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The skilled collaborators - the winners in a digitized maritime sector

by

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Digitization opens new opportunities for collaboration in the maritime sector

Business today is much different than 100, or even 50 years ago. Traditionally transactions were done in isolation to protect a business from competitors and create a competitive advantage. Working with competitors or even with those with links in the same market was often seen as detrimental as this could disclose critical information and reduce competitive advantages. The way to do business was cooperation in systems of production (e.g., unloading cargo) through episodic tight coupling (e.g., rendezvousing with a pilot). Only the minimum data necessary for the encounter was exchanged.

In our connected world, cooperation within and across markets is necessary for survival. Almost all airlines collaborate in alliances and work together closely when setting up code-share flights, and this in a very competitive environment. Collaboration in the car industry can result in vehicle designs that are shared between competitors, who might simply make a few cosmetic changes and rebadge for sale. The shipping industry is waking up to that concept, which is greatly supported, even enabled, by the developments in digitization, IoT, and Big Data.

As we all know, 2017 has been coined as the year when digitization was implemented broadly across many different areas of the maritime field. But, if we look at how the industry adopts digital technologies and explores new opportunities, these seem to be mainly oriented towards empowering access to data for different stakeholders, stretching all the way from shipping companies, ports, operators to diverse (digital) service providers. Due to the maritime sector's self-organizing characteristics with many competing actors and providers, such approaches might actually lead to increased sub optimization resulting in a value chain reconfiguration, where some actors will gain business while others will go into bankruptcy. Exchanging just enough data creates ignorance gaps resulting in missed detection of opportunities for system wide efficiency.

Digitization may empower ecosystem performance



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Alibaba and Amazon have demonstrated that no industry is immune from disruptive interlopers. Innovative entrants might establish new shipping lines and ports or increase their influence over ports by establishing terminals and service provision. To avoid such storms, the maritime sector needs to utilize opportunities for enhanced ecosystem performance enabled by digitization.

Luckily, the cost of shipping per transported unit is low at the moment, and there might be little attraction for new entrants. Saving a \$1 for shipping a TV set is not worth the capital investment for these global players. However, not everything is driven by costs, the promise of higher service levels, resulting from more effective collaboration among involved actors, can be alluring to some customers.

The question is whether the maritime sector is collaboratively mature or if current practices are so deeply rooted that the introduction of digitization rather dilutes and decreases cooperation jeopardizing the economics of the maritime sector. Because it took longer for the maritime sector than for other industries to adopt digitization, it might be that digitization empowers the wrong objective. It should show the effects of each actors changed behaviour because everyone can see the consequences of all actions from a holistic point of view that was not been possible before. This introduces possibilities for enhancements in coordination, informed collaboration, and possibilities for analytics that take a longer time horizon and a larger part of the ecosystem into consideration.

An unresolved question is whether the sector can take advantage of the potentials that digitization enables, or if different actors developing proprietary capabilities create an even more fragmented ecosystem, which would mean that the maritime industry moves away from the proven business practice of other industries.

Collaborative dynamics as the key driver for integrated performance

One of the answers to the challenges being faced is to stress the importance of collaboration, with the goal of enhanced integrated performance in the ecosystem. This also means that we must move beyond IoT in the sense of not just sharing data, such as the status of a bollard and ship movements communicated via AIS. There is also a need to use digital technologies for instant and efficient interaction between involved actors as well as for capturing the status of agreements, planned operations, and conducted operations. The maritime sector needs to empower its capabilities by collaborative dynamics.

Collaborative dynamics means that each actor in the (maritime) value chain needs to empower its collaborative capabilities rather than using each actor's insights to outmanoeuvre competitors through knowing more than them. This also means that there needs to be agreement within the industry that some actors, involved in the same common object of interest in the ecosystem (such as a ship's turnaround), sometimes might have

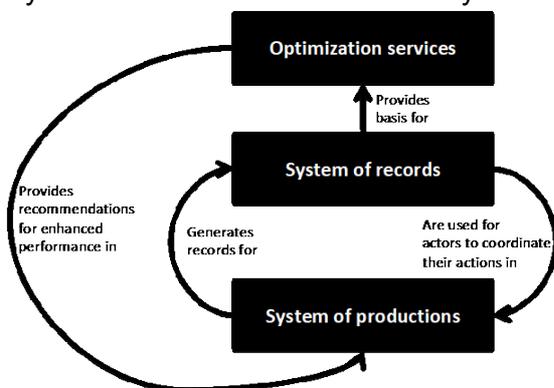


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less than optimal operations in order to ensure that the ecosystem as a whole is operating optimally. As an example, a pilot may have some idle time between taking ships as the ship arrival is optimized for berth readiness, but in a long run pilots might have more business because of the port's high efficiency.

Digitization enables the creation of a system of records

In collaboration, trust, communication, relationships, and knowledge of the likely outcome are the most important ingredients, where there are some basic prerequisites that need to be established such as agreed languages, communication channels, and procedures for interaction. As an example, port collaborative decision making (PortCDM, a concept existing within Sea Traffic Management (STM)) stresses patterns for internal (within ports) and external collaboration (between a port and ships, other ports, and hinterland operators) to enable data sharing according to agreed patterns and relationships, enabling involved actors to respond instantly regarding disruptions and initiatives contributing to a create better whole. STM can support the sharing of data taking into account berth-to-berth sea transport in which **both** the ship as well as the port are foundational units of analysis. PortCDM records data about relevant actions completed by the production system, resulting in a system of record that can be analysed to enhance the quality of the production system as



well as informing ecosystem members of their plans and performances. In the figure to the left, the relationships between the two types of systems are depicted.

Among other things, the era of digitization can feed data of planned and conducted transactions into a system of records to be shared among involved stakeholders and analysed to support production system optimization. To gain maximal value from a

production system data, it should record spatial-temporal digital data for each activity, such as e.g. ship movements capture by AIS. Thus, for each event the location and time as well as its characteristics should be recorded.

Collaboration requires episodic tight coupling between two or more parties to fulfil agreements. The parties interact in sequences of initiatives and responses, such as executing an agreement between a ship and a tug operator on the time and location of towage. This agreement will regulate temporal (when) and spatial (where) dimensions among other characteristics. The fulfilment of this agreement is initiated by the captain ensuring that the ship is at the specified location at the specified time, and that the tug operator must match the location and time and be ready to commence towing.



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However, this collaboration process is also of interest for others involved in the sequence of activities that need to happen during a port visit. For example, if the terminal operator could get insights of a towage's progress, it could plan accordingly. Because there are many actors in port call operations, there is a need to establish a schema of how collaborations can be facilitated by real-time systems of records and how these could be shared among involved actors. One of today's challenges is that the industry has not arranged its installed base, in all its different parts, to share data to enhance collaboration. There is a need for message formats for capturing spatial-temporal data for essential actions emerging from collaboration revealing the status of a production system.

The industry thus needs to establish capabilities for collaborative dynamics enabled by digitization as a basis for everyone to be more informed. Collaboration releases data, captured in systems of records, which could be shared among many and used for making well-informed decisions. The means for generating reliable and relevant data for such decisions is through collaboration and the use of multiple data sources.

The establishment of message formats, communication channels, and interaction procedures are just foundational capabilities. The real benefits come when data derived from different areas of operations, related systems of production in the ecosystem, is used in optimizing the overall ecosystem's performance. The winners are not the ones that are in possession of data; but the ones who can optimize for the good of the whole ecosystem. This is also a call for innovators to enter and enrich the maritime sector by offering new digital value-adding services.

Collaboration of tomorrow requires a process of emerging standardization

There already exists standards and formats for these interactions, but these have been constructed for the pre-digital and pre-IoT era. New initiatives for standardization are needed rapidly to ensure the future of the industry, and it is not feasible to wait for regulative processes to act. Industrial actors need to be involved in developing future-proof standards. The way forward for creating emergent standards is collaborative forums, with small and big industrial actors, authorities, regulative bodies, and service providers to make agreements on future movements. Examples of such evolved standards are Bluetooth (outside the maritime sector), and route exchange format (RTZ) (within the maritime sector). Examples of ongoing standard initiatives within shipping in different phases are port call message format (PCMF), shipboard data (ISO/DIS 19847 & 19848) and ship reporting. Skilled collaboration requires digital proficiency.

Digitization can enable the maritime sector to take steps towards standardization and automation thereby becoming an attractive part in a holistic transport system. Such a leap, however, requires stakeholder engagement utilizing digitization for sharing data and



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enabling optimization initiatives. The winners will be those that master collaboration and data analytics.

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