Ports of the future
A Vision

Indra Vonck, Deloitte Port Services, Baltic Ports Conference 2017
“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

<table>
<thead>
<tr>
<th>Increased complexity</th>
<th>Pressure on revenue and costs</th>
<th>Energy transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology challenges</td>
<td>Price volatility</td>
<td>Energy demand growth</td>
</tr>
<tr>
<td>Sustainability and social license to operate</td>
<td>Operating costs</td>
<td>Energy mix and carbon shift</td>
</tr>
<tr>
<td>Global trade flows</td>
<td>Capital costs</td>
<td>Energy efficiency</td>
</tr>
</tbody>
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*Big data analytics allow for a renewed vision on the complexity of supply chains*  
*Technologies like predictive maintenance and automation allow for a reduction in opex*  
*New players are targeted focused on renewable energies and alternative fuels*
Digital is extending the range of innovation possibilities as IT and OT converge...

**1960-1979**
- **OT**: Operations Technologies
- Analog operational processes

**1980-1999**
- **OT**: Operations Technologies
- **IT**: Information Technologies
- Computer technologies introduced into industrial operations

**2000-2010**
- **OT**: Operations Technologies
- **IT**: Information Technologies
- IP technologies introduced to industrial controls along with network connectivity

**Today**
- **OT Application**
- **IT Application**
- **Technology, Data, Platform**
- Prevalence of networks, sensor prices decrease, cyber risk increases

**2020-...**
- **Technology**

**OT**: Operations Technologies
**Source**: Monitor Deloitte
...And Digital is providing opportunities across the entire value chain

<table>
<thead>
<tr>
<th>Producer</th>
<th>Transport node</th>
<th>Maritime transport</th>
<th>Seaside</th>
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<tr>
<td>Virtual Reality</td>
<td>Intelligent Asset Development</td>
<td>IoT enabled remote operations</td>
<td>Cross-functional and geographical working</td>
</tr>
<tr>
<td>Commodity data analytics</td>
<td>Big data Analytics</td>
<td>RFID for logistics and transportation</td>
<td>Internet of Things</td>
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<td>Supply analytics</td>
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<td>Supply chain and vendor optimization</td>
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<td>Mobile Workforce</td>
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<tr>
<th>Port</th>
<th>Approach services</th>
<th>Loading/unloading</th>
<th>Storage</th>
<th>Industrial processing</th>
<th>Port</th>
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<td>Real-time digital resource management</td>
<td>Supply chain and vendor optimization</td>
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<td>Robotics</td>
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<td>3D Printing</td>
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<th>Landside</th>
<th>Intermodal transport</th>
<th>Dry port</th>
<th>Hinterland transport</th>
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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...

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<th>Innovation</th>
<th>Sustainability</th>
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<td>• Technological innovation will push ports to work together</td>
<td>• Ports will be forced to accept innovation through automation and digitization</td>
<td>• Ports of the future will promote renewable energy sources and cleaner forms of industry</td>
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<td>• Cooperation will occur on a horizontal and vertical level along both the supply chain and across different</td>
<td>• Ports of the future will harness the innovation for new insight driven business models</td>
<td>• The logistics fleet will use alternative fuels like electricity (cars/trucks) and LNG (ships)</td>
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<td>• All stakeholders will be cooperating with the port, for e.g. smart cities</td>
<td>• Ports of the future will become “smart” and require different skills to operate</td>
<td>• Ports will adhere to the triple P value of People Planet Profit to grow in a sustainable manner</td>
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... the impact on work force and knowledge requirement will be extensive

Speed of introduction of robotized and autonomous equipment

Autonomous rail vehicles/applications
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Autonomous vessels (maritime)
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Autonomous drones for emergencies
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Autonomous drones for regular logistics
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Autonomous drones for port services
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Autonomous vans
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Autonomous trucks
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Autonomous terminal equipment
- No opinion
- Long term (+10 years)
- Mid to long term (+5 years)
- Short term (-3 years)
- Already happening

Evolution of staff characteristics

Different profiles will be required in the future

Importance of conceptual and abstract capabilities will increase

Operational expertise, efficiency and knowledge will be digitized

Operational expertise, efficiency and knowledge will be indispensable for supply chain decisions

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

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

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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.
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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