DIGITAL DISRUPTION IN MARITIME

Workshops Summary

25 APRIL 2018, SINGAPORE & 31 MAY 2018, HAMBURG

New digital technologies are bringing major challenges and opportunities to the global economy and to the maritime industry. With the aim of exploring the potential for collaborative action to address this, the Global Maritime Forum, in cooperation with Rainmaking Innovation, organized two workshops on digital disruption in maritime in Singapore in April 2018 and in Hamburg in May 2018.

The ambition of the workshops was to discuss the impact of disruptive digital technologies on the maritime sector and get insight on how startups can bring innovation to the maritime industry. The purpose of the workshop was also to identify areas of opportunity that, after validation with a wider audience, could become the launchpad for structured collaborative industry action.

The workshops gathered representatives from different parts of the maritime industry including shipowners, ship managers, ports, classification societies, finance as well as representatives from government and international organizations. One of the key takeaways from the discussions was the importance of gathering a variety of stakeholders, since many of the identified action opportunities require collaboration across the industry and with outside partners and regulators.

"Collaboration and honest sharing is key!"
"If people from the industry do not do it, people from outside will do it!"
Workshops participants

Disruptive trends

In the workshops Nicklas Viby Fursund, Founder of Rainmaking Transport, presented key disruptive trends impacting the maritime industry as well as the new opportunities this opens-up for companies. One of the key disruptive elements of new digital business model is the ability to quickly scale growth and revenues. Companies that manage to seize new digital growth opportunities will have the opportunity to generate new revenue streams that could outpace the revenue streams from traditional core business and lead to higher valuations and easier access to capital.

When looking at new digital business opportunities it was highlighted that it is useful to distinguish between different innovation horizons (*Annex 1*) based on the potential impact of the opportunity ranging from an incremental improvement of existing business models to a complete reconfiguration of the value chain in an entire industry. Incremental improvements typically entail minor gains and low uncertainty whereas transformative changes can offer high rewards but also high uncertainty.

Another defining characteristic of the ongoing digital disruption is the speed and scale of change taking place. Many actors are moving quickly both within and outside the maritime industry and companies need to move fast if they are to seize new digital growth opportunities. This will require new skillsets, culture, technology and much more. Most companies face hundreds of opportunities that no single player holds full capability to unlock, which means that collaboration with other companies and with startups is necessary. Finding meaningful models for collaboration that can create impact is thus important and has been done in many other industries before maritime.

Collaborative responses in other industries – case studies

The maritime industry can take inspiration from other industries that collaboratively worked together to successfully transition to the digital economy. At the workshop, participants discussed a selection of case studies from different industries -financial services, pharma, smart cities -, which illustrated various structured vehicles for collaboration that have demonstrated success. The vehicles were clustered in 4 main categories, depending on the specific types of challenges they help to address (a more detailed typology of collaboration vehicles is provided in *Annex 2*)

Shared infrastructure and assets

The purpose of sharing infrastructure and assets is to reduce cost compared to owning it and is relevant, when there is no competitive advantage in owning the infrastructure. The shared infrastructure is usually financed by participating members and may be run as a stand-alone not for profit organization.

Learning

The purpose is to accelerate the speed of knowledge creation. They usually exist in areas of high uncertainty, high interdependence or in white spaces, where no applied knowledge is available. Base research and pre-commercial stages of R&D are typical areas of collaboration, as learning in these circumstances is expensive, slow and non-competitive.

Innovation

The purpose is similar to learning but at later stages, when the focus is in execution methods and applied knowledge. Collaborative vehicles in these areas focus on managing key risks in the innovation process through structured approaches to engage outsiders (startups). As innovation is often expensive, collaboration aims to minimize the cost of uncertainty.

Business model

When several parties jointly execute a business model and depend on each other for value creation in cases where none of the parties can serve the customer by themselves. Often one party acts as the orchestrator and the others are plugged in at different parts of a customer journey to deliver different value. The business model is often based around a digital platform.

In the discussions at the workshops, the learning and innovation vehicles were considered very important for tackling digital disruption in the maritime industry. Using vehicles that could draw upon the innovative capacity of start ups were also thought critical for both engaging the emerging start-up ecosystem as well as acquiring new capabilities and learnings.

Inspiration from the startup world

Spanning emerging customer needs, technologies and new business models, startups are a great vehicle from which the maritime industry can take inspiration. Startups are teams trying to identify repeatable and scalable business models to solve problems in maritime value chains. In doing so, they are not constrained by the industry's status quo. They experiment with new ways of using digital technologies and business model to orchestrate value at a much lower cost than established players, and thus can be used for inspiration and learning about what models work.

A number of digital startups are already working on issues related to the maritime industry and in the workshops three tech startups related to the maritime industry were invited to present their work. The presentations were both relevant in their own right since the startups were all working actively on some of the pressing challenges of the maritime industry and as concrete examples on how the innovative capacity of startups can be used to solve industry challenges in general:

BLOC
BLOC[2] is an example of collaborative action using blockchain to address challenges around tracking and quality assurance of fuel as it transitions through various points in the value chain. BLOC's structured working method consists of gathering a wide group of stakeholders, engaging key players such as the regulators, creating concurrent "demonstrators" that test different parts of the idea and running multiple pilots with interested parties to validate ideas and gather data.

HEURO Labs
Heuro Labs specializes in using artificial intelligence and machine learning to tackle different transport challenges. They build AI components focusing on industry problems that are trained on data relevant to the problem at hand. This enables decision-making that is context driven and optimized in a way a human would not be able to do. Contrary to many, they do not aim to own the data or a platform, but offer AI as a service partnering with industry players. Heuro Labs has applied their solution in several different industries and problem sets, such as the challenges of predicting rates, bunker prices, logistics optimisation and automating customer service replies.

C-LOG
C-Log is a platform that addresses the challenge of how different players within the maritime industry can share data. The platform provides the tools that are needed for seamless data pooling including tools that ensures traceability and trust for instance through the use of Smart Contracts. Such a platform can address many challenges where cross-organisational collaboration is key or where data is dispersed across multiple stakeholders, such as crew matrix management.

Action opportunities identified at the workshops

One of the ambitions of the workshops was to identify concrete action opportunities where the application of digital technologies can help improve the performance of the maritime industry and thus contribute to a more sustainable industry in economic, social and environmental terms.

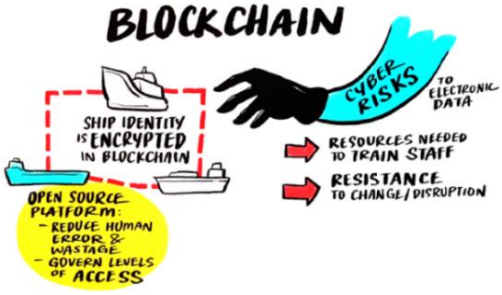
Inspired by the presentations and discussions on collaborative approaches from other industries and startups, participants started developing ideas for the maritime industry. The action opportunities identified at the workshops and described below vary in their focus, complexity and purpose. Some of the action opportunities could be taken up immediately by a few partners working together while others would require cross-sectoral and multi-stakeholder collaboration.

One of the issues that was raised in the context of the proposed platform-based solution was the trade-off between having only one or a few widespread solutions across the industry, which would create significant positive network externalities and economies of scale, but could also lead to a lack of competition and innovation compared to a situation with many competing solutions.

The action opportunities will feed into the upcoming inaugural Global Maritime Forum summit to be held in Hong Kong in October 2018 where they can be further validated and serve as inspiration for action.

1. Blockchain for cargo tracking

Challenge: Today, the tracking of cargo in cases of incorrect delivery is nearly impossible. It is also hard to identify where in the chain the issue occurred. This is due to a number of missing mechanisms, e.g. reliable record of identity, transparent and verifiable trail of ownership and up to date cargo traceability information.



Solution: Blockchain can be used to solve some of these challenges by creating an electronic immutable transparent and verifiable decentralized record around cargo documentation. Additional benefits from such a solution would include access to reliable information that can be used for risk management or financial purposes, the creation of automated smart contracts around container documentation and a reduction of human errors due to automated processes.

Barriers: Implementing an early stage technology brings a number of risks, including cyber security, resistance to adoption and the need to retrain people to work with the new technology. There are also challenges related to regulation in particular related to the legal validity of electronic documents.

Way forward: One way forward could be to build on existing block chain initiatives and engage maritime stakeholders in developing commercial pilots focusing on specific applications for instance related to the misdelivery of cargo. Alternatively 2-3 industry partners and a venture builder could launch an explorative phase to identify problems to solve and build an initial prototype to demonstrate the value and feasibility. Afterwards the solution could be scaled commercially with multiple partners or become a non-profit infrastructure.

2. Smart Capacity Management Platform

Challenge: Today the capacity on board ships is not fully utilized since no mechanism exists to dynamically match cargo with unused capacity across operators. This means that more resources in the form of ships, fuel and port infrastructure etc. is required to transport the cargo than necessary, which increases operating costs and environmental impact.

Solution: The efficiency of the maritime logistics chain can be improved through a data-driven Smart Capacity Management Platform, which would match cargo with unused capacity. The platform should combine multiple data sources including vessel positioning data, cargo flows and requirements, tracking of cargo contents at container and more granular level, as well as unused capacity in transit.

The data gathered by the platform could also be used to better understand patterns of cargo flows, managing peaks and predicting needed capacity more accurately, which could also allow optimizing vessel routing and improving vessel positioning as well as modelling risks of various routes and optimizing travel routes against risk exposure and weather events.

Barriers: The introduction of a Smart Capacity Management Platform could erode existing margins due to data symmetry/transparency, which could make operators hesitant to join. There is also a need to resolve questions around ownership of the platform and business model. The platform would require access to reliable data from multiple sources as well as data matching/modelling capabilities, which might not be readily available and raise concerns regarding confidentiality and data protection.

Way forward: A first set of actions could focus on identifying available data that will allow matching ships with cargo and their use for predictive analysis as well as mapping the state of art in terms of data matching/modelling capabilities that exist in other industries. On this basis commercial pilots could be developed. It would be relevant to involve actors from the maritime industry as well as outside actors for instance experts from academia, software development and entrepreneurs, and collaborative vehicles such as hackathons and start-up accelerators could be used.

3. Circular ship recycling and waste management

Challenge: With the decreasing length of life of ships as well as the increased focus on environmental sustainability, sustainable ship recycling is becoming a growing need and concern. At the same time the trend towards building a circular economy focusing on reusing valuable resources as input in new production processes could create new market opportunities for recycled materials.

Solution: Digital technologies can be used to scale current waste management and recycling efforts and underpin the creation of digital market places, where materials produced through ship recycling can be sold as inputs into other production processes, thus incentivizing sustainable ship recycling practices.

Barriers: The creation of a circular shipbuilding and ship recycling industry requires the involvement of a large number of stakeholders including shipyards, equipment manufacturers, shipowners, ship recyclers, ship financers and regulators. In addition, there is a need for a systemic understanding of the barriers and friction points that must be overcome to realize the vision in order to catalyse real action.

Way forward: A cross-industry focus group involving key stakeholders from across the maritime industry (ship owners, ship yards, finance, regulators etc.) and involving thought leaders from outside the industry should be tasked with developing a vision for circular ship recycling and identifying the key friction points that must be addressed. The focus group should also help disseminate best practices and identify proposals for concrete actions that could be taken for instance related to regulation, use of digital technologies or economic and market-based incentives.

4. Crew recruitment and allocation marketplace – "Upwork" for crewing

Challenge: Crew allocation and recruitment is a challenge and the existing generic platforms for talent/matching (e.g. LinkedIn, Upwork) do not provide the necessary granularity of information and matching capabilities to address the talent marketplace within the shipping industry.

Solution: A custom-designed platform (talent marketplace) that operates on industry level could consolidate supply of available talent, provide a structured and trusted way of qualifying/vetting the talent and make it possible to algorithmically match supply to demand.

Barriers: While the technology required to build a digital talent marketplace is readily available a number of barriers exists in order to make it a practical tool. A key issue is the vetting and reliability of data about potential talent i.e. how can companies make sure that the information provided is correct. There are also issues related to the protection of personal data that must be addressed. A successful platform must be attractive to use both for talent and for companies and have a sufficient critical mass of users to create value

Way forward: The implementation of the platform could be done through a startup venture with limited participation in order to demonstrate a Minimum Viable Product. Initial stakeholders in this venture would be 2-3 large crew management players and a venture builder. After proof of concept additional partners could be invited to scale the venture.

5. "Trip advisor" for the maritime industry

Challenge: There is a general lack of transparency in the maritime industry, which makes it difficult to choose those service providers that deliver high quality service while also making it difficult for quality providers to charge a premium for their services.

Solution: The creation of a Tripadvisor for the maritime industry, where industry players rate and review the maritime services they use - for instance ports, cargo handlers, pilots, agents and suppliers - could help create much needed transparency as well as give feedback that service providers could use to improve their quality.

Barriers: A maritime trip advisor would require sufficient critical mass of active users to bring value. Mechanisms should be put in place to ensure the reliability of the information provided by the platform. A concrete business model that can both ensure neutrality and generate sufficient income to run the platform would also need to be developed.

Way forward: A first step could be to gather a critical mass of stakeholders interested in establishing a maritime Trip Advisor platform that could develop a more concrete proof of concept that would outline objectives and goals for the platform. On this basis a platform could be established either as a not-for-profit initiative or as a commercial venture.

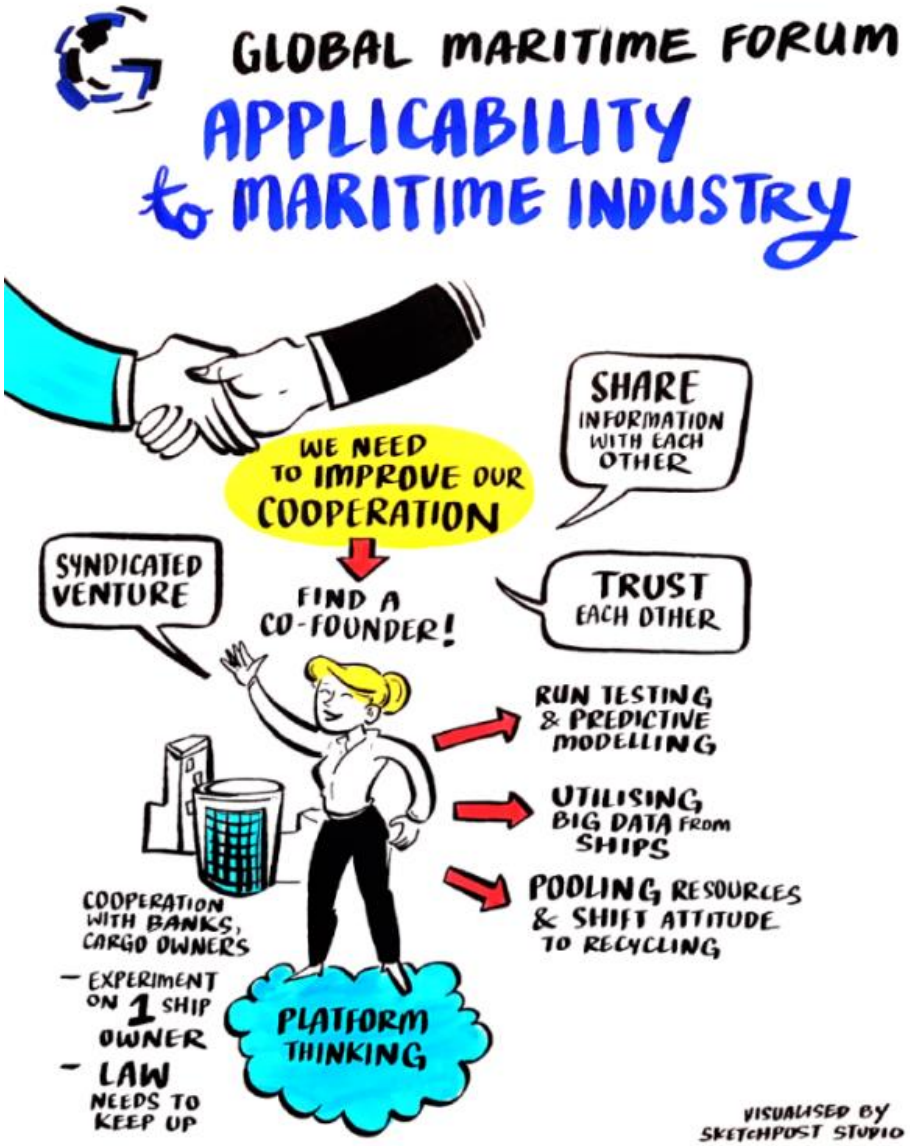
6. Port Call optimization

Challenge: Many ships schedule to arrive early at ports in order to make sure that they can access the necessary services and reach their berth in time. This leads to suboptimal route planning and higher fuel consumption as well as potential congestion in and around ports.

Solution: By creating digital solutions for the exchange of digital information between ships, ports and relevant service providers based on internationally accepted common data standards, the port call process can be optimized. This can improve the reliability of the maritime logistics chains, improve efficiency and reduce the environmental impact of shipping.

Barriers: There have already been established initiatives aimed at optimizing the port call process through the use of digital technologies and platforms, for instance an initiative by the Port of Rotterdam, but in order to reap the full potential solutions should be developed that would include more partners and more ports.

Way forward: The awareness of the potential for optimizing the port call process through the use of digital solutions and standardized data should be raised for instance based on the best practices identified in existing initiatives. In addition, barriers to the full deployment of port call optimization initiatives should be identified as well as possible ways of addressing them.


GLOBAL MARITIME FORUM
APPLICABILITY
to MARITIME INDUSTRY
WE NEED TO IMPROVE OUR COOPERATION
SHARE INFORMATION WITH EACH OTHER
SYNDICATED VENTURE
FIND A CO-FOUNDER!
TRUST EACH OTHER
RUN TESTING & PREDICTIVE MODELLING
UTILISING BIG DATA FROM SHIPS
POOLING RESOURCES & SHIFT ATTITUDE TO RECYCLING
COOPERATION WITH BANKS, CARGO OWNERS
- EXPERIMENT ON 1 SHIP OWNER
- LAW NEEDS TO KEEP UP
PLATFORM THINKING
VISUALISED BY SKETCHPOST STUDIO

Annex 1: 3 Horizons model

3 Horizons model: Model used to describe the disruptive potential of Innovation.

- H1: refers to incremental innovation, impacting mainly changes in existing value propositions or optimization of existing business models.
- H2: refers to business model innovations, completely new value propositions or customer segments. Horizon 2 innovation has significantly bigger disruption potential.
- H3 refers to innovations resulting either from new technological advancements, or complete reconfiguration of value chains within an industry. They have the highest disruptive potential and are often observed in situations where a step change in technology or market conditions is happening. Horizon 3 innovations or ideas open up huge opportunities as they usually uncover new and previously underserved spaces in the market.

The 3 horizons are also linked to uncertainty: H3 being the one with the highest degree of uncertainty.

Annex 2: Examples of collaboration vehicles:

The annex provides additional information and concrete examples of different types of collaborative vehicles that can be used in the context of developing new solutions and business model based on new digital technologies and cooperation with startups.

Shared infrastructure

When several organizations put together resources to create a utility or assets that can be used by all contributing members. Sharing of knowledge or infrastructure is more cost effective and there is no competitive advantage in owning it.

Vehicles:

- **Shared assets**: knowledge and tools: Several parties pool together their resources to create co-owned tools used by all parties. - Case study: OASIS
- **Shared Sandbox**: Well-defined environment used by multiple parties with set of specific policies, processes or legal constraints different from the typical ones, with the purpose of testing early innovations in a confined and controlled manner. It may also comprise technical infrastructure such as software libraries, data or APIs. - Case study: Regulator sandbox
- **Shared infrastructure**: Technical platform created by members to address a common problem in a standard way, usually in situations where bilateral solutions are more expensive, thus bringing significant economies. The infrastructure is usually financed by member participants, and may be run as a stand-alone not for profit organization. - Case studies: SWIFT, Eurocontrol

Learning

Accelerate the speed at which a body of knowledge is being created. They usually exist in areas of high uncertainty (shifting conditions), high interdependence (knowledge is spread in many parties) or white spaces (no applied knowledge available). Base research and pre-commercial stages of R&D are typical areas of collaboration, as learning in these circumstances is expensive, slow and non-competitive.

Vehicles:

- **Shared test infrastructure**: Common test environment that requires testing of interoperability of different solutions or providers. - Case study: DOLL Living Labs

- **Communities of practice**: Groups of practitioners from different companies organized around topics or knowledge areas to advance the learning in an area by sharing of best practices across different organizations. - Case studies: OASIS, LLN Science park

- **Shared learning resources**: Learning resources build and accessible to multiple parties. These may be different learning tools: research program for understanding customer preferences, courses, playbooks, simulators, surveys... - Case study: Always in Beta

Innovation

Similar to learning but at later stages, when the focus is in execution methods and applied knowledge. Collaborative vehicles in these areas focus on managing key risks in the innovation process through structured approaches to engage outsiders (startups). As innovation often is expensive, collaboration aims to minimize the cost of uncertainty."

- *Vehicles*:

  Startup accelerator: 3-month acceleration programme of a cohort of startups in a specific area of interest, funded by a group of established organizations interested in the topic and that may receive equity in exchange of the funding. - Case studies: Startupbootcamp Fintech, Free Electrons

- **Co-investing**: Pool together investment resources from different organizations and structure them to invest in different startup ventures. It allows multiple organizations with interest in a particular space of startup activity to share the risk of investment and to achieve enough scale to be a respected investor in their space. - Case study: LLN Science park

- **Startup factory/Joint venture**: Different parties combine funds to create own startups from scratch, thus reducing the risk of early stage exploration. It is applied in spaces where there is no sufficient startup activity or where the funders want to own the space. All parties hold equity in the startups, thus benefiting from any that is successful. - Case studies: Inttra, LLN Science park

- **Innovation Lab/open innovation**: Physical (e.g. labs) or virtual environment consisting of processes, tools, campaigns and communities or participants with the purpose of innovating/finding original solutions to problems. Often run as competitions where challenges are posted to the community, which responds with their own solutions. Member organizations benefit from the presence of such talent and the knowledge that is being generated in the space. - Case studies: Open Lab foundation, InnoCentive

- **Incubator**: Solving problems structured approach: incubators (neutral spaces) provide support (e.g. mentoring, knowledge, tools, data, testing capabilities, experts) to early stage ideas to grow into firmed concepts. IP generated is usually covered by collaborative licenses - Case study: LLN Science park

- **Commercial Pilot**: Collaboration between one/several established companies and one/several late stage startups, to establish viability of the startup solutions in a specific problem space. It usually takes 8-12 weeks, and has a well-defined scope and success criteria. It is a pre-cursor to a larger partnership, in order to control key uncertainties. - Case studies: Gamuda, BLOC

- **Collaborative IP practices:** Custom designed licensing models that serve the various needs of protection, sharing, attribution, propagation and benefit that arise specifically in situations of collaborative work. - Case study: LLN Science park

Business model

When several parties jointly execute a business: they own the users/customers together, depend on each other for value creation (none of the parties can serve well the customer by themselves) and share revenue. Such businesses are often called ecosystems, and have different typology/structure. Often one party acts as the orchestrator and the others are plugged in at different parts of a customer journey to deliver different value. Collaborative platforms and APIs (application programming interfaces) are the technologies that enable the ecosystem business models."

Vehicles:

- **Platform business model**: Business where many organizations collaborate to serve the same customer, often sharing resources (e.g. channels, data, technical platform) and revenues. It allows small companies to compete successfully with large established corporations without investing in owning resources at the same scale and provides for very nimble adaptation as new value propositions can be delivered by just plugging in another company. E.g. App stores - Case study: Xero

- **Network business model**: Aggregation of multiple players – individuals and companies around a common purpose and value proposition delivery. Often created as freemium businesses: collaborators build a base product that is available for free, after which each participant can independently provide payable value-add services around that product. - Case study: Linux