



KONGSBERG

# Digitalize or sink

**A digital and secure post-Covid  
recovery plan for the maritime industry**

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# Digitalization will be crucial for ship owners to manage post-Covid recovery

The year 2020 has turned out to be very different from what anyone had forecasted. Covid-19 caught the world by surprise and left no life around the world unimpacted.

National lockdowns have forced societies to fast-forward their digitalization efforts, enabling what was never thought possible: at the time of writing this publication, we are working and studying remotely, we connect virtually with friends and family, and our businesses and administrations have adopted digital ways to keep essential services running.

The shipping sector was one of the first industries to feel the devastating impact of Covid-19, when the Chinese lockdown in February brought major trade lanes to a halt. Ever since, global trade volumes have been dramatically reduced. Being a slow-moving industry, which is still heavily dependent on paper-based processes and with a low grade of digitalization, shipping was put into a very difficult position to tackle the crisis effectively.

However, probably due to this limited degree of digital preparedness, the pandemic actually has “turbocharged maritime digital development by half a decade” as DNV GL observed recently. While this is a great – and some might say overdue – first step, we must be aware that the steps taken to digitalize the maritime industry within the last months are still not enough. During a webinar of the Maritime and Port Authority of Singapore in July, IMO Secretary-General Kitack Lim stated that digitalization will be key for shipping in order to tackle the pandemic effectively.

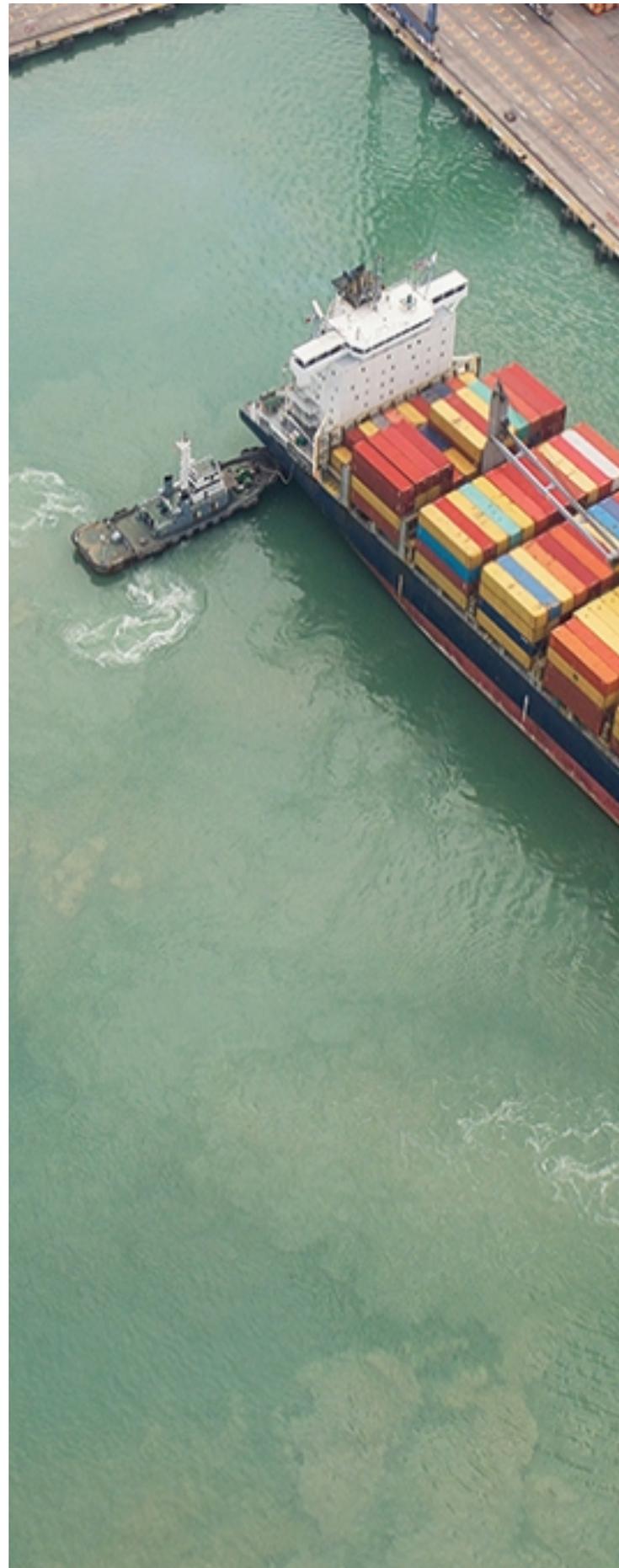
## So what makes digitalization such an essential element for maritime post-Covid recovery?

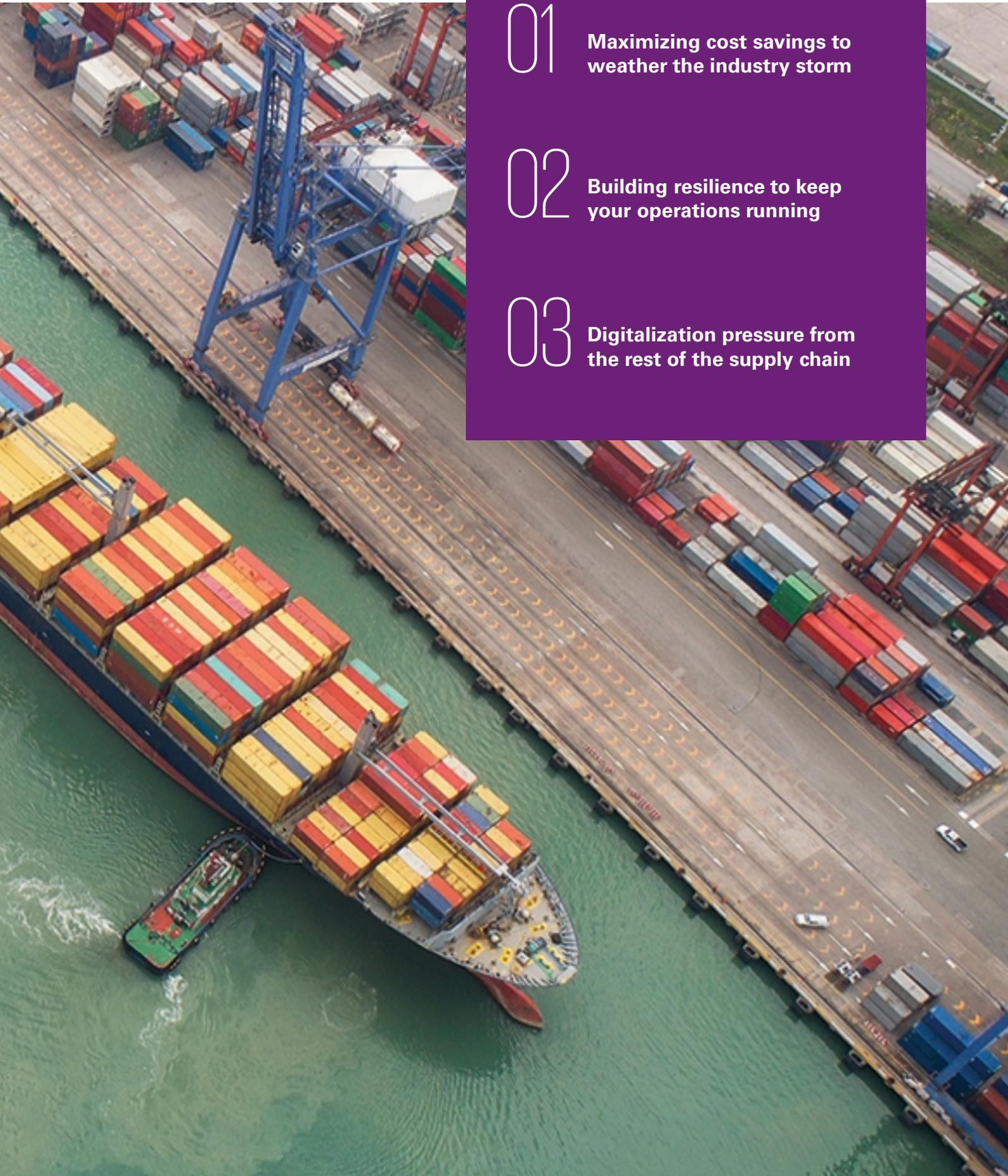


Digitalization, big data, and new technologies such as artificial intelligence are key in enabling the post-COVID recovery and taking shipping into this new era. ”

**Kitack Lim**

IMO Secretary-General, 2020





**01** Maximizing cost savings to weather the industry storm

**02** Building resilience to keep your operations running

**03** Digitalization pressure from the rest of the supply chain

## 01 Maximizing cost savings to weather the industry storm

First of all, the maximization of cost savings will be essential for ship owners and operators to get through the crisis and survive until markets recover. For example, in some of the dry bulk markets freight rates have dropped by over 70% and according to Clarksons the best-case scenario for market recovery foresees sea trade to pick up again not before 2023. The more negative scenarios even foresee a shrinking of trade until at least 2024.

This leaves shipping companies - that were already commercially suffering from troubled markets of previous years as well as the global desulphurization rules - still with at least 1.5 years to bridge until market recovery.

Obviously, some segments will be affected more than others – but in general a strong cost-consciousness will be critical to weather the storm. Digital tools will be an essential support in this journey, offering up to 30% OPEX savings.

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For the next few years digitalisation for leading shipowners can reduce opex by some 30%, possibly more.

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DNV GL, 2018

Given the OPEX cost structure the largest saving potential lies in the optimization of fuel costs. Measures like optimized routing and port arrival, improved onboard energy management and engine optimization are key to achieve savings. However also in the other OPEX areas relevant cost reduction can be achieved: optimizing R&M costs with continuous monitoring and predictive maintenance; cutting insurance premiums by greater transparency and reduced risk; or reducing crew costs by increased automation and decision-support systems.

**In the end, those cumulative savings from all those different areas will make the difference on the ship owner's bottom-line profits.**

## 02 Building resilience to keep your operations running

Secondly, non-digital businesses have proven to be extremely vulnerable in times of a pandemic. Non-digital businesses, like restaurants, in-store shopping or the travel industry, have suffered the most, with many businesses forced to cease operations. Tech-driven businesses, on the other hand, have turned the pandemic into an opportunity and have been able to even increase their revenue.

But independent of the industry, the imperative for businesses was to build up digital infrastructure to effectively enable operations with a distributed workforce working from home. A recent study of McKinsey has shown that across the globe digitalization efforts have become 20 to 25 times faster due to Covid. This is also very true for the maritime sector.

Besides organizing infrastructure to allow remote working, for ship owners some of the largest operational problems centered around the topics of crew change and cargo documentation. Due to national lockdowns, travel restrictions and flight cancellations many shipowners have struggled with organizing crew changes, and as a result many crew members have been stranded onboard for longer periods of time.



And while this is not a problem that could be solved entirely digitally, digitalization has played a key part in easing the pain: For example several digital solutions have helped crew managers to stay on top of ever-changing local Covid-regulations. Also improvements in vessel connectivity have helped stranded crew members to cope with the situation by offering entertainment and a way to stay in touch with their families.

Other problems were related to the handling of key cargo documentation. As of today, the majority of bill of ladings is still issued as paper-based B/Ls, since not all stakeholders or legislations allow the use of electronic documentation. Due to interruptions of postal services during the pandemic, it was often not possible for shippers to get hold of the original B/L in time, leaving them unable to release their cargo in port. As a consequence, containers stranded and accumulated in the ports, often incurring significant additional costs and causing liability disputes. Several container lines have thus fast-forwarded their implementation of electronic B/Ls in order to address this problem.

While this certainly still did not solve all challenges in acceptance of the documents, it surely did accelerate the process and has provided more flexibility and safety.

But also other maritime service providers that still heavily rely on presence of their personnel onboard, were also forced to digitize their service offering to keep their operations running. For example several maritime OEMs - among those also KONGSBERG - have seen a large increase in customer requests for remote service and support – a service that was pre-crisis only used in moderate levels. Similarly, several classification societies have been able to maintain essential services by providing remote surveys and audits - without surveyors travelling several days around the globe and being present onboard.

It is becoming clear that this pandemic was not a time-limited occurrence but will be a “new” normal that will be shaping the way we live and do business in the months (maybe even years) to come. **As a result, we will be forced to continue the road of reinventing the way of doing business and use digitalization in order to maintain operations and stay in the business.**



## 03 Digitalization pressure from the rest of the supply chain

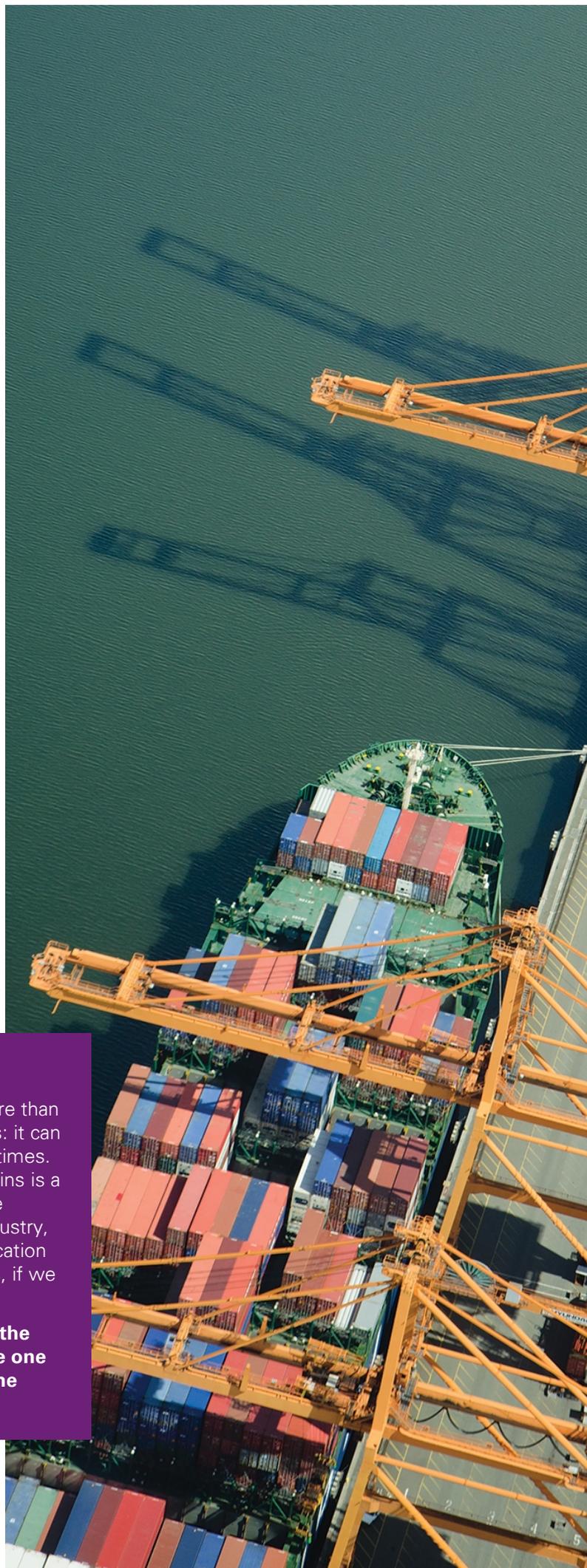
Lastly, shipping will receive increasing pressure from the supply chain to digitalize and be more transparent. During this crisis the fragility and weaknesses of global supply chains have been revealed. A high focus on supply chain optimization during the previous decades in order to reduce costs, inventory and drive up asset utilization has removed any existing buffers and taken the flexibility to absorb disruptions. In a recent study KPMG found that as a result, several companies have announced to pay more attention to risks related to supply chains and will be restructuring them to make them more resilient against disruption in the future, but also to improve their decision making as well as for cost efficiencies. Being an integral part of global supply chains, the maritime industry will receive increasing pressure from actors along the supply chain to make its operations more transparent and enable better communication between supply chain stakeholders.

Fortunately, digitalization can help us to transform these traditional supply chains into modern supply ecosystems in which all actors are connected to the whole supply chain, enabling end-to-end visibility, collaboration but also increase agility, responsiveness and optimization. The maritime industry is already taking first steps into this direction with solutions like TradeLens – an ecosystem for connecting supply chain partners – being rolled out not only by the leading port and terminal operator DP World, but also by the large container lines Maersk, CMA and MSC. By this, these industry heavyweights will create a de-facto standard in the market and take the industry closer to allowing full visibility of cargo flows between shippers, port operators and shipping lines at all times. Other initiatives go hand-in-hand with these efforts, such as for example the digital container alliance who is equipping containers with sensors to allow continuous tracking along the supply chain.

### Digitalize – or sink!

Covid-19 has shown us that digitalization is much more than a simple cost-saving tool for advanced industry actors: it can be a vital means of survival and resilience in unusual times. Also, increased transparency within global supply chains is a must to keep the complex world trade flowing. These digitalization efforts need to be holistic across the industry, including not only ship owners but also ports, classification societies, equipment manufacturers and many others, if we are to unlock the true digital potential.

**Darwin once stated that it is not the strongest or the most intelligent species who survives, but it is the one who adapts best to change. Or to say it in maritime terms: We need to digitalize – or we sink.**



# Embrace new technologies to gain a competitive advantage

Covid-resilience is not the only reason for shipowners to invest into digitalization. New technologies have the potential to significantly strengthen their overall competitive advantage.

A competitive advantage is an attribute that enables a company to outperform its competitors. While in some cases new technologies and digitalization have the potential to fully disrupt current ways of doing business, they have an equal potential to create a competitive advantage by improving existing business practices. This is especially true when it comes to the key drivers of maritime business: profitability, safety and sustainability.

## Improving profitability by applying new technologies

Improved profitability can be either achieved by increasing the revenue on the same cost base, or by reducing the cost base - or in the best case both. New technologies can play a key role in both increasing revenue or cutting costs for ship owners. By getting access to near-live operational data from vessels, owners and operators are able to unlock a new level of intelligence and analytics, and by this address both cost-saving and revenue optimization initiatives.

The OPEX-saving potential of digital technologies is widely discussed and the opportunities are still vast: for example, utilizing condition monitoring to maximize the lifespan of parts and components will bring a fundamental shift from planned maintenance to condition based maintenance. Also, combining digital ship models with real-live weather and traffic data will enable a flexible ad-hoc routing optimization based on different criteria like safety, time or fuel costs.

But also the revenue optimization potential of data is often overlooked. Considering that an average bulk carrier still spends up to 40% of its operating time in ballast condition, this shows that there is still significant potential to maximize transport capacities within existing fleets. Data analytics and improved planning (maybe even supported by artificial intelligence or machine learning) will be at the heart of such capacity optimization efforts. Also, digital platforms can provide an additional channel in bringing together actors across the whole supply chain, such as cargo owners, shippers, ship and terminal operators, thus lifting further optimization potential coming from legs before or after the actual sea transport.

Improved visibility into operations and asset risk also creates interesting

opportunities in areas like insurance and financing. The insights generated by operational data could be even used to develop new business models and value-added services towards customers.

## Still large potential for new technologies to improve safety performance

Another positive effect of new technologies is increased safety. The cruise industry has always been at the forefront of maritime digitalization, but surprisingly it was not driven by the desire of higher profitability – but by the need of increasing safety after a series of serious incidents. The potential for new technologies - so called “safetytech” - is still large: even though in 2019 shipping losses were with only 46 at the lowest in this century, the overall number of incidents did only show little decline according to Allianz’ annual safety & shipping review.

Using cameras and advanced algorithms for image recognition, we are now able to create situational awareness systems that can provide valuable decision support. Combined with onboard collision avoidance, algorithms have successfully shown to support navigational officers during the passage of crowded and congested areas. In Remote Operation Centers onshore employees of a shipping company can follow the live status of the fleet and assist crew with potentially challenging situations, such as e.g. provide warning from bad weather ahead, during passages within high-risk piracy areas or even if the vessel deviates from the planned route.

Another area where new technologies can significantly increase safety is inspection: by using drones and robots instead of humans for the inspection of tanks and hulls, potential harm to inspectors or crew can be significantly reduced.

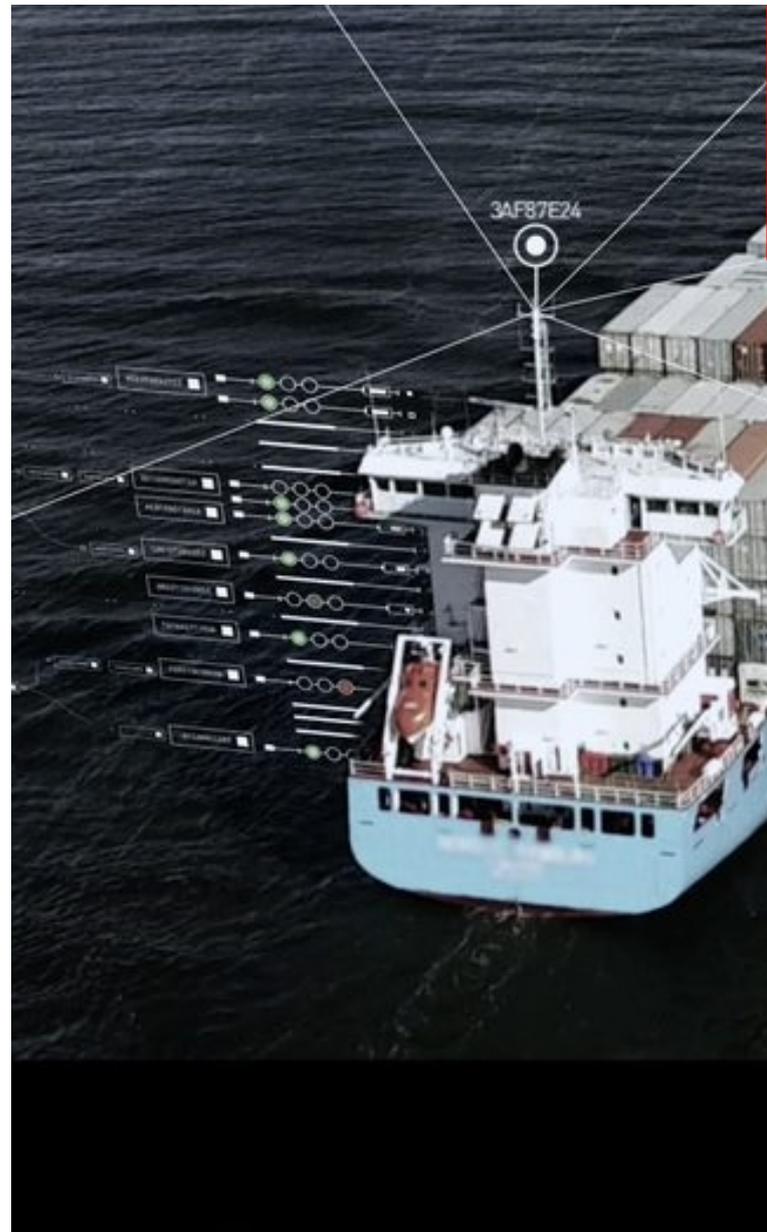


## New technologies enabling transparency and improved sustainability

A recent study of KPMG has found, that as a consequence of the supply chain disruptions during the pandemic, the shipping sector will receive increasing pressure from the supply chain to digitalize and be more transparent. But end-consumers, charterers and investors require not only high-precision in delivery dates and close to real-time updates of the current cargo location and condition, but they also get more environmentally conscious in their choices. As a result, the environmental footprint of products – including transport – is becoming a new differentiator on the market.

Many digital tools are nowadays already supporting the need for improved environmental performance - often as an additional benefit to fuel cost reduction: improved onboard energy management, weather routing and just-in-time arrival are examples for these efforts. For example, trials of the Port of Rotterdam have shown that improved port call planning and just-in-time arrival of vessels at the terminal can reduce waiting time by 20%. Translating such unproductive waiting times into slower speed to port has the potential to significantly reduce both fuel costs and emissions.

For the long-run DNV GL has shown in its latest Maritime Forecast to 2050 different pathways to decarbonization. In these scenarios alternative fuels and power systems will be most likely the driving technologies in actually reducing emissions in the future. However, also here digital technologies will be vital to document the improved environmental footprint towards regulators and stakeholders and thus in addressing the demand for compliance with ever-tightening regulations.



## Potential for disruption: Digital Twins

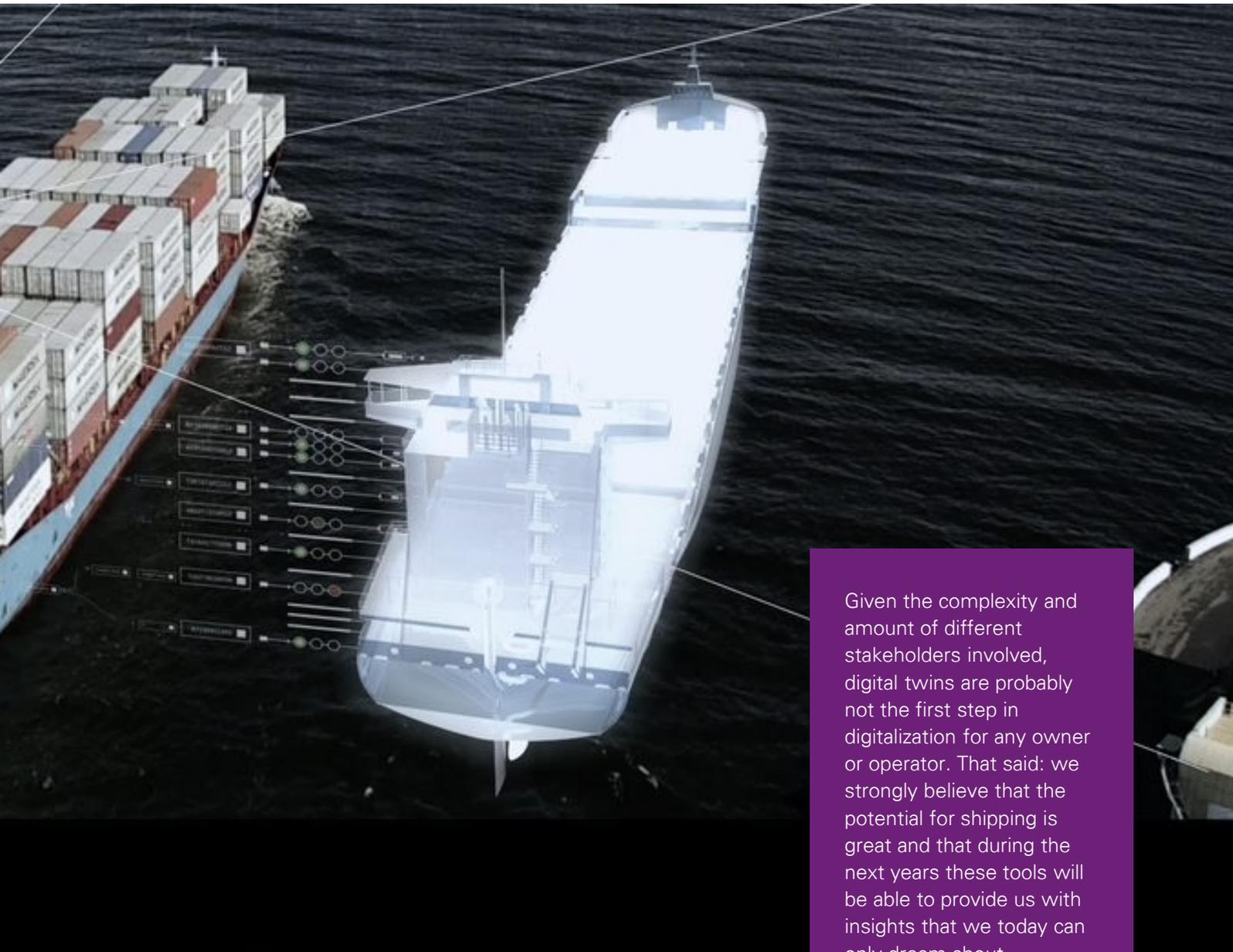
In non-distant future, we see another essential technology coming up, that has the potential to revolutionize and to truly disrupt marine operations: digital twins are near-real time digital models of real-world objects or processes, that help to optimize business performance.

KONGSBGERG has already experienced the benefits that digital twins can bring to other industries. For example in the energy sector digital twins have already successfully been applied to create a digital copy of oil rigs and production plants, allowing operators to significantly maximize operations.

Maritime digital twins will allow us to run hypotheses on our marine operations, combining real time data with synthetic values from a simulator. By doing this, we will be able to optimize a vessel's profitability from cradle to grave.

Obvious use cases could be optimizing vessel trim and hull cleaning intervals, but one could also imagine more advanced what-if scenarios surrounding maneuvers or potential savings from investments in new technologies. A maritime digital twin is the tool that will allow owners and operators to truly transform their operations.

Furthermore, digital twins will undoubtedly play a key role in the journey towards semi and fully autonomy shipping as the "digital captains" will need to train on a lot of data and scenarios – scenarios that one would not like to expose real assets to. Being able to create all possible and impossible scenarios and see how the autonomy algorithms react, will be critical towards ensuring safe autonomous operations and getting stakeholders like class, flag, financial and insurance companies' approval.



Given the complexity and amount of different stakeholders involved, digital twins are probably not the first step in digitalization for any owner or operator. That said: we strongly believe that the potential for shipping is great and that during the next years these tools will be able to provide us with insights that we today can only dream about.

## How to start your digital transformation journey?

Digital technologies will be key to strengthen profitability, safety and environmental performance of ship owners and operators in the future. Luckily, the barriers to starting the digital transformation journey are not that high anymore.

One key barrier for many ship owners in the past was related to costs: however, price levels for new technologies have been constantly falling and will continue to fall further. Thus, digitalization is no longer an opportunity just for owners with deep pockets but is becoming increasingly available for mass adoption.

While in the past it was mostly the high-end segments, such as cruise or offshore, who were spearheading maritime digitalization, we nowadays observe that adoption is happening already across all segments, led by some forward-leaning digital pioneers - and with others willing to follow as soon as they see positive results of such pilots.

The second barrier to digitalization is often related to insecurity in finding the correct approach towards digitalization. In our experience there are many different ways to approaching this: while some owners

choose a gradual incremental approach with building infrastructure on their fleets over time, some owners chose a project approach, defining holistic concepts in the beginning, before implementing them in large focussed fleet-wide rollouts.

**While both approaches have its benefits, in our experience there is only one thing that really matters in your digital transformation: to get started!**

# Optimize your business in a secure and resilient way

After almost a year of the ongoing global pandemic, one thing can be certainly stated: the recovery plan will be digital. While this trend is positive, it also reveals the spread in cyber maturity between different sectors.

## All at sea - the global pandemic and the omnipresent cyber threat

The pandemic reminded our societies of how the cyber security of critical infrastructure providers and their workforce is now more relevant than ever. Ensuring the resilience of core national and international transportation systems is of vital economic importance, not only for the maritime sector itself but across all industries. And while the industry has implemented technology to improve the efficiency of its operations, the adaptation of cyber security measures has not necessarily occurred at the same rate. This has caused an increased exposure of both onshore and offshore infrastructure to cyber related threats and although we have not observed any Covid-19 related campaigns that specifically target the transportation sector, the increased cyber hostile activity in other sectors like healthcare and banking shall be taken as a warning signal.

Lack of particularly Covid-19 related attacks does not mean that the sector is immune. Widely known cyber incidents like the ones on Maersk, MSC and CMA show that focus of cyber criminals on shipowners is increasing. Alarmingly, among the most recent example of hostile cyber actors targeting the maritime sector, is a hack of International Maritime Organization's (IMO) that affected public website and other web-based services. The organization has not provided any details about the incident and its consequences, but some industry expert speculate that the hack was indirectly connected with IMO's "inaction" to address the accident involving bulk carrier that ran aground off Mauritius coast, causing an oil spill in one of the world's most pristine maritime environments.

This, and other incidents, prove yet another, often omitted element. The cyber threat picture for the maritime sector is very dynamic. Diverse actors like environmental hacktivists that use cyberspace to protest climate change matters, state-sponsored groups representing national interest or motivated by financial gains cyber criminals pose an ever-growing threat to the industry. As example may serve China-linked Advanced Persistent Threat (APT) group Leviathan, aka TEMP. Periscope, that increased its attacks on engineering and maritime entities over the course of last two years or Gold Galleon presumably Nigeria based hacking group active from 2017.

In aim to address these risks and tackle the challenges related to the ongoing digitalization in the sector, IMO introduced a new resolution that makes an inclusion of cyber risk management in Safety Management Systems onboard of vessels recommendatory. Ship owners will need to ensure compliance with these new requirements by January 2021.



## Digitalization efforts that go hand in hand with cyber security

Besides brought by the pandemic financial constraints, most of the shipping companies will still decide to move forward with their digitalization process for the reasons we covered earlier. Those who do, will face a question on how to approach it. There are typically two main strategies: a complete transformation that includes all parts of an organization, or slower incremental changes. With deliberate execution and a clearly defined plan, they can both be successful. Still, each approach will require a holistic view of accompanying digitalization cyber risk. However, addressing cyber risk management in the maritime sector can be a tricky task as the complex supply chain makes it difficult for organizations to define a clear line between accountability and responsibility. Mapping of stakeholders but also commercial, regulatory, technological and security requirements will be a first step to begin a secure digital journey.

Probably the most notable task will be faced by Shipowners who will need to address IT-onshore infrastructure and Ship Managers managing vessels' Information Technology (IT) and Operational Technology (OT) systems. The establishment of clearly defined cyber security requirements from Shipowners towards Ship Managers will be the key task towards compliance and cyber maturity. Simultaneously, the increased demand for Ship Managers, who can offer the advantages of purchasing power and expert knowledge in area of digitalization and cyber security will even more increase interdependencies in the supply chain. Therefore, the entire maritime sector will need to step up its cyber maturity game and focus on managing IT and OT related risks.



## Why small and medium companies should address digitalization needs

The negative financial impact caused by Covid-19 hit small and medium-size companies hardest, as they generally demonstrate lower financial resilience compared to large organizations. The same argument applies to cyber risk management, as smaller businesses tend to devote less effort to security measures, leaving them an easy target for cyber criminals. Furthermore, small and medium shipowners often trivialize a potential cyber threat to their companies. Unfortunately, opportunistic hacking groups exploit any security vulnerabilities simply for a financial gain purposes, regardless of the size of a company.

Those small organizations that will be able to show more flexibility and demonstrate cyber resilience towards their business partners will have a competitive advantage. Being prepared for the change of cyber landscape and moving forward with digitalization is therefore important for businesses of all sizes, as the maritime sector is being digitalized and more interconnected.

## One size does not fit all, but all have something in common

One size might not fit all but there are certain trends that poses a challenge to everyone in the industry. A prominent concern is the management of 3rd party risk. The complex supply chain and interdependencies directly affect the industry capacity to contain potential cyber incident and its overall cyber resilience. Improper outsourcing of IT or other critical functions may lead to an increased exposure of company' and vessels infrastructure, simultaneously endangering its operations. Accompanying it often, lack of cyber response capabilities in extreme cases may even endanger lives of crew members. Subsequently, a successful cyber incident management requires planning and practicing, which is frequently down prioritized in the maritime industry.

Although, the sector has been traditionally very focused on safety and security, the lack of an overall understanding of these relatively new cyber related risks may lead to bad investments or even lack of investments in the appropriate security measures. This does not mean that cyber risk management is a *Gordian Knot*.

**Starting small and focusing on prioritizing these areas that require immediate actions will allow companies to gradually improve its cyber security posture and ensure compliance with IMO's cyber security requirements.**

# Combining leading positions

We can help you navigate safely through these challenges, enabling you and your company to reap the full rewards of connecting your vessels to the cloud and turn data into value.

KONGSBERG develops industry-leading technology that can be utilized for measuring, monitoring and correlating all types of maritime data. KONGSBERG offer an open digital ecosystem that helps clients unlock the value of their data.

KPMG has global expertise on cybersecurity advisory and digital risk management for critical sectors like maritime. KPMG develops digital risk management solutions that

bring together their award-winning advisory practices, methodologies and industry benchmark data.

By combining leading positions in these areas, KPMG and KONGSBERG want to provide the maritime sector with innovative digital services to address existing and future cybersecurity risks.



## Contacts

For more information about the transformation of your maritime cyber risk management practices and the immediate benefits of KPMG's and KONGSBERG's solutions for your organization, contact us or visit us at [www.kpmg.com/no](http://www.kpmg.com/no) or at [www.kongsberg.com/kdi](http://www.kongsberg.com/kdi)



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