

**From high street
to eStreet.**

Transforming
logistics.

**Nash
Tech.**

What's inside

Introduction 3

Three important industry trends 3



Going the 'last mile' in a sustainable way 4



Internet of Things (IoT) 6



Warehouse automation and AI 8

From infection to injection 10

Consider investing in technology 11

Summary 13

Logistics organisations face unprecedented transformation as consumer expectations change and new technologies emerge. Customers increasingly want to receive their goods faster, more flexibly, at a lower price and in a way that is least harmful to the environment. **Hyper-personalisation** of some manufactured goods is another growing trend that creates a unique set of supply chain and logistics issues. Fuelled by Covid lockdowns, the pressure on companies to find creative, cost-effective ways to transfer goods from A to B has never been greater.

Moving parcels sounds simple, but there is much that can go wrong. We have all experienced poor customer service or had a poor customer experience. Increasingly it is now the responsibility of the logistics partner to influence both. Too often, the consumer experience is 'lost in the post', or 'they sent the wrong thing', or 'I received two of them', or 'it arrived damaged', or 'it's not in stock'. Imagine the impact it would have on your brand if those poor experiences disappeared?

Emerging technology holds enormous potential for logistics companies willing to innovate. Finding a flexible technology partner that can help to optimise logistics and supply chains has become ever more critical to achieving a competitive advantage.

We look at key areas of disruption and opportunity in the logistics sector and outline four technology-led solutions that could help you to outpace the competition.

Three important industry trends

Market trends are significantly impacting the logistics sector. From exciting new technology to shifting regulations to changing customer expectations, here are our top three:



Trend 1
**Going the 'last mile'
in a sustainable way**



Going the 'last mile' in a sustainable way

If you have ever tracked a package that is 'out for delivery', you may not have received it as quickly as expected. This is typically because your goods share the final leg of the delivery journey with many others, also out for delivery. This 'last mile' involves traffic congestion, re-routing and multiple other stops along the way.

Jaguar Land Rover (JLR) invests in battery recycling technology

JLR aims to achieve net zero carbon emissions across its supply chain, operations and products by 2039. Recycling batteries is a key part of the plan to help them achieve this, enabling them to minimise waste and create a circular economy across the battery supply chain.

Their venture capital and mobility arm, InMotion Ventures, **has invested** in Battery Resourcers, a lithium ion battery recycling and materials company. Together they are creating an innovative closed-loop process that integrates battery recycling, refining and materials engineering to convert scrap end-of-life batteries into materials that can be used to make new batteries.

This leg of the trip is likely to be the most expensive — some estimates put it at 50% of the total cost — and the most time-consuming.

With Amazon now delivering goods in as little as two hours, organisations are searching for ways to deliver their own goods as fast as possible too. How can companies keep pace with customers' need for speed, as well as the growing environmental agenda? We take a look at different ways to optimise your last mile delivery process.

And as if the logistics industry needed further sharpening of their focus, original equipment manufacturers (OEM's) are now committing to net zero carbon emissions across many, if not all, parts of their business, including supply chain operations. **Here is a selection:**

- JLR — Supply Chain, Operations and Products by 2039
- British Airways net zero by 2050
- Microsoft net zero by 2030
- AstraZeneca carbon-negative by 2030
- Sainsbury's net zero emissions by 2040
- Apple net zero by 2030
- HMRC net zero by 2040
- Facebook net zero value chain by 2030
- NHS net zero by 2040
- BBC net zero by 2030



The UK Net Zero Carbon 2050 plan

The UK Government has legislated for a Net Zero Carbon 2050 plan. As a result, some last mile deliveries in urban areas will be affected by ZEZ's (Zero Emissions Zone), ULEZ's (Ultra Low Emission Zones), LEZ's (Low Emission Zones), and CAZ's (Clean Air Zone's). Logistics providers need to find new and innovative ways to deliver into these zones, such as autonomous vehicles, light vans, eCargo bikes, drones, and other battery or **hydrogen fuel cell powered vehicles**.

Cities that are planning this now:

- | | |
|--|--|
| ■ Bath
Bath's CAZ is live | ■ Leicester
CAZ expected in Summer 2021 |
| ■ Birmingham
CAZ is live | ■ Manchester
CAZ expected in Spring 2022 |
| ■ Bristol
CAZ expected in October 29, 2021 | ■ Newcastle
CAZ expected in 2021 |
| ■ London
ULEZ expansion expected in October 2021 | ■ Portsmouth
CAZ expected in November 2021 |
| ■ Bradford
CAZ expected in October 2021 | ■ Oxford
Zero Emissions Zone planned for Summer 2021 |

Source: www.fleetnews.co.uk

A photograph of several blue shipping containers stacked on top of each other. The containers are arranged in a way that shows multiple levels, with some containers in the foreground and others receding into the background. The sky is visible in the upper portion of the image, featuring soft, white clouds against a pale blue background. The lighting suggests it might be early morning or late afternoon, with a warm glow on the horizon. A red rectangular frame is overlaid on the left side of the image, enclosing the text.

Trend 2 **Internet of Things (IoT)**

Internet of Things (IoT)

IoT technology can be used to monitor the health of manufacturing equipment, fleets of ships and trucks, shipping containers, supply levels at warehouses, last mile delivery and even the people responsible for the efficiency at different parts in the supply chain. The result? A data-driven, results-focused supply chain, with optimised and cost effective processes, leading to an enhanced customer experience.

There are many ways that the internet of things will continue to positively impact logistics. Examples include:

- **In the warehouse** — real-time stock level monitoring, picking and packing, check and confirm, etc.
- **Efficient use of trucks** — predictive maintenance to reduce downtime of trucks, real-time location monitoring and rerouting according to traffic conditions, weather conditions, fuel costs, geography, etc.
- **Data integration** — interoperability of IoT-enabled devices with other business systems provides end-to-end transparency, from parts and supplies, through production, and all the way to final delivery. For example, using IoT-enabled scanners, sensors and transmitters, a factory can automatically alert the purchasing department when supplies are running low, or a supermarket can alert their fulfillment partner when shelf-stocks are reducing. This information can be sent to the supplier, automatically, triggering a resupply shipment.

Data from IoT-enabled trucks can inform the supplier about their exact arrival time, enabling the shipment to be processed in the most effective way. The same data can ensure real-time factory alerts to improve production efficiency.

IoT devices generate a staggering quantity of data — growing quickly and continuously; becoming so vast as to render the human brain virtually incapable of keeping up on its own. The World Economic Forum suggests that every connected vehicle creates four terabytes of new data every day, and there are estimated to be around three million vehicles on the UK's roads with embedded telematics. Step in automation, artificial intelligence and machine learning, all of which need to be implemented to make use of the data and to extract meaningful information from it.



Maersk containers bring you perfectly ripe bananas

Maersk is the world's largest container shipping organisation, handling around a fifth of the world's cargo. With a fleet of 700 vessels and four million containers, it also operates 78 terminals.

Over the last few years, Maersk realised that to compete in the long-term, it needs to significantly change its operations, transforming from a carrier of goods to delivering a complete supply chain solution. A digital transformation strategy would be the key enabler.

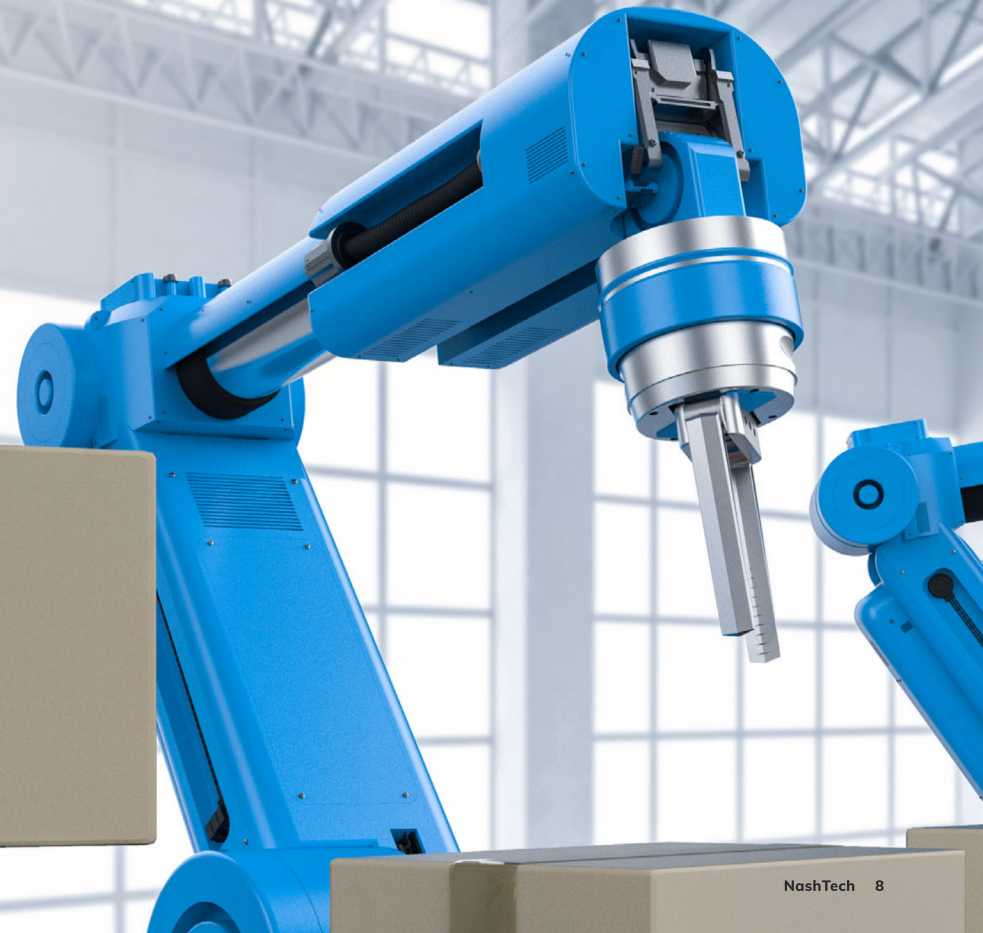
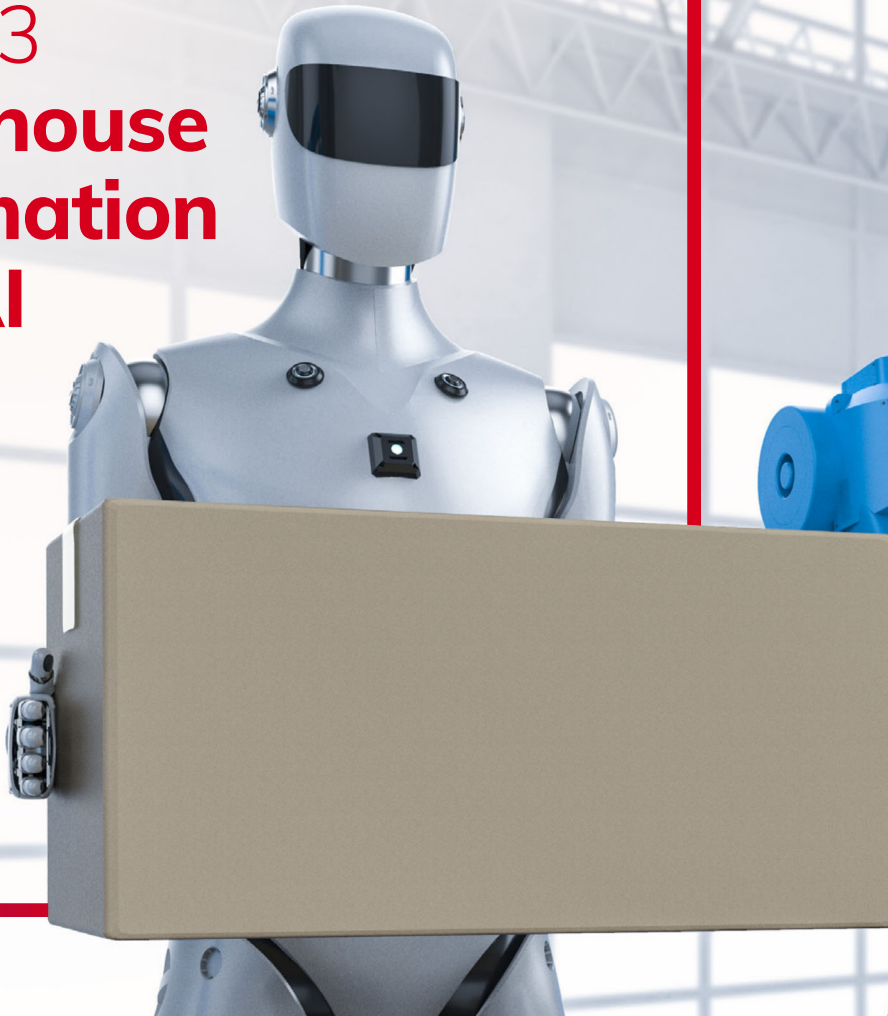
Part of the strategic solution involved the use of the Internet of Things (IoT) in 380,000 specialised refrigerator containers known as reefers. This enables customers to see

where their shipments are, and atmospheric parameters can be changed to enable medicine and food to be in perfect shape when they arrive at their destination. This includes the ability to adjust a reefer's oxygen and carbon dioxide levels so fruit and vegetable ripening can be accelerated or inhibited in line with the unique customer requirements. Data that is collected can also be used by Maersk to monitor equipment problems and improve service quality.

Digital services have enabled Maersk to become an end-to-end integrator of container logistics, a key market differentiator.

You can read more about this case study [here](#).

Trend 3
**Warehouse
automation
and AI**



Warehouse automation and AI

One of the fastest growth sectors in the wider property market is for warehouse space. Every extra £1bn spent online requires almost an additional 900,000 sq ft of logistics space, according to property company CBRE. Savills estimates that **investment into distribution warehouses reached £4.7bn in 2020**, 25% more than in 2019.

Warehouses typically involve a manual workforce, which can be expensive to recruit, motivate and retain. With machine-learning technologies and sensors that ensure accuracy and easy traceability, many tasks such as loading and unloading goods, monitoring stock, good-to-person picking, automated packing and stacking can be automated. This can significantly improve the efficiency and speed of warehouse processes. Amazon is a good example of **smart warehouse implementation in action**, giving millions of people what they need, when they want it in record time.

There are many different types of warehouse robots that offer a range of efficient business solutions. These include:

- 1. Automated storage and retrieval systems.** Typically comprising cranes that retrieve goods for shipment, this type of robot automates the inventory process.
- 2. Articulated robotic arms.** Robotic limbs with multiple joints lift and move warehouse items. This type of robot is typically used to move items from pallets to racks, for picking and packing and shipping.
- 3. Automated guided vehicles.** Self-driving forklifts and carts transport stock between warehouse locations. This type of robot relies on tracks or magnetic strips along planned travel paths, alongside camera vision technology or sensors to avoid obstacles.
- 4. Goods-to-person technology.** This type of robot delivers items to picking stations, where human operators complete orders as goods are delivered.
- 5. Autonomous mobile robots.** Relying on maps and sensors to create flexible routes by interpreting the environment, this type of robot transports goods throughout a warehouse autonomously. When used with radio frequency identification (RFID) tagged equipment, they can also conduct inventory counts at predetermined intervals.
- 6. Unmanned aerial vehicles or drones.** When equipped with RFID technology, this type of robot provides real time visibility of warehouse stock.



Mobile, automated case handling for more efficient warehouse operations

U.S. robotics company Boston Dynamics has recently unveiled a new robot called **Stretch**, designed to move boxes in a warehouse.

Stretch has a small mobile base that allows it to move around tight spaces in existing warehouses without having to reconfigure them for automation. It is equipped with an arm and a smart-gripper with advanced sensing and computer vision cameras that can identify and handle a large variety of boxed and shrink wrapped cases.

It can pick up boxes of 50 pounds (23 kilograms) and can move up to 800 cases per hour, making it a versatile and fast moving robot. The robot is designed to 'go where the work is' in a warehouse, unloading trucks, de-palleting shipments and eventually building orders.

From infection to injection.

How technology is supporting the logistics of vaccine roll out around the world.

Fewer challenges in healthcare this century have been as important as the race for the Covid-19 vaccine. And once the vaccine was approved late in 2020, efficient distribution was critical. The stakes couldn't have been higher. We have witnessed the most ambitious vaccination programme across the world, with the health and wealth of the global population in the balance.

To get the vaccine into people's arms as quickly as possible, a supply chain strategy and its delivery in practice has been key to success for governments across the world. This includes overall process design as well as the need to keep vaccines under certain conditions. The Pfizer vaccine is a good example. When kept between -60oC and -80oC, it has a maximum shelf life of six months. Once thawed, it will last for 120 hours in the fridge and two hours out. To facilitate the process, the strategy also needs to include specialist transport solutions and medical supplies, especially syringes. Of equal importance is the technology used to monitor and manage flows, the geographical distribution of stock and the availability of skilled people to administer the vaccine.

The Covid-19 vaccine supply chain typically involves many hand-offs between distributors and logistics organisations, and each hand-off increases the risk of delays or vaccine damage. Technology has been used to generate real-time visibility that reduces this risk. Radio frequency identification (RFID) mobile track and trace devices are helping to monitor vaccine shipments from the manufacturing plants to vaccine centres. IoT devices have been attached to vaccine containers during shipment, collecting precise location information and compiling it into simplified reports and graphs. This data triggers immediate alerts so that vaccine centers know when vaccines are arriving, in what quantity and if there are delays.

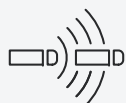
Technology has become a logistics game changer in our race to beat the pandemic, where every container delivered has the potential to save many lives.



Considering investing in technology to enhance your logistics operation?

Four emerging solutions for consideration.

Established logistics organisations and innovative, agile start-ups are capitalising on the volume of data and high level of transactions that are needed in the logistics industry to develop wide ranging technology-driven solutions. In a highly competitive marketplace with significant potential, we recommend that organisations take a close look at four technology-led solutions:



1. The journey towards fully autonomous vehicle platooning

Using technology, when trucks and vans drive in semi-autonomous convoys a short distance apart, a smoother traffic flow, improved safety, increased fuel efficiency and a reduction in carbon dioxide emissions is the result.

Platooning is the linking of two or more vehicles in a convoy, using connectivity technology and automated driving support systems. They are connected for certain parts of the journey, for example on motorways, where they automatically maintain a set distance between each other. With the vehicle at the front acting as the leader, the vehicles behind react and adapt to changes in its movement — requiring little to no action from drivers. At the moment, drivers remain in control all the time, so they can also decide to leave the platoon. **In the future, it is likely that vehicles will be completely autonomous.**



2. Drones and the 'last mile' parcel delivery

Unmanned aerial vehicles, commonly known as drones, have the potential to become a game changer in the logistics industry. By delivering items to specified locations, drones are increasingly used for delivery in the e-commerce, quick-service restaurants and healthcare sectors.

While major global industry players such as Amazon, Google, FedEx, UPS and DHL are developing drone delivery services worldwide to improve last mile delivery, it's not all plain sailing. Airspace regulations, package weight and the need for certain pilots are challenges.

Nevertheless, there are many examples of organisations who are trialling the

new technology. Domino's has started to **deliver pizza by drones** in New Zealand. Zipline is using drones to **deliver medicines faster** in Ghana and other parts of Africa. In the UK, drones are piloting **delivering essential medical supplies** across parts of Scotland, linking hospitals and GP surgeries with labs and distribution centres, and **delivering post from mainland UK to the Isles of Scilly**. With the green agenda in mind, the UK's first operationally-based, **low-carbon aviation test centre** is being established at Orkney's Kirkwall Airport.

Drones for potential use in delivering medical supplies will also be flown as part of the trial.

Considering investing in technology to enhance your logistics operation?



3. Autonomous vehicles and 'last mile' parcel delivery

Autonomous vehicles are being tested for home delivery. In this situation, an autonomous vehicle brings a package to a customer's house, and the customer needs to enter a code or use a smart device with NFC capabilities, to retrieve the package from a cargo hold.

In April 2021, Cleveron, a parcel delivery robotics developer, unveiled its new **unmanned last-mile delivery vehicle**, the Cleveron 701. As the first company in Europe granted a pilot license to operate this type of vehicle on public streets, Cleveron has been trialling the new vehicle across Estonia for many months, with mass production scheduled for 2023.

Packages are not the only thing that require last mile transportation — sometimes humans do too! In 2019, Toyota launched 20 specially-designed autonomous **'Tokyo 2020 Version' e-Palette vehicles**,

intended to provide a loop-line bus transportation service for the Olympic and Paralympic villages at the Olympic and Paralympic Games Tokyo 2020 that were postponed to 2021. The battery-electric, automated vehicles have been adapted specifically for use during the Games based in part on feedback from athletes about their mobility needs.

A recent demonstration of the vehicles by Toyota showed multiple e-Palletes autonomously driving on a course with many curves and stops. Each vehicle ran at equal intervals, and when they passed each other, the vehicle that came later gave way — as if the vehicles were having a conversation with each other. e-Palette operates based on prior planning, but if more people are waiting at the bus stop than anticipated, it modifies the schedule and automatically dispatches extra vehicles into service.



4. Internet of things and the sustainability agenda

The Paris agreement enforces a 45% reduction in carbon dioxide emissions in transportation by 2050. Achieving this will not be easy. Given that **global freight transportation is increasing every year and it is estimated to grow by 60% by 2050**, balancing speed, flexibility, cost and the carbon footprint is an ongoing challenge.

Logistics operators are increasingly using IoT technology to monitor, control and optimise their supply chains and goods. Ensuring efficient routes and avoiding traffic jams saves considerable amounts of fuel, especially for goods with long transport routes. The ability to track returnable and reusable

packaging and shipping materials can result in more streamlined operations, better efficiency and real cost savings. With a connected fleet of trucks, supply chains can reduce their carbon emissions while increasing their profit margins through energy savings.

These gains go beyond trucks and planes. With inventory management software and integrated IoT sensors, forklifts can be used more effectively as well, giving operators the ability to locate shipments, boxes and pallets in real time. On average, forklift operators are able to move up to 30% more freight per work shift, all while saving on fuel costs.

Summary

Imagine a world where a drone will drop your parcel, either at your home or in a nearby central location. Robots will automatically collect it, bring it to our homes and put it in our fridges. If that seems like a sci-fi film, it's time to think again. A revolution is taking place in the logistics sector.

Technology is transforming almost every part of the way logistics companies operate. To survive, organisations will need to be able to exploit a wide range of new technologies, from data analytics to artificial intelligence, automation and platform solutions.

According to **research** by transport intelligence (Ti), the global e-commerce logistics market grew by more than a quarter in 2020 — an estimated 27.3% — to around \$368 billion and is forecast to expand to \$557 billion by 2025.

It's no wonder then, that there is intense competition for market share, with technology giants such as Amazon investing in start-ups to innovate in last-mile delivery, while others, like SAP and Google, are investing heavily in big data analytics, artificial intelligence and machine learning.

At **NashTech**, we deliver solutions across the digital logistics spectrum with our agile, solution-focused approach, leveraging mainstream and emerging technologies to build custom software products that are robust, scalable and secure. As a trusted technology partner, we work in close collaboration with our customers to ensure they realise the value of the software we write, or that they already own. We are here to help. **Get in touch** today to find out more.

From high street to eStreet. Transforming logistics.



We are experts in technology, delivering smart solutions that solve business challenges and create value. Our award-winning teams apply deep expertise and passion to deliver complex IT projects globally.

 @NashTechHN

 NashTech

For more details, please send your enquiry to info@nashtechglobal.com or visit our website www.nashtechglobal.com



**Nash
Tech.**