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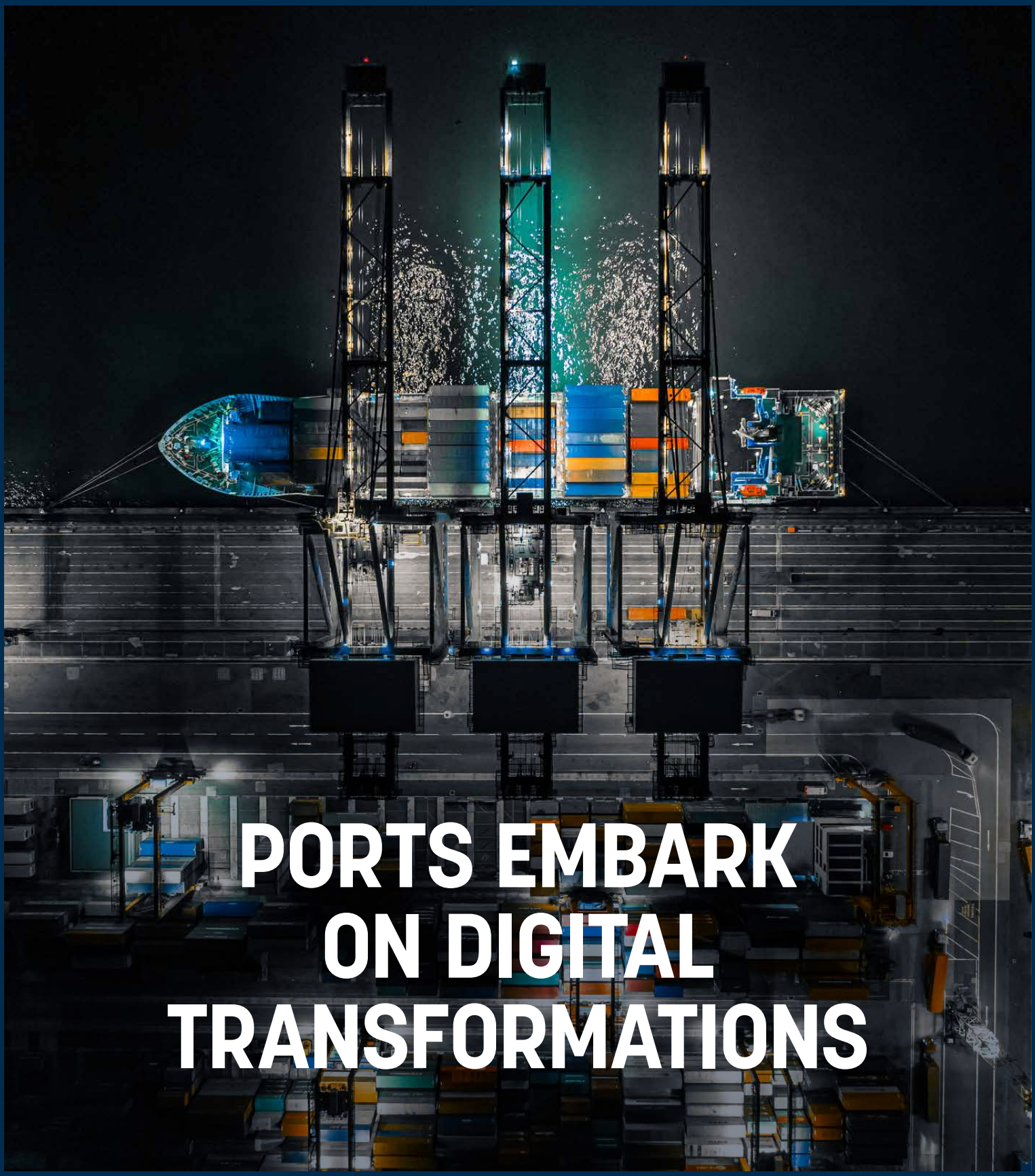

PORTS EMBARK ON DIGITAL TRANSFORMATIONS

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FROM THE EDITOR

Today's ports find themselves at the centre of the digitalisation journey the global supply chain is currently on.

Industry members agree that the uptake of digital processes, automation and other efficiency driving technologies will certainly increase in the coming years because of the impact of COVID-19 on ports and terminals. This type of digitalisation enhances resiliency to crises like the COVID-19 pandemic.

However, according to a new report, we run the risk of creating a 'two tiered' system if some ports are left behind on the path towards digitalisation.

A divide has already appeared between ports who have digitalised, mainly in the northern hemisphere, and those who have not, typically those in the southern hemisphere, according to the report launched by the World Bank and International Association of Ports and Harbors (IAPH) on 21 January.

COVID-19 has emphasised the risks ports face from technological inefficiencies, which are caused by lack of a high level of integration between devices, agents and activities at ports, the report authors suggest.

In this edition of the Journal, we explore some of the tools available to ports today to enhance their digital transformations including port call optimisation, digital twins and modern data analytics.

Inform gives us part two of a three-part series on data, in which the authors discuss decisions behind democratisation and data.

PTI also spoke to the Port of Marseille Fos, France, and the Port of Tanjung Pelapas, Malaysia, about their digital journeys.

CAUSE FOR CELEBRATION

The International Port Community Systems Association (IPCSA) celebrates its 10th anniversary in 2021, having been founded on 15 June 2011. IPCSA will be submitting a series of articles in PTI's 2021 Journals, beginning with insight from its own members on digital transformations.

Today IPCSA has nearly 50 members, including Port Community System (PCS) and Cargo Community System operators, Single Window operators, and Seaport and Airport Authorities, drawn from all regions of the world.

The pandemic has certainly not held back IPCSA – rather the reverse. In the past year, IPCSA has launched its Network of Trusted Networks (NoTN) a secure port-to-port and cross-border data exchange solutions to provide predictability, visibility and certainty within the supply chain, and developed and piloted a Blockchain Bill of Lading. The association was also one of the leading signatories to the International Maritime Organization's 'Call to Action' to accelerate the pace of digitalisation to cope with a post COVID-19 new normal.

With maritime transport carrying over 90% of global merchandise trade, totalling some 11 billion tons of cargo per year, digitalising the sector would bring wide-ranging economic benefits and contribute to a stronger, more sustainable recovery, the World Bank and IAPH point out in their report.

Beth Maundrill
Editor

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DIGITAL TRANSFORMATION: REAL RESULTS

Richard Morton, Secretary General, International Port Community Systems Association (IPSCA)

Ask a port operator about their strategy for the next few years and there's a word you will always hear: digitalisation. Yes, that has been the case for some time – but the difference now is that we are seeing real projects, real results and a genuine understanding of what can be achieved.

While 2020 was hardly a year we will remember fondly, there are always silver linings to be found. The COVID-19 pandemic focused minds even more on digitalisation and the way in which it can transform operations by increasing safety, improving efficiency, cutting costs and delivering greener solutions.

IPCSA welcomes this acceleration towards digital technology. As we celebrate our tenth anniversary of our association – IPCSA was officially formed in June 2011 – we will, of course, be reflecting and looking back on the past decade. But, at the same time, our members are focusing firmly on what happens next and we are celebrating that too!

Among the many examples of members' digital transformation work, and as well as several collective projects such as our Network of Trusted Networks (NoTN), I would like to highlight the Port of Ravenna's Digital Twin project; Djibouti Port Community System's (PCS) work to enable tracking, transparency and visibility in the cross-border supply chain; and the Indian Ports Association's various Digital Ports Projects in India.

DJIBOUTI PCS

In Djibouti, a package of digital solutions is proving transformational for the flow of cargo through its ports and across the border into landlocked Ethiopia.

"Our PCS implementation is driven by Djibouti Ports and Free Zones Authority (DPFZA) strategies," explained Warsama Mouhoumed Bouh, CEO of Djibouti PCS. "We are working to create an interconnected environment for maritime investment in ports, in feeder services and in bunkering, etc., transforming Djibouti into an international maritime centre. Second, we are working to

"WE HAVE DEMONSTRATED THAT JUST THROUGH DIGITALISATION, EXISTING CUSTOMERS HAVE BEEN ABLE TO SAVE FOUR TO FIVE HOURS ON EACH CONSIGNMENT."

- Warsama Mouhoumed Bouh

provide better transit services to our landlocked neighbours. About 95% of Ethiopia's imports pass through our ports. The focus of our PCS has a lot to do with tracking and tracing; we have to provide as much transparency and visibility to the final customers as we can, since they are not here."

In this, Djibouti PCS (DPCS) has connected all the different stakeholders – terminal operators, shipping lines, forwarders, port authority, Customs authority – to provide a 360-degree view of cargo and documentation flows.

"We are tracking the cargo operations to identify when it has been unloaded at the port, container position, gate-in/gate-out, and at the same time tracking the documentation – including clearance, port fees invoicing and booking collection of the cargo," said Bouh. "Recently we have integrated systems with Djibouti Corridor Agency to provide 'check points' in the corridor where the customer can follow his cargo and its documentation all the way through to Ethiopia."

This tracking capability has generated a lot of interest from the Ethiopian logistics community as well as government entities of Ethiopia, whose transport authority contacted DPCS with a view to integrating systems to provide full tracking and visibility of Ethiopia-based trucks, from starting their journey, through loading goods at the port to final delivery. "From our side, we wanted more information about the transport companies and drivers registered in Ethiopia," said Bouh. "Through this integration, the Ethiopian transport authority aims to provide full information on the truckers that are heading our way.

"Our biggest objective is reducing the time and cost of logistics. We have demonstrated that just through digitalisation, existing customers have been able to save four to five hours on each consignment. Where there were nine manual processes taking up a full day, we have reduced this down to five, all electronic. We expect documentation to be finalised within an hour."

By continuing to analyse data, DPCS has been able to identify bottlenecks, assess customer behaviour and adjust processes accordingly, in collaboration with its stakeholders. At the same time, the final importers, whether they are based in Djibouti or in Ethiopia, can check vessel arrival details, container status and position, and truck progression in the corridor, as well as allow verification of invoicing from forwarders against the correct port prices.

PORT OF RAVENNA

A Digital Twin project will assist the Port of Ravenna, Italy, in managing its assets, planning projects and maintenance, and fulfilling a major port dredging programme.

The port is working with Ancona-based CNT Technologies, whose managing director, Saimon Conti, told us the idea of a port Digital Twin started when working with two shipyard clients.

"We were working out how we could control a shipyard and optimise the process of shipbuilding and realised that it was not a matter of just the shipyard, but of the whole port," he said. "We began to consider if there was a way to digitalise an entire asset and to get benefit from it independently, wherever you are in the value chain of a port."

CNT wanted to find a port with many complexities in terms of shipping and the environment. Ravenna was the answer; one of Italy's biggest ports, stretching 14km from sea to city centre, Ravenna is home to a range of operations, including oil and gas, while the city is a UNESCO World Heritage Site.

The Digital Twin will provide the port authority with an information model which Conti likened to an interactive video game. It will include layer upon layer of information and will, of course, never stand still.

Andrea Minardi, IT and security manager at the Port of Ravenna, added: "As part of the Ravenna Port Hub project, in the next few years we will be dredging the entire port canal – from 10m depth to 12.5m in the first phase, with plans to reach 14.5m. This will open up new markets and oppor-

tunities for the port. The Digital Twin will provide real-time information on the depth of water – how it is changing and how it has changed. This will be helpful in evaluating the works to be done in the different sections of the port canal."

Conti continued: "Up to now, the port authority has had all the historical and current information on the status of the seabed stored in many folders, from many surveys; in the future, this Digital Twin will provide a unique database showing the chronology of the water depths and how they have changed."

The Digital Twin is bringing together information on everything from light towers and buoys to port infrastructure and assets, and also incorporates data collected from regional and local authorities, public service providers and other interested parties. To give an idea of the diversity, it ranges from information on soil to the layout of cables.

The result will be a valuable tool for planning port developments or simulating new operations or vessel calls – but equally, it could be used for planning a city concert or event, visualising a proposed building, working out traffic flows or even analysing emergency response plans.

INDIAN PORTS ASSOCIATION

India has been working on its digital infrastructure and enabling of e-governance for many years, and digitalisation is gathering pace across all industries, explained Dr Abhijit Singh, executive director of the Indian Ports Association (IPA), an apex body of major ports under administrative control of the Ministry of Ports, Shipping and Waterways, Government of India.

"The arrival of technologies such as the Internet of Things, AI and big data, blockchain, etc., have made it possible to collect and process larger and larger volumes of information at increasingly lower costs. Ports, too, have embarked on this journey with an objective to improve port performance, bring efficiencies and increase productivity," he said.

A number of digital transformation measures have been taken across major ports of India to speed up import/export processes and improve the ease of doing business, he said – including Direct Port Delivery, Direct Port Entry, the PCS, the installation of container scanners and radio-frequency identification (RFID) systems, and eliminating paper forms.

"IPA has taken forward the Government's initiative to establish a centralised/uniform web-based PCS covering all its major ports, to move towards a paperless regime. As a part of its collective, collaborative and cooperative approach to EDI implementation, for the benefit of the whole Indian port ecosystem, this is covering non-major ports as well."

An upgraded version PCS1x, launched in December 2018 as an open platform, is evolving into a National Logistics Portal (NLP-Marine). A secure, neutral and open electronic/internet-based platform for all stakeholders in maritime trade and Indian seaport communities, it will optimise, manage and automate logistics-efficient processes through a single submission of data, linking the entire maritime transport and logistics chain and enabling real-time information exchange and business transactions.

Other developments include implementation of an Enterprise Business System (EBS) at five major ports, which harmonised and standardised port operation processes to a minimum; the introduction of RFID-based gate automation systems; real-time cargo tracking; and automatic berth allocation.

These achievements have undoubtedly helped improve India's 'Ease of Doing Business' ranking, which has risen from 152 in 2015, to 63 in 2020.

As Dr Singh pointed out: "Ports are the gateway to prosperity for the country. Adoption of next-generation technology is critical to revamp the maritime industry – to enhance user experience and make it more efficient and safer."

"ADOPTION OF NEXT-GENERATION TECHNOLOGY IS CRITICAL TO REVAMP THE MARITIME INDUSTRY."

- Dr Abhijit Singh

ABOUT THE AUTHOR

Richard Morton has been Secretary General of the International Port Community Systems Association (IPCSA) since its beginnings as a European organisation in 2011.

As an expert in trade facilitation and the exchange of electronic information, Richard is in demand across the globe as an adviser and speaker. He is a member of the Experts Committee of the APEC E-Commerce Business Alliance and an Expert at UN/CEFACT.

ABOUT IPCSA

IPCSA is an international association of sea and air port community operators, sea and air port authorities and single window operators that is recognised across the globe for providing advice and guidance on the electronic exchange of information across borders and throughout the whole supply chain.

The association has nearly 50 members from across the globe who handle the exchange of information for Business to Business, Government to Business and Government to Government processes and facilitate the smooth cross-border movement of goods. This equates to the electronic exchange of information relating to more than 500 million TEU movements and 10 billion tonnes of cargo for air, sea and land transport – estimated to be in excess of 50 billion million exchanges every year.

THE PORT COMMUNITY OF MARSEILLE FOS: FOSTERING INNOVATION

Interview with Marie-Hélène Pasquier, Secretary General, Union Maritime et Fluviale (UMF), and Senior Member, Via Marseille Fos (VMF)

The Port of Marseille Fos is a key multi-purpose port in the south of France. The port has been resilient throughout 2020 against the effects of the COVID-19 pandemic and with investments planned into the next five years is embarking on a modernisation and development path.

The Port continued to operate ships and cargo with a good fluidity throughout 2020 and although it experienced a decrease of 13% of total cargo throughput for the year the Port showed its capacity to resist and keep customers satisfied.

"The main point to highlight is the strong cohesion within the community of port companies, and local authorities through a 'Marseille-Fos commitment Pact', which made this resilience possible. For instance, we were the first French port to successfully import masks for port workers. Moreover, our port community has set up commercial incentives on port duties, storage charges and port services during 2020 to enhance the recovery," explained Marie-Hélène Pasquier, Secretary General, Union Maritime et Fluviale (UMF), and Senior Sember, Via Marseille Fos (VMF).

SMART PORT AND MODERNISATION

The Port of Marseille Fos is working with start-ups to foster initiatives and innovation in the field of both digitalisation and sustainability in the maritime and port industry.

"We benefit from a particularly positive environment in Marseille, where a lot of start-ups and incubators are located," Pasquier said. "A pitch contest is annually organised during the 'Smart Port day'".

In March 2020 the Marseille-Fos Port Community represented by UMF won the Tank Storage Award in the innovation category. The Port's mixture of green initiatives, digital innovations and port community cohesion helped win the award.

The Port of Marseille Fos is a landlord Port and with this status it is part of the digital transition that affects numerous economic sectors in order to generate new activities at the port, offer new services to the industry and bring innovative initiatives to the port territories with the help of its institutional or private partners.

At the Port's container terminal, Terminal de la Méditerranée, which has a capacity of 1.5 million TEU operated by Eurofos/Portsynergie, the aim is to improve the level of service for the Port's customers.

"The terminal operators in Fos have invested in the largest gantry cranes in the world, which will enable to operate the largest ships with better productivity and fluidity," Pasquier explained.

She also explained that processes and formalities at the port are among the fastest in Europe thanks to the Ci5, the latest generation of Cargo Community System (CCS) developed and run by MGI, a subsidiary of UMF.

The Ci5 solution was deployed at Marseille-Fos Port in October 2018.

Ci5 is an essential part of the Marseille-Fos Port ecosystem, providing users with greater operational efficiency thanks to new innovations integrated into the CCS.

For example, activities can be managed through the Dashboard, the To Do List with prioritised tasks, by tracking ship loading and unloading operations, predictive text, and a built-in quick search engine. The Fast Lane concept speeds up administrative, physical and regulatory goods processing. Ci5 also provides secure data flows and end-to-end goods tracking throughout the entire supply chain.

Ci5 is based on open-source technologies and a service-oriented architecture to take advantage of innovations like big data, Internet of Things (IoT), smart containers and Artificial Intelligence. The solution was designed in collaboration with users so that it could be developed and deployed quickly.

Ci5 has been implemented at 13 ports worldwide and covers both port transit and hinterland processes up to the last kilometre.

Some of the Key Performance Indicators (KPI) Pasquier highlighted include customs clearance within 3.30 minutes and port passage of cargo within 26 minutes.

"New KPIs will soon be available to measure and promote port performances on sea and on land, with our port promotion body, Via Marseille-Fos," she added.

The Port of Marseille Fos also intends to modernise its ports services approach with regards to petrochemical liquid bulk, which today represents 50% of Marseille-Fos's total volume of traffic.

With 32 MT of petrochemical bulk in 2020, Marseille-Fos remains the largest French port in this sector.

"Our strategy for the future is: secure existing traffics with a modernisation program (processes, ship calls and infrastructure) of the liquid bulk terminals in Fos.

"Improve fluidity in liquid bulk operations on terminals through enhanced private and public IT systems connections.

"Develop networks and business through the Petrochemical Global Logistics Convention (PGLC), an event organized by UMF in 2019 and soon in 2021, to win new markets, as well as through several other international events of this industry," Pasquier explained. PGLC is a joint enterprise between UMF Marseille, France and Tankbank Singapore.

GREEN PROJECTS

Marseille-Fos aims to become one of the greenest European ports. The Port is involved in a green and smart port strategy and the Marseille-Fos community is working on multiple initiatives.

Pasquier argues that Marseille-Fos is a natural green port because of its location which enables it to reduce maritime transit times for Europe to Asia trade.

"Due to this advantage, our port is a natural 'green port'. We intend to highlight this advantage, in the context of growing demand for more sustainability. A group of local start-ups have developed several applications around these topics; among them, one calculates the more sustainable routes for shipments," she said.

In addition, the Port is improving air quality and sustainability. Cold ironing, or onshore power, has been operational for ships to Corsica since 2017, is scheduled in 2025 for cruise ships, and in the future for all ships. This has involved €30 million ($160 million) of public and private investments.

New Liquified Natural Gas (LNG) bunkering is set to commence in 2021 as the port aims to become a bunkering hub for the Mediterranean.

The Port performed the second ship-to-ship LNG bunkering operation on 15 June 2020, having organised the first in early-May 2020, along with Shell energy.

The port said it will use its position in the Society for Gas as a Marine Fuel (SGMF) to promote use of LNG in commercial shipping. This will include contributing to working groups with operators and other stakeholders to introduce all the safety conditions that meet European and global standards.

The UMF created an original Port Community Quality Charter in 2017, which promotes all initiatives in the fields of quality of service, safety/security, and sustainability.

HINTERLAND DEVELOPMENT

"Inland connections to European markets are a major issue for all ports," Pasquier said.

Marseille Fos' strategy is to enlarge its hinterland, namely along the Rhone–Saone corridor and beyond to North-East France, Switzerland and Germany. Its strong position in the Mediterranean offers great opportunities for North–South and East-West traffic.

This strategy is based on a good balance between the four modes of inland transport: road, rail, river and pipelines. These modes are not in competition but complementary, to offer a large range of solutions to its customers, including those in multimodality and combined transports.

Today's modal split sees road at 79%, rail at 15% and river at just 6%.

For the roads, Pasquier said a huge amount of public investment is expected to better connect Fos to the motorway network.

Marseille Fos is ranked in fourth place with regards to rail modal share in Europe. The port authority strongly invests both Fos and Marseille to go further.

Currently, UMF and GPMM are working with Duisport to create a land bridge between Duisburg, a city in western Germany, at the junction of the Rhine and Ruhr rivers, and Marseille Fos.

Pasquier said the river modal share has dropped in 2020 because of COVID-19 and other technical problems. With the recovery this share should reach again 10% and more. The port community continuously works with concerned players to optimise barge services in Fos.

Finally, the UMF has just registered a new trademark named 'Greenterland', as an extension of "green port" to promote Marseille-Fos strategy to reach new market in a sustainable way.

ABOUT THE AUTHOR

Marie-Hélène has been secretary general of the Maritime Union since 1996. The union (UMF) aims at representing all the employer organisations to coordinate, represent and mediate within the port community. She is also a member of the development council of the port of Marseille Fos, as well as on the board of the Port Community System (MGI – Marseille Gyptis International).

ABOUT THE ORGANISATION

The Port of Marseille Fos is a multipurpose, multi-channel port with infrastructure to handle all types of traffic. Thanks to its geostrategic positioning, at the heart of the Euro-Mediterranean area, and its quadrimodality (road, rail, river and pipelines), it is positioned as Europe's southern gateway.

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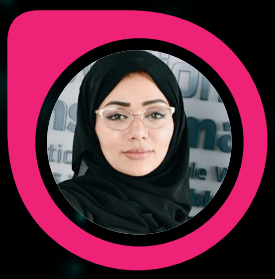

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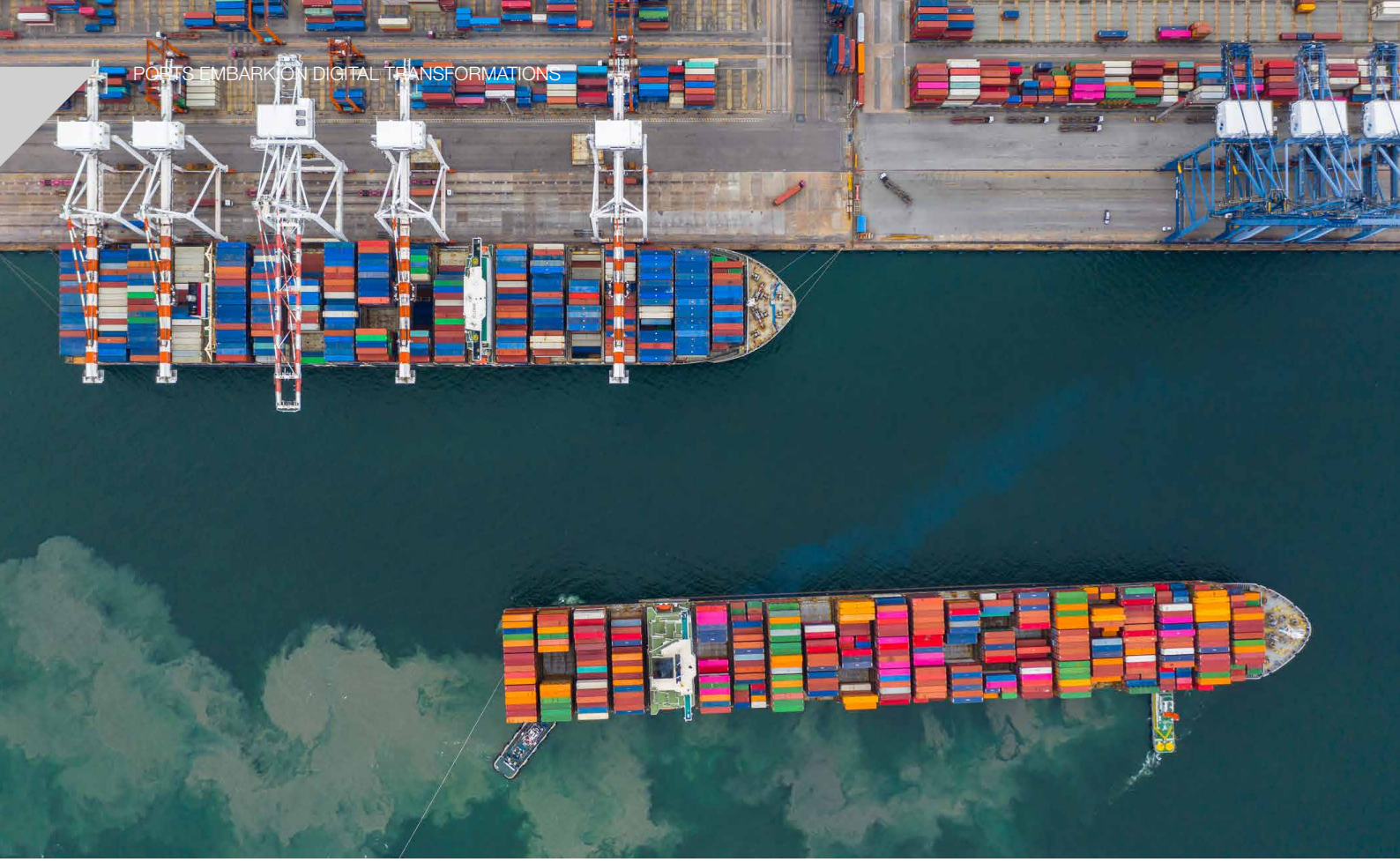


CARGO FLOW OPTIMISATION: A MUST FOR MODERN, COMPETITIVE PORTS AND MARITIME LOGISTICS ACTORS

awake.ai

Full cargo flow optimisation is critical for ports and terminals to achieve efficiencies but achieving this demands collaboration across all stakeholders. Since the beginning of 2020, maritime digitalisation trends have accelerated. There has been an increase in the unexpected fluctuation of import and export flows; it is now more critical than ever to achieve port call optimisation.

"Partial supply chain optimisation is not enough in today's world where changes and disruptions are a new normal due to climate change, changing trade routes due to COVID-19 and trade wars, and changes in manufacturing and food production locations and technologies," said Simo Salminen, VP of Product and Co-founder, Awake.AI.

What is cargo flow optimisation? Awake.AI's definition of cargo flow optimisation is exceptional transparency of ongoing cargo operations and data flow visibility to ensure the most effective use of resources and generate actionable insights for planned events.

Awake.AI suggests that a collaborative and holistic approach is imperative to attain intelligent cargo flow optimisation. "This kind of wider optimisation cannot be done alone if you are a shipping line, terminal operator/port authority or hinterland logistics operator but requires higher level, global, trusted and open data platforms like Awake.AI," said Salminen.

"Port call optimisation and wider port-bound cargo flow optimisation will be a must in modern competitive ports in just a few years," he said.

The key message from Awake.AI is that optimisation does not happen if you simply optimise one link within the supply chain. Awake.AI says its platform can assist in this wider-reaching optimisation as it enhances collaboration, data sharing, predictions, resource planning and offers real-time cargo visibility at all times.

At the moment, Salminen said he is not aware of a true optimisation platform approach in the industry which would include sea, port and hinterland scopes.

"There are multimodal optimisation platforms for land-side logistics that connect different delivery options and paths for door-to-door logistics, mostly within a single country," he said.

TradeLens from IBM and GTD Solutions comes closest and is the current juggernaut for containerised cargo flow tracking.

In 2019, industry thought leader Kris Kosmala said, "Today, even the best-known platforms don't include all the data necessary to make better supply chain decisions or don't reflect all processes that make the cargo move efficiently."

"Another drawback of the existing platforms is that they don't provide insights for each organisation engaged in moving cargo along its journey to improve itself. This is important because 'track-and-trace' pitched by today's platforms doesn't make for easier analysis of why the cargo moves at such and such speed through the series of handlers," Kosmala explained.

FULL TRANSPARENCY BENEFITS

Awake.AI explicitly says that its value proposition for cargo owners is to get full transparency of cargo flow at sea, in ports and on land.

Awake.AI delivers smart data to ensure efficient and reliable cargo operations and insight to plan future operations well in advance.

With the Awake Platform, cargo owner clients can track, trace, and optimise their cargo flow through ports. This provides an excellent overview to better prepare for deliveries and pick-ups at the right time.

Awake.AI outlines the key benefits for cargo owners as the following:

- Full transparency to sea-port-land cargo flow
- Manage the risks in cargo supply chains
- Better planning and prediction capability for days and even weeks forward
- Real-time information sharing, ensuring efficient and reliable logistic operations
- Saving of time and cost
- Reduce emissions in the logistics chain

The reduction of emissions is one of the top four effects of port call optimisation, Salminen explained. In addition to reducing sea, port and hinterland operational costs, optimisation can reduce the waiting time along the entire cargo flow and allows corrective action to be taken quickly in case of disruption of cargo through real-time and longer-term analysis.

"Ships wait with no operations activity at berths and anchorage up to 30-40% of the port call visit, and unfortunately still by far need to produce their needed electricity by auxiliary engines polluting the port and surrounding areas in significant amounts," Salminen said.

"Optimising truck and train traffic can also greatly reduce idling time at gates and inside ports, thus reducing environmental impact (noise and pollution)," he added.

However, while the benefits seem clear, there are still challenges surrounding greater supply chain optimisation.

First, there is a lack of willingness for partners to share data and see the value of this for themselves. There is still some progress and momentum required to change the industry's mindset to accept this type of business openness and see its mutual benefits.

In addition, Salminen noted that a large amount of systems integration is needed which slows progress today.

Proof of concepts and trials for wider port-bound logistics chains to show the value of a holistic approach require both time and some level of investment, which is not quite there yet. Business models and contract needs also must be taken into consideration.

Finally, there is a high demand for data analytics, optimisation and machine learning skills.

STANDARDS

But with all of this data comes the need for data standards. Yes, these standards are coming and are a major factor in cargo flow optimisation.

Notably, in October 2020, the Digital Container Shipping Association (DCSA) published standard data definitions for the port call process. This was the first publication of the DCSA Just-in-Time (JIT) Port Call programme.

By moving container shipping towards a JIT port call process, DCSA port call standards will enable container ships to optimise their steaming speed, thereby lowering fuel consumption and reducing CO2 emissions, the DCSA said.

Awake.AI argues it is essential to take a holistic approach to JIT arrivals. The company's Smart Port as a Service (SPaaS) application provides situational awareness, accurate data and identifies potential communication problems.

SPaaS offers all port actors tools to share real-time information securely, communicate any changes in advance, and make informed decisions toward optimised port operations.

Synchronisation between berth availability and JIT vessel arrival is crucial to ensure the completeness of the JIT concept. First, it is essential to ensure that the berth and terminal operators are ready to discharge and load the ship.

Therefore, Awake.AI also provides insight on the estimated time of departure (ETD) of the vessel at berth and provides berth visibility for the upcoming arrivals, inspections, mooring, pilots and towing.

This all requires information exchange with the port operator. This type of information exchange and operational activities require a trusted collaboration platform, Awake.AI noted.

WHAT IS NEXT?

Awake.AI says while they are more active on the sea and port side of cargo, they have also had discussions in North America, Central Europe and Oceania with local and regional intermodal terminal players.

"They are interested and have quite modern systems already in place and have the technical capability to connect and share data with the platform like we have. However, our main challenge seems to be at this time our company history (2 years) and making them see enough value for them to start in a few ports and grow from there," Salminen explained.

Salminen has said several things still need to happen to achieve optimised cargo flows for ports and terminals, many of which directly respond to the aforementioned challenges.

Sharing some of the cargo flow data within the port community and customers outside ports, preferably using open data platform(s), is a must.

Salminen also recommends that ports and terminals start investing money and especially skills into digitalisation in addition to their usual infrastructure investment.

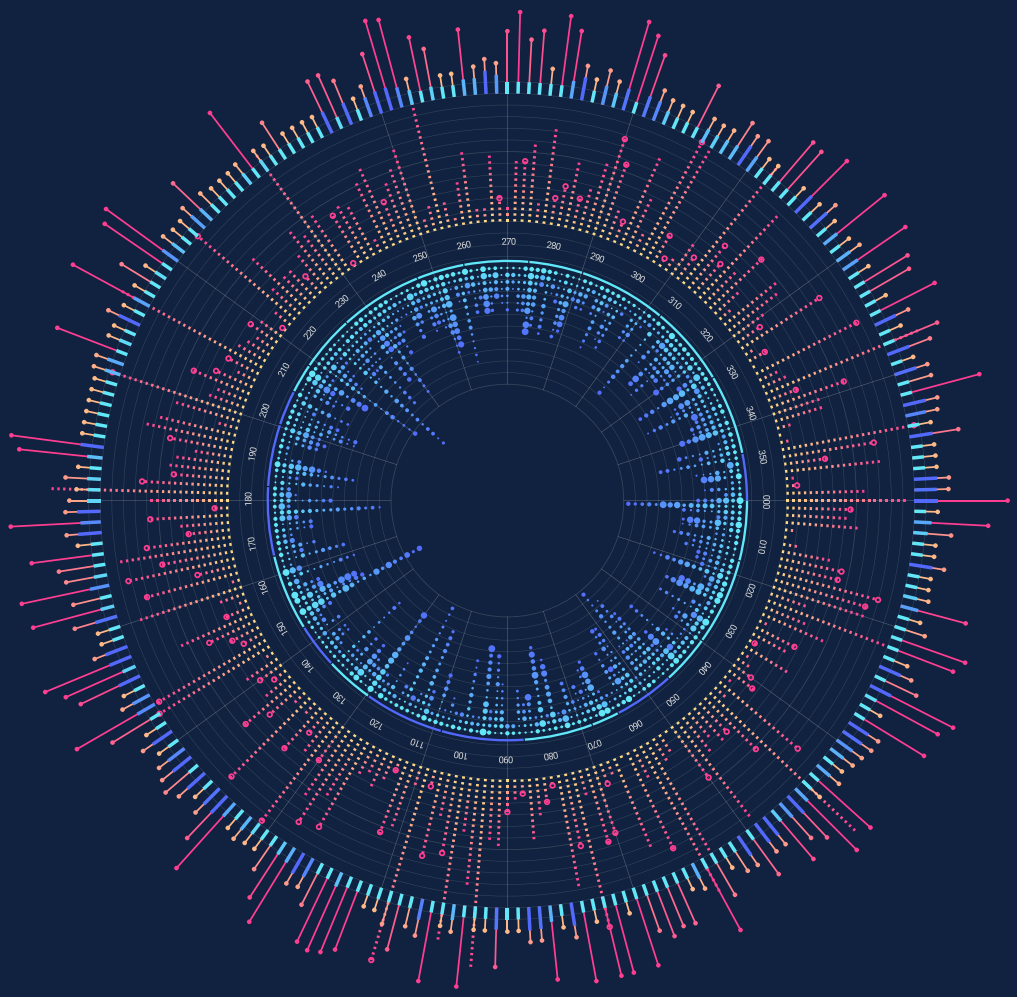
When it comes to digitalisation, ports should also install or upgrade their IoT type device installations for more automated cargo tracking, identification, counting and congestion detection.

Finally, Salminen said, "We need to recognise that cargo flow optimisation is happening not only at the sea, but also at the hinterland. Maritime industry is very traditional and far behind to implement the holistic supply chain model connecting sea, port and land". Salminen encourages industry thought leaders to realise the urgency and take actions towards sustainable maritime logistics.

Written by Beth Maundrill
In Partnership with Awake.AI

ABOUT THE ORGANISATION

Awake.AI is a software platform company building an ecosystem for smart ports and autonomous shipping. Awake.AI's mission is to lead the transition to sustainable and intelligent maritime logistics and reduce global shipping emissions with our ecosystem partners. The platform is the first of its kind, built from the ground up to accommodate seamless collaboration within the entire maritime logistics chain by sharing situational awareness and providing AI-supported predictions for future planning. The API's and applications built on top of the Awake platform are available for customers and third parties using the subscription business model. For more information visit www.awake.ai



DECISION DEMOCRATISATION USING MODERN DATA ANALYTICS

Dr. Eva Savelsberg, Senior Vice President, INFORM;
Dr. Boris Michel, Head of Sales & Technical Sales INFORM DataLab;
Matthew Wittemeier, Senior Manager International Marketing and Customer Relations, INFORM's Logistics Division

"MOST PEOPLE USE STATISTICS LIKE A DRUNKARD USES A LAMPPOST; MORE FOR SUPPORT THAN ILLUMINATION."

- Mark Twain

It would be impossible for us not to consider the global pandemic and its impact on the state of digitalisation as part of our three-part series on data strategy, and for good reason. The COVID-19 pandemic has taught all of us new things about society, about ourselves, and how we do work.

While some businesses had to shut-down due to national regulations, most in the maritime industry were deemed essential workers and had to find new ways to do many things that were once normal almost overnight.

Many challenges with service availability, communication, and decision management had to be overcome and fast. The rapid decentralisation of many teams led to technological and cultural advances. While many at first sought ways to continue things as they used to do them, they soon realised that novel approaches contain opportunities for sustained change and optimisation. Some say organisations' digitisation has moved forward five years in just the first six months of the COVID-19 pandemic.

What are the implications of the things we are looking at in our three-part series on data value generation? One of the issues many organisations have faced was inertia creeping into their decision-making processes.

START AT THE BEGINNING: DATA MANAGEMENT IS FUNDAMENTAL

Early in 2020, one could just walk into the office next door to ask for a particular piece of information. Now, with most of the administrative staff being in home offices, the only thing one has found next door was a child in home-schooling. That has meant we have had to resort to Microsoft Teams, Slack, emails, our phones, or any other means of communication to reach that someone sitting on the data we need to make a decision, or worse, get the data needed to compile a report to get to someone else needing to make a decision. These situations reinforced two things we know about decision-making: the power to decide needs to be democratised and the main resource to enable this decision democratisation is data.

DECISION DEMOCRATISATION AND DATA

To achieve this democratisation, we need to enable our people to have access to correct, reliable, and relevant data across organisational functions on a centralised platform via an intuitive interface. Additionally, they need access to business intelligence (BI) tools like Qlik Sense, Microsoft Power BI, or the range of others available on the market that enable them to load that data into an intuitive user interface that allows them to quickly visualise the information inside the data, to derive insights, and to ultimately take a decision.

It is important in a governed framework that data access is as open as possible for any individual that makes decisions on the spot. Put simply, while visualising and wrangling data in one's own domain might be sufficient most of the time, all too often, it is the data coming in from another business unit or function that provides valuable context that enhances certainty. Nobel Laureate Daniel Kahnemann put it best when he said, "No one ever made a decision because of a number. They need a story."

BUSINESS INTELLIGENCE TOOLS ARE FUNDAMENTAL

Modern self-service business intelligence tools easily enable users to build new analytics applications in minutes using a web-based drag and drop interface. More importantly, they enable people to extend existing dashboards and analytics with additional data with just a few clicks. This flexibility allows companies to bring digitally based, reliable, and informed decision-making to every level of their organisation. Not being able to reach a certain individual would no longer throw a spanner into the decision works since vital information can be drawn from a centralised source, easily refined, and easily understood.

Traditionally, enterprise BI solutions required substantial effort to set up and customise. However, with today's technology, building a BI dashboard is much easier than it was in the past resulting in a BI market that is crowded and very competitive. It is easy to get dazzled by fancy features and pretty dashboards that do not necessarily add value. Companies must make sure they get the best value out of their investment. As a starting point, buyers should ensure that their BI vendor has a proven track record of delivering tailored solutions to the needs of the bulk materials industry. This will make it easier to access relevant and actionable information for the planning and decision-making process across the maritime industry.

WHERE THERE'S DATA, THERE'S KEY PERFORMANCE INDICATORS

"Most people use statistics like a drunkard uses a lamppost; more for support than illumination." When Mark Twain wrote this quote more than one hundred years ago, the second industrial revolution saw electricity replace steam as the main source of power. Today, data drives industries around the world and is replacing uncertainty. With the latest digital technologies, one can measure almost anything, but just because they can measure something does not mean they should. The challenge is to count the things that really matter and relate to business success, namely Key Performance Indicators (KPIs).

In a modern terminal environment, there is no shortage of data and, increasingly, no shortage of KPIs to make that data "actionable." The problem is having the right KPIs. KPIs combined with the latest BI tools provide granular visibility as never seen before. How can these insights be used to drive logistics performance and decision-making? Good KPIs are also quickly measurable and reproducible. Equally, if not more important, all departments across the company should have the same understanding of a particular KPI.

Focus must also be given to contextualise a KPI. As an example, focusing solely on ship-to-ship (STS) productivity is certainly a wise move for a maritime terminal. However, when not considering the broader process chain involved in taking containers to and from STS cranes, the KPI is only likely to reveal the symptom and not the cause of any potential issues. A well-rounded suite of KPIs that consider the complete terminal operations are more likely to assist managers in diagnosing operational issues in real-time.

BI tools take the dashboard idea to the next level. Beyond simple reporting, they offer trend analysis, forecasting, what-if-scenarios and have the power to drill down to the deepest level of detail to analyse each transaction. In the race for data, the latest BI tools combine data from a multitude of sources and enable port and terminal operators to discover new relations in their company's data structure.

DATA LITERACY – IT'S NOT A SKILLSET; IT'S A MINDSET

A shift needs to happen with regards to how people see data visualisation, reporting, and analytics. In many organisations today, people use analytics, but they use it because they have to for meetings, reports, audits, etc., things that are more of a chore than something they do for themselves. People must learn to recognise data and analytics as a chance to enhance their everyday work lives. Staff need to learn to want to use analytics. Insight-driven decision-making is therefore not simply implemented on a technology level but needs to be anchored in a company's culture. The term that combines the "upskilling" (knowing how to use tools and how and when to use which data or visualisation) and the mindset shift is called "Data Literacy." And just like general literacy, the ability to read, work with, analyse, and argue with data should become second nature to people in a data-driven company – at every level.

Describing ways of how to drive data literacy and transforming an organisational culture towards becoming more data or insights-driven would require an

entire article by itself. Do not be put off by the subject. It should also not come as a surprise, after all, in 2018 we penned a paper in PTI's Journal titled "Humans and Technology Understanding the Sceptical User" where we dug into the psychology of humans and change, especially change resulting from technology projects. Normally, there is no need to run an entire organisational overhaul with a massive management consulting project. The best way to get started with this is to pick an area of need, find early adopters, and generate results.

READ MORE:
HUMANS AND TECHNOLOGY

MOVING FORWARD

What does all of this mean for us? We have seen that data analytics is already much more than just a tool that gives us quicker access to our numbers for reporting purposes. It is a tool that allows us to aggregate and view business and associated data in context, which enables us to make informed, fact-based decisions. Modern BI platforms allow users to access governed, curated information and then extend it using readily available data from a centralised data analytics platform. This gives people a huge advantage by not having to escalate questions across a hierarchy but enables them to make decisions by themselves – with the highest level of certainty.

Deploying data analytics platforms and inspiring the people in an organisation to embrace data or insights-driven approaches to tackle their everyday challenges is something that we have been successfully doing for many years and to great effect. In our next article, we are going to elaborate on how you can use data science with modern algorithms and AI to broaden the data foundation underlying individual decisions even further, which will continue to push the limits of operations and automation.

Stay tuned...

HOW CAN INFORM HELP?

At Inform, we are always looking to the future to understand what products and solutions we need to be developing and positioning into the port and terminals industry. Building on our decades of experience and rich knowledge base that spans our 850+ strong company, Inform has been quietly working on our data strategy offering to enrich our customers' data sets, which in turn enriches our Machine Learning-, AI-, and Operations-Research-based algorithms, all of which depend on good quality, and, as we learned here, timely access to data. Leveraging both the expertise of Inform's DataLab and our team's rich industry experience, our data strategy services are unmatched in the industry.

ABOUT THE AUTHORS

Boris Michel is the lead for Inform's DataLab Sales and Strategy effort. As the head of the Sales and Technical Sales department Boris and his team are working closely with customers and partners to drive the adoption of solutions and processes that enable people to make healthy, data driven decisions. These approaches cover the entire data value added chain starting from raw data all the way to sophisticated Business Intelligence Applications or AI solutions based on modern data science.

Dr. Eva Savelsberg is Senior Vice President of Inform's Logistics Division. She specialises in Optimisation Software that renders a wide range of operational processes more productive, agile, and reliable. Eva is also lecturer at the University of Aachen (RWTH), where she received her PhD in mechanical Engineering in 2002. Eva has published 5 books and over 40 papers on innovation in freight transportation.

Matthew Wittemeier is Senior Manager International Marketing and Customer Relations at Inform's Logistics Division where he's become a thought-provoking contributor to many industry publications and conferences. He's co-author of the multi-award winning 2038: A Smart Port Story – a novella about the future of technology and the social challenges it may bring. In addition, he serves on the board of YoungShip Rotterdam as well as the senior producer and host of the buzzITtalk podcast.

ABOUT THE ORGANISATION

Inform specialises in AI and optimisation software to improve operational decision making. Based in Aachen, Germany, the company has been in the optimisation business for 50 years and serves a wide span of logistics industries including maritime, intermodal, and inland terminals. With a broad range of standalone and add-on software modules, Inform's unique blend of algorithmic based software expertise, rich industry experience, and big world thinking delivers huge value for their customers.

"A SHIFT NEEDS TO HAPPEN WITH REGARDS TO HOW PEOPLE SEE DATA VISUALISATION, REPORTING, AND ANALYTICS."

DIGITAL TRANSFORMATION: THE BENEFITS EXTEND BEYOND YOUR TERMINAL

Ajay Bhardwaj, Sr Director of Product Management, and Meena Shah, Sales Engineer, Navis

Data is transforming the world- the increasing rates at which data is generated, shared, stored and analysed is staggering. Digital transformation can be viewed as the movement of processes, functions and information flows utilising the benefits of data and analysis aided by modern technology.

The maritime ecosystem is rapidly evolving to becoming more digitised across the globe and are all on the path to becoming more digitally connected. In this article we will take three high level use cases that exemplify the need for digitalisation and opportunity it presents to vendors and stakeholders.

1. Lack of transparency in data exchange
2. Inadequate visibility
3. Automation

LACK OF TRANSPARENCY IN DATA EXCHANGE

The lack of transparency in data exchange is a well-known problem and has many facets to it. COVID-19 has undoubtedly changed the way we do things. In many ways, it has accelerated digitisation due to the inability of physical transactions and personal interactions during a pandemic. Imagine terminal operators reducing their time on phone, emails and paper trails significantly - the opportunity to engage in their core business initiatives now is greatly enhanced. The alternative to voice messages and emails (and other inefficiencies) is the idea of a connected and digitised ecosystem. For instance, with mobile applications we can digitise operations within the terminals for bulk, breakbulk, ro-ro and container cargo. The mobile capabilities extend to the crew working pinning stations, to lashers and deck crew aboard vessels.

Additionally, many terminals are facing a need for contactless entry and to reduce face to face interactions to keep their workers safe. As we start to digitise these operations, our terminals often identify ways to improve safety for their workers, as well as reduce operating costs. They gain visibility into true productivity figures and are able to plan the workforce more accurately for demand.

Terminals and carriers are also rapidly seeking ways to electronically exchange data that can help improve overall efficiency of transactions. Integrating better estimated time of vessel arrival predictability into software systems or predictions around estimated time of completions at the terminal can improve planning and resource allocation.

Predicting and optimising vessel berthing locations while considering horizontal transport distances can drive efficiencies, reduce emissions, and enable shorter vessel port stays allowing vessels to slow steam further reducing global emissions.

Predicting equipment maintenance requirements based on historical data can extend the useful lifetime of equipment assets, reduce costs by merging maintenance windows for multiple assets, avoid costly off-hours unplanned maintenance, and avoid service level failures due to unexpected equipment downtime. Data exchange technologies have evolved rapidly and ideas like blockchain based systems which have a single source of ledger-based tracking are helping entities keep track of milestones in processes.

INADEQUATE VISIBILITY

Inadequate visibility and tracking of data and assets creates opportunities for improvements in areas such as reducing maintenance for equipment, container damage tracking, vessel efficiency improvements and others. Artificial intelligence (AI) and machine learning (ML) technologies can be layered on top of the measurable data and useful predictions derived from the data sets. Waiting times at terminals is a huge pain point as well- these include trucks having to wait at the gate due to appointment delays, unproductive movements to uncover target containers causing delays, or vessels having to wait for pilots or for an available berth to mention a few. Solutions available today help alleviate these and collectively underscore the importance of digitalisation within the ecosystem.

Navis' next generation solutions leverage the Navis Smart Data architecture that not only allows us to process data faster in real time, but also enables data integration from other TOS and different third-party applications to derive valuable correlations.

Navis Smart OpsView focuses on real time Key Performance Indicator (KPIs), insights that help our customers manage operations 24/7. The Analytics platform is powered with latest technologies like Natural Language Processing (NLP) and easy to analyse datasets, giving our customers the ability to figure out why things happened the way they happened and predict what could happen in the future. Many terminals look to leverage the data they are producing and as they start to extract this data from their various systems, they run into a lot of different issues which can cause project delays. By building applications that can consume streams of data, they can subscribe to event updates, and reduce the need to rebuild infrastructure for downstream applications which may consume the same data. With the integration of other data streams, such as financial systems, equipment maintenance, and labour management terminals can determine where in the operations it makes sense to invest, such as when evaluating modernisation, expansion and automation projects.

AUTOMATION

Automation builds on the idea of digitalisation, providing more predictability over operations and improved asset usage. As processes and decisions are automated, variability is reduced between shifts and levels of experience. Automation enables one to get the most of current assets, which reduces fuel emissions and leads to a cleaner terminal and port. Digitalisation is also about being to connect various systems together and automate updates instead of relying on email and phone call exchanges. We have been working with terminals in Europe to implement the forwarding and transport schedule and availability information message (IFTSAI) EDIFACT message which can exchange vessel actual arrival/depart times and update vessel schedules. This can keep all parties informed on berthing information and proformas and can be pushed from liners, partners of liners and shipping consortia or port community systems and centres.

There have been two notable learnings (for all of us) from the digitisation efforts seen thus far. Firstly, the idea of going digital is only as good as the adoption of digital technologies. For example, when two entities want to exchange data digitally, but only one of them is bought into the technology, the idea will not work. There needs to be incentives for both parties exchanging data and sharing the derived benefit, which is amply seen within other processes at terminals or vessels at sea. Secondly, digitalisation breeds the need for data compliance and governance. This may soon become a huge issue if left unchecked and if the security measures taken are inadequate to ensure data integrity. These concerns can be mitigated with platforms that can provide digital trust and governance such that data contributors are able to determine levels of access and duration to address concerns around data ownership and use. Such a platform can then be consumed by authorised applications to deliver use cases based on trusted provenance and transparency, that solve specific operational challenges with real quantified benefits to stakeholders driving further buy-in with the technology.

Now is the time for ports, terminals, carriers, and their logistics partners involved in the ocean supply chain to act if they want to remain competitive in an ever-changing market. Customers are demanding more of their supply chain networks and the adoption of digitalisation technologies will provide a better level of service and consequently, customer satisfaction once implemented. Organisations that can harness new technologies to make data-driven decisions will realise new opportunities that would otherwise remain unseen. The vision of smart, sustainable ports and terminals are within reach for those who are willing to commit to the future by investing in innovative technology now.

"THE IDEA OF GOING DIGITAL IS ONLY AS GOOD AS THE ADOPTION OF DIGITAL TECHNOLOGIES."

ABOUT THE AUTHORS

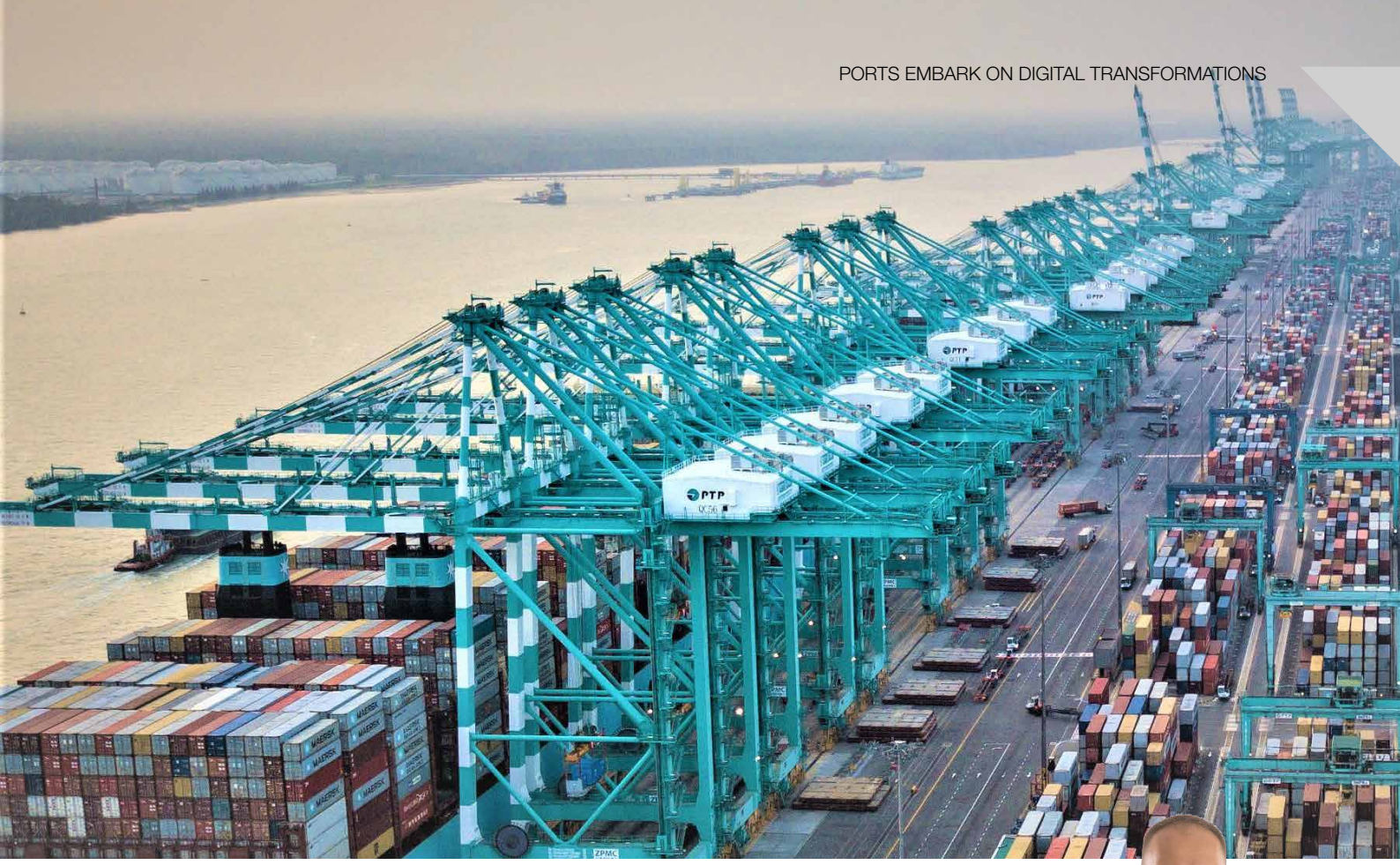
Ajay Bharadwaj is responsible for Navis's cloud initiatives and SaaS application offerings. Ajay brings expertise in launching products to cloud environments, security, and pricing and licensing models. Prior to joining Navis, Ajay held leadership positions in product management across Enterprises in the Networking and Security domains. Ajay has a BS & MS in Computer Science. He also holds an MBA degree from the University of California, Los Angeles.

Meena Shah is a Sales Engineer at Navis focusing on brownfield retrofit automation and optimisation. She has over a decade of experience developing software solutions for both automated and conventional terminals. She holds a BS in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology and a MS in Computer Science from the California State University East Bay.

ABOUT THE ORGANISATION

Navis provides operational technologies that unlock greater performance and efficiency for our customers, the world's leading terminal operators. The Navis N4 terminal operating system (TOS) represents more than 27 years of experience and innovation that enables terminals to optimise their operations and move cargo smarter, faster and more efficiently.

As an industry leading technology, more than 270 container terminals worldwide, including some of the world's most advanced automated facilities, have partnered with Navis to improve performance, reduce costs and minimise risk.



GROWTH PRIORITIES AND EQUIPMENT PURCHASES AT THE PORT OF TANJUNG PELEPAS

Interview with Marco Neelsen, CEO, Port of Tanjung Pelepas

The Port of Tanjung Pelepas will continue to be agile, adaptive and resilient against the crisis of COVID-19 and the resulting economic instability as it continues its growth journey.

Part of that growth is to double the TEU throughput at the port.

"With the increase demand from our customers and our growth prospect, our primary focus moving forward is to optimize the current terminal footprint up to 15 mil TEUs in the coming years," Marco Neelsen, CEO, Port of Tanjung Pelepas, told PTI. This compared with the current footprint of 12.5 million TEUs.

"This programme covers the upgrading of our equipment fleets such as procuring more ship-to-shore (STS) Quay Cranes and subsequently adding landside equipment like Electrified Rubber Tyred Gantry Cranes and Prime Movers. Apart from that, the initiative also covers improving existing infrastructure and further enhancing our terminal efficiency and processes via the digitisation and automation effort.

"The business environment remains unpredictable and dynamic; it is therefore imperative for PTP to be swift and agile in adapting to any challenges. Nevertheless, PTP remains proactive in managing into its long-term strategy, venturing into future projects to meet our customer's supply chain demand," added Neelsen.

Regarding equipment at the port, PTP currently has a total of 24 STS Super Post Panamax Quay Cranes out of its total fleet of 66 quay cranes along its 14 berths totalling 5.04km in linear wharf design.

Its deep draft of 18.5m will ensure the new generation of Ultra Large Container Vessels (ULCV) can safely navigate in and out of PTP at all tide conditions.

In 2021 the port plans to procure additional seven STS quay cranes which are projected to be fully delivered by mid-2022.

"These cranes will serve mainly feeder vessels and at the same time permit movement of existing volumes across berths, providing operational flexibility and subsequently allowing PTP to optimize vessel berthing arrangements," according to Neelsen.

Furthermore, PTP will also procure 11 new 61T Twin Lift Electrified Rubber Tyred Gantry Cranes (E-RTG) as part of its equipment modernisation plan. All equipment is expected to be put into operation by Q3 2022.

"THE BUSINESS ENVIRONMENT REMAINS UNPREDICTABLE AND DYNAMIC; IT IS THEREFORE IMPERATIVE FOR PTP TO BE SWIFT AND AGILE IN ADAPTING TO ANY CHALLENGES."

THE IMPORTANCE OF DIGITALISATION

The seamless exchange of info and data amongst the industry players will become more crucial as port community will demand tighter collaboration, faster responsiveness and immediate access in data exchange and sharing in the face of the continued uncertainties caused by the pandemic.

In addition, Neelsen also said that it is imperative for all within the industry to work closely among the supply chain players and stakeholders to ensure the sustainability of continuous business growth.

"Digitisation will naturally become even more important as port community at present demands tighter collaboration, faster responsiveness and immediate access in data exchange and sharing. TradeLens platform for example, is a Blockchain that is able to provide PTP with the secure and collaborative digital tool enabling PTP to view millions of shipment events and documents, helping to simplify the process."

DIGITALISATION PROGRAMMES

PTP is continuing its digital journey with the roll out of a number of key programmes.

1. Asset Digitalisation (AD) or Fleet Management: A combination of LIVE vehicle tracking and management of vehicle maintenance which aim to maximise PTP's Operations efficiency, increase productivity and improve safety for an organization's vehicles and drivers.

2. Data Lake and Analytics: A PTP wide data storage repository with a data analytics platform. Data lake will help to break down data silos, centralising and consolidating all PTP's dashboards and analytics tools and to streamline data assets into a complete and authoritative data store for analytics that is always up to date.

3. The Internet of Things (IoT): Goes hand in glove with Data Lake and Analytics and is aimed to enable PTP interconnection and integration of the physical world and the cyber space.

It will be applied to PTP's existing container terminal and enable collection of sensor data, machine communications and automation systems. These IoT data will then feed into PTP's digitalisation efforts which include Asset Digitalisation, SCADA Control System, Autonomous Prime Movers, Operational CCTV Digitalisation and Data Lake and Data Analytics platform.

IoT unlocks PTP Business Value by deriving data-driven insights from IoT data to help better manage the business, increasing productivity and efficiency of business operations as well as easily and seamlessly connecting the physical business world to the digital world to drive quick time to value.

4. Blue Collar Incentive Application: The application enables our blue-collar workforce to see live feedback on targets, moves and even how much incentive they will earn at each individual end's shift as well as earning projection if they continue to perform at specific self-chosen rate. Such approach allows us to digitise not only our equipment but also our people to make everything and everyone in the port environment a source of data and therefore provide more opportunities to improve, while at the same time limit CAPEX spending and waste accordingly.

5. Autonomous Prime Mover Project: A joint collaboration project between PTP and Terberg Tractors Malaysia (TTM) to develop autonomous prime mover project. Discussions are also underway between the key stakeholders for this pilot, namely APM Terminals, Terberg Tractors Malaysia (TTM), supported by Terberg Benschop from the Netherlands, to scope out the key milestones for the first stages of the pilot. The pilot is expected to take between 12 to 18 months for reaching the first milestones/ Proof of Concept.

ABOUT THE ORGANISATION

The Port of Tanjung Pelepas (PTP) is strategically located at the confluence of the main east-west shipping lanes, offering Shipping Lines minimal deviation time of 45 minutes. PTP is situated in a sheltered bay and has no tide restrictions.

Local cargo movement to major industrial estates is accessible through the second Malaysia-Singapore expressway and the north-south highway. In addition to road, sea and air inter-modal linkages, PTP is also connected to the national rail grid passing through Peninsular Malaysia from Singapore to Southern Thailand.

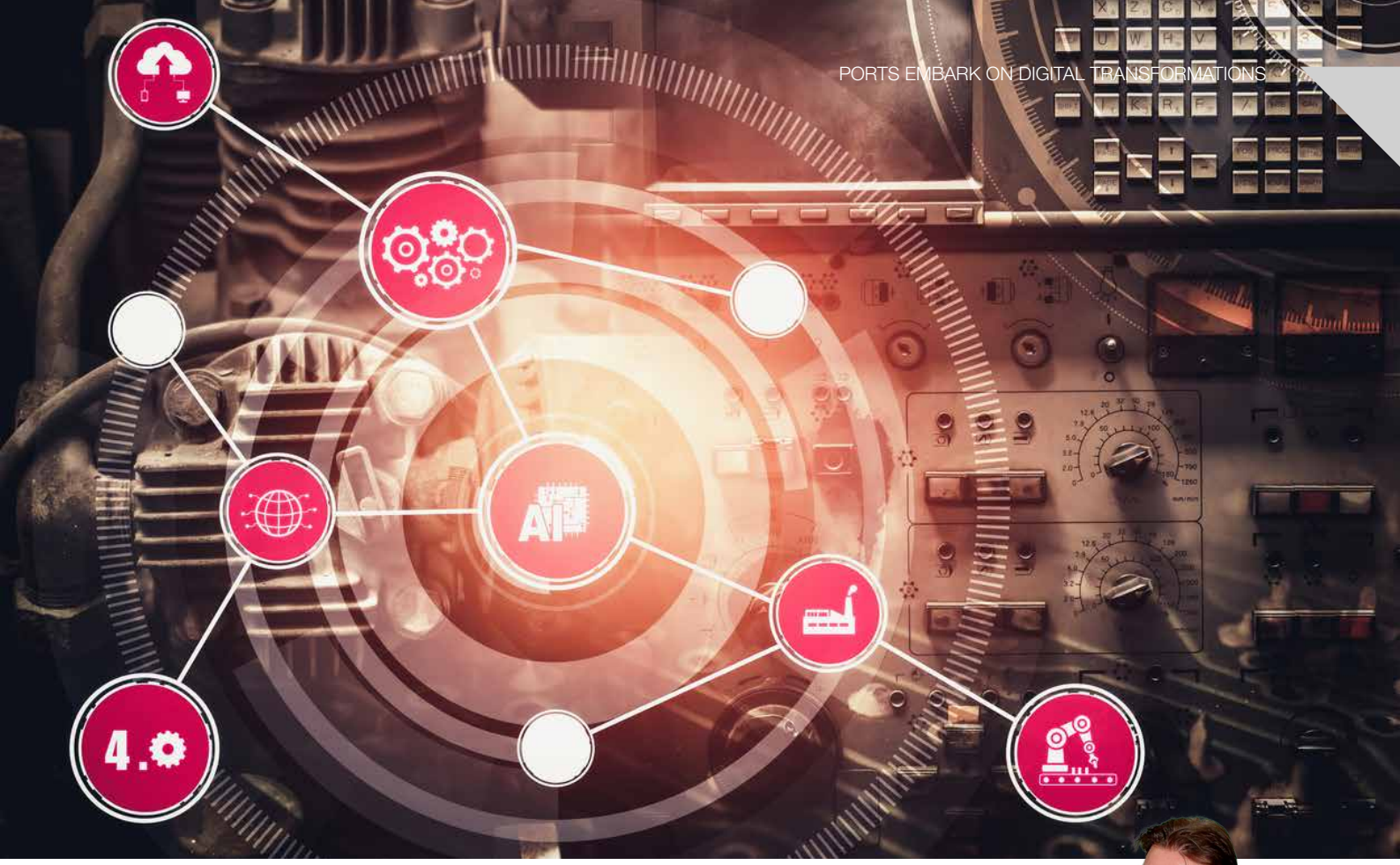
PTP has 14 linear berths totalling 5.04km. The terminal is equipped with 58 Super Post Panamax cranes, 16 of which have a 24-box outreach catering for the next generation of Triple E size vessels.

ABOUT THE INTERVIEWEE

Marco Neelsen joined PTP as Chief Executive Officer on 7th of November 2016. A certified and trained navigational officer, Marco holds a Bachelor Degree in Maritime Transport and a Master Mariner in Maritime from Germany.

Prior to joining PTP, Marco served Buss Port Logistics GmbH & Co. KG in Hamburg / Germany as its Chief Executive Officer, leading a Portfolio of 12 Terminals (General Cargo, Offshore, Contract Logistics, Bulk and Shortsea Container) in Germany, Netherlands and Turkey.

He also spent almost 10 years in Middle East in various Operations and Executive position within the A.P. Møller Terminals Group in places like Salalah/Oman/Aqaba/Jordan and being the last one CEO of APM Terminals Bahrain. He also worked a short while in Lagos / Nigeria at the APM Terminals facility.



COME ON, LET'S TWIN

Robin Audenaerdt, Audenaerdt Project Management

Digital transformation has taken a giant leap into the future over the past twelve months. The impact of the COVID-19 pandemic is set to sure accelerate the pace of investments in digital transformations and implementations in ports and terminal operations.

TRANSFORMATION

While the common term is transformation, what we actually mean is evolution. Transformation is a marked change in form or appearance, whereas evolution is growth and advancement.

So, talking about digital transformation, what does it mean? The words transformation and change are often used interchangeably. Moreover, transformation is also viewed suspiciously – a codeword for technology, cost cutting and ending of careers.

While change seems future-oriented, it is firmly embedded in the past. It often tries to produce a better version of what already exists. The use of the term 'digital revolution' is also often used. This is linked to the previous industrial revolutions.

The Third Industrial Revolution, also known as the Digital Revolution, occurred in the late 20th century, after the end of the two world wars. The production of the first computer was the beginning of more advanced digital developments. The next significant development was the supercomputer, with extensive use of computer and communication technologies in the production process; machinery began to minimise the need for human power.

Nowadays we talk of a Fourth Industrial Revolution, using modern smart technology. Large-scale machine-to-machine communication and the Internet of Things (IoT) are integrated. Smart machines can analyse and diagnose issues without the need for human intervention.

With the introduction of this technology in the port industry, the role of dockers has further been transformed from hands-on, physical jobs into white-collar, monitoring and process controlling jobs.

This requires totally new skill sets like overall insight in logistics, working with automation tools and able to pre-plan operations. However, the more we automate, the more we become dependable of the people who are able to deal with exceptions. This is because all automation will have its exceptions and bugs and dealing with them efficiently will make all the difference with your competition.

TWINNING

The current acceleration in the usage of digital twins is mainly possible thanks to IoT and the lowering costs of technologies.

The COVID-19 pandemic has also made our industry better understand the value of new technologies.

Moving operators from the crane or truck cabin into offices and having them operate by remote control and automation allows more capacity of the equipment to be utilised.

Today, remote operation and exception handling are an integral part of automation that enables people to be separated from machines and moved from a dangerous and harsh working environment to the safety and comfort of a control room. This has made it easier to socially distance and maintain efficiency levels during national lockdowns that have been put in place to control the spread of COVID-19.

New technologies, such as artificial intelligence (AI), 5G, big data, IoT and cloud computing, will transform infrastructure

in ports and terminals and build so-called "digital twins".

Digital twins can be defined as an evolving digital profile of behaviour of a physical object or process tiered to optimise business performance. It is based on a set of measurements, capturing real time information from the physical world.

A digital twin of your terminal or port can deliver a set of insights, augmenting the capability to take business critical decision based on the information attained. Hence, entire processes can be redesigned as a consequence of actionable insights. It has promoted the shift from traditional thinking to automated and intelligent thinking. It is an ingenious approach that facilitates transformation without risking operations.

The Port of Rotterdam, one of Europe's largest and busiest ports, has embraced this approach. Sensors throughout the enormous dock facility continuously gather real-time data about air temperature, wind speed, humidity plus water flow and levels, tides, and currents.

The port uses smart quay walls, sensor-equipped buoys and other IoT devices. Each day, their platform is already processing more than one million data points for models, systems and users. Using AI to analyse all the data collected it is possible to predict more accurately what is the best time to moor and depart. This reduces waiting times, costs and will add to the sustainability goals of the port.

An increasing number of ports, terminals and businesses will explore opportunities to use digital twins in order to design new products, business models whilst optimising processes and make data-driven decision in real time.

This course of action will be aided by more advanced network connectivity such as 5G, providing an almost limitless opportunity around track and tracing, real time monitoring and flow of goods.

Capital-intensive assets and processes like manufacturing, utilities, and energy are already at the forefront of research and application of digital twin use cases taking on the lessons learnt from the aerospace industry.

An example of pioneering research is the application of digital twins in the healthcare sector and its application to monitor patients. We can now create a digital twin of a human body in order to monitor and respond to diseases or pandemics. With 3D printing of organs as a very likely future scenario, the age of the digital twin is coming.

GET A MOVE ON

Building a Smart Port or Terminal does not happen overnight, it takes many small steps to get to the end goal: Does it really?

I would argue that in taking these small steps, we will never reach the moon. As a valued business partner once said to me in an innovative discussion; "while shooting for the moon, man should not build a stair but shoot a rocket". In other words, small steps and evolution will not cut it. We need revolution.

Data forms the heart of AI. The success of AI-driven digital transformations, therefore, relies greatly on the ability to draw insights from big data. These are the critical building blocks of AI. However, this is the area where most organisations are still struggling.

Whilst some of us are still arguing about the ownership of data or the risk of sharing it, without looking beyond and viewing the enormous potential, we need to get a move on.

Sometimes it looks to me like the industry is lacking the bold ones who can spark off these revolutionary innovations. Instead, incremental advances in technology and processes are currently being executed only by a few companies in the industry (who are boldly going where no men have gone before).

"SMALL STEPS AND EVOLUTION WILL NOT CUT IT. WE NEED REVOLUTION."

ABOUT THE AUTHOR

Robin Audenaerdt, MSc., MA, started as a project engineer at Europe Combined Terminals in Rotterdam in 1995. Robin holds university degrees in Logistics, Business Administration and Supply Chain Optimisation from Insead. With first-hand experience from the first fully automated container terminal in the world, he has been working as a freelance project and implementation manager for container-, car-, and air-freight terminals and ports ever since. In the last few years, amongst other projects, he has been working for- and with - the Port Authority Rotterdam on the development of the Container Exchange Route which will enable autonomous transport of containers on the Maasvlakte in Rotterdam. Currently he is working on new projects for APM Terminal's Maasvlakte II terminal.

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This year's event will host debates on the state of the sector featuring C-Level leaders from the industry. Explore the emerging technologies that are revolutionising the sector and help guide your continued journey towards automation.

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President
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PROGRAMME HIGHLIGHTS INCLUDE:

- Get an update on the state of the sector from C-Level speakers representing industry leading terminal operators.
- Discover the best strategy for automation and hear from successful adopters.
- Extract value from emerging technologies such as AI, machine learning and digital twin.
- Promote collaboration between the industry's key players to both push for data standards and work towards sustainability goals.

"A great opportunity to learn new technologies, strategies, and trends and hear about the strategies of other terminals."

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