

# Future Smart Ports

## Scenario Analysis

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# Research

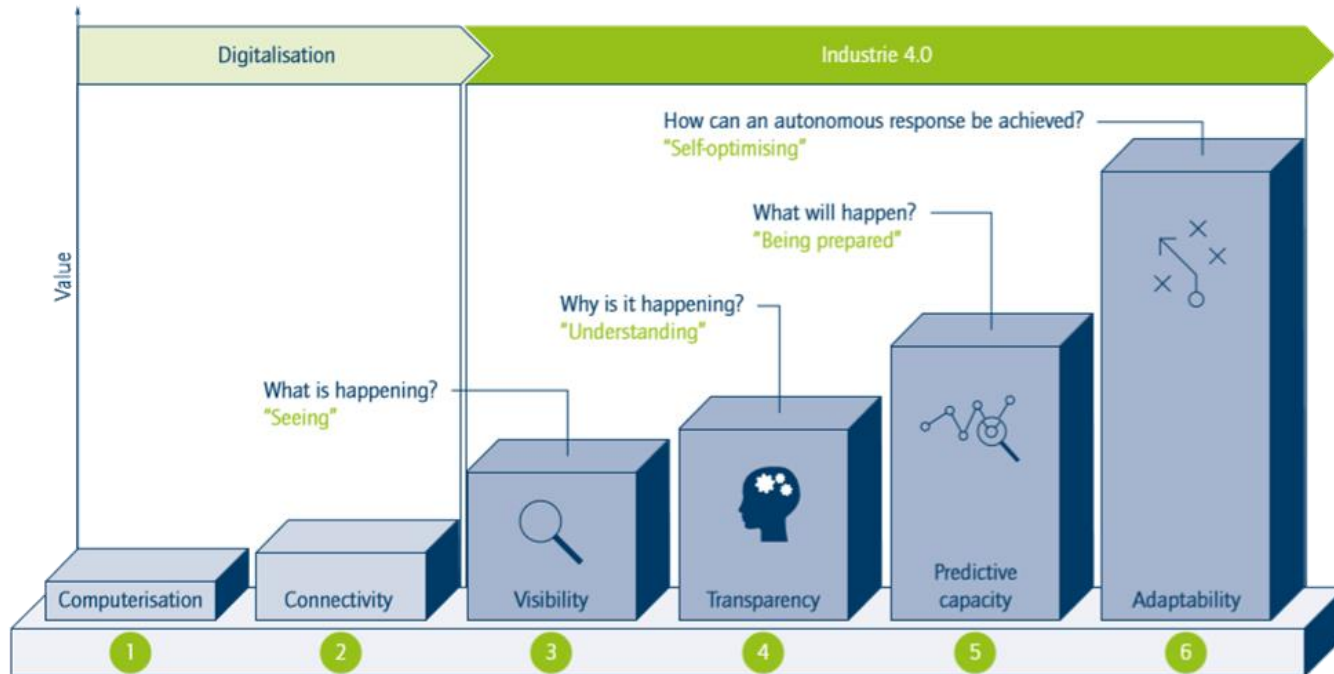
First results from our study

- Carried out Nov 2020 - March 2021
- Analysed
  - Academic literature
  - Public data on R&D activity in selected ports
- Interviewed selected terminal operators
- Constructed smart port scenarios





# Industry 4.0 Concept



*“Intelligent networking of machines and processes for industry with the help of information and communication technology”*

# What is Port 4.0 / Smart Port ?

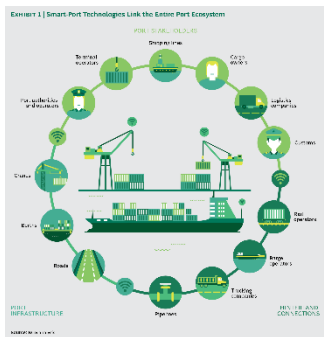
It is typically described as



- **Digitalised**  
Automated systems, ICT and analytics to enhance productivity



- **Green**  
reduce carbon dioxide emissions



- **Collaborative**  
improves visibility and transparency within the ecosystem

It has activity domains such as

## Cargo operations & traffic management

- 🚧 terminal operations
- 🚢 traffic optimization at seaside
- 🚚 traffic optimization towards hinterland

## Services and co-operation within the ecosystem

- 👤 services towards stakeholders
- 🤝 Collaboration and co-creation

## Infrastructure and continuity management

- 🔒 safety and (cyber)security
- 📶 connectivity (5G)
- ♻️ sustainability and energy efficiency

# Formulation of Smart Port Scenarios

- Development might take different paths
  - Depending on the focus and decisions taken the future ports might look very different
  - One of the main factors impacting the future direction is the innovation leader
- The following scenarios present four alternatives



# Four Future Scenarios for Smart Ports



## FRAGMENTED INNOVATION

- Everyone develops its own processes
- Cooperation is superficial and opportunistic
- Aims at cost reduction
- Port 4.0 development leads towards group of intelligent - but loosely connected – systems.



## PORT ECOSYSTEM

- Primarily lead by port authority
- Active cooperation within the port community and companies nearby
- Aims at fulfilling political and social objectives, e.g. sustainability
- Port 4.0 development leads towards integrated operations and shared data.



## LOGISTIC CHAIN ALLIANCES

- Lead by shipping lines
- Strong alliances with terminals and increasingly with inland logistics companies.
- Aims at improving efficiency in part of logistic chain
- Port 4.0 development leads towards open solutions and platforms for sharing data on cargo.



## GLOBAL CLOSED PLATFORMS

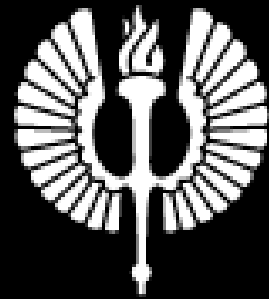
- Lead by large players (Amazon, Alibaba or other high-volume cargo owners)
- Collaborate with own terminals or with selected contracted terminals
- Aims at predictable door-to-door deliveries
- Port 4.0 development leads towards own closed, tightly controlled and optimised logistic pipes and systems.



# Conclusions

- Industry 4.0 solutions will be utilized in future ports, but
- depending on who is taking the leading role the future of port looks very different.





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**Thank you!**

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