



Ports of the future

A Vision

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the most adaptable to change.”

Charles Darwin

The Shipping and ports industry is under pressure and undergoing structural changes, driving the need for innovation

Increased complexity

- Technology challenges
- Sustainability and social license to operate
- Global trade flows

Big data analytics allow for a renewed vision on the complexity of supply chains



Pressure on revenue and costs

- Price volatility
- Operating costs
- Capital costs

Technologies like predictive maintenance and automation allow for a reduction in opex



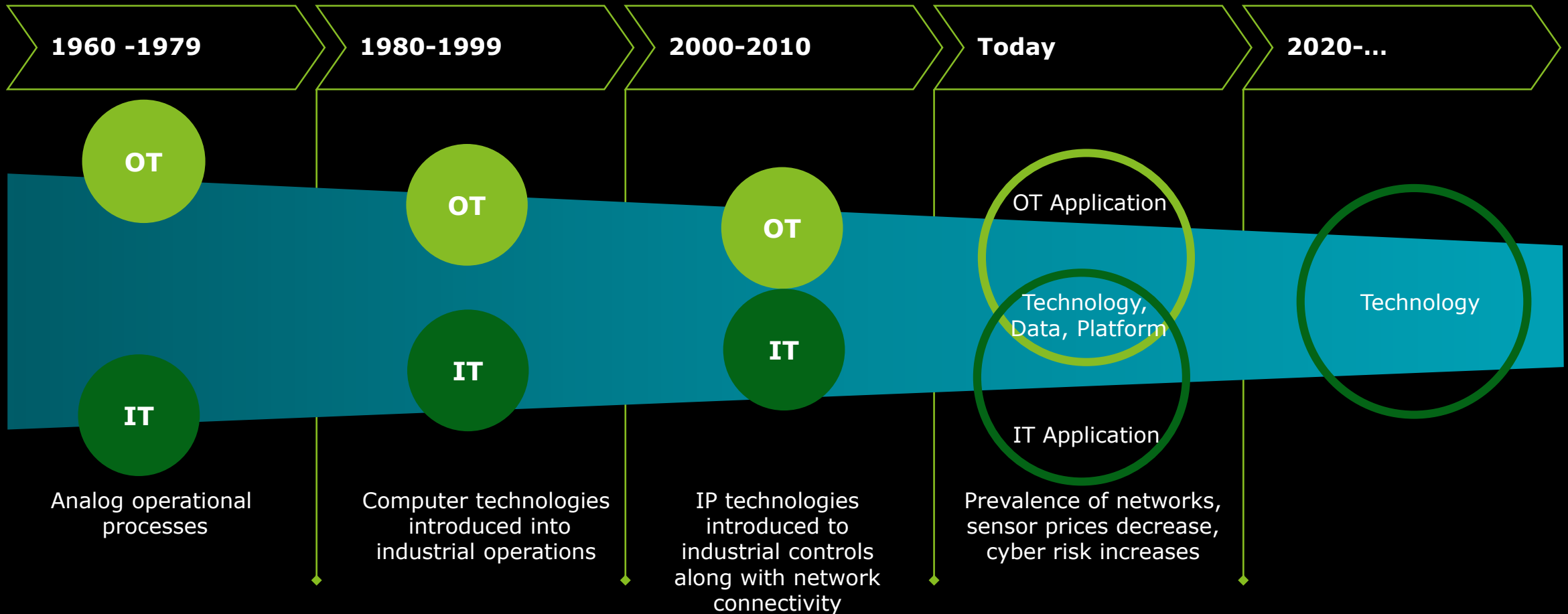
Energy transition

- Energy demand growth
- Energy mix and carbon shift
- Energy efficiency

New players are targeted focused on renewable energies and alternative fuels



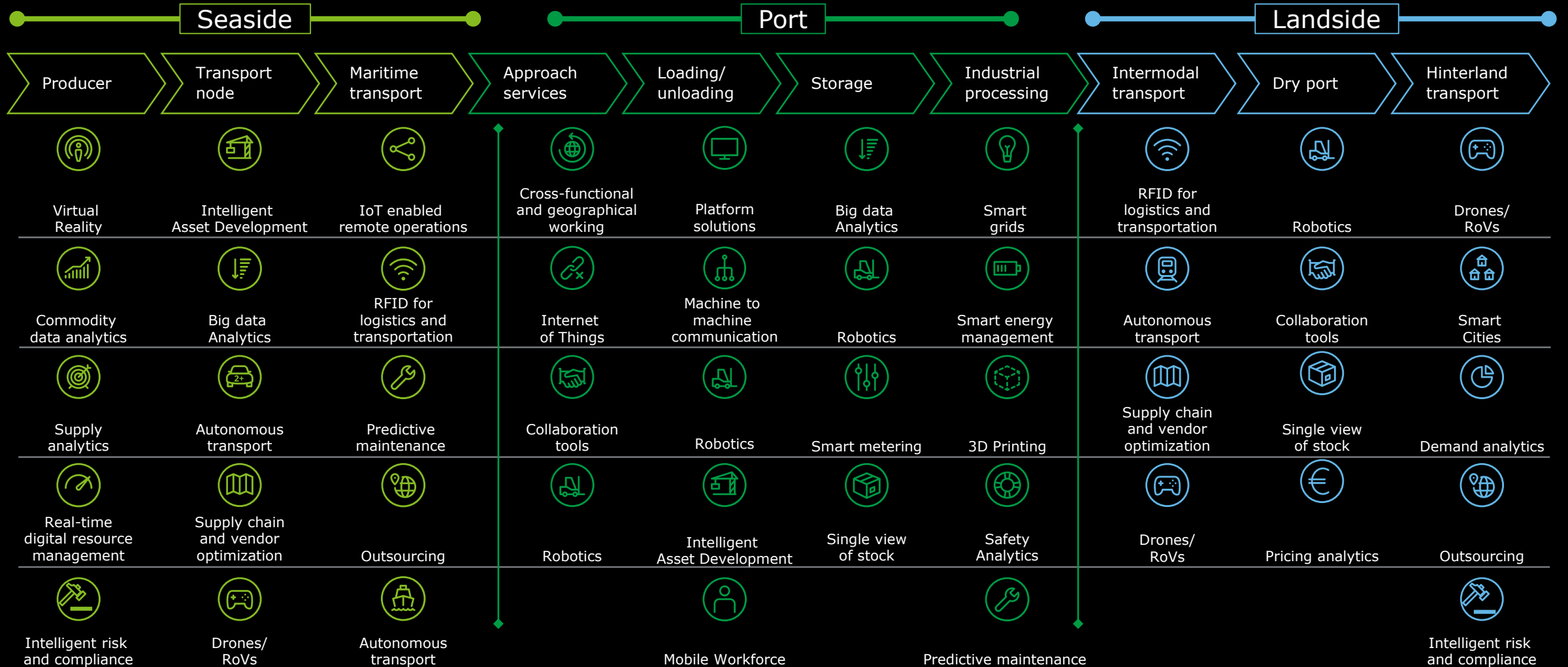
Digital is extending the range of innovation possibilities as IT and OT converge...



OT: Operations Technologies

Source: Monitor Deloitte

...And Digital is providing opportunities across the entire value chain



Note: Non exhaustive Source: Monitor Deloitte

A port of the future has 3 defining characteristics which allow it to adapt to the changing environment because...

Cooperation

- Technological innovation will push **ports to work together**
- Cooperation will occur on a **horizontal and vertical level** along both the supply chain and across different
- **All stakeholders** will be cooperating with the port, for e.g. smart cities

Innovation

- Ports will be forced to accept innovation through **automation and digitization**
- Ports of the future will harness the innovation for **new insight driven business models**
- Ports of the future will become **"smart"** and require different skills to operate

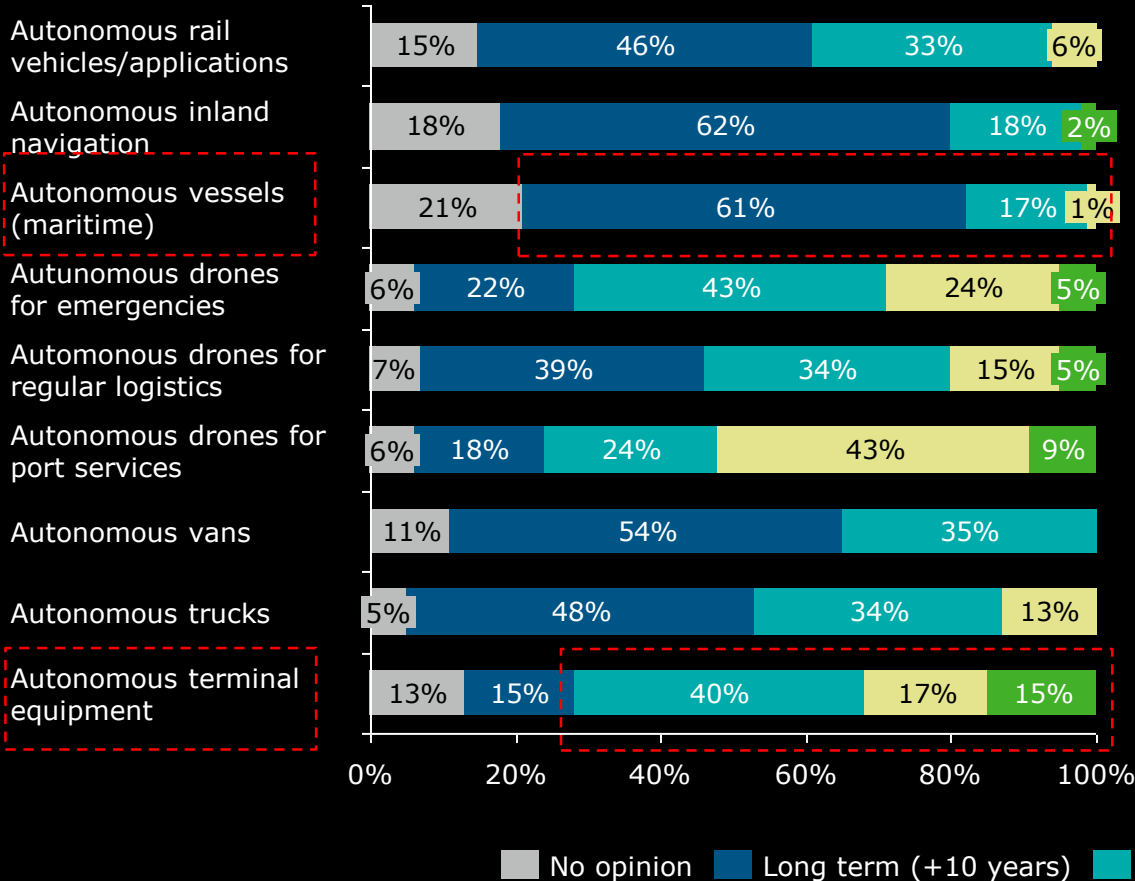
Sustainability

- Ports of the future will promote **renewable energy** sources and cleaner forms of industry
- The logistics fleet will use **alternative fuels** like electricity (cars/trucks) and LNG (ships)
- Ports will adhere to the **triple P** value of People Planet Profit to grow in a sustainable manner

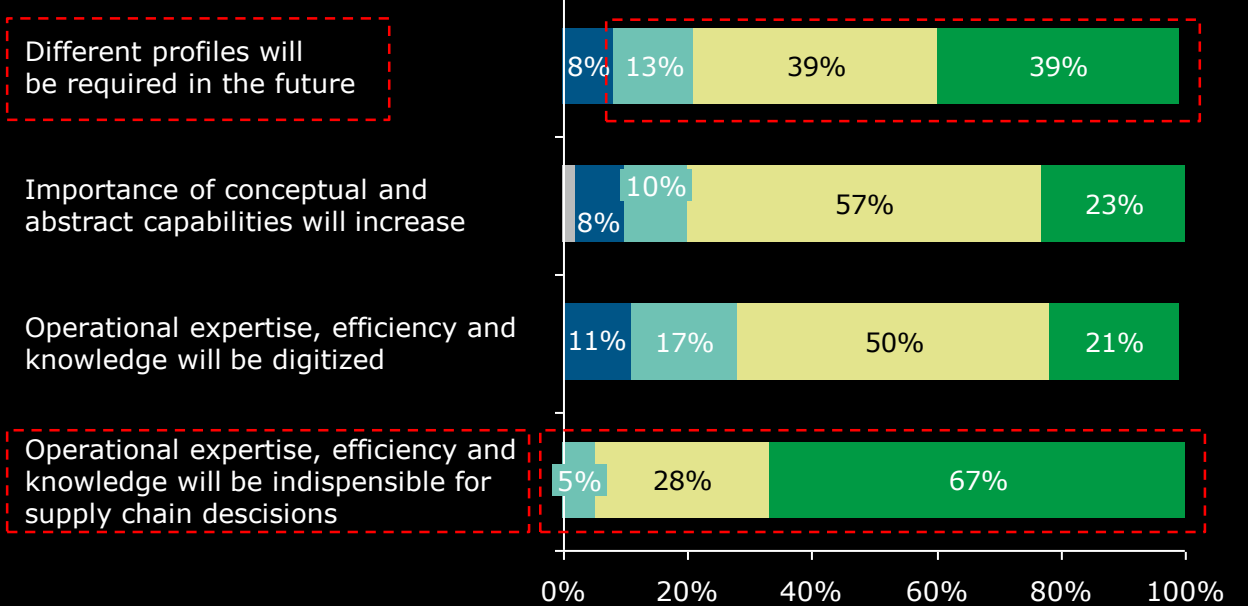


... the impact on work force and knowledge requirement will be extensive

Speed of introduction of robotized and autonomous equipment



Evolution of staff characteristics

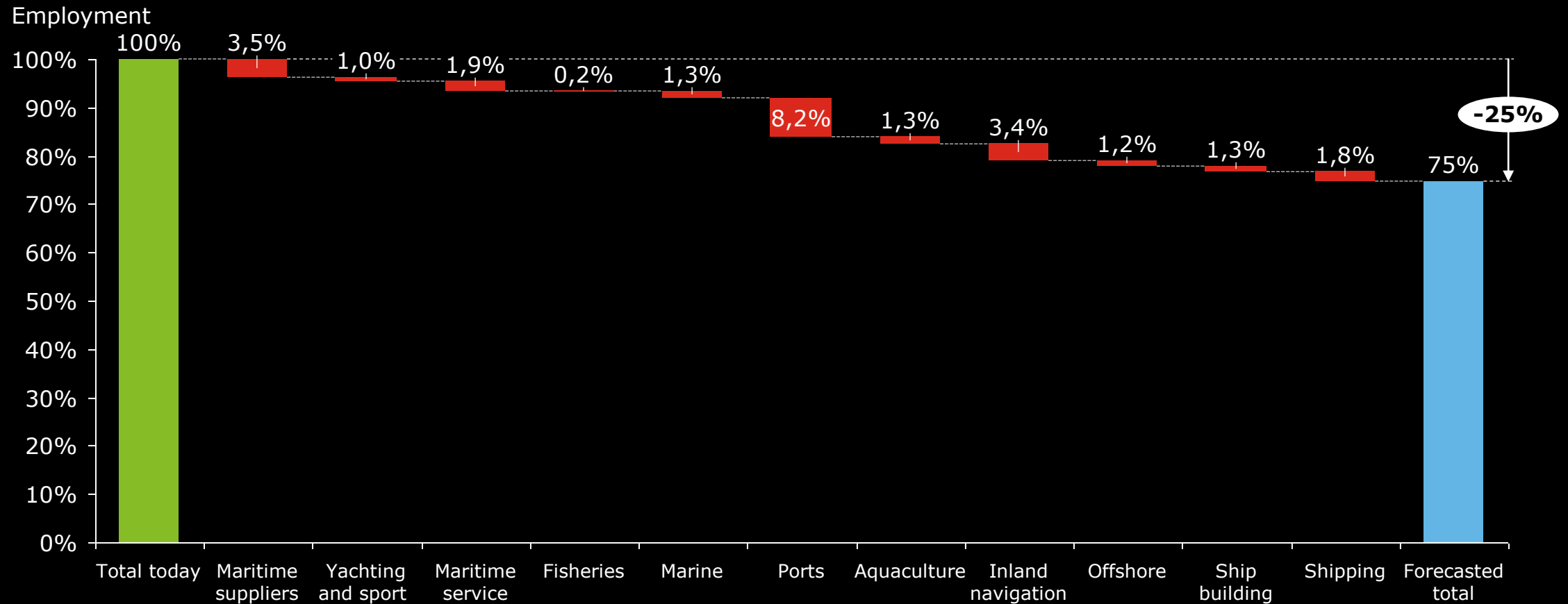


Source: The Future of Port Logistics, ING/UA, 2017

N=82, respondents include shipping companies, Maritime Transshipment, Port Logistics, Logistic service providers, Freight forwarders & customs, Shipping & industry, other

Forecasts show at least a 25% drop in generated employment as a result of digitization

Impact of digital disruption on port employment



Source: Havenmonitor, Deloitte Digital Disruption Map, Deloitte analysis

Note: Impact calculated based on the Deloitte Digital Disruption map, multiplied with the total employment generated by each sector in 2015

Security, both physical and digital is a growing concern, since the majority of goods, as well as strategic stockpiles are often stored and handled in local terminals

Search frequency of cyber security topics¹



Maersk revealed that the (hacking) incident could **cost it as much as \$300 million (£155 million) in profits**

¹Source: Google trends analysis

Container terminals APMT down through hack

Seventeen APM container terminals in Rotterdam and other parts of the world were successfully attacked by hackers.

Source, Lloyds

Threats to Cybersecurity in Ports

Availability of a large port could present a major economic incident for a state or country, and could bring 'just in time' supply chains to a grinding halt in a number of days.

Source, PTI

Maritime cyber security awareness low

Increased automation and the decrease of manual intervention in the maritime industry provides fertile ground for security breaches,

Source, BPO interview Indra Vonck Deloitte

How hackers are targeting the shipping industry

The head of Europe's crime fighting agency has warned of the growing risk of organized crime groups using cyber-attacks to allow them to traffic drugs.

Source, BBC News

Port authorities and regulators have the important role to support the industry and guide it in a proactive manner towards a sustainable future

Role of the regulator

- Accelerate the development of **common standards**
- Increase the attractiveness to investments in the production of **digital products**
- Increase the level of **digital skills** amongst the current working population
- Push our **cybersecurity** standards further

Role of the port authority

- Support the port cluster in a **sustainable manner**
- Facilitate the transition to a new **digital workforce**
- Be **resilient** and adapt to change in a successful manner
- Reward **green initiatives**
- Create awareness surrounding **cybersecurity** in the cluster
- Be prepare to **cooperate and integrate**

Some suggestions moving forward

- The future of the ports is challenging but bright since innovation will have a greater role to play and will enable the port to **generate significant value** for customers, shareholders and employees
- The regulator and port authority must strive to guide ports through these turbulent times as well as **facilitate them in this process of change**
- **Collaboration is critical** on both a horizontal and vertical level and nurturing an ecosystem where innovation can truly thrive is now essential
- Rethink how change is currently managed in your port and **develop specific strategies for transformational innovations**: be bold, set up a specific structure operating with protected funds, measure and incentivize with non-economic metrics
- We need to **manage the risks of innovation in proactively** and prepare our workforce and organizations for the impact of digitalization and automation

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