2020: Achieving Supply Chain Visibility & Operational Efficiency

Contents

Introduction

COIVD-19 has allowed supply chain and logistics professionals the world over to realize where their armour is most penetrable.

Long before COVID-19 wreaked its path of disruption, cracks of operational vulnerability had forever been present within supply chains.

These cracks however, have been easy to ignore as their impact on the day to day operations for most businesses had not yet reached a level of severity that was damaging for economic survival and customer relations.

Nevertheless, this does not mean that to operate in such a manner is correct, but rather it was more logical given the fact that large portions of the human race never experience such circumstances.

It is therefore very difficult to make a business case for proactive 'just-in-case' measures to improve resilience, especially when budgets and human resources may be limited.

"Disasters are the embodiment of randomness. You don't know when they're going to happen, where it's going to happen, and who's going to be affected." - Lynn Fritz, founder of the Fritz Institute

In a complex inter-organisational supply chain it would of course be difficult if not impossible for anyone to identify every possible hazard or point of vulnerability.

Moreover, it must be remembered that 'known' problems are only part of the picture.

As these cracks within our supply chains turn to chasms, we must understand how this pandemic took advantage of our operational weaknesses before we can fully appreciate which supply chain technologies are most applicable to our companies' needs.

In doing so, this eBook will look at:

- How an ever increasing globalised world has brought with it a multitude of risks and threats that have long been ignored
- The impact of previous diseases and natural disasters
- The dependency on China and lack of visibility amongst suppliers
- Which supply chain technologies are most appropriate to deal with the problems listed above

Digital capabilities offer many benefits in today's environment, but many organizations are facing economic uncertainty and financial pressures.

Those already behind the digital curve are now trying to deal with all the complexities at once, struggling to measure demand, attain visibility, create more flexibility and update antiquated systems.

While no one can foresee what is in store for tomorrow, we can work today on building a smarter global supply chain.

Organizations can leverage artificial intelligence (AI) and other technologies such as automation, blockchain, IoT, 5G, and edge computing to help turn the unanticipated into the envisioned.

This eBook shall later go on to provide more information on how Hanhaa is providing such technologies to a whole variety of industries scattered across the world and in turn, revolutionising their supply chains operations.

As supply chains evolve and recover through COVID-19, we will continue to uncover ongoing evolution of processes and infrastructures.

Ultimately, after some initial shaking out of the supply chains, we will see most move into a long-term recovery mode, with the potential for new opportunities that will strengthen them over time and provide insight for future improvement.

"COVID-19 is vastly accelerating digital transformation." - Mary Long, director of the Supply Chain Forum at the University of Tennessee, Knoxville

Globalisation

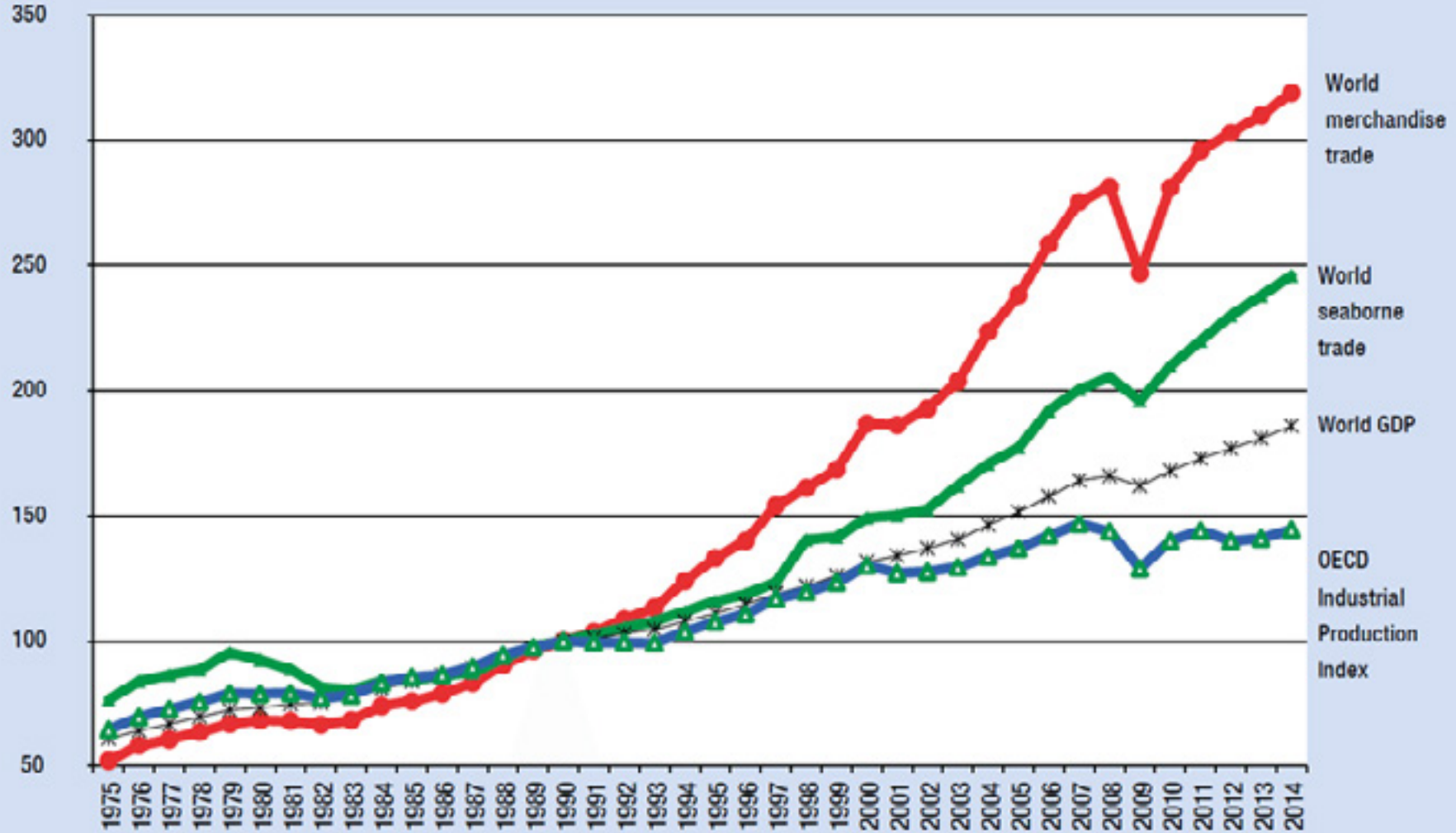
Globalisation of industry and commerce has brought with it many benefits but also a plethora of challenges.

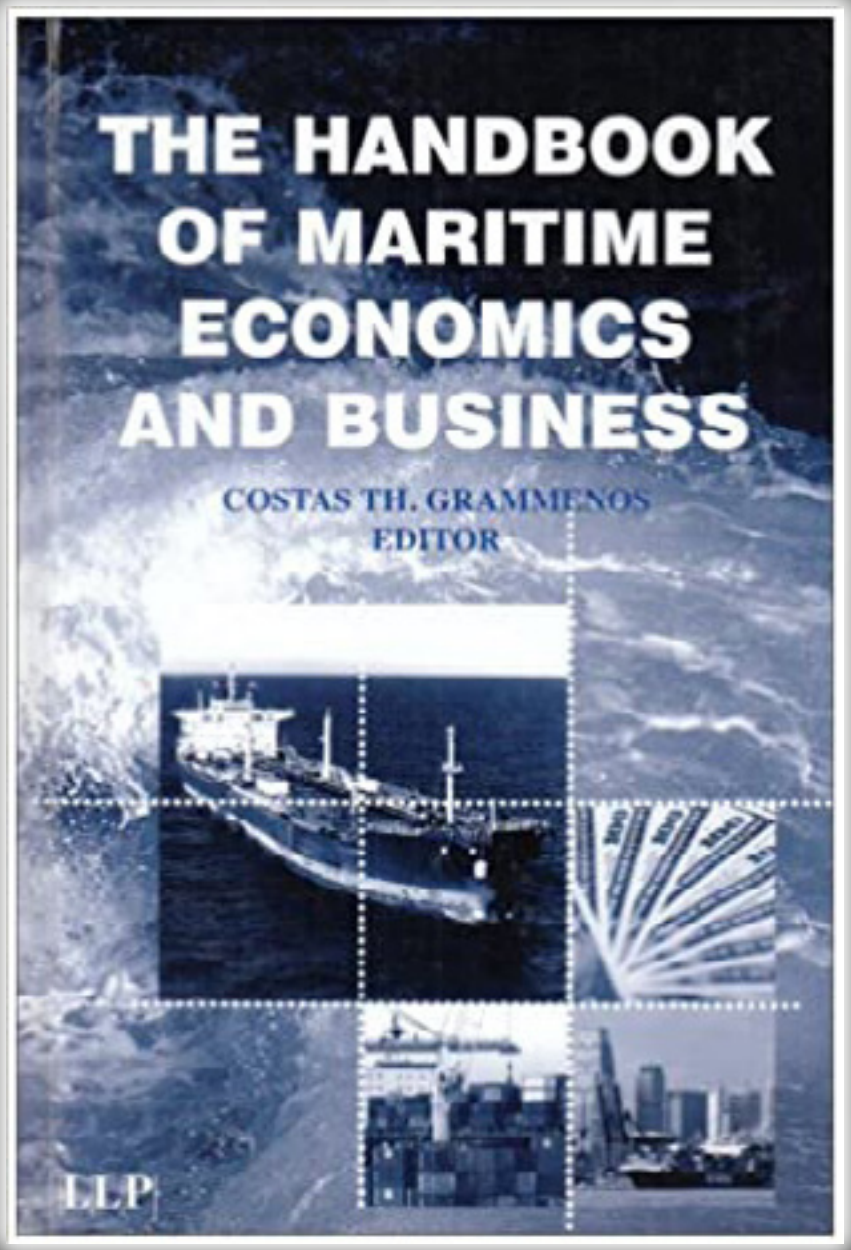
Companies that once served only local markets now reach out to customers and consumers located far from their original home base.

At the same time, their sourcing and manufacturing arrangements extend around the world.

As a result, their supply and distribution networks have become more complex and often more prone to risks and threats.

The OECD industrial production index and indices for the world: gross domestic product, merchandise trade (by value) and seabone shipments, 1975-2014 (1990 = 100)



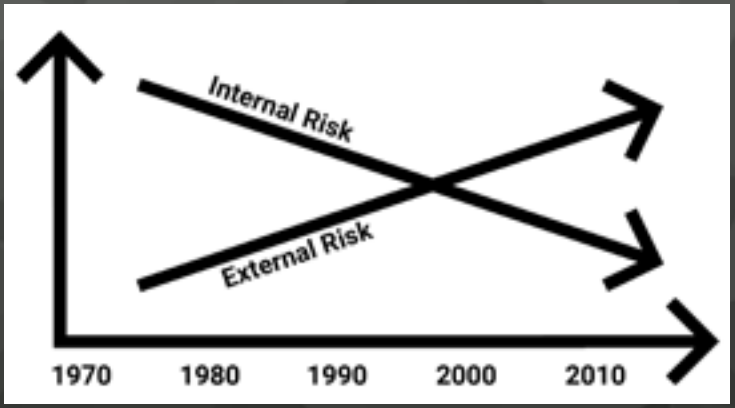


Jan Hoffmann and Shashi Kumar in The Handbook of Maritime Economics and Business give the following example to explain the intricacies of modern supply chains:

> "A Greek owned vessel, built in Korea, may be chartered to a Danish operator, who employs Philippine seafarers via a Cypriot crewing agent, is registered in Panama, insured in the UK, and transports German made cargo in the name of a swiss freight forwarder from a Dutch port to Argentina, through terminals that are concessioned to port operators from Hong Kong and Australia."

The task of managing and co-ordinating this global web of physical and information flows has become a key priority for businesses as they attempt to remain competitive in an environment hit hard by the negative implications of COVID-19.

Consequently, the need for higher levels of logistics and supply chain management capabilities is now greater than ever before.



Risk and Threats

Typically, whilst company metrics may include inventory-on-hand, stock turns and the like, there are no metrics to measure the resilience of a company's supply chain to potential threats.

Subsequently, as with insurance, there is a temptation to put off the premiums and 'hope for the best'.

Nobody is suggesting that years of advances in supply chain management efficiency should be rolled back on the basis that an unforecastable event may disrupt production or supply.

Rather it should be the aim of supply chain managers to balance these risks. In this goal, technology will have an important role to play.

The most disruptive supply chain events are those which have not or cannot be planned for.

Addressing vulnerability is the best way to mitigate the impact of a disruption, although there still remains the issue of how much time and money should be invested on each received weakness. This approach is called 'Risk Agnostic'.

"Running your procurement purely in a short term, point in time, cost minimization model is like shopping for rock bottom home insurance. It looks real smart until your house burns down." - Bob Lutz, former VP of General Motors

Creeping Crises

The outbreak of foot and mouth disease in British livestock herds in February 2001 resulted in damage to whole sectors of the economy.

Foot and mouth was a known threat to livestock, albeit one that had not been seen in the UK for a generation. The impact of livestock diseases is something that might reasonably be expected to be included in the supplier monitoring activities of companies engaged in the production and distribution of food.

But what about car manufactures or high fashion apparel companies?

The shortage of high-quality leather following the foot and mouth outbreak affected automotive manufacturers and fashion houses across Europe. The scale and extent of the disruptions prompted the UK government to seek a better understanding of what are now sometimes referred to in emergency planning circles as creeping crises.

During the foot and mouth outbreak it was industry and government – not the usual 'blue light' emergency services that found themselves in the unfamiliar role of 'first responders'.

We are now currently seeing a similar reaction as governments attempt to deal with the impact of COVID-19.

These 'creeping crises' were remarkable in one other respect – they represented systematic supply chain disruptions.

Creeping crises illustrate the fact that supply chains are more than value-adding mechanisms underlying competitive business models.

Supply chains link organisations, industries and economies.

They are part of the fabric of society.

Pandemics may not be the first risk identified by supply chain managers, but they are one of the most serious.

In the last instance of an outbreak in summer 2009, the swine flu virus killed 392 people, although in fact it could have been much worse.

At the beginning of the crisis the UK government was warning of a potential 65,000 fatalities.

At the time, one assumption made by government agencies is that if a flu pandemic takes hold, up to 50 percent of the workforce could be affected, with each person who falls sick asking between five and eight days off work.

This would have an immediate impact on the ability of private and public sectors to maintain operations especially in such a labour intensive industry as transport and logistics.

The swine flu outbreak of 2009 provided a very real warning of what could happen and the potential impact on the UK's society and economy.

Dependency on China

As governments and health care agencies work to stop the spread of COVID-19, manufacturers in more than a dozen industries are struggling to manage the pandemics growing impact on their supply chains.

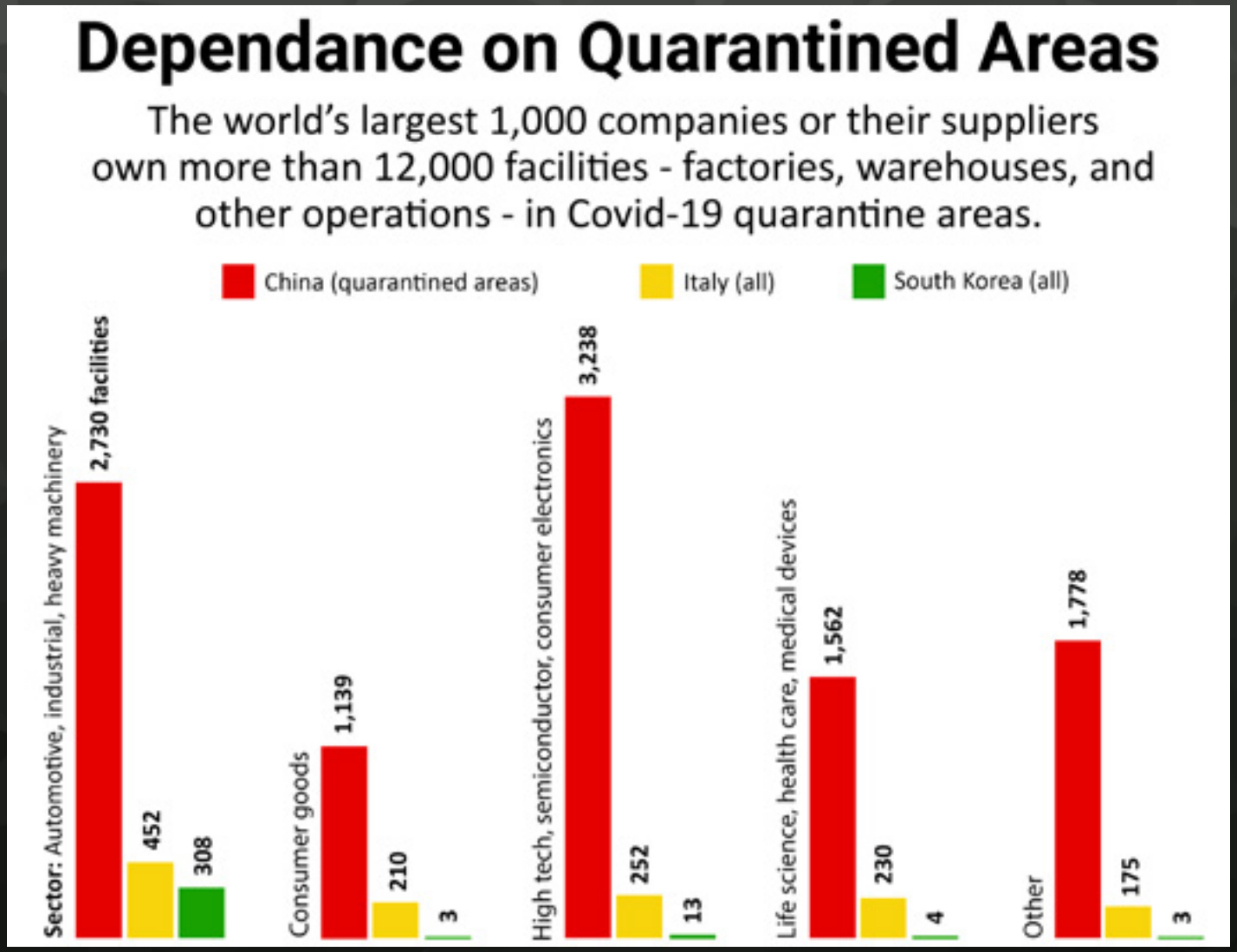
Many are facing a supply crisis that stems from weaknesses in their sourcing strategies that could have been corrected years ago.

Just how extensive the crisis is can be seen in data released by Resilinc, a supply-chain-mapping and risk-monitoring company, which shows the number of sites of industries located in the quarantined areas of China, South Korea, and Italy, and the number of items sourced from the quarantined regions of China.

After the March 2011 earthquake and tsunami in Fukushima, Japan, many multinationals learned painful lessons about the hidden weaknesses in their supply chains — weaknesses that resulted in loss of revenue.

While most companies could quickly assess the impacts that Fukushima had on their direct suppliers, they were blindsided by the impacts on second- and third-tier suppliers in the affected region.

Almost nine years later, it seems the lessons of Fukushima must be learned anew as many companies worldwide scramble to identify which of their "invisible" lower-tier suppliers — those with whom they don't directly deal — are based in the affected regions of China.



Many companies are probably also regretting their reliance on a single company for items they directly purchase. Supply chain managers know the risks of single sourcing, but they do it anyway in order to secure their supply or meet a cost target. Often, they have limited options to choose from, and increasingly those options are only in China.

Lack of Visibility Amongst Suppliers

Today, organizations are in reaction mode, focused strictly on maintaining supply and meeting customer needs.

At some point, leaders must analyse the current pain points to better prepare for tomorrow.

To avoid perpetual reaction to future similar situations that we are experiencing now, leaders need to evaluate how they can proactively get ready for future unpredictable, yet inevitable, disruptions.

Today's supply chains are incredibly complex, with myriad partners spread across multiple geographies as part of an unprecedented, intertwined global trade ecosystem.

Consider the severe acute respiratory syndrome (SARS) epidemic, for example: in 2003 during the SARS outbreak, China accounted for just 2 percent of global GDP.

Now consider the COVID-19 pandemic: today, China's share of global GDP has increased to almost 20 percent.

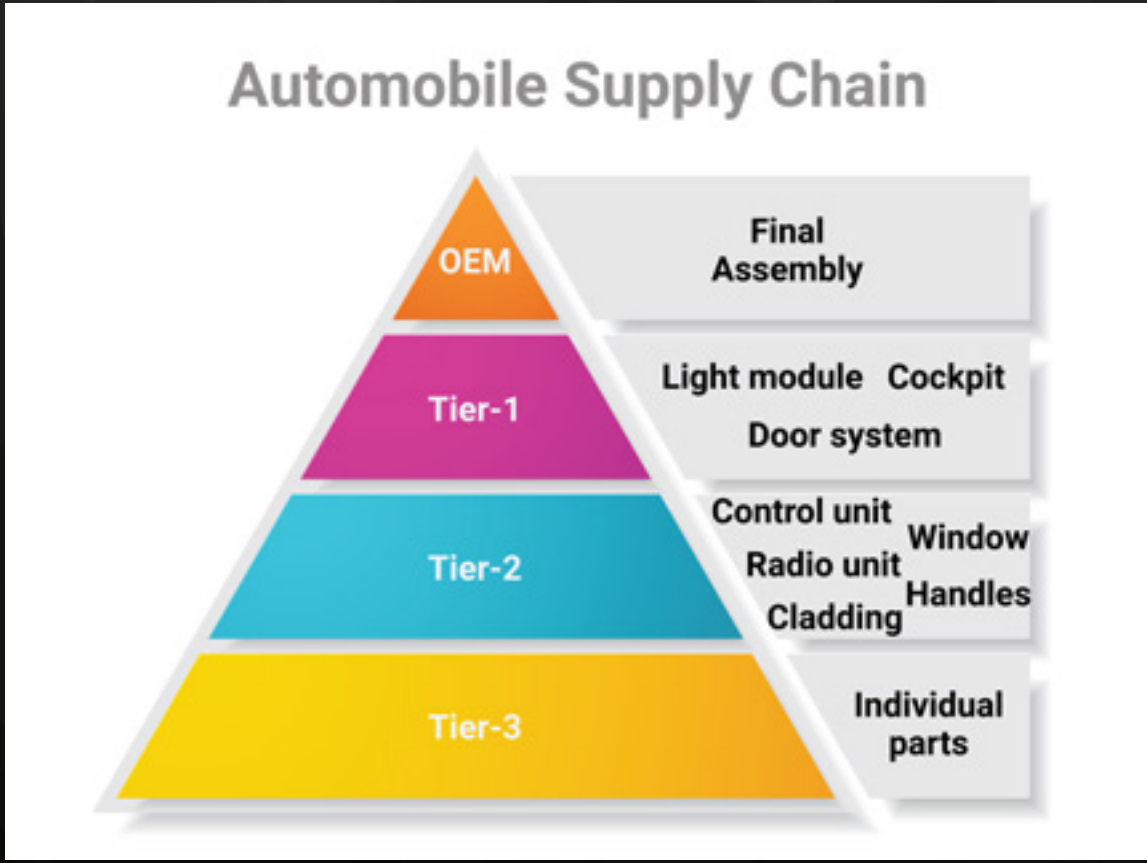
To understand the multitude of issues arising amongst suppliers throughout the supply chain, it's worth acknowledging how those in the automotive industry operate to fully appreciate the turmoil COVID-19 has caused to their operations.

The Automotive Industry Example

Instead of producing all their components in-house, automotive manufacturers procure the individual modules from specialist suppliers.

These suppliers will in turn assemble components supplied by specialized component suppliers. The suppliers of individual parts are found on the third tier.

The following diagram below illustrates an example of an automobile supply chain:



Close interlinking between OEMs and their individual Tier Suppliers pose special challenges to the smooth operation of processes.

The horizontal integration of many different suppliers and their own suppliers will, for instance, demand that required quantities are communicated fast and effectively if the supply of modules, components and individual parts is to be ensured.

This is a critical factor in success especially with just-in-time (JIT) and just-in-sequence processes.

Reducing costs and improving competitive advantage are two of the main drivers in any business. For that companies must ensure that every part of their business is aligned and ready to meet customer requirements.

This is particularly important for those in just in time (JIT) production. At the time of production, each 'moving part' needs to arrive at the right place at the same time.

To increase the efficiency of operations an increasing number of companies have decided to switch to the 'just in time' production method.

While JIT inventories are proven to drive financial returns, implementing JIT comes with challenges that require complete information sharing amongst shareholders to streamline the process.

JIT is also heavily dependent on third parties, therefore, any kind of disruptions among the supply chain can have a serious impact on the production process.

The success of this strategy relies on how precise the coordination between businesses and their suppliers is. In addition, effective JIT implementation requires investing in information technology as well in order for suppliers to be automatically notified when orders are placed.

To ensure just in time management systems are running to their full potential the need for end-to-end visibility among the supply chain needs to be addressed and implemented.

Internet of Things (IoT) technology is now making it possible to track inventory with pinpoint accuracy achieving full visibility and allowing companies to react immediately to unforeseen supply chain fluctuations.

The impact of COVID-19 on the automotive sector has been swift and significant. Initial concerns over a disruption in Chinese parts exports quickly pivoted to large-scale manufacturing interruptions across Europe and America.

With such a heavy dependency on Chinese suppliers that has caused so much disruption in the midst of this pandemic, we should see potential changes in the auto part manufacturers' own and OEM supply patterns.

Countries that have been heavily impacted by the outbreak, in particular, China, Japan and South Korea, account for a significant share of global auto manufacturing.

China's Hubei province, the pandemic's epicentre, is one of the country's key automotive production centres.

The deeper into the supply chain, the greater the impact of the outbreak is likely to be. Automakers with global supply chains are likely to see tier 2 and especially tier 3 suppliers most affected by pandemic-related disruptions.

While many major automotive original equipment manufacturers (OEMs) have instant, online visibility into top-tier suppliers, the challenge grows at lower levels.

Hanhaa's Supply Chain Solutions

VUCA – This acronym emerged in the military in the 1990s and has since attracted interest in other sectors, too:

1. From Volatility to Vision
2. From Uncertainty to Understanding
3. From Complexity to Clarity
4. From Ambiguity to Agility

"Data is a vital raw material of the information economy, much as coal and iron ore were in the Industrial Revolution." – New York Times

Companies are taking a second look at digital transformation as they attempt to operate in the new uncertainty of COVID-19. While they previously looked to technologies such as IoT, blockchain, AI and analytics to drive efficiency, they're now viewing them as a means to increase resiliency in disruptive times.

The evaluation, selection and implementation of technology solutions can be a daunting task within supply chains, especially as the global impact of COVID-19 is so new to us.

To outmanoeuvre uncertainty will require a plan of reinvention. This presents an opportunity for many companies to build the competences they wish they had invested in before: to be more digital, data-driven, to have more variable cost structures, agile operations and automation.

This agility will be core to the long-term capabilities they build. Leaders should consider the steps they take to achieve supply chain visibility and operational efficiency as the first in a long journey of wider transformation.

The Internet of Things (IoT)

Getting to grips with IoT technology within supply chain management is quite a simple concept to understand. With IoT, we are:

> Taking all the things in the world and connecting them to the internet. We are extending the power of the internet beyond computers and smartphones to a whole range of other things, processes and environments.

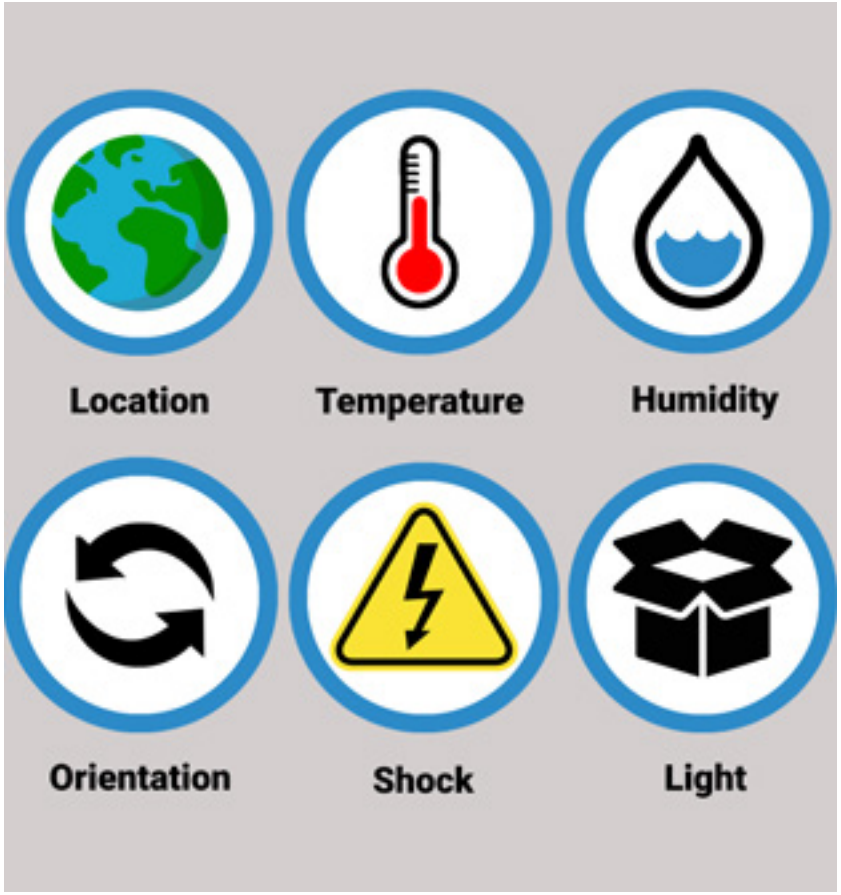
Those "connected" things are used to gather information, send information back, or both.

ParceLive: Global Supply Chain Visibility

Hanhaa is an internet-of-things innovator.

Our first integrated solution, ParceLive, is a real-time IoT cargo tracking service that connects users to live information about the location, condition and security of their assets regardless of their country, carrier or scale.

Alerts of exceptional events are trigged – such as a shipment being dropped, opened, tilted or exposed to temperature or humidity outside of defined parameters – and transmitted via the Hanhaa XG network to the ParceLive portal. Or directly into users' systems via integrated API's.



ParceLive's service-based model means that users can now collect data from the whole delivery supply chain. Real-time alerts, stamped with time and location data, mean that delivery systems can create meaningful workflows to address improvements and deliver competitive advantage and/or new efficiencies to users.

ParceLive service-based model

Network insight: puts shippers in control by enabling them to see what's really happening and trending within their delivery network;

Customer service: can be dramatically improved by enabling shippers and logistics suppliers to identify where delays and issues are happening and report-back to customers in real-time. The ParceLive service enables each individual asset to become its very own customer service agent;

Network optimisation: shipping professionals can identify pinch-points and inefficiencies in delivery networks to improve routing and select the best logistics suppliers;

Dispute resolution: auditable data helps everyone to identify the facts behind late, non-delivery and damage disputes;

Competitive advantage: by offering access to live and accurate data, ParceLive gives end-users as well as 3PLs, logistics vendors and a host of other sectors an incredible opportunity to add value to their service; shippers can differentiate themselves through enhanced service delivery.

ParceLive: Operational Efficiency

A USP for ParceLive is the E-ink display embedded in each tracker along with an international returns postal license on each trackers packaging.

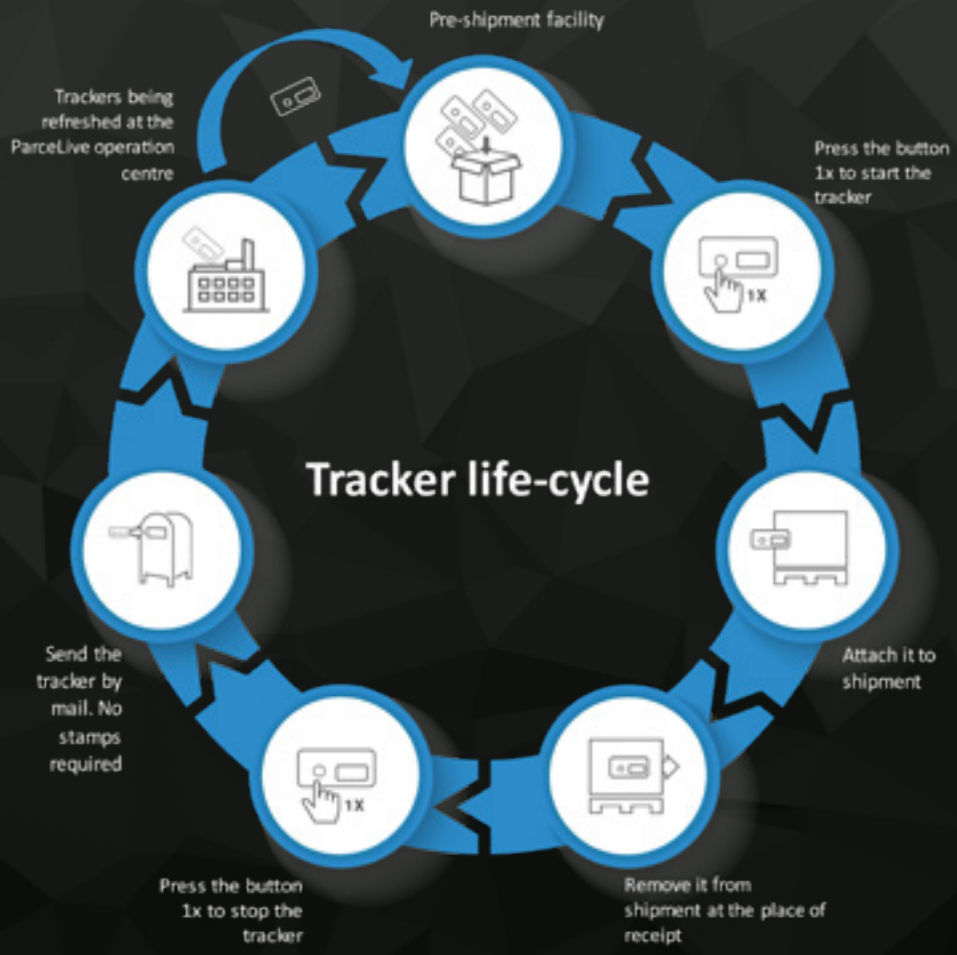
ParceLive channel partners and end-users simply inform the team at Hanhaa via the ParceLive portal as to where they need trackers sent to, ready for their next shipment.

When the journeys are complete, the trackers are sent back to a Hanhaa fulfilment centre via freepost where they are recharged and updated for their next journey.

The aim here is to minimise the operational pain of companies having to deal with the trackers before and after use.

In doing so, companies that adopt ParceLive do not have to set up multiple teams across the world to deal with the trackers, as this is all handled by the team at Hanhaa.

This method makes the adoption of ParceLive even more simple, eliminating potential barriers for those who fear that the time and costs of implementing such technology is not viable.



Telematics

MECOMO AG is one of the leading providers of tracking solutions that specializes in creating customized telematics services for solving complex logistics tasks.

The technical fundament for location-based and tracking solutions is mecFLEET, a modular, flexible software platform for tracking and providing telematics of vehicles, objects and persons.

Through API integration, Hanhaa's ParceLive device connects with MECOMO's mecFLEET platform to enable ParceLive users with improved fleet management, greater control and enhanced reporting abilities.

Geofencing

Geofencing is a location-based service in which an app or other software uses GPS, RFID, Wi-Fi or cellular data to trigger a pre-programmed action when a mobile device or RFID tag enters or exits a virtual boundary set up around a geographical location.

With the mecFLEET integration, ParceLive users are able to set up their own geofences enabling them to monitor activity in secure areas, allowing management to see alerts when anyone enters or leaves a specific area.

ParceLive users are able to draw polygons for selected geofenced areas for a more detailed border.

For companies that have a high volume of shipments, using geofenced areas to define delivery areas allows you to easily notify on-site staff when a shipment is approaching.

This means you can free up resources and docks before the truck arrives, which allows you to better manage everyone's time.

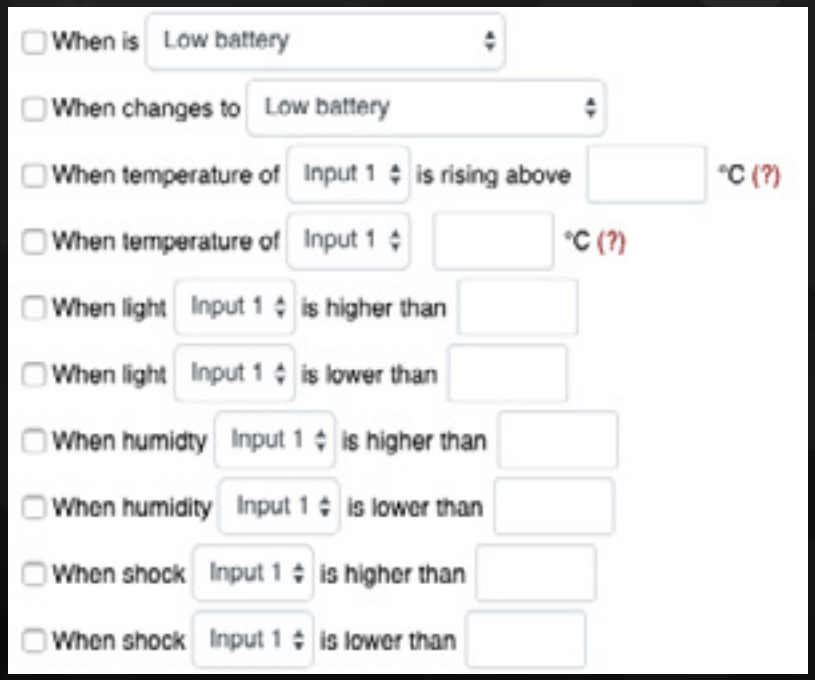
You can also geofence something as simple as a truck route, allowing you to receive notifications if the driver deviates from the planned path, which could indicate a delay in delivery time.

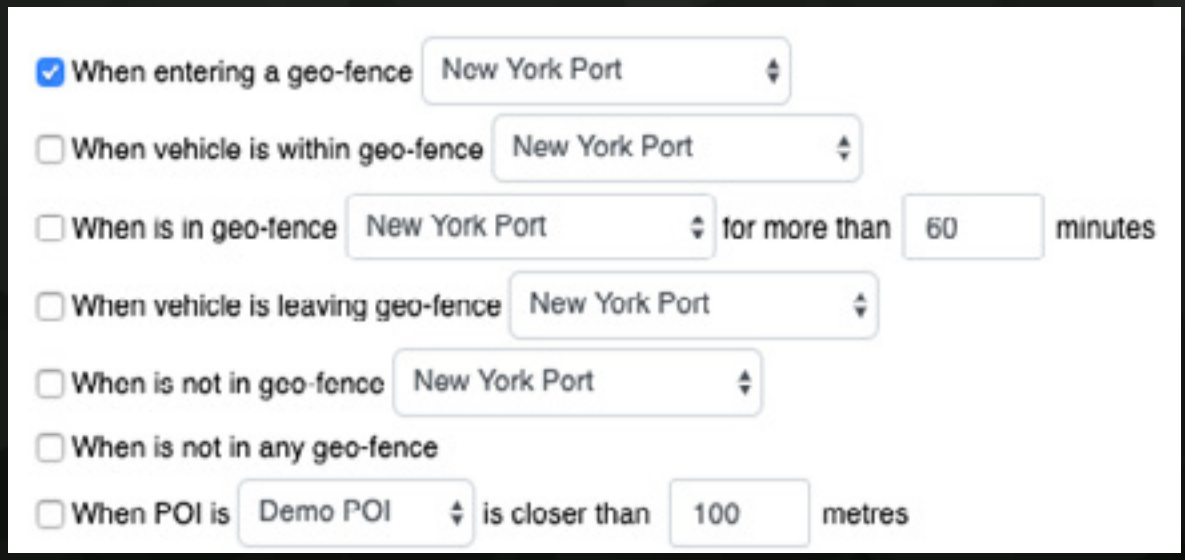
Automated Reporting

For organisations with high volumes of shipments, monitoring all your assets in transport can be a daunting thought.

Depending on the nature of your cargo, there are numerous variables one must constantly monitor so as to not cause damage to the goods in transit. ParceLive users that integrate with mecFLEET are able to automate the entire reporting process with all shipments, saving time and reducing stress.

The images below are an example of some of the reporting metrics that you can automate:





When an alert is triggered, ParceLive users are able to receive email or text alerts to notify them on their cargo's location and condition.

Shipment/Tour Monitoring

Knowing where your cargo is at all times is imperative for any supply chain manager. When cargo travels via sea freight enclosed within a container, ParceLive's smart sensor technology is able to still pick up GPS signal and relay data back to the user's portal - as can be seen below:

Whilst at sea, there will be times when ParceLive will struggle to pick up a signal. Although this may be the case, all the sensor data regarding the condition of the cargo in transit will still be recorded, and made readily available to the ParceLive user once a signal has been found again.

With the mecFLEET integration, ParceLive users are able to see the GPS positioning of the seafaring vessel at all times.

With the ParceLive mecFLEET integration, supply chain and logistics professionals the world over are able to transform their logistic workflows.

Users are now afforded with the tools and software for improved fleet management and reporting, more control possibilities through freely definable geofencing and greater flexibility through scalable interfaces and workflow management.

Blockchain and IoT

While globalization has driven trade growth 3.5 times since the 1980s to USD $16 Trillion, global supply chains have not kept pace. According to the World Bank, these inefficiencies have created a USD $2 Trillion opportunity. Customs are overburdened with manual processes and have few tools to detect the entry of black market, counterfeit or contraband goods. While regulatory authorities struggle with the compliance of health, safety and security standards.

Whether you have already started on a digital transformation initiative of your global supply chains, or your project is still on the drawing board, there are two key challenges:

1. Empower stakeholders with tools to add digital documentation for shipping and regulatory compliance in an effective and timely manner.

2. Create real time visibility into the shipment and product status.

Morpheus.Network is a SaaS middleware platform for seamlessly integrating legacy and emerging technologies. Founded in 2016, Morpheus.Network was designed in consultation with some of the world's largest shipping, customs and banking firms with the aim to make logistics easier using blockchain, IoT and AI.

In order to create a transparent and efficient supply chain, Morpheus.Network have engaged in a strategic partnership with Hanhaa, an internet-of-things (IoT) innovator.

Together, Morpheus.Network and Hanhaa, provide supply chain managers with a complete Digital Footprint, providing shipment history and item visibility for optimizing safe and secure supply chains saving time and money. IoT provides the monitoring and tracking of assets and goods and blockchain provides an immutable record of truth for compliance events based on IoT data.

Blockchain alone does not utilize the advantages of the technology. Implementing emerging technologies with blockchain not only solves the visibility and traceability challenges in supply chain, but also facilitates connectivity and increases transparency. Blockchain systems will work solely with data automatically generated from physical IoT devices in the whole supply chain.

What are the clear business benefits?

1. Purchase Orders: ERP integrations such as SAP ensure that orders are captured digitally at source.

2. Digitize Regulatory Compliance and Shipping Documentation: Improved control and stakeholder accountability over complete process will reduce manual errors and costly delays such as demurrage, lowering OPEX and increasing profits.

3. High Precision Inventory at Scale: IoT gives you real time visibility throughout the supply chain leading to a reduction in working capital requirements.

4. Immutable Proof Of Delivery: Effectively close the shipment, link core financial processes such as billing and payments, accounts receivable, payments and credit letters to convert shipments into cash.

ParceLive Case Study: Wine and Spirits

Wine is not recession proof, but it is recession resistant. COVID-19 has witnessed huge swathes of us ordering our favourite wine and spirits to our front door.

We have seen an increase in the home consumption of wine, an increase in same-day delivery of food and alcohol, and higher levels of online wine sales from retailers and smaller wineries.

Since September 2018, TrackIQ have been a valued channel partner of Hanhaa, accumulating a number of ParceLive customers, all from varying industries.

This case study shall focus on one of TrackIQ's customers, Southern Glazer's Wine and Spirits, who is one of the largest wine and spirits distributors in the United States, with operations in 44 states.

Through the application of ParceLive, Southern Glazers is able to monitor their wine and spirits as they travel throughout the supply chain, ensuring that all beverages reach their intended destination in the desired condition.

The information below is a set of guidelines that should be followed in order for both wine and spirits to arrive at their end destination in suitable conditions.

Wine/Spirit Storage Conditions

Temperature:

- Temperatures higher than 70° F (21 degrees), can cause the wine to spoil, resulting in flat aromas and flavours. If the wine in transport is subject to such low temperatures that it begins to freeze, It could expand enough to push out the cork.
- Unlike white wines and champagne, spirits can and should be stored at room temperature.

Humidity:

- Humidity levels should ideally be between 50%-80% to prevent any damage being caused to the labels.

Orientation of bottles:

- Wine should be stored on its side in order to keep the liquid up against the cork which keeps the cork from drying out.
- Unlike wine, spirits should not be stored on their sides. Keeping your liquor down rather than standing it upright can cause the cork to mix and seep into the liquid, altering the high-alcohol content.

Impact & shock of bottles:

- Vibrations can damage the wine by speeding up the chemical reactions in the liquid. Significant vibrations could possibly disturb the sediment in older wines and keep them from settling.

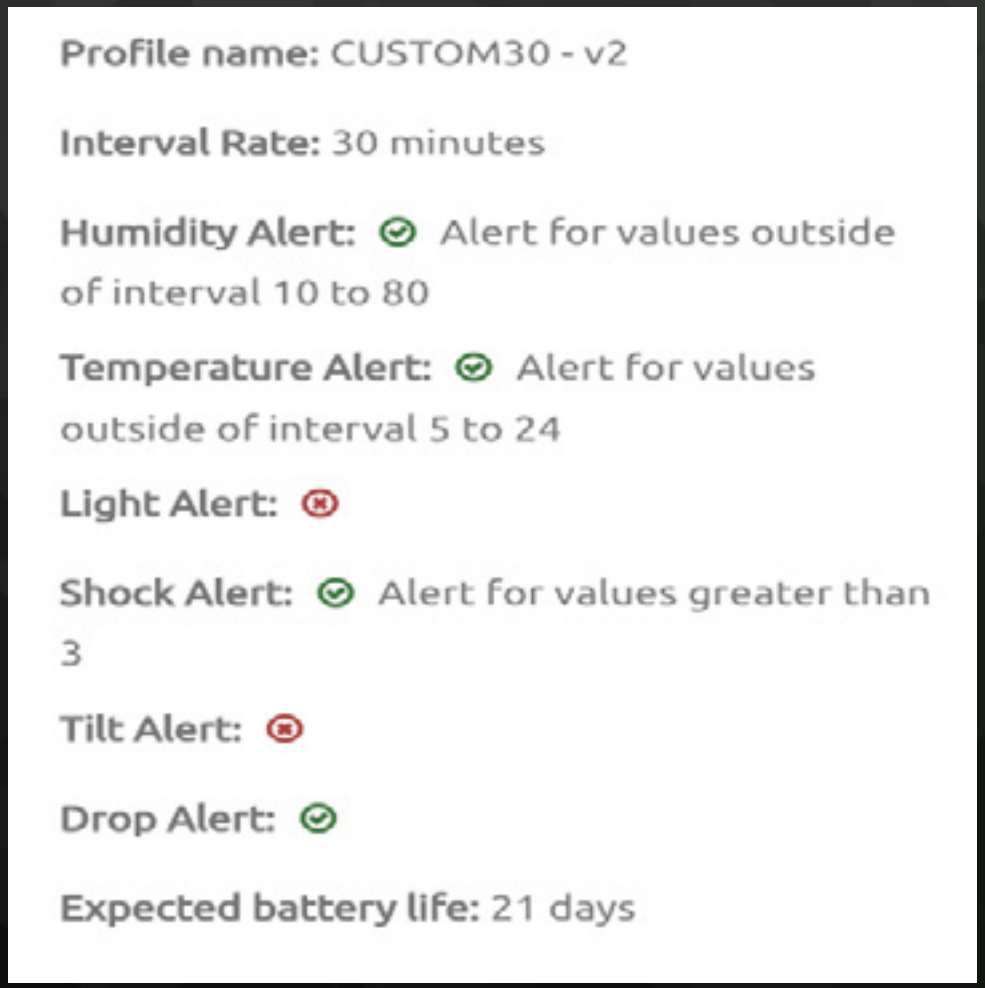
With so many variables to measure and constantly monitor, ParceLive and its smart sensor technology is able to provide the user with real-time data on the storage and transportation conditions listed above.

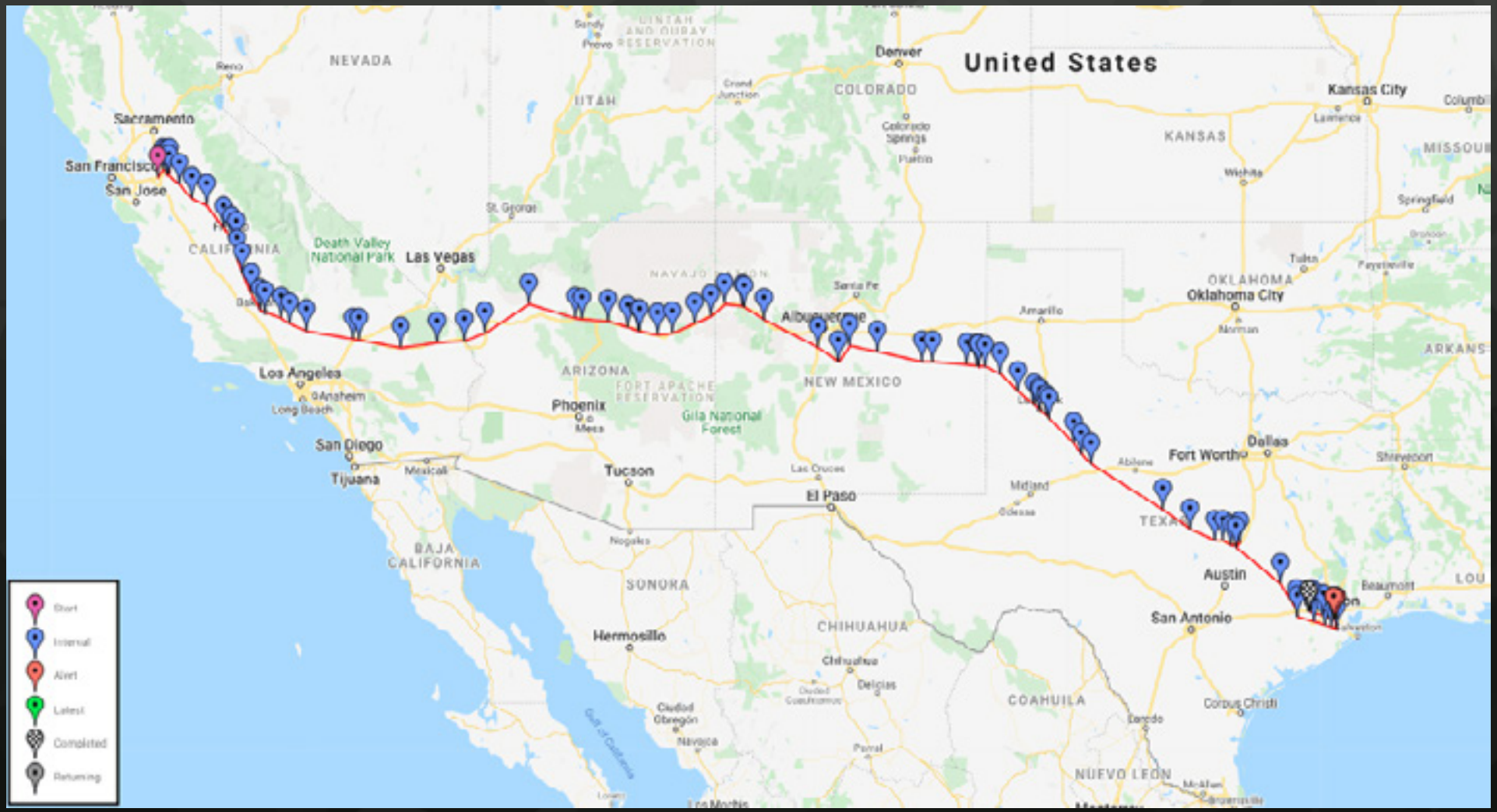
To ensure maximum security and visibility when transporting cargo, Hanhaa have developed a profiling feature so that customers can configure the sets of data that they want to be alerted on and determine the frequency at which this data is reported back to them.

The custom profile above is indicative of the nature of the cargo being transported.

The humidity, temperature and shock sensors have been set up in a way so that Southern Glazers will be alerted to environmental readings outside of defined parameters.

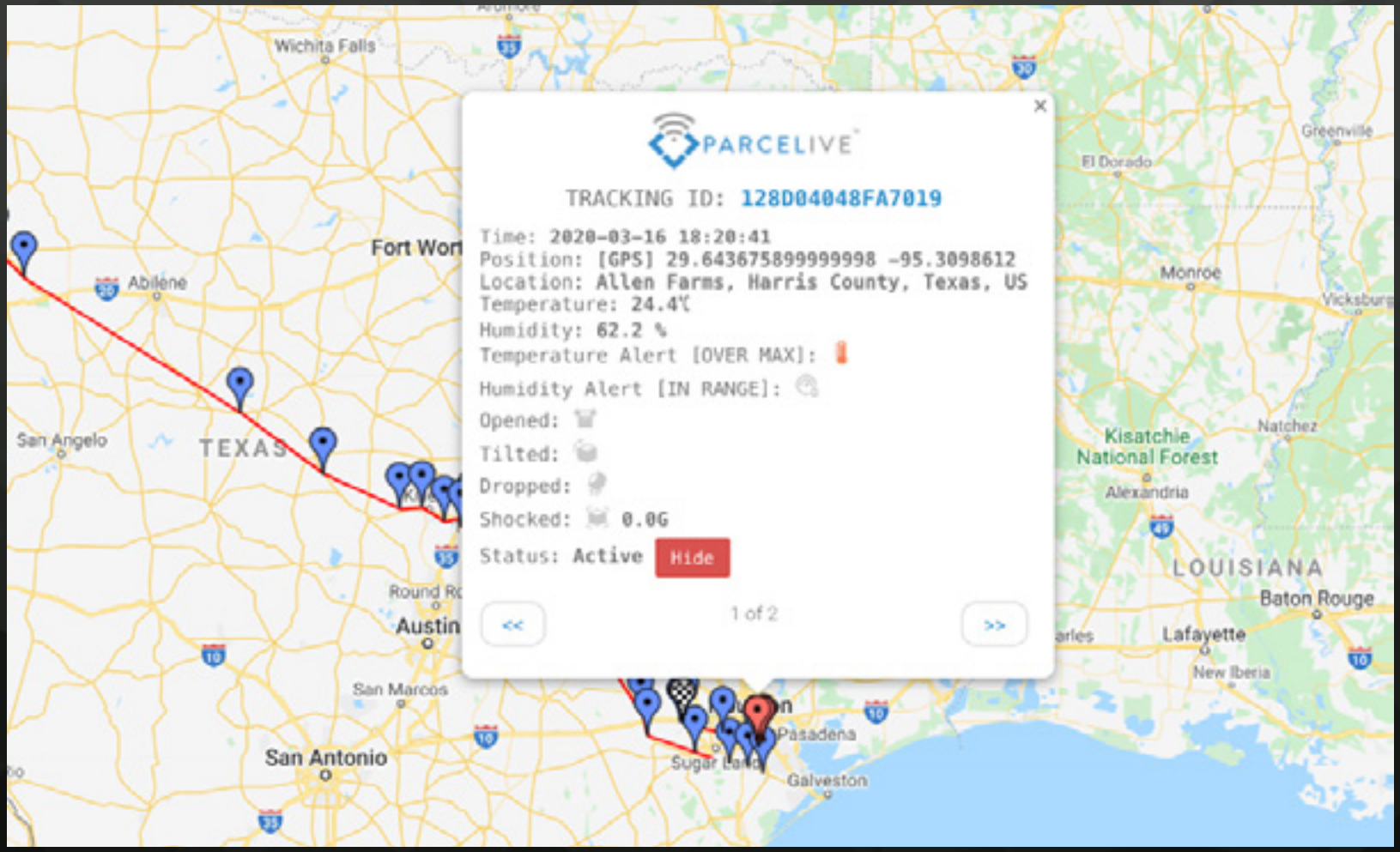
The custom profile has been programmed to report back on data every 30 minutes, allowing ample visibility into the conditions of the cargo as it travels throughout America.





The image above shows a recent wine and spirits shipment from San Francisco to Houston. As far as journeys go, this one was very uneventful which is of course ideal.

Once the shipment entered into the heart of Houston, a temperature alert was reported that may have had serious consequences for the integrity of the wine and spirits...



With ParceLive, food and beverage companies are able to monitor the entirety of the journey in-depth. As this particular journey reported very few alerts, Southern Glazers can feel confident in knowing that the route they took was most suitable and one that they will use again in the future.

The ParceLive data may also act as a testament to the professionalism of the shipping company that handled and transported the cargo.

Nevertheless, if anything were to go wrong that would jeopardise the wine and spirits in transit, the customer is now in a position to act quickly to ensure product integrity and to resolve any disputes around late or damaged goods.

Other supply chain routes may not be as uneventful as the one depicted above. If not, the ParceLive user has the ability to get in touch with the driver and immediately inform him of the damage that is being caused to the cargo.

Auditable data thus helps everyone to identify the facts behind late, non-delivery and damage disputes whilst shipping professionals can then identify pinch-points and inefficiencies in delivery networks to improve routing and select the best logistics suppliers.

ParceLive's service-based model means that users can collect data from the whole delivery supply chain.

Real-time alerts, stamped with time and location data, mean that delivery systems can create meaningful workflows to address improvements and deliver competitive advantage and/or new efficiencies to users.