MAERSK

Logistics'
Digital Revolution

The Transformation of Data and Technology in Supply Chain Logistics

Executive Summary

As supply chains grow ever more complex and fragmented, technology will take an increasingly central role in how the industry develops and overcomes those challenges. As a result, the demand for new technologies in supply chains has increased significantly and logistics now stands before a crucial inflection point that will see profound changes to how the industry operates. Fundamental to this technological revolution will be the establishment of clear industry data standards that are the key to unlocking the enormous potential of new technologies such as AI and blockchain. At the same time, taking advantage of these new technologies will require an underlying shift in the way both businesses and logistics providers manage and act upon the insights they provide.

In this report we speak with Maersk's Navneet Kapoor, Chief Technology and Information Officer, Carsten Frank Olsen, Global Head of eBusiness, Lars Schmeltzer, Global Head of Orchestrator, 4PL, and August Chen, Head of China Digital Innovation, to examine the key challenges facing the adoption of new technologies within logistics as well as some of the trends that are shaping the industry and what benefits they might bring.

Key Learnings

• A combination of rising supply chain complexity, growing need for resilience in the face of global disruptions, and the availability of comparatively cheap processing power is driving a digital revolution in the logistics industry.

• Currently logistics is behind the curve compared to other industries and will need to make fundamental changes in order to fully realise the benefit of new technologies.

• Key to this will be the adoption of industry data standards that will in turn drive increased use of API-based data integration, and the collection of 'clean' real-time data.

• Businesses should be prepared for a shift towards data-driven logistics or risk being left behind.

Navneet Kapoor
Chief Technology and Information Officer
Maersk
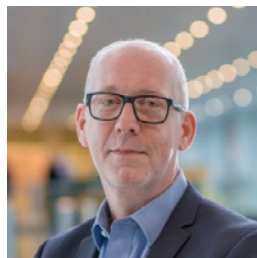
Carsten Frank Olsen
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August Chen
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Logistics is
Behind
the Curve

It is no secret that the logistics is behind the curve when it comes to technology. According to one PWC survey, just 28% of transport and logistics companies rated themselves as 'advanced' on digitisation compared to 41% of automotive companies and 45% of electronics companies.[1] At the same time, only 35% of shippers believe 3PLs could support their big data initiatives, while a study by Penn University found only 26% of shippers are satisfied with the current data analytics capabilities within the industry. [2, 3]

"This is partly due to the fragmented nature of the industry itself" says Carsten Frank Olsen, Global Head of eBusiness at Maersk. "Logistics is extremely siloed, and you have large numbers of service providers across any given supply chain each using their own systems and data standards. This gives rise to a highly fragmented digital landscape with multiple data streams that are difficult to integrate with one another."

"Businesses have tended to prioritise the technological development of their core business and the evolution of their supply chains has often played second fiddle to more crucial planning or production systems. "

Carsten Frank Olsen
Global Head of eBusiness
Maersk

At the same time, modernising legacy systems is an enormous challenge with many structures and systems currently in use woefully outdated. "Printed documentation still features heavily at some point in almost every single supply chain" notes Navneet Kapoor, Chief Technology and Information Officer at Maersk, "some orders still get made by fax. When you compare that to how other industries now operate, you can start to see how much logistics needs to catch up."

However, until now, there has only been limited impetus to change from both inside and outside the industry. "There's been a sort of lethargy" says Olsen, "on the one hand, businesses have tended to prioritise the technological development of their core business and the evolution of their supply chains has often played second fiddle to more crucial planning or production systems. From within the industry, changes in the logistics over the past 20 years have been focused on extracting value from a heavily cost-focused model. We sacrificed visibility and flexibility in favour of reliability and cost and, until now, this hasn't needed to change."

[1] https://www.pwc.com/gx/en/transportation-logistics/pdf/the-future-of-the-logistics-industry.pdf
[2] https://www.globaltrademag.com/big-data-big-changes-logistics-transportation/?utm_source=datafloq&utm_medium=ref&utm_campaign=datafloq
[3] https://www.infosysconsultinginsights.com/insights/3pl/

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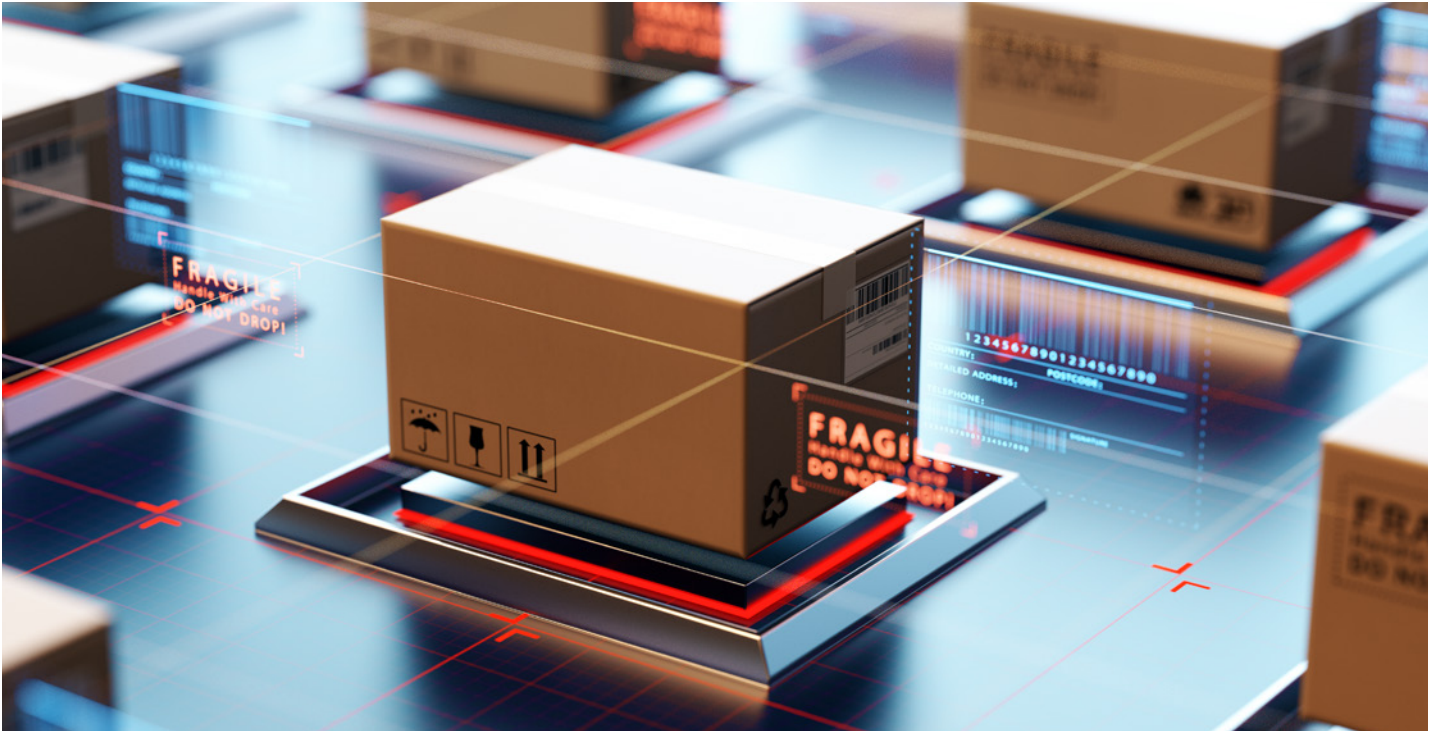
Why is Logistics
Changing Now?

Global logistics is evolving towards increasingly complex and fragmented supply chains. Even before the US/China trade war and growing geopolitical tensions, there has been a growing need for diversifying supply chains that had grown too lean and vulnerable to disruption. This has only been reinforced by black swan events such as COVID-19 which have further accelerated the proliferation of China +1, nearshoring, and regionalisation strategies.

At the same time, the emergence of new economies, and in particular the rise of APAC as an important destination for western goods, has challenged the traditional hegemony of East to West cargo flows. Meanwhile, the growth of e-commerce and omni-channel logistics is not only adding to that complexity but also driving customer expectations to the point that a 'lot size of one' will increasingly be the goal for manufacturers and retailers alike.

"To meet these challenges, visibility and control over the supply chain is paramount however, the current level of technology will need to rapidly improve to accommodate this new standard" says Lars Schmeltzer, Global Head of Orchestrator, 4PL at Maersk. Fortunately, technology has evolved to such a point that its considerable benefits are more accessible than there were before. "The prevalence of cheap processing power and cloud computing has made the application of emerging new technologies an increasingly viable option in a way that was not the case 20 or even 10 years ago" explains Kapoor.

Growing Demand for Change

This need for technological change is mirrored by a rapid increase in demand from businesses. "Some 70% of the RFPs that Maersk receive include a digital solution component" says August Chen, Head of Maersk's China Digital Innovation team, "the other 30% just assume digital is part of the solution" he adds.

Black swan events such as COVID-19 have only served to accelerate this interest. Throughout 2019, for example, the Maersk Shipment App – a cargo tracking platform that allows customers to follow the progress of their shipment in real-time – saw a steady increase in usage. In 2020, however, the app saw an astounding 460% increase in uptake and activity from January to June.

Similarly, Spot, Maersk's online booking platform launched in 2019, saw a significant increase in the 3 months between March and June 2020 compared to the previous 3 months. Bookings were up 49.9% across the entire platform, indicating both a need and a new willingness to use these online tools. "This trend is only going to continue" says Chen "and we are likely to see online bookings, apps, and other digital tools to increasingly become the norm in the industry."
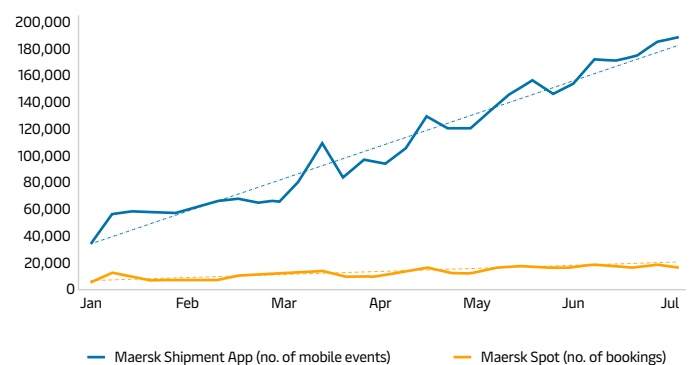
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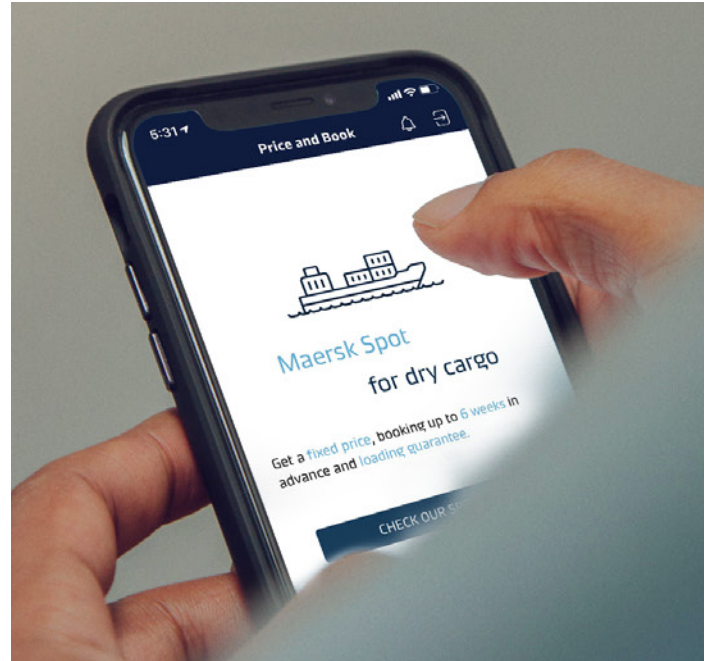
Usage on Maersk Spot and Maersk Shipment App

— Maersk Shipment App (no. of mobile events)   — Maersk Spot (no. of bookings)

What is Maersk Spot?

Launched in June 2019, Maersk Spot is an online platform that makes the container booking process simpler and more efficient. Traditionally, shippers would have to go through a lengthy process of rate calculation and booking in a system in which it is not uncommon to see overbookings to the tune of 30%, often leading to the rolling of cargo. With Spot, shippers can simply click and book online, or from a mobile, as simply as they would when ordering airline tickets online. Rate calculations are fixed at the time of booking and a cargo loading guarantee avoids the unpredictability of being rolled.

The Maersk Digital Innovation Team

The Maersk Digital Innovation Team is a highly agile business unit based in China and dedicated to exploring, validating, incubating, and developing new innovations for the logistics industry. Established in June 2019, they have developed a range of digital solutions including AI-powered container stuffing, triangulation technology, bespoke API connections, and greatly aided the wider COVID-19 response in China with chatbot, E-fapiao and e-counter solutions to reduce the need for physical contact and allow business continuity despite social distancing rules.
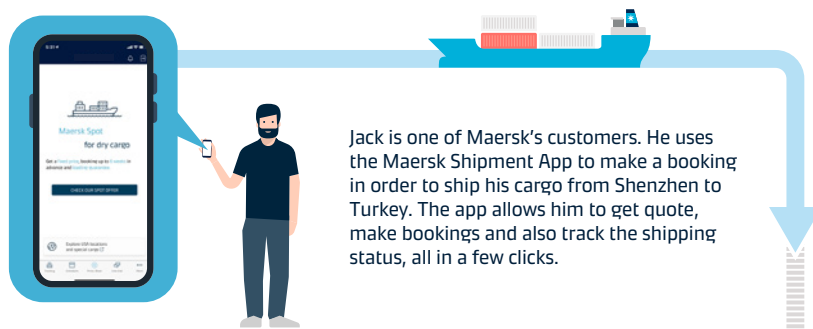
Data, Data
Everywhere

From AI-powered data analytics to blockchain, there are huge potential applications of new technology within logistics. However, in order for these technologies to flourish, they require the right foundations, and this means fundamental changes in how data is collected and integrated within the industry.

"Data is at the heart of logistics' rapidly evolving technological landscape" explains Schmeltzer, "the key to unlocking it will be the ability to harmonise data between different actors within the supply chain." Ultimately, better data integration enables businesses to have significantly faster and more informed decision-making. This in turn can be supported by the development of industry-wide data standards that will make the sharing of clean, usable data much easier and more robust.

Jack is one of Maersk's customers. He uses the Maersk Shipment App to make a booking in order to ship his cargo from Shenzhen to Turkey. The app allows him to get quote, make bookings and also track the shipping status, all in a few clicks.

However, there are times that unfortunate incidents could happen unexpectedly throughout the logistics process – from the moment the cargo leaves the production centre to the moment it arrives the destination. For example:

1 Damaged Goods

2 Unexpected Delay

3 Inefficient Communication between Suppliers and Vendors

After we inform Jack about the issues, Jack can instantly activate contingency plans to ensure his goods can arrive the destinations on time. For example, he can instantly arrange another bulk of goods to be sent from another location closer to destination, using the Maersk Shipment App.

Fortunately, with aid of advanced technologies we utilise and adopt in our tools, Jack will be notified in a quick manner if anything goes wrong.

The Importance of Data Standards

Logistics is a data-rich environment and yet the majority of supply chains operate according to multiple independent bespoke data standards, making both the collection and integration data extremely difficult. According to the 2020 Council of Supply Chain Management Professionals (CSCMP) survey, the lack of clean and useful data was one of the leading concerns of shippers and 3PL providers alike with 77% and 82% respectively acknowledging this as a key problem in implementing analytics.[4] While this can be addressed through the harmonising of data between different agencies, the adoption of data standards is an important step towards addressing this shortage across the entire industry.

Nonetheless, promising steps towards rectifying this have been taken by the Digital Container Shipping Association (DCSA).

"The DCSA is a non-profit organisation, we set this up in 2019 with several other leading container shipping companies in the world" says Olsen "it's dedicated to building technology standards and frameworks for the shipping industry because we all realise the value this will have for the industry."

To date, the organisation created its first Industry Blueprint in 2019 consisting of recommended state standards for the processes used in container shipping. This can be used as a baseline standard for digitalisation and standardisation initiatives in shipments, equipment, and vessels. Further, in January 2020, the group released comprehensive track-and-trace API definitions to support easier cross-carrier shipment tracking by carriers, shippers and third parties.

Likewise, similar efforts are being made by the Blockchain in Transport Alliance (BiTA) which are aiming to develop standards that will help in the establishment of public blockchains for use by the entire industry. It's still relatively early days, but these efforts are important steps towards standardisation across the rest of the industry and the ongoing release of similar standards should be expected.

4 2020 Third-Party Logistics Study, Results and Findings of the 24th Annual Study, CSCMP

From EDI to API

While currently the majority of logistics communications utilises EDI, API is growing popularity and by 2023, Gartner predicts that over half of all B2B transactions will take place via real-time APIs.[5] "Developing new DCSA standard-compliant APIs is really going to open the door for increased use of APIs for data integration" according to Kapoor, "While EDIs will continue to play an important role in logistics and can complement APIs, the use of APIs is going to grow rapidly and likely to become the new norm for the industry."

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Even though EDI is a widely accepted data format with several established standards, there are numerous unique requirements that surround every organisation's EDI exchange process. "EDI set-up tends to be extremely cumbersome, time-consuming, and costly" Kapoor explains, "and it also prohibits new or smaller parties from entering into the data exchange and that means you are losing visibility over those parts of the supply chain."

APIs on other hand can be implemented quickly are a lot more cost-efficient, and, because they are based on technology standards, are significantly more flexible meaning that more parties can be added to the exchange making the data collection that much richer. Moreover, unlike EDIs, APIs are also able to integrate with millions of IoT objects, sensors, manufacturing robots, vehicles, weather analysis – all acting as a data source to vastly enrich the information available to businesses.

As well as being more flexible, APIs also enable synchronous integrations, meaning that they facilitate real-time data sharing more readily than EDIs which are comparatively slower. "Access to high quality real-time data is likely to be a huge gamechanger" predicts Schmeltzer "For example, imagine if cargo is damaged in transit. It is not always easy to know this before it reaches the destination and the container is opened. With a combination of real-time data connected to in-container sensors or even to the cargo itself, businesses can be made aware of the issue ahead of time and react accordingly before the cargo arrives."

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Lars Schmeltzer
Global Head of Orchestrator, 4PL
Maersk

5 https://ecosio.com/en/blog/the-future-of-edi-debunking-the-myths-and-building-a-realistic-picture-of-what-the-next-decade-will-bring-for-b2b-integration/

AI and Analytics

There are numerous opportunities for AI within the logistics industry. "This year we trialed a new AI system to optimise container stuffing" says Chen "using this system, we've been able to increase the efficiency of container usage by up to 9-16%".

However, according to Carsten one of the biggest applications will be in prescriptive and cognitive analytics that can identify patterns of activity and provide actionable insights.

"A huge number of changing factors can impact a supply chain – weather conditions, vehicle usage, route availability, cargo damage. With access to clean real-time data, new AI models have the power to predict disruptions before they happen so businesses can manage their operations proactively, rather than reactively. Understanding ahead of time what is happening to cargo will allow for real-time adjustment to shipments in response to specific changes or impacts to routes or inventory."

Currently however, only 21% of 3PLs report using cognitive/AI-based analytics and a key barrier cited is the lack of adequate high-quality data. Ultimately, the availability of high-quality data is a prerequisite to high-quality results, and this is yet another area where data standards will enable this area to flourish. "Widespread access to clean, industry standard, real-time data is a necessary foundation for AI-based analytics and, given all the benefits, I see this growing rapidly in the future" says Carsten.
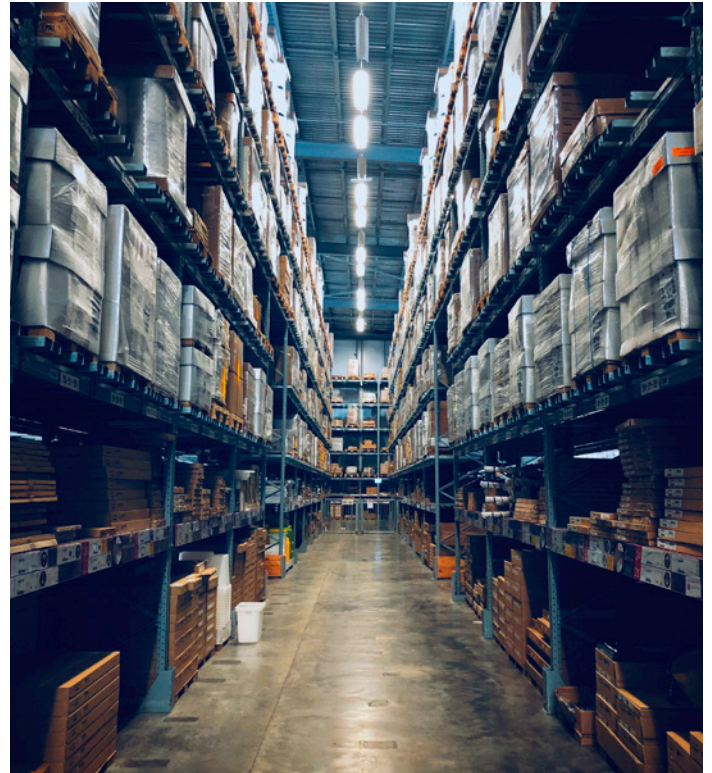
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AI-Assisted Container Packing

Optimum container stuffing plays an important role in ensuring container shipping remains efficient and cost-effective. This is a complex task involving a wide variety of parameters including origin, destination, or cargo-specific regulations, client determined rules and restrictions, optimum patterns for loading and unloading, and a myriad of other factors that will determine the most efficient way to pack each individual container.

Traditionally, this is handled by experienced staff, however in 2020 we've successfully completed trials of an AI-assisted container stuffing system which can quickly determine the best way to pack a container according to the parameters. Initial results have seen a 9% increase in efficiency however the system is still learning, and we may see greater gains as it improves. Moving forward, we expect this AI-assisted container stuffing to become the norm in the future with 95% of all containers packed in this way.

[6] https://ecosio.com/en/blog/the-future-of-edi-debunking-the-myths-and-building-a-realistic-picture-of-what-the-next-decade-will-bring-for-b2b-integration/

Blockchain

By allowing data to be securely shared among multiple parties through a decentralised and distributed system, blockchains will have enormous ramifications for an industry that is notorious for having an unwieldy number of different entities involved.

"In any given supply chain, there may be 30 or more separate parties with more than 200 separate communications required while at the same time overreliance on paper transactions has driven up the costs of processing and administration to as high as 20% of the cost of transportation" explains Olsen, "With blockchain however, all these communications can be shared and recorded through an encrypted audit trail and this removes the need for all that physical documentation and vastly improves the speed and efficiency as cargo moves through ports, vehicles, and containers."

This technology has already been successfully realised in the form of TradeLens, a collaborative project between Maersk and IBM. However, despite this success, currently only 6% of shippers see blockchain as an important component of logistics.[6] "We've barely begun to scratch the surface of what blockchain applications can do in the industry" says Carsten "but we are likely going to see a gravitation towards all documents in the industry using blockchain in the future." The growth of public blockchains, however, will hinge on the release of industry data standards and, until then, initial development will most likely focus on private blockchains.

"In any given supply chain, there may be more than 200 separate communications required. With blockchain, all these communications can be vastly improved in terms of the speed and efficiency."

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What is TradeLens?

TradeLens is a blockchain-enabled digital container logistics platform. Developed in collaboration with IBM, TradeLens is an interconnected ecosystem of supply chain partners including cargo owners, ocean and inland carriers, freight forwarders and logistics providers, ports and terminals, customs authorities. It utilises Distributed Ledger Technology (DLT) to provide a secure, single-shared view over a transaction allowing parties to interact more efficiently through real-time access to shipping data and shipping documents, including IoT and sensor data ranging from temperature control to container weight.

Learn more at www.tradelens.com.

6 https://ecosio.com/en/blog/the-future-of-edi-debunking-the-myths-and-building-a-realistic-picture-of-what-the-next-decade-will-bring-for-b2b-integration/

Disruption and Opportunity

New technology is evolving at an unprecedented rate. With access to ever cheaper processing power, innovations such as blockchain, AI, and data driven logistics will revolutionise how logistics operates, and this means disruption but also opportunity.

"While currently behind the curve, logistics technology is going to take a big leap forward and will create an inflection point in the evolution of the industry" says Kapoor "Businesses need to be prepared to capitalise on this change or risk being left behind."

As supply chains grow ever more complex and fragmented, visibility will become increasingly important. "Visibility and predictability remain two cornerstones in a well-working supply chain", says Carsten, "New solutions are constantly finding their way into this space – not least through the logistics platform solutions Maersk is working on as well as our investments in blockchain, AI, and IoT that will enable close to real-time visibility to cargo-whereabouts."

Key to this will be initiatives such as industry data standards and the adoption of APIs that can facilitate improved integration and the capture of clean, usable data. However, data alone is not enough to transform the industry. More crucial will be how it is used.

"Data can inform you what is going on within the supply chain, but the next step is to act upon those insights" says Schmeltzer, "As the technology evolves, decision-making capability has to evolve with it. To extract the most value from these new technologies, you need experts who can read the data, understand the impacts, and act upon it, otherwise it is just numbers."

How businesses approach not only the capture of clean, accurate, real-time data but what they then do with it, will play a crucial role in determining their own success moving forward.

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Chief Technology and Information Officer
Maersk

Digital Efficiency Index

How efficient is your supply chain? The Maersk Digital Efficiency Index is a high-level overview of a customer's digital engagement with Maersk. By analysing a business's usage of our various digital platforms and initiatives, we are able to reveal key areas that they can take advantage of in order to increase efficiency and reduce their costs. For instance, for one client, we estimated they could save more than $500k a year by better leveraging a range of existing digital opportunities such as APIs or EDIs for their transactions, tracking, or schedule searches.

Get in Touch

To learn more about how Maersk can help you digitalise your supply chain, here's how to get in touch:

1. Visit us online: www.maersk.com/solutions/digital-solutions

2. Reach out to our Tech & Electronics supply chain experts around Asia-Pacific:

   • Tom Harris (China, Taiwan, Hong Kong SAR): tom.harris@maersk.com
   • Jason Park (Korea, Japan): jason.park@maersk.com
   • Hean Chun Goh (Thailand, Malaysia, Singapore): hean.chun.goh@maersk.com
   • Phuong Ngo (Vietnam): phuong.ngo@maersk.com
   • Natalie Wallace (Oceania): natalie.wallace@maersk.com

   Or, if you already have a dedicated Maersk contact, you can get in touch with them directly.

Further reading

1. Listen to Carsten Frank Olsen talk more about data standard in our Podcast episode "How industry standards are driving integrated container logistics (Jul 15, 2020)":
   http://podcast.maersk.com/maersk-podcast-how-industry-standards-are-driving-integrated-container-logistics

2. To learn more about TradeLens, visit www.tradelens.com
   Or, reach out to Tina Ho (tina.ho@maersk.com) or Samuel Lim (samuel.lim@maersk.com),
   TradeLens Product Manager, Asia-Pacific

3. To learn more about Maersk Spot, visit www.maersk.com/solutions/digital-solutions/maersk-spot
   Existing Maersk customers can speak to their usual Maersk representative to start booking on Spot.

4. To learn more about Maersk Flow, our digital supply chain management platform:
   www.maersk.com/solutions/supply-chain/maersk-flow

   • Read our Special Report "Overcoming the COVID-19 crisis with Maersk Flow":
     www.maersk.com/stay-ahead/advice