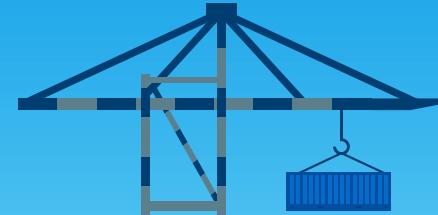




Port 2050

What could shape the port of the future?



→

TRENDS EMERGING NOW



Physical

- Ports as hubs for wider economic activity – logistics, manufacturing, 'free areas'
- More solutions specific for customers
- Decline in coal and hydro-carbon cargoes
- Connectivity – ongoing shift to multi-modal



Augmentation and Automation



- Remotely operated equipment (e.g. cranes)
- Autonomous operations (e.g. container yards)
- Operators as supervisors & technology users

00010001
00010001
01000100
00010001
00010001

Digital

- Ports as data platforms (e.g. Port Community Systems and advanced inventory systems)
- Providing tracking data
- Blockchain and 'smart contracts'
- Cyber security as a core skill



Sustainable

- Ports as (renewable) power stations
- Electrification of processes and plant & equipment
- Reducing emissions and improving air quality through smarter operations (e.g. Vehicle Booking Systems)
- UK as a key influencer of global standards



- More flexible usage of assets
 - Use of data for real time utilisation
 - End to end supply chain visibility
 - Adaptable buildings / space
- Large scale port-based value addition
- Connectivity
 - Focused key trade corridors
 - More & better integrated hub & spoke water borne freight
 - New modes (e.g. hyper loop)
 - Constrained assets / 'capacity markets'

- Further applications of enhanced technology developments
- An Internet of Things enabled world
- New business opportunities – 'Air Traffic Control' for near UK waters; drone operation hubs; human services to enable remote / autonomous operations
- Changed roles for human interface

- Applying Artificial Intelligence, Machine Learning, 'Digital twins' and other advanced analytics for applications such as predictive planning & operations, self diagnosis
- Seamless end-to-end data supply chains – data as a service
- Large scale blockchain adoption
- More dynamic charging in response to demand

- Large scale alternative fuelling
- Ports as key nodes in energy transition
 - both as consumers & enablers
- Electric vessels for some uses (e.g. coastal feeder services)
- Natural capital businesses
- Use of advanced analytics in monitoring & approvals
- Appropriately integrated regulatory framework

POSSIBLE FUTURE GAME-CHANGERS



THE HUMAN DIMENSION

Challenges but also opportunities

- Safer jobs – Less man / machine interface, height, confined spaces
- Different jobs – e.g. high intensity crewing, data services
- Better jobs – more skilled, new skills
- Balance – Increased gender diversity
- Continuity – Ports will remain significant sources and catalysts of employment



THE ROLE FOR GOVERNMENT

Create an enabling framework for investment, development and innovation

- Do – provide infrastructure – physical and knowledge; set a consistent long-term direction; join and align the regulatory framework with strategic goals (e.g. trade)
- Don't – pick winners, over regulate

