WHITEPAPER
DIGITALIZATION OF MARITIME SUPPLY CHAINS

EMERGING CHALLENGES IN A COMPLEX FUTURE

28th Global Supply Chain Forum by ISLI - KEDGE Business School

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EDITORIAL

For the 28th year, KEDGE Business School Global Supply Chain Management Programme, ISLI, ORGANIZES and hosts the Supply Chain Forum. In 1990, the ISLI programme created the first event which aim was to share Supply Chain knowledge in different sectors. Intended to Supply Chain professional willing to keep themselves on the know and exchange good practices with their peers, over time the ISLI Forum has acquired a reputation enabling the event to gather more than 300 supply chain leaders in 2017.

During this one-day gathering, Supply Chain Leaders come to give their insights about tomorrow challenges highlighted by the multicultural promotion of ISLI Master of Science.

This new edition entitled “Emerging Challenges in a Complex Future” offers to discuss new challenges and technologies and the evolution of consumption models around 4 round tables animated by high profile supply chain leaders on the following themes:

➢ **Green Loop Supply Chain Implementation**: As a result of empirical studies, companies acknowledge the benefits of a closed-loop logistics. This year professional leaders will exhibit challenges going along with the implementation of a Green-Loop Supply chain and how to successfully transit toward this best practice.

➢ **New Urban Supply Chain in Smart Cities**: Today, 54% of the world’s population lives in urban areas. This number is expected to increase to 66% by 2050. Due to the urbanization, companies need to redefine and seize new opportunities in this growing urban area. The urban community requests more customized products and efficient supply chain solutions. Why the supply chain in urbanized areas is difficult to implement? What are enterprises currently focusing on to improve their urban supply chain?

➢ **Startups’ Effects on Supply Chain Innovation**: Increasing recognition of the importance of a well-designed supply chain, combined with huge advances in technology, make the supply chain field a fertile field for innovation. Who are the leading innovators, and how are they impacting supply chain performance? Leading supply chain startups will provide the answers.

➢ **Toward Digitalization of Maritime Supply Chains**: it is time to reconsider the world of maritime supply chain and find solutions to current and future challenges. Information technology is the base and digitalization is the key. The question is how digital business transformation as an emerging trend would change the way maritime industry operates. Experts will be here to provide clear answer to this question.
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OVERVIEW

Globalization and the technological advancements in the transportation such as containerization, logistics integration and the consequent extension of the maritime industry and international logistics have portrayed the functional role of shipping and ports in supply chains differently and have created a new display of freight distribution. The drastic increase in international trade in the past years has reshaped the global maritime industry, bringing new developments to the scene, deregulations and liberalization as well as increased competition.

There have been intense changes in the mode of world trade and cargo transportation, as per the prevalence of business-to-business and integrated supply chains. These changes can be illustrated by the increasing demand for value-added logistics services and the integration of various transportation modes such as inter- or multi-modal transport systems. Therefore, high-quality logistics services mainly including the digitalized solutions and the effective and efficient integration of transport and logistics systems offered by shipping companies as well as terminal or port operators have become a matter of survival in the industry.

Inspired by digital revolutionary companies such as Uber, Amazon, and Airbnb, customers throughout the world are now seeking services and products designed according to their individual needs. At the same time, they are becoming more and more impatient when it comes to delivery times and are less willing to accept mistakes. Also, their loyalty towards brands is decreasing and thus switching suppliers is becoming more common. Companies that have the competences to best answer customer requirements will be the winners of this change. Consequently, this leads to a market with much deeper volatility of demand and greater variety of products available. In this way, companies are forced to align their strategy to a global presence. This geographical shift increases complexity. In order to face this, a more expanded and flexible supply chain is needed. This is to be addressed through the coordination of the individual components of the supply chain including production and distribution of finished goods. The main goal of Logistics 4.0, Maritime 4.0, and Port 4.0 is to reach further improvements of effectiveness and efficiency.
IMPACT OF DIGITALIZATION

Maritime Supply Chain is one of the key sectors for digital transformation. With its high degree of networking and its large number of interfaces, maritime supply chain offers a broad range of applications for digital technologies. Therefore, digitization and logistics 4.0 provide a great potential for maritime shipping companies. Traffic, port logistics, and just-in-time shipping will change as an electronic revolution takes shape with Big Data and the increasing networking of technologies. Already today large amounts of data are gathered on each individual ship, although most of them still remain unused. The International Maritime Organization (IMO) supports the introduction of electronic data exchange from ship to ship and from land to ship, to improve the efficiency, safety, and data security of navigation and communication. For the ports and thus for the digital linking of complete value chains in maritime logistics, there are numerous developments in the area of Global Positioning System (GPS) navigation, more accurate ship arrival times, weather data in real-time feeds, and smart container technology to name only a few of the possibilities.

Automation, the Internet of Things, and artificial intelligence (AI) as discussed above, are some of the technologies that have in recent months had potential transformative impacts on the industry. According to the previously mentioned survey, digitalization has impacted the following areas, as shown in the picture below:

![Fig 1: Impact of Digitalization](image)

Digitalization has helped bridging the gaps between collaboration and data integration. Stakeholders across the supply chain see huge protentional to improve service level and efficiency by having more collaboration and integration. When asked to rate the percentage of potential improvement that could be achieved across a wide range of ocean supply chain processes, surveyed executives estimate the room for improvement in each area is as high as 66 percent and no less than 55 percent.

”Anytime we know more, we have the ability to do better” said one of the surveyed executives.

Improving transparency and information sharing is key to increasing efficiency, according to survey participants. Some 90 percent of all respondents say real time
access and information sharing between shipping partners is essential in improving the overall performance of the industry. Increased collaboration and intelligence means better organization in terms of handling of understanding and processes. This will help them to better plan, stack, sort, organize and deliver. The digitalization has brought a tremendous lift in providing information which has improved planning and execution.
FINDINGS

1. CHALLENGES

In maritime supply chains, meaningful innovation is long overdue. The shipping industry in the past decade and more has been characterized by intense peaks and troughs, rivalries and rate wars - but little in the way of real technological innovation. While container ships, ports and inland logistics alike have gotten much larger, they have not become much smarter, nor more connected to the wider logistics ecosystem. "Maritime is quite traditional and has not changed much in the practices it follows for the last 40-50 years" says VesselBot's Komodromos. "Ship designs, automation of processes, business processes have in their majority remained the same for a number of decades; only a small fraction of these has been changed. Definitely not in line with other markets of the economy." A large number of market participants coming from various seniority levels was stating that digitization/digitalization is just a topic to be discussed at conferences, and not something that could be potentially reforming the market.

Of course, the maritime supply chain is already awash with information - commercial, legal and operational. Indeed, the cost of physically moving a container is less than half the cost of handling the information related to its transport, said Maersk in a 2016 study of the trade pipeline. All this latent data can potentially deliver lots of operational and business value when properly mined on a massive, automated scale, as some start-ups are now setting out to do.

But all too often, the data on which supply chains rely remains after the fact, fragmented and unreliable - not surprising, given how much manual keying and rekeying is still involved. This may be a rather shaky foundation on which to build the digital revolution. At the TOC Asia conference this April, Electrolux executive Bjorn Vang Jensen lamented that the shipper currently gets “horrible visibility” from its container supply chain and that “data is not satisfactory.” As for the challenges the maritime supply chain is facing, they can mainly be summarized by the results of the new BPI survey ‘Competitive Gain in the Ocean Supply Chain: Innovation That's Driving Maritime Operational Transformation’, carried out in coordination with Navis and XVELA targeting 200 executives across the maritime supply chain industry.

Fig 2: Visibility & Connectivity as requirements of a Fully Functional Maritime Supply Chain
Fig 3: The Biggest challenges plaguing the Maritime Industry

The following are the areas these executives think are the most important to tackle.

Fig 4: Areas in need of Process Improvement

However, change is happening. “Across industries, geographies and societies massive (technological) change is underway. There is a mass delusion going on that somehow shipping is going to be immune from all of this. That—to paraphrase Robert C Gallagher—change is inevitable, except from a vending machine, and the shipping industry.” KD Adamson, Futurist & CEO Future Nautics.

The mantra of the new normal is 'simplify, standardize, share'. But shipping and maritime isn't adapting quickly enough. Humility is in very short supply and as for simplicity, the industry has always believed itself to be highly complex and used that to justify conservatism, insularity and poor customer service. In the age of machine learning though, where Google can map every street number in France in an our, complexity isn't an excuse for not delivering.

The maritime industry is famously conservative, but change is coming quickly. There will be a need for more collaboration, as different stakeholders have different strengths. This will make partnerships throughout the supply chain and across industries critical.

A wave of change is coming to container supply chains, driven on the one hand by rapid advances in the cloud, digitization, automation and autonomous traffic, and on the other by evolving market dynamics. New technology plays are now coming thick and fast - and not just from ‘disruptive’ start-ups.
Consider Maersk’s evolving digital container logistics strategy, including recent tie-ups with Microsoft and IBM, on top of its smart container program. Or OneSea, a consortium of established marine and IT names with a vision to make autonomous commercial maritime traffic a reality by 2025. Or the tie-up between Port of Los Angeles and GE to launch a digital port information platform. Or DP World’s recently-announced cargo tracking initiative for shippers. The list goes on. The technology genie is well and truly out of the bottle - even if current reality does not, yet, match up to the digital hype.

And the main impediments to the change are related to cost and complexity of legacy system, no strong will to share data between partners, lack of standards and industry-wide agreement and finally some security concerns.
2. DIGITALIZATION AS AN ENABLER

Seaports are supposed to function in an ever-changing environment. The dynamics of the changes and challenges are expanding, mainly because of global trade trends, socioeconomic aspects and industry developments. Seaports have to stay innovative to keep up with these changes and actively participate in the era of digitalization for it to remain competitive. If the ports do not keep up-to-date with the current industry trends, there will be startups bringing disrupting innovations to the market, similar to what has occurred in other sectors.

The terms digitalization and Industry 4.0 are frequently mentioned nowadays. “Digitalization is the technical infiltration of all social and economic sectors. Innovative technologies are not used only to speed up or expand IT and production. Innovations like Internet of Things, cloud computing, cyber-physical systems, robotics, additive production processes, machine learning, augmented reality, blockchain, etc., allow new ways to communicate and new intellectual approaches as well as new business models”. (Fraunhofer Center for Maritime Logistics and Services CML, 2017)

2.1. INDUSTRY 4.0

In all economic sectors elements of supply chains are analyzed, enhanced and interlinked by technological means. Digitalization is the process of moving to a digital business. Industry 4.0 indicates the so-called fourth industrial revolution on the base of cyber-physical systems using the internet. Industry 4.0 combines production activities with state-of-the-art information and communication technologies. Following this, other concepts have followed, namely: Logistics 4.0, Maritime 4.0, and Port 4.0.

Logistics 4.0 (or digital logistics) refers to the connection of processes, objects, supply chain partners, and customers through information and communication technologies with decentralized autonomous decision-making.

Maritime 4.0 is more oriented towards shipping and describes the redesign of the maritime industry’s supply chains shaped by digitalization and interlinking, also making use of autonomous vessels, where and when adequate.

Port 4.0 can be explained by the overall vision of the digital port that uses the specific role of ports as the hubs for physical and information flows across the global supply chains, interconnecting all the players involved. Through a value chain network which is objectively enabled by ports, digitalization issues such as the improved connectivity, autonomous systems and automation of knowledge work will lead to greater reliability and efficiency.
2.2. ENABLING TECHNOLOGIES

Big data and analytics

As its name infers, big data brings together huge volumes of information from a set of different sources and under different forms - often at very high speeds. This data transformation has become possible thanks to the growing application and development of advanced sensor technology that allows large volumes of engine, fuel, traffic, cargo, weather and other data to be created and gathered on board a vessel.

Some applications of Big Data in maritime supply chain are the following:

➢ Remote Sensing: Ships will be supervised continuously from remote locations. The real-time sensor data will be collected as a database and be dispatched to the interested parties giving them latest information on what is happening onboard.

➢ Intelligent Traffic Management: Port authorities have access to the ship data for safety. Intelligent traffic management systems linking ship position, cargo and personnel information will be transferred to the port for advance planning by the port authorities in terms of monitoring potential congestion and improving cargo handling performance.

➢ Operational Predictability: Vessel operational performance can be checked in real-time by analyzing ship performance data. Ship operators will gain the capability to predict future vessel performance against specific criteria to help achieve better decision-making process on maintenance needs.

IoT: Hamburg port case

The Port of Hamburg (PoH) is one of the most flexible and high-performing universal ports worldwide with a long history dating back to the 9th century. It is an inland port located in Hamburg in Germany and encompasses a port area of 7,200ha in total with 49km of quay walls. The PoH is the most important transport hub in the North of Europe and, as it connects 950 ports in 178 countries worldwide, it is also called “Gateway to the World”. Besides waterside connections for large vessels the PoH offers well-developed hinterland connections allowing for transport by rail, barge and truck. The port’s three main trading partners are China, Russia and Singapore.

The Hamburg Port Authority (HPA) has engaged in the most impressive Internet of Things (IoT) project that the logistics industry has seen. The Port of Hamburg is the second busiest container port in Europe and is a key trade lane connecting Eastern Europe to Germany and the rest of the world. The HPA is in charge of providing efficient infrastructure in the port area: managing the real estate; making sure quay walls, bridges, wharves and other waterfront structures are maintained, maintaining 140 kilometers of roads and 130 bridges within the port area, and managing the
traffic - across ocean, barge, rail, and truck - into and out of the port. Other parts of the infrastructure, like the 4 big container terminals, are managed by industrial companies.

Over 9 million twenty-foot equivalent units (TEUs) are transported through the port every year, and this is forecast to double by 2025. But the Hamburg Port is located in an urban area and they cannot increase the size of the port to handle increased traffic. To handle shipments efficiently, the HPA must operate smarter. Better traffic management also helps to minimize pollution. The port and city are impacted by up to 40,000 truck trips daily and no one wants those trucks spending a high amount of time idling.

To help keep traffic flowing smoothly, the HPA worked with big companies like SAP on a series of 20 projects collectively called smartPort Logistics. This work began five years ago. The SAP HANA Cloud Platform was used to enable a real-time connection to the port’s various stakeholders through a mobile business cloud. Those stakeholders include: the HPA itself; shippers; trucking, rail, and ocean carriers; customs authorities; terminals; contract warehouses; parking providers; and other businesses across the port. People, processes, and things data is then consolidated and analyzed using the SAP HANA Cloud Platform. The process data is based on an extended supply chain view that begins with a shipment from another port and can extend to inbound truck drivers hundreds of kilometers outside of Hamburg. Based on the analysis, HPA provides various types of schedules, tasks, and insights to the people who need it via their mobile devices.

Under the banner of smartPort logistics they have predictive and preventive maintenance capabilities. The Port Authority has sensors on their most intensely used rail switches, for example, and is experimenting with sensors that measure the structural strain and tension of a bridge.

Another smartPort application is known as the Port Monitor and is used for vessel traffic services (VTS). VTS is a marine traffic monitoring system similar to air traffic control for aircraft. VTS makes use of digital maps combined with AIS data on the positions of vessels, and data on sea levels, berths, whether bridges are closed or open, and where construction is occurring.

Just as there is a control room for managing waterborne traffic, there are control rooms used to manage traffic on the railways, and roads, as well as for managing the movable infrastructure. About 300 traffic sensors and 270 kilometers of fiber optics feed data into these control rooms. Eventually these separate control rooms will be merged into one virtual control room to increase synergies.

The road traffic control room also pulls various streams of data to predict travel time into terminals and suggests alternative routes when traffic is heavy. In addition to
traffic sensors, data sources include the schedule for bridges being raised and lowered, the situation at the container terminals, and other sources as well. Truckers can view this data on their telematics devices.

Trucks are not allowed to enter the container terminals unless they have an appointment for a slot. If they will be late for their appointment, they must see if they can get a new slot or whether they must exit the port and wait until a new slot can be booked. Once entering the yard, very often a truck will be directed to a marshalling area to park bumper to bumper until traffic eases. This prevents idling. Smart parking capabilities direct trucks to lots with available space.

Smart traffic lights make sure a platoon of trucks get an extended green light through an intersection, while the smaller number of trucks on the cross street must wait. If pedestrians are crossing an intersection when the light is red, a safety warning message is sent to the vehicle to let them know of the danger associated with trying to beat the light. HPA is experimenting with functionality that will automatically increase street lighting if pedestrians or cyclists are present; and video streams that help to predict potential traffic accidents, for example, if a vehicle is stopped even though there is no traffic jam.

Slot management is key to increasing efficiencies and reducing pollution, but it even works better with the ability to pull the wide variety of data sources together. These data sources have included information from competing stakeholders, and role-based visibility had to be constructed in a way that preserved privacy and competitive information while providing useful information to all stakeholders. Much work went into creating a simple user interface, but nevertheless there have still been issues associated with getting truck drivers and other stakeholders to efficiently use the information that is available. And finally, the worse the traffic conditions, the higher the value this system provides.

Seeing Double: Digital Twins

A digital twin is a computerized companion of a physical asset; in the case of shipping it’s a copy of a vessel. Its virtual systems allow mistakes to be made, so processes like software updates can be tested before being used on real ships for cost, efficiency, safety and sustainability purposes.

DNV GL, whose roots go back to 1864, is a risk management company based in Norway. On their website, software company DNV GL explains what their digital twin does: “The digital twin addresses both the historical industry weakness of poor information management and simultaneously provides the platform to fully harness the vast increase in real and near real-time data that is now economically and technically viable to capture.”
The digital twin will be a single source for all asset information, including physical properties, mill certificates from steel production, construction inspections and acceptance tests, the operational business process state, production demand history and projections, risk levels, remaining life estimate and structural reliability. Via IoT technologies and data historians, the digital twin will also provide dynamic updates on condition and operational parameter states.

Whether used in ship design, construction or to track the performance of vessels through their life cycles, the marine industry has woken up to the opportunities of the digital twin. In April this year, Bureau Veritas and Dassault Systèmes launched Veristar AIM3D, an asset integrity management system for the shipping and offshore sectors that places a digital twin of any asset at the heart of its proposition.

More recently in July, a prestigious group of marine-related organisations announced a partnership to push the digital twin concept further for the design and construction of new vessels. Project partners DNV GL, the Norwegian University of Science and Technology (NTNU), Rolls-Royce and SINTEF Ocean have joined forces to set a new standard in marine digital twins.

The team is taking an open-source approach, allowing any user in the industry to access the standard (and the planned digital library of generic product models) for free.

**Artificial Intelligence**

![Fig 6: An Autonomous Ship utilizing AI Technology](image)

Artificial intelligence is a branch of computer science that aspires to create intelligent machines. It has become an essential part of the technology industry.

Artificial intelligence (AI) can collect and analyze data for the container shipping industry to chalk out plans more accurately. AI is pursued as the digital game changer in a variety of industries, which can render effective support to containerized supply chains with in-time transits and equipment availability.
The logistics and shipping sector can gain major benefits from AI, as artificial intelligence is most attentive to large-scale numbers. These figures are analyzed and organized from different sources, shaped and then used as the basis for decision-making, at times with minimum or no human input.

With its harsh working conditions, isolated crew and high economical, ecological and human risks, any technology that is implemented through AI, should have a great impact while tackling these issues. Technological advances must be directed to the benefit of seafarers, bringing them more safety and first world care, experts opined.

**Blockchain:**

A blockchain is a digitized, decentralized, public ledger of all cryptocurrency transactions. Constantly growing as ‘completed’ blocks (the most recent transactions) are recorded and added to it in chronological order, it allows market participants to keep track of digital currency transactions without central recordkeeping. Each node (a computer connected to the network) gets a copy of the blockchain, which is downloaded automatically (Investopedia).

With the help of Blockchain technology, bank doesn’t exist anymore. Money can be transferred freely between four companies. Each company holds one transaction sheet and each flow of money is registered on the sheet.

The essence of Blockchain technology is using a very reliable and effective way to share information between all parties. It creates an immutable digital ledger that is maintained by a distributed computer network.

The shared potential of this technology lies in its tamper-evident architecture and its complete transparency, making it a perfect tool to revolutionize the way how supply chain is managed today.

Nowadays, with the development of e-commerce, the delivery of goods has become unusually rapid. This speed matches port growth, service expansion and the introduction of large container ships. As we shall see, the next step in the race for shipping between infrastructure and applied science in this industry should be the digitization, but since the growth of global trade in goods is so fast that so many participants are involved, how can technology follow up with global trade on this scale? The answer seems to be blockchain technology.

Blockchain is a secure, immutable and tamper-resistant ledger that can be used to track shipments, documentation and payment transactions. Its digital infrastructure can connect parties in the supply chain, giving them access to information and real-time visibility based on their level of permission.

Documentation and administration are estimated to be one-fifth of the $1.8 trillion spent annually to move goods across borders. In addition to showing the location of
containers in transit, blockchain can show the status of customs documents, bills of lading and other documentation. It can improve workflow, cut processing costs and enhance visibility by integrating shipping processes and partners.

Customs and border authorities can use the technology to improve the information available for risk analysis, leading to increased safety and security as well as greater efficiency in border inspection clearance.

An Actual case of blockchain in shipping

On the morning of the 19 July 2017, IBM said:

“IBM & Maersk have built 1st Industry-wide cross-border supply chain solution on blockchain”

In fact, IBM and Maersk Line already worked together in March and succeeded on their first shipping test on Blockchain. The aim of this test was to simplify the delivery of trillions of dollars’ worth of goods in the world.

Maersk Line followed and tested the delivery of goods of Schneider Electric from the Port of Rotterdam to the Port of Newark. The ship started on mid-February and lasted two weeks.

This test was proceeded on based of the Hyperledger Fabrice - a Blockchain solution built by IBM and Maersk. Each part of participants (Maersk Line, Schneider Electric, customs etc.) had the right to follow and verify all data from this delivery.

Hyperledger Fabrice helps to create a new global trade digitization platform for ship lines, freight forwarders, ports and customs authorities. This digital solution can reduce costs and complexity of trading by using blockchain technology to establish transparency among parties.

For instant, not only Maersk, many other important ship lines realize the importance of reducing risks during shipping by using Blockchain technology.

HMM installed also in the same year the DLT (Distributed Ledger Technology) on his container vessels in order to facilitate participation in database records. With the help of DLT, HMM succeeded his 1st trial reefer container ship from Fusan (South Korea) to Qingdao (China), from 24th August to 4th September.

HMM applied Blockchain technology on this trial ship from the booking to delivery of goods and reviewed the feasibility of applying this technology to the maritime supply chain. Otherwise, by real-time monitoring and management of ship, HMM verified and tested the combination of Blockchain technology and IoT.

HMM is planning to expand Blockchain and IoT to China, India, Thailand etc. in Asia. Besides, this technology will also be applied on dry cargo container terminal in the future.
The objective of Blockchain technology in maritime supply chain is to share all information safely by all parties. Data will be more secure by sharing encrypted public key. This digital solution is also designed to help reduce fraud and errors, reduce the time products spend in the transit and shipping process, improve inventory management and ultimately reduce waste and cost.

Shipping insurance is a crucial term talked in maritime supply chain. International shipping is characterized as long routes and various risks during the transportation, storage, loading and unloading and handling of goods. In order to minimize loss during shipping, cargo owners choose to buy insurance for goods. The uncertain cargo damage can be converted into a fixed cost by insuring the insurance company so that the owner can obtain the corresponding financial compensation within the scope of the insurance when the risk occurs.

On the 6st of September 2017, PwC’s insurance department announced a news: the company had established the first shipping insurance Blockchain platform with Guardtime, Microsoft, Maersk and other companies.

In maritime supply chain, because of big number of parties, it takes long time to enter information and documents. Blockchain technology increases the transparency of data, insurance companies can also use those data to reduce costs and augment profits and efficiency.

This global Blockchain platform solves thus directly the actual problem of complexity in sea shipping insurance. It connects insurance customers, insurance brokers, insurers and third-party agencies through a distributed ledger account that contains customer information, risk categories and exposures, as well as information about insurance contracts.
3. APPLICATION OF DIGITAL SOLUTIONS

Xeneta

Xeneta is the leading ocean freight price benchmarking and market intelligence platform transforming the shipping and logistics industry. Xeneta’s turnkey yet powerful reporting and analytic platform provides shippers and freight forwarders the data they need in real time to compare their shipping prices against the world’s largest database of contracted rates. Xeneta reports in real time on market average and low/high movements with over 45 million short and long-term contracted rates in its database covering over 160,000 global trade routes. Xeneta helps make informed decisions with actionable intelligence optimizing companies’ logistics procurement.

![Xeneta Platform](image)

Fig 7: Freight Booking with Xeneta

Named Norway’s “Startup of the Year 2016”, Xeneta are continuing our growth with recent commercial expansions to the U.S. and Germany. The density of Xeneta’s ocean freight rate data has also exploded with 35+ million contracted rates currently in our platform reporting on 160K port-port pairs.

Stay on top of the ocean freight market and analyze spot market prices and long-term contracts. Easily benchmark container rates and see how they compare to current market movements.

Customer will know which lanes you can improve rates with suppliers and have the data they need to enter supplier negotiations.

Customer can also upload all their existing rates and directly compare your ocean freight rates to the market rates straight in the Xeneta platform.
Freightos®

Freightos® is making international trade frictionless, by bringing the trillion-dollar global freight industry online. The Freightos Marketplace, currently in beta, gives importers and exporters instant transparent access to the best global freight services; making shipping cargo as easy as booking a passenger flight. Behind the scenes, Freightos AcceleRate™ software-as-a-service automates the complex tasks of freight rate management, routing and pricing, and business intelligence. With Freightos, leading freight forwarders, carriers and shippers automate thousands of price quotes each week, including complex door-to-door quotes which combine ocean, air, and land shipping. In the meantime, forwarders not using Freightos take an average of over 90 hours to quote a price. Notable customers of Freightos include top twenty global 3PLs like Hellmann Worldwide Logistics, CEVA Logistics, and Nippon Express, as well as Fortune 100 companies, such as Sysco.

iContainer

iContainers, a startup with ambitions to make moving goods from warehouse to warehouse anywhere in the world as easy as booking a hotel room.

![iContainers](image)

**Fig 8: Freight Pricing and Routing Options - iContainer**

iContainers is an early market mover in what it calls door-to-door servicing. Using the company’s platform, users can schedule a warehouse pickup and have goods delivered directly to another warehouse in over 1,200 destinations. Previously, individuals would have to pick up goods directly at the port and arrange those logistics independently. Customers can use the platform to customize shipping routes based on factors, including timing, price and vendor. iContainers serves more than 250,000 ocean trade routes to more than 300 sites in the US, Europe, Asia, Australia, Latin America, and Africa.
Smart Bill of Lading

Every sea transfer in the world starts with the NVOCC (or carrier) issuing a Bill of Lading document that acknowledges the receipt of the cargo. The Bill of Lading serves as a document of title to the goods in transfer. Anyone in possession of the document can claim the goods at a port, making it most important document in the shipping industry. The following diagram illustrates the typical lifecycle of a Bill of Lading document.

1. The carrier or NVOCC issues the Bill of Lading for the receipt of the goods and sends it to the exporter (producer) of the goods by express courier service.
2. The exporter (after receiving the money for the goods from the importer) sends the Bill of Lading to the importer by express courier service.
3. The importer takes over the goods at the final destination by presenting the Bill of Lading to the carrier or NVOCC. The Bill of Lading is usually again sent by express courier service.

The issue with traditional B/L is that it is costly, unsecured i.e. can be lost or stolen and slow.

CargoX will create an open system based on Ethereum and encrypted permanent decentralised data storage which will enable the creation and exchange of Bill of Lading documents. The following diagram illustrates the workflow between different parties in the CargoX system.

The blockchain-based Smart B/L works in a similar way to tokens. The user can create/ transfer/claim its ownership.
1. At the origin the carrier uses our dApp to create a blockchain-assisted Smart B/L with the exporter’s address and sends it as a token to the exporter.

2. After receiving the money for the goods from the importer, the exporter transfers ownership of Smart B/L to the importer by using our dApp.

3. The importer can claim ownership of the goods at the destination port by presenting the Smart B/L token to the carrier or NVOCC at the destination by using our dApp.

4. At the destination the carrier releases the goods to importer once importer proves ownership of the Smart B/L token.

All Global Trade sensitive information will be hidden from public view and only shown to the importer, the exporter and the issuer of the Smart B/L; special care will be given to properly secure all information about multiple business interactions between the same peers.

The shipping currency - 300 Cubits

In the Alphaliner interview, Johnson Leung, Co-Founder of 300 Cubits, said: “Firstly, once the booking counterparties have a financial stake in the booking process, they tend to fulfill their obligations when a booking is made i.e. the shippers will send in cargo and carriers will load the cargo.

“So the booking deposit serves more as a deterrence to default on a booking than a transfer of value from one party to another.

“Hence, value storage may not be an important function in a booking deposit.

“In the unlikely event that one party defaults and the value of compensation matters, having a deposit that is volatile in value is still superior to today’s status quo where the parties receive zero value in compensation.”
300cubits, one of the first companies to focus on the use of blockchain applications for the container shipping industry, has opened up its sign-up scheme so that shippers can start.

300cubits’ Booking Deposit Module, hosted on the Ethereum Blockchain, is described by the company as “a cloud-based, easy-to-use, secure TEU Ecosystem to manage and transact TEU tokens as booking deposit”.

Since the project was launched on August 1, 2017, 300cubits has minted 100 million TEU tokens.

It sold 2 million tokens over the August to September period, the equivalent of 1,588 Ethers - another digital currency, worth about $1.8 million at current valuation.

Of the remaining 98 million TEU tokens, 38 million will be sold to generate funding for its project development while 54 million will be distributed to the container shipping industry’s

**Vessel chartering**

Ship owners and charterers wishing to charter a vessel have to go through the complex and time consuming manual process of reviewing thousands of emails with offers from Shipbrokers in order to identify prospective matches. Currently ship owners and charterers rely extensively on the information provided by the brokers with whom they cooperate regarding the prevailing market hire rates at given ports.

**VesselBot**

VesselBot is a digital chartering marketplace that provides strategic operating and financially efficient benefits for Charterers and Vessel Owners by enabling them, through our platform, to instantaneously identify the best possible counterparty whilst utilizing the least possible company resources at a significantly lower cost than the traditional chartering houses.

Fig 12: Vesselbot Chartering Platform
VesselBot’s SaaS-enabled marketplace provides Charterers and Vessel Owners with strategic, operating, and financial efficiencies: each side is able to identify quickly the best possible transport counterpart for less than half of current broker fees.

VesselBot’s algorithm is designed to match possible counterparts seamlessly based on a number of factors. The parties can then enter negotiations with the best matches. Instead of relying on phone and email, their negotiations can be handled via our platform.

**Intelligent cargo**

We have entered a new era of goods tracking right across the supply chain. Thanks to new technologies cargo has become intelligent and can be tracked wherever it is currently located in the world. Today, supply chain players need performant IT solutions that outdo the functions traditional port & cargo community systems (PCS; CCS) have been offering so far.

**MGI**

Marseille Gyptis International (MGI) has just launched a new system called Ci5 that represents a 180-degree shift in vision, all in order to bring about a new era of goods tracking by connecting supply chains through a high-performance information door-to-door freight track system. Ci5 stands for “Cargo intelligence 5,” encompassing five “arrows” (modes) of transport (air, rail, road, ocean, and waterways), as well as five continents since the solution will fit any port in the world. The new system aims at replacing the AP+ Cargo Community System, which is currently used as the French national system (implemented over the past ten years in most of the country’s ports, but also abroad, and representing around 30 logistics communities). While keeping all the best features of AP+, MGI have added new functions that look ahead to future usages in goods transportation. MGI used the so-called user-centric approach with online surveys, user and expert workshops to identify needs and define new functionalities, but also to evaluate the evolution of cargo transportation as well as explore how innovation can revolutionize the industry in terms of data gathering and sharing.

**Shiptify**

Tender platform for transport

To put different carriers in competition, a transporter must multiply the exchanges by email and telephone, then accumulate quotes that he must then compare. A long and tedious process that the Shiptify platform transforms in a few clicks. Connected to his account, the customer realizes online a specific call for tenders (number of
boxes, fragility, cubic meters, that he then chooses to notify the carriers of his list or all those registered on the platform. Carriers wishing to respond to the call for tenders also do so online, which makes it possible to harmonize quotes. Shiptify then generates a comparative table by which the customer can arbitrate more simply. The platform even incorporates an ergonomic messaging system, to simplify exchanges, and billing.

Arnaud Page, B2CEurope's Director of Development France, says: "Shiptify allows us to achieve administrative productivity gains for our charter teams because there is no longer a double entry or an email search. In case of delay or incident, the alerts sent by the platform allow us to react as quickly as possible, and in a more transparent way with our end customers. The follow-up of the financial progress is also extremely useful to control our expenses transport in live, without waiting for the invoices of our partners. But more surprising is that this tool has refocused our teams on value-added exchanges with our transport partners, and no longer on the formalism imposed by email. Paradoxically, there is more human thanks to this platform! ".

**Octopi Terminal Operating System**

Port productivity is defined differently by the terminal operators and the customers. However, productivity is one aspect of a Terminal Operating System (TOS) that both operators and customers would like improved. Technological advances can relieve stress and increase the rate and accountability of work in terminals.

Octopi is a modern, web-based TOS that improves operations in port terminals. Octopi relieves many of the challenges that terminals face on a daily basis to improve overall productivity. Here are four ways Octopi does it.

*Real-Time Data Reports:* with high level security controls, port operators can easily manage and track cargo with Octopi in order to report real-time data to customers. This minimizes customer complaints and frees up time for operators to focus on other matters.
Yard Stock Management: ports will be able to manage employees, equipment, vessels, and cargo all from one device in real-time.

Container History Reports: cloud-based, real-time load, discharge, and restow cargo tally clerk functions during vessel operations including seal checking and auditing, automated EDI production for gate and ship movements, CFS operations for container stuffing, customs inspections and delivery of cargo.

Keep Track of Demurrage and Detention Fees: all demurrage and detention fees are easily accessible, so a container can leave the premise in a timely manner and also its ensured to have paid all associated fees.

Smart container

For every refrigerated ‘reefer’ container on the road, at sea or in a port somewhere in the world, there is a customer in the dark, forced to run their business without valuable information about the condition and location of their products.

Whether it is frozen poultry, pineapples or bananas, perishable commodities are time sensitive and require precise temperature and atmospheric conditions. If the power goes off on the reefer or a malfunction occurs, and it is not discovered quickly enough in the terminal, on the truck or ship, an entire container of goods can be spoiled.
Maersk Line

By providing visibility of a refrigerated container’s location and atmospheric conditions inside throughout its journey, Remote Container Management (RCM) gives customers shipping refrigerated cargo an unprecedented understanding of their supply chain.

With RCM, both customers and Maersk Line have complete access to the reefer’s current location, temperature and atmospheric conditions inside as well as the power status, at all times and no matter where it may be in the world. Meanwhile, Maersk Line’s RCM experts are to manage the container, either remotely or through notifications to local technicians if a hands-on fix is required.

If the impact of RCM is powerful, the technology behind it is relatively simple. A GPS, a modem and a SIM card on all 270,000 of Maersk’s refrigerated ‘reefer’ containers enables location, temperature, humidity and power status readings to be continuously collected and stored. That information then reaches customers and RCM global support teams via satellite transmitters on 400 of Maersk Line’s owned and chartered ships.

With clarity about the location and condition of the cargo at all times, not just during the ocean transport but throughout the journey of the container, RCM will help identify problem areas in customers’ supply chains and ways to improve them.

For example, if a customer’s reefer is not being pre-cooled as agreed at the farm, the customer can easily see this in the temperature graph on their screen and can
contact or follow up with the supplier and the farm. Likewise, if a truck driver or port worker turns off the power to the reefer, this will be visible. RCM ensures the customer has the information they need to improve their processes.

**Data Science & Predictive Intelligence**

The depth and complexity of the global trade network is immense, and the volume of data continues to grow as every aspect is digitized. If carriers use cutting edge technology to leverage their data and analyze every aspect of the shipment cycle, then Predictive Intelligence can be used to resolve uncertainty, make proactive decisions, and drive true asset efficiency.

**ClearMetal**

ClearMetal is a Predictive Logistics company using data science to unlock unprecedented efficiencies for global trade. Its Predictive Intelligence Platform helps solve the most complex operational problems in container-shipping. ClearMetal help customer efficiently allocate assets, by analysing all the uncertainties, mapping every contingency, accurately predicting all outcomes, and using data to determine the best course of action, including:

- Predict Market & Shipper Behavior
- Accurately Forecast Inventory
- Optimize Container Positioning
- Maximize Vessel Utilization

**AI Solution for Reducing Fuel Consumption: Sail Router**

SailRouter™ is a desktop and cloud software solution that uses operational sensors onboard and needs just one additional, small and easy to install motion sensor to measure ship motions during navigations. From these ship motions SailRouter uses in-house developed machine learning algorithm to recognize sea waves and in this way SailRouter offers a complete insight into real-world ship performances. By using self-learning algorithm, SailRouter™ can learn about real-world ship behaviour on
waves and support user to make proper decision during both voyage planning and navigation. In voyage planning SailRouter can define optimal route where ship will use natural forces from wind, waves and sea currents and in the same time to use minimum possible ship speed to arrive at defined time frame by using self-created ship performance characteristic for each ship particularly.

**Ship Connectivity**

Traditionally, once ships had left port they were isolated from communication with shore. This was true until the introduction of radio on ships at the beginning of the 20th century. Since then, both the capacity and coverage of ship to shore communication has been gradually evolving.

![Ship Connectivity Diagram](image)

Fig 17: Improvement of Ships Connectivity

However, we are now experiencing a step change in this field, with digital signals that can be transferred from ship to shore, and in the reverse direction, at significant rates, independent of the ship’s location.

Currently, the maritime industry contributes to the growth in deployment of VSAT (Very Small Aperture Terminals) equipment on board ships. By 2020, most classed vessels will be broadband capable. Also, the VSAT network capacity is increasing owing to the introduction of new high throughput satellite (FITS) systems, with two to ten times higher throughput than classical satellites.

The overall VSAT network capacity over maritime regions will experience at least a tenfold growth to some 200 Gbps in 2025, implying a massive increase in data transfer rates and decreased cost per bit for the connected vessels.
Most ships, systems and components will be linked to the Internet, making them accessible from almost integrity management, building on remote condition monitoring as well as allowing for an increased level of automation. This may, in turn, facilitate remote controlled and autonomous ship operations.

Improvements in maritime connectivity will allow supply chains to be more efficiently organized around adaptable operations. This could reduce lead times and fuel consumption by optimizing arrival times and allow a better organization of operations and workforces on land for handling cargo and carrying out repairs and inspection.

Remote control and autonomy

Increased reliability and capacity of data transfer can enable applications related to flow of information but may also have the potential for introducing capabilities for controlling ship functions from shore.

**Maersk Line**

The launch of the world’s first remotely operated commercial vessel in November 2017 is just the beginning for Maersk, as it explores the potential benefits of autonomous technologies across the Transport & Logistics division.

In the picture above, the captain is doing his usual job, sailing Svitzer Hermod around Copenhagen harbour, but instead of standing onboard he is sailing it remotely from this futuristic chair in an office half a kilometre away.

![Fig 18: Worlds first Remotely Operated Commercial Vessel](Image)

Svitzer Hermod is the world’s first remotely operated commercial vessel and the result of a long collaboration between Rolls Royce and Maersk. For Maersk, this an
important first step as it explores a range of autonomous technologies and their potential commercial and operational benefits. “We firmly believe that advanced technologies that build on autonomous principles can help further improve safe, efficient and reliable working environments and operations across the container logistics value chain - from ports and terminals to tugs and container ships,” says Svitzer CEO, Henriette Thygesen.

Cyber Security

Cyber security incidents can put business operations at risk and also human lives on the line. For example, the malware on a Mobile Offshore Drilling Unit a few years ago has incapacitated networks, forcing the well to shut down due to the high physical risk it posed to the seafarers.

“In June 2017, IMO’s approval of Resolution MSC.428(98), Maritime Cyber Risk Management in Safety Management Systems, was a tremendous development in maritime cyber risk management. Shortly after the approval of the IMO resolution, an industry working group released the second edition of The Guidelines on Cyber Security Onboard Ships. Building on the first edition that was released in January 2016, the second version is more comprehensive, includes information on insurance issues, and is aligned with the recommendations given in the IMO’s guidelines. These developments may help the U.S. Coast Guard move forward with regulations and/or develop further guidance on maritime cyber risk management”, said Kate Belmont, Associate at Blank Rome, at the Shipping2030 North America event in November 2017.

“The shipping industry needs to protect itself better against hackers — the fraud case dealt with by CyberKeel was just another example,” Jensen said. “In June 2017, we saw how NotPetya ransomware created havoc and one of the hardest hit was Maersk.”

Now, as things get back to normal, Maersk has revealed that the total cost of dealing with the ransomware was US$300 million

The consequences of a NotPetya cyber-attack on the Maersk resulted in a shutdown of their port terminals. Today, shipping companies realize that NotPetya’s attacks on Maersk have pushed these companies against the wall. The shipping industry has finally woken up to the harsh reality that their operation is vulnerable to digital disruption.

The shipping industry carries 90 percent of the world’s trade, and we have seen how Maersk has experienced significant damage to its business operation, thanks to NotPetya. Now before the world asks what’s next, it’s high time the shipping industry made a comprehensive effort to safeguard its systems.
Empty containers positioning

In addition to expediting transaction times by cutting down on paperwork and making it more difficult to commit fraud, the blockchain, according to Ramesh Gopinath, who helped oversee the Maersk implementation, has the potential to better optimize the use of empty containers by giving more parties access to the availability of nearby ships.

“There’s a trade imbalance resulting from all these empty containers being located in the wrong places,” Gopinath told.

To increase the visibility of such lost opportunities, Gopinath suggested that information about which containers are empty and available could be updated in real-time. He added IBM wants to capture data on as many as 10 million containers by the end of the year.

Agility- Blockchain

Agility, a leading global logistics provider, is the first freight forwarder to collaborate on a Maersk-IBM solution to provide more efficient and secure methods for conducting global trade by using blockchain technology to manage and track container shipments.

Agility has agreed to identify events associated with individual shipments and to share and receive information about them via the distributed ledger blockchain technology developed by IBM and Maersk.

Agility’s goal is to reduce costs and increase shipping efficiency by integrating information about shipments onto a secure platform accessible to shippers, carriers, freight forwarders and others in the supply chain.

“Blockchain technology is going to make shipping cheaper, safer and more reliable. As early adopters, companies like Agility can help Maersk and IBM understand the needs of shippers and develop standards that will make trade more efficient,” said Essa Al-Saleh, CEO of Agility Global Integrated Logistics. “We can help customers understand how to use blockchain to improve shipment visibility, eliminate paperwork, reduce errors, and shorten transit and clearance times.”

“For Agility, it’s important to be involved early in blockchain and to work with forward-thinking companies like Maersk and IBM,” Al-Saleh said. “Together, we have a lot to learn and share in order to bring the benefits of this technology to shippers and consumers as quickly as possible.”
CONCLUSION

There is an extensive acknowledgment within today’s maritime supply chain that the industry must move toward a technological transformation to increase efficiency, visibility and customer service. Digital technologies—such as big data analytics, IoT, Artificial intelligence and Blockchain all hold great opportunities to improve productivity and drive profitability and growth higher. Change is coming, many executives are aware of it. It seems that the impediments to implement this change are numerous, yet, thinking about all the benefits that can be generated from digitalization is great motive to move further especially that these benefits are expected to outweigh all the costs and risks of digital transformation.

Improving the digital ability and thus efficiencies of the maritime supply chain will require strong will and cooperation.

A new attitude towards change should be adopted to overcome this slow move toward new platforms and models for sharing data as it is mandatory to meet the needs of the entire ever-changing environment of ship owners, carriers, terminal operators, port authorities and, of course, customers in the global economy.

By taking a look at the other industries which are mostly digitalized, one thing is obvious: the players who fail to adapt to the new era of digitalization are risking being left behind are threatened by the entrance of more innovative competitors and new business models to the market.
EXECUTIVE INSIGHTS

• Interview of Luc CASTERA, Founder & CEO of Octopi

Why is the Maritime Industry slow to adopt innovative digital solutions compared to other industries and what is the current situation when it comes to digitalization?

The current situation when it comes to digitalization in the maritime industry is the following:

➢ The bigger companies, such as the major shipping lines, are digitized but they use old standards of digitization. For example, in terms of Electronic Data Interchange (EDI), the standards used by most shipping lines are UN EDIFACT standards. It’s a standard from the 1970s!
➢ Many of the smaller companies are still using pen and paper processes. Some are using Excel or homegrown solutions that are not adequate. It’s one of the few industries that has not adopted the Cloud Computing paradigm that has been eating the world in the last decade. I believe that there are four main factors driving slow adoption of digital solutions in our industry. First, it’s an industry with a lot of interconnections. As goods are carried around, they are passed from one member of the chain to another member, so everyone has to communicate with each other. This makes it harder for one player in the chain to innovate because all the other partners are requiring them to still operate in the old ways. The industry as a whole is dragging the innovators behind. For example, if my port decides to innovate and use better technologies, the shipping lines are still going to require me to send them cargo information using old-school Electronic Data Interchange (EDI) formats from four decades ago that are inefficient. I have to maintain that ‘backward compatibility.’
➢ Second, the maritime industry is dominated by some very big companies and, due to their size, it’s harder for these companies to innovate. The smaller players in the industry are limited by the decisions made by the bigger players and thus the industry as a whole depends on the bigger players innovating.
➢ Third, the workforce in our industry is aging and it is harder to convince older, more experienced people to do things in a new way. They have been doing it the same way for decades and they don’t want to change their way of working just before the end of their careers. You would be surprised to see how hard it is to get some people to stop using pen and paper processes for more efficient computer-based processes.
➢ Finally, it’s a space that has been historically ignored by ‘Silicon Valley’. Most software vendors in this space are also operating with old paradigms. For example, at Octopi, we are the only true SaaS TOS product for port terminals. Before we entered this market, port terminals had no modern options. All of them required you to buy hardware and turn into a company running a data center.

What are the challenges faced by the maritime industry during the digital transformation?

One of the main challenge is to transition from older standards to newer
technologies. It requires a lot of companies and people to work in parallel. For example, even if Octopi were to build a better standard than EDIFACT, it will be hard to get the shipping lines and carriers to redo all their connections with all the ports in the world. It would be a massive effort and undertaking so most of them do not even consider doing it. The problem is that the more we wait, the bigger the risk and opportunity cost of sticking to these old technologies.

The other challenge is that many businesses will have to reinvent themselves. What happens to the traditional freight forwarders when the online freight forwarders gain scale? What about the trucking companies once Uber enters that market?

**What are the main digital trends disrupting the shipping industry?**

I think we need to break this down into short-term, medium-term, and long-term disruption.

In the short term, I see three disrupting trends. The first one is that companies like Flexport are changing the traditional model of Freight Forwarders and Shipping Agents by offering an online platform to book and move cargo. This is similar to what happened to the airline industries when companies like kayak.com and expedia.com disrupted the business of many retail travel agents. The second trend in the short term is that Amazon is getting deeper and deeper into shipping and will start competing with some key players in the shipping industry. In the near term, they will compete with Fedex, UPS, DHL, etc... but it’s possible that they start competing with the shipping lines as well in the future. Finally, I think that Machine Learning and Artificial Intelligence will help us solve problems in this industry and probably replace the traditional workforce in many aspects. An example of that are vessel planners who decide how to stow a container ship. Soon, I believe algorithms will do a better job at vessel planning than humans.

In the medium term, I think self-driving trucks and ships will disrupt the industry, as well as the use of drones to deliver cargo.

In the long term, I’m paying attention to Hyperloop and rockets to ship cargo. I also think that technologies like Virtual Reality, 3D Printing and Teleportation might enable humans to ship less stuff. For example, instead of buying toys that will be shipped to me, I might print them at home or use a Virtual Reality headset to trick my brain into thinking they are in the room with me right now. More virtual goods will mean less physical goods.

**What are the key impediments to improving visibility and collaboration in maritime supply chain?**

I think there are three key impediments to improving visibility and collaboration in the maritime supply chain. Number one: the data is stuck in isolated silos since there is no adoption of cloud computing and everyone is managing their own data centers that are not connected to the Internet. Number two: there is an old school mentality of hoarding data instead of providing data transparency in this industry. It’s a cultural barrier that we will need to overcome. Finally, a lot of the data that we have come across in the industry is simply not clean enough so even if shared, it’s not necessarily
useful. You end up having a lot of bad data being inputted and shared amongst other members in the chain. Garbage In, Garbage Out. We need a massive data cleaning initiative!

**What are the most promising technologies for the maritime industry and how to align the company’s processes, organization and technologies in the future in order to achieve the desired effects?**

I think the most promising technologies for the maritime industry is cloud computing because it has proven to make significant changes in other industries and has not yet impacted the maritime and shipping industry. It will help the industry realize massive cost savings and to operate more effectively. It’s not as fun as blockchain, AI, big Data, IoT and all these other fun buzz words, but it’s the necessary step to move the industry forward.
Interview of Romain CODRON, Founder of Shiptify:

1. Why is the Maritime Industry slow to adopt innovative digital solutions compared to other industries and what is the current situation when it comes to digitalization?

Maritime industry is an asset-based business, where administrative operational efficiency and customer service did not use to be a strategic priority.

Digitalization is slowly happening for a long time due to the existence of such players as INTTRA, but it is accelerating since historical players have understood that thanks to Digitalization, they could go deeper into the value chain of their customers' supply chain.

2. What are the challenges faced by the maritime industry during the digital transformation?

The proliferation of the players and intermediaries within the maritime supply chain such as ports, freight forwarders and custom brokers are slowing down the digital transformation of the industry.

3. What are the main digital trends disrupting the shipping industry?

The main digital trends are emerging from digital freight forwarders such as Flexport. Also, blockchain is expected to bring breakthrough innovation.

4. What are the key impediments to improving visibility and collaboration in maritime supply chain?

The key impediments to improving visibility are the fierce competition between companies, and between freight forwarders, competition between companies & freight forwarders.

All this competition generates a lack of trust and in consequence a lack of technical collaboration to define standards of communication towards shippers.

5. What are the most promising technologies for the maritime industry and how to align the company’s processes, organization and technologies in the future in order to achieve the desired effects?

The most promising technologies are collaborative APIs and blockchain technologies linked to IoT.
• Interview of Dominique LEBRETON, Executive board - MGI

1. Why is the Maritime Industry slow to adopt innovative digital solutions compared to other industries and what is the current situation when it comes to digitalization?

Can we say that the maritime industry is slow compared to other industries? I will say that maritime has started later than others... The automation and digital applications appeared in the maritime domain with the rise of EDI in the 80’s (interconnection between different IT systems). Currently, we can see several examples of innovative projects in the industry (Example of Maersk with its Blockchain projects...)

2. What are the challenges faced by the maritime industry during the digital transformation?

Organizational challenges for sure! The maritime industry has to become more agile to embrace digital challenges. This will be more difficult for big players who deal with huge organizations. We can see that disrupting technologies or processes are brought to the market mostly by startups.

3. What are the main digital trends disrupting the shipping industry?

The main digital trends are related to Cloud infrastructure, Blockchain, Artificial Intelligence, Automation...

4. What are the key impediments to improving visibility and collaboration in maritime supply chain?

The maritime supply chain shows a multiplicity of stakeholders who can have various operational or strategic objectives. The main obstacles we face today is the collaborative process between the main actors of the maritime industry (Customs controls vs Markets needs to speed up the cargo flow for example).

5. What are the most promising technologies for the maritime industry and how to align the company’s processes, organization and technologies in the future in order to achieve the desired effects?

We can see that several technologies emerge in the last couple of years: Blockchain aiming to secure and trace the goods from door to door and also in order to run paperless some maritime documentation. Artificial Intelligence with the objective to forecast the main maritime operations. Geo-fencing and geolocation of the goods.
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