

# Debunking the mythical beasts of maritime digital transformation

Exploring attitudes to digital transformation among global maritime professionals



The Kraken of Digitalisation



The Selma of Decarbonisation



The Jörmungand of Regulation



The Cthulhu of Decision-Support



The Hydra of Highly-Automated Ship



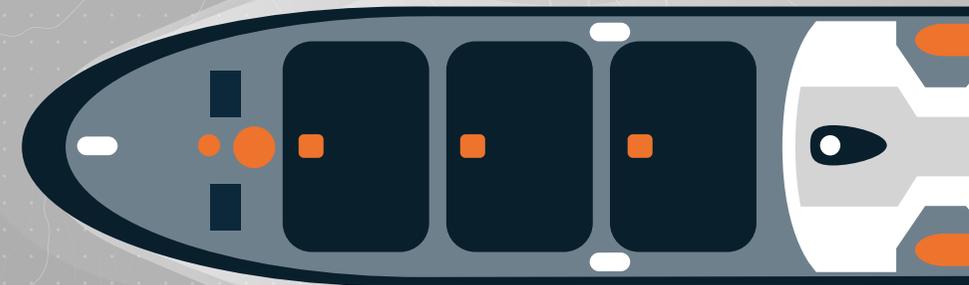
The Umibōzu of Next-Generation Tal



The Sirens of Fragmentation

# Contents

●	<b>Foreword</b>	03
●	<b>One: The Kraken of Digitalisation</b>	04
●	<b>Two: The Selma of Decarbonisation</b>	08
●	<b>Three: The Jörmungand of Regulation</b>	11
●	<b>Four: The Cthulhu of Decision-Support</b>	14
●	<b>Five: The Hydra of Highly-Automated Shipping</b>	17
●	<b>Six: The Umibōzu of Next-Generation Talent</b>	21
●	<b>Seven: The Sirens of Fragmentation</b>	25
●	<b>Conclusion</b>	28



**Wärtsilä | The global leader  
in innovative technologies  
and lifecycle solutions for the  
marine and energy markets**

# Foreword

## The open ocean was and still can be a fearful place

Miles from shore on storm-tossed seas, with nothing but water in all directions, early sailors couldn't help but imagine what lurked in the depths.

Their fear needed an explanation. What surfaced were the vivid stories of legendary sea monsters we know from mythology and folklore today.

But while the monsters live on in our imaginations, we recognise them for what they are: a blend of tall tales, misunderstanding and mistaken identity.

Fast forward to 2023 and we can see similar trepidation towards navigating the largely uncharted ocean of digital transformation creating modern folklore of its own.

Collectively the industry has argued so much that nobody would now deny digital transformation is essential to the future of shipping. But progress has been challenging. Part of the problem is that we think that we know what digital transformation is. Yet we have wildly different interpretations that, like sea monster stories, reveal more about our state of mind than reality.

The Kraken of digitalisation. The Selma of decarbonisation. The Sirens of fragmentation. This interconnected family of beasts and their siblings are the real barrier to progress. They exist in the maritime industry's psyche because of misunderstanding, apprehension and inertia.

Drawing on original research from a broad cross-section of maritime professionals in EMEA, the US and APAC, this report aims to debunk these seven mythical beasts of maritime digital transformation and spread a message of collaboration.<sup>1</sup>

We outline a vision for a connected ecosystem from ship to shore – and beyond; a maritime ecosystem that can deliver improved efficiencies, better safety and compliance, and greater sustainability for all.



**Collectively the industry has argued so much that nobody would now deny digital transformation is essential to the future of shipping.**

<sup>1</sup> See Appendix

## The Kraken of Digitalisation



**The Kraken of digitalisation is a myth that thrives on the confusion and division among industry authorities, leaders and employees about what digitalisation looks like in practice. It threatens to sink organisations as they navigate their digital transformation journey.**

**In the battle to slay the Kraken, our weapon is iteration, through which we can reframe the route to digitalisation and turn threats into opportunities.**

# One: The Kraken of Digitalisation

## A Kraken of contradictions

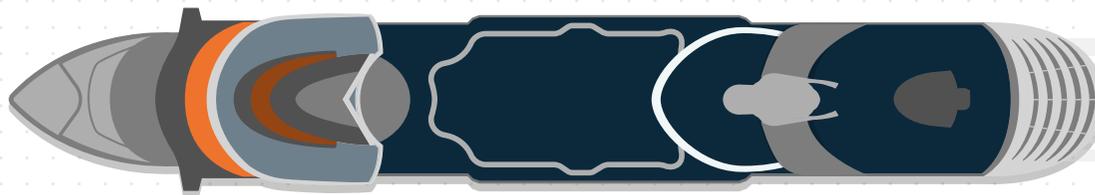
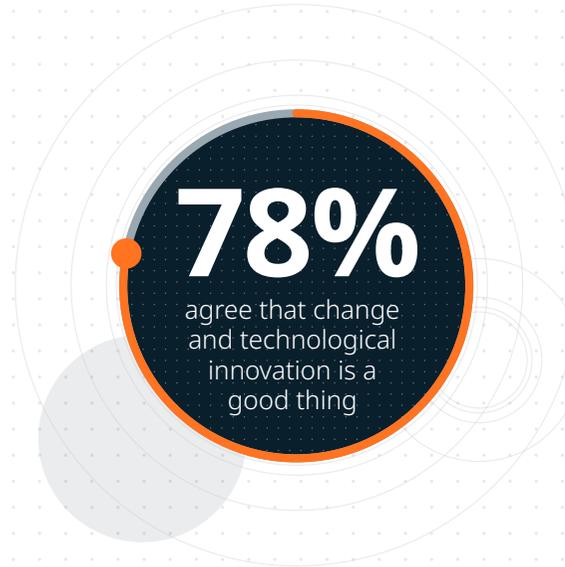
The Kraken of digitalisation is a mythical beast that appears to plague those in the maritime industry with scepticism and uncertainty around digitalisation.

**But there is a contradiction at play.**

Broadly, the maritime industry is open to digitalisation and sees it as a positive influence.

It makes sense. We live in a digital era where we can control our entire lives through our smartphones and where AI helps us navigate various decisions daily.

And if technology is a familiar concept, the advantages it can bring are no secret either. Our research shows that the industry agrees that digitalisation is necessary – and can spot from a distance how it will positively impact their bottom line.



**So, what's stopping the industry from advancing on its digital transformation journey?**

# One: The Kraken of Digitalisation

## Tall tales of the Kraken

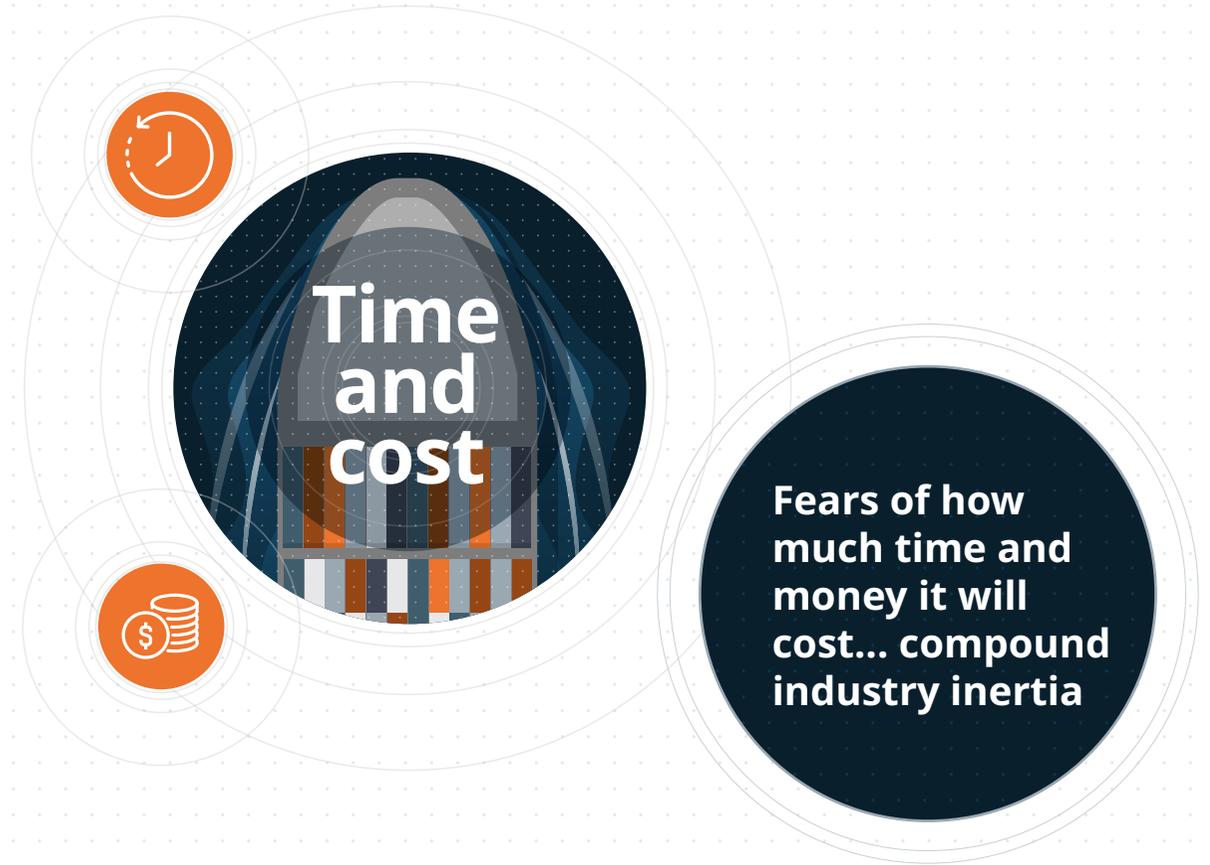
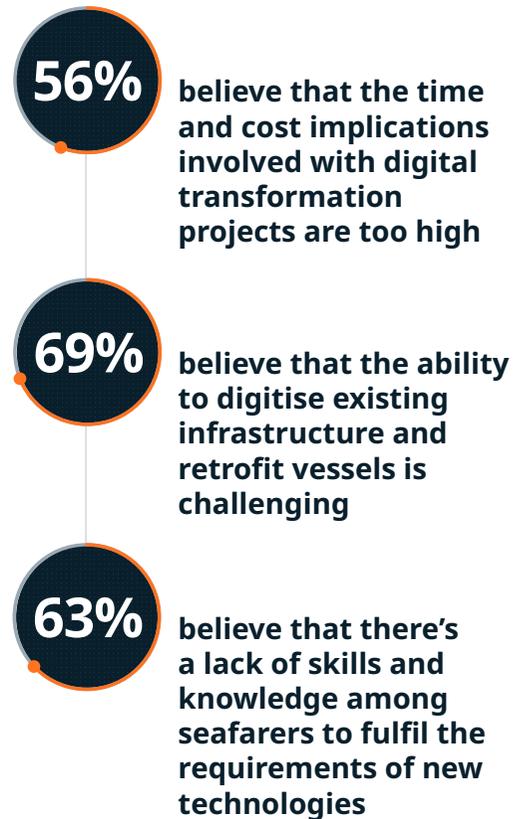
Diving deeper into the stats, it seems that there is something more going on.

While consensus on the necessity and advantages of technology exists, professionals acknowledged they were worried about what the route to digitalisation might hold.

Fears of how much time and money it will cost, whether seafarers lack the skills to leverage advanced technology, and if it is even possible to retrofit existing infrastructure with digital tools, compound industry inertia.

It seems that the lack of clarity around what digitalisation might mean for seafarers is only augmenting feelings of not having the necessary skills.

This is significant. Without buy-in from a larger proportion of maritime industry professionals (especially key decision-makers) from the outset, sustainable and successful digital transformation will be impossible.



# One: The Kraken of Digitalisation

## Battling the Kraken

Many maritime professionals have different interpretations of digital transformation which are hindering progress. There is a lack of industry-wide consensus on what digital transformation looks like for different organisations in practice.

Add to this the fact that many feel unsupported in their organisations and by industry authorities, and it's clear that our mythical monster thrives on division and confusion.

### What can we do to overcome this mythical beast?

Real progress will only happen when we abandon the idea of digital transformation as an all-or-nothing operation along a one-size-fits-all route. Each organisation within the maritime industry will be at a different stage of its journey.

Additionally, reliance on technology brings with it a high amount of risk. Ships cannot afford technological breakdowns while at sea. The environment, operations, jobs, even lives are at stake – and this is not an exhaustive list.

**64%** believe there is a **lack of industry-wide awareness of these benefits**

**61%** believe that **digitalisation is a journey of small iterative changes, yet the same percentage say that maritime firms must go all in on their investments**

A step-by-step approach to digitalisation is needed to ensure the successful adoption of new technologies that will have transformative business impact. Tech providers should view digital transformation as a continuing service rather than a one-off product.

This is about quick wins and small gains, trial and error, and agile decision-making – skills that must be cultivated across the industry if it is to withstand the ongoing disruption in the global trading system post-pandemic.



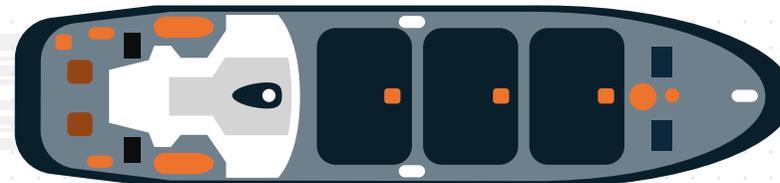
### Tipco Asphalt keeps it simple with integrated navigation

Discover how one of Thailand's biggest tanker fleets removed complexity from navigational planning, ship-to-shore coordination and fleet management with Wärtsilä's Fleet Optimisation Solution.

*"The whole shipping world is looking to digitalisation to reduce their footprint. We are doing the same. Meanwhile this first step with FOS has been very transparent, very intuitive and very user friendly."*

Martin Brzuska, Managing Director of Tipco Marine Group

[Learn more >](#)



## Two: The Selma of Decarbonisation

# The Selma of Decarbonisation



**The International Maritime Organization has set a target to cut the sector's emissions – responsible for at least 2.5% of the world's CO<sub>2</sub> emissions – in half by 2050. But decarbonisation efforts are being underserved by the industry, fuelled by misunderstandings between regulators and organisations.**

**What our study shows is that organisations need better support to balance current challenges alongside regulatory demands. This is one way we can slay the Selma of decarbonisation in our battle for a more sustainable future.**

## Two: The Selma of Decarbonisation

# Decarbonisation: priority or regulatory headache?

With the shipping sector producing around 940 million tonnes of CO<sub>2</sub> annually, the maritime industry has a critical collective role to play in tackling climate change.

Decarbonisation is the top priority for the majority of those within the maritime industry, with digital technology recognised as a vital tool in achieving the net zero emissions targets set out by the International Maritime Organization (IMO).

**89%** of respondents say that minimising CO<sub>2</sub> emissions is an important driver for regulation in the industry

**8 in 10** respondents understand the importance that digital technology will play in halving carbon emissions by 2050

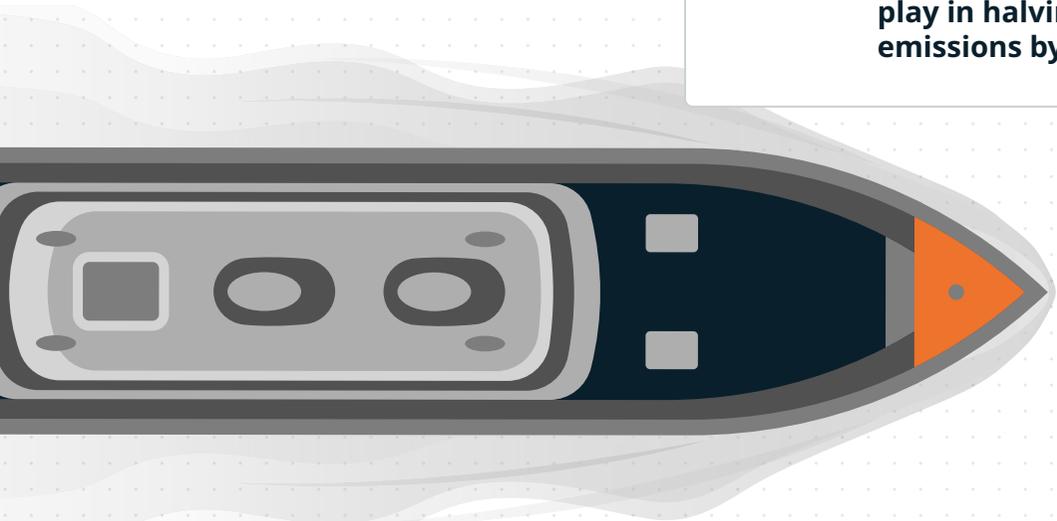
The IMO has been strengthening regulations around sustainability to support organisations to meet their short and long-term sustainability goals. However, the maritime industry is struggling to make headway in emissions reductions, with levels remaining broadly the same in recent years.

Rates of regulatory compliance appear to vary widely at regional and international levels.

What could be happening here?

**63%** of organisations are committing to bigger investments

**37%** But over a third (37%) say they are doing the minimum amount necessary to be compliant with new regulation



## Two: The Selma of Decarbonisation

### Slaying the Selma

While decarbonisation is clearly at the forefront of the IMO's agenda, many organisations are facing other critical challenges in the here and now rather than the seemingly distant future. These include supply and demand imbalances, equipment and crew shortages, cybersecurity and rising costs.

What organisations need is the support to balance present risks and challenges alongside the wider demands of the industry. Decarbonisation as the only important priority is a myth that needs to be dispelled if we are to achieve the urgent goals of climate change.

Technology could provide this crucial assistance. For example, with the right tools and analysis, professionals could have greater visibility of opportunities for fuel and operational efficiencies that optimise journey times to reduce overall emissions.

**Our respondents agree.**

**64%** say that they would value a tech provider that acts as a bridge between real-life needs and demands of the industry and regulatory agenda

Emissions targets and punitive regulations are not enough to galvanise the industry into making the efforts needed to reach net zero by 2050. Regulatory bodies must work to align their agendas with other industry stakeholders, setting aside vested interests for the greater good – the preservation of our planet.

While decarbonisation is at the forefront of the IMO's agenda, in today's competitive maritime landscape, organisations must juggle environmental and regulatory goals with action that ensures the highest possible profit margin.

A more holistic view, considering the barriers that businesses face in improving sustainability and offering the right technological tools to help overcome them, will strengthen relations between regulatory bodies and maritime organisations.

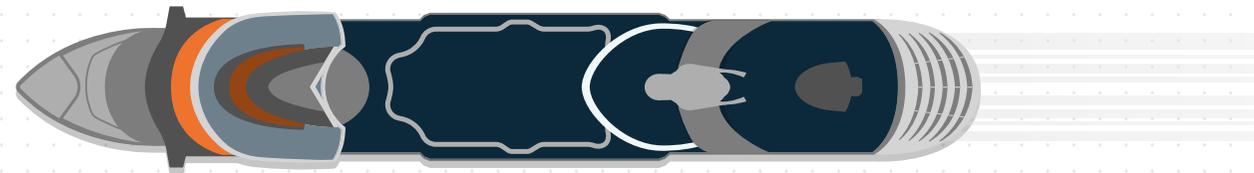
Ultimately, mutual investment in a common understanding and goal will help to boost compliance and achieve climate goals.

#### Decarbonising maritime

There is no silver bullet for decarbonisation. We need a range of solutions to meet the ambitions of the IMO's Initial Greenhouse Gas Strategy. By joining forces with other ecosystem players, we can ensure an even broader decarbonisation offering to our customers.

Find out what we're doing to build a product portfolio ready for a zero-carbon future.

[Learn more](#) >



## Three: The Jörmungand of Regulation

# The Jörmungand of Regulation



**Technology has an ever more crucial role to play in maritime regulation as shipping firms struggle to keep up with changing regulations that vary from port to port.**

**With environmental and cybersecurity issues as the foremost regulatory concerns today, we believe technological solutions are best placed to support organisations in staying compliant – and to help tame the myth of the Jörmungand of regulation.**

# Three: The Jörmungand of Regulation

## Facing the Jörmungand

Maritime is facing a period of extraordinary regulatory change that involves increased scrutiny from those outside of the industry, particularly where cybersecurity and environmental concerns come into play.

Yet looking at what drivers for regulation resonated the most for our respondents, seafarer welfare is at the top, with minimising CO<sub>2</sub> emissions coming last.



### Key drivers for regulation in the maritime industry



**Two-thirds** of respondents see a need to increase investment levels to meet future regulatory requirements and drive commercial success.

What this shows is a discrepancy between what maritime professionals feel that regulation should address (like seafarer welfare) versus what regulatory bodies are prioritising in reality (such as CII and EEXI).

Do regulators need to pay more attention to seafarer welfare to enable them to succeed with other initiatives? It's clear that all these issues intersect, again proving that a more holistic view is needed.

## Three: The Jörmungand of Regulation

### Using tech to tame the Jörmungand

Although 58% recognise the importance and necessity of imposed regulation in promoting a safe, efficient and sustainable industry, many also admitted that regulation posed an entirely separate challenge.

In an ever-evolving regulatory landscape, digital transformation – enabled by tech providers – can be seen as a positive force for necessary change.

Digital technologies can resolve regulatory requirements, for instance by providing decision-making support tools, tracking, improving crew safety and strengthening cybersecurity, at the same time as creating efficiencies in assessing and reporting regulatory compliance.

**57%** say imposed regulation makes their job more challenging

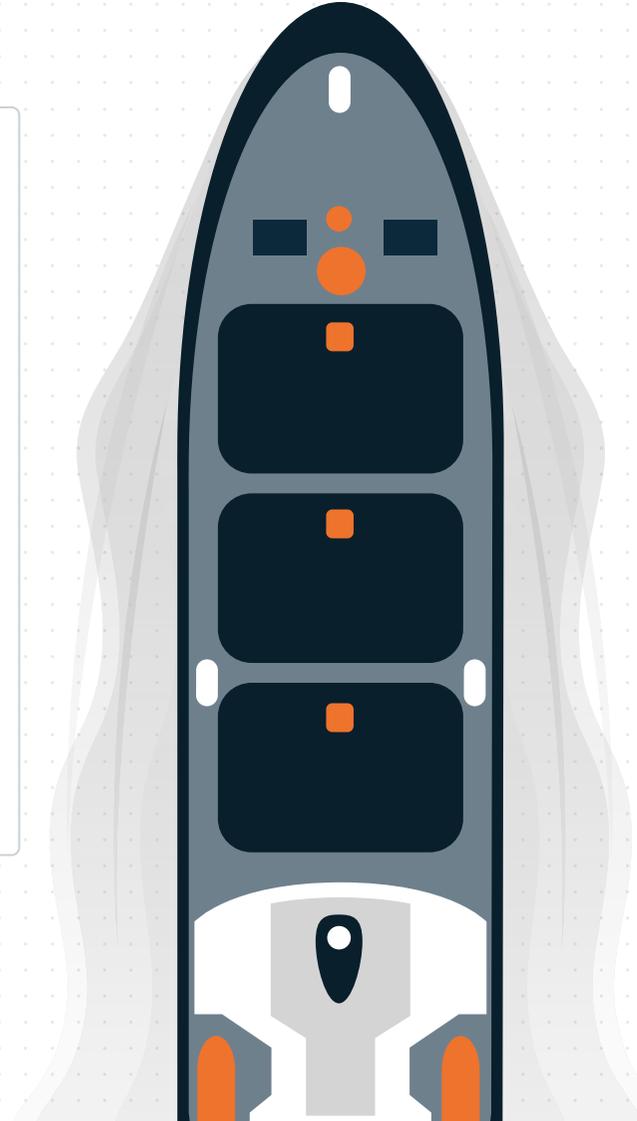
**60%** say there are too many regulations to follow

**45%** say regulators do not do enough to consult with various stakeholders before defining upcoming regulations

#### The alchemy of effective compliance

When it comes to regulation, the accounting and algebra of compliance reporting are a necessary 'license to trade' for ship operators. But with effective data analysis and the tools to interrogate the data meaningfully, ship operators can turn compliance requirements into business opportunities.

[Read more](#) >



## Four: The Cthulhu of Decision-Support

# The Cthulhu of Decision-Support



**Technology seems to be the ideal weapon to counter the metaphorical mythical beast that we've envisaged as the Cthulhu of decision-support.**

**Organisations can leverage machine learning and predictive analytics for use cases including port and terminal operations, timely loading and offloading, and record-keeping.**

**But like many industries, the maritime sector is struggling with increasing volumes of big data. How can we improve data availability, governance and analysis to counter the Cthulhu?**

## Four: The Cthulhu of Decision-Support

### Exploring the data depths

Regarding the use and availability of data within the maritime sector, **two-thirds** of professionals deem the industry to be data savvy. What's more, organisations appear to be implementing data to enhance decision making consistently.

With the adoption of machine learning and artificial intelligence into data processing, every time data is used in decisions around vessel management and traffic analysis, for example, information gets fed back into analytics software and assessed so that its decisions can be improved next time.

Data-driven operations will only become smarter. This will have a compounding effect across the industry if that data is shared, speeding up the rate of advancement globally – a compelling reason for organisations to consider data as a critical asset.



#### eGuide: 7 benefits of data-driven decision making in maritime

*Peter Jackson, Chief Data and Analytics Officer at Carruthers & Jackson*

What are the benefits of embracing intelligent technologies that help connect the dots across the entire maritime ecosystem? Maritime stands to gain so much through a data-driven approach to decision making, says renowned data specialist Peter Jackson.

[Read more >](#)



## Four: The Cthulhu of Decision-Support

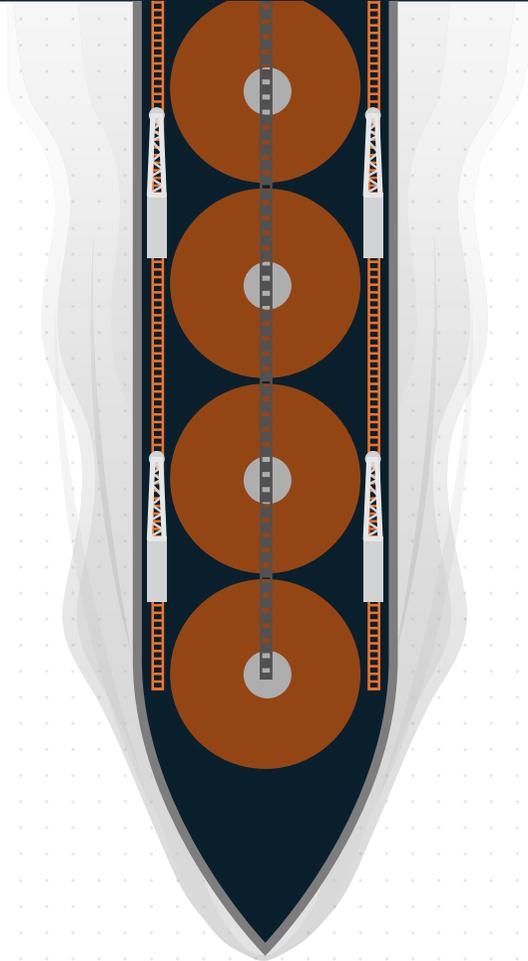
### How tech providers can help

However, with the volume of data increasing exponentially and becoming more and more complex, professionals are worried that they will struggle to leverage it effectively.

The right technology must be in place to unlock the power of data and ensure that it is used optimally. Any data system brought on board should simplify, not complicate, processes.

Tech providers can work closely with port authorities, ship owners and seafarers to deliver a customer success programme that will include the proper implementation and education around new technologies.

Initiatives like this, alongside intuitive and easy-to-use products, will support professionals to maximise the data insights available to them.



**63%** say that the amount of data generated on board ships is overwhelming and complex to manage

**44%** do not agree that their employer has given them the right skills and confidence to use data effectively

**Wärtsilä partners with the Maritime and Port Authority of Singapore to co-develop a next-generation safer and greener smart port solution**

What happened when Wärtsilä's Navi-Port solution and MPA's maritime digital platforms and shipboard systems synergised to enable the optimisation of port services and sustainable shipping in Singapore?

[Read more](#) >

## Five: The Hydra of Highly-Automated Shipping

# The Hydra of Highly-Automated Shipping



**From a distance, the maritime industry is often viewed as technologically immature. But this is far from the truth.**

**Maritime professionals acknowledge the positive role that increased automation has played - and will continue to play - in the future. Our Hydra is a monstrous myth that haunts them with uncertainty and fear of what highly-automated shipping means for the sector.**

**How can we help professionals embrace a more autonomous tomorrow?**

## Five: The Hydra of Highly-Automated Shipping

# The benefits of highly-automated shipping

**Two-thirds** of maritime professionals see highly-automated shipping as a means of providing efficiency and safety improvements, along with economic and sustainability benefits.

When asked to consider solutions for highly-automated shipping and the advantages they bring, respondents said:



Highly-automated shipping is still generally talked about as a far off and intangible concept. However, much of the groundwork has been adopted and is well understood by the market.

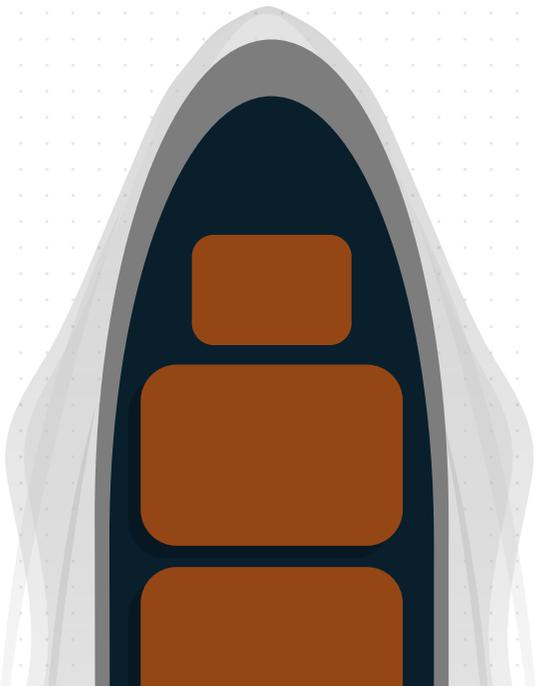
The IMO has defined the four different levels of autonomy for ships. Level one equates to automated processes and decision-support supervised by seafarers, moving then to level two which is a remotely controlled ship with seafarers on board. Level three means remote control shipping without a crew, while level four envisages fully autonomous vessels able to operate and make decisions by themselves.

Looking at it this way, many of the pieces of the highly-automated shipping puzzle are already present across the industry. Consider the transition to ECDIS, the development of situational awareness technologies, or the applications of machine learning, for example, to optimise when clean technologies turn off and on in certain wind or sea states.

There is an increasing understanding of how certain features will be essential to create a commercially and environmentally sustainable future for highly-automated shipping.

However, challenges remain around retrofitting older ships with newer technology and connecting that to onshore processors, a lack of standardised guidance and regulation, as well as regional variations in approach.

**We need to find a way to fit those pieces together to be able to level up in a smart way.**



## Five: The Hydra of Highly-Automated Shipping

# How the Hydra of highly-automated shipping has impacted jobs

Highly-automated shipping has already transformed the job roles of many professionals in the sector in different ways. Yet many are worried about what impact the widespread adoption of highly-automated vessels will have on their career.

**58%** say they are apprehensive about highly-automated shipping and how this will impact job/careers

**58%** say that their immediate colleagues are apprehensive about highly-automated shipping and how this will impact jobs/careers

Uncertainty is fuelled by a lack of shared business cases across the sector of what successful highly-automated ships look like, made worse by the general economic and political challenges that have significantly disrupted the workforce over the past few years.

It is important that professionals at all levels are consulted when technology is brought in and that they come together to make appropriate decisions with everybody informed.

The industry should also look to create standardised training programmes and professional career paths that embrace a new landscape of highly-automated shipping, reframing the vision of autonomy to include both humans and technology working in harmony.

### Wärtsilä SmartMove Suite sets sail with the American Steamship Company

Wärtsilä SmartMove Suite features the industry's most advanced sensors and high-accuracy ship control systems, taking the concept of automated dock-to-dock operations to the next level. The tech was first installed on the MV American Courage, a self-unloading bulk freighter with a cargo carrying capacity of 24,300 gross tonnage. This is the largest ship ever to now be capable of performing automated docking and dock-to-dock sailing operations.

[Read more >](#)

**It is important that professionals at all levels are consulted**

## Five: The Hydra of Highly-Automated Shipping

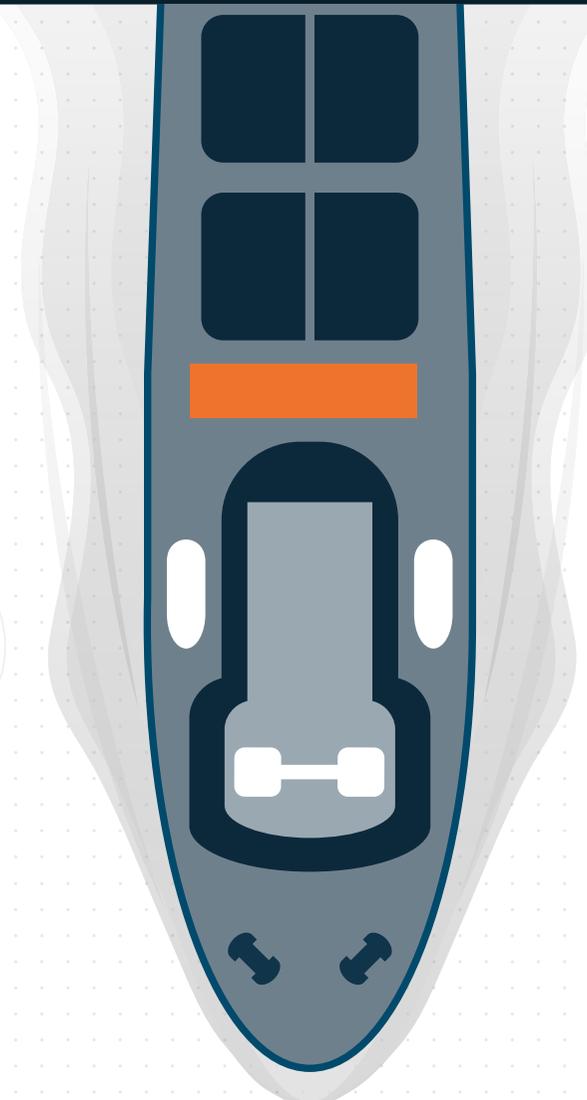
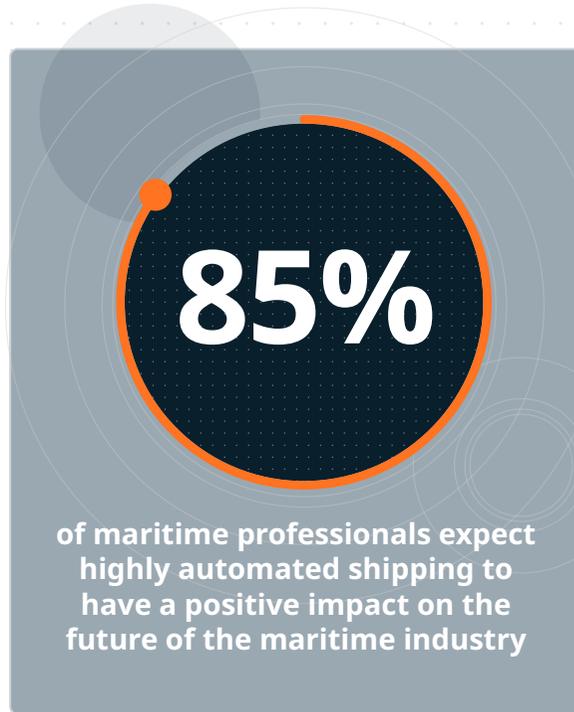
### The future is highly automated

Shipping's current view of autonomy, or autonomous vessels, misses the real technological change that is about to happen to the sector.

In our view, highly-automated shipping is not about one technology that revolutionises everything. Instead, it is a puzzle with many pieces; a basket of technologies that are greater than the sum of their parts and will develop at their own pace to enhance the capabilities of the maritime workforce – rather than outright replacing them.

The best use case of automation creates the opportunity to enhance people's roles and make the most of their unique skills and experience, leading to safer, healthier and happier employees.

Thankfully, there is optimism in the industry for this possibility.



## Six: The Umibōzu of Next-Generation Talent

# The Umibōzu of Next-Generation Talent



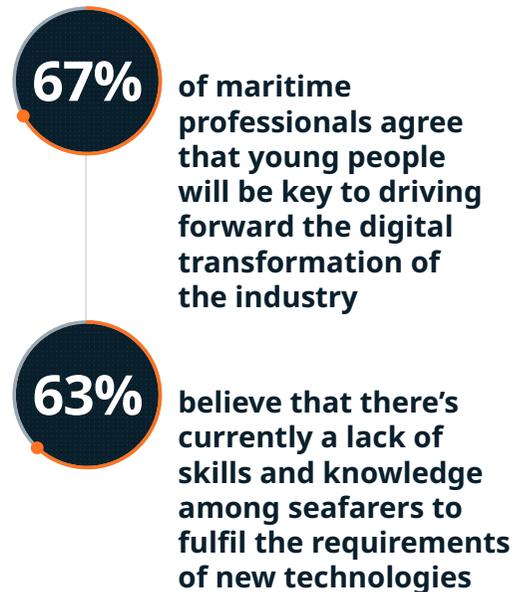
Attracting young talent is key to futureproofing and accelerating the digital transformation of the maritime industry. Digitalisation could help tame the mythical Umibōzu of next-generation talent – that is, many of the issues that cause job dissatisfaction among seafarers, as well as create opportunities for new roles.

## Six: The Umibōzu of Next-Generation Talent

# Futureproofing the industry with young talent

The maritime industry has been locked in a battle with the Umibōzu of next-generation talent for the past few years. Even as maritime becomes a less attractive career destination for macroeconomic reasons, more vessels will be plying the world's oceans.

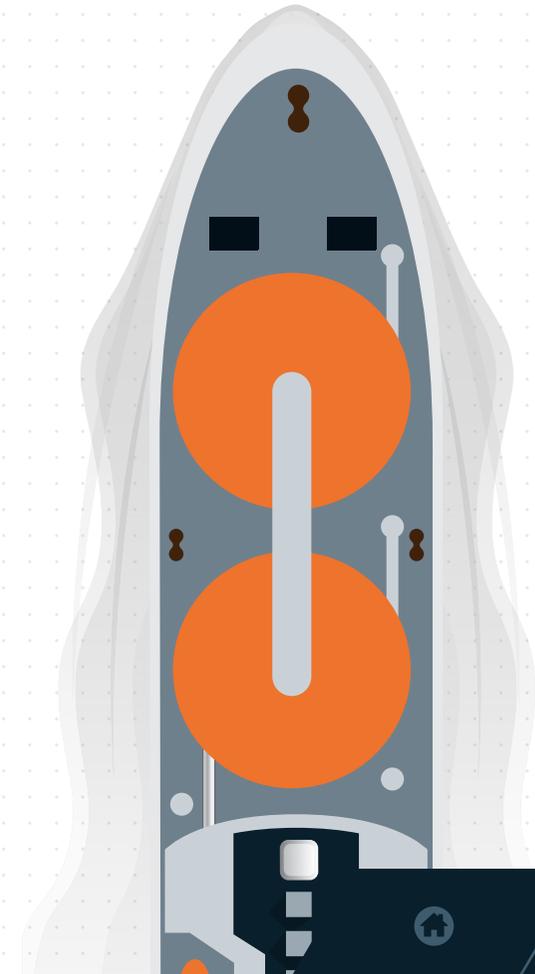
This paradox is at the heart of the industry's future and justifies pursuing digital transformation.



Our respondents recognise the vital need to attract young talent to future-proof the industry and support its digital transformation.

But the industry has a bad reputation among younger generations and those looking for a career change – a perception that was only worsened during the Covid pandemic which stranded seafarers around the world, while leaving those at home without work.

Moreover, the nations that shipping has traditionally drawn its workers from will see increasing living standards and rapidly growing economies. Shipping will have to recruit its people either from this growing global middle class (meaning the cost of employment could increase) or the emerging seafaring market in Africa where long-term investment in training and recruitment will be necessary.<sup>2</sup>

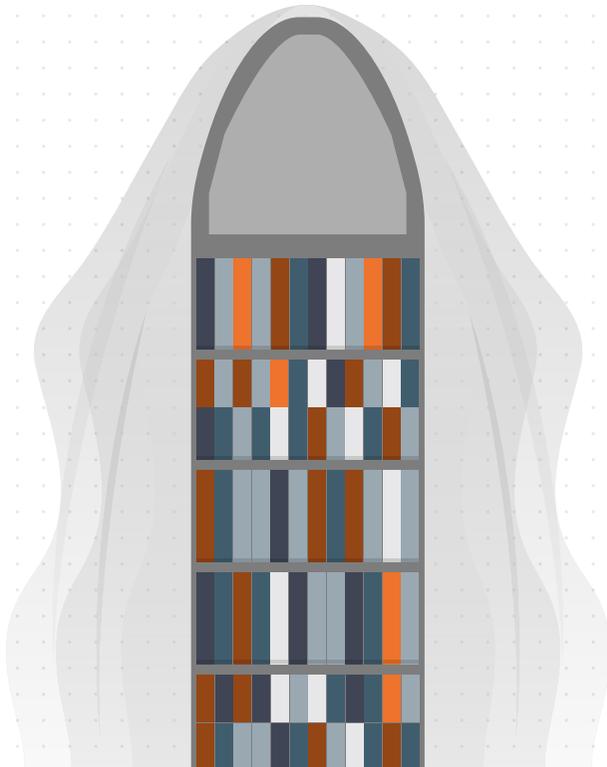


<sup>2</sup> <https://splash247.com/africa-as-the-next-manning-frontier/>

## Six: The Umibōzu of Next-Generation Talent

# Barriers to attracting new generations of talent

Among the reasons cited by respondents for the seafarer shortage, the extended period away from friends/family and increasing mental health issues are to blame.



### Reasons for the shortage of seafarers



**Long periods at sea mean they can't spend valuable time with friends/family**



**Mental health i.e., burnout, isolation**



**Lack of progression opportunities**



**Lack of industry-wide education and training programmes to boost skills development**



**Pay/salaries**



**The monotonous nature of the job and manual, paper-based processes**



**Fear that automation will take their jobs in the future**

Digitalisation can create opportunities for improvement in many of these areas, with highly-automated ships freeing up crews to spend less time on mundane manual tasks, transforming laborious process roles into system management ones requiring IT and data analytics skills.

Young people already equipped with IT know-how will be more attracted by a sector that's seen as technologically progressive, providing opportunities to learn and be at the forefront of something exciting.

# Six: The Umibōzu of Next-Generation Talent

## Investing in education

Boosting education and training initiatives is another way to attract seafarers.

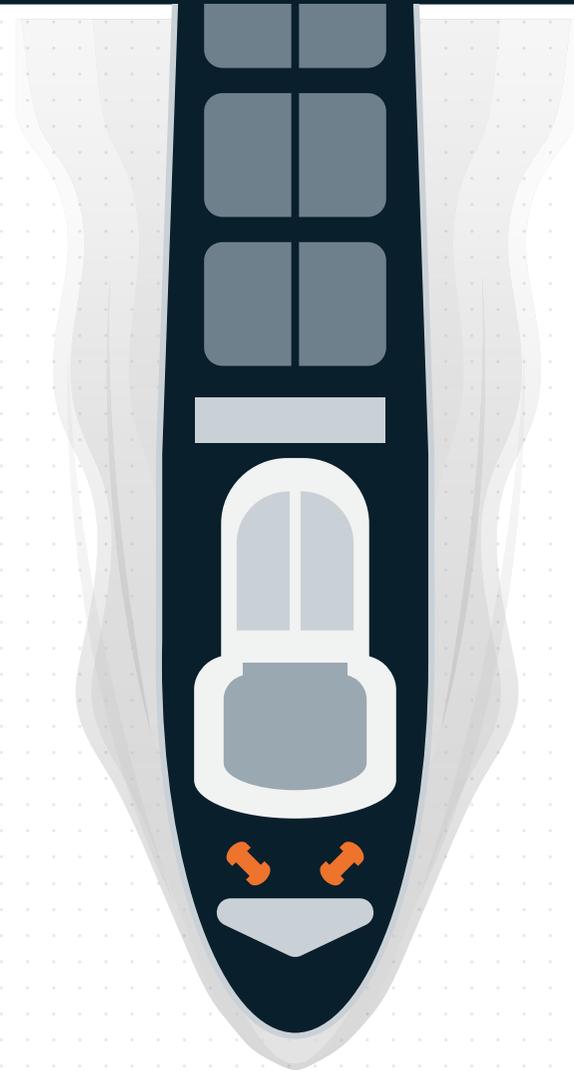
**70%** say that the industry needs to invest more in education and training initiatives to boost skills development

**65%** say the industry needs to invest more specifically in data education and training

Investment in maritime education will not only support the recruitment of talent but could help with upskilling those professionals who have cited a lack of skills as a potential obstacle to participating in digital transformation.

Many organisations have already seen how technology can create efficiencies and headroom on the cost front, freeing up more investment for recruitment and retention.

When fully realised, digital transformation will allow the maritime sector to be confident it is operating in the most commercially sensible way.



### Wärtsilä cloud simulation training

As officers work around more sophisticated navigation equipment, training solutions will be vital to ensure that the industry doesn't fall into a skills gap. Cloud simulation training can play a massive role in the familiarisation process. Wärtsilä's award-winning cloud simulation solutions use cutting-edge learning software to enable marine schools and training centres to offer their usual services on-demand to a larger group of trainees without additional hardware.

[Read more >](#)

## Seven: The Sirens of Fragmentation

# The Sirens of Fragmentation



**Tech providers, ship managers, owners, operators, ports and seafarers must work together if they want to make digital transformation happen. Without collaboration, we'll continue to fall into the traps laid by the Sirens of fragmentation.**

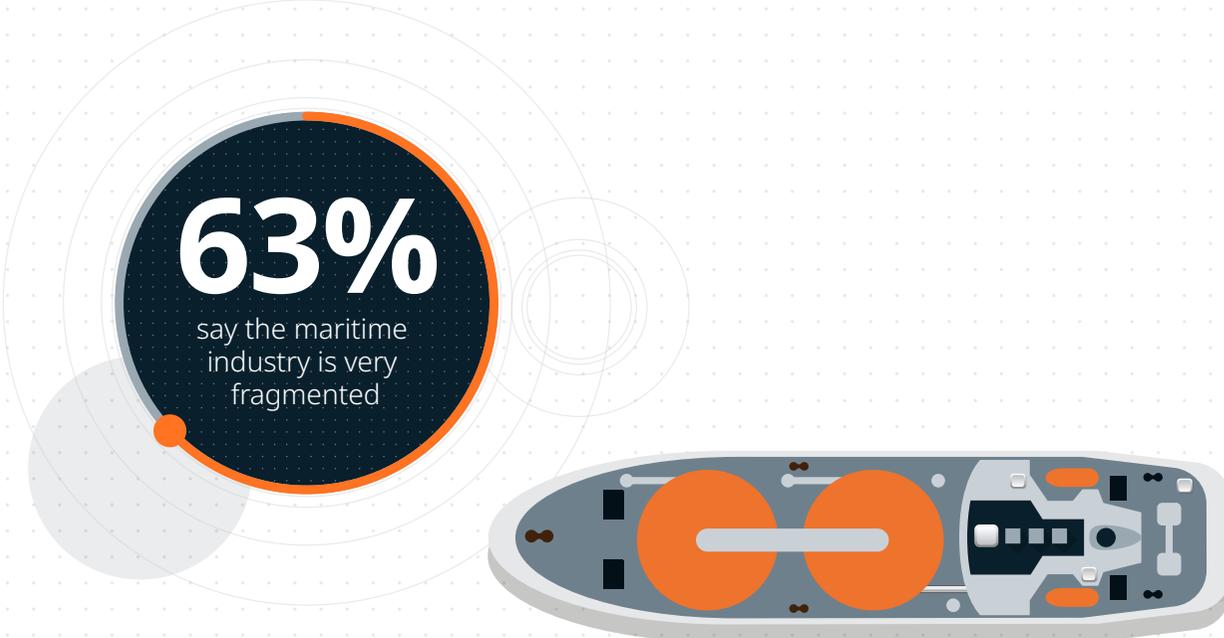
**It is crucial for the industry to foster collaboration between the various stakeholders and across the various aspects of digitalisation to defeat the Sirens and propel positive change.**

# Seven: The Sirens of Fragmentation

## A fragmented industry

The maritime industry is often thought of as traditional and slow to embrace change – with 80% of the nearly 5,000 ports in the world still relying heavily on manual legacy tools such as whiteboards, spreadsheets and hundreds of back-and-forth emails for critical processes and services.<sup>3</sup>

Without collaboration, products and tools are brought in but not implemented in a sustainable and ongoing way. This aggravates the issue of professionals being overwhelmed by technology and data – becoming once more disempowered rather than empowered in the face of digitalisation.



**63%**

say the maritime industry is very fragmented

**65%**

view the need for collaboration between those in the maritime industry and technology suppliers as important

**69%**

say that collaboration between tech brands, ship managers, owners, operators, ports and seafarers could be improved

### Wärtsilä: Connecting the dots to future-proof your operations

Find out how we can collaborate with you to harness digitalisation while you continue to run your day-to-day operations in a sustainable way.

Watch the video >

<sup>3</sup> <https://unctad.org/news/collaborative-innovation-within-maritime-sector-path-grow-back-better>

# Seven: The Sirens of Fragmentation

## Embracing change through collaboration

It's understandable that collaboration across the industry has been difficult. The maritime industry – and the global supply chain and trade network within which it operates – is complex.

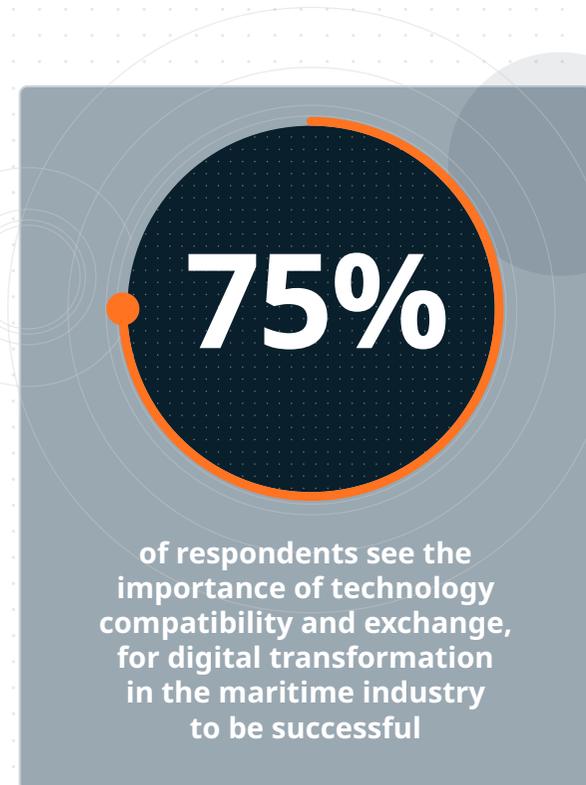
This aggravates a general hesitancy to collaborate, where a lack of understanding of each player's unique experience and perspective contributes to the unsuccessful implementation of technologies.

Moreover, many competing product and service providers work against rather than with each other, resulting in a fragmented bridge onboard that's disparately connected to shore.

Different tools are at different stages in their own progress journey, meaning a bridge will be stocked with a large variety of equipment spread all over the place. Data then needs to be transferred between tools – a risky and inefficient process that is prone to error and requires extra training and maintenance to boot.

It is highly unfortunate that we don't tend to see the same plug-in and acceleration layer capabilities in maritime tech as we do elsewhere in the software industry.

Interoperability is an important consideration for tech providers as they are developing products. In fact, it's a vital step in facilitating the digital transformation of the industry. Without it, that destination will never be reached.



**The lesson of TradeLens**

*"It is an indication that it is commercial usage which determines the fate of new technological initiatives and not the sophistication of the technology employed,"* said Lars Jensen, former Maersk employee, in response to the announcement that blockchain platform TradeLens would be folded in 2023.<sup>4</sup>

A joint project between Maersk and IBM, TradeLens aimed to accelerate global supply chain digitalisation via an open and neutral platform. Unfortunately, the lack of industry buy-in and participation overall meant that it was not able to achieve commercial viability.

This is what happens when the dangers of fragmentation are ignored. Collaboration is crucial in order to foster the widespread usage of innovative technologies.



<sup>4</sup> <https://splash247.com/tradelens-folds/>

## Conclusion

# Conclusion

**When it comes to the digitalisation of maritime, we are all in the same boat. Like the sea, digital transformation is a great unifier.**

**We all must share and learn from each other's experiences because digitalisation won't be achieved by any one player alone. We need to work together.**

**By connecting the dots across the maritime ecosystem, we can reframe the fear-based narrative holding us back and propel positive change through embracing data and digital technologies.**

# Appendix

## Research Methodology

Our research was collected by Lloyd's List Intelligence from October 10 through November 2, 2022. We surveyed a cross-section of professional roles in the maritime industry across EMEA, the US and APAC, with Management (**33%**) and Seafarer (**23%**) most commonly represented.

19% of respondents hold director-level or higher positions within their organisations, while managers account for just over a quarter of the sample (**27%**).

A variety of industry types are represented in the sample, most commonly Ferries (35%) and Merchants (**27%**).

There were **221** respondents to the survey in total.



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