

no. 2/2019 (7)

ISSN2449-6030

**Harbours**  
review

future of work  
technology  
economy  
sustainability

# The Port of Opportunities

The Port of HaminaKotka is a versatile Finnish seaport serving trade and industry. The location of HaminaKotka at the logistics hub makes the port truly unique – it opens up connections to all parts of the world.

Welcome to the port of HaminaKotka!

**[haminakotka.com](http://haminakotka.com)**





Photo: Pixabay



**Przemysław Myszkowski**  
*Editor-in-Chief*  
przemek@baltic-press.com



**Andrzej Urbaś**  
*Content Editor*  
andrew@baltic-press.com



**Marek Błus**  
*Roving Editor*  
marek@baltic-press.com



**Przemysław Opiński**  
*Managing Director*  
po@baltic-press.com



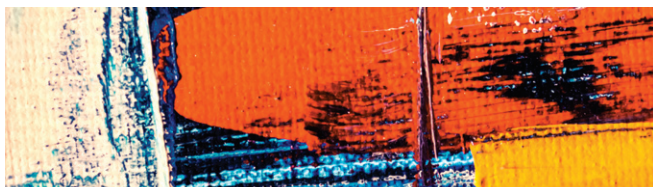
**Klaudia Hinz**  
*Marketing & Communications Specialist*  
klaudia@baltic-press.com



**Ewelina Synak**  
*Marketing & Communications Specialist*  
ewelina@baltic-press.com



**Danuta Sawicka**  
*Art Director/DTP*



## dear readers,

**W**elcome to this year's latest and last instalment of the printed version of the *Harbours Review*, where we've collected some of the most interesting and insightful pieces gathered on the pages of our e-zines throughout the past months. While the year is slowly crawling to an end, we're doing the exact opposite and picking up the pace.

Winter sleep is out of the question with everything that's been going on recently. This issue, whether you're reading it on your tablet or flipping through the printed pages while enjoying your whatever-the-time-is-coffee, has four major focus points. We're kicking things off with the future of work, analysing how Millennials are faring in the maritime industry. At the same time, we're asking the question everyone seems to worry about most, namely will the advancing technology be the end of the rank and file worker? On the topic of technology, all you tech-savvy readers will have a chance to bite into the meat of the matter and decide for yourselves whether blockchain truly is all that it's promised to be. Sustainability also makes an appearance, as we delve into the characteristics defining smart ports. Naturally, it is impossible to ignore economic topics, not with the world's two leading superpowers at each other's throat.

And before you know it, the last edition of our e-zine will also be finding its way to your mailboxes. We couldn't leave you without talking about Brexit, could we?

Have a great read!

PS. Don't forget to head to [www.harboursreview.com](http://www.harboursreview.com) for more free of charge articles, news, and statistics, making sure to join our newsletter for the latest updates, too.

andrzej urbaś

---

■ **PUBLISHER** ■  
**Baltic Press Ltd**

**President of the board:**  
Bogdan Oldakowski

**Board Members:**  
Alan Arent

ul. Pułaskiego 8, 81-368 Gdynia, Poland  
tel. +48 58 627 23 21/95  
[editorial@baltic-press.com](mailto:editorial@baltic-press.com), [www.harboursreview.com](http://www.harboursreview.com)

■ Subscriptions: [www.harboursreview.com](http://www.harboursreview.com) ■

*If you wish to share your feedback or have information for us,  
do not hesitate to contact us at: [editorial@baltic-press.com](mailto:editorial@baltic-press.com)*

---

# contents

03. Editorial

58. Partnership events

## top news

### Red-hot port matters

**06.** Wärtsilä to supply learning tech to Bulgarian NVNA

Ten Nordic ports declare readiness for sustainable action

IAPH partners with PortXL

World's first use of SNG as ship's fuel

Battery-ready bulker

**07.** Seaspan acquires six container vessels

MOL Group to build Japan's first LNG-fuelled ferries

Liebherr reaches new milestone in Spain

Rhenus orders four eco-friendly vessels

Piraeus secures major funding

New cranes arrive in Hamburg

**08.** By rail & ferry from Xi'an to Hamburg via Baltiysk and Mukran – and on a single waybill

NYK and Dualog sign an R&D contract

All of Värtahamnen now covered by OPS

Hollandia Seaways enters DFDS'

Gothenburg-Ghent service

**09.** Corvus Energy and SEC Marine to cooperate on a hybrid SES project

World's first use of SNG as ship's fuel

Tallinn to have a new cruise terminal

Unikie to help digitalise Gävle and Rauma

### Market SMS

**10.** Port of Helsinki

Port of Hamburg

**11.** Port of Klaipėda

Port of Gothenburg

HHLA's intermodal business

Finnlines



## future of work

**12.** Millennials in Maritime

*Matthew Wittemeier*

**14.** Out of work?

– The impact of technology on the transport & logistics industry's future workforce

*Przemysław Myszka*

**24.** Is it a men's game (only)?

– Levelling women's uphill struggle to join the maritime community

*Anna Miler*







## technology

### 26. “Doing something”x

– Examples of how to effectively use blockchain in the transport industry

*Deanna MacDonald*

### 28. A blockbuster

– How to use blockchain to optimise supply chains

*Marie Pavesio*

### 30. Don’t let it turn to dust

– Unlocking data is key to improving safety at sea

*Manit Chander*

### 32. The new fuel

– Why ports should transform themselves into digital data platforms

*Bartosz Dąbrowski*

### 36. Revolution by evolution

– Autonomous ships are hailed as the future of shipping. The technology is here, but are we ready for it?

*Filip Koscielecki*

### 40. Deconstruction of the value chain

– Companies-turned-freelancers and what it could mean for the shipping industry

*Johannes Schlingmeier*



## economy

### 42. When dragons and eagles go to war

– Are China and the US on a one-way trip towards the point of no return?

*Andrzej Urbaś*

### 46. In/out of the running

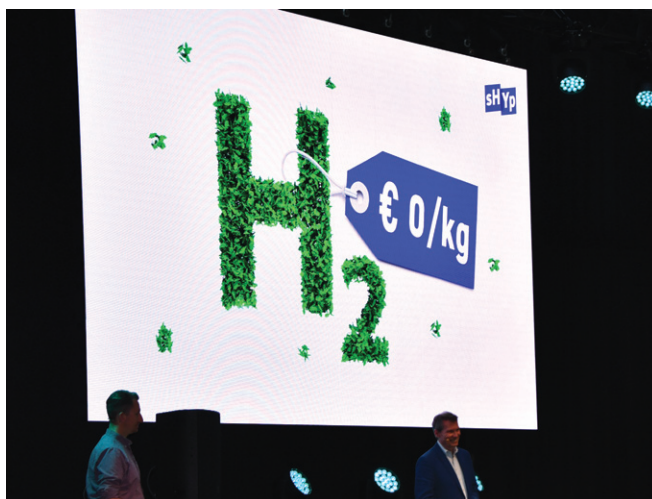
– How, on what, and with whom will companies compete in the next decade

*Bartosz Dąbrowski*

### 48. Shifting logistics bananas

– The changing face of distribution

*Lisa Graham*



## sustainability

### 52. One shot, multiple hits

– Addressing the excuses of not using hydrogen as ship fuel

*Carl Fischer*

### 54. The albatross around climate's neck

– Decarbonising Europe's transport sector

*Gabrielė Vilemo Gotkovič*

### 56. Electric, digital, and connected

– On the way to a smarter future

*Guido Jouret*



# red-hot port matters

Photo: Pixabay

## Wärtsilä to supply learning tech to Bulgarian NVNA

The Finnish company will provide the Varna-located **Nikola Vaptsarov Naval Academy** (NVNA) with two additional mini-bridge simulators (hard- and software for two Wärtsilä NTPro). Included in the order is also an extension of the functionality of an existing engine-room simulator. "Safety and efficiency at sea are key pillars in Wärtsilä's Smart Marine approach. By providing the opportunity for maritime students to attain realistic, hands-on training with the latest navigational systems, we are endorsing our commitment to this approach. We design our systems in close collaboration with training institutions around the world to provide the most comprehensive, flexible, and customised solutions possible," **Shalbuz Talibov**, Senior Commercial Project Manager, Wärtsilä, underlined. The installation of Wärtsilä's training solution is timed to coincide with the start of the new academic year 2019/2020.

## Ten Nordic ports declare readiness for sustainable action

The agreement emphasizes the importance of exchanging knowledge, information, and best practices related to various environmental topics, including the UN's Sustainable Development Goals (SDGs), like the use of alternative energy sources, implementation of pollution reduction technologies combating emissions to air and water (not limited to port area operations), as well as actions protecting biodiversity. Signatories include the ports of **Copenhagen-Malmö, Helsingborg, Aarhus, Helsinki, Esbjerg, Gothenburg, Stockholm, Tórshavn, Oslo**, and the **Associated Icelandic Ports**.

## World's first use of SNG as ship's fuel

Nauticor, MAN Energy Solutions, and Wessels Marine have partnered to bunker the container ship **Wes Amelie** with synthetic natural gas (SNG). Audi's power-to-gas facility in Werlte near the German Cloppenburg, where a liquefaction plant is currently under construction, will provide 20t of SNG for the project. Following the plant's commissioning, currently foreseen for Q2 2020, Nauticor will take care of transporting the SNG batch from the production facility to the ship as well as of truck-to-ship bunkering of **Wes Amelie**. Since the Audi facility is using wind energy to produce SNG, the CO<sub>2</sub> emissions from **Wes Amelie** are expected to decline by 56t/trip (as of today, the ship plies on liquefied natural gas, LNG, also supplied by Nauticor).

## Battery-ready bulker

The Swedish shipping company **Berndtssons Rederi** has commissioned the Chinese **Dayang Offshore Equipment** to construct a brand-new 8,500t dwt-big, 1B ice class dry bulk carrier, scheduled for delivery in 2021. The ship has been designed by the Norwegian **Marine Design & Consulting**. The blueprint provides for the installation of batteries in the future should the investor decide to do so. The agreement with the shipyard includes an option for a sister ship.

## IAPH partners with PortXL

Following the agreement, the members of the **International Association of Ports and Harbors** (IAPH) are being offered access to the PortXL start-ups via an online form where they can either declare their interest or submit specific challenges to the **PortXL** network. By the time of the IAPH World Port Conference in Antwerp in March 2020, these ports will have a chance to 'meet and match' the start-ups face-to-face on location to discuss concrete pilots and trials. **Patrick Verhoeven**, Managing Director, IAPH, commented, "If you take a look at some of the innovations in PortXL's portfolio, any port in the world could benefit in practice, not just the major ones. A floating autonomous collector of plastic waste that collects data on water quality. Floaters attached to man-made structures capable of generating grid-connected electricity power from ocean and sea waves. Concrete composite structures for breakwaters capable of generating marine diversity and acting as a carbon sink. A hull cleaner capable of 'car-washing' a vessel to remove biofouling during a port stay. These are just four of the multitude of innovations being supported by PortXL through their network of port communities." **Cees-Willem Koorneef**, Director, PortXL, added, "Port Authorities know which of their customers and stakeholders might be best equipped to trial and use these innovations. [...] As an example, it is in Gibraltar where the world's first wave-generated electricity is being fed into the grid."



## Seaspan acquires six container vessels

The transaction will move **Seaspan's** global fleet closer to 1m TEUs, with a final fleet size of approx. 975k TEUs. It positions the independent charter owner at a projected market share of approx. 7.7% of the global fleet. New acquisitions are comprised of three 10.7k TEUs-big vessels built in 2012, two 9.2k TEUs (2013), and one 9.2k TEUs (2014). Delivery is expected in December 2019, upon which Seaspan's fleet will grow to a total of 119 ships. The purchase totalling \$380m in cash is expected to be financed from additional borrowings as well as cash on hand.

## MOL Group to build Japan's first LNG-fuelled ferries

The company plans to order the newbuilds from **Mitsubishi Shipbuilding** in December. Once delivered, *Ferry Sunflower*, part of the **MOL Group**, will charter the ferries, whose tentative names are *Sunflower Kurenai* and *Sunflower Murasaki*, and launch them on the **Osaka-Beppu** route from the end of 2022 through the first half of 2023, as replacements for the vessels currently in service (*Sunflower Ivory* and *Sunflower Cobalt*). The ferries will be equipped with high-performance dual-fuel engines and are promised to be quieter than current units, ensuring a smoother, more relaxing travel.

## Liebherr reaches new milestone in Spain

The 100<sup>th</sup> mobile harbour crane has been handed over to the Gijón-based **Marítima del Principado**. As such, Spain became the third country, alongside Russia and India, with a fleet of 100 or more of the manufacturer's cranes. The new machine is an LHM 600 and belongs to Generation 5, the latest technical development stage in the **Liebherr** Mobile Harbour Crane programme. The first mobile harbour crane produced by the company reached Spain in 1992, and it remains operational to this day. There are currently 179 mobile harbour cranes in use in the country, out of which 55% have been manufactured by Liebherr.

## Rhenus orders four eco-friendly vessels

The **Rhenus-Arkon-Shipinvest** shipping company has started to set up its own ecological short sea fleet, dubbed "Hanse Eco Short Sea Coasters." Construction work is expected to start in February 2020, and the ships are due to be delivered during H2 2021. The Hanse Eco fleet is the result of an initiative launched by **Torsten Westphal**, one of the founding members of Arkon Shipping. The vessels will be about 90 m-long and have a carrying capacity of 4.2kt. The cargo hold will be able to accommodate more than 5.5k m3 of goods. The ships will feature a number of innovative solutions: a front-mounted bridge will allow for a clear view during deck loading procedures, and the hull design will reduce fuel consumption. Furthermore, an enlarged hold length will enable the transportation of project loads along typical dry bulk and break-bulk cargo. Alongside the water treatment systems, which will be mandatory from 2020 onwards, the eco-vessels will be equipped with a hybrid propulsion system with an organic catalytic converter, support from an electric motor, and a waste gas after-treatment unit. The main engine will be capable of running on organic fuel.

## Piraeus secures major funding

The **European Investment Bank** (EIB) formally agreed to provide €140m to support expansion and upgrading of the Greek port (whose authority is run by the Chinese **COSCO**). It is the largest loan for port investment in Greece by the EIB in history and will support part of the actions forming a total investment plan of over €600m. The first €100m tranche has already been signed, with the remainder to follow as project construction progresses.

## New cranes arrive in Hamburg

Three container gantries, manufactured by **ZPMC**, have arrived at **HHLA's Container Terminal Burchardkai** (CTB). The machinery is designed for handling ultra-large 23k+ TEUs container vessels and will replace three smaller units (already dismantled). HHLA is expecting the delivery of another two large ship-to-shore cranes of the same type in the first quarter of 2020. The largest container gantry cranes currently at the **Port of Hamburg** can accommodate ships with a width of 24 containers side-by-side. The new cranes' jibs are almost 80 m-long and can reach across 26 rows. The new equipment can move two FEUs/four TEUs with a combined weight of 110t in one go. There are currently 18 mega-ship cranes in operation at CTB. Apart from new handling equipment, HHLA's investment programme includes the construction of new storage yards and the expansion of the container railway station in 2019. The company plans to invest 1b throughout the Group by 2022, approx. €450m of which will be spent on container handling capacity.

## By rail & ferry from Xi'an to Hamburg via Baltiysk and Mukran – and on a single waybill

The **United Transport and Logistics Company – Eurasian Rail Alliance** (UTLC ERA), a JV set up by the railways of Belarus, Kazakhstan, and Russia, is trialling a multimodal rail service between the Chinese **Xi'an** and **Hamburg** by routing the train sets through the Kaliningrad region where the containers are loaded on a ferry that goes to the German **Mukran Port**, from which, in turn, the goods again travel by rail to their final destination. In addition, as UTLC ERA underlined in its press release, the service is the first of its kind to cover the entire route on a single CIM/SMGS waybill. "Moreover, this new CIM/SMGS waybill is being used for the first time not only for two internationally different legal systems but also for two different modes of transport," the company added. **Alexey Grom**, CEO, UTLC ERA, elaborated on the service's prospects, "The first deliveries of goods via this short sea route already show that there is huge potential. However, the success of this new route depends on the degree of integration and interaction between all transport partners. So, we look forward to the further development of our joint project and to opening scheduled services very soon."

## Hollandia Seaways enters DFDS' Gothenburg-Ghent service

After her 15k miles journey from the Chinese **Jinling Shipyard**, the 237.4 m-long and 33m-wide 15k dwt-big ro-ro, offering 6,700 lane metres of carrying capacity, called to **Gothenburg** on 25 November. The ship, third in a series of six (designed by Knud E. Hansen), entered traffic between the Swedish and Belgian seaports five days later. According to **DFDS**, **Hollandia Seaways** is to date the biggest ro-ro vessel to visit Gothenburg. Once completed, the sixth newbuild will join her on the route (nos. 1 and 2, *Ephesus Seaways* and *Troy Seaways*, already ply between Turkey, Italy, and France, while nos. 4 and 5 will serve the company's Rotterdam-Immingham connection). **Hollandia Seaways** is equipped with hybrid scrubbers.

## NYK and Dualog sign an R&D contract

Supported by **Innovation Norway**, the agreement will see the development of digitised products and services across a testbed of 50 vessels. The aim is to implement the products across the company's 250-big fleet eventually. Cepa Shield, as the project is known, will bring together research and development teams from **Dualog's** innovation environment and that of the **NYK Group** company **MTI.Co. Ltd**. The teams will work to maximize the efficiency of ship-to-shore communications, both in-house and with third-party managers and solutions providers. Data security and exchange are of highest importance for the project team. The system will collect a variety of traffic information, such as accessing servers from each application service. These will be merged into a monitoring system that will make it easy to determine what is going on and make it easier to take action if necessary. According to Dualog, several features have already been delivered with additional elements to follow; these include tools for simplification of larger-scale distribution of software through automated systems for downloading and upgrading. The project is set to run until the end of 2021.

## All of Värtahamnen now covered by OPS

The **Ports of Stockholm**, together with the ferry line **Tallink Silja**, has concluded a €4.4m-big (SEK 47m) project aimed at providing onshore power at every berth of its terminal in the Swedish capital. The new onshore power supply facility, technology provided by **Cavotec**, came online on 4 November. As part of its eco-policy, the Ports of Stockholm is granting SEK1.0m per vessel (approx. €90k) to shipping companies which decide to convert their ships so as to plug them into electricity from the shore. "It is really pleasing that Tallink Silja can now directly connect to onshore power, from the quayside to the vessel, at the Värtahamnen Port. We believe that taking away the need to run the engines when in port to supply power to the vessel is a major step towards improved sustainability and well-being," **Marcus Risberg**, CEO, Tallink Silja Sweden, commented. He also highlighted, "The shore power connections not only allow us to reduce emissions and noise levels when in port, but also mean a much better working environment in the engine room, where it is now completely silent during the day." To this **Joakim Larsson**, Vice Mayor for City Planning, added, "The Värtahamnen Port is one of Stockholm's gateways to the surrounding world, and we need to create a welcoming district where the growth of the city and the port are integrally linked. I am delighted that vessels can now connect to onshore power at the Värtahamnen Port. This provides the prerequisites for greener shipping and a more attractive port, free from unnecessary emissions." **Thomas Andersson**, MD, the Ports of Stockholm, summed it up by saying, "The results at the Värtahamnen Port are a positive step in the right direction. Ports of Stockholm is continuing this prioritised work according to our established operating policy to develop onshore power supply at our ports."



## Corvus Energy and SEC Marine to cooperate on a hybrid SES project

The companies signed a contract for the supply of an energy storage system (ESS) for the world's first hybrid crew transfer surface effect ship (SES), to be employed for servicing offshore wind farms. The design features two catamaran hulls, closed area between and an inflated rubber bag in the stern, which will support up to 80% of the vessel weight when filled with air (the remaining 20% will be supported by hull buoyancy). Lower hull resistance will enable higher vessel speed, and less wave contact will result in reduced motion for the crew. The ship will be built at **Wight Shipyard** in the UK and is expected to service from mid-2020 the Borssele 1 and 2 offshore wind farms located some 23 km off the Dutch coast. **Trygve Halvorsen Espeland**, Naval Architect, ESNA, said, "The vessels have the benefit of range with the combustion engine, while the batteries provide both increased speed with power boost, peak shaving and reduced fuel consumption. Moreover, the engines will have fewer running hours and the silent hours on board will be appreciated by the crew and passengers. The vessel design will accommodate further developments in hybrid propulsion and battery technology, ensuring it has the capability of being developed into a totally carbon-free solution in the future."

## World's first use of SNG as ship's fuel

**Nauticor**, **MAN Energy Solutions**, and **Wessels Marine** have partnered to bunker the container ship *Wes Amelie* with synthetic natural gas (SNG). **Audi's** power-to-gas facility in Werlte near the German Cloppenburg, where a liquefaction plant is currently under construction, will provide 20t of SNG for the project. Following the plant's commissioning, currently foreseen for Q2 2020, Nauticor will take care of transporting the SNG batch from the production facility to the ship as well as of truck-to-ship bunkering of *Wes Amelie*. Since the Audi facility is using wind energy to produce SNG, the CO<sub>2</sub> emissions from *Wes Amelie* are expected to decline by 56t/trip (as of today, the ship plies on liquefied natural gas, LNG, also supplied by Nauticor).

## Unikie to help digitalise Gävle and Rauma

The Finnish software company specialising in Artificial Intelligence and software for autonomous vehicles has won a tender for **Efficient Flow**, an international sea traffic management digitalisation project. "The purpose of the Ship and Port ICT solution is to streamline and simplify the port actors' operations and also to get a digital communication channel to vessels. In connection to this, hinterland operations will be connected to see how they could benefit from the information sharing and vice versa," **Anders Berg**, Project Manager, **Swedish Maritime Administration** (the organisation leading the Efficient Flow project), explained. He added, "One basic principle of the Ship and Port ICT solution will be that port actors share their estimated and actual times regarding certain states – mainly ETAs, ETDs, and TDs – in the port call process as a minimum set of data." **Jussi Mäntynen**, General Manager, **Unikie**, also said. "Unikie is very proud about winning this open Tender. A chance to design and create a new state-of-art solution using an open source from scratch will provide a scalable, cost-effective and robust solution for Ports in Sweden and Finland, today and tomorrow." **Esko Mertsalmi**, CEO, Unikie, highlighted, "The digitalization of ports is the future. With our ICT solution, shipping and ports are taking a big step in digitalisation by uniting key players. If this development project succeeds, the solution will be ready to be implemented in other ports throughout the Nordic countries as well."

## Tallinn to have a new cruise terminal

The port authority has launched a public procurement for the construction of a new cruise facility in the **Old City Harbour**, along with a promenade. The terminal will feature a 4,000 m<sup>2</sup>-big building that will be able to accommodate up to 2,000 people at once. Between cruise seasons, it will function as a venue for different kinds of events, including concerts and conferences. "The interior and exterior architecture was designed paying special attention to ensuring the best possible environmental properties of the materials and inventory. The building will be heated with sea heating, and additional energy will be generated using solar panels. The main materials used for the building will be glass, natural concrete, heat-treated pine and steel painted in black colour. Open rooms will have plenty of live plants which will create a good interior climate and cosy atmosphere," the **Port of Tallinn** underlined in a press release. The 900 m-long promenade – featuring cycling and pedestrian roads, green areas, small squares, open shelters for walkers, and zones for activities for children and sports enthusiasts – will stretch from the present cruise gate located under the roof of the building to the end of the North-Western pier of the Old City Harbour.

Photo: Pixabay

## PORT OF HELSINKI:

401,200 TEUs handled in I-IX 2019 (+4.5% yoy)

Measured in tonnes, the port's containerised freight traffic totted up to 3,172.4kt, an increase of 3.7% on the result from the corresponding period last year.

### Port of Helsinki's volumes

	I-IX 2019	Yoy
Unitised, out of which	8,876.2kt	-0.1%
Wheeled (ro-ro)	5,715.1kt	-1.7%
Containerised	3,172.4kt	+3.7%
Dry bulk	1,161.6kt	-20.6%
Break-bulk	586.2kt	-15.4%
<b>Total</b>	<b>10,786.1kt</b>	<b>-3.3%</b>
<b>Ro-ro traffic</b>		
Trucks & trailers	452,058	-0.8%
<b>Container traffic</b>		
<b>TEUs</b>	<b>401,200</b>	<b>+4.5%</b>
<b>Passenger traffic</b>		
Ferry	8,942,004	+0.6%
Cruise	581,015	+14.4%
<b>Total</b>	<b>9,523,019</b>	<b>+1.3%</b>

## PORT OF HAMBURG:

7.04m TEUs handled in I-IX 2019 (+6.9% yoy)

Growth in transshipment traffic was one of the reasons behind the numbers, accounting for 2.6m TEU (+4.3% year-on-year).

### Port of Hamburg's volumes

	2019	Yoy
General cargo	72.4mt	+5.7%
Dry bulk	21.6mt	-4.4%
Liquid bulk	10.0mt	+3.0%
<b>Total, out of which</b>	<b>104.0mt</b>	<b>+3.2%</b>
<b>Imports</b>	<b>60.2mt</b>	<b>+1.8%</b>
<b>Exports</b>	<b>43.8mt</b>	<b>+5.1%</b>
<b>Container traffic (million TEUs)</b>		
Transshipment (deep sea & feeder)	2.61	+4.3%
Hinterland traffic (rail, barge, truck)	4.43	+8.6%
<b>Total</b>	<b>7.04</b>	<b>+6.9%</b>
<b>Rail traffic</b>	<b>2.06</b>	<b>+11.9%</b>



Photo: Port of Hamburg



---

## PORT OF KLAIPĖDA:

542,340 TEUs handled in I-IX 2019 (+2.2% yoy)

The Lithuanian seaport handled a total of 34.89mt over the January-September 2019 period, up by 3.9% year-on-year. Klaipėda's passenger traffic rose, too, by 5.8% yoy to altogether 336.4k travellers. Out of the total, ferry traffic accounted for 269.1k (+8.1% yoy), while cruise for 67.3k (-2.3% yoy) passengers.



Photo: Port of Klaipėda

---

## PORT OF GOTHENBURG:

582k TEUs handled in I-IX 2019 (+3.7% yoy)

Out of the total, rail-based container traffic to and from the Swedish port totted up to 345k TEUs, up by as much as 20.2% on the result from January-September 2018. At the same time, however, Gothenburg's ro-ro traffic contracted by 5% year-on-year down to 419k cargo units. The vehicle logistics segment noted a decrease, too, of 8.1% yoy to 193k new cars. More passengers went through the port's quays, up by 8% yoy to altogether 1,463k ferry and cruise travellers.



Photo: Port of Gothenburg

---

## HHLA'S INTERMODAL BUSINESS:

1,184k TEUs carried in I-IX 2019 (+7.8% yoy)

Out of the total, rail carriages amounted to 930k TEUs (+7.6% year-on-year), while the road division added the remaining 254k TEUs (+8.8% yoy). The company's sea container terminals (three in Hamburg and one apiece in Odessa and Tallinn) handled a total of 5,730k TEUs, up by 4% on the January-September 2018 result. "As encouraging as our business trend is this year, we must still keep a realistic view of the changing conditions in which we operate. The challenges facing the entire transport and logistics industry remain significant. We are approaching these challenges with confidence and vigour and are continuing to work towards our aim and mission of making HHLA ready for the future. This means that we will strengthen our core business and tap into new, highly promising sectors," Angela Titzrath, Chairwoman of HHLA's Executive Board, commented.

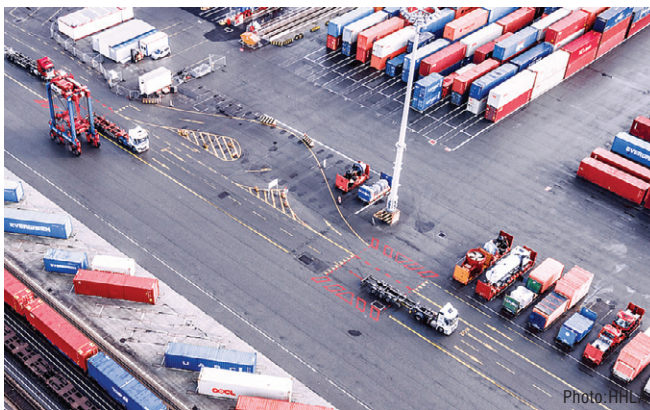


Photo: HHLA

---

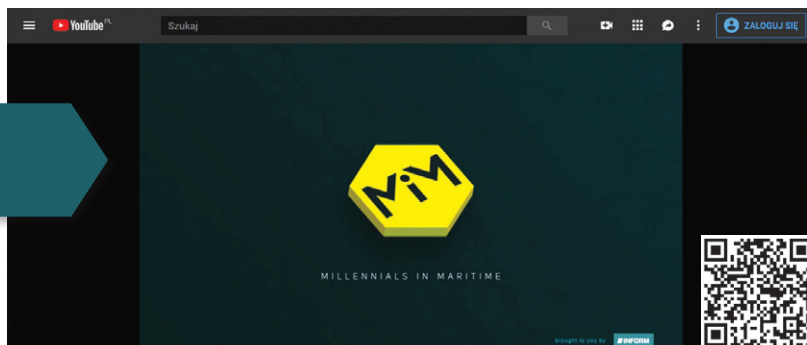
## FINNLINE'S:

127k new vehicles carried in I-IX 2019 (+11.4% yoy)

However, the company's vessels transported fewer ro-ro cargo units overall, noting a drop of 0.7% year-on-year to a total of 571k. Finnlines also handled less non-unitised freight in the reported period, a decrease of 8.6% yoy down to 853kt. At the same time, more private and commercial passengers boarded Finnlines' ships, up by 2.6% yoy to 544k travellers altogether.



Photo: Finnlines



## Millennials in Maritime

by Matthew Wittemeier, *Marketing & Sales, Logistics Division, INFORM*

Something different happened at TOC Europe this year, going mostly under the radar. A quick session on Wednesday (19/06) morning took place on the TECH TOC stage, and while it was only a brief, 75 minutes in duration, it was undoubtedly different from everything else that cropped up during the three-day event. The meeting, organised by INFORM and titled “Millennials in Maritime” (MiM), solely featured Millennial-aged panellists debating topics across four main categories: people, environment, industry, and technology. Challenged by the session’s moderator, Dirk Schlemper of INFORM’s Logistics Division (distinctly not a Millennial), many of the answers offered a unique perspective on our industry, its role in the broader global marketplace, and the role of Millennials therein.

“ Millennials,” “Generation Y,” Digital Natives,” “Generation Avocado Toast.” These are just a few terms used to describe a group of

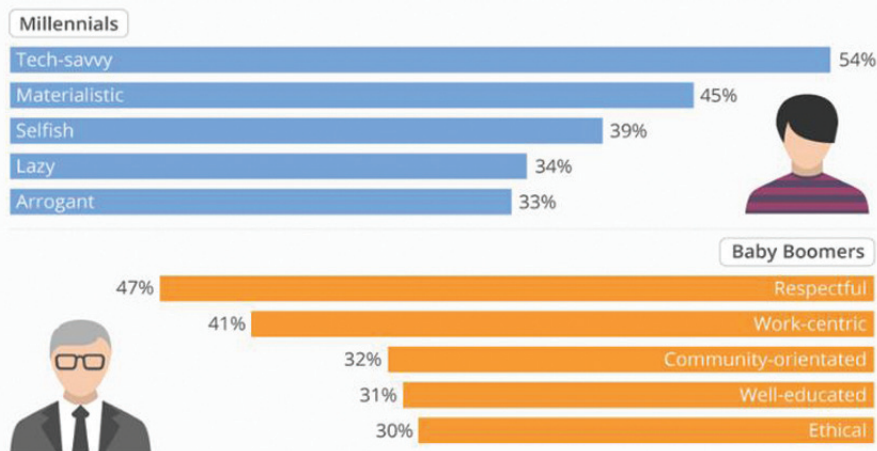
people born between 1981 and 1996. Today, they are the largest generation on this planet, and, by 2025, they will make up 75% of the global workforce.

However, one only needs to take a look around to see that in our industry Millennials are underrepresented. Take, for example, the Tech Talk sessions at TOC Europe. Having gone through the list and counted the number of Millennial speakers across all three days (excl. our session), the number of Millennials was 7 vs. 65 Baby Boomers or Generation Xers. What’s worse, many of these industry veterans are going to retire in the next decade, and we need to attract younger people to fill the gaps their retirements will create. In short, the Millennials are about to inherit the legacy of the Baby Boomers. But, is it the legacy that they would want?

What’s extremely important, too, the MiM session looked beyond the stereotypes commonly held for Millennials – that they’re materialistic, arrogant, lazy, and selfish people. Instead, it focused on their use of, impact on, and relation

### War of the Words: Millenials vs. Baby Boomers

Words most often used to describe the 'Millennial' and 'Baby Boomer' generations\*



\*N=18,810 aged 16 and over in 23 countries. Conducted September to October 2016  
@StatistaCharts Source: Ipsos Mori

statista





SCAN THE IMAGES ABOVE TO READ MORE ABOUT  
MILLENNIALS' APPROACH TOWARDS OTHER PEOPLE (ROUND 1),  
THE ENVIRONMENT (ROUND 2),  
THE TRANSPORT & LOGISTICS INDUSTRY (ROUND 3),  
AND TECHNOLOGY (ROUND 4),  
AS WELL AS THE "MILLENNIALS IN MARITIME" CLOSING THOUGHTS

to other people, the environment, the transport & logistics industry, and finally, of course, technology, the tissue that binds these elements together.

The panel comprised six Millennials stemming from across the maritime industry. The aim was to build a representation that reflects the diversity of our industries' makeup. As such, the MiM team included Elliot Benjamin (Tide-works Technology, the Supplier perspective), Eslie Vrolijk (Royal HaskoningDHV, the Port Planner), Dr. Jennifer

Sommer (HPC Hamburg Port Consulting, the IT Consultant), Anastassios Adamopoulos (Llyods List, the Journalist), Marius Waldum (Maersk, the Carrier), and Krzysztof Zalewski (the Port of Gdańsk, the Port). Behind these six individuals was a range of backup panelists and other experts who also added tremendous value along the way. What follows is a series that offers a snapshot of the MiM session enriched with anecdotes and supporting interview content where appropriate. ■



Photo: Kongsberg

# Out of work?

by Przemysław Myszk

Take a brief moment to ask yourself the following question: am I 100% certain that no robot or software will take over my current work? Or for that matter – any future gig I might find myself occupied with? Can you imagine landing a dream job only to find out it's getting automated soon afterwards? While it's true that the up-to-date industrial revolutions created more employment, both in quantitative and qualitative terms, can the same be said about what lies ahead once we pass the gates of Industry 4.0?

“[...] Every new invention changes the nature of work. It may require new skill sets, or it may change working routines. It may lead to a reduced demand for workers of a certain profile and may create new demands for workers with different qualifications,” said Dr Cleopatra Doumbia-Henry, President, World Maritime University (WMU) in the Preface to the University's paper *Transport 2040: Automation, Technology, Employment – The Future of Work*. In it, the authors set out to assess the possible impact technological advancements (first and foremost automation), coupled with changes in trade patterns, can have on future employment throughout the transport sector. What kind of occupation has the highest risk of being handed over to robots and software? Will the rise in global trade, hence transported volumes, make up for the employment losses brought about by automation? What can economies do to bank on this unknown? And if there are in fact measures thanks to which this potentially immense disruption can be tamed, which fields are likely to yield crops if only cultivated with enough care and foresight?

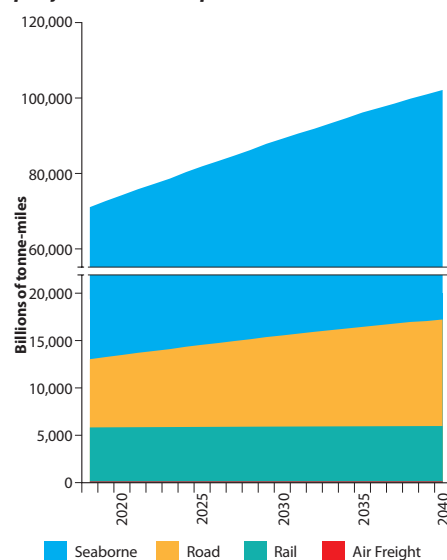
## What can be automated...

In 2040, forecasts say, between 8.1 and 9 billion humans will be inhabiting our planet. More people, in general, equals economic growth, which, in turn, propels trade, hence the demand for transport services. Extrapolating the data from the International Monetary Fund (global annual GDP growth of 3% over the 2018-2023 period, trade up by 4-4.4% in 2018-2019), authors of the *Transport 2040* predict that transport work volume will rise from today's 62.7tr tonnes-miles (one mile counting for 1.852 kilometres) to 95tr-mi in 2040 (Fig. 1). The bulk of it will continue to be shipped in ship cargo holds. However, the researchers note, the speed of growth will eventually slow down, from +2.2%/year in 2015-2030 to +0.6%/year beyond 2030 (though with varying degrees for different transport modes). As also pointed out by another organisation, the International Transport Forum, climate change mitigation policies and an overall more eco-friendly consumer behaviour can noticeably cut into the demand for fossil fuels (read more in BTJ 6/18's *The rub of the green. Zero-emission shipping by 2035*); on the other hand, changing demographics will have a leverage effect on the transportation of finished and semi-finished goods, thus

at least partially compensate for the lost oil and coal volumes (interestingly, looking at the breakdown of cargo types handled in Baltic ports, for instance, one can notice the rising share of general cargo at the expense of liquid and dry bulk).

So far that's good news for those employed in the transport sector, which in

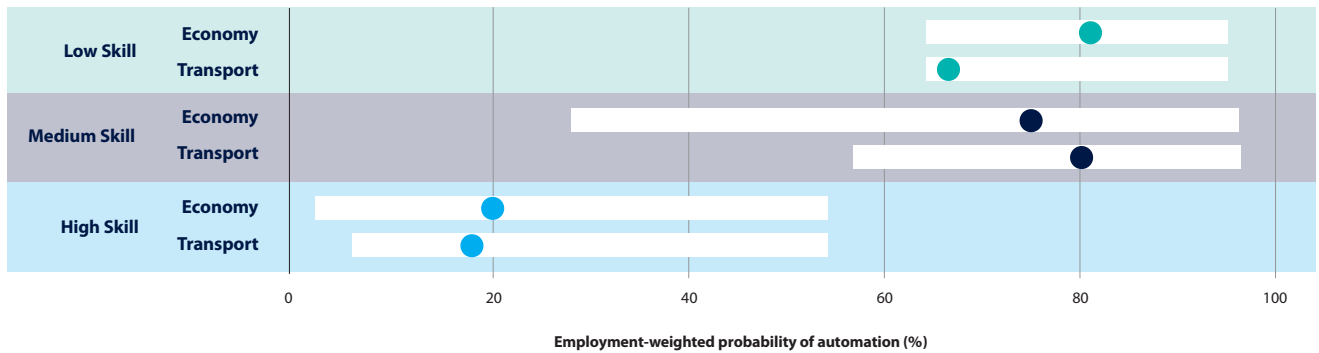
**Fig. 1. Global transport turnover: projected development to 2040**



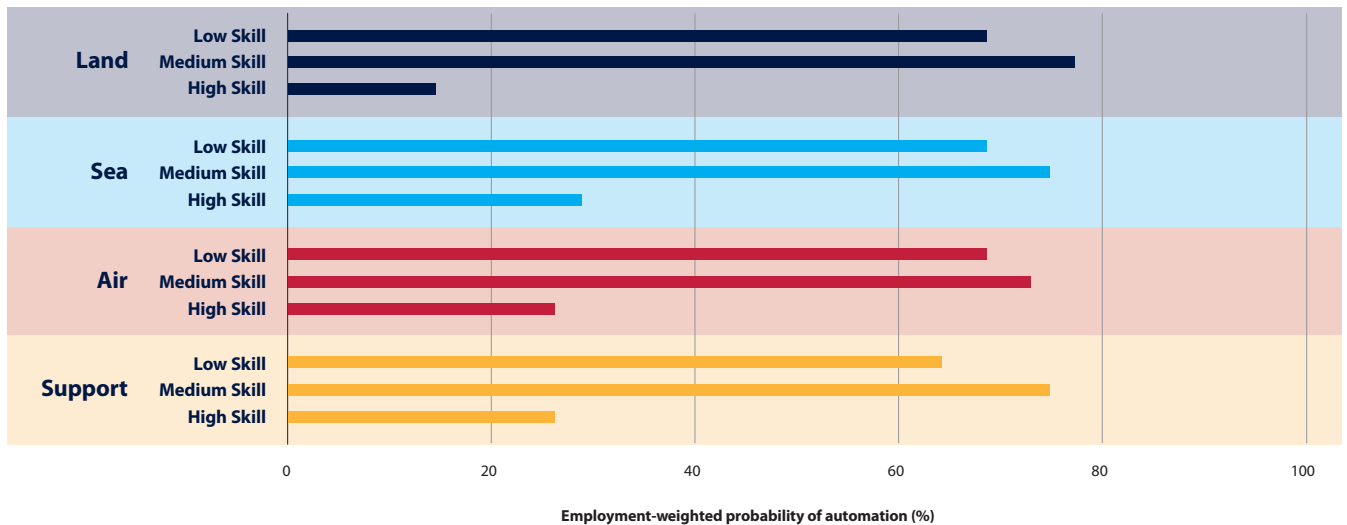
Source for all tabs. and figs. (except Tab. 1): World Maritime University's *Transport 2040: Automation, Technology, Employment – The Future of Work*



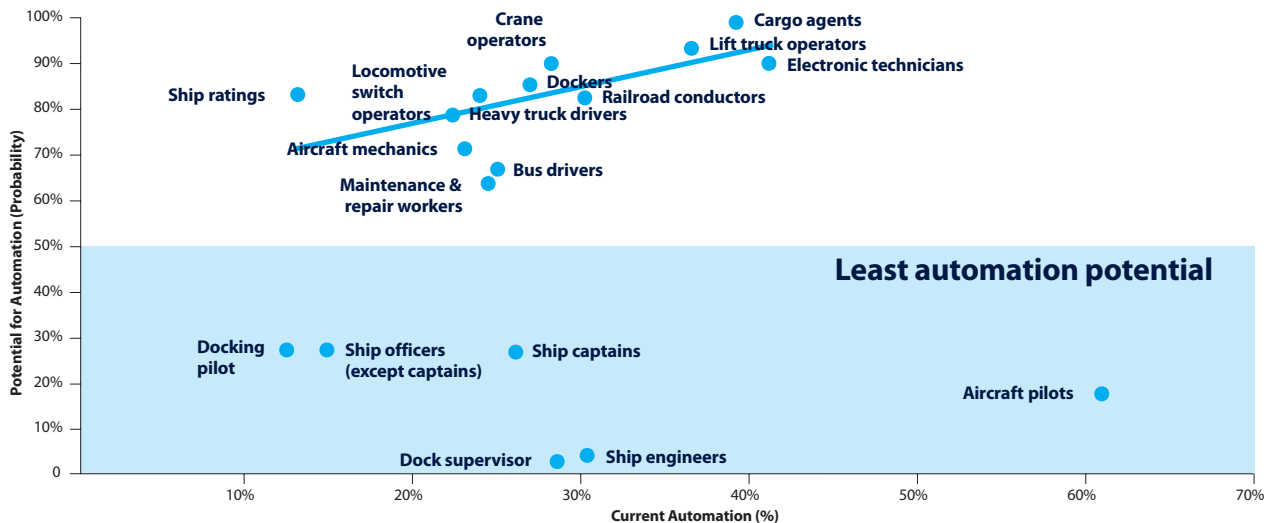
**Fig. 2. Automation potential in relation to skill groups in transport (Frey and Osborne, 2017)**



**Fig. 3. Automation potential in relation to skill groups by transport mode**



**Fig. 4. Automation potential job profile in transport**

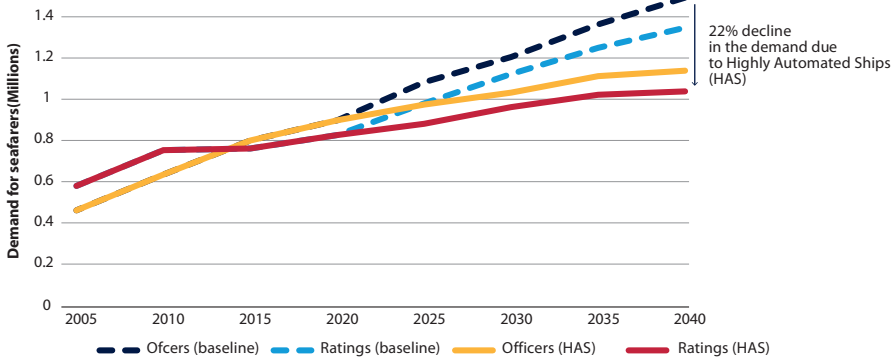


2017 accounted for as much as 5% of all workers globally (7% if we exclude people working in agriculture). This percentage translates into 168m direct jobs (out of which 3.3m are employed in the maritime business), making transport the world's third-largest employer among

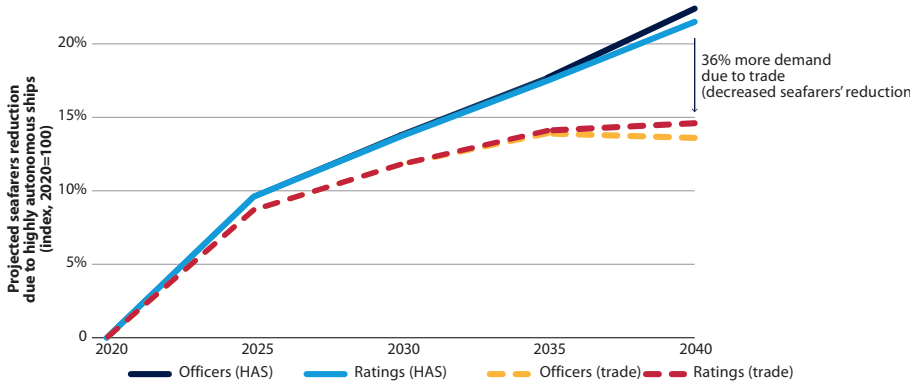
the service-industries. Doing some haphazard mathematics, it means that a single transport worker is nowadays responsible for about 373kt-mi of transport work. In a 1:1 ratio, this would mean that over 254m workers would be needed in 2040 to handle 95tr-mi.

Having analysed a total of 630 occupations, Frey and Osborne estimated – in their 2017 paper titled *The future of employment: How susceptible are jobs to computerisation? Technological Forecasting and Social Change* – that 47% of

**Fig. 5. Projected reduction on the labour demand for seafarers**



**Fig. 6. Simulations for the demand for seafarers**



US jobs are at a high risk of being automated over the next one-to-two decades (Figs. 2-3). The OECD own research into 21 of its members' economies speaks of

a far lower number of 14% (incl. 9% for the US alone). That said, the OECD's research highlights another fact, namely that more than 70% of these jobs' tasks will be fully automated within the next 20

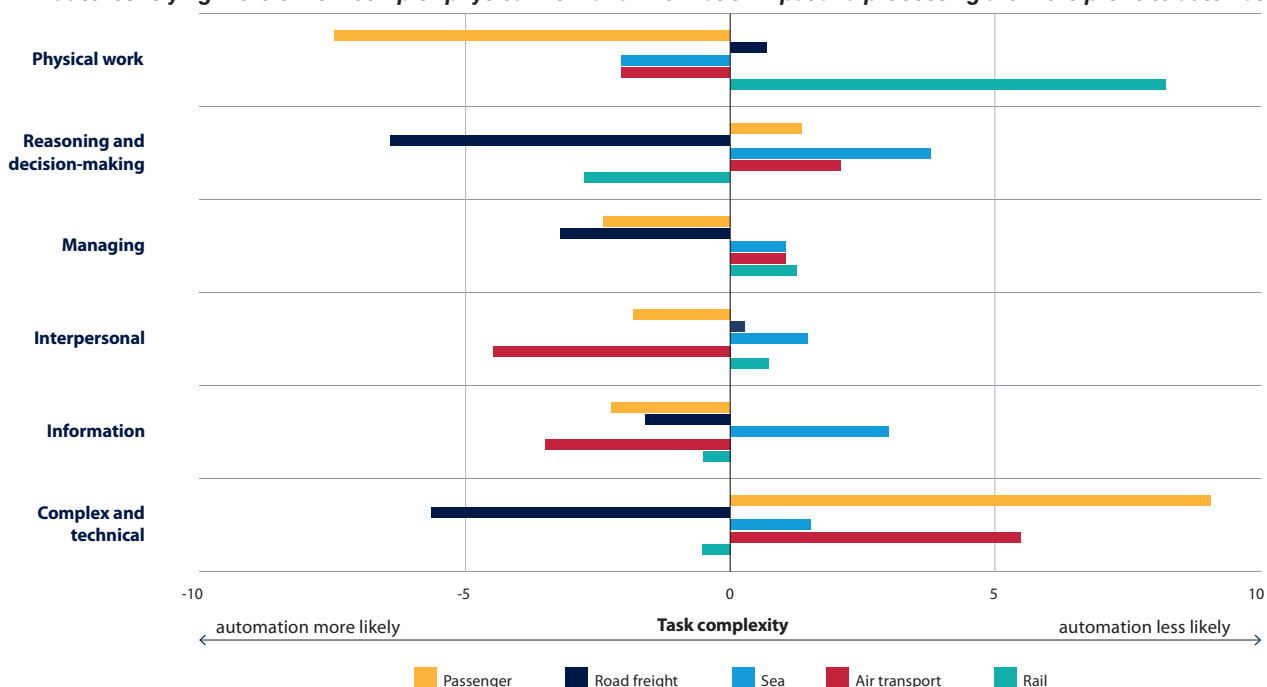
years. While on the one hand, *Transport 2040* reads, "New technologies and automation are usually introduced with the objective of increasing the output/efficiency of individual employees. Because jobs are a complex bundle of interrelated tasks, the automation of tasks does not result immediately in jobs becoming obsolete," on the other, the report continues (Fig. 4), "[...] for lift truck operators the current automation level is [...] less than 40 per cent on average but it could reach 90 per cent. By 2040, a rate of 90 per cent task automation is projected for crane operators and dockers in general."

A transport company can also be described as a "complex bundle," but this time from the perspective of the worker skills. WMU's research covered 60% of the global transport force from more than 70 countries. Analysing historical trends, the authors of the *Transport 2040* concluded that the automation of routine-based tasks has led in the first place to downgrading mid-skilled jobs to those requiring a less sophisticated set of competences as well as where they're being paid less. More advanced technologies currently making their way into the transport & logistics domain just amplify this tendency. Taken alone, highly automated ships, for example, are expected to decrease the global demand for seafarers by some 22%. This will be only partially offset (+8%)





**Fig. 7. Industries relying more on low complex physical work and information input and processing are more prone to automation**



by the forecasted increase in trade and transportation. So, ultimately, making shipping near- or fully-automated will result in a 14% loss as regards employment demand for seafarers (Figs. 5-6). However, *Transport 2040* emphasises, more seafarers will be needed in absolute numbers; ship automation will just limit job creation of this particular

occupation. Moreover, the issue is more regionally-nuanced, “Automation may not be adopted in regions or countries simultaneously or on the same scale. On the one hand, increased automation in some countries may help to fill in the gaps arising from an overaged, retiring workforce. On the other hand, other regions with younger workforce may lack

the prerequisites for large-scale automation,” WMU’s paper reads.

Low-skilled workers (i.e., dockers, baggage handlers) will also face a high risk (6-50%) of losing their posts, or, alternatively, their jobs won’t exist in their current form by 2040. For mid-skilled workers (apart from able seafarers also heavy-duty vehicle drivers), there’s a 7%-to-23% chance of being ousted by machines or algorithms. For both groups, there’s a positive linear relationship, meaning that jobs at present facing a high degree of automation – especially relatively high-wage, low-/mid-skilled jobs performed by older employees – are highly susceptible to be further automatised (Figs. 7-8). These figures take into account the economic and regulatory aspects. When looking solely at the technical feasibility of automating a particular job, there’s a 68% risk of mechanising or computerising low-to-mid-skilled posts, with the latter group confronted with a 77% probability of receiving a pink slip. In the transport & logistics business, mid-skilled employees account for over 72% of all labour force (as much as 76% in the road business and 62% in maritime), while low- and high-skilled for approx. 15% and 12%, respectively. High-skilled workers

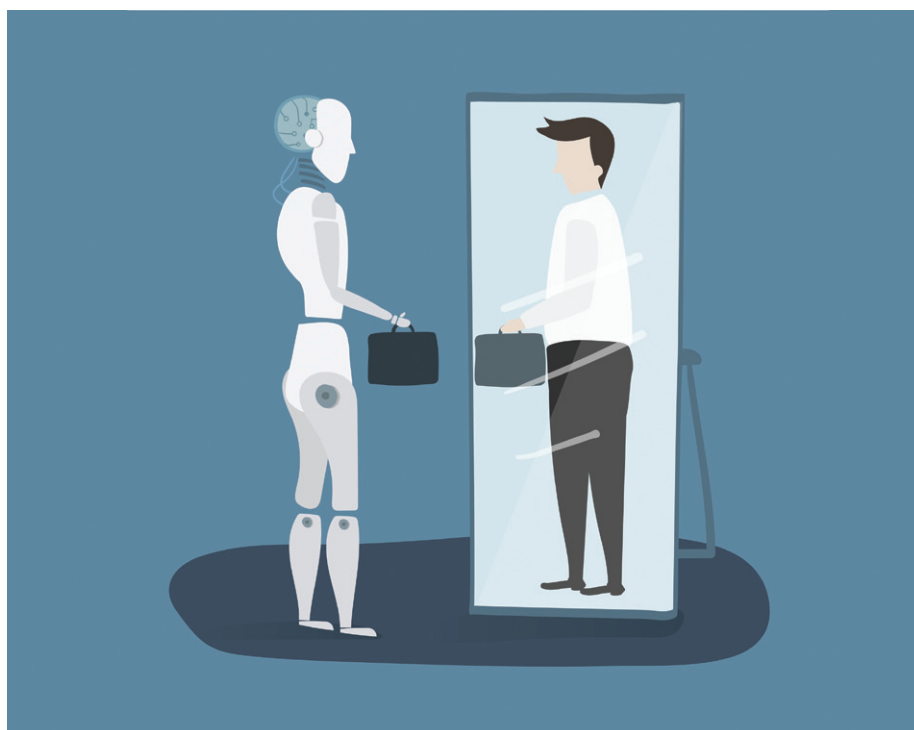


Fig. 8. Benchmark of the determination of automation

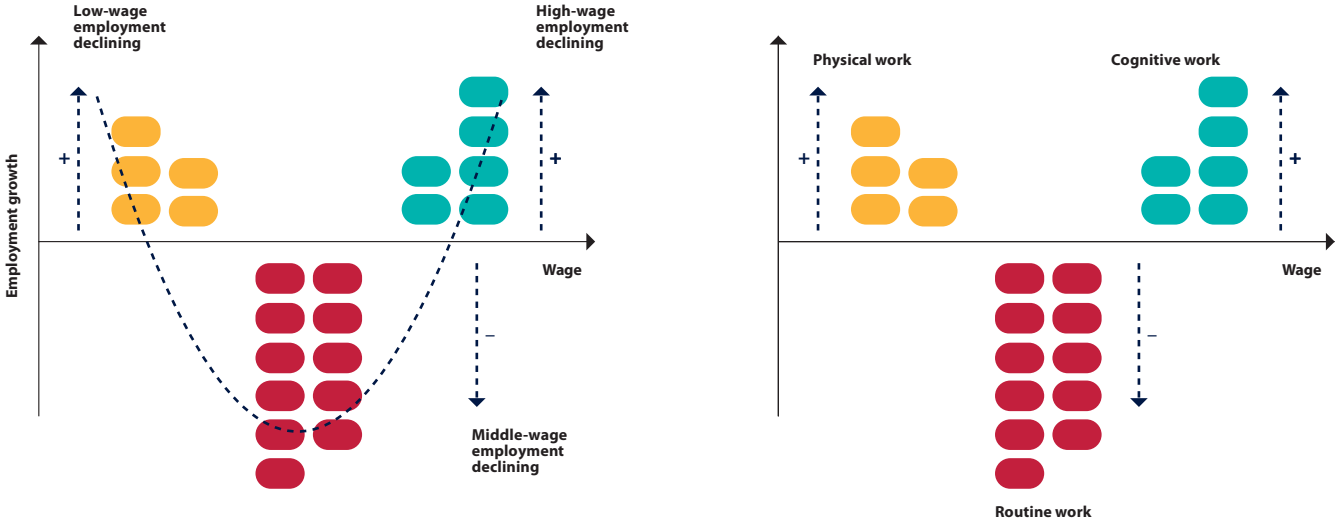
REGION	LABOUR COSTS	(% ) EMPLOYMENT AGE >45 OR >50				TECHNICAL FEASIBILITY			
		Land	Sea	Air	Support	Land	Sea	Air	Support
Africa	-0.8	21	18	21	22	H	M	M	M
Asia and Pacific	-0.6	26	32	26	25	H	M	M	M
Europe	0.6	37	30	29	30	M	M	M	M
Latin America and the Caribbean	-0.7	37	37	15	30	H	M	M	M
North America	1.5	55	37	55	50	H	M	M	H

(ship officers, aircraft pilots) are, to a certain degree, immune to this trend (risk of under 2%; up to 20-30% if technical feasibility is the only factor). First, some of these posts, like airmen, have already been highly automatised (>50% of their work). Second, the tech-solutions

In short, what can be automated doesn't necessarily (immediately) have to be. In fact, increasing automation of routine tasks in the past hasn't resulted in long-term unemployment. Authors of *Transport 2040* argue that so far, there hasn't been proof of what's called "technological unemployment." They also

"Because new technologies can generally be more easily acquired by those who are highly-skilled and educated, the demand for such workers has been rising in recent decades in parallel with the increasing use of technology in the workplace. In the process, the wages of high-skilled workers have risen sharply, while middle- and

Fig. 9. Employment polarisation



have been developed to aid them in their task, e.g. in decision-making, not replace them. "Context-aware apps," *Transport 2040* puts forward an example in this context, "[...] can provide on-demand information supporting specific tasks, e.g. displaying to maintenance personnel technical details of the piece of equipment on which maintenance is to be performed."

underlined, "Even when the automation of most work activities is technically possible, its implementation needs to be economically feasible. Studies [Acemoglu and Restrepo, 2017] have empirically shown that factors, such as the ageing of the population, are determining factors for adopting automation technologies, in particular, manufacturing robots." Then again, there's evidence that technology has driven wage inequality (Fig. 9),

low-skilled groups have lagged behind. More recently, from the 1990s onwards, this trend has become more nuanced, with the demand for workers starting to polarize towards low-skill workers and high-skill and high-earning workers." "Not inevitable" Apart from the debates revolving around whether social media have been more or less intentionally designed (and



not changed to do otherwise) to hijack our brains and wallets, destroy democracy, and surface what's worst in human nature, it's pretty much self-evident that meaningful technological advancements have made our lives better across numerous fronts. That's also the reasoning behind many solutions marketed to the transport & logistics stakeholders.

Air and underwater drones can work in hazardous environments in which people would risk the loss of life or limb. The same holds for remote operations of heavy-duty cargo-handling machinery, where the smallest mistake, e.g. on-board a gantry crane, can be grave. Truck platooning has also been devised with the intention to take driver fatigue out of the safety equation. Artificial Intelligence and big data have already been successfully put to the test in screening ship holds in search for misdeclared, potentially dangerous goods. Predictive analytics can lead to substantial savings and safety improvements when it comes to maintenance (in the energy sector, the U.S. Department of Energy reports, it has resulted in up to 30% reduction in maintenance tasks and up to 75% in business interruptions). Augmented reality, through the use of virtual reality glasses for inspecting ship machinery or mounting sensors on transport infrastructure, can also make maintenance easier, faster, and, in the end, better. Additive manufacturing (3D printing) is likely to profoundly alter vehicle maintenance, too, especially that of ships, by making it possible to print spare parts on-demand and right on the spot. Taken as a whole, tech-enabled safety advancements – getting rid of the so-called d-tasks: dirty, dangerous, and difficult – are aimed at making transport & logistics more worker-friendly, so as to attract new generations or groups that have previously been excluded from working in the industry, such as people with disabilities, or who've perceived the occupation too dangerous, like women (who constitute only about 20% of all transport workers, incl. those office-based).

Other tech-developments promise to deliver greater efficiency – vessel voyage and port call optimisation tools save the supply chain time, hence money, as well as spare the environment the unnecessary emissions generated by ships queuing in wait for a berthing slot. Blockchain is seen not only as a means of speeding up import/export operations

**Fig. 10. Status of key technology categories and their effect on the workforce for selected applications across transport sectors<sup>1</sup>**

KEY TECHNOLOGY CATEGORIES IN CLUSTERS, BY TRANSPORT MODE	QUALITATIVE JUDGEMENTS					
	Economic benefits	Regulation and governance	Technical feasibility	Social acceptance	Knowledge and skills	Labour market dynamics
<b>Core automation functionalities</b>						
<b>Infrastructure</b>						
Next generation air transport systems	●	●	●	●	●	●
Vessel traffic management	●	●	●	●	●	●
Rail traffic management	●	●	●	●	●	●
Road traffic management	●	●	●	●	●	●
<b>Vehicles</b>						
Airport automation	●	●	●	●	●	●
Ship automation	●	●	●	●	●	●
Train driving	●	●	●	●	●	●
Car/truck driver or operator	●	●	●	●	●	●
<b>Automation of maintenance</b>						
Air	●	●	●	●	●	●
Maritime	●	●	●	●	●	●
Rail (vehicle)	●	●	●	●	●	●
Rail (infrastructure)	●	●	●	●	●	●
Road (vehicle)	●	●	●	●	●	●
Road (infrastructure)	●	/	●	/	/	●
<b>Customer interface</b>						
Air	●	●	●	●	●	●
Maritime	●	●	●	●	●	●
Rail	●	●	●	●	/	●
Road	●	/	/	/	/	●
<b>Planning and new services</b>						
Air	●	●	●	●	●	●
Maritime	●	●	●	●	/	●
Rail	●	●	/	●	/	●
Road	●	●	/	/	/	●

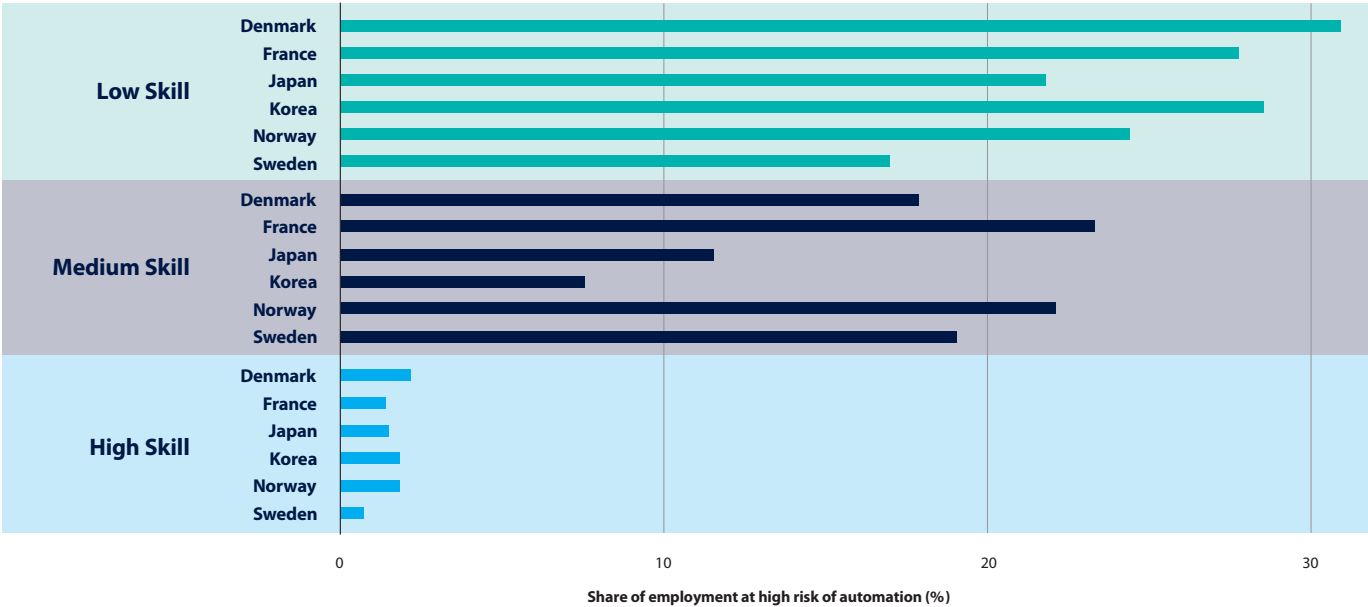
● Negative effects    ● Neutral effects    ● Positive effects    / Not applicable

and executing associated handling & forwarding payments but also as something which will facilitate trustworthy data exchange in an industry sadly known for its distrust. As the authors of *Transport 2040* put it, "Connecting data streams from different transport modes and mining of 'big data' will make it possible to process logistics information, e.g. customs, security, health and waste, more efficiently. Efficiency will be improved when common data structures are used by all stakeholders." Data, the new fuel, also makes it possible to develop a

digital twin of highly complex and interrelated areas, e.g. ports. This, in turn, can make it easier to simulate the soundness of an investment, i.e., whether all those taxpayers' or private investors' money will really improve operations.

While it's true that labour accounts for a considerable portion of costs in transport – according to the U.S. Department of Transport 26% in aviation, 27% in both road and waterborne, and 28.7% in rail across the US (2015 data) – exchanging a worker for

Fig. 11. Variation of automation risk across skill groups by countries



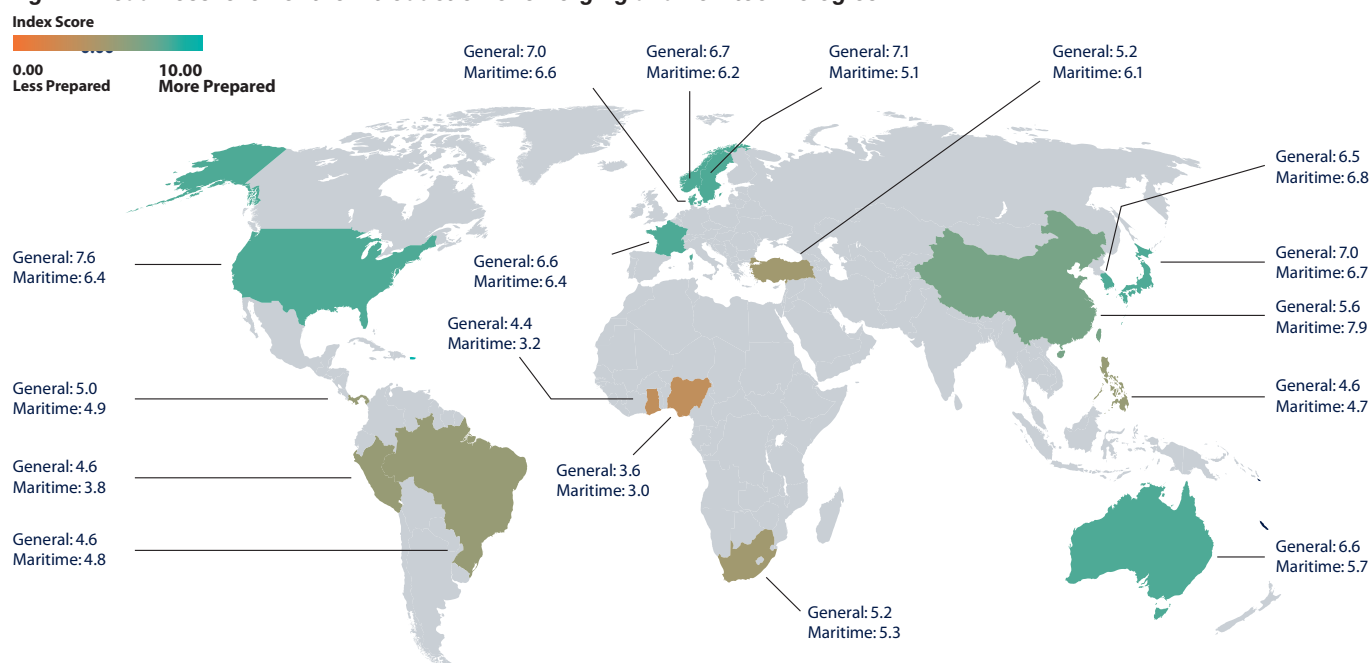
a robot/software isn't as straightforward as doing a Windows update. Again, a job is a bundle of activities, often requiring, apart from the proper perception of surroundings and gear/software manipulation, also social intelligence and creativity. If automation stumbles somewhere along the work chain, it'll create an efficiency bottleneck, not gain.



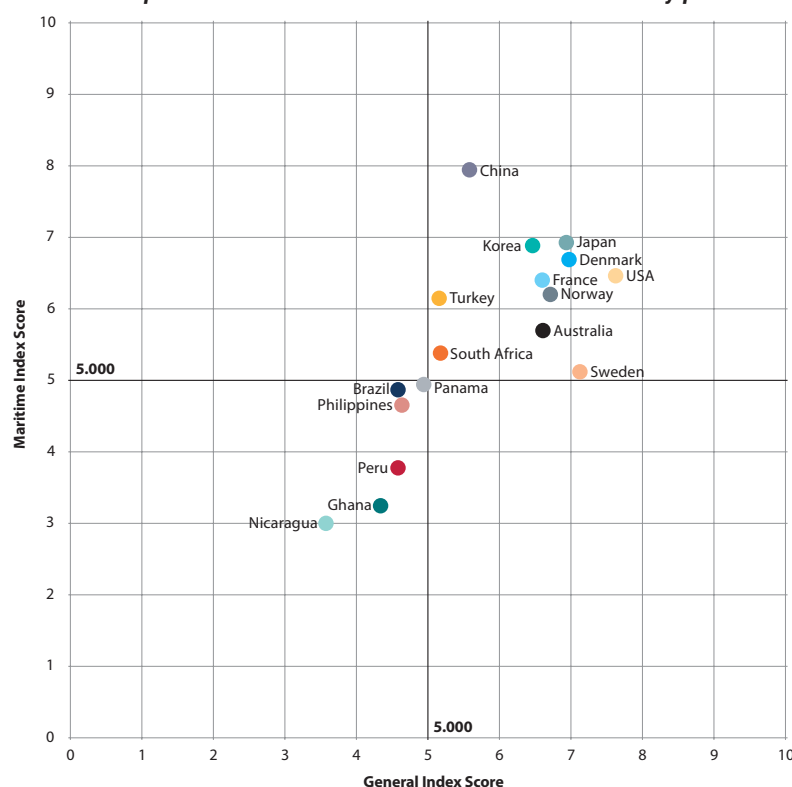
Photo: Volvo Group



**Fig. 12. Readiness level for the introduction of emerging and new technologies**



**Fig. 13. Global map of readiness assessment result for the country profiles**



So, if neither of the two extremes is the most plausible to turn into reality – i.e., business as usual or the revolutionary ‘machines will take over next Monday’ scenario – then what we’re left with will probably be the prevailing approach. Companies will continue to explore

new concepts more and more boldly, while countries, at least those forward-looking, will set up institutions that, on the one hand, will assist workers in their transition towards Industry 4.0-type-of-employment, and, on the other, will foster an environment that encourages

innovation and what’s maybe even more important – how innovation is interwoven with the socioeconomic fabric. “There are many things we, as a society, can do to stop the harmful effects of technology. We can secure regulations. Workers can use new technology to organise,” Stephen Cotton, General Secretary, the International Transport Workers’ Federation. He added, “The effects of automation and new technologies are not inevitable; they are a policy choice. Politicians, employers and workers have the power to make digital technology a tool for positive change.”

### Are you tech-absorptive?

The World Maritime University in the *Transport 2040* paper also analysed what the authors dubbed “technology absorptive capacity.” It’s a tech-specific measure of what the World Economic Forum and the management consulting firm A. T. Kearney define as “readiness,” i.e., “the capability to capitalize on the future, mitigate risks and challenges, and be resilient and agile in responding to unknown future shock.” The WMU has scrutinised 17 countries (incl. two from the Baltic: Denmark and Sweden, and our closest neighbour, Norway; Figs. 11-13) through the lenses of five

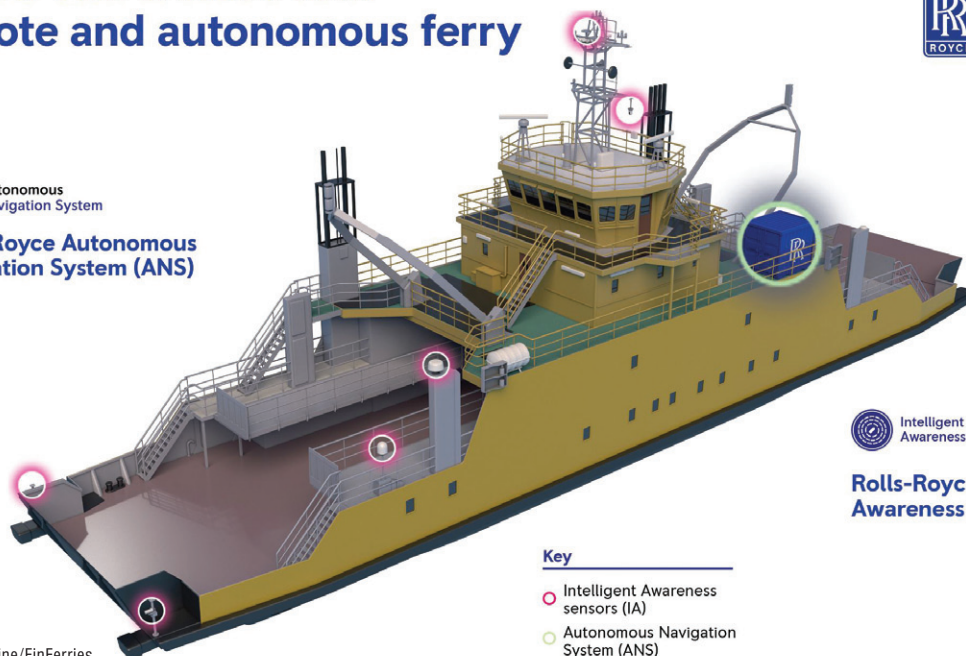


## SVAN: The world's first remote and autonomous ferry



Autonomous  
Navigation System

**Rolls-Royce Autonomous  
Navigation System (ANS)**



Intelligent  
Awareness

**Rolls-Royce Intelligent  
Awareness solution (IA)**

### Key

- Intelligent Awareness sensors (IA)
- Autonomous Navigation System (ANS)

Photo: Rolls-Royce Marine/FinFerries

factors, all in order to score their tech-readiness as well as to create a data-based agenda that would point low scorers and other peoples in the right direction. These are Innovation & Technology; Infrastructure Quality; Regulation & Governance; Human Capital & Skills; and Business & Investment.

The first one, Innovation & Technology, is the main driver of change in the maritime industry. Here, setting up secure and

connected ICT infrastructure is of the essence for the development and adoption of new technologies. This factor also stands for a country's ability to foster and commercialise innovation (investment in research & development), but also to what extent hi-end ICT is available and actually used. This category relies upon Infrastructure Quality, as it makes no sense to digitalise highways made of potholes, decaying port quays and yards furnished with rusting cranes, or non-existent railways. Those

who'll fail to integrate information technology with its operational counterpart, and vice versa, will blunt the opportunity to gain a competitive edge. On top of these two sits Business & Investment, i.e., how supportive, transport-oriented, and logistically performant is the environment in a given country.

Human Capital & Skills, as per OECD's definition, represents the "knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances." In short, it's the country's ability to respond to shifts brought about by Industry 4.0 so as to long-term adapt its workforce. "Several studies suggest that there will be shortages of suitably qualified personnel in different industry sectors, including transport," *Transport 2040* notes and accordingly advises, "As part of a life-long learning process, transport workers need to be prepared to adapt to the changing nature of work and develop new skills and competencies. Examples include digital skills, such as data fluency, digital operation and basic software engineering." Remote-control drivers of port gantries are a case in point, "It is compulsory for the 'new' quay crane drivers to obtain general prior knowledge on mechanics and electronics, in addition

**Tab. 1. Lloyd's Register's taxonomy of autonomy levels in maritime transport**

Level of autonomy (AL)	Details
AL 0: Manual	No autonomous function. All action and decision-making performed manually (n.b. systems may have level of autonomy, with human in/on the loop.), i.e., human controls all actions.
AL 1: On-board decision support	All actions taken by a human operator, but decision support tool can present options or otherwise influence the actions chosen. Data is provided by systems on-board.
AL 2: On & off-board decision support	All actions taken by a human operator, but decision support tool can present options or otherwise influence the actions chosen. Data may be provided by systems on- or off-board.
AL 3: 'Active' human in the loop	Decisions and actions are performed with human supervision. Data may be provided by systems on- or off-board.
AL 4: Human on the loop, operator/supervisory	Decisions and actions are performed autonomously with human supervision. High impact decisions are implemented in a way to give human operators the opportunity to intercede and over-ride.
AL 5: Fully autonomous	Rarely supervised operation where decisions are entirely made and actioned by the system.
AL 6: Fully autonomous	Unsupervised operation where decisions are entirely made and actioned by the system during the mission

Source: LR Code for Unmanned Maritime Systems

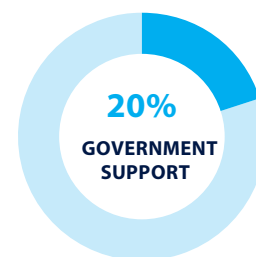
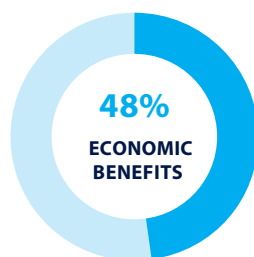


Fig. 14. Enablers and hurdles of deploying highly autonomous ships

# HIGHLY AUTOMATED SHIPS



## ENABLERS



## HURDLES

14%  
COST

25%  
ECONOMIC  
BENEFIT

39%  
REGULATION AND  
GOVERNANCE

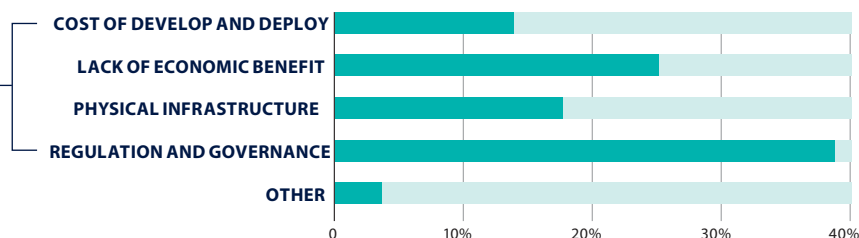
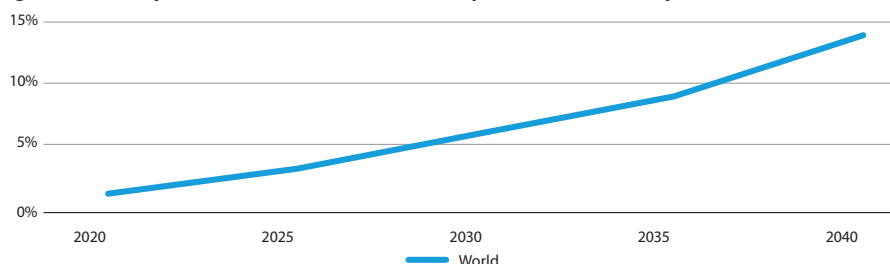


Fig. 15. Start-up-curves for autonomous ships with human supervision



to state-of-the-art handling skills on control panels,” WMU observed in its research.

Regulation & Governance – as we know from, e.g., turning parts of northern Europe into 0.1% Sulphur Emission Control Areas (SECA) – can drive an industry to froth at its mouth or kick-start a game-changing wave of innovation, or both (as has been to a certain degree the case with SECA in the Baltic; luckily, the latter attitude taking the upper hand eventually). For instance, Filip Kosci-electki, Claims Executive at UK P&I Club, noticed (in his highly recommended article *Revolution by evolution. Autonomous ships are hailed as the future of shipping. The technology is here, but are we ready for it?*), “There is currently no international definition of what an autonomous or unmanned ship is, what the various levels of autonomy are and whether an autonomous ship is a ship under international law. When definitions are in use in various conventions, they tend to be very broad and customs-made to cover the subject matter to be regulated.

Attempting to build a unified legal and regulatory framework is extremely difficult if there are no preliminary agreements on the basic definitions.”

That’s why the up-to-date autonomous shipping trials have been performed under the auspices of governments that are in general known for their tech- and future-oriented mindsets, like Norway (piloting the YARA Birkeland project on the world’s first autonomous container ship) and Finland (Falco, the first remote and autonomous ferry in the world) – with the support of such marine tech-heavyweights as Kongsberg and Rolls-Royce, interestingly, both from Norway (Figs. 14-15). “Challenges that need to be resolved in all modes of transport are mainly operational and legal ones. Within the next 10 to 15 years fully autonomous operations are expected to become possible with the technical and legal barriers having been resolved,” the authors of *Transport 2040* conclude. That said, “autonomous” doesn’t have to automatically mean “unmanned.” WMU predicts that such ships won’t be

“[...] conventional vessels without a crew; rather they are a novel type of ship with fewer but highly skilled crew members who control an increasing number of autonomous functions and operations on board, possibly from remote control stations.” So, back to square Human Capital & Skills.

## The Big Transport Tech

More and more people from the transport & logistics industry, including representatives of technological companies, speak of thinking about transportation in terms of corridors, not whether a particular country, mode of transport, or seaport is better or receives more/less support than its neighbour (within a country or outside its borders). It should be clear that although the factors devised by WMU are used to assess the performance of a single country, the interconnected world the Big Transport Tech is brewing for us will sooner or later make it evident that, e.g., autonomous shipping, however successfully developed in country A, will bring no benefits unless countries B, C, and D, which are in the trade/supply chain, don’t catch up. In the fields of innovation, technology, human capital, skills, regulation, governance, infrastructure, business, and investment to be perfectly exact.



Photos: Emilia Mirek/Emi Photo

# Is it a men's game (only)?

by Anna Miler, *Start-Up Development Specialist, Gdańsk Entrepreneurship Incubator STARTER*

**“Empowering Women in the Maritime Community” is the theme of this year’s World Maritime Day. On this occasion, a variety of initiatives have been kicked off, including the 3rd International Women’s Conference held in Malmö in April or the upcoming September London-hosted Women in Shipping Summit. In turn, the Polish arm of the Women’s International Shipping & Trading Association (WISTA) has been supporting women in the maritime industry by making it possible for them to establish personal and professional contacts, as well as to present their accomplishments, improve qualifications. In addition, this autumn, the Gdańsk Entrepreneurship Incubator STARTER has been implementing, in cooperation with the City of Gdańsk, the Women Build Ships Too project, the purpose of which is to draw attention to the women’s situation in the industry and to aid their career development, i.e., by inspiring them to embrace a more entrepreneurial mindset.**

**S**upporting women in professions connected with technology and exact sciences is a global trend, and a number of established companies (Shell, Damen, Stena Line) are executing programmes to that end. Numerous studies have shown that a more diverse workforce gives a company the creativity-enabled competitive edge. On the flip side, it’s a loss for a country’s economy when women are either left outside the market or take up positions below their qualifications, often in an environment which further suppresses their potential (glass ceiling, lower pay, being faced with career vs family choice).

As such, to increase the number of women in the STEM field (Science, Technology, Engineering, Mathematics), we need to understand what stereotypes and prejudices make it difficult for women to pursue education and jobs in these fields as well as to present successful white and blue-collar female workers as encouraging role models. Maritime UK, for

instance, keeps a female expert database (Speaker Bank), organises public speaking workshops, and seeks female volunteers who are interviewed in order to make the committee more diverse (Interview Pool). The findings gathered by the organisation’s project point out what should be obvious: a more balanced workforce improves work culture and productivity.

## Cultural change

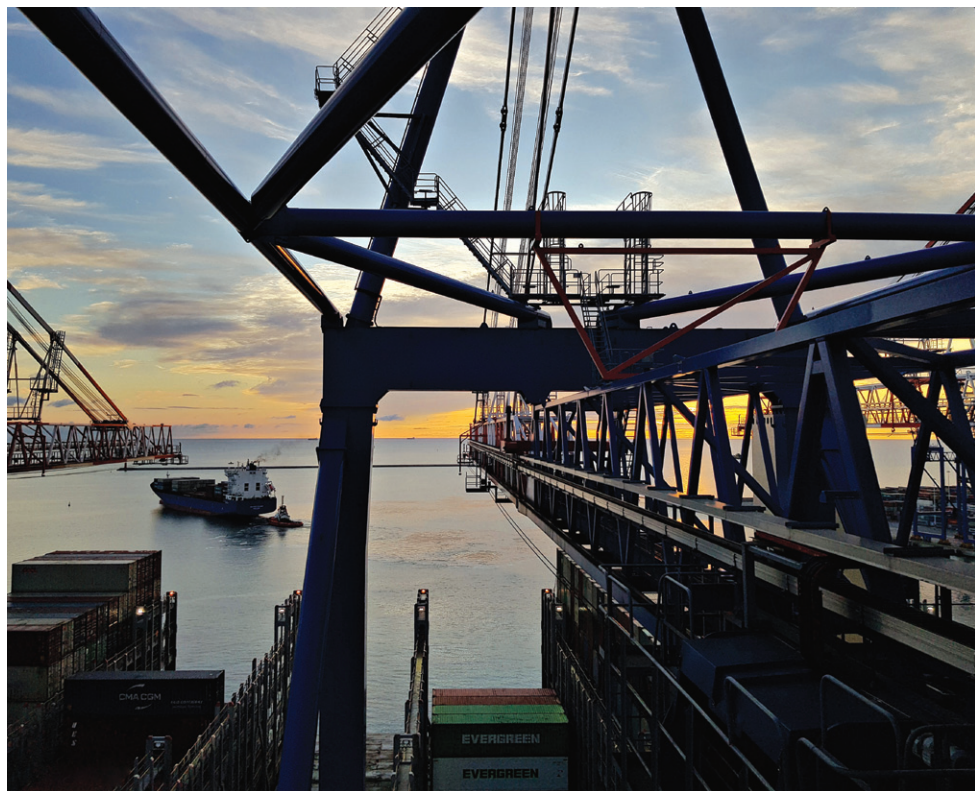
After WWII, all hands were needed to rebuild Poland. Following workforce shortages, women were encouraged to fill what used to be “men’s jobs” – in factories, across crop fields, or in shipbuilding. Female shipyard employees were featured on the covers of trade journals and local magazines. Presented as role models, they were supposed to encourage more women to take up the excessive production challenges set by the centrally-planned economy. But women also entered the “superstructure.” First women graduated from the Faculty of Naval Architecture at the Gdańsk University of Technology in the mid-1950s. Krystyna

Chojnowska-Liskiewicz is probably the faculty’s most famous female graduate. She single-handedly sailed around the world in 1976-1978. Years later, she said she had felt that she was paving the way for the next generations of women.

Yet, those efforts didn’t bring about a profound cultural change. Women who took up shipbuilding jobs revealed later that they weren’t accepted by male teams, their knowledge and skills were constantly questioned and put to the test, while working away from home for weeks or even months on end, taking overtime, and undergoing professional training was impossible to reconcile with what the society demanded of them as mothers.

What’s more, Jagiellonian University’s Dr Zofia Łapniewska emphasises, when girls decide to take up technical studies, they struggle with autostereotyping: “Research conducted by Ireneusz Sadowski showed that girls who applied to the Warsaw University of Technology usually had really high scores in sciences (so they only had enough courage to apply if they were sure they could manage it)





while boys applied even with much lower school-leaving exam scores. Therefore, low self-esteem when it comes to abstract thinking and solving science problems is still internalised and strengthened in girls." The data published by the Polish Naval Academy seem to confirm it. Girls accounted for only 33% of applicants in the academic year of 2017/2018, but they constituted 42% of those admitted. Other schools which prepare for working in the shipbuilding industry include the Gdynia Maritime University and the Gdańsk University of Technology (especially the Faculty of Ocean Engineering and Ship Technology; women were 33.1% of all the students during the 2018/2019 term). Female students train to work as designers in the Studio of Naval Design at the Academy of Fine Arts. The University of Gdańsk runs applicable studies at the Faculty of Oceanography and Geography. Women who have completed chemical, biological, IT, and economic studies also make it to the maritime industry.

Breaking stereotypes in our thinking and encouraging girls who graduate from high schools to choose technical or scientific studies are the goals of the Girls As Engineers and Girls Go Science campaigns initiated by the Conference of Rectors of Polish Universities of Technology and the Education Foundation Perspektywy.

### Knowledge-to-action

Unfortunately, not enough is known about the current situation of women in the Polish maritime sector. Thanks to the support of the City of Gdańsk, STARTER has been conducting a study a goal of which is to obtain information about their work conditions as well as their unique pathway for moving up the career ladder. Based on individual interviews, a report will be produced, pinpointing key issues along with recommendations for further action.

Preliminary findings show that women in this industry do not form a homogeneous group. The situation of those having technical jobs is different from the ones who have managerial positions but do not necessarily have experience in the field. The fact that they often work in specialised companies which act as subcontractors, where they have limited chances of promotion, is also significant; above all, development is possible on the basis of competence – through developing their skills during task completion. Women experience unequal treatment, but they do not notice its structural nature. Many of them are the first women on their posts and do not have role models or more experienced colleagues who could support them. The fact that they have turned up is a challenge for the men who work with them – both on the organisational

and mental level. It is also difficult for them to balance motherhood with serving on ships, which gives them a chance to improve their qualifications and get promoted sooner.

Apart from the report, STARTER will have completed by end-November other activities, including conducting workshops targeted at improving women's managerial skills, creating a database of female experts in this field, and supporting educators when it comes to teaching business in the context of maritime industries and encouraging girls to take up studies in this field. ■



The Gdańsk-based STARTER is a business-minded organisation that helps start-ups and newly-born companies to develop faster and better. "STARTER is a space, knowledge and networking. It is a community. We alter the way of thinking by creating future winners – from pre-schoolers to businessmen," its motto goes. For more info on the Incubator, please visit [www.inkubatorstarter.pl/en](http://www.inkubatorstarter.pl/en), while for its involvement in researching women's situation in the maritime industry head to [www.kobiety.inkubatorstarter.pl](http://www.kobiety.inkubatorstarter.pl)

## “Doing something”

by Deanna MacDonald, CEO, BLOC

**In several forums last year, blockchain was touted as a silver bullet that could – all on its own – resolve any kind of issues in shipping, from cargo brokerage and emissions tracking to tackling safety concerns. However, the industry is yet to have experienced the fundamental transformation that many predicted. Initial coin offerings are seen as an exciting way to raise capital beyond traditional sources, and regardless of whether it makes any sense, companies scramble over one another to be seen to be “doing something with blockchain.”**

**T**hat hype curve goes up steeply for the last couple of years, but when we get to mid-2019, it flattens out. There is now a considerable amount of scepticism towards the technology. Many have quite rightly critiqued the rush to use blockchain for everything – leading to an unprecedented backlash towards the technology that, two years ago, few had even heard of. So has it come crashing to a halt?

Given that I’m writing this as part of a blockchain consultancy, it’s clear that the answer is going to be “no.” But looking at the trajectory that blockchain has followed, it’s possible to learn some important lessons about what those of us who believe in the technology need to do to keep climbing up that hill.

### **The paradox**

A recent report from the Boston Consulting Group (BCG) does a great job of identifying some of the barriers the technology faces in transport and logistics markets where, initially, the thought of a secure, decentralised store of information seemed to be some of the most exciting and applicable use cases. According to a survey of professionals in the sector, the

vast majority of respondents (88%) believe that blockchain will disrupt the industry at least somewhat, mostly within the next two to five years. But nearly three-quarters (74%) say that they are exploring opportunities only superficially or haven’t thought about blockchain at all. Why is that?

“The best blockchain networks,” BCG argues (and we agree), “are often the hardest to create”. At the crux of the issue is a fundamental element of blockchain, namely that of trust. The transformational potential of blockchain networks lies in their potential to create trust between parties without intermediation – but this fundamentally runs counter to many of the business models in which we are embedded. “By increasing transparency, these distributed digital ledgers can mitigate the mistrust that often exists among the industry’s transacting parties. Yet this same mistrust makes it hard to bring together the industry’s diverse participants into a common blockchain ecosystem,” the report’s authors noted. This paradox is at the heart of blockchain, and an important reason why so many applications in transport and logistics have struggled to find their feet.



# BLOCKCHAIN

Photo: Pexels

### Fraught with peril

Instead, we've found the best results come from bringing together industry stakeholders (incl. suppliers, producers, customers, competitors, regulators, and governments) by invitation and aligning interests to address shared friction points across entire value chains. The pain points we've identified are specific but important.

One of these is the handling of dangerous goods. Shipping containers often carry little to no indication of their specific contents. At best, a product code is scanned, traced, and managed by siloed data systems, which rarely interoperate with data systems managed by other stakeholders along the connected value chain. This is compounded by weak enforcement, documentation complexity, and the lack of transparency around the origin and content of containers. When it comes to the declaration of dangerous goods, this want of transparency can literally cost lives. According to the Cargo Incident Notification System (CINS), nearly 25% of all serious incidents on-board container ships were attributable to misdeclared cargo.

In light of this, our latest consortium, funded by Lloyd's Register Foundation, has been set up to explore the use of digital tools for traceability of dangerous goods cargo and immutable attestations and digital audit trails for due diligence with a view to generating more transparency and accountability in tracking dangerous goods; ultimately, reducing incidents. As blockchain is a shared tamper-proof ledger that records the entire history of transactions, it can make information exchange quicker, safer, and easier. In addition to streamlining the process

(and saving costs), it provides a high level of visibility and transparency.

Let's look at how this could apply to carrying dangerous goods cargoes. A recognised ploy of some shippers is to declare the cargo as non-dangerous at the time of booking but then amend it at the very last minute to declare that it is, in fact, a dangerous goods cargo. The shipper hopes that the changes are not processed in time and the carrier fails to be informed at loading, therefore carrying the cargo as if it were non-dangerous. But using a system based on blockchain, the rapid exchange of information could result in the carrier being better positioned to make the necessary changes and compliance arrangements. A further benefit is that all of the data related to the nature of the dangerous goods cargo is securely stored in one ledger, immediately accessible to any "permissioned" party participating in the transaction (this can include material safety data sheets and emergency response procedures).

### Fuel up

Much is made of the tamper-proof qualities and transparent nature of blockchain. However, it does not readily solve the problem of unscrupulous shippers wilfully misdeclaring the cargo at the time of booking. It would still be possible to knowingly submit false information. Tackling this aspect requires other measures and incentives in addition to a blockchain-based system.

This is where we see the value of our consortium-based approach. By bringing together stakeholders, we aim to not only combine both physical and digital tracking but examine the incentives that underpin the entire value chain, thus using blockchain as a digital foundation

that lets us tackle the bigger governance questions.

Working in a consortium-based way, we believe, is how blockchain is going to grow in shipping. It's already starting to show results; last year, we launched our first consortium, looking at tracking fuel quality. Right now, we're in the process of launching BunkerTrace, a product that combines synthetic DNA tagging technology with blockchain to trace marine fuel throughout the supply chain.

With a critical perspective on blockchain, and if we start with consortia and make sure we're building with the industry to genuinely solve problems, it doesn't matter if the blockchain adoption curve has a few peaks and troughs – ultimately, the solutions it enables will speak for themselves. ■



Maritime Blockchain Labs (MBL) develops blockchain pilot projects together with industry consortia to solve industry-wide problems. Currently sponsored by Lloyd's Register Foundation, MBL is the first industry-led initiative of its kind where we collaboratively source, experiment, prototype, and test new value propositions of blockchain and digitisation in the shipping sector. For more info, incl. on participating as a consortium partner, in sponsoring pilots, or becoming a general member, please click [www.un-bloc.com](http://www.un-bloc.com)



# A blockbuster

by Marie Pavesio, Deputy Director for Projects, Audits and Business Development, MGI

**Ports are key entry & exit nodes in the global supply chain. The less time goods spend in transit – the more performant and attractive the port will be. However, gone are the days when ports competed solely among themselves. Nowadays, entire logistics systems are battling for who'll take care of the freight traffic. Providing greater cargo visibility is one of the measures to take the lead.**

**B**lockchain is a relationship of trust between partners exchanging the required information throughout the shipment transfer process. This sharing of technology speeds up cargo flows, improves tracking, and ensures the reliability and security of shared data, all of which are much sought-after edges in the logistics competition race. The logistics sector is starting to see the benefits of blockchain technology as it is aimed at improving the operational performance of a compound of players. In other words, we've finally got a technology that facilitates cooperation. With our latest innovation, Ci5, we already offer the transport & logistics market one blockchain application, while another is in the pipeline.

## The faster the better

Ci5 stands for the latest development of our Cargo Intelligent System (CiS), a digital cargo management system for smart ports. The solution links various actors throughout the logistics supply chain – port authorities; customs; veterinary and plant health services; terminal operators; shipping agents; vessel owners; freight forwarders; shippers; road, rail, and barge transport providers;

owners and managers of empty container depots; and freight consolidators/deconsolidators – in order to give them visibility on cargo statuses and events in order to speed up the transit of goods.

In detail, the Ci5 generates releases so that import goods are handed over for picking-up at a shipping terminal or loading onto a ship for export. As regards the former, the system produces the Shipping Release/Release Order (shipping agent authorization), the Forwarder Release (freight forwarder authorization), and the Customs Release (clearance issued by customs). Once these releases have been obtained, Ci5 automatically generates the Final Release – or the green light for goods pick-up at a terminal. At the Marseille Fos Port, where Ci5 has been in operation since October 2018, some 80% of goods are leaving the port in less than 48 hours.

Working in partnership with Thales Services, MGI is now offering to use blockchain technology to record transactions in Ci5 to generate the Shipping Release/Release Order, the Forwarder Release, and the Customs Release by a consortium of system users acting as trusted third parties. As soon as these are validated, Ci5 generates the Final Release. Each event that creates a new status is tracked and cannot be altered or falsified. Through Ci5, the blockchain technology adds the tracking and security features in

obtaining the cargo release status. This innovative blockchain-enabled module makes MGI the world's first provider of Cargo Community Systems/Port Community Systems-type of a solution to offer integrated blockchain technology, and it's now available to all clients who want to make use of it.

## End-to-end shipment tracking

The MeRS (Mediterranean-Rhône-Saône) blockchain project is working on finding the best way of sharing logistics information with shippers and carriers when goods are transiting to a port terminal. Led by the French Inter-ministerial Delegation for the Development of the MeRS Port and Logistics Route, the project is looking to improve the route's supply chain in order to increase the competitiveness of the Marseille Fos, Sète, and Toulon ports.

This is the second blockchain application MGI is working on, this time focusing on the cargo export leg. Our company is providing its expertise in connecting logistics professionals and optimising and tracking goods flows via Ci5, whereas two other project partners, Keeex and Buyco, specialise in secure and augmented data as well as booking services and cargo tracking respectively.

Ci5 has already several features that have been developed to enable

**Ci5 Tracking**

Shipping Order reference: **DAL19123**

Container / RoRo / Breakbulk number or Booking / Shipping: **MB 2018955**

Bill of Lading: **CSA0235725**  
Quantity: **11998**

Pre arrival notification	Discharge	Gate in	Release order	Forwarder release	Customs release	Final release	Gate Out	Load
✓ 15:52 27/03/2019	✓ 15:45 28/03/2019	✓ 15:45 28/03/2019	✓ 08:04 28/03/2019	✓ 12:23 29/03/2019	✓ 12:23 29/03/2019	✓ 12:23 29/03/2019	✓ 13:47 29/03/2019	

Date	Time	Event	Status	Agent	Reference
26/03/2019	16:37	Release order	CREATED	SHIPPING AGENT	#GHI9123
27/03/2019	09:16	Release order	DELETED	SHIPPING AGENT	#JKL4567
27/03/2019	09:29	Release order	CREATED	SHIPPING AGENT	#MNO8912
28/03/2019	08:04	Release order	UPDATED	SHIPPING AGENT	#VSL6054
28/03/2019	08:04	Customs release	CREATED	CUSTOMS AGENT	#GHI9123
29/03/2019	12:23	Customs release	UPDATED	CUSTOMS AGENT	#XSQ3174
29/03/2019	12:23	Final release	CREATED		#HIO185

information access and sharing for export cargo. For instance, the system records cargo events and statuses such as Pre-arrival Notification (cargo announcement prior to arrival at a maritime terminal), Gate In (cargo enters the terminal), Shipping Release, Forwarder Release, Customs Release, and Load (confirmation that the cargo has been loaded on a ship). However, diverse and unstructured data is still being exchanged between shippers and carriers, which affects the performance of inland logistics. The pilot phase started six months ago based on a use case for carriers and shippers. These entities (shippers, carriers, and multimodal operators) have also formed a consortium in order to join this project and provide their expertise.

This solution works with a range of data, including cargo statuses, geographical positions of shipments and means of transport, predictions on the estimated time of arrival in a terminal, and sequences that guarantee that all logistics processes have been integrated. Documents are also recorded, such as delivery slips, CMRs, or loading reports involved in pre-routing. It improves collaboration between pre-routing players by structuring, optimising, and securing their data exchanges, with a specific focus put on facilitating sustainable transports, especially by rail or inland waterways.

The solution creates a string of secure, virtual documents, enabling data sharing between various bodies without the need for a trusted third party superstructure, all thanks to the certified interface the blockchain technology delivers. This blockchain approach, implemented by MGI, supplements Ci5's transactional or Electronic Data Interchange services with a hybrid solution that organises data transfers and integrates them into current processes so that any future users can tap into them trouble-free.

### Cargo and data handled intelligently

These two examples of blockchain use do not interfere in current processes but document the flow of export/import goods. Our solution allows to achieve process improvements and save costs by connecting logistics systems and players who previously found it difficult to effectively and reliably share data.

As we approach the even more digitalised decade of the 2020s, the most feasible way for ports to boost their performance – and for that matter the efficiency of the entire supply chain they're part of – is to speed up the flow of information they're handling. "Show me how quickly you can process your data, and I'll tell you how good is your port," will be the new attitude. Ports that combine smart blockchain-leveraged systems will get a head start.



As a recognized expert in Cargo Community Systems (CCS), MGI innovates to streamline and speed up cargo data exchanges between all private and public stakeholders. The company's vision – to connect supply chains using a smart information system offering smooth door-to-door goods tracking – is the backbone behind the development of the Cargo Intelligent System Ci5. Thanks to incorporating innovations enabled by the use of big data, the Internet of Things, smart container technologies, blockchain, or Artificial Intelligence in the company's systems (as in the Channel 5 information and decision-making tool used to avoid congestion in port terminals) MGI is a provider of choice for smart port solutions. The company is certified according to the ISO 27001 (Information Security Management) standard, and works with ports of the future and logistics professionals, providing them with solutions to improve their competitiveness. For more info about MGI, its products and services, please head to [www.mgi-ci5.com](http://www.mgi-ci5.com)

# Don't let it turn to dust

by Manit Chander, CEO, HiLo Maritime Risk Management

---

**Following significant and ongoing operational advances in the aviation, rail, and road transport sectors, more organisations within the shipping industry are waking up to the value of data sharing as a safety resource. In fact, leveraging shared data is the most effective way to reduce risk and improve safety at sea.**

**A**t a recent event staged by the Open Data Institute, a broad range of professionals discussed the challenges of convincing the shipping world that sharing data reduces risk. Some ship managers are already developing a more open and collaborative culture through the understanding that technical and operational data delivers a safer platform for marine operations. In contrast, ship managers that choose not to share data within a structured setting can only develop safety practices based on their own experiences.

The event also highlighted the continuing need for more investment, development of regulations covering vessel data, and updated standards and best-practice guidelines to deliver robust data infrastructure. The clear inference is that the industry needs to be more open if accidents are to be reduced.

## Previously unobtainable insights

A great deal can be learned from investigating incidents in retrospect, but looking at data from ships proactively can prevent them from happening in the first place. The collection, pooling, and structuring of data enable trends to be identified, analysed, and acted on.

This is already happening, with vessel operational and technical data provided by ship managers put through High Impact Low Frequency (HiLo) predictive models. Developed using peer-reviewed statistics, the models enable HiLo Maritime Risk Management to share data-derived insight and industry best practices in risk dashboards for each company.

Building from an early base of ten ship managers who shared their fleet data to the HiLo platform, there are now 42 companies providing data, and new organisations are subscribing regularly. HiLo currently analyses data from more than 3,000 vessels and operates predictive risk models for tankers and bulkers. As subscribers to the platform, ship managers help to enhance their own and others' operational safety by supplying vessel data already collected according to their internal company procedures. The process is, therefore, of little burden. By feeding data from multiple sources through the HiLo models, previously unobtainable insights can be revealed.

With HiLo, analysis of the data is a continuous, dynamic process, informing and improving risk models for specific vessel types. HiLo can accordingly identify critical areas of action to avoid serious incidents. These insights are communicated in dynamic Risk Rankings, regular Deep Dive reports, and specific alerts for individual subscribers,

enabling them to act before minor issues become major incidents.

By way of example, HiLo predicted that the risk of an engine room fire was high for a particular subscriber's vessel. The subscriber investigated the weak signal – small leaks of fuel – and discovered a link to inadequate bolt tightening, with some bolts being the wrong size. Corrective actions were taken to significantly reduce the risk of an engine room fire. As another example, the risk of lifeboat accidents was pinpointed as a high potential impact area for one company. The precursor to this was identified as a lifeboat brake failure: company action showed that eight unapproved service providers had crept into their system over the past couple of years.

Overall, the maritime industry is starting to recognise that shared data can be secured and can generate real value by reducing the cost of minor and major accidents. In fact, predictive models based on real data from HiLo subscribers have had an immediate and demonstrable impact on safety. Between August 2017 and June 2018 alone, HiLo was responsible for reducing the risk of lifeboat accidents by 72% on 900 ships. In the first six months of 2018, meanwhile, engine room fires and bunker spills on 1,800 vessels were reduced by 65% and 25%, respectively. The data-sharing platform's successes were recognised when HiLo won the Lloyd's List Global Safety Award 2018.





Photos: HiLo

### Two steps to data sharing

With more data sources, HiLo modelling can deliver deeper insights, so to improve the safety processes industry-wide, it's important to break down preconceptions about the risks of sharing operational data to such a platform.

The first step is to demonstrate a secure system where all data is anonymised and held in a secure environment with stringent information security and IT compliance practices. The second step is providing ship managers with something worthwhile in exchange for their data. Existing HiLo subscribers are willing to share their internal reports because the platform creates tangible improvements for the safety of their seafarers and vessels, which translates to providing a more effective service to their customers.

Additionally, looking ahead, there is tightening of regulatory compliance in the tanker sector, which will inevitably filter through to the container and bulk carrier sectors. With its ability to see early warning signals, HiLo will be able to identify the effects of these regulations on the maritime industry as a whole.

### Saving lives and ships

A new HiLo container ship model is coming soon and will be followed later in

the year by a risk model for ferries. These have been created through close collaboration with individual experts and organisations with exceptional operational knowledge.

Ultimately, leveraging the power of data will save lives and ships, so it's essential that the industry focuses on working together. With such high stakes, locking data away to gather dust is simply not an option. ■



HiLo (High Impact Low Frequency) Maritime Risk Management is a not-for-profit joint industry initiative – founded in 2016 by Shell Shipping and Maritime, Maersk Tankers A/S, and Lloyd's Register Consulting – which uses a predictive mathematical model to enhance industrial safety. By reading and analysing several precursors (weak signals), HiLo can predict the likelihood of more serious events. HiLo works across multiple asset types, with models currently available for liquid and dry bulk carriers. A container model is under development and ferries will follow later in 2019. For more info, please visit [www.hilomrm.com](http://www.hilomrm.com)





Photo: NASA/Rawpixel

# The new fuel

by Bartosz Dąbrowski

It appears that digitalisation has penetrated every nook and cranny of our everyday lives. Thanks to going digital, many businesses have reached new heights. No wonder then that the maritime industry, though conservative by nature, wants to make sense of this all-embracing change and jump on the e-bandwagon. Yet, going down the digital lane isn't as easy as ordering the IT guys to buy and install new software. Even the most well-established parties, like seaports, have to re-invent themselves. Easier said than done, but there're ways of, e.g., transforming ports into real digital platforms, argue the authors of the Port of Rotterdam's *Move Forward. Data as Fuel for the Digital Port* white paper.

Future ports will have to invest in both hard- and digital infrastructures to maintain and develop sound relationships with their clients. They will have to approach the issue carefully and consequently, in order to avoid the fate of such businesses as the hotel industry, where properties no longer retain a direct relationship with customers due to the emergence of online booking agencies. As such, ports should transform into digital platforms on their own, without the need for intermediaries. That does not mean ports will need to become software houses but rather open, transparent platforms interconnected with other parties along the supply chain to add value (e.g., eco-benchmarking by gathering data on CO<sub>2</sub> emissions or optimising berth and yard usage by collecting data on vessels' waiting times and the containers' location).

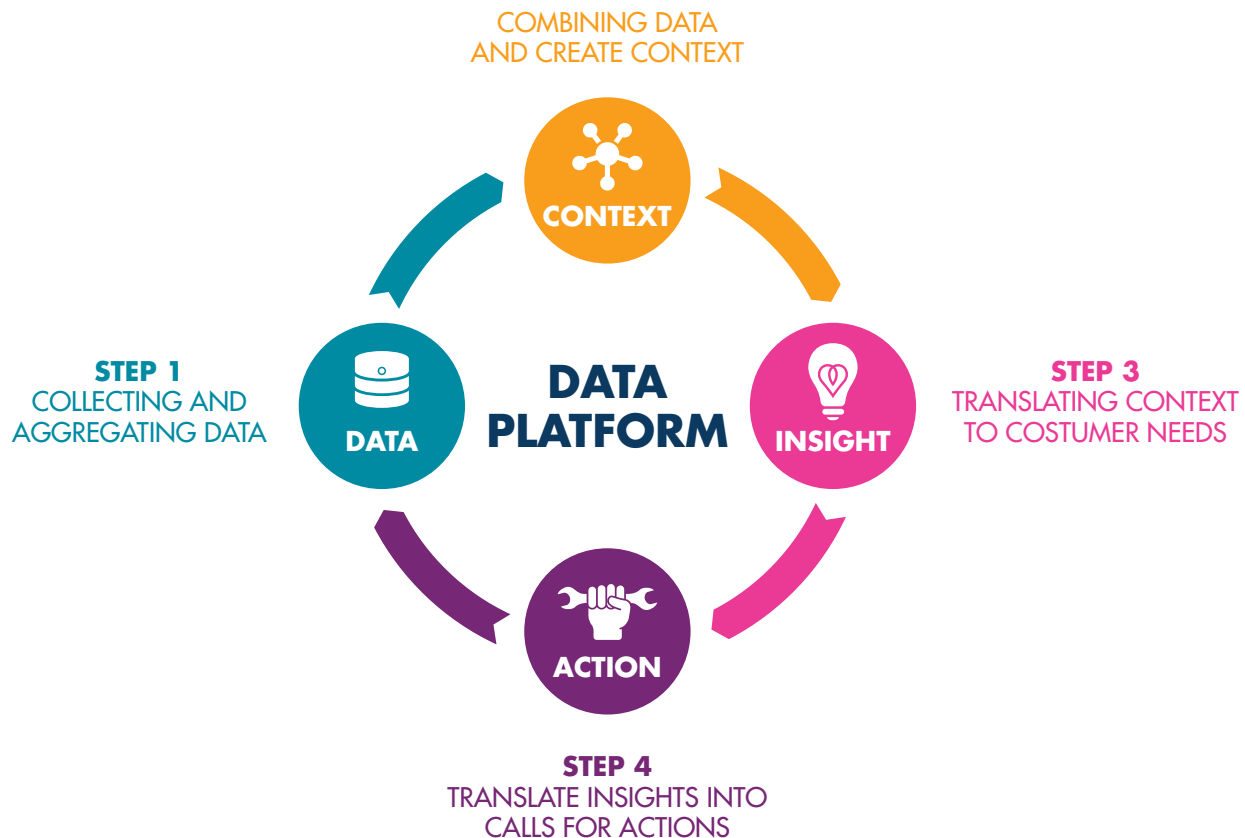
## "It's the data, stupid!"

The availability of data and its proper use are pivotal in simplifying port operations as well as making them more efficient and safer. So far, data have been either under- or unused in the maritime industry. However, ports, just like other platforms and industries, could welcome numerous innovative products and services with the proper management of data. For instance,

similarly to the software industry, port platforms could become open to third parties and their developments with the use of such methods as Application Programming Interface stores. One such example is Port Insight, a joint venture between the Port of Rotterdam and the Dutch company TWTG. Their project aims to develop Internet of Things-enabled solutions. Since its launch in November last year, its first achievement was a service through which barges can be tracked across a large part of Europe. Effectively, this solution spares the barge operators a lot of mundane, manual tasks, including paperwork such as invoicing.

Next, in its move towards becoming a smart port, Rotterdam introduced this year a hydro-meteo monitoring system, which uses a network of sensors to provide accurate and up-to-date water and weather data, used particularly for the planning and management of shipping. In total, 44 sensors installed across the port feed data on the height of tides, tidal streams, salinity, wind speed and direction, and overall visibility.

Making use of digital twin technology is another promising avenue worth exploring. Building a quay wall, for instance, can be very costly and even the best blueprint is as good as its designers and the



historical data they have at their disposal. On the other hand, testing the structure's functionality before it is constructed offers a much clearer insight into what impact a major investment like this could have. In addition to technical benefits, money saved through digitisation can be used elsewhere to fund other projects.

### In control

Customers, including terminals, shipping lines, and forwarders also take part in the digitisation process. They can optimise their own processes should ports provide them with quicker handling of cargo, smarter applications, and better access to data. Customer satisfaction brings increased sales opportunities, especially when we think about new players on the market, like the growing e-commerce business.

Ports must be aware of the impact the so-called platform economy has made globally. Platform giants like Amazon plan to expand their shipping arm by entering the maritime business, and it's only a matter of time before they disrupt the status quo in port logistics. Third parties collect vast amounts of data for the platform economy, but if ports want to become powerful digital platforms themselves, they need to remain in control. They should be creators and moderators of such

platforms and help third parties optimise their processes by proper data sharing.

Apart from current opportunities, ports need to anticipate future developments. Transport is undergoing radical changes, with new fuel types making their way onto the bunkering market and autonomous vehicles being slowly but steadily introduced. Concerning the latter, successful operation of self-sailing ships depends on the proper handling of infrastructure and event data. The vessels need to 'know' what's happening in and around them to decide whether it's safe for them to berth as well as what's the most optimal time to call a port. A central platform managed by port authorities would be an ideal response to the need for such data.

### Safe and sound

It isn't enough to come up with new ideas to transform a port into a real digital platform. Close cooperation with the port community is key as well. Only then is it possible to support the analysis of shared data collectively, and it is easier to face any serious economic, technological, and legal issues when the parties work hand-in-hand.

No solution will be adapted by a port if it is only a brilliant concept that is not capable of generating revenues or savings. A

future-fit solution must serve a common aim for both the port and its community. One example would be Rotterdam's Pronto – an application for port call optimisation. It has already started bringing the planned economic benefits by reducing the average port waiting time for ships by 20%.

Even if economic requirements are met, ports will have to face technological challenges. One thing is ensuring the unified standards and definitions so that a neutral digital platform can be used by many players. Here, the International Taskforce Port Call Optimisation brings together standards from the nautical sector. The organization is represented by such bodies as shipping lines, oil tanker owners, terminal operators and ports, and co-operates with the International Harbour Masters Association, the United Kingdom Hydrographic Office, and GS1.

Another challenge lies in ensuring that the technology used is safe. In an interconnected digital platform, any lack of proper security measures on the part of a single organisation can jeopardise the whole pack. Cybersecurity requires companies to



invest financially, technologically, and culturally, and needs to be prioritised as the connectivity of assets – the Internet of Things – grows.

Even if the data is safe, its accessibility and reliability remain a concern. On a digital platform, data must be available all the time. Even temporary interruptions in data flows may have a major impact for all of the platform's members, so ports need to invest in reliable business continuity protection.

Accessible and reliable data should be available but only to the intended recipients. The aspect of privacy is even more important now, after the introduction of the General Data Protection Regulation across the EU in May 2018. In the maritime industry, these rules are applicable to the automatic identification system (AIS) signal from inland vessels, among others. Because many such vessels are private, the use of AIS data to facilitate cargo handling or to collect port dues automatically should be used only with the consent of the vessel owners.

This shows that there is a need for rules on data ownership, and access

and user rights to be laid down. Terminals and vessels carry confidential and commercially sensitive data, which should be limited only to the authorised parties. Another example is the information on completion times of terminal operations, which in some cases is commercially sensitive, too. In such digital databases as the Port of Rotterdam's systems PortInsider and PortBase, security is prioritised by requiring identification, authentication, and authorization from its users. Sure, it requires going through a few more security steps, but that's still nothing compared to the time and effort saved thanks to the digital solutions made possible by PortInsider and PortBase.

#### The best time

When the tools are available, the funds are there, and the process is secure, it is time to display the skills necessary to make the digital future happen. Ports will need employees with strong data capabilities, who have IT background and are capable of handling smart digital applications. Analytical skills will also come in handy to work on historical data as well as create new/alternative models and forecasts.

Before any set of data is transformed into action, it goes through a cycle. First,

the data are collected from the port community before being combined with other available data to create a context. Only then can the collected data be properly analysed and translated so that the consumer can start taking action. Such actions can bring about tangible effects, just like the one-off potential savings of €1.0m in Rotterdam, resulting from more efficient dredging based on combined operational and historical data (the solution has been transformed into the Optimised Dredging Application).

Before ports complete their conversion into data platforms with ongoing data use cycles, they need to lay solid foundations. To remain competitive and achieve greater efficiency, they have to start building the platform around talented employees, innovative ideas, and comprehensive troubleshooting.

There's no turning back from the digital revolution. The good news is that ports, be they big or small, can be leaders of change in the maritime industry, not victims of the inevitable. So, the modern version of the well-known Chinese saying would go like this, "The best time to go digital was 20 years ago, the second-best time is now." ■

# #CHALLENGE YOUR TOS

## Add-on Optimization for your existing TOS

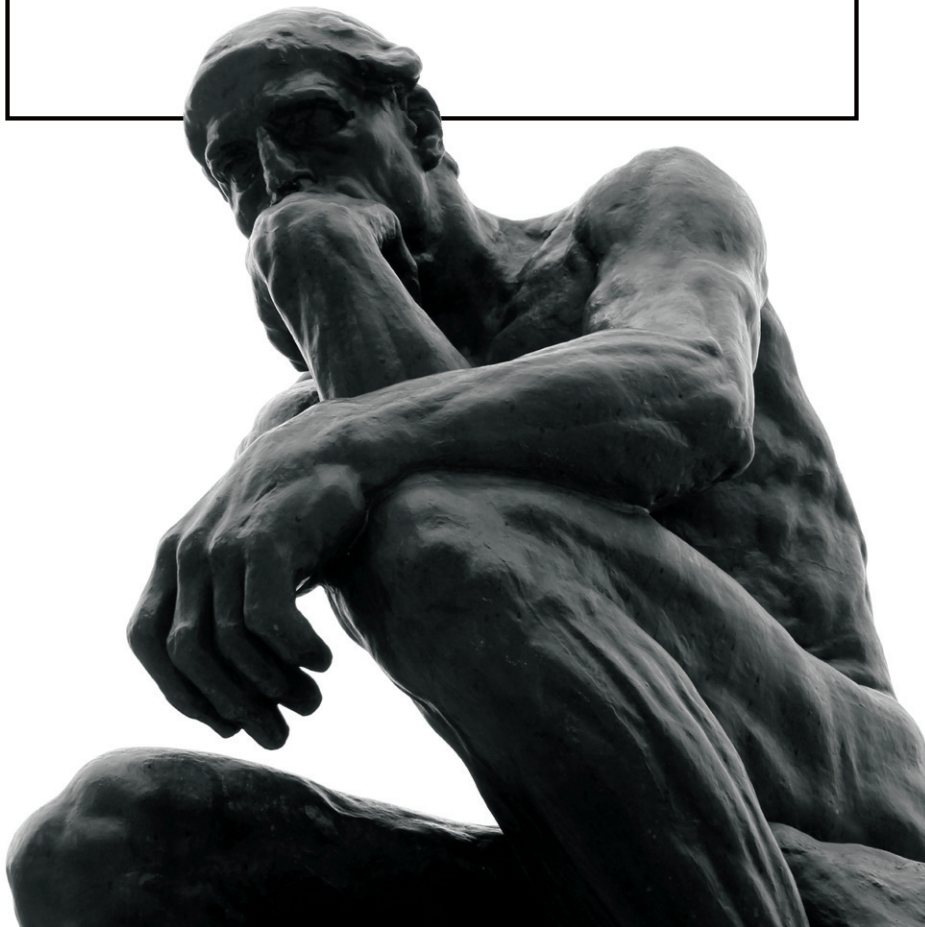
[www.inform-software.com/challengeyourtos](http://www.inform-software.com/challengeyourtos)

Thanks for  
visiting us  
at TOC

 **INFORM**

bimonthly-daily companion  
**Baltic Transport**  
**Journal**

*Thinking of  
transport & logistics?*



Scan the QR code  
to download a FREE issue

**Go to**  
**Baltic Transport Journal for your food for thought**

**[www.baltictransportjournal.com](http://www.baltictransportjournal.com)**



# Revolution by evolution

by Filip Koscielecki, *Claims Executive, UK P&I Club*

**Autonomous shipping is looking ever more likely to be the future of the maritime industry. The use of robots in shipping is nevertheless not new. Robotics technology has been in use in underwater and surface settings for some time (autopilots and the Electronic Chart Display and Information System) but the rapidly advancing technology towards crewless and remotely controlled vessels has fast-forwarded the need to consider its regulatory framework. The legal perspective concern is only natural bearing in mind that the autonomous shipping market, estimated in 2018 to be worth \$6.1b, is now projected by some to reach a staggering \$136b by 2030.**

**T**he benefits of autonomous shipping are many, not least the reduction or elimination of human errors and crew claims where the vessel is wholly unmanned or only sails with a skeleton crew, and from the additional space freed up for cargo. The exciting development of a “smart ship” will revolutionise the landscape of ship design and operations, but this revolution will come with many challenges. This briefing presents an introduction to the subject of autonomous shipping, discusses a number of the legal issues arising from this new technology, and highlights the international conventions and regulations which will need to be adapted to accommodate this new technology.

## Definitions

There is currently no international definition of what an autonomous or unmanned ship is, what the various levels of autonomy are and whether an autonomous ship is a ship under international law. When definitions are in use in various conventions, they tend to be very broad and customs-made to cover the subject matter to be regulated.

Attempting to build a unified legal and regulatory framework is extremely difficult

if there are no preliminary agreements on the basic definitions. A proposal on a list of recommended terms was submitted to the International Maritime Organization’s (IMO) Maritime Safety Committee (MSC) 101. For example, the “autonomous ship” is defined as, “the operating system of the ship able to make decisions and determine actions by itself. It performs functions related to operation and navigation independently and self-sufficiently. Terms to be reserved to ships complying with degree 4 of automation,” and a “smart ship” defined as a “ship equipped with automation systems capable, to varying degrees, of making decisions and performing actions with or without human interaction.”

MSC 99 had established the following four degrees of autonomy for the purpose of the Committee’s scoping exercise. Degree 1 – ship with automated processes and decision support: seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated and at times be unsupervised but with seafarers on board ready to take control. Degree 2 – remotely controlled ship with seafarers on board: the ship is controlled and operated from another location. Seafarers are available on board to take control and



to operate the shipboard systems and functions. Degree 3 – remotely controlled ship without seafarers on board: the ship is controlled and operated from another location. There are no seafarers on board. Degree 4 – fully autonomous ship: the operating system of the ship is able to make decisions and determine actions by itself.

The European Commission splits this emerging industry into three parts, namely “Remote Ship,” “Automated Ship” and “Autonomous Ship,” while Lloyd’s Register has developed a classification of six levels of autonomy, AL 1 to AL 6. In this legal briefing, we will be referring to MSC 99’s degrees of autonomy but it is clear that the existence of all these different classification systems will make it very difficult to transpose/convert regulations uniformly once these bodies have developed their own regulations.

International regulations do not contain any direct requirements for a ship to be manned in order for it to be considered “a ship.” The precondition is rather one of functionality, i.e., what the ship needs to achieve and its ability to move on, and through, water. So, it seems that autonomous shipping has not been specifically excluded by the conventions – at the definitions level at least.

The position under national laws, however, is more complicated. Under English Law, the Merchant Shipping Act 1995, section 313(1), states that “‘ship’ includes every description of vessel used in navigation.” While there is no legal authority for the definition of an autonomous ship, it is expected that an autonomous ship would be a ship under English law. On the other hand, in France, the Code Des Transports 2010 explicitly defines the term “Ship” as “Except as indicated to the contrary, for the purposes of the present Code, ships are: Any floating

craft, built and manned for maritime merchant navigation, or for fishing, or for yachting and dedicated to it.” It seems therefore that for any craft in France to be a ship, it must be manned. Crucially, under French law, the owners of ships are strictly liable for any damage caused by them.

As a ship is subject to the law of her flag state (based on her nationality) and the law of the coastal or port state (linked to her physical location), the absence of an internationally accepted definition for an autonomous ship could potentially have the consequence of an autonomous ship being considered a ship under the law of her flag state but not under the law of the coastal or port state. A ban on autonomous ships by the coastal or port states will have a negative impact on the growth of autonomous shipping.

#### **Absence of crew**

The United Nations Convention on the Law of the Sea provides that all ships must be “in the charge of a master and officers who possess appropriate qualifications.” The International Convention for the Safety of Life at Sea, the International Convention for the Prevention of Pollution from Ships, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, the Paris MoU, as well as the EU directive 16/2009 on Port State Control all presume that the master will be present on board.

Ships operated remotely, regardless of whether they are manned or not, could possibly meet the requirement for a master if the remote controller has the requisite qualifications, albeit that the type of qualifications would be different to that held by the traditional master. As the remote operators will assume a key role in a ship’s navigation and

management, they would be expected to shoulder a degree of independent liability. It remains to be seen whether such liability could also be attached to a remote operator, which is a corporate legal entity, as well as to private individuals, like masters of today.

There is also uncertainty surrounding the master’s obligation to render assistance to persons in distress at sea. It could be more challenging for a ship with a degree 3 or 4 of autonomy to render aid and to rescue people and salvage ships and goods. However, what exactly is the nature of the of master’s obligation? Is it to have sufficient manning numbers or is it to have capabilities to provide rescue and salvage services at sea? As seafarers tend to rely on equipment on board to provide rescue and salvage, rather than jump into the water, it may be argued that autonomous ships fitted with equipment enabling it to identify distress, send alerts so that search and rescue can be met by services from shore, deploy adequate practical assistance, life rafts, emergency rations and other emergency equipment, are capable of satisfying the master’s obligation to render assistance.

There are also requirements for the master, as the shipowners’ representative to issue documentation, and for documents to be physically kept on board. These challenges may be overcome if flag states amend their regulations to make digitally issued documents acceptable, and if Port State Controls remove their requirements for certain documents to be kept on board.

The regulatory issues surrounding the absence of crew on board the ship are bound to be one of the most challenging to overcome.

### Navigation rules

It is expected that all ships will be capable of executing manoeuvres and steering in accordance with the basic rules of navigation as prescribed by the so called “Rules of the Road” – The International Regulations for Avoiding Collisions at Sea 1972 (COLREGS; overtaking, crossing situation, head-on course, speed, etc.).

However, it will be more problematic for autonomous ships, particularly a degree 4 ship, to meet some of the more open and subjective concepts required by these rules for avoiding collisions. For example, Rule 2 provides that nothing in the rules will exonerate any ship, owner, master or crew from the consequences of any neglect to comply with the rules or of the neglect of any precaution, which may be required by “the ordinary practice of seamen.” The same rule goes on to state that an analysis of the situation may require departure from the rules to avoid immediate danger. Rule 8 insist that avoidance actions must have a “due regard to the observance of good seamanship.” COLREGS also require that a proper lookout is maintained by sight and hearing (Rule 8).

Will software ever be able to understand the meaning of “the ordinary practice of seamen” or have regard to “good seamanship” when making a decision? Some additional thought will have to be given on how best to address these requirements.

### Seaworthiness and error in navigation

Section 39 of the Marine Insurance Act 1906 as amended contains an implied warranty that the vessel is “reasonably seaworthy in all respects.” This warranty applies to voyage policies of marine insurance at the commencement of the voyage (this warranty is an absolute warranty but it is for the insurer to prove that a breach of the warranty has occurred. While insurers could previously escape liability completely once such a breach has been proven, section 10 of the Marine Insurance Act 2015 now merely suspends the insurer’s liability from the

time of the breach until the breach is remedied, if the same can be remedied).

The Hague Visby Rules require that a ship is seaworthy at the beginning of the voyage, and the carrier is to properly and carefully load, handle, stow, carry, keep, care for, and discharge the goods carried. To be seaworthy, the ship must be properly manned, be able to sail on the sea, and be able to face the perils of the sea and other incidental risks to which she may be exposed in the course of a voyage.

If it is the competence of the crew rather than the number of crew that determines the seaworthiness of a ship (as per the 1962 Hong Kong Fir Shipping Co vs Kawasaki Kisen Kaisha case), then a degree 3 or 4 ship may be deemed seaworthy if her land-based remote operators can navigate the ship safely. In time, it is not wholly unforeseeable that the “human” element of an autonomous ship’s seaworthiness, as it is gradually replaced by Artificial Intelligence

(AI), might eventually cross over to the ship’s technical ability area and end up being regulated by Class/flag.

The error in navigation defence would not be available if the master is incompetent but may be available if he is merely negligent. The question that arises then is whether any autonomous software navigating the ship (digital master) can be competent (seaworthy) but nevertheless make an error? The software itself possibly cannot but perhaps the solution providers in developing the software and/or the shipowner in choosing the software could? This question requires additional consideration.

### Cyber risks

Autonomous ships are highly dependent on computers and other robotic equipment, which could exacerbate the consequences of a cyber attack. If there is no crew on board, there will be no possibility of physically overriding remote or

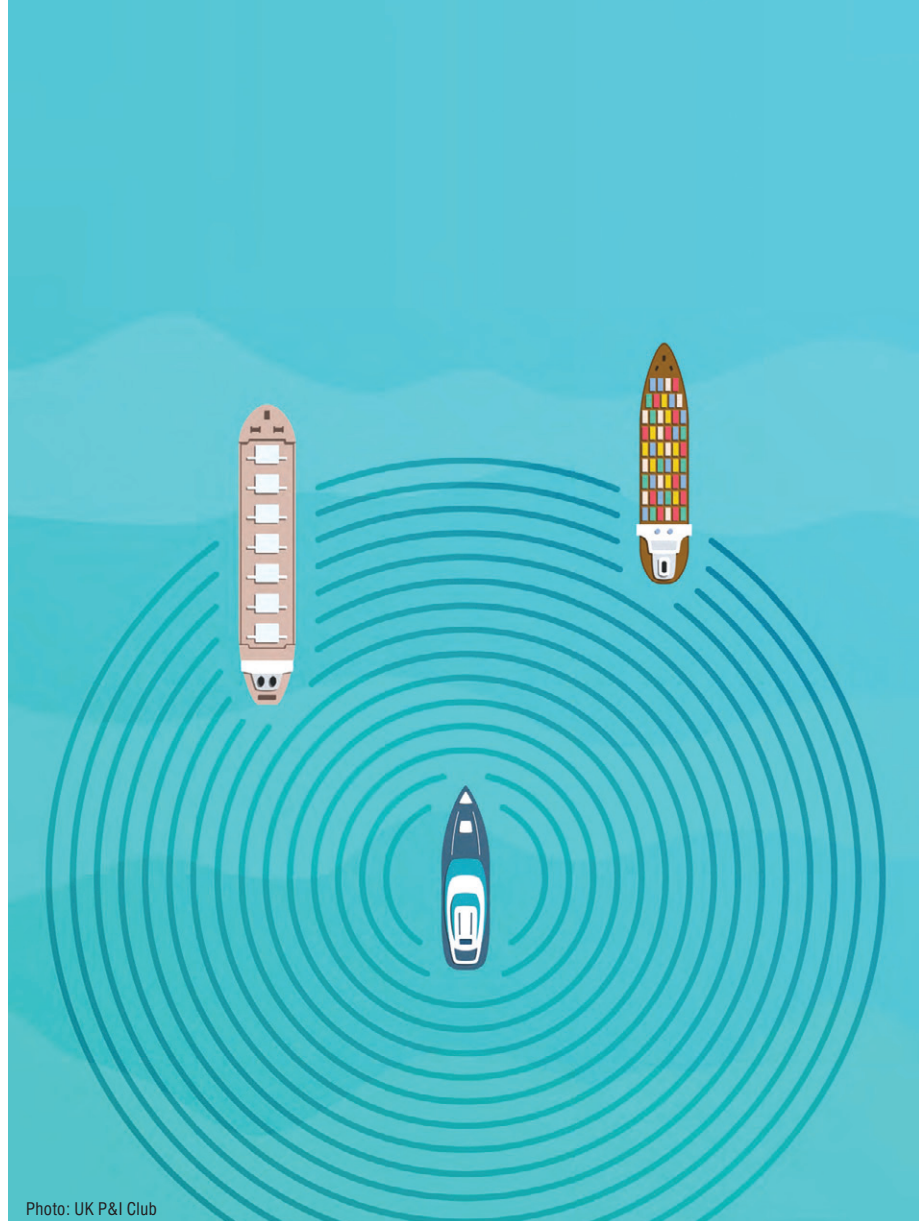


Photo: UK P&I Club

autonomous control. Cyber attacks and the consequential disruption to business, loss of confidential information, damage to reputation, not to mention ransom demands, are important concerns for supporters of autonomous shipping.

The majority of cyber attacks are, however, a consequence of poor “cyber hygiene” such as not using good firewalls and robust antivirus protection, not updating software, poor password policies, failure to identify phishing or social engineering attacks, providing back door entry for hackers. It is important that best practices for cyber resilience are adopted (e.g., BIMCO’s *Guidelines on Cyber Security Onboard Ships* for guidance on how mitigate the potential safety, environmental and commercial consequences of a cyber incident). It may be that “Cyber Safety Regulation” could be fully developed and become part of Flag and Class requirements for autonomous ships. This notion may be considered by the International Association of Classification Societies through their *12 IACS Recommendations On Cyber Safety Mark Step Change in Delivery of Cyber Resilient Ship*.

The Institute Cyber Attack Exclusion Clause, CL.38011, is a wide blanket exclusion clause incorporated into many marine insurance contracts. This clause, which the market is currently reviewing, can impact negatively on the progress of the autonomous shipping industry.

Insofar as P&I cover is concerned, liabilities set out in Rule 2 of the UK P&I Club’s Rules and the International Group Pooling Agreement are not generally subject to any exclusion for cyber risks. Some maritime cyber risks simply do not come within the scope of P&I cover because they do not arise from the operation of a ship (an example is where a shipping company is held to ransom for the restoration of its IT data following a cyber attack).

If a cyber attack on a ship is the result of commercial sabotage or a malicious act by an individual with a grudge against the shipowner, the shipowner’s normal P&I cover will continue to respond (subject to the rest of the rules and the specific terms of cover including any applicable deductible). It is only if the cyber attack, based on the motive of the attacker, can be said to constitute an “act of terrorism,” when warlike circumstances or a hostile act by a belligerent power exists, will a claim flowing from the cyber attack be excluded from the UK Club’s standard P&I cover under Rule 5E: Exclusion of War Risks.

## Liability and its limitation

Generally, civil liability in shipping is regulated nationally, and it can be said that most jurisdictions require a fault-based standard. For ships with a degree 3 or 4 autonomy, the challenge would be to try and determine human fault when ships are navigated without any real-time human intervention, relying only on pre-programmed algorithms operated by AI or by remote operators. The only place(s) where human fault could be assessed would be in connection with a failure of remote operators to monitor or take intervening action or of the shipowner to keep necessary software up to date, maintain the same or possibly in choosing the vendor of the software.

Shipowners can be vicariously liable for their crew’s, employees’ or third parties’ acts and omissions in the course of operating the ship in the interest of the shipowner. The question that arises then is whether the shipowner can be held vicariously liable for the acts and omissions of vendors providing the software technology, the remote operators using the technology or the system maintenance technician.

The status of these individuals and companies needs to be clarified so that the shipowner’s and these parties’ risks exposures can be better understood and adequately insured against. In the absence of clarification and explicit solutions to clarify the issue of liability, there is a real concern that the application of the current fault-based liability could be replaced with a strict liability standard for shipowners. This development would not be welcomed.

The issue of limitation of liability is also relevant in relation to autonomous shipping. Article 4 of the Convention on Limitation of Liability for Maritime Claims (LLMC) 1976 provides as follows, “A person liable shall not be entitled to limit his liability if it is proved that the loss resulted from his personal act or omission, committed with the intent to cause such loss, or recklessly and with knowledge that such loss would probably result.” In the context of an autonomous ship, questions would naturally arise as to who is to be considered “the person liable” and where the requisite intent or knowledge of probable consequences of a reckless act would lie. Would this be with the shipowner, the vendor of the software or the shore operator?

## Conclusion

The technological advancements, which will eventually bring to life the vision of fully autonomous shipping, are gaining momentum. However, the technology is subject to a vast regulatory framework which enables the shipping industry to provide a crucial service to the world’s economy in a safe manner. While supporters of autonomous shipping would like to bring forward the technology faster, a balance must be struck between the speed and the safety of doing so. For autonomous shipping to gain regulatory and societal acceptance, this technology must be at least as safe as traditional ships.

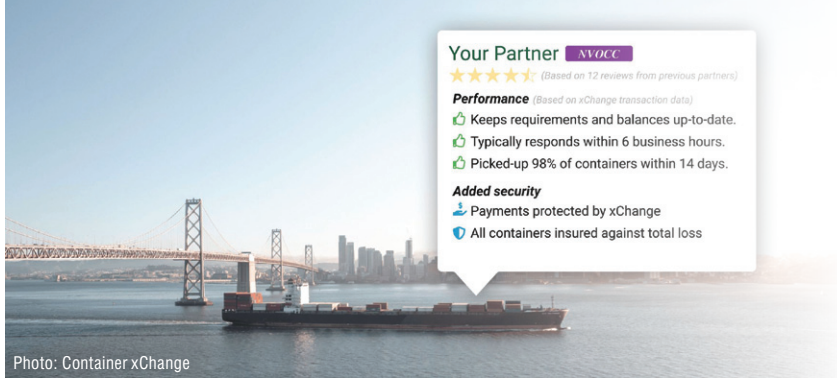
A successful approach to change would be to develop regulations in tandem with technological advancements, always maintaining the focus on the safety of people and property at sea, but this may not always be possible. There is also a risk that too much regulation can throttle innovation. Undoubtedly, however, the present framework will need to be adapted and evolved to accommodate autonomous shipping.

At MSC 100 in December 2018, a regulatory “scoping exercise” was carried out to assess how IMO instruments apply to ships with varying degrees of autonomy. An intersessional MSC working group is expected to meet again in September 2019 with the aim of completing the regulatory scoping exercise in 2020. ■



The UK P&I Club is a leading provider of protection and indemnity insurance and other services to the international shipping community. 2019 marks the Club’s 150th Anniversary. The UK P&I Club insures over 240 million tonnes of owned and chartered shipping through its international offices and claims network. ‘A (Stable)’ rated by Standard & Poor’s with free reserves capital of \$505m, the UK P&I Club is renowned for its specialist skills and expertise which ensure ‘best in class’ underwriting, claims handling and loss prevention services. The UK P&I Club is managed by Thomas Miller, an independent and international insurance, professional and investment services provider. For more details please visit [www.ukpandi.com](http://www.ukpandi.com)





# Deconstruction of the value chain

by Dr Johannes Schlingmeier, CEO, Container xChange

In the past, companies tried to optimize and unearth efficiency gains through value chain integration. The reason was that it is easier to communicate and optimize within a company than with external partners. Examples from container logistics include Maersk Line acquiring Damco as part of the P&O Nedlloyd acquisition, or Amazon's aim to consolidate the entire value chain from factory to last-mile delivery.

In the literature, the explanations focus on lower transaction costs when communicating within an organization compared to the outside, and the risk of “holdups” being more manageable with the ability to observe the entire value chain compared to just a small fraction. In fact, one could argue that these factors and risks are the only reason why we have companies at all, a way for humans to work together and communicate efficiently. In a sense, a company is just a collection of specialists who work together on a “platform” called a company.

## Power to the platforms!

Today, technology and digital platforms reduce transaction costs and remove risks. This makes the traditional “company borders” obsolete. We see that in the so-called “gig” economy. Here, specialists, from highly paid professionals such as lawyers and consultants to poorly paid, uneducated “hands,” chose not to get a job in a company; instead, they offer their workforce on platforms like Uber, Fiverr, and even Deliveroo. Interestingly, this does not quite fit into the B2B vs B2C vs C2C logic of the past. Rather, we're dealing with a P2B/C model: as a company/consumer, I only have to join a platform to get access to a wide range of services without further needing to search, compare, or contract.

As such, mergers & acquisitions are likely to lose their status of the only logical way to increase efficiency along the value chain and to achieve economies of scale. Instead, platforms and digital technologies allow companies (no matter how small or specialised) to work together across company borders. On successful platforms, this is not only powered by efficient online processes, but it is supported by platform activities that increase trust such as peer reviews, performance information, always-on troubleshooting, or payment handling (the last one, again, through impartial blockchain-enabled platforms). Examples include a “simulated large, consolidated company” which operates equipment in an efficient, market-driven pool or platforms focused on the optimisation of intermodal traffic thanks to improved communication between container carriers, freight forwarders, and truckers.

## Deconsolidation

Thinking about the future of the shipping industry, we'll witness further deconstruction taking place. Multiple “neutral” platforms will link together specialised actors along the value chain. This will be the reverse of what's currently the state of play, namely carriers pushing for vertical integration. The future

value chain will comprise many more parties, not only the all-mighty carriers but also niche lines, shipowners, vessel operators, equipment owners, slot marketer, port agents, technology suppliers, ports, terminals, truckers, depots, etc.

From an economic viewpoint (and when removing transaction costs/communication barriers and “holdup risks”) it makes only very little sense to have “vessel operation” and “equipment ownership” done by the same party. In the case of equipment, managing a pool allows to even out company-specific imbalances and, e.g., reduce empty container moves. Container leasing companies are a prime example of an area where this has already started to happen.

Why shouldn’t forwarders or shippers bring their own containers and only book the vessel slot? The so-called shipper-owned containers (SOC) increase flexibility and create a win-win for shippers and carriers: forwarders save demurrage charges, while carriers avoid time-consuming planning and can focus on what they’re good at, i.e., moving goods between continents and the sale of vessel slots. More and more shipping companies increase their SOC activities because online platforms provide them with access to global capacity and streamline processes of booking containers separately to the vessel slot.

Of course, this does not need to be fragmented down to the individual micro-service at all stages. There will be companies taking care of multiple “chains,” so to speak. Some clients will continue to prefer buying from a consolidated entity instead of plugging-and-playing services on a platform. In this instance, think of a

large shipper who wants to have a reliable long-term contract with stable rates and a single point of contact. That said, deconsolidation makes sense by and large, because in the wake of the digital revolution individual on-demand platform freelancing companies promise greater efficiency, be it cost- or performance-wise. The question is whether the trend will be potent enough to deconsolidate even the strongest of today’s transport & logistics integrators.

### Eco-systematisation

The “race to be the largest and most integrated actor” could be stopped. In the future of shipping that we’re painting, one will need to be super specialised and able to play multiple platforms, with no room left for “conglomerate cover-ups,” as every activity will have to be performed on par with, or better than, the best. Because markets will be so efficient, customers won’t be willing to pay for sub-optimal solutions anymore.

This will be a “battle for services” or to put it differently – who’ll have the upper hand when deciding on the shape of the future business eco-system. Just imagine parties like Amazon or Alibaba rekindling the shipping industry. Will we see more companies disinvesting what used to be their core activities, as when COSCO had let go of its shipbuilding arm? What to leave in the portfolio and what to drop or outsource has already become a major headache, not to mention the need to design, implement, and follow through new not only technical but also business plug-and-play architectures and practices (e.g., shorter duration contracts). Atop of that lies interoperability – being sure the value chain speaks the same language.

Zapier is a really good example in this regard, as the company is an online service that “connects” distinct services of other parties to provide additional user value. Easyjet is another illustration of “unbundling” an offer into micro-services; the platform allows to book virtually everything for holidays (incl. the vacation package itself) but gives the possibility to pick the individual items at the user’s pleasure.

Lastly, going full circle to the transportation business, we as Container xChange are also an example of how companies can work together on a neutral platform and share capabilities/assets. It is also possible to add further services from third parties to a transaction, such as container insurance or surveying, to further drive down transaction costs. It is not necessary anymore to take over your competitor to leverage a shared pool of containers. More than 300 companies use this chance to access the world market and to have eyes and ears across the entire globe. ■



The Hamburg-based company stands behind xChange, an online platform enabling container users to find third-party equipment for their freight and container owners to supply their equipment to save on empty repositioning costs. For more info as well as to book a free demo how the whole solution works, please check <https://container-xchange.com>

# When dragons and eagles go to war

by Andrzej Urbaś

**Some 40 years after China and the United States first kindled their diplomatic relationships, the relations have never been in a shakier condition. What are the next steps in the trade war between the world's two biggest superpowers that has become increasingly intense over the past 19 months? A recent report published by the Center for Strategic and International Studies (CSIS) may hold the answer.**

**T**he *Beyond the Brink: Escalation and Conflict in U.S.-China Economic Relations* study, prepared by a team of CSIS experts under the direction of Matthew P. Goodman, attempted to model the possible outcome of the conflict between the two countries. The findings suggest that the trade war may not end any time soon and will shape the relationship between China and the US for the foreseeable future. No end seems to be in sight until both players decide to change their perception of relative costs.

## A pinch of history

Carl Sagan, an American astronomer and cosmologist, once said that in order to understand the present we need to know the past. It may be helpful to take a short trip down the memory lane to get a better picture of what led to the conflict at hand and where we are as of this moment.

A handy timeline provided by Reuters traces the possible ignition point of the debacle to President Trump's plans to counter Chinese unfair trade practices, presented during a rally in Pennsylvania in June 2016. While this happened during the campaigning period, it suggested the turn US policy towards China might take should Trump win the election. And win he did.

Three months later, on 31 March 2017, the new president signed two executive orders, one of them ordering a review of US trade deficits and reasons behind them. What followed was the first meeting between Trump and the Chinese President Xi Jinping at the beginning of April the same year, which initiated the so-called 100-day plan for trade talks. However, it proved unsuccessful to produce any consensus as to how to reduce the US deficit with China. Fast forward to August 2017 to witness Trump issue his first direct trade action against Beijing. The US president ordered a probe into alleged Chinese intellectual property threat, activities he accused China of during his campaign back in 2016.

Skipping ahead to 8 March 2018, this date marks the beginning of a long list of back and forth tariff impositions between the two superpowers. Up until 6 July 2018, these tariffs weren't as big in scope as they are today. But on that day the hammer finally came down, and the US imposed tariffs of 25% on \$34b worth of Chinese imports, China didn't wait long to retaliate and responded with its own tariffs of comparable magnitude.

There is no need to further scrutinise each of the myriad of events that followed. What is important, however, is that according to the CSIS report, a year after the trade-war began in earnest, over three-quarters of the \$660b in trade between the two countries are subject to tariffs. It is no wonder that the fallout that might follow

this power struggle can affect not only the economies of China and the US but also other countries all over the world.

According to the report, the US entered the conflict without sufficient preparation. In order to support US policymakers in navigating the intricacies of the biggest trade war in recent history, the CSIS developed a model to try and predict in which direction it may escalate.

## A dash of theory

Based on game theory and tested in simulation sessions with a group of experts, the model relies on two underlying theories. First is the theory of bargaining. It illustrates how both sides of a given conflict decide to divide a set of goods between each other, applying leverage or straight out threats when necessary to gain an advantage. There is a cost to every action but should the gains exceed it, one of the parties might decide to engage in a conflict instead of choosing to bargain. This decision may be based on private intel about the strength of the adversary, miscalculation due to insufficient information thereof, or simply the fact that the goods at the heart of the feud are judged indivisible.

The other theory applied to the model developed by the CSIS is that of deterrence and compellence. It describes how the sides of a conflict compel each other to act or refuse to take action with threats or resource denial. It can be used



## Are China and the US on a one-way trip towards the point of no return?

to analyse how one of the players may raise the stakes high enough to force the other to submit. The report identifies three dimensions of escalation in case of an economic conflict, i.e., vertical escalation (affecting frequency of action or the number of targets); horizontal escalation (affecting the boundaries of the conflict); or types of targets and political escalation (affecting the rhetoric, objectives, demands, or rules of engagement).

Each country's willingness to take risks and the available pool of information are the two primary factors for the predictions produced by the model. Considering that the trade war between China and the US has continually escalated, it is obvious that both parties didn't go the bargaining route, instead deciding to pile pressure on the other side in hopes of gaining the upper hand.

### The economic war arsenal

The report also lists the actions countries involved in a trade war may take. Outbound economic actions are associated with the highest potential cost and are most likely to provoke retaliation. These may include international complaints, e.g., ones filled to the World Trade Organization (WTO), non-WTO-sanctioned tariffs, investment restrictions, de-listing of foreign companies on domestic stock exchanges, commercial espionage, and currency manipulation. Sounds familiar? These were the weapons of choice of our two fighters.

Two other types of actions identified in the report were coalition building and domestic interventions. The former makes use of economic partnerships to apply pressure on the opponent and rely on the support of third-party countries. The latter turns to domestic policy and development in order to strengthen the country internally and include fiscal support for sectors disrupted by the trade war or initiatives that lower or eliminate the reliance on trade with the opponent.

### Playing the game

As mentioned above, the model invented by the CSIS has been tested in two simulation runs in March and May 2019. In both cases, the teams representing China and the US failed to come to an agreement. The first one ended with China threatening to abandon final negotiations, while a partial understanding was reached during the second simulation, it still ended with both sides disagreeing on specific policy decisions. Each time the US took the aggressive stance, China took steps to strengthen domestic growth and to reduce dependence on the US economy.

Despite the rather unoptimistic outcome of the simulations, they still managed to provide insights into the nature of the conflict and possibly contribute to finding solutions further down the path. The team representing China was very susceptible to threats of export bans aimed at the country's technological sector. Broad-base tariffs proved less effective. 'Team China' was also keen on seeking partners. Considering Beijing's sizeable efforts to win over partners could mean that the US could gain an advantage by adopting a multilateral approach.

The simulations also showed that an enduring conflict of such magnitude would push the governments to get increasingly involved in the domestic economy. Governments might decide to stop certain companies from engaging in trade with the other side. They will also need to find ways to support growth in order to soften the consequences of the conflict's escalation. Should they fail, the adversary will see it as weakness and gain additional leverage. Speaking of escalation, the report also states that once a line is crossed, there might be no coming back. If a point of no

### RECENT TIMELINE OF THE US-CHINA TRADE WAR

6/7  
2018

US - 25% tariffs on \$34bn Chinese goods  
China - 25% tariffs on \$34bn U.S. goods

23/8  
2018

US - 25% tariffs on \$16bn Chinese goods  
China - 25% tariffs on \$16bn U.S. goods

24/9  
2018

US - 10% tariffs on \$200bn Chinese goods  
China - 10% tariffs on \$60bn U.S. goods

1/9  
2019

US - 10% tariffs on \$125bn Chinese goods take effect

20/9  
2019

USTR issues tariff exclusions on approx. 400 Chinese products

7/10  
2019

US Commerce Department puts 28 Chinese companies on its "entity list"

OVER 75% OF \$660B

IN TWO-WAY TRADE  
IS SUBJECT TO  
TARIFFS

**Fig. 1. Course of the second simulation illustrating various de- and escalation possibilities in the US-China trade war**



return is reached, economic decoupling might become a reality; even if a deal is struck in the end, the resulting lack of trust and credibility on both sides will mar public and private sector decisions for years to come.

A number of recommendations presented in the report include establishing "dual credibility" by the US.

It seems crucial for Washington to be able to convince Beijing that it is willing to go through with threats and weather the strain on its own economy, while at the same time honouring its commitments in case both parties manage to reach an understanding. The US also should not shy away from stakeholder and expert input, thus enhancing the decision-making process.

Transparency in dialogue with industry and consumer groups could also prove valuable. A better understanding of the benefits and costs of trade between the US and China is perhaps of the greatest importance. It would allow the US to set clear objectives for the negotiations, which is considered by the report as the first step to success when bargaining with a foreign power.

**Tab.1. GDP growth in selected regions and countries since the start of the trade war**

	2017	2018	2019	2020
<b>Asia and Pacific</b>	+5.7%	+5.3%	+4.8%	+4.9%
China	+6.8%	+6.6%	+6.1%	+5.8%
<b>North America</b>	+2.4%	+2.7%	+2.1%	+2%
United States	+2.4%	+2.9%	+2.4%	+2.1%
<b>South America</b>	+0.6%	+0.4%	-0.2%	+1.8%
<b>Europe</b>	+2.6%	+2.2%	+1.5%	+1.7%
Western Europe	+2.4%	+1.9%	+1.2%	+1.4%
Eastern Europe	+3%	+3.2%	+2.3%	+2.4%
<b>Africa</b>	+3.6%	+3.4%	+3.2%	+3.8%

Source: International Monetary Fund

## Ripples of war

The economic conflict between China and the US does not affect just the two adversaries. According to the International Monetary Fund (IMF) estimates, global growth in October slowed down to 3%. It is the first time in ten years the breaks have been hit that hard. What you may not know is that despite its clash with China, the US is not the biggest loser, far from it. According to data provided by Reuters, the country is the least affected by export drops. One of the reasons is its huge domestic consumer spending base.

Europe, on the other hand, is largely reliant on exports. Around 40% of Germany's GDP in 2018 was linked to exports. Europe's leading economy had to throttle down its growth forecasts from 1.5% to only 0.5%. This will affect companies' willingness to invest and may be still felt years from now. It is a factor that cannot be measured and therefore highly problematic, according to Olaf Scholz, Germany's Finance Minister. Naturally, the trade war at hand isn't the only reason for Europe's economy taking a hit (Brexit is there as well, but this is a topic for our December issue). It's not just the big players who are struggling because of the trade slugfest between the two superpowers. We can read in a Reuters article that Iceland's economy-linchpin, tourism, took a big hit since the war began. Foreign arrivals are down 15.6% in comparison to last year's summer season.

While the trade dispute wasn't as hard on the US, it doesn't mean the country hasn't felt the consequences at all. Farmers in the US were the most affected group due to China slapping tariffs on its opponent's agricultural products. According to Bloomberg, China's purchases of American soybeans exceeded \$12b in 2017. These hit a radical stop in 2018. A ray of hope appeared

when China bought, as a gesture of goodwill, around 600kt of soybeans in September 2019. But that was a drop in the ocean, amounting to merely 10% of its former purchases. This forced the US to approve nearly \$20b in direct government aid, not including further \$10b in federally subsidised crop insurance payments. But it doesn't seem to be enough. As one of the farmers told Bloomberg, "[...] it's not a solution, it's a Band-Aid."

## So what about shipping and logistics?

An article by Forbes outlined four ways the trade war may influence shipping and logistics in the coming months. Diversification of import sources is one of them. In times when importing goods from one single source becomes a risky undertaking, we can observe importers switching production from China to other countries as well as sourcing from multiple locations. This will be reflected in smaller orders and an increase in the number of shipments, possibly benefiting the feeder market. The growing amount of smaller orders comes with increased complexity of the sourcing map. In order to simplify the logistics chains, logistics companies may be more eager to consolidate. They might decide to lower the risk by taking storage, ground transport, and shipping or cartage upon themselves instead of relying on a broad net of partners. Foreign trade zones will become increasingly more important, too, with companies trying to avoid the plethora of tariffs thrown at each other by China and the US; those enjoying zone status might profit here. Last but not least, there is the possibility of growth in the domestic transport sector, as companies may decide to source goods from local suppliers.

## Not all is lost?

As I am penning this article, China and the US find themselves in the

middle of another round of trade talks. The Dragon is putting pressure on President Trump to loosen the belt on a greater amount of tariffs imposed on \$112b of Chinese goods earlier this year. According to the Financial Times, the Eagle is considering the move. This would be a big step towards easing the tension, but one that is not going to happen without China returning the favour in one way or another.

The article mentions assurances on increased protection of American intellectual property and purchases of US agricultural goods, and possibly even for a signing ceremony of the agreement to be held on US soil. The fact is that both sides of the conflict have proved exceedingly stubborn since the beginning of the trade war and have a lot to lose. President Trump can't afford to look weak, not with the upcoming presidential election. And while it seems like easing up on the tariffs would be a much bigger concession in comparison to America's own demands, it is also hard to expect any far-reaching commitments to be promised by China when it comes to intellectual property.

Going back to the beginning of the article, it might be important to remember what is at stake. The point of no return hasn't been crossed. Not yet. But should it happen, the fallout could be felt decades from now. It is time for both players to once again consider the costs associated with further chest-puffing and escalation and ask themselves whether it's all really worth it. If a deal isn't reached, in the end, as Kristalina Georgieva, Managing Director, IMF, said after her organisation met with the World Bank in October, "Everybody loses." ■



# In/out of the running

by Bartosz Dąbrowski

**“You are only as good as your last game.” You may be talented and successful, but you need to be able to prove your worth – again and again – when tied against competitors. This sports rule turns out to be more universal and applies to the realm of business. Here, companies have to constantly compete against peers in their sector and increasingly – also beyond. To remain a highly competitive business will be quite a challenge in the 2020s, as the very nature of how firms compete with each other is changing, the authors from the Boston Consulting Group’s Henderson Institute argue in their *The New Logic of Competition* paper, part of the *Winning the ‘20s* series.**

**T**he traditional model of competition is largely outdated nowadays. Many of today’s executives were educated and started their careers in times when industries were well-defined, with peer companies selling similar sets of products, often in the bricks-and-mortar fashion. The modern logic of competition, in contrast, no longer involves stable offerings and familiar, easy-to-spot competitors; instead, it’s a dynamic game played across many dimensions. Boundaries are blurring, as technology completely changes the rules, causing industries to collide. At the same time, product and company lifespans are shrinking. And it all happens in times of economic, political, and competitive uncertainty.

## Learning how to learn

First of all, leaders of successful businesses need to be aware of the importance of organizational learning (read more about the necessity of lifelong education in BTJ 2/19’s *Default to change. What will companies need to embrace to be successful in the 2020s*). It will no longer be enough to possess the static knowledge of how to make a product or execute a process. Companies will

be able to reduce costs and get key contracts by growing their experience. Learning how to do new things will be one piece of the puzzle, but the capacity to “learn how to learn” will probably be even more crucial. This includes the implementation of new technologies, such as Artificial Intelligence (AI), Internet of Things-connected sensors, and digital platforms, which are all already becoming a necessity. Businesses focused on discovery and adaptation are positioned to learn faster, thus create better offerings and have more data for learning purposes. An example here could be Netflix with its algorithms taking behavioural data from users and then providing personalized offers to keep more users on the platform.

## Blurred lines

Another thing that technology is changing in the nature of competition is the way how companies and industries are divided. Shapeable ecosystems are taking the place of rigid boundaries. These non-traditional networks challenge conventional business assumptions, like in the case of Uber, which relies more on freelancers than direct employees. Within ecosystems,

companies can also be partners and competitors at the same time, as in the example of Amazon-the-seller and third-party vendors trading their goods at Amazon-the-marketplace.

Managing all the functions of an ecosystem is a tough job, but it can bring a lot of benefits. Many large corporations have already mastered this competence. For instance, China's giant Alibaba runs many businesses indirectly by building platforms that connect manufacturers, suppliers, logistics providers, and other partners. This allows the company to cut down on the logistics and personnel costs, and better adapt to customers' needs. However, Alibaba's central position is just one of the successful options. Not all companies can be orchestrators, but within an ecosystem, all members can and should create value, according to customized strategies.

### Creating hybrids

The operations of the successful companies mentioned before are predominantly digital. But as it constantly becomes more difficult to stand out in the largely penetrated digital market, another chance to make a dent in the 2020s competition race lies in combining the physical and digital worlds. The easiest way is to digitize the physical world with AI and the Internet of Things (IoT). Even digital giants, like Amazon and Google, have recently entered the 'hybrid' competition by investing in retail and automotive industries. Meanwhile, companies that base their operations on long-lived and specialized assets avidly pursue digitization. The port cargo handling equipment manufacturer Liebherr is one example, as the company has added connected sensors to some of its product lines thanks to which it can offer additional services, e.g. advice on the optimal use of the machines.

At some point, younger digital natives and traditional physical players are

bound to clash. However, in the coming decade, the parties may compete on equal terms. Technology companies may not feel safe as leaders anymore, as they are about to face such issues as user trust, data privacy, and regulation. Businesses basing on material assets and services can benefit from their ability to better leverage existing relationships and expertise in the physical world. To win the physical-digital battle, companies will also need to look at the basics. The hybrid competition will require building strong relationships both with customers and suppliers, as well as properly managing data and algorithms to preserve users' trust.

### Room for the human factor

Competition is, however, not only about organizing and improving things. Companies that plan to succeed in the next decade will need to put a lot of effort into generating new ideas for their businesses. This proves to be more difficult if a company is large and mature. For such companies, inspiration and imagination may be the crucial drivers in successfully developing their businesses. It is not enough to, e.g., implement digitalization as a means to boost what used to be a task carried out by people (whether analogue or digital). The human factor enables a company to stay focused on anomalies, accidents, and analogies, rather than averages. What's more, businesses can benefit from competition within organizations, especially when employees are free to present their ideas and make imaginative proposals in a hierarchy-free environment.

Even though planning and introducing new projects should help any business to grow, they may be severely hampered by economic or political uncertainties. If we add the ecological and demographic threats and that societies are questioning the ethics of technological advance and what it may mean for the future of their

present work, the future does not necessarily come in rainbows and sunshine only. Forecasts and plans won't always be reliable in the next decade, and leaders will need to develop tactics to tackle any unanticipated shocks. Resilience will be one of the most desirable assets, as even large and stable companies will need to be capable of quickly adjusting to new circumstances. Leaders will have to be ready to act on multiple scenarios and be proactive in addressing any global issues to maintain social trust.

### Past master of the 20s

Luckily, most businesses won't have to gain knowledge of all the new features of modern competition from scratch. The new aspects of competition often take the form of interconnected 'vessels.' Companies that function in ecosystems will have an advantage in competing on learning by using easily accessible real-time data and digital platforms. Machine learning and AI give humans more time to concentrate on imagination and new ideas. And many of these concepts will focus on integrating physical and digital assets into hybrid ecosystems, as there's still a lot of room for innovation and improvement. Finally, all the changes will bring more unpredictability, thus forcing companies to build resilience strategies.

This, however, doesn't mean that companies will transform almost automatically. The real challenge standing in front of those who want to master the art of doing business in the 20s will be to focus on creating the organization of the future – balancing the proportions between the digital and physical, humans and machines, and learning and inventing. ■



Photo: Matthew T. Rader

# Shifting logistics bananas

by Lisa Graham, EMEA Head of Logistics & Industrial Research & Insight, Cushman & Wakefield

**The European Commission forecasts that demand for freight transport in Continental Europe will almost triple (182%) between 2010 and 2050. Higher operating costs associated with negative environmental impacts generated by freight traffic, of which most come from road operations (estimated to increase by 40% in 2030 and 80% in 2050), are putting pressure on companies to adapt their transport modes, supply chains, and fuel sources. Meanwhile, labour pools are shrinking, and road congestion is intensifying on the continent's motorways. According to a recent Inrix study, Europe's top ten traffic hotspots could tot up to over €205 billion of economic costs by 2025.**

According to the European Commission's 2016 EU Reference Scenario Model, the EU-28 (incl. the UK) is now facing a 22% rise in freight activity over the next decade, fuelled by growing eCommerce that increases the amount of finished goods in trailers and containers. Relying principally on road transport, which has accounted for three-quarters of total goods movement in the EU since 2011, is no longer feasible if we're really serious about curbing exacerbating road congestion.

## Alternatives

At the same time, increasingly sophisticated government-sponsored tracking and measurement systems will become the norm across Europe. Such systems will oblige companies to disclose all types of emissions they produce, such as CO<sub>2</sub>, nitrogen oxide, and noise. Consequently, this data can be used by city authorities to adjust congestion charges and other tolls that are already in place. New costs associated with negative environmental impacts will be allocated to infrastructure users and

therefore will need to be factored into the overall transport cost breakdown.

Tightening regulations that prohibit or increase the cost of traditional freight transport by lorry and van will see EU-, state-, and city-level programmes encouraging the use of other transport modes and green-powered vehicles through direct funding, subsidies, and/or tax deferrals or credits. However, while electric and hybrid vehicles are starting to replace diesel-powered heavy-duty vehicles, the speed of the shift is slow for several reasons, including the still relatively high cost of batteries, as well as the delay in establishing a charging infrastructure with sufficient capacity to power trucks, in addition to legal responsibility impediments.

## Labour shortages and attracting new talent

Labour is a critical component of any logistics or manufacturing supply chain. Notwithstanding the efficiencies achieved through automation, sorting and picking activities remain very labour intensive, particularly in eFulfillment centres. The post-baby boom's decline in birth rates across Europe has made it especially difficult for the logistics and manufacturing sectors to

replace retiring workers. Recent Eurostat data show that the share of employees nearing retirement age (i.e. 50-64) in the road transport sector is higher than the average share for other industry sectors.

Technology and automation have the potential to fill in the gaps by significantly reducing reliance on the low-to-mid-skilled workforce. However, simultaneously, innovation is creating the need to hire high-skilled workers who can manage complex equipment and IT processes. To source such talents, manufacturing and logistics sectors must compete with other industries that can offer employees more attractive amenities including finished office space, among other things.

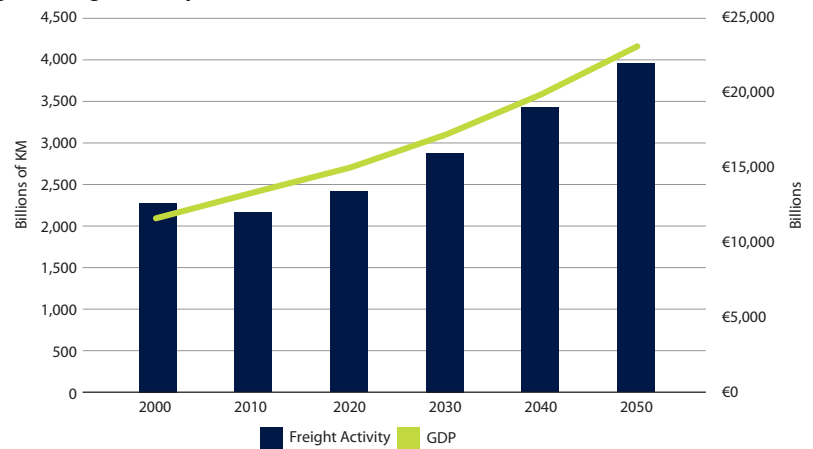
Technological adoption has been slower within the logistics industry, which must contend with complex, multi-link B2B and B2C supply chains while navigating EU regulations and legal impediments. Today, however, the share of all warehouses equipped with full robotic and automated technology remains small – roughly 10% on average across Europe.

## Is combined transport feasible?

Since over 70% of road transport engaged in last-mile delivery cannot be

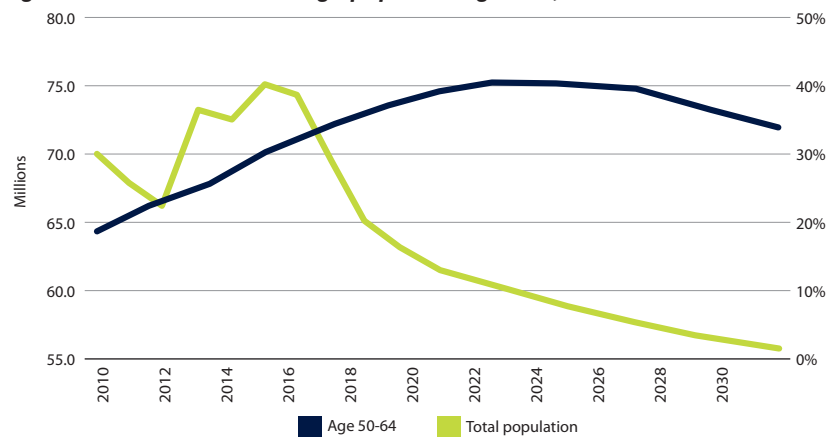


**Fig. 1. Freight transport demand forecasts – 2000 to 2050**



Source: European Commission's EUTRIM; Cushman & Wakefield

**Fig. 2. Total and retirement age population growth, 2010-2030**



Source: Oxford Economics; Eurostat

replaced by another transport mode, several ongoing initiatives focused on new types/uses of infrastructure and long-distance haulage vehicles/vessels aim to improve the cost, speed, availability, and overall efficiency of alternatives to road transport. These include standardising freight modules, which could be more easily grouped or separated across different transport modes; doubling the permissible length a cargo train can have on Europe's railroads (up to 1,500 m); establishing new rail services that directly link Far East Asian economies with major transport and logistics hubs located in the European hinterland; or looking at freight flows from a broader perspective, paying more attention to the efficiency of entire multinational transport corridors (like in the EU TEN-T policy) rather than particular nodes.

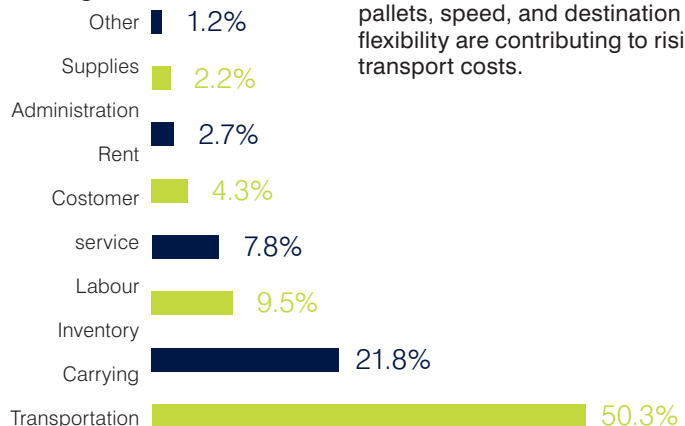
## The shape of future logistics bananas

Over the next decade, a total of eight primary logistics banana corridors are likely to emerge. Some of these have already taken shape, while the timing for others to be fully operational depends on the availability and reliability of both

**Fig. 1. Using technology to reduce transportation costs**

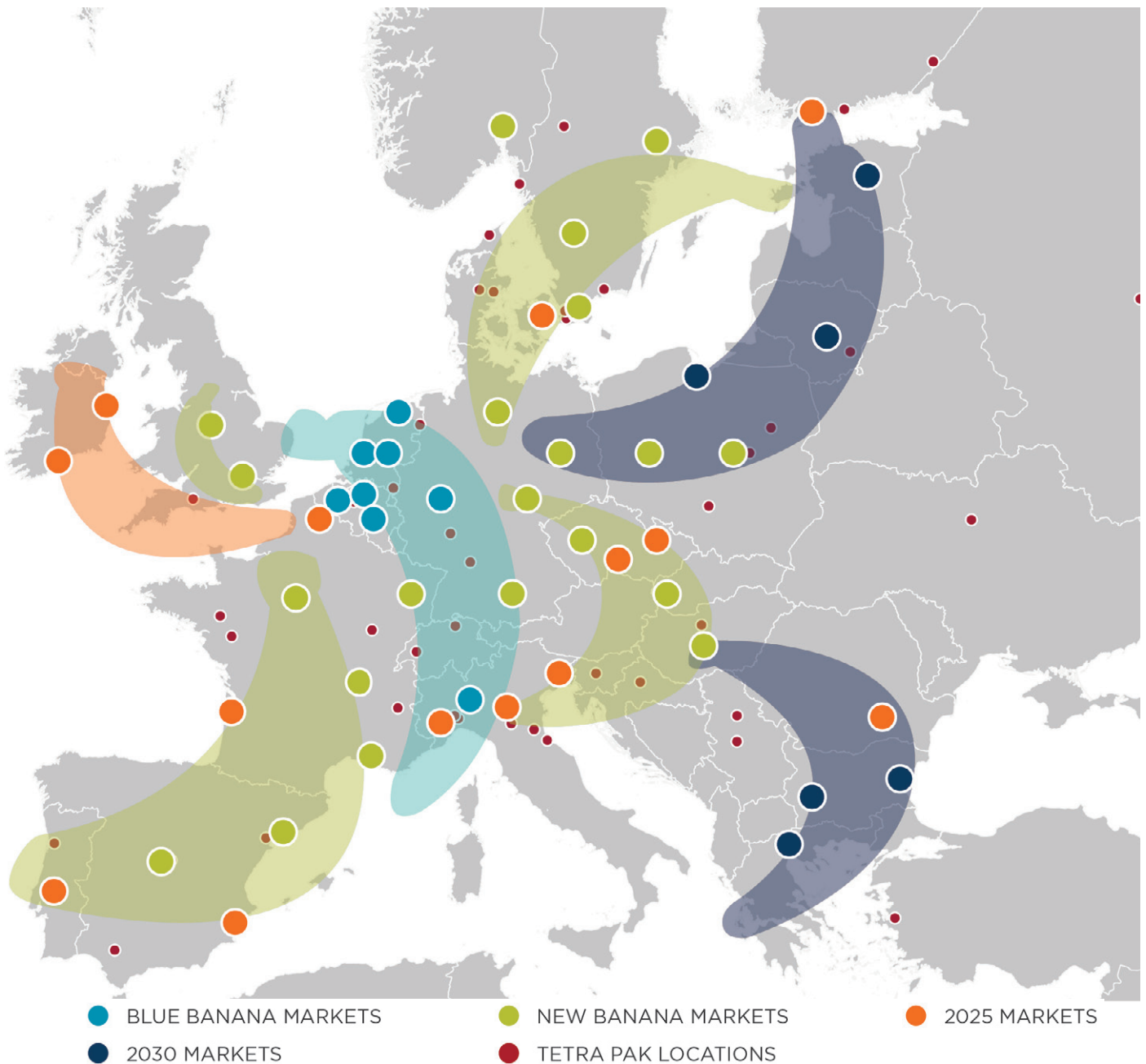
**With transportation costs accounting for half of total logistics costs, a competitive logistics industry is motivated to find ways to reduce these costs.**

## Composition of logistics costs



Source: Establish

For pan-European distribution, increasing real estate costs through multiple warehouses has been an effective way to reduce transport distances. However, complex consumer-centric supply chains that emphasise parcels rather than pallets, speed, and destination flexibility are contributing to rising transport costs.



## CUSHMAN & WAKEFIELD

Through all of the twists and turns over more than 100 years, ours has been a story of people putting ideas into action for the benefit of our clients. What began as a small family business in New York is now a commercial real estate company with a solid foothold across the globe, with 400 offices in approximately 70 countries employing 51,000 people. And from Silver Court in Shanghai to the Sears Tower in Chicago to all that comes next, our clients are at the centre of all we do. For more details please click [www.cushmanwakefield.com](http://www.cushmanwakefield.com)

infrastructure and multimodal links as well as the outcome of current legal impediments and future trade agreements. With the traditional long-haul (road) transport reaching breaking point, all parties committed to the seamless flow of goods into, out of, and across Europe are under pressure to work together. Realisation and timing thereof will depend on striking and nurturing successful public-private partnerships.

To remain feasible in the future, road transport must become autonomous. This way, it can potentially alleviate

motorway congestion through effective use of off-peak hours while also reducing transportation costs by eliminating the need of having the driver's hands on the steering wheel. A first step to circumventing legal impediments may be to take advantage of the existing dedicated rail infrastructure to demonstrate how autonomous transport can offer enhanced safety and cost-efficiency. Less congested inner waterways and maritime passageways may mean that barges and ships could be next in adopting autonomous technology. ■

## CLEVELAND - EUROPE EXPRESS



### THE FIRST, ONE AND ONLY SCHEDULED LINER SERVICE TO/FROM THE GREAT LAKES!

- Quick transit time
- Through bills of lading
- Onward connections using worldwide Spliethoff's European and Americas logistics network
- Line-supplied containers, project, heavy lift, steel, forest products and bulk
- Also calling other Great Lakes ports, incl. Valleyfield near Montreal
- Year round service!

**CLEVELAND  
EUROPE  
EXPRESS**

OPERATED BY  **spliethoff**



### CONTACT

#### Amsterdam office:

✉ [greatlakes@spliethoff.com](mailto:greatlakes@spliethoff.com)  
☎ +31 20 448 8454

#### Cleveland office:

✉ [cleveland@spliethoff.com](mailto:cleveland@spliethoff.com)  
☎ +1 216 377 1341

#### Gdynia office:

✉ [gdynia@spliethoff.com](mailto:gdynia@spliethoff.com)  
☎ +48 58 6601260

#### Antwerp office:

✉ [antwerp@spliethoff.com](mailto:antwerp@spliethoff.com)  
☎ +32 3 570 6857

#### Houston office:

✉ [houston@spliethoff.com](mailto:houston@spliethoff.com)  
☎ +1 281 248 4900

#### Montreal office:

✉ [montreal@spliethoff.com](mailto:montreal@spliethoff.com)  
☎ +1 514 822 1115



## One shot, multiple hits

by Carl Fischer, CEO & Co-Founder, sHYp B.V.



During his impressive career, Carl worked, i.a., as a Fellow of JHU City Lab on novel affordable housing concept in Baltimore based on a CLT plus renewable energy microgrid (he also structured a Social Impact Bond against homelessness in Baltimore back in 2013); worked on an investment vehicle to employ people diagnosed with ASD as investment analysts; launched a quantitative model for foundations and endowments to improve their investments in SRI ETFs; developed a concept for an Entrepreneur Revenue Structure; developed the Baltimore "Hatch" Fund (the first Impact Investment fund for unaccredited investors); created the first Public-Private Impact Investment project "Green City Clean Water Impact Investment Fund" in 2015 for the Philadelphia water department; and assisted the Nobel Prize Laureate Prof. Yunus on his Rockefeller Foundation. Carl's also a Board Member of Refugee Cities, having worked with Rutgers Graduate School on solutions to address refugee-related issues, entrepreneurship for students, and job creation in deprived neighbourhoods.

**The maritime industry is at a crossroad. Having sailed under the radar for decades, it has recently found itself in the spotlight for its emissions, most visibly in the public eye the cruise ships whose auxiliary engines massively contribute to air pollution in port towns, with container ships, tankers, and bulkers in the background, burning heavy fuel oil for decades. The industry, which globally contributes to greenhouse gas emissions more than Germany, will have to clean up its act sooner or later.**

Many approaches are being debated: the use of scrubbers to clean the exhaust so as to continue sailing on cheap bunker, the introduction of biofuels, and, of course, liquefied natural gas (LNG). All of these solutions, however, will be a temporary fix at best – whether the industry likes it or not.

The only solution to be truly emission free – as Maersk stated as its 2050 goal – will be to use hydrogen as fuel. When burned, it produces nothing more than clean water. It is highly energy efficient and lightweight. The main reason – or rather an excuse – it hasn't been used so far was storage and lack of refuelling infrastructure. And, of course, the cost. New technologies render these "alibis" worthless.

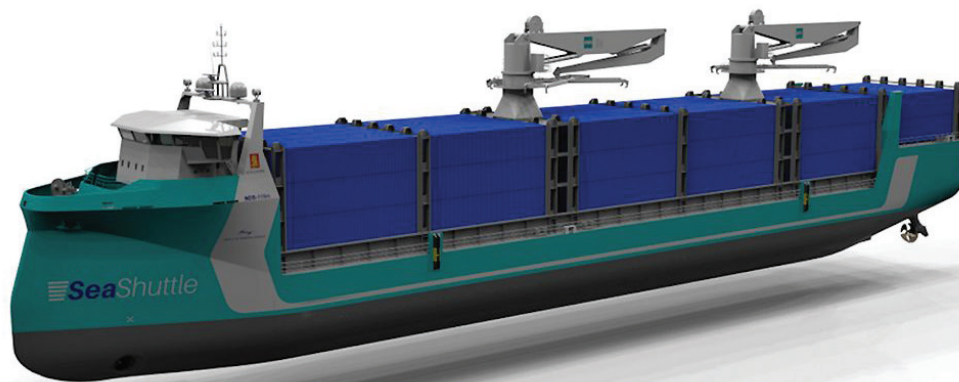
### The road(s) not taken

Modern technologies such as Liquid Organic Hydrogen Carrier (LOHC) or metal hydrides allow its safe storage at room temperature at no risk of explosion. Existing combustion engines can be converted to burn hydrogen just as efficiently as diesel or even run in the dual fuel mode, allowing to switch from one to the other should hydrogen not be available (as demonstrated

by CMB's ferry *Hydroville* in Antwerp). The good ol' fuel cells are naturally another possibility for smaller vessels (though cruise shipping heavyweights are also putting the technology to the test on-board their luxury over 200 m-long newbuilds).

Hydrogen is produced by splitting water using an electrolyzer. In order to do so, electricity and pure water are needed. However, the latest technology – a membrane free electrolyzer – even allows the splitting of the sea or ballast water without having to purify it, thus saving extra energy. That same process can also harvest some of the minerals inherent in seawater, in such a way creating an additional revenue stream (our start-up, which has just hopped out of the accelerator programme PortXL, is championing this approach).

Going forward, it is not unthinkable to have this technology installed on-board ships, allowing vessels to produce hydrogen from ballast or seawater while sailing. While this cannot be achieved quite yet, it is certainly worth aiming for as it would hit two birds with one stone – the need to treat ballast water and provide hydrogen refuelling infrastructure. What requires sorting out, of course, is finding a way of tapping into



greater flows of renewable energy already on-board the ships, since the current efforts in this regard (Flettner rotors, sails, kites) are directed towards aiding propulsion and reducing fuel consumption.

### Let the numbers do the talking

Currently, the price of low sulphur bunker hovers around \$600/t. One tonne is equivalent to approx. 260 gallons. One kilogram of hydrogen offers energy equivalent to one gallon of fuel. Therefore 260kg of hydrogen can replace one tonne of fuel. Dividing \$600 by 260 leads to a price of \$2.30/kg for hydrogen to be competitive.

Modern electrolyzers can produce one kg of hydrogen by using approx. nine litres of water and 56 kWh of electricity. Therefore, if you divide \$2.3 by 56, you arrive at the necessary price per kWh in order to achieve that – some \$0.041 per kWh.

Renewable energy has lately been priced a lot lower than that. Prices in the range from 3.0 to as low as 1.75 cents were offered, and due to the fact that offshore wind farms produce electricity even when there is no demand, i.e., surplus energy prices dropped to or even below zero at times. And of course, there

is always the possibility to hedge your exposure via electricity exchanges.

But hydrogen has more to offer. When you burn it, the result is water vapour which can be cooled down on the spot to get hold of the water (nine litres out of one kg of hydrogen). Moreover, in the process, seawater is turned into desalinated water – a boon to cruise ships or nations that are struggling with water scarcity. In such countries, desalinated water is priced at approx. 35 cents per litre. Again, do the math: \$0.35 times nine litres per kg of hydrogen results in \$3.15/kg. Your hydrogen production just created another revenue stream which will allow you to offer it competitively even if your electricity prices are higher than 4.3 cents per kWh.

And then, there may well be another incentive, namely carbon tax credits. The International Maritime Organization has calculated that each tonne of fuel burned produces approx. 3.1t of carbon dioxide. On the EU Emissions Trading System (EU ETS) one tonne of CO<sub>2</sub> has averaged approx. \$25. The math again: \$25 times 3.1 equals \$77.5, divided by 260 equals \$0.30. That's another 30 cents per kg earned. Rumour has it that the EU ETS, following its reset and restructuring, will raise the price to \$75/t of CO<sub>2</sub>.

### The dots connect

Overstated costs can no longer be used as an argument as hydrogen can be priced competitively and still turn a profit (and yes, profits are necessary to incentivise the maritime industry to make the transition and bear the costs attached to it). Storage technology has improved significantly, too, and will be ready to move onto ships – if it hasn't already. Refuelling infrastructure will be made available across berths just as with LNG (once players like Maersk push for it, the ports will scramble to offer it). And the recent investment by Royal Vopak into Hydrogenious and its LOHC storage technology demonstrates that the maritime service sector is preparing itself for that moment. ■



The sHYp B.V. start-up was included into the PortXL selection days and accepted into its 2019 cohort.




Photo: Dexter Fernandes/Pexels

# The albatross around climate's neck

by Gabrielė Vilemo Gotkovič

**While the Amazon is burning and Greta Thunberg is raising awareness of the climate crisis, the transport industry still accounts for a staggering 27% of all greenhouse gas (GHG) emissions in Europe. At the same time, the EU annually spends over €200 billion importing oil to power its vehicle fleet. In order to address global warming and the extreme weather events that come to pass as its direct consequence, a shift in spending from imported fossil fuels to domestically produced clean alternatives is necessary to help eliminate transport pollution and carbon dioxide (CO<sub>2</sub>) emissions.**

**C**limate change has an impact on lives all around the globe and will affect each and every one of us in due time if the status quo is maintained. Higher temperatures cause persistent, years-long droughts, rising sea levels threaten low-lying regions, whereas ever more catastrophic weather extremes lead to severe disruptions and economic losses counted in billions of dollars.

Climate change simply cannot be stopped without transport decarbonisation because this industry emits around 23% of the energy-related CO<sub>2</sub> that feeds global warming. As a matter of fact, cars, vans, trucks, ships, and planes combined are the EU's largest – and growing – source of GHG emissions. And whilst for other sectors, such as those related to power production, there is a clear commitment to decarbonise by 2050, officially the EU still assumes transport emissions will decrease by 60% only. And today it is what it is – an assumption, nothing more – since transport is the only sector of which emissions are above the 1990 levels (Fig. 1). Emission reductions in other sectors have been partially offset by the emissions growth in the transport sector.

Next, according to a study published by the European Federation for Transport and Environment, energy dependency on oil imports has recently increased. In 2017, oil imports were 8% higher than in 2014 and, in fact, at the highest level since 2008. Of the total volume of liquid bulk imported to the EU, the majority, amounting to about 75%, are imports of crude oil, adding to 180b. Importing refined fuels, such as diesel, costs an additional 45b. Around two-thirds of this demand comes from the transport sector, particularly road transport. As such, transport decarbonisation isn't only an environmental issue but also that of energy sovereignty.

## **“We shall fight on the seas...”**

Surface transport accounts for around three-quarters of all EU transport emissions. Within that category, light-duty vehicles (LDVs; private cars) are the largest emitters; thus, decarbonising LDVs is the most urgent task at hand. The technology for doing so is already available. For example, the Netherlands leads this discussion by planning to pass forward-thinking green legislation targeted at banning the sale of conventionally-fuelled vehicles by 2025. If this proposal is adopted, the Dutch will join Denmark and Norway in making a concerted move to develop their electric car industry.

Light commercial vehicles (LCVs) are a neglected area as they are often exempt from certain EU's safety and environmental policies, such as driving regulations or tolls, compared to their bigger counterparts, heavy-duty vehicles (HDVs). This enhances their attractiveness and in part, explains why their use and emissions are growing. That said, HDVs represent around a fifth of all EU transport emissions, and its importance is expected only to increase (read more in the article *Shifting logistics bananas. The changing face of distribution* on pgs. 18-21). Unless emissions from LDVs, LCVs, and HDVs are dealt with, it will be impossible to meet climate targets.

Aviation has already been a major and growing emitter. In Europe, its emissions have doubled since 1990, and globally they could, without action, double or even triple by 2050. It is necessary to reverse this and bring aviation's emissions to zero by 2050 if we are to meet the 1.5°C and 2°C goals of the Paris Agreement. Unfortunately, aviation is at risk of having its emissions locked in due to the growth in passenger numbers and aircraft fleet.

Shipping is one of the largest GHG emitting sectors of the global economy, responsible for around one gigatonne CO<sub>2</sub> equivalent every year. If shipping



were a country, it would be the world's sixth-biggest GHG emitter. This speaks to the absolute necessity of including maritime transport in the development of an EU 2050 economy-wide decarbonisation strategy and the subsequent financial, investment, and regulatory decisions that will be imperative.

### Unlikely to deliver?

The gap between the GHG emissions projected in the EU Reference Scenario 2016 and the level of emissions needed to limit global warming to less than 2°C or even further to 1.5°C is huge. The EU has already adopted a strategy for low-emission mobility to promote the decarbonisation of transport and has strengthened the EU Emission Trading System (ETS) by increasing the pace of annual reductions in allowances and adding a market stability reserve. The ETS does not directly address the transport sector, but doing so will become increasingly important as transport is electrified (adding to the power generation industry's emissions). The EU has also committed a growing fraction of its future budget to investments in infrastructure and to research and innovation for a more sustainable economy.

Nevertheless, much more needs to be done to deliver the target set in the European Commission's 2011 *White Paper* on transport to reduce emissions from the transport sector by 60% by 2050 (compared with 1990 levels) and to ensure that EU emissions are firmly on the way to zero by that date. According to the European Academies Science Advisory Council (EASAC), current EU policies are unlikely to deliver emission reductions quickly enough to limit global warming to less than 2°C as required by the Paris Agreement.

Emission reductions should be, therefore, accelerated urgently over the next 10-15 years. It will take about two decades to renew the current vehicle fleet, which could potentially reduce emissions more quickly than by promoting changes in other industries (e.g. more energy-efficient housing). However, low-carbon vehicles currently make up less than 3% of the total new vehicle sales in the EU. Decarbonisation of the transport sector, along with other industries for that matter, depends to a large extent on greening Europe's electricity sources. In addition, urgent policy support is needed for other short-to-mid-term options that

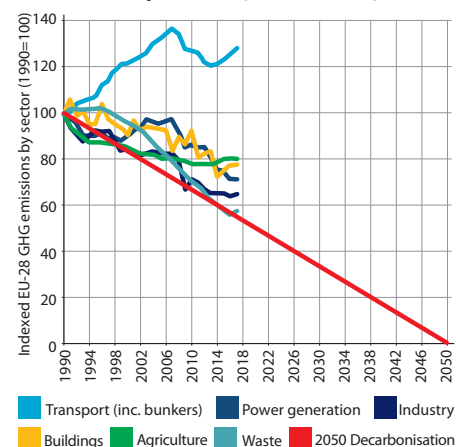
could quickly reduce emissions, such as containing transport demand (through, e.g., consuming less in general, curbing food waste, or making consumption more circular), shifting passengers and freight to low(er)-emission transport modes, and improving vehicle design and the efficiency of powertrains through hybridisation (to be promoted using legislation and standards like eco-labelling vehicles).

Current EU policies do not adequately and visibly address the timely phase-out of fossil fuels. Governments should establish binding target dates for phasing out 'dirty' sources of energy and subsidise scrapping schemes to accelerate fleet renewal as soon as possible, along with nourishing policies that contain the growth of freight transport demand by, e.g., implementing sustainable urban logistic plans. International collaboration and citizen engagement, including awareness campaigns and incentives to help citizens understand and agree to take action, will become more important as falling consumption makes oil and gas prices more volatile.

New markets can be created alongside the shift towards e-vehicles. As Europe's power generation and electricity transmission industries move closer and closer to renewables, which feed energy in a more unstable fashion than conventional power plants, the batteries in cars, vans, and trucks can be used as part of the grid, since the majority of vehicles stands idle at night (though, it's important to remember that if we are to achieve successful transport decarbonisation, the growth of low-carbon electricity generation must be higher than the total growth in electricity demand from transport and other industrial sectors).

Improving and simplifying guidance on the use of biofuels, biogas, natural gas, and methane for transport are equally important. Sustainability should be the underlying factor. For example, biofuels cannot be zero-rated if produced from forest biomass with long carbon-payback times. Natural gas can reduce internal combustion engine vehicle emissions but should only be used for transport if all upstream 'fugitive' leakages of methane are monitored, certified, and limited to less than about 1%. In a similar fashion, it is important to improve resources for the development of technologies for producing synthetic fuels. In this regard, the EU must also strengthen international cooperation in producing, certifying, labelling, and

**Fig. 1. Indexed EU-28 GHG emissions by sector (1990 = 100)**



Source: Transport & Environment (from EU Member States' reporting to the United Nations Framework Convention on Climate Change, 1990-2016 data, and European Environment Agency's approximated EU GHG inventory, 2017 data)

using synthetic fuels in aviation and shipping as well as on synthetic fuels for seasonal storage of electricity.

Finally, EASAC encourages policymakers to strengthen preparations for long-term emission reductions by making policy commitments to invest in innovation, jobs, skills, and interdisciplinary research. This can be achieved by supporting the transition of the EU automotive industry to a decarbonised future by investing in low-carbon-footprint battery manufacturing within the EU. The public sector can give an example by investing in e-transport, exchanging fossil fuel buses for battery-powered electric/fuel cell vehicles. Additionally, it is important to support collaborative research and innovation activities to build skills in ICT, life cycle analysis, electrical system management, and low-carbon vehicle manufacturing, maintenance and repair.

### Climate-friendly

Science tells us that action needs to start immediately. Unfortunately, this requires very strong political action, agreed across the entire EU and individual Member States board so that we won't see strategies put on hold or even derailed after each and every election. Without rapid changes, eco-aligning the goals of different industries and securing citizens' backing, making transport climate-friendly by 2050 becomes more and more unlikely. ■



# Electric, digital, and connected

by Guido Jouret, *Chief Digital Officer, ABB*

**There is a lot of talk about the Fourth Industrial Revolution, with electrification, digitalisation, and connectivity converging across industries. The innovations, visions, and transformations made possible by the most powerful combination of these change enablers is what that the maritime industry has seen for decades.**

**E**lectrification is the logical choice for future power systems. Compared to mechanical systems, electricity enables more flexible solutions that require less maintenance. It also allows power to be applied more precisely, including installing more power in smaller spaces.

Digitalisation enables small-scale efficiency, but it also helps to keep costs under control if we want to expand the scope of an application or operation. The level of complexity no longer has to increase when scaling up; operating 100 things does not have to mean that systems become 100 times more complex.

Connectivity has been primarily a consumer-driven trend, enabled by mobile and broadband technologies, but these days it is becoming well established in the industrial space. Buyers of equipment increasingly realize that those who build the machines can also help optimize operations from remote locations, and industrial customers want that help.

There are also examples of industrial digital technology migrating into the consumer space, such as the Global Positioning System. This phenomenon is a lot less frequent but still very significant. Back in the 1970s and 80s, there was a lot of

government spending on military digital technology. These were the early investments that eventually gave birth to Silicon Valley, and the pendulum of innovation swung from the industrial to the consumer space. We already have an example of this in ABB Marine & Ports, where our ABB Ability™ Marine Advisory System – OCTOPUS, originally designed to help guide some of the biggest ships in the world, is now being applied to the SeaBubbles urban water taxi concept. This shows that industrial digital innovations are highly scalable – and that opens the door for application in many different spaces.

## Planet 4.0

We are in the middle of a massive change, and we see it all across society. The planetary operating system is being revised. How we manage food processing, water and energy supply, manufacturing of goods, or moving people – all these areas are being reinvented using digital technology.

ABB is well-positioned to be a major player in this ongoing development, and we are experiencing growing momentum. As an indicator of this, the number of applicants for employment in ABB has doubled in the past year. Working with digital technology in a maker company like ABB is different than working in a software company. We get to help solve issues of sustainability, transportation,

and electrification. People can see the impact of what they do has on society. In my opinion, this is the reason we are able to attract employees in a highly competitive environment.

With this growing interest in doing things that make a difference, I believe the time is now for industrials to get involved and drive the development of the things that matter for everyone. In the mobility segment, ABB is the title sponsor of Formula E racing, the fastest electric motor-powered racing cars on the planet. This may seem frivolous at first glance, but it is about much more than just fast cars. It is about the electrification of transportation.

Racing can serve as an incubator for innovation. ABB FIA Formula E Championship racing puts unimaginable stress on the cars and their power systems. The technology has to deal with heat and loads far beyond those in commercial vehicles. Participating in the ABB FIA Formula E Championship allows the industrial partners to bring this advanced technology into the consumer sphere at a much faster pace.

While technology in traditional Formula 1 is maturing, there is still a lot of innovation left in ABB FIA Formula E Championship. One clear example of this is that next season they will need only one car to finish a race, instead of the two they had used since the start of the Championship





just four years ago. Also, the fact that they race in a city or urban environment, not on isolated tracks, makes electric transportation visible and accessible for everybody.

### No end in sight

I honestly don't see any horizon for the electric-digital-connected potential. The revolution is different this time because it's not just one thing. By contrast to previous disruptions like steam power or electrification, the Fourth Industrial Revolution involves multiple elements. In fact, it can be difficult to articulate the current shift, because it is made up of so many things. Digitalisation, connectivity, and cloud computing are all converging, with machine learning and Artificial Intelligence amplifying their impact. Sensors are getting smaller, and big data is, well, getting bigger. Augmented and Virtual Reality technologies continue to provide previously unattainable perspectives.

But despite these advances, any machine we can make today remains relatively primitive, compared to the human brain. We are basically trying to make a model of the brain, and what has been achieved so far might even be called

baby steps. Computer models have the potential to be a million times better than today, not just faster and cheaper.

Looking ahead to the "Next Big Thing," I hope we rediscover that small is beautiful. Industrial technology in the 19<sup>th</sup> and 20<sup>th</sup> centuries was all about making things bigger and achieving efficiency of scale. Nowadays, digital technology enables efficiency at any level. 3D printing is a good example of small-scale efficiency, delivering tailor-made components at the point of consumption. By moving bits, not atoms, we are reinventing the way we run the modern economy.

In a way, we are going back to our roots, by enabling smaller, closer, and smarter solutions. Only 30% of our planet remains jungle and rainforest. If we want to avoid eating into undeveloped land – and clearly we do – cities will have to absorb the bulk of the population growth. That means we will need to think and work in new ways to create dense but sustainable and attractive urban solutions. I believe that the innovative use of electric, digital, and connected technologies will be the key to finding smarter ways to manage our new future. ■

On the way  
to a smarter future



**Juha Koskela**

Managing Director, ABB Marine & Ports

**"Electric. Digital. Connected.** These are the keys to a new era in shipping. Together they offer virtually unlimited opportunities for gains in efficiency, safety, and sustainability. The maritime industry continues to explore new energy sources and autonomous operations – and the electric, digital, and connected approach is helping us define a better future, bringing new levels of reliability, efficiency, and sustainability to shipping. We believe that future ships will be built on the foundation of electricity. Hybrid solutions combining sustainable fuels with electric power systems are cleaner and more robust, require less maintenance, are highly programmable, and are easily monitored and managed remotely. Electrical propulsion integrated with automation and control systems is already moving the industry closer to autonomous shipping, with collaborative, remote, and highly automated operations showing the way. ABB has provided electric systems for vessels for more than 110 years. Today, well over 1,300 ships employ ABB electric systems, and close to 1,000 vessels are connected to the ABB Ability™ Collaborative Operation Centers for remote support. It is our role as an industry frontrunner to drive this transformation and equip the marine industry with electric, digital, and connected solutions that maximize the full potential of vessels. To find out more, please check ABB's Generations series under the following link <https://new.abb.com/marine/generations>.



The Swiss-Swedish ABB, headquartered in Zurich, is a Fortune 500 tech-focused multinational, delivering solutions across its five leading businesses: Electrification, Industrial Automation, Motion, Robotics & Discrete Automation, and Power Grids. For more details about the company's products and services, please go to <https://new.abb.com/>



# partnership events

Photo: Pixabay

## Smart Ports Summit

**Smart Ports Summit**  
19-20 February 2020  
UK/London

Join leading port authorities and terminals who will describe their experiences of optimising port processes. Gain tangible feedback from the whole supply chain on the implementation of smarter systems, the use of big data, 5G, automation and datasharing. All readers of the Harbour Review can benefit from a 20% discount. Please quote FKT3669HR at the time of registration by contacting [Roxanna.Kashfi@informa.com](mailto:Roxanna.Kashfi@informa.com) or follow this link and the discount will be automatically applied <http://bit.ly/2WIB3le>.



**International Rail Forum & Conference 2020**  
1-3 April 2020  
CZ/Prague

The International Railway Forum & Conference (IRFC) is one of the leading events in the international railway calendar and will bring together top executives and decision makers, rail and logistics professionals, customers, influential politicians and institutions from across Europe. The 7th biennial IRFC will take place in Prague on 1-3 April 2020 (Wednesday-Friday) in the Clarion Congress Hotel Prague and will be organised by OLTIS Group.



**Multimodal 2020**  
16-18 June 2020  
UK/Birmingham

Multimodal 2020 celebrates thirteen years of putting shippers, retailers, manufacturers, wholesalers, importers and exporters in front of exhibitors who offer the latest logistics and supply chain solutions. Multimodal is firmly established as the UK, Ireland and Northern Europe's premier freight transport, logistics and supply chain management event.

Multimodal represents every logistics sector under one roof, and is characterised by key vertical sectors, including manufacturing, retail, agribusiness, chemical, automotive, electronics, FMCG, food & drink, fashion, pharmaceuticals, construction, aerospace, energy, real estate, recycling, paper/print and perishables, amongst others, whilst horizontally, the show covers all modes of transportation, including sea, road, rail, air and inland waterways.

This matrix design makes Multimodal incredibly valuable and accessible for shippers – whilst also affording them the opportunity to successfully meet and network with peers from other sectors, which is another key reason for their attendance.



Photo: Pexels/Chris Schippers

We invite you to cooperate with us! If you wish to comment on any key port issue, share your feedback or have information for us, do not hesitate to contact us at: [editorial@baltic-press.com](mailto:editorial@baltic-press.com), +48 58 627 2320/ 2321.

**170+** operators  
**620+** ports  
**1,130+** services  
**1,150+** terminals



EUROPEAN  
TRANSPORT  
MAPS

**EUROPE:**

all over the ro-ro & ferry,  
container, and rail maps

[www.europeantransportmaps.com](http://www.europeantransportmaps.com)





# Experience the progress.



## Mobile Harbour Crane

- Manoeuvrability and versatility – for all areas of application in the harbour
- 360° mobility – absolute outstanding in the MHC market
- Stepless hydrostatic power transmission for smooth and sensitive operation
- Extensive range with load capacities of 42 tonnes to 308 tonnes
- Proven Liebherr quality and full support for our products and services

mobile.harbour.crane@liebherr.com  
facebook.com/LiebherrMaritime  
www.liebherr.com

# LIEBHERR