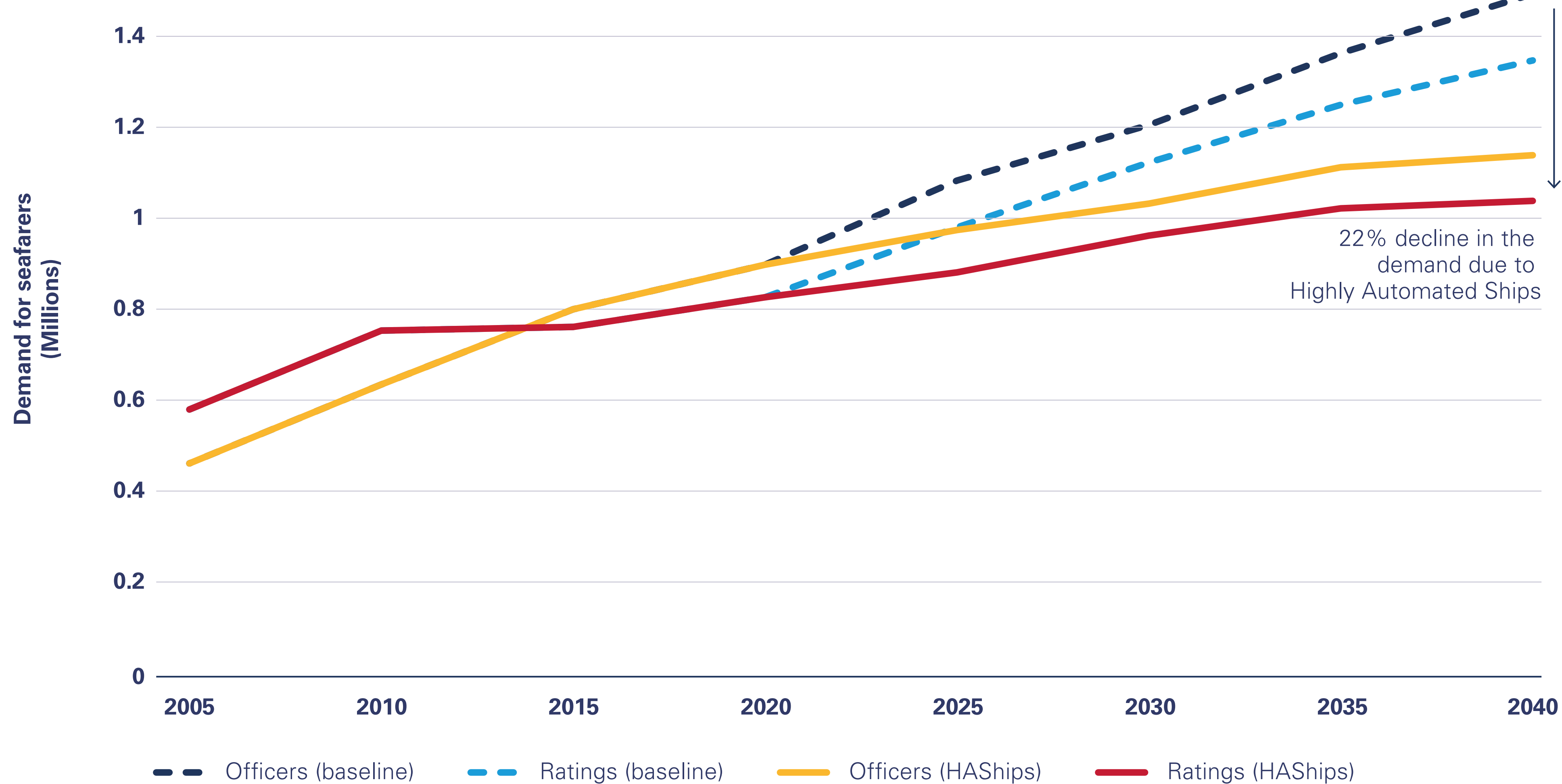
ECONOMIC BENEFIT

39%

REGULATION AND GOVERNANCE



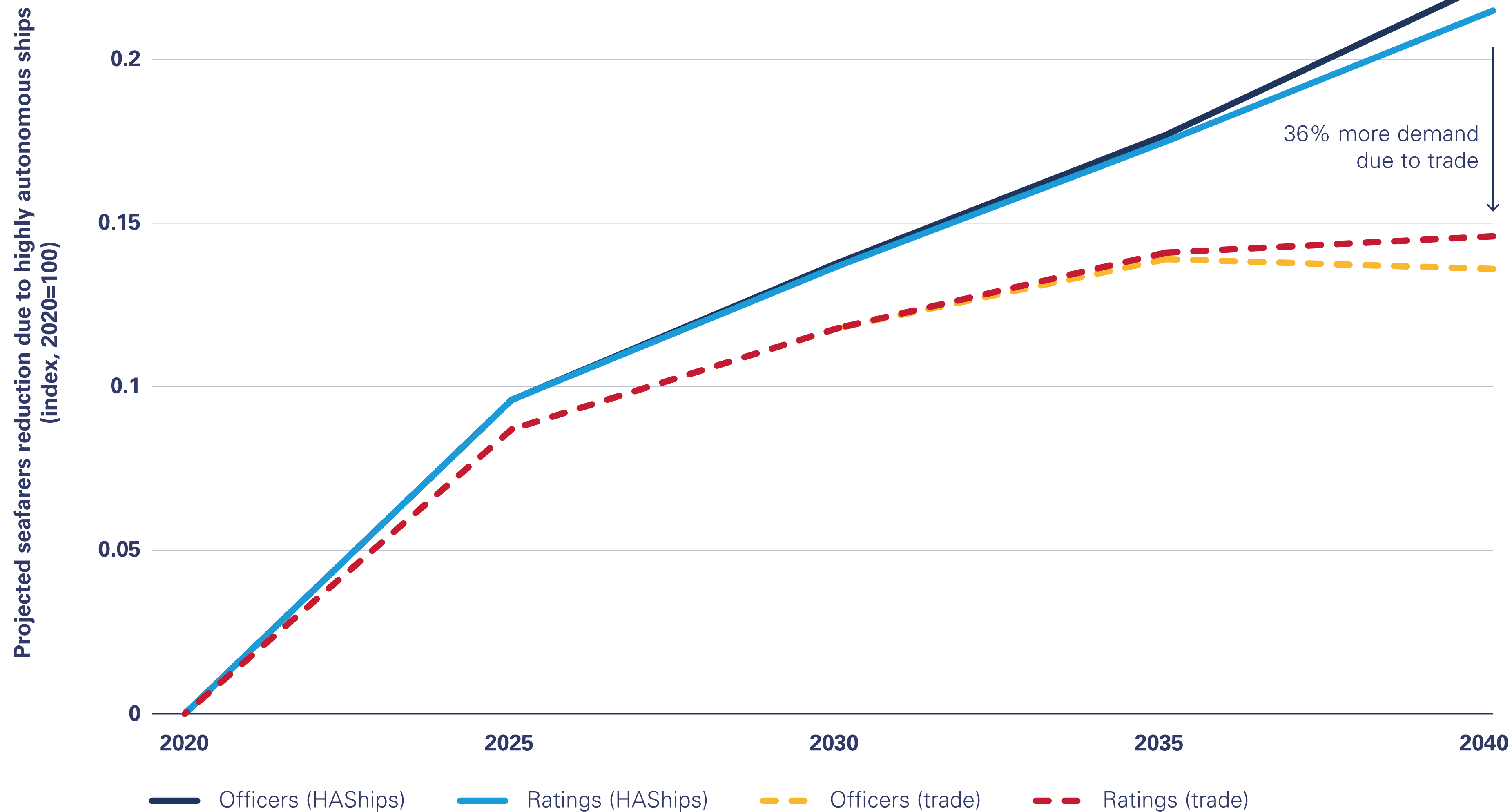
3. OVERVIEW OF THE LABOUR FORCE



Sources: Historical data from ICS/BIMCO (2016); forecast used data from the start-up curves of Chapter 1 and UNCTAD maritime data; WMU forecast.

Notes: HAShips stands for Highly Automated Ships taking international voyages (average tonnage, average trade). The predictions are subject to a high level of uncertainty, quantified between -6 percentage points and +18 percentage points within a 95 per cent confidence interval. The crew reduction approximately follows an exponential process and by 2040 the crewing levels are assumed to be reduced between 16 and 24 per cent.

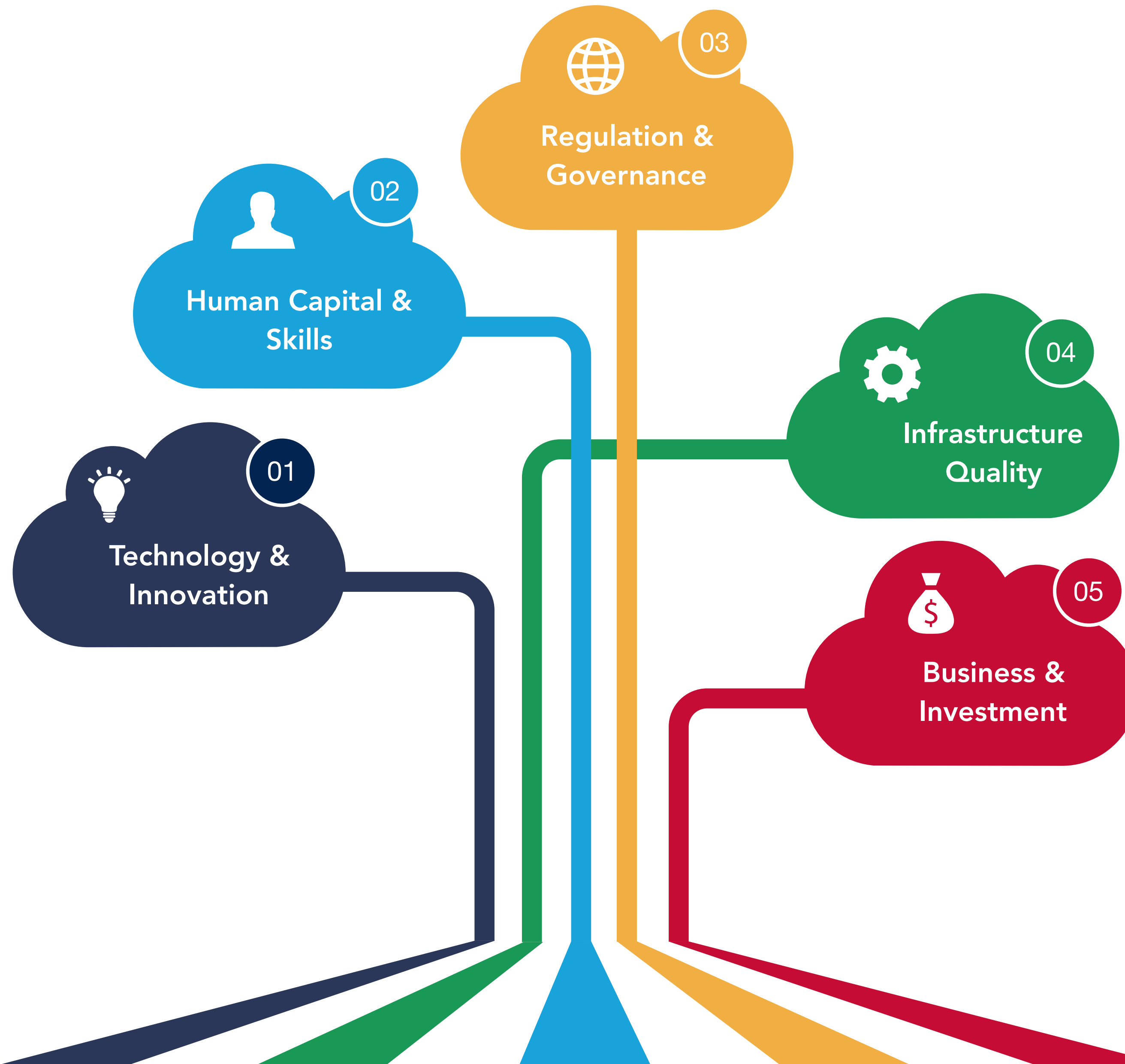
3. OVERVIEW OF THE LABOUR FORCE



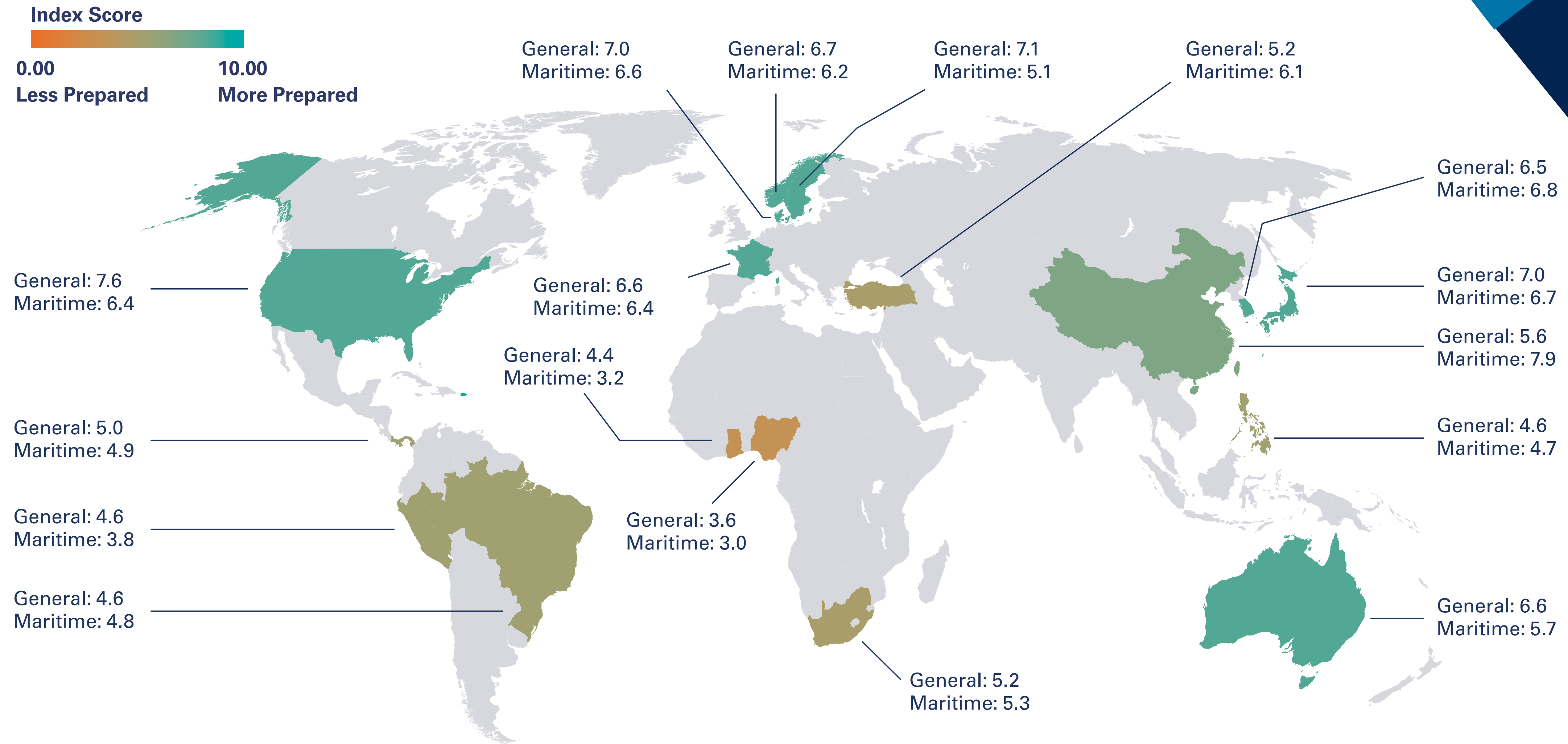
Sources: historical data from ICS/BIMCO (2016); forecast used data from the start-up curves of Chapter 1 and UNCTAD maritime data.

Note: The graph displays a reduction in the demand for seafarers in comparison with the baseline (conventional ships, that is, no Highly Automated Ships, HShips). A decrease in the graph corresponds to an increase in the demand for seafarers.

4. COUNTRY PROFILES



4. COUNTRY PROFILES



4. COUNTRY PROFILES: DETAILED OVERVIEW

COUNTRY PROFILE

TECHNOLOGY READINESS: MARITIME



AUSTRALIA

KEY MARITIME INFORMATION FOR 2017



POPULATION (2017)
24.3 MILLION



MERCHANDISE TRADE (US\$)
388,470 MILLION



FLEET OWNERSHIP (DWT)
2,355 THOUSANDS



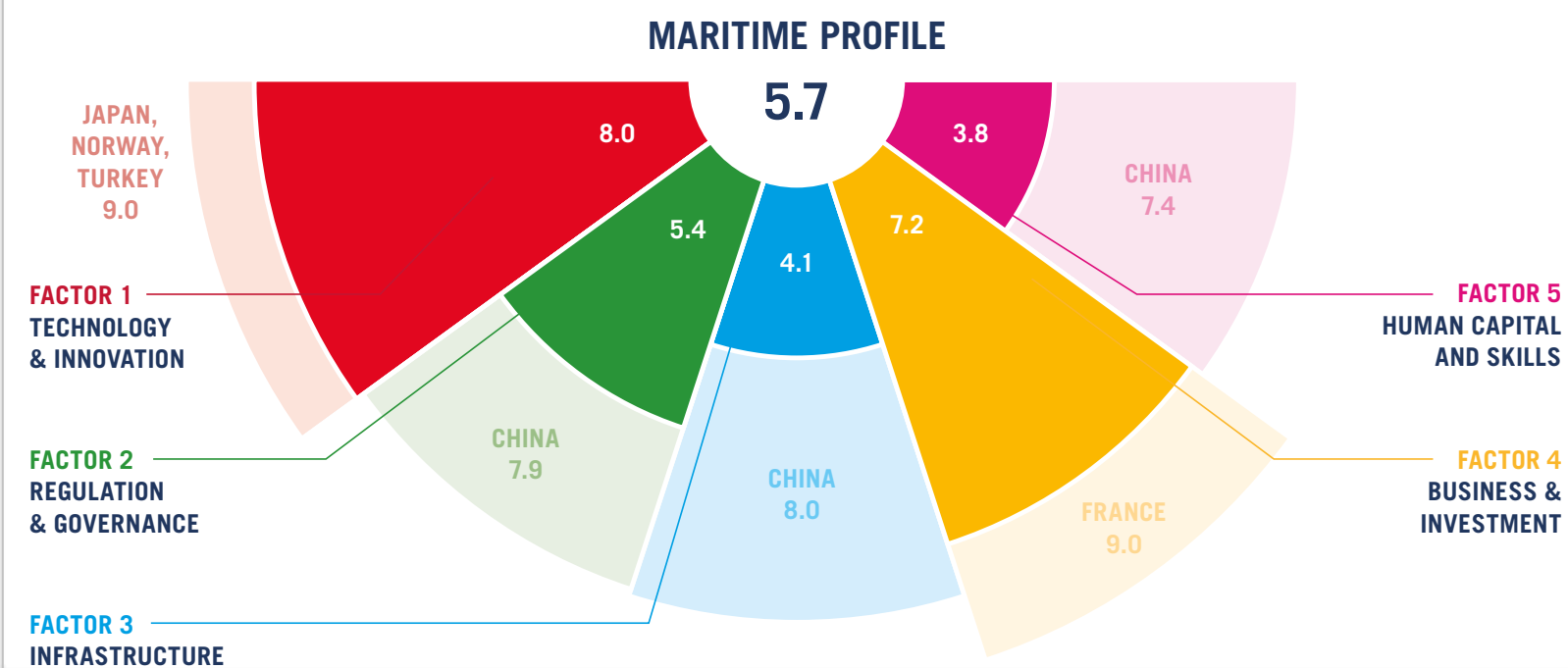
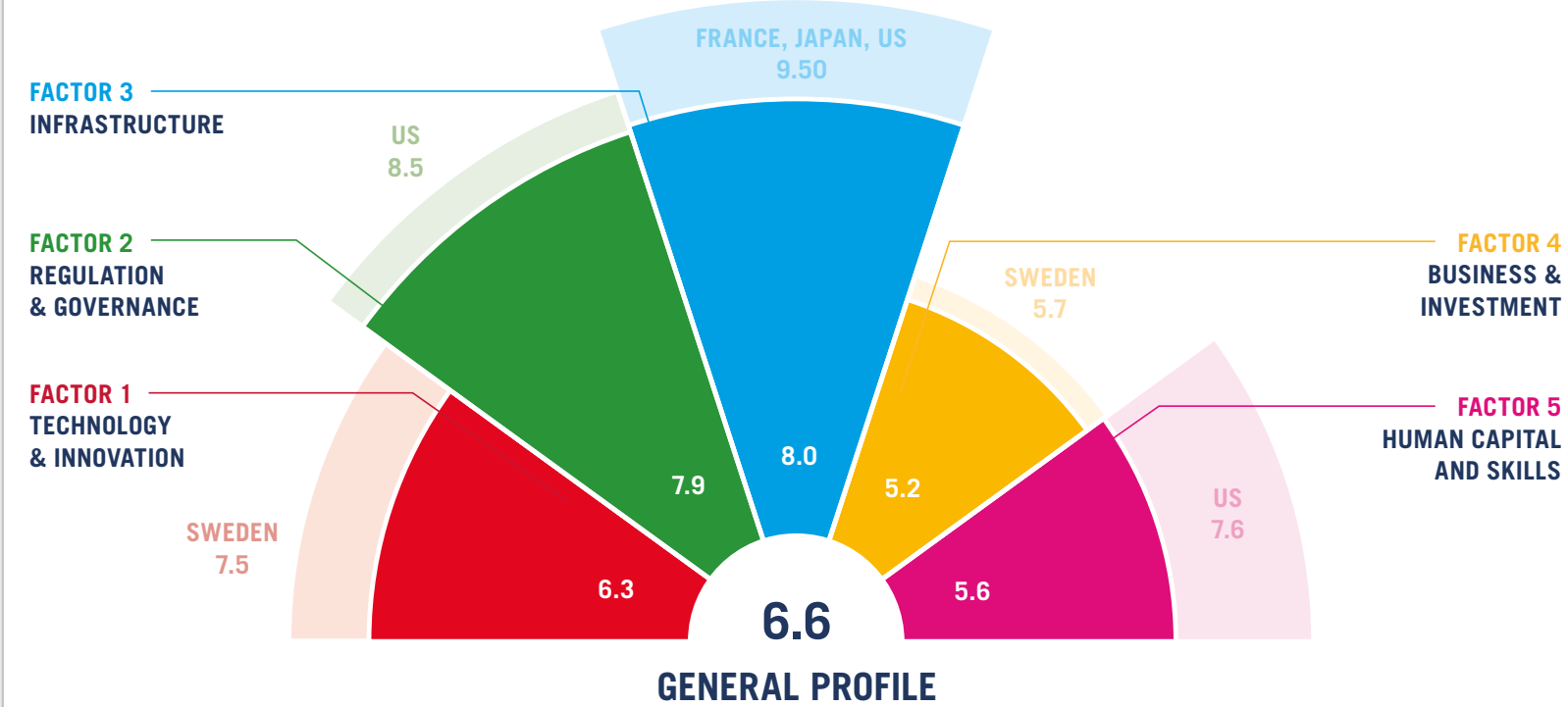
GDP US\$ (2017)
1,259.0 BILLION



FLEET-NATIONAL FLAG (DWT)
1,907 THOUSANDS



SHIP BUILDING (GT)
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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

THANK YOU FOR YOUR ATTENTION





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