

Data-powered, real-time port sustainability

by Grant Ingram, *CEO for the UK and EMEA, Innovez One*

As volatility is now a feature of life for ports around the globe, becoming ‘smart’ is more than just a buzzword. Digitalisation is at the core of these ports’ sustainability strategy, helping them build resilience to not only improve their efficiency but also meet their long-term decarbonisation goals.

After over two years of supply chain disruption, it’s no surprise that someone has developed a digital tool to identify supply chain bottlenecks around the world. CNBC’s new **Supply Chain Heat Map** was created in partnership with ten of the world’s top maritime and logistics data providers, and it shows global supply chain challenges in real-time. There are many, and they are expected to continue to impact trade well into next year.

Not only is this causing shocks across global supply chains, but it’s driving up emissions, both as ships idle outside ports and as they race to make the most of the higher rates that congestion brings. This is a major issue for ports around the world, many of whose long-term goals depend on them increasing efficiency and throughput but also developing the regions around them into new technology hubs. In the UK, for example, port areas are looking to play their part in the regional Levelling Up agenda, becoming hubs where supply chains, energy chains, and renewable technology intersect.

On the global stage, ports also have a significant role to play in making green shipping corridors a reality. As countries such as Australia, Japan, the UK, and the US have pledged to develop zero-emission shipping routes between selected port hubs, it is clear that these must be supported by a network of efficient, green ports. Smart ports will also play a key role in enabling just-in-time arrivals, which can curb emissions by 14% on a per voyage basis, **according to a recent study** by the International Maritime Organization.

As a vital component of global supply chains, ports must be ready to play their part – by reducing their own environmental footprint and by putting the right measures in place to help the visiting ships minimise their emissions in the critical ‘first and last mile’ of their journey at sea. Ports, and particularly the communities they support, cannot afford for congestion to undermine

these goals. While the challenge is colossal, the starting point is clear: digitalisation.

No easy task

It is critical to understand where the bottlenecks are to mitigate the impact of congestion on global trade. With its MarineM solution, Innovez One is contributing its analytical power to a different aspect of the problem – building efficiency at the local level. By optimising tug, service, and pilot operations, we help ports tackle their emissions.

This is no easy task. More than just places where goods are loaded and unloaded, ports are complex ecosystems of their own, where numerous moving pieces (pilots, tugs, trucks, service boats) are dispatched to welcome vessels as they arrive or depart. Reducing the amount of carbon emitted by these marine service fleets requires organising them in the most efficient way possible to assign the right assets to each job and avoid unnecessary journeys.

We do this by using artificial intelligence (AI) to handle the vast amount of constantly-evolving variables that are essential to optimise all port resources. Where manual processes, spreadsheets and whiteboards fall short, algorithms can solve complex puzzles and calculate optimal resource allocation. AI can take into account additional constraints such as the need to assign pilots to specific vessel types and sizes depending on their licence, the types and number of tugboats required for each job, and even the shuttles needed to take the pilots to the correct boarding grounds.

By making the most of resources, digital solutions eliminate unnecessary journeys and reduce the overall distance travelled, which makes a significant difference in emissions. A tangible example is the Indonesian Tanjung Priok, the 22nd busiest port in the world. The implementation of MarineM’s AI-powered scheduling reduced the overall distance travelled during tug/pilot operations by 20%, saving \$155k in fuel annually. Not only did

the port see tangible benefits in reducing port congestion, but it was also fiscally savvy, as the payback was a mere six months.

At an unmatched speed

Beyond that minute-by-minute, day-by-day logistics management function, our AI-powered MarineM system enables ports to simultaneously reduce emissions caused by having harbour craft and cargo ships idling unnecessarily in port waters. This makes it a long-term decarbonisation tool as well as a precious instrument to minimise disruption in the first and last mile of shipping logistics chains.

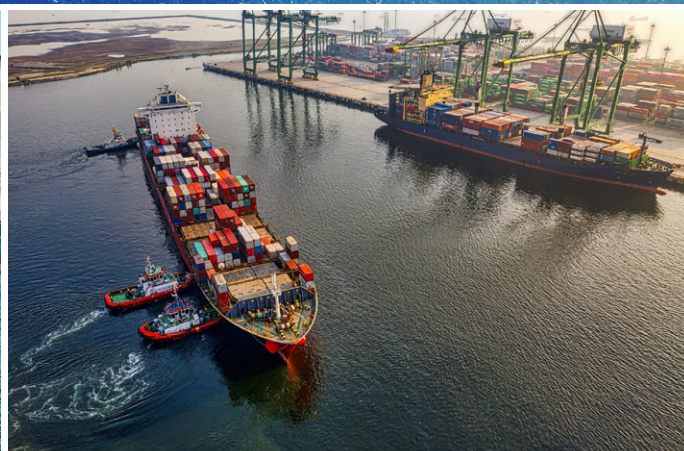
One of the fundamental advantages of AI-powered algorithms is that they learn from historical data to predict the duration of each job based on many factors like weather conditions, vessel type, and the required level of service. This remarkable accuracy helps ensure all the moving pieces fall into place seamlessly, so everything is ready to welcome ships exactly when they arrive. Crucially, these algorithms can adapt to any changes in vessels’ estimated time of arrival, updating schedules, and reallocating resources at a speed unmatched by manual systems.

This gives ports the flexibility needed to respond to problems or delays elsewhere in the supply chain, which is key to minimising the amount of time that vessels spend queuing outside ports with their engines on. Time efficiency-wise, in Tanjung Priok, MarineM has reduced the average waiting times for visiting ships from 2.4 hours to 30.6 minutes.

This increased resilience is even more critical in the context of the unprecedented congestion experienced in ports worldwide. Just like in traffic jams, congestion inflates idle time as vessels wait on anchorage, which inevitably leads to a spike in emissions. The congestion experienced during the coronavirus pandemic is no exception – emissions have doubled in the ports of Singapore and Los Angeles during this



Photos: Innovez One



period, according to a study by Singapore's Nanyang Technological University.

Good governance

Digitalisation also helps ports of all sizes overcome some of the most immediate challenges that they face daily. Problems with ordering and scheduling are common: frequent order amendments for pilots, tugs and pilot boards, inaccurate job entries, and inefficient scheduling can all drive down productivity. The manual, paper-based processes still in place in the majority of the world's ports frequently lead to billing issues, delays, lack of interoperability, and disputes.

One of the main benefits of digitalisation is its impact on good governance principles, another essential part of the sustainable development puzzle. MarineM captures job requests, automatically tracks the progress of each work, and generates invoices automatically – creating transparency and minimising the risk of errors or disputes.

Not only does this help users get paid on time, but the data collected also facilitates audits and accountability. By gathering data on the operation of fleets at a granular

level, ports or service providers can more easily detect any irregularities, thereby preventing misuse of assets (e.g., illegal use of water or fuel theft).

More important than ever

The global discussion on how best to achieve a sustainable future will continue to gain momentum as the world looks ahead to the 2022 United Nations Climate Change Conference in Egypt this November.

Shipping has already been identified as a key area of concern. The disruptions of the past few years have demonstrated that ports must play a central role in the decarbonisation of global trade because they provide the efficiency and infrastructure needed for

more sustainable voyages and port stays.

Many ports are already taking the lead, and others are looking to learn from them. For example, the Baltic Ports Organization's Digitalization Working Group met in June 2022 to discuss the results of a questionnaire of member seaports. The results indicated that port representatives believe cooperation and exchange of information regarding the development and implementation of digitalisation projects would be of great benefit for all actors in the maritime supply chain.

Globally, it is being recognised that digitalisation is now more important than ever to make ports more resilient to disruptions and to achieve decarbonisation goals, delivering real-time sustainability. ■

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The Singapore-headquartered Innovez One, with offices in Jakarta and London, has been delivering expert maritime software solutions for the world's busiest ports and towage operators since 2004. That year was also marked by the digitalisation of the Port of Singapore's pilotage and towage operations by the company. With a vision to automate complex maritime operations for ports, towage and workboat operators worldwide, the Innovez One team has engineered and developed the marineM platform that helps to optimise critical maritime resource allocations for operations carried out by ports of all sizes. Go to **www.innovez-one.com** to find out more.