



Unlock millions in supply chain value with data and analytics

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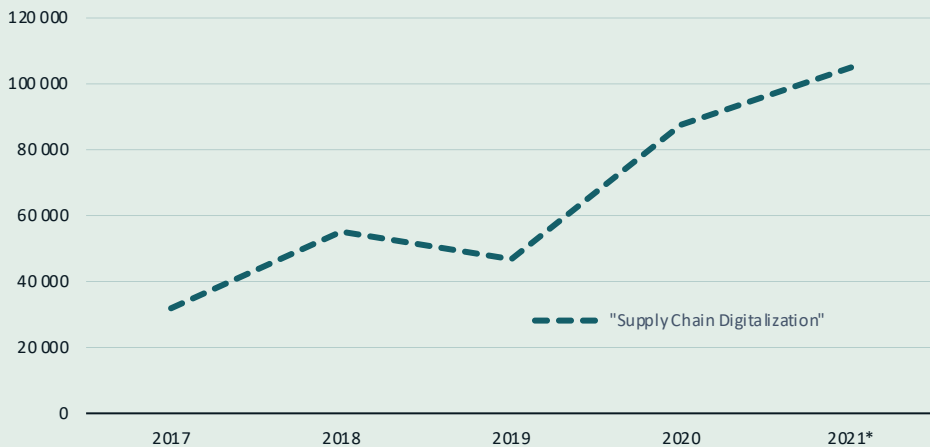


Introduction

For those working within supply chain management it is a challenging time. Recent years have seen volatile shipping markets, trade wars, an unprecedented pandemic, and mounting pressure upon all industries to take steps towards decarbonization.

Amidst this, supply chain professionals must manage an ever-increasing intricacy of networks and product portfolios together with pressure to keep their supply chains cost-efficient and competitive. With the constant advancement of technology; buzzwords such as IoT, automation, big data, blockchain, and other innovations have shaken up all areas of business in recent times.

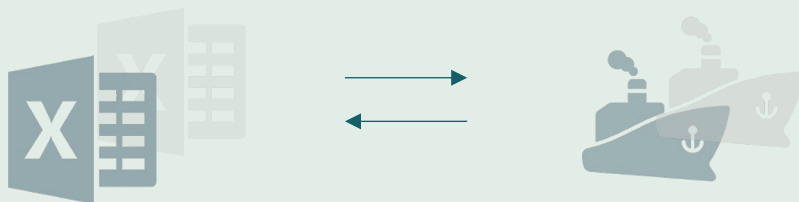
These trends, while more developed and commonplace than just five years ago (as illustrated below), are still young and will continue to disrupt industries as market leaders continuously accelerate digitalization agendas as they seek ways to improve performance and stay ahead of the competition.



A key enabler of this digital age and 'Supply Chain 4.0' has been the access to computing power and the democratization of that power through cloud services. The calculation and processing of massive amounts of data can be done today using advanced algorithms on scales previously unknown, and they are continuously evolving and improving.

However, many companies with supply chains dependent on seaborne logistics continue to rely on spreadsheets, physical data entry, and manual ways of exchanging information between stakeholders throughout the planning, procurement, execution, and sales processes.

This means one of the more cost-intensive (and risk-prone) part of their supply chain relies on structures and systems that lack inter-connectivity, the ability to provide transparency, visibility, or reliable access to real-time information.



The good thing is many stakeholders already have a key component in place to get started - knowledge. Skills and insight harnessed through years of 'hands on' industry experience is hard to recreate, and technology should be embraced as a means of improving decision making and empowering those stakeholders to perform even better.

By using data and analytics as a tool when planning and looking for optimization potential, value creation opportunities are highlighted early enough to be able to capitalize upon them. Finite and time-sensitive opportunities where profit margins are slim will become recognizable, and real-time decision-making will generate real value across the supply chain by reducing costs, waste, and the environmental impact of sub-optimal planning.

The challenge is identifying solutions capable of harnessing the data and analytics that already exist throughout supply chains today and turning that into insights. Solutions, especially those that stand out, should be able to utilize existing information that is managed today in ERP systems, spreadsheets or other sources and create more value with that data.

Examples could be through predictive algorithms, scenario builders or optimization modules where traditional planning tools are limited. With the right tools in place for the job, the next step becomes identifying the cases where data and analytics can be put to work for improved decision making; this white paper will explore some examples of such opportunities.



Reduce Surplus

Maritime Expenses



Improve Berth Utilization

Berth utilization is generally defined as the calculated percentage of time a berth is occupied by vessel(s), coavailable each year. And while shipping is a delicate art of precise scheduling and changing variables, mastering berth utilization is no doubt one of the most vital aspects of the planning and execution process.

The gaps caused by relying on gut feeling, guesswork, and fragmented communications to make critical berth decisions often result in delayed or broken flows of information, clashes, waiting time, and costly demurrage.

Put into context; the graphic below illustrates the line-up combinations for multiple arriving vessels.



6



720



480 000 000

This quickly becomes a complex problem to solve without the ability to put the analytics to work and holds great potential for cost and efficiency savings.

While land-based transportation and machinery may accrue less idle time through inoperability, savings on demurrage and CO² emissions on voyages will be achieved as illustrated in the example on the next page.

Scenario: 82 000 DWT vessel reduces its speed from 13 to 11 knots ~5-6 days prior to ETA in order to arrive one day later. By doing so, it saves fuel during sailing time and reduces waiting time by one day.

Variable	Unit	Before	After	Change
Speed	knots	13	11	-15 %
Remaining Distance	Nm	1716	1716	
Remaining Sailing Time	Days	5.5	6.5	+1 day
Daily Consumption	tFuel/day	34	21	-38 %
Distance (per day)	nm/day	312	264	-15 %
Consumption/Distance	tFuel/nm	0.11	0.08	-27 %
Consumption	tFuel	187	136.5	-51 tFuel (-27%)
Emissions (per distance)	tCO₂e/nm	0.34	0.25	-27 %
Emissions	tCO₂e	582	425	-157 tCO₂e (-27%)
Idle Consumption/day	tFuel/day	4		
Expected Waiting Time	Days	1	0	-1 day
Idle Consumption	tFuel	4	0	-4 tFuel
Idle Emissions	tCO₂e	12.4	0.0	-12.4 tCO₂e
Emission Factor	tCO ₂ e/tFuel	3.11	3.11	



Emissions Saving (Sailing): 157 tCO₂e
 Emissions Saving (Idle): 12 tCO₂e

Total Voyage Savings: 169 tCO₂e

With a price on CO₂ emissions imminent, the losses and savings will become increasingly valuable to stakeholders. Were the above applied to 30% of voyages, on an average schedule of 300 voyages per year, savings (total for operator and cargo owner) reach:



Fuel & Emissions Saved: 4,905 tFuel & 15,255 tCO₂e
 Waiting Time Saved: 90 days
 Fuel Cost Savings*: \$2.5 million
 Carbon Tax Savings*: \$1.5 million
 Demurrage/hire Savings**: \$1.6 million

Total Voyage Savings: \$5 600 000

* Assuming fuel price of \$500 per t and future carbon tax of \$100 tCO₂e based on expectations as of June 2021
 ** Average demurrage/hire rate of \$18 000 per day applied to reduction of 90 days of awaiting time per annum

Decrease Discharge Challenges

For importers seeking to improve the accuracy and predictability on the impact of intakes, discharge challenges (often cited as the most common cause of demurrage) will also have great potential to be reduced. Proactive decision making and eliminating the cost of information delay and human error will not only optimize storage management; but can open doors for capitalizing on spot market purchases and other arbitrage opportunities.

Increase Competitive Insights

The increased probability of identifying bottlenecks and any inconsistencies in top-down planning can avoid later costs incurred by seeking tonnage from the spot market.

Significant potential to seize opportunities will increase, when possible, to collate and act on real-time data of:

- Trade flows
- Vessel movements
- Vessel availability with commodity prices and freight costs
- Competitors' movements
- Ongoing and planned port operations

While these examples are to name a few, the very nature of bringing information flows into real-time and ensuring existing supply chain data is continuously analyzed and value-assessed against these factors will ensure stakeholders are alerted to challenges and opportunities.



Release Millions in

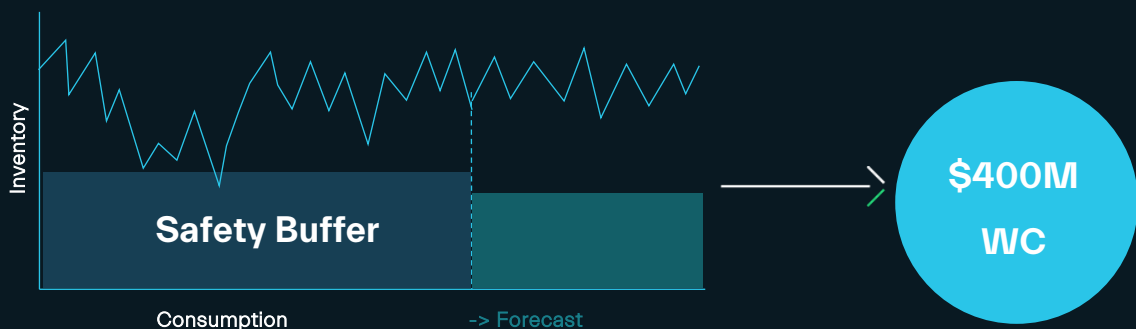
Working Capital



Lower Inventory Buffers

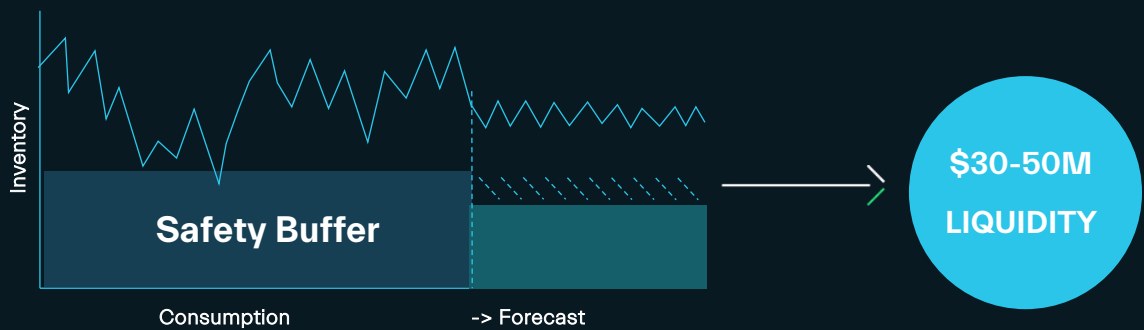
Many companies are known to have vast amounts tied up in working capital and reluctant to lower inventory levels. This is usually to maintain reliable safety buffers to avoid stockout and damage to customer relations when unable to deliver on schedule.

Though such measures are necessary to prevent or lower the risk of these possibilities, it does not directly contribute to revenue or profitability. Owning too much working capital may hinder financial results when the resources sit unused until a liquidity need presents itself. Low levels of working capital that do not incur too much liquidity risk can be of benefit to a company's everyday operations and capital investments.



Companies that can establish a control tower level of visibility delivering real-time data and analytics (preferably by individual stakeholders' needs) will ensure their teams work in unison to forecast and manage inventory requirements with accuracy and confidence. Supported by data-driven decisions, collaboration across all business units responsible for moving materials will improve and safety buffer reductions can be considered.

While different industries, sectors, and supply chains have unique variables; an assessment into the potential in raw material reduction revealed reductions of 10-15% were achievable for some companies; equating to \$30-50M* freed up in liquidity.



*2018. Klaveness Digital customer case study with aluminium smelters

Predict Supply Risks

With such amounts tied up in working capital to prevent supply interruptions, utilizing advanced analytics makes it possible to apply algorithms to learn from inefficiencies and predict where risk is highest.

For example, if lead time via certain trade routes is unpredictable and prone to high variation, it can be challenging to plan with accuracy, especially for those companies living by just-in-time logistic models. This can incur costs otherwise not anticipated and be difficult to mitigate.

With advanced algorithms learning over time and collating lead times, automating the updates to trade routes can help stakeholders predict when delays could be likely to occur.

Examples may be port congestion, poor equipment at load and discharge operations, sluggish suppliers, or even weather patterns. Stakeholders will plan with renewed confidence and greater degrees of accuracy to adjust in real-time as and when needed.

The improved insight will also demonstrate to stakeholders where patterns of inefficiency are emerging across the supply chain, and prompt opportunities for investigation and taking longer-term preventative action.



Reclaim Millions in

Lost Sales



Minimize Missed Opportunities

Lost sales typically occur when customer service is poor and/or the consumer has decided to purchase elsewhere. Yet by harnessing and utilizing data that exists throughout supply chains and turning that into visibility, companies can also regain substantial amounts in lost sales through predicting and reducing inoperability.

A particular example is missed berth gaps, and competitive ports often hold startling lost opportunity if this occurs. One example is iron ore, a consistently ‘in demand’ commodity, where prices hit \$200/MT in Q2 2021. A 24-hour load rate of 200 000MT and 100% utilization generates a staggering \$40 000 000 per day.

Under these circumstances, the example below illustrates the re-gained opportunity of optimizing berth utilization by reducing gaps.



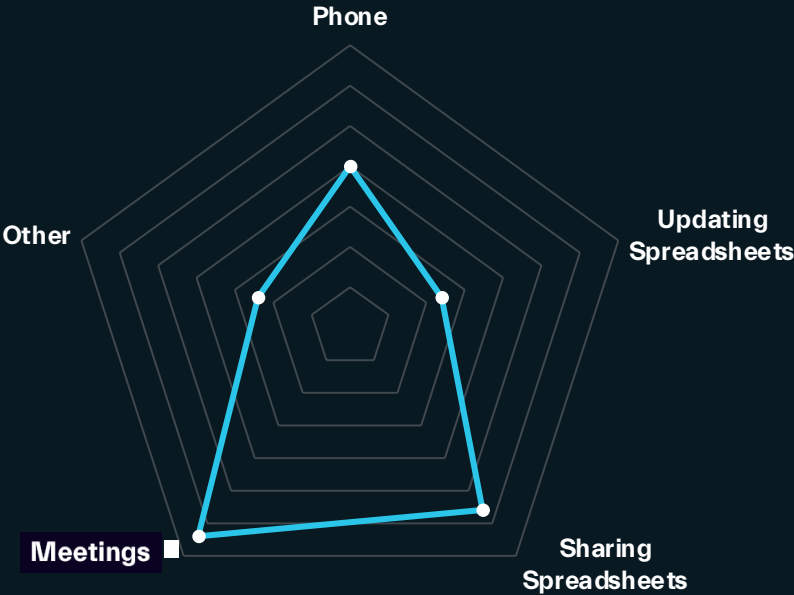
Berth Utilization:	82.14%
Optimized Level:	84.08%
Increased Capacity:	1.94% (38.27 hours)

Sales Potential: \$ 63 783 333

As industries embrace collaboration in the years to come, the next level of transparency will allow customers and suppliers to share data and analytics across digital platforms. Such new ways of delivering value throughout the buyer’s journey will change the way industries interacts, further mitigate lost opportunities, and afford those embracing the digital reality a new competitive advantage.

Maximize Productivity

It is expected that stakeholders must spend much of their time each day in meetings and collecting and sharing operational updates; as illustrated in the below graph.



**Klaveness Digital Survey 2020-21. How do you spend your time managing operational updates?*

While such ways of working are necessary to run a business and not all manual exchanges of information can be replaced, there is undeniable opportunity to regain some of this lost time through applying data, analytics, and automation where possible.

One simple example that has great potential for reduction is the reporting and sharing of operational KPIs. This could be replaced with dashboards offering real-time visibility of ongoing KPIs, or at least by automating the dissemination of key reports. This means the need to cross-reference and share operational updates through meetings and other channels for making decisions can no doubt be reduced.

With these practices in place, the need for the manual updating and sharing of information to exchange status updates drops in frequency; as illustrated to the right.

Efficiency Savings Per Person*	
Per Day:	25 minutes
Per Week:	2 hours
Per Month:	1 Working Day

Stakeholders will spend time on other value-added tasks concerned with sales, or further exploring optimization throughout supply chains.

Grab Spot Market Opportunities

The economic yield of key raw materials becoming available at lower market prices can also present massive opportunities to maximize the profit margins of sales revenue.

The example below illustrates a simple cost analysis (and net revenue) when plans are realigned to capitalize on the sudden availability of cheaper raw materials and acquiring an 80 000/MT cargo.



Diversion Cost:	(\$3/MT)
Material Savings:	\$12/MT
Net Material Saving:	\$9/MT

Total Spot Market Saving: \$720 000

With stakeholders alerted to market fluctuations, data and analytics can provide an analysis into not just whether the commodities can be stored, but whether vessel(s) can be diverted and whether the economic deficit of adjusting plans is a viable option when offset against the economic value of the acquisition.



Conclusion

From Supply Chain Vision to Visionary Supply Chain

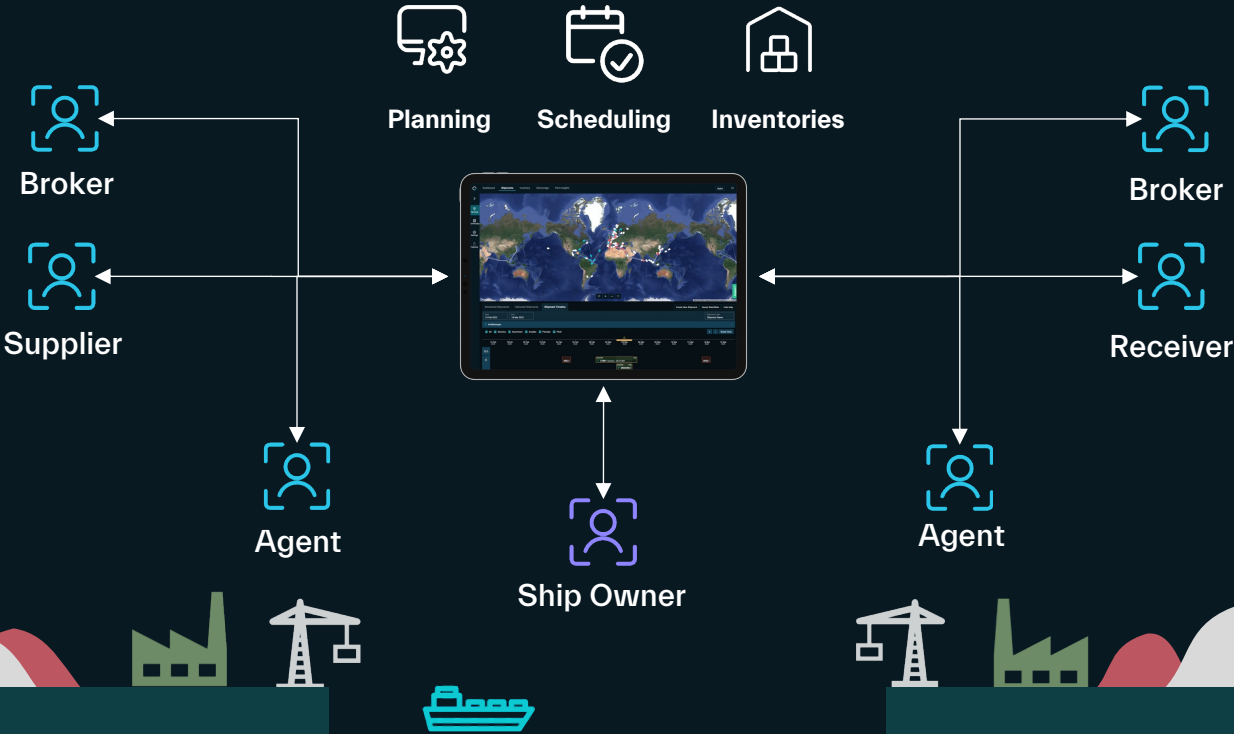


Truly connected and real-time supply chains will spur these business models and enable new degrees of resiliency and responsiveness. Moving forward, visionary leaders will establish a digital ecosystem where data is fed from multiple sources and generates key insights into all areas of the material flows.

While these examples are not limited to the potential of applying the power of data and analytics to supply chains, they serve to illustrate some of the ways value creation can be extracted from the data that already exists in many supply chains today.

Just as there is no silver bullet to the world’s decarbonization challenge, there is no turn-key solution that can meet all requirements of any given supply chain. A best-of-breed approach is typically required to achieve the target state many companies are seeking; turning data into insights is a vital part of that journey.

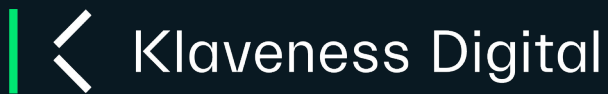
Fig. Illustration of ‘Supply Chain Ecosystem’



Nevertheless, data and analytical tools in action should be able to cater to providing the most important supply chain elements for the user and at least be able to offer some degree of customization. This will also ensure a smoother transition for those previously accustomed to acting on a much more limited set of information when transitioning from traditional work processes.

While many companies are just beginning to unlock the vast potential digitalization offers, their stakeholders already possess a great deal of wealth in terms of the knowledge and experience that comes from governing supply chains. Adapting to new ways of working when having even more data available will improve their decision-making capacity and allow them to capitalize on new business opportunities while embracing the new digital reality.

A reality that holds a lot of promise for the next generation of resilient, decarbonized, and cost-effective supply chains.



Who we are

Klaveness Digital is a Norwegian technology company on a mission to bring shipping and logistics into the future. They develop intelligent solutions using the latest advances in machine learning and artificial intelligence, to solve the everyday challenges that the world's largest industrial companies face.

CargoValue

The companies' flagship product, CargoValue, is a Software as a Service (SaaS) solution that provides industrial companies with a digital twin of their seaborne supply chain. The platform improves supply chain management by delivering real-time visibility, improved transparency, and fostering collaboration between stakeholders involved in the planning, scheduling, and production processes.