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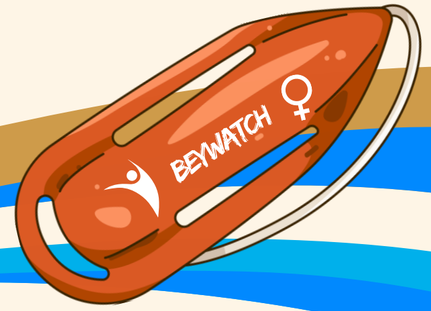
BLACK SEA BEYWATCH

Black Sea Blue Economy
Youth and Women Watch

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Technology Adoption in a Port Environment
&
Associated Tradeoffs

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The Port City as an interconnected system

Port operations

Vessels, terminals, customs and inland freight depend on shared timing and data.

Urban life

Residents experience traffic, air pollution, noise and land use pressures.

Public value

Technology matters when operational gains also improve environmental and social outcomes.



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A smart port creates value beyond the gate

The port and the city share one operating environment

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Turkey Istabul

PORT

Cargo, vessels, terminals

CITY

Mobility, land, communities

ENERGY

Grid, fuels, storage

BUSINES

Operators, SMEs, investors

A smart port combines connectivity, resilience and inclusion

Technology succeeds when businesses, citizens and the environment can measure the benefit

A layered technology landscape

Shared data

Maritime single windows and port community systems reduce duplicate reporting.

Physical sensing

Sensors observe assets, vessels and local environmental conditions.

Decision support

Forecasting and digital twins help compare operational scenarios.

Low emission assets

Shore power and equipment electrification change the physical footprint.



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Four pressures make transformation urgent

Efficiency	**Reduce waiting, re-entry and empty movements**
Resilience	**Anticipate disruption and recover faster**
Decarbonization	**Coordinate shore power, clean fuels and grid demand**
Public legitimacy	**Improve air, noise, safety and access**

Technology must address ***operational*** and ***public*** outcomes

Efficiency alone cannot deliver a resilient ecosystem

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Five technology families reshape the ecosystem

SEE

IoT sensors
Satellite data
Digital twins

CONNECT

Single windows
Community systems
Secure data spaces

DECIDE

AI forecasting
Optimization
Computer vision

ACT

Automation
Robotics and drones
Edge and 5G

DECARBONIZE

Shore power
Smart grids
Alternative fuels



Visibility + coordination + decisions + operations + clean energy

Technology adoption creates tradeoffs

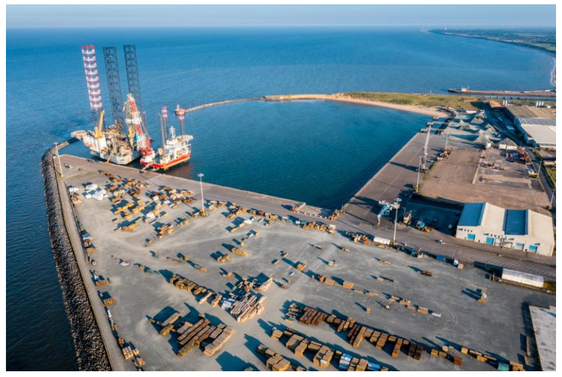
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Interoperability Closed formats and inconsistent definitions fragment the ecosystem.

Cybersecurity Connected operational systems create shared failure paths.

Equity Smaller firms and nearby communities may have less influence or access.

Energy demand Digital systems and electrification need credible power planning.



A Governance model for adoption

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Set outcomes	Agree on vessel time, local air quality, access and resilience measures.
Assign stewardship	Specify who controls data, validates models and answers for errors.
Pilot with baselines	Compare a bounded intervention against predeclared indicators.
Scale through standards	Require portable interfaces and security obligations in procurement.

Adoption requires six connected capabilities

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Weak governance can stop strong technology from scaling

1 **Problem**

A measurable operational or public outcome

2 **Data**

Standards, access and quality

3 **Security**

Protection, recovery and fallback



4 **Scale**

A route from pilot to procurement

5 **Skills**

Workforce transition and adoption

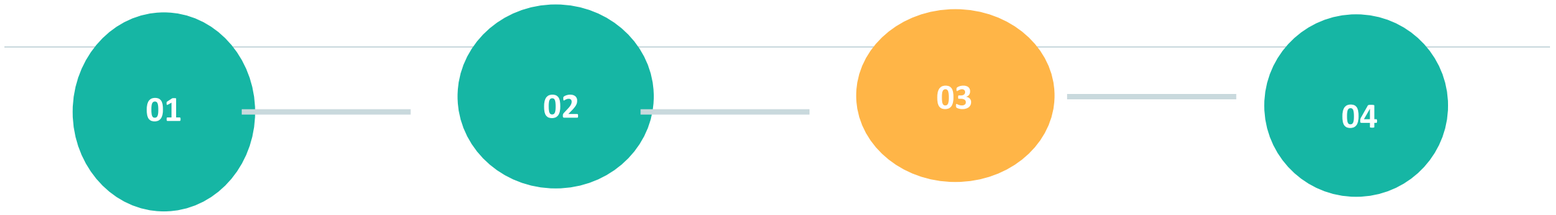
6 **Governance**

Shared decisions and accountability

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A pilot should test adoption as well as technology

Decide the route to scale before the demonstration begins



BASELINE
Current cost, delay, risk or emissions

PILOT
Users, owner, data and success threshold

DECISION
Stop, adapt or scale

DEPLOYMENT
Integration, procurement and support

The pilot proves that the ecosystem can adopt the solution

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SMEs need a route into operations

SMES

Innovation programmes should reduce adoption barriers on both sides

PUBLIC AUTHORITIES

Create fair access

Challenge-based procurement
Regulatory sandboxes
Shared test facilities
Clear standards and interfaces

LARGE OPERATORS

Open real pathways

Operational problem owners
Safe access to data
Mentoring and integration
A route to a first contract

SMEs

Design for deployment

Secure architecture
Interoperable products
Evidence of value
Maintenance and support

Conclusion: Public Outcomes Should Guide Technical Choices

- Begin with interoperable data and accountable institutions.
- Use sensing and analytics to test specific operational and environmental hypotheses.
- Evaluate benefits across the port and city, including the communities that bear external costs

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Thank You

https://maritime-forum.ec.europa.eu/theme/governance/european-maritime-day-my-country_en

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